

Appendix A – Detailed Reactive Support Analysis

Table A.1 Detailed Reactive Support Analysis

Config #	Healy - Douglas #1 #2 138 KV		Healy - Douglas #1 #2 230 KV		Lorraine - Douglas #1 #2 230 KV		Gold Creek 138 230 KV		upgrade H - H - W, GH 230 KV		Healy - Doug Open End	No GVEA Import Reactor Size (MVAR)		Total Comp (MVAR)		SP #2 - 75 MW Import Reactor Size (MVAR)		WP #2 - 125 MW Import Reactor Size (MVAR)		Reactive Support Requirements (MVAR)																								
	Lorr	Doug	Lorr	Doug	Lorr	Doug	Lorr	Doug	Lorr	Doug		Lorr	Doug	Lorr	Doug	Lorr	Doug	Lorr	Doug	Lorr	Doug	Healy	Lorraine	Douglas	Sold Creel	Healy	Douglas	Sold Creel	Healy															
0	x				x								48	0	0	145	53	25	0	need voltage support	53	0	25	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
1	x				x								70	0	0	190	70	35	0	need voltage support	70	0	35	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2	x	x			x	x							76	0	0	218	76	55	5	need voltage support in GVEA at Wilson / Gold Hill	76	0	55	82	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3	x	x			x	x							70	0	0	103	76	27	0	need voltage support in GVEA at Wilson / Gold Hill	76	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4	x	x			x	x							70	0	0	245	81	50	27	60	10	27	81	0	50	87	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5	x	x			x	x							81	0	0	108	81	27	0	60	10	27	81	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6			x	x	x	x							121	0	0	461	121	55	85	90	5	55	121	0	55	185	85	16	90	31	5	235	0	0	0	0	0	0	0	0	0	0		
7			x	x	x	x							107	0	0	190	107	83	0	90	0	83	107	0	83	0	0	0	90	17	0	83	0	0	0	0	0	0	0	0	0	0	0	
8			x	x	x	x							115	0	0	490	115	60	100	110	5	100	115	0	60	184	100	31	110	5	239	0	0	0	0	0	0	0	0	0	0	0	0	0
9			x	x	x	x							99	0	0	193	99	92	3	90	0	88	99	0	92	0	3	0	90	9	0	88	4	3	0	0	0	0	0	0	0	0	0	0



Appendix B – Detailed Dynamic Results

Table B.1 Summer Valley – Dispatch #2, HCCP offline

Case	Upgrade	Healy Flows (MW)		Healy Gen Output (MW)	Wilson-Ft_WW@Wilson	North_Pole-Ft_WW@North_Pole	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lorraine	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP
		Import	Export*		a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4
HCCP offline (g2)	0	30	71	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		35	76	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		40	81	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		45	86	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		50	91	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		55	96	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
	1	30	71	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		35	76	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		40	81	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		45	86	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		50	91	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		55	96	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
	3	30	71	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		35	76	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		40	81	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		45	86	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		50	91	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		55	96	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
		60	101	47	x	x	x	x	x	x	x	x	x	x	x					x	x	
	65	106	47	x	x	x	x	x	x	x	x	x	x	x					x	x		
	5	30	71	47	x	x	x	x	x	x	x					x	x	x	x	x	x	
		35	76	47	x	x	x	x	x	x	x					x	x	x	x	x	x	
		40	81	47	x	x	x	x	x	x	x					x	x	x	x	x	x	
		45	86	47	x	x	x	x	x	x	x					x	x	x	x	x	x	
50		91	47	x	x	x	x	x	x	x					x	x	x	x	x	x		
55		96	47	x	x	x	x	x	x	x					x	x	x	x	x	x		
60		101	47	x	x	x	x	x	x	x					x	x	x	x	x	x		
65	106	47	x	x	x	x	x	x	x					x	x	x	x	x	x			
		marginal	unstable																			

Table B.2 Summer Valley – Dispatch #3, Healy #1 at Min

Case	Upgrade	Healy Flows (MW)		Healy Gen Output (MW)	Wilson-Ft_WW@Wilson	North_Pole-Ft_WW@North_Pole	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lorraine	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP
		Import	Export*		a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4
		Healy at Min (g3)	0		60	72	18	x	x	x	x	x	x	x	x	x	x	x				
65	77			18	x	x	x	x	x	x	x	x	x	x	x					x	x	
70	82			18	x	x	x	x	x	x	x	x	x	x	x					x	x	
75	87			18	x	x	x	x	x	x	x	x	x	x	x					x	x	
80	92			18	x	x	x	x	x	x	x	x	x	x	x					x	x	
85	97			18	x	x	x	x	x	x	x	x	x	x	x					x	x	
1	60		72	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	65		77	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	70		82	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	75		87	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	80		92	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	85		97	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
3	60		72	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	65		77	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	70		82	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	75		87	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	80		92	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	85		97	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	90		102	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
	95		107	18	x	x	x	x	x	x	x	x	x	x	x					x	x	
5	60		72	18	x	x	x	x	x	x	x					x	x	x	x	x	x	
	65		77	18	x	x	x	x	x	x	x					x	x	x	x	x	x	
	70		82	18	x	x	x	x	x	x	x					x	x	x	x	x	x	
	75		87	18	x	x	x	x	x	x	x					x	x	x	x	x	x	
	80	92	18	x	x	x	x	x	x	x					x	x	x	x	x	x		
	85	97	18	x	x	x	x	x	x	x					x	x	x	x	x	x		
	90	102	18	x	x	x	x	x	x	x					x	x	x	x	x	x		
	95	107	18	x	x	x	x	x	x	x					x	x	x	x	x	x		
100	112	18	x	x	x	x	x	x	x					x	x	x	x	x	x			
		marginal	unstable		potential voltage problems										simulations ended							

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Table B.4 Summer Peak – Dispatch #1, Healy Generation at Full Output

Case	Upgrade Case #	Healy Flows (MW)		Healy Gen Output (MW)	Wilson-Ft_WW@Wilson	North_Pole-Ft_WW@North_Pole	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lorraine	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP			
		Import	Export*		a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4			
																								g0	g3
Healy full output (g1)	0	50	145	103	x	x	x	x	x	x	x	x	x	x	x						x	x	x		
		55	150	103	x	x	x	x	x	x	x	x	x	x	x	x						x	x	x	
		60	155	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		65	160	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		70	165	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		75	170	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		80	175	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		85	180	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	1	50	145	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		55	150	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		60	155	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		65	160	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		70	165	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		75	170	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		80	175	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		85	180	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	3	50	145	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		55	150	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		60	155	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		65	160	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		70	165	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		75	170	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		80	175	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
		85	180	103	x	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	5	50	145	103	x	x	x	x	x	x	x	x											x	x	x
		55	150	103	x	x	x	x	x	x	x	x											x	x	x
		60	155	103	x	x	x	x	x	x	x	x											x	x	x
		65	160	103	x	x	x	x	x	x	x	x											x	x	x
70		165	103	x	x	x	x	x	x	x	x											x	x	x	
75		170	103	x	x	x	x	x	x	x	x											x	x	x	
80		175	103	x	x	x	x	x	x	x	x											x	x	x	
85		180	103	x	x	x	x	x	x	x	x											x	x	x	
90		185	103	x	x	x	x	x	x	x	x											x	x	x	
95		190	103	x	x	x	x	x	x	x	x											x	x	x	
100		195	103	x	x	x	x	x	x	x	x											x	x	x	
105		200	103	x	x	x	x	x	x	x	x											x	x	x	
110	205	103	x	x	x	x	x	x	x	x											x	x	x		
115	210	103	x	x	x	x	x	x	x	x											x	x	x		
120	214	102	x	x	x	x	x	x	x	x											x	x	x		
125	219	102	x	x	x	x	x	x	x	x											x	x	x		
		marginal	unstable		potential voltage problems												simulations ended								

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Table B.5 Summer Peak – Dispatch #2, HCCP Offline

Case	Upgrade Case #	Healy Flows (MW)		Healy Gen Output (MW)	Wilson-Ft_WW@Wilson	North_Pole-Ft_WW@Nor	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lor	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP	
		Import	Export*		a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4	
HCCP offline (g2)	0	75	115	48	x	x	x	x	x	x	x	x	x	x						x	x		
		80	120	48	x	x	x	x	x	x	x	x	x	x						x	x		
		85	125	48	x	x	x	x	x	x	x	x	x	x						x	x		
		90	130	48	x	x	x	x	x	x	x	x	x	x						x	x		
		95	135	48	x	x	x	x	x	x	x	x	x	x						x	x		
	1	75	115	48	x	x	x	x	x	x	x	x	x	x							x	x	
		80	120	48	x	x	x	x	x	x	x	x	x	x							x	x	
		85	125	48	x	x	x	x	x	x	x	x	x	x							x	x	
		90	130	48	x	x	x	x	x	x	x	x	x	x							x	x	
		95	135	48	x	x	x	x	x	x	x	x	x	x							x	x	
		100	140	48	x	x	x	x	x	x	x	x	x	x							x	x	
	3	75	115	48	x	x	x	x	x	x	x	x	x	x							x	x	
		80	120	48	x	x	x	x	x	x	x	x	x	x							x	x	
		85	125	48	x	x	x	x	x	x	x	x	x	x							x	x	
		90	130	48	x	x	x	x	x	x	x	x	x	x							x	x	
		95	135	48	x	x	x	x	x	x	x	x	x	x							x	x	
		100	140	48	x	x	x	x	x	x	x	x	x	x							x	x	
		105	144	47	x	x	x	x	x	x	x	x	x	x							x	x	
		110	150	48	x	x	x	x	x	x	x	x	x	x							x	x	
		115	155	48	x	x	x	x	x	x	x	x	x	x							x	x	
	120	159	47	x	x	x	x	x	x	x	x	x	x							x	x		
	125	165	48	x	x	x	x	x	x	x	x	x	x							x	x		
	5	75	115	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		80	120	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		85	125	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		90	130	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		95	135	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		100	140	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		105	144	47	x	x	x	x	x	x	x						x	x	x	x	x	x	
		110	150	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		115	155	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		120	159	47	x	x	x	x	x	x	x						x	x	x	x	x	x	
		125	165	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		130	169	47	x	x	x	x	x	x	x						x	x	x	x	x	x	
		135	175	48	x	x	x	x	x	x	x						x	x	x	x	x	x	
		140	179	47	x	x	x	x	x	x	x						x	x	x	x	x	x	
		145	184	47	x	x	x	x	x	x	x						x	x	x	x	x	x	
	150	189	47	x	x	x	x	x	x	x						x	x	x	x	x	x		
	155	195	48	x	x	x	x	x	x	x						x	x	x	x	x	x		

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Table B.6 Summer Peak – Dispatch #3, Healy #1 at Min

Case	Upgrade Case #	Healy Flows (MW)		Healy Gen Output (MW)	Wilson-Ft_WW@Wilson	North_Pole-Ft_WW@North_Pole	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lorraine	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP	
		Import	Export*		a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4	
		Healy at Min (g3)	0		75	85	18	x	x	x	x	x	x	x	x	x	x	x					
80	90			18	x	x	x	x	x	x	x	x	x	x	x							x	x
85	95			18	x	x	x	x	x	x	x	x	x	x	x							x	x
90	100			18	x	x	x	x	x	x	x	x	x	x	x							x	x
95	105			18	x	x	x	x	x	x	x	x	x	x	x							x	x
1	75		85	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	80		90	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	85		95	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	90		100	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	95		105	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	100		110	18	x	x	x	x	x	x	x	x	x	x	x							x	x
3	75		85	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	80		90	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	85		95	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	90		100	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	95		105	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	100		110	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	105		115	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	110		120	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	115		125	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	120		130	18	x	x	x	x	x	x	x	x	x	x	x							x	x
5	75		85	18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x
	80		90	18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x
	85		95	18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x
	90		100	18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x
	95		105	18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x
	100		110	18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x
	105		115	18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x
110	120		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
115	125		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
120	130		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
125	135		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
130	140		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
135	145		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
140	150		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
145	155		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
150	160		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	
155	165		18	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	

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Table B.7 Winter Peak – Dispatch #1, Healy Generation at Full Output

Case	Upgrade Case #	Healy Flows (MW)		Healy Gen Output (MW)	Wilson-Ft_WW@Wilson	North_Pole-Ft_WW@North_Pole	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lorraine	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP		
		Import	Export*		a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4		
		Healy full output (g1)	0		65	161	104	x	x	x	x	x	x	x	x	x	x	x						x
70	166			104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
75	171			104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
80	176			104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
85	181			104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
90	186			104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
95	191			104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
100	195		103	x	x	x	x	x	x	x	x	x	x	x							x	x	x	
1	65		161	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	70		166	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	75		171	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	80		176	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	85		181	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	90		186	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	95		191	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
100	195		103	x	x	x	x	x	x	x	x	x	x	x							x	x	x	
3	65		161	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	70		166	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	75		171	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	80		176	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	85		181	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	90		186	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
	95		191	104	x	x	x	x	x	x	x	x	x	x	x							x	x	x
100	195		103	x	x	x	x	x	x	x	x	x	x	x							x	x	x	
5	65		161	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x
	70		166	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x
	75		171	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x
	80		176	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x
	85	181	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	90	186	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	95	191	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	100	195	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	105	201	104	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	110	205	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	115	210	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	120	215	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	125	220	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	130	225	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x	
135	230	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x		
140	235	103	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x		
145	239	102	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x		
150	244	102	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x		
155	249	102	x	x	x	x	x	x	x					x	x	x	x	x	x	x	x	x		

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Table B.8 Winter Peak – Dispatch #2, HCCP Offline

Case	Upgrade Case #	lealy Flows (MW)		Healy Gen Output (MW)	Generator/Source																		
		Import	Export*		Wilson-Ft_WW@Wilson	North_Pole_Ft_WW@North_Pole	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lorraine	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP	
					a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4	
HCCP offline (g2)	0	75	117	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
		80	122	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		85	127	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		90	132	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		95	136	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		100	142	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
	105	147	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	1	75	117	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		80	122	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		85	127	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		90	132	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		95	136	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		100	142	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
	105	147	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	3	75	117	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		80	122	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		85	127	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
		90	132	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x
95		136	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
100		142	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
105		147	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
110		151	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
115		157	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
120		161	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
5	75	117	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	80	122	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	85	127	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	90	132	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	95	136	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	100	142	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	105	147	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	110	151	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	115	157	50	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
	120	161	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	
125	166	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		
130	171	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		
135	176	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		
140	181	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		
145	186	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		
150	191	49	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		
155	195	48	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		

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Table B.9 Winter Peak – Dispatch #3, Healy #1 at Min

Case	Upgrade Case #	Healy Flows (MW)		Healy Gen Output (MW)	Wilson-Ft_WW@Wilson	North_Pole-Ft_WW@North_Pole	Douglas-Healy@Douglas	Douglas-Healy@Healy	Lorraine-West_Term@Lorraine	Lorraine-Douglas@Lorraine	Lorraine-Douglas@Douglas	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	Eva_Creek-Healy@Healy	Eva_Creek-Healy@Eva	Eva_Creek-Wilson@Eva	Gold_Hill-Healy@Healy	NPCC1	HEALY	HCCP	
		Import	Export*		a0	a1	a2	a3	a4	a5	a6	b0	b1	b2	b3	u0	u1	u2	u3	g0	g3	g4	
Healy at Min (g3)	0	75	85	18	x	x	x	x	x	x	x	x	x	x	x						x	x	
		80	90	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		85	95	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		90	100	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		95	105	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	1	75	85	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		80	90	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		85	95	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		90	100	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		95	105	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		100	110	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	3	75	85	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		80	90	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		85	95	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		90	100	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		95	105	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		100	110	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		105	115	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		110	120	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		115	125	18	x	x	x	x	x	x	x	x	x	x	x							x	x
		120	130	18	x	x	x	x	x	x	x	x	x	x	x							x	x
	5	75	85	18	x	x	x	x	x	x	x	x										x	x
		80	90	18	x	x	x	x	x	x	x	x										x	x
		85	95	18	x	x	x	x	x	x	x	x										x	x
		90	100	18	x	x	x	x	x	x	x	x										x	x
		95	105	18	x	x	x	x	x	x	x	x										x	x
		100	110	18	x	x	x	x	x	x	x	x										x	x
		105	115	18	x	x	x	x	x	x	x	x										x	x
		110	120	18	x	x	x	x	x	x	x	x										x	x
		115	125	18	x	x	x	x	x	x	x	x										x	x
		120	130	18	x	x	x	x	x	x	x	x										x	x
	125	135	18	x	x	x	x	x	x	x	x										x	x	
	130	140	18	x	x	x	x	x	x	x	x										x	x	
	135	145	18	x	x	x	x	x	x	x	x										x	x	
	140	150	18	x	x	x	x	x	x	x	x										x	x	
	145	155	18	x	x	x	x	x	x	x	x										x	x	
	150	160	18	x	x	x	x	x	x	x	x										x	x	
	155	165	18	x	x	x	x	x	x	x	x										x	x	

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Appendix C – Detailed Power Flow Results

Table C.1 Power Flow Results – Summer Valley

Case	Trans Config	Healy Flows (MW)		Healy Gen	Outage			Volt (kV)	Overload			Volt (kV)	Rating (MVA)	% Rating
		Import	Export*		From Bus	To Bus	ID		From Bus	To Bus	ID			
HCCP offline (g2)	3	65	106	47	Ft. WW	N. Pole	1	138	Ft. WW Sub	FTWP Tap	1	69	46	105
									Ft. WP Tap	Badger Tap	1	69	46	105
Healy at Min (g3)	3	100	112	18	Ft. WW	N. Pole	1	138	Ft. WW Sub	FTWP Tap	1	69	46	105
									Ft. WP Tap	Badger Tap	1	69	46	105

Table C.2 Power Flow Results – Summer Peak

Case	Trans. Config	Healy Flows		Healy Gen	Outage			Volt (kV)	Overload			Volt (kV)	Rating (MVA)	% Rating		
		Import	Export*		From Bus	To Bus	ID		From Bus	To Bus	ID					
Healy full output (g1)	3	75	165	103	base case				Hamilton	FTWW	1	69	46	105		
					Eva Creek	Wilson	1	138	Nenana bus voltage = 0.9225 pu							
					Wilson	Ft. WW	1	138	Gold Hill XFMR	1	138/69	112	143			
									Gold Hill	Aurora	1	69	68	129		
									Aurora	Zehnder	1	69	68	118		
									FTWW XFMR		1	138/69	100	101		
					N. Pole Ind	Carney	1	138	Hwy Park	Dawson	1	69	57	103		
									FTWW Sub	FTWP Tap	1	69	66	109		
									FT. WW XFMR	1	138/69	Gold Hill XFMR	1	138/69	112	106
												FTWW XFMR	1	138/69	100	138
HCCP offline (g2)	3	110	150	48	base case				Hamilton	FTWW	1	69	46	105		
					Eva Creek	Wilson	1	138	Nenana bus voltage = 0.9322 pu							
					Wilson	Ft. WW	1	138	Gold Hill XFMR	1	138/69	110	129			
									Gold Hill	Aurora	1	69	68	117		
									Aurora	Zehnder	1	69	68	107		
									Hwy Park	Dawson	1	69	57	101		
					N. Pole Ind	Carney	1	138	FTWW Sub	FTWP Tap	1	69	66	104		
									FT. WW XFMR	1	138/69	Gold Hill XFMR	1	138/69	112	105
												FTWW XFMR	1	138/69	100	137
									Gold Hill XFMR	1	138/69	Zehnder	Hamilton	1	69	68
HCCP, Healy, and Eva Creek offline (g3)	3	130	140	18	base case				Hamilton	FTWW	1	69	46	107		
					Wilson	Ft. WW	1	138	Gold Hill XFMR	1	138/69	112	121			
									Gold Hill	Aurora	1	69	68	125		
					N. Pole Ind	Carney	1	138	Hwy Park	Dawson	1	69	57	103		
									FT. WW XFMR	1	138/69	Gold Hill XFMR	1	138/69	112	103
												FTWW XFMR	1	138/69	100	135
				Gold Hill XFMR	1	138/69	Hamilton	Ft WW	1	69	46	105				
Low 69 kV voltages between 0.95 and 0.946																

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Table C.3 Power Flow Results – Winter Peak

Case	Trans. Config	Healy Flows		Healy Gen	Outage			Volt (kV)	Overload			Volt (kV)	Rating (MVA)	% Rating	
		Import	Export*		From Bus	To Bus	ID		From Bus	To Bus	ID				
Healy full output (g1)	3	65	161	104	base case				FTWW XFMR			1	138/69	100	103
					Eva Creek	Wilson	1	138	Nenana bus voltage = 0.9126 pu						
					Healy	Nenana	1	138	Hamilton	Ft WW	1	69	66	106	
					Nenana	Ester	1	138	Hamilton	Ft WW	1	69	66	106	
					Ester	Gold Hill	1	138	Hamilton	Ft WW	1	69	66	105	
					Wilson	Ft. WW	1	138	Gold Hill XFMR	1	138/69	112	139		
					N. Pole Ind	Carney	1	138	Carney XFMR	1	138/69	30	138		
					FT. WW XFMR	1	138/69	Hwy Park Dawson	1	69	57	119			
					Gold Hill XFMR	1	138/69	Gold Hill XFMR	1	138/69	112	131			
					Low 69 kV voltages between 0.95 and 0.86										
Hamilton Ft WW 1 69 66 168															
Low 69 kV voltages between 0.95 and 0.92															
HCCP offline (g2)	3	100	142	50	base case				FTWW XFMR			1	138/69	100	101
					Eva Creek	Wilson	1	138	Nenana bus voltage = 0.9409 pu						
					Healy	Nenana	1	138	Hamilton	Ft WW	1	69	66	105	
					Nenana	Ester	1	138	Low 138 kV voltage at Eva Creek = 0.9376						
					Ester	Gold Hill	1	138	Hamilton	Ft WW	1	69	66	105	
					Gold Hill	Wilson	1	138	Hamilton	Ft WW	1	69	66	104	
					Wilson	Ft. WW	1	138	Gold Hill XFMR	1	138/69	112	121		
					N. Pole Ind	Carney	1	138	Hwy Park Dawson	1	69	57	118		
					FT. WW XFMR	1	138/69	Carney XFMR	1	138/69	30	140			
					Gold Hill XFMR	1	138/69	Low 69 kV voltages between 0.95 and 0.94							
Gold Hill XFMR 1 138/69 112 127															
Low 69 kV voltages between 0.95 and 0.89															
Hamilton Ft WW 1 69 66 167															
Low 69 kV voltages between 0.95 and 0.92															
HCCP, Healy, and Eva Creek offline (g3)	3	125	135	18	base case				FTWW XFMR			1	138/69	100	101
					Healy	Eva Creek	1	138	Nenana bus voltage = 0.9450 pu						
					Eva Creek	Wilson	1	138	Nenana bus voltage = 0.9398 pu						
					Healy	Nenana	1	138	Hamilton	Ft WW	1	69	66	105	
					Nenana	Ester	1	138	Low 138 kV voltage at Eva Creek = 0.9376						
					Ester	Gold Hill	1	138	Hamilton	Ft WW	1	69	66	105	
					Gold Hill	Wilson	1	138	Hamilton	Ft WW	1	69	66	104	
					Wilson	Ft. WW	1	138	Gold Hill XFMR	1	138/69	112	114		
					N. Pole SubN. Pole Ind	1	138	Hamilton	Ft WW	1	69	66	101		
					N. Pole Ind	Carney	1	138	Hwy Park Dawson	1	69	57	119		
FT. WW XFMR	1	138/69	Carney XFMR	1	138/69	30	138								
Gold Hill XFMR	1	138/69	Low 69 kV voltages between 0.95 and 0.94												
Gold Hill XFMR 1 138/69 112 125															
Low 69 kV voltages between 0.95 and 0.89															
Hamilton Ft WW 1 69 66 167															
Low 69 kV voltages between 0.95 and 0.92															

Appendix D – Transmission Configuration Single Line Drawings

Table D.1 – Transmission Configuration #0

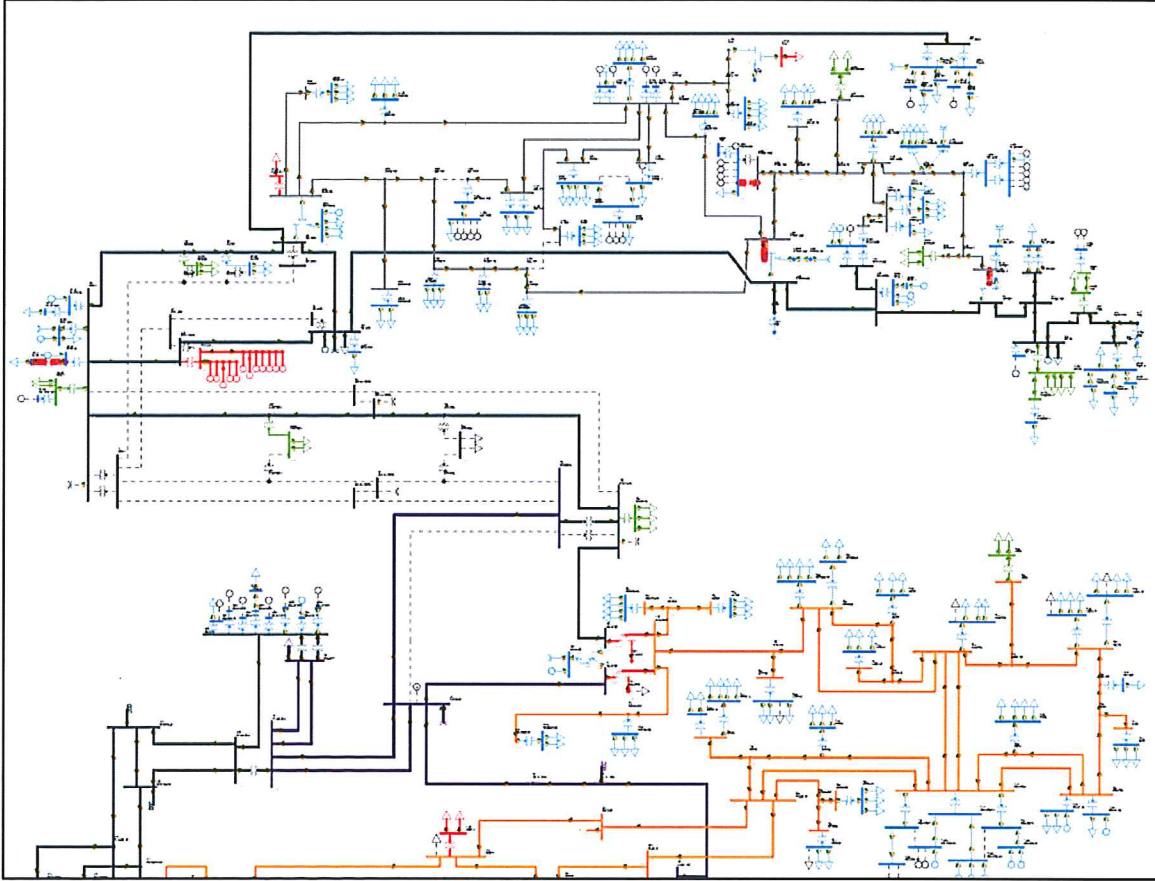


Table D.2 – Transmission Configuration #1

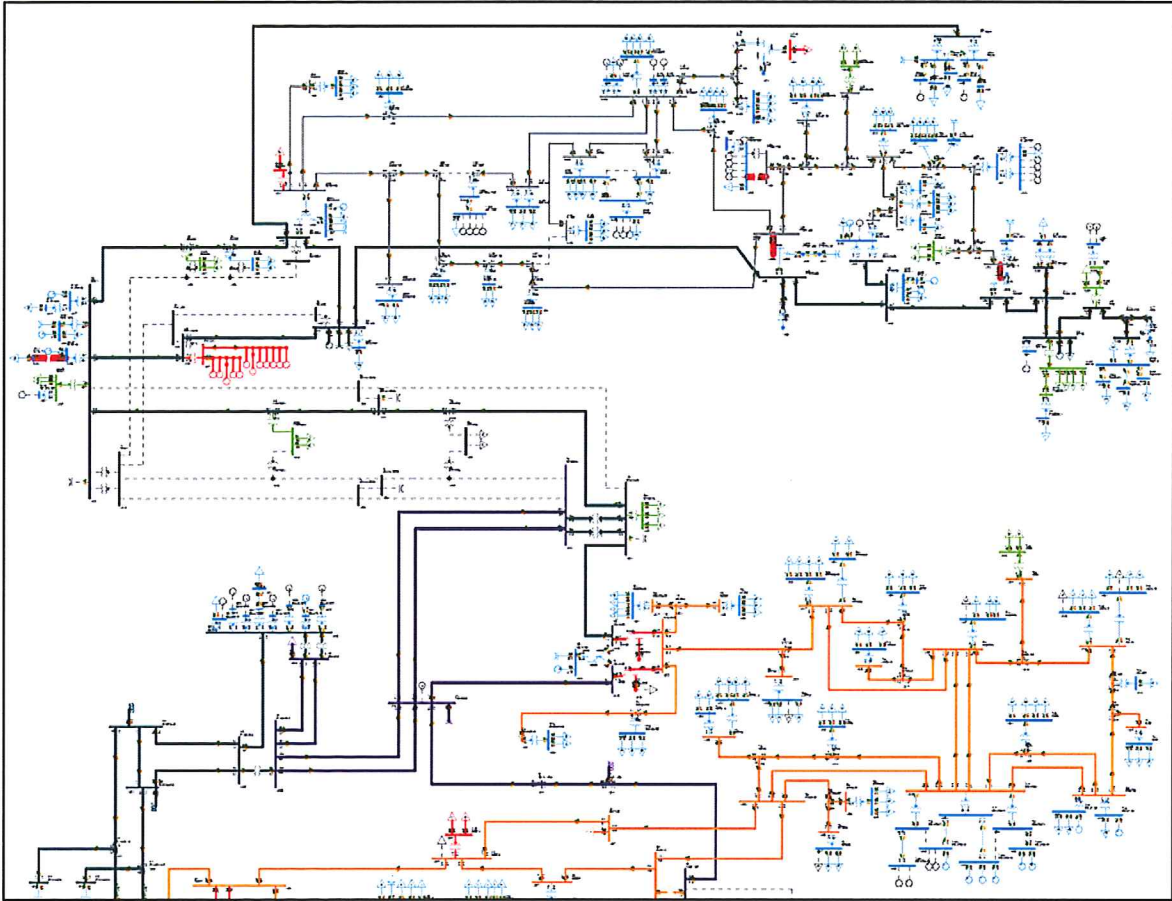


Table D.3 – Transmission Configuration #3

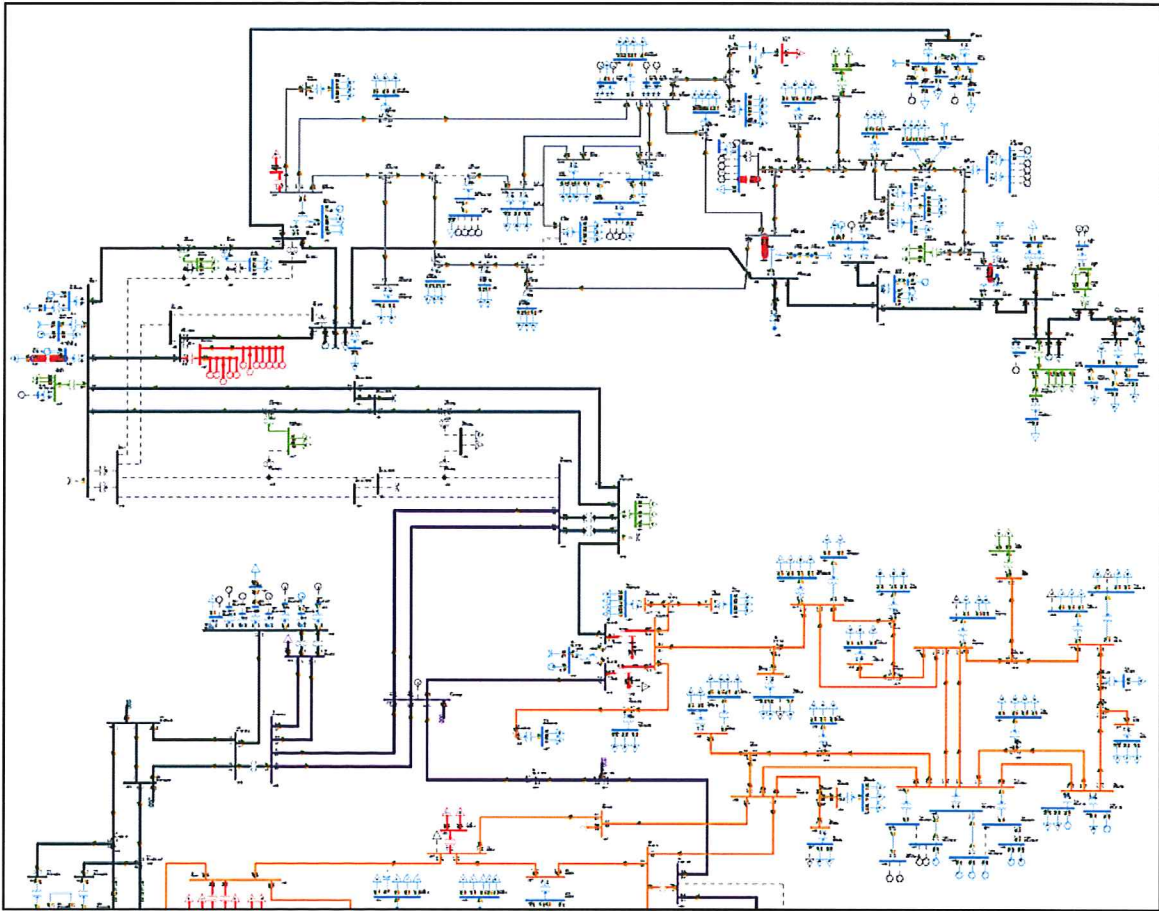


Table D.4 – Transmission Configuration #5

