

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**



## Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-74	CANYON 138 kV---COLDCREK 138 kV Ckt #1	Line PAHRUMP 138.0 to VISTA 138.0 Circuit 1	B	L-1	100%	52%	49%	Notice NVE. Consider operation solution to trip VEA loads as an interim mitigation before Charleston-Vista 138 kV line is in service
VEA-T-75	CANYON 138 kV---SNOW MTN 138 kV Ckt #1		B	L-1	101%	53%	50%	
VEA-T-76	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		B	L-1	102%	69%	65%	
VEA-T-77	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Circuit 1 0.00	B	L-1	93%	98%	107%	Develop higher emergency rating, upgrad the Pahrump 230/138 kV transformers, or add a new 230/138 kV source to supply the northern VEA system
VEA-T-78	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Circuit 2 0.00	B	L-1	93%	99%	107%	Develop higher emergency rating, upgrad the Pahrump 230/138 kV transformers, or add a new 230/138 kV source to supply the northern VEA system
VEA-T-79	CANYON 138 kV---COLDCREK 138 kV Ckt #1	Brkr Fail VISTA-PAHRUMP 138 & VISTA-CHARLESTON 138 1.000 CatC BKR Flt	C	Breaker Failure	NA	109%	96%	Collaborate with NVE to develop SPS to shed load prior to generation coming on line in VEA, or re-design bay positions for the two 138 kV lines at Vista 138 kV sub.
VEA-T-80	CANYON 138 kV---SNOW MTN 138 kV Ckt #1		C	Breaker Failure	NA	109%	97%	
VEA-T-81	COLDCREK 138 kV---RADAR 138 kV Ckt #1		C	Breaker Failure	NA	105%	91%	
VEA-T-82	IS TAP 138 kV---RADAR 138 kV Ckt #1		C	Breaker Failure	NA	104%	90%	
VEA-T-83	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	Breaker Failure	NA	110%	98%	

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					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-84	CANYON 138 kV---COLDCREK 138 kV Ckt #1	Brkr Fail PAHRUMP-VISTA 138 & PAHRUMP-GAMEBIRD 138 1.000 CatC BKR Flt	C	Breaker Failure	100%	90%	89%	Collaborate with NVE to develop SPS to shed load prior to generation coming on line in VEA, or re-design bay positions for the two 138 kV lines at Pahrump 138 kV sub.
VEA-T-85	CANYON 138 kV---SNOW MTN 138 kV Ckt #1		C	Breaker Failure	101%	91%	89%	
VEA-T-86	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	Breaker Failure	102%	92%	91%	
VEA-T-87	CANYON 138 kV---COLDCREK 138 kV Ckt #1	Line PAHRUMP 138.0 to VISTA 138.0 Ckt 1_Line GAMEBIRD 138.0 to THSNDIAIR 138.0 Ckt 1	C	L-1/L-1	100%	Not Solved	Not Solved	Notice NVE. Develop SPS to open the 138 kV tie with VEA at Lathrop under second contingency, or manually open the 138 kV tie with NVE at Lathrop after first contingency to isolate potential impact/blockout from the vicinity area (Zone 183/187)
VEA-T-88	CANYON 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	101%	Not Solved	Not Solved	
VEA-T-89	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	102%	Not Solved	Not Solved	
VEA-T-90	CANYON 138 kV---SNOW MTN 138 kV Ckt #1	Line PAHRUMP 138.0 to VISTA 138.0 Ckt 1_Line THSNDIAIR 138.0 to CHARLSTN 138.0 Ckt 1	C	L-1/L-1	101%	132%	118%	Notice NVE. Develop SPS to open the 138 kV tie with VEA at Lathrop under second contingency, or manually open the 138 kV tie with NVE at Lathrop after first contingency to isolate potential impact/blockout from the vicinity area (Zone 183/187)
VEA-T-91	IS TAP 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	96%	126%	111%	
VEA-T-92	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	102%	133%	119%	
VEA-T-93	CANYON 138 kV---COLDCREK 138 kV Ckt #1	Line NWEST 230.0 to DESERT VIEW 230.0 Ckt 1_Line PAHRUMP_1 230.0 to CRAZY EYE TP 230.0 Ckt 1	C	L-1/L-1	123%	128%	134%	Notice NVE. review existing UVLS to shed loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-T-94	COLDCREK 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	118%	123%	126%	
VEA-T-95	IS TAP 138 kV---MERCERYSW 138 kV Ckt #1		C	L-1/L-1	111%	115%	116%	
VEA-T-96	IS TAP 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	118%	123%	126%	
VEA-T-97	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	124%	130%	136%	

**Thermal Overloads**

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					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-98	COLDCREK 138 kV---RADAR 138 kV Ckt #1	Line NWEST 230.0 to DESERT VIEW 230.0 Ckt 1_Line CRAZY EYE TP 230.0 to BOB TAP 230.0 Ckt 1	C	L-1/L-1	117%	122%	125%	Notice NVE. review existing UVLS to shed loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-T-99	IS TAP 138 kV---MERCERYSW 138 kV Ckt #1		C	L-1/L-1	110%	114%	115%	
VEA-T-100	IS TAP 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	117%	122%	125%	
VEA-T-101	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	123%	129%	134%	
VEA-T-102	AMARGOSA 230 kV---AMARGOSA 138 kV Ckt #1	Line PAHRUMP_1 230.0 to DESERT VIEW 230.0 Ckt 1_Line PAHRUMP_1 230.0 to CRAZY EYE TP 230.0 Ckt 1	C	L-1/L-1	141%	153%	159%	Notice NVE. review existing UVLS to shed loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-T-103	CANYON 138 kV---COLDCREK 138 kV Ckt #1		C	L-1/L-1	129%	135%	142%	
VEA-T-104	CANYON 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	129%	135%	142%	
VEA-T-105	COLDCREK 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	123%	129%	134%	
VEA-T-106	IS TAP 138 kV---MERCERYSW 138 kV Ckt #1		C	L-1/L-1	116%	121%	123%	
VEA-T-107	IS TAP 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	123%	129%	133%	
VEA-T-108	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	130%	136%	143%	

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ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-109	AMARGOSA 230 kV---AMARGOSA 138 kV Ckt #1	Line PAHRUMP_1 230.0 to DESERT VIEW 230.0 Ckt 1_Line CRAZY EYE TP 230.0 to BOB TAP 230.0 Ckt 1	C	L-1/L-1	140%	151%	157%	Notice NVE. review existing UVLS to shed loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-T-110	CANYON 138 kV---COLDCREK 138 kV Ckt #1		C	L-1/L-1	127%	133%	140%	
VEA-T-111	CANYON 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	128%	133%	140%	
VEA-T-112	COLDCREK 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	122%	127%	132%	
VEA-T-113	IS TAP 138 kV---MERCERYSW 138 kV Ckt #1		C	L-1/L-1	115%	120%	122%	
VEA-T-114	IS TAP 138 kV---RADAR 138 kV Ckt #1		C	L-1/L-1	122%	127%	132%	
VEA-T-115	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	L-1/L-1	129%	134%	142%	
VEA-T-116	AMARGOSA 230 kV---AMARGOSA 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/T-1	141%	153%	159%	Notice NVE. review existing UVLS to shed loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-T-117	CANYON 138 kV---COLDCREK 138 kV Ckt #1		C	T-1/T-1	129%	135%	142%	
VEA-T-118	CANYON 138 kV---SNOW MTN 138 kV Ckt #1		C	T-1/T-1	129%	135%	142%	
VEA-T-119	COLDCREK 138 kV---RADAR 138 kV Ckt #1		C	T-1/T-1	123%	129%	133%	
VEA-T-120	IS TAP 138 kV---MERCERYSW 138 kV Ckt #1		C	T-1/T-1	116%	122%	123%	
VEA-T-121	IS TAP 138 kV---RADAR 138 kV Ckt #1		C	T-1/T-1	123%	129%	133%	
VEA-T-122	NWEST 138 kV---SNOW MTN 138 kV Ckt #1		C	T-1/T-1	130%	136%	143%	

**Thermal Overloads**

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-123	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Line AMARGOSA 138.0 to SANDY 138.0 Ckt 1_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00	C	T-1/L-1	107%	115%	118%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers
VEA-T-124	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Line AMARGOSA 138.0 to SANDY 138.0 Ckt 1_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/L-1	107%	115%	118%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers
VEA-T-125	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Line GAMEBIRD 138.0 to GAMEBIRD_PST 138.0 Ckt bp_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00	C	T-1/L-1	103%	111%	114%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers
VEA-T-126	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Line GAMEBIRD 138.0 to GAMEBIRD_PST 138.0 Ckt bp_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/L-1	103%	111%	114%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers
VEA-T-127	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Line SANDY 138.0 to GAMEBIRD_PST 138.0 Ckt 1_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00	C	T-1/L-1	103%	111%	114%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers
VEA-T-128	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Line SANDY 138.0 to GAMEBIRD_PST 138.0 Ckt 1_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/L-1	103%	111%	114%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers
VEA-T-129	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran AMARGOSA 230.00 to AMARGOSA 138.00 Ckt 1 0.00_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00	C	T-1/T-1	106%	114%	118%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers

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ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-130	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran AMARGOSA 230.00 to AMARGOSA 138.00 Ckt 1 0.00_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/T-1	107%	114%	118%	Develop higher emergency rating before upgrading the Pahrump 230/138 kV transformers
VEA-T-131	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Line IS TAP 138.0 to MERCYSW 138.0 Ckt 1	C	T-1/L-1	108%	112%	117%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-132	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Line CANYON 138.0 to COLDCREK 138.0 Ckt 1	C	T-1/L-1	115%	119%	127%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-133	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Line CANYON 138.0 to SNOW MTN 138.0 Ckt 1	C	T-1/L-1	115%	119%	127%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-134	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Line COLDCREK 138.0 to RADAR 138.0 Ckt 1	C	T-1/L-1	111%	116%	122%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers

**Thermal Overloads**

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-135	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Line IS TAP 138.0 to RADAR 138.0 Ckt 1	C	T-1/L-1	111%	116%	122%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-136	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Line N WEST 138.0 to SNOW MTN 138.0 Ckt 1	C	T-1/L-1	115%	120%	128%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-137	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00_Line IS TAP 138.0 to MERCRYSW 138.0 Ckt 1	C	T-1/L-1	108%	113%	117%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-138	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00_Line CANYON 138.0 to COLD CREK 138.0 Ckt 1	C	T-1/L-1	115%	120%	127%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-139	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00_Line CANYON 138.0 to SNOW MTN 138.0 Ckt 1	C	T-1/L-1	115%	120%	127%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers



**Thermal Overloads**

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-T-140	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00_Line COLDCREK 138.0 to RADAR 138.0 Ckt 1	C	T-1/L-1	111%	116%	122%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-141	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00_Line IS TAP 138.0 to RADAR 138.0 Ckt 1	C	T-1/L-1	111%	116%	122%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-142	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00_Line NWest 138.0 to SNOW MTN 138.0 Ckt 1	C	T-1/L-1	115%	121%	128%	Notice NVE. Work out operation plan with NVE if VEA can't develop higher emergency rating for Pahrump 230/138 kV transformers
VEA-T-143	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #2	Tran ELDORDO 500.0 to ELDORDO2 230.0 Ckt 1_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00	C	T-1/T-1	93%	103%	117%	Notice SCE. Develop higher emergency rating for Pahrump 230/138 kV transformers before upgrading them
VEA-T-144	PAHRUMP_1 230 kV---PAHRUMP 138 kV Ckt #1	Tran ELDORDO 500.0 to ELDORDO2 230.0 Ckt 1_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/T-1	93%	105%	117%	Notice SCE. Develop higher emergency rating for Pahrump 230/138 kV transformers before upgrading them



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## Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-156	BEATTY 138 kV Bus	Line PAHRUMP 138.0 to VISTA 138.0 Circuit 1	B	L-1	-6.47%	-0.92%	-0.85%	Consider higher voltage deviation criteria (7%) before Charleston-Vista 138 kV line in service while improving PF on distribution loads at Vista/Beatty or adding dynamic reactive power support.
VEA-VD-157	BONDGDTP 138 kV Bus		B	L-1	-6.47%	-0.92%	-0.85%	
VEA-VD-158	FRENCHMN 138 kV Bus		B	L-1	-5.58%	-0.79%	-0.73%	
VEA-VD-159	GROOM LK 138 kV Bus		B	L-1	-5.97%	-0.86%	-0.79%	
VEA-VD-160	JACKASSF 138 kV Bus		B	L-1	-6.28%	-0.90%	-0.84%	
VEA-VD-161	JOHNNIE 138 kV Bus		B	L-1	-7.20%	-0.95%	-0.88%	
VEA-VD-162	LTHRPWLS 138 kV Bus		B	L-1	-6.44%	-0.92%	-0.85%	
VEA-VD-163	MERCRYSW 138 kV Bus		B	L-1	-5.32%	-0.75%	-0.70%	
VEA-VD-164	MERCURY 138 kV Bus		B	L-1	-5.32%	-0.76%	-0.70%	
VEA-VD-165	NTSCANYN 138 kV Bus		B	L-1	-6.24%	-0.90%	-0.83%	
VEA-VD-166	RAINIER 138 kV Bus		B	L-1	-6.04%	-0.86%	-0.80%	
VEA-VD-167	STOCKADE 138 kV Bus		B	L-1	-6.12%	-0.89%	-0.81%	
VEA-VD-168	VALLEYNT 138 kV Bus		B	L-1	-5.97%	-0.86%	-0.79%	
VEA-VD-169	VALLEYTP 138 kV Bus		B	L-1	-6.53%	-0.93%	-0.86%	
VEA-VD-170	VALLEYVE 138 kV Bus		B	L-1	-6.53%	-0.93%	-0.86%	

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ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-171	VISTA 138 kV Bus		B	L-1	-7.21%	-0.91%	-0.83%	
VEA-VD-172	YUCCAFLT 138 kV Bus		B	L-1	-5.80%	-0.83%	-0.77%	
VEA-VD-173	CHARLSTN 138 kV Bus	Line PAHRUMP 138.0 to GAMEBIRD 138.0 Circuit 1	B	L-1	-13.19%	-1.60%	-1.30%	Consider higher voltage deviation criteria (7%) before Charleston-Vista 138 kV line in service while improving PF on distribution loads at Vista/Beatty and/or adding dynamic reactive power support.
VEA-VD-174	GAMEBIRD 138 kV Bus		B	L-1	-13.09%	-2.56%	-2.29%	
VEA-VD-175	SANDY 138 kV Bus		B	L-1	-10.46%	-2.03%	-1.79%	
VEA-VD-176	THSNDAIR 138 kV Bus		B	L-1	-13.14%	-2.28%	-2.01%	
VEA-VD-177	PAHRUMP_1 230 kV Bus	Line PAHRUMP_1 230.0 to CRAZY EYE TP 230.0 Circuit 1	B	L-1	-4.24%	-4.11%	-5.40%	May be waived due to non-load bus by requests, or consider higher voltage deviation criteria (7%)
VEA-VD-178	PAHRUMP_1 230 kV Bus	Line CRAZY EYE TP 230.0 to BOB TAP 230.0 Circuit 1	B	L-1	-3.68%	-3.54%	-5.06%	May be waived due to non-load bus by requests, or consider higher voltage deviation criteria (7%)
VEA-VD-179	CHARLSTN 138 kV Bus	Brkr Fail PAHRUMP-VISTA 138 & PAHRUMP-GAMEBIRD 138 1.000 CatC BKR Flt	C	Breaker Failure	-13.20%	-9.79%	-9.71%	Collaborate with NVE to develop SPS to shed load prior to generation coming on line in VEA, or re-design bay positions for the two 138 kV lines at Pahrump 138 kV sub.
VEA-VD-180	GAMEBIRD 138 kV Bus		C	Breaker Failure	-13.10%	-10.16%	-10.06%	
VEA-VD-181	GAMEBIRD_PST138 kV Bus		C	Breaker Failure	-13.09%	-10.16%	-10.04%	
VEA-VD-182	JOHNNIE 138 kV Bus		C	Breaker Failure	-7.16%	-9.18%	-9.16%	
VEA-VD-183	SANDY 138 kV Bus		C	Breaker Failure	-10.47%	-8.17%	-8.03%	
VEA-VD-184	THSNDAIR 138 kV Bus		C	Breaker Failure	-13.15%	-10.08%	-9.98%	

**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-185	VISTA 138 kV Bus		C	Breaker Failure	-7.17%	-9.44%	-9.40%	
VEA-VD-186	AMARGOSA 138 kV Bus	Line NWest 230.0 to DESERT VIEW 230.0 Ckt 1_Line PAHRUMP_1 230.0 to CRAZY EYE TP 230.0 Ckt 1	C	L-1/L-1	-6.50%	-6.97%	-7.82%	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-VD-187	BEATTY 138 kV Bus		C	L-1/L-1	-15.91%	-16.98%	-19.30%	
VEA-VD-188	BONDGDTP 138 kV Bus		C	L-1/L-1	-15.91%	-16.97%	-19.28%	
VEA-VD-189	CHARLSTN 138 kV Bus		C	L-1/L-1	-19.20%	-20.00%	-22.68%	
VEA-VD-190	DESERT VIEW 230 kV Bus		C	L-1/L-1	-24.05%	-26.14%	-27.25%	
VEA-VD-191	FRENCHMN 138 kV Bus		C	L-1/L-1	-12.64%	-13.54%	-15.15%	
VEA-VD-192	GAMEBIRD 138 kV Bus		C	L-1/L-1	-19.03%	-19.98%	-22.60%	
VEA-VD-193	GROOM LK 138 kV Bus		C	L-1/L-1	-13.65%	-14.62%	-16.41%	
VEA-VD-194	IND SPR 138 kV Bus		C	L-1/L-1	-7.07%	-7.66%	-8.38%	
VEA-VD-195	IS TAP 138 kV Bus		C	L-1/L-1	-7.07%	-7.66%	-8.37%	
VEA-VD-196	JACKASSF 138 kV Bus		C	L-1/L-1	-14.75%	-15.76%	-17.78%	
VEA-VD-197	JOHNNIE 138 kV Bus		C	L-1/L-1	-18.38%	-19.53%	-22.21%	
VEA-VD-198	LTHRPWLS 138 kV Bus		C	L-1/L-1	-15.83%	-16.88%	-19.18%	
VEA-VD-199	MERCRYSW 138 kV Bus		C	L-1/L-1	-12.00%	-12.86%	-14.36%	

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**

## Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-200	MERCURY 138 kV Bus		C	L-1/L-1	-12.00%	-12.87%	-14.36%	
VEA-VD-201	NTSCANYN 138 kV Bus		C	L-1/L-1	-14.59%	-15.59%	-17.58%	
VEA-VD-202	PAHRUMP 138 kV Bus		C	L-1/L-1	-19.68%	-20.70%	-23.41%	
VEA-VD-203	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-24.18%	-26.27%	-28.42%	
VEA-VD-204	RAINIER 138 kV Bus		C	L-1/L-1	-13.82%	-14.79%	-16.61%	
VEA-VD-205	SANDY 138 kV Bus		C	L-1/L-1	-15.58%	-16.47%	-18.55%	
VEA-VD-206	STOCKADE 138 kV Bus		C	L-1/L-1	-14.03%	-15.02%	-16.87%	
VEA-VD-207	THSNDAIR 138 kV Bus		C	L-1/L-1	-19.12%	-20.03%	-22.68%	
VEA-VD-208	VALLEYNT 138 kV Bus		C	L-1/L-1	-13.65%	-14.61%	-16.40%	
VEA-VD-209	VALLEYTP 138 kV Bus		C	L-1/L-1	-16.61%	-17.70%	-20.17%	
VEA-VD-210	VALLEYVE 138 kV Bus		C	L-1/L-1	-16.63%	-17.71%	-20.20%	
VEA-VD-211	VISTA 138 kV Bus		C	L-1/L-1	-18.73%	-19.88%	-22.57%	
VEA-VD-212	YUCCAFLT 138 kV Bus		C	L-1/L-1	-13.19%	-14.12%	-15.83%	
VEA-VD-213	DESERT VIEW 230 kV Bus		C	L-1/L-1	-24.05%	-26.14%	-27.25%	
VEA-VD-214	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-24.18%	-26.27%	-28.42%	

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**

## Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-215	CRAZY EYE TP230 kV Bus	Line N WEST 230.0 to DESERT VIEW 230.0 Ckt 1_Line CRAZY EYE TP 230.0 to BOB TAP 230.0 Ckt 1	C	L-1/L-1	-23.64%	-25.64%	-28.00%	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-VD-216	DESERT VIEW 230 kV Bus		C	L-1/L-1	-22.95%	-25.01%	-26.10%	
VEA-VD-217	LTHRPWLS 138 kV Bus		C	L-1/L-1	-15.06%	-16.07%	-18.31%	
VEA-VD-218	MERCRYSW 138 kV Bus		C	L-1/L-1	-11.47%	-12.31%	-13.76%	
VEA-VD-219	MERCURY 138 kV Bus		C	L-1/L-1	-11.48%	-12.32%	-13.76%	
VEA-VD-220	NTSCANYN 138 kV Bus		C	L-1/L-1	-13.92%	-14.89%	-16.82%	
VEA-VD-221	PAHRUMP 138 kV Bus		C	L-1/L-1	-18.62%	-19.59%	-22.23%	
VEA-VD-222	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-23.10%	-25.15%	-27.29%	
VEA-VD-223	RAINIER 138 kV Bus		C	L-1/L-1	-13.21%	-14.14%	-15.91%	
VEA-VD-224	STOCKADE 138 kV Bus		C	L-1/L-1	-13.41%	-14.36%	-16.16%	
VEA-VD-225	THSND AIR 138 kV Bus		C	L-1/L-1	-18.09%	-18.97%	-21.54%	
VEA-VD-226	VALLEYNT 138 kV Bus		C	L-1/L-1	-13.04%	-13.97%	-15.71%	
VEA-VD-227	VALLEYTP 138 kV Bus		C	L-1/L-1	-15.77%	-16.82%	-19.22%	
VEA-VD-228	VALLEYVE 138 kV Bus		C	L-1/L-1	-15.79%	-16.83%	-19.24%	
VEA-VD-229	VISTA 138 kV Bus		C	L-1/L-1	-17.73%	-18.83%	-21.44%	

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**

## Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-230	YUCCAFLT 138 kV Bus		C	L-1/L-1	-12.61%	-13.50%	-15.17%	
VEA-VD-231	CRAZY EYE TP230 kV Bus		C	L-1/L-1	-23.64%	-25.64%	-28.00%	
VEA-VD-232	DESERT VIEW 230 kV Bus		C	L-1/L-1	-22.95%	-25.01%	-26.10%	
VEA-VD-233	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-23.10%	-25.15%	-27.29%	
VEA-VD-234	BEATTY 138 kV Bus	Line PAHRUMP_1 230.0 to DESERT VIEW 230.0 Ckt 1_Line PAHRUMP_1 230.0 to CRAZY EYE TP 230.0 Ckt 1	C	L-1/L-1	-19.75%	-20.61%	-23.78%	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-VD-235	GROOM LK 138 kV Bus		C	L-1/L-1	-16.69%	-17.41%	-19.95%	
VEA-VD-236	JACKASSF 138 kV Bus		C	L-1/L-1	-18.13%	-18.91%	-21.73%	
VEA-VD-237	JOHNNIE 138 kV Bus		C	L-1/L-1	-23.08%	-24.07%	-27.65%	
VEA-VD-238	LTHRPWLS 138 kV Bus		C	L-1/L-1	-19.65%	-20.49%	-23.63%	
VEA-VD-239	MERCRYSW 138 kV Bus		C	L-1/L-1	-14.64%	-15.23%	-17.43%	
VEA-VD-240	MERCURY 138 kV Bus		C	L-1/L-1	-14.64%	-15.25%	-17.44%	
VEA-VD-241	NTSCANYN 138 kV Bus		C	L-1/L-1	-17.91%	-18.69%	-21.46%	
VEA-VD-242	PAHRUMP 138 kV Bus		C	L-1/L-1	-24.90%	-25.73%	-29.32%	
VEA-VD-243	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-29.43%	-31.35%	-34.06%	
VEA-VD-244	RAINIER 138 kV Bus		C	L-1/L-1	-16.90%	-17.62%	-20.20%	

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**

## Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-245	SANDY 138 kV Bus		C	L-1/L-1	-19.63%	-20.37%	-23.18%	
VEA-VD-246	STOCKADE 138 kV Bus		C	L-1/L-1	-17.16%	-17.91%	-20.53%	
VEA-VD-247	THSNDAIR 138 kV Bus		C	L-1/L-1	-24.17%	-24.87%	-28.40%	
VEA-VD-248	VALLEYNT 138 kV Bus		C	L-1/L-1	-16.68%	-17.40%	-19.94%	
VEA-VD-249	VALLEYTP 138 kV Bus		C	L-1/L-1	-20.76%	-21.66%	-25.00%	
VEA-VD-250	VALLEYVE 138 kV Bus		C	L-1/L-1	-20.78%	-21.68%	-25.03%	
VEA-VD-251	VISTA 138 kV Bus		C	L-1/L-1	-23.65%	-24.66%	-28.23%	
VEA-VD-252	YUCCAFLT 138 kV Bus		C	L-1/L-1	-16.11%	-16.79%	-19.24%	
VEA-VD-253	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-29.43%	-31.35%	-34.06%	
VEA-VD-254	BEATTY 138 kV Bus		C	L-1/L-1	-19.03%	-19.83%	-22.88%	
VEA-VD-255	GROOM LK 138 kV Bus		C	L-1/L-1	-16.12%	-16.79%	-19.25%	
VEA-VD-256	JACKASSF 138 kV Bus		C	L-1/L-1	-17.50%	-18.22%	-20.94%	
VEA-VD-257	JOHNNIE 138 kV Bus		C	L-1/L-1	-22.19%	-23.12%	-26.56%	
VEA-VD-258	LTHRPWLS 138 kV Bus		C	L-1/L-1	-18.93%	-19.72%	-22.74%	
VEA-VD-259	MERCRYSW 138 kV Bus		C	L-1/L-1	-14.14%	-14.70%	-16.82%	



**Voltage Deviations**

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-260	MERCURY 138 kV Bus	Line PAHRUMP_1 230.0 to DESERT VIEW 230.0 Ckt 1_Line CRAZY EYE TP 230.0 to BOB TAP 230.0 Ckt 1	C	L-1/L-1	-14.15%	-14.71%	-16.82%	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-VD-261	NTSCANYN 138 kV Bus		C	L-1/L-1	-17.29%	-18.01%	-20.68%	
VEA-VD-262	PAHRUMP 138 kV Bus		C	L-1/L-1	-23.91%	-24.69%	-28.15%	
VEA-VD-263	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-28.44%	-30.30%	-32.94%	
VEA-VD-264	RAINIER 138 kV Bus		C	L-1/L-1	-16.32%	-16.99%	-19.48%	
VEA-VD-265	SANDY 138 kV Bus		C	L-1/L-1	-18.88%	-19.57%	-22.26%	
VEA-VD-266	STOCKADE 138 kV Bus		C	L-1/L-1	-16.58%	-17.27%	-19.80%	
VEA-VD-267	THSND AIR 138 kV Bus		C	L-1/L-1	-23.22%	-23.87%	-27.26%	
VEA-VD-268	VALLEYNT 138 kV Bus		C	L-1/L-1	-16.11%	-16.78%	-19.23%	
VEA-VD-269	VALLEYTP 138 kV Bus		C	L-1/L-1	-19.98%	-20.82%	-24.04%	
VEA-VD-270	VALLEYVE 138 kV Bus		C	L-1/L-1	-20.00%	-20.83%	-24.07%	
VEA-VD-271	VISTA 138 kV Bus		C	L-1/L-1	-22.73%	-23.66%	-27.11%	
VEA-VD-272	YUCCAFLT 138 kV Bus		C	L-1/L-1	-15.57%	-16.19%	-18.56%	
VEA-VD-273	CRAZY EYE TP230 kV Bus		C	L-1/L-1	-28.99%	-30.79%	-33.66%	
VEA-VD-274	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-28.44%	-30.30%	-32.94%	

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**

## Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-275	BEATTY 138 kV Bus	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/T-1	-19.60%	-20.88%	-23.57%	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-VD-276	BONDGDTP 138 kV Bus		C	T-1/T-1	-19.59%	-20.87%	-23.55%	
VEA-VD-277	CHARLSTN 138 kV Bus		C	T-1/T-1	-24.13%	-25.05%	-28.19%	
VEA-VD-278	FRENCHMN 138 kV Bus		C	T-1/T-1	-15.28%	-16.35%	-18.20%	
VEA-VD-279	GAMEBIRD 138 kV Bus		C	T-1/T-1	-23.91%	-25.03%	-28.10%	
VEA-VD-280	GROOM LK 138 kV Bus		C	T-1/T-1	-16.54%	-17.69%	-19.75%	
VEA-VD-281	JACKASSF 138 kV Bus		C	T-1/T-1	-17.97%	-19.19%	-21.52%	
VEA-VD-282	JOHNNIE 138 kV Bus		C	T-1/T-1	-22.93%	-24.31%	-27.44%	
VEA-VD-283	LTHRPWLS 138 kV Bus		C	T-1/T-1	-19.49%	-20.76%	-23.42%	
VEA-VD-284	MERCRYSW 138 kV Bus		C	T-1/T-1	-14.48%	-15.51%	-17.23%	
VEA-VD-285	MERCURY 138 kV Bus		C	T-1/T-1	-14.49%	-15.53%	-17.24%	
VEA-VD-286	NTSCANYN 138 kV Bus		C	T-1/T-1	-17.76%	-18.96%	-21.25%	
VEA-VD-287	PAHRUMP 138 kV Bus		C	T-1/T-1	-24.75%	-25.95%	-29.12%	
VEA-VD-288	RAINIER 138 kV Bus		C	T-1/T-1	-16.74%	-17.90%	-20.00%	
VEA-VD-289	SANDY 138 kV Bus		C	T-1/T-1	-19.51%	-20.54%	-23.01%	

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**

## Voltage Deviations



ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-VD-290	STOCKADE 138 kV Bus		C	T-1/T-1	-17.01%	-18.19%	-20.32%	
VEA-VD-291	THSND AIR 138 kV Bus		C	T-1/T-1	-24.03%	-25.09%	-28.20%	
VEA-VD-292	VALLEYNT 138 kV Bus		C	T-1/T-1	-16.53%	-17.68%	-19.74%	
VEA-VD-293	VALLEYTP 138 kV Bus		C	T-1/T-1	-20.61%	-21.92%	-24.79%	
VEA-VD-294	VALLEYVE 138 kV Bus		C	T-1/T-1	-20.63%	-21.94%	-24.82%	
VEA-VD-295	VISTA 138 kV Bus		C	T-1/T-1	-23.51%	-24.89%	-28.03%	
VEA-VD-296	YUCCAFLT 138 kV Bus		C	T-1/T-1	-15.96%	-17.07%	-19.04%	
VEA-VD-297	BOB TAP 230 kV Bus	Tran ELDORDO 500.0 to ELDORDO2 230.0 Ckt 1_Line MEAD S 230.0 to BOB TAP 230.0 Ckt 1	C	L-1/L-1	-2.66%	-11.31%	-11.55%	Notice SCE. Modify Ivanpah-Eldorado SPS identified in GIP, or apply congestion management to curtail generation after first contingency
VEA-VD-298	ELDORDO2 230 kV Bus		C	L-1/L-1	0.00%	-11.14%	-11.47%	
VEA-VD-299	PAHRUMP_1 230 kV Bus		C	L-1/L-1	-1.65%	-10.44%	-10.19%	

# 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - Summer Peak without renewables**

High/Low Voltage



ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-V-139	CHARLSTN 138 kV Bus	Line PAHRUMP 138.0 to GAMEBIRD 138.0 Circuit 1	B	L-1	0.89	1.00	1.00	Adjust NLTC of Amargosa 230/138 kV transformer if doable. If not, new Charleston-Vista 138 kV line will fix it
VEA-V-140	GAMEBIRD 138 kV Bus		B	L-1	0.89	1.00	1.00	
VEA-V-141	THSND AIR 138 kV Bus		B	L-1	0.89	1.00	1.00	
VEA-V-142	CHARLSTN 138 kV Bus	Brkr Fail PAHRUMP-VISTA 138 & PAHRUMP-GAMEBIRD 138 1.000 CatC BKR Fit	C	Breaker Failure	0.89	0.92	0.92	Collaborate with NVE to develop SPS to shed load prior to generation coming on line in VEA, or re-arrange bay positions for the two 138 kV lines at Pahrump 138 kV sub.
VEA-V-143	GAMEBIRD 138 kV Bus		C	Breaker Failure	0.89	0.92	0.92	
VEA-V-144	GAMEBIRD_PST138 kV Bus		C	Breaker Failure	0.89	0.92	0.92	
VEA-V-145	THSND AIR 138 kV Bus		C	Breaker Failure	0.89	0.92	0.92	
VEA-V-146	BEATTY 138 kV Bus	Line N WEST 230.0 to DESERT VIEW 230.0 Ckt 1_Line PAHRUMP_1 230.0 to CRAZY EYE TP 230.0 Ckt 1	C	L-1/L-1	0.86	0.85	0.83	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-V-147	BONDGDTP 138 kV Bus		C	L-1/L-1	0.86	0.85	0.83	
VEA-V-148	CHARLSTN 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-149	DESERT VIEW 230 kV Bus		C	L-1/L-1	0.76	0.75	0.72	
VEA-V-150	FRENCHMN 138 kV Bus		C	L-1/L-1	0.89	0.88	0.87	
VEA-V-151	GAMEBIRD 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-152	GROOM LK 138 kV Bus		C	L-1/L-1	0.89	0.88	0.86	
VEA-V-153	JACKASSF 138 kV Bus		C	L-1/L-1	0.87	0.86	0.85	
VEA-V-154	JOHNNIE 138 kV Bus		C	L-1/L-1	0.84	0.83	0.80	
VEA-V-155	LTHRPWLS 138 kV Bus		C	L-1/L-1	0.87	0.86	0.83	
VEA-V-156	MERCRYSW 138 kV Bus		C	L-1/L-1	0.89	0.89	0.88	
VEA-V-157	MERCURY 138 kV Bus		C	L-1/L-1	0.89	0.89	0.88	
VEA-V-158	NTSCANYN 138 kV Bus		C	L-1/L-1	0.87	0.87	0.85	
VEA-V-159	PAHRUMP 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-160	PAHRUMP_1 230 kV Bus		C	L-1/L-1	0.75	0.74	0.71	
VEA-V-161	RAINIER 138 kV Bus		C	L-1/L-1	0.88	0.88	0.86	
VEA-V-162	SANDY 138 kV Bus		C	L-1/L-1	0.86	0.85	0.83	
VEA-V-163	THSND AIR 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-164	VALLEYNT 138 kV Bus		C	L-1/L-1	0.89	0.88	0.86	
VEA-V-165	VALLEYTP 138 kV Bus		C	L-1/L-1	0.86	0.85	0.82	

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-V-166	VALLEYVE 138 kV Bus		C	L-1/L-1	0.86	0.85	0.82	
VEA-V-167	VISTA 138 kV Bus		C	L-1/L-1	0.84	0.82	0.79	
VEA-V-168	YUCCAFLT 138 kV Bus		C	L-1/L-1	0.89	0.88	0.87	
VEA-V-169	DESERT VIEW 230 kV Bus		C	L-1/L-1	0.76	0.75	0.72	
VEA-V-170	PAHRUMP_1 230 kV Bus		C	L-1/L-1	0.75	0.74	0.71	
VEA-V-171	BEATTY 138 kV Bus	Line NWest 230.0 to DESERT VIEW 230.0 Ckt 1_Line CRAZY EYE TP 230.0 to BOB TAP 230.0 Ckt 1	C	L-1/L-1	0.87	0.86	0.84	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-V-172	BONDGDTP 138 kV Bus		C	L-1/L-1	0.87	0.86	0.84	
VEA-V-173	CHARLSTN 138 kV Bus		C	L-1/L-1	0.84	0.83	0.80	
VEA-V-174	CRAZY EYE TP230 kV Bus		C	L-1/L-1	0.77	0.76	0.73	
VEA-V-175	DESERT VIEW 230 kV Bus		C	L-1/L-1	0.77	0.76	0.73	
VEA-V-176	FRENCHMN 138 kV Bus		C	L-1/L-1	0.90	0.89	0.88	
VEA-V-177	GAMEBIRD 138 kV Bus		C	L-1/L-1	0.84	0.83	0.81	
VEA-V-178	GROOM LK 138 kV Bus		C	L-1/L-1	0.89	0.88	0.87	
VEA-V-179	JACKASSF 138 kV Bus		C	L-1/L-1	0.88	0.87	0.85	
VEA-V-180	JOHNNIE 138 kV Bus		C	L-1/L-1	0.85	0.84	0.81	
VEA-V-181	LTHRPWLS 138 kV Bus		C	L-1/L-1	0.87	0.86	0.84	
VEA-V-182	MERCRYSW 138 kV Bus		C	L-1/L-1	0.90	0.89	0.88	
VEA-V-183	MERCURY 138 kV Bus		C	L-1/L-1	0.90	0.89	0.88	
VEA-V-184	NTSCANYN 138 kV Bus		C	L-1/L-1	0.88	0.87	0.86	
VEA-V-185	PAHRUMP 138 kV Bus		C	L-1/L-1	0.84	0.83	0.80	
VEA-V-186	PAHRUMP_1 230 kV Bus		C	L-1/L-1	0.77	0.75	0.73	
VEA-V-187	RAINIER 138 kV Bus		C	L-1/L-1	0.89	0.88	0.87	
VEA-V-188	SANDY 138 kV Bus		C	L-1/L-1	0.87	0.86	0.84	
VEA-V-189	THSNDALR 138 kV Bus		C	L-1/L-1	0.84	0.83	0.80	
VEA-V-190	VALLEYNT 138 kV Bus		C	L-1/L-1	0.89	0.88	0.87	
VEA-V-191	VALLEYTP 138 kV Bus		C	L-1/L-1	0.87	0.86	0.83	
VEA-V-192	VALLEYVE 138 kV Bus		C	L-1/L-1	0.87	0.86	0.83	
VEA-V-193	VISTA 138 kV Bus		C	L-1/L-1	0.85	0.83	0.81	
VEA-V-194	YUCCAFLT 138 kV Bus		C	L-1/L-1	0.89	0.89	0.87	
VEA-V-195	CRAZY EYE TP230 kV Bus		C	L-1/L-1	0.77	0.76	0.73	
VEA-V-196	DESERT VIEW 230 kV Bus		C	L-1/L-1	0.77	0.76	0.73	

**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-V-197	PAHRUMP_1 230 kV Bus	Line PAHRUMP_1 230.0 to DESERT VIEW 230.0 Ckt 1_Line PAHRUMP_1 230.0 to CRAZY EYE TP 230.0 Ckt 1	C	L-1/L-1	0.77	0.75	0.73	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-V-198	BEATTY 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-199	BONDGDTP 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-200	CHARLSTN 138 kV Bus		C	L-1/L-1	0.77	0.77	0.73	
VEA-V-201	FRENCHMN 138 kV Bus		C	L-1/L-1	0.86	0.86	0.84	
VEA-V-202	GAMEBIRD 138 kV Bus		C	L-1/L-1	0.78	0.77	0.74	
VEA-V-203	GROOM LK 138 kV Bus		C	L-1/L-1	0.86	0.85	0.83	
VEA-V-204	JACKASSF 138 kV Bus		C	L-1/L-1	0.84	0.83	0.81	
VEA-V-205	JOHNNIE 138 kV Bus		C	L-1/L-1	0.80	0.78	0.75	
VEA-V-206	LTHRPWLS 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-207	MERCRYSW 138 kV Bus		C	L-1/L-1	0.87	0.86	0.85	
VEA-V-208	MERCURY 138 kV Bus		C	L-1/L-1	0.87	0.86	0.85	
VEA-V-209	NTSCANYN 138 kV Bus		C	L-1/L-1	0.84	0.84	0.81	
VEA-V-210	PAHRUMP 138 kV Bus		C	L-1/L-1	0.78	0.77	0.73	
VEA-V-211	PAHRUMP_1 230 kV Bus		C	L-1/L-1	0.70	0.69	0.66	
VEA-V-212	RAINIER 138 kV Bus		C	L-1/L-1	0.85	0.85	0.83	
VEA-V-213	SANDY 138 kV Bus		C	L-1/L-1	0.82	0.81	0.78	
VEA-V-214	THSND AIR 138 kV Bus		C	L-1/L-1	0.78	0.77	0.73	
VEA-V-215	VALLEYNT 138 kV Bus		C	L-1/L-1	0.86	0.85	0.83	
VEA-V-216	VALLEYTP 138 kV Bus		C	L-1/L-1	0.82	0.81	0.78	
VEA-V-217	VALLEYVE 138 kV Bus		C	L-1/L-1	0.82	0.81	0.77	
VEA-V-218	VISTA 138 kV Bus		C	L-1/L-1	0.79	0.78	0.74	
VEA-V-219	YUCCAFLT 138 kV Bus		C	L-1/L-1	0.86	0.85	0.83	
VEA-V-220	PAHRUMP_1 230 kV Bus		C	L-1/L-1	0.70	0.69	0.66	
VEA-V-221	BEATTY 138 kV Bus		C	L-1/L-1	0.83	0.82	0.80	
VEA-V-222	BONDGDTP 138 kV Bus		C	L-1/L-1	0.83	0.83	0.80	
VEA-V-223	CHARLSTN 138 kV Bus		C	L-1/L-1	0.78	0.78	0.75	
VEA-V-224	CRAZY EYE TP230 kV Bus		C	L-1/L-1	0.71	0.70	0.67	
VEA-V-225	FRENCHMN 138 kV Bus		C	L-1/L-1	0.87	0.87	0.85	
VEA-V-226	GAMEBIRD 138 kV Bus		C	L-1/L-1	0.79	0.78	0.75	
VEA-V-227	GROOM LK 138 kV Bus		C	L-1/L-1	0.86	0.86	0.84	

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-V-228	JACKASSF 138 kV Bus	Line PAHRUMP_1 230.0 to DESERT VIEW 230.0 Ckt 1_Line CRAZY EYE TP 230.0 to BOB TAP 230.0 Ckt 1	C	L-1/L-1	0.84	0.84	0.81	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-V-229	JOHNNIE 138 kV Bus		C	L-1/L-1	0.80	0.79	0.76	
VEA-V-230	LTHRPWLS 138 kV Bus		C	L-1/L-1	0.83	0.83	0.80	
VEA-V-231	MERCRYSW 138 kV Bus		C	L-1/L-1	0.87	0.87	0.85	
VEA-V-232	MERCURY 138 kV Bus		C	L-1/L-1	0.87	0.87	0.85	
VEA-V-233	NTSCANYN 138 kV Bus		C	L-1/L-1	0.85	0.84	0.82	
VEA-V-234	PAHRUMP 138 kV Bus		C	L-1/L-1	0.79	0.78	0.74	
VEA-V-235	PAHRUMP_1 230 kV Bus		C	L-1/L-1	0.71	0.70	0.67	
VEA-V-236	RAINIER 138 kV Bus		C	L-1/L-1	0.86	0.85	0.83	
VEA-V-237	SANDY 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-238	THSND AIR 138 kV Bus		C	L-1/L-1	0.79	0.78	0.75	
VEA-V-239	VALLEYNT 138 kV Bus		C	L-1/L-1	0.86	0.86	0.84	
VEA-V-240	VALLEYTP 138 kV Bus		C	L-1/L-1	0.83	0.82	0.79	
VEA-V-241	VALLEYVE 138 kV Bus		C	L-1/L-1	0.83	0.82	0.78	
VEA-V-242	VISTA 138 kV Bus		C	L-1/L-1	0.80	0.79	0.75	
VEA-V-243	YUCCAFLT 138 kV Bus		C	L-1/L-1	0.87	0.86	0.84	
VEA-V-244	CRAZY EYE TP230 kV Bus		C	L-1/L-1	0.71	0.70	0.67	
VEA-V-245	PAHRUMP_1 230 kV Bus		C	L-1/L-1	0.71	0.70	0.67	
VEA-V-246	BEATTY 138 kV Bus	Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 1 0.00_Tran PAHRUMP_1 230.00 to PAHRUMP 138.00 Ckt 2 0.00	C	T-1/T-1	0.83	0.81	0.79	Review existing UVLS to shed VEA loads, or operate the 138 kV system in radial with two independent supplies from Amargosa and Pahrump after first contingency to isolate potential impact on the vicinity area (Zone 183/187)
VEA-V-247	BONDGDTP 138 kV Bus		C	T-1/T-1	0.83	0.81	0.79	
VEA-V-248	CHARLSTN 138 kV Bus		C	T-1/T-1	0.78	0.77	0.74	
VEA-V-249	FRENCHMN 138 kV Bus		C	T-1/T-1	0.87	0.86	0.84	
VEA-V-250	GAMEBIRD 138 kV Bus		C	T-1/T-1	0.78	0.77	0.74	
VEA-V-251	GROOM LK 138 kV Bus		C	T-1/T-1	0.86	0.85	0.83	
VEA-V-252	JACKASSF 138 kV Bus		C	T-1/T-1	0.84	0.83	0.81	
VEA-V-253	JOHNNIE 138 kV Bus		C	T-1/T-1	0.80	0.78	0.75	
VEA-V-254	LTHRPWLS 138 kV Bus		C	T-1/T-1	0.83	0.82	0.79	
VEA-V-255	MERCRYSW 138 kV Bus		C	T-1/T-1	0.87	0.86	0.85	
VEA-V-256	MERCURY 138 kV Bus		C	T-1/T-1	0.87	0.86	0.85	
VEA-V-257	NTSCANYN 138 kV Bus		C	T-1/T-1	0.84	0.83	0.81	
VEA-V-258	PAHRUMP 138 kV Bus		C	T-1/T-1	0.78	0.77	0.73	



**High/Low Voltage**

ID	Substation	Worst Contingency	Category	Category Description	Voltage (PU)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	
VEA-V-259	RAINIER 138 kV Bus		C	T-1/T-1	0.86	0.85	0.83	
VEA-V-260	SANDY 138 kV Bus		C	T-1/T-1	0.82	0.81	0.78	
VEA-V-261	THSNDAIR 138 kV Bus		C	T-1/T-1	0.78	0.77	0.74	
VEA-V-262	VALLEYNT 138 kV Bus		C	T-1/T-1	0.86	0.85	0.83	
VEA-V-263	VALLEYTP 138 kV Bus		C	T-1/T-1	0.82	0.81	0.78	
VEA-V-264	VALLEYVE 138 kV Bus		C	T-1/T-1	0.82	0.81	0.78	
VEA-V-265	VISTA 138 kV Bus		C	T-1/T-1	0.79	0.77	0.74	
VEA-V-266	YUCCAFLT 138 kV Bus		C	T-1/T-1	0.86	0.85	0.84	
VEA-V-267	CRAZY EYE TP230 kV Bus	Tran ELDORDO 500.0 to ELDORDO2 230.0 Ckt 1_Line MEAD S 230.0 to BOB TAP 230.0 Ckt 1	C	T-1/L-1	0.98	0.89	0.89	Notice SCE. Modify Ivanpah-Eldorado SPS identified in GIP, or apply congestion management to curtail generation after first contingency
VEA-V-268	PAHRUMP_1 230 kV Bus		C	T-1/L-1	0.98	0.90	0.90	



Transient Stability

ID	Contingency	Category	Category Description	Transient Stability Performance			Potential Mitigation Solutions
				2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	

No transient stability issues identified.



Post-Transient Thermal Overloads

ID	Overloaded Facility	Worst Contingency	Category	Category Description	Loading (%)			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	

No post-transient thermal overloads identified.

Post-Transient Voltage Deviations

ID	Substation	Worst Contingency	Category	Category Description	Post Cont. Voltage Deviation %			Potential Mitigation Solutions
					2014 Summer Peak	2017 Summer Peak	2022 Summer Peak	

No post-transient voltage deviations identified.

## 2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - without renewables**



### Single Contingency Load Drop

ID	Worst Contingency	Category	Category Description	Amount of Load Drop (MW)			Potential Mitigation Solutions
				2014	2017	2022	

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

2012/2013 ISO Reliability Assessment - Preliminary Study Results

Study Area: **Valley Electric Association - without renewables**



*Single Source Substation with more than 100 MW Load*

ID	Substation	Load Served (MW)			Potential Mitigation Solutions
		2014	2017	2022	

No single source substation with more than 100 MW Load