

Appendix F.1: Path 8 Pre-MATL Simultaneous Powerflow Analysis - Thermal N-0

NO	COMMENT	OVERLOADED ELEMENT				N RATE	N PCT	E RATE	E PCT	COMP	UNIT	AREA	NAME	NOTES
0	N-0 BASE CASE	BEAGLE	100.00-BEAGLE	6.60 #1	0	18.8	112.41	18.8	112.41	XFMR	MVA	62	MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	BILGEN I	13.80-BILINGSX	50.00 #1	0	60	107.2	60	107.2	XFMR	MVA	62	MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	CENTR P1	500.00-CENTR G1	20.00 #1	0	728	105.01	728	105.01	XFMR	MVA	40	NORTHWES	NORMAL RATING VIOLATION
0	N-0 BASE CASE	MONTANA1	115.00-MONTANA1	13.80 #1	0	40	103.83	40	103.83	XFMR	MVA	62	MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	COPCO 2	115.00-COPCO 2G	69.00 #1	0	30	100.08	30	100.08	XFMR	MVA	40	NORTHWES	NORMAL RATING VIOLATION
0	N-0 BASE CASE	LEMOLO2	12.00-LEMOLO2	115.00 #1	0	34.7	100.06	34.7	100.06	XFMR	MVA	40	NORTHWES	NORMAL RATING VIOLATION

Appendix F.1: Path 8 Pre-MATL Simultaneous Powerflow Analysis - Thermal N-1 & N-2

NO	COMMENT	OVERLOADED ELEMENT	N RATE	N PCT	E RATE	E PCT	COMP	UNIT	AREA	NAME	NOTES
1005	N-1 GREAT FALLS - LANDERS FORK 230 KV LINE	HOLTER 6.60-HOLTER 100.00 #1 0	48	100.8	20	241.92	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1006	N-1 LANDERS FORK - OVANDO 230 KV LINE	HOLTER 6.60-HOLTER 100.00 #1 0	48	100.8	20	241.92	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	120.56	933	120.56	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	105.92	728	105.92	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	MADISON 100.00-MADISON 4.00 #1 0	10	105.63	10	105.63	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	102.14	20	245.13	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	153.24	933	153.24	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.24	728	106.24	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	MADISON 100.00-MADISON 4.00 #1 0	10	105.58	10	105.58	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	102.89	20	246.92	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	170.9	933	170.9	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.32	728	106.32	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	MADISON 100.00-MADISON 4.00 #1 0	10	105.56	10	105.56	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	114.01	1021.16	101.73	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	BRAZ#1 9 13.70-BRAZEAU4 240.00 #T1 0	207	144.61	207	144.61	XFMR	MVA	54	ALBERTA	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	123.9	933	123.9	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1013	N-1 CRANBROOK - SELKIRK 500 KV LINE (RAS)	BRAZ#1 9 13.70-BRAZEAU4 240.00 #T1 0	207	144.61	207	144.61	XFMR	MVA	54	ALBERTA	EMERGENCY RATING VIOLATION
1013	N-1 CRANBROOK - SELKIRK 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	124.07	933	124.07	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	124.16	933	124.16	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	105.93	728	105.93	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	MADISON 100.00-MADISON 4.00 #1 0	10	105.63	10	105.63	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	THOMSON 6.60-THOMSON 115.00 #1 0	42.3	102.33	42.3	102.33	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	THOMSON 115.00-THOMSON 13.80 #1 0	63.5	100.54	63.5	100.54	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	147.85	933	147.85	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106	728	106	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	MADISON 100.00-MADISON 4.00 #1 0	10	105.64	10	105.64	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	THOMSON 115.00-THOMSON 13.80 #1 0	63.5	101.21	63.5	101.21	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	ASHE 500.00-CGS 25.00 #1 0	1231	100.06	1231	100.06	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	101.11	20	242.67	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	185.85	933	185.85	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.46	728	106.46	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	MADISON 100.00-MADISON 4.00 #1 0	10	105.6	10	105.6	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	117.98	1021.16	105.28	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	ASHE 500.00-CGS 25.00 #1 0	1231	100.34	1231	100.34	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	102.88	20	246.9	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	214.67	933	214.67	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	125.58	1021.16	112.06	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.36	728	106.36	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	MADISON 100.00-MADISON 4.00 #1 0	10	105.54	10	105.54	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	THOMSON 115.00-THOMSON 13.80 #1 0	63.5	101.21	63.5	101.21	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION

Appendix F.1: Path 8 Pre-MATL Simultaneous Powerflow Analysis - Voltage N-0

NO	COMMENT	BUS NAME	BASE KV	TYPE	BASE PU	BASE VOLT	BASE ANG	VSCHED	VMAX	VMIN	PU VOLT	VOLTAGE	ANGLE	CHG VPU	DEVIATN	NOTES	AREA	NAME
0	N-0 BASE CASE	PRIEST10	13.8	2	0.86444	11.93	15.3	0.86133	0	0	0.86445	11.93	15.3	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	INTPAPER	69	1	0.90376	62.36	-10.5	0.90624	0	0	0.90376	62.36	-10.5	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	WEED	69	1	0.90414	62.39	-10.5	0.90663	0	0	0.90414	62.39	-10.5	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	MCA 66	66	1	0.90841	59.95	-3	0.90724	0	0	0.90841	59.95	-3	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	WDJCT L1	69	1	0.90985	62.78	-10.4	0.91232	0	0	0.90985	62.78	-10.4	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	WDJCT L2	69	1	0.90993	62.79	-10.4	0.9124	0	0	0.90993	62.79	-10.4	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	RUS G1	13.2	2	0.91	12.01	-23.6	0.96129	0	0	0.91	12.01	-23.6	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	RUS G2	13.2	2	0.91	12.01	-23.6	0.96118	0	0	0.91	12.01	-23.6	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	RUS G3	13.2	2	0.91	12.01	-23.6	0.96118	0	0	0.91	12.01	-23.6	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	GST 66	66	1	0.91088	60.12	-3.2	0.90971	0	0	0.91088	60.12	-3.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	GSM 66	66	1	0.9109	60.12	-3.2	0.90973	0	0	0.9109	60.12	-3.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MCK 66	66	1	0.91092	60.12	-3.2	0.90976	0	0	0.91092	60.12	-3.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	ING T4	12.6	1	0.91294	11.5	-14.8	0.9122	0	0	0.91294	11.5	-14.8	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	ING T5	12.6	1	0.91367	11.51	-14.8	0.91293	0	0	0.91367	11.51	-14.8	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MSA T2	12.6	1	0.91395	11.52	-16.2	0.91289	0	0	0.91395	11.52	-16.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	K12 T3	12.6	1	0.91411	11.52	-19.3	0.91159	0	0	0.91411	11.52	-19.3	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	99871_MP	230	1	0.91411	210.24	-19.3	1.05532	0	0	0.91411	210.24	-19.3	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MSA T1	12.6	1	0.91412	11.52	-16.2	0.91306	0	0	0.91412	11.52	-16.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MDN T3	12.6	1	0.9179	11.57	-15.3	0.91729	0	0	0.9179	11.57	-15.3	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	UMH IPP	13.8	2	0.92	12.7	-11.7	0.92	0	0	0.92	12.7	-11.7	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	WSN T2	12.6	1	0.92121	11.61	-11.7	0.92049	0	0	0.92121	11.61	-11.7	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	WSN T4	12.6	1	0.92129	11.61	-11.7	0.92058	0	0	0.92129	11.61	-11.7	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MUR T6	12.6	1	0.92174	11.61	-18.5	0.91844	0	0	0.92174	11.61	-18.5	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	SHASTINA	69	1	0.92371	63.74	-10	0.92614	0	0	0.92371	63.74	-10	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	NTL VR	138	1	0.9245	127.58	24.4	0.93712	0	0	0.9245	127.58	24.4	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	99874_MP	230	1	0.92689	213.18	-18.5	1.05532	0	0	0.92689	213.18	-18.5	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	PRIEST04	13.8	2	0.93185	12.86	15.2	0.9313	0	0	0.93185	12.86	15.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	LB2 GEN	2.4	2	0.93458	2.24	-18.7	1.02	0	0	0.93458	2.24	-18.7	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	BIGSPRNG	69	1	0.93494	64.51	-9.6	0.93734	0	0	0.93494	64.51	-9.6	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	PRIEST02	13.8	2	0.93505	12.9	13.8	0.93459	0	0	0.93505	12.9	13.8	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	PRIEST01	13.8	2	0.93544	12.91	13.6	0.93499	0	0	0.93544	12.91	13.6	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	BONANZA	69	1	0.94005	64.86	-11.8	0.9316	0	0	0.94005	64.86	-11.8	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	KMO G7	13.8	2	0.94015	12.97	0.2	0.93814	0	0	0.94015	12.97	0.2	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	CASEBEER	69	1	0.9403	64.88	-11.8	0.93186	0	0	0.9403	64.88	-11.8	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	LB1 G1	13.8	2	0.94064	12.98	-18.7	0.94064	0	0	0.94064	12.98	-18.7	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	PRAXAIR	4.2	1	0.94269	3.96	-10	0.94194	0	0	0.94269	3.96	-10	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	KLY T1	12.6	1	0.94304	11.88	-11.4	0.94217	0	0	0.94304	11.88	-11.4	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	RPG G1	13.8	2	0.94319	13.02	-12.2	1	0	0	0.94319	13.02	-12.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	RPG G2	13.8	2	0.9432	13.02	-12.2	1	0	0	0.9432	13.02	-12.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	PRIEST05	13.8	2	0.94353	13.02	5.2	0.94362	0	0	0.94353	13.02	5.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	PRIEST06	13.8	2	0.94353	13.02	5.2	0.94362	0	0	0.94353	13.02	5.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	PRIEST07	13.8	2	0.94353	13.02	5.2	0.94362	0	0	0.94353	13.02	5.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	PRIEST08	13.8	2	0.94353	13.02	5.2	0.94362	0	0	0.94353	13.02	5.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	PRIEST03	13.8	2	0.94636	13.06	5.3	0.94645	0	0	0.94636	13.06	5.3	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	BURNS &A	500	1	0.94665	473.32	27.1	0.94444	0	0	0.94665	473.32	27.1	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	SKA138	138	1	0.9468	130.66	-11.1	0.94346	0	0	0.9468	130.66	-11.1	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	CENTR1AX	4.2	1	0.94743	3.98	1.5	0.94421	0	0	0.94743	3.98	1.5	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	TACOMA3	13.8	1	0.948	13.08	-2.5	0.94806	0	0	0.948	13.08	-2.5	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	TACOMA4	13.8	1	0.94803	13.08	-2.5	0.94806	0	0	0.94803	13.08	-2.5	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	L SHASTA	69	1	0.94998	65.55	-9.1	0.95233	0	0	0.94998	65.55	-9.1	-0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	SPN G1-3	4.2	2	0.95	3.99	18.2	0.95	0	0	0.95	3.99	18.2	0	0	LOW NORMAL VOLTAGE LT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	KGH 25	25.2	1	1.05	26.46	-27.6	1.05	0	0	1.05	26.46	-27.6	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	RUT 230	230	1	1.05	241.5	-12.5	1.04908	0	0	1.05	241.5	-12.5	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	HLF IPP	25.2	2	1.05	26.46	-24.1	1.05	0	0	1.05	26.46	-24.1	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MEA IPP	25.2	2	1.05	26.46	-23	1.05	0	0	1.05	26.46	-23	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	GENES 39	20.5	2	1.05	21.52	53.7	1.05	0	0	1.05	21.52	53.7	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	GENES 19	20.5	2	1.05	21.52	53.4	1.05	0	0	1.05	21.52	53.4	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	GENES 29	20.5	2	1.05	21.52	53.5	1.05	0	0	1.05	21.52	53.5	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	HR MILN9	15	2	1.05	15.75	39.3	1.05	0	0	1.05	15.75	39.3	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	BAT #3	16	2	1.05	16.8	38.7	1.05	0	0	1.05	16.8	38.7	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	BAT #4	16	2	1.05	16.8	38.9	1.05	0	0	1.05	16.8	38.9	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	BAT #5	21	2	1.05	22.05	44.7	1.05	0	0	1.05	22.05	44.7	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	BEARCK2	13.8	2	1.05	14.49	26.7	1.05	0	0	1.05	14.49	26.7	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	SYNC_UE5	13.8	2	1.05	14.49	35.8	1.05	0	0	1.05	14.49	35.8	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	NOVA ST1	18	2	1.05	18.9	38	1.05	0	0	1.05	18.9	38	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	GPEP39	13.8	2	1.05	14.49	41.6	1.05	0	0	1.05	14.49	41.6	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	SYNC_UE4	13.8	2	1.05	14.49	33.4	1.05	0	0	1.05	14.49	33.4	0	0	HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA

Appendix F.1: Path 8 Pre-MATL Simultaneous Powerflow Analysis - Voltage N-0

NO	COMMENT	BUS NAME	BASE KV	TYPE	BASE PU	BASE VOLT	BASE ANG	VSCHED	VMAX	VMIN	PU VOLT	VOLTAGE	ANGLE	CHG VPU	DEVIATN	NOTES	AREA	NAME
0	N-0 BASE CASE	BLU25VR1	25.2	1	1.14355	28.82	-16.2	1.13973	0	0	1.14355	28.82	-16.2	0		0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	BBR25VR1	25.2	1	1.15036	28.99	-12.3	1.14245	0	0	1.15036	28.99	-12.3	0		0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	RIVERVIE	25	2	1.1725	29.31	31.8	1	0	0	1.1725	29.31	31.8	0		0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	RIVERVIE	25	2	1.1725	29.31	31.8	1	0	0	1.1725	29.31	31.8	0		0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA

Appendix F.1: Path 8 Pre-MATL Simultaneous Powerflow Analysis - Voltage N-1 & N-2

NO	COMMENT	BUS NAME	BASE KV	TYPE	BASE PU	BASE VOLT	BASE ANG	VSCHED	VMAX	VMIN	PU VOLT	VOLTAGE	ANGLE	CHG VPU	DEVIATN	NOTES	AREA	NAME
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03587	14.29	20.7	1.03495	0	0	0.97851	13.5	6.7	-0.05735	-5.54	DEVIATION LT -4 PCT	40	NORTHWES
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04122	14.37	15.9	1.03484	0	0	0.94611	13.06	-3.4	-0.09511	-9.13	DEVIATION LT -4 PCT, VOLTAGE LT 0.9500 PU	40	NORTHWES
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	COULEE22	15	2	1.03068	15.46	13.8	1.03755	0	0	0.95593	14.34	-6.1	-0.07475	-7.25	DEVIATION LT -4 PCT	40	NORTHWES
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03587	14.29	20.7	1.03495	0	0	0.9833	13.57	0.1	-0.05257	-5.07	DEVIATION LT -4 PCT	40	NORTHWES
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04122	14.37	15.9	1.03484	0	0	0.95698	13.21	-6.7	-0.08424	-8.09	DEVIATION LT -4 PCT	40	NORTHWES
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	COULEE22	15	2	1.03068	15.46	13.8	1.03755	0	0	0.96486	14.47	-9.5	-0.06582	-6.39	DEVIATION LT -4 PCT	40	NORTHWES
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03587	14.29	20.7	1.03495	0	0	0.98079	13.53	-3.2	-0.05508	-5.32	DEVIATION LT -4 PCT	40	NORTHWES
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	COULEE22	15	2	1.03068	15.46	13.8	1.03755	0	0	0.97882	14.68	-4.2	-0.05186	-5.03	DEVIATION LT -4 PCT	40	NORTHWES
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04122	14.37	15.9	1.03484	0	0	0.94679	13.07	-4	-0.09443	-9.07	DEVIATION LT -4 PCT, VOLTAGE LT 0.9500 PU	40	NORTHWES
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03587	14.29	20.7	1.03495	0	0	0.98191	13.55	-1.9	-0.05396	-5.21	DEVIATION LT -4 PCT	40	NORTHWES
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04122	14.37	15.9	1.03484	0	0	0.94988	13.11	-11.6	-0.09134	-8.77	DEVIATION LT -4 PCT, VOLTAGE LT 0.9500 PU	40	NORTHWES
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	COULEE22	15	2	1.03068	15.46	13.8	1.03755	0	0	0.9618	14.43	-20.6	-0.06888	-6.68	DEVIATION LT -4 PCT	40	NORTHWES

Appendix F.1: Path 8 Post-MATL North to South Simultaneous Analysis - Thermal N-0

NO	COMMENT	OVERLOADED ELEMENT				N RATE	N PCT	E RATE	E PCT	COMP	UNIT	AREA	NAME	NOTES
0	N-0 BASE CASE	CENTR P1	500.00-CENTR G1	20.00 #1	0	728	105.01	728	105.01	XFMR	MVA		40 NORTHWES	NORMAL RATING VIOLATION
0	N-0 BASE CASE	RAYRS TP	69.00-STIRLIN8	69.00 #25	1	209.18	100.73	234.29	89.93	Line	Amps		54 ALBERTA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	COPCO 2	115.00-COPCO 2G	69.00 #1	0	30	100.08	30	100.08	XFMR	MVA		40 NORTHWES	NORMAL RATING VIOLATION
0	N-0 BASE CASE	LEMOLO2	12.00-LEMOLO2	115.00 #1	0	34.7	100.06	34.7	100.06	XFMR	MVA		40 NORTHWES	NORMAL RATING VIOLATION

Appendix F.1: Path 8 Post-MATL North to South Simultaneous Analysis - Thermal N-1 & N-2

NO	COMMENT	OVERLOADED ELEMENT	N RATE	N PCT	E RATE	E PCT	COMP	UNIT	AREA	NAME	NOTES
1001	N-1 MATL PS - CUTBANK 230 KV LINE	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	105.25	728	105.25	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1002	N-1 CUTBANK - GREAT FALLS 230 KV LINE	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	105.25	728	105.25	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	HARDINA2 69.00-HARDIN 115.00 #1 0	18.8	109.48	18.8	109.48	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	BROADV&2 500.00-BROADVU 500.00 #2 1	2000.06	104.37	2000.06	104.37	Line	Amps	62	MONTANA	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	113.88	933	113.88	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	105.84	728	105.84	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	174.07	933	174.07	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.26	728	106.26	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	114.84	1021.16	102.48	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	BRAZ#1 9 13.70-BRAZEAU4 240.00 #T1 0	207	326.95	207	326.95	XFMR	MVA	54	ALBERTA	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	152.5	933	152.5	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	WILLES9 240.00-BENALTO4 240.00 #95 1	1121.02	110.08	1200.41	102.8	Line	Amps	54	ALBERTA	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	BRAZEAU4 240.00-WILLES9 240.00 #95 1	1157.11	104.48	1200.41	100.71	Line	Amps	54	ALBERTA	EMERGENCY RATING VIOLATION
1013	N-1 CRANBROOK - SELKIRK 500 KV LINE (RAS)	BRAZ#1 9 13.70-BRAZEAU4 240.00 #T1 0	207	326.95	207	326.95	XFMR	MVA	54	ALBERTA	EMERGENCY RATING VIOLATION
1013	N-1 CRANBROOK - SELKIRK 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	152.67	933	152.67	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1013	N-1 CRANBROOK - SELKIRK 500 KV LINE (RAS)	WILLES9 240.00-BENALTO4 240.00 #95 1	1121.02	110.08	1200.41	102.8	Line	Amps	54	ALBERTA	EMERGENCY RATING VIOLATION
1013	N-1 CRANBROOK - SELKIRK 500 KV LINE (RAS)	BRAZEAU4 240.00-WILLES9 240.00 #95 1	1157.11	104.48	1200.41	100.71	Line	Amps	54	ALBERTA	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	123.01	933	123.01	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	105.98	728	105.98	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	147.86	933	147.86	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	105.99	728	105.99	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	ASHE 500.00-CGS 25.00 #1 0	1231	100.11	1231	100.11	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	185.9	933	185.9	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.46	728	106.46	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	117.99	1021.16	105.29	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	ASHE 500.00-CGS 25.00 #1 0	1231	100.34	1231	100.34	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	216.62	933	216.62	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	126.09	1021.16	112.51	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.34	728	106.34	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION

Appendix F.1: Path 8 Post-MATL North to South Simultaneous Analysis - Voltage N-0

NO	COMMENT	BUS NAME	BASE KV	TYPE	BASE PU	BASE VOLT	BASE ANG	VSCHED	VMAX	VMIN	PU VOLT	VOLTAGE	ANGLE	CHG VPU	DEVIATN	NOTES	AREA	NAME
0	N-0 BASE CASE	HAMBURG7	138	1	1.12008	154.57	23.3	1.11633	0	0	1.12008	154.57	23.3	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	HOTCHKS9	25	1	1.12098	28.02	25.3	1.11745	0	0	1.12098	28.02	25.3	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	MIT5 E.4	240	1	1.12133	269.12	37.8	1.125	0	0	1.12133	269.12	37.8	-0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	KEMP RV9	138	1	1.12152	154.77	26.1	1.11816	0	0	1.12152	154.77	26.1	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	HOTCHKS7	138	1	1.12236	154.89	26.1	1.12	0	0	1.12236	154.89	26.1	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	SUMMIT 1	24	1	1.12275	26.95	-16.4	1.12318	0	0	1.12275	26.95	-16.4	-0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	40	NORTHWES
0	N-0 BASE CASE	L. SMOKY	240	1	1.12378	269.71	34.9	1.125	0	0	1.12378	269.71	34.9	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	CARMON 9	138	1	1.126	155.39	29.1	1.11609	0	0	1.126	155.39	29.1	-0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	MAC TAP	60	1	1.1275	67.65	-19	1.12755	0	0	1.1275	67.65	-19	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MAC 60	60	1	1.1277	67.66	-19	1.12775	0	0	1.1277	67.66	-19	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	WESLY C7	138	1	1.12799	155.66	29.3	1.1181	0	0	1.12799	155.66	29.3	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	TRR 60	60	1	1.13015	67.81	-18.9	1.1302	0	0	1.13015	67.81	-18.9	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	CLW25VR1	25.2	1	1.1305	28.49	-17	1.12681	0	0	1.1305	28.49	-17	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	GCL 60	60	1	1.13134	67.88	-20	1.13142	0	0	1.13134	67.88	-20	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	SSC TAP	60	1	1.13135	67.88	-18.9	1.1314	0	0	1.13135	67.88	-18.9	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	SSC 60	60	1	1.13146	67.89	-18.9	1.13151	0	0	1.13146	67.89	-18.9	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	DTR 60	60	1	1.13147	67.89	-18.9	1.13153	0	0	1.13147	67.89	-18.9	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	MATLN_&1	230	1	1.13326	260.65	53.7	1.09042	0	0	1.13326	260.65	53.7	-0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	62	MONTANA
0	N-0 BASE CASE	RIVERVIE	25	2	1.13705	28.43	29.2	1	0	0	1.13705	28.43	29.2	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	RIVERVIE	25	2	1.13705	28.43	29.2	1	0	0	1.13705	28.43	29.2	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	BLU25VR1	25.2	1	1.14311	28.81	-16.3	1.13973	0	0	1.14311	28.81	-16.3	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	BBR25VR1	25.2	1	1.15014	28.98	-12.3	1.14245	0	0	1.15014	28.98	-12.3	-0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR

Appendix F.1: Path 8 South to North Simultaneous Powerflow Analysis - Thermal N-0

NO	COMMENT	OVERLOADED ELEMENT				N RATE	N PCT	E RATE	E PCT	COMP	UNIT	AREA	NAME	NOTES
0	N-0 BASE CASE	BEAGLE	100.00-BEAGLE	6.60 #1	0	18.8	118.61	18.8	118.61	XFMR	MVA		62 MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	MADISON	100.00-MADISON	4.00 #1	0	10	110.74	10	110.74	XFMR	MVA		62 MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	BILGEN I	13.80-BILINGSX	50.00 #1	0	60	109.31	60	109.31	XFMR	MVA		62 MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	CENTR P1	500.00-CENTR G1	20.00 #1	0	728	105.56	728	105.56	XFMR	MVA		40 NORTHWES	NORMAL RATING VIOLATION
0	N-0 BASE CASE	MONTANA1	115.00-MONTANA1	13.80 #1	0	40	105.33	40	105.33	XFMR	MVA		62 MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	HOLTER	100.00-HOLTER	6.60 #1	0	48	103.12	20	247.5	XFMR	MVA		62 MONTANA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	BOYLE	230.00-BOYLE 2	11.00 #1	0	42.3	101.67	42.3	101.67	XFMR	MVA		40 NORTHWES	NORMAL RATING VIOLATION
0	N-0 BASE CASE	KCL G4	13.80-KCL230	230.00 #4	0	147	101.22	147	101.22	XFMR	MVA		50 B.C.HYDR	NORMAL RATING VIOLATION
0	N-0 BASE CASE	E EDMON4	240.00-946/947N	240.00 #46	1	1200.41	100.34	1440.97	83.59	Line	Amps		54 ALBERTA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	MATL_AB	240.00-MATL_AB	230.00 #1	0	330	100.07	450	73.38	XFMR	MVA		54 ALBERTA	NORMAL RATING VIOLATION
0	N-0 BASE CASE	LEMOLO2	12.00-LEMOLO2	115.00 #1	0	34.7	100.06	34.7	100.06	XFMR	MVA		40 NORTHWES	NORMAL RATING VIOLATION

Appendix F.1: Path 8 South to North Simultaneous Powerflow Analysis - Thermal N-1 & N-2

NO	COMMENT	OVERLOADED ELEMENT	N RATE	N PCT	E RATE	E PCT	COMP	UNIT	AREA	NAME	NOTES
1001	N-1 MATL PS - CUTBANK 230 KV LINE	NLYPHS 230.00-NLY230 230.00 #2 0	400	123.28	400	123.28	XFMR	MVA	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1001	N-1 MATL PS - CUTBANK 230 KV LINE	NLY230 230.00-SEL230 230.00 #1 1	1051.78	110.81	1051.78	110.81	Line	Amps	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1002	N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLYPHS 230.00-NLY230 230.00 #2 0	400	123.28	400	123.28	XFMR	MVA	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1002	N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLY230 230.00-SEL230 230.00 #1 1	1051.78	110.81	1051.78	110.81	Line	Amps	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1003	N-1 GREAT FALLS - JUDITH GAP SOUTH 230 KV LINE	NLYPHS 230.00-NLY230 230.00 #2 0	400	100.93	400	100.93	XFMR	MVA	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1003	N-1 GREAT FALLS - JUDITH GAP SOUTH 230 KV LINE	SEL230 230.00-NLY230 230.00 #1 1	1051.78	100.02	1051.78	100.02	Line	Amps	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	106.7	20	256.09	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	119.92	933	119.92	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	BILINGS 230.00-BLGS PHA 230.00 #1 0	300	115.06	300	115.06	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	RIMROCK 161.00-RMRK PHA 161.00 #1 0	100	110.14	100	110.14	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	YELLOWTLP 161.00-YELLOWTLP 230.00 #1 0	100	110.11	100	110.11	XFMR	MVA	65	PACE	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.21	728	106.21	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	RAINBOW 100.00-RAINBOW 6.60 #1 0	37	101.77	37	101.77	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	106.69	20	256.05	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	153.02	933	153.02	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	BILINGS 230.00-BLGS PHA 230.00 #1 0	300	112.75	300	112.75	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	RIMROCK 161.00-RMRK PHA 161.00 #1 0	100	107.45	100	107.45	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	YELLOWTLP 161.00-YELLOWTLP 230.00 #1 0	100	107.34	100	107.34	XFMR	MVA	65	PACE	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.42	728	106.42	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	RAINBOW 100.00-RAINBOW 6.60 #1 0	37	102.58	37	102.58	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	106.68	20	256.04	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	170.27	933	170.27	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	BILINGS 230.00-BLGS PHA 230.00 #1 0	300	115.73	300	115.73	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	RIMROCK 161.00-RMRK PHA 161.00 #1 0	100	107.49	100	107.49	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	YELLOWTLP 161.00-YELLOWTLP 230.00 #1 0	100	106.85	100	106.85	XFMR	MVA	65	PACE	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.46	728	106.46	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	RAINBOW 100.00-RAINBOW 6.60 #1 0	37	103.82	37	103.82	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	113.06	1021.16	100.89	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	KCL230 230.00-KCL G3 13.80 #3 0	147	103.62	147	103.62	XFMR	MVA	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1012	N-1 LANGDON - CRANBROOK 500 KV LINE (RAS)	KCL230 230.00-KCL G1 13.80 #1 0	147	103.62	147	103.62	XFMR	MVA	50	B.C.HYDR	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	106.71	20	256.11	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	129.51	933	129.51	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.07	728	106.07	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	106.71	20	256.1	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	151.68	933	151.68	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.32	728	106.32	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	THOMSON 115.00-THOMSON 13.80 #1 0	63.5	103.97	63.5	103.97	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	BILINGS 230.00-BLGS PHA 230.00 #1 0	300	102.05	300	102.05	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	106.7	20	256.08	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	189.9	933	189.9	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.73	728	106.73	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	118.27	1021.16	105.54	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	BILINGS 230.00-BLGS PHA 230.00 #1 0	300	104.57	300	104.57	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	ASHE 500.00-CGS 25.00 #1 0	1231	100.35	1231	100.35	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	HOLTER 100.00-HOLTER 6.60 #1 0	48	106.69	20	256.05	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	PTSB 7 20.00-PITSBG E 230.00 #1 0	933	216.43	933	216.43	XFMR	MVA	30	PG AND E	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	BILINGS 230.00-BLGS PHA 230.00 #1 0	300	113.85	300	113.85	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	SOBRANTE 115.00-MORAGA 115.00 #1 1	911.21	125.25	1021.16	111.77	Line	Amps	30	PG AND E	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	RIMROCK 161.00-RMRK PHA 161.00 #1 0	100	107.35	100	107.35	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	YELLOWTLP 161.00-YELLOWTLP 230.00 #1 0	100	107.09	100	107.09	XFMR	MVA	65	PACE	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	CENTR P1 500.00-CENTR G1 20.00 #1 0	728	106.23	728	106.23	XFMR	MVA	40	NORTHWES	EMERGENCY RATING VIOLATION
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	THOMSON 115.00-THOMSON 13.80 #1 0	63.5	103.97	63.5	103.97	XFMR	MVA	62	MONTANA	EMERGENCY RATING VIOLATION

Appendix F.1: Path 8 South to North Simultaneous Powerflow Analysis - Voltage N-0

NO	COMMENT	BUS NAME	BASE KV	TYPE	BASE PU	BASE VOLT	BASE ANG	VSCHED	VMAX	VMIN	PU VOLT	VOLTAGE	ANGLE	CHG VPU	DEVIATN	NOTES	AREA	NAME
0	N-0 BASE CASE	MATLN_&2	230	1	1.13318	260.63	11.7	1.05532	0	0	1.13318	260.63	11.7	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	62	MONTANA
0	N-0 BASE CASE	CANYON	7	2	1.13718	7.96	43.5	1.06904	0	0	1.13718	7.96	43.5	-0	-0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	62	MONTANA
0	N-0 BASE CASE	BLU25VR1	25.2	1	1.14306	28.81	-19.6	1.13973	0	0	1.14306	28.81	-19.6	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	BBR25VR1	25.2	1	1.15034	28.99	-15.7	1.14245	0	0	1.15034	28.99	-15.7	-0	-0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	50	B.C.HYDR
0	N-0 BASE CASE	RIVERVIE	25	2	1.15613	28.9	31.6	1	0	0	1.15613	28.9	31.6	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA
0	N-0 BASE CASE	RIVERVIE	25	2	1.15613	28.9	31.6	1	0	0	1.15613	28.9	31.6	0	0	0 HIGH NORMAL VOLTAGE GT 0.0000 PU	54	ALBERTA

Appendix F.1: Path 8 South to North Simultaneous Powerflow Analysis - Voltage N-1 & N-2

NO	COMMENT	BUS NAME	BASE KV	TYPE	BASE PU	BASE VOLT	BASE ANG	VSCHED	VMAX	VMIN	PU VOLT	VOLTAGE	ANGLE	CHG VPU	DEVIATN	NOTES	AREA	NAME
1009	N-1 COLSTRIP - BROADVIEW #1 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03563	14.29	18	1.03495	0	0	0.98309	13.57	4.7	-0.05254	-5.07	DEVIATION LT -4 PCT	40	NORTHWES
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04123	14.37	13.2	1.03484	0	0	0.95034	13.11	-5.5	-0.09089	-8.73	DEVIATION LT -4 PCT	40	NORTHWES
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	COULEE22	15	2	1.03046	15.46	7.5	1.03755	0	0	0.95822	14.37	-12.1	-0.07224	-7.01	DEVIATION LT -4 PCT	40	NORTHWES
1010	N-1 BROADVIEW - TOWNSEND - GARRISON #1 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03563	14.29	18	1.03495	0	0	0.98203	13.55	-2	-0.0536	-5.18	DEVIATION LT -4 PCT	40	NORTHWES
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04123	14.37	13.2	1.03484	0	0	0.97066	13.4	-8.9	-0.07056	-6.78	DEVIATION LT -4 PCT	40	NORTHWES
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	COULEE22	15	2	1.03046	15.46	7.5	1.03755	0	0	0.96666	14.5	-15.4	-0.0638	-6.19	DEVIATION LT -4 PCT	40	NORTHWES
1011	N-1 GARRISON - TAFT #1 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03563	14.29	18	1.03495	0	0	0.97995	13.52	-5.3	-0.05568	-5.38	DEVIATION LT -4 PCT	40	NORTHWES
1014	N-1 TAFT - BELL 500 KV LINE (RAS)	COULEE22	15	2	1.03046	15.46	7.5	1.03755	0	0	0.97863	14.68	-11.2	-0.05183	-5.03	DEVIATION LT -4 PCT	40	NORTHWES
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04123	14.37	13.2	1.03484	0	0	0.94611	13.06	-6.7	-0.09512	-9.14	DEVIATION LT -4 PCT, VOLTAGE LT 0.9500 PU	40	NORTHWES
1015	N-1 TAFT - DWORSHAK 500 KV LINE (RAS)	LWG 0102	13.8	2	1.03563	14.29	18	1.03495	0	0	0.9806	13.53	-4.6	-0.05503	-5.31	DEVIATION LT -4 PCT	40	NORTHWES
1016	N-1 DWORSHAK - HATWAI 500 KV LINE (RAS)	LMN 0102	13.8	2	1.04123	14.37	13.2	1.03484	0	0	0.94861	13.09	-14.4	-0.09262	-8.89	DEVIATION LT -4 PCT, VOLTAGE LT 0.9500 PU	40	NORTHWES
1017	N-2 TAFT - BELL & TAFT - GARRISON #1 500 KV LINES (RAS)	COULEE22	15	2	1.03046	15.46	7.5	1.03755	0	0	0.96326	14.45	-27	-0.06719	-6.52	DEVIATION LT -4 PCT	40	NORTHWES

Appendix F.1: Path 8 South to North Simultaneous Powerflow Analysis - Nelway-Boundary Sensitivity

Table F.1.1: Interface Flow Comparison Summary

NUM	PATH NAME	Interface Rating 1	Interface Rating 2	PATH 8 @ 2,200 MW	PATH 8 @ 1,900 MW	DELTA
-1	MATL			312	312	0
0	NLYPHS 230			384	382	-2
1	ALBERTA - BRITISH COLUMBIA	1000	-1200	399.7	397.7	-2
2	ALBERTA - SASKATCHEWAN	150	-150	0.1	0.1	0
3	NORTHWEST - CANADA	2000	-3150	1499.5	1503.1	3.6
4	WEST OF CASCADES - NORTH	9800	-9800	3714.7	3740.7	26
5	WEST OF CASCADES - SOUTH	7000	-7000	2462.6	2450	-12.6
6	WEST OF HATWAI	2800	0	3882.7	3596.6	-286.1
8	MONTANA - NORTHWEST	2200	-600	2205.4	1900	-305.4
9	WEST OF BROADVIEW	2573	0	2671.1	2324.1	-347
10	WEST OF COLSTRIP	2598	0	2091.2	1707.9	-383.3
11	WEST OF CROSSOVER	2598	0	2343.2	1989.6	-353.6
14	IDAHO - NORTHWEST	2400	-1200	1147.3	1108.5	-38.8
15	MIDWAY - LOS BANOS	4800	-2000	1673.7	1668.1	-5.6
16	IDAHO - SIERRA	500	-360	-150.9	-152.8	-1.9
17	BORAH WEST	2307	0	1775.1	1739.6	-35.5
18	IDAHO - MONTANA	337	-337	-17.4	4.4	21.8
19	BRIDGER WEST	2200	0	2203.1	2177.7	-25.4
20	PATH C	1000	-1000	326.1	333.2	7.1
21	ARIZONA - CALIFORNIA	5700	0	3449	3434.1	-14.9
46	WEST OF COLORADO RIVER (WOR)	10118	-10118	3484.5	3479.5	-5
49	EAST OF COLORADO RIVER (EOR)	7550	0	973.7	966.6	-7.1
53	BILLINGS - YELLOWTAIL	400	-400	-392.7	-391.7	1
55	BROWNLEE EAST	1750	0	8.7	9.5	0.8
65	PACIFIC DC INTERTIE (PDCI)	3100	-3100	2000	2000	0
66	COI	4800	-3675	541.3	546.1	4.8
73	NORTH OF JOHN DAY	7900	-7900	2242.9	2275.7	32.8
75	MIDPOINT - SUMMER LAKE	1500	-400	1043	1012.7	-30.3
76	ALTURAS PROJECT	300	-300	135.8	138.8	3
500	Southern CA Imports	0	0	6460	6458.6	-1.4
501	South of KEG Cutplane (SOK)	1880	0	431.3	431.3	0
502	North of Calgary Cutplane (NOC)	1330	0	342.1	341	-1.1
503	Fort McMurray Flowgate	600	-600	120.4	120.4	0

Appendix F.1: Path 8 South to North Simultaneous Powerflow Analysis - Nelway-Boundary Sensitivity

Table F.1.2a: MATL = 312 MW, Path 8 = 2,200 MW, Nelway = 384 MW (-5.00 Degrees)

COMMENT	OVERLOADED ELEMENT	E RATE	E PCT	COMP	UNIT
N-1 MATL PS - CUTBANK 230 KV LINE	NLYPHS - NLY230 230 KV XFMR #2	400	123.32	XFMR	MVA
N-1 MATL PS - CUTBANK 230 KV LINE	NLYPHS - BOUNDARY 230 KV LINE #1	1042	114.8	Line	Amps
N-1 MATL PS - CUTBANK 230 KV LINE	NLY230 - SEL230 230 KV LINE #1	1052	110.85	Line	Amps
N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLYPHS - NLY230 230 KV XFMR #2	400	123.32	XFMR	MVA
N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLYPHS - BOUNDARY 230 KV LINE #1	1042	114.8	Line	Amps
N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLY230 - SEL230 230 KV LINE #1	1052	110.85	Line	Amps

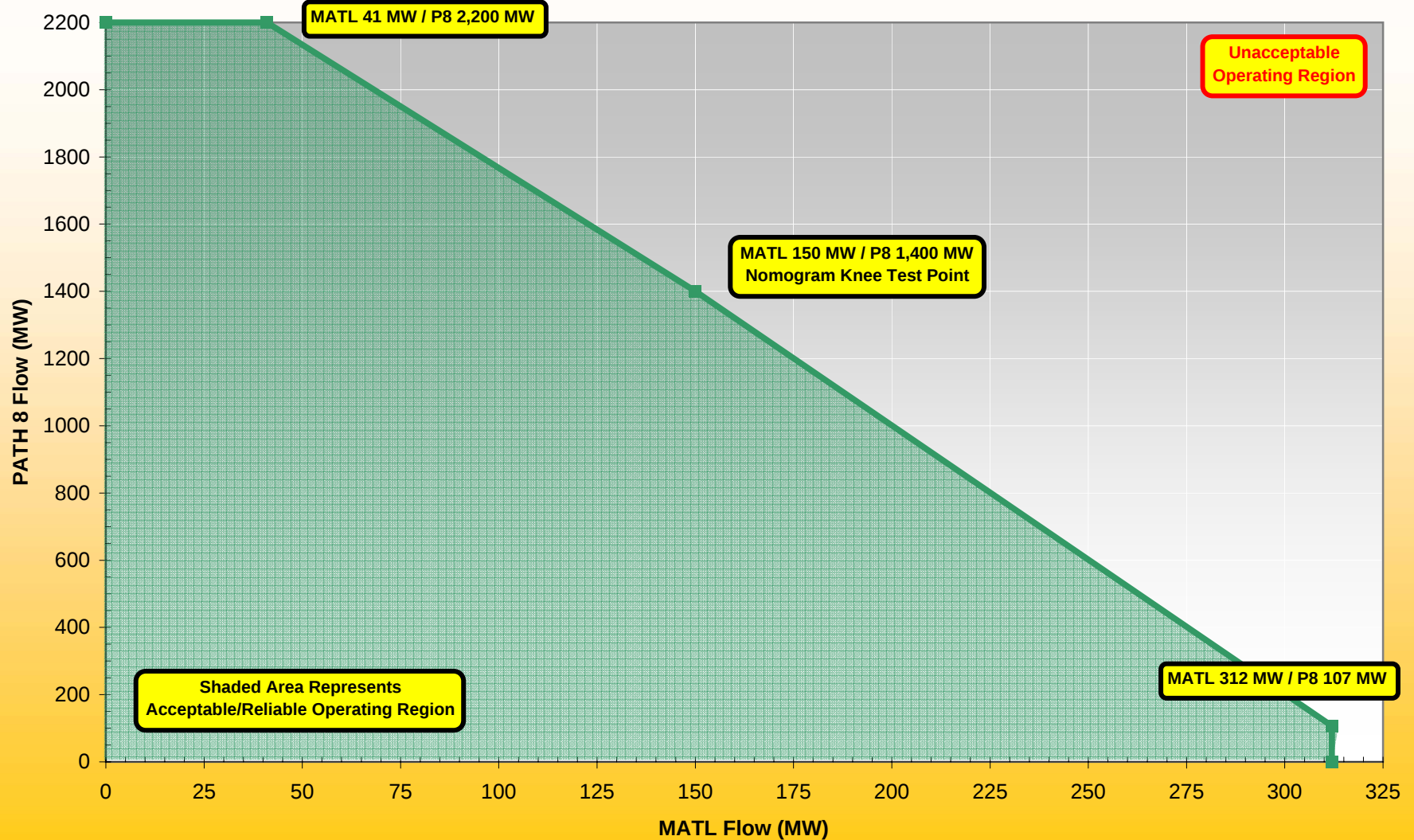
Table F.1.2b: MATL = 312 MW, Path 8 = 1,900 MW, Nelway = 382 MW (-3.90 Degrees)

COMMENT	OVERLOADED ELEMENT	E RATE	E PCT	COMP	UNIT
N-1 MATL PS - CUTBANK 230 KV LINE	NLYPHS - NLY230 230 KV XFMR #2	400	122.52	XFMR	MVA
N-1 MATL PS - CUTBANK 230 KV LINE	NLYPHS - BOUNDARY 230 KV LINE #1	1042	114.05	Line	Amps
N-1 MATL PS - CUTBANK 230 KV LINE	NLY230 - SEL230 230 KV LINE #1	1052	110.22	Line	Amps
N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLYPHS - NLY230 230 KV XFMR #2	400	122.52	XFMR	MVA
N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLYPHS - BOUNDARY 230 KV LINE #1	1042	114.05	Line	Amps
N-1 CUTBANK - GREAT FALLS 230 KV LINE	NLY230 - SEL230 230 KV LINE #1	1052	110.22	Line	Amps

Appendix F.1:



Traditional Power Flow-Based Nomogram Relationship
2007 Light Spring Path 8 Simultaneous - Post-Project [South-to-North]
Loss of MATL PS - Cutbank 230 kV Line or Cutbank - Great Falls 230 kV Line



Appendix F.1: Path 8 Powerflow Nomogram Data

Project	MATL Flow (MW)	Path 8 Flow (MW)	OVERLOADED ELEMENT				N RATE	N PCT	E RATE	E PCT	COMP	UNIT
S2N	35	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.51	400	99.51	XFMR	MVA
S2N	36	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.52	400	99.52	XFMR	MVA
S2N	37	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.66	400	99.66	XFMR	MVA
S2N	38	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.74	400	99.74	XFMR	MVA
S2N	39	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.83	400	99.83	XFMR	MVA
S2N	40	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.91	400	99.91	XFMR	MVA
S2N	41	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.99	400	99.99	XFMR	MVA
S2N	42	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	100.09	400	100.09	XFMR	MVA
S2N	43	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	100.17	400	100.17	XFMR	MVA
S2N	44	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	100.26	400	100.26	XFMR	MVA
S2N	45	2200	NLYPHS	230.00-NLY230	230.00 #2	0	400	100.34	400	100.34	XFMR	MVA
S2N	150	1400	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.92	400	99.92	XFMR	MVA
S2N	312	110	NLYPHS	230.00-NLY230	230.00 #2	0	400	100.03	400	100.03	XFMR	MVA
S2N	312	109	NLYPHS	230.00-NLY230	230.00 #2	0	400	100.02	400	100.02	XFMR	MVA
S2N	312	108	NLYPHS	230.00-NLY230	230.00 #2	0	400	100.01	400	100.01	XFMR	MVA
S2N	312	107	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.99	400	99.99	XFMR	MVA
S2N	312	106	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.98	400	99.98	XFMR	MVA
S2N	312	105	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.97	400	99.97	XFMR	MVA
S2N	312	104	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.96	400	99.96	XFMR	MVA
S2N	312	103	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.95	400	99.95	XFMR	MVA
S2N	312	102	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.95	400	99.95	XFMR	MVA
S2N	312	101	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.93	400	99.93	XFMR	MVA
S2N	312	100	NLYPHS	230.00-NLY230	230.00 #2	0	400	99.92	400	99.92	XFMR	MVA

Appendix F.2: Path 8 Simultaneous Studies Post-transient Thermal Summary

Overloaded Element	Contingency	Area	Zone	Flow (Amps)	Flow (MVA)	Rating	Unit	Percent Loading
RMRK PHA 161.0 RIMROCK 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	344.72	100.03	100	MVA	102
SYNC_D08 69.0 SYNC_UE1 69.0 #1	15. Broadview - Townsend - Garrison 1 and 2 500 kV Lines	54	545	629.7	79.3	627.55	Amps	100
SYNC_D08 69.0 SYNC_UE1 69.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	54	545	630.35	79.37	627.55	Amps	100
YELOWTLP 230.0 YELOWTLP 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	65	650	245.69	100.38	100	MVA	101
YELOWTLP 230.0 YELOWTLP 161.0 #1	9. Colstrip - Broadview 1 500 kV Line	65	650	245.77	99.67	100	MVA	100

Notes

The Billings & Rimrock phase-shifters are set to +10 degrees in the base case power flow. Adjustment of the phase angles to -10 degrees (post-contingency) eliminates the thermal overloads observed on Billings, Rimrock & Yellowtail facilities.

Appendix F.2: Path 8 Simultaneous Studies Post-transient Thermal Summary

Overloaded Element					Contingency		Area	Zone	Flow (Amps)	Flow (MVA)	Rating	Unit	Percent Loading
BROADVU	500.0	BROADV&2	500.0	#2	9. Colstrip - Broadview 1 500 kV Line		62	623	2102.18	1865.1	2000.06	Amps	105
SYNC_D08	69.0	SYNC_UE1	69.0	#1	15. Broadview - Townsend - Garrison 1 and 2 500 kV Lines		54	545	654.5	81.66	627.55	Amps	104
SYNC_D08	69.0	SYNC_UE1	69.0	#1	16. Garrison - Taft 1 and 2 500 kV Lines		54	545	654.46	81.66	627.55	Amps	104
SYNC_D08	69.0	SYNC_UE1	69.0	#1	11. Garrison - Taft 1 500 kV Line		54	545	641.26	80.05	627.55	Amps	102

Notes													
Broadview series capacitors have a 110% overload capability for 30 minutes													

Appendix F.2: Path 8 Simultaneous Studies Post-transient Thermal Summary

Overloaded Element	Contingency	Area	Zone	Flow (Amps)	Flow (MVA)	Rating	Unit	Percent Loading
BLGS PHA 230.0 BILINGS 230.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	888.21	362.91	300	MVA	125
BLGS PHA 230.0 BILINGS 230.0 #1	11. Garrison - Taft 1 500 kV Line	62	623	879.86	352.34	300	MVA	121
BLGS PHA 230.0 BILINGS 230.0 #1	9. Colstrip - Broadview 1 500 kV Line	62	623	874.03	344.2	300	MVA	117
BLGS PHA 230.0 BILINGS 230.0 #1	10. Broadview - Townsend - Garrison 1 500 kV Line	62	623	858.82	342.15	300	MVA	117
BOUNDARY 230.0 NLYPHS 230.0 #1	1. MATL PS - Cutbank 230 kV Line	40	406	1210.55	500.08	1041.74	Amps	116
BOUNDARY 230.0 NLYPHS 230.0 #1	2. Cutbank - Great Falls 230 kV Line	40	406	1210.55	500.08	1041.74	Amps	116
NLY230 230.0 NLYPHS 230.0 #2	1. MATL PS - Cutbank 230 kV Line	50	500	1210.72	495.4	400	MVA	125
NLY230 230.0 NLYPHS 230.0 #2	2. Cutbank - Great Falls 230 kV Line	50	500	1210.72	495.4	400	MVA	125
NLY230 230.0 NLYPHS 230.0 #2	3. Great Falls - Judith Gap South 230 kV Line	50	500	981.28	401.35	400	MVA	101
RMRK PHA 161.0 RIMROCK 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	386.51	111.59	100	MVA	115
RMRK PHA 161.0 RIMROCK 161.0 #1	9. Colstrip - Broadview 1 500 kV Line	62	623	395.27	109.88	100	MVA	112
RMRK PHA 161.0 RIMROCK 161.0 #1	11. Garrison - Taft 1 500 kV Line	62	623	386.86	109.45	100	MVA	112
RMRK PHA 161.0 RIMROCK 161.0 #1	10. Broadview - Townsend - Garrison 1 500 kV Line	62	623	387	108.79	100	MVA	111
SEL230 230.0 NLY230 230.0 #1	1. MATL PS - Cutbank 230 kV Line	50	500	1176.6	477.73	1051.78	Amps	112
SEL230 230.0 NLY230 230.0 #1	2. Cutbank - Great Falls 230 kV Line	50	500	1176.6	477.73	1051.78	Amps	112
SEL230 230.0 NLY230 230.0 #1	3. Great Falls - Judith Gap South 230 kV Line	50	500	1054.58	427.12	1051.78	Amps	100
SYNC_D08 69.0 SYNC_U01 69.0 #1	15. Broadview - Townsend - Garrison 1 and 2 500 kV Lines	54	545	629.42	79.28	627.55	Amps	100
SYNC_D08 69.0 SYNC_U01 69.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	54	545	629.5	79.29	627.55	Amps	100
YELOWTLP 230.0 YELOWTLP 161.0 #1	9. Colstrip - Broadview 1 500 kV Line	65	650	279.71	111.29	100	MVA	112
YELOWTLP 230.0 YELOWTLP 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	65	650	275.83	110.63	100	MVA	112
YELOWTLP 230.0 YELOWTLP 161.0 #1	11. Garrison - Taft 1 500 kV Line	65	650	275.07	109.48	100	MVA	111
YELOWTLP 230.0 YELOWTLP 161.0 #1	10. Broadview - Townsend - Garrison 1 500 kV Line	65	650	274.47	109.61	100	MVA	110

Notes
The Billings & Rimrock phase-shifters are set to +10 degrees in the base case power flow. Adjustment of the phase angles to -10 degrees (post-contingency) eliminates the thermal overloads observed on Billings, Rimrock and Yellowtail facilities.
A MATL versus Path 8 Nomogram was developed to mitigate thermal overloads.

Appendix F.2: Path 8 Simultaneous Studies Post-transient Thermal Summary

NELWAY PHASE SHIFTER SENSITIVITY

Project	Overloaded Element	Contingency	Area	Zone	Flow (Amps)	Flow (MVA)	Rating	Unit	Percent Loading	Nelway Phase Angle (Degrees)	Comments
S2N	BOUNDARY 230.0 NLYPHS 230.0 #1	1. MATL PS - Cutbank 230 kV Line	40	406	1211	500	1042	Amps	116	-5	Post-Transient Governor Power Flow.
S2N	BOUNDARY 230.0 NLYPHS 230.0 #1	1. MATL PS - Cutbank 230 kV Line	40	406	946	391	1042	Amps	91	-14	Post-Transient Governor Power Flow.
S2N	BOUNDARY 230.0 NLYPHS 230.0 #1	2. Cutbank - Great Falls 230 kV Line	40	406	1211	500	1042	Amps	116	-5	Post-Transient Governor Power Flow.
S2N	BOUNDARY 230.0 NLYPHS 230.0 #1	2. Cutbank - Great Falls 230 kV Line	40	406	946	391	1042	Amps	91	-14	Post-Transient Governor Power Flow.
S2N	NLY230 230.0 NLYPHS 230.0 #2	1. MATL PS - Cutbank 230 kV Line	50	500	1211	495	400	MVA	125	-5	Post-Transient Governor Power Flow.
S2N	NLY230 230.0 NLYPHS 230.0 #2	1. MATL PS - Cutbank 230 kV Line	50	500	946	388	400	MVA	98	-14	Post-Transient Governor Power Flow.
S2N	NLY230 230.0 NLYPHS 230.0 #2	2. Cutbank - Great Falls 230 kV Line	50	500	1211	495	400	MVA	125	-5	Post-Transient Governor Power Flow.
S2N	NLY230 230.0 NLYPHS 230.0 #2	2. Cutbank - Great Falls 230 kV Line	50	500	946	388	400	MVA	98	-14	Post-Transient Governor Power Flow.
S2N	NLY230 230.0 NLYPHS 230.0 #2	3. Great Falls - Judith Gap South 230 kV Line	50	500	981	401	400	MVA	101	-5	Post-Transient Governor Power Flow.
S2N	NLY230 230.0 NLYPHS 230.0 #2	3. Great Falls - Judith Gap South 230 kV Line	50	500	717	294	400	MVA	74	-14	Post-Transient Governor Power Flow.
S2N	SEL230 230.0 NLY230 230.0 #1	1. MATL PS - Cutbank 230 kV Line	50	500	1177	478	1052	Amps	112	-5	Post-Transient Governor Power Flow.
S2N	SEL230 230.0 NLY230 230.0 #1	1. MATL PS - Cutbank 230 kV Line	50	500	961	392	1052	Amps	91	-14	Post-Transient Governor Power Flow.
S2N	SEL230 230.0 NLY230 230.0 #1	2. Cutbank - Great Falls 230 kV Line	50	500	1177	478	1052	Amps	112	-5	Post-Transient Governor Power Flow.
S2N	SEL230 230.0 NLY230 230.0 #1	2. Cutbank - Great Falls 230 kV Line	50	500	961	392	1052	Amps	91	-14	Post-Transient Governor Power Flow.
S2N	SEL230 230.0 NLY230 230.0 #1	3. Great Falls - Judith Gap South 230 kV Line	50	500	1055	427	1052	Amps	100	-5	Post-Transient Governor Power Flow.
S2N	SEL230 230.0 NLY230 230.0 #1	3. Great Falls - Judith Gap South 230 kV Line	50	500	839	341	1052	Amps	80	-14	Post-Transient Governor Power Flow.

BILLINGS & RIMROCK PHASE SHIFTER SENSITIVITY

Project	Overloaded Element	Contingency	Area	Zone	Flow (Amps)	Flow (MVA)	Rating	Unit	Percent Loading	Billings & Rimrock Phase Angle (Degrees)	Comments
S2N	BLGS PHA 230.0 BILINGS 230.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	886	362	300	MVA	124	+8.75/+6.56	
S2N	BLGS PHA 230.0 BILINGS 230.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	803	330	300	MVA	113	+5.00	
S2N	BLGS PHA 230.0 BILINGS 230.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	712	295	300	MVA	101	0.00	
S2N	BLGS PHA 230.0 BILINGS 230.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	621	259	300	MVA	88	-5.00	
S2N	BLGS PHA 230.0 BILINGS 230.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	532	223	300	MVA	76	-10.00	
S2N	RMRK PHA 161.0 RIMROCK 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	386	111	100	MVA	114	+8.75/+6.56	
S2N	RMRK PHA 161.0 RIMROCK 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	394	114	100	MVA	117	+5.00	
S2N	RMRK PHA 161.0 RIMROCK 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	352	103	100	MVA	105	0.00	
S2N	RMRK PHA 161.0 RIMROCK 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	311	91	100	MVA	93	-5.00	
S2N	RMRK PHA 161.0 RIMROCK 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	62	623	270	81	100	MVA	81	-10.00	
S2N	YELOWTLP 230.0 YELOWTLP 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	65	650	275	110	100	MVA	112	+8.75/+6.56	
S2N	YELOWTLP 230.0 YELOWTLP 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	65	650	281	113	100	MVA	115	+5.00	
S2N	YELOWTLP 230.0 YELOWTLP 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	65	650	252	102	100	MVA	103	0.00	
S2N	YELOWTLP 230.0 YELOWTLP 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	65	650	224	91	100	MVA	92	-5.00	
S2N	YELOWTLP 230.0 YELOWTLP 161.0 #1	16. Garrison - Taft 1 and 2 500 kV Lines	65	650	196	80	100	MVA	81	-10.00	

Appendix F.2: Path 8 Simultaneous Studies Post-transient Voltage Summary

Contingency	Location	Area	Percent Deviation
*** No Voltage Criteria Violations Observed ***			

Appendix F.2: Path 8 Simultaneous Studies Post-transient Voltage Summary

Contingency	Location	Area	Percent Deviation
*** No Voltage Criteria Violations Observed ***			

Appendix F.2: Path 8 Simultaneous Studies Post-transient Voltage Summary

Contingency	Location	Area	Percent Deviation
3. Great Falls - Judith Gap South 230 kV Line	HARLOWTN 100.0	62	5.20%
3. Great Falls - Judith Gap South 230 kV Line	LOWETH 100.0	62	5.00%

Appendix F.2: Path 8 Simultaneous Post-Transient Studies - Reactive Margin Summary

Contingency	Location	Pre-Project			Post-Project [N-S]			Post-Project + 5.00% [N-S]			Post-Project [S-A]			Post-Project + 5.00% [S-A]		
		Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose
0. No Disturbance	MATL_AB 240		NA		-672	0.722	0	-671	0.724	1	-720	0.714	1	-703	0.714	1
	MARIAS 230		NA		-321	0.644	0	-330	0.634	0	-327	0.634	0	-307	0.644	0
	GT FALLS 230	-335	0.735	0	-389	0.730	0	-365	0.787	0	-346	0.800	7	-317	0.812	8
	GARRISON 500	-438	0.959	6	-511	0.948	6	-524	0.942	6	-337	0.972	6	-306	0.976	6
	OVANDO 230	-459	0.770	5	-502	0.728	6	-513	0.719	6	-378	0.830	1	-363	0.842	0
	BROADVU 230	-337	0.926	6	-378	0.930	6	-389	0.928	6	-242	0.944	6	-221	0.948	7
	CBK500 500	-900	0.839	1	-862	0.840	2	-862	0.840	2	-885	0.840	1	-883	0.840	1
	BOUNDARY 230	-719	0.799	0	-716	0.799	0	-717	0.798	0	-707	0.798	0	-706	0.798	0
	NTL138 138	-248	0.635	1	-249	0.628	2	-251	0.616	3	-251	0.597	4	-247	0.619	3
	LANGDON9 240	-1230	0.750	0	-1099	0.746	0	-1094	0.752	0	-1260	0.741	0	-1246	0.743	1
1. MATL PS - Cutbank 230 kV Line	MATL_AB 240		NA		-633	0.728	0	-630	0.726	1	-712	0.716	0	-712	0.716	0
	MARIAS 230		NA			NA			NA			NA			NA	
	GT FALLS 230		NA		-356	0.730	0	-357	0.730	0	-199	0.908	2	-161	0.930	2
	GARRISON 500		NA		-710	0.944	6	-728	0.944	6	-117	0.974	6	-85	0.976	6
	OVANDO 230		NA		-616	0.676	7	-624	0.670	6	-141	0.925	4	-104	0.940	3
	BROADVU 230		NA		-508	0.922	6	-519	0.922	6	-93	0.952	6	-68	0.952	6
	CBK500 500		NA		-678	0.842	1	-665	0.842	1	-964	0.840	1	-966	0.840	1
	BOUNDARY 230		NA		-702	0.798	0	-700	0.798	0	-580	0.855	0	-480	0.902	0
	NTL138 138		NA		-184	0.758	0	-183	0.758	0	-219	0.761	0	-219	0.762	0
	LANGDON9 240		NA		-967	0.748	0	-947	0.754	0	-1347	0.736	0	-1350	0.735	0
2. Cutbank - Great Falls 230 kV Line	MATL_AB 240		NA		-633	0.728	0	-630	0.726	1	-712	0.716	0	-712	0.716	0
	MARIAS 230		NA			NA			NA			NA			NA	
	GT FALLS 230		NA		-356	0.730	0	-357	0.730	0	-199	0.908	2	-161	0.930	2
	GARRISON 500		NA		-710	0.944	6	-728	0.944	6	-117	0.974	6	-85	0.976	6
	OVANDO 230		NA		-616	0.676	7	-624	0.670	6	-141	0.925	4	-104	0.940	3
	BROADVU 230		NA		-508	0.922	6	-519	0.922	6	-93	0.952	6	-68	0.952	6
	CBK500 500		NA		-678	0.842	1	-665	0.842	1	-964	0.840	1	-966	0.840	1
	BOUNDARY 230		NA		-702	0.798	0	-700	0.798	0	-580	0.855	0	-480	0.902	0
	NTL138 138		NA		-184	0.758	0	-183	0.758	0	-219	0.761	0	-219	0.762	0
	LANGDON9 240		NA		-967	0.748	0	-947	0.754	0	-1347	0.736	0	-1350	0.735	0
3. Great Falls - Judith Gap South 230 kV Line	MATL_AB 240		NA		-657	0.722	0	-657	0.724	1	-753	0.714	1	-740	0.714	1
	MARIAS 230		NA		-268	0.668	1	-275	0.672	6	-301	0.726	9	-268	0.762	0
	GT FALLS 230	-230	0.734	0	-281	0.730	0	-264	0.787	0	-265	0.832	3	-228	0.862	1
	GARRISON 500	-388	0.964	7	-491	0.945	6	-504	0.942	6	-140	0.990	6	-108	0.994	6
	OVANDO 230	-419	0.790	5	-494	0.719	3	-505	0.712	4	-183	0.922	2	-142	0.938	3
	BROADVU 230	-296	0.931	6	-361	0.936	6	-371	0.934	6	-101	0.956	7	-78	0.960	7
	CBK500 500	-897	0.840	1	-860	0.840	1	-859	0.840	2	-906	0.840	1	-902	0.841	3
	BOUNDARY 230	-719	0.798	0	-714	0.799	0	-443	0.938	0	-488	0.914	0	-590	0.860	0
	NTL138 138	-204	0.758	0	-206	0.759	0	-249	0.627	2	-206	0.760	0	-252	0.617	3
	LANGDON9 240	-1230	0.750	0	-1088	0.752	0	-1084	0.753	0	-1039	0.882	0	-1292	0.738	0
4. Judith Gap South - Broadview 230 kV Line	MATL_AB 240		NA		-671	0.722	0	-670	0.724	1	-729	0.714	1	-714	0.714	1
	MARIAS 230		NA		-317	0.614	0	-322	0.634	0	-320	0.664	6	-302	0.672	10
	GT FALLS 230	-302	0.735	0	-329	0.788	0	-364	0.731	0	-324	0.794	6	-301	0.818	7
	GARRISON 500	-362	0.970	6	-434	0.958	6	-447	0.956	6	-257	0.981	7	-231	0.982	6
	OVANDO 230	-413	0.808	2	-469	0.756	4	-479	0.748	4	-320	0.864	0	-291	0.878	1
	BROADVU 230	-260	0.940	6	-311	0.932	7	-320	0.930	6	-180	0.946	6	-162	0.950	7
	CBK500 500	-901	0.839	1	-858	0.841	3	-864	0.839	1	-889	0.840	1	-886	0.841	1
	BOUNDARY 230	-482	0.924	0	-448	0.936	0	-716	0.798	0	-705	0.798	0	-704	0.798	0
	NTL138 138	-252	0.606	4	-251	0.616	4	-252	0.615	2	-252	0.598	4	-202	0.760	0
	LANGDON9 240	-1231	0.749	0	-1098	0.750	0	-781	0.914	0	-1270	0.741	0	-1259	0.741	0
5. Great Falls - Landers Fork 230 kV Line	MATL_AB 240		NA		-689	0.728	0	-694	0.724	0	-711	0.714	1	-695	0.714	1
	MARIAS 230		NA		-308	0.652	0	-317	0.654	0	-280	0.644	0	-261	0.652	0
	GT FALLS 230	-238	0.731	0	-316	0.730	0	-327	0.730	0	-262	0.788	0	-248	0.760	6
	GARRISON 500	-378	0.962	6	-452	0.950	6	-460	0.946	6	-320	0.974	6	-292	0.976	6
	OVANDO 230	-366	0.778	6	-415	0.734	4	-420	0.730	6	-324	0.816	1	-300	0.832	1
	BROADVU 230	-299	0.934	7	-342	0.934	6	-350	0.932	6	-235	0.946	7	-215	0.948	6
	CBK500 500	-897	0.840	1	-845	0.840	1	-846	0.840	1	-885	0.841	2	-884	0.841	3
	BOUNDARY 230	-479	0.925	0	-714	0.799	0	-714	0.799	0	-706	0.798	0	-705	0.799	0
	NTL138 138	-204	0.758	0	-205	0.758	0	-205	0.758	0	-248	0.619	3	-248	0.619	3
	LANGDON9 240	-1231	0.749	0	-1107	0.745	0	-1104	0.751	0	-1259	0.740	0	-1246	0.743	1
6. Landers Fork - Ovando 230 kV Line	MATL_AB 240		NA		-689	0.728	0	-694	0.724	0	-711	0.714	1	-695	0.714	1
	MARIAS 230		NA		-308	0.652	0	-317	0.654	0	-280	0.644	0	-261	0.652	0
	GT FALLS 230	-238	0.731	0	-316	0.730	0	-327	0.730	0	-262	0.788	0	-248	0.760	6
	GARRISON 500	-378	0.962	6	-452	0.950	6	-460	0.946	6	-320	0.974	6	-292	0.976	6
	OVANDO 230	-366	0.778	6	-415	0.734	4	-420	0.730	6	-324	0.816	1	-300	0.832	1
	BROADVU 230	-299	0.934	7	-342	0.934	6	-350	0.932	6	-235	0.946	7	-215	0.948	6
	CBK500 500	-897	0.840	1	-845	0.840	1	-846	0.840	1	-885	0.841	2	-884	0.841	3
	BOUNDARY 230	-479	0.925	0	-714	0.799	0	-714	0.799	0	-706	0.798	0	-705	0.799	0
	NTL138 138	-204	0.758	0	-205	0.758	0	-205	0.758	0	-248	0.619	3	-248	0.619	3
	LANGDON9 240	-1231	0.749	0	-1107	0.745	0	-1104	0.751	0	-1259	0.740	0	-1246	0.743	1

Appendix F.2: Path 8 Simultaneous Post-Transient Studies - Reactive Margin Summary

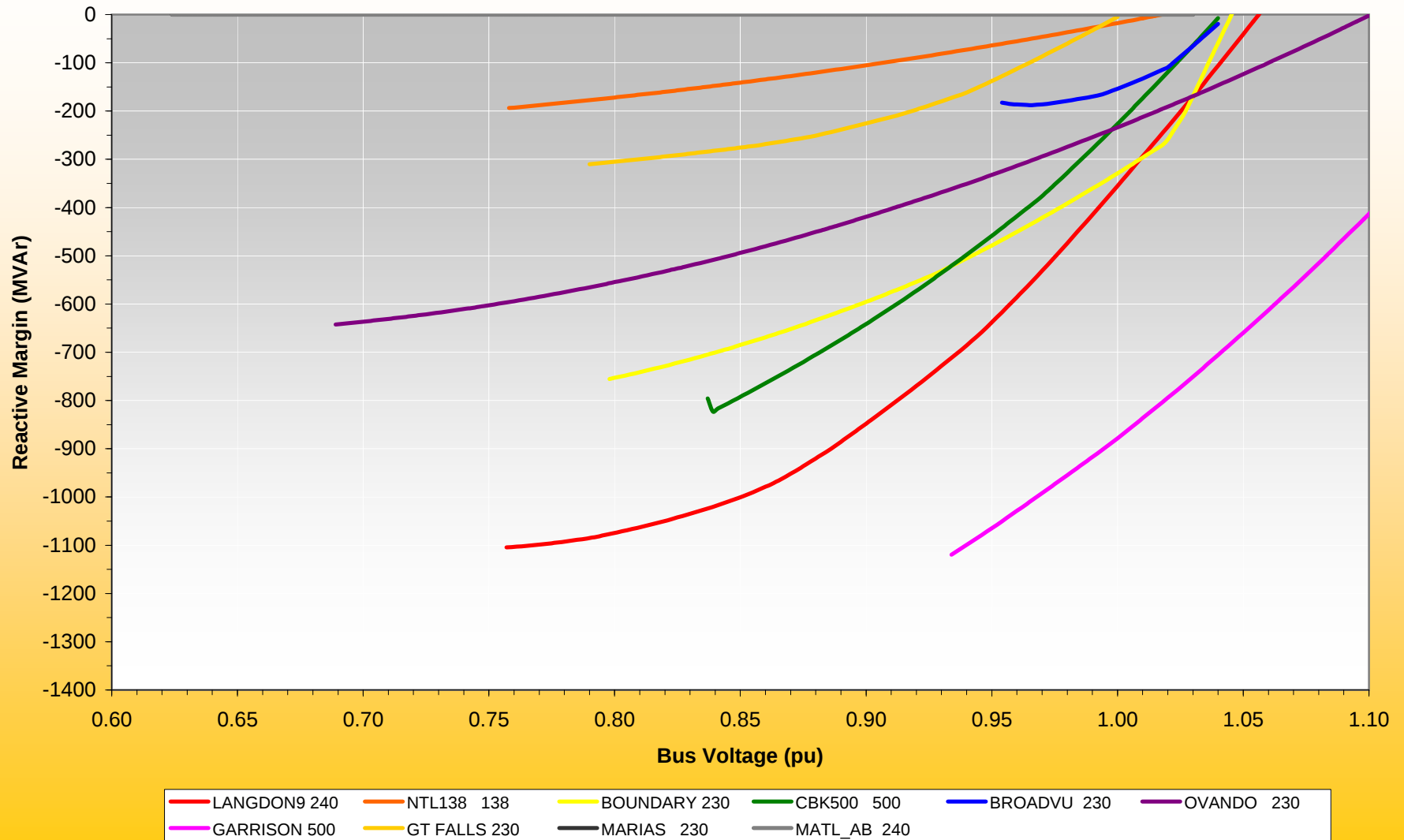
Contingency	Location	Pre-Project			Post-Project [N-S]			Post-Project + 5.00% [N-S]			Post-Project [S-A]			Post-Project + 5.00% [S-A]		
		Reactive Margin (MVAR)	Voltage (pu)	Points After Nose	Reactive Margin (MVAR)	Voltage (pu)	Points After Nose	Reactive Margin (MVAR)	Voltage (pu)	Points After Nose	Reactive Margin (MVAR)	Voltage (pu)	Points After Nose	Reactive Margin (MVAR)	Voltage (pu)	Points After Nose
7. Ovando - Hot Springs 230 kV Line	MATL_AB 240		NA		-676	0.722	0	-675	0.724	1	-716	0.714	1	-700	0.714	1
	MARIAS 230		NA		-327	0.613	0	-331	0.633	0	-318	0.638	3	-296	0.668	7
	GT FALLS 230	-304	0.790	0	-348	0.788	0	-360	0.788	0	-325	0.822	8	-295	0.832	8
	GARRISON 500	-405	0.960	6	-475	0.948	6	-488	0.942	6	-314	0.972	6	-283	0.976	6
	OVANDO 230	-375	0.742	5	-409	0.698	6	-418	0.690	7	-313	0.810	2	-287	0.824	1
	BROADVU 230	-314	0.928	6	-355	0.934	7	-366	0.933	7	-227	0.948	7	-205	0.948	6
	CBK500 500	-897	0.840	1	-252	0.994	0	-860	0.840	2	-269	0.996	0	-269	0.996	0
	BOUNDARY 230	-719	0.798	0	-714	0.799	0	-448	0.936	0	-703	0.799	0	-703	0.799	0
	NTL138 138	-204	0.758	0	-251	0.617	4	-251	0.617	4	-251	0.598	5	-250	0.597	4
	LANGDON9 240	-878	0.918	0	-752	0.921	0	-1095	0.752	0	-1255	0.742	0	-1243	0.742	0
8. Ovando - Garrison 230 kV Line	MATL_AB 240		NA		-674	0.724	0	-674	0.724	1	-723	0.714	1	-707	0.714	1
	MARIAS 230		NA		-321	0.614	0	-323	0.644	0	-319	0.644	0	-302	0.630	4
	GT FALLS 230	-290	0.790	0	-366	0.728	0	-375	0.728	0	-333	0.788	0	-306	0.800	8
	GARRISON 500	-413	0.960	6	-489	0.946	6	-500	0.942	6	-309	0.972	6	-280	0.976	6
	OVANDO 230	-282	0.623	0	-278	0.604	0	-270	0.644	0	-290	0.644	0	-287	0.634	0
	BROADVU 230	-323	0.930	6	-371	0.932	6	-382	0.932	6	-229	0.948	6	-207	0.952	7
	CBK500 500	-902	0.838	1	-858	0.841	3	-860	0.840	2	-887	0.840	1	-883	0.841	1
	BOUNDARY 230	-480	0.925	0	-714	0.799	0	-445	0.937	0	-707	0.798	0	-706	0.798	0
	NTL138 138	-253	0.604	2	-206	0.758	0	-207	0.758	0	-202	0.760	0	-201	0.760	0
	LANGDON9 240	-1231	0.749	0	-1098	0.753	0	-1095	0.752	0	-1263	0.742	1	-1252	0.741	0
9. Colstrip - Broadview #1 500 kV Line	MATL_AB 240		NA		-670	0.722	0	-669	0.724	1	-762	0.712	1	-749	0.715	1
	MARIAS 230		NA		-267	0.742	0	-291	0.718	1	-377	0.674	0	-367	0.664	0
	GT FALLS 230	-368	0.732	0	-201	0.892	0	-233	0.880	0	-440	0.786	0	-442	0.738	4
	GARRISON 500	-739	0.962	3	-108	0.990	6	-126	0.986	6	-529	0.994	6	-526	0.996	6
	OVANDO 230	-639	0.666	1	-133	0.936	1	-157	0.926	1	-543	0.772	4	-539	0.774	4
	BROADVU 230	-459	0.916	6	-77	0.950	6	-91	0.948	6	-317	0.938	6	-314	0.938	6
	CBK500 500	-874	0.840	1	-857	0.840	1	-858	0.840	1	-889	0.840	1	-886	0.840	1
	BOUNDARY 230	-750	0.798	0	-604	0.856	0	-648	0.830	0	-738	0.798	0	-738	0.799	0
	NTL138 138	-201	0.758	0	-206	0.758	0	-207	0.758	0	-203	0.760	0	-252	0.596	4
	LANGDON9 240	-1190	0.754	0	-1092	0.752	0	-1088	0.752	0	-1284	0.741	0	-1162	0.830	0
10. Broadview - Townsend - Garrison #1 500 kV Line	MATL_AB 240		NA		-636	0.726	0	-632	0.732	0	-769	0.715	1	-756	0.718	0
	MARIAS 230		NA		-311	0.592	0	-314	0.613	0	-390	0.678	0	-386	0.639	0
	GT FALLS 230	-386	0.730	0	-379	0.726	1	-386	0.728	0	-468	0.786	0	-455	0.786	0
	GARRISON 500	-1079	0.933	4	-736	0.943	4	-735	0.944	5	-845	0.976	4	-842	0.976	4
	OVANDO 230	-663	0.683	0	-599	0.654	5	-601	0.652	4	-687	0.683	0	-692	0.653	5
	BROADVU 230	-545	0.918	5	-398	0.932	6	-399	0.932	6	-405	0.945	6	-402	0.945	6
	CBK500 500	-863	0.840	1	-852	0.840	2	-853	0.840	2	-888	0.839	1	-886	0.839	1
	BOUNDARY 230	-761	0.799	0	-747	0.798	0	-747	0.798	0	-754	0.798	0	-754	0.798	0
	NTL138 138	-250	0.596	5	-205	0.758	0	-250	0.616	3	-202	0.760	0	-247	0.618	3
	LANGDON9 240	-1171	0.755	0	-932	0.852	0	-1032	0.755	0	-1283	0.741	0	-1225	0.791	0
11. Garrison - Taft #1 500 kV Line	MATL_AB 240		NA		-605	0.728	0	-604	0.728	1	-771	0.718	0	-760	0.719	0
	MARIAS 230		NA		-289	0.641	0	-303	0.594	0	-395	0.692	0	-387	0.681	0
	GT FALLS 230	-372	0.789	0	-349	0.786	0	-391	0.725	0	-508	0.726	0	-496	0.727	0
	GARRISON 500	-1129	0.848	7	-1029	0.839	7	-1032	0.832	3	-975	0.864	6	-973	0.863	5
	OVANDO 230	-693	0.674	0	-672	0.644	0	-668	0.654	0	-697	0.684	0	-696	0.684	0
	BROADVU 230	-831	0.789	2	-762	0.814	6	-768	0.797	4	-699	0.822	0	-697	0.822	0
	CBK500 500	-855	0.839	1	-841	0.840	1	-874	0.970	0	-878	0.840	1	-878	0.840	1
	BOUNDARY 230	-743	0.800	0	-742	0.799	0	-741	0.799	0	-735	0.799	0	-737	0.798	0
	NTL138 138	-250	0.591	2	-247	0.627	1	-204	0.758	0	-252	0.590	4	-201	0.760	0
	LANGDON9 240	-876	0.904	0	-983	0.759	0	-979	0.756	2	-1152	0.837	0	-1272	0.741	0
12. Langdon - Cranbrook 500 kV Line	MATL_AB 240		NA													
	MARIAS 230		NA													
	GT FALLS 230															
	GARRISON 500															
	OVANDO 230															
	BROADVU 230															
	CBK500 500															
13. Cranbrook - Selkirk 500 kV Line (RAS used)	MATL_AB 240		NA													
	MARIAS 230		NA													
	GT FALLS 230															
	GARRISON 500															
	OVANDO 230															
	BROADVU 230															
	CBK500 500															

Appendix F.2: Path 8 Simultaneous Post-Transient Studies - Reactive Margin Summary

Contingency	Location	Pre-Project			Post-Project [N-S]			Post-Project + 5.00% [N-S]			Post-Project [S-N]			Post-Project + 5.00% [S-N]		
		Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose	Reactive Margin (MVar)	Voltage (pu)	Points After Nose
15. Broadview - Townsend - Garrison #1 and #2 500 kV Lines	MATL_AB 240		NA		-565	0.736	0	-568	0.736	0	-756	0.716	1	-745	0.716	1
	MARIAS 230		NA		-249	0.644	0	-261	0.630	0	-330	0.732	7	-285	0.798	1
	GT FALLS 230	-310	0.790	0	-379	0.726	1	-297	0.733	0	-296	0.868	1	-239	0.910	0
	GARRISON 500	-1119	0.934	0	-1160	0.885	0	-1141	0.888	0	-1032	0.951	0	-769	1.021	0
	OVANDO 230	-643	0.689	0	-576	0.689	0	-584	0.651	0	-583	0.776	0	-466	0.872	0
	BROADVU 230	-188	0.966	6	-398	0.932	6	-179	0.968	6	-90	0.988	7	-60	0.998	6
	CBK500 500	-822	0.839	1	-801	0.842	1	-801	0.840	1	-855	0.841	1	-853	0.840	1
	BOUNDARY 230	-755	0.798	0	-750	0.800	0	-747	0.799	0	-752	0.798	0	-608	0.892	0
	NTL138 138	-194	0.758	0	-198	0.758	0	-198	0.758	0	-198	0.758	0	-198	0.758	0
	LANGDON9 240	-1104	0.757	0	-892	0.779	6	-880	0.767	1	-1239	0.743	0	-1231	0.743	0
16. Garrison - Taft #1 and #2 500 kV Lines	MATL_AB 240		NA		-595	0.734	1	-595	0.735	1	-757	0.718	1	-745	0.720	0
	MARIAS 230		NA		-304	0.580	0	-307	0.598	0	-385	0.704	0	-378	0.693	0
	GT FALLS 230	-394	0.729	0	-358	0.786	0	-368	0.786	0	-498	0.726	0	-486	0.726	0
	GARRISON 500	-620	0.880	10	-563	0.878	9	-567	0.877	6	-534	0.922	6	-527	0.928	9
	OVANDO 230	-611	0.681	0	-568	0.662	4	-571	0.658	2	-595	0.704	0	-591	0.700	4
	BROADVU 230	-573	0.853	9	-525	0.856	9	-530	0.846	6	-480	0.868	6	-474	0.868	6
	CBK500 500	-807	0.840	1	-799	0.840	1	-801	0.840	1	-835	0.840	1	-833	0.840	1
	BOUNDARY 230	-704	0.798	0	-703	0.798	0	-704	0.798	0	-695	0.798	0	-695	0.798	0
	NTL138 138	-193	0.757	0	-198	0.758	0	-199	0.759	0	-243	0.618	4	-195	0.759	0
	LANGDON9 240	-1098	0.756	0	-917	0.763	0	-916	0.764	0	-1231	0.742	0	-1223	0.743	0

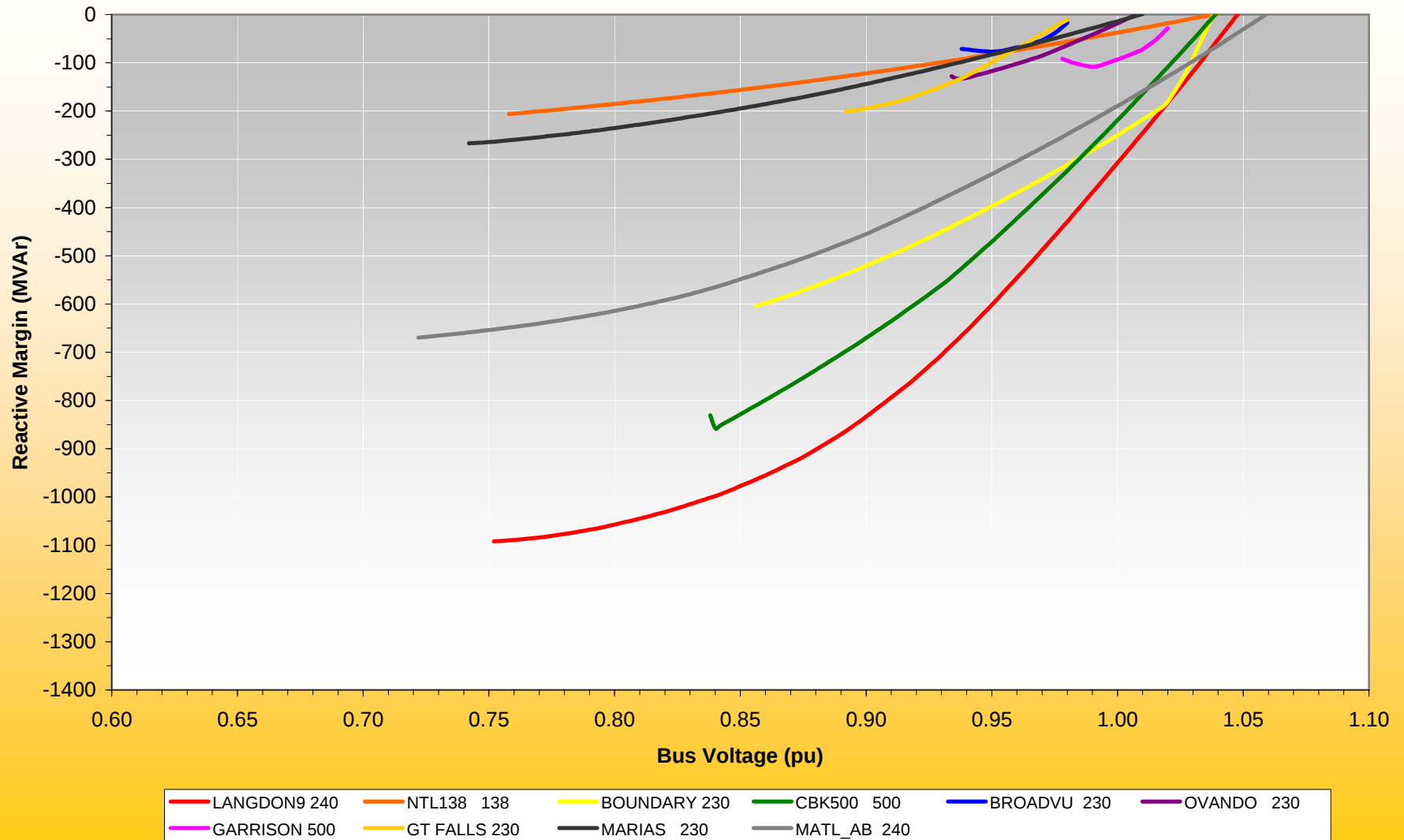


Summary of Reactive Margin (Q-V Curves)
2007 Light Spring Path 8 Simultaneous - Pre-Project
Loss of Broadview - Townsend - Garrison #1 and #2 500 kV Lines



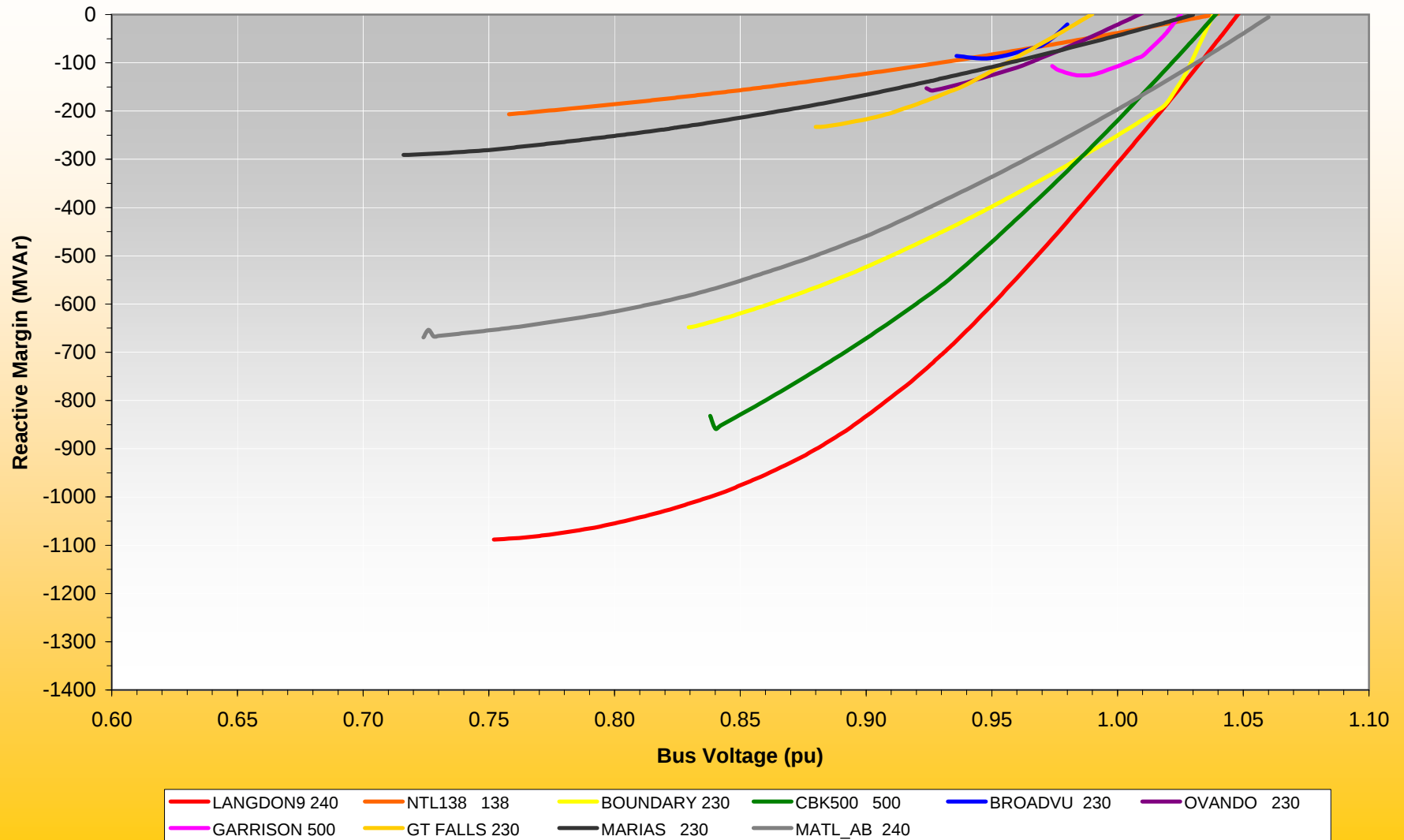


Summary of Reactive Margin (Q-V Curves)
2007 Light Spring Path 8 Simultaneous - Post-Project [North-to-South]
Loss of Colstrip - Broadview #1 500 kV Line



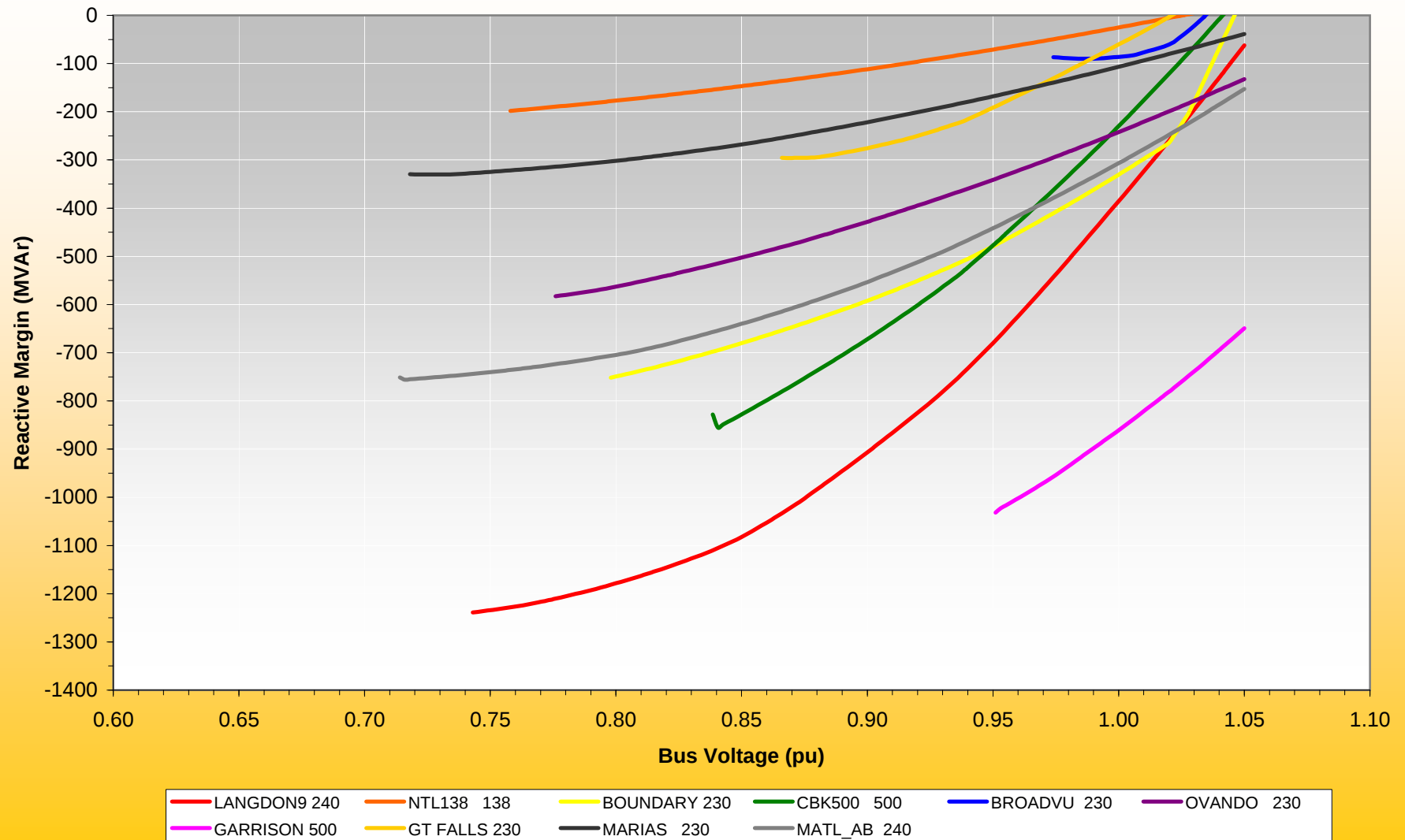


Summary of Reactive Margin (Q-V Curves)
2007 Light Spring Path 8 Simultaneous - Post-Project [North-to-South + 5.00%]
Loss of Colstrip - Broadview #1 500 kV Line



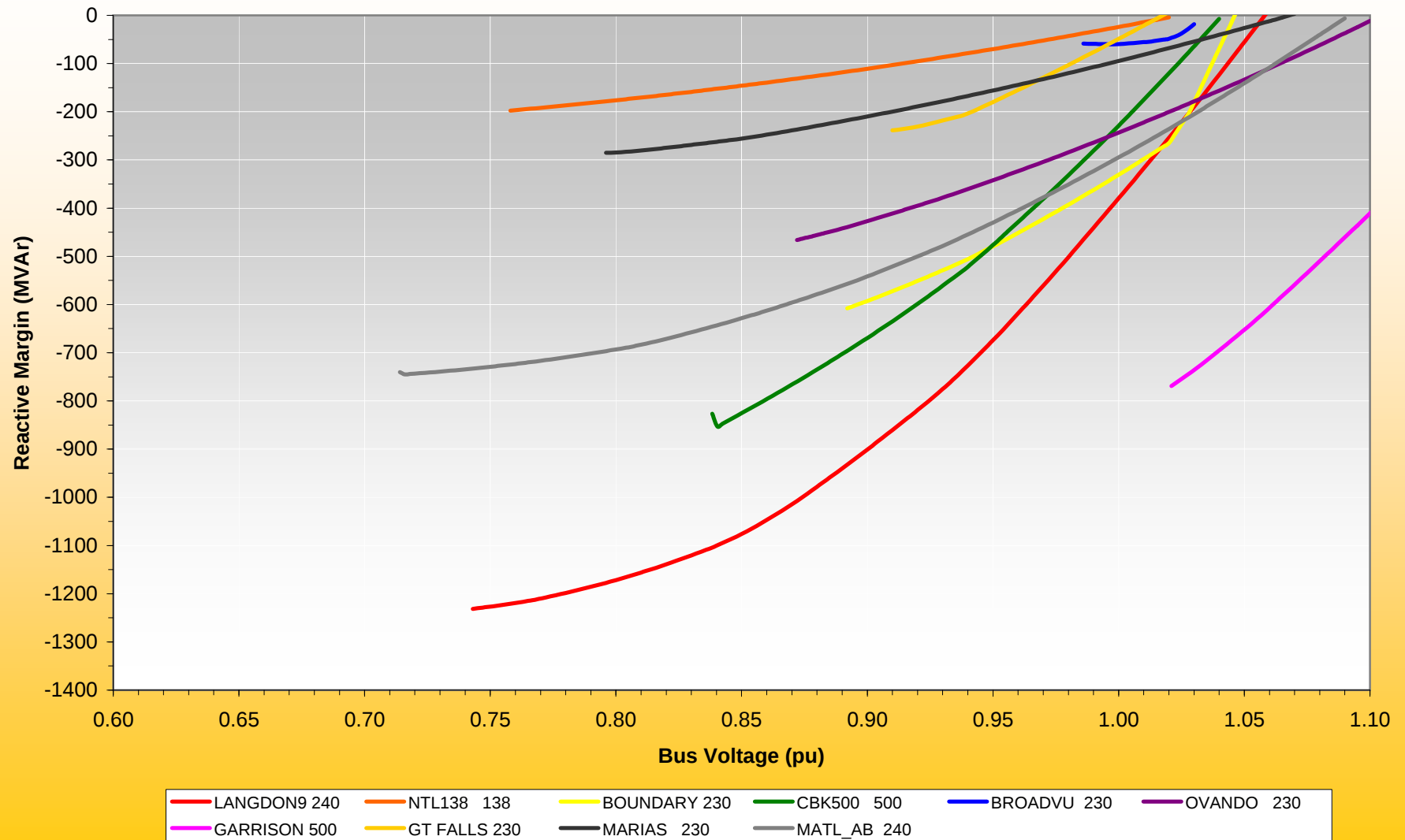


Summary of Reactive Margin (Q-V Curves)
2007 Light Spring Path 8 Simultaneous - Post-Project [South-to-North]
Loss of Broadview - Townsend - Garrison #1 and #2 500 kV Lines



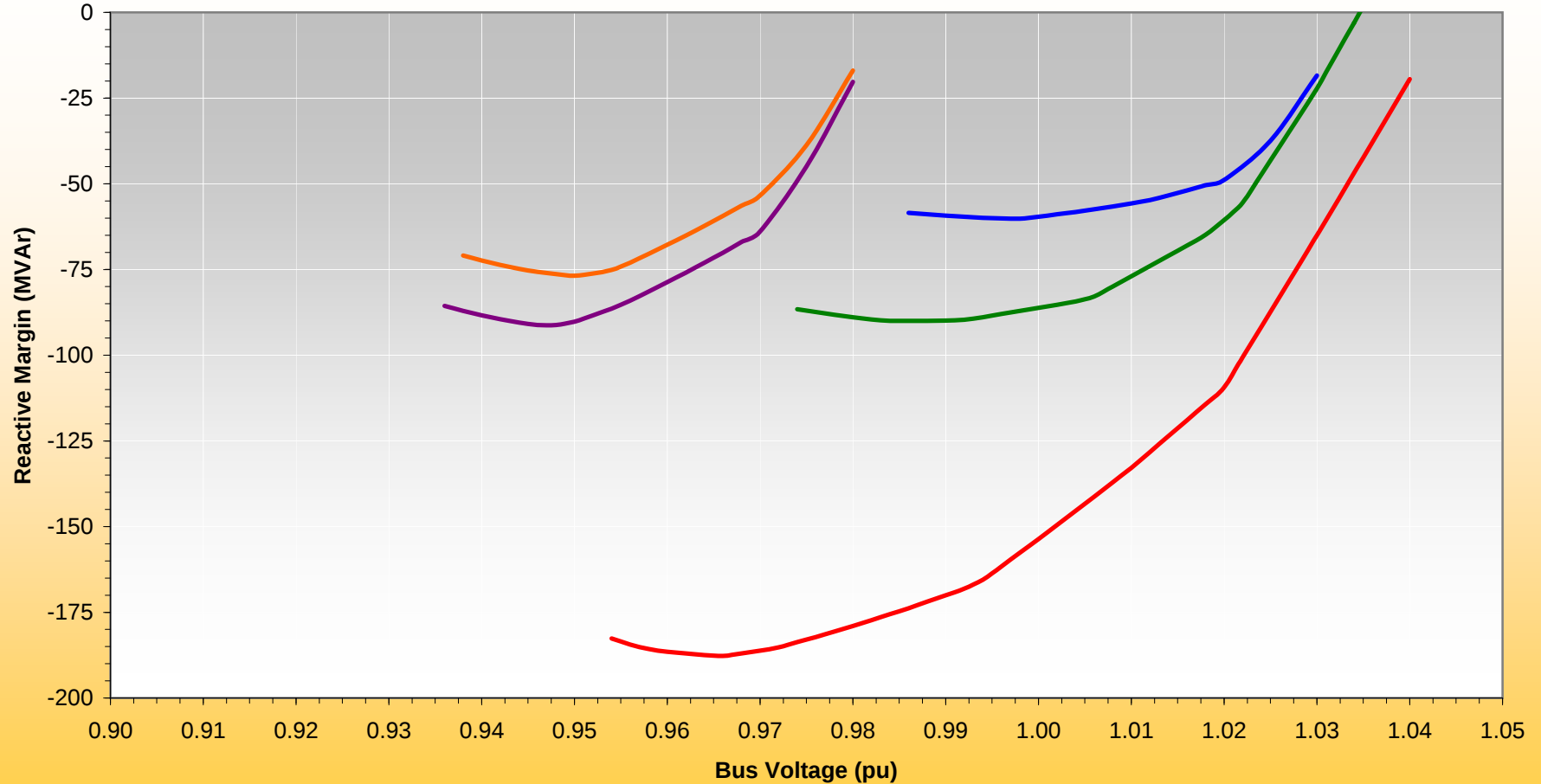


Summary of Reactive Margin (Q-V Curves)
2007 Light Spring Path 8 Simultaneous - Post-Project [South-to-North + 5.00%]
Loss of Broadview - Townsend - Garrison #1 and #2 500 kV Lines





**Comparison of Minimum Reactive Margin (Q-V Curves)
2007 Light Spring Path 8 Simultaneous**



- BROADVU 230 (Pre-Project: Loss of Broadview - Townsend - Garrison #1 and #2 500 kV Lines)
- BROADVU 230 (Post-Project [North-to-South]: Loss of Colstrip - Broadview #1 500 kV Line)
- BROADVU 230 (Post-Project [North-to-South + 5.00%]: Loss of Colstrip - Broadview #1 500 kV Line)
- BROADVU 230 (Post-Project [South-to-North]: Loss of Broadview - Townsend - Garrison #1 and #2 500 kV Lines)
- BROADVU 230 (Post-Project [South-to-North + 5.00%]: Loss of Broadview - Townsend - Garrison #1 and #2 500 kV Lines)

Appendix F.3: Path 8 Transient Stability Results Summary

Case No.	Project	Power Flow Base Case	Basecase Flows (MW)		Outage	Stable (Y/N)	Creates An Island? (Y/N)	Angle Violations Machines out of Step	Voltage Deviations										Frequency Deviations						Comments
			Path 8	MATL					Dip Violations	Bus Name and kV	Area	Type	Minimum (p.u.)	Percentage Deviation	Time (Sec.)	20/40 Cycle Violations	Max Time (Cycles)	Freq. Dip Violations	Bus Name and kV	Area	Type	Minimum (Hz)	6 Cycle Violations	Max Time (Cycles)	
CATEGORY B																									
1	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	MATL PS - Cutbank 230 kV Line																				No simulation run for this outage. The planned circuit(s) are not in pre-project case.
2	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Cutbank - Great Falls 230 kV Line																				No simulation run for this outage. The planned circuit(s) are not in pre-project case.
3	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Great Falls - Judith Gap South 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	2	62041 MORONY 13.8	62	fbug	59.43	2	9.00	The minimum frequencies were recorded at 1.367 Seconds (82 cycles). This case was re-run using PSS/E and these frequency deviation violations did not occur.
4	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Judith Gap South - Broadview 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
5	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Great Falls - Landers Fork 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
6	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Landers Fork - Ovando 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
7	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Ovando - Hot Springs 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
8	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Ovando - Garrison 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
9	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Colstrip - Broadview #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	53	62316 HARDINGN 13.8	62	fbug	59.24	53	15.75	All frequency deviations were recorded in Montana & WAPA U.M. areas. ¹
10	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Broadview - Townsend - Garrison #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	95	62316 HARDINGN 13.8	62	fbug	59.22	95	15.75	All frequency deviations were recorded in Montana & WAPA U.M. areas. ¹
11	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Garrison - Taft #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	155	62316 HARDINGN 13.8	62	fbug	59.27	155	15.75	All frequency deviations were recorded in Montana & WAPA U.M. areas. ¹
12	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Langdon - Cranbrook 500 kV Line	Y	1	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
13	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Cranbrook - Selkirk 500 kV Line (RAS Used)	Y	1	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	Upon reclosure of the three-phase fault at Selkirk 500 kV the frequency drops to 40.0 Hz. The frequency at Selkirk 500 kV takes 12 cycles to reach 59.6 Hz.
CATEGORY C																									
14	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Colstrip - Broadview #1 & #2 500 kV Lines																				Outage not simulated. Not common tower or common ROW.
15	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Broadview - Townsend - Garrison #1 & #2 500 kV Lines	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
16	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Garrison - Taft #1 & #2 500 kV Lines	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
17	PRE	07lsp_p8_pre_rev12st.sav	2203.5	NA	Taft 500 kV Breaker Failure at Bell/Garrison #1 Position	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
CATEGORY B																									
1	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	MATL PS - Cutbank 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
2	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Cutbank - Great Falls 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
3	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Great Falls - Judith Gap South 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
4	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Judith Gap South - Broadview 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
5	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Great Falls - Landers Fork 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
6	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Landers Fork - Ovando 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
7	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Ovando - Hot Springs 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
8	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Ovando - Garrison 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
9	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Colstrip - Broadview #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
10	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Broadview - Townsend - Garrison #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	40	62316 HARDINGN 13.8	62	fbug	59.31	40	15.75	All frequency deviations were recorded in Montana & WAPA U.M. areas. ¹
11	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Garrison - Taft #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	66	62316 HARDINGN 13.8	62	fbug	59.33	66	15.75	All frequency deviations were recorded in Montana & WAPA U.M. areas. ¹
12	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Langdon - Cranbrook 500 kV Line	Y	1	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
13	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Cranbrook - Selkirk 500 kV Line (RAS Used)	Y	1	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
CATEGORY C																									
14	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Colstrip - Broadview #1 & #2 500 kV Lines																				Outage not simulated. Not common tower or common ROW.
15	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Broadview - Townsend - Garrison #1 & #2 500 kV Lines	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
16	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Garrison - Taft #1 & #2 500 kV Lines	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
17	POST (N2S)	07lsp_p8_n2s_rev12st.sav	2203.6	299.6	Taft 500 kV Breaker Failure at Bell/Garrison #1 Position	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
CATEGORY B																									
1	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	MATL PS - Cutbank 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
2	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Cutbank - Great Falls 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
3	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Great Falls - Judith Gap South 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	3	62041 MORONY 13.8	62	fbug	59.37	3	9.00	The minimum frequencies were recorded at 1.367 Seconds (82 cycles). This case was re-run using PSS/E and these frequency deviation violations did not occur.
4	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Judith Gap South - Broadview 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
5	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Great Falls - Landers Fork 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	3	62041 MORONY 13.8	62	fbug	59.41	3	9.00	The minimum frequencies were recorded at 1.367 Seconds (82 cycles). This case was re-run using PSS/E and these frequency deviation violations did not occur.
6	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Landers Fork - Ovando 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
7	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Ovando - Hot Springs 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
8	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Ovando - Garrison 230 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	
9	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Colstrip - Broadview #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	37	62316 HARDINGN 13.8	62	fbug	59.25	37	18.00	All frequency deviations were recorded in Montana & WAPA U.M. areas. ¹
10	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Broadview - Townsend - Garrison #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	93	62316 HARDINGN 13.8	62	fbug	59.22	93	18.00	All frequency deviations were recorded in Montana, WAPA U.M. & WAPA R.M. areas. ¹
11	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Garrison - Taft #1 500 kV Line	Y	N	0	None	--	--	--	--	--	--	--	--	88	62316 HARDINGN 13.8	62	fbug	59.27	88	15.75	All frequency deviations were recorded in Montana & WAPA U.M. areas. ¹
12	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Langdon - Cranbrook 500 kV Line	N	1	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	A MATL versus Path 8 Nomogram was developed to mitigate thermal overloads. Operation within Nomogram limits was confirmed to ensure system damping.
13	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Cranbrook - Selkirk 500 kV Line (RAS Used)	N	1	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	A MATL versus Path 8 Nomogram was developed to mitigate thermal overloads. Operation within Nomogram limits was confirmed to ensure system damping.
12a	POST (S2N)	07LSP_41_2200.sav	2200	41	Langdon - Cranbrook 500 kV Line	Y	1	0	None	--	--	--	--	--	--	--	--	None	--	--	--	--	--	--	MATL versus Path 8 Nomogram point transient stability test.

Appendix F.3: Path 8 Transient Stability Results Summary

Case No.	Project	Power Flow Base Case	Basecase Flows (MW)		Outage	Stable	Creates An Island?	Angle Violations	Voltage Deviations								Frequency Deviations						Comments			
			Path 8	MATL		(Y/N)	(Y/N)	Machines out of Step	Dip Violations	Bus Name and kV	Area	Type	Minimum (p.u.)	Percentage Deviation	Time (Sec.)	20/40 Cycle Violations	Max Time (Cycles)	Freq. Dip Violations	Bus Name and kV	Area	Type	Minimum (Hz)		6 Cycle Violations	Max Time (Cycles)	
13a	POST (S2N)	07LSP_41_2200.sav	2200	41	Cranbrook - Selkirk 500 kV Line (RAS Used)	Y	1	0	None	--	--	--	--	--	--	--	None	--	--	--	--	--	--	MATL versus Path 8 Nomogram point transient stability test.		
12b	POST (S2N)	07LSP_150_1400.sav	1400	150	Langdon - Cranbrook 500 kV Line	Y	1	0	None	--	--	--	--	--	--	--	None	--	--	--	--	--	--	MATL versus Path 8 Nomogram point transient stability test.		
13b	POST (S2N)	07LSP_150_1400.sav	1400	150	Cranbrook - Selkirk 500 kV Line (RAS Used)	Y	1	0	None	--	--	--	--	--	--	--	None	--	--	--	--	--	--	MATL versus Path 8 Nomogram point transient stability test.		
12c	POST (S2N)	07LSP_312_107.sav	107	312	Langdon - Cranbrook 500 kV Line	Y	1	0	None	--	--	--	--	--	--	--	None	--	--	--	--	--	--	MATL versus Path 8 Nomogram point transient stability test.		
13c	POST (S2N)	07LSP_312_107.sav	107	312	Cranbrook - Selkirk 500 kV Line (RAS Used)	Y	1	0	None	--	--	--	--	--	--	--	None	--	--	--	--	--	--	MATL versus Path 8 Nomogram point transient stability test.		
CATEGORY C																										
14	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Colstrip - Broadview #1 & #2 500 kV Lines																			Outage not simulated. Not common tower or common ROW.		
15	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Broadview - Townsend - Garrison #1 & #2 500 kV Lines	Y	N	0	43	62250 BGTMBERA 161	62	vbul	0.622	38.40	1.26	--	18.0	None	--	--	--	--	--	--	All forty-three (43) voltage dips exceeding 30% occur in the Montana area. This case was re-run using PSS/E and these voltage dip violations did not occur.	
16	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Garrison - Taft #1 & #2 500 kV Lines	Y	N	0	None	--	--	--	--	--	--	--	None	--	--	--	--	--	--			
17	POST (S2N)	07lsp_p8_s2n_rev12st.sav	2205.4	312.6	Taft 500 kV Breaker Failure at Bell/Garrison #1 Position	Y	N	0	None	--	--	--	--	--	--	--	None	--	--	--	--	--	--			

¹ These simulations were re-run using PSS/E and the frequency deviations were checked against the UFLS data to ensure that no underfrequency load shedding would occur for these outages. Since no UFLS occurred, the system performance for these contingencies is considered acceptable.

Appendix F.3: Path 8 PSS/E Transient Simulation Summary Table

tag_lsppre	rflg	tday	ttim	stdnam	root	swdeck	label	atrev	rglvstrts	rglvstopts	rglvthrs	simtim
07lsp_path8_pre_rev2_csbv1.idv	bat	21/02/2007	7:29:46	pre	07lsp_path8_pre	sdk_csbv1.txt	csbv1	1	0.1	2	0.8	20
07lsp_path8_pre_rev2_bg1m.idv	bat	21/02/2007	8:25:49	pre	07lsp_path8_pre	sdk_bg1m.txt	bg1m	1	0.1	2	0.8	20
07lsp_path8_pre_rev2_grtt1.idv	bat	21/02/2007	9:07:50	pre	07lsp_path8_pre	sdk_grtt1m_mc.txt	grtt1	1	0.1	2	0.8	20
07lsp_path8_pre_rev2_bg12m.idv	bat	21/02/2007	10:00:04	pre	07lsp_path8_pre	sdk_bg12m.txt	bg12m	1	0.1	2	0.8	20
07lsp_path8_pre_rev2_grtt12.idv	bat	21/02/2007	11:42:11	pre	07lsp_path8_pre	sdk_grtt12m.txt	grtt12	1	0.1	2	0.8	20
07lsp_path8_pre_rev2_tthbb.idv	bat	13/03/2007	16:00:11	pre	07lsp_path8_pre	sdk_3tthbb_gr.txt	tthbb	1	0.26667	2	0.8	10
07lsp_path8_pst_n2s_rev2_csbv1.idv	bat	21/02/2007	18:40:07	8_n2s	07lsp_path8_pst	sdk_csbv1.txt	csbv1	1	0.1	2	0.8	20
07lsp_path8_pst_n2s_rev2_bg1m.idv	bat	21/02/2007	20:23:15	8_n2s	07lsp_path8_pst	sdk_bg1m.txt	bg1m	1	0.1	2	0.8	20
07lsp_path8_pst_n2s_rev2_grtt1.idv	bat	21/02/2007	21:15:17	8_n2s	07lsp_path8_pst	sdk_grtt1m_mc.txt	grtt1	1	0.1	2	0.8	20
07lsp_path8_pst_n2s_rev2_bg12m.idv	bat	22/02/2007	6:03:05	8_n2s	07lsp_path8_pst	sdk_bg12m.txt	bg12m	1	0.1	2	0.8	20
07lsp_path8_pst_n2s_rev2_grtt12.idv	bat	22/02/2007	6:52:00	8_n2s	07lsp_path8_pst	sdk_grtt12m.txt	grtt12	1	0.1	2	0.8	20
07lsp_path8_pst_n2s_rev2_tthbb.idv	bat	14/03/2007	7:14:14	8n2s	07lsp_path8_pst	sdk_3tthbb_gr.txt	tthbb	1	0.26667	2	0.8	10
07lsp_path8_pst_s2n_rev2_csbv1.idv	bat	21/02/2007	12:47:56	8_s2n	07lsp_path8_pst	sdk_csbv1.txt	csbv1	1	0.1	2	0.8	20
07lsp_path8_pst_s2n_rev2_bg1m.idv	bat	21/02/2007	13:32:33	8_s2n	07lsp_path8_pst	sdk_bg1m.txt	bg1m	1	0.1	2	0.8	20
07lsp_path8_pst_s2n_rev2_grtt1.idv	bat	21/02/2007	15:58:17	8_s2n	07lsp_path8_pst	sdk_grtt1m_mc.txt	grtt1	1	0.1	2	0.8	20
07lsp_path8_pst_s2n_rev2_bg12m.idv ¹	bat	06/03/2007	12:33:57	8_s2n	07lsp_path8_pst	sdk_bg12m.txt	bg12m	1	0.1	2	0.8	2
07lsp_path8_pst_s2n_rev2_grtt12.idv	bat	21/02/2007	17:40:51	8_s2n	07lsp_path8_pst	sdk_grtt12m.txt	grtt12	1	0.1	2	0.8	20
07lsp_path8_pst_s2n_rev2_tthbb.idv	bat	14/03/2007	6:03:22	8_s2n	07lsp_path8_pst	sdk_3tthbb_gr.txt	tthbb	1	0.26667	2	0.8	10

¹ This case actually experienced a "double dip" voltage deviation violation. Each individual deviation was less than 0.80 p.u. for less than 40 cycles. Therefore, this case meets the NERC/WECC Planning Standards and is acceptable.

Appendix F.3: Path 8 PSS/E Transient Simulation Summary Table

tag_lsppre	clksecs	shortstop	atrmode	grskey	grst	mct	mt1t	igrsw	idmc	auxx	curbt	reslt	wsc	stlo	enlo
07lsp_path8_pre_rev2_csbv1.idv	2248.485	1.683333	mute	na	0	0	0	na	na	1	0	SS	B	0	0
07lsp_path8_pre_rev2_bg1m.idv	2437.796	1.616667	mute	na	0	0	0	na	na	1	0	SS	B	0	0
07lsp_path8_pre_rev2_grtt1.idv	2313.687	1.616667	mute	fr	6.5	11	0	igrs.idv	idropmcdc.idv	1	19	SS	B	0	0
07lsp_path8_pre_rev2_bg12m.idv	2864.844	1.583333	mute	nmc	6.5	0	0	igrs.idv	na	1	0	MUS	B	14.5	19
07lsp_path8_pre_rev2_grtt12.idv	-83608.3	1.603333	mute	fr	6.5	11	0	igrs.idv	idropmcdc.idv	1	19	SS	B	0	0
07lsp_path8_pre_rev2_tthbb.idv	1346.828	5	mute	nmc	16.5	21	0	igrs.idv	idropmcdc.idv	1	29	SS	B	0	0
07lsp_path8_pst_n2s_rev2_csbv1.idv	1626.765	0.25	mute	na	0	0	0	na	na	1	0	SS	B	0	0
07lsp_path8_pst_n2s_rev2_bg1m.idv	2185.266	1.683333	mute	na	0	0	0	na	na	1	0	SS	B	0	0
07lsp_path8_pst_n2s_rev2_grtt1.idv	-84091.6	1.616667	mute	fr	6.5	11	0	igrs.idv	idropmcdc.idv	1	19	SS	B	0	0
07lsp_path8_pst_n2s_rev2_bg12m.idv	-83563.6	1.59	mute	nmc	6.5	0	0	igrs.idv	na	1	0	MUS	B	15	19.5
07lsp_path8_pst_n2s_rev2_grtt12.idv	2693.828	1.603333	mute	fr	6.5	11	0	igrs.idv	idropmcdc.idv	1	19	SS	B	0	0
07lsp_path8_pst_n2s_rev2_tthbb.idv	1356.203	2	mute	nmc	16.5	21	0	igrs.idv	idropmcdc.idv	1	29	SS	B	0	0
07lsp_path8_pst_s2n_rev2_csbv1.idv	2224.875	1.683333	mute	na	0	0	0	na	na	1	0	MSS	B	0	0
07lsp_path8_pst_s2n_rev2_bg1m.idv	-83938.4	1.616667	mute	na	0	0	0	na	na	1	0	SS	B	0	0
07lsp_path8_pst_s2n_rev2_grtt1.idv	2392.203	1.616667	mute	fr	6.5	11	0	igrs.idv	idropmcdc.idv	1	19	SS	B	0	0
07lsp_path8_pst_s2n_rev2_bg12m.idv ¹	239.015	1.583333	mute	nmc	6.5	0	0	igrs.idv	na	1	0	US	D	9	96.5
07lsp_path8_pst_s2n_rev2_grtt12.idv	-83661.8	1.603333	mute	fr	6.5	11	0	igrs.idv	idropmcdc.idv	1	19	MUS	B	40	50
07lsp_path8_pst_s2n_rev2_tthbb.idv	1339.593	5	mute	nmc	16.5	21	0	igrs.idv	idropmcdc.idv	1	29	SS	B	0	0

Appendix F.3: Path 8 PSS/E Transient Simulation Summary Table

tag_lsppre	dtlo	timlo	lovlt	lobus	shdnvlt	wsvlt	ntlvlt	mcvlt	cuvt	rbvlt	xovlt	cs1g	cs2g	cs3g
07lsp_path8_pre_rev2_csbv1.idv	0	0	0.8167	62216LAVINAPM100	0	0	0	0	0	0	0	330	330	794.8
07lsp_path8_pre_rev2_bg1m.idv	0	0	0.8627	62250BGTMBERA161	0	0	0	0	0	0	0	330	330	794.8
07lsp_path8_pre_rev2_grtt1.idv	0	0	0.8201	40267CONKELLY230	0	0	0	0	0	0	0	330	330	794.8
07lsp_path8_pre_rev2_bg12m.idv	4.5	17.5	0.7817	62325DUCKCR-R161	0	0	0	0	0	0	0	330	330	794.8
07lsp_path8_pre_rev2_grtt12.idv	0	0	0.8255	40267CONKELLY230	0	0	0	0	0	0	0	330	330	794.8
07lsp_path8_pre_rev2_tthbb.idv	0	0	0.8914	66336SHERIDAN34.5	0	0	0	0	0	0	0	330	330	794.8
07lsp_path8_pst_n2s_rev2_csbv1.idv	0	0	0.8273	62216LAVINAPM100	0	0	0	0	0	0	0	330	330	698.5
07lsp_path8_pst_n2s_rev2_bg1m.idv	0	0	0.8233	62325DUCKCR-R161	0	0	0	0	0	0	0	330	330	698.5
07lsp_path8_pst_n2s_rev2_grtt1.idv	0	0	0.8471	40267CONKELLY230	0	0	0	0	0	0	0	330	330	698.5
07lsp_path8_pst_n2s_rev2_bg12m.idv	4.5	18	0.7827	62325DUCKCR-R161	0	0	0	0	0	0	0	330	330	698.5
07lsp_path8_pst_n2s_rev2_grtt12.idv	0	0	0.8526	40267CONKELLY230	0	0	0	0	0	0	0	330	330	698.5
07lsp_path8_pst_n2s_rev2_tthbb.idv	0	0	0.9029	66336SHERIDAN34.5	0	0	0	0	0	0	0	330	330	698.5
07lsp_path8_pst_s2n_rev2_csbv1.idv	0	0	0.8019	62218ROUNDUPM100	0	0	0	0	0	0	0	330	330	758.7
07lsp_path8_pst_s2n_rev2_bg1m.idv	0	0	0.8397	62095INVRGGN134.5	0	0	0	0	0	0	0	330	330	758.7
07lsp_path8_pst_s2n_rev2_grtt1.idv	0	0	0.8119	40267CONKELLY230	0	0	0	0	0	0	0	330	330	758.7
07lsp_path8_pst_s2n_rev2_bg12m.idv ¹	87.5	17.5	0.7127	62325DUCKCR-R161	0	0	0	0	0	0	0	330	330	758.7
07lsp_path8_pst_s2n_rev2_grtt12.idv	10	45	0.7804	66336SHERIDAN34.5	0	0	0	0	0	0	0	330	330	758.7
07lsp_path8_pst_s2n_rev2_tthbb.idv	0	0	0.8437	66336SHERIDAN34.5	0	0	0	0	0	0	0	330	330	758.7

Appendix F.3: Path 8 PSS/E Transient Simulation Summary Table

tag_lsppre	cs4g	cstot	mtnw	mtse	ytno	ytso	tot4a	tot4b	ytgen	mcp	wocs	woxo	atrt1	cs1t	cs1lt	atrt2	cs2t	cs2lt	atrt3
07lsp_path8_pre_rev2_csbv1.idv	821	2276.1	2215	-409	230	-55	400	344	180	195	2125	2310	0	0	0	0	0	0	15
07lsp_path8_pre_rev2_bg1m.idv	821	2276.1	2215	-409	230	-55	400	344	180	195	2125	2310	10	10	18.5	0	0	0	11
07lsp_path8_pre_rev2_grtt1.idv	821	2276.1	2215	-409	230	-55	400	344	180	195	2125	2310	10	10	18.5	0	0	0	11
07lsp_path8_pre_rev2_bg12m.idv	821	2276.1	2215	-409	230	-55	400	344	180	195	2125	2310	8	8	16.5	0	0	0	9
07lsp_path8_pre_rev2_grtt12.idv	821	2276.1	2215	-409	230	-55	400	344	180	195	2125	2310	9.2	9.2	17.7	0	0	0	10.2
07lsp_path8_pre_rev2_tthbb.idv	821	2276.1	2215	-409	230	-55	400	344	180	195	2125	2310	12.4	12.4	20.9	0	0	0	13.4
07lsp_path8_pst_n2s_rev2_csbv1.idv	812	2170.1	2215	-409	230	-55	400	344	180	195	2125	2310	0	0	0	0	0	0	0
07lsp_path8_pst_n2s_rev2_bg1m.idv	812	2170.1	2215	-409	230	-55	400	344	180	195	2125	2310	0	0	0	0	0	0	15
07lsp_path8_pst_n2s_rev2_grtt1.idv	812	2170.1	2215	-409	230	-55	400	344	180	195	2125	2310	10	10	18.5	0	0	0	0
07lsp_path8_pst_n2s_rev2_bg12m.idv	812	2170.1	2215	-409	230	-55	400	344	180	195	2125	2310	8.4	8.4	16.9	0	0	0	9.4
07lsp_path8_pst_n2s_rev2_grtt12.idv	812	2170.1	2215	-409	230	-55	400	344	180	195	2125	2310	9.2	9.2	17.7	0	0	0	10.2
07lsp_path8_pst_n2s_rev2_tthbb.idv	812	2170.1	2215	-409	230	-55	400	344	180	195	2125	2310	12.4	12.4	20.9	0	0	0	0
07lsp_path8_pst_s2n_rev2_csbv1.idv	823	2241.7	2215	-568	388	-153	454	451	242	195	2091	2342	0	0	0	0	0	0	15
07lsp_path8_pst_s2n_rev2_bg1m.idv	823	2241.7	2215	-568	388	-153	454	451	242	195	2091	2342	10	10	18.5	0	0	0	11
07lsp_path8_pst_s2n_rev2_grtt1.idv	823	2241.7	2215	-568	388	-153	454	451	242	195	2091	2342	10	10	18.5	0	0	0	11
07lsp_path8_pst_s2n_rev2_bg12m.idv ¹	823	2241.7	2215	-568	388	-153	454	451	242	195	2091	2342	8	8	16.5	0	0	0	9
07lsp_path8_pst_s2n_rev2_grtt12.idv	823	2241.7	2215	-568	388	-153	454	451	242	195	2091	2342	9.2	9.2	17.7	0	0	0	10.2
07lsp_path8_pst_s2n_rev2_tthbb.idv	823	2241.7	2215	-568	388	-153	454	451	242	195	2091	2342	12.4	12.4	20.9	0	0	0	13.4

Appendix F.3: Path 8 PSS/E Transient Simulation Summary Table

tag_lspre	cs3t	cs3lt	attr4	cs4t	cs4lt	algr1	att1	algr2	att2	algr3	att3	algr4	att4	iflt	swt1	idev1	swt2
07lsp_path8_pre_rev2_csbv1.idv	15	23.5	0	0	0	tdac	11		0		0		0	i3cs.idv	3	iopncsbv1.idv	3
07lsp_path8_pre_rev2_bg1m.idv	11	19.5	0	0	0	tdac	7		0		0		0	i3bv.idv	3	iopnbvgr1.idv	6.5
07lsp_path8_pre_rev2_grtt1.idv	11	19.5	0	0	0	tdac	7		0		0		0	i3gr.idv	0	igar_tft_byp12.idv	3
07lsp_path8_pre_rev2_bg12m.idv	9	17.5	9	9	17.5	oacc	5		0		0		0	i3bv.idv	3	iopnbvgr12.idv	3
07lsp_path8_pre_rev2_grtt12.idv	10.2	18.7	10.2	10.2	18.7	tdac	6.2		0		0		0	i3gr.idv	0	igar_tft_byp12.idv	3
07lsp_path8_pre_rev2_tthbb.idv	13.4	21.9	0	0	0	tdac	9.4		0		0		0	i1tt.idv	4	iopn1pttbb.idv	12
07lsp_path8_pst_n2s_rev2_csbv1.idv	0	0	0	0	0		0		0		0		0	i3cs.idv	3	iopncsbv1.idv	3
07lsp_path8_pst_n2s_rev2_bg1m.idv	15	23.5	0	0	0	tdac	11		0		0		0	i3bv.idv	3	iopnbvgr1.idv	6.5
07lsp_path8_pst_n2s_rev2_grtt1.idv	0	0	11	11	19.5	tdac	7		0		0		0	i3gr.idv	0	igar_tft_byp12.idv	3
07lsp_path8_pst_n2s_rev2_bg12m.idv	9.4	17.9	9.4	9.4	17.9	oacc	5.4		0		0		0	i3bv.idv	3	iopnbvgr12.idv	3
07lsp_path8_pst_n2s_rev2_grtt12.idv	10.2	18.7	10.2	10.2	18.7	tdac	6.2		0		0		0	i3gr.idv	0	igar_tft_byp12.idv	3
07lsp_path8_pst_n2s_rev2_tthbb.idv	0	0	13.4	13.4	21.9	acsp	9.4		0		0		0	i1tt.idv	4	iopn1pttbb.idv	12
07lsp_path8_pst_s2n_rev2_csbv1.idv	15	23.5	0	0	0	tdac	11		0		0		0	i3cs.idv	3	iopncsbv1.idv	3
07lsp_path8_pst_s2n_rev2_bg1m.idv	11	19.5	0	0	0	tdac	7		0		0		0	i3bv.idv	3	iopnbvgr1.idv	6.5
07lsp_path8_pst_s2n_rev2_grtt1.idv	11	19.5	0	0	0	tdac	7		0		0		0	i3gr.idv	0	igar_tft_byp12.idv	3
07lsp_path8_pst_s2n_rev2_bg12m.idv ¹	9	17.5	9	9	17.5	oacc	5		0		0		0	i3bv.idv	3	iopnbvgr12.idv	3
07lsp_path8_pst_s2n_rev2_grtt12.idv	10.2	18.7	10.2	10.2	18.7	tdac	6.2		0		0		0	i3gr.idv	0	igar_tft_byp12.idv	3
07lsp_path8_pst_s2n_rev2_tthbb.idv	13.4	21.9	0	0	0	tdac	9.4		0		0		0	i1tt.idv	4	iopn1pttbb.idv	12

Appendix F.3: Path 8 PSS/E Transient Simulation Summary Table

tag_lsppre	idev2	swt3	idev3	swt4	idev4	swt5	idev5	swt6	idev6	swt7	idev7	swt8	idev8	swt9
07lsp_path8_pre_rev2_csbv1.idv	iclrcs.idv	0	na	0	na	0	na	0	na	0	na	0	na	0
07lsp_path8_pre_rev2_bg1m.idv	igrs.idv	0	na	0	na	0	na	0	na	0	na	0	na	0
07lsp_path8_pre_rev2_grtt1.idv	iclgr2.idv	3	iopngrtt1	3	igar_tft_2_unby	6.5	igrs.idv	11	idropm	19	icurbars	0	na	0
07lsp_path8_pre_rev2_bg12m.idv	iclrbv.idv	10	idrophd.i	6.5	igrs.idv	0	na	0	na	0	na	0	na	0
07lsp_path8_pre_rev2_grtt12.idv	iopngrtt12_1.idv	6.5	igrs.idv	11	idropmcdc.idv	19	icurbars.idv	0	na	0	na	0	na	0
07lsp_path8_pre_rev2_tthbb.idv	iopnttbb.idv	12	iopngrtt1	12	iclrtt0.idv	16.5	igrs.idv	18	idroplit	18	idroplit	18	idroplit	18
07lsp_path8_pst_n2s_rev2_csbv1.idv	iclrcs.idv	0	na	0	na	0	na	0	na	0	na	0	na	0
07lsp_path8_pst_n2s_rev2_bg1m.idv	igrs.idv	0	na	0	na	0	na	0	na	0	na	0	na	0
07lsp_path8_pst_n2s_rev2_grtt1.idv	iclgr2.idv	3	iopngrtt1	3	igar_tft_2_unby	6.5	igrs.idv	11	idropm	19	icurbars	0	na	0
07lsp_path8_pst_n2s_rev2_bg12m.idv	iclrbv.idv	10	idrophd.i	6.5	igrs.idv	0	na	0	na	0	na	0	na	0
07lsp_path8_pst_n2s_rev2_grtt12.idv	iopngrtt12_1.idv	6.5	igrs.idv	11	idropmcdc.idv	19	icurbars.idv	0	na	0	na	0	na	0
07lsp_path8_pst_n2s_rev2_tthbb.idv	iopnttbb.idv	12	iopngrtt1	12	iclrtt0.idv	16.5	igrs.idv	18	idroplit	18	idroplit	18	idroplit	18
07lsp_path8_pst_s2n_rev2_csbv1.idv	iclrcs.idv	0	na	0	na	0	na	0	na	0	na	0	na	0
07lsp_path8_pst_s2n_rev2_bg1m.idv	igrs.idv	0	na	0	na	0	na	0	na	0	na	0	na	0
07lsp_path8_pst_s2n_rev2_grtt1.idv	iclgr2.idv	3	iopngrtt1	3	igar_tft_2_unby	6.5	igrs.idv	11	idropm	19	icurbars	0	na	0
07lsp_path8_pst_s2n_rev2_bg12m.idv ¹	iclrbv.idv	10	idrophd.i	6.5	igrs.idv	0	na	0	na	0	na	0	na	0
07lsp_path8_pst_s2n_rev2_grtt12.idv	iopngrtt12_1.idv	6.5	igrs.idv	11	idropmcdc.idv	19	icurbars.idv	0	na	0	na	0	na	0
07lsp_path8_pst_s2n_rev2_tthbb.idv	iopnttbb.idv	12	iopngrtt1	12	iclrtt0.idv	16.5	igrs.idv	18	idroplit	18	idroplit	18	idroplit	18

Appendix F.3: Path 8 PSS/E Transient Simulation Summary Table

tag_lsppre	idev9	swt10	idev10	wknqmx	bvqmx	grqmx
07lsp_path8_pre_rev2_csbv1.idv	na	0	na	0	0	0
07lsp_path8_pre_rev2_bg1m.idv	na	0	na	0	0	0
07lsp_path8_pre_rev2_grtt1.idv	na	0	na	0	0	0
07lsp_path8_pre_rev2_bg12m.idv	na	0	na	0	0	0
07lsp_path8_pre_rev2_grtt12.idv	na	0	na	0	0	0
07lsp_path8_pre_rev2_tthbb.idv	idroplit	18	idroplibE	0	0	0
07lsp_path8_pst_n2s_rev2_csbv1.idv	na	0	na	0	0	0
07lsp_path8_pst_n2s_rev2_bg1m.idv	na	0	na	0	0	0
07lsp_path8_pst_n2s_rev2_grtt1.idv	na	0	na	0	0	0
07lsp_path8_pst_n2s_rev2_bg12m.idv	na	0	na	0	0	0
07lsp_path8_pst_n2s_rev2_grtt12.idv	na	0	na	0	0	0
07lsp_path8_pst_n2s_rev2_tthbb.idv	idroplit	18	idroplibE	0	0	0
07lsp_path8_pst_s2n_rev2_csbv1.idv	na	0	na	0	0	0
07lsp_path8_pst_s2n_rev2_bg1m.idv	na	0	na	0	0	0
07lsp_path8_pst_s2n_rev2_grtt1.idv	na	0	na	0	0	0
07lsp_path8_pst_s2n_rev2_bg12m.idv ¹	na	0	na	0	0	0
07lsp_path8_pst_s2n_rev2_grtt12.idv	na	0	na	0	0	0
07lsp_path8_pst_s2n_rev2_tthbb.idv	idroplit	18	idroplibE	0	0	0