BC HYDRO

T&D SYSTEM OPERATIONS

ATTACHMENT 1 OF SYSTEM OPERATING ORDER 7T-14

BRIDGE RIVER - LOWER MAINLAND INTERCONNECTION GENERATION SHEDDING REQUIREMENTS

Supersedes SOO 7T-14 Attachment 1 issued 23 April 2021

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- Dated and published simultaneously with SOO 7T-14 main body
- Refer to SOO 7T-14 Section 9.0 for Revision History
- Requires same day posting on bchydro.com and on BCRC Extranet upon release
- Requires same day MRS conveyance notification upon posting

Indicates Revision ‖

TABLE OF CONTENTS

1.0 GENERAL

System Operating Order (SOO) 7T-14 Attachment 1 is being issued as a separate document because of the large number of pages in SOO 7T-14. Generation Shedding (tripping and run back) requirements are implemented at Bridge River, Kwalsa IPP, Wahleach Generating Station (WAH), Upper Lillooet IPPs, and Cheakamus Generating Station (CMS).

Wahleach Generating Station has non redundant fibre optic communication and will not participate in system gen-shedding, but is used to implement local tripping in an anti-Islanding protection scheme.

The UH IPP label used in this Attachment is interchangeable with KWL IPP (as used in the main body). In all pre-outage limit and generation shedding formulas in the tables below, KWL IPP is referred as UH IPP. The label will be updated (and also in programming of TSA-PM) on a future revision.

Generation runback function has been implemented at CMS, e.g. CMS units will be run back to 40 MW per unit, at a rate of 1 MW/sec, if armed.

The UL IPP includes both Upper Lillooet Cluster (ULR) and Boulder Creek Cluster (BDH).

Generation Shedding at different plants have different effectiveness in removing overload on different circuit elements under different system conditions. The effectiveness is designated as distribution factor. There are five distribution factors designated at five plants:

- DF_BRR is designated as distribution factor at Bridge River Plant 1 and Bridge River Plant 2
- DF_UH is designated as distribution factor at Kwalsa IPPs
- DF_WAH is designated as distribution factor at Wahleach Generating Station
- DF_UL is designated as distribution factor at Upper Lillooet IPPs
- DF_CMS is designated as distribution factor at Cheakamus Generating Station

Operational procedures in this attachment are based on the system configuration with all 60 kV transmission circuits between CYP and WLT in service unless specified. There are two 60 kV paths connect CYP to WLT. The **CYP to WLT 60 kV paths** are defined as:

- The first path consists of 60L99, 60L66, and 60L64.
- The second path consists of 60L65, 60L97, 60L63, 60L61, and 60L62.

2.0 RATINGS OF TRANSMISSION CIRCUITS

Ambient temperature dependent ratings are used for 2L90. These ratings are continuous ratings and are shown in Section 5 of SOO 7T-14 main body.
Refer to SOO 5T-10 and 5T-14 for the transmission lines and transformers ratings source.

The continuous ratings for North Shore/Fraser Valley 345/230/132/60 kV circuit elements are listed in Table 2.1. The 30 minutes emergency ratings for North Shore/Fraser Valley 345/230/132/60 kV circuit elements are listed in Table 2.2.

Table 2.1 Continuous Ratings for North Shore/Fraser Valley 345/230/132/60 kV Circuit Elements

Circuit	Variable name used in Generation Shedding Tables	Conductor Ratings (Amp)		MW Conductor Ratings (= MVA x 0.97 pf) MW Transformer Ratings(= MVA x 0.93pf)	
		Summer Season (Note 10)	Winter Season (Note 10)	Summer Season	Winter Season
		Based on 30 deg C ambient	Based on 10 deg C ambient	Based on 30 deg C ambient	Based on 10 deg C Ambient
60L65	60L65_Norm_Rating	730	1090 Note (7)	73.6	109.9
1L31	1L31_Norm_Rating	260	440	60.3	102.0
1L35	1L35_Norm_Rating	490	590	113.6	136.8
2L1	2L1_Norm_Rating	505	800 Note (5)	195.1	309.1 Note (5)
2L2	2L2_Norm_Rating	800 (Note 6)	800 (Note 6)	309.1	309.1
2L3	2L3_Norm_Rating	995	1200 Note (3)	384.5	463.7
2L5	2L5_Norm_Rating	609	889	235.3	343.5
2L9	2L9_Norm_Rating	871	1139	336.6	440.1
2L11	2L11_Norm_Rating	840	1160	324.6	448.2
2L13	2L13_Norm_Rating	899	1167	347.4	451.0
2L14	2L14_Norm_Rating	850	1102	328.5	425.8
2L17	2L17_Norm_Rating	980	1193	378.7	461.0
2L41	2L41_Norm_Rating	800 Note (5)	800 Note (5)	309.1 Note (5)	309.1 Note (5)
2L77	2L77_Norm_Rating	1700	2000 Note (6)	656.9	772.8 Note (6)
	2L77_Norm_Rating_ALZ2CB3 OOS Note (4)	1600 Note (4)	1600 Note (4)	618.3 Note (4)	618.3 Note (4)
2L78	2L78_Norm_Rating	1700	2000 Note (6)	656.9	772.8 Note (6)
2L90	2L90_Norm_Rating	Refer to 7T-14 Section 5	Refer to 7T-14 Section 5	Refer to 7T-14 Section 5	Refer to 7T-14 Section 5
3L2	3L2_Norm_Rating	960	1200 Note (6)	556.4	695.5 Note (6)
3L3	3L3_Norm_Rating	122 Note (8)	145 Note (8)	70.7 Note (8)	84 Note (8)
3L5	3L5_Norm_Rating	960	1200 Note (6)	556.4	695.5 Note (6)
BRT T4	BRT T4_Norm_Rating		1200 Note (1)	418.5 MW (450 MVA) (Note 1)	444.5 MW (478 MVA) (Note 1)
ROS T1	ROS T1_Norm_Rating			418.5 MW (450 MVA)	496.6 MW (534 MVA) Note (2)

Table 2.2 30 Minutes Emergency Ratings for North Shore/Fraser Valley 345/230/132/60 kV Circuit Elements

Circuit	Variable name used in Generation Shedding Tables	Conductor Ratings (Amp)		MW Conductor Ratings (= MVA x 0.97 pf) MW Transformer Ratings(= MVA x 0.93pf)	
		Summer Season	Winter Season	Summer Season	Winter Season
		Based on 30 deg C ambient	Based on 10 deg C ambient	Based on 30 deg C ambient	Based on 10 deg C Ambient
60L65	60L65_Over_Rating	730	1090 Note (7)	73.6	109.9
1L31	1L31_Over_Rating	260	440	60.3	102.0
1L35	1L35_Over_Rating	490	590	113.6	136.8
2L1	2L1_Over_Rating	505	800 Note (5)	195.1	309.1 Note (5)
2L2	2L2_Over_Rating	800 Note (6)	800 Note (6)	309.1	309.1
2L3	2L3_Over_Rating	995	1200 Note (3)	384.5	463.7
2L5	2L5_Over_Rating	808	1034	312.2	399.5
2L9	2L9_Over_Rating	1031	1200 (9)	398.4	463.7
2L11	2L11_Over_Rating	840	1160	324.6	448.2
2L13	2L13_Over_Rating	899	1167	347.4	451.0
2L14	2L14_Over_Rating	850	1102	328.5	425.8
2L17	2L17_Over_Rating	980	1193	378.7	461.0
2L41	2L41_Over_Rating	800 Note (5)	800 Note (5)	309.1 Note (5)	309.1 Note (5)
2L77	2L77_Over_Rating	1700	2000 Note (6)	656.9	772.8 Note (6)
	2L77_Over_Rating_ALZ2CB3 OOS Note (4)	1600 Note (4)	1600 Note (4)	618.3 Note (4)	618.3 Note (4)
2L78	2L78_Over_Rating	1700	2000 Note (6)	656.9	772.8 Note (6)
2L90	2L90_Over_Rating	Refer to 7T-14 Section 5	Refer to 7T-14 Section 5	Refer to 7T-14 Section 5	Refer to 7T-14 Section 5
3L2	3L2_Over_Rating	960	1200 Note (6)	556.4	695.5 Note (6)
3L3	3L3_Over_Rating	122 Note (8)	145 Note (8)	70.7 Note (8)	84 Note (8)
3L5	3L5_Over_Rating	960	1200 Note (6)	556.4	695.5 Note (6)
BRT T4	BRT T4_Over_Rating		1200 Note (1)	444.5 MW (478 MVA) (Note 1)	444.5 MW (478 MVA) (Note 1)
ROS T1	ROS T1_Over_Rating			418.5 MW (450 MVA)	496.6 MW (534 MVA) Note (2)

Notes:

(1) MVA ratings are from SOO 5T-14. BRT T4 winter continuous, winter 30 minutes emergency ratings, and summer 30 minutes emergency rating are limited by the 230 kV disconnect, 2D4, associated with BRT T4. BRT 2D4 is rated at 1200 A (478 MVA = 1.732 * 230 kV * 1.2 kA).
(2) This winter continuous rating is based on 0 degree C ambient.
(3) 2L3 line DS - WLT 2D24 is the limiting element
(4) Single Breaker Closed DS Rating:– ALZ 2D1CB4, 2D2CB4 is limiting element
(5) A Wave Trap is limiting element
(6) CT is limiting element
(7) It is a temporary overload rating from SOO 5T-10.
(8) WAH T1 is the limiting element.
(9) CT and DS are the limiting elements.
(10) Refer to SOO 5T-10 for the definitions of “Summer Season” and “Winter Season”.

Table 1.1 **System Normal**

Note 1 System Normal means that all of the following North Shore/Fraser Valley 345/230 kV circuit elements are in service: 2L1, 2L2, 2L3, 2L5, 2L9, 2L11, 2L13, 2L14, 2L17, 2L41, 2L77, 2L78, 2L90, 3L2, 3L3, 3L5 and BRT T4.

Note 2 The pre-outage limit (BRR + UH_IPP + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.36
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS_T1_Norm_Rating – ROS T1) / 0.31
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L3_Norm_Rating – 2L3 WLT) / 0.17

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPP, and CMS generation within the pre-outage limit.

Transmission studies are done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating). The distribution factors for this case are:
DF_BRR=0.36, DF_UH = 0.24, DF_WAH = 0.17, DF_UL = 0.30, DF_CMS = 0.18

(b) If TSA alarms "VIOLATION_ ROS T1 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating). The distribution factors for this case are:
DF_BRR=0.31, DF_UH = 0.53, DF_WAH = 0.68, DF_UL = 0.16, DF_CMS = 0.09

(c) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating). The distribution factors for this case are:
DF_BRR=0.17, DF_UH = 0.11, DF_WAH = 0.08, DF_UL = 0.29, DF_CMS = 0.41

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 5 Transient stability requirements

Note 6 The pre-outage limit for BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 7 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
Shed UH IPP down to 135 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.1	System Normal	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.33 * 2L1 BRT – 2L90_Over_Rating	0.40	0.27		0.30		1,2,3
					2	ROS T1	ROS T1 + 0.17 * 2L1 BRT – ROS T1_Over_Rating	0.33	0.54		0.16		1,2,3
					3	2L2	2L2 RUT + 0.48 * 2L1 BRT – 2L2_Over_Rating	0.25	0.17		0.51		1,2,3
1.1	System Normal	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.33 * 2L2 TIS – 2L90_Over_Rating	0.42	0.27		0.47		1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L2 TIS – 2L1_Over_Rating	0.21	0.14		0.22		1,2,3
					3	ROS T1	ROS T1 + 0.17 * 2L2 TIS – ROS T1_Over_Rating	0.42	0.55		0.25		1,2,3
1.1	System Normal	2L41	Note 2		1	2L90	2L90 BRT + 0.36 * 2L41 BRT – 2L90_Over_Rating	0.42	0.29		0		1,2,3
					2	2L1	2L1 PEM + 0.42 * 2L41 BRT – 2L1_Over_Rating	0.21	0.15		0		1,2,3
					3	ROS T1	ROS T1 + 0.19 * 2L41 BRT – ROS T1_Over_Rating	0.34	0.55		0		1,2,3
1.1	System Normal	2L3	Note 2		1	2L11	2L11 WLT + 0.90 * 2L3 WLT – 2L11_Over_Rating	0.26	0.17		0.41	0.59	1,2,3
1.1	System Normal	2L9 OR LYN T1	Note2		1	2L90	2L90 BRT + 0.21 * 2L9 CKY – 2L90_Over_Rating	0.37	0.24		0.34	0.24	1,2,3
					2	2L13	2L13 CKY + 0.58 * 2L9 CKY – 2L13_Over_Rating	0.22	0.14		0.35	0.50	1,2,3
					3	ROS T1	ROS T1 + 0.14 * 2L9 CKY – ROS T1_Over_Rating	0.35	0.57		0.19	0.13	1,2,3
1.1	System Normal	2L11	Note 2		1	2L3	2L3 WLT + 0.91 * 2L11 WLT – 2L3_Over_Rating	0.26	0.17		0.42	0.63	1,2,3
1.1	System Normal	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.19 * 2L13 CKY – 2L90_Over_Rating	0.36	0.24		0.34	0.23	1,2,3
					2	2L9	2L9 CKY + 0.62 * 2L13 CKY – 2L9_Over_Rating	0.24	0.15		0.39	0.56	1,2,3
					3	ROS T1	ROS T1 + 0.12 * 2L13 CKY – ROS T1_Over_Rating	0.34	0.56		0.18	0.11	1,2,3
1.1	System Normal	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.14 * 2L14 CYP – 2L90_Over_Rating	0.36	0.23		0.31	0.20	1,2,3
					2	2L9	2L9 CKY + 0.47 * 2L14 CYP – 2L9_Over_Rating	0.21	0.14		0.33	0.46	1,2,3
1.1	System Normal	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.21 * 2L17 LYN – 2L90_Over_Rating	0.37	0.24		0.34	0.26	1,2,3
					2	2L13	2L13 CKY + 0.58 * 2L17 LYN – 2L13_Over_Rating	0.22	0.14		0.35	0.50	1,2,3
					3	ROS T1	ROS T1 + 0.14 * 2L17 LYN – ROS T1_Over_Rating	0.35	0.57		0.19	0.14	1,2,3
1.1	System Normal	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.52 * 2L77 ALZ – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.21 * 2L77 ALZ – 2L1_Over_Rating	0.20	0.20		0		1,2,3
					4	2L3	2L3 WLT + 0.24 * 2L77 ALZ – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3
					5	2L9	2L9 CKY + 0.22 * 2L77 ALZ – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3
					6	2L13	2L13 CKY + 0.18 * 2L77 ALZ – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3
1.1	System Normal	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.52 * 2L78 ROS – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.21 * 2L78 ROS – 2L1_Over_Rating	0.20	0.20		0		1,2,3
					4	2L3	2L3 WLT + 0.24 * 2L78 ROS – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3
					5	2L9	2L9 CKY + 0.22 * 2L78 ROS – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3
					6	2L13	2L13 CKY + 0.18 * 2L78 ROS – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3
1.1	System Normal	2L90	Note 2		1	ROS T1	ROS T1 + 0.37 * 2L90 BRT – ROS T1_Over_Rating	0.44	0.66		0.28		1,2,3
					2	2L1	2L1 PEM + 0.25 * 2L90 BRT – 2L1_Over_Rating	0.22	0.15		0.09		1,2,3
					3	2L9	2L9 CKY + 0.28 * 2L90 BRT – 2L9_Over_Rating	0.25	0.17		0.34		1,2,3
					4	2L13	2L13 CKY + 0.23 * 2L90 BRT – 2L13_Over_Rating	0.21	0.14		0.28		1,2,3
					5	2L3	2L3 WLT + 0.31 * 2L90 BRT – 2L3_Over_Rating	0.28	0.18		0.37		1,2,3
1.1	System Normal	3L2	Note 2		1	2L90	2L90 BRT + 0.52 * 3L2 BRT – 2L90_Over_Rating	0.51	0		0.39		1,2,3,7
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,7
					3	2L1	2L1 PEM + 0.21 * 3L2 BRT – 2L1_Over_Rating	0.20	0		0		1,2,3,7
					4	2L3	2L3 WLT + 0.24 * 3L2 BRT – 2L3_Over_Rating	0.23	0		0.29		1,2,3,7

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L9	2L9 CKY + 0.22 * 3L2 BRT – 2L9_Over_Rating	0.21	0		0.27		1,2,3,7
					6	2L13	2L13 CKY + 0.18 * 3L2 BRT – 2L13_Over_Rating	0.17	0		0.22		1,2,3,7
1.1	System Normal	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.17 * 3L3 ROS – 2L90_Over_Rating	0.34	0.22				1,2,3,4
					2	BRT T4	BRT T4 + 0.33 * 3L3 ROS – BRT T4_Over_Rating	0.66	0.44				1,2,3,4
1.1	System Normal	3L5	Note2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,7
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,7
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20		0		1,2,3,7
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,7
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,7
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3,7
1.1	System Normal	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1		0		1,2,3,5
1.1	System Normal & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2_Over_Rating	0.45	0.31		0.67		1,2,3
					2	ROS T1	ROS T1 + 0.30 * 2L1 BRT + 0.44 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.66		0.29		1,2,3
					3	2L41	2L41 BRT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L41_Over_Rating	0.45	0.31		0		1,2,3
1.1	System Normal & BRT 2CB2 O.O.S.	2L41	Note 2		1	2L1	2L1 PEM + 0.58 * 2L41 BRT + 0.45 * 2L90 BRT – 2L1_Over_Rating	0.40	0.27		0		1,2,3
					2	ROS T1	ROS T1 + 0.37 * 2L41 BRT + 0.48* 2L90 BRT – ROS T1_Over_Rating	0.54	0.69		0		1,2,3
1.1	System Normal & BRT 2CB3 O.O.S.	2L90	Note 2,6		1	2L1	2L1 PEM + 0.58 * 2L41 BRT + 0.45 * 2L90 BRT – 2L1_Over_Rating	0.40	0.27				1,2 3,6
					2	ROS T1	ROS T1 + 0.37 * 2L41 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.54	0.69				1,2 3,6
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,6	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92		0		1,2,3,5,6
1.1	System Normal & BRT 2CB4 O.O.S.	2L90	Note 2,6		1	2L2	2L2 RUT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2_Over_Rating	0.45	0.31		0.67		1,2,3,6
					2	ROS T1	ROS T1 + 0.30 * 2L1 BRT + 0.44 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.66		0.29		1,2,3,6
					3	2L41	2L41 BRT + 0.66 * 2L1 BRT + 0.50 * 2L90 – 2L41_Over_Rating	0.45	0.31		0		1,2,3,6
		2L41	Note 2,6	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92		0		1,2,3,5,6
1.1	System Normal & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,4,7
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4,7
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20		0		1,2,3,4,7
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,4,7
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,4,7
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3,4,7
1.1	System Normal & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20		0		1,2,3,4
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,4
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,4

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13 Over Rating	0.17	0.17		0.22		1,2,3,4
1.1	System Normal & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90 Over Rating	0.51	0.51		0.39		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4 Over Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1 Over Rating	0.20	0.20		0		1,2,3,4
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3 Over Rating	0.23	0.23		0.29		1,2,3,4
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9 Over Rating	0.21	0.21		0.27		1,2,3,4
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13 Over Rating	0.17	0.17		0.22		1,2,3,4

Table 1.2 **2L1 or 2L5 or (2L1 and 2L5) out-of-service**

Note 1 System condition: 2L1 or 2L5 or (2L1 and 2L5) out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW,
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.40, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L2_Norm_Rating – 2L2 RUT) / 0.25, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS T1_Norm_Rating – ROS T1) / 0.33, or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING, then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.40, DF_UH = 0.27, DF_WAH = 0.19, DF_UL = 0.30, DF_CMS = 0.13

(b) If TSA alarms "VIOLATION_2L2 CONTINUOUS RATING", then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (2L2 RUT - 2L2_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.25, DF_UH = 0.17, DF_WAH = 0.12, DF_UL = 0.51, DF_CMS = 0

(c) If TSA alarms "VIOLATION_ROS T1 CONTINUOUS RATING", then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.33, DF_UH = 0.54, DF_WAH = 0.69, DF_UL = 0.16, DF_CMS = 0.07

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Loss of 2L5 (or 2L1) with 2L1 (or 2L5) already opened will drop 2L1 load and FCN load. No further impact on North Shore 230 kV is anticipated.

Note 5 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 6 Transient stability requirements

Note 7 The pre-outage limit in conjunction with BRT 2CB2 outage or BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 8 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
Shed UH IPP down to 135 MW

Note 9 For 2L1 outage, the power line carrier is also out of service.

- Turn off 2L2 auto reclose at CKY
- RMR IPPs SOR and FTZ offline.

Refer to OO 3T-RBW-01 Section 2.2.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2										1,2,4
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.64 * 2L2 TIS – 2L90_Over_Rating	0.57	0.39		0.63		1,2,3
					2	ROST1	ROS T1 + 0.33 * 2L2 TIS – ROS T1_Over_Rating	0.40	0.59		0.32		1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L41	Note 2		1	2L90	2L90 BRT + 0.64 * 2L41 BRT – 2L90_Over_Rating	0.56	0.39		0		1,2,3
					2	ROST1	ROS T1 + 0.33 * 2L41 BRT – ROS T1_Over_Rating	0.40	0.60		0		1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L3	Note 2										1,2
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.17 * 2L9 CKY – 2L90_Over_Rating	0.40	0.26		0.35	0.21	1,2,3
					2	2L13	2L13 CKY + 0.63 * 2L9 CKY – 2L13_Over_Rating	0.18	0.11		0.35	0.56	1,2,3
					3	ROS T1	ROS T1 + 0.11 * 2L9 CKY – ROS T1_Over_Rating	0.36	0.58		0.19	0.11	1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L11	Note 2										1,2
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.15 * 2L13 CKY – 2L90_Over_Rating	0.40	0.26		0.34	0.19	1,2,3
					2	2L9	2L9 CKY + 0.68 * 2L13 CKY – 2L9_Over_Rating	0.19	0.12		0.37	0.6	1,2,3
					3	ROS T1	ROS T1 + 0.10 * 2L13 CKY – ROS T1_Over_Rating	0.36	0.57		0.17	0.09	1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.12 * 2L14 CYP – 2L90_Over_Rating	0.39	0.26		0.33	0.17	1,2,3
					2	2L9	2L9 CKY + 0.50 * 2L14 CYP – 2L9_Over_Rating	0.17	0.11		0.34	0.53	1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.17 * 2L17 LYN – 2L90_Over_Rating	0.40	0.26		0.34	0.2	1,2,3
					2	2L13	2L13 CKY + 0.63 * 2L17 LYN – 2L13_Over_Rating	0.18	0.11		0.35	0.56	1,2,3
					3	ROS T1	ROS T1 + 0.11 * 2L17 LYN – ROS T1_Over_Rating	0.36	0.58		0.19	0.11	1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.61 * 2L77 ALZ – 2L90_Over_Rating	0.60	0.60		0.43		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L2	2L2 RUT + 0.39 * 2L77 ALZ – 2L2_Over_Rating	0.38	0.38		0.55		1,2,3
					4	2L3	2L3 WLT + 0.20 * 2L77 ALZ – 2L3_Over_Rating	0.19	0.19		0.27		1,2,3
					5	2L9	2L9 CKY + 0.18 * 2L77 ALZ – 2L9_Over_Rating	0.17	0.17		0.25		1,2,3
					6	2L13	2L13 CKY + 0.14 * 2L77 ALZ – 2L13_Over_Rating	0.13	0.13		0.21		1,2,3
					7	2L41	2L41 BRT + 0.39 * 2L77 ALZ – 2L41_Over_Rating	0.38	0.38		0		1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.61 * 2L78 ROS – 2L90_Over_Rating	0.60	0.60		0.43		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L2	2L2 RUT + 0.39 * 2L78 ROS – 2L2_Over_Rating	0.38	0.38		0.55		1,2,3
					4	2L3	2L3 WLT + 0.20 * 2L78 ROS – 2L3_Over_Rating	0.19	0.19		0.27		1,2,3
					5	2L9	2L9 CKY + 0.18 * 2L78 ROS – 2L9_Over_Rating	0.17	0.17		0.25		1,2,3
					6	2L13	2L13 CKY + 0.14 * 2L78 ROS – 2L13_Over_Rating	0.13	0.13		0.21		1,2,3
					7	2L41	2L41 BRT + 0.39 * 2L78 ROS – 2L41_Over_Rating	0.38	0.38		0		1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	2L90	Note 2		1	ROS T1	ROS T1 + 0.51 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.65		0.28		1,2,3
					2	2L2	2L2 RUT + 0.43 * 2L90 BRT – 2L2_Over_Rating	0.45	0.31		0.70		1,2,3
					3	2L41	2L41 BRT + 0.43 * 2L90 BRT – 2L41_Over_Rating	0.45	0.31		0		1,2,3
1.2	2L1 or 2L5 or (2L1 and 2L5)	3L2	Note 2		1	2L90	2L90 BRT + 0.61 * 3L2 BRT – 2L90_Over_Rating	0.60	0		0.43		1,2,3,8
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,8
					3	2L2	2L2 RUT + 0.39 * 3L2 BRT – 2L2_Over_Rating	0.38	0		0.55		1,2,3,8
					4	2L3	2L3 WLT + 0.20 * 3L2 BRT – 2L3_Over_Rating	0.19	0		0.27		1,2,3,8

					5	2L9	2L9 CKY + 0.18 * 3L2 BRT – 2L9_Over_Rating	0.17	0		0.25		1,2,3,8
					6	2L13	2L13 CKY + 0.14 * 3L2 BRT – 2L13_Over_Rating	0.13	0		0.21		1,2,3,8
					7	2L41	2L41 BRT + 0.39 * 3L2 BRT – 2L41_Over_Rating	0.38	0		0		1,2,3,8
1.2	2L1 or 2L5 or (2L1 and 2L5)	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.19 * 3L3 ROS – 2L90_Over_Rating	0.38	0.25				1,2,3,5
					2	BRT T4	BRT T4 + 0.31 * 3L3 ROS – BRT T4_Over_Rating	0.64	0.42				1,2,3,5
1.2	2L1 or 2L5 or (2L1 and 2L5)	3L5	Note 2		1	2L90	2L90 BRT + 0.61 * 3L5 UHT – 2L90_Over_Rating	0.60	0.60		0.43		1,2,3,8
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,8
					3	2L2	2L2 RUT + 0.39 * 3L5 UHT – 2L2_Over_Rating	0.38	0.38		0.55		1,2,3,8
					4	2L3	2L3 WLT + 0.20 * 3L5 UHT – 2L3_Over_Rating	0.19	0.19		0.27		1,2,3,8
					5	2L9	2L9 CKY + 0.18 * 3L5 UHT – 2L9_Over_Rating	0.17	0.17		0.25		1,2,3,8
					6	2L13	2L13 CKY + 0.14 * 3L5 UHT – 2L13_Over_Rating	0.13	0.13		0.21		1,2,3,8
					7	2L41	2L41 BRT + 0.39 * 3L5 UHT – 2L41_Over_Rating	0.38	0.38		0		1,2,3,8
1.2	2L1 or 2L5 or (2L1 and 2L5)	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1		0		1,2,3,6
1.2	(2L1 or 2L5 & BRT 2CB2 O.O.S.) OR (2L1 or 2L5 & BRT 2CB4 O.O.S.) OR (2L1 or 2L5 & BRT 2CB2 & BRT 2CB4 O.O.S.)	2L41	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92		0		1,2,3,6,7
1.2	2L1 (BRT dso) & BRT 2CB3 O.O.S.	2L90	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92		0		1,2,3,6,7
1.2	[2L1 or 2L5 or (2L1 and 2L5)] & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.61 * 3L5 UHT – 2L90_Over_Rating	0.60	0.60		0.43		1,2,3,5,8
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5,8
					3	2L2	2L2 RUT + 0.39 * 3L5 UHT – 2L2_Over_Rating	0.38	0.38		0.55		1,2,3,5,8
					4	2L3	2L3 WLT + 0.20 * 3L5 UHT – 2L3_Over_Rating	0.19	0.19		0.27		1,2,3,5,8
					5	2L9	2L9 CKY + 0.18 * 3L5 UHT – 2L9_Over_Rating	0.17	0.17		0.25		1,2,3,5,8
					6	2L13	2L13 CKY + 0.14 * 3L5 UHT – 2L13_Over_Rating	0.13	0.13		0.21		1,2,3,5,8
					7	2L41	2L41 BRT + 0.39 * 3L5 UHT – 2L41_Over_Rating	0.38	0.38		0		1,2,3,5,8
1.2	[2L1 or 2L5 or (2L1 and 2L5)] & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.61 * 3L5 UHT – 2L90_Over_Rating	0.60	0.60		0.43		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L2	2L2 RUT + 0.39 * 3L5 UHT – 2L2_Over_Rating	0.38	0.38		0.55		1,2,3,5
					4	2L3	2L3 WLT + 0.20 * 3L5 UHT – 2L3_Over_Rating	0.19	0.19		0.27		1,2,3,5
					5	2L9	2L9 CKY + 0.18 * 3L5 UHT – 2L9_Over_Rating	0.17	0.17		0.25		1,2,3,5
					6	2L13	2L13 CKY + 0.14 * 3L5 UHT – 2L13_Over_Rating	0.13	0.13		0.21		1,2,3,5
					7	2L41	2L41 BRT + 0.39 * 3L5 UHT – 2L41_Over_Rating	0.38	0.38		0		1,2,3,5
1.2	[2L1 or 2L5 or (2L1 and 2L5)] & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.61 * 3L5 UHT – 2L90_Over_Rating	0.60	0.60		0.43		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L2	2L2 RUT + 0.39 * 3L5 UHT – 2L2_Over_Rating	0.38	0.38		0.55		1,2,3,5
					4	2L3	2L3 WLT + 0.20 * 3L5 UHT – 2L3_Over_Rating	0.19	0.19		0.27		1,2,3,5
					5	2L9	2L9 CKY + 0.18 * 3L5 UHT – 2L9_Over_Rating	0.17	0.17		0.25		1,2,3,5
					6	2L13	2L13 CKY + 0.14 * 3L5 UHT – 2L13_Over_Rating	0.13	0.13		0.21		1,2,3,5
					7	2L41	2L41 BRT + 0.39 * 3L5 UHT – 2L41_Over_Rating	0.38	0.38		0		1,2,3,5

Table 1.3 **2L2 out-of-service**

Note 1 System condition: 2L2 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + ULL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.42, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L1_Norm_Rating – 2L1 PEM) / 0.21, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS T1_Norm_Rating – ROS T1) / 0.34, or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.42, DF_UH = 0.29, DF_WAH = 0.20, DF_UL = 0.47, DF_CMS = 0.11

(b) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (2L1 PEM - 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UH = 0.14, DF_WAH = 0.10, DF_UL = 0.22, DF_CMS = 0

(c) If TSA alarms "VIOLATION_ROS T1 CONTINUOUS RATING", then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.34, DF_UH = 0.55, DF_WAH = 0.69, DF_UL = 0.25, DF_CMS = 0.05

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load

Note 5 Transient stability requirements

Note 6 The pre-outage limit in conjunction with BRT 2CB1 outage or BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 7 Shed UL down to 60 MW for transient stability requirements.

Note 8 Shed UL clusters: ULR and BDH for transient stability requirements.

Note 9 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
Shed UH IPP down to 135 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.3 Note1,2	2L2	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.64 * 2L1 BRT – 2L90_Over_Rating	0.57	0.39		0.63		1,2,3
					2	ROS T1	ROS T1 + 0.32 * 2L1 BRT – ROS T1_Over_Rating	0.40	0.59		0.31		1,2,3
1.3 Note 1,2	2L2	2L3	Note 2										1,2
1.3 Note1,2	2L2	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.15 * 2L9 CKY – 2L90_Over_Rating	0.42	0.28		0.47	0.17	1,2,3
					2	2L13	2L13 CKY + 0.66 * 2L9 CKY – 2L13_Over_Rating	0.15	0.10		0.16	0.61	1,2,3
					3	ROS T1	ROS T1 + 0.10 * 2L9 CKY – ROS T1_Over_Rating	0.37	0.58		0.25	0.09	1,2,3
1.3 Note 1,2	2L2	2L11	Note 2										1,2
1.3 Note1,2	2L2	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.13 * 2L13 CKY – 2L90_Over_Rating	0.41	0.27		0.47	0.16	1,2,3
					2	2L9	2L9 CKY + 0.71 * 2L13 CKY – 2L9_Over_Rating	0.16	0.11		0.17	0.64	1,2,3
					3	ROS T1	ROS T1 + 0.09 * 2L13 CKY – ROS T1_Over_Rating	0.37	0.58		0.25	0.09	1,2,3
1.3 Note1,2	2L2	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.10 * 2L14 CYP – 2L90_Over_Rating	0.41	0.27		0.47	0.14	1,2,3
					2	2L9	2L9 CKY + 0.52 * 2L14 CYP – 2L9_Over_Rating	0.14	0.09		0.15	0.57	1,2,3
1.3 Note1,2	2L2	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.15 * 2L17 LYN – 2L90_Over_Rating	0.42	0.28		0.48	0.19	1,2,3
					2	2L13	2L13 CKY + 0.66 * 2L17 LYN – 2L13_Over_Rating	0.15	0.10		0.16	0.61	1,2,3
					3	ROS T1	ROS T1 + 0.10 * 2L17 LYN – ROS T1_Over_Rating	0.37	0.58		0.26	0.09	1,2,3
1.3 Note1,2	2L2	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.65 * 2L77 ALZ – 2L90_Over_Rating	0.64	0.64		0.64		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.31 * 2L77 ALZ – 2L1_Over_Rating	0.30	0.30		0.30		1,2,3
1.3 Note1,2	2L2	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.65 * 2L78 ROS – 2L90_Over_Rating	0.64	0.64		0.64		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.31 * 2L78 ROS – 2L1_Over_Rating	0.30	0.30		0.30		1,2,3
1.3 Note1,2	2L2	2L90	Note 2		1	ROS T1	ROS T1 + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.53	0.68		0.48		1,2,3,7
					2	2L1	2L1 PEM + 0.44 * 2L90 BRT – 2L1_Over_Rating	0.39	0.27		0.43		1,2,3,7
1.3 Note1,2	2L2	3L2	Note 2		1	2L90	2L90 BRT + 0.65 * 3L2 BRT – 2L90_Over_Rating	0.64	0		0.64		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,9
					3	2L1	2L1 PEM + 0.31 * 3L2 BRT – 2L1_Over_Rating	0.30	0		0.30		1,2,3,9
1.3 Note1,2	2L2	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.20 * 3L3 ROS – 2L90_Over_Rating	0.40	0.27				1,2,3,4
					2	BRT T4	BRT T4 + 0.31 * 3L3 ROS – BRT T4_Over_Rating	0.63	0.41				1,2,3,4
1.3 Note1,2	2L2	3L5	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90_Over_Rating	0.64	0.64		0.64		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,9
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1_Over_Rating	0.30	0.30		0.30		1,2,3,9
1.3 Note1,2	2L2	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1				1,2,3,5
1.3 Note1,2,6	2L2 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,6	174	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,5,6,8
1.3 Note1,2	2L2 & BRT 2CB2 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.64 * 2L1 BRT – 2L90_Over_Rating	0.57	0.39		0.63		1,2,3
					2	ROS T1	ROS T1 + 0.32 * 2L1 BRT – ROS T1_Over_Rating	0.40	0.59		0.31		1,2,3
1.3 Note1,2,6	2L2 & BRT 2CB3 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2, 6	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,5,6
1.3 Note1,2,6	2L2 & BRT 2CB4 O.O.S.	2L90	Note 2, 6	174	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,5,6,8
1.3 Note1,2	2L2 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90_Over_Rating	0.64	0.64		0.64		1,2,3,4,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4,9
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1_Over_Rating	0.30	0.30		0.30		1,2,3,4,9

1.3 Note1,2	2L2 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90 Over Rating	0.64	0.64		0.64		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4 Over Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1 Over Rating	0.30	0.30		0.30		1,2,3,4
1.3 Note1,2	2L2 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90 Over Rating	0.64	0.64		0.64		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4 Over Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1 Over Rating	0.30	0.30		0.30		1,2,3,4

Table 1.4 **2L9 out-of-service**

Note 1 System condition: 2L9 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.37, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L13_Norm_Rating – 2L13 CKY) / 0.22, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS T1_Norm_Rating – ROS T1) / 0.35,or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs and CMS generation within the pre-outage limit. Transmission studies were done with a maximum of 952 MW of generation.

If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.37, DF_UH = 0.24, DF_WAH = 0.19, DF_UL = 0.34, DF_CMS = 0.24.

(b) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L13 CKY - 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.22, DF_UH = 0.14, DF_WAH = 0.06, DF_UL = 0.35, DF_CMS = 0.50.

(c) If TSA alarms "VIOLATION_ROS T1 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.35, DF_UH = 0.57, DF_WAH = 0.69, DF_UL = 0.18, DF_CMS = 0.11.

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 5 Loss of 2L17 with 2L9 already opened will drop LYN load. No further impact anticipated.

Note 6 Transient stability requirements.

Note 7 The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 8 CKY to MSA 132 kV Path consists of 1L31, 1L32 and 1L35.

Note 9 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
SHED DOWN all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW

No gen shed
Else
SHED UH IPP down to 135 MW

Note 10 60L65 would still be thermally overloaded even after generation shedding in BR regional system if the total power output from non sheddable generating plants in CKY area is more than 210 MW. A recommended solution for operators is to :

- Open the 60 kV paths between CYP and WLT.

The non sheddable generating plants in CKY area are listed below:
ASL, SKO, CTN, RUT, MAM, UMH, FRI, BOX, BDW, FTZ, SOR, MCP, Min(40 MW, CMS G1), Min(40 MW, CMS G2)

Note 11 If TSA alarms “INSUFFICIENT GEN-SHED for 60L65 OVERLOAD”, then both 60 kV paths between CYP and WLT shall be opened. Consult Operations Planning Department for the locations to open.

Note 12 Avoid scheduling circuits OOS to cause only one of the two CYP-WLT 60 kV paths open. If TSA alarms “AVOID ONE 60KV CYP-WLT PATH OPEN WITH 2L9 OOS”, studies by Operations Planning Department are required to determine whether switch in the path or open the other one.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.4	2L9	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	ROS T1	ROS T1 + 0.14 * 2L1 BRT – ROS T1_Over_Rating	0.34	0.55		0.18		1,2,3
					2	2L90	2L90 BRT + 0.27 * 2L1 BRT – 2L90_Over_Rating	0.42	0.29		0.35		1,2,3
1.4	2L9	2L2 OR RBW T2	Note 2		1	ROS T1	ROS T1 + 0.17 * 2L2 TIS – ROS T1_Over_Rating	0.35	0.55		0.26		1,2,3
					2	2L90	2L90 BRT + 0.32 * 2L2 TIS – 2L90_Over_Rating	0.44	0.30		0.50		1,2,3
					3	2L1	2L1 PEM + 0.49 * 2L2 TIS – 2L1_Over_Rating	0.18	0.12		0.19		1,2,3
1.4	2L9	2L41	Note 2		1	ROS T1	ROS T1 + 0.17 * 2L41 BRT – ROS T1_Over_Rating	0.35	0.56				1,2,3
					2	2L90	2L90 BRT + 0.33 * 2L41 BRT – 2L90_Over_Rating	0.44	0.30				1,2,3
					3	2L1	2L1 PEM + 0.49 * 2L41 BRT – 2L1_Over_Rating	0.18	0.12				1,2,3
1.4	2L9	2L3	Note 2										1,2
1.4	2L9	2L9 OR LYN T1	Note 2		Not applicable								
1.4	2L9	2L11	Note 2										1,2
1.4	2L9	2L13 OR CYP T2	Note 2		GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 2 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 2 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 2 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 2 for this contingency.								

Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1	2L90	2L90 BRT + 0.55 * 2L13 CKY - 2L90_Over_Rating	0.54	0.37		0.54	0.51	1,2,3,8
2	ROS T1	ROS T1 + 0.25 * 2L13 CKY - ROS_T1_Over_Rating	0.35	0.55		0.29	0.25	1,2,3,8

If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1 – 0.14 * GS_UL1 – 0.19 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 < 1L35_Over_Rating, then:
Shed at BRR: GS_BRR1
Shed at UH_IPPs: GS_UH1

Shed at UL_IPPs: GS_ULL1
Shed at CMS: RB_CMS1

If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L35_Over_Rating)], then,

Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 3 to 4:

Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
3	2L90	2L90 BRT + 0.55 * 2L13 CKY + 0.69 * (0.19 * 2L13 CKY–1L31 GIB) – 2L90_Over_Rating	0.54	0.37		0.54	0.51	1,2,3,8
4	ROS T1	ROS T1 + 0.25 * 2L13 CKY + 0.31 * (0.19 * 2L13 CKY – 1L31 GIB) – ROS_T1_Over_Rating	0.35	0.55		0.29	0.25	1,2,3,8

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 5 to 6:								
					Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L90	2L90 BRT + 0.68 * 2L13 CKY – 2L90_Over_Rating	0.59	0.41		0.63	0.63	1,2,3,8
					6	ROS T1	ROS T1 + 0.30* 2L13 CKY – ROS T1_Over_Rating	0.37	0.57		0.31	0.29	1,2,3,8
1.4	2L9	2L14	Note 2		If both CYP to WLT 60 kV paths are in service, then, GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 3 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 3 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 2 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 2 for this contingency.								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					1	2L90	2L90 BRT + 0.32 * 2L14 CYP - 2L90_Over_Rating	0.48	0.33		0.45	0.40	1,2,3,8,12
					2	ROS T1	ROS T1 + 0.15 * 2L14 CYP - ROS_T1_Over_Rating	0.33	0.55		0.24	0.20	1,2,3,8,12
					3	60L65	-60L65 JLN + 0.24 * 2L14 CYP - 60L65_Over_Rating	0.06	0.04		0.09	0.13	1,2,3,8, 10,11,12
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.11 * 2L14 CYP – 0.05 * GS_BRR1 – 0.04 * GS_UH1– 0.11 * GS_UL1 – 0.13 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.11 * 2L14 CYP – 0.05 * GS_BRR1 – 0.04 * GS_UH1– 0.11 * GS_UL1 – 0.13 * RB_CMS1 < 1L35_Over_Rating, then, Shed at BRR: GS_BRR1 Shed at UH_IPPs: GS_UH1 Shed at UL_IPPs: GS_UL1 Shed at CMS: RB_CMS1 If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.11 * 2L14 CYP – 0.05 * GS_BRR1 – 0.04 * GS_UH1– 0.11 * GS_UL1 – 0.13 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.11 * 2L14 CYP – 0.05 * GS_BRR1 – 0.04 * GS_UH1– 0.11 * GS_UL1 – 0.13 * RB_CMS1 >= 1L35_Over_Rating)], then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 4 to 6:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					4	2L90	2L90 BRT + 0.32 * 2L14 CYP + 0.52 * (0.11 * 2L14 CYP–1L31 GIB) – 2L90_Over_Rating	0.48	0.33		0.45	0.40	1,2,3,8,12
					5	ROS T1	ROS T1 + 0.15 * 2L14 CYP + 0.22 * (0.11 * 2L14 CYP – 1L31 GIB) – ROS_T1_Over_Rating	0.33	0.55		0.24	0.20	1,2,3,8,12
					6	60L65	-60L65 JLN + 0.24 * 2L14 CYP + 0.14 * (0.11 * 2L14 CYP - 1L31 GIB) - 60L65_Over_Rating	0.06	0.04		0.09	0.13	1,2,3,8, 10,11,12
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 7 to 9:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					7	2L90	2L90 BRT + 0.38 * 2L14 CYP – 2L90_Over_Rating	0.51	0.35		0.51	0.43	1,2,3,8,12
					8	ROS T1	ROS T1 + 0.18* 2L14 CYP – ROS T1_Over_Rating	0.34	0.57		0.29	0.27	1,2,3,8,12
					9	60L65	-60L65 JLN + 0.25 * 2L14 CYP - 60L65_Over_Rating	0.06	0.04		0.11	0.15	1,2,3,8, 10,11,12

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					If both CYP to WLT 60 kV paths are OOS, the following requirements need to be met: GS_BRR2: Gen-shedding amount armed at BRR to solve cases 10 to 11 for this contingency. GS_UH2: Gen-shedding amount armed at UH_IPPs to solve cases 10 to 11 for this contingency. GS_UL2: Gen-shedding amount armed at UL_IPPs to solve cases 10 to 11 for this contingency. RB_CMS2: Runback amount armed at CMS to solve cases 10 to 11 for this contingency.								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					10	2L90	2L90 BRT + 0.52 * 2L14 CYP - 2L90_Over_Rating	0.53	0.32		0.53	0.49	1,2,3,8,12
					11	ROS T1	ROS T1 + 0.28 * 2L14 CYP - ROS_T1_Over_Rating	0.28	0.62		0.28	0.26	1,2,3,8,12
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.20 * 2L14 CYP - 0.08 * GS_BRR2 - 0.04 * GS_UH2 - 0.14 * GS_UL2 - 0.18 * RB_CMS2 < 1L31_Over_Rating AND 1L35 SEC + 0.20 * 2L14 CYP - 0.08 * GS_BRR2 - 0.04 * GS_UH2 - 0.14 * GS_UL2 - 0.18 * RB_CMS2 < 1L35_Over_Rating, then, Shed at BRR: GS_BRR2 Shed at UH_IPPs: GS_UH2 Shed at UL_IPPs: GS_UL2 Shed at CMS: RB_CMS2 If CKY to MSA 132 kV PATH I/S AND [-1L31 GIB + 0.20 * 2L14 CYP - 0.08 * GS_BRR2 - 0.04 * GS_UH2 - 0.14 * GS_UL2 - 0.18 * RB_CMS2 >= 1L31_Over_Rating OR 1L35 SEC + 0.20 * 2L14 CYP - 0.08 * GS_BRR2 - 0.04 * GS_UH2 - 0.14 * GS_UL2 - 0.18 * RB_CMS2 >= 1L35_Over_Rating], then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 12 to 13:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					12	2L90	2L90 BRT + 0.52 * 2L14 CYP + 0.65 * (0.20 * 2L14 CYP - 1L31 GIB) - 2L90_Over_Rating	0.53	0.32		0.53	0.49	1,2,3,8,12
					13	ROS T1	ROS T1 + 0.28 * 2L14 CYP + 0.32 * (0.20 * 2L14 CYP - 1L31 GIB) - ROS_T1_Over_Rating	0.28	0.62		0.28	0.26	1,2,3,8,12
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 14 to 15:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					14	2L90	2L90 BRT + 0.65 * 2L14 CYP - 2L90_Over_Rating	0.56	0.35		0.62	0.61	1,2,3,8,12
					15	ROS T1	ROS T1 + 0.35 * 2L14 CYP - ROS_T1_Over_Rating	0.4	0.63		0.32	0.32	1,2,3,8,12
1.4	2L9	2L17 OR LYN T2	Note 2										5
1.4	2L9	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.59 * 2L77 ALZ – 2L90_Over_Rating	0.58	0.58		0.49		1,2,3,
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.18 * 2L77 ALZ – 2L1_Over_Rating	0.17	0.17		0		1,2,3
					4	2L13	2L13 CKY + 0.32 * 2L77 ALZ – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3
1.4	2L9	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.59 * 2L78 ROS – 2L90_Over_Rating	0.58	0.58		0.49		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.18 * 2L78 ROS – 2L1_Over_Rating	0.17	0.17		0		1,2,3
					4	2L13	2L13 CKY + 0.32 * 2L78 ROS – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3
1.4	2L9	2L90	Note 2		1	ROS T1	ROS T1 + 0.43 * 2L90 BRT – ROS T1_Over_Rating	0.49	0.65		0.35		1,2,3
					2	2L1	2L1 PEM + 0.22 * 2L90 BRT – 2L1_Over_Rating	0.19	0.12		0.06		1,2,3
					3	2L13	2L13 CKY + 0.41 * 2L90 BRT – 2L13_Over_Rating	0.38	0.25		0.51		1,2,3
1.4	2L9	3L2	Note 2		1	2L90	2L90 BRT + 0.59 * 3L2 BRT – 2L90_Over_Rating	0.58	0		0.49		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,9
					3	2L1	2L1 PEM + 0.18 * 3L2 BRT – 2L1_Over_Rating	0.17	0		0		1,2,3,9
					4	2L13	2L13 CKY + 0.32 * 3L2 BRT – 2L13_Over_Rating	0.31	0		0.37		1,2,3,9

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.4	2L9	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.19 * 3L3 ROS – 2L90_Over_Rating	0.37	0.24				1,2,3,4
					2	BRT T4	BRT T4 + 0.32 * 3L3 ROS – BRT T4_Over_Rating	0.64	0.42				1,2,3,4
1.4	2L9	3L5	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.49		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,9
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,9
					4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3,9
1.4	2L9	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1				1,2,3,6
1.4	2L9 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L2_Over_Rating	0.40	0.27		0.61		1,2,3
					2	2L13	2L13 CKY - 0.27 * 2L1 BRT + 0.35 * 2L90 BRT – 2L13_Over_Rating	0.32	0.22		0.49		1,2,3
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.49 * 2L90 BRT – ROS T1_Over_Rating	0.55	0.69		0.35		1,2,3
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L41_Over_Rating	0.40	0.27		0		1,2,3
1.4	2L9 & BRT 2CB2 O.O.S.	2L41	Note 2		1	2L1	2L1 PEM + 0.61 * 2L41 BRT + 0.40 * 2L90 BRT – 2L1_Over_Rating	0.36	0.24				1,2,3
					2	2L13	2L13 CKY - 0.33 * 2L41 BRT + 0.31 * 2L90 BRT – 2L13_Over_Rating	0.28	0.19		0.66		1,2,3
					3	ROS T1	ROS T1 + 0.34 * 2L41 BRT + 0.53 * 2L90 BRT – ROS T1_Over_Rating	0.58	0.71				1,2,3
1.4	2L9 & BRT 2CB3 O.O.S.	2L90	Note 2,7		1	2L1	2L1 PEM + 0.61 * 2L41 BRT + 0.40 * 2L90 BRT – 2L1_Over_Rating	0.36	0.24				1,2,3,7
					2	2L13	2L13 CKY - 0.33 * 2L41 BRT + 0.31 * 2L90 BRT – 2L13_Over_Rating	0.28	0.19		0.66		1,2,3,7
					3	ROS T1	ROS T1 + 0.34 * 2L41 BRT + 0.53 * 2L90 BRT – ROS T1_Over_Rating	0.58	0.71				1,2,3,7
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.4	2L9 & BRT 2CB4 O.O.S.	2L90	Note 2,7		1	2L2	2L2 RUT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L2_Over_Rating	0.40	0.27		0.61		1,2,3,7
					2	2L13	2L13 CKY - 0.27 * 2L1 BRT + 0.35 * 2L90 BRT – 2L13_Over_Rating	0.32	0.22		0.49		1,2,3,7
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.49 * 2L90 BRT – ROS T1_Over_Rating	0.55	0.69		0.35		1,2,3,7
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L41_Over_Rating	0.40	0.27		0		1,2,3,7
		2L41	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.4	2L9 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.49		1,2,3,4,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4,9
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,4,9
					4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3,4,9
1.4	2L9 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.49		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,4
					4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3,4
1.4	2L9 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.49		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,4
					4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3,4

Table 1.5 2L13 out-of-service

Note 1 System condition: 2L13 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.36, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L9_Norm_Rating – 2L9 CKY) / 0.24, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS T1_Norm_Rating – ROS T1) / 0.34,or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating). The distribution factors for this case are: DF_BRR = 0.36, DF_UH = 0.24, DF_WAH= 0.19, DF_UL = 0.34, DF_CMS = 0.24.

(b) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating). The distribution factors for this case are: DF_BRR = 0.24, DF_UH = 0.15, DF_WAH = 0.11, DF_ULL = 0.39, DF_CMS = 0.56.

(c) If TSA alarms "VIOLATION_ROS T1 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating). The distribution factors for this case are: DF_BRR = 0.34, DF_UH = 0.56, DF_WAH = 0.69, DF_ULL = 0.18, DF_CMS = 0.11.

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Loss of 2L14 with 2L13 already open will open CYP T2 on the high side. No other impact on the North Shore 230 kV circuits.

Note 5 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 6 Transient stability requirements

Note 7 The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 8 CKY to MSA 132 kV Path consists of 1L31, 1L32 and 1L35.

Note 9 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
Shed UH IPP down to 135 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.5	2L13	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	ROS T1	ROS T1 + 0.15 * 2L1 BRT – ROS T1_Over_Rating	0.34	0.55		0.18		1,2,3
					2	2L90	2L90 BRT + 0.29 * 2L1 BRT – 2L90_Over_Rating	0.42	0.28		0.34		1,2,3
1.5	2L13	2L2 OR RBW T2	Note 2		1	ROS T1	ROS T1 + 0.17 * 2L2 TIS – ROS T1_Over_Rating	0.34	0.55		0.26		1,2,3
					2	2L90	2L90 BRT + 0.34 * 2L2 TIS – 2L90_Over_Rating	0.44	0.30		0.49		1,2,3
					3	2L1	2L1 PEM + 0.47 * 2L2 TIS – 2L1_Over_Rating	0.19	0.13		0.20		1,2,3
1.5	2L13	2L41	Note 2		1	ROS T1	ROS T1 + 0.18 * 2L41 BRT – ROS T1_Over_Rating	0.35	0.55				1,2,3
					2	2L90	2L90 BRT + 0.34 * 2L41 BRT – 2L90_Over_Rating	0.44	0.30				1,2,3
					3	2L1	2L1 PEM + 0.47 * 2L41 BRT – 2L1_Over_Rating	0.19	0.13				1,2,3
1.5	2L13	2L3	Note 2										1,2
1.5	2L13	2L9 OR LYN T1	Note 2		GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 2 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 2 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 2 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 2 for this contingency.								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					1	2L90	2L90 BRT + 0.55 * 2L9 CKY - 2L90_Over_Rating	0.53	0.37		0.54	0.50	1,2,3,8
					2	ROS T1	ROS T1 + 0.25 * 2L9 CKY - ROS_T1_Over_Rating	0.35	0.56		0.27	0.25	1,2,3,8
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.19 * 2L9 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.19 * 2L9 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1< 1L35_Over_Rating, then, Shed at BRR: GS_BRR1 Shed at UH_IPPs: GS_UH1 Shed at UL_IPPs: GS_UL1 Shed at CMS: RB_CMS1 If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.19 * 2L9 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1 – 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.19 * 2L9 CKY – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L35_Over_Rating)], then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 3 to 4:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L90	2L90 BRT + 0.55 * 2L9 CKY + 0.69 * (0.19 * 2L9 CKY – 1L31 GIB) – 2L90_Over_Rating	0.53	0.37		0.54	0.50	1,2,3,8
					4	ROS T1	ROS T1 + 0.25 * 2L9 CKY + 0.31 * (0.19 * 2L9 CKY – 1L31 GIB) – ROS_T1_Over_Rating	0.35	0.56		0.27	0.25	1,2,3,8
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 5 to 6:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L90	2L90 BRT + 0.68 * 2L9 CKY – 2L90_Over_Rating	0.59	0.41		0.63	0.60	1,2,3,8
					6	ROS T1	ROS T1 + 0.30 * 2L9 CKY – ROS T1_Over_Rating	0.36	0.56		0.32	0.35	1,2,3,8
1.5	2L13	2L11	Note 2										1,2

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.5	2L13	2L13 OR CYP T2	Note 2		Not applicable								
1.5	2L13	2L14 OR CYP T3	Note 2										1,2,4
1.5	2L13	2L17 OR LYN T2	Note 2		GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 2 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 2 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 2 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 2 for this contingency.								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					1	2L90	2L90 BRT + 0.57 * 2L17 LYN - 2L90_Over_Rating	0.53	0.37		0.54	0.50	1,2,3,8
					2	ROS T1	ROS T1 + 0.25 * 2L17 LYN - ROS_T1_Over_Rating	0.35	0.56		0.27	0.25	1,2,3,8
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.19 * 2L17 LYN – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.19 * 2L17 LYN – 0.08 * GS_BRR1 – 0.05 * GS_UH1 – 0.14 * GS_UL1 – 0.19 * RB_CMS1 < 1L35_Over_Rating, then, Shed at BRR: GS_BRR1 Shed at UH_IPPs: GS_UH1 Shed at UL_IPPs: GS_UL1 Shed at CMS: RB_CMS1 If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.19 * 2L17 LYN – 0.08 * GS_BRR1 – 0.05 * GS_UH1 – 0.14 * GS_UL1 – 0.19 * RB_CMS1>= 1L31_Over_Rating OR 1L35 SEC + 0.19 * 2L17 LYN – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L35_Over_Rating)], then, Gen-shedding at BRR, UH_IPPs, WAH, UL_IPPs and/or CMS to solve cases 3 to 4:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L90	2L90 BRT + 0.55 * 2L17 LYN + 0.69 * (0.19 * 2L17 LYN – 1L31 GIB) – 2L90_Over_Rating	0.53	0.37		0.54	0.50	1,2,3,8
					4	ROS T1	ROS T1 + 0.25 * 2L17 LYN + 0.31 * (0.19 * 2L17 LYN – 1L31 GIB) – ROS_T1_Over_Rating	0.35	0.56		0.27	0.25	1,2,3,8
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, WAH, UL_IPPs and/or CMS to solve cases 5 to 6:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L90	2L90 BRT + 0.68 * 2L17 LYN – 2L90_Over_Rating	0.59	0.41		0.63	0.65	1,2,3,8
					6	ROS T1	ROS T1 + 0.32* 2L17 LYN – ROS T1_Over_Rating	0.36	0.56		0.32	0.35	1,2,3,8
1.5	2L13	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.57 * 2L77 ALZ – 2L90_Over_Rating	0.56	0.56		0.46		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.19 * 2L77 ALZ – 2L1_Over_Rating	0.18	0.18		0		1,2,3
					4	2L9	2L9 CKY + 0.34 * 2L77 ALZ – 2L9_Over_Rating	0.33	0.33		0.40		1,2,3
1.5	2L13	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.57 * 2L78 ROS – 2L90_Over_Rating	0.56	0.56		0.46		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.19 * 2L78 ROS – 2L1_Over_Rating	0.18	0.18		0		1,2,3
					4	2L9	2L9 CKY + 0.34 * 2L78 ROS – 2L9_Over_Rating	0.33	0.33		0.40		1,2,3
1.5	2L13	2L90	Note 2		1	ROS T1	ROS T1 + 0.42 * 2L90 BRT – ROS T1_Over_Rating	0.48	0.64		0.32		1,2,3
					2	2L1	2L1 PEM + 0.23 * 2L90 BRT – 2L1_Over_Rating	0.20	0.13		0.07		1,2,3
					3	2L9	2L9 CKY + 0.44 * 2L90 BRT – 2L9_Over_Rating	0.40	0.27		0.55		1,2,3
1.5	2L13	3L2	Note 2		1	2L90	2L90 BRT + 0.57 * 3L2 BRT – 2L90_Over_Rating	0.56	0		0.46		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,9
					3	2L1	2L1 PEM + 0.19 * 3L2 BRT – 2L1_Over_Rating	0.18	0		0		1,2,3,9

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					4	2L9	2L9 CKY + 0.34 * 3L2 BRT – 2L9_Over_Rating	0.33	0		0.40		1,2,3,9
1.5	2L13	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.18 * 3L3 ROS – 2L90_Over_Rating	0.36	0.24				1,2,3,5
					2	BRT T4	BRT T4 + 0.32 * 3L3 ROS – BRT T4_Over_Rating	0.65	0.43				1,2,3,5
1.5	2L13	3L5	Note 2		1	2L90	2L90 BRT + 0.57 * 3L5 UHT – 2L90_Over_Rating	0.56	0.56		0.46		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,9
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,9
					4	2L9	2L9 CKY + 0.34 * 3L5 UHT – 2L9_Over_Rating	0.33	0.33		0.40		1,2,3,9
1.5	2L13	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1				1,2,3,6
1.5	2L13 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L2_Over_Rating	0.41	0.28		0.63		1,2,3
					2	2L9	2L9 CKY – 0.28 * 2L1 BRT + 0.38 * 2L90 BRT – 2L9_Over_Rating	0.34	0.23		0.52		1,2,3
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.53	0.68		0.34		1,2,3
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L41_Over_Rating	0.41	0.28		0		1,2,3
1.5	2L13 & BRT 2CB2 O.O.S.	2L41	Note 2		1	2L1	2L1 PEM + 0.61 * 2L41 BRT + 0.42 * 2L90 BRT – 2L1_Over_Rating	0.37	0.25				1,2,3
					2	2L9	2L9 CKY – 0.35 * 2L41 BRT + 0.33 * 2L90 BRT – 2L9_Over_Rating	0.30	0.21		0.70		1,2,3
					3	ROS T1	ROS T1 + 0.35 * 2L41 BRT + 0.51 * 2L90 BRT – ROS T1_Over_Rating	0.57	0.70				1,2,3
1.5	2L13 & BRT 2CB3 O.O.S.	2L90	Note 2,7		1	2L1	2L1 PEM + 0.61 * 2L41 BRT + 0.42 * 2L90 BRT – 2L1_Over_Rating	0.37	0.25				1,2,3,7
					2	2L9	2L9 CKY – 0.35 * 2L41 BRT + 0.33 * 2L90 BRT – 2L9_Over_Rating	0.30	0.21		0.70		1,2,3,7
					3	ROS T1	ROS T1 + 0.35 * 2L41 BRT + 0.51 * 2L90 BRT – ROS T1_Over_Rating	0.57	0.70				1,2,3,7
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.5	2L13 & BRT 2CB4 O.O.S.	2L90	Note 2,7		1	2L2	2L2 RUT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L2_Over_Rating	0.41	0.28		0.63		1,2,3,7
					2	2L9	2L9 CKY – 0.28 * 2L1 BRT + 0.38 * 2L90 BRT – 2L9_Over_Rating	0.34	0.23		0.52		1,2,3,7
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.53	0.68		0.34		1,2,3,7
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L41_Over_Rating	0.41	0.28		0		1,2,3,7
		2L41	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.5	2L13 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.57 * 3L5 UHT – 2L90_Over_Rating	0.56	0.56		0.46		1,2,3,5,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5,9
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5,9
					4	2L9	2L9 CKY + 0.34 * 3L5 UHT – 2L9_Over_Rating	0.33	0.33		0.40		1,2,3,5,9
1.5	2L13 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.57 * 3L5 UHT – 2L90_Over_Rating	0.56	0.56		0.46		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5
					4	2L9	2L9 CKY + 0.34 * 3L5 UHT – 2L9_Over_Rating	0.33	0.33		0.40		1,2,3,5
1.5	2L13 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.57 * 3L5 UHT – 2L90_Over_Rating	0.56	0.56		0.46		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5
					4	2L9	2L9 CKY + 0.34 * 3L5 UHT – 2L9_Over_Rating	0.33	0.33		0.40		1,2,3,5

Table 1.6 2L14 out-of-service

Note 1 System condition: 2L14 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.36, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L9_Norm_Rating – 2L9 CKY) / 0.21, or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating). The distribution factors for this case are: DF_BRR = 0.36, DF_UH = 0.23, DF_WAH = 0.17, DF_UL = 0.31, DF_CMS = 0.20.

(b) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating). The distribution factors for this case are: DF_BRR = 0.21, DF_UH = 0.14, DF_WAH = 0.09, DF_UL = 0.33, DF_CMS = 0.46.

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP,), and/or run back CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Loss of 2L13 with 2L14 already opened will open CYP T2 on the high side.

Note 5 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 6 Transient stability requirements

Note 7 – The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 8 CKY to MSA 132 kV Path consists of 1L31, 1L32 and 1L35.

Note 9 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
SHED DOWN all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
SHED UH IPP down to 135 MW

Note 10 60L65 would be thermally overloaded if the total power output from non sheddable generating plants in CKY area is more than 210 MW. A recommended solution for Operators is to:

- Open the 60 kV paths between CYP and WLT.

The non sheddable generating plants in CKY area are listed below:
ASL, SKO, CTN, RUT, MAM, UMH, FRI, BOX, BDW, FTZ, SOR, MCP, Min(40 MW, CMS G1), Min(40 MW, CMS G2)

Note 11 If TSA alarms "INSUFFICIENT GEN-SHED for 60L65 OVERLOAD", then both 60 kV paths between CYP and WLT shall be opened. Consult Operations Planning Department for the locations to open.
Note 12 Avoid scheduling circuits OOS to cause only one of the two CYP-WLT 60 kV paths open. If TSA alarms "AVOID ONE 60KV CYP-WLT PATH OPEN WITH 2L14 OOS", studies by Operations Planning Department are required to determine whether switch in the path or open the other one.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.6	2L14	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	ROS T1	ROS T1 + 0.15 * 2L1 BRT – ROS T1_Over_Rating	0.34	0.55		0.18		1,2,3
					2	2L90	2L90 BRT + 0.29 * 2L1 BRT – 2L90_Over_Rating	0.42	0.28		0.34		1,2,3
1.6	2L14	2L2 OR RBW T2	Note 2		1	ROS T1	ROS T1 + 0.17 * 2L2 TIS – ROS T1_Over_Rating	0.34	0.55		0.26		1,2,3
					2	2L90	2L90 BRT + 0.34 * 2L2 TIS – 2L90_Over_Rating	0.44	0.30		0.49		1,2,3
					3	2L1	2L1 PEM + 0.46 * 2L2 TIS – 2L1_Over_Rating	0.19	0.13		0.20		1,2,3
1.6	2L14	2L41	Note 2		1	ROS T1	ROS T1 + 0.18 * 2L41 BRT – ROS T1_Over_Rating	0.35	0.55				1,2,3
					2	2L90	2L90 BRT + 0.34 * 2L41 BRT – 2L90_Over_Rating	0.44	0.30				1,2,3
					3	2L1	2L1 PEM + 0.46 * 2L41 BRT – 2L1_Over_Rating	0.19	0.13				1,2,3
1.6	2L14	2L3	Note 2										1,2
1.6	2L14	2L9 OR LYN T1	Note 2										

If both CYP to WLT 60 kV paths are in service, then,

GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 3 for this contingency.
GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 3 for this contingency.GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 3 for this contingency.
RB_CMS1: Runback amount armed at CMS to solve cases 1 to 3 for this contingency.

Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1	2L90	2L90 BRT + 0.40 * 2L9 CKY - 2L90_Over_Rating	0.48	0.33		0.47	0.39	1,2,3,8,12
2	ROS T1	ROS T1 + 0.18 * 2L9 CKY - ROS_T1_Over_Rating	0.32	0.55		0.23	0.20	1,2,3,8,12
3	60L65	-60L65 JLN + 0.14 * 2L9 CKY - 60L65_Over_Rating	0.05	0.04		0.08	0.12	1,2,3,8,10, 11,12

If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.14 * 2L9 CKY – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.14 * 2L9 CKY – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1< 1L35_Over_Rating, then,
Shed at BRR: GS_BRR1
Shed at UH_IPPs: GS_UH1
Shed at UL_IPPs: GS_ULL1
Shed at CMS: RB_CMS1

If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.14 * 2L9 CKY – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.14 * 2L9 CKY – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1>= 1L35_Over_Rating)], then,

Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 4 to 6:

Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
4	2L90	2L90 BRT + 0.40 * 2L9 CKY + 0.51 * (0.14 * 2L9 CKY – 1L31 GIB) – 2L90_Over_Rating	0.48	0.33		0.47	0.39	1,2,3,8,12
5	ROS T1	ROS T1 + 0.18 * 2L9 CKY + 0.21 * (0.14 * 2L9 CKY – 1L31 GIB) – ROS_T1_Over_Rating	0.32	0.55		0.23	0.20	1,2,3,8,12
6	60L65	-60L65 JLN + 0.14 * 2L9 CKY + 0.13 * (0.14 * 2L9 CKY - 1L31 GIB) - 60L65_Over_Rating	0.05	0.04		0.08	0.12	1,2,3,8,10, 11,12

If CKY to MSA 132 kV PATH OOS, then,

Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 7 to 9:

Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
7	2L90	2L90 BRT + 0.51 * 2L9 CKY – 2L90_Over_Rating	0.51	0.36		0.50	0.46	1,2,3,8,12

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					8	ROS T1	ROS T1 + 0.34 * 2L9 CKY – ROS T1_Over_Rating	0.34	0.57		0.25	0.23	1,2,3,8,12
					9	60L65	-60L65 JLN + 0.16 * 2L9 CKY - 60L65_Over_Rating	0.06	0.04		0.09	0.13	1,2,3,8,10, 11,12
					If both CYP to WLT 60 kV paths are OOS, the following requirements need to be met: GS_BRR2: Gen-shedding amount armed at BRR to solve cases 10 to 11 for this contingency. GS_UH2: Gen-shedding amount armed at UH_IPPs to solve cases 10 to 11 for this contingency GS_UL2: Gen-shedding amount armed at UL_IPPs to solve cases 10 to 11 for this contingency. RB_CMS2: Runback amount armed at CMS to solve cases 10 to 11 for this contingency.								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					10	2L90	2L90 BRT + 0.52 * 2L9 CKY - 2L90_Over_Rating	0.51	0.34		0.53	0.50	1,2,3,8,12
					11	ROS T1	ROS T1 + 0.27 * 2L9 CKY - ROS_T1_Over_Rating	0.37	0.57		0.27	0.26	1,2,3,8,12
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.19 * 2L9 CKY - 0.08 * GS_BRR2 - 0.06 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 < 1L31_Over_Rating AND 1L35 SEC + 0.19 * 2L9 CKY - 0.08 * GS_BRR2 - 0.06 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 < 1L35_Over_Rating, then, Shed at BRR: GS_BRR2 Shed at UH_IPPs: GS_UH2 Shed at UL_IPPs: GS_ULL2 Shed at CMS: RB_CMS2 If CKY to MSA 132 kV PATH I/S AND [-1L31 GIB + 0.19 * 2L9 CKY - 0.08 * GS_BRR2 - 0.06 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 >= 1L31_Over_Rating OR 1L35 SEC + 0.19 * 2L9 CKY - 0.08 * GS_BRR2 - 0.06 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 >= 1L35_Over_Rating], then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 12 to 13:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					12	2L90	2L90 BRT + 0.52 * 2L9 CKY + 0.66 * (0.19 * 2L9 CKY - 1L31 GIB) - 2L90_Over_Rating	0.51	0.34		0.53	0.50	1,2,3,8,12
					13	ROS T1	ROS T1 + 0.27 * 2L9 CKY + 0.32 * (0.19 * 2L9 CKY - 1L31 GIB) - ROS_T1_Over_Rating	0.37	0.57		0.27	0.26	1,2,3,8,12
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 14 to 15:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					14	2L90	2L90 BRT + 0.64 * 2L9 CKY - 2L90_Over_Rating	0.56	0.38		0.63	0.62	1,2,3,8,12
					15	ROS T1	ROS T1 + 0.33 * 2L9 CKY - ROS_T1_Over_Rating	0.39	0.58		0.31	0.31	1,2,3,8,12
1.6	2L14	2L11	Note 2										1,2
1.6	2L14	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.19 * 2L13 CKY – 2L90_Over_Rating	0.36	0.24		0.34	0.23	1,2,3,4
					2	2L9	2L9 CKY + 0.62* 2L13 CKY – 2L9_Over_Rating	0.24	0.15		0.38	0.54	1,2,3,4
					3	ROS T1	ROS T1 + 0.12 * 2L13 CKY – ROS T1_Over_Rating	0.34	0.56		0.17	0.11	1,2,3,4
1.6	2L14	2L14 OR CYP T3	Note 2		Not applicable								
1.6	2L14	2L17 OR LYN T2	Note 2		If both CYP to WLT 60 kV paths are in service, then, GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 3 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 3 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 3 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 3 for this contingency.								

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					1	2L90	2L90 BRT + 0.41 * 2L17 LYN - 2L90_Over_Rating	0.48	0.33		0.44	0.39	1,2,3,8,12
					2	ROS T1	ROS T1 + 0.19 * 2L17 LYN - ROS_T1_Over_Rating	0.33	0.54		0.23	0.20	1,2,3,8,12
					3	60L65	-60L65 JLN + 0.15 * 2L17 LYN - 60L65_Over_Rating	0.05	0.04		0.08	0.12	1,2,3,8,10, 11,12
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.14 * 2L17 LYN – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.14 * 2L17 LYN – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 < 1L35_Over_Rating, then, Shed at BRR: GS_BRR1 Shed at UH_IPPs: GS_UH1 Shed at UL_IPPs: GS_UL1 Shed at CMS: RB_CMS1 If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.14 * 2L17 LYN – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.14 * 2L17 LYN – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 >= 1L35_Over_Rating)], then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 4 to 6:							
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					4	2L90	2L90 BRT + 0.41 * 2L17 LYN + 0.51 * (0.14 * 2L17 LYN–1L31 GIB) –2L90_Over_Rating	0.48	0.33		0.44	0.39	1,2,3,8,12
					5	ROS T1	ROS T1 + 0.18 * 2L17 LYN + 0.23 * (0.14 * 2L17 LYN – 1L31 GIB) – ROS_T1_Over_Rating	0.33	0.54		0.23	0.20	1,2,3,8,12
					6	60L65	-60L65 JLN + 0.15 * 2L17 LYN + 0.14 * (0.14 * 2L17 LYN - 1L31 GIB) - 60L65_Over_Rating	0.05	0.04		0.08	0.12	1,2,3,8,10, 11,12
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 7 to 9:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					7	2L90	2L90 BRT + 0.48 * 2L17 LYN – 2L90_Over_Rating	0.51	0.35		0.49	0.46	1,2,3,8,12
					8	ROS T1	ROS T1 + 0.22 * 2L17 LYN – ROS T1_Over_Rating	0.34	0.55		0.26	0.23	1,2,3,8,12
					9	60L65	-60L65 JLN + 0.17 * 2L17 LYN - 60L65_Over_Rating	0.06	0.04		0.10	0.14	1,2,3,8,10, 11,12
					If both CYP to WLT 60 kV paths are OOS, the following requirements need to be met: GS_BRR2: Gen-shedding amount armed at BRR to solve cases 10 to 11 for this contingency. GS_UH2: Gen-shedding amount armed at UH_IPPs to solve cases 10 to 11 for this contingency GS_UL2: Gen-shedding amount armed at UL_IPPs to solve cases 10 to 11 for this contingency. RB_CMS2: Runback amount armed at CMS to solve cases 10 to 11 for this contingency.								
					10	2L90	2L90 BRT + 0.54 * 2L17 LYN - 2L90_Over_Rating	0.51	0.34		0.54	0.51	1,2,3,8,12
					11	ROS T1	ROS T1 + 0.28 * 2L17 LYN - ROS_T1_Over_Rating	0.28	0.57		0.27	0.26	1,2,3,8,12

<table>
<tr><th>Table</th><th>Condition</th><th>Contingency</th><th>MAX Gen</th><th>SHED BRR Down to MW</th><th>Case no</th><th>Overload element</th><th>Overload Amount</th><th>DF_BRR</th><th>DF_UH</th><th></th><th>DF_UL</th><th>DF_CMS</th><th>Notes</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td colspan="9">If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.20 * 2L17 LYN - 0.08 * GS_BRR2 - 0.05 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 < 1L31_Over_Rating AND 1L35 SEC + 0.20 * 2L17 LYN - 0.08 * GS_BRR2 - 0.05 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 < 1L35_Over_Rating, then,

Shed at BRR: GS_BRR2
Shed at UH_IPPs: GS_UH2
Shed at UL_IPPs: GS_ULL2
Shed at CMS: RB_CMS2

If CKY to MSA 132 kV PATH I/S AND [-1L31 GIB + 0.20 * 2L17 LYN - 0.08 * GS_BRR2 - 0.05 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 >= 1L31_Over_Rating OR 1L35 SEC + 0.20 * 2L17 LYN - 0.08 * GS_BRR2 - 0.05 * GS_UH2 - 0.14 * GS_ULL2 - 0.19 * RB_CMS2 >= 1L35_Over_Rating], then,

Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 12 to 13:
<table>
<tr><th>Case</th><th>Overload Element</th><th>Overload Amount</th><th>DF_BRR</th><th>DF_UH</th><th></th><th>DF_UL</th><th>DF_CMS</th><th>Notes</th></tr>
<tr><td>12</td><td>2L90</td><td>2L90 BRT + 0.54 * 2L17 LYN + 0.66 * (0.20 * 2L17 LYN - 1L31 GIB) - 2L90_Over_Rating</td><td>0.51</td><td>0.34</td><td></td><td>0.54</td><td>0.51</td><td>1,2,3,8,12</td></tr>
<tr><td>13</td><td>ROS T1</td><td>ROS T1 + 0.28 * 2L17 LYN + 0.32 * (0.20 * 2L17 LYN - 1L31 GIB) - ROS_T1_Over_Rating</td><td>0.28</td><td>0.57</td><td></td><td>0.27</td><td>0.26</td><td>1,2,3,8,12</td></tr>
</table>
If CKY to MSA 132 kV PATH OOS, then,

Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 14 to 15:
<table>
<tr><th>Case</th><th>Overload Element</th><th>Overload Amount</th><th>DF_BRR</th><th>DF_UH</th><th></th><th>DF_UL</th><th>DF_CMS</th><th>Notes</th></tr>
<tr><td>14</td><td>2L90</td><td>2L90 BRT + 0.67 * 2L17 LYN - 2L90_Over_Rating</td><td>0.56</td><td>0.38</td><td></td><td>0.63</td><td>0.63</td><td>1,2,3,8,12</td></tr>
<tr><td>15</td><td>ROS T1</td><td>ROS T1 + 0.33 * 2L17 LYN - ROS_T1_Over_Rating</td><td>0.39</td><td>0.59</td><td></td><td>0.32</td><td>0.32</td><td>1,2,3,8,12</td></tr>
</table></td></tr>
<tr><td>1.6</td><td>2L14</td><td>2L77 OR CBN T3 OR CBN T6</td><td>Note 2</td><td></td><td>1</td><td>2L90</td><td>2L90 BRT + 0.55 * 2L77 ALZ – 2L90_Over_Rating</td><td>0.54</td><td>0.54</td><td></td><td>0.44</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2</td><td>BRT T4</td><td>BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating</td><td>0.99</td><td>0.99</td><td></td><td>0</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2L1</td><td>2L1 PEM + 0.19 * 2L77 ALZ – 2L1_Over_Rating</td><td>0.18</td><td>0.18</td><td></td><td>0</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>4</td><td>2L9</td><td>2L9 CKY + 0.29 * 2L77 ALZ – 2L9_Over_Rating</td><td>0.28</td><td>0.28</td><td></td><td>0.36</td><td></td><td>1,2,3</td></tr>
<tr><td>1.6</td><td>2L14</td><td>2L78 OR ROS T1</td><td>Note 2</td><td></td><td>1</td><td>2L90</td><td>2L90 BRT + 0.55 * 2L78 ROS – 2L90_Over_Rating</td><td>0.54</td><td>0.54</td><td></td><td>0.44</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2</td><td>BRT T4</td><td>BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating</td><td>0.99</td><td>0.99</td><td></td><td>0</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2L1</td><td>2L1 PEM + 0.19 * 2L78 ROS – 2L1_Over_Rating</td><td>0.18</td><td>0.18</td><td></td><td>0</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>4</td><td>2L9</td><td>2L9 CKY + 0.29 * 2L78 ROS – 2L9_Over_Rating</td><td>0.28</td><td>0.28</td><td></td><td>0.36</td><td></td><td>1,2,3</td></tr>
<tr><td>1.6</td><td>2L14</td><td>2L90</td><td>Note 2</td><td></td><td>1</td><td>ROS T1</td><td>ROS T1 + 0.42 * 2L90 BRT – ROS T1_Over_Rating</td><td>0.49</td><td>0.64</td><td></td><td>0.32</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2</td><td>2L1</td><td>2L1 PEM + 0.24 * 2L90 BRT – 2L1_Over_Rating</td><td>0.20</td><td>0.13</td><td></td><td>0.07</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2L9</td><td>2L9 CKY + 0.44 * 2L90 BRT – 2L9_Over_Rating</td><td>0.40</td><td>0.27</td><td></td><td>0.55</td><td></td><td>1,2,3</td></tr>
<tr><td>1.6</td><td>2L14</td><td>3L2</td><td>Note 2</td><td></td><td>1</td><td>2L90</td><td>2L90 BRT + 0.55 * 3L2 BRT – 2L90_Over_Rating</td><td>0.54</td><td>0</td><td></td><td>0.44</td><td></td><td>1,2,3,9</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2</td><td>BRT T4</td><td>BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating</td><td>0.99</td><td>0</td><td></td><td>0</td><td></td><td>1,2,3,9</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2L1</td><td>2L1 PEM + 0.19 * 3L2 BRT – 2L1_Over_Rating</td><td>0.18</td><td>0</td><td></td><td>0</td><td></td><td>1,2,3,9</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>4</td><td>2L9</td><td>2L9 CKY + 0.29 * 3L2 BRT – 2L9_Over_Rating</td><td>0.28</td><td>0</td><td></td><td>0.36</td><td></td><td>1,2,3,9</td></tr>
<tr><td>1.6</td><td>2L14</td><td>3L3 OR WAH T1 OR WAH T3 OR WAH T5</td><td>Note 2</td><td></td><td>1</td><td>2L90</td><td>2L90 BRT + 0.18 * 3L3 ROS – 2L90_Over_Rating</td><td>0.36</td><td>0.23</td><td></td><td></td><td></td><td>1,2,3,5</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2</td><td>BRT T4</td><td>BRT T4 + 0.32 * 3L3 ROS – BRT T4_Over_Rating</td><td>0.65</td><td>0.43</td><td></td><td></td><td></td><td>1,2,3,5</td></tr>
<tr><td>1.6</td><td>2L14</td><td>3L5</td><td>Note 2</td><td></td><td>1</td><td>2L90</td><td>2L90 BRT + 0.55 * 3L5 UHT – 2L90_Over_Rating</td><td>0.54</td><td>0.54</td><td></td><td>0.44</td><td></td><td>1,2,3,9</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2</td><td>BRT T4</td><td>BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating</td><td>0.99</td><td>0.99</td><td></td><td>0</td><td></td><td>1,2,3,9</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2L1</td><td>2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating</td><td>0.18</td><td>0.18</td><td></td><td>0</td><td></td><td>1,2,3,9</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>4</td><td>2L9</td><td>2L9 CKY + 0.29 * 3L5 UHT – 2L9_Over_Rating</td><td>0.28</td><td>0.28</td><td></td><td>0.36</td><td></td><td>1,2,3,9</td></tr>
<tr><td>1.6</td><td>2L14</td><td>BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30</td><td>Note 2</td><td>220</td><td>1</td><td>ROS T1</td><td>ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating</td><td>1</td><td>1</td><td></td><td></td><td></td><td>1,2,3,6</td></tr>
<tr><td>1.6</td><td>2L14 & BRT 2CB1 O.O.S.</td><td>2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1</td><td>Note 2</td><td></td><td>1</td><td>2L2</td><td>2L2 RUT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L2_Over_Rating</td><td>0.41</td><td>0.28</td><td></td><td>0.63</td><td></td><td>1,2,3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>2</td><td>2L9</td><td>2L9 CKY – 0.28 2L1 BRT + 0.38 * 2L90 BRT – 2L9_Over_Rating</td><td>0.34</td><td>0.23</td><td></td><td>0.52</td><td></td><td>1,2,3</td></tr>
</table>

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.53	0.68		0.34		1,2,3
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L41_Over_Rating	0.41	0.28		0		1,2,3
1.6	2L14 & BRT 2CB2 O.O.S.	2L41	Note 2		1	2L1	2L1 PEM + 0.60 * 2L41 BRT + 0.43 * 2L90 BRT – 2L1_Over_Rating	0.36	0.25				1,2,3
					2	2L9	2L9 CKY – 0.35 * 2L41 BRT + 0.33 * 2L90 BRT – 2L9_Over_Rating	0.30	0.21		0.70		1,2,3
					3	ROS T1	ROS T1 + 0.35 * 2L41 BRT + 0.51 * 2L90 BRT – ROS T1_Over_Rating	0.57	0.70				1,2,3
1.6	2L14 & BRT 2CB3 O.O.S.	2L90	Note 2,7		1	2L1	2L1 PEM + 0.60 * 2L41 BRT + 0.43 * 2L90 BRT – 2L1_Over_Rating	0.36	0.25				1,2,3,7
					2	2L9	2L9 CKY – 0.35 * 2L41 BRT + 0.33 * 2L90 BRT – 2L9_Over_Rating	0.30	0.21		0.70		1,2,3,7
					3	ROS T1	ROS T1 + 0.35 * 2L41 BRT + 0.51 * 2L90 BRT – ROS T1_Over_Rating	0.57	0.70				1,2,3,7
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.6	2L14 & BRT 2CB4 O.O.S.	2L90	Note 2,7		1	2L2	2L2 RUT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L2_Over_Rating	0.40	0.28		0.63		1,2,3,7
					2	2L9	2L9 CKY – 0.28 * 2L1 BRT + 0.38 * 2L90 BRT – 2L9_Over_Rating	0.34	0.23		0.52		1,2,3,7
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.53	0.69		0.34		1,2,3,7
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.47 * 2L90 BRT – 2L41_Over_Rating	0.40	0.28		0		1,2,3,7
		2L41	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.6	2L14 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.55 * 3L5 UHT – 2L90_Over_Rating	0.54	0.54		0.44		1,2,3,5,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5,9
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5,9
					4	2L9	2L9 CKY + 0.29 * 3L5 UHT – 2L9_Over_Rating	0.28	0.28		0.36		1,2,3,5,9
1.6	2L14 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.55 * 3L5 UHT – 2L90_Over_Rating	0.54	0.54		0.44		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5
					4	2L9	2L9 CKY + 0.29 * 3L5 UHT – 2L9_Over_Rating	0.28	0.28		0.36		1,2,3,5
1.6	2L14 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.55 * 3L5 UHT – 2L90_Over_Rating	0.54	0.54		0.44		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5
					4	2L9	2L9 CKY + 0.29 * 3L5 UHT – 2L9_Over_Rating	0.28	0.28		0.36		1,2,3,5

Table 1.7 **2L17 out-of-service**

Note 1 System condition: 2L17 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.37, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L13_Norm_Rating – 2L13 CKY) / 0.22, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS T1_Norm_Rating – ROS T1) / 0.35, or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.37, DF_UH = 0.24, DF_WAH = 0.19, DF_ULL = 0.34, DF_CMS = 0.26.

(b) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L13 CKY - 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.22, DF_UH = 0.14, DF_WAH = 0.11, DF_UL = 0.35, DF_CMS = 0.50.

(c) If TSA alarms "VIOLATION_ROS T1 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.35, DF_UH = 0.57, DF_WAH = 0.69, DF_UL = 0.19, DF_CMS = 0.14.

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Loss of 2L9 with 2L17 already opened will drop LYN load.

Note 5 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 6 Transient stability requirements

Note 7 The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 8 CKY to MSA 132 kV Path consists of 1L31, 1L32 and 1L35.

Note 9 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
SHED DOWN all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
SHED UH IPP down to 135 MW

Note 10 60L65 would still be thermally overloaded after BR generation shedding if the total power output from non sheddable generating plants in CKY area is more than 230 MW. A recommended solution for Operators is to:

- Open the 60 kV paths between CYP and WLT.

The non sheddable generating plants in CKY area are listed below:
ASL, SKO, CTN, RUT, MAM, UMH, FRI, BOX, BDW, FTZ, SOR, MCP, Min(40 MW, CMS G1), Min(40 MW, CMS G2)

Note 11 If TSA alarms "INSUFFICIENT GEN-SHED for 60L65 OVERLOAD", then both of 60 kV paths between CYP and WLT shall be opened. Consult Operations Planning department for the locations to open.

Note 12 Avoid scheduling circuits OOS to cause only one of the two CYP-WLT 60 kV paths open. If TSA alarms "AVOID ONE 60KV CYP-WLT PATH OPEN WITH 2L17 OOS", studies by Operations Planning Department are required to determine whether switch in the path or open the other one.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case No.	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.7	2L17	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	ROS T1	ROS T1 + 0.14 * 2L1 BRT – ROS T1_Over_Rating	0. 34	0.55		0.18		1,2,3
					2	2L90	2L90 BRT + 0.27 * 2L1 BRT – 2L90_Over_Rating	0.42	0.29		0.35		1,2,3
1.7	2L17	2L2 OR RBW T2	Note 2		1	ROS T1	ROS T1 + 0.17 * 2L2 TIS – ROS T1_Over_Rating	0.35	0.55		0.26		1,2,3
					2	2L90	2L90 BRT + 0.32 * 2L2 TIS – 2L90_Over_Rating	0.44	0.30		0.50		1,2,3,
					3	2L1	2L1 PEM + 0.49 * 2L2 TIS – 2L1_Over_Rating	0.18	0.12		0.19		1,2,3
1.7	2L17	2L41	Note 2		1	ROS T1	ROS T1 + 0.17 * 2L41 BRT – ROS T1_Over_Rating	0.35	0.56				1,2,3
					2	2L90	2L90 BRT + 0.33 * 2L41 BRT – 2L90_Over_Rating	0.44	0.30				1,2,3
					3	2L1	2L1 PEM + 0.49 * 2L41 BRT – 2L1_Over_Rating	0.18	0.12				1,2,3
1.7	2L17	2L3	Note 2										1,2
1.7	2L17	2L9 OR LYN T1	Note 2										1,2
1.7	2L17	2L11	Note 2										1,2
1.7	2L17	2L13 OR CYP T2	Note 2		GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 2 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 2 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 2 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 2 for this contingency.								

Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1	2L90	2L90 BRT + 0.54 * 2L13 CKY - 2L90_Over_Rating	0.54	0.37		0.51	0.49	1,2,3,8
2	ROS T1	ROS T1 + 0.25 * 2L13 CKY - ROS_T1_Over_Rating	0.35	0.55		0.30	0.27	1,2,3,8

If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.06 * GS_UH1 – 0.11* GS_UL1 – 0.16 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.06 * GS_UH1– 0.11* GS_UL1 – 0.16 * RB_CMS1 < 1L35_Over_Rating, then,
Shed at BRR: GS_BRR1
Shed at UH_IPPs: GS_UH1

Shed at UL_IPPs: GS_UL1
Shed at CMS: RB_CMS1

If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.06 * GS_UH1– 0.11* GS_UL1 – 0.16 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.19 * 2L13 CKY – 0.08 * GS_BRR1 – 0.06 * GS_UH1– 0.11* GS_UL1 – 0.16 * RB_CMS1 >= 1L35_Over_Rating)], then,

Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 3 to 4:

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case No.	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L90	2L90 BRT + 0.54 * 2L13 CKY + 0.69*(0.19*2L13 CKY–1L31 GIB) –2L90_Over_Rating	0.54	0.37		0.51	0.49	1,2,3,8
					4	ROS T1	ROS T1 + 0.25 * 2L13 CKY + 0.29*(0.19*2L13 CKY – 1L31 GIB) – ROS_T1_Over_Rating	0.35	0.55		0.30	0.27	1,2,3,8
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 5 to 6:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L90	2L90 BRT + 0.68 * 2L13 CKY – 2L90_Over_Rating	0.60	0.41		0.64	0.62	1,2,3,8
					6	ROS T1	ROS T1 + 0.30 * 2L13 CKY – ROS T1_Over_Rating	0.37	0.57		0.34	0.33	1,2,3,8
1.7	2L17	2L14 OR CYP T3	Note 2		If both CYP to WLT 60 kV paths are in service, then, GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 3 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 3 for this contingency. GS_ULL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 3 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 3 for this contingency.								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					1	2L90	2L90 BRT + 0.33 * 2L14 CYP - 2L90_Over_Rating	0.48	0.33		0.45	0.39	1,2,3,8,12
					2	ROS T1	ROS T1 + 0.15 * 2L14 CYP - ROS_T1_Over_Rating	0.33	0.55		0.26	0.20	1,2,3,8,12
					3	60L65	-60L65 JLN + 0.23 * 2L14 CYP - 60L65_Over_Rating	0.05	0.04		0.09	0.13	1,2,3,8, 10,11,12
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.11 * 2L14 CYP – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.11 * 2L14 CYP – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1 < 1L35_Over_Rating, then, Shed at BRR: GS_BRR1 Shed at UH_IPPs: GS_UH1 Shed at UL_IPPs: GS_ULL1 Shed at CMS: RB_CMS1 If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.11 * 2L14 CYP – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_ULL1 – 0.14 * RB_CMS1>= 1L31_Over_Rating OR 1L35 SEC + 0.11 * 2L14 CYP – 0.06 * GS_BRR1 – 0.04 * GS_UH1– 0.10 * GS_UL1 – 0.14 * RB_CMS1>= 1L35_Over_Rating)], then, Gen-shedding at BRR, UH_IPPs, WAH, UL_IPPs and/or CMS to solve cases 4 to 6:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					4	2L90	2L90 BRT + 0.33 * 2L14 CYP + 0.48 * (0.11 * 2L14 CYP–1L31 GIB) – 2L90_Over_Rating	0.48	0.33		0.45	0.39	1,2,3,8,12
					5	ROS T1	ROS T1 + 0.15 * 2L14 CYP + 0.20 * (0.11 * 2L14 CYP – 1L31 GIB) – ROS_T1_Over_Rating	0.33	0.55		0.26	0.20	1,2,3,8,12
					6	60L65	-60L65 JLN + 0.23 * 2L14 CYP + 0.15 * (0.11 * 2L14 CYP - 1L31 GIB) - 60L65_Over_Rating	0.05	0.04		0.09	0.13	1,2,3,8, 10,11,12
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 7 to 9:								
					Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					7	2L90	2L90 BRT + 0.38 * 2L14 CYP – 2L90_Over_Rating	0.51	0.35		0.50	0.46	1,2,3,8,12
					8	ROS T1	ROS T1 + 0.17 * 2L14 CYP – ROS T1_Over_Rating	0.34	0.55		0.22	0.21	1,2,3,8,12

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case No.	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					9	60L65	-60L65 JLN + 0.25 * 2L14 CYP - 60L65_Over_Rating	0.06	0.05		0.11	0.14	1,2,3,8, 10,11,12

If both CYP to WLT 60 kV paths are OOS, the following requirements need to be met:

GS_BRR2: Gen-shedding amount armed at BRR to solve cases 10 to 11 for this contingency.
GS_UH2: Gen-shedding amount armed at UH_IPPs to solve cases 10 to 11 for this contingency.
GS_ULL2: Gen-shedding amount armed at UL_IPPs to solve cases 10 to 11 for this contingency.
RB_CMS2: Runback amount armed at CMS to solve cases 10 to 11 for this contingency.

Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
10	2L90	2L90 BRT + 0.52 * 2L14 CYP - 2L90_Over_Rating	0.5	0.32		0.53	0.49	1,2,3,8,12
11	ROS T1	ROS T1 + 0.28 * 2L14 CYP - ROS T1 rating	0.37	0.61		0.27	0.26	1,2,3,8,12

If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.20 * 2L14 CYP - 0.08 * GS_BRR2 - 0.05 * GS_UH2 - 0.14 * GS_ULL2 - 0.18 * RB_CMS2 < 1L31_Over_Rating AND 1L35 SEC + 0.20 * 2L14 CYP – 0.08 * GS_BRR2 – 0.05 * GS_UH2 – 0.14 * GS_ULL2 – 0.18 * RB_CMS2 < 1L35_Over_Rating, then,
Shed at BRR: GS_BRR2
Shed at UH_IPPs: GS_UH2
Shed at UL_IPPs: GS_ULL2
Shed at CMS: RB_CMS2

If CKY to MSA 132 kV PATH I/S AND [-1L31 GIB + 0.20 * 2L14 CYP - 0.08 * GS_BRR2 - 0.05 * GS_UH2 - 0.14 * GS_ULL2 - 0.18 * RB_CMS2 >= 1L31_Over_Rating OR 1L35 SEC + 0.20 * 2L14 CYP – 0.08 * GS_BRR2 – 0.05 * GS_UH2 – 0.14 * GS_ULL2 – 0.18 * RB_CMS2 >= 1L35_Over_Rating], then,

Gen-shedding at BRR, UH_IPPs, WAH, UL_IPPs and/or CMS to solve cases 12 to 13:

Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
12	2L90	2L90 + 0.52 * 2L14 CYP + 0.64 * (0.20 * 2L14 CYP - 1L31 GIB) - 2L90_Over_Rating	0.5	0.32		0.53	0.49	1,2,3,8,12
13	ROS T1	ROS T1 + 0.28 * 2L14 CYP + 0.33 (0.20 * 2L14 CYP - 1L31 GIB) - ROS_T1_Over_Rating	0.37	0.61		0.27	0.26	1,2,3,8,12

If CKY to MSA 132 kV PATH OOS, then,

Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 14 to 15:

Case	Overload Element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
14	2L90	2L90 BRT + 0.65 * 2L14 CYP - 2L90_Over_Rating	0.56	0.34		0.62	0.61	1,2,3,8,12
15	ROS T1	ROS T1 + 0.35 * 2L14 CYP - ROS_T1_Over_Rating	0.4	0.63		0.32	0.32	1,2,3,8,12

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case No.	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.7	2L17	2L17 OR LYN T2	Note 2		Not applicable								
1.7	2L17	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.59 * 2L77 ALZ – 2L90_Over_Rating	0.58	0.58		0.48		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.18 * 2L77 ALZ – 2L1_Over_Rating	0.17	0.17		0		1,2,3
					4	2L13	2L13 CKY + 0.32 * 2L77 ALZ – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3
1.7	2L17	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.59 * 2L78 ROS – 2L90_Over_Rating	0.58	0.58		0.48		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.18 * 2L78 ROS – 2L1_Over_Rating	0.17	0.17		0		1,2,3
					4	2L13	2L13 CKY + 0.32 * 2L78 ROS – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3
1.7	2L17	2L90	Note 2		1	ROS T1	ROS T1 + 0.43 * 2L90 BRT – ROS T1_Over_Rating	0.49	0.65		0.35		1,2,3
					2	2L1	2L1 PEM + 0.22 * 2L90 BRT – 2L1_Over_Rating	0.19	0.12		0.06		1,2,3
					3	2L13	2L13 CKY + 0.41 * 2L90 BRT – 2L13_Over_Rating	0.38	0.25		0.51		1,2,3
1.7	2L17	3L2	Note 2		1	2L90	2L90 BRT + 0.59 * 3L2 BRT – 2L90_Over_Rating	0.58	0		0.48		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,9

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case No.	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L1	2L1 PEM + 0.18 * 3L2 BRT – 2L1_Over_Rating	0.17	0		0		1,2,3,9
					4	2L13	2L13 CKY + 0.32 * 3L2 BRT – 2L13_Over_Rating	0.31	0		0.37		1,2,3,9
1.7	2L17	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.19 * 3L3 ROS – 2L90_Over_Rating	0.37	0.24				1,2,3,5
					2	BRT T4	BRT T4 + 0.32 * 3L3 ROS – BRT T4_Over_Rating	0.64	0.42				1,2,3,5
1.7	2L17	3L5	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.48		1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,9
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,9
					4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3,9
1.7	2L17	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1				1,2,3,6
1.7	2L17 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L2_Over_Rating	0.40	0.27		0.61		1,2,3
					2	2L13	2L13 CKY - 0.27 * 2L1 BRT + 0.35 * 2L90 BRT – 2L13_Over_Rating	0.32	0.22		0.49		1,2,3
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.49 * 2L90 BRT – ROS T1_Over_Rating	0.55	0.69		0.35		1,2,3
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L41_Over_Rating	0.40	0.27		0		1,2,3
1.7	2L17 & BRT 2CB2 O.O.S.	2L41	Note 2		1	2L1	2L1 PEM + 0.61 * 2L41 BRT + 0.40 * 2L90 BRT – 2L1_Over_Rating	0.36	0.24				1,2,3
					2	2L13	2L13 CKY - 0.33 * 2L41 BRT + 0.31 * 2L90 BRT – 2L13_Over_Rating	0.28	0.19		0.66		1,2,3
					3	ROS T1	ROS T1 + 0.34 * 2L41 BRT + 0.53 * 2L90 BRT – ROS T1_Over_Rating	0.58	0.71				1,2,3
1.7	2L17 & BRT 2CB3 O.O.S.	2L90	Note 2,7		1	2L1	2L1 PEM + 0.61 * 2L41 BRT + 0.40 * 2L90 BRT – 2L1_Over_Rating	0.36	0.24				1,2,3,7
					2	2L13	2L13 CKY - 0.33 * 2L41 BRT + 0.31 * 2L90 BRT – 2L13_Over_Rating	0.28	0.19		0.66		1,2,3,7
					3	ROS T1	ROS T1 + 0.34 * 2L41 BRT + 0.53 * 2L90 BRT – ROS T1_Over_Rating	0.58	0.71				1,2,3,7
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.7	2L17 & BRT 2CB4 O.O.S.	2L90	Note 2,7		1	2L2	2L2 RUT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L2_Over_Rating	0.40	0.27		0.61		1,2,3,7
					2	2L13	2L13 CKY - 0.27 * 2L1 BRT + 0.35 * 2L90 BRT – 2L13_Over_Rating	0.32	0.22		0.49		1,2,3,7
					3	ROS T1	ROS T1 + 0.29 * 2L1 BRT + 0.49 * 2L90 BRT – ROS T1_Over_Rating	0.55	0.69		0.35		1,2,3,7
					4	2L41	2L41 BRT + 0.68 * 2L1 BRT + 0.45 * 2L90 BRT – 2L41_Over_Rating	0.40	0.27		0		1,2,3,7
		2L41	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.7	2L17 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.48		1,2,3,5,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5,9
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,5,9
					4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3,5,9
1.7	2L17 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.48		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,5
					4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13_Over_Rating	0.31	0.31		0.37		1,2,3,5
1.7	2L17 & ROS 3CB3	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.59 * 3L5 UHT – 2L90_Over_Rating	0.58	0.58		0.48		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,5

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case No.	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
	O.O.S.				4	2L13	2L13 CKY + 0.32 * 3L5 UHT – 2L13 Over Rating	0.31	0.31		0.37		1,2,3,5

Table 1.8 **2L41 out-of-service**

Note 1 System condition: 2L41 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.42, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L1_Norm_Rating – 2L1 PEM) / 0.21, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS T1_Norm_Rating – ROS T1) / 0.34, or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs, and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms “VIOLATION_2L90 CONTINUOUS RATING”, then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.42, DF_UH = 0.29, DF_WAH = 0.19, DF_UL = 0, DF_CMS = 0.12

(b) If TSA alarms “VIOLATION_2L1 CONTINUOUS RATING”, then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (2L1 PEM - 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UH = 0.13, DF_WAH = 0.10, DF_UL = 0, DF_CMS = 0

(c) If TSA alarms “VIOLATION_ROS T1 CONTINUOUS RATING”, then BRR, UH_IPP WAH, UL_IPP, and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.34, DF_UH = 0.55, DF_WAH = 0.69, DF_UL = 0, DF_CMS = 0.06

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP) and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 5 Transient stability requirements

Note 6 The pre-outage limit in conjunction with BRT 2CB1 outage or BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 7 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
SHED DOWN all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
SHED UH IPP down to 135 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.8 Note1,2	2L41	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.64 * 2L1 BRT – 2L90_Over_Rating	0.56	0.38				1,2,3
					2	ROS T1	ROS T1 + 0.33 * 2L1 BRT – ROS T1_Over_Rating	0.41	0.59				1,2,3
1.8 Note 1,2	2L41	2L3	Note 2		1	2L11	2L11 WLT + 0.92 * 2L3 WLT – 2L11_Over_Rating	0.16	0.11		0.65	0.67	1,2,3
1.8 Note1,2	2L41	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.15 * 2L9 CKY – 2L90_Over_Rating	0.42	0.28		0.18	0.19	1,2,3
					2	2L13	2L13 CKY + 0.66 * 2L9 CKY – 2L13_Over_Rating	0.15	0.10		0.59	0.60	1,2,3
					3	ROS T1	ROS T1 + 0.10 * 2L9 CKY – ROS T1_Over_Rating	0.37	0.58		0.10	0.10	1,2,3
1.8 Note 1,2	2L41	2L11	Note 2		1	2L3	2L3 WLT + 0.97 * 2L11 WLT – 2L3_Over_Rating	0.17	0.12		0.68	0.70	1,2,3
1.8 Note1,2	2L41	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.13 * 2L13 CKY – 2L90_Over_Rating	0.41	0.27		0.17	0.16	1,2,3
					2	2L9	2L9 CKY + 0.71 * 2L13 CKY – 2L9_Over_Rating	0.16	0.11		0.63	0.64	1,2,3
					3	ROS T1	ROS T1 + 0.09 * 2L13 CKY – ROS T1_Over_Rating	0.37	0.58		0.09	0.09	1,2,3
1.8 Note1,2	2L41	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.10 * 2L14 CYP – 2L90_Over_Rating	0.41	0.27		0.15	0.14	1,2,3
					2	2L9	2L9 CKY + 0.52 * 2L14 CYP – 2L9_Over_Rating	0.14	0.09		0.54	0.56	1,2,3
1.8 Note1,2	2L41	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.15 * 2L17 LYN – 2L90_Over_Rating	0.42	0.28		0.18	0.17	1,2,3
					2	2L13	2L13 CKY + 0.66 * 2L17 LYN – 2L13_Over_Rating	0.15	0.10		0.59	0.61	1,2,3
					3	ROS T1	ROS T1 + 0.10 * 2L17 LYN – ROS T1_Over_Rating	0.37	0.58		0.10	0.10	1,2,3
1.8 Note1,2	2L41	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.65 * 2L77 ALZ – 2L90_Over_Rating	0.64	0.64		0		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.31 * 2L77 ALZ – 2L1_Over_Rating	0.30	0.30		0		1,2,3
					4	2L3	2L3 WLT + 0.17 * 2L77 ALZ – 2L3_Over_Rating	0.16	0.16		0.43		1,2,3
					5	2L9	2L9 CKY + 0.14 * 2L77 ALZ – 2L9_Over_Rating	0.13	0.13		0.40		1,2,3
					6	2L13	2L13 CKY + 0.12 * 2L77 ALZ – 2L13_Over_Rating	0.11	0.11		0.33		1,2,3
1.8 Note1,2	2L41	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.65 * 2L78 ROS – 2L90_Over_Rating	0.64	0.64		0		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.31 * 2L78 ROS – 2L1_Over_Rating	0.30	0.30		0		1,2,3
					4	2L3	2L3 WLT + 0.17 * 2L78 ROS – 2L3_Over_Rating	0.16	0.16		0.43		1,2,3

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L9	2L9 CKY + 0.14 * 2L78 ROS – 2L9_Over_Rating	0.13	0.13		0.40		1 2,3
					6	2L13	2L13 CKY + 0.12 * 2L78 ROS – 2L13_Over_Rating	0.11	0.11		0.33		1,2,3
1.8 Note1,2	2L41	2L90	Note 2		1	ROS T1	ROS T1 + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.54	0.68				1,2,3
					2	2L1	2L1 PEM + 0.45 * 2L90 BRT – 2L1_Over_Rating	0.40	0.27				1,2,3
1.8 Note1,2	2L41	3L2	Note 2		1	2L90	2L90 BRT + 0.65 * 3L2 BRT – 2L90_Over_Rating	0.64	0		0		1,2,3,7
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,7
					3	2L1	2L1 PEM + 0.31 * 3L2 BRT – 2L1_Over_Rating	0.30	0		0		1,2,3,7
					4	2L3	2L3 WLT + 0.17 * 3L2 BRT – 2L3_Over_Rating	0.16	0		0.43		1,2,3,7
					5	2L9	2L9 CKY + 0.14 * 3L2 BRT – 2L9_Over_Rating	0.13	0		0.40		1,2,3,7
					6	2L13	2L13 CKY + 0.12 * 3L2 BRT – 2L13_Over_Rating	0.11	0		0.33		1,2,3,7
1.8 Note1,2	2L41	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.20 * 3L3 ROS – 2L90_Over_Rating	0.40	0.27				1,2,3,4
					2	BRT T4	BRT T4 + 0.31 * 3L3 ROS – BRT T4_Over_Rating	0.63	0.41				1,2,3,4
1.8 Note1,2	2L41	3L5	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90_Over_Rating	0.64	0.64		0		1,2,3,7
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,7
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1_Over_Rating	0.30	0.30		0		1,2,3,7
					4	2L3	2L3 WLT + 0.17 * 3L5 UHT – 2L3_Over_Rating	0.16	0.16		0.43		1,2,3,7
					5	2L9	2L9 CKY + 0.14 * 3L5 UHT – 2L9_Over_Rating	0.13	0.13		0.40		1,2,3,7
					6	2L13	2L13 CKY + 0.12 * 3L5 UHT – 2L13_Over_Rating	0.11	0.11		0.33		1,2,3,7
1.8 Note1,2	2L41	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L19) BRT – ROS T1_Over_Rating	1	1				1,2,3,5
1.8 Note1,2,6	(2L41 & BRT 2CB1 O.O.S.) OR (2L41 & BRT 2CB1 & BRT 2CB3 O.O.S.)	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note2,6	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,5,6
1.8 Note1,2	2L41 (BRT dso) & BRT 2CB2 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.64 * 2L1 BRT – 2L90_Over_Rating	0.56	0.38				1,2,3
					2	ROS T1	ROS T1 + 0.33 * 2L1 BRT – ROS T1_Over_Rating	0.41	0.59				1,2,3
1.8 Note1,2,6	(2L41 & BRT 2CB3 O.O.S.) OR (2L41 & BRT 2CB1 & BRT 2CB3 O.O.S.)	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,6	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 +) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,5,6

1.8 Note1,2,6	2L41 (BRT dso) & BRT 2CB4 O.O.S.	2L90	Note 2,6	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,5,6
1.8 Note1,2	2L41 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90_Over_Rating	0.64	0.64		0		1,2,3,4,7
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4,7
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1_Over_Rating	0.30	0.30		0		1,2,3,4,7
					4	2L3	2L3 WLT + 0.17 * 3L5 UHT – 2L3_Over_Rating	0.16	0.16		0.43		1,2,3,4,7
					5	2L9	2L9 CKY + 0.14 * 3L5 UHT – 2L9_Over_Rating	0.13	0.13		0.40		1,2,3,4,7
					6	2L13	2L13 CKY + 0.12 * 3L5 UHT – 2L13_Over_Rating	0.11	0.11		0.33		1,2,3,4,7
1.8 Note1,2	2L41 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90_Over_Rating	0.64	0.64		0		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1_Over_Rating	0.30	0.30		0		1,2,3,4
					4	2L3	2L3 WLT + 0.17 * 3L5 UHT – 2L3_Over_Rating	0.16	0.16		0.43		1,2,3,4
					5	2L9	2L9 CKY + 0.14 * 3L5 UHT – 2L9_Over_Rating	0.13	0.13		0.40		1,2,3,4
					6	2L13	2L13 CKY + 0.12 * 3L5 UHT – 2L13_Over_Rating	0.11	0.11		0.33		1,2,3,4
1.8 Note1,2	2L41 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.65 * 3L5 UHT – 2L90_Over_Rating	0.64	0.64		0		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4
					3	2L1	2L1 PEM + 0.31 * 3L5 UHT – 2L1_Over_Rating	0.30	0.30		0		1,2,3,4
					4	2L3	2L3 WLT + 0.17 * 3L5 UHT – 2L3_Over_Rating	0.16	0.16		0.43		1,2,3,4
					5	2L9	2L9 CKY + 0.14 * 3L5 UHT – 2L9_Over_Rating	0.13	0.13		0.40		1,2,3,4
					6	2L13	2L13 CKY + 0.12 * 3L5 UHT – 2L13_Over_Rating	0.11	0.11		0.33		1,2,3,4

Table 1.9 **2L77 OR (2L77 and 3L3) out-of-service**

Note 1 System condition: 2L77 OR (2L77 and 3L3) out-of-service

Note 2 **The pre-outage limit** (BRR + UH_IPPs + UL_IPPs + CMS) is the least of:

- 887 MW, or
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.51, or
- (BRR + UH_IPPs + UL_IPPs + CMS) + (BRT T4_Norm_Rating – BRT T4) / 0.99
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L1_Norm_Rating – 2L1 PEM) / 0.20
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L3_Norm_Rating – 2L3 WLT) / 0.23
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L9_Norm_Rating – 2L9 CKY) / 0.21
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L13_Norm_Rating – 2L13 CKY) / 0.17

Max Gen refers to the sum of BRR, UH_IPP, UL_IPPs, and CMS generation within the pre-outage limit.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.51, DF_UH = 0.51, DF_UL = 0.39, DF_CMS = 0.22

(b) If TSA alarms "VIOLATION_BRT T4 CONTINUOUS RATING", then BRR and / or UH_IPP generation must be reduced by (BRT T4 – BRT T4_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.99, DF_UH = 0.99

(c) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR, and / or UH_IPP generation must be reduced by (2L1 PEM – 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.20, DF_UH = 0.20

(d) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.23, DF_UH = 0.23, DF_UL = 0.29, DF_CMS = 0.41

(e) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UH = 0.21, DF_UL = 0.27, DF_CMS = 0.38

(f) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and / or CMS generation must be reduced by (2L13 CKY – 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.17, DF_UH = 0.17, DF_UL = 0.22, DF_CMS = 0.31

BR Requirements:

- To prevent self-excitation of BR generators the following must be observed:
  - With no UHT RX on-line a minimum of (2 BR2 units and 1 BR1 unit) OR 4 BR1 units must be on-line
    With one UHT RX on-line a minimum of 2 BR2 units OR 3 BR1 units must be on-line.
    (A BR2 unit is a good substitution for a BR1 unit meeting the minimum units-on-line requirements to prevent self-excitation to BRR units.)

UHT Requirements

To prevent self-excitation of UHT generators the following must be observed:

- With no UHT RX on-line a minimum of 18 bigger units must be on-line, e.g. 3 USR, 2 DGL, 2 FRE, 2 LMN, 2 SKK, 2 TPA, 2 TWY, and 3 BSV for a total of 235 MVA or 215 MW capacity
- With one UHT RX on-line a minimum of 12 bigger units must be on-line, e.g. 2 DGL, 2 FRE, 2LMN, 2 USR, 2 SKK & 2 TPA for a total of 165 MVA or 148 MW capacity
- With both UHT RX on-line a minimum of 7 bigger units must be on-line, e.g. 2 DGL, 2 FRE, 2 LMN & 1 USR for a total of 98 MVA or 88 MW capacity

All UHT IPP plants have to be off-line if the above minimum unit-on-line requirements cannot be met

As an alternative, considering a large load at ALZ, allow the number of UH_IPP units on-line with a total generating capacity equivalent to less than one-half of ALZ load. WAH should be taken off-line to maximize the number of UH_IPP units on-line if WAH is not required for voltage control.

Suggest at least one UHT 35 MVAr reactor to be on-line (yields lower min-unit-on-line requirements & lower switching surge voltages)

Note 3 Shed at (BRR, UL_IPP, and/or UH_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 For (2L77 and 3L3) outage, if WAH is on-line, it will be connected to ALZ load.
Loss of 2L78 with 2L77 already opened will island WAH with ALZ load.
If 3L3 is in-service, no tripping of WAH is required for 2L78 contingency with 2L77 already opened.

Note 5 Removed.

Note 6 Transient stability requirements:
- Trip all 3 UH_ IPP Clusters
  Shed BRR down to 350 MW

Note 7 Removed.

Note 8 Loss of 3L2 with 2L77 already opened will island UH IPPs with ALZ load and WAH 60 kV load.
- Shed down all 3 UH IPP Clusters
  These actions will blackout ALZ load and WAH 60 kV load. WAH G1 will be tripped under islanding situation.

Note 9 For loss of 3L3, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will drop WAH 60 kV load.

Note 10 - For managing the inevitable islanding scenario upon loss of 3L5:
This action will black out ALZ load and WAH 60 kV load. WAH G1 will be tripped under islanding situation.

Note 11 - Loss of BRT T4 with 2L77 already opened will island BRR & UH_ IPPs generation with BR load, ALZ load and WAH 60 kV load.

For managing the inevitable islanding scenario upon loss of BRT T4:
- Shed down all 3 UH Clusters
- Shed down all BRR units

These actions will black out BR area load, ALZ load and WAH 60 kV load; WAH tripping (if on-line) will rely on under-frequency protection, set at 56 HZ.

Note 12 - The pre-outage limit in conjunction with BRT 2CB1 outage
- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)
- Shed BR down to 170 MW
- Shed all 3 UH_IPP clusters

Note 13 – The pre-outage limit in conjunction with BRT 2CB2 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of 2L41

- Shed BR down to 170 MW
- Shed all 3 UH_IPP clusters

Note 14 – The pre-outage limit in conjunction with BRT 2CB3 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19/(BR1 T3 and T30) outage generation restrictions

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed all UH_IPP Clusters
- Shed all BR units

These actions will black out BR area load and WAH 60 kV load. WAH G1 will be tripped under islanding situation

For loss of 2L90 (same as 2L77 & BRT 2CB2 outage; 2L2 contingency)

- Shed BR down to 170 MW
- Shed all 3 UH_IPP clusters

Note 15 – The pre-outage limit in conjunction with BRT 2CB4 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19/(BR1 T3 and T30) outage generation restrictions

For loss of 2L41

- Shed all UH_IPP Clusters
- Shed all BR units

These actions will black out BR area load and WAH 60 kV load. WAH G1 will be tripped under islanding situation.

For loss of 2L90 (same as 2L77 & BRT 2CB1 outage; 2L1 contingency)

- Shed BR down to 170 MW
- Shed all 3 UH_IPP clusters

Note 16 – For (2L77 and 3L3) outage, if WAH is on-line, it will be connected to ALZ load.

- Loss of 3L5 with 2L77 already opened will island WAH 60 kV load with ALZ load. WAH G1 will be tripped under islanding situation.
- If 3L3 is in-service, WAH G1 will be tripped by anti-islanding protection if 3L3_WAH (WAH to ROS) > 15 MW, this action will drop WAH 60 kV load.

Note 17 – ALZ load will be blacked out.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.9	2L77 OR (2L77 and 3L3)	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.54 * 2L1 BRT – 2L2_Over_Rating	0.36	0.36		0.58		1,2,3
					2	2L90	2L90 BRT + 0.43 * 2L1 BRT – 2L90_Over_Rating	0.61	0.61		0.41		1,2,3
					3	2L41	2L41 BRT + 0.54 * 2L1 BRT – 2L41-rating	0.36	0.36		0		1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L2 OR RBW T2	Note 2		1	2L1	2L1 PEM + 0.47 * 2L2 TIS – 2L1_Over_Rating	0.30	0.30		0.29		1,2,3
					2	2L90	2L90 BRT + 0.50 * 2L2 TIS – 2L90_Over_Rating	0.66	0.66		0.66		1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L41	Note 2		1	2L1	2L1 PEM + 0.47 * 2L41 BRT – 2L1_Over_Rating	0.31	0.31				1,2,3
					2	2L90	2L90 BRT + 0.50 * 2L41 BRT – 2L90_Over_Rating	0.65	0.65				1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L3	Note 2		1	2L11	2L11 WLT + 0.91 * 2L3 WLT – 2L11_Over_Rating	0.35	0.35		0.47	0.63	1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.29 * 2L9 CKY – 2L90_Over_Rating	0.58	0.58		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L9 CKY – 2L13_Over_Rating	0.34	0.34		0.41	0.53	1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L11	Note 2		1	2L3	2L3 WLT + 0.96 * 2L11 WLT – 2L3_Over_Rating	0.38	0.38		0.49	0.66	1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.26 * 2L13 CKY – 2L90_Over_Rating	0.56	0.56		0.44	0.30	1,2,3
					2	2L9	2L9 CKY + 0.67 * 2L13 CKY – 2L9_Over_Rating	0.36	0.36		0.44	0.59	1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.19 * 2L14 CYP – 2L90_Over_Rating	0.54	0.54		0.41	0.26	1,2,3
					2	2L9	2L9 CKY + 0.50 * 2L14 CYP – 2L9_Over_Rating	0.32	0.32		0.39	0.51	1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.29 * 2L17 LYN – 2L90_Over_Rating	0.58	0.58		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L17 LYN – 2L13_Over_Rating	0.34	0.34		0.42	0.54	1,2,3
1.9	2L77 OR (2L77 and 3L3)	2L77 OR CBN T3 OR CBN T6	Note 2		Not applicable								
1.9	2L77 OR (2L77 and 3L3)	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.52 * 2L78 ROS – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,4
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L1	2L1 PEM + 0.21 * 2L78 ROS – 2L1_Over_Rating	0.20	0.20		0		1,2,3,4
					4	2L3	2L3 WLT + 0.24 * 2L78 ROS – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,4
					5	2L9	2L9 CKY + 0.22 * 2L78 ROS – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,4
					6	2L13	2L13 CKY + 0.18 * 2L78 ROS – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3,4
1.9	2L77 OR (2L77 and 3L3)	2L90	Note 2	350	1	2L1	2L1 PEM + 0.39 * 2L90 BRT – 2L1_Over_Rating	0.39	0.40		0.20		1,2,3,6
					2	2L3	2L3 WLT + 0 47 * 2L90 BRT – 2L3_Over_Rating	0.48	0.48		0.49		1,2,3,6
					3	2L9	2L9 CKY + 0.43 * 2L90 BRT – 2L9_Over_Rating	0.44	0.44		0.46		1,2,3,6
					4	2L13	2L13 CKY + 0.36 * 2L90 BRT – 2L13_Over_Rating	0.36	0.36		0.38		1,2,3,6
1.9	2L77 OR (2L77 and 3L3)	3L2	Note 2		1	2L90	2L90 BRT + 0.52 * 3L2 BRT – 2L90_Over_Rating	0.51	0		0.39		1,2,3,8
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,8
					3	2L1	2L1 PEM + 0.21 * 3L2 BRT – 2L1_Over_Rating	0.20	0		0		1,2,3,8
					4	2L3	2L3 WLT + 0.24 * 3L2 BRT – 2L3_Over_Rating	0.23	0		0.29		1,2,3,8
					5	2L9	2L9 CKY + 0.22 * 3L2 BRT – 2L9_Over_Rating	0.21	0		0.27		1,2,3,8
					6	2L13	2L13 CKY + 0.18 * 3L2 BRT – 2L13_Over_Rating	0.17	0		0.22		1,2,3,8
1.9	2L77 OR (2L77 and 3L3)	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L3 ROS – 2L90_Over_Rating	0.51	0.51				1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L3 ROS – BRT T4_Over_Rating	0.99	0.99				1,2,3,9
1.9	2L77 OR (2L77 and 3L3)	3L5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,10
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,10
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20		0		1,2,3,10
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,10
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,10

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3,10
1.9	2L77 OR (2L77 and 3L3)	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2										1,2,11
1.9	[2L77 or (2L77 & 3L3)] & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,12	Note 12									1,2,12
1.9	[2L77 or (2L77 & 3L3)] & BRT 2CB2 O.O.S.	2L41	Note 2,13	Note 13									1,2,13
1.9	[2L77 or (2L77 & 3L3)] & BRT 2CB3 O.O.S.	2L90	Note 2,14	Note 14									1,2,14
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,14	Note 14									1,2,14
1.9	[2L77 or (2L77 & 3L3)] & BRT 2CB4 O.O.S.	2L90	Note 2,15	Note 15									1,2,15
		2L41	Note 2,15	Note 15									1,2,15
1.9	[2L77 or (2L77 & 3L3)] & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,16
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,16
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20		0		1,2,3,16
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,16
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,16
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3,16
1.9	[2L77 or (2L77 & 3L3)] & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,9,17
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,9,17
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20		0		1,2,3,9,17
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,9,17
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,9,17
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3,9,17

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.9	[2L77 or (2L77 & 3L3)] & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51		0.39		1,2,3,4,9
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4,9
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20		0		1,2,3,4,9
					4	2L3	2L3 WLT + 0.24 * 3L5 UHT – 2L3_Over_Rating	0.23	0.23		0.29		1,2,3,4,9
					5	2L9	2L9 CKY + 0.22 * 3L5 UHT – 2L9_Over_Rating	0.21	0.21		0.27		1,2,3,4,9
					6	2L13	2L13 CKY + 0.18 * 3L5 UHT – 2L13_Over_Rating	0.17	0.17		0.22		1,2,3,4,9

Table 1.10 **2L78 OR (2L78 & 3L3) out-of-service**

Note 1 For system conditions 2L78 or (2L78 & 3L3) out-of-service it is recommended to also take 3L3 and 3L5 out-of-service, then follow all the requirements specified in Table 1.14 – 3L5 OR (2L78 & 3L3 & 3L5) out-of-service.

Note 2 The pre-outage limit (BRR + UH_IPPs + UL_IPPs + CMS) is the least of:

- 887 MW, or
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.51, or
- (BRR + UH_IPPs + UL_IPPs + CMS) + (BRT T4_Norm_Rating – BRT T4) / 1.00
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L1_Norm_Rating – 2L1 PEM) / 0.20
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L3_Norm_Rating – 2L3 WLT) / 0.23
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L9_Norm_Rating – 2L9 CKY) / 0.21
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L13_Norm_Rating – 2L13 CKY) / 0.17

Max Gen refers to the sum of BRR, UH_IPP, UL_IPPs, and CMS generation within the pre-outage limit.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, ULL_IPP and / or CMS_IPP generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.51, DF_UH = 0.51, DF_UL = 0.39, DF_CMS = 0.22

(b) If TSA alarms "VIOLATION_BRT T4 CONTINUOUS RATING", then BRR and / or UH_IPP generation must be reduced by (BRT T4 – BRT T4_Norm_Rating).
The distribution factors for this case are: DF_BRR = 1.00, DF_UH = 1.00

(c) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR, and / or UH_IPP generation must be reduced by (2L1 PEM – 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.20, DF_UH = 0.20

(d) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UH_IPP, ULL_IPP and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.23, DF_UH = 0.23, DF_UL = 0.29, DF_CMS = 0.41

(e) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, UH_IPP, ULL_IPP and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UH = 0.21, DF_UL = 0.27, DF_CMS = 0.38

(f) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, UH_IPP, ULL_IPP and / or CMS generation must be reduced by (2L13 CKY – 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.17, DF_UH = 0.17, DF_UL = 0.22, DF_CMS = 0.31

WAH REQUIREMENTS

Take 3L3 out-of-service and if WAH is required on-line connect it to the 60 kV. This is because there is no generation shedding to WAH for BRT T4 contingency and there will be self-excitation concerns if WAH is connected to 3L3. Having 3L3 out-of-service enables 3L5 to be taken out-of-service to reduce UH_IPPs minimum unit's on-line requirements dealing with self-excitation concerns for UH_IPPs.

BR REQUIREMENTS

To prevent self-excitation of BR generators the following must be observed:

- With no UHT RX on-line a minimum of (2 BR2 units and 1 BR1 unit) OR 4 BR1 units must be on-line.
- With 1 UHT RX on-line a minimum of 2 BR2 units OR 3 BR1 units must be on-line. A BR2 unit is a good substitution for a BR1 unit meeting the minimum units-on-line requirements to prevent self-excitation to BRR units.

UHT REQUIREMENTS

To prevent self-excitation of UHT generators the following must be observed:

- With no UHT RX on-line all UHT IPP plants must be on-line
- With 1 UHT RX on-line a minimum of 14 bigger units must be on-line, e.g. 3 USR, 2 DGL, 2 FRE, 2 LMN, 2 SKK, 2 TPA, 1 TWY for a total of 180 MVA or 162 MW capacity
- With both UHT RX on-line a minimum of 9 larger units must be on-line,
  e.g. 2 DGL, 2 FRE, 2 LMN, 2 USR & 1 TPA for a total of 125 MVA or 112 MW capacity

All UHT IPP plants have to be off-line if the above minimum unit-on-line requirements cannot be met.

It is recommended to take 3L5 out-of-service as well as this yields lower minimum units on-line requirements), then follow all requirements specified in Table 1.14 – 3L5 OR (2L78 & 3L3 & 3L5) out-of-service

Suggest at least one UHT 35 MVAr reactor to be on-line (yields lower min-unit-on-line requirements & lower switching surge voltages).

Note 3 Shed at (BRR, UL_IPP, and/or UH_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 5 Removed.

Note 6 Removed.

Note 7 If WAH is required on-line, it will be connected to ALZ load as 3L3 will be opened as recommended in Pre-Outage Restrictions in Note 2.
Loss of 2L77 with 2L78 already opened will island WAH with ALZ load. Hence for 2L77 contingency:
WAH G1 will be tripped under islanding situation. No impact on North Shore 230 kV.

Note 8 Transient stability requirements:

- Shed BR down to 350 MW
- Shed all three UHT IPP Clusters

Note 9 Loss of 3L2 with 2L78 already opened will island UH IPPs with WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network.
For managing the inevitable islanding scenario upon loss of 3L2:

- Shed down all 3 UH IPP Clusters
  This action will black out the WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network.

Note 10 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW. This action will drop the WAH 60 kV load.

Note 11 Loss of 3L5 with 2L78 already opened will drop WAH 60 kV load unless WAH 60 kV load is fed from the 60 kV network.

Note 12 Loss of BRT T4 with 2L78 already opened will island BR & UHT IPPs with BR load and WAH 60 kV load unless WAH 60 kV load is fed from the 60 kV network.

For managing the inevitable islanding scenario upon loss of BRT T4:

- Shed down all 3 UHT IPP Clusters
- SHED all BR units

These actions will black out BR area load and WAH 60 kV load (unless WAH 60 kV load is fed from the 60 kV network)

Note 13 The pre-outage limit in conjunction with BRT 2CB1 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed all UH_IPP Clusters
- Shed BR down to 170 MW

Note 14 The pre-outage limit in conjunction with BRT 2CB2 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of 2L41

- Shed all UH_IPP Clusters
- Shed BR down to 170 MW

Note 15 The pre-outage limit in conjunction with BRT 2CB3 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19 (BR1 T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed all UH_IPP Clusters
- Shed BR down to 170 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed all UH_IPP Clusters
- Shed all BR units

These actions will black out BR area load and WAH 60 kV load (unless WAH 60 kV load is fed from the 60 kV network)

Note 16 The pre-outage limit in conjunction with BRT 2CB4 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19 (BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed all UH_IPP Clusters
- Shed BR down to 170 MW

For loss of 2L41

- Shed all UH_IPP Clusters
- SHED all BR units

These actions will black out BR area load and WAH 60 kV load unless WAH 60 kV load is fed from the 60 kV network.

Note 17 Loss of 3L5 with 2L78 already opened and ROS 3CB1 OOS will trip WAH G1 under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW. This action will drop the WAH 60 kV load. WAH 60 kV load will not be affected if it is fed from the 60 kV network when 3L3 is also OOS.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.10	2L78 or (2L78 & 3L3)	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.54 * 2L1 BRT – 2L2_Over_Rating	0.36	0.36		0.58		1,2,3
					2	2L90	2L90 BRT + 0.43 * 2L1 BRT – 2L90_Over_Rating	0.61	0.61		0.41		1,2,3
					3	2L41	2L41 BRT + 0.54 * 2L1 BRT – 2L41_Over_Rating	0.36	0.36		0		1,2,3
1.10	2L78 or (2L78 & 3L3)	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.50 * 2L2 TIS – 2L90_Over_Rating	0.66	0.65		0.65		1,2,3
					2	2L1	2L1 PEM + 0.46 * 2L2 TIS – 2L1_Over_Rating	0.30	0.30		0.30		1,2,3
1.10	2L78 or (2L78 & 3L3)	2L41	Note 2		1	2L90	2L90 BRT + 0.50 * 2L41 BRT – 2L90_Over_Rating	0.66	0.65				1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L41 BRT – 2L1_Over_Rating	0.31	0.30				1,2,3
1.10	2L78 or (2L78 & 3L3)	2L3	Note 2		1	2L11	2L11 WLT + 0.91 * 2L3 WLT – 2L11_Over_Rating	0.35	0.35		0.47	0.63	1,2,3
1.10	2L78 or (2L78 & 3L3)	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.29 * 2L9 CKY – 2L90_Over_Rating	0.58	0.58		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L9 CKY – 2L13_Over_Rating	0.34	0.34		0.41	0.53	1,2,3
1.10	2L78 or (2L78 & 3L3)	2L11	Note 2		1	2L3	2L3 WLT + 0.96 * 2L11 WLT – 2L3_Over_Rating	0.38	0.38		0.48	0.65	1,2,3
1.10	2L78 or (2L78 & 3L3)	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.26 * 2L13 CKY – 2L90_Over_Rating	0.56	0.56		0.44	0.30	1,2,3
					2	2L9	2L9 CKY + 0.67 * 2L13 CKY – 2L9_Over_Rating	0.36	0.36		0.44	0.59	1,2,3
1.10	2L78 or (2L78 & 3L3)	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.19 * 2L14 CYP – 2L90_Over_Rating	0.54	0.54		0.41	0.26	1,2,3
					2	2L9	2L9 CKY + 0.50 * 2L14 CYP – 2L9_Over_Rating	0.32	0.32		0.39	0.51	1,2,3
1.10	2L78 or (2L78 & 3L3)	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.29* 2L17 LYN – 2L90_Over_Rating	0.58	0.58		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L17 LYN – 2L13_Over_Rating	0.34	0.34		0.42	0.54	1,2,3
1.10	2L78 or (2L78 & 3L3)	2L77 OR CBN T3 OR CBN T6	Note 2										7
1.10	2L78 or (2L78 & 3L3)	2L78 OR ROS T1	Note 2		Not applicable								
1.10	2L78 or (2L78 & 3L3)	2L90	Note 2	350	1	2L1	2L1 PEM + 0.39 * 2L90 BRT – 2L1_Over_Rating	0.39	0.40		0.20		1,2,3,8
					2	2L3	2L3 WLT + 0 47 * 2L90 BRT – 2L3_Over_Rating	0.48	0.48		0.49		1,2,3,8
					3	2L9	2L9 CKY + 0.43 * 2L90 BRT – 2L9_Over_Rating	0.44	0.44		0.46		1,2,3,8
					4	2L13	2L13 CKY + 0.36 * 2L90 BRT – 2L13_Over_Rating	0.36	0.36		0.38		1,2,3,8
1.10	2L78 or (2L78 & 3L3)	3L2	Note 2		1	2L90	2L90 BRT + 0.52 * 3L2 BRT – 2L90_Over_Rating	0.51	0				1,2,3,9
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0				1,2,3,9
					3	2L1	2L1 PEM + 0.21 * 3L2 BRT – 2L1_Over_Rating	0.20	0				1,2,3,9
1.10	2L78 or (2L78 & 3L3)	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L3 ROS – 2L90_Over_Rating	0.51	0.51				1,2,3,10
					2	BRT T4	BRT T4 + 1.00 * 3L3 ROS – BRT T4_Over_Rating	0.99	0.99				1,2,3,10
1.10	2L78 or (2L78 & 3L3)	3L5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51				1,2,3,11
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99				1,2,3,11
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20				1,2,3,11
1.10	2L78 or (2L78 & 3L3)	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2										1,2,12

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.10	[2L78 or (2L78 & 3L3)] AND BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,13	Note 13									1,2,13
1.10	[2L78 or (2L78 & 3L3)] AND BRT 2CB2 O.O.S.	2L41	Note 2,14	Note 14	1	2L1	2L1 PEM + 0.89 * 2L41 BRT + 0.84 * 2L90 BRT – 2L1_Over_Rating	0.82					1,2,3,14
1.10	[2L78 or (2L78 & 3L3)] AND BRT 2CB3 O.O.S.	2L90	Note 2,15	Note 15									1,2,15
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,15	Note 15									1,2,15
1.10	[2L78 or (2L78 & 3L3)] AND BRT 2CB4 O.O.S.	2L90	Note 2,16	Note 16									1,2,16
		2L41	Note 2,16	Note 16									1,2,16
1.10	[2L78 or (2L78 & 3L3)] AND ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90 Over Rating	0.51	0.51				1,2,3,17
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4 Over Rating	0.99	0.99				1,2,3,17
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20				1,2,3,17
1.10	[2L78 or (2L78 & 3L3)] AND ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90 Over Rating	0.51	0.51				1,2,3,10
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4 Over Rating	0.99	0.99				1,2,3,10
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20				1,2,3,10

Table 1.11 2L90 out-of-service

Note 1 System condition: 2L90 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (ROS T1_Norm_Rating – ROS T1) / 0.44
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L1_Norm_Rating – 2L1 PEM) / 0.22
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L9_Norm_Rating – 2L9 CKY) / 0.25
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L13_Norm_Rating – 2L13 CKY) / 0.21
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L3_Norm_Rating – 2L3 WLT) / 0.28

Max Gen refers to the sum of BRR, UH_IPP WAH, UL_IPP, and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_ROS T1 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.44, DF_UH = 0.62, DF_WAH = 0.75, DF_UL = 0.28, DF_CMS = 0.15
(b) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (2L1 PEM – 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.22, DF_UH = 0.15, DF_WAH = 0.11, DF_UL = 0.09,DF_CMS = 0
(c) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.25, DF_UH = 0.17, DF_WAH = 0.12, DF_UL = 0.34, DF_CMS = 0.41
(d) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (2L13 CKY – 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UH = 0.14, DF_WAH = 0.10, DF_UL = 0.28, DF_CMS = 0.34
(e) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPP, and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.28, DF_UH = 0.18, DF_WAH = 0.13, DF_UL = 0.37, DF_CMS = 0.46

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 5 Removed.

Note 6 For transient stability requirement, shed BRR down to 360 MW.

Note 7 For transient stability requirement, shed UH IPP down to:
(406-BRR output) *0.6 + 120 MW.

Note 8 For transient stability requirement,

If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

Note 9 For transient stability requirements:

If UH_IPP output < 135 MW
No gen shed
Else
Shed UH IPP Clusters down to: 0.12 * (406 – BRR output) + 85 MW

Note 10 For transient stability requirements:

- Shed BRR down to 220 MW

Note 11 The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.11	2L90	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	ROS T1	ROS T1 + 0.32 * 2L1 BRT – ROS T1_Over_Rating	0.51	0.67		0.29		1,2,3
					2	2L2	2L2 RUT + 0.64 * 2L1 BRT – 2L2_Over_Rating	0.44	0.30		0.68		1,2,3
					3	2L41	2L41 BRT + 0.64 * 2L1 BRT – 2L41_Over_Rating	0.44	0.30		0		1,2,3
1.11	2L90	2L2 OR RBW T2	Note 2		1	ROS T1	ROS T1 + 0.38 * 2L2 TIS – ROS T1_Over_Rating	0.55	0.69		0.49		1,2,3
					2	2L1	2L1 PEM + 0.56 * 2L2 TIS – 2L1_Over_Rating	0.38	0.26		0.41		1,2,3
1.11	2L90	2L41	Note 2		1	ROS T1	ROS T1 + 0.38 * 2L41 BRT – ROS T1_Over_Rating	0.55	0.69				1,2,3
					2	2L1	2L1 PEM + 0.57 * 2L41 BRT – 2L1_Over_Rating	0.39	0.26				1,2,3
1.11	2L90	2L3	Note 2		1	2L11	2L11 WLT + 0.93 * 2L3 WLT – 2L11_Over_Rating	0.42	0.28		0.55	0.67	1,2,3
1.11	2L90	2L9 OR LYN T1	Note 2		1	2L13	2L13 CKY + 0.68 * 2L9 CKY – 2L13_Over_Rating	0.37	0.25		0.50	0.61	1,2,3
					2	ROS T1	ROS T1 + 0.23 * 2L9 CKY – ROS T1_Over_Rating	0.52	0.68		0.33	0.24	1,2,3
1.11	2L90	2L11	Note 2		1	2L3	2L3 WLT + 0.94 * 2L11 WLT – 2L3_Over_Rating	0.43	0.29		0.57	0.70	1,2,3
1.11 Note 1, 2	2L90	2L13 OR CYP T2	Note 2		1	2L9	2L9 CKY + 0.72 * 2L13 CKY – 2L9_Over_Rating	0.39	0.27		0.54	0.66	1,2,3
					2	ROS T1	ROS T1 + 0.20 * 2L13 CKY – ROS T1_Over_Rating	0.50	0.67		0.31	0.21	1,2,3
1.11 Note 1, 2	2L90	2L14 OR CYP T3	Note 2		1	ROS T1	ROS T1 + 0.15 * 2L14 CYP – ROS T1_Over_Rating	0.49	0.66		0.29	0.19	1,2,3
					2	2L9	2L9 CKY + 0.50 * 2L14 CYP – 2L9_Over_Rating	0.35	0.23		0.46	0.56	1,2,3
1.11 Note 1, 2	2L90	2L17 OR LYN T2	Note 2		1	2L13	2L13 CKY + 0.70 * 2L17 LYN – 2L13_Over_Rating	0.37	0.25		0.50	0.61	1,2,3
					2	ROS T1	ROS T1 + 0.23 * 2L17 LYN – ROS T1_Over_Rating	0.52	0.68		0.34	0.24	1,2,3
1.11	2L90	2L77 OR CBN T3 OR CBN T6	Note 2	360	1	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,6
					2	2L1	2L1 PEM + 0.42 * 2L77 ALZ – 2L1_Over_Rating	0.41	0.41		0.16		1,2,3,6
					3	2L3	2L3 WLT + 0.44 * 2L77 ALZ – 2L3_Over_Rating	0.43	0.43		0.31		1,2,3,6

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					4	2L9	2L9 CKY + 0.43 * 2L77 ALZ – 2L9_Over_Rating	0.42	0.42		0.37		1,2,3,6
					5	2L13	2L13 CKY + 0.35 * 2L77 ALZ – 2L13_Over_Rating	0.34	0.34		0.30		1,2,3,6
1.11	2L90	2L78 OR ROS T1	Note 2		1	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,7
					2	2L1	2L1 PEM + 0.42 * 2L78 ROS – 2L1_Over_Rating	0.41	0.41		0.16		1,2,3,7
					3	2L3	2L3 WLT + 0.44 * 2L78 ROS – 2L3_Over_Rating	0.43	0.43		0.31		1,2,3,7
					4	2L9	2L9 CKY + 0.43 * 2L78 ROS – 2L9_Over_Rating	0.42	0.42		0.37		1,2,3,7
					5	2L13	2L13 CKY + 0.35 * 2L78 ROS – 2L13_Over_Rating	0.34	0.34		0.30		1,2,3,7
1.11	2L90	2L90	Note 2		Not applicable								
1.11	2L90	3L2	Note 2		1	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,8
					2	2L1	2L1 PEM + 0.42 * 3L2 BRT – 2L1_Over_Rating	0.41	0		0.16		1,2,3,8
					3	2L3	2L3 WLT + 0.44 * 3L2 BRT – 2L3_Over_Rating	0.43	0		0.31		1,2,3,8
					4	2L9	2L9 CKY + 0.43 * 3L2 BRT – 2L9_Over_Rating	0.42	0		0.37		1,2,3,8
					5	2L13	2L13 CKY + 0.35 * 3L2 BRT – 2L13_Over_Rating	0.34	0		0.30		1,2,3,8
1.11	2L90	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	BRT T4	BRT T4 + 0.26 * 3L3 ROS – BRT T4_Over_Rating	0.53	0.35				1,2,3,4
1.11	2L90	3L5	Note 2		1	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,9
					2	2L1	2L1 PEM + 0.42 * 3L5 UHT – 2L1_Over_Rating	0.41	0.41		0.16		1,2,3,9
					3	2L3	2L3 WLT + 0.44 * 3L5 UHT – 2L3_Over_Rating	0.43	0.43		0.31		1,2,3,9
					4	2L9	2L9 CKY + 0.43 * 3L5 UHT – 2L9_Over_Rating	0.42	0.42		0.37		1,2,3,9
					5	2L13	2L13 CKY + 0.35 * 3L5 UHT – 2L13_Over_Rating	0.34	0.34		0.30		1,2,3,9
1.11	2L90	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1				1,2,3,10

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.11	2L90 (BRT dso) & BRT 2CB3 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,11	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,10,11
1.11	2L90 (BRT dso) & BRT 2CB4 O.O.S.	2L41	Note 2,11	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,10,11
1.11	2L90 & ROS 3CB1 O.O.S.	3L5	Note 2		1	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4,9
					2	2L1	2L1 PEM + 0.42 * 3L5 UHT – 2L1_Over_Rating	0.41	0.41		0.16		1,2,3,4,9
					3	2L3	2L3 WLT + 0.44 * 3L5 UHT – 2L3_Over_Rating	0.43	0.43		0.31		1,2,3,4,9
					4	2L9	2L9 CKY + 0.43 * 3L5 UHT – 2L9_Over_Rating	0.42	0.42		0.37		1,2,3,4,9
					5	2L13	2L13 CKY + 0.35 * 3L5 UHT – 2L13_Over_Rating	0.34	0.34		0.30		1,2,3,4,9
1.11	2L90 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4
					2	2L1	2L1 PEM + 0.42 * 3L5 UHT – 2L1_Over_Rating	0.41	0.41		0.16		1,2,3,4
					3	2L3	2L3 WLT + 0.44 * 3L5 UHT – 2L3_Over_Rating	0.43	0.43		0.31		1,2,3,4
					4	2L9	2L9 CKY + 0.43 * 3L5 UHT – 2L9_Over_Rating	0.42	0.42		0.37		1,2,3,4
					5	2L13	2L13 CKY + 0.35 * 3L5 UHT – 2L13_Over_Rating	0.34	0.34		0.30		1,2,3,4
1.11	2L90 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,4,7
					2	2L1	2L1 PEM + 0.42 * 3L5 UHT – 2L1_Over_Rating	0.41	0.41		0.16		1,2,3,4,7
					3	2L3	2L3 WLT + 0.44 * 3L5 UHT – 2L3_Over_Rating	0.43	0.43		0.31		1,2,3,4,7
					4	2L9	2L9 CKY + 0.43 * 3L5 UHT – 2L9_Over_Rating	0.42	0.42		0.37		1,2,3,4,7
					5	2L13	2L13 CKY + 0.35 * 3L5 UHT – 2L13_Over_Rating	0.34	0.34		0.30		1,2,3,4,7

Table 1.12 3L2 out-of-service

Note 1 System condition: 3L2 out-of-service

Note 2 The pre-outage limit (BRR + UL_IPPs + CMS) is the least of:

- 635 MW, or
- BRR + UL_IPPs + CMS + (2L90_Norm_Rating – 2L90 BRT) / 0.51, or
- BRR + UL_IPPs + CMS + (BRT T4_Norm_Rating – BRT T4) / 1.00
- BRR + UL_IPPs + CMS + (2L1_Norm_Rating – 2L1 PEM) / 0.20
- BRR + UL_IPPs + CMS + (2L3_Norm_Rating – 2L3 WLT) / 0.23
- BRR + UL_IPPs + CMS + (2L9_Norm_Rating – 2L9 CKY) / 0.21
- BRR + UL_IPPs + CMS + (2L13_Norm_Rating – 2L13 CKY) / 0.17

Max Gen refers to the sum of BRR, UL_IPPs, and CMS generation within the limit.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UL_IPP and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.51, DF_UL = 0.39, DF_CMS = 0.22

(b) If TSA alarms "VIOLATION_BRT T4 CONTINUOUS RATING", then BRR generation must be reduced by (BRT T4 – BRT T4_Norm_Rating).
The distribution factors for this case are: DF_BRR = 1.00

(c) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR generation must be reduced by (2L1 PEM – 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.20.

(d) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UL_IPP and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.23, DF_UL = 0.29, DF_CMS = 0.41

(e) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, UL_IPP and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UL = 0.27, DF_CMS = 0.38

(f) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, UL_IPP and / or CMS generation must be reduced by (2L13 CKY – 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.17, DF_UL = 0.22, DF_CMS = 0.31

UHT REQUIREMENTS:

To prevent self-excitation of UHT generators the following must be observed:

- With no UHT RX on-line a minimum of approximately 8 bigger units (112 MVA or 100 MW capacity) must be on-line
- With 1 UHT RX on-line a minimum of approximately 2 bigger units (35 MVA or 31 MW capacity) must be on-line

If the minimum unit requirements cannot be met KWL IPPs units have to be shut down

Note 3 Shed at (BRR and/or UL_IPP) and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Removed.

Note 5 Loss of 2L77 with 3L2 already opened will island UH IPPs & WAH with ALZ load and WAH 60 kV load

- Shed all 3 UH_ IPP Clusters

These actions will black out ALZ load and WAH 60 kV load. WAH G1 will be tripped under islanding situation.

Note 6 Loss of 2L78 with 3L2 already opened will island UH IPPs & WAH with WAH 60 kV load (unless WAH 60 kV load is fed from the 60 kV network).

- Shed all 3 UH_ IPP Clusters

These actions will black out WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network. WAH G1 will be tripped under islanding situation.

Note 7 Removed.

Note 8 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 9 Loss of 3L5 with 3L2 already opened will isolate UH IPPs. There would be no further impact on the North Shore 230 kV system as long as the Pre-outage BRR limit is observed.

- Shed all 3 UH IPP Clusters

Note 10 - Loss of BRT T4 with 3L2 already opened will island BR plant with BR load

For managing the inevitable islanding scenario upon loss of BRT T4:

- Shed all BR units

This action will black out BR area load

Note 11 - The pre-outage limit in conjunction with BRT 2CB1 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed BR down to 220 MW

Note 12 - The pre-outage limit in conjunction with BRT 2CB2 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of 2L41

- Shed BR down to 180 MW

Note 13 - The pre-outage limit in conjunction with BRT 2CB3 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19 (BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed BR down to 180 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed all BR units

These actions will black out BR area load.

Note 14 - The pre-outage limit in conjunction with BRT 2CB4 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19 (BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed BR down to 220 MW

For loss of 2L41

- SHED all BR units

These actions will black out BR area load.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.12	3L2	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.43* 2L1 BRT – 2L90_Over_Rating	0.60	0		0.40		1,2,3
					2	2L2	2L2 RUT + 0.56 * 2L1 BRT – 2L2_Over_Rating	0.38	0		0.59		1,2,3
					3	2L41	2L41 BRT + 0.56 * 2L1 BRT – 2L41_Over_Rating	0.38	0		0		1,2,3
1.12	3L2	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.50* 2L2 TIS – 2L90_Over_Rating	0.64	0		0.65		1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L2 TIS – 2L1_Over_Rating	0.31	0		0.30		1,2,3
1.12	3L2	2L41	Note 2		1	2L90	2L90 BRT + 0.50* 2L41 BRT – 2L90_Over_Rating	0.65	0				1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L41 BRT – 2L1_Over_Rating	0.32	0				1,2,3
1.12	3L2	2L3	Note 2		1	2L11	2L11 WLT + 0.91 * 2L3 WLT – 2L11_Over_Rating	0.36	0		0.47	0.63	1,2,3
1.12	3L2	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.29 * 2L9 CKY – 2L90_Over_Rating	0.58	0		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L9 CKY – 2L13_Over_Rating	0.34	0		0.42	0.54	1,2,3
1.12	3L2	2L11	Note 2		1	2L3	2L3 WLT + 0.96 * 2L11 WLT – 2L3_Over_Rating	0.38	0		0.59	0.66	1,2,3
1.12	3L2	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.26 * 2L13 CKY – 2L90_Over_Rating	0.56	0		0.44	0.31	1,2,3
					2	2L9	2L9 CKY + 0.67 * 2L13 CKY – 2L9_Over_Rating	0.36	0		0.46	0.60	1,2,3
1.12	3L2	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.19 * 2L14 CYP – 2L90_Over_Rating	0.54	0		0.41	0.27	1,2,3
					2	2L9	2L9 CKY + 0.46 * 2L14 CYP – 2L9_Over_Rating	0.29	0		0.39	0.51	1,2,3
1.12	3L2	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.29 * 2L17 LYN – 2L90_Over_Rating	0.58	0		0.47	0.33	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L17 LYN – 2L13_Over_Rating	0.34	0		0.42	0.54	1,2,3
1.12	3L2	2L77 OR CBN T3 OR CBN T6	Note 2										1,2,5
1.12	3L2	2L78 OR ROS T1	Note 2										1,2,6
1.12	3L2	2L90	Note 2		1	2L1	2L1 PEM + 0.39 * 2L90 BRT – 2L1_Over_Rating	0.39	0		0.20		1,2,3
					2	2L3	2L3 WLT + 0 47 * 2L90 BRT – 2L3_Over_Rating	0.48	0		0.49		1,2,3

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L9	2L9 CKY + 0.43 * 2L90 BRT – 2L9_Over_Rating	0.44	0		0.46		1,2,3
					4	2L13	2L13 CKY + 0.36 * 2L90 BRT – 2L13_Over_Rating	0.36	0		0.38		1,2,3
1.12	3L2	3L2	Note 2		Not applicable								
1.12	3L2	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2										1,2,8
1.12	3L2	3L5	Note 2										1,2,9
1.12	3L2	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2										1,2,10
1.12	3L2 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,11	Note 11	1	2L2	2L2 RUT + 0.94 * 2L1 BRT + 0.91 * 2L90 BRT – 2L2 _Over_Rating	0.90			0.95		1,2,3,11
1.12	3L2 & BRT 2CB2 O.O.S.	2L41	Note 2,12	Note 12	1	2L1	2L1 PEM + 0.89 * 2L41 BRT + 0.84 * 2L90 BRT – 2L1_Over_Rating	0.82					1,2,3,12
1.12	3L2 & BRT 2CB3 O.O.S.	2L90	Note 2,13	Note 13									1,2,13
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,13	Note 13									1,2,13
1.12	3L2 & BRT 2CB4 O.O.S.	2L90	Note 2,14	Note 14									1,2,14
		2L41	Note 2,14	Note 14									1,2,14
1.12	3L2 & ROS 3CB1 O.O.S.	3L5	Note 2										1,2,8,9
1.12	3L2 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2										1,2,8,9
1.12	3L2 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2										1,2,8,9

Table 1.13 3L3 out-of-service

Note 1 System condition: 3L3 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPP + UL_IPPs + CMS) is the least of:

- 887 MW, or
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.36
- (BRR + UH_IPPs + UL_IPPs + CMS) + (ROS_T1_Norm_Rating – ROS T1) / 0.31
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L3_Norm_Rating – 2L3 WLT) / 0.17

Max Gen refers to the sum of BRR, UH_IPP, UL_IPP, and CMS generation within the pre-outage limit.

Transmission studies are done with a maximum of 887 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP, and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating). The distribution factors for this case are:
DF_BRR=0.36, DF_UH = 0.24 , DF_UL = 0.30, DF_CMS = 0.18
(b) If TSA alarms "VIOLATION_ ROS T1 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP, and / or CMS generation must be reduced by (ROS T1 - ROS T1_Norm_Rating). The distribution factors for this case are:
DF_BRR=0.31, DF_UH = 0.53, DF_UL = 0.16, DF_CMS = 0.09
(c) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP, and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating). The distribution factors for this case are:
DF_BRR=0.17, DF_UH = 0.11, DF_UL = 0.29, DF_CMS = 0.41

Note 3 Shed at (BRR, UL_IPP, and/or UH_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 For transient stability requirements:

- Shed BRR down to 220 MW

Note 5 – The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 6 Removed.

Note 7 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

For loss of 3L5:
Shed UH_IPPs down to 130 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.13	3L3	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.32 * 2L1 BRT – 2L90_Over_Rating	0.40	0.27		0.30		1,2,3
					2	ROS T1	ROS T1 + 0.20 * 2L1 BRT – ROS T1_Over_Rating	0.33	0.54		0.16		1,2,3
					3	2L2	2L2 RUT + 0.48 * 2L1 BRT – 2L2_Over_Rating	0.25	0.17		0.51		1,2,3
1.13	3L3	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.33 * 2L2 TIS – 2L90_Over_Rating	0.42	0.27		0.47		1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L2 TIS – 2L1_Over_Rating	0.21	0.14		0.22		1,2,3
					3	ROS T1	ROS T1 + 0.17 * 2L2 TIS – ROS T1_Over_Rating	0.42	0.55		0.25		1,2,3
1.13	3L3	2L41	Note 2		1	2L90	2L90 BRT + 0.36 * 2L41 BRT – 2L90_Over_Rating	0.42	0.29				1,2,3
					2	2L1	2L1 PEM + 0.42 * 2L41 BRT – 2L1_Over_Rating	0.21	0.15				1,2,3
					3	ROS T1	ROS T1 + 0.23 * 2L41 BRT – ROS T1_Over_Rating	0.34	0.55				1,2,3
1.13	3L3	2L3	Note 2		1	2L11	2L11 WLT + 0.90 * 2L3 WLT – 2L11_Over_Rating	0.25	0.17		0.41	0.59	1,2,3
1.13	3L3	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.21 * 2L9 CKY – 2L90_Over_Rating	0.37	0.24		0.35	0.26	1,2,3
					2	2L13	2L13 CKY + 0.58 * 2L9 CKY – 2L13_Over_Rating	0.22	0.14		0.36	0.51	1,2,3
					3	ROS T1	ROS T1 + 0.14 * 2L9 CKY – ROS T1_Over_Rating	0.35	0.57		0.18	0.11	1,2,3
1.13	3L3	2L11	Note 2		1	2L3	2L3 WLT + 0.92 * 2L11 WLT – 2L3_Over_Rating	0.26	0.17		0.43	0.61	1,2,3
1.13	3L3	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.19 * 2L13 CKY – 2L90_Over_Rating	0.36	0.24		0.32	0.23	1,2,3
					2	2L9	2L9 CKY + 0.62 * 2L13 CKY – 2L9_Over_Rating	0.24	0.15		0.38	0.54	1,2,3
					3	ROS T1	ROS T1 + 0.12 * 2L13 CKY – ROS T1_Over_Rating	0.34	0.56		0.18	0.11	1,2,3
1.13	3L3	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.14 * 2L14 CYP – 2L90_Over_Rating	0.36	0.23		0.31	0.21	1,2,3
					2	2L9	2L9 CKY + 0.47 * 2L14 CYP – 2L9_Over_Rating	0.21	0.14		0.33	0.47	1,2,3
1.13	3L3	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.21 * 2L17 LYN – 2L90_Over_Rating	0.37	0.24		0.35	0.26	1,2,3
					2	2L13	2L13 CKY + 0.58 * 2L17 LYN – 2L13_Over_Rating	0.22	0.14		0.36	0.50	1,2,3
					3	ROS T1	ROS T1 + 0.14 * 2L17 LYN – ROS T1_Over_Rating	0.35	0.57		0.18	0.13	1,2,3
1.13	3L3	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.52 * 2L77 ALZ – 2L90_Over_Rating	0.51	0.51				1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99				1,2,3
					3	2L1	2L1 PEM + 0.21 * 2L77 ALZ – 2L1_Over_Rating	0.20	0.20				1,2,3
1.13	3L3	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.52 * 2L78 ROS – 2L90_Over_Rating	0.51	0.51				1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99				1,2,3
					3	2L1	2L1 PEM + 0.21 * 2L78 ROS – 2L1_Over_Rating	0.20	0.20				1,2,3
1.13	3L3	2L90	Note 2		1	ROS T1	ROS T1 + 0.40* 2L90 BRT – ROS T1_Over_Rating	0.46	0.64				1,2,3
					2	2L1	2L1 PEM + 0.25 * 2L90 BRT – 2L1_Over_Rating	0.22	0.14				1,2,3
					3	2L9	2L9 CKY + 0.28 * 2L90 BRT – 2L9_Over_Rating	0.25	0.17		0.34		1,2,3
					4	2L13	2L13 CKY + 0.23 * 2L90 BRT – 2L13_Over_Rating	0.21	0.14		0.28		1,2,3
					5	2L3	2L3 WLT + 0.31 * 2L90 BRT – 2L3_Over_Rating	0.28	0.18		0.37		1,2,3
1.13	3L3	3L2	Note 2		1	2L90	2L90 BRT + 0.52 * 3L2 BRT – 2L90_Over_Rating	0.51	0				1,2,3,7
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0				1,2,3,7
					3	2L1	2L1 PEM + 0.21 * 3L2 BRT – 2L1_Over_Rating	0.20	0				1,2,3,7
1.13	3L3	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		Not applicable								
1.13	3L3	3L5	Note 2		1	2L90	2L90 BRT + 0.52 * 3L5 UHT – 2L90_Over_Rating	0.51	0.51				1,2,3,7
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99				1,2,3,7
					3	2L1	2L1 PEM + 0.21 * 3L5 UHT – 2L1_Over_Rating	0.20	0.20				1,2,3,7
1.13	3L3	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1		0		1,2,3,4
1.13	3L3 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2_Over_Rating	0.45	0.31		0.67		1,2,3
					2	ROS T1	ROS T1 + 0.30 * 2L1 BRT + 0.44 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.66		0.29		1,2,3
					3	2L41	2L41 BRT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L41_Over_Rating	0.45	0.31		0		1,2,3
1.13	3L3 & BRT 2CB2	2L41	Note 2		1	2L1	2L1 PEM + 0.58 * 2L41 BRT + 0.45 * 2L90 BRT – 2L1_Over_Rating	0.40	0.27				1,2,3

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
	O.O.S.				2	ROS T1	ROS T1 + 0.37 * 2L41 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.54	0.69				1,2,3
1.13	3L3 & BRT 2CB3 O.O.S.	2L90	Note 2,5		1	2L1	2L1 PEM + 0.58 * 2L41 BRT + 0.45 * 2L90 BRT – 2L1_Over_Rating	0.40	0.27				1,2,3,5
					2	ROS T1	ROS T1 + 0.37 * 2L41 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.54	0.69				1,2,3,5
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,5	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92		0		1,2,3,4,5
1.13	3L3 & BRT 2CB4 O.O.S.	2L90	Note 2,5		1	2L2	2L2 RUT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2_Over_Rating	0.45	0.31		0.67		1,2,3,5
					2	ROS T1	ROS T1 + 0.30 * 2L1 BRT + 0.44 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.66		0.29		1,2,3,5
					3	2L41	2L41 BRT + 0.66 * 2L1 BRT + 0.50 * 2L90 – 2L41_Over_Rating	0.45	0.31		0		1,2,3,5
		2L41	Note 2,5	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92		0		1,2,3,4,5

Table 1.14 **3L5 OR (3L5 and 3L3 and 2L78) out-of-service**

Note 1 System condition: 3L5 OR (3L5 and 3L3 and 2L78) out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + UL_IPPs + CMS) is the least of:

- 887 MW, or
- (BRR + UH_IPPs + UL_IPPs + CMS) + (2L90_Norm_Rating – 2L90 BRT) / 0.51, or
- (BRR + UH_IPPs + UL_IPPs + CMS) + (BRT T4_Norm_Rating – BRT T4) / 1.00
- BRR + UH_IPPs + UL_IPPs + CMS + (2L1_Norm_Rating – 2L1 PEM) / 0.20
- BRR + UH_IPPs + UL_IPPs + CMS + (2L3_Norm_Rating – 2L3 WLT) / 0.23
- BRR + UH_IPPs + UL_IPPs + CMS + (2L9_Norm_Rating – 2L9 CKY) / 0.21
- BRR + UH_IPPs + UL_IPPs + CMS + (2L13_Norm_Rating – 2L13 CKY) / 0.17

Max Gen refers to the sum of BRR, UH_IPP, UL_IPPs, and CMS generation within the pre-outage limit.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and/or CMS_ generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.51, DF_UH = 0.51, DF_UL = 0.39, DF_CMS = 0.22

(b) If TSA alarms "VIOLATION_BRT T4 CONTINUOUS RATING", then BRR and/or UH_IPP generation must be reduced by (BRT T4 – BRT T4_Norm_Rating).
The distribution factors for this case are: DF_BRR = 1.00, DF_UH = 1.00

(c) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR and / or UH_IPP generation must be reduced by (2L1 PEM – 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.20, DF_UH = 0.20

(d) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.23, DF_UH = 0.23, DF_UL = 0.29, DF_CMS = 0. 41

(e) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UH = 0.21, DF_UL = 0.27, DF_CMS = 0.38

(f) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, UH_IPP, UL_IPP and / or CMS generation must be reduced by (2L13 CKY – 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.17, DF_UH = 0.17, DF_UL = 0.22, DF_CMS = 0.31

BR REQUIREMENTS:

To prevent self-excitation of BR generators the following must be observed:

- With no UHT RX on-line a minimum of (2 BR2 units and 1 BR1 unit) OR 4 BR1 units must be on-line.
- With 1 UHT RX on-line a minimum of 2 BR2 units OR 3 BR1 units must be on-line.

A BR2 unit is a good substitution for a BR1 unit meeting the minimum units-on-line requirements to prevent self-excitation to BRR units.)

UHT REQUIREMENTS:

To prevent self-excitation of UHT generators the following must be observed:

- With no UHT RX on-line a minimum of 14 bigger units (180 MVA or 162 MW capacity) must be on-line
- With 1 UHT RX on-line a minimum of approximately 8 bigger units (112 MVA or 100 MW capacity) must be on-line
- With 2 UHT RX on-line a minimum of approximately 2 bigger units (27 MVA or 24 MW capacity) must be on-line

All UHT IPP plants have to be off-line if the above minimum unit-on-line requirements cannot be met.

Suggest at least one UHT 35 MVAr reactor to be on-line (yields lower min-unit-on-line requirements & lower switching surge voltages).

Note 3 Shed at (BRR, UL_IPP, and/or UH_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Removed.

Note 5 Loss of 2L77 with 3L5 already opened will island WAH with ALZ load and WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network.

For managing the inevitable islanding scenario upon loss of 2L77:
- This action will black out ALZ load and WAH 60 kV load. WAH G1 will be tripped under islanding situation.

Note 6 Loss of 2L78 with 3L5 already opened will island WAH with WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network.

For managing the inevitable islanding scenario upon loss of 2L78:
This action will black out WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network). WAH G1 will be tripped under islanding situation.

Note 7 For transient stability requirements:
- Shed all 3 UH_ IPP Clusters
- Shed BRR down to 350 MW.

Note 8 Loss of 3L2 with 3L5 already opened will isolate UH_ IPPs.
- Shed all 3 UH_IPP Clusters

Note 9 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 10

Loss of BRT T4 with 3L5 already opened will island BRR/UH plants with BR load.
- Shed all 3 UH_ IPP Clusters
- Shed all BRR units

These actions will black out BR area load

Note 11

The pre-outage limit in conjunction with BRT 2CB1 outage:
- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)
- Shed all UH_IPP Clusters
- Shed BR down to 170 MW

Note 12

The pre-outage limit in conjunction with BRT 2CB2 outage:
- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of 2L41
- Shed all UH_IPP Clusters
- Shed BR down to 170 MW units

Note 13

The pre-outage limit in conjunction with BRT 2CB3 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19(BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed all UH_IPP Clusters
- Shed BR down to 170 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed all UH_IPP Clusters
- Shed all BR units

These actions will black out BR area load

Note 14

The pre-outage limit in conjunction with BRT 2CB4 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19(BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed all UH_IPP Clusters
- Shed BR down to 170 MW

For loss of 2L41

- Shed all UH_IPP Clusters
- Shed all BR units

These actions will black out BR area load

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.54 * 2L1 BRT – 2L2_Over_Rating	0.36	0.36		0.58		1,2,3
					2	2L90	2L90 BRT + 0.43 * 2L1 BRT – 2L90_Over_Rating	0.61	0.61		0.41		1,2,3
					3	2L41	2L41 BRT + 0.54 * 2L1 BRT – 2L41_Over_Rating	0.36	0.36		0		1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.50 * 2L2 TIS – 2L90_Over_Rating	0.66	0.66		0.66		1,2,3
					2	2L1	2L1 PEM + 0.46 * 2L2 TIS – 2L1_Over_Rating	0.30	0.30		0.29		1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L41	Note 2		1	2L90	2L90 BRT + 0.50 * 2L41 BRT – 2L90_Over_Rating	0.66	0.66				1,2,3
					2	2L1	2L1 PEM + 0.49 * 2L41 BRT – 2L1_Over_Rating	0.31	0.30				1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L3	Note 2		1	2L11	2L11 WLT + 0.91 * 2L3 WLT – 2L11_Over_Rating	0.36	0.35		0.47	0.63	1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.29 * 2L9 CKY – 2L90_Over_Rating	0.58	0.58		0.47	0.36	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L9 CKY – 2L13_Over_Rating	0.34	0.34		0.41	0.53	1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L11	Note 2		1	2L3	2L11 WLT + 0.96 * 2L3 WLT – 2L3_Over_Rating	0.37	0.37		0.49	0.66	1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.26 * 2L13 CKY – 2L90_Over_Rating	0.56	0.56		0.44	0.30	1,2,3
					2	2L9	2L9 CKY + 0.67 * 2L13 CKY – 2L9_Over_Rating	0.36	0.36		0.45	0.59	1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.19 * 2L14 CYP – 2L90_Over_Rating	0.54	0.54		0.42	0.27	1,2,3
					2	2L9	2L9 CKY + 0.46 * 2L14 CYP – 2L9_Over_Rating	0.32	0.32		0.38	0.51	1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.29 * 2L17 LYN – 2L90_Over_Rating	0.58	0.58		0.46	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L17 LYN – 2L13_Over_Rating	0.34	0.34		0.41	0.54	1,2,3
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L77 OR CBN T3 OR CBN T6	Note 2										1,2,5
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L78 OR ROS T1	Note 2										1,2,6
1.14	3L5 OR (3L5 and 3L3 and 2L78)	2L90	Note 2	350	1	2L1	2L1 PEM + 0.39 * 2L90 BRT – 2L1_Over_Rating	0.39	0.40		0.20		1,2,3,7
					2	2L3	2L3 WLT + 0 47 * 2L90 BRT – 2L3_Over_Rating	0.48	0.48		0.49		1,2,3,7
					3	2L9	2L9 CKY + 0.43 * 2L90 BRT – 2L9_Over_Rating	0.44	0.44		0.46		1,2,3,7

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					4	2L13	2L13 CKY + 0.36 * 2L90 BRT – 2L13_Over_Rating	0.36	0.36		0.38		1,2,3,7
1.14	3L5 OR (3L5 and 3L3 and 2L78)	3L2	Note 2										1,2,8
1.14	3L5 OR (3L5 and 3L3 and 2L78)	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2										1,2,9
1.14	3L5 OR (3L5 and 3L3 and 2L78)	3L5	Note 2		Not applicable								
1.14	3L5 OR (3L5 and 3L3 and 2L78)	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2										1,2,10
1.14	[3L5 OR (3L5 and 3L3 and 2L78)] & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,11	Note 11									1,2,11
1.14	[3L5 OR (3L5 and 3L3 and 2L78)] & BRT 2CB2 O.O.S.	2L41	Note 2,12	Note 12	1	2L1	2L1 PEM + 0.89 * 2L41 BRT + 0.84 * 2L90 BRT – 2L1_Over_Rating	0.82					1,2,3,12
1.14	[3L5 OR (3L5 and 3L3 and 2L78)] & BRT 2CB3 O.O.S.	2L90	Note 2,13	Note 13									1,2,13
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,13	Note 13									1,2,13
1.14	[3L5 OR (3L5 and 3L3 and 2L78)] & BRT 2CB4 O.O.S.	2L90	Note 2,14	Note 14									1,2,14
		2L41	Note 2,14	Note 14									1,2,14

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.14	[3L5 OR (3L5 and 3L3 and 2L78)] & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2										1,2,9

Table 1.15 BRT T4 out-of-service

Note 1 System condition: BRT T4 out-of-service

Note 2 pre-outage restrictions for BR + UH_IPPs + WAH:

- (BR+UHT IPPs + WAH) total generation will be restricted to less than ROS T1_Norm_Rating + WAH 60KV load (WAH 60KV load can be calculated as WAH generation -3L3 WAH)

Max Gen refers to the sum of BRR, UH_IPP, and/or WAH generation within the pre-outage limit. Transmission studies were done with a maximum of 687 MW of generation.
If generation exceeds this number then additional studies will need to be performed

(a) If TSA alarms "VIOLATION_ROS T1 CONTINUOUS RATING", then BRR, UH_IPP, and/or WAH generation must be reduced by (ROS T1 - ROS T1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 1.00, DF_UH = 1.00, DF_WAH = 1.00

BR REQUIREMENTS:

To prevent self-excitation of BR generators the following must be observed:

- With no UHT RX on-line a minimum of (2 BR2 units and 1 BR1 unit) OR 4 BR1 units must be on-line.
- With 1 UHT RX on-line a minimum of 2 BR2 units OR 3 BR1 units must be on-line. A BR2 unit is a good substitution for a BR1 unit meeting the minimum units-on-line requirements to prevent self-excitation to BRR units.

Suggest at least one UHT 35 MVAr reactor to be on-line (yields lower min-unit-on-line requirements & lower switching surge voltages).

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Loss of 2L1 or 2L5 with BRT T4 already opened would not have any impact on the North Shore 230 kV.

Note 5 Loss of 2L2 or 2L41 with BRT T4 already opened would not have any impact on the North Shore 230 kV.

Note 6 Removed.

Note 7 Removed.

Note 8 Removed.

Note 9 Removed.

Note 10

Loss of 2L77 with BRT T4 already opened will island BR, UHT IPPs & WAH with BR load, ALZ load, and WAH 60 kV load (unless WAH 60 kV load is fed from the 60 kV network)

For managing the inevitable islanding scenario upon loss of 2L77:

- Shed all 3 UHT Clusters
- Shed all BR units

These actions will black out BR area load, ALZ load and WAH 60 kV load. WAH G1 will be tripped under islanding situation.

Note 11

Loss of 2L78 with BRT T4 already opened will island BRR, UH IPPs & WAH with WAH 60 kV load (unless WAH 60 kV load is fed from the 60 kV network).
For managing the inevitable islanding scenario upon loss of 2L78:

- Shed all 3 UH_IPP Clusters
- Shed all BRR units

These actions will black out BR area load and WAH 60 kV load (unless WAH 60 kV load is fed from the 60 kV network). WAH G1 will be tripped under islanding situation.

Note 12

Loss of 2L90 with BRT T4 already opened would not have any impact on the North Shore 230 kV.

Note 13

Loss of 3L2 with BRT T4 already opened will island BR plant with BR load

For managing the inevitable islanding scenario upon loss of 3L2:

- Shed all BR units

This action will black out BR area load

Note 14

To avoid violating transient under-voltage criteria

If UH_IPP output < 140 MW

No gen shed

Else

Shed down all 3 UH IPP Clusters

Also, for loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW. This action will black out WAH 60 kV load.

Note 15

Loss of 3L5 with BRT T4 already opened will island BR/UHT plants with a small BR load

For managing the inevitable islanding scenario upon loss of 3L5:

- Shed all 3 UH Clusters
- Shed all BR units

These actions will black out BR area load

Note 16

The pre-outage limit in conjunction with BRT 2CB3 outage or BRT 2CB4 outage or (BRT 2CB3 & 2CB4) outage:

- Open 2L19/(BR1 T3 and T30)

Refer to SOO 7T-25 for switching requirements and restrictions associated with 2L19/(BR1 T3 and T30) outage.

Note 17 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW. This action will black out WAH 60 kV load.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.15	BRT T4	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2										1,2,4
1.15	BRT T4	2L2 OR RBW T2	Note 2										1,2,5
1.15	BRT T4	2L41	Note 2										1,2,5
1.15	BRT T4	2L3	Note 2										1,2
1.15	BRT T4	2L9 OR LYN T1	Note 2		1	2L13	2L13 CKY + 0.62 * 2L9 CKY – 2L13_Over_Rating	0	0		0.43	0.54	1,2
1.15	BRT T4	2L11	Note 2										1,2
1.15	BRT T4	2L13 OR CYP T2	Note 2		1	2L9	2L9 CKY + 0.67 * 2L13 CKY – 2L9_Over_Rating	0	0		0.46	0.60	1,2
1.15	BRT T4	2L14 OR CYP T3	Note 2		1	2L9	2L9 CKY + 0.47 * 2L14 CYP – 2L9_Over_Rating	0	0		0.40	0.51	1,2
1.15	BRT T4	2L17 OR LYN T2	Note 2		1	2L13	2L13 CKY + 0.64 * 2L17 LYN – 2L13_Over_Rating	0	0		0.43	0.54	1,2
1.15	BRT T4	2L77 OR CBN T3 OR CBN T6	Note 2										1,2,10
1.15	BRT T4	2L78 OR ROS T1	Note 2										1,2,11
1.15	BRT T4	2L90	Note 2										1,2,12
1.15	BRT T4	3L2	Note 2										1,2,13
1.15	BRT T4	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2										1,2,14
1.15	BRT T4	3L5	Note 2										1,2,15
1.15	BRT T4	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2		Not applicable								
1.15	BRT T4 (dso) & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2	Not required									1,2,4
		2L41	Note 2	Not required									1,2,5
		2L90	Note 2	Not required									1,2,12
1.15	BRT T4 (dso) & BRT 2CB2 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2	Not required									1,2,4
		2L41	Note 2	Not required									1,2,5
		2L90	Note 2	Not required									1,2,12
1.15	BRT T4 (dso) & BRT 2CB3 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,16	Not required									1,2,4,16
		2L41	Note 2,16	Not required									1,2,5,16
		2L90	Note 2,16	Not required									1,2,12,16

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.15	BRT T4 (dso) & BRT 2CB4 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,16	Not required									1,2,4,16
		2L41	Note 2,16	Not required									1,2,5,16
		2L90	Note 2,16	Not required									1,2,12,16
1.15	BRT T4 & (BRT 2CB3 & BRT 2CB4) O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,16	Not required									1,2,4,16
		2L41	Note 2,16	Not required									1,2,5,16
		2L90	Note 2,16	Not required									1,2,12,16
1.15	BRT T4 & ROS 3CB1 O.O.S.	3L5	Note 2										1,2,15,17
1.15	BRT T4 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2										1,2,15,17
1.15	BRT T4 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2										1,2,15,17

Table 1.16 **3L2 & 3L5 out-of-service**

Note 1 System condition: 3L2 & 3L5 out-of-service

Note 2 The pre-outage limit (BRR + UL_IPPs + CMS) is the least of:

- 635 MW, or
- BRR + UL_IPPs + CMS + (2L90_Norm_Rating – 2L90 BRT) / 0.51, or
- BRR + UL_IPPs + CMS + (BRT T4_Norm_Rating – BRT T4) / 1.00
- BRR + UL_IPPs + CMS + (2L1_Norm_Rating – 2L1 PEM) / 0.20
- BRR + UL_IPPs + CMS + (2L3_Norm_Rating – 2L3 WLT) / 0.23
- BRR + UL_IPPs + CMS + (2L9_Norm_Rating – 2L9 CKY) / 0.21
- BRR + UL_IPPs + CMS + (2L13_Norm_Rating – 2L13 CKY) / 0.17

Max Gen refers to the sum of BRR, UL_IPPs, and CMS generation within the limit.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.51, DF_UL = 0.39, DF_CMS = 0.22

(b) If TSA alarms "VIOLATION_BRT T4 CONTINUOUS RATING", then BRR generation must be reduced by (BRT T4 – BRT T4_Norm_Rating).
The distribution factors for this case are: DF_BRR = 1.00

(c) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR generation must be reduced by (2L1 PEM – 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.20.

(d) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.23, DF_UL = 0.29, DF_CMS = 0.41

(e) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UL= 0.27, DF_CMS = 0.38

(f) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L13 CKY – 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.17, DF_UL= 0.22, DF_CMS = 0.31

Note 3 Shed at (BRR and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Removed.

Note 5 Loss of 2L77 with 3L5 already opened will island WAH with ALZ load and WAH 60 kV load

- WAH G1 will be tripped under islanding situation. This action will black out ALZ load and WAH 60 kV load.

Note 6 Loss of 2L78 with 3L5 already opened will island WAH with WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network.

- If 3L3 is in-service, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW

These actions will black out WAH 60 kV load unless the WAH 60 kV load is fed from the 60 kV network.

Note 7 Removed.

Note 8 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW. This action will black out WAH 60 kV load.

Note 9 Loss of BRT T4 with 3L2 already opened will island BR plant with BR load
For managing the inevitable islanding scenario upon loss of BRT T4:

- Shed all BR units

This action will black out BR area load

Note 10 The pre-outage limit in conjunction with BRT 2CB1 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed BR down to 220 MW

Note 11 The pre-outage limit in conjunction with BRT 2CB2 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of 2L41

- Shed BR down to 180 MW

Note 12 The pre-outage limit in conjunction with BRT 2CB3 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19(BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed BR down to 180 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed all BR units

These actions will black out BR area load.

Note 13 The pre-outage limit in conjunction with BRT 2CB4 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T-25 2L19(BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed BR down to 220 MW

For loss of 2L41

- Shed all BR units

These actions will black out BR area load.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.16	3L2 and 3L5	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.43* 2L1 BRT – 2L90_Over_Rating	0.60	0		0.40		1,2,3
					2	2L2	2L2 RUT + 0.56 * 2L1 BRT – 2L2_Over_Rating	0.38	0		0.59		1,2,3
					3	2L41	2L41 BRT + 0.56 * 2L1 BRT – 2L41_Over_Rating	0.38	0		0		1,2,3
1.16	3L2 and 3L5	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.50* 2L2 TIS – 2L90_Over_Rating	0.64	0		0.65		1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L2 TIS – 2L1_Over_Rating	0.31	0		0.30		1,2,3
1.16	3L2 and 3L5	2L41	Note 2		1	2L90	2L90 BRT + 0.50* 2L41 BRT – 2L90_Over_Rating	0.65	0				1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L41 BRT – 2L1_Over_Rating	0.32	0				1,2,3
1.16	3L2 and 3L5	2L3	Note 2		1	2L11	2L11 WLT + 0.91 * 2L3 WLT – 2L11_Over_Rating	0.36	0		0.46	0.59	1,2,3
1.16	3L2 and 3L5	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.29 * 2L9 CKY – 2L90_Over_Rating	0.58	0		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L9 CKY – 2L13_Over_Rating	0.34	0		0.41	0.54	1,2,3
1.16	3L2 and 3L5	2L11	Note 2		1	2L3	2L3 WLT + 0.96 * 2L11 WLT – 2L3_Over_Rating	0.38	0		0.49	0.66	1,2,3
1.16	3L2 and 3L5	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.26 * 2L13 CKY – 2L90_Over_Rating	0.56	0		0.45	0.31	1,2,3
					2	2L9	2L9 CKY + 0.67 * 2L13 CKY – 2L9_Over_Rating	0.36	0		0.45	0.59	1,2,3
1.16	3L2 and 3L5	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.19 * 2L14 CYP – 2L90_Over_Rating	0.54	0		0.42	0.27	1,2,3
					2	2L9	2L9 CKY + 0.46 * 2L14 CYP – 2L9_Over_Rating	0.29	0		0.38	0.50	1,2,3
1.16	3L2 and 3L5	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.29 * 2L17 LYN – 2L90_Over_Rating	0.58	0		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L17 LYN – 2L13_Over_Rating	0.34	0		0.42	0.54	1,2,3
1.16	3L2 and 3L5	2L77 OR CBN T3 OR CBN T6	Note 2										1,2,5
1.16	3L2 and 3L5	2L78 OR ROS T1	Note 2										1,2,6
1.16	3L2 and 3L5	2L90	Note 2		1	2L1	2L1 PEM + 0.39 * 2L90 BRT – 2L1_Over_Rating	0.39	0		0.20		1,2,3

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					2	2L3	2L3 WLT + 0 47 * 2L90 BRT – 2L3_Over_Rating	0.48	0		0.49		1,2,3
					3	2L9	2L9 CKY + 0.43 * 2L90 BRT – 2L9_Over_Rating	0.44	0		0.46		1,2,3
					4	2L13	2L13 CKY + 0.36 * 2L90 BRT – 2L13_Over_Rating	0.36	0		0.38		1,2,3
1.16	3L2 and 3L5	3L2	Note 2		Not Applicable								
1.16	3L2 and 3L5	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2										1,2,8
1.16	3L2 and 3L5	3L5	Note 2		Not Applicable								
1.16	3L2 and 3L5	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2										1,2,9
1.16	3L2 and 3L5 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,10	Note 10	1	2L2	2L2 RUT + 0.94 * 2L1 BRT + 0.91 * 2L90 BRT – 2L2 _Over_Rating	0.90			0.95		1,2,3,10
1.16	3L2 and 3L5 & BRT 2CB2 O.O.S.	2L41	Note 2,11	Note 11	1	2L1	2L1 PEM + 0.89 * 2L41 BRT + 0.84 * 2L90 BRT – 2L1_Over_Rating	0.82					1,2,3,11
1.16	3L2 and 3L5 & BRT 2CB3 O.O.S.	2L90	Note 2,12	Note 12									1,2,12
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,12	Note 12									1,2,12
1.16	3L2 and 3L5 & BRT 2CB4 O.O.S.	2L90	Note 2,13	Note 13									1,2,13
		2L41	Note 2,13	Note 13									1,2,13

Table 1.17 **3L2, 3L3, & 3L5 out-of-service**

Note 1 System condition: 3L2, 3L3, & 3L5 out-of-service

Note 2 The pre-outage limit (BRR + UL_IPPs + CMS) is the least of:

- 635 MW, or
- BRR + UL_IPPs + CMS + (2L90_Norm_Rating – 2L90 BRT) / 0.51, or
- BRR + UL_IPPs + CMS + (BRT T4_Norm_Rating – BRT T4) / 1.00
- BRR + UL_IPPs + CMS + (2L1_Norm_Rating – 2L1 PEM) / 0.20
- BRR + UL_IPPs + CMS + (2L3_Norm_Rating – 2L3 WLT) / 0.23
- BRR + UL_IPPs + CMS + (2L9_Norm_Rating – 2L9 CKY) / 0.21
- BRR + UL_IPPs + CMS + (2L13_Norm_Rating – 2L13 CKY) / 0.17

Max Gen refers to the sum of BRR, UL_IPPs, and CMS generation within the limit.

(a) If TSA alarms "VIOLATION_2L90 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L90 BRT – 2L90_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.51, DF_UL = 0.39, DF_CMS = 0.22

(b) If TSA alarms "VIOLATION_BRT T4 CONTINUOUS RATING", then BRR generation must be reduced by (BRT T4 – BRT T4_Norm_Rating).
The distribution factors for this case are: DF_BRR = 1.00

(c) If TSA alarms "VIOLATION_2L1 CONTINUOUS RATING", then BRR generation must be reduced by (2L1 PEM – 2L1_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.20

(d) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.23, DF_UL = 0.29, DF_CMS = 0.41

(e) If TSA alarms "VIOLATION_2L9 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L9 CKY – 2L9_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.21, DF_UL= 0.27, DF_CMS = 0.38

(f) If TSA alarms "VIOLATION_2L13 CONTINUOUS RATING", then BRR, ULL_IPP and / or CMS generation must be reduced by (2L13 CKY – 2L13_Norm_Rating).
The distribution factors for this case are: DF_BRR = 0.17, DF_UL= 0.22, DF_CMS = 0.31

Note 3 Shed at (BRR and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 Removed.

Note 5 Loss of 2L77 with 3L5 already opened will island WAH with ALZ load and WAH 60 kV load
WAH G1 will be tripped under islanding situation. This action will black out ALZ load and WAH 60 kV load.

Note 6 No action required as 3L3 is already opened and WAH 60 kV load is fed from ALZ.

Note 7 Removed.

Note 9 Loss of BRT T4 with 3L2 already opened will island BR plant with BR load
For managing the inevitable islanding scenario upon loss of BRT T4:

- Shed all BR units

This action will black out BR area load

Note 10

The pre-outage limit in conjunction with BRT 2CB1 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed BR down to 220 MW

Note 11

The pre-outage limit in conjunction with BRT 2CB2 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

For loss of 2L41

- Shed BR down to 180 MW

Note 12

The pre-outage limit in conjunction with BRT 2CB3 outage:

- Close BR1 60CB5
- Open 2L19/(BR1 T3 and T30); refer to SOO 7T-25 for switching requirements
- RMR SON+LAJ+JME+WDN<=35MW, refer to SOO 7T 25 2L19(BR1T3 and T30) outage generation restrictions.

For loss of 2L90

- Shed BR down to 180 MW

For loss of (2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1)

- Shed all BR units

These actions will black out BR area load.

Note 13

The pre-outage limit in conjunction with BRT 2CB4 outage:

For loss of 2L90

- Shed BR down to 220 MW

For loss of 2L41

- Shed all BR units

These actions will black out BR area load.

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.17	3L2, 3L3, and 3L5	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L90	2L90 BRT + 0.43* 2L1 BRT – 2L90_Over_Rating	0.60	0		0.40		1,2,3
					2	2L2	2L2 RUT + 0.56 * 2L1 BRT – 2L2_Over_Rating	0.38	0		0.59		1,2,3
					3	2L41	2L41 BRT + 0.56 * 2L41 BRT – 2L41_Over_Rating	0.38	0		0		1,2,3
1.17	3L2, 3L3, and 3L5	2L2 OR RBW T2	Note 2		1	2L90	2L90 BRT + 0.50* 2L2 TIS – 2L90_Over_Rating	0.64	0		0.65		1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L2 TIS – 2L1_Over_Rating	0.31	0		0.30		1,2,3
1.17	3L2, 3L3, and 3L5	2L41	Note 2		1	2L90	2L90 BRT + 0.50* 2L41 BRT – 2L90_Over_Rating	0.65	0				1,2,3
					2	2L1	2L1 PEM + 0.47 * 2L41 BRT – 2L1_Over_Rating	0.32	0				1,2,3
1.17	3L2, 3L3, and 3L5	2L3	Note 2		1	2L11	2L11 WLT + 0.91 * 2L3 WLT – 2L11_Over_Rating	0.36	0		0.46	0.59	1,2,3
1.17	3L2, 3L3, and 3L5	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.29 * 2L9 CKY – 2L90_Over_Rating	0.58	0		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L9 CKY – 2L13_Over_Rating	0.34	0		0.41	0.54	1,2,3
1.17	3L2, 3L3, and 3L5	2L11	Note 2		1	2L3	2L3 WLT + 0.96 * 2L11 WLT – 2L3_Over_Rating	0.38	0		0.49	0.66	1,2,3
1.17	3L2, 3L3, and 3L5	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.26 * 2L13 CKY – 2L90_Over_Rating	0.56	0		0.45	0.31	1,2,3
					2	2L9	2L9 CKY + 0.67 * 2L13 CKY – 2L9_Over_Rating	0.36	0		0.45	0.59	1,2,3
1.17	3L2, 3L3, and 3L5	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.19 * 2L14 CYP – 2L90_Over_Rating	0.54	0		0.42	0.27	1,2,3
					2	2L9	2L9 CKY + 0.46 * 2L14 CYP – 2L9_Over_Rating	0.29	0		0.38	0.50	1,2,3
1.17	3L2, 3L3, and 3L5	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.29 * 2L17 LYN – 2L90_Over_Rating	0.58	0		0.47	0.34	1,2,3
					2	2L13	2L13 CKY + 0.62 * 2L17 LYN – 2L13_Over_Rating	0.34	0		0.42	0.54	1,2,3
1.17	3L2, 3L3, and 3L5	2L77 OR CBN T3 OR CBN T6	Note 2										1,2,5
1.17	3L2, 3L3, and 3L5	2L78 OR ROS T1	Note 2										1,2,6
1.17	3L2, 3L3, and 3L5	2L90	Note 2		1	2L1	2L1 PEM + 0.39 * 2L90 BRT – 2L1_Over_Rating	0.39	0		0.20		1,2,3
					2	2L3	2L3 WLT + 0 47 * 2L90 BRT – 2L3_Over_Rating	0.48	0		0.49		1,2,3
					3	2L9	2L9 CKY + 0.43 * 2L90 BRT – 2L9_Over_Rating	0.44	0		0.46		1,2,3
					4	2L13	2L13 CKY + 0.36 * 2L90 BRT – 2L13_Over_Rating	0.36	0		0.38		1,2,3
1.17	3L2, 3L3, and 3L5	3L2	Note 2		Not Applicable								
1.17	3L2, 3L3, and 3L5	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		Not Applicable								

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.17	3L2, 3L3, and 3L5	3L5	Note 2		Not Applicable								
1.17	3L2, 3L3, and 3L5	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2										1,2,9
1.17	3L2, 3L3 and 3L5 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,10	Note 10	1	2L2	2L2 RUT + 0.94 * 2L1 BRT + 0.91 * 2L90 BRT – 2L2 _Over_Rating	0.90			0.95		1,2,3,10
1.17	3L2, 3L3 and 3L5 & BRT 2CB2 O.O.S.	2L41	Note 2,11	Note 11	1	2L1	2L1 PEM + 0.89 * 2L41 BRT + 0.84 * 2L90 BRT – 2L1_Over_Rating	0.82					1,2,3,11
1.17	3L2,3L3 and 3L5 & BRT 2CB3 O.O.S.	2L90	Note 2,12	Note 12									1,2,12
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,12	Note 12									1,2,12
1.17	3L2, 3L3 and 3L5 & BRT 2CB4 O.O.S.	2L90	Note 2,13	Note 13									1,2,13
		2L41	Note 2,13	Note 13									1,2,13

Table 1.18 2L3 out-of-service

Note 1 System condition: 2L3 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L11_Norm_Rating – 2L11 WLT) / 0.26, or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L11 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L11 WLT – 2L11_Norm_Rating). The distribution factors for this case are: DF_BRR = 0.26, DF_UH = 0.17, DF_WAH = 0.12, DF_UL = 0.41, DF_CMS = 0.59.

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 CKY to MSA 132 kV Path consists of 1L31, 1L32 and 1L35.

Note 5 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 6 Transient stability requirements

Note 7 The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 8 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
Shed UH IPP down to 135 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.18	2L3	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	ROS T1	ROS T1 + 0.16 * 2L1 BRT – ROS T1_Over_Rating	0.33	0.54		0.16		1,2,3
					2	2L90	2L90 BRT + 0.31 * 2L1 BRT – 2L90_Over_Rating	0.40	0.27		0.31		1,2,3
1.18	2L3	2L2 OR RBW T2	Note 2		1	ROS T1	ROS T1 + 0.18 * 2L2 TIS – ROS T1_Over_Rating	0.34	0.55		0.25		1,2,3
					2	2L90	2L90 BRT + 0.35 * 2L2 TIS – 2L90_Over_Rating	0.43	0.29		0.48		1,2,3
					3	2L1	2L1 PEM + 0.43 * 2L2 TIS – 2L1_Over_Rating	0.20	0.14		0.22		1,2,3
1.18	2L3	2L41	Note 2		1	ROS T1	ROS T1 + 0.19 * 2L41 BRT – ROS T1_Over_Rating	0.34	0.55				1,2,3
					2	2L90	2L90 BRT + 0.36 * 2L41 BRT – 2L90_Over_Rating	0.43	0.29				1,2,3
					3	2L1	2L1 PEM + 0.43 * 2L41 BRT – 2L1_Over_Rating	0.20	0.14				1,2,3
1.18	2L3	2L3			Not applicable								
1.18	2L3	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.21 * 2L9 CKY – 2L90_Over_Rating	0.40	0.28		0.36	0.27	1,2,3
					2	ROS T1	ROS T1 + 0.38 * 2L9 CKY – ROS T1_Over_Rating	0.32	0.52		0.19	0.14	1,2,3
					3	2L13	2L13 CKY + 0.59 * 2L9 CKY – 2L13_Over_Rating	0.19	0.13		0.32	0.46	1,2,3
1.18	2L3	2L11	Note 2		GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 2 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 2 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 2 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 2 for this contingency.								
					Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					1	2L90	2L90 BRT + 0.54 * 2L11 WLT – 2L90_Over_Rating	0.50	0.34		0.52	0.50	1,2,3,4
					2	ROS T1	ROS T1 + 0.27 * 2L11 WLT – ROS_T1_Over_Rating	0.38	0.56		0.28	0.26	1,2,3,4
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.18 * 2L11 WLT – 0.08 * GS_BRR1 – 0.05 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.18 * 2L11 WLT – 0.08 * GS_BRR1 – 0.05 * GS_UH1 – 0.14 * GS_ULL1 – 0.19 * RB_CMS1 < 1L35_Over_Rating, then: Shed at BRR: GS_BRR1 Shed at UH_IPPs: GS_UH1 Shed at UL_IPPs: GS_UL1 Shed at CMS: RB_CMS1 If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.18 * 2L1 WLT – 0.08 * GS_BRR1 – 0.05 * GS_UH1 – 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.18 * 2L11 WLT – 0.08 * GS_BRR1 – 0.05 * GS_UH1 – 0.14 * GS_ULL1 – 0.19 * RB_CMS1 >= 1L35_Over_Rating)], then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 3 to 4:								
					Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L90	2L90 BRT + 0.54 * 2L11 WLT + 0.64 * (0.18 * 2L11 WLT – 1L31 GIB) – 2L90_Over_Rating	0.50	0.34		0.52	0.50	1,2,3,4
					4	ROS T1	ROS T1 + 0.27 * 2L11 WLT + 0.33 * (0.18 * 2L11 WLT – 1L31 GIB) – ROS_T1_Over_Rating	0.38	0.56		0.28	0.26	1,2,3,4
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 5 to 6:								
					Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L90	2L90 BRT + 0.67 * 2L11 WLT – 2L90_Over_Rating	0.56	0.38		0.61	0.62	1,2,3,4
					6	ROS T1	ROS T1 + 0.33 * 2L11 WLT – ROS_T1_Over_Rating	0.40	0.57		0.36	0.33	1,2,3,4
1.18	2L3	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.19 * 2L13 CKY – 2L90_Over_Rating	0.38	0.27		0.34	0.24	1,2,3,
					2	2L9	2L9 CKY + 0.64* 2L13 CKY – 2L9_Over_Rating	0.22	0.16		0.37	0.51	1,2,3,
					3	ROS T1	ROS T1 + 0.10 * 2L13 CKY – ROS T1_Over_Rating	0.31	0.51		0.18	0.11	1,2,3,4
1.18	2L3	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.13 * 2L14 CYP – 2L90_Over_Rating	0.38	0.38		0.33	0.23	1,2,3

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					2	2L9	2L9 CKY + 0.45 * 2L14 CYP – 2L9 Over Rating	0.19	0.13		0.32	0.46	1,2,3
1.18	2L3	2L17 OR LYN T2	Note 2		1	2L90	2L90 BRT + 0.22 * 2L17 LYN – 2L90 Over Rating	0.39	0.27		0.35	0.27	1,2,3
					2	ROS T1	ROS T1 + 0.24 * 2L17 LYN – ROS T1 Over Rating	0.33	0.53		0.19	0.14	1,2,3
					3	2L13	2L13 CKY + 0.62 * 2L17 LYN – 2L13 Over Rating	0.20	0.13		0.34	0.49	1,2,3
1.18	2L3	2L77 OR CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.55 * 2L77 ALZ – 2L90 Over Rating	0.54	0.54		0.43		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4 Over Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.19 * 2L77 ALZ – 2L1 Over Rating	0.18	0.18		0		1,2,3
					4	2L9	2L9 CKY + 0.21 * 2L77 ALZ – 2L9 Over Rating	0.20	0.20		0.24		1,2,3
					5	2L11	2L11 WLT + 0.36 * 2L77 ALZ – 2L11 Over Rating	0.35	0.35		0.42		1,2,3
					6	2L13	2L13 CKY + 0.17 * 2L77 ALZ – 2L13 Over Rating	0.16	0.16		0.21		1,2,3
1.18	2L3	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.55 * 2L78 ROS – 2L90 Over Rating	0.54	0.54		0.43		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4 Over Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.19 * 2L78 ROS – 2L1 Over Rating	0.18	0.18		0		1,2,3
					4	2L9	2L9 CKY + 0.21 * 2L78 ROS – 2L9 Over Rating	0.20	0.20		0.24		1,2,3
					5	2L11	2L11 WLT + 0.36 * 2L78 ROS – 2L11_Over_Rating	0.35	0.35		0.42		1,2,3
					6	2L13	2L13 CKY + 0.17 * 2L78 ROS – 2L13 Over Rating	0.16	0.16		0.21		1,2,3
1.18	2L3	2L90	Note 2		1	ROS T1	ROS T1 + 0.37 * 2L90 BRT – ROS T1_Over_Rating	0.44	0.62		0.28		1,2,3
					2	2L1	2L1 PEM + 0.24 * 2L90 BRT – 2L1 Over Rating	0.22	0.15		0.09		1,2,3
					3	2L11	2L11 WLT + 0.46 * 2L90 BRT – 2L11 Over Rating	0.42	0.28		0.57		1,2,3
1.18	2L3	3L2	Note 2		1	2L90	2L90 BRT + 0.55 * 3L2 BRT – 2L90 Over Rating	0.54	0		0.43		1,2,3,8
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4 Over Rating	0.99	0		0		1,2,3,8
					3	2L1	2L1 PEM + 0.19 * 3L2 BRT – 2L1 Over Rating	0.18	0		0		1,2,3,8
					4	2L9	2L9 CKY + 0.21 * 3L2 BRT – 2L9 Over Rating	0.20	0		0.24		1,2,3,8
					5	2L11	2L11 WLT + 0.36 * 3L2 BRT – 2L11 Over Rating	0.35	0		0.42		1,2,3,8
					6	2L13	2L13 CKY + 0.17 * 3L2 BRT – 2L13 Over Rating	0.16	0		0.21		1,2,3,8
1.18	2L3	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.18 * 3L3 ROS – 2L90 Over Rating	0.36	0.23				1,2,3,5
					2	BRT T4	BRT T4 + 0.32 * 3L3 ROS – BRT T4 Over Rating	0.65	0.43				1,2,3,5
1.18	2L3	3L5	Note 2		1	2L90	2L90 BRT + 0.55 * 3L5 UHT – 2L90 Over Rating	0.54	0.54		0.43		1,2,3,8
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4 Over Rating	0.99	0.99		0		1,2,3,8
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1 Over Rating	0.18	0.18		0		1,2,3,8
					4	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.24		1,2,3,8
					5	2L11	2L11 WLT + 0.36 * 3L5 UHT – 2L11_Over_Rating	0.35	0.35		0.42		1,2,3,8
					6	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.21		1,2,3,8
1.18	2L3	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1 Over Rating	1	1				1,2,3,6
1.18	2L3 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2 Over Rating	0.44	0.30		0.67		1,2,3
					2	2L11	2L11 WLT - 0.28 * 2L1 BRT + 0.40 * 2L90 BRT – 2L11_Over_Rating	0.36	0.25		0.54		1,2,3
					3	ROS T1	ROS T1 + 0.30 * 2L1 + 0.40 * 2L90 BRT – ROS T1 Over Rating	0.50	0.66		0.29		1,2,3
					4	2L41	2L41 BRT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L41_Over_Rating	0.44	0.30		0		1,2,3
1.18	2L3 & BRT 2CB2 O.O.S.	2L41	Note 2		1	2L1	2L1 PEM + 0.59 * 2L41 BRT + 0.44 * 2L90 BRT – 2L1 Over Rating	0.39	0.27				1,2,3
					2	2L11	2L11 WLT – 0.35 * 2L41 BRT + 0.35 * 2L90 BRT – 2L11 Over Rating	0.32	0.22		0.71		1,2,3
					3	ROS T1	ROS T1 + 0.36 * 2L41 BRT + 0.49 * 2L90 BRT – ROS T1_Over_Rating	0.55	0.69				1,2,3
1.18	2L3 & BRT 2CB3	2L90	Note 2,7		1	2L1	2L1 PEM + 0.59 * 2L41 BRT + 0.44 * 2L90 BRT – 2L1 Over Rating	0.39	0.27				1,2,3,7

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
	O.O.S.				2	2L11	2L11 WLT – 0.35 * 2L41 BRT + 0.35 * 2L90 BRT – 2L11_Over_Rating	0.32	0.22		0.71		1,2,3,7
					3	ROS T1	ROS T1 + 0.36 * 2L41 BRT + 0.49 * 2L90 BRT – ROS T1_Over_Rating	0.55	0.69				1,2,3,7
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.18	2L3 & BRT 2CB4 O.O.S.	2L90	Note 2,7		1	2L2	2L2 RUT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2_Over_Rating	0.44	0.30		0.67		1,2,3,7
					2	2L11	2L11 WLT - 0.28 * 2L1 BRT + 0.40 * 2L90 BRT – 2L11_Over_Rating	0.36	0.25		0.54		1,2,3,7
					3	ROS T1	ROS T1 + 0.30 * 2L1 BRT + 0.40 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.66		0.29		1,2,3,7
					4	2L41	2L41 BRT + 0.66 * 2L1 BRT + 0.50 * 2L90 BRT – 2L41_Over_Rating	0.44	0.30		0		1,2,3,7
		2L41	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.18	2L3 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.55 * 3L5 UHT – 2L90_Over_Rating	0.54	0.54		0.43		1,2,3,5,8
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5,8
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5,8
					4	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.24		1,2,3,5,8
					5	2L11	2L11 WLT + 0.36 * 3L5 UHT – 2L11_Over_Rating	0.35	0.35		0.42		1,2,3,5,8
					6	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.21		1,2,3,5,8
1.18	2L3 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.55 * 3L5 UHT – 2L90_Over_Rating	0.54	0.54		0.43		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5
					4	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.24		1,2,3,5
					5	2L11	2L11 WLT + 0.36 * 3L5 UHT – 2L11_Over_Rating	0.35	0.35		0.42		1,2,3,5
					6	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.21		1,2,3,5
1.18	2L3 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.55 * 3L5 UHT – 2L90_Over_Rating	0.54	0.54		0.43		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.19 * 3L5 UHT – 2L1_Over_Rating	0.18	0.18		0		1,2,3,5
					4	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.24		1,2,3,5
					5	2L11	2L11 WLT + 0.36 * 3L5 UHT – 2L11_Over_Rating	0.35	0.35		0.42		1,2,3,5
					6	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.21		1,2,3,5

Table 1.19 2L11 out-of-service

Note 1 System condition: 2L11 out-of-service

Note 2 The pre-outage limit (BRR + UH_IPPs + WAH + UL_IPPs + CMS) is the least of:

- 952 MW, or
- (BRR + UH_IPPs + WAH + UL_IPPs + CMS) + (2L3_Norm_Rating – 2L3 WLT) / 0.26, or

Max Gen refers to the sum of BRR, UH_IPP, WAH, UL_IPPs, and CMS generation within the pre-outage limit.

Transmission studies were done with a maximum of 952 MW of generation. If future installed generation exceeds this number then additional studies will need to be performed.

(a) If TSA alarms "VIOLATION_2L3 CONTINUOUS RATING", then BRR, UH_IPP, WAH, UL_IPPs and / or CMS generation must be reduced by (2L3 WLT – 2L3_Norm_Rating). The distribution factors for this case are: DF_BRR = 0.26, DF_UH = 0.17, DF_WAH = 0.12, DF_UL = 0.42, DF_CMS = 0.63.

Note 3 Shed at (BRR, UH_IPP, and/or UL_IPP), and/or run back at CMS for each contingency to eliminate the overload amount for all of the cases for that contingency.

Note 4 CKY to MSA 132 kV Path consists of 1L31, 1L32 and 1L35.

Note 5 For loss of 3L3, WAH G1 will be tripped under islanding situation if 3L3_WAH (WAH to ROS) > 15 MW, this action will black out WAH 60 kV load.

Note 6 Transient stability requirements

Note 7 The pre-outage limit in conjunction with BRT 2CB3 outage or 2CB4 outage:

- LAJ <= 20 MW, and
- JME <= 15 MW, and
- SON <= 40 MW, and
- WDN <= 10 MW

Note 8 Transient stability requirements

For loss of 3L2:
If UH_IPP output < 126 MW
No gen shed
Else
Shed down all 3 UH IPP Clusters

For loss of 3L5:
If UH_IPP output < 186 MW
No gen shed
Else
Shed UH IPP down to 135 MW

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.19	2L11	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	ROS T1	ROS T1 + 0.17 * 2L1 BRT – ROS T1_Over_Rating	0.33	0.54		0.16		1,2,3
					2	2L90	2L90 BRT + 0.32 * 2L1 BRT – 2L90_Over_Rating	0.40	0.27		0.30		1,2,3
1.19	2L11	2L2 OR RBW T2	Note 2		1	ROS T1	ROS T1 + 0.19 * 2L2 TIS – ROS T1_Over_Rating	0.34	0.55		0.25		1,2,3
					2	2L90	2L90 BRT + 0.36 * 2L2 TIS – 2L90_Over_Rating	0.42	0.29		0.48		1,2,3
					3	2L1	2L1 PEM + 0.42 * 2L2 TIS – 2L1_Over_Rating	0.21	0.14		0.23		1,2,3
1.19	2L11	2L41	Note 2		1	ROS T1	ROS T1 + 0.19 * 2L41 BRT – ROS T1_Over_Rating	0.34	0.55				1,2,3
					2	2L90	2L90 BRT + 0.37 * 2L41 BRT – 2L90_Over_Rating	0.42	0.29				1,2,3
					3	2L1	2L1 PEM + 0.42 * 2L41 BRT – 2L1_Over_Rating	0.21	0.14				1,2,3
1.19	2L11	2L3	Note 2		GS_BRR1: Gen-shedding amount armed at BRR to solve cases 1 to 2 for this contingency. GS_UH1: Gen-shedding amount armed at UH_IPPs to solve cases 1 to 2 for this contingency. GS_UL1: Gen-shedding amount armed at UL_IPPs to solve cases 1 to 2 for this contingency. RB_CMS1: Runback amount armed at CMS to solve cases 1 to 2 for this contingency.								
					Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					1	2L90	2L90 BRT + 0.53 * 2L3 WLT - 2L90_Over_Rating	0.50	0.34		0.52	0.50	1,2,3,4
					2	ROS T1	ROS T1 + 0.29 * 2L3 WLT - ROS_T1_Over_Rating	0.38	0.57		0.28	0.26	1,2,3,4
					If CKY to MSA 132 kV PATH I/S AND -1L31 GIB + 0.20 * 2L3 WLT – 0.08 * GS_BRR1 – 0.06 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 < 1L31_Over_Rating AND 1L35 SEC + 0.20 * 2L3 WLT – 0.08 * GS_BRR1 – 0.06 * GS_UH1– 0.14 * GS_ULL1 – 0.19 * RB_CMS1 < 1L35_Over_Rating, then: Shed at BRR: GS_BRR1 Shed at UH_IPPs: GS_UH1 Shed at UL_IPPs: GS_ULL1 Shed at CMS: RB_CMS1 If CKY to MSA 132 kV PATH I/S AND [(-1L31 GIB + 0.20 * 2L3 WLT – 0.08 * GS_BRR1 – 0.06 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L31_Over_Rating OR 1L35 SEC + 0.20 * 2L3 WLT – 0.08 * GS_BRR1 – 0.06 * GS_UH1– 0.14 * GS_UL1 – 0.19 * RB_CMS1 >= 1L35_Over_Rating)], then, Gen-shedding at BRR, UH_IPPs, WAH, UL_IPPs and/or CMS to solve cases 3 to 4:								
					Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					3	2L90	2L90 BRT + 0.55 * 2L3 WLT + 0.64 * (0.20 * 2L3 WLT–1L31 GIB) – 2L90_Over_Rating	0.50	0.34		0.52	0.50	1,2,3,4
					4	ROS T1	ROS T1 + 0.25 * 2L3 WLT + 0.31 * (0.19 * 2L13 CKY – 1L31 GIB) – ROS_T1_Over_Rating	0.38	0.57		0.28	0.26	1,2,3,4
					If CKY to MSA 132 kV PATH OOS, then, Gen-shedding at BRR, UH_IPPs, UL_IPPs and/or CMS to solve cases 5 to 6:								
					Case	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
					5	2L90	2L90 BRT + 0.67 * 2L3 WLT – 2L90_Over_Rating	0.55	0.38		0.70	0.61	1,2,3,4
					6	ROS T1	ROS T1 + 0.33 * 2L3 WLT – ROS T1_Over_Rating	0.41	0.59		0.37	0.31	1,2,3,4
1.19	2L11	2L9 OR LYN T1	Note 2		1	2L90	2L90 BRT + 0.22 * 2L9 CKY – 2L90_Over_Rating	0.39	0.27		0.35	0.26	1,2,3
					2	2L13	2L13 CKY + 0.58 * 2L9 CKY – 2L13_Over_Rating	0.21	0.14		0.34	0.49	1,2,3
					3	ROS T1	ROS T1 + 0.33 * 2L9 CKY – ROS T1_Over_Rating	0.33	0.53		0.19	0.14	1,2,3

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.19	2L11	2L13 OR CYP T2	Note 2		1	2L90	2L90 BRT + 0.20 * 2L13 CKY – 2L90_Over_Rating	0.38	0.26		0.34	0.23	1,2,3
					2	ROS T1	ROS T1 + 0.31 * 2L13 CKY – ROS T1_Over_Rating	0.32	0.53		0.18	0.11	1,2,3
					3	2L9	2L9 CKY + 0.63 * 2L13 CKY – 2L9_Over_Rating	0.23	0.16		0.38	0.54	1,2,3
1.19	2L11	2L14 OR CYP T3	Note 2		1	2L90	2L90 BRT + 0.32* 2L14 CYP – 2L90_Over_Rating	0.37	0.25		0.32	0.21	1,2,3
					2	2L9	2L9 CKY + 0.44 * 2L14 CYP – 2L9_Over_Rating	0.19	0.13		0.33	0.47	1,2,3
1.19	2L11	2L17 OR LYN T2	Note 2		1	2L13	2L13 CKY + 0.60 * 2L17 LYN – 2L13_Over_Rating	0.21	0.14		0.34	0.49	1,2,3
					2	2L90	2L90 BRT + 0.23 * 2L17 LYN – 2L90_Over_Rating	0.39	0.27		0.35	0.26	1,2,3
					3	ROS T1	ROS T1 + 0.12 * 2L17 LYN – ROS_T1_Over_Rating	0.33	0.53		0.19	0.14	1,2,3
1.19	2L11	2L77 CBN T3 OR CBN T6	Note 2		1	2L90	2L90 BRT + 0.54 * 2L77 ALZ – 2L90_Over_Rating	0.53	0.53		0.41		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L77 ALZ – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.18 * 2L77 ALZ – 2L1_Over_Rating	0.17	0.17		0		1,2,3
					4	2L13	2L13 CKY + 0.17 * 2L77 ALZ – 2L13_Over_Rating	0.16	0.16		0.22		1,2,3
					5	2L3	2L3 WLT + 0.36 * 2L77 ALZ – 2L3_Over_Rating	0.35	0.35		0.43		1,2,3
					6	2L9	2L9 CKY + 0.21 * 2L77 ALZ – 2L9_Over_Rating	0.20	0.20		0.26		1,2,3
1.19	2L11	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.54 * 2L78 ROS – 2L90_Over_Rating	0.53	0.53		0.41		1,2,3
					2	BRT T4	BRT T4 + 1.00 * 2L78 ROS – BRT T4_Over_Rating	0.99	0.99		0		1,2,3
					3	2L1	2L1 PEM + 0.18 * 2L78 ROS – 2L1_Over_Rating	0.17	0.17		0		1,2,3
					4	2L13	2L13 CKY + 0.17 * 2L78 ROS – 2L13_Over_Rating	0.16	0.16		0.22		1,2,3
					5	2L3	2L3 WLT + 0.36 * 2L78 ROS – 2L3_Over_Rating	0.35	0.35		0.43		1,2,3
					6	2L9	2L9 CKY + 0.21 * 2L78 ROS – 2L9_Over_Rating	0.20	0.20		0.26		1,2,3
1.19	2L11	2L90	Note 2		1	ROS T1	ROS T1 + 0.36* 2L90 BRT – ROS T1_Over_Rating	0.44	0.61		0.26		1,2,3
					2	2L1	2L1 PEM + 0.25 * 2L90 BRT – 2L1_Over_Rating	0.27	0.15		0.10		1,2,3
					3	2L3	2L3 WLT + 0.48 * 2L90 BRT – 2L3_Over_Rating	0.43	0.29		0.59		1,2,3
1.19	2L11	3L2	Note 2		1	2L90	2L90 BRT + 0.54 * 3L2 BRT – 2L90_Over_Rating	0.53	0		0.41		1,2,3,8
					2	BRT T4	BRT T4 + 1.00 * 3L2 BRT – BRT T4_Over_Rating	0.99	0		0		1,2,3,8
					3	2L1	2L1 PEM + 0.18 * 3L2 BRT – 2L1_Over_Rating	0.17	0		0		1,2,3,8
					4	2L13	2L13 CKY + 0.17 * 3L2 BRT – 2L13_Over_Rating	0.16	0		0.22		1,2,3,8
					5	2L3	2L3 WLT + 0.36 * 3L2 BRT – 2L3_Over_Rating	0.35	0		0.43		1,2,3,8
					6	2L9	2L9 CKY + 0.21 * 3L2 BRT – 2L9_Over_Rating	0.20	0		0.26		1,2,3,8
1.19	2L11	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.19 * 3L3 ROS – 2L90_Over_Rating	0.37	0.24				1,2,3,5
					2	BRT T4	BRT T4 + 0.32 * 3L3 ROS – BRT T4_Over_Rating	0.64	0.42				1,2,3,5
1.19	2L11	3L5	Note 2		1	2L90	2L90 BRT + 0.54 * 3L5 UHT – 2L90_Over_Rating	0.53	0.53		0.41		1,2,3,8
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,8
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,8
					4	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.22		1,2,3,8
					5	2L3	2L3 WLT + 0.36 * 3L5 UHT – 2L3_Over_Rating	0.35	0.35		0.43		1,2,3,8
					6	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.26		1,2,3,8
1.19	2L11	BRT T4 OR 2L19 OR BR1 T3 OR BR1 T30	Note 2	220	1	ROS T1	ROS T1 + (2L1 + 2L90 + 2L41 + 2L19) BRT – ROS T1_Over_Rating	1	1				1,2,3,6
1.19	2L11 & BRT 2CB1 O.O.S.	2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2		1	2L2	2L2 RUT + 0.65 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2_Over_Rating	0.45	0.31		0.68		1,2,3
					2	2L3	2L3 WLT – 0.29 * 2L1 BRT + 0.41 * 2L90 BRT – 2L3_Over_Rating	0.37	0.25		0.56		1,2,3
					3	ROS T1	ROS T1 + 0.31 * 2L1 BRT + 0.44 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.66		0.28		1,2,3
					4	2L41	2L41 BRT + 0.65 * 2L1 BRT + 0.50 * 2L90 BRT – 2L41_Over_Rating	0.45	0.31		0		1,2,3

Table	Condition	Contingency	MAX Gen	SHED BRR Down to MW	Case no	Overload element	Overload Amount	DF_BRR	DF_UH		DF_UL	DF_CMS	Notes
1.19	2L11 & BRT 2CB2 O.O.S.	2L41	Note 2		1	2L1	2L1 PEM + 0.58 * 2L41 BRT + 0.44 * 2L90 BRT – 2L1_Over_Rating	0.40	0.27				1,2,3
					2	2L3	2L3 WLT – 0.36 2L41 BRT + 0.35 * 2L90 BRT – 2L3_Over_Rating	0.32	0.22		0.73		1,2,3
					3	ROS T1	ROS T1 + 0.37 * 2L41 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.54	0.69				1,2,3
1.19	2L11 & BRT 2CB3 O.O.S.	2L90	Note 2,7		1	2L1	2L1 PEM + 0.58 * 2L41 BRT + 0.44 * 2L90 BRT – 2L1_Over_Rating	0.40	0.27				1,2,3,7
					2	2L3	2L3 WLT – 0.36 2L41 BRT + 0.35 * 2L90 BRT – 2L3_Over_Rating	0.32	0.22		0.73		1,2,3,7
					3	ROS T1	ROS T1 + 0.37 * 2L41 BRT + 0.48 * 2L90 BRT – ROS T1_Over_Rating	0.54	0.69				1,2,3,7
		2L1 OR 2L5 OR FCN T1 OR FCN T2 OR PEM T1 OR PEM T2 OR RBW T1	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.19	2L11 & BRT 2CB4 O.O.S.	2L90	Note 2,7		1	2L2	2L2 RUT + 0.65 * 2L1 BRT + 0.50 * 2L90 BRT – 2L2_Over_Rating	0.45	0.31		0.68		1,2,3,7
					2	2L3	2L3 WLT – 0.29 * 2L1 BRT + 0.41 * 2L90 BRT – 2L3_Over_Rating	0.37	0.25		0.56		1,2,3,7
					3	ROS T1	ROS T1 + 0.31 * 2L1 BRT + 0.44 * 2L90 BRT – ROS T1_Over_Rating	0.50	0.66		0.28		1,2,3,7
					4	2L41	2L41 BRT + 0.65 * 2L1 BRT + 0.50 * 2L90 BRT – 2L41_Over_Rating	0.45	0.31		0		1,2,3,7
		2L41	Note 2,7	220	1	ROS T1	ROS T1 + 0.89 * (2L1 + 2L90 + 2L41) BRT – ROS T1_Over_Rating	0.88	0.92				1,2,3,6,7
1.19	2L11 & ROS 3CB1 O.O.S.	3L5	Note 2		1	2L90	2L90 BRT + 0.54 * 3L5 UHT – 2L90_Over_Rating	0.53	0.53		0.41		1,2,3,5,8
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5,8
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,5,8
					4	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.22		1,2,3,5,8
					5	2L3	2L3 WLT + 0.36 * 3L5 UHT – 2L3_Over_Rating	0.35	0.35		0.43		1,2,3,5,8
					6	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.26		1,2,3,5,8
1.19	2L11 & ROS 3CB2 O.O.S.	3L3 OR WAH T1 OR WAH T3 OR WAH T5	Note 2		1	2L90	2L90 BRT + 0.54 * 3L5 UHT – 2L90_Over_Rating	0.53	0.53		0.41		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,5
					4	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.22		1,2,3,5
					5	2L3	2L3 WLT + 0.36 * 3L5 UHT – 2L3_Over_Rating	0.35	0.35		0.43		1,2,3,5
					6	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.26		1,2,3,5
1.19	2L11 & ROS 3CB3 O.O.S.	2L78 OR ROS T1	Note 2		1	2L90	2L90 BRT + 0.54 * 3L5 UHT – 2L90_Over_Rating	0.53	0.53		0.41		1,2,3,5
					2	BRT T4	BRT T4 + 1.00 * 3L5 UHT – BRT T4_Over_Rating	0.99	0.99		0		1,2,3,5
					3	2L1	2L1 PEM + 0.18 * 3L5 UHT – 2L1_Over_Rating	0.17	0.17		0		1,2,3,5
					4	2L13	2L13 CKY + 0.17 * 3L5 UHT – 2L13_Over_Rating	0.16	0.16		0.22		1,2,3,5
					5	2L3	2L3 WLT + 0.36 * 3L5 UHT – 2L3_Over_Rating	0.35	0.35		0.43		1,2,3,5
					6	2L9	2L9 CKY + 0.21 * 3L5 UHT – 2L9_Over_Rating	0.20	0.20		0.26		1,2,3,5