

APPENDIX A INTERCONNECTION QUEUE

Table A-1: Generation Interconnection Queue

Position	Project Number	Project Name	Planning Area	Generation (MW)	Type
1	502	Kettles Hill Wind Farm- Expansion	53	77	Wind
2	518	Confidential Wind Project	42	75	Wind
3	519	Old Man River Wind Farm	53	47	Wind
4	393	VisionQuest Summerview Ph. 2 Wind Farm	53	63	Wind
5	376	VisionQuest Bluetrail Wind Farm	53	66	Wind
6	513	Confidential Wind Project	4	116	Wind
7	509	Yagos Wind Farm	53	100	Wind
8	524	River View Wind Power Plant	53	115	Wind
9	510	HWY 785 Wind Plant	53	235	Wind
10	462	Castle Rock Ridge Wind Power	53	112	Wind
12	392	VisionQuest - Waterton Wind Farm	55	300	Wind
14	389	VisionQuest Seven Persons Wind Farm	4	120	Wind
16	444	MEG Energy 240 kV Interconnection	25	75	Cogen
17	475	Syncrude G11, G12, G21 Upgrade	25	no change	
19	469	Confidential Wind Project	53	99	Wind
20	515	Confidential Wind Project	53	350	Wind
21	505	Confidential Wind Project	55	110	Wind
22	479	Wild Rose Wind Project Phase 1	48	200	Wind
23	496	Suncor Firebag Stage 3	25	170	
25	500	TransAlta Keephills 3	40	450	Coal
29	465	Luscar Bow City Power Project	47	1050	Coal
31	514	Confidential Wind Project	52	80	Wind
36	534	Confidential Wind Project	4	75	Wind
40	557	Confidential Gas Project	19	370	Gas
42	581	Confidential Wind Project	53	49.5	Wind
44	580	Confidential Wind Project	53	61.2	Wind
47	590	Windcor Buffalo Atlee Wind Farm	48	99	Wind
48	593	Epcor Clover Bar Peaker	60	246	Gas
53	614	Confidential Wind Project	53	100	Wind
56	617	Confidential Wind Project	47	100	Wind
58	622	Confidential Wind Project	55	120	Wind
61	634	Confidential Wind Project	43	99	Wind
62	635	Confidential Wind Project	43	79.5	Wind
65	656	TransAlta Sundance 5 Upgrade	40	53	Coal
68	678	Confidential Wind Project	42	80	Wind
71	672	Grande Prairie Generation Northern Prairie Power Project	20	93	Gas
74	679	Confidential Wind Project	55	99	Wind
75	680	Confidential Wind Project	45	70.5	Wind
76	681	Confidential Wind Project	53	99	Wind
77	STS	Confidential STS Project	56	10	STS
79	STS	Confidential STS Project	25	80	STS

Position	Project Number	Project Name	Planning Area	Generation (MW)	Type
82	689	Confidential Wind Project	52	15	Wind
83	690	Confidential Wind Project	55	60	Wind
84	691	Confidential Wind Project	53	30	Wind
85	692	DAPP Power Westlock Expansion	27	12	Gas
86	STS	Confidential STS Project	43	29.9	STS
87	STS	Confidential STS Project	43	29.9	STS
88	693	Confidential Wind Project	4	200	Wind
90	695	Greengate Stirling Wind Farm	54	100	Wind
95	703	Maxim Power Skaro Peaking Station	33	180	Gas
96	707	Suncor Energy Firebag SAGD Project Stage 4	25	no change	
97	718	Greengate Wintering Hills Wind Project	42	150	Wind
105	715	Confidential Wind Project	4	79.5	Wind
106	716	Confidential Wind Project	20	79.5	Wind
108	STS	Confidential STS Project	40	25	STS
109	719	ENMAX 1200 MW Generation Project	6	1200	Gas
113	723	Greengate Halkirk Wind Project	42	150	Wind
114	727	City of Medicine Hat Generator Upgrade	4	no change	
115	728	Greengate Blackspring Ridge Wind Project	49	300	Wind
117	729	Confidential Wind Project	4	700	Wind
119	731	Confidential Wind Project	60	150	Wind
120	738	Confidential Gas Project	6	370	Gas
122	739	Confidential Gas Project	27	82	Gas
124	740	Confidential Wind Project	52	150	Wind
173	741	Confidential Gas Project	25	85	Gas
174	742	Confidential Wind Project	53	120	Wind
175	743	Greengate Pine Lake Wind Farm	35	100	Wind
176	744	TransCanada Saddlebrook Generating Station	46	350	Gas
177	745	Confidential Gas Project	46	200	Gas
179	747	Maxim Power Milner Unit II	22	475	Coal
180	749	Confidential Gas Project	46	90	Gas
181	750	Confidential Wind Project	53	25	Wind
182	751	Confidential Wind Project	55	100	Wind
183	752	Confidential Wind Project		100	Wind
184	753	Confidential Wind Project	43	130	Wind
185	754	Confidential Wind Project	4	300	Wind
188	756	Confidential Wind Project	52	40	Wind
189	757	Greengate Chigwell Wind Project	35	150	Wind
190	758	Confidential Wind Project	42	102	Wind
191	759	Confidential Wind Project	42	102	Wind
192	760	Confidential Wind Project	45	102	Wind
193	761	Confidential Wind Project	49	102	Wind
195	762	Confidential Wind Project	48	200	Wind

Position	Project Number	Project Name	Planning Area	Generation (MW)	Type
196	763	Confidential Wind Project	42	200	Wind
197	764	Confidential Wind Project	42	150	Wind
198	765	Confidential Wind Project	4	150	Wind
199	766	Confidential Wind Project	54	100	Wind
200	767	Confidential Wind Project	55	300	Wind
203	770	Greengate Power Corp. Blackspring Ridge Phase II	49	300	Wind
205	773	Confidential Wind Project	43	210	Wind
211	780	Confidential Gas Project	6	110	Cogen
212	781	Confidential Project	25	1000-1500	Hydro
213	782	Confidential Gas Project	39	123	Gas
215	STS	Confidential STS Project	40	54	STS
216	790	Confidential Wind Project	37	400	Wind
217	788	Confidential Generation Project	33	63	
218	789	Confidential Wind Project	26	130	Wind
222	796	Confidential Wind Project	43	2	Wind
224	798	Confidential Wind project	42	2	Wind
225	800	Confidential Wind project	26	200	Wind
227	802	Confidential Wind Project	4	240	Wind
228	799	Confidential Wind project	49	299	Wind
229	803	Confidential Biomass Project	18	30	Biomass
231	805	Greengate Power Halkirk II Wind Project	42	150	Wind
238	816	Confidential Biomass Project	20	150	Biomass
239	818	Confidential Wind Project	20	250	Wind
240	819	Confidential Wind Project	20	500	Wind
250	830	Glacier Power Dunvegan Hydro Electric Project	33	100	Hydro
253	432	Nexen Long Lake Interconnection	25	120	Steam
258	841	Confidential Project	6	45	Gas
260	845	Confidential Wind Project	45	102	Wind
261	843	AlterNRG Bruderheim Generating Facility	60	120	Gas/Steam
262	844	TransAlta Sundance Unit 3 Upgrades	40	53	Coal
263	847	Confidential Wind Project	42	60	Wind
264	848	TransAlta Keephills 1 Uprate	40	35	Coal
265	849	TransAlta Keephills 2 Uprate	40	35	Coal
267	852	Confidential Generation Project	26	344	Combined Cycle
269	854	TransAlta Ardenville Wind Farm	53	66	Wind
271	856	Confidential Gas Project	54	175.32	Gas
275	860	TransAlta Tempest Wind Farm	52	289.5	Wind
283	868	Confidential Steam Project	25	85	
286	875	Confidential Wind Farm	42	100	Wind
287	876	Confidential Wind Farm	42	100	Wind
288	877	Confidential Wind Farm	29	100	Wind

* Wind generations in south region are highlighted.

APPENDIX B EXISTING SYSTEM POWER FLOW ANALYSIS

Table B-1: Summary of Existing 2008 South Planning Analysis

Figure No.	Contingency	Overloaded Element	Percentage	Other System Performance Concerns
Fig Existing-SL-1	Summer Light Generation Dispatch			
Fig Existing-SL-2/3	SL All Elements in Service	170L Coleman 799S to Natal	108%	None
Fig Existing-SL-4/5	Peigan 59S 240/138kV Transformer T1	170L Peigan 59S to Ft. Macleod 15S ¹	111%	None
		170L Coleman 799S to 170AL Tap	107%	
		170L Coleman 799S to Natal	125%	
Fig Existing-SL- 6/7	170L Peigan 59S to Ft. Macleod 15S	725L Bowron 674S to 725BL Tap ¹	107%	None
		170L Coleman 799S to Natal	116%	
Fig Existing-SL- 8/9	170L Peigan 59S to Kettle's Hill 383S	170L Pincher Creek 396S to 170AL Tap	108%	None
		170L Coleman 799S to 170AL Tap	141%	
		170L Coleman 799S to Natal	166%	
Fig Existing-SL- 10/11	170L Coleman 799S to 170AL Tap	170L Peigan 59S to Ft. Macleod 15S ¹	106%	None
		170L Peigan 59S to Kettle's Hill 383S	125%	
Fig Existing-SL- 12/13	863L Riverbend 618S to Magrath 225S	170L Coleman 799S to Natal	111%	None
		225L Stirling 67S to Raymond Reservoir Tap	168%	

Figure No.	Contingency	Overloaded Element	Percentage	Other System Performance Concerns
		225L Magrath 225S to Raymond Reservoir Tap	143%	
Fig Existing-SL-14/15	911L Janet 74S to Peigan 59S	170L Peigan 59S to Ft. Macleod 15S ¹	111%	None
		170L Coleman 799S to 170AL Tap	107%	
		170L Coleman 799S to Natal	125%	
Fig Existing-SP- 1	Summer Peak Generation Dispatch			
Fig Existing-SP- 2/3	SP All Elements in Service	None	N/A	None
Fig Existing-SP- 4/5	185L Pincher Creek 396S to Waterton 379S	Drywood 415S 138/69kV Transformer T1 ¹	133%	None
Fig Existing-SP- 6/7	931L Ware Junction 132S to W. Brooks 28S	Amoco Empress 163S 240/138Kv Transformer T5 ²	104%	None
		760L Empress 394S to Amoco Empress 163S ²	108%	
Fig Existing-SP- 8/9	100L Brooks 121S to Tilley 498S	760L Empress 394S to Amoco Empress 163S ²	121%	None
		610L Fincastle 336S to Taber 83S ²	110%	
Fig Existing-SP- 10/11	814L Brooks 121S to W. Brooks 28S	827L Brooks 121S to W. Brooks 28S ²	128%	None
Fig Existing-SP- 12/13	827L Brooks 121S to W. Brooks 28S	814L Brooks 121S to W. Brooks 28S ²	110%	None
Fig Existing-SP- 14/15	W. Brooks 28S 240/138kV Transformer T1	W. Brooks 28S 240/138kV Transformer T2 ²	159%	None
Fig Existing-SP- 16/17	610L Fincastle 336S to Taber 83S	100L Brooks 121S to Tilly 498 ²	112%	Low voltage in Medicine Hat area

Figure No.	Contingency	Overloaded Element	Percentage	Other System Performance Concerns
		760L Empress 394S to Amoco Empress 163S ²	109%	
		892L Suffield 895S to Medicine Hat 41S ²	108%	
Fig Existing-SP-18/19	207L Coal Banks 111S to N. Lethbridge 370S	734L Lethbridge Upland 241S to N. Lethbridge 370S ²	111%	None
Fig Existing-SP-20/21	734L Lethbridge Upland 241S to N. Lethbridge 370S	207L Coal Banks 111S to N. Lethbridge 370S ²	131%	None
Fig Existing-SP-22/23	944L Ware Junction to Jenner	None Converge ²		
Fig Existing-SP-24/25	727L Janet 74S to Okotoks 678S	158L High River 65S to Black Diamond 392S	100%	Voltage Collpas in High River Area
Fig Existing-SP-26/27	Drywood 415S 138/69kV Transformer T1	None	N/A	Voltage drops more than 5% on the Drywood 415S , Waterton 379S, Yarrow 995S, Glenwood 229S and Shell Waterton 502S 69kV buses

¹ Addressed by Southwest Alberta Transmission System Need Application

² Addressed by Southeast Alberta Transmission System Need Application

GENERATION DISPATCH REPORT

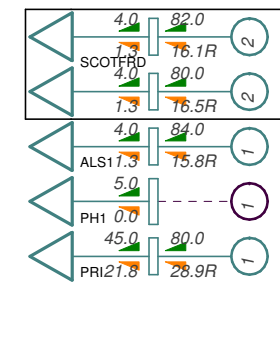
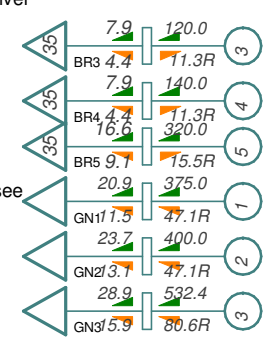
GROSS COAL GEN. 4635.4 MW

GAS GENERATION

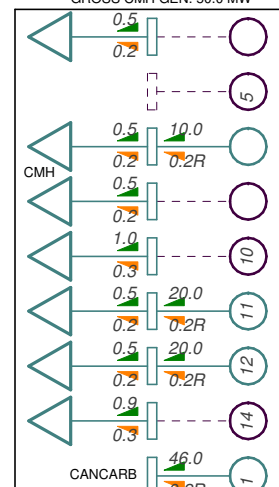
HYDRO GENERATION GROSS EXISTING WIND GEN. 497.0 MW

FORT MCMURRAY GEN.

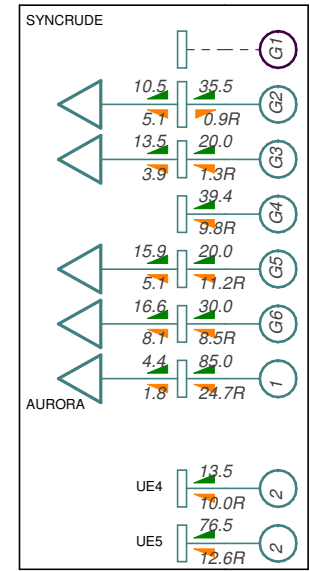
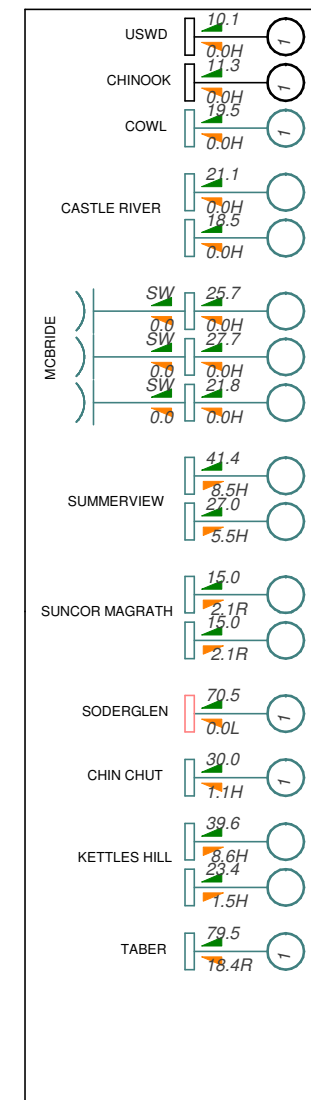
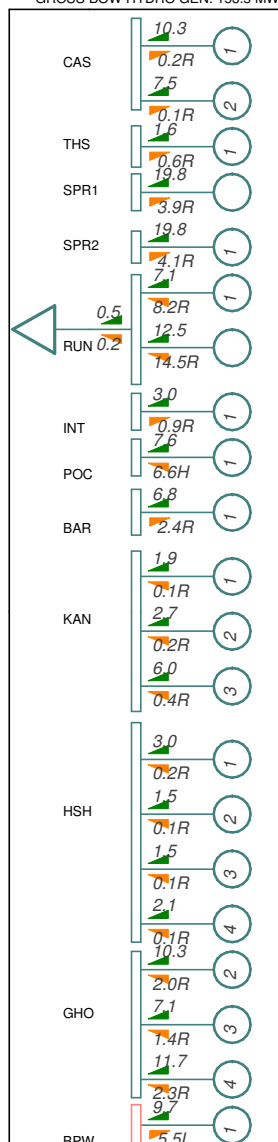
BattleRiver



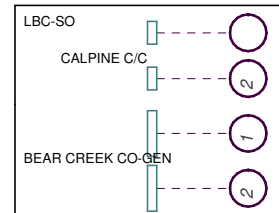
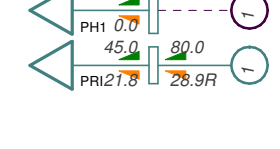
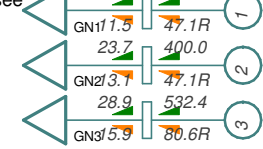
GROSS CMH GEN. 50.0 MW



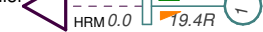
GROSS BOW HYDRO GEN. 153.5 MW



Geneesee



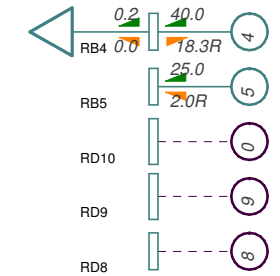
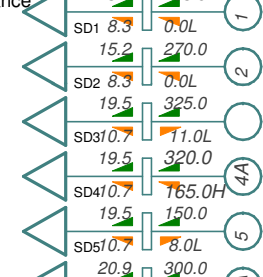
HR Miller



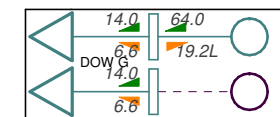
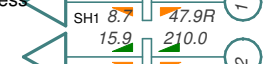
Keephill



Sundance



Sheerness



Wabamun

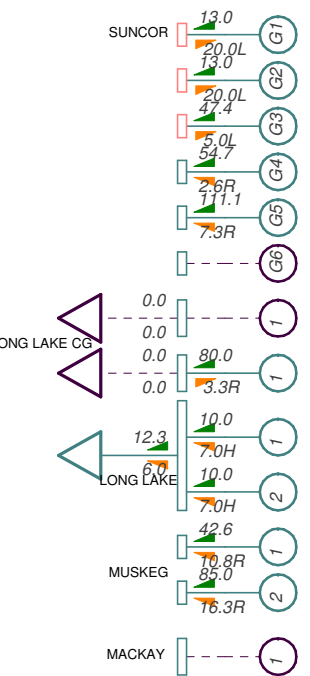
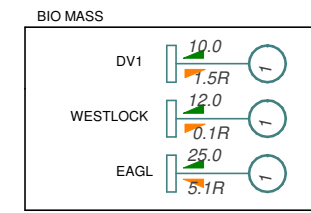
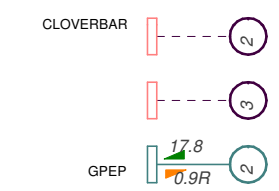
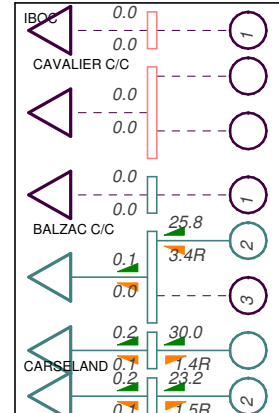
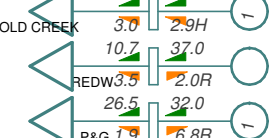
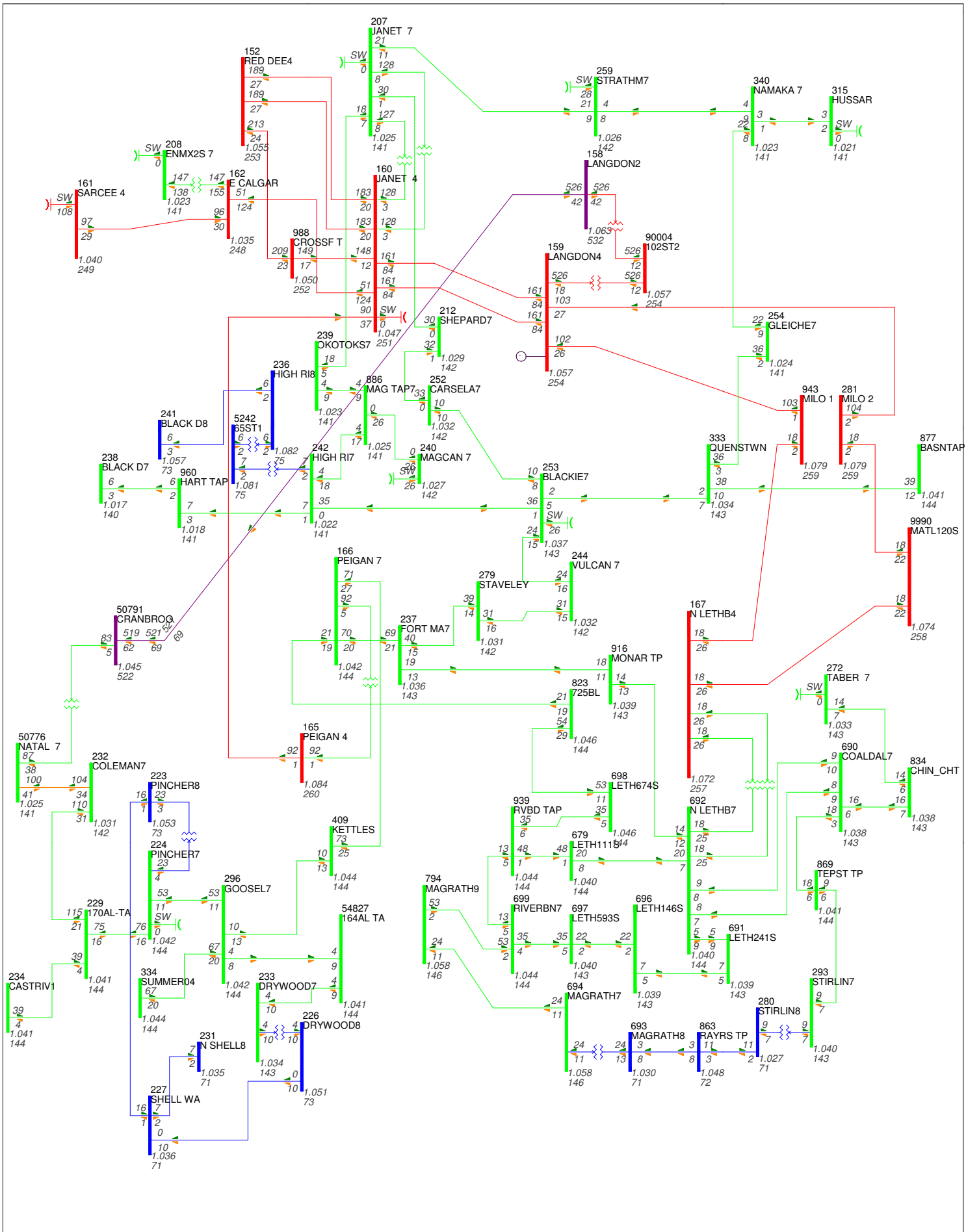


Fig Existing-SL-1



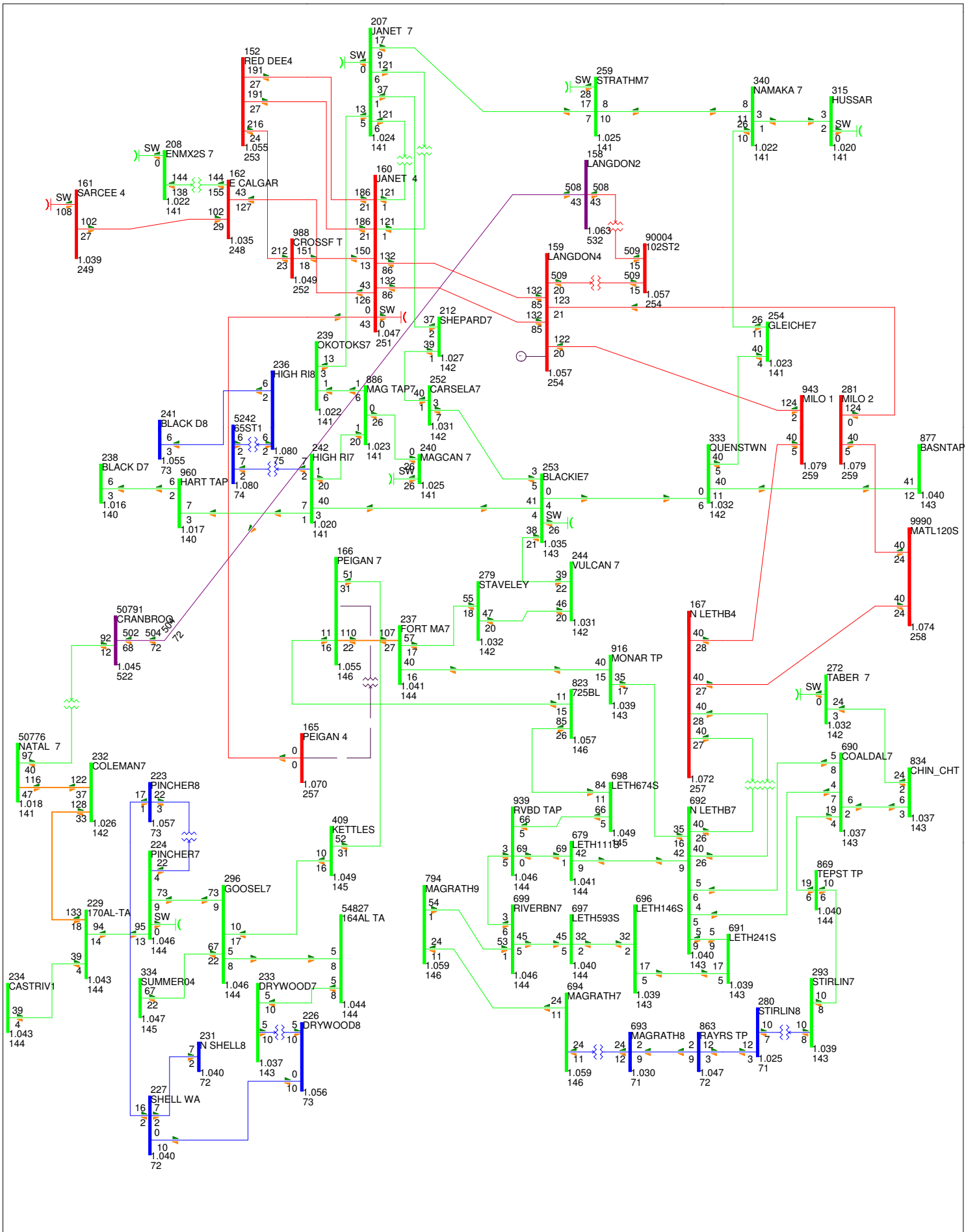
EXISTING SUMMER LIGHT CASE

Existing South West System THU, NOV 20 2008 15:23

EXISTING SYSTEM

Fig Existing-SL-2

Bus: VOLTAGE (kV) 100 230 138 69
 Branch: MW/MVA
 Equipment: MW/MVA
 MW: <0.000 <-49.000 <-139.000 <-240.000 <-500.000 <-600.000 <-699.000



EXISTING SUMMER LIGHT CASE

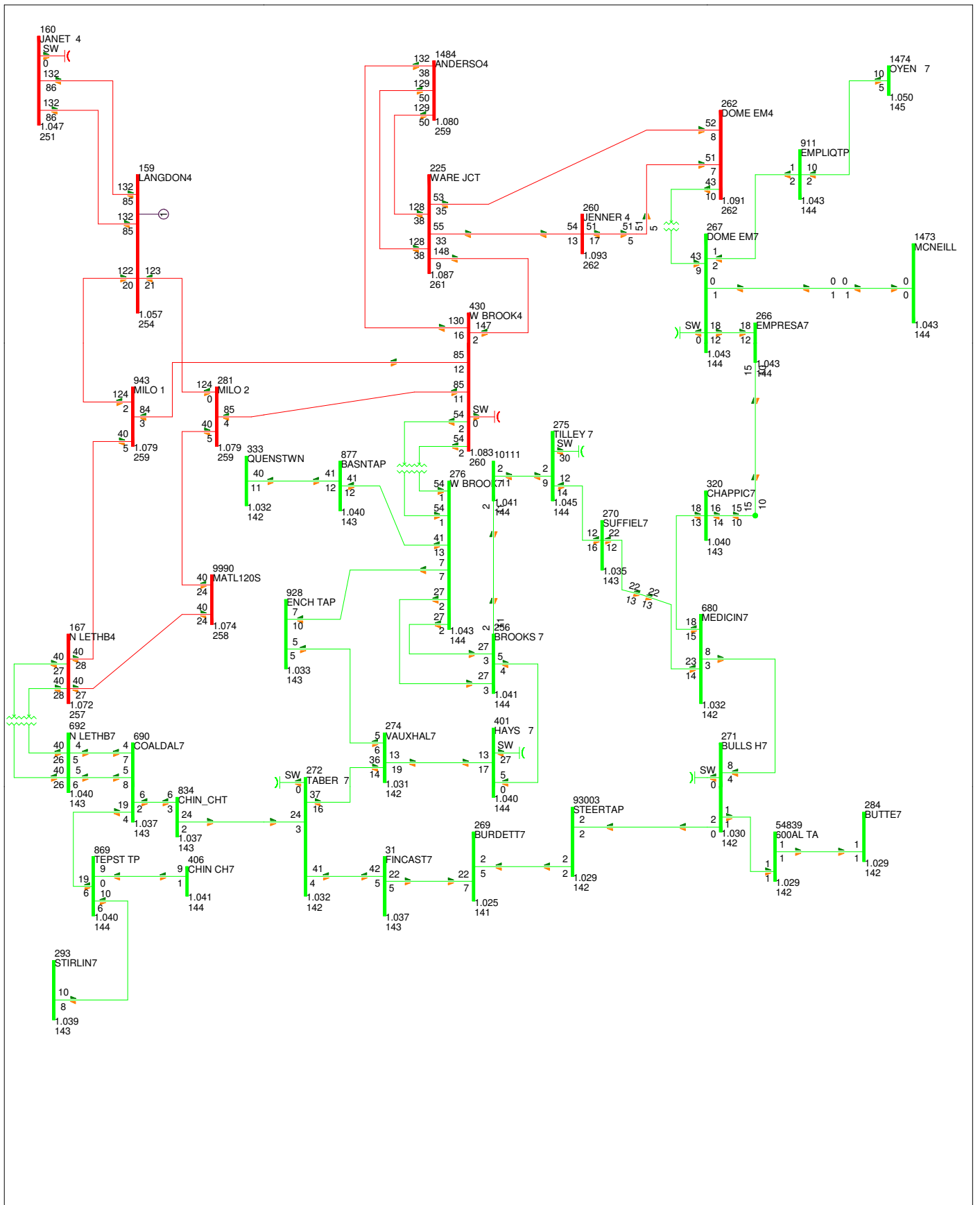
Existing South West System THU, NOV 20 2008 15:27

EXISTING SYSTEM

Fig Existing-SL-4

Bus: VOLTAGE (V) (P) (M)
 Branch: MW (W) (M)
 Equipment: MW (W) (M)
 #0 = 0.000 #1 = 0.000 #2 = 0.000 #3 = 0.000 #4 = 0.000 #5 = 0.000

BC Export: 636 MW

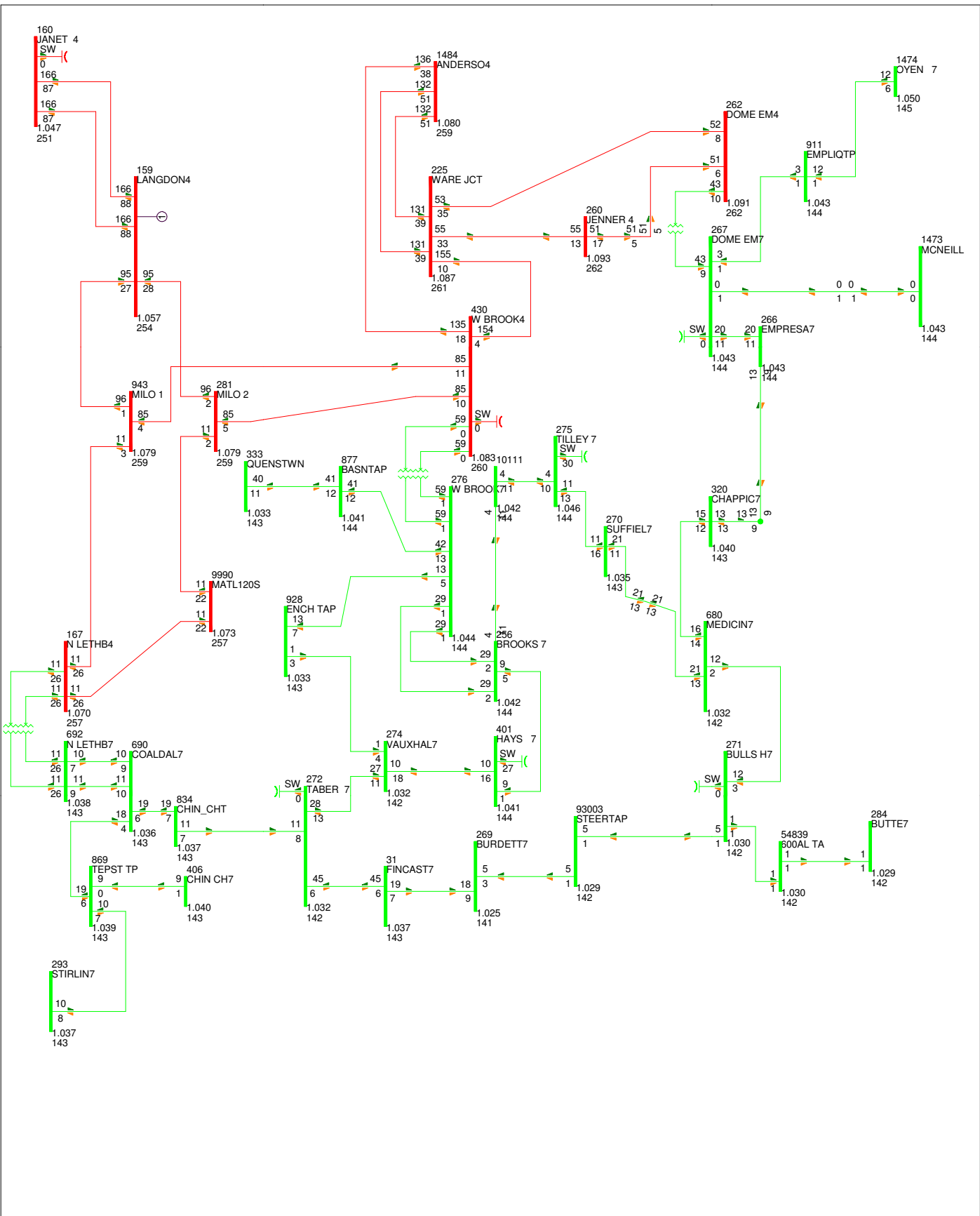


EXISTING SUMMER LIGHT CASE
 Existing South East System THU, NOV 20 2008 16:50

EXISTING SYSTEM
 Fig Existing-SL-5

Bus - VOLTAGE (MVA)
 Breaker - SW (MVA)
 Line - MVA
 Transformer - MVA
 PV - MVA

BC Export: 636 MW

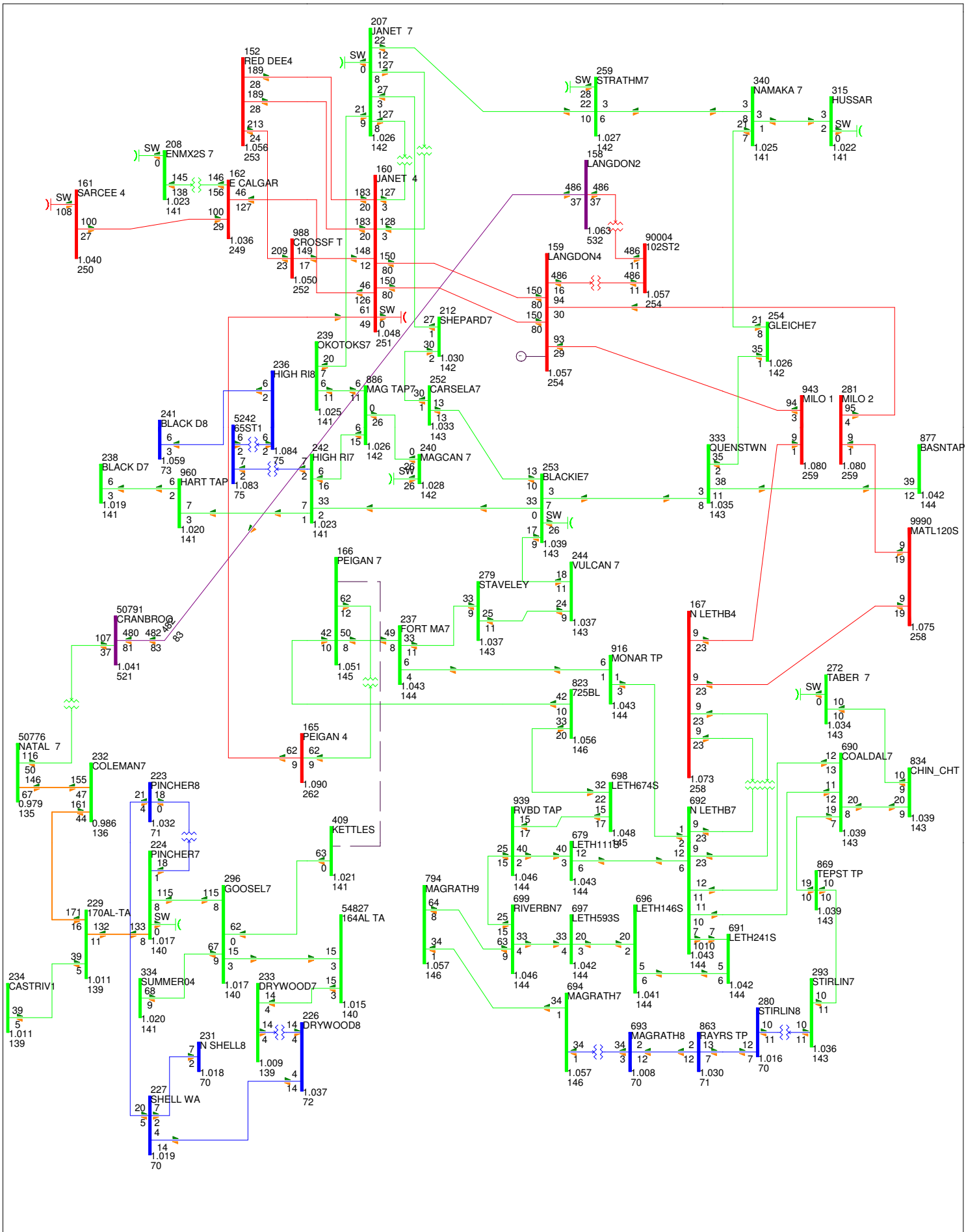


EXISTING SUMMER LIGHT CASE
 Existing South East System THU, NOV 20 2008 16:51

EXISTING SYSTEM
 Fig Existing-SL-7

Bus - VOLTAGE (MVA)
 Breaker - MW (MW)
 Transformer - MW
 Load - MW
 PV - MW (MW) MW (MW) MW (MW) MW (MW) MW (MW)

BC Export: 642 MW



EXISTING SUMMER LIGHT CASE

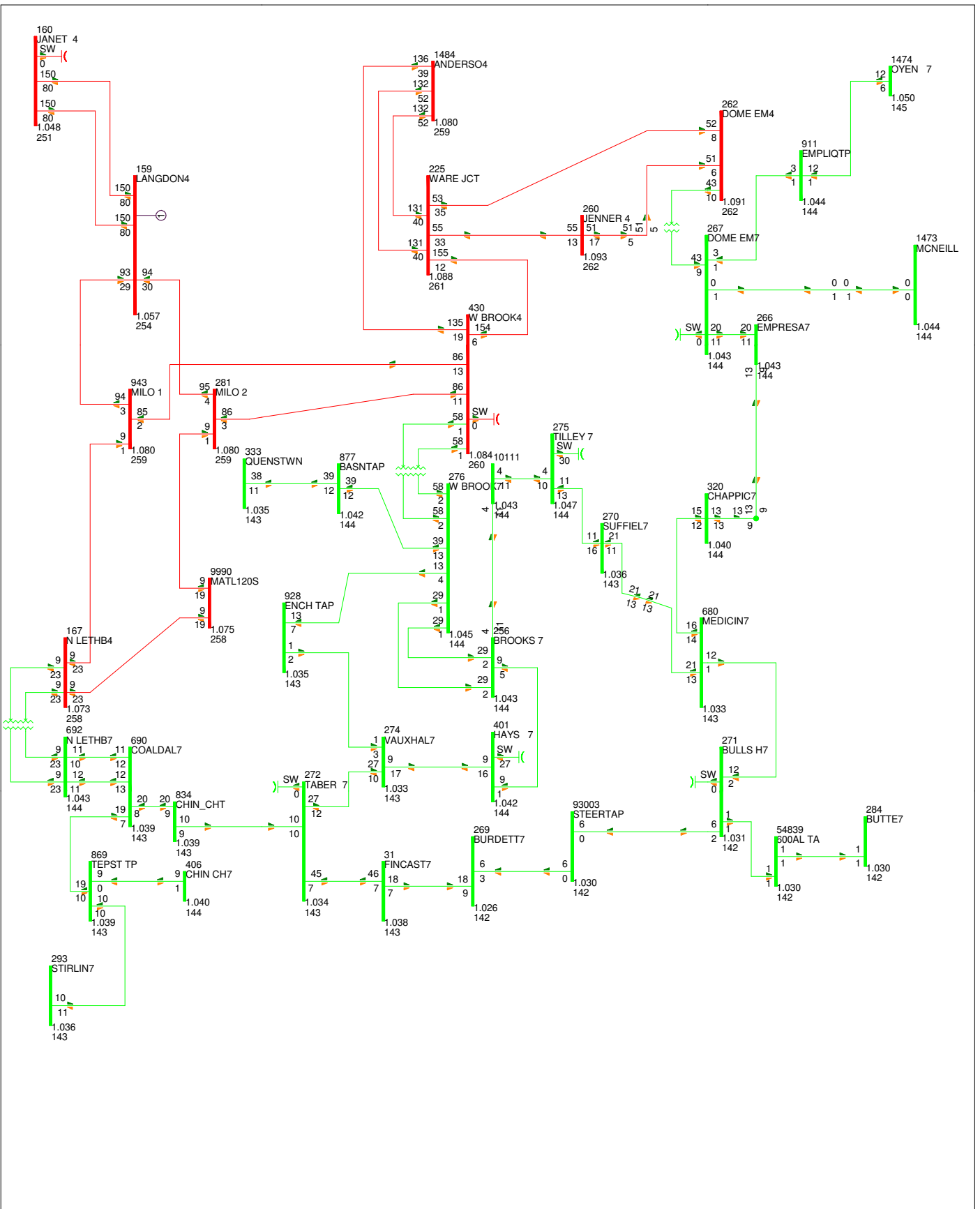
Existing South West System THU, NOV 20 2008 15:28

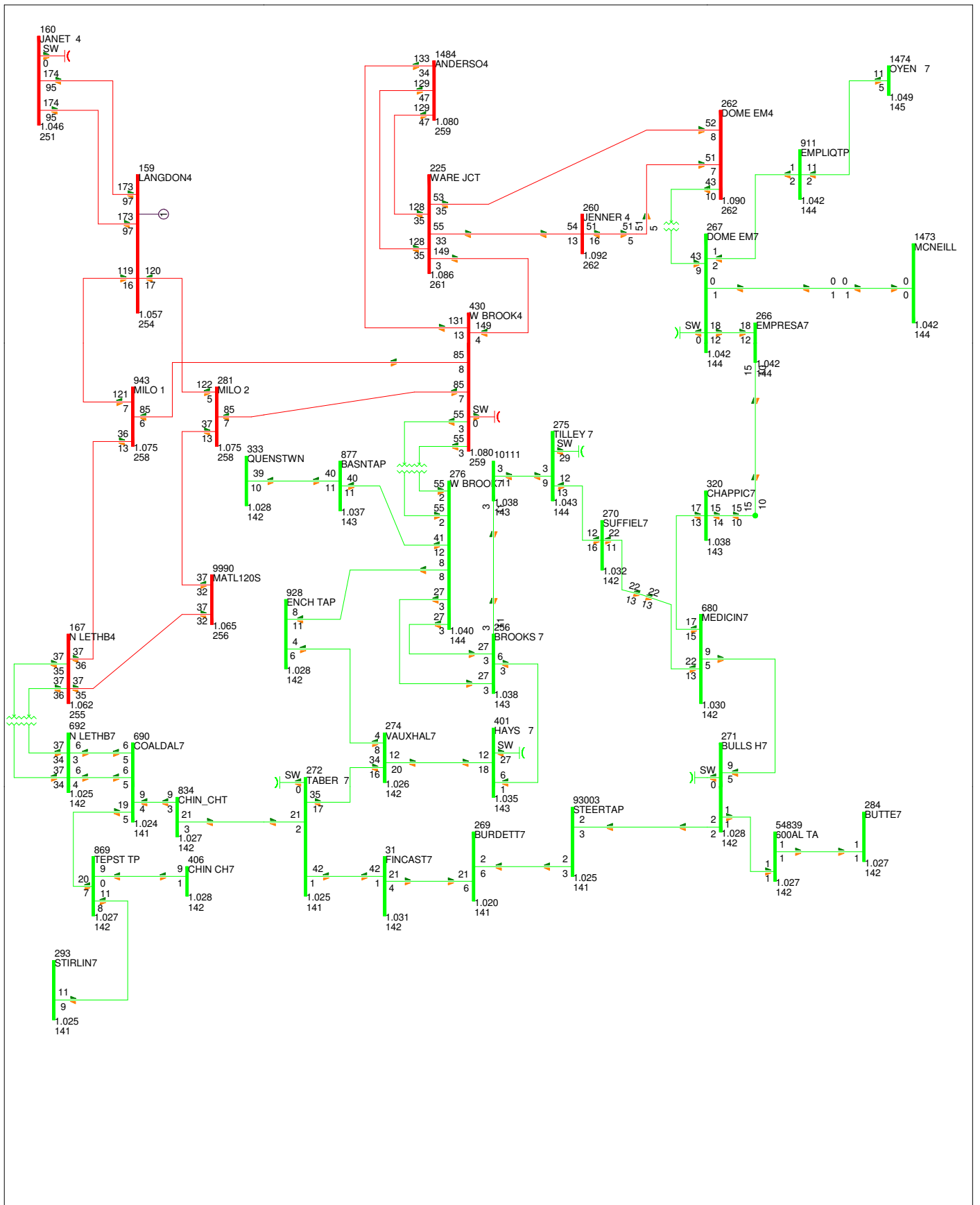
EXISTING SYSTEM

Fig Existing-SL-8

Bus: VOLTAGE (V/PU)
 Branch: MW/MVA
 Element: MW/MVA
 100.0000000
 100.0000000 ←-69.000 ←-139.000 ←-240.000 ←-500.000 ←-600.000 ←-600.000

BC Export: 637 MW

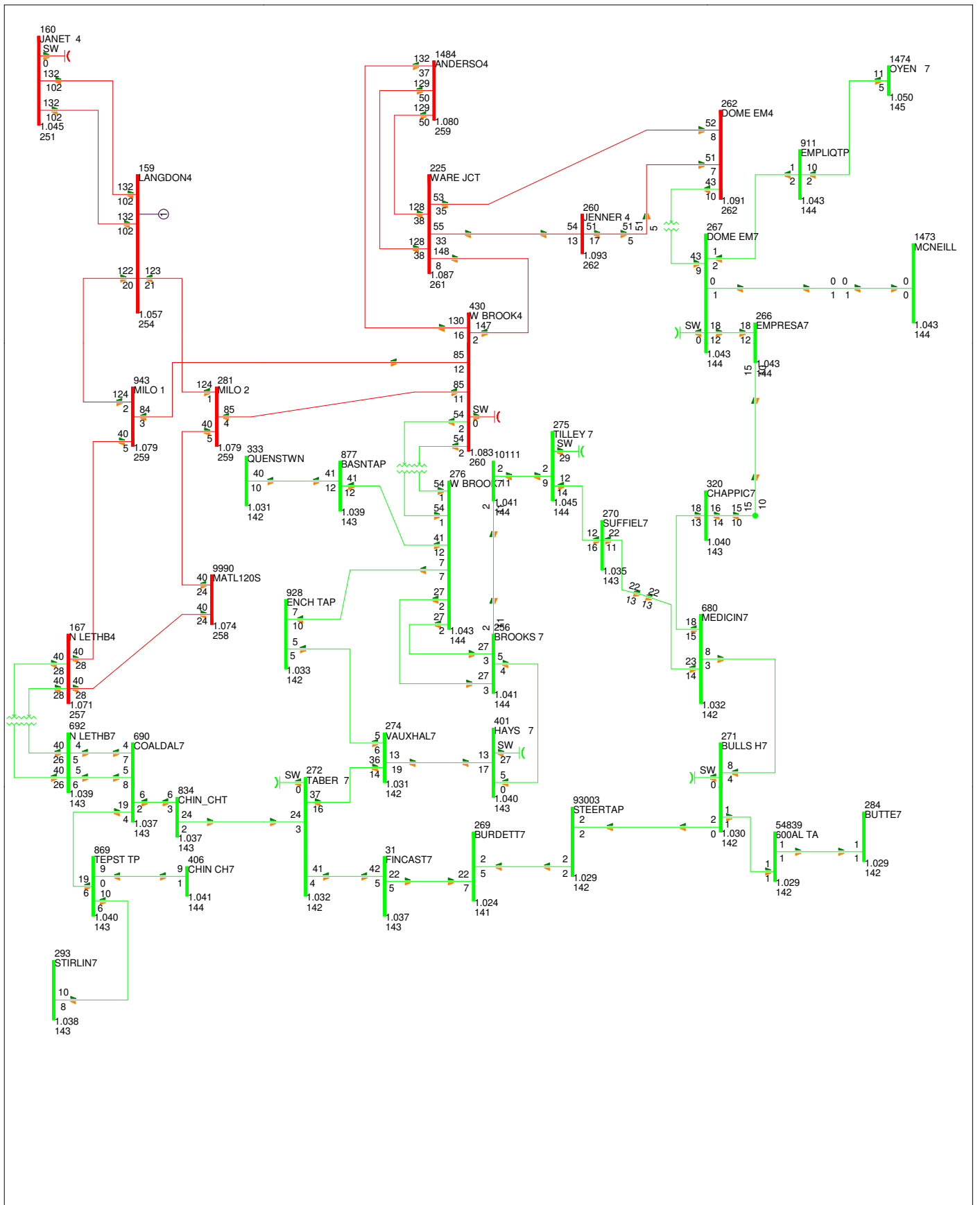




EXISTING SUMMER LIGHT CASE
 Existing South East System THU, NOV 20 2008 16:52

EXISTING SYSTEM
 Fig Existing-SL-11

Bus - VOLTAGE (MVA)
 Breaker - SW (MVA)
 Transformer - MVA
 Line - MVA
 PV - kW (MW) - kW (MW) - kW (MW) - kW (MW) - kW (MW)



EXISTING SUMMER LIGHT CASE
 Existing South East System THU, NOV 20 2008 16:53

EXISTING SYSTEM
 Fig Existing-SL-15

Bus - VOLTAGE (MVA)
 Breaker - SW (MVA)
 Transformer - MVA
 Line - MVA
 PV - MVA

BC Export: 635 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 6120.6 MW

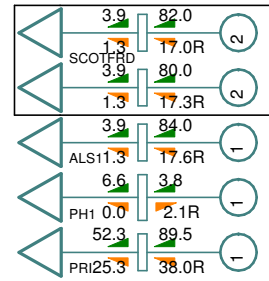
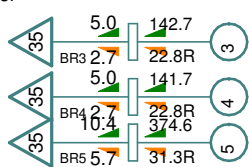
GAS GENERATION

GROSS CMH GEN. 86.4 MW
GROSS BOW HYDRO GEN. 201.3 MW

GROSS EXISTING WIND GEN. 0.0 MW

FORT MCMURRAY GEN.

BattleRiver



GROSS CMH GEN. 86.4 MW

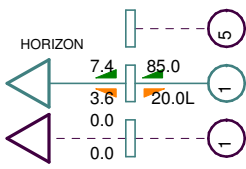
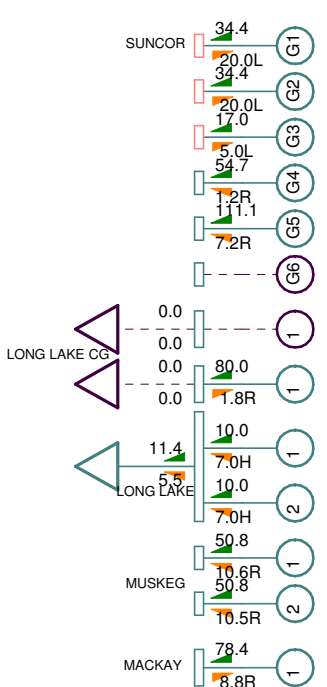
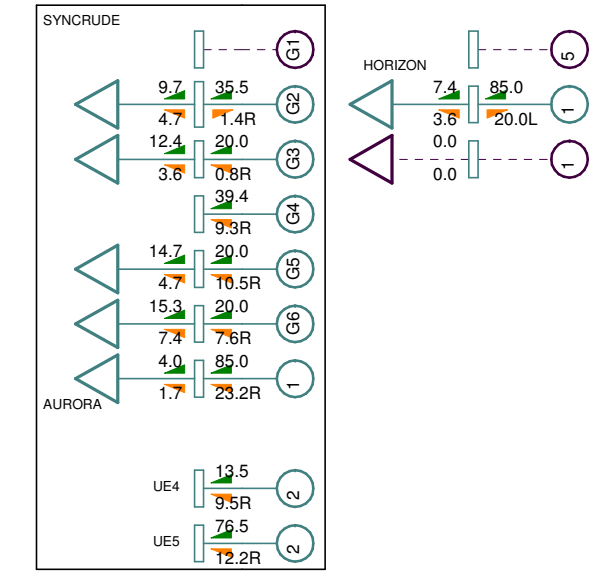
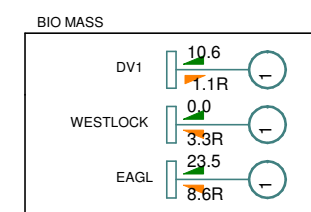
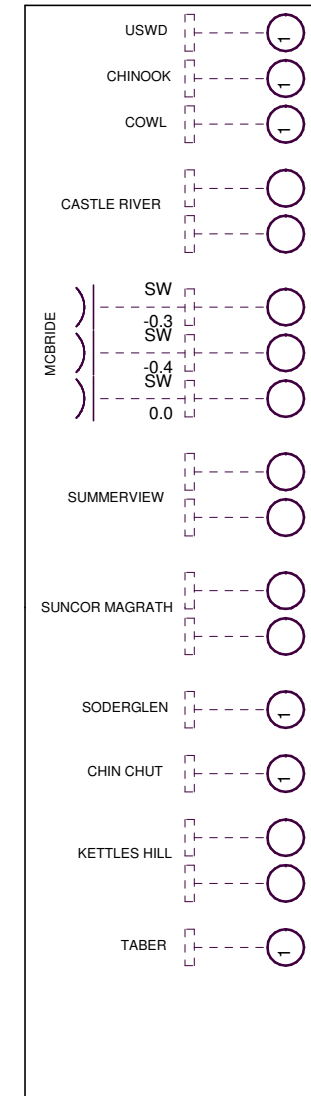
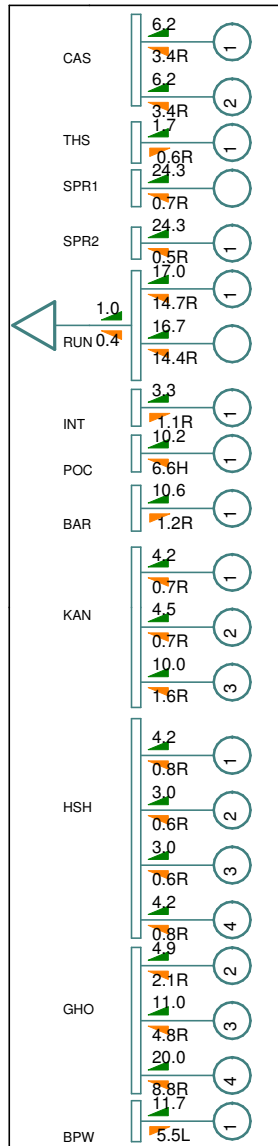
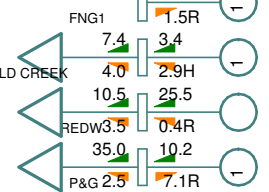
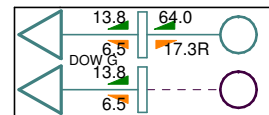
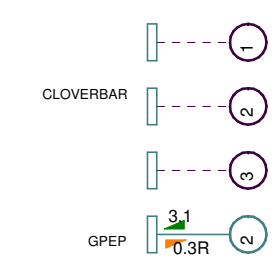
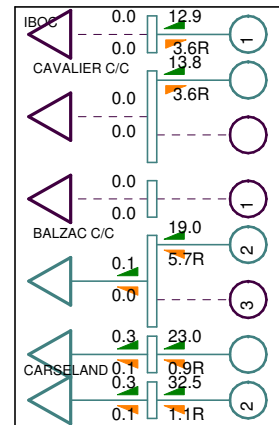
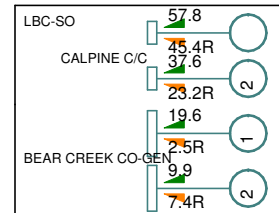
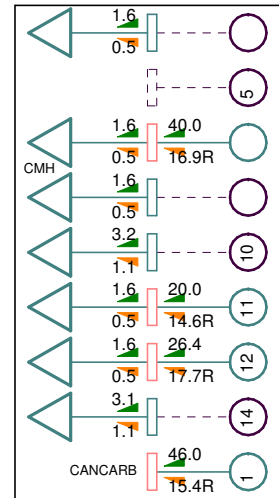
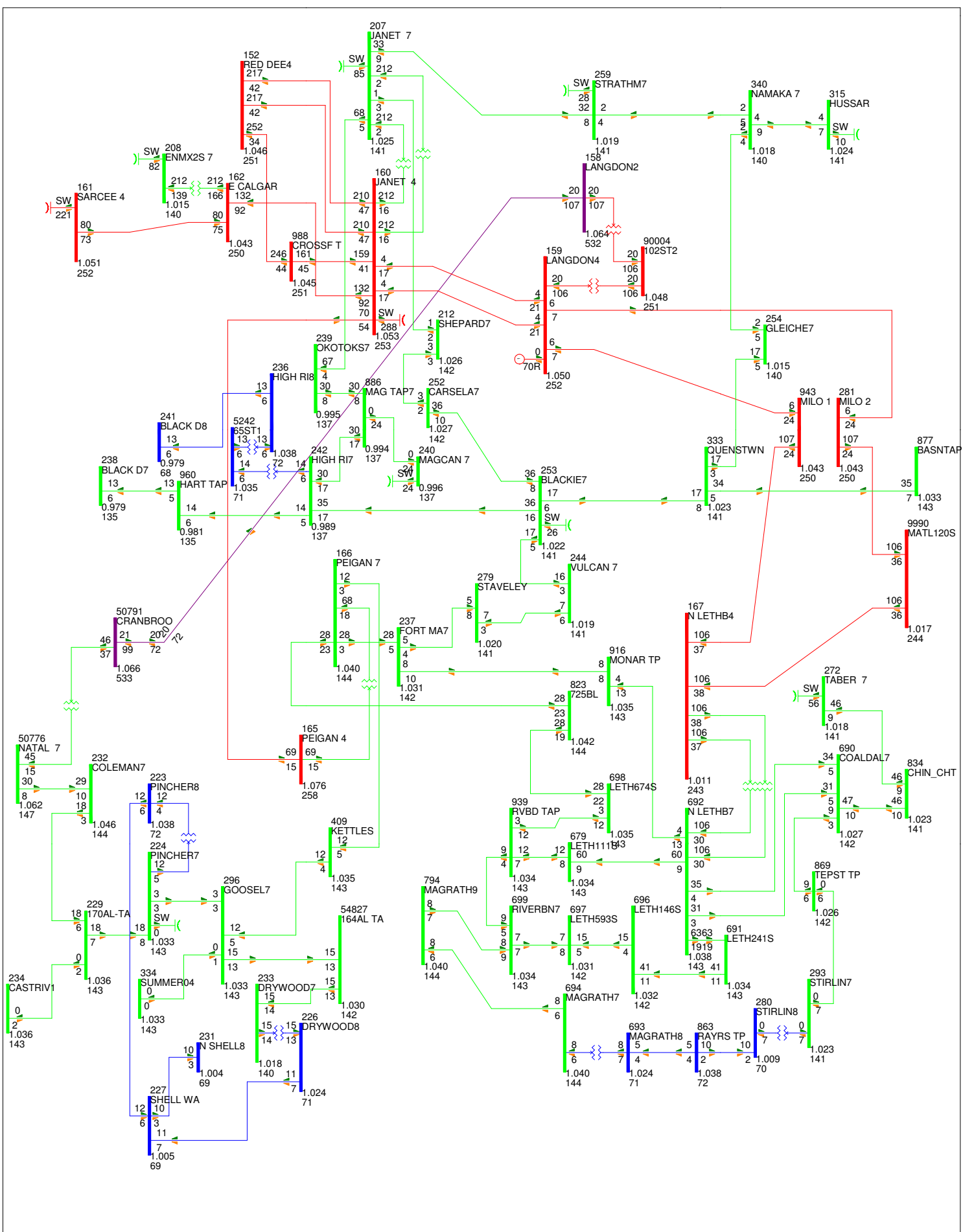


Fig Existing-SP-1

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
100.0% RATED
1.0500V 0.950UV
KV: <=25.000 <=34.500 <=69.000 <=138.000 <=240.000 >240.000

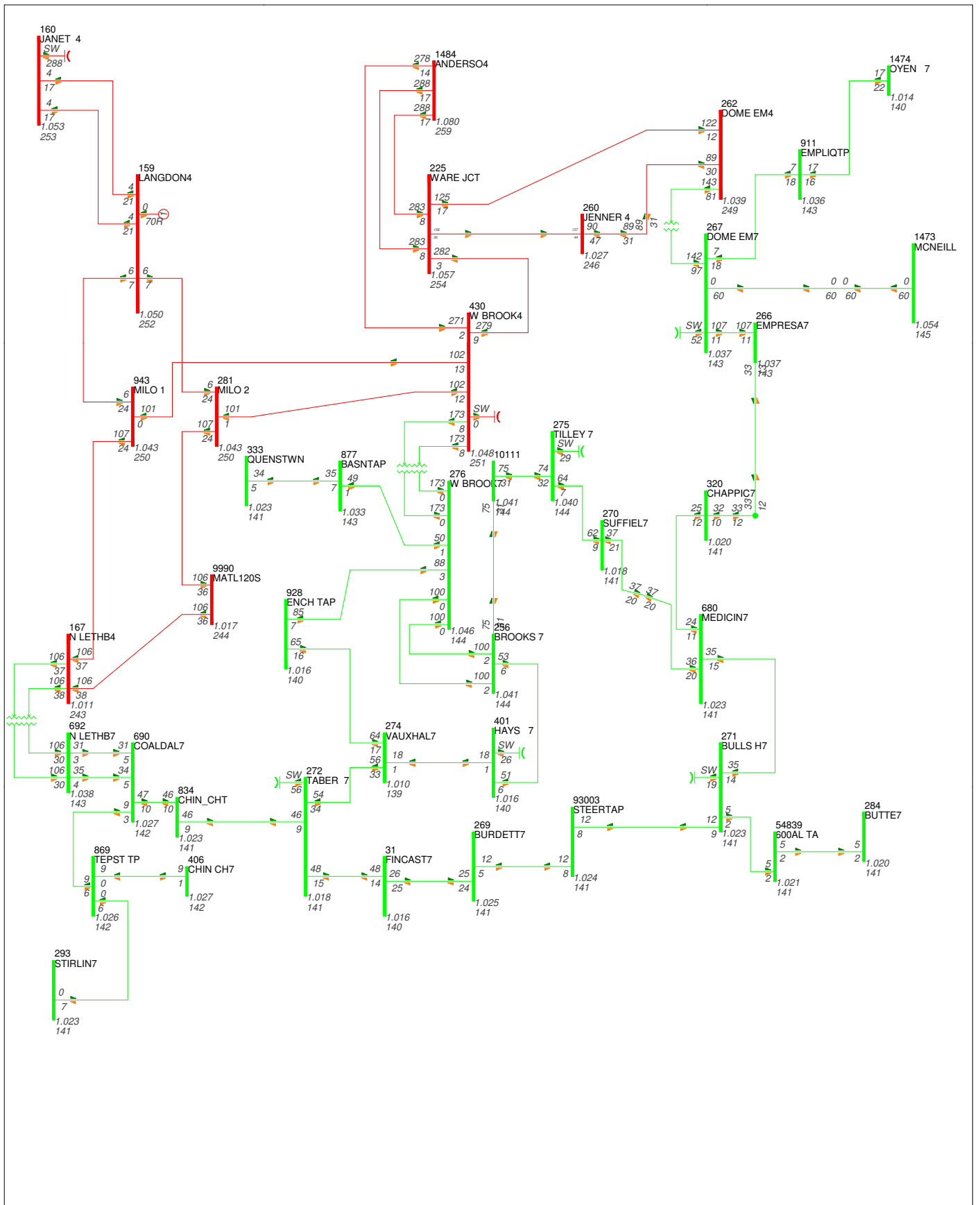


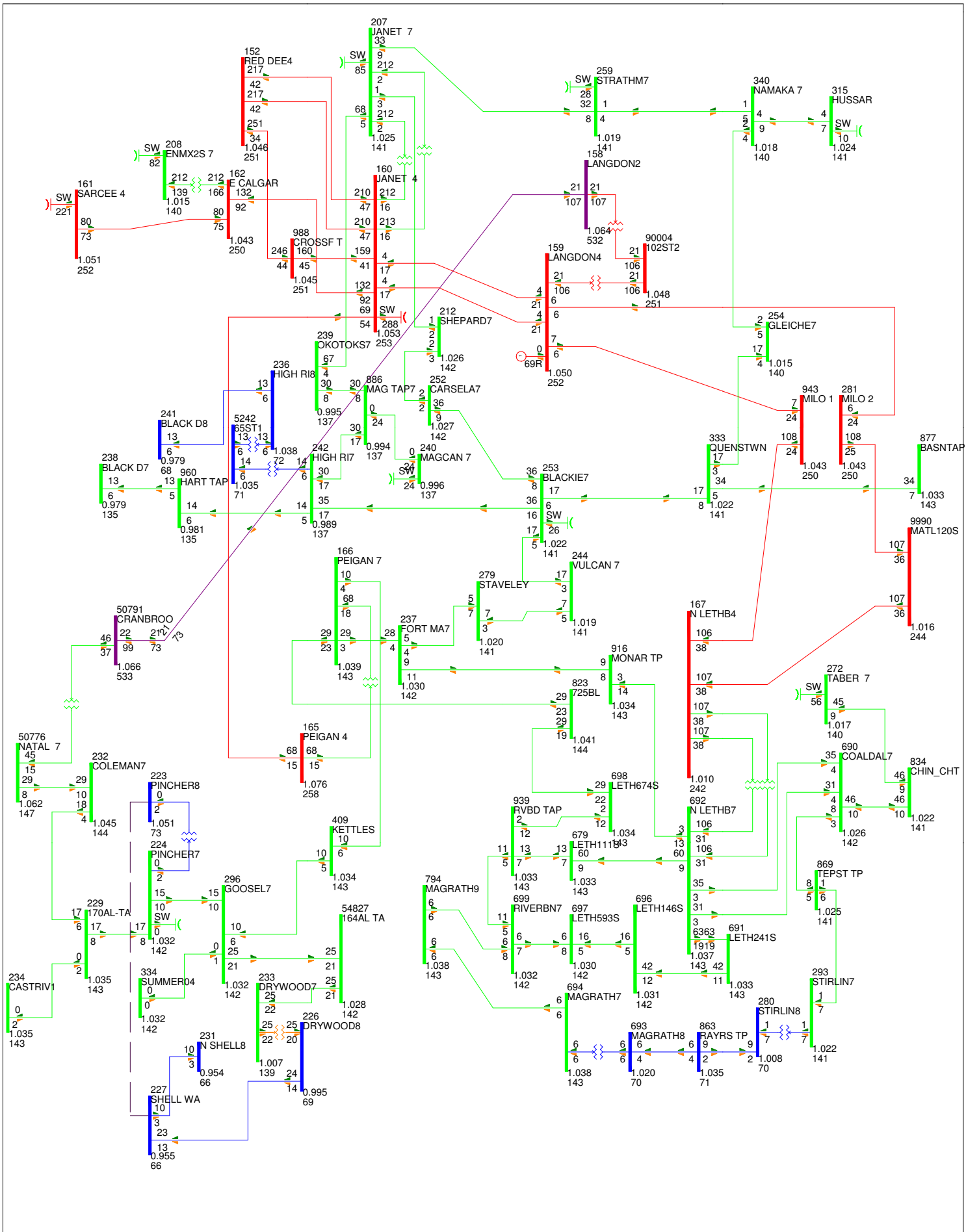
SOUTH PLANNING STUDY
 2007 SUMMER PEAK CASE
 Existing South West System THU, NOV 20 2008 16:56

EXISTING SYSTEM

Fig Existing-SP-2

Bus: VOLTAGE (V/MVA)
 Branch: MW/MVA
 Equipment: MW/MVA
 115kV: 115.000
 33kV: 33.000
 13.8kV: 13.800
 4.16kV: 4.160

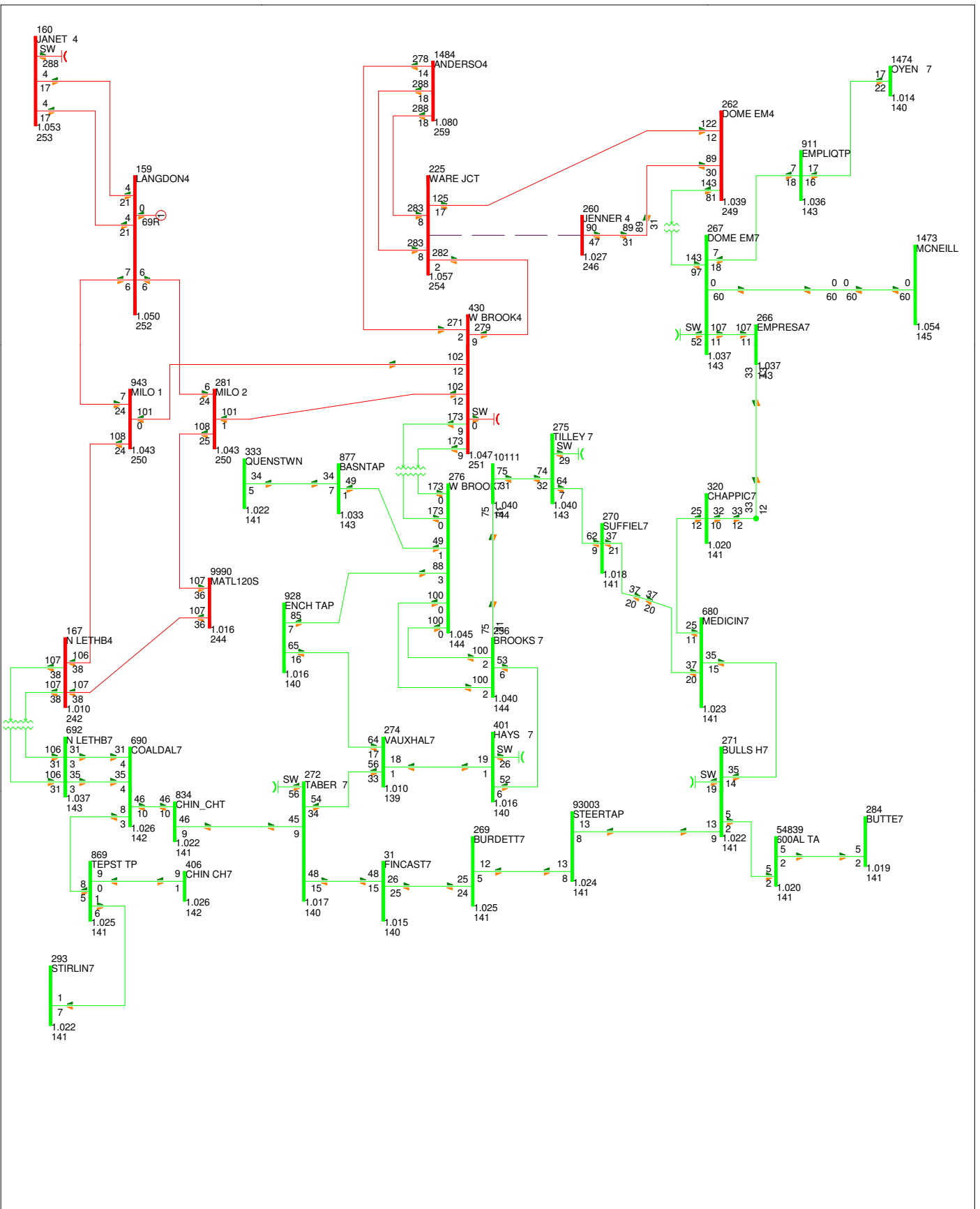


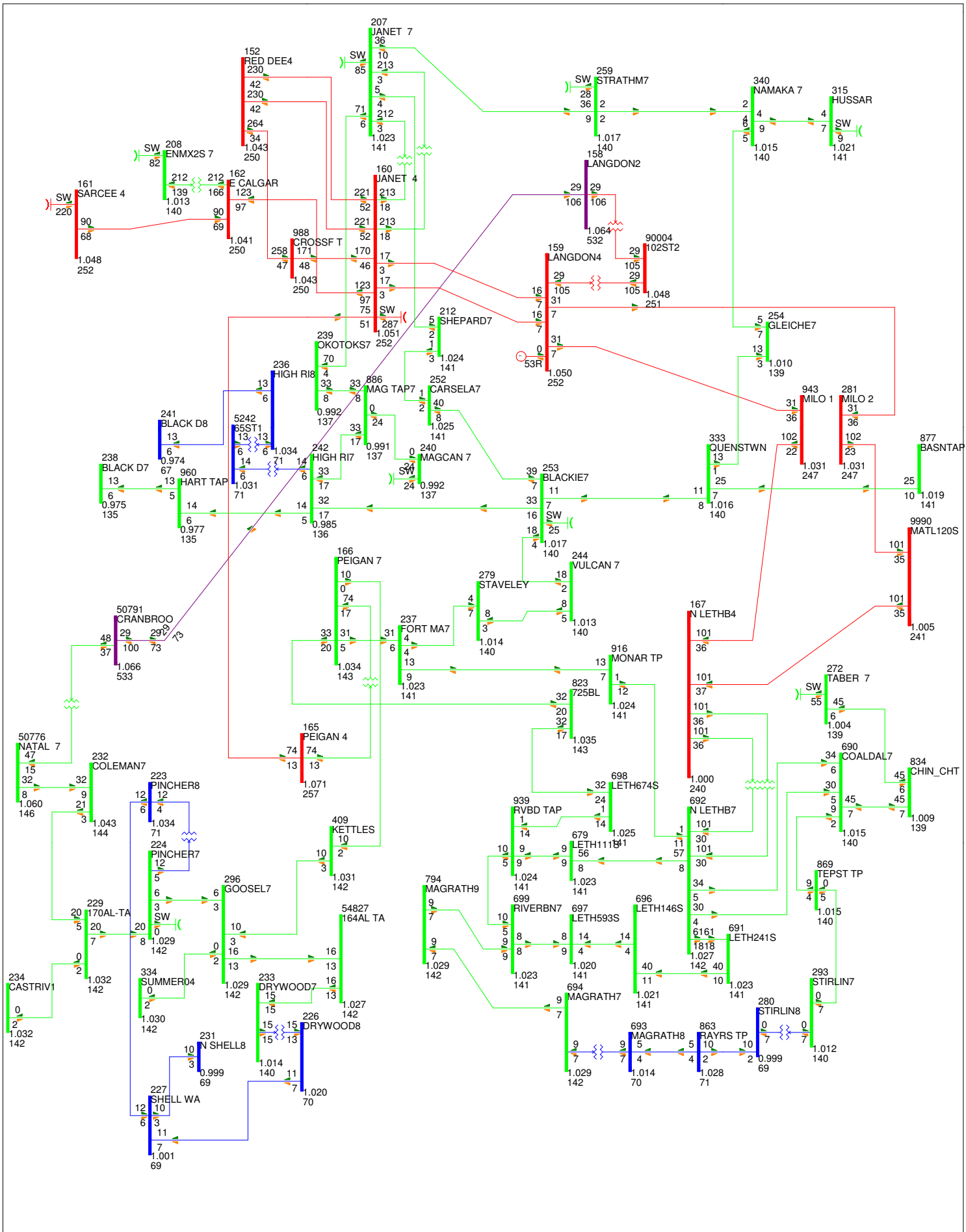


SOUTH PLANNING STUDY
 2007 SUMMER PEAK CASE
 Existing South West System THU, NOV 20 2008 17:05

EXISTING SYSTEM
 Fig Existing-SP-4

Bus: VOLTAGE (V/MVA)
 Branch: MW/MVA
 Equipment: MW/MVA
 115.000 69.000 23.000 12.000
 MW: 0.000 0.000 0.000 0.000



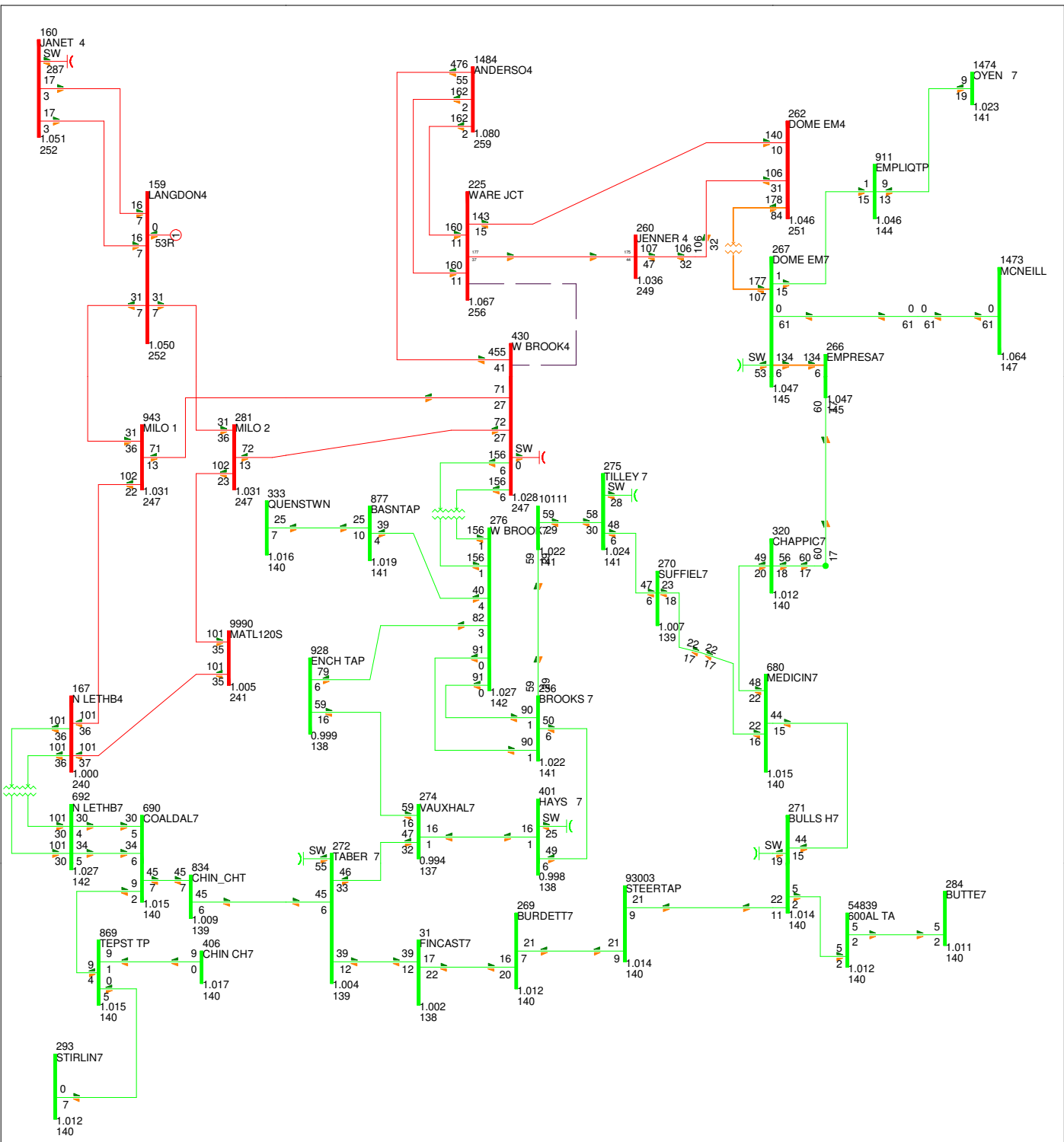


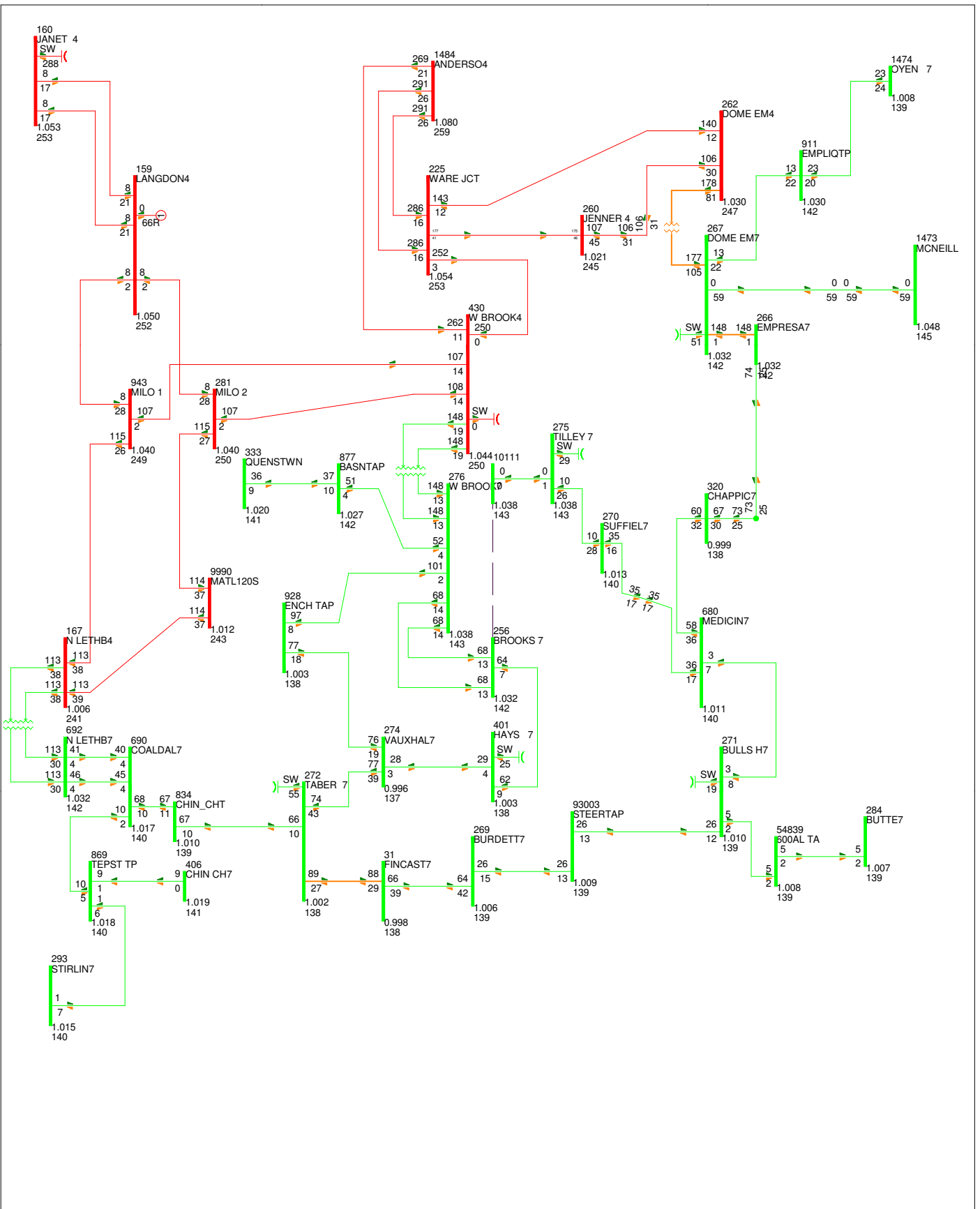
SOUTH PLANNING STUDY
 2007 SUMMER PEAK CASE
 Existing South West System THU, NOV 20 2008 17:06

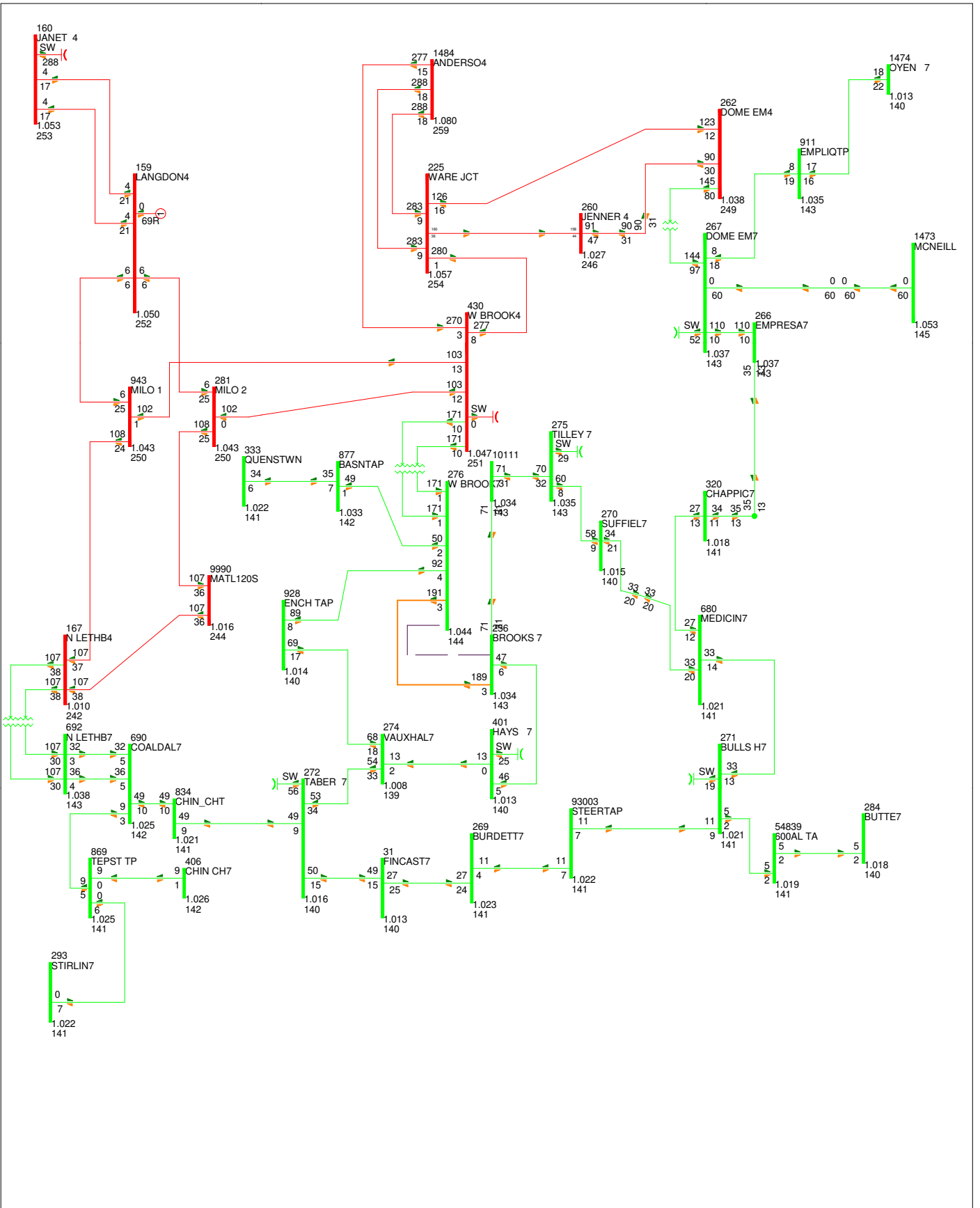
EXISTING SYSTEM
 Fig Existing-SP-6

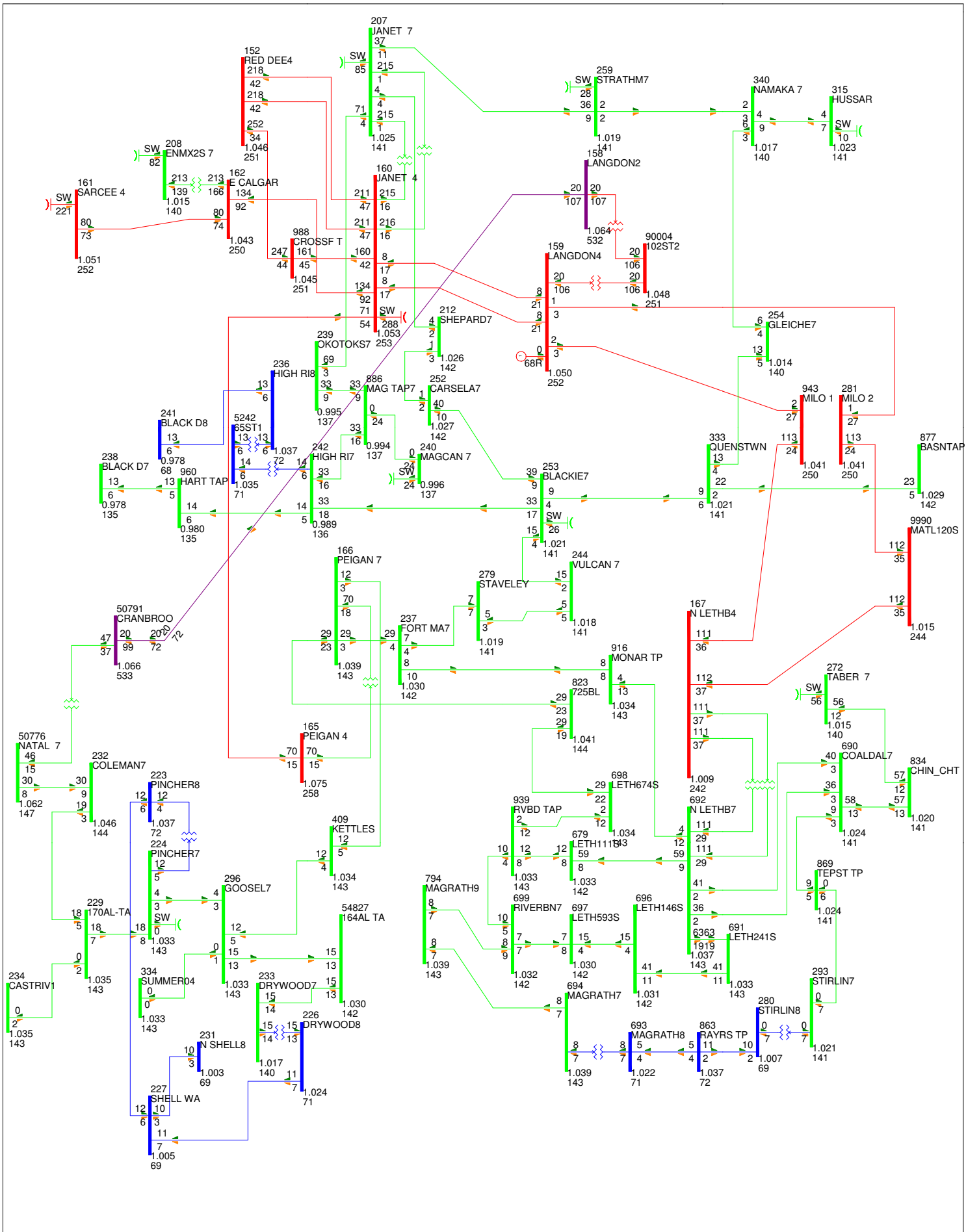
Rev: VOLTAGE (V) (P) (M)
 Branch: MW (W) (M)
 Equipment: MW (W) (M)
 100-250000
 100-250000 -400000 -100000 -240000 -500000 -600000 -600000

BC Export: -46 MW







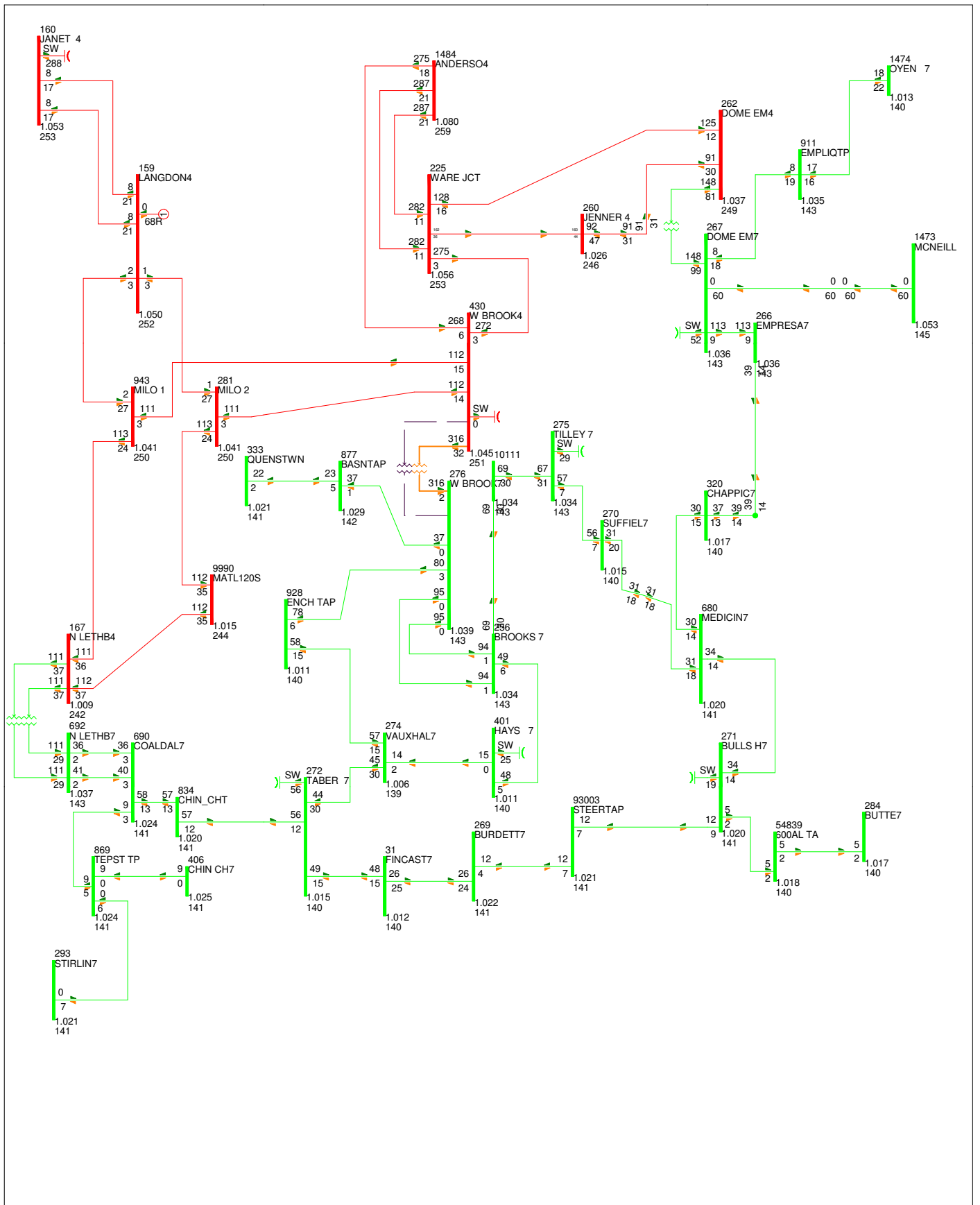


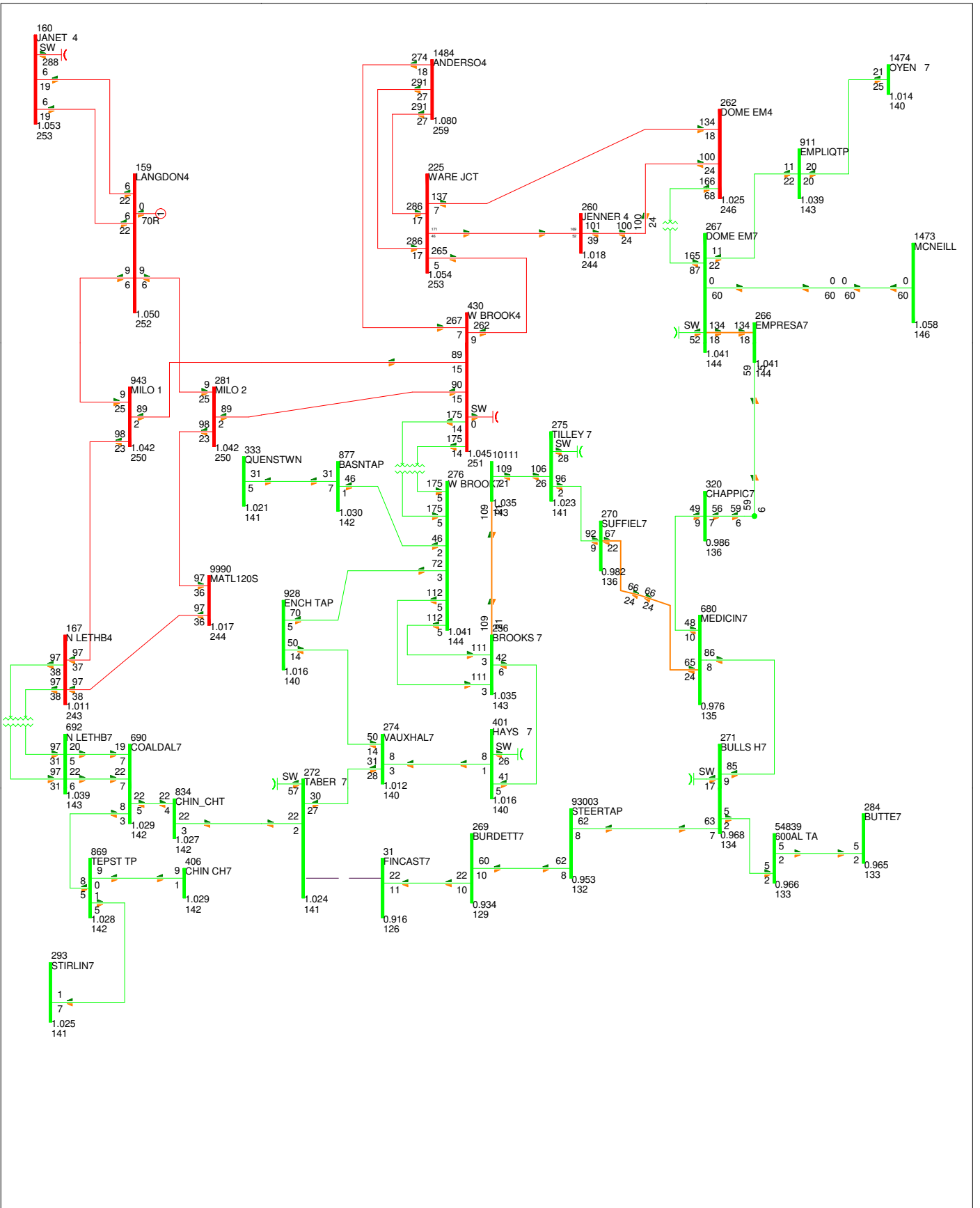
SOUTH PLANNING STUDY
 2007 SUMMER PEAK CASE
 Existing South West System THU, NOV 20 2008 17:12

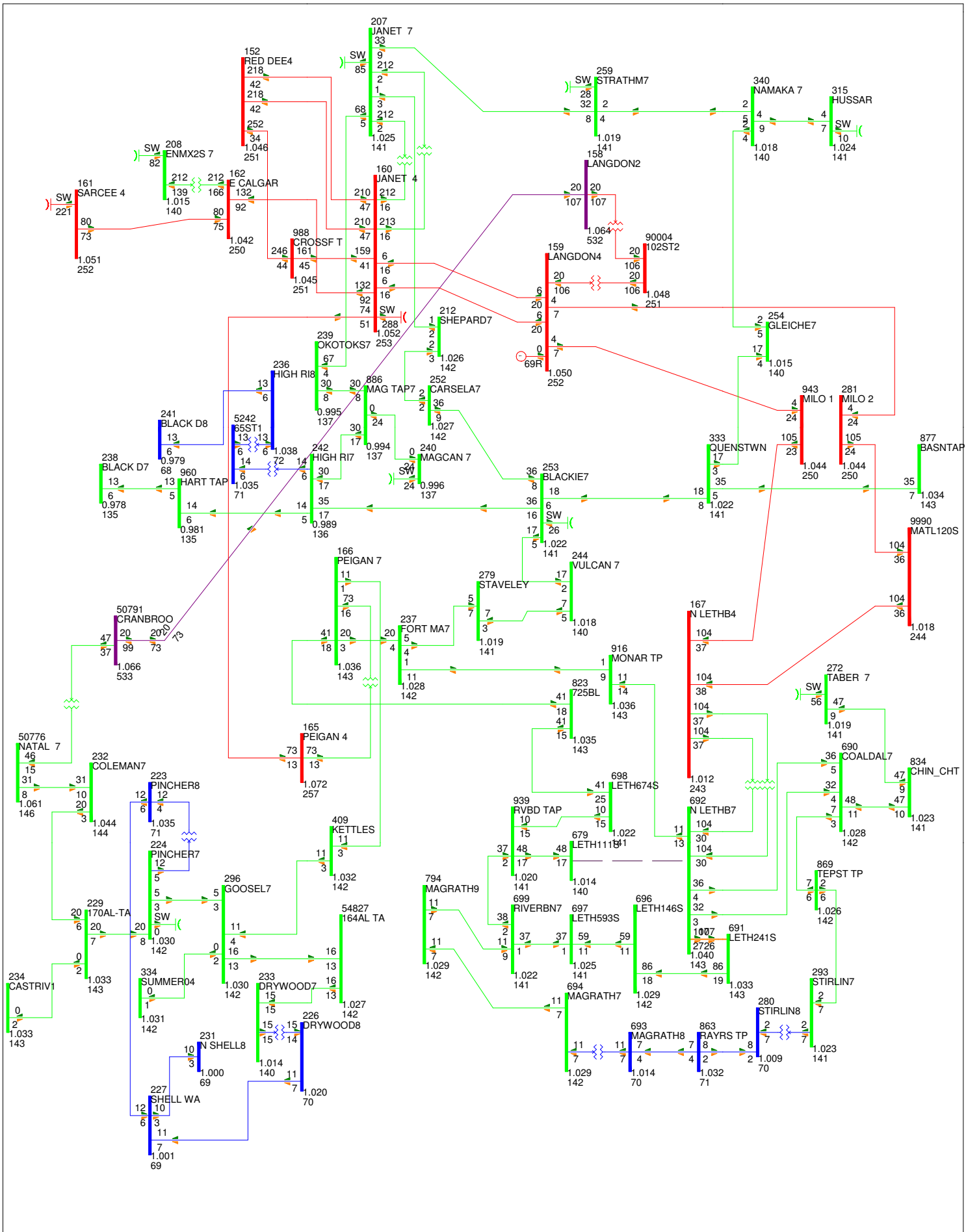
EXISTING SYSTEM
 Fig Existing-SP-14

Bus: VOLTAGE (kV) (P) (M)
 Branch: MW (W) (M)
 Equipment: MW (W) (M)
 115.000 35.000 15.000 1.000 0.000 0.000 0.000
 MW=0.000 MW=0.000 MW=0.000 MW=0.000 MW=0.000 MW=0.000

BC Export: -35 MW





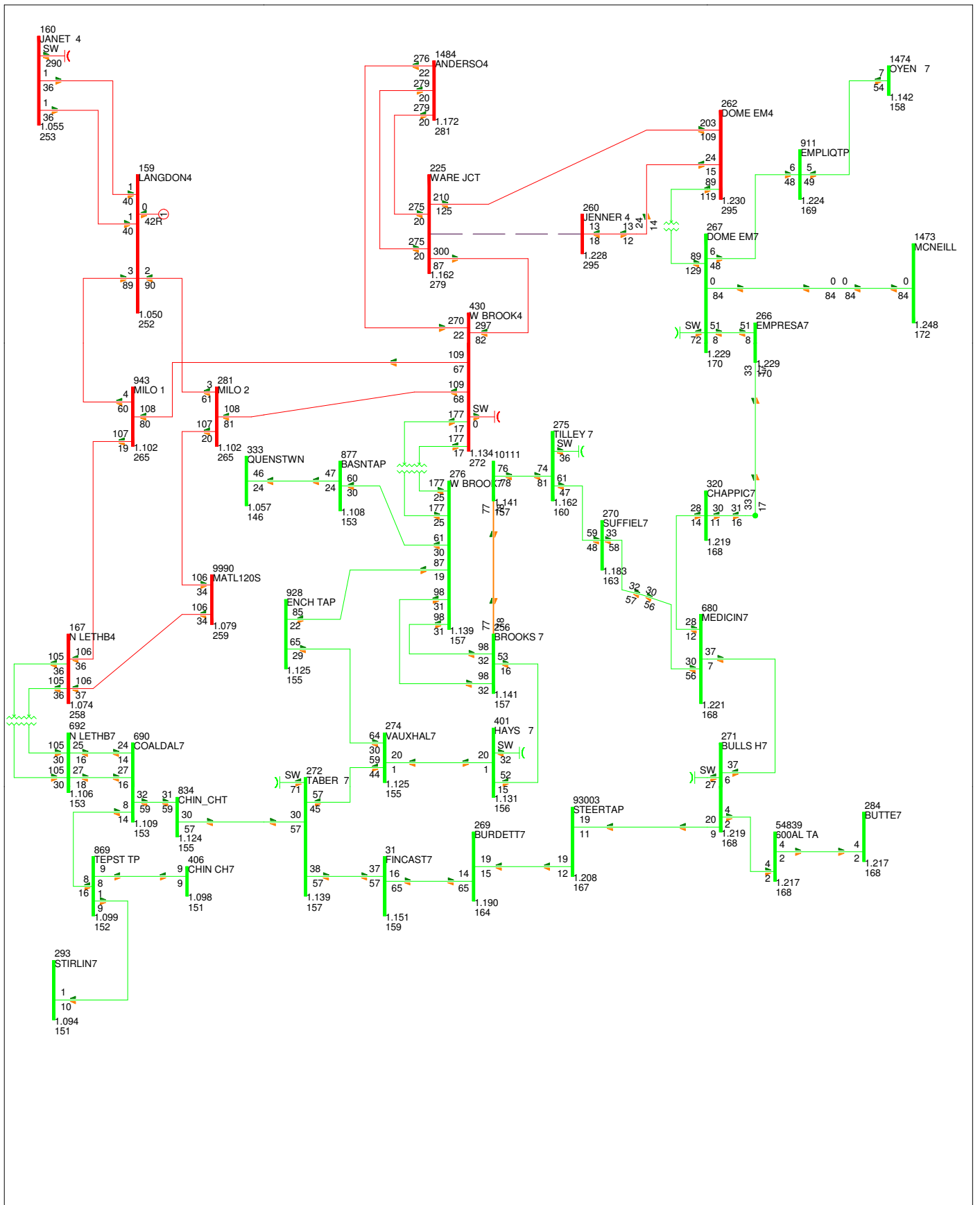


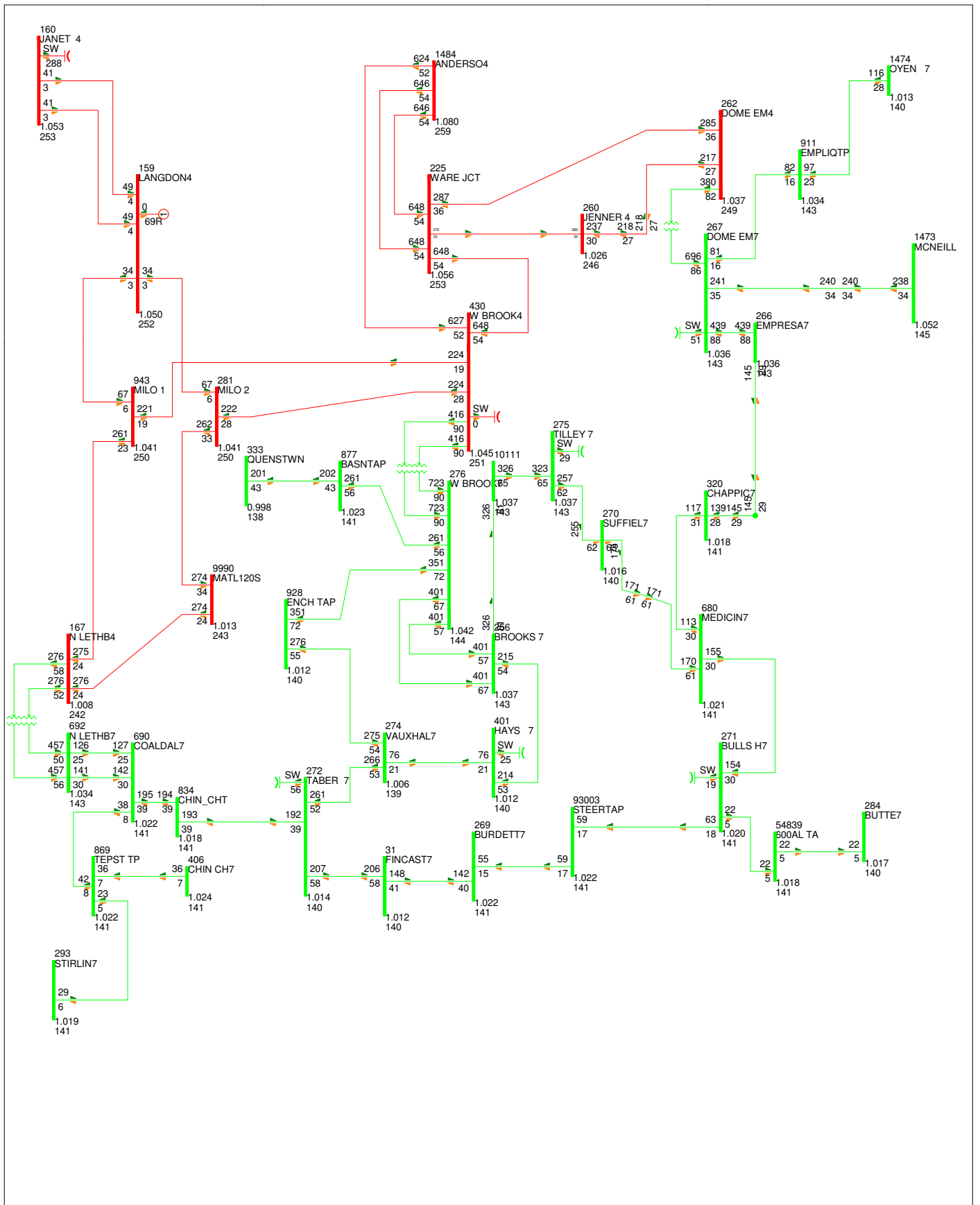
SOUTH PLANNING STUDY
 2007 SUMMER PEAK CASE
 Existing South West System THU, NOV 20 2008 17:14

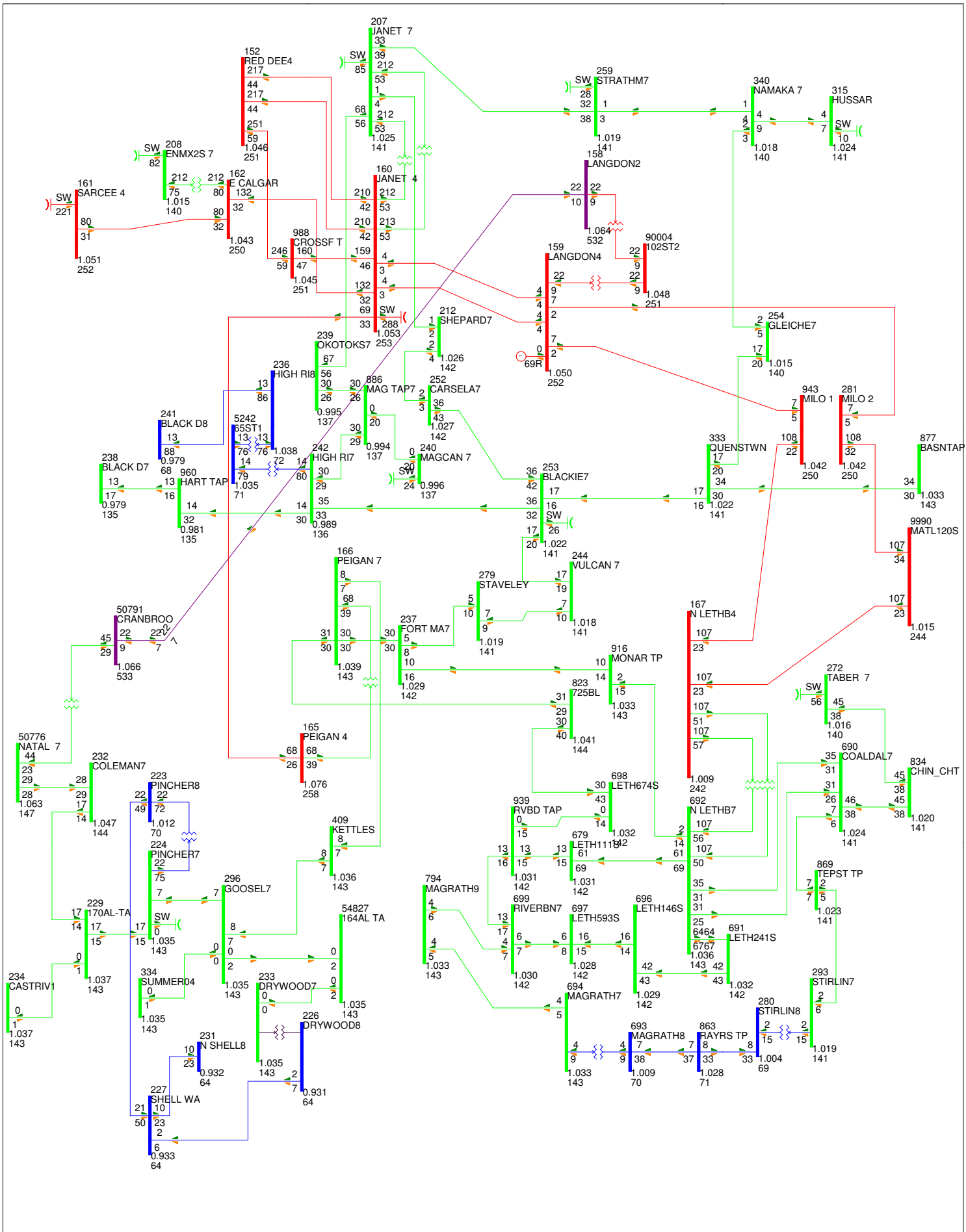
EXISTING SYSTEM
 Fig Existing-SP-18

Bus: VOLTAGE (KV) (P)
 Branch: MW (W) (P)
 Equipment: MW (W) (P)
 100-250000
 100-250000 -49000 -135000 -240000 -500000 -600000 -690000

BC Export: -36 MW







SOUTH PLANNING STUDY
 2007 SUMMER PEAK CASE
 Existing South West System FRI, NOV 21 2008 8:32

EXISTING SYSTEM
 Fig Existing-SP-26

Bus: VOLTAGE (KV) / PHASE
 Branch: MW / MVA / RATE A
 Equipment: MW / MVA
 110: 240-240-240
 69: 69-69-69
 24: 130-130-240-240
 15: 300-300-400-300-400-300

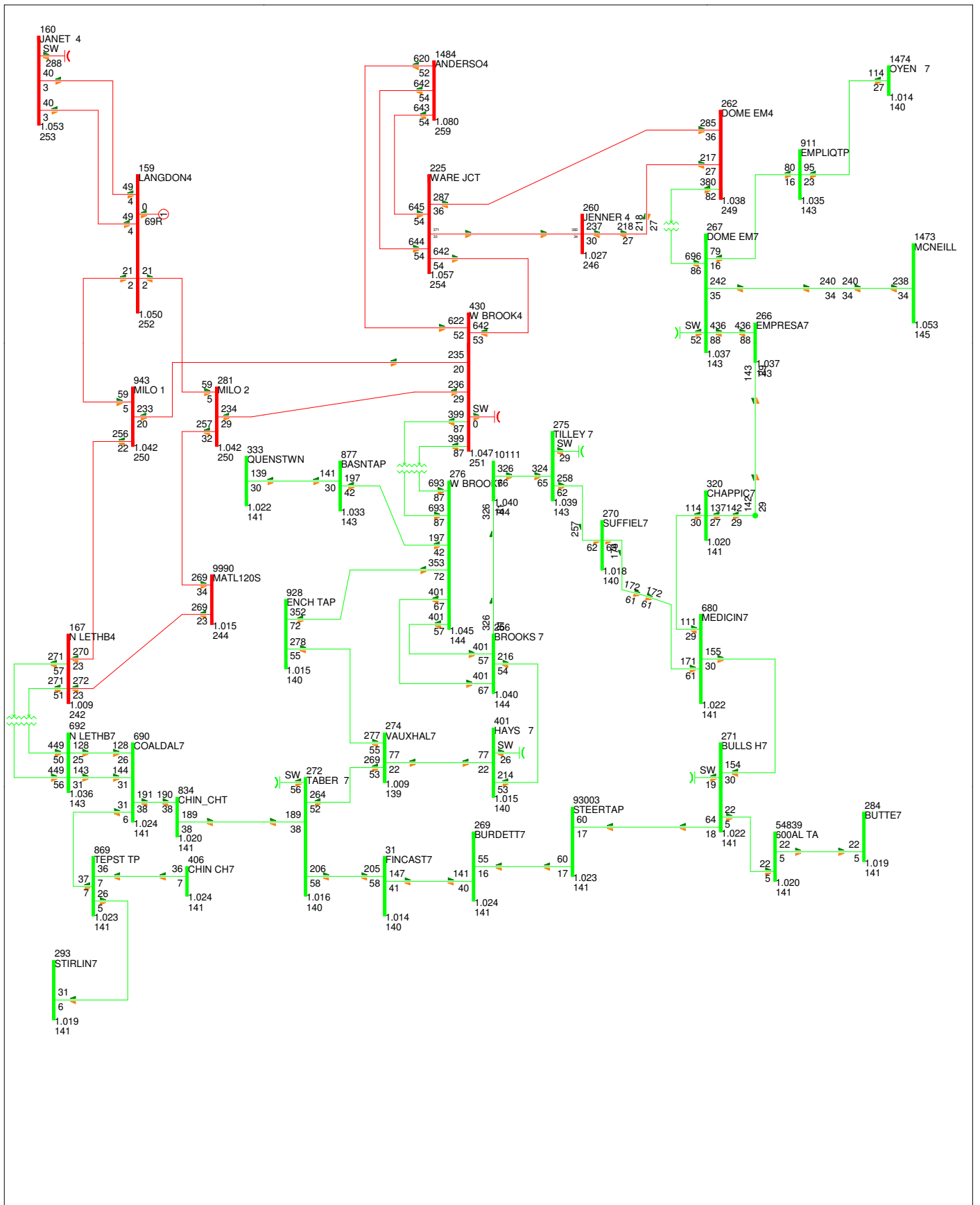


Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
1382[BUFALOTP] - 1383[VERMILO7] 138 kV line 50														923		
1382[BUFALOTP] - 1490[JAROW TP] 138 kV line 50														831		
1474[OYEN 7] - 89993[KYSTP3T3] 138 kV line 98														1043		
1474[OYEN 7] - 89994[KYSTP4T4] 138 kV line 60												612	930			
159[LANGDON4] - 160[JANET 4] 240 kV line 36	268	424	439	394	408	413	320	328	376	334	345	333	350	405		351
159[LANGDON4] - 281[MILO 2] 240 kV line 27																
160[JANET 4] - 165[PEIGAN 4] 240 kV line 11	366	426	417	551	552	468	715	1000	491	583				720		555
165[PEIGAN 4] - 166[PEIGAN 7] 240/138 kV transformer T1	11	9	8			17	113									
165[PEIGAN 4] - 346[GOOSEL4] 240 kV line 75		841														
165[PEIGAN 4] - 346[GOOSEL4] 240 kV line 76		841														
166[PEIGAN 7] - 77703[TAP BUS] 138 kV line 70	34	29	25			48	339									
167[N LETHB4] - 692[N LETHB7] 240/138 kV transformer T3				474	441		767	777								505
167[N LETHB4] - 692[N LETHB7] 240/138 kV transformer T5				425	407		766	448								455
167[N LETHB4] - 943[MILO 1] 240 kV line 24			929						775							
167[N LETHB4] - 9990[MATL120S] 240 kV line 1		807	700						270							
171[SEEBE 7] - 329[POCATER7] 138 kV line 77	225	523	580						829							756

Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
207[JANET 7] - 212[SHEPARD7] 138 kV line 50		666	668	550	512				860	783				888	129	759
207[JANET 7] - 239[OKOTOKS7] 138 kV line 27															364	
207[JANET 7] - 259[STRATHM7] 138 kV line 65															264	
207[JANET 7] - 577[ENMX23S7] 138 kV line 80															681	
207[JANET 7] - 590[ENMX24S7] 138 kV line 83															786	
212[SHEPARD7] - 252[CARSELA7] 138 kV line 50		743	806	615	571				662					972	141	822
223[PINCHER8] - 227[SHELL WA] 69 kV line 85	18					151										
223[PINCHER8] - 876[514BL TP] 69 kV line 14	0															
224[PINCHER7] - 223[PINCHER8] 138/69 kV transformer T1	7	683	703			48	346	141								
224[PINCHER7] - 229[170AL-TA] 138 kV line 70	201	321	367			435										
224[PINCHER7] - 296[GOOSEL7] 138 kV line 1	59	372	424													
225[WARE JCT] - 260[JENNER 4] 240 kV line 44														872		
225[WARE JCT] - 260[JENNER 4] 240 kV line 51														687		
225[WARE JCT] - 430[W BROOK4] 240 kV line 31														728		
226[DRYWOOD8] - 227[SHELL WA] 69 kV line 85	29					132	409									
226[DRYWOOD8] - 245[GLENWOO8] 69 kV line 46	87	297	365		656	17	49	193								632

Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
229[170AL-TA] - 232[COLEMAN7] 138 kV line 70	113	166	194		1000	457	636		655							1000
232[COLEMAN7] - 1501[NATAL 7] 138 kV line 86	81	103	122	752	654	349	614	773	454							1000
233[DRYWOOD7] - 226[DRYWOOD8] 138/69 kV transformer T1	34	893	957			41	240	210								
233[DRYWOOD7] - 54827[164AL TA] 138 kV line 64	73					88	352									
237[FORT MA7] - 279[STAVELEY] 138 kV line 80	358	519	516	152	120	412	312	327	429	424				694	603	352
237[FORT MA7] - 77705[TAP BUS] 138 kV line 72				86	87				982						514	919
237[FORT MA7] - 823[725BL] 138 kV line 25		995	945	12	219	467	248	209	776							651
239[OKOTOKS7] - 886[MAG TAP7] 138 kV line 27															331	
242[HIGH RI7] - 253[BLACKIE7] 138 kV line 53					1000										239	
242[HIGH RI7] - 886[MAG TAP7] 138 kV line 27															330	
244[VULCAN 7] - 253[BLACKIE7] 138 kV line 61		677	621	202	155	454	705	470	586	580					536	492
244[VULCAN 7] - 279[STAVELEY] 138 kV line 80	357	621	617	180	140	481	689	397	521	520				816	567	431
245[GLENWOO8] - 246[SPRING 8] 69 kV line 25	133	263	328		938	19	1	3								1000
246[SPRING 8] - 693[MAGRATH8] 69 kV line 25	135	261	324		953	19	1	5								
252[CARSELA7] - 253[BLACKIE7] 138 kV line 51					933										223	
253[BLACKIE7] - 77715[TAP BUS] 138 kV line 52					459										116	

Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
254[GLEICHE7] - 333[QUENSTWN] 138 kV line 76		786	806	693	683				823	721				767	118	724
254[GLEICHE7] - 340[NAMAKA 7] 138 kV line 33															227	
256[BROOKS 7] - 10111[] 138 kV line 1										648	264	272	289			
256[BROOKS 7] - 401[HAYS 7] 138 kV line 95										511						476
259[STRATHM7] - 340[NAMAKA 7] 138 kV line 33															275	
260[JENNER 4] - 677[CYPRESS1] 240 kV line 45														650		
260[JENNER 4] - 77714[TAP BUS] 240 kV line 51														345		
262[DOME EM4] - 267[DOME EM7] 240/138 kV transformer T5													241	377		
262[DOME EM4] - 677[CYPRESS1] 240 kV line 45														650		
262[DOME EM4] - 77714[TAP BUS] 240 kV line 51														343		
266[EMPRESA7] - 267[DOME EM7] 138 kV line 60										827	625	681	144	559		
266[EMPRESA7] - 77713[TAP BUS] 138 kV line 60					992					302	184	117	62	653		558
267[DOME EM7] - 911[EMPLIQTP] 138 kV line 60													563	824		
269[BURDETT7] - 77711[TAP BUS] 138 kV line 72				817	291			395		31	88	112	327			109
270[SUFFIEL7] - 275[TILLEY 7] 138 kV line 00										233	180	160	170			986
270[SUFFIEL7] - 675[REDCLIFF] 138 kV line 00										167	136	122	132			991

Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
271[BULLS H7] - 54839[600AL TA] 138 kV line 00												119				
271[BULLS H7] - 680[MEDICIN7] 138 kV line 80										130	108	100	269			583
271[BULLS H7] - 93003[STEERTAP] 138 kV line 72					972			872		51	44	97	255			252
272[TABER 7] - 274[VAUXHAL7] 138 kV line 63				789	758		722	477		160	207	290				147
272[TABER 7] - 834[CHIN_CHT] 138 kV line 72	309		936	404	386	452	509	217	796	194	243	344	746			92
274[VAUXHAL7] - 401[HAYS 7] 138 kV line 21										322	440					295
274[VAUXHAL7] - 928[ENCH TAP] 138 kV line 63										344	450					318
275[TILLEY 7] - 10111[] 138 kV line 00										637	263	270	287			
276[W BROOK7] - 877[BASNTAP] 138 kV line 53		586	592						542	417	397	1000	388	398	273	472
276[W BROOK7] - 928[ENCH TAP] 138 kV line 63										353	465					326
280[STIRLIN8] - 863[RAYRS TP] 69 kV line 25	-195					-47	-27	11								
281[MILO 2] - 9990[MATL120S] 240 kV line 23			995						347							
284[BUTTE7] - 54839[600AL TA] 138 kV line 00												119				
293[STIRLIN7] - 280[STIRLIN8] 138/69 kV transformer T3	236					19	10	33								
293[STIRLIN7] - 869[TEPST TP] 138 kV line 20						430	302	94								
296[GOOSEL7] - 409[KETTLES] 138 kV line 70	1	116	-10			199										

Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
296[GOOSEL7] - 54543[OLDMAN1] 138 kV line 24		164														
296[GOOSEL7] - 54827[164AL TA] 138 kV line 64	75					90	355									
31[FINCAST7] - 269[BURDETT7] 138 kV line 12		995	967	-17	-17	431	-15	-11	868	-4	105	133	400			-7
31[FINCAST7] - 272[TABER 7] 138 kV line 10				703	685		689	358		21	43	60	175			209
31[FINCAST7] - 828[PURPLETP] 138 kV line 88										11						
320[CHAPPIC7] - 680[MEDICIN7] 138 kV line 60					211					74	39	27	97	911		116
320[CHAPPIC7] - 77713[TAP BUS] 138 kV line 60					371					133	68	47	93	872		206
329[POCATER7] - 819[BRITT TP] 138 kV line 87	211	412	459		613				636					763		595
333[QUENSTWN] - 77715[TAP BUS] 138 kV line 52					1000										115	
333[QUENSTWN] - 877[BASNTAP] 138 kV line 53		590	605						547	421	401	1000	392	401	270	476
346[GOOSEL4] - 296[GOOSEL7] 240/138 kV transformer T1	377	238	246			510										
389[CHIN-CH8] - 834[CHIN_CHT] 138 kV line 72																87
409[KETTLES] - 77703[TAP BUS] 138 kV line 70	25	24	55			38	264									
430[W BROOK4] - 276[W BROOK7] 240/138 kV transformer T1																845
430[W BROOK4] - 276[W BROOK7] 240/138 kV transformer T2																845
65[BARDO 7] - 68[N HOLDE7] 138 kV line 74														825		

Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
670[TAYLOR 8] - 693[MAGRATH8] 69 kV line 25							13									
675[REDCLIFF] - 680[MEDICIN7] 138 kV line 00										168	135	122	132			987
679[LETH111S] - 692[N LETHB7] 138 kV line 07				92	241	260	145	215								
679[LETH111S] - 939[RVBD TAP] 138 kV line 25				65	194	222	106	213								
68[N HOLDE7] - 76[IPPL ST7] 138 kV line 01														693		
690[COALDAL7] - 692[N LETHB7] 138 kV line 70								252		366	475					241
690[COALDAL7] - 692[N LETHB7] 138 kV line 72								227		329	423	1000				194
690[COALDAL7] - 834[CHIN_CHT] 138 kV line 72				569	546	484	658	268	961	168	214	306	715			93
690[COALDAL7] - 869[TEPST TP] 138 kV line 20						400	274	87								
691[LETH241S] - 692[N LETHB7] 138 kV line 34				258	699		157	224								
691[LETH241S] - 696[LETH146S] 138 kV line 13				235	640	538	146	201								
692[N LETHB7] - 916[MONAR TP] 138 kV line 72		616	590	112	92			348	526						677	322
693[MAGRATH8] - 863[RAYRS TP] 69 kV line 25	-178					-36	-20	2		444						687
694[MAGRATH7] - 693[MAGRATH8] 138/69 kV transformer T1	127					38	16	21								
694[MAGRATH7] - 794[MAGRATH9] 138 kV line 63	126					203	71	185								
696[LETH146S] - 697[LETH593S] 138 kV line 23				240	652	460	151	203								

Table B-2

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Light Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
697[LETH593S] - 699[RIVERBN7] 138 kV line 24				206	558	399	131	193								
698[LETH674S] - 823[725BL] 138 kV line 25				13	102										631	
698[LETH674S] - 939[RVBD TAP] 138 kV line 25				35	141										904	
699[RIVERBN7] - 794[MAGRATH9] 138 kV line 63	129					88	33	52								
699[RIVERBN7] - 939[RVBD TAP] 138 kV line 25				214	550	218	75	195								
76[IPPL ST7] - 1491[BAT. RV7] 138 kV line 01														672		
77711[TAP BUS] - 93003[STEERTAP] 138 kV line 72					953		677	852		50	44	98	257			250
816[LINE TP] - 1501[NATAL 7] 138 kV line 87	230	628	693													
816[LINE TP] - 817[ELKFRD T] 138 kV line 87	218	659														
823[725BL] - 901[MCBRIDE1] 138 kV line B1				105												
911[EMPLIQTP] - 89994[KYSTP4T4] 138 kV line 60												1000	518	723		
916[MONAR TP] - 77705[TAP BUS] 138 kV line 72		668	643	105	86				584						626	423

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
1382[BUFALOTP] - 1383[VERMILO7] 138 kV line 50														NC		
1382[BUFALOTP] - 1490[JAROW TP] 138 kV line 50		NC	NC		NC				NC					NC		NC
1471[MONITOR7] - 89993[KYSTP3T3] 138 kV line 98													1451	1018		
1474[OYEN 7] - 89993[KYSTP3T3] 138 kV line 98													699	900		
1474[OYEN 7] - 89994[KYSTP4T4] 138 kV line 60													636	788		
159[LANGDON4] - 160[JANET 4] 240 kV line 36		803	824		785				787					809		697
159[LANGDON4] - 160[JANET 4] 240 kV line 37		803	824		785				787					809		697
159[LANGDON4] - 281[MILO 2] 240 kV line 27									923							
160[JANET 4] - 162[E CALGAR] 240 kV line 17	377	762	762	856	839	531	754	790	784	830	857			929		800
160[JANET 4] - 165[PEIGAN 4] 240 kV line 11	301	664	635			492	701		808							
165[PEIGAN 4] - 166[PEIGAN 7] 240/138 kV transformer T1	37	31	26			54	429									
165[PEIGAN 4] - 346[GOOSEL4] 240 kV line 75		847														
165[PEIGAN 4] - 346[GOOSEL4] 240 kV line 76		847														
166[PEIGAN 7] - 77703[TAP BUS] 138 kV line 70	62	49	43			88	705									
167[N LETHB4] - 692[N LETHB7] 240/138 kV transformer T3				520	470		727	747								467
167[N LETHB4] - 692[N LETHB7] 240/138 kV transformer T5				489	444		739	677								443

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
167[N LETHB4] - 943[MILO 1] 240 kV line 24									903							
167[N LETHB4] - 9990[MATL120S] 240 kV line 1		794	698						299							
171[SEEBE 7] - 329[POCATER7] 138 kV line 77	213	439	504													
207[JANET 7] - 212[SHEPARD7] 138 kV line 50				359	331			980	790	786				825	89	680
207[JANET 7] - 239[OKOTOKS7] 138 kV line 27															378	
207[JANET 7] - 259[STRATHM7] 138 kV line 65														771	85	
207[JANET 7] - 577[ENMX23S7] 138 kV line 80	-194	-527	-524	-331	-325	-128	-364	-351	-420	-398	-388	-374	-428	-493	-138	-407
207[JANET 7] - 590[ENMX24S7] 138 kV line 83	-193	-637	-633	-950	-1058	-123	-375	-400	-544	-475	-483	-406	-490	-619	-490	-474
208[ENMX2S 7] - 577[ENMX23S7] 138 kV line 80		925	905	675	655				840	867				923	263	837
212[SHEPARD7] - 252[CARSELA7] 138 kV line 50				405	379			1000	882	966				932	99	771
223[PINCHER8] - 227[SHELL WA] 69 kV line 85	18					158										
223[PINCHER8] - 876[514BL TP] 69 kV line 14	2															
224[PINCHER7] - 223[PINCHER8] 138/69 kV transformer T1	10	808	828			66	311	194								
224[PINCHER7] - 229[170AL-TA] 138 kV line 70	206	313	358			398										
224[PINCHER7] - 296[GOOSEL7] 138 kV line 1	58	346	395			301										
225[WARE JCT] - 260[JENNER 4] 240 kV line 44														978		

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
225[WARE JCT] - 260[JENNER 4] 240 kV line 51														792		
225[WARE JCT] - 430[W BROOK4] 240 kV line 31														288		
226[DRYWOOD8] - 227[SHELL WA] 69 kV line 85	32					131	303									
226[DRYWOOD8] - 245[GLENWOO8] 69 kV line 46	82	301	370			19	61	90								615
229[170AL-TA] - 232[COLEMAN7] 138 kV line 70	117	160	187		1000	267	605	759	611							991
232[COLEMAN7] - 1501[NATAL 7] 138 kV line 86	87	107	126	682	620	250	609	763	444	1000						1000
233[DRYWOOD7] - 226[DRYWOOD8] 138/69 kV transformer T1	38	790	846			41	269	235								
233[DRYWOOD7] - 54827[164AL TA] 138 kV line 64	1					97	347									
237[FORT MA7] - 279[STAVELEY] 138 kV line 80	345	666	629	166	132	209	620	566	590	817					623	515
237[FORT MA7] - 77705[TAP BUS] 138 kV line 72				85	87			1000	994						499	962
237[FORT MA7] - 823[725BL] 138 kV line 25		989	936	13	218	226	284	224	759							631
239[OKOTOKS7] - 886[MAG TAP7] 138 kV line 27															330	
242[HIGH RI7] - 253[BLACKIE7] 138 kV line 53				780	713										168	
242[HIGH RI7] - 886[MAG TAP7] 138 kV line 27															291	
244[VULCAN 7] - 253[BLACKIE7] 138 kV line 61		948	894	226	174	480	695	811	803						534	809
244[VULCAN 7] - 279[STAVELEY] 138 kV line 80		828	782	200	156	516	708	842	711						576	669

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
245[GLENWOO8] - 246[SPRING 8] 69 kV line 25	116	273	339		947	21	1	4								922
246[SPRING 8] - 693[MAGRATH8] 69 kV line 25	122	274	340		963	20	1	5								
252[CARSELA7] - 253[BLACKIE7] 138 kV line 51				788	720										170	
253[BLACKIE7] - 77715[TAP BUS] 138 kV line 52														762	55	1000
254[GLEICHE7] - 333[QUENSTWN] 138 kV line 76															151	
254[GLEICHE7] - 340[NAMAKA 7] 138 kV line 33															267	
256[BROOKS 7] - 10111[] 138 kV line 1										632	345	290	315			
256[BROOKS 7] - 401[HAYS 7] 138 kV line 95										569						528
259[STRATHM7] - 340[NAMAKA 7] 138 kV line 33					968									734	82	
260[JENNER 4] - 677[CYPRESS1] 240 kV line 45														723		
260[JENNER 4] - 77714[TAP BUS] 240 kV line 51														346		
262[DOME EM4] - 267[DOME EM7] 240/138 kV transformer T5													287	NC		
262[DOME EM4] - 677[CYPRESS1] 240 kV line 45														723		
266[EMPRESA7] - 267[DOME EM7] 138 kV line 60										877	690	705	153	351		
266[EMPRESA7] - 77713[TAP BUS] 138 kV line 60							-38	-31		-16	-10	-7	-4	526		-24
267[DOME EM7] - 911[EMPLIQTP] 138 kV line 60												1000	NC	744		

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
269[BURDETT7] - 77711[TAP BUS] 138 kV line 72					575			1000		54	86	116	265			202
270[SUFFIEL7] - 275[TILLEY 7] 138 kV line 00										231	182	166	179			1022
270[SUFFIEL7] - 675[REDCLIFF] 138 kV line 00										146	121	112	125			
271[BULLS H7] - 54839[600AL TA] 138 kV line 00												117				
271[BULLS H7] - 680[MEDICIN7] 138 kV line 80										162	134	125	211			771
271[BULLS H7] - 93003[STEERTAP] 138 kV line 72								1000		68	60	103	217			311
272[TABER 7] - 274[VAUXHAL7] 138 kV line 63							664	900		191	251	531				176
272[TABER 7] - 834[CHIN_CHT] 138 kV line 72				433	418	233	655	235	869	210	254	382	739			92
274[VAUXHAL7] - 401[HAYS 7] 138 kV line 21										359						331
274[VAUXHAL7] - 928[ENCH TAP] 138 kV line 63										387						360
275[TILLEY 7] - 10111[] 138 kV line 00										612	342	288	313			
276[W BROOK7] - 877[BASNTAP] 138 kV line 53												1000	847	559	248	
276[W BROOK7] - 928[ENCH TAP] 138 kV line 63										404						375
280[STIRLIN8] - 863[RAYRS TP] 69 kV line 25	-190					-48	-28	13								
281[MILO 2] - 9990[MATL120S] 240 kV line 23									348							
284[BUTTE7] - 54839[600AL TA] 138 kV line 00												117				

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
293[STIRLIN7] - 280[STIRLIN8] 138/69 kV transformer T3	119					13	7	35								
293[STIRLIN7] - 869[TEPST TP] 138 kV line 20						416	318	100								
296[GOOSEL7] - 409[KETTLES] 138 kV line 70	1	127	-11			212										
296[GOOSEL7] - 54543[OLDMAN1] 138 kV line 24		163														
296[GOOSEL7] - 54827[164AL TA] 138 kV line 64	1					100	351									
31[FINCAST7] - 269[BURDETT7] 138 kV line 12				-243	-242	-118	-194	-139		-49	118	156	389			-91
31[FINCAST7] - 272[TABER 7] 138 kV line 10				717	698		729	363		27	59	85	177			212
31[FINCAST7] - 828[PURPLETP] 138 kV line 88										10						
320[CHAPPIC7] - 680[MEDICIN7] 138 kV line 60							-374	-398		-375	-259	-209	99	808		-544
320[CHAPPIC7] - 77713[TAP BUS] 138 kV line 60							-362	-397		-275	-181	-169	93	754		-418
329[POCATER7] - 819[BRITT TP] 138 kV line 87	151	302	341		481	162			764							397
333[QUENSTWN] - 77715[TAP BUS] 138 kV line 52										530			408	354	116	736
333[QUENSTWN] - 877[BASNTAP] 138 kV line 53												1000	861	566	246	
346[GOOSEL4] - 296[GOOSEL7] 240/138 kV transformer T1	374	263	272			238										
389[CHIN-CH8] - 834[CHIN_CHT] 138 kV line 72																85
409[KETTLES] - 77703[TAP BUS] 138 kV line 70	40	36	53			61	504									

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
430[W BROOK4] - 1484[ANDERSO4] 240 kV line 33														427		
430[W BROOK4] - 276[W BROOK7] 240/138 kV transformer T1														-334		861
430[W BROOK4] - 276[W BROOK7] 240/138 kV transformer T2														-334		861
550[ENMX22S7] - 572[ENMX39S7] 138 kV line 81		576	569	536	532				551	568				632	304	559
567[ENMX1S 7] - 568[ENMX5S 7] 138 kV line 82				-1054	-974				-400	-1238	-388				-884	-383
567[ENMX1S 7] - 568[ENMX5S 7] 138 kV line 84				-1054	-974				-400	-1238	-388				-884	-383
579[ENMX31S7] - 585[ENMX9S 7] 138 kV line 80															920	
579[ENMX31S7] - 590[ENMX24S7] 138 kV line 81															630	
583[ENMX32S7] - 589[ENMX26S7] 138 kV line 81															903	
589[ENMX26S7] - 590[ENMX24S7] 138 kV line 82															356	
65[BARDO 7] - 68[N HOLDE7] 138 kV line 74														726		
670[TAYLOR 8] - 693[MAGRATH8] 69 kV line 25							14									
675[REDCLIFF] - 680[MEDICIN7] 138 kV line 00										145	121	112	125			
679[LETH111S] - 692[N LETHB7] 138 kV line 07				122	295	264	192	232								
679[LETH111S] - 939[RVBD TAP] 138 kV line 25				81	222	199	129	200								
68[N HOLDE7] - 76[IPPL ST7] 138 kV line 01													822	593		

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
690[COALDAL7] - 692[N LETHB7] 138 kV line 70								259		377	494					252
690[COALDAL7] - 692[N LETHB7] 138 kV line 72					970			235		344	448	1074				204
690[COALDAL7] - 834[CHIN_CHT] 138 kV line 72				582	573	457	690	280		182	229	325	674			93
690[COALDAL7] - 869[TEPST TP] 138 kV line 20						431	291	92								
691[LETH241S] - 692[N LETHB7] 138 kV line 34				320	782	514	185	232								
691[LETH241S] - 696[LETH146S] 138 kV line 13				289	727	266	169	234								
692[N LETHB7] - 916[MONAR TP] 138 kV line 72		667	656	117	96			311	576	451					717	315
693[MAGRATH8] - 863[RAYRS TP] 69 kV line 25	-191					-43	-24	6		337						253
694[MAGRATH7] - 693[MAGRATH8] 138/69 kV transformer T1	132					47	19	25								
694[MAGRATH7] - 794[MAGRATH9] 138 kV line 63	128					207	76	183								
696[LETH146S] - 697[LETH593S] 138 kV line 23				276	722	266	165	222								
697[LETH593S] - 699[RIVERBN7] 138 kV line 24				228	615	220	137	198								
698[LETH674S] - 823[725BL] 138 kV line 25				12	103											640
698[LETH674S] - 939[RVBD TAP] 138 kV line 25				45	155											
699[RIVERBN7] - 794[MAGRATH9] 138 kV line 63	133					106	38	65								
699[RIVERBN7] - 939[RVBD TAP] 138 kV line 25				227	572	231	80	208								

Table B-3

TRANSFER OUT ANALYSIS RESULTS
2010 Summer Peak Model

Limiting Element	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
74[METIS647] - 814[KILRY TP] 138 kV line 49														881		
76[IPPL ST7] - 1491[BAT. RV7] 138 kV line 01									960	966			779	569		989
77711[TAP BUS] - 93003[STEERTAP] 138 kV line 72								1000		67	60	104	220			308
816[LINE TP] - 1501[NATAL 7] 138 kV line 87	212	573	628													
816[LINE TP] - 817[ELKFRD T] 138 kV line 87	217	604	666													
817[ELKFRD T] - 818[GR HL TP] 138 kV line 87		636	702													
818[GR HL TP] - 819[BRITT TP] 138 kV line 87		666														
823[725BL] - 901[MCBRIDE1] 138 kV line B1				105												
911[EMPLIQTP] - 89994[KYSTP4T4] 138 kV line 60												1000	NC	676		
916[MONAR TP] - 77705[TAP BUS] 138 kV line 72		749	723	107	89			342	672						643	392

In the result tables, there are positive and negative values as well as the notation “NC”. The positive values indicate that the limiting element shown became an overloaded system constraint at that level of MW transfer from the respective collection point (CP) substation. For example, in Table B-2, the positive value of 37 shown in the CP #1 column indicates that the Peigan 240/138 kV transformer T1 becomes overloaded when 37 MW of generation is injected at the collection substation CP #1.

A negative value in the transfer out analysis results indicates that the limiting element shown is already overloaded under single contingency conditions and has zero incremental transfer capability. This means that zero wind generation can be injected at that collection substation without overloading the limiting element during a single contingency condition.

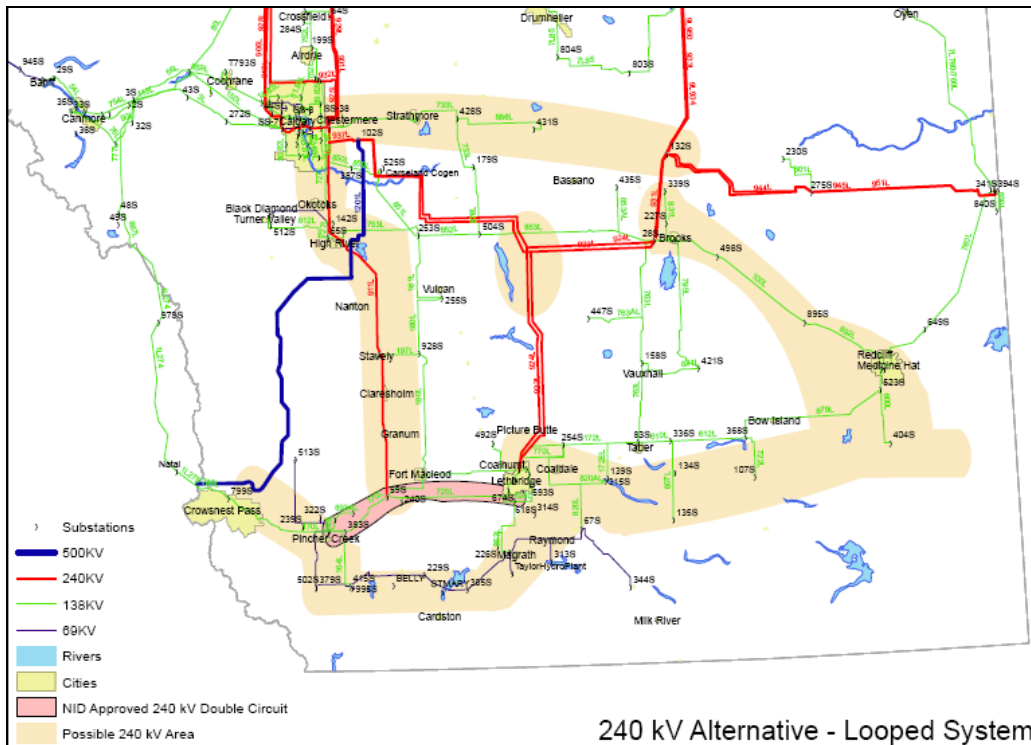
The notation “NC” in the results indicates that the worst case single contingency did not converge for the identified limiting element. There is a high likelihood that a transfer limitation exists for the identified limiting element, but the transfer MW value is not known from this result. However, if the same limiting element consistently has reported values for other collection point substation columns, then the transfer MW value can be inferred from the results from similar collection point substations. A blank cell in the table indicates that the facility does not overload for a transfer up to 1000 MW from the specific collection substation.

Some important factors about the transfer out can be observed. As shown by the rows in the result tables with some blank cells and some non-blank cells, a transmission line or transformer which is a limiting element for one collection substation is not necessarily a limiting element for all collection substations. For example, the Peigan 240/138 kV transformer T1, shown in Table B-2, is a transfer limiting element for collection substations 1, 2, 3, 6, and 7, while not a limiting element for the remaining collection substations. This clearly illustrates that the southern transmission system responds differently depending upon the generation interconnection location.

Also shown by the results are that some limiting elements are persistent across all or most collection substations. For example, the Peigan to Janet 240 kV line is a limiting element in the summer light transfer out results for all but four of the collection substation locations. Therefore, some lines and transformers are consistently overloading regardless of the generation interconnection location.

APPENDIX C TRANSMISSION ALTERNATIVES

ALTERNATIVE 1A:



Stage I:

- 911L replaced by Calgary South – Peigan 240 kV double circuit transmission line with 50% series compensation
- Sub D (south of Bow Island) substation
- Sub D – Medicine Hat 2 – West Brooks 240 kV double circuit transmission line
- Milo Junction Switching Station
- Phase Shifting Transformer on 170L Coleman to Natal
- Peigan SVC = 0 - -200MVAR and Sub D SVC = 0 - -100 MVAR

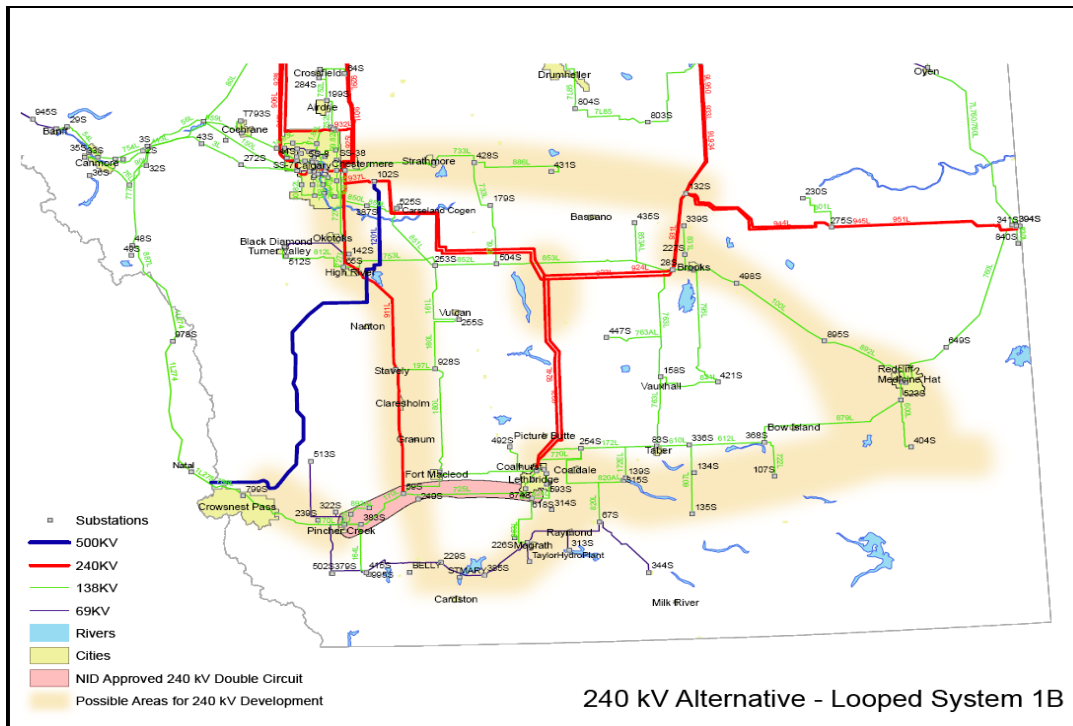
Stage II:

- Medicine Hat 2 substation; Medicine Hat 138 kV changes/upgrades (reflected in analysis as potentially being advanced in parallel with Stage I development)
- New Crowsnest 500/240 kV substation 2 x 1200 MVA
- Crowsnest – Goose Lake 240 kV double circuit transmission line
- Goose Lake – Sub C 240 kV double circuit line with one side strung
- Sub C (south of Taber) substation
- Sub C – Montana Alberta Tie Ltd. (MATL) 240 kV double circuit line with one side strung
- Sub C – Sub D 240 kV double circuit transmission line
- Salvage line 911L
- Peigan 179 MVA transformer replaced by 2 x 200 MVA transformers
- Blackie Area 138 kV upgrades/modifications
- Anderson – W. Brooks 240 kV in-and-out at Ware Junction
- Crowsnest SVC = +400 MVAR, Sub C SVC = 0 - -100 MVAR, Cypress SVC = 25 - -50 MVAR

Stage III:

- Ware Junction – Langdon 240 kV double circuit transmission line with 50% series compensation

ALTERNATIVE 1B:



Stage I:

- 911L replaced by Calgary South – Peigan 240 kV double circuit transmission line with 50% series compensation
- Sub D (south of Bow Island) substation
- Sub D – Medicine Hat 2 – West Brooks 240 kV double circuit transmission line
- Milo Junction Switching Station
- Phase Shifting Transformer on 170L Coleman to Natal
- Peigan SVC = 0 - -200MVAR and Sub D SVC = 0 - -100 MVAR

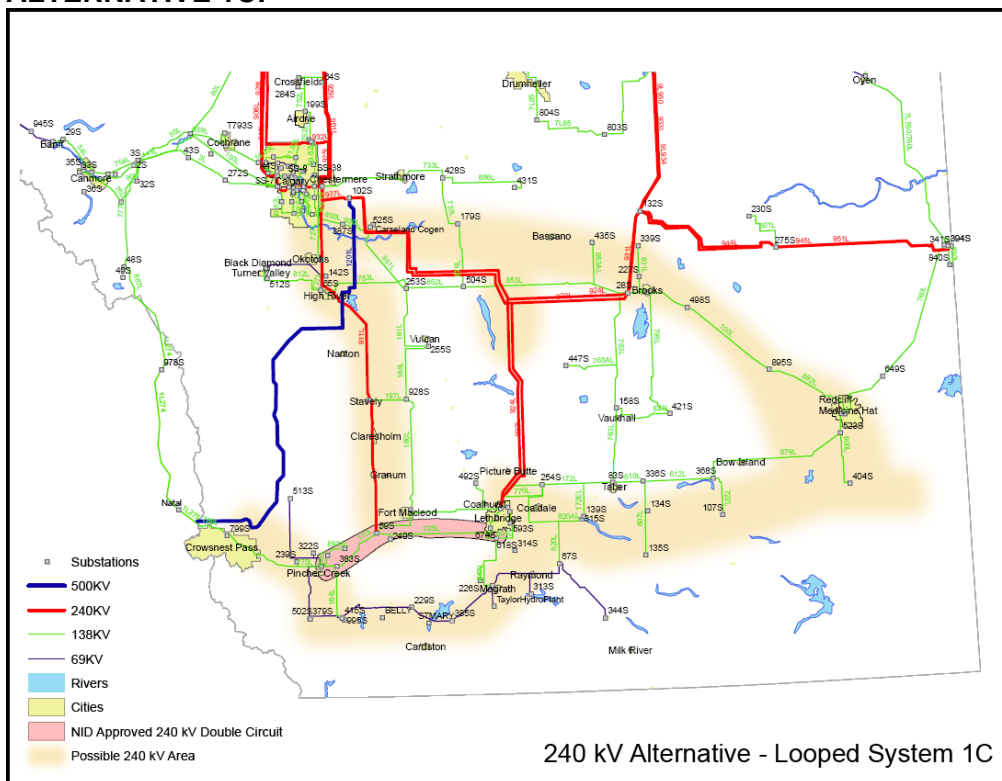
Stage II:

- Medicine Hat 2 substation; Medicine Hat 138 kV changes/upgrades (reflected in analysis as potentially being advanced in parallel with Stage I development)
- New Crowsnest 500/240 kV substation 2 x 1200 MVA
- Crowsnest – Goose Lake 240 kV double circuit transmission line
- Peigan – Sub C 240 kV double circuit line with one side strung
(This is the only difference from Alternative 1A.)
- Sub C (south of Taber) substation
- Sub C – Montana Alberta Tie Ltd. (MATL) 240 kV double circuit line with one side strung
- Sub C – Sub D 240 kV double circuit transmission line
- Salvage line 911L
- Peigan 179 MVA transformer replaced by 2 x 200 MVA transformers
- Blackie Area 138 kV upgrades/modifications
- Anderson – W. Brooks 240 kV in-and-out at Ware Junction
- Crowsnest SVC = +400 MVAR Sub C SVC = 0 - -100 MVAR, Cypress SVC = 25 - -50 MVAR

Stage III:

- Ware Junction – Langdon 240 kV double circuit transmission line with 50% series compensation

ALTERNATIVE 1C:



Stage I:

- 911L replaced by Calgary South – Peigan 240 kV double circuit transmission line with 50% series compensation
- Sub D (south of Bow Island) substation
- Sub D – Medicine Hat 2 – West Brooks 240 kV double circuit transmission line
- Milo Junction Switching Station
- Phase Shifting Transformer on 170L Coleman to Natal
- Peigan SVC = 0 - -200MVAR and Sub D SVC = 0 - -100 MVAR

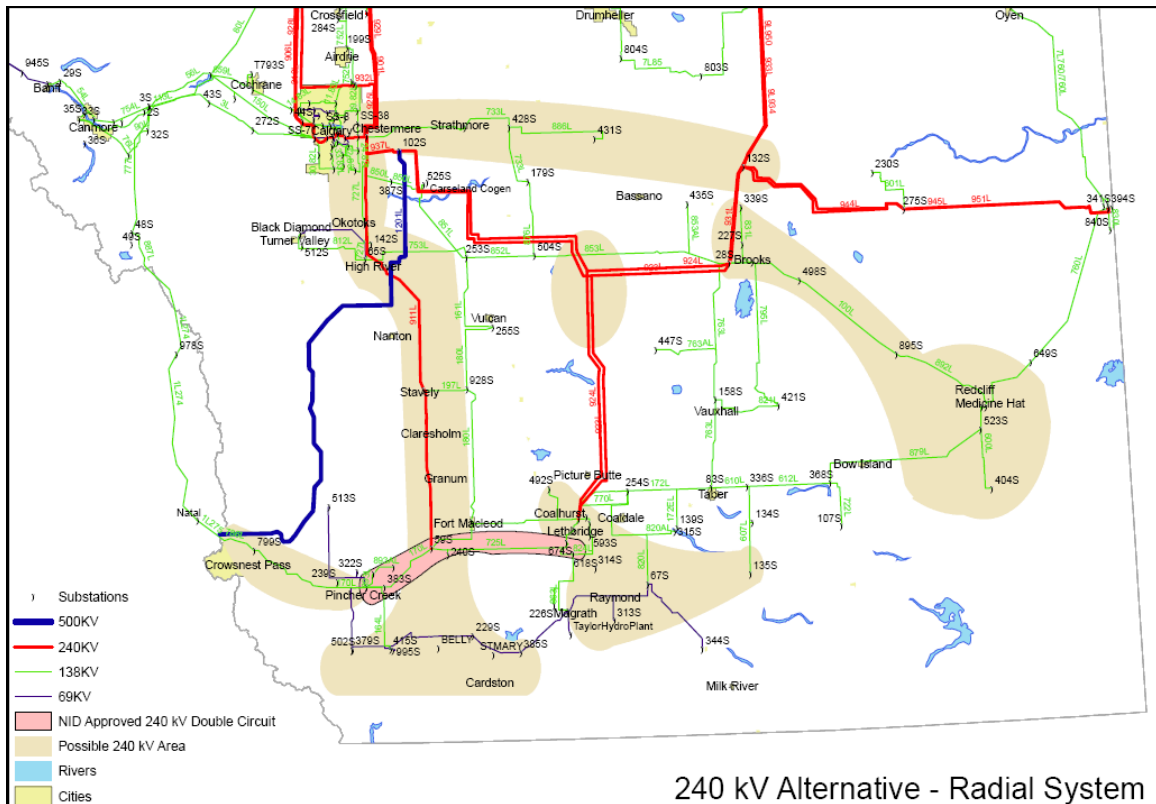
Stage II:

- Medicine Hat 2 substation; Medicine Hat 138 kV changes/upgrades (reflected in analysis as potentially being advanced in parallel with Stage I development)
- New Crowsnest 500/240 kV substation 2 x 1200 MVA
- Crowsnest – Goose Lake 240 kV double circuit transmission line
- Goose Lake – Sub C 240 kV double circuit line with one side strung
- Sub C (south of Taber) substation
- Sub C – Montana Alberta Tie Ltd. (MATL) 240 kV double circuit line with one side strung
- Sub C – Sub D 240 kV double circuit transmission line
- Salvage line 911L
- Peigan 179 MVA transformer replaced by 2 x 200 MVA transformers
- Blackie Area 138 kV upgrades/modifications
- Anderson – W. Brooks 240 kV in-and-out at Ware Junction
- Crowsnest SVC = +400 MVAR Sub C SVC = 0 - -100 MVAR, Cypress SVC = 25 - -50 MVAR

Stage III:

- West Brooks – South Calgary 240 kV double circuit transmission line
(This is the only difference from Alternative 1A.)

ALTERNATIVE 2:



Stage I:

- 911L replaced by Calgary South – Peigan 240 kV double circuit transmission line with 50% series compensation
- Sub D (south of Bow Island) substation
- Sub D – Medicine Hat 2 – West Brooks 240 kV double circuit transmission line
- Milo Junction Switching Station
- Phase Shifting Transformer on 170L Coleman to Natal
- Peigan SVC = 0 - -200MVAR and West Brooks SVC = 0 - -300 MVAR

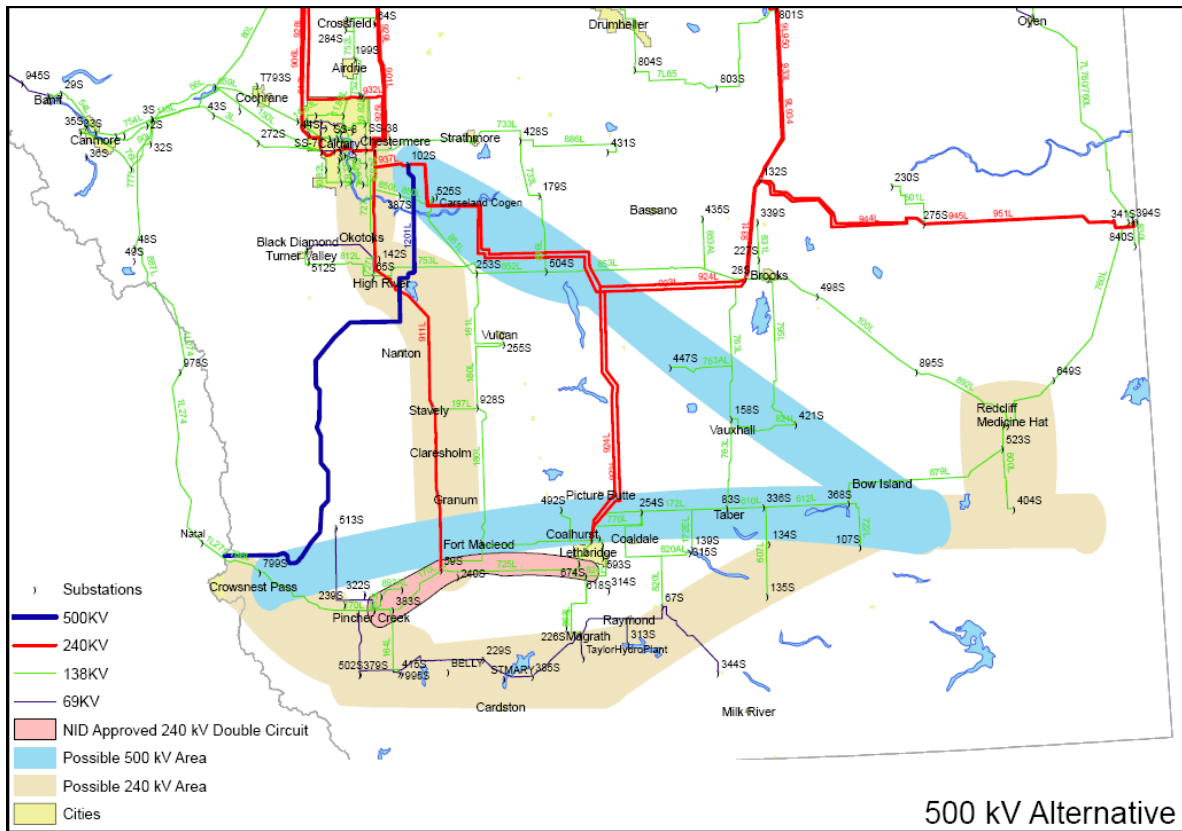
Stage II:

- Med Hat2 2 X 200 MVA substations
- Med Hat 138 kV changes/upgrades
- New Crowsnest 500/240 kV substation 2 x 1200 MVA, Sub C 240 kV substation, Sub A 240 kV substation
- Crowsnest – Goose Lake 240 kV double circuit transmission line
- Peigan– Sub A 240 kV double circuit line
- Sub C – MATL 240 kV double circuit line
- Anderson – W. Brooks 240 kV in-and-out at Ware Junction
- West Brooks – Sub D 240 kV single circuit line
- Peigan 179 MVA transformers replaced by 2 x 200 MVA transformer
- Blackie Area 138 kV upgrades/modifications
- Crowsnest SVC = 0 - +400 MVAR, MATL SVC = 0 - -100 MVAR, Cypress SVC = 25 - -50 MVAR

Stage III:

- Ware Junction – Langdon 240 kV double circuit transmission line

ALTERNATIVE 3:



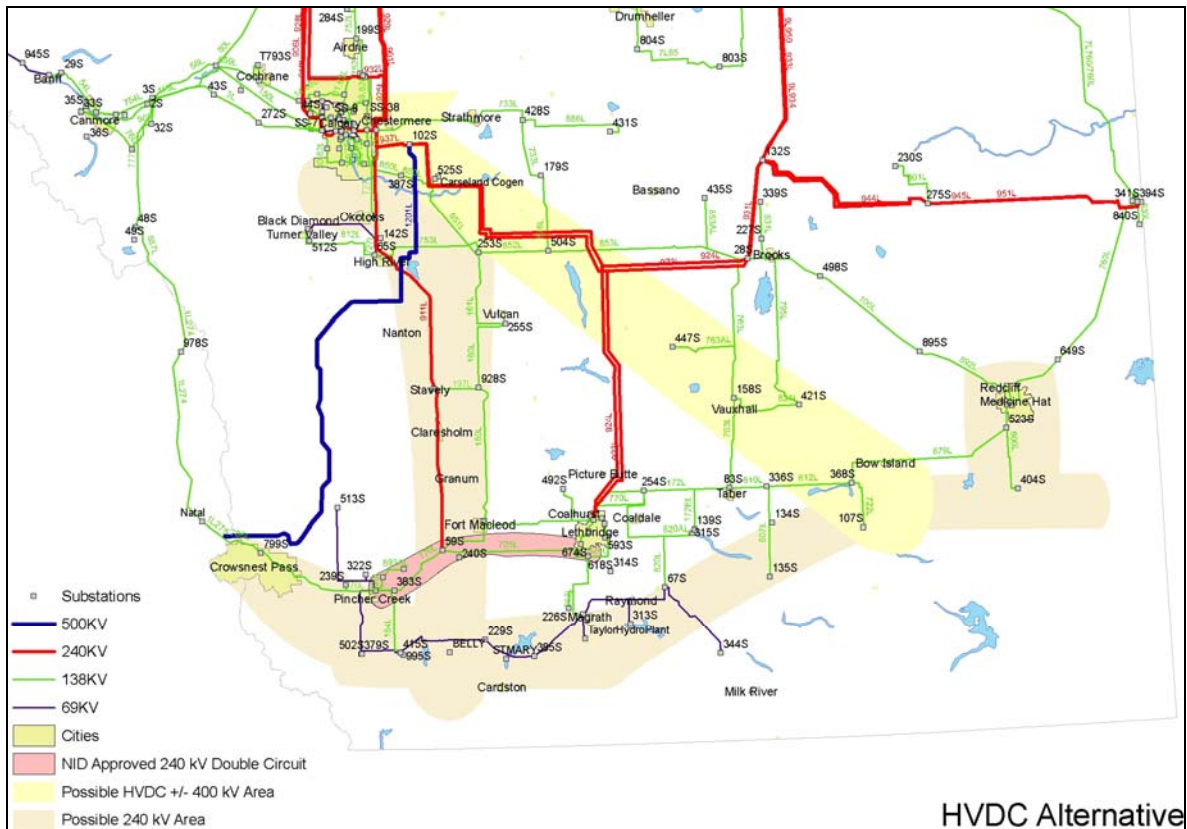
Stage I:

- 911L replaced by Calgary South – Peigan 240 kV double circuit transmission line with 50% series compensation
- Sub D substation 240kV (Sub H)
- Milo Junction Switching Station 240kV
- Langdon to Milo Junction 500kV single circuit line operated at 240kV
- Milo Junction to Sub D 500kV single circuit line operated at 240kV
- Phase Shifting Transformer on 170L

Stage II:

- New Crowsnest 500/240 kV 2 X 1200 MVA, Sub D 500kV 2 X 1200 MVA, Milo Junction 500kV 2 X 1200 MVA, Sub C 240kV
- Langdon to Milo Junction to Sub D upgrade to 500kV
- Crowsnest – Sub D 500kV single circuit line
- Crowsnest – Goose Lake 240 kV double circuit transmission line
- Goose Lake – Sub C 240kV single circuit line
- Sub C – Sub D 240kV single circuit line
- Sub D – Med Hat 2 240 kV double circuit transmission line
- Med Hat 2 240kV substation 2 X 200 MVA
- Med Hat 138 kV changes/upgrades
- Peigan 179 MVA transformers replaced by 2 x 200 MVA transformer
- Blackie Area 138 kV upgrades/modifications
- Anderson – W. Brooks 240 kV in-and-out at Ware Junction
- Crowsnest SVC = 0 - -300 MVAR, Sub D SVC = 0 - -300 MVAR, Milo Junction SVC = 0 - -400 MVAR

ALTERNATIVE 4



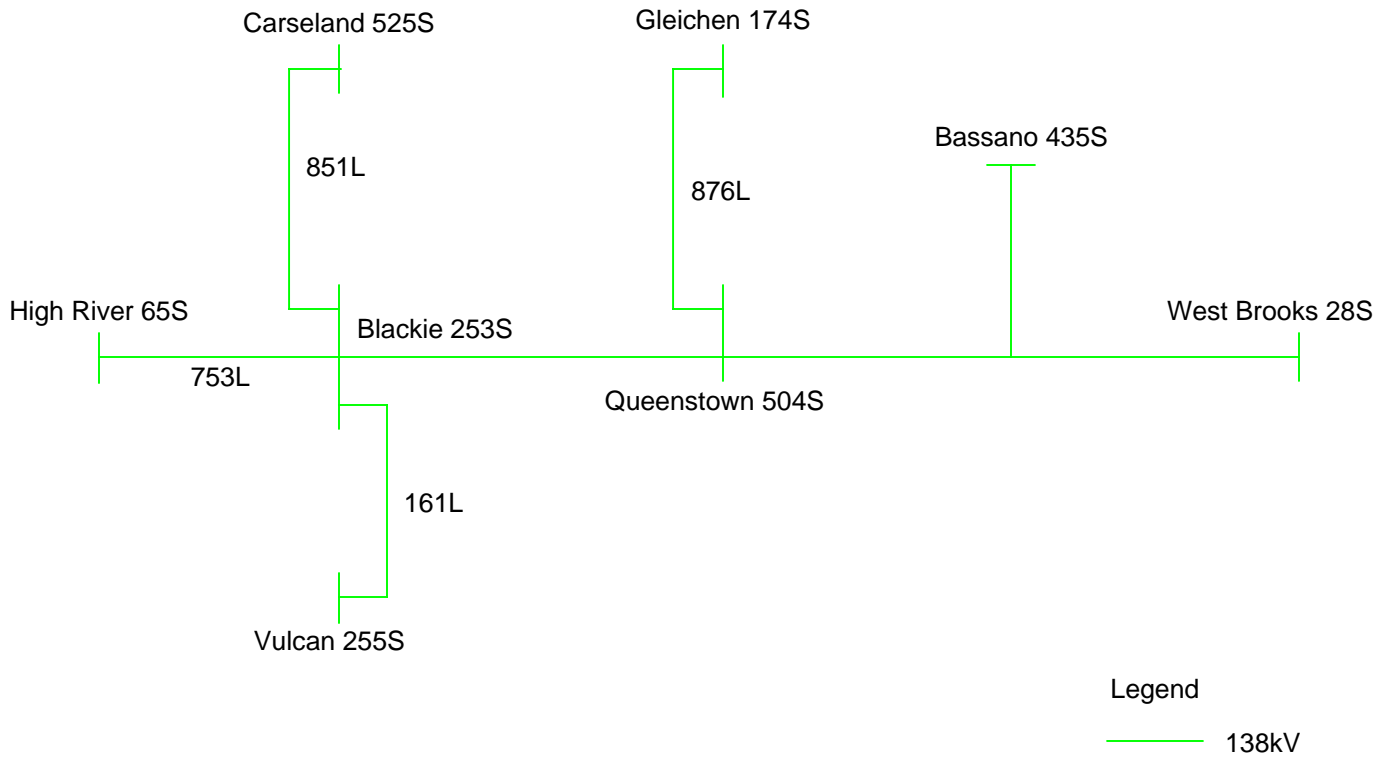
Stage I:

- 911L replaced by Calgary South – Peigan 240 kV double circuit transmission line with 50% series compensation with a SVC at Peigan
- Milo Junction Switching Station
- Langdon 500kV converter station
- Sub D 500kV converter station
- Sub D 500/240kV substation 2 X 1200 MVA
- Langdon – Sub D HVDC line
- Phase Shifting Transformer on 170L

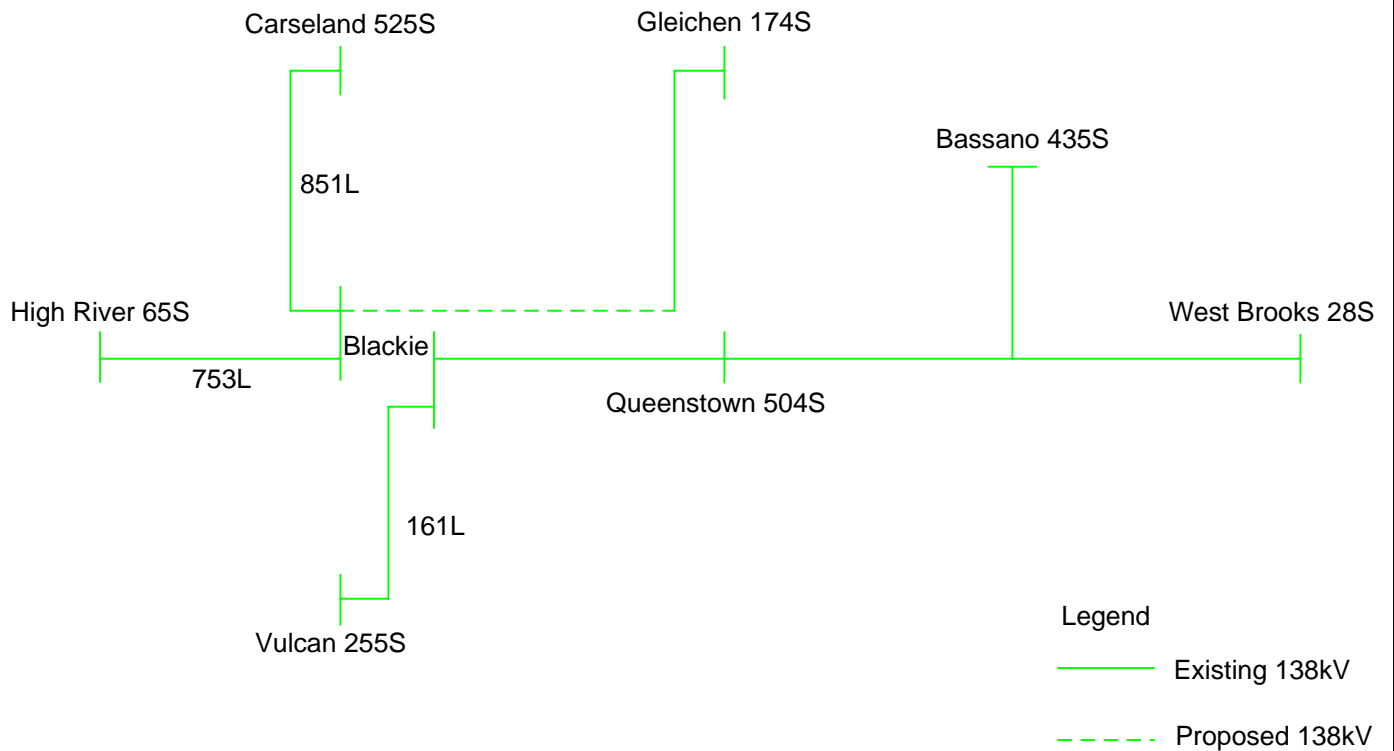
Stage II:

- New Crowsnest 500/240 kV 2 X 1200 MVA, Sub C 240kV, Medicine Hat 2 240kV 2 X 200 MVA substations
- Crowsnest – Goose Lake 240 kV double circuit transmission line
- Goose Lake – Sub C 240kV single circuit line
- Sub C – Sub D 240kV single circuit line
- Sub D – Med Hat 2 240 kV double circuit transmission line
- Med Hat 138 kV changes/upgrades
- Peigan 179 MVA transformers replaced by 2 x 200 MVA transformer
- Blackie Area 138 kV upgrades/modifications
- Anderson – W. Brooks 240 kV in-and-out at Ware Junction
- Crowsnest SVC = 0 - +400 MVAR, Sub C SVC = 0 - -100 MVAR, Sub D SVC = 300 - -50 MVAR, Cypress SVC = 25 - -50 MVAR

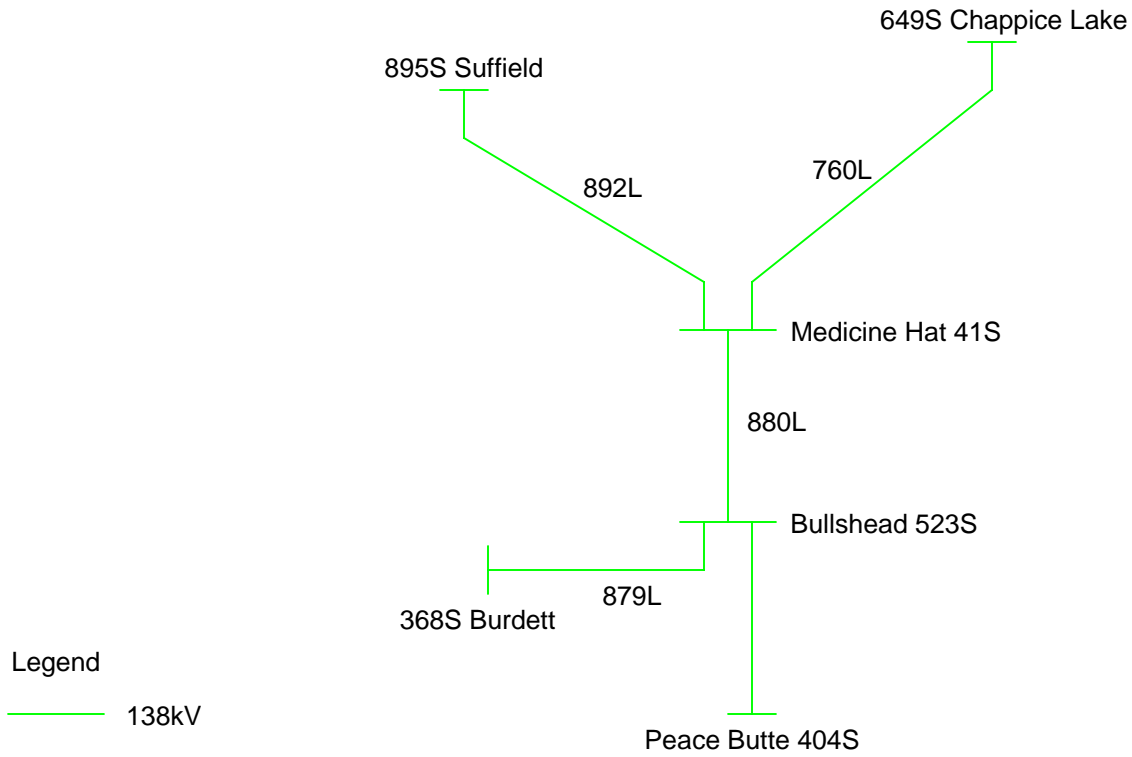
Blackie 138kV Existing System



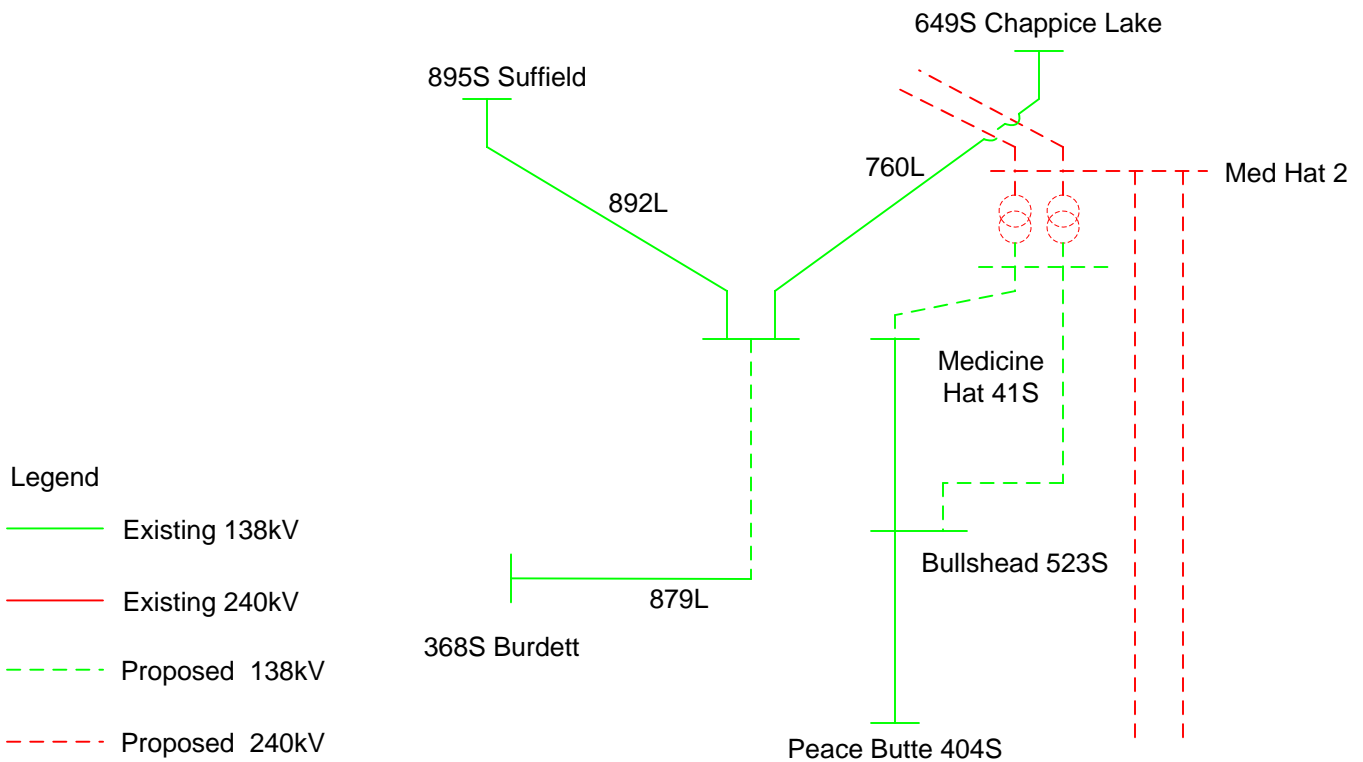
Blackie 138kV Proposed Modifications



Medicine Hat 138kV Existing System



Medicine Hat Proposed 138kV Upgrade (Conceptual)

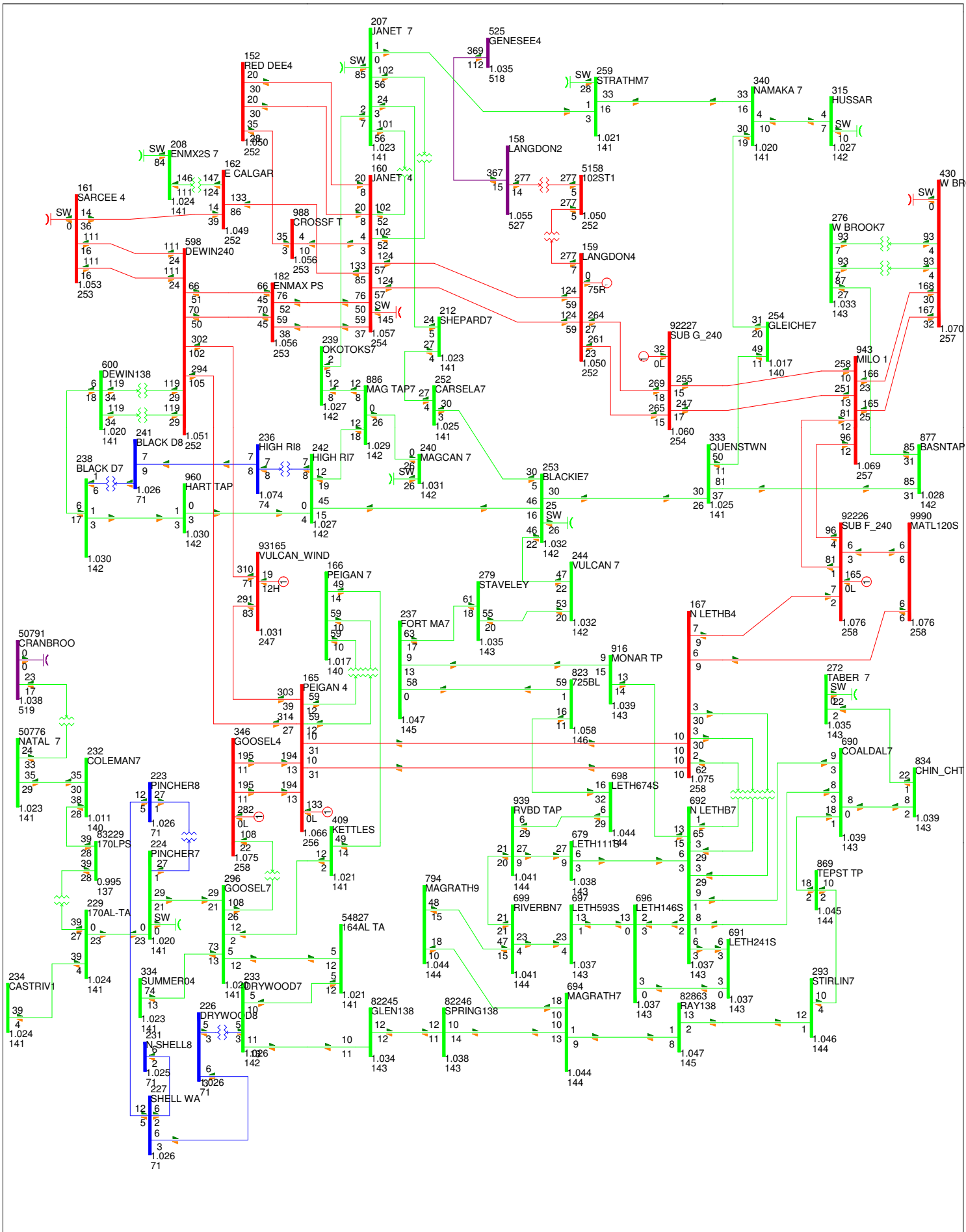


**APPENDIX D ALTERNATIVES STEADY STATE TECHNICAL
ANALYSIS**

Table D-1: Summary of 2013 Power flow analysis

Figure No.	Scenario	Description	Overloaded Element	Percent Overload	Other System Performance Concerns
	2013 Summer Light				
Fig 2013-SL- 1		Generation Dispatch			
Fig 2013-SL- 2/3	Alternative 1A	Normal condition	None	N/A	None
Fig 2013-SL- 4/5	Alternative 1B	Normal condition	None	N/A	None
Fig 2013-SL- 6/7	Alternative 1C	Normal condition	None	N/A	None
Fig 2013-SL- 8/9	Alternative 2	Normal condition	None	N/A	None
Fig 2013-SL- 10/11	Alternative 3	Normal condition	None	N/A	None
Fig 2013-SL- 12/13	Alternative 4	Normal condition	None	N/A	None
	2013 Summer Peak				
Fig 2013-SP- 1		Generation Dispatch			None
Fig 2013-SP- 2/3	Alternative 1A	Normal condition	None	N/A	None
		912L from Nevis 766S to Red Deer 63S	853L W.Brooks 28S to Queenstown 504S	108%	None
Fig 2013-SP- 4/5	Alternative 1B	Normal condition	None	N/A	None
		912L from Nevis 766S to Red Deer 63S	853L W.Brooks 28S to Queenstown 504S	108%	None
Fig 2013-SP- 6/7	Alternative 1C	Normal condition	None	N/A	None
		912L from Nevis 766S to Red Deer 63S	853L W.Brooks 28S to Queenstown 504S	108%	None
Fig 2013-SP- 8/9	Alternative 2	Normal condition	None	N/A	None

Figure No.	Scenario	Description	Overloaded Element	Percent Overload	Other System Performance Concerns
		912L from Nevis 766S to Red Deer 63S	853L W.Brooks 28S to Queenstown 504S	113%	None
Fig 2013-SP- 10/11	Alternative 3	Normal condition	None	N/A	None
Fig 2013-SP- 12/13	Alternative 4	Normal condition	None	N/A	None



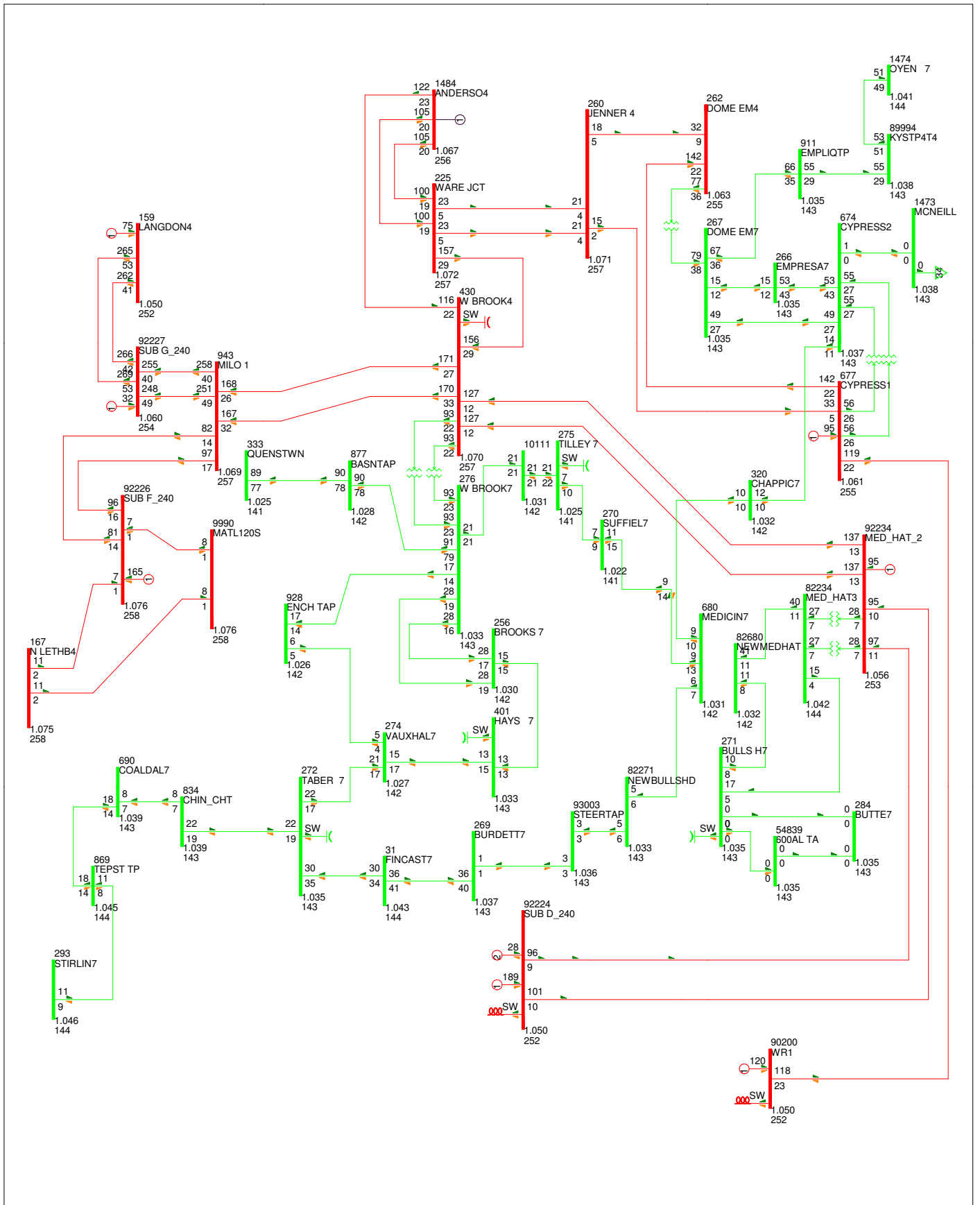
2013 SUMMER LIGHT CASE

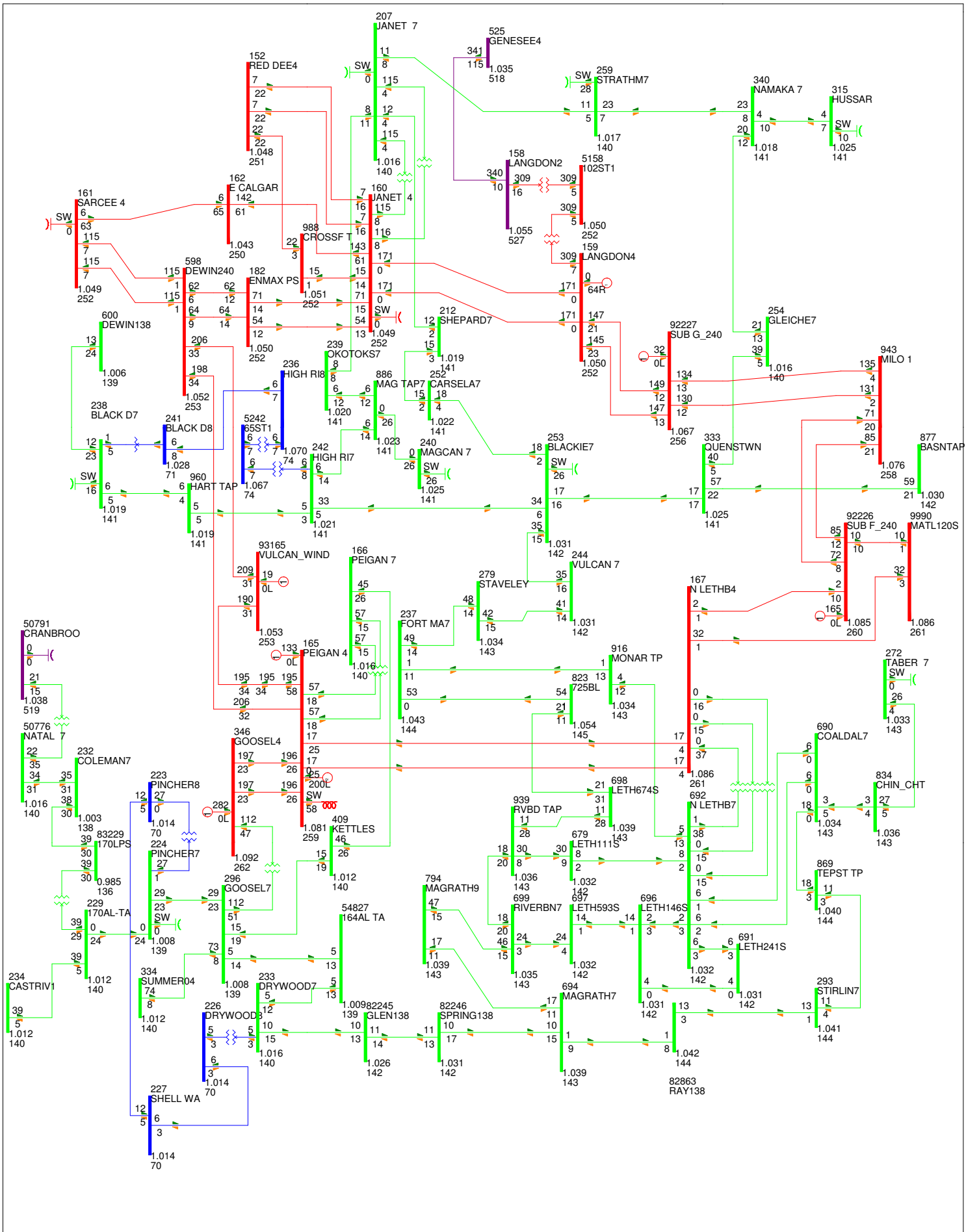
2013 South West System SAT, DEC 13 2008 14:32

ALTERNATIVE 1C

Fig 2013-SL-6

Bus: VOLTAGE (V/MVA)
 Busch: MW/MVA
 Diagram: MW/MVA
 100kV: 100.000 -> 130.000 -> 240.000 -> 500.000 -> 690.000





2013 SUMMER LIGHT CASE

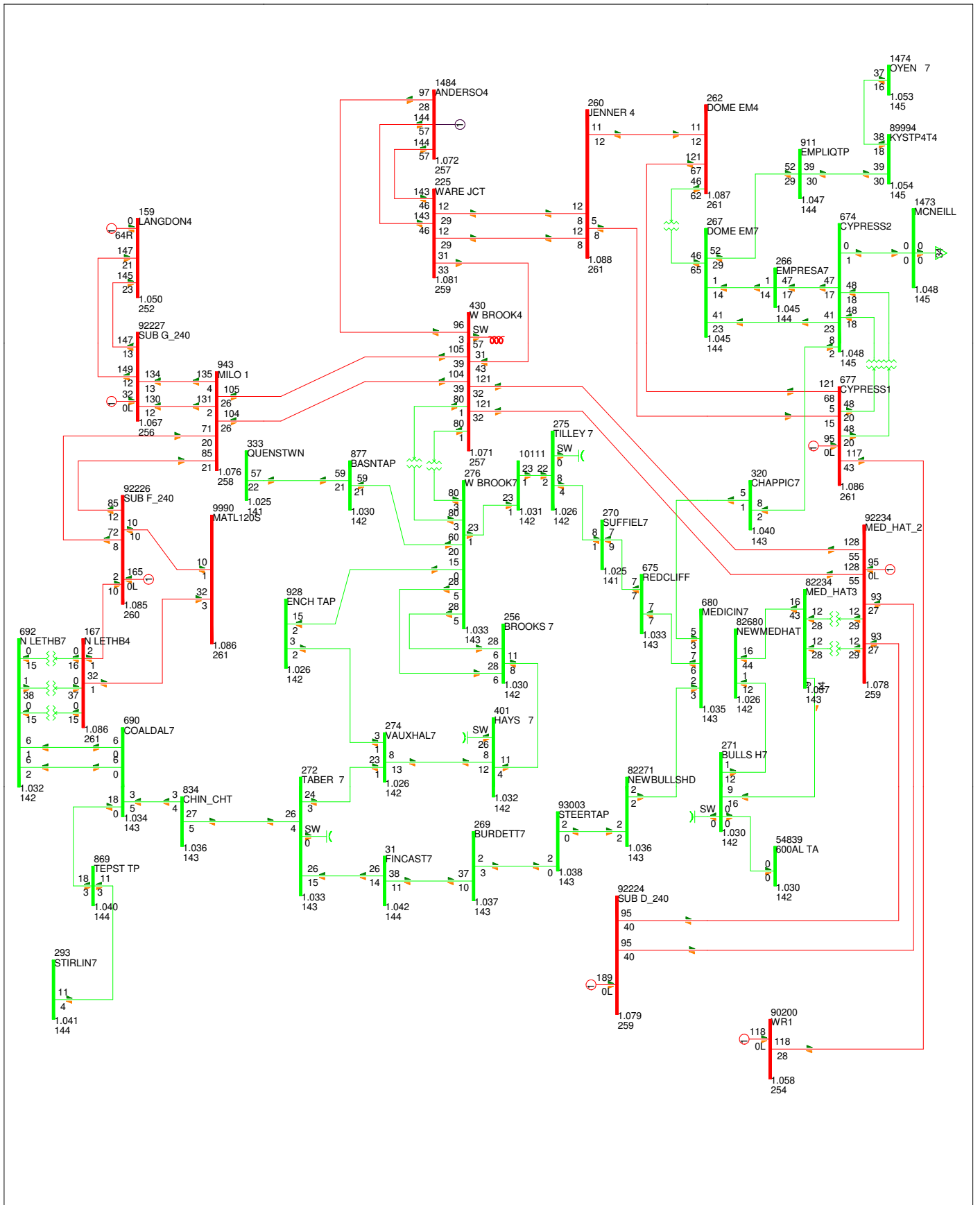
2013 South West System SAT, DEC 13 2008 14:32

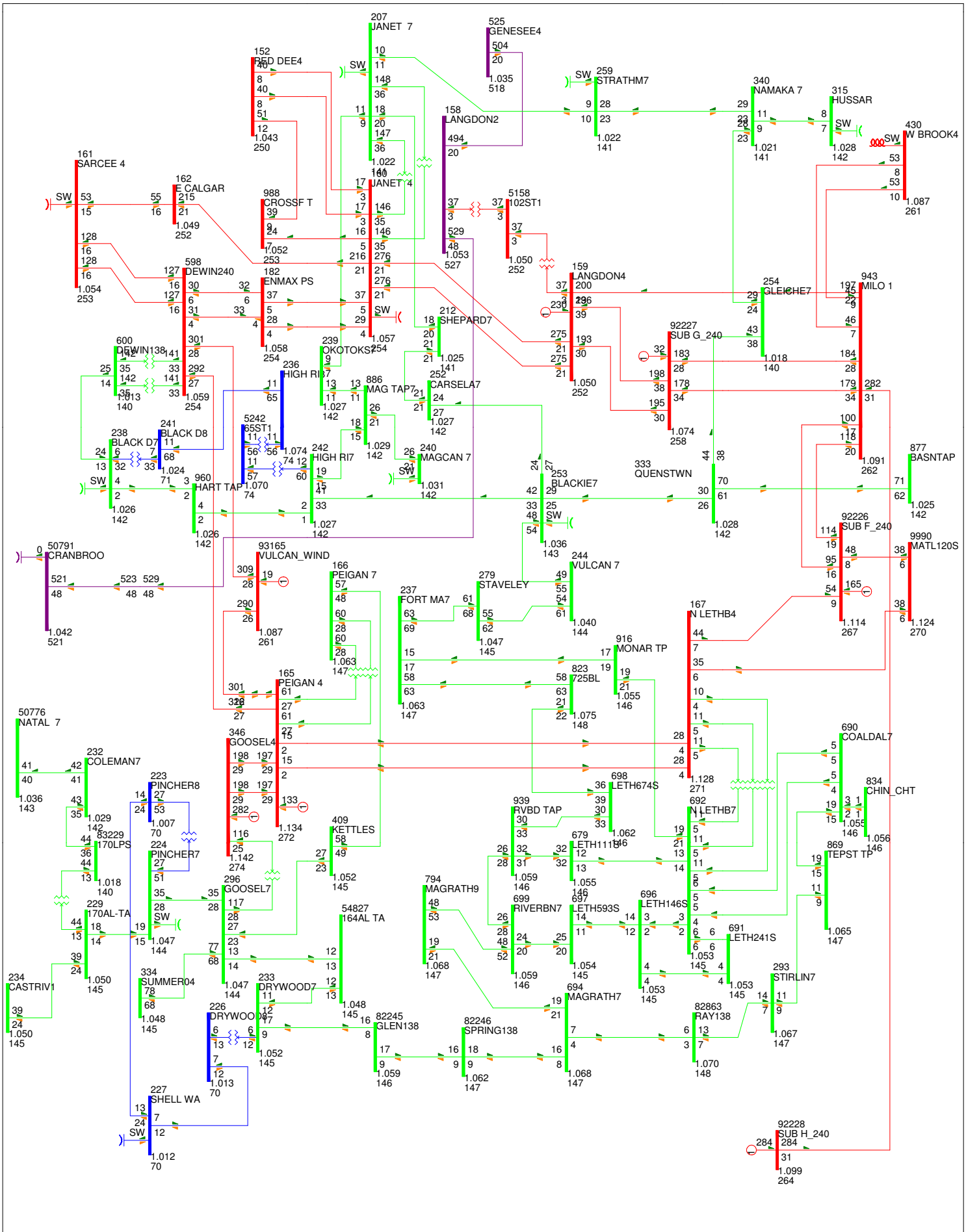
ALTERNATIVE 2

Fig 2013-SL-8

Bus: VOLTAGE (V) (P) (M)
 Branch: MW (W) (M)
 Equipment: MW (W) (M)
 PV: MW (W) (M) (P) (M) (S) (T) (U) (V) (W) (X) (Y) (Z)

BC Export: 705 MW





2013 SUMMER LIGHT CASE

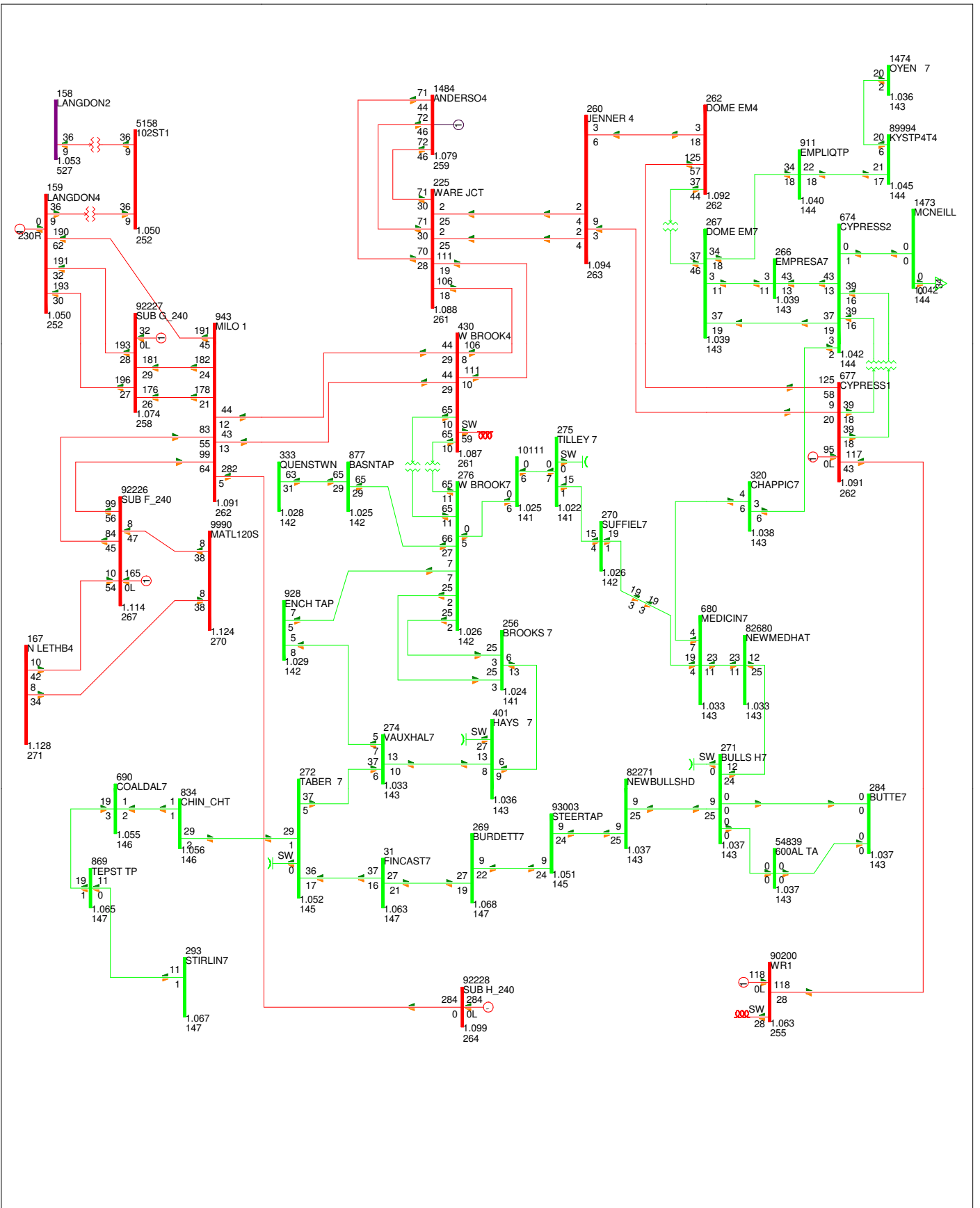
2013 South West System SAT, DEC 13 2008 14:33

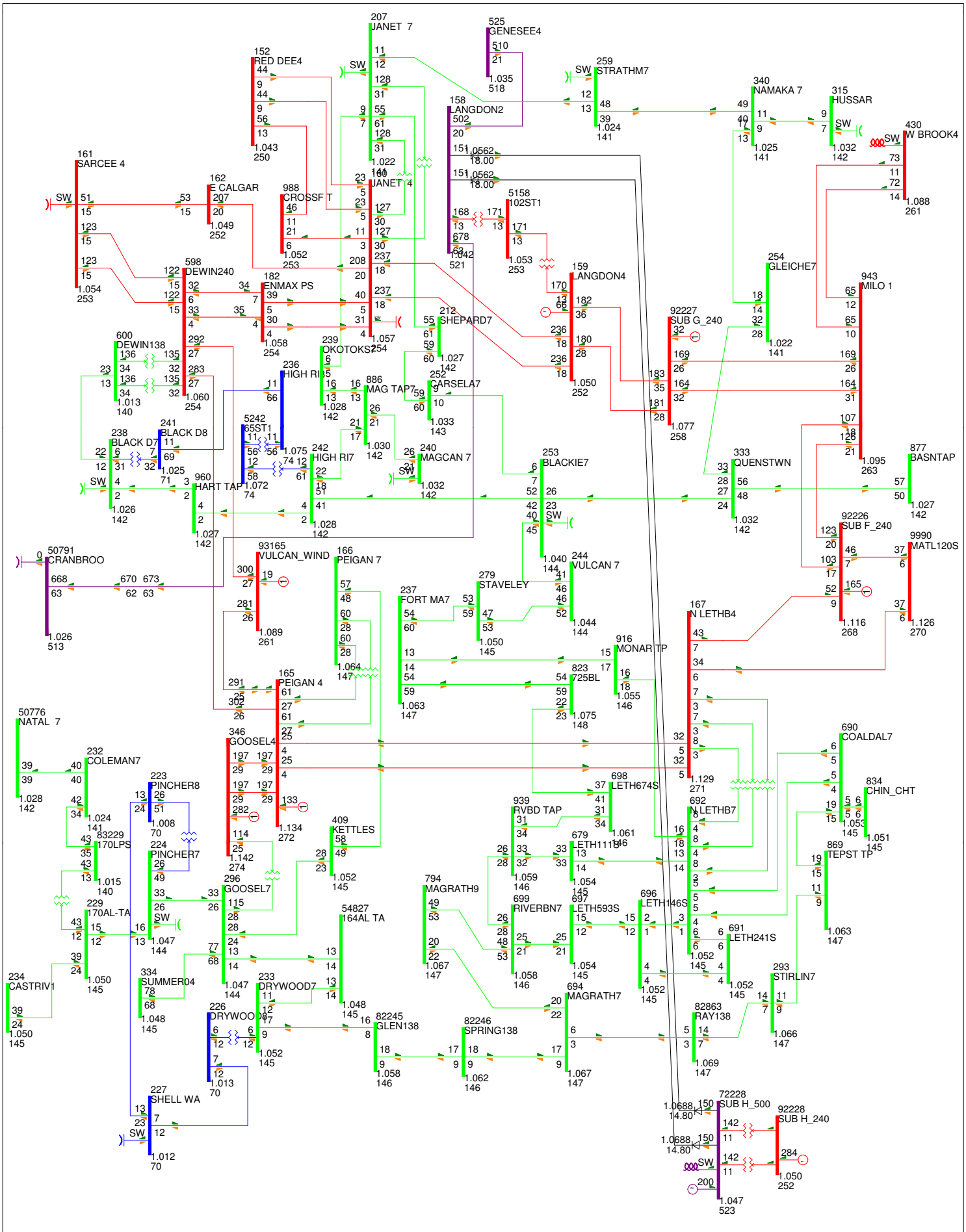
ALTERNATIVE 3

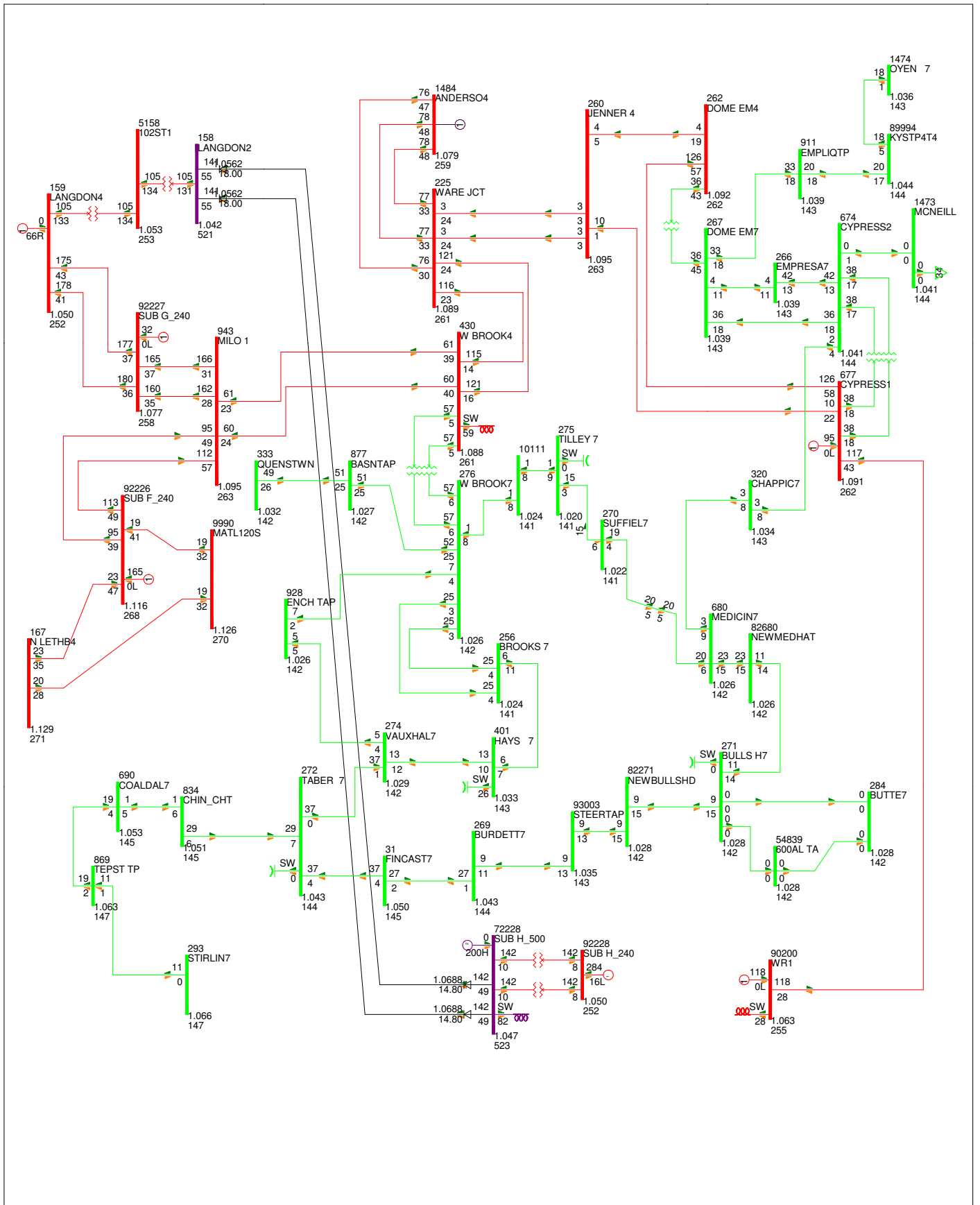
Fig 2013-SL-10

BC Hydro
 2013 SUMMER LIGHT CASE
 Alternative 3
 100% FINANCING
 \$0 - \$400M - \$800M - \$1,200M - \$1,600M - \$2,000M - \$2,400M - \$2,800M - \$3,200M - \$3,600M - \$4,000M

BC Export: 523 MW







GENERATION DISPATCH REPORT

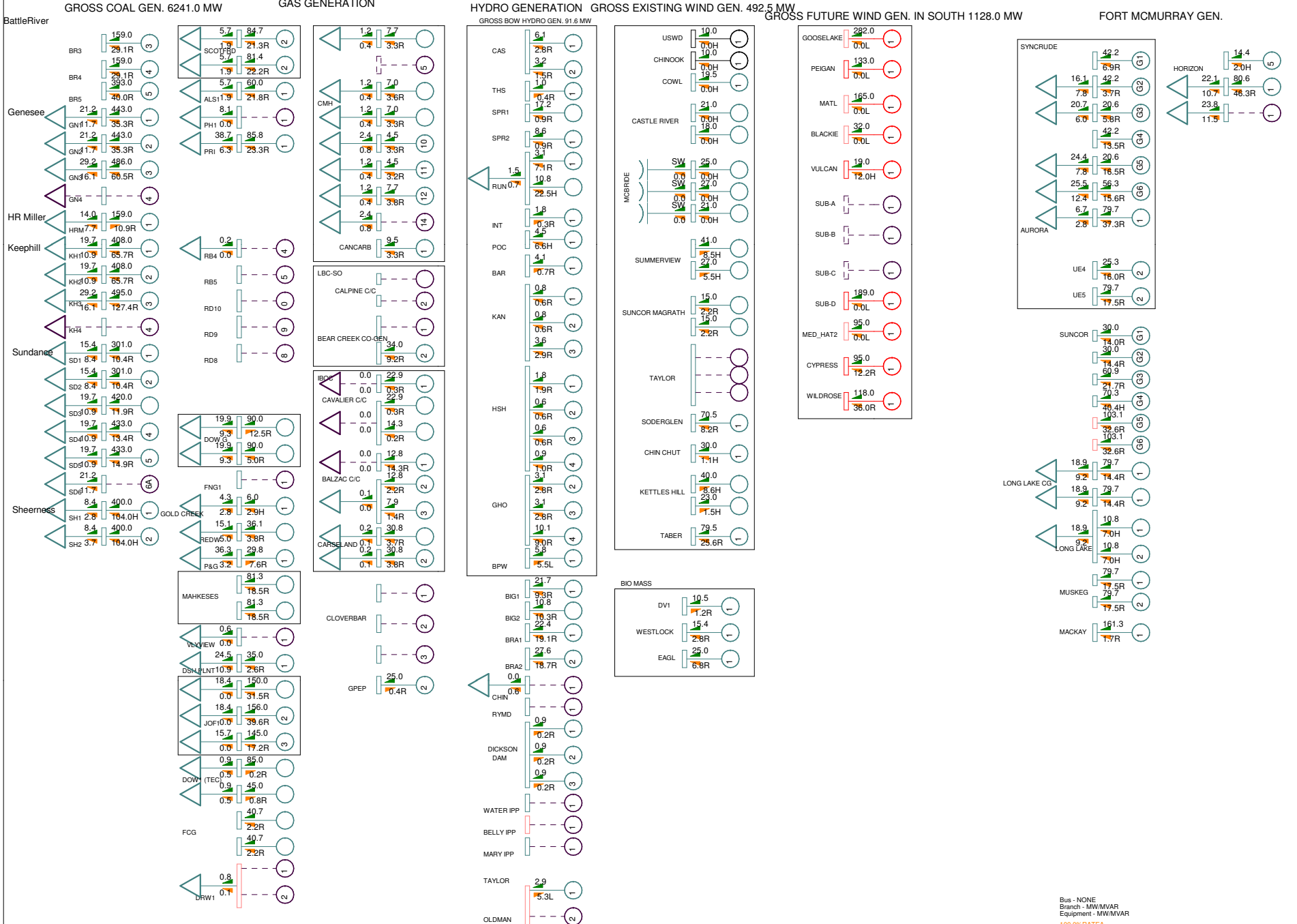
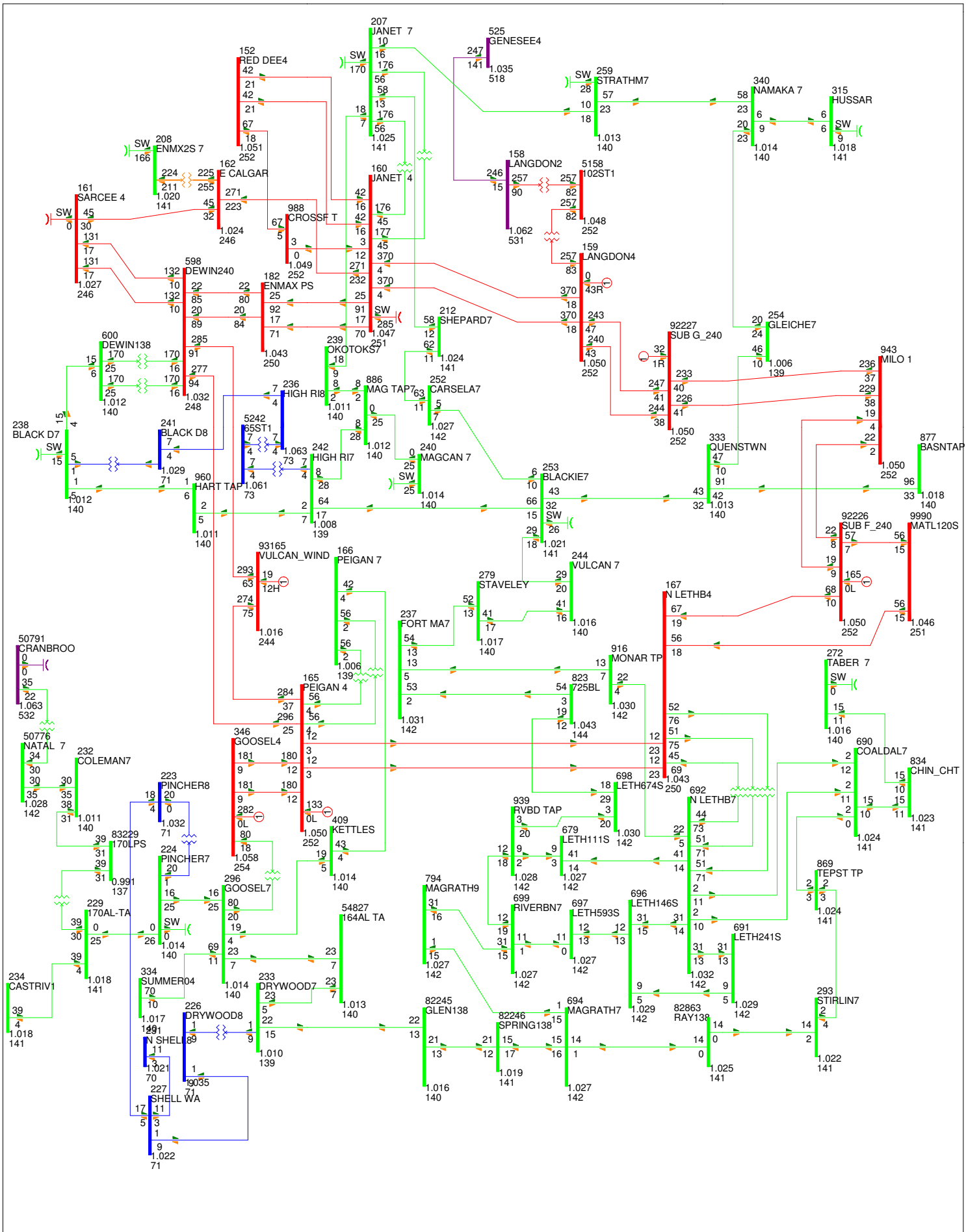


Fig 2013-SP-1



2013 SUMMER PEAK CASE

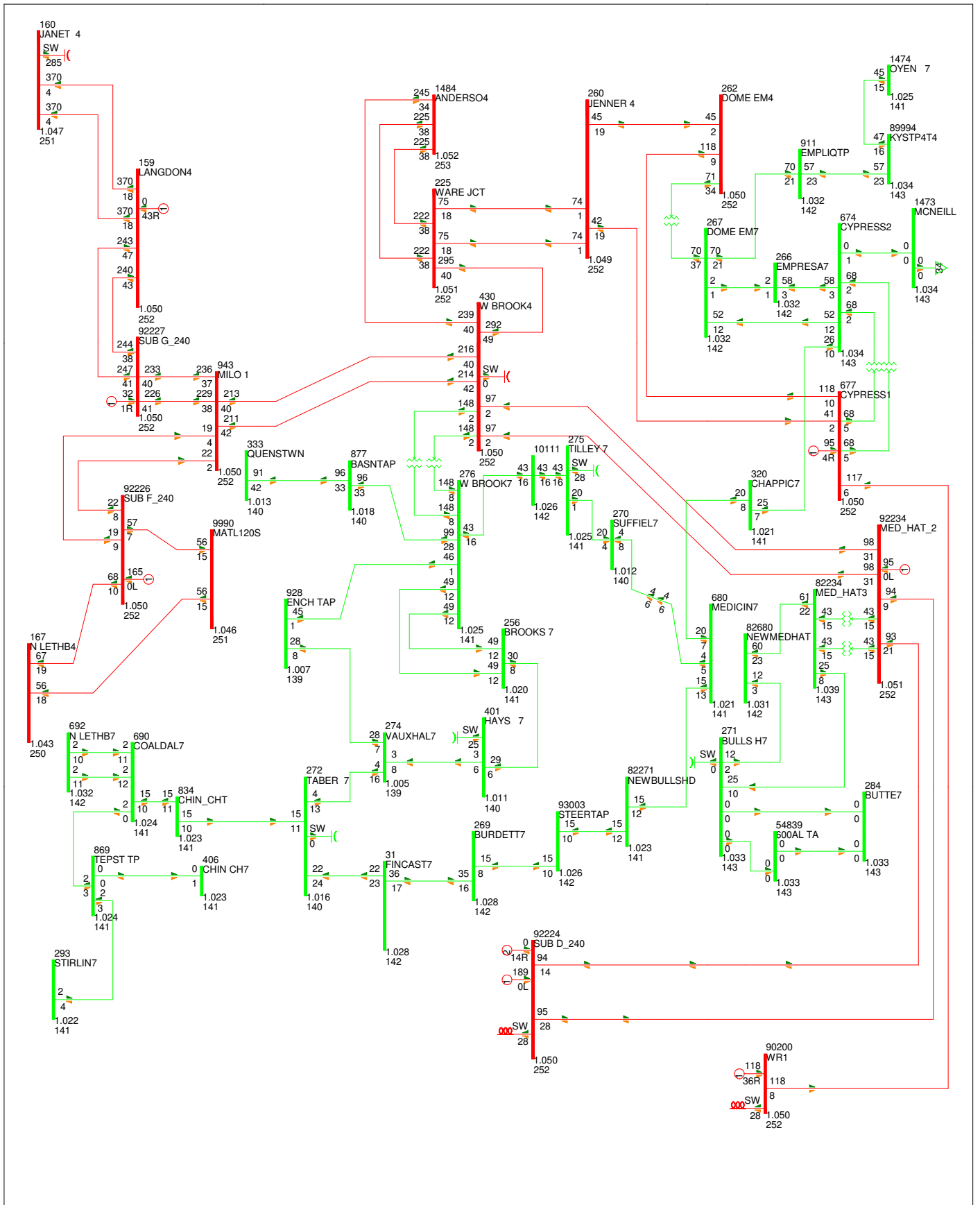
2013 South West System SAT, DEC 13 2008 14:51

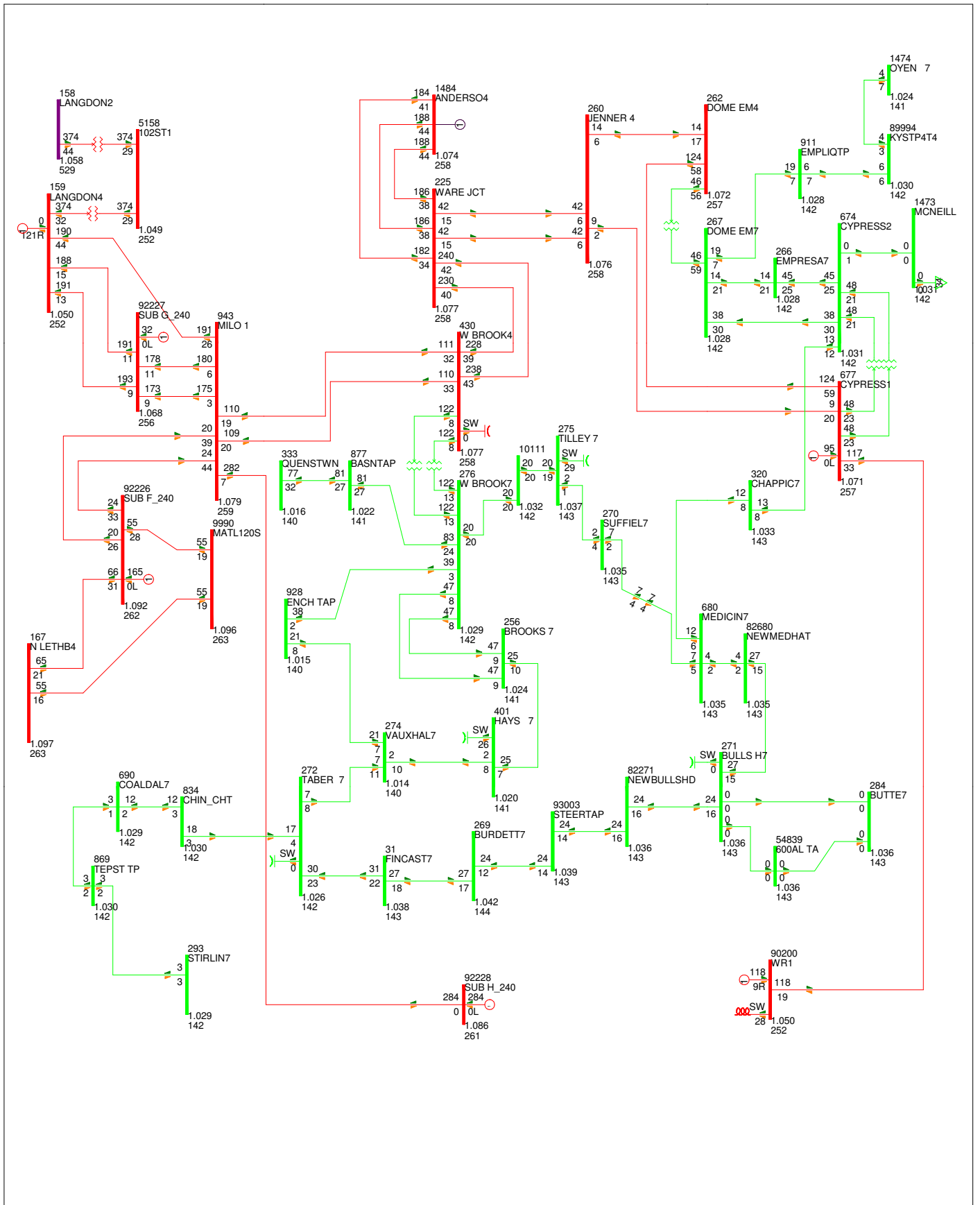
ALTERNATIVE 1A

Fig 2013-SP-2

Bus: VOLTAGE (V/MVA)
 Branch: MW/MVA
 Equipment: MW/MVA
 115kV: 115.000 -115.000
 70kV: 70.000 -70.000
 35kV: 35.000 -35.000
 23kV: 23.000 -23.000

BC Export: -3 MW





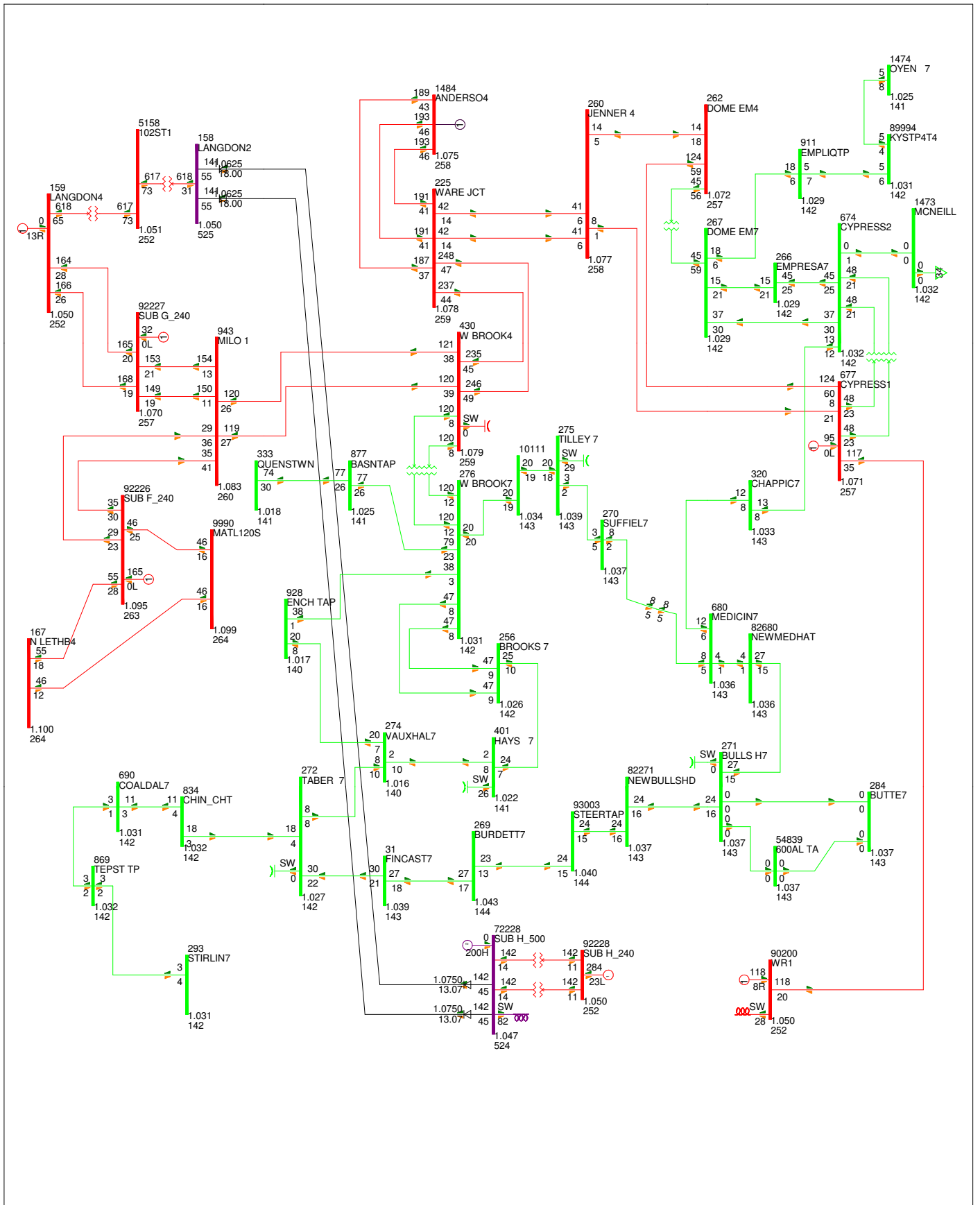


Table D-2: Summary of 2017 Summer Light Contingency Analysis – Alternative 1A

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SL-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SL-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SL-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-1A-SL-6/7	500/240kV Transformer at New Crowsnest	None	N/A	None
Fig 2017-1A-SL-8/9	500/240kV Transformer at Langdon 102S	None	N/A	None
Fig 2017-1A-SL-10/11	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-1A-SL-12/13	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-1A-SL-14/15	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-1A-SL-16/17	240kV Line C1 Goose Lake 103S to Sub C	None	N/A	None
Fig 2017-1A-SL-18/19	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SL-20/21	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-1A-SL-22/23	240kV 923L Milo JK to W. Brooks 28S	None	N/A	None
Fig 2017-1A-SL-24/25	240kV 924L Milo JK to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SL-26/27	240kV Line D MATL 120S to Sub C	None	N/A	None
Fig 2017-1A-SL-28/29	240kV Line E Sub C to Sub D	None	N/A	None
Fig 2017-1A-SL-30/31	240kV Line G - W. Brook 28S to MH2 41S	None	N/A	None
Fig 2017-1A-SL-32/33	240kV Line H Langdon 102S to W. Junction 132S	None	N/A	None
Fig 2017-1A-SL-34/35	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None
Fig 2017-1A-SL-36/37	240kV 945L Dome Empress 163S to Cypress	None	N/A	None

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SL-38/39	240kV 934L W. Junction 132S to Anderson 810S	None	N/A	None
Fig 2017-1A-SL-40/41	240/138kV Transformer at Goose Lake 102S	None	N/A	None
Fig 2017-1A-SL-42/43	240/138kV Transformer at Peigan 59S	None	N/A	None
Fig 2017-1A-SL-44/45	240/138kV Transformer at Dome Empress 163S	None	N/A	None
Fig 2017-1A-SL-46/47	240/138kV Transformer at Cypress	None	N/A	None
Fig 2017-1A-SL-48/49	138kV 164L Peigan 59S to Drywood 415S	None	N/A	None
Fig 2017-1A-SL-50/51	138kV 100L Brooks 121S to Tiley 498S	None	N/A	None
Fig 2017-1A-SL-52/53	138kV 760L MH 41S to Chappice Lake 649S	None	N/A	None
Fig 2017-1A-SL-54/55	138kV MH 41S to Burdett 368S	None	N/A	None
Fig 2017-1A-SL-56/57	138kV 727L High River 65S to Okotoks to 678S	None	N/A	None
Fig 2017-1A-SL-58/59	138kV 850L Janet 74S to Carseland 525S	None	N/A	None
Fig 2017-1A-SL-60/61	138kV 852L Blackie to Queenstown 504S	None	N/A	None
Fig 2017-1A-SL-62/63	138kV 170L Peigan 59S to Goose Lake 103S	None	N/A	None
Fig 2017-1A-SL-64/65	138kV 863L Riverbend 618S to Magrath 225	None	N/A	None

Table D-3: Summary of 2017 Summer Peak Contingency Analysis – Alternative 1A

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SP-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SP-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SP-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-1A-SP-6/7	500/240kV Transformer at New Crowsnest	None	N/A	None
Fig 2017-1A-SP-8/9	500/240kV Transformer at Langdon 102S	None	N/A	None
Fig 2017-1A-SP-10/11	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-1A-SP-12/13	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-1A-SP-14/15	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-1A-SP-16/17	240kV Line C1 Goose Lake 103S to Sub C	None	N/A	None
Fig 2017-1A-SP-18/19	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SP-20/21	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-1A-SP-22/23	240kV 923L Milo JK to W. Brooks 28S	None	N/A	None
Fig 2017-1A-SP-24/25	240kV 924L Milo JK to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SP-26/27	240kV Line D MATL 120S to Sub C	None	N/A	None
Fig 2017-1A-SP-28/29	240kV Line E Sub C to Sub D	None	N/A	None
Fig 2017-1A-SP-30/31	240kV Line G - W. Brook 28S to MH2 41S	None	N/A	None
Fig 2017-1A-SP-32/33	240kV Line H Langdon 102S to W. Junction 132S	None	N/A	None
Fig 2017-1A-SP-34/35	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None
Fig 2017-1A-SP-36/37	240kV 945L Dome Empress 163S to Cypress	None	N/A	None

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SP-38/39	240kV 934L W. Junction 132S to Anderson 810S	None	N/A	None
Fig 2017-1A-SP-40/41	240/138kV Transformer at Goose Lake 102S	None	N/A	None
Fig 2017-1A-SP-42/43	240/138kV Transformer at Peigan 59S	None	N/A	None
Fig 2017-1A-SP-44/45	240/138kV Transformer at Dome Empress 163S	None	N/A	None
Fig 2017-1A-SP-46/47	240/138kV Transformer at Cypress	None	N/A	None
Fig 2017-1A-SP-48/49	138kV 164L Peigan 59S to Drywood 415S	None	N/A	None
Fig 2017-1A-SP-50/51	138kV 100L Brooks 121S to Tiley 498S	None	N/A	None
Fig 2017-1A-SP-52/53	138kV 760L MH 41S to Chappice Lake 649S	None	N/A	None
Fig 2017-1A-SP-54/55	138kV MH 41S to Burdett 368S	None	N/A	None
Fig 2017-1A-SP-56/57	138kV 727L High River 65S to Okotoks to 678S	None	N/A	None
Fig 2017-1A-SP-58/59	138kV 850L Janet 74S to Carseland 525S	None	N/A	None
Fig 2017-1A-SP-60/61	138kV 852L Blackie to Queenstown 504S	None	N/A	None
Fig 2017-1A-SP-62/63	138kV 170L Peigan 59S to Goose Lake 103S	None	N/A	None
Fig 2017-1A-SP-64/65	138kV 863L Riverbend 618S to Magrath 225	None	N/A	None

Table D-4: Summary of 2017 Summer Light Contingency Analysis – Alternative 1B

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1B-SL-1	Generation Dispatch	None	N/A	None
Fig 2017-1B-SL-2/3	All Elements in Service	None	N/A	None
Fig 2017-1B-SL-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-1B-SL-6/7	240kV New Crowsnest to Goose Lake 102S	None	N/A	None
Fig 2017-1B-SL-8/9	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-1B-SL-10/11	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-1B-SL-12/13	240kV Line C2 Goose Lake 102S to Sub C	None	N/A	None
Fig 2017-1B-SL-14/15	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1B-SL-16/17	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-1B-SL-18/19	240kV Line H Langdon 102S to W. Junction 132S	None	N/A	None
Fig 2017-1B-SL-20/21	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None

Table D-5: Summary of 2017 Summer Peak Contingency Analysis – Alternative 1B

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1B-SP-1	Generation Dispatch	None	N/A	None
Fig 2017-1B-SP-2/3	All Elements in Service	None	N/A	None
Fig 2017-1B-SP-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-1B-SP-6/7	240kV New Crowsnest to Goose Lake 102S	None	N/A	None
Fig 2017-1B-SP-8/9	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-1B-SP-10/11	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-1B-SP-12/13	240kV Line C2 Goose Lake 102S to Sub C	None	N/A	None
Fig 2017-1B-SP-14/15	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1B-SP-16/17	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-1B-SP-18/19	240kV Line H Langdon 102S to W. Junction 132S	None	N/A	None
Fig 2017-1B-SP-20/21	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None

Table D-6: Summary of 2017 Summer Light Contingency Analysis – Alternative 1C

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1C-SL-1	Generation Dispatch	None	N/A	None
Fig 2017-1C-SL-2/3	All Elements in Service	None	N/A	None
Fig 2017-1C-SL-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-1C-SL-6/7	240kV New Crowsnest to Goose Lake 102S	None	N/A	None
Fig 2017-1C-SL-8/9	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-1C-SL-10/11	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-1C-SL-12/13	240kV Line C2 Goose Lake 102S to Sub C	None	N/A	None
Fig 2017-1C-SL-14/15	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1C-SL-16/17	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-1C-SL-18/19	240kV Line K W. Brooks 28S to Dewinton	None	N/A	None
Fig 2017-1C-SL-20/21	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None

Table D-7: Summary of 2017 Summer Peak Contingency Analysis – Alternative 1C

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1C-SP-1	Generation Dispatch	None	N/A	None
Fig 2017-1C-SP-2/3	All Elements in Service	None	N/A	None
Fig 2017-1C-SP-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-1C-SP-6/7	240kV New Crowsnest to Goose Lake 102S	None	N/A	None
Fig 2017-1C-SP-8/9	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-1C-SP-10/11	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-1C-SP-12/13	240kV Line C2 Goose Lake 102S to Sub C	None	N/A	None
Fig 2017-1C-SP-14/15	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1C-SP-16/17	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-1C-SP-18/19	240kV Line K W. Brooks 28S to Dewinton	None	N/A	None
Fig 2017-1C-SP-20/21	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None

Table D-8: Summary of 2017 Summer Light Contingency Analysis – Alternative 2

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-2-SL-1	Generation Dispatch	None	N/A	None
Fig 2017-2-SL-2/3	All Elements in Service	None	N/A	None
Fig 2017-2-SL-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-2-SL-6/7	240kV New Crowsnest to Goose Lake 102S	None	N/A	None
Fig 2017-2-SL-8/9	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-2-SL-10/11	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-2-SL-12/13	240kV Line D2 MATL 120S to Sub C	None	N/A	None
Fig 2017-2-SL-14/15	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-2-SL-16/17	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-2-SL-18/19	240kV Line H Langdon 102S to W. Junction 132S	None	N/A	None
Fig 2017-2-SL-20/21	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None

Table D-9: Summary of 2017 Summer Peak Contingency Analysis – Alternative 2

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-2-SP-1	Generation Dispatch	None	N/A	None
Fig 2017-2-SP-2/3	All Elements in Service	None	N/A	None
Fig 2017-2-SP-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-2-SP-6/7	240kV New Crowsnest to Goose Lake 102S	None	N/A	None
Fig 2017-2-SP-8/9	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-2-SP-10/11	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-2-SP-12/13	240kV Line D2 MATL 120S to Sub C	None	N/A	None
Fig 2017-2-SP-14/15	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-2-SP-16/17	240kV 923L Milo JK to Langdon 102S	None	N/A	None
Fig 2017-2-SP-18/19	240kV Line H Langdon 102S to W. Junction 132S	None	N/A	None
Fig 2017-2-SP-20/21	240kV 931L W. Brooks 28S to W. Junction 132S	None	N/A	None

Table D-10: Summary of 2017 Summer Light Contingency Analysis – Alternative 3

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-3-SL-1	Generation Dispatch	None	N/A	None
Fig 2017-3-SL-2/3	All Elements in Service	None	N/A	None
Fig 2017-3-SL-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-3-SL-6/7	500/240kV Transformer at Langdon 102S	None	N/A	None
Fig 2017-3-SL-8/9	500/240kV Transformer at Milo	None	N/A	None
Fig 2017-3-SL-10/11	500kV Line X New Crowsnest to Sub D	None	N/A	None
Fig 2017-3-SL-12/13	500kV Line Y Milo to Sub D	None	N/A	None
Fig 2017-3-SL-14/15	500kV Line Z Langdon 102S to Milo	None	N/A	None
Fig 2017-3-SL-16/17	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-3-SL-18/19	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-3-SL-20/21	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None

Table D-11: Summary of 2017 Summer Peak Contingency Analysis – Alternative 3

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-3-SP-1	Generation Dispatch	None	N/A	None
Fig 2017-3-SP-2/3	All Elements in Service	None	N/A	None
Fig 2017-3-SP-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-3-SP-6/7	500/240kV Transformer at Langdon 102S	None	N/A	None
Fig 2017-3-SP-8/9	500/240kV Transformer at Milo	None	N/A	None
Fig 2017-3-SP-10/11	500kV Line X New Crowsnest to Sub D	None	N/A	None
Fig 2017-3-SP-12/13	500kV Line Y Milo to Sub D	None	N/A	None
Fig 2017-3-SP-14/15	500kV Line Z Langdon 102S to Milo	None	N/A	None
Fig 2017-3-SP-16/17	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-3-SP-18/19	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-3-SP-20/21	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None

Table D-12: Summary of 2017 Summer Light Contingency Analysis – Alternative 4

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-4-SL-1	Generation Dispatch	None	N/A	None
Fig 2017-4-SL-2/3	All Elements in Service	None	N/A	None
Fig 2017-4-SL-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-4-SL-6/7	500/240 kV Transformer at New Crowsnest	None	N/A	None
Fig 2017-4-SL-8/9	500kV HVDC Line from Langdon 102S to SUB D	None	N/A	None
Fig 2017-4-SL-10/11	500kV line Langdon 102S to Genesee	None	N/A	None
Fig 2017-4-SL-12/13	500/240kV Transformer at SUB H	None	N/A	None
Fig 2017-4-SL-14/15	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-4-SL-16/17	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-4-SL-18/19	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-4-SL-20/21	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None

Table D-13: Summary of 2017 Summer Peak Contingency Analysis – Alternative 4

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-4-SP-1	Generation Dispatch	None	N/A	None
Fig 2017-4-SP-2/3	All Elements in Service	None	N/A	None
Fig 2017-4-SP-4/5	500kV 1201L Langdon 102S to New Crowsnest	None	N/A	None
Fig 2017-4-SP-6/7	500/240 kV Transformer at New Crowsnest	None	N/A	None
Fig 2017-4-SP-8/9	500kV HVDC Line from Langdon 102S to SUB D	None	N/A	None
Fig 2017-4-SP-10/11	500kV line Langdon 102S to Genesee	None	N/A	None
Fig 2017-4-SP-12/13	500/240kV Transformer at SUB H	None	N/A	None
Fig 2017-4-SP-14/15	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-4-SP-16/17	240kV 955L Goose Lake 102S to Peigan 59S	None	N/A	None
Fig 2017-4-SP-18/19	240kV Line J Dewinton to Peigan 59S	None	N/A	None
Fig 2017-4-SP-20/21	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3584.0 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.

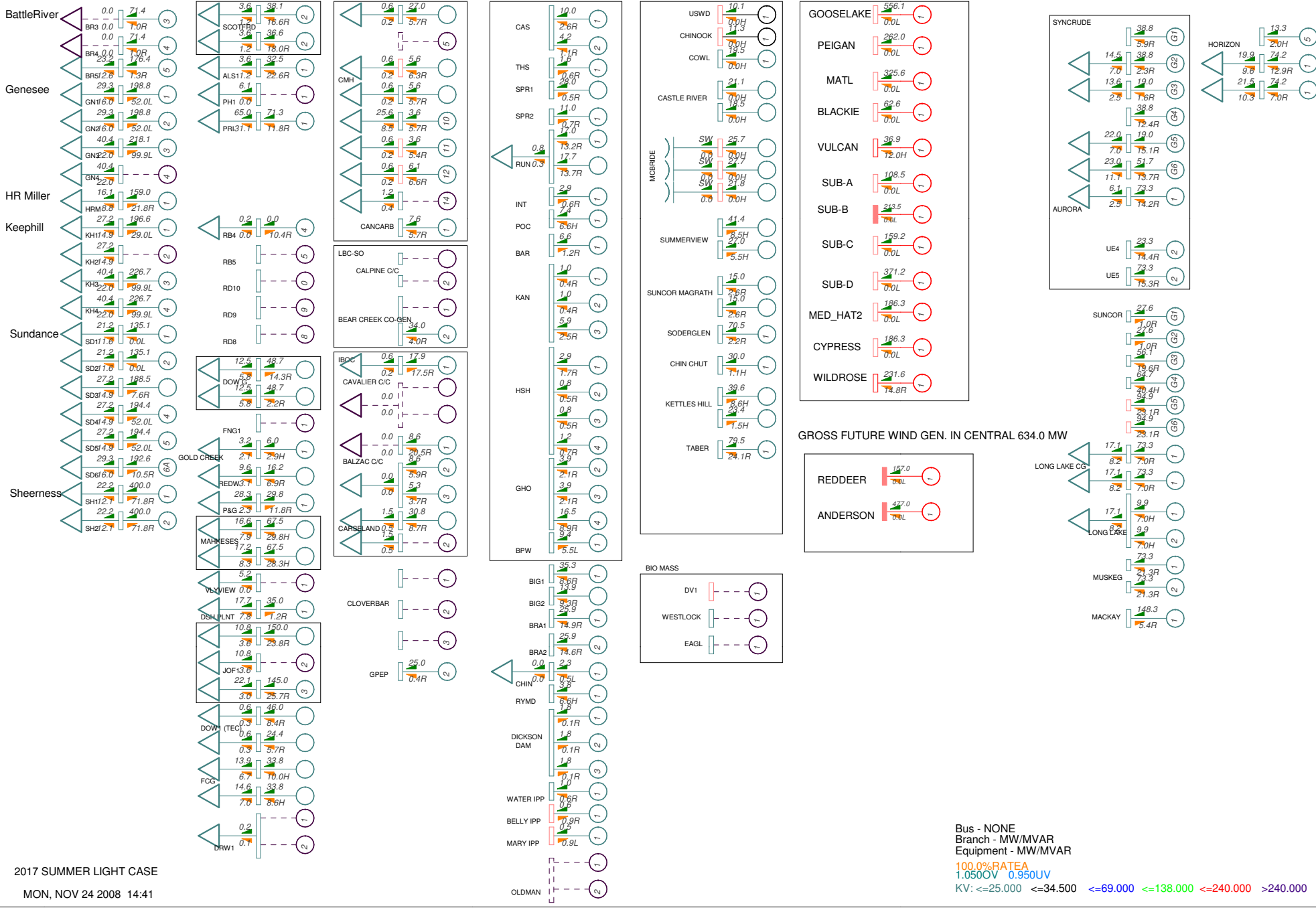


Fig 2017-1A-SL-1

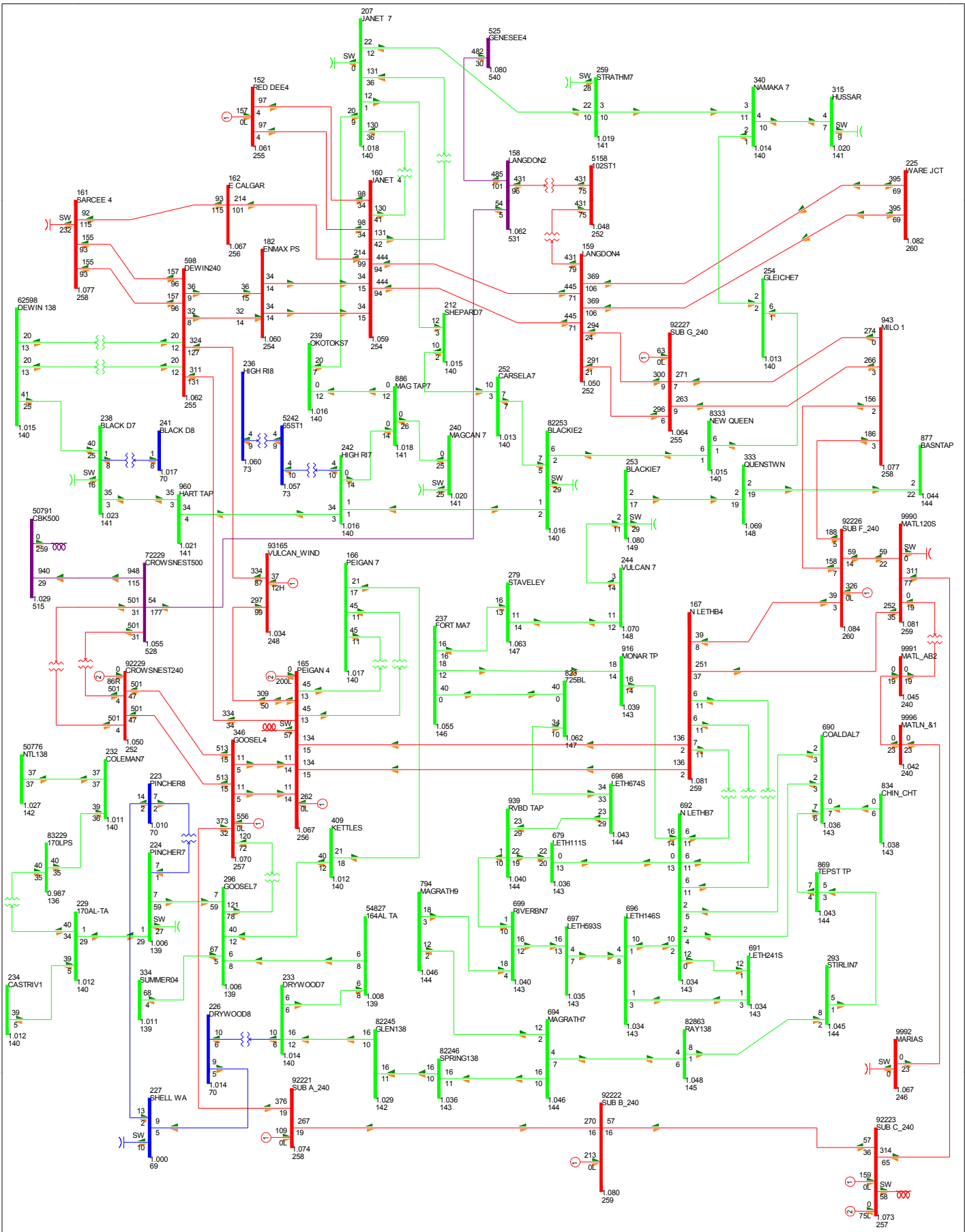


FIG 2017-1A-SL-2: N-0 CONDITION

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:39

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1007 MW

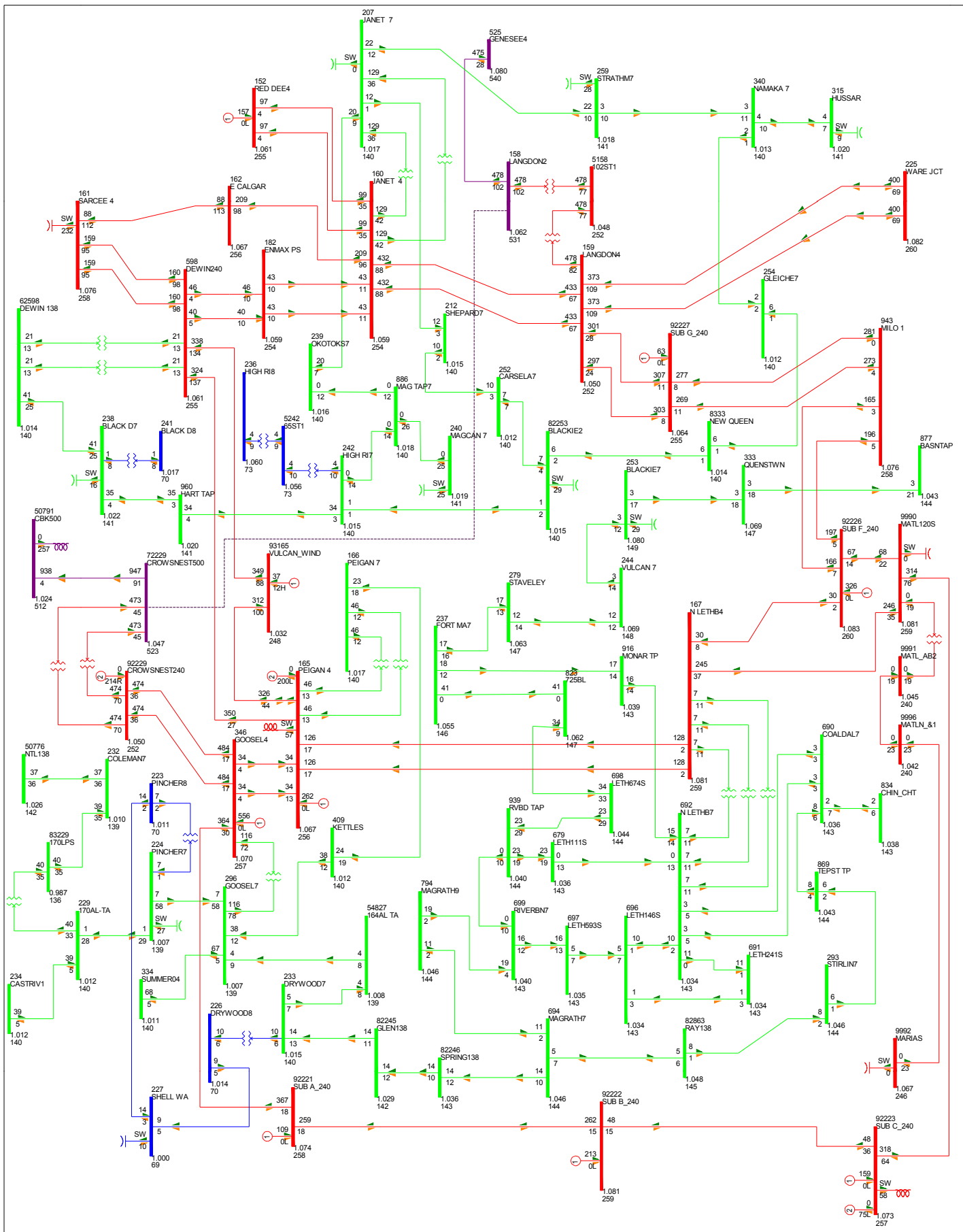


FIG 2017-1A-SL-4: LANGDON TO CROWSNEST 500 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:39

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1002 MW

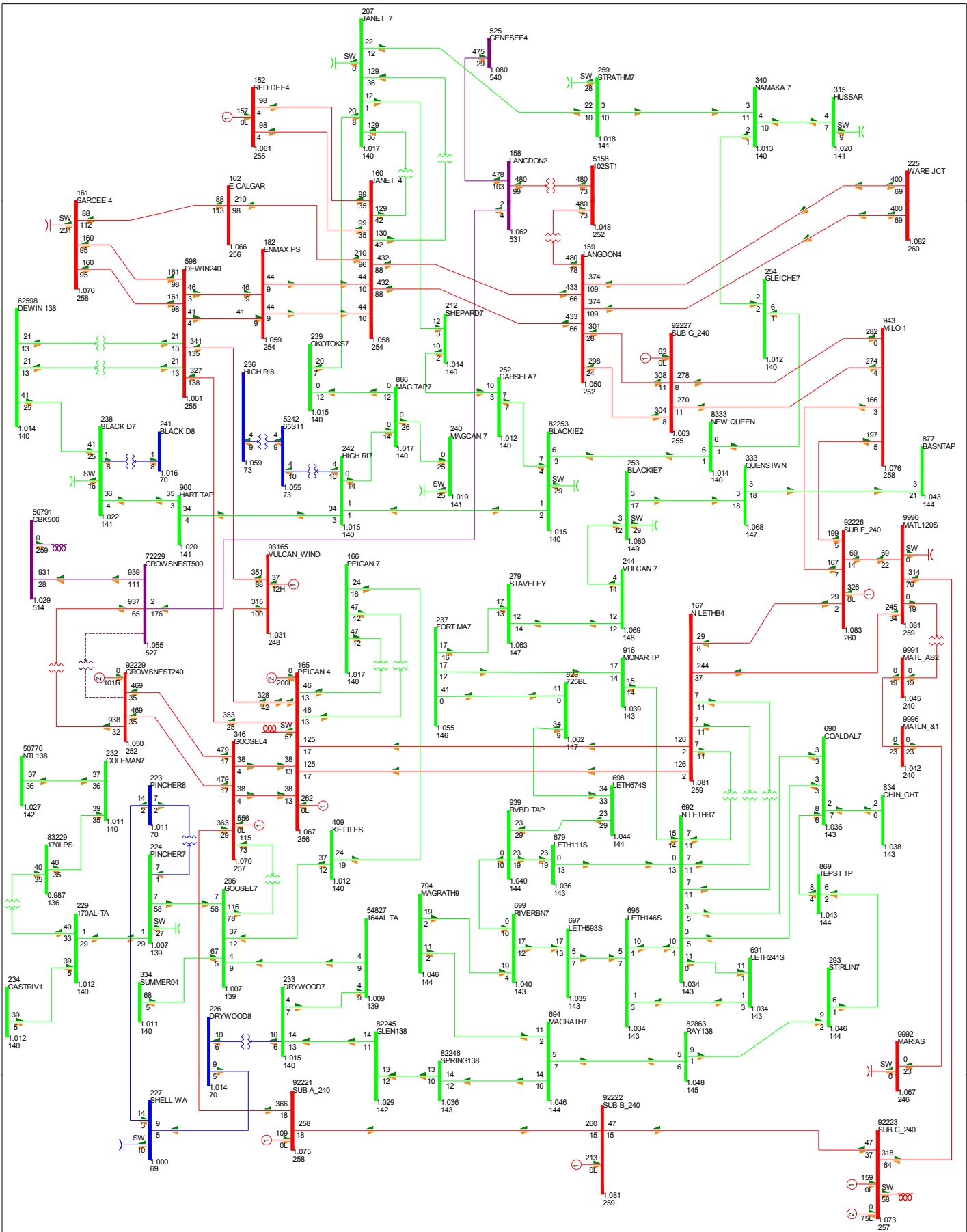


FIG 2017-1A-SL-6: CROWNSNEST 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:39

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

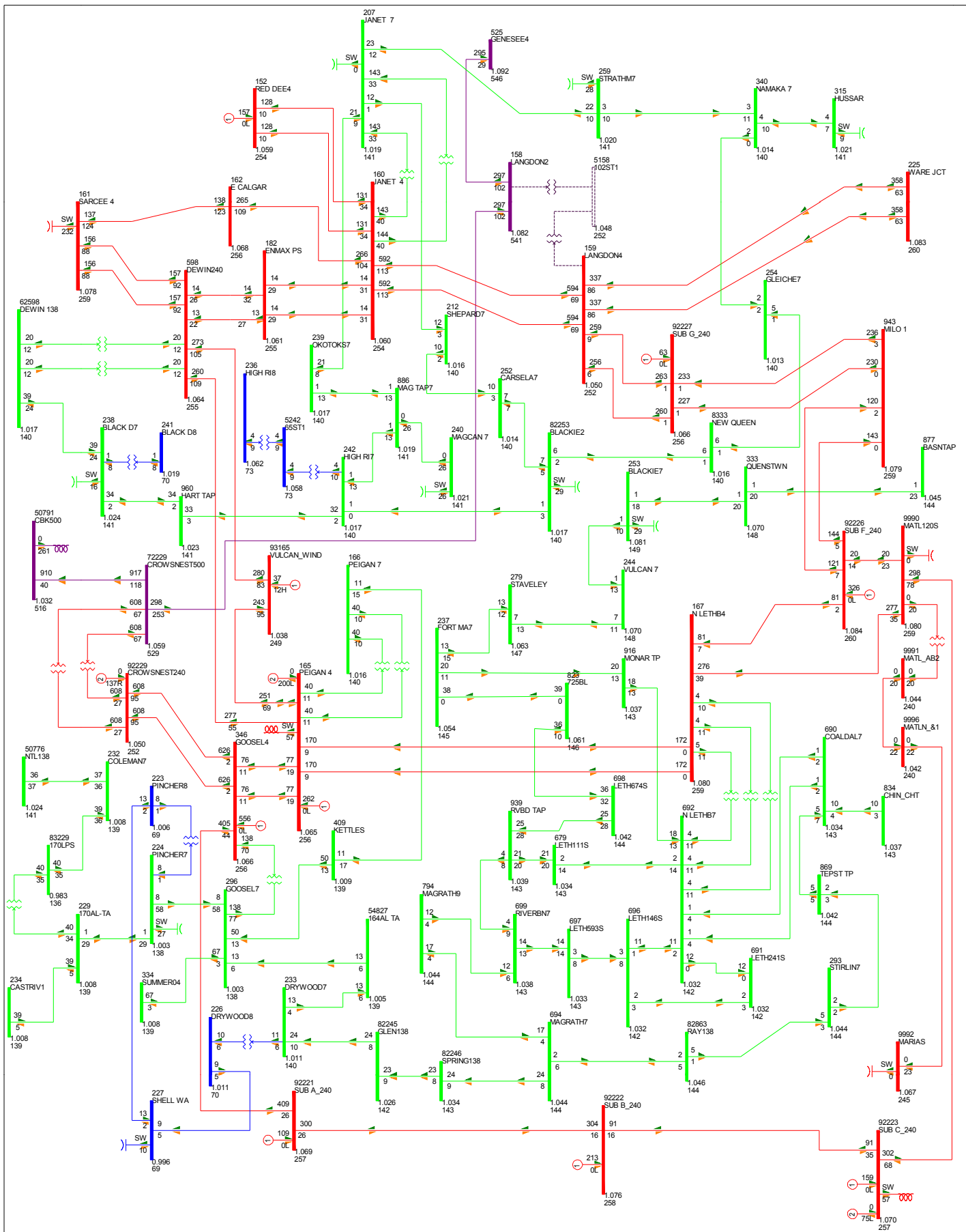


FIG 2017-1A-SL-8: LANGDON 500/240 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:39

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 989 MW

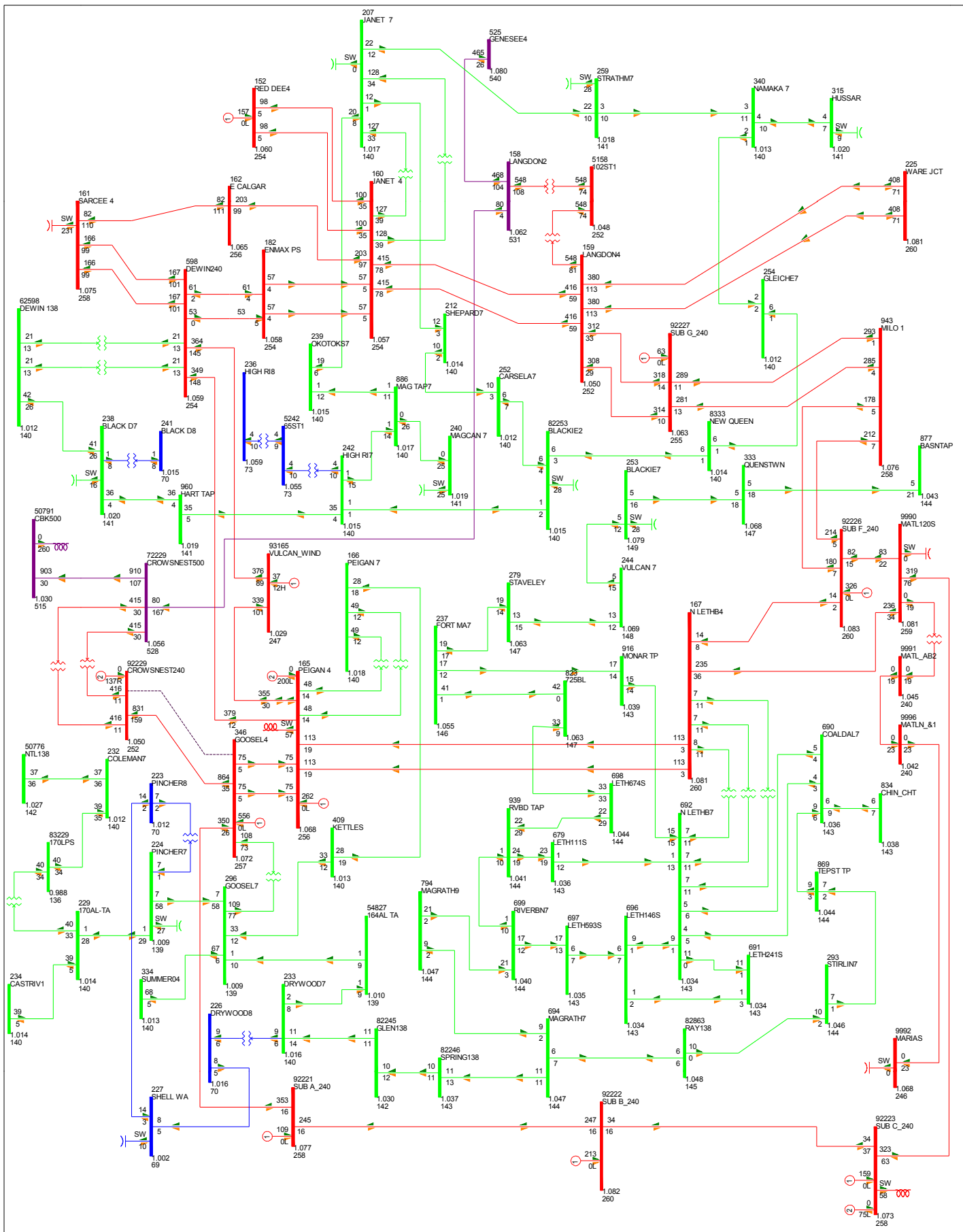


FIG 2017-1A-SL-10: CROWSNEST TO GOOSELAKE 240KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 975 MW

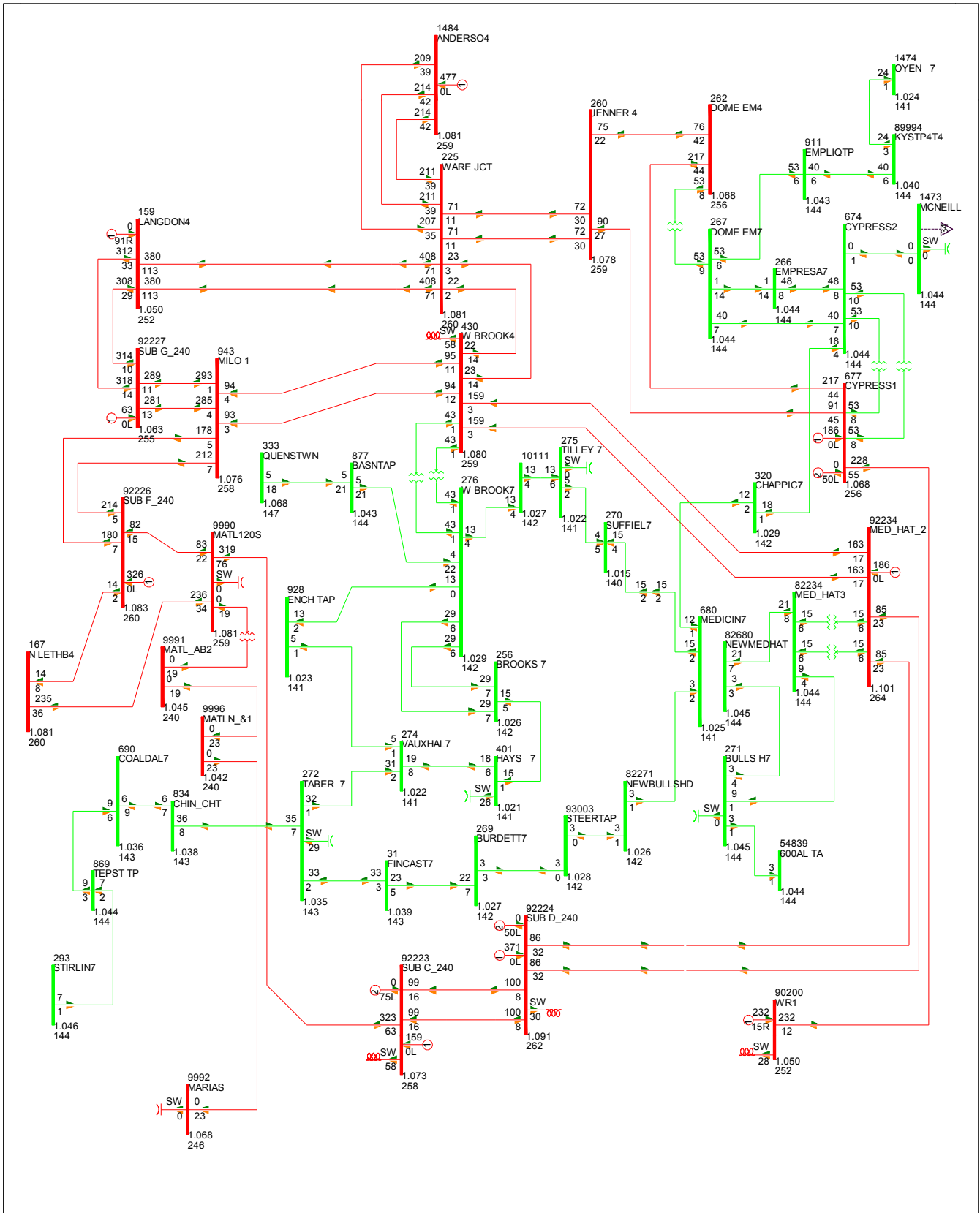


FIG 2017-1A-SL-11: CROWNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 975 MW

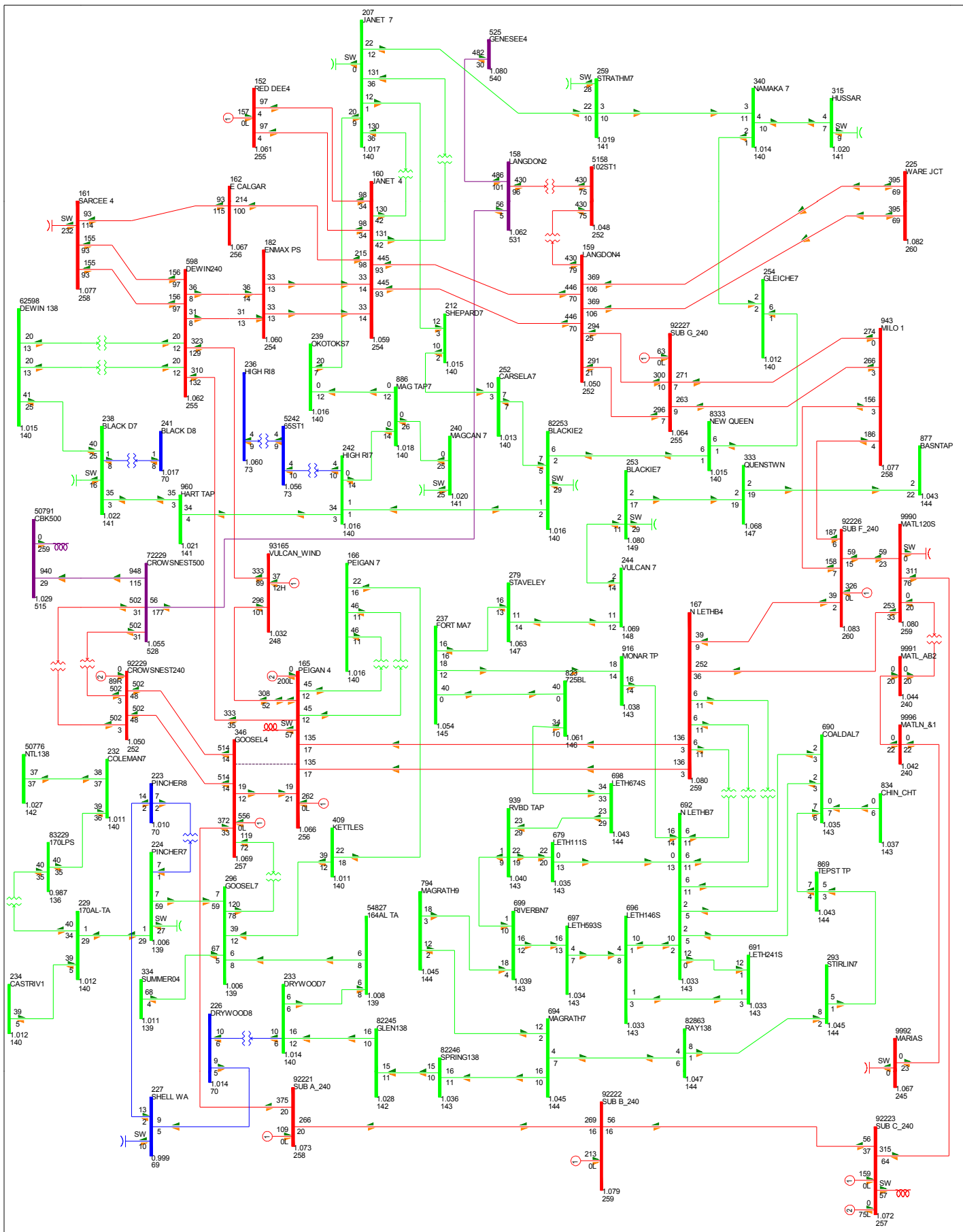


FIG 2017-1A-SL-12: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

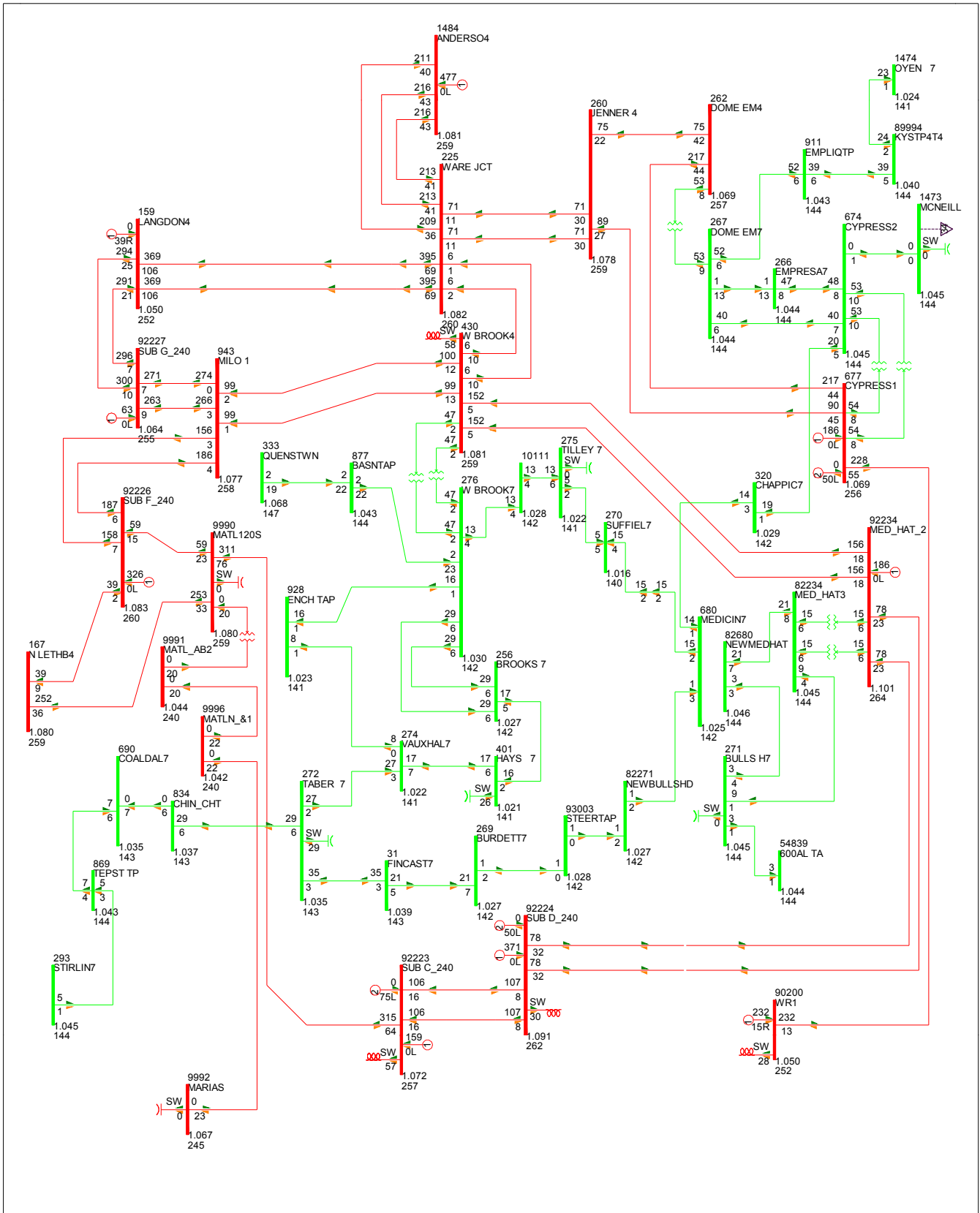


FIG 2017-1A-SL-13: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

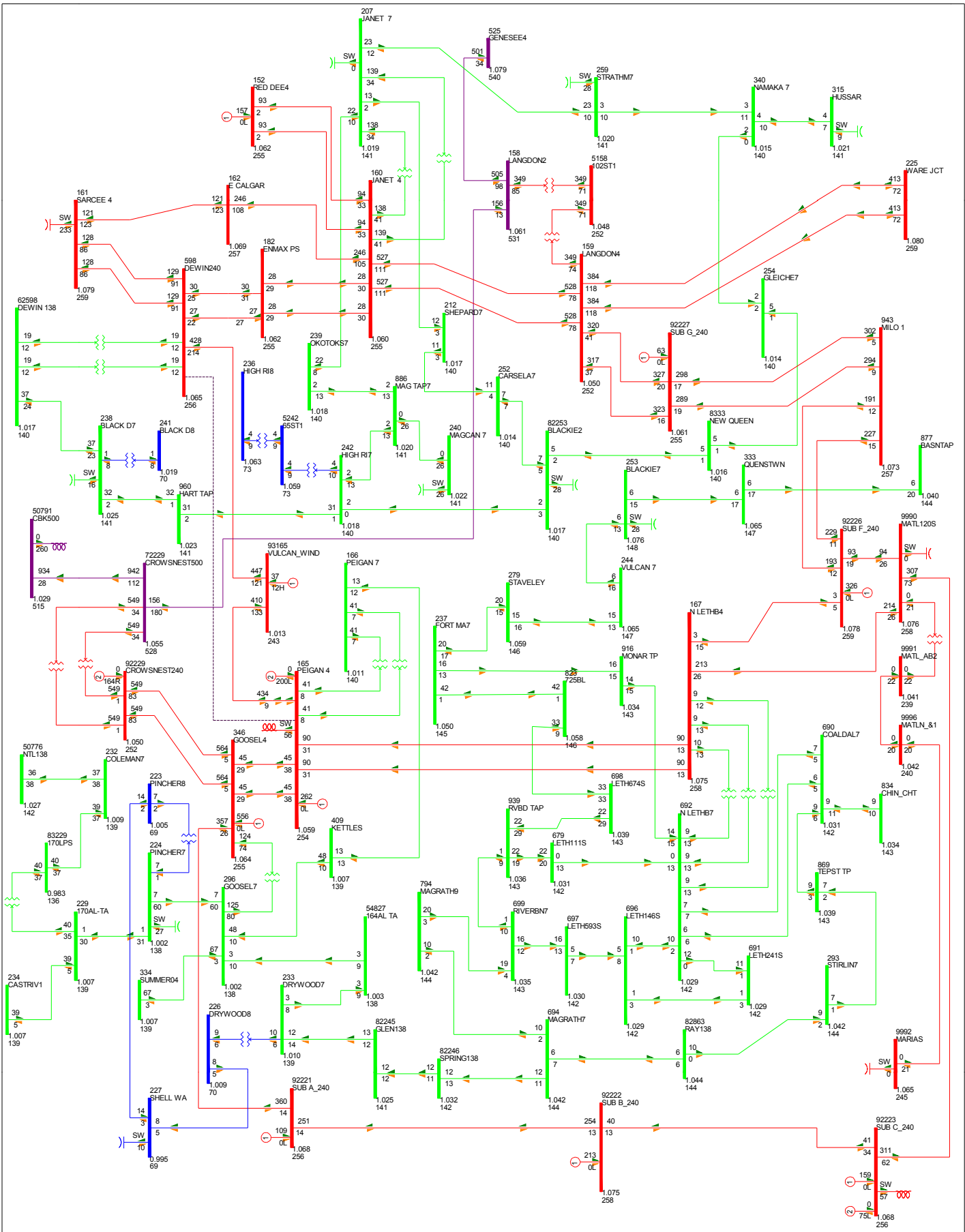


FIG 2017-1A-SL-14: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 ≤ 500.000 >500.000
 BC Export: 994 MW

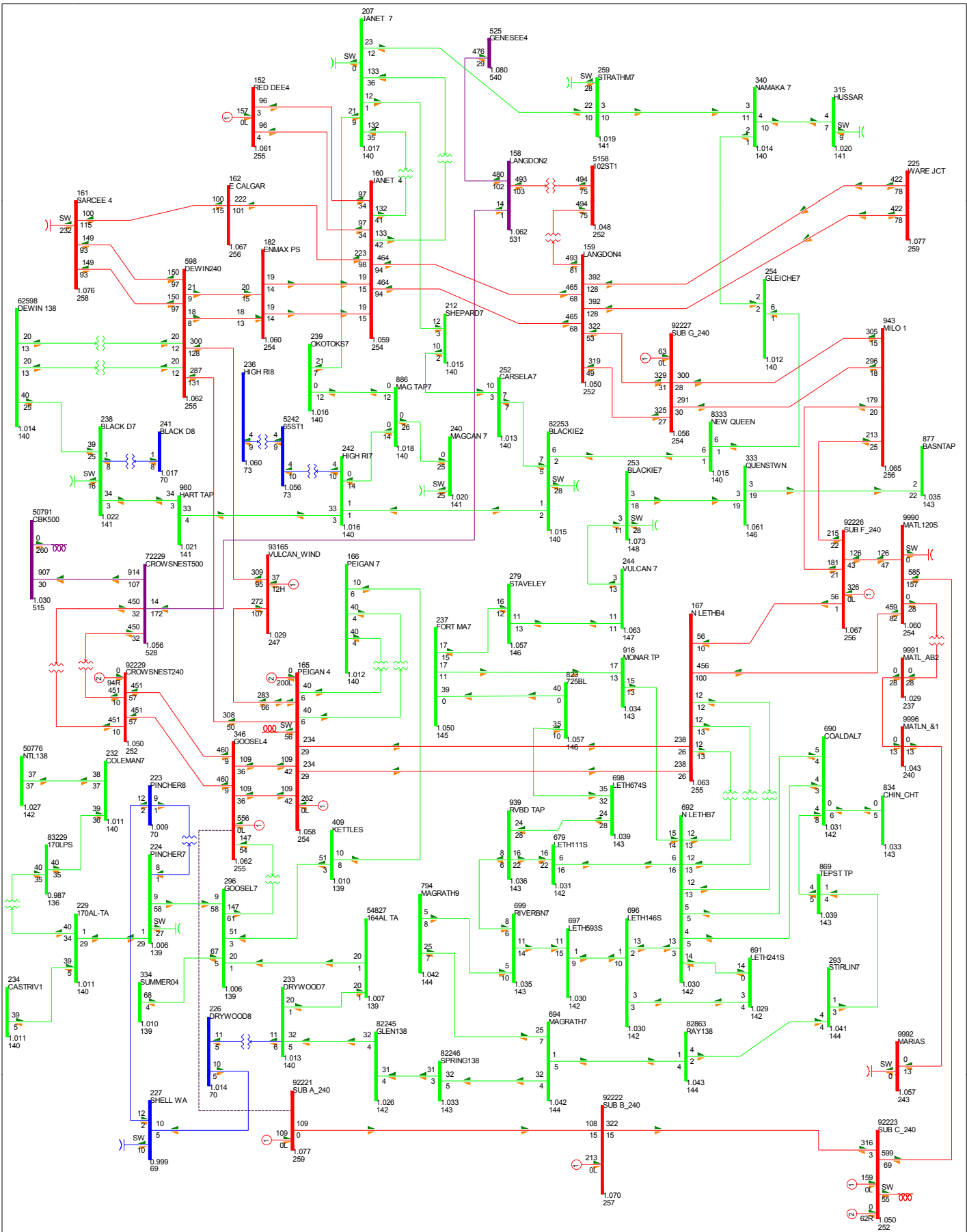


FIG 2017-1A-SL-16: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 975 MW

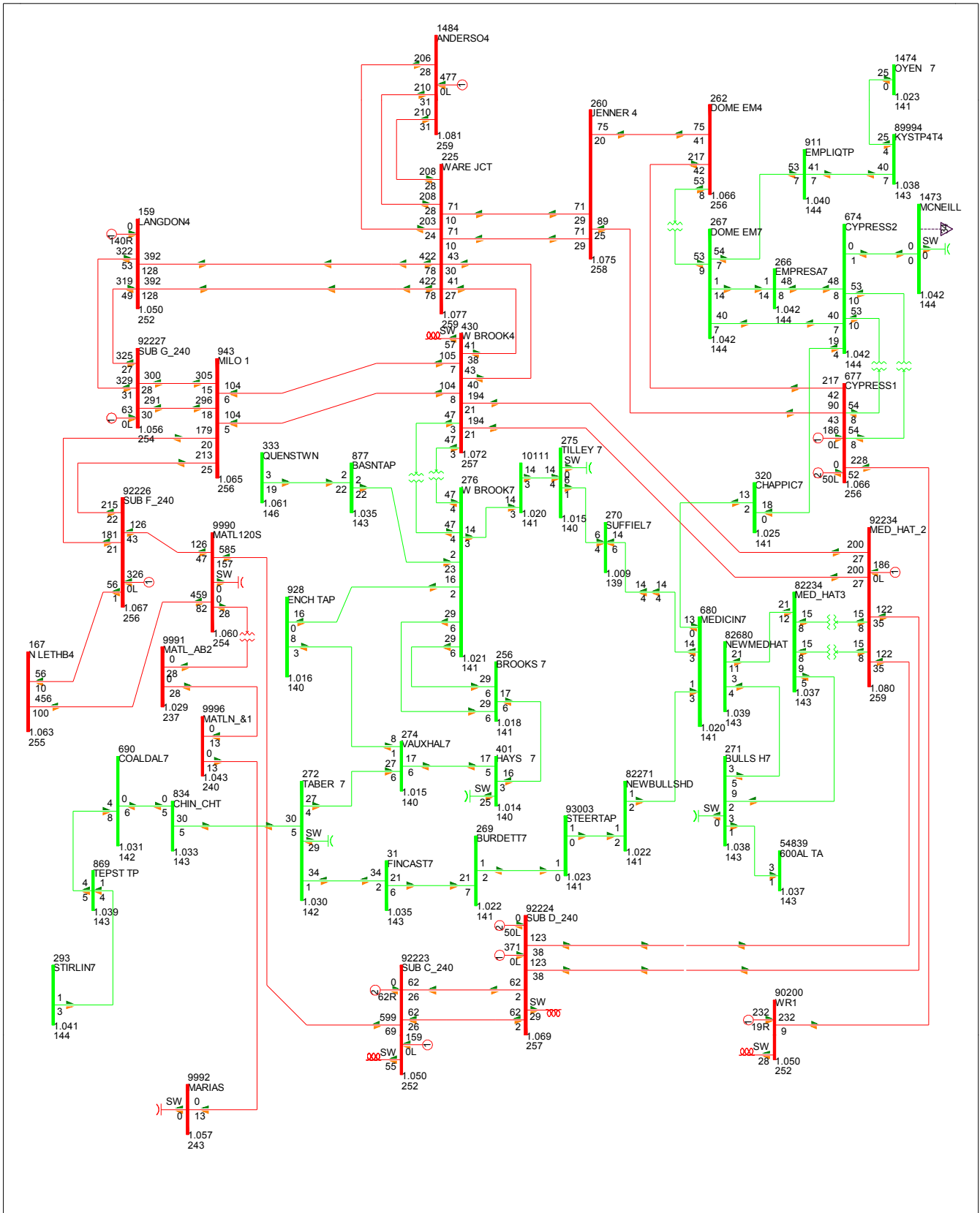


FIG 2017-1A-SL-17: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 975 MW

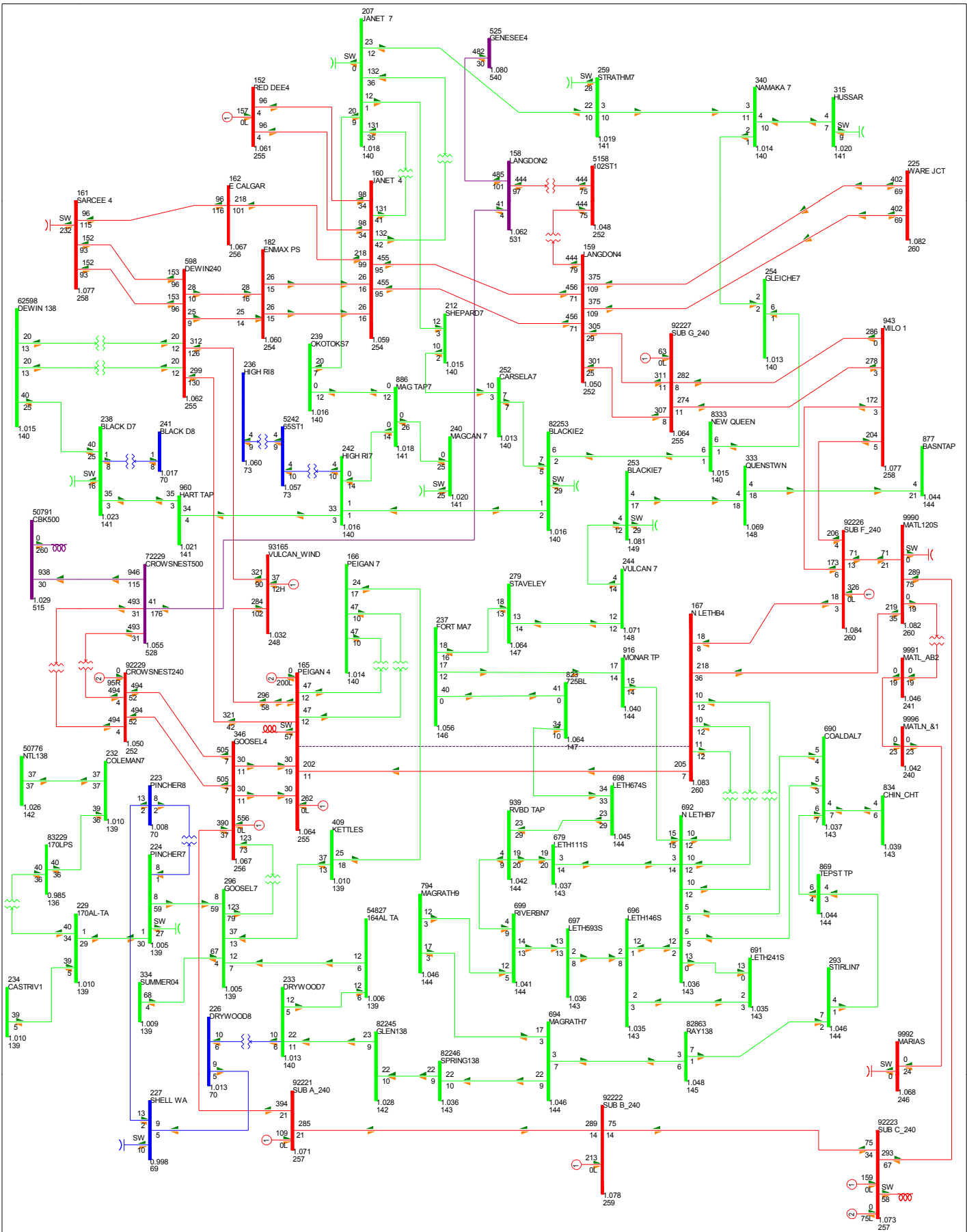


FIG 2017-1A-SL-18: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1005 MW

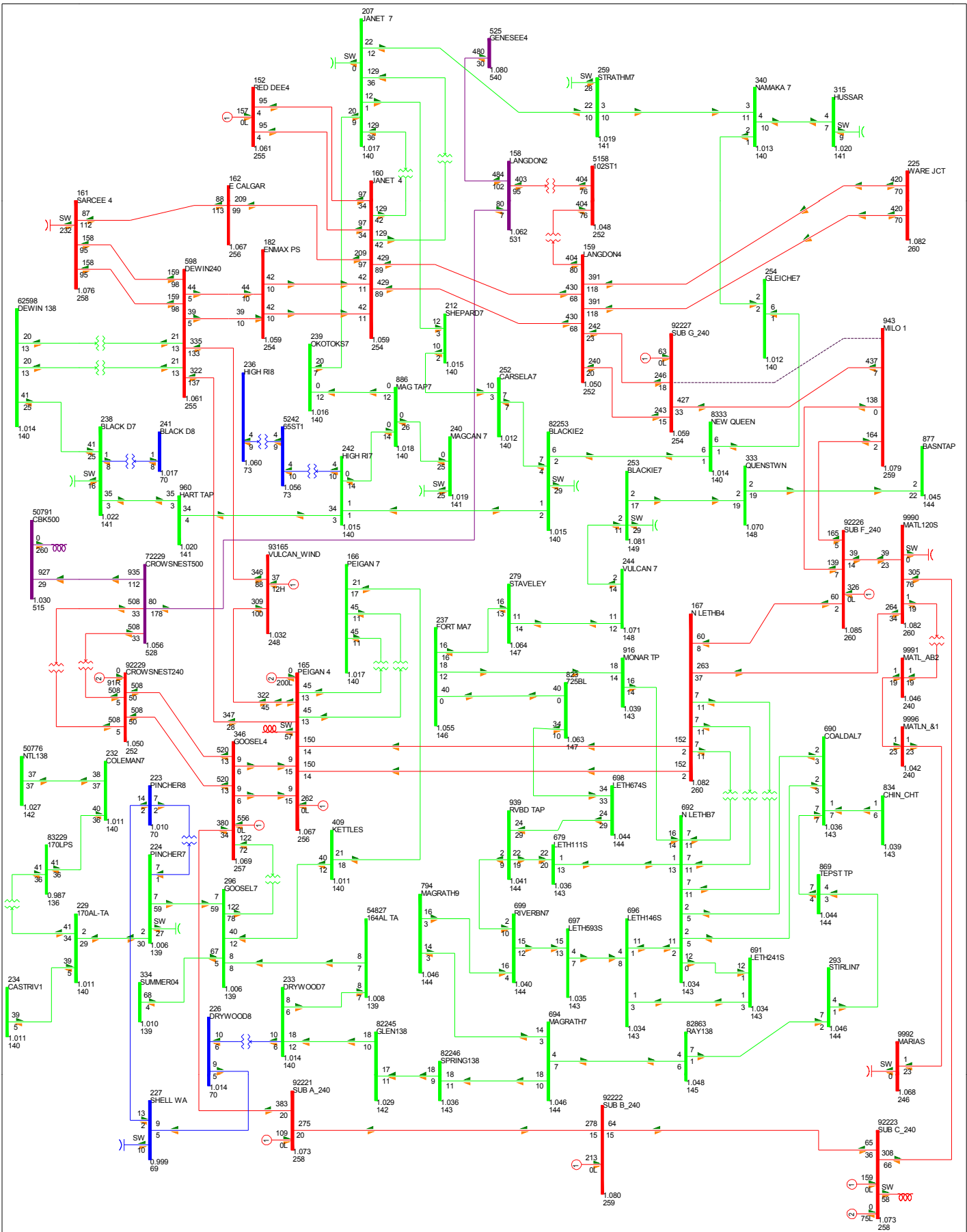


FIG 2017-1A-SL-20: MILO TO SUB G 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 994 MW

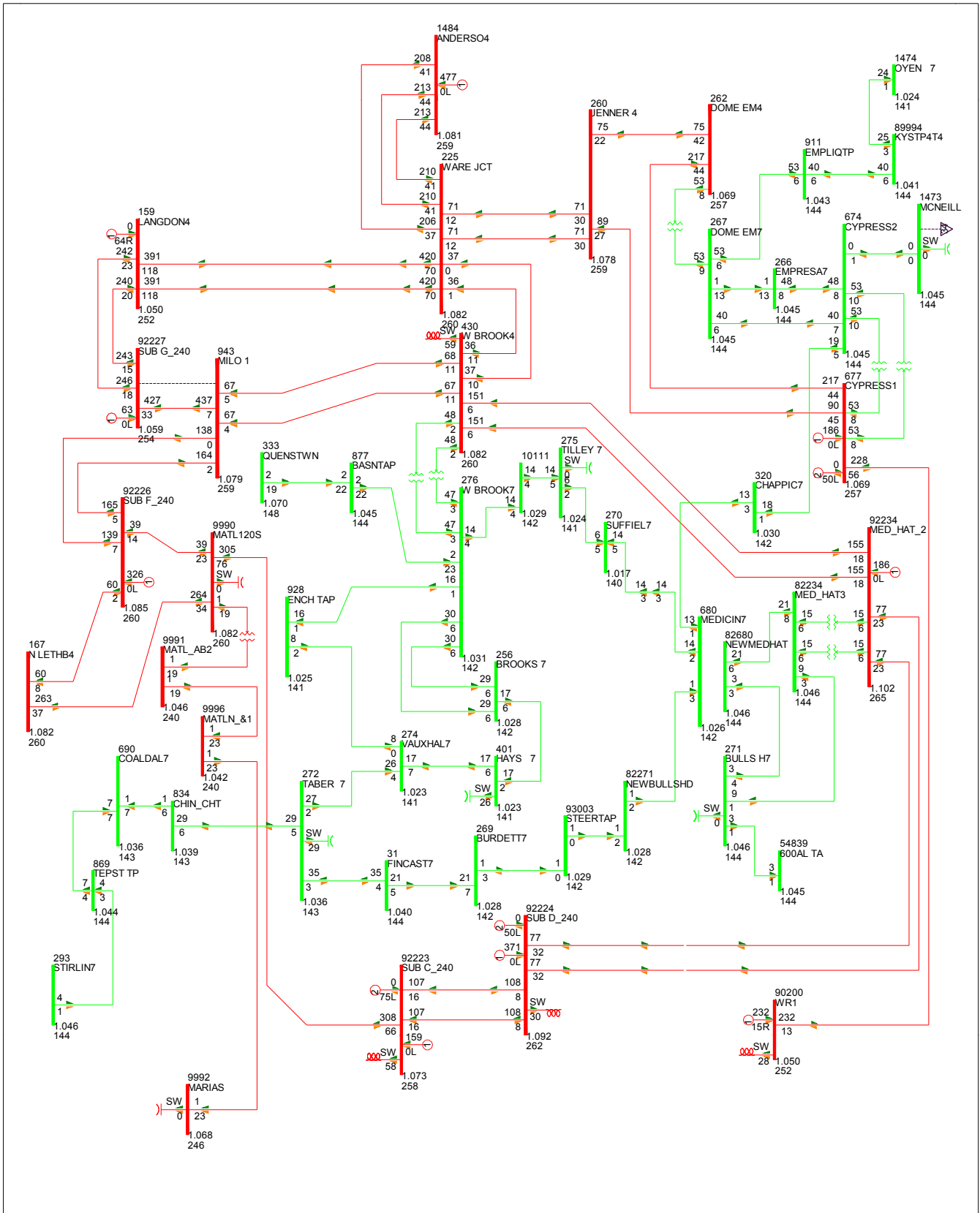


FIG 2017-1A-SL-21: MILO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 994 MW

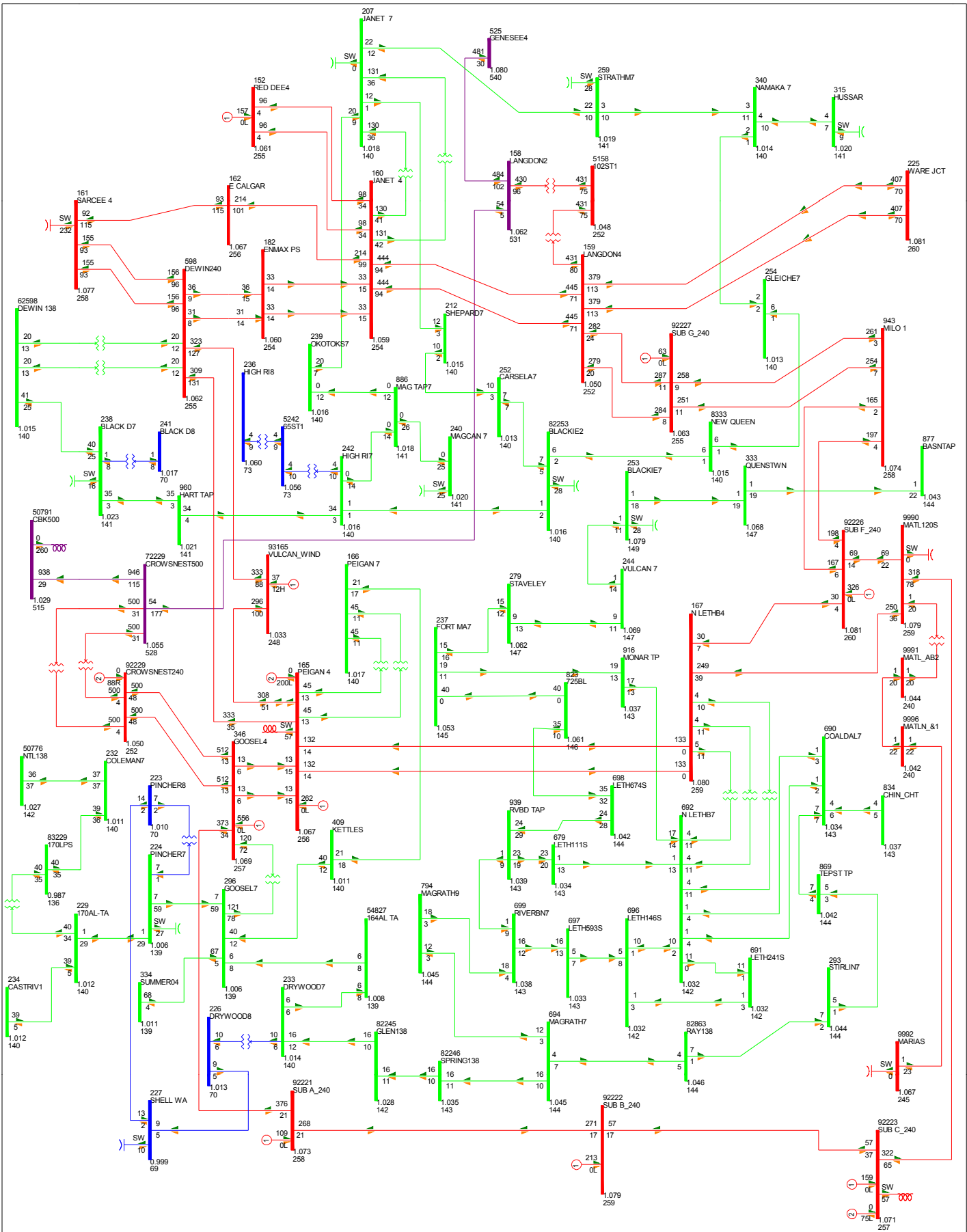


FIG 2017-1A-SL-22: MILO TO WESTBROOKS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=240.000 <=500.000 >500.000
 BC Export: 1005 MW

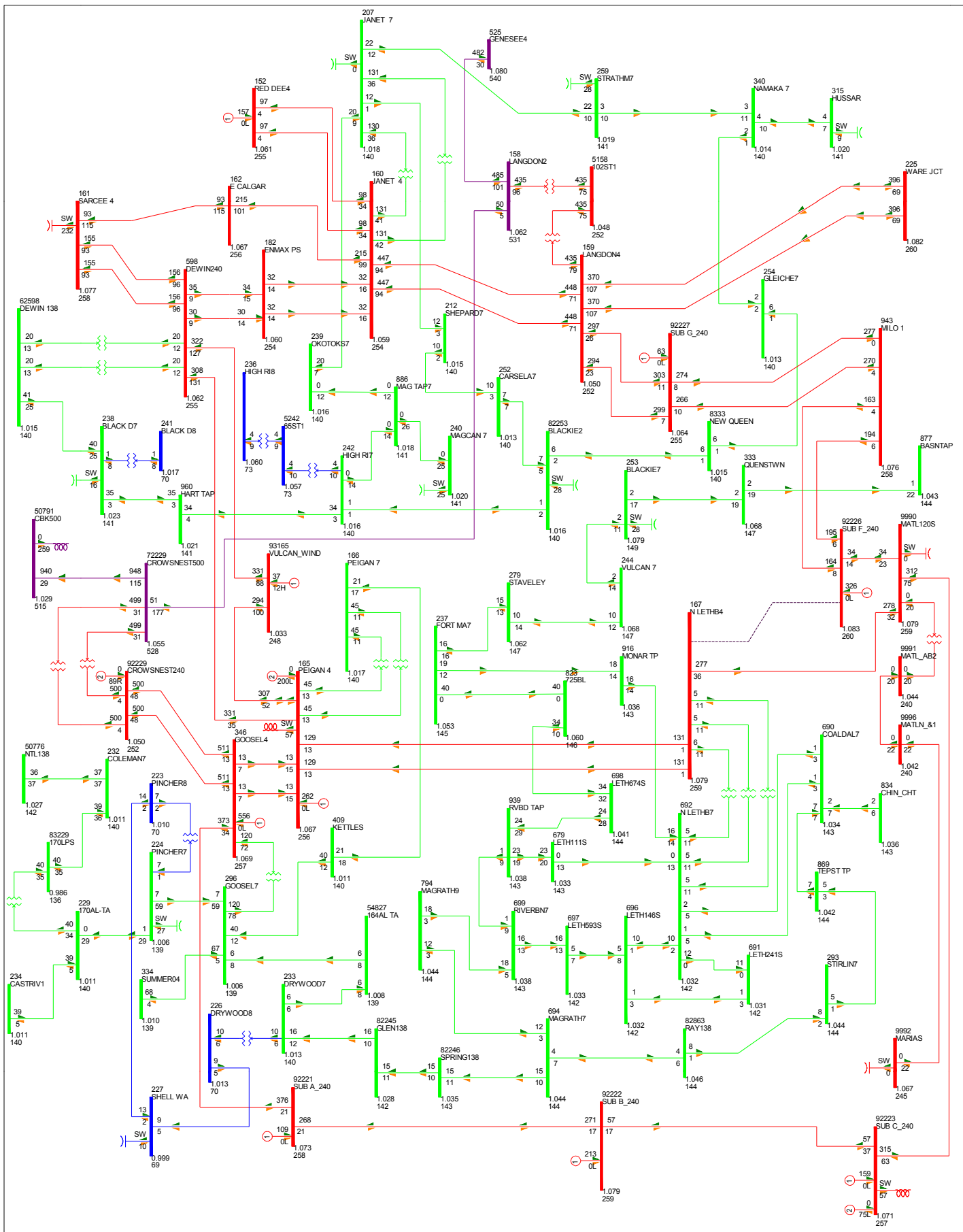


FIG 2017-1A-SL-24: N. LETHBRIDGE TO SUB F 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1007 MW

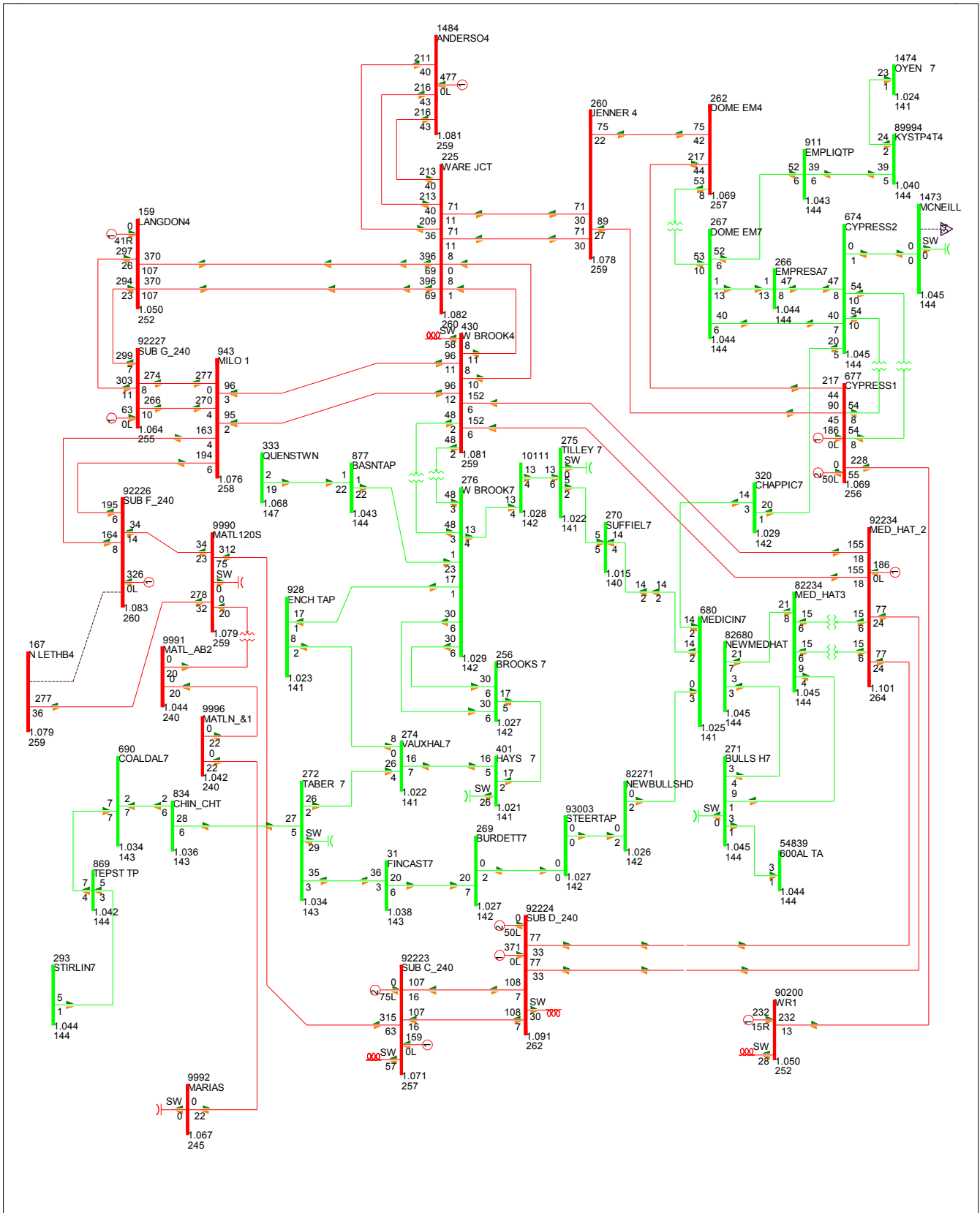


FIG 2017-1A-SL-25: N. LETHBRIDGE TO SUB F 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

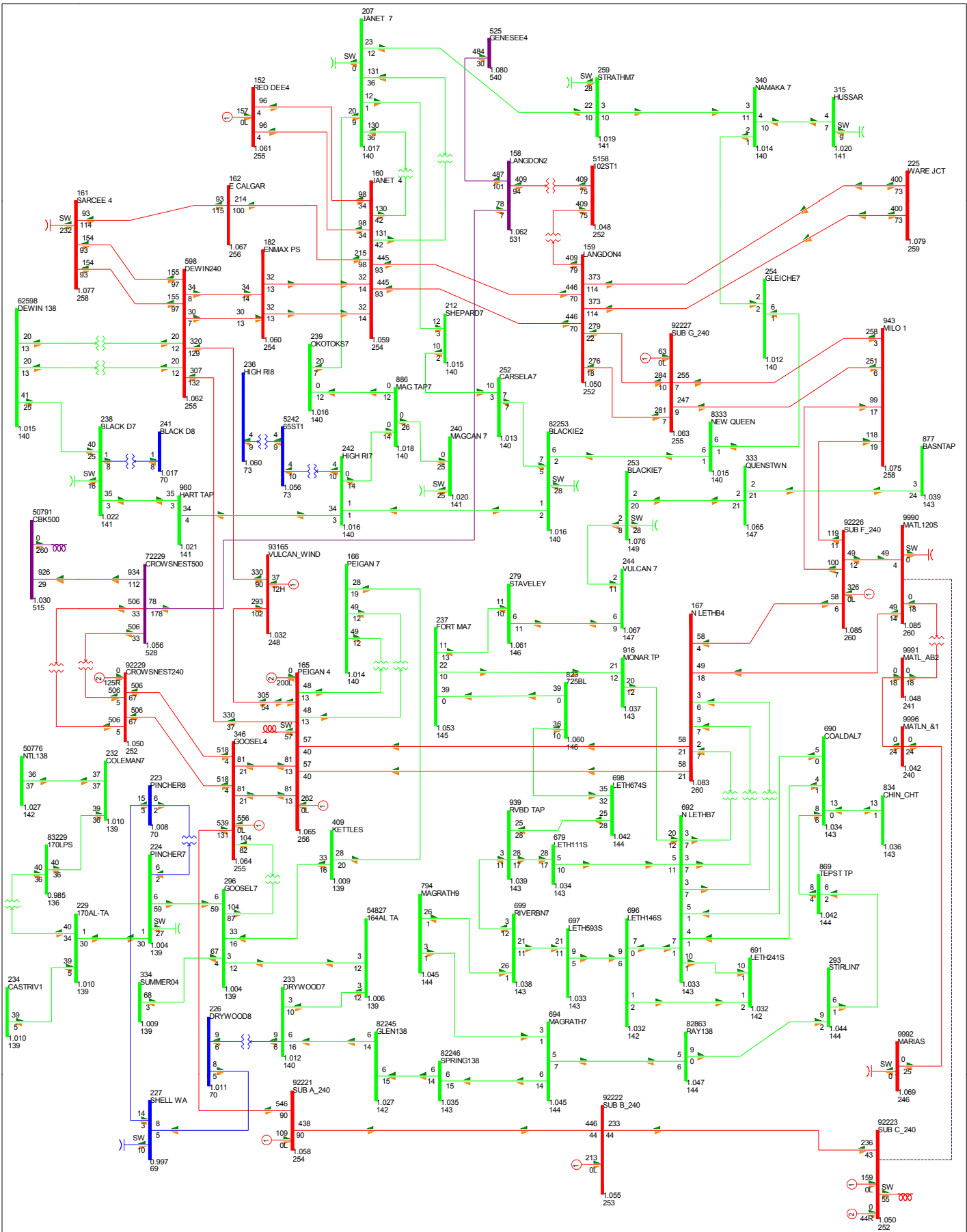


FIG 2017-1A-SL-26: MATL TO SUB C 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 991 MW

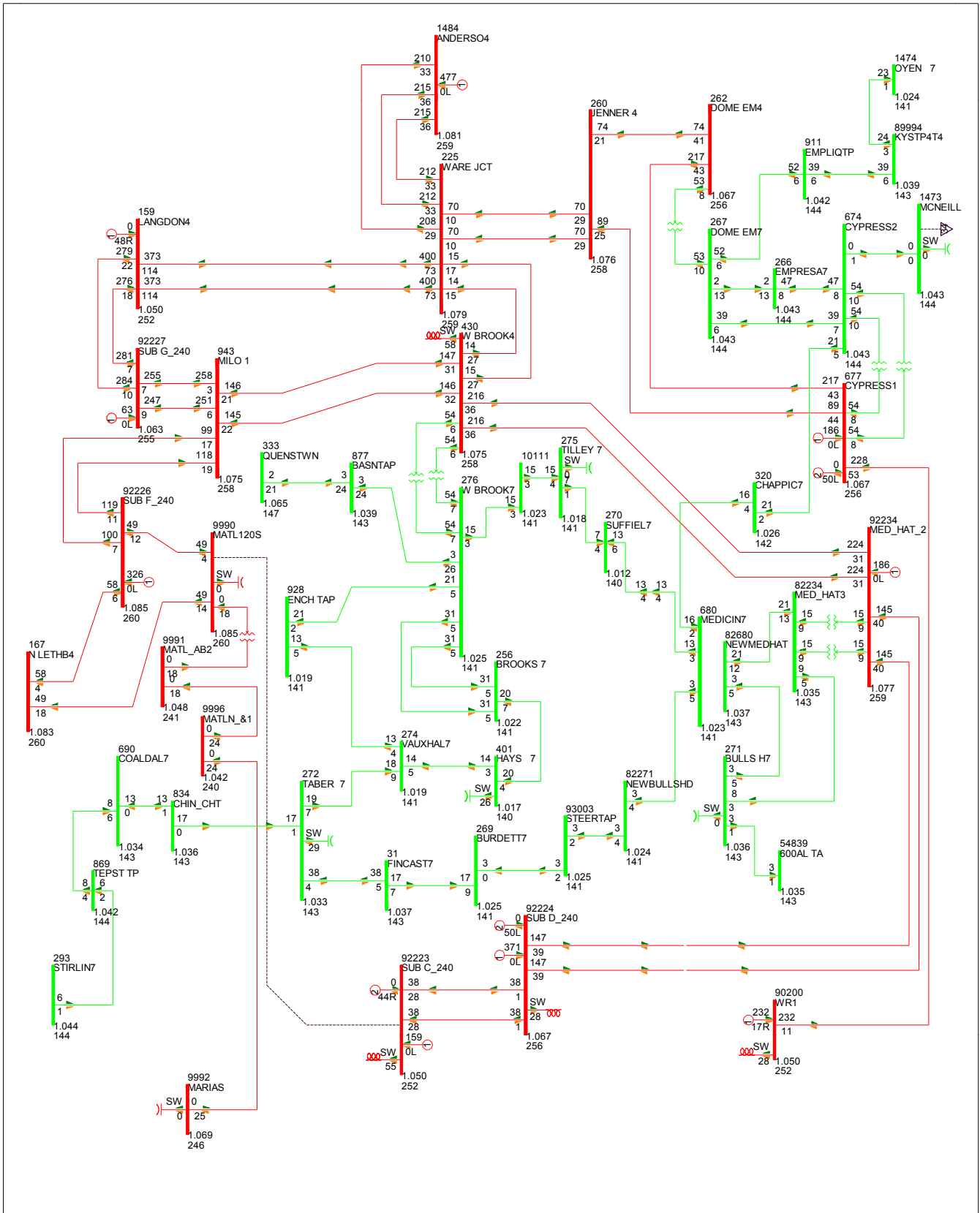


FIG 2017-1A-SL-27: MATL TO SUB C 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 991 MW

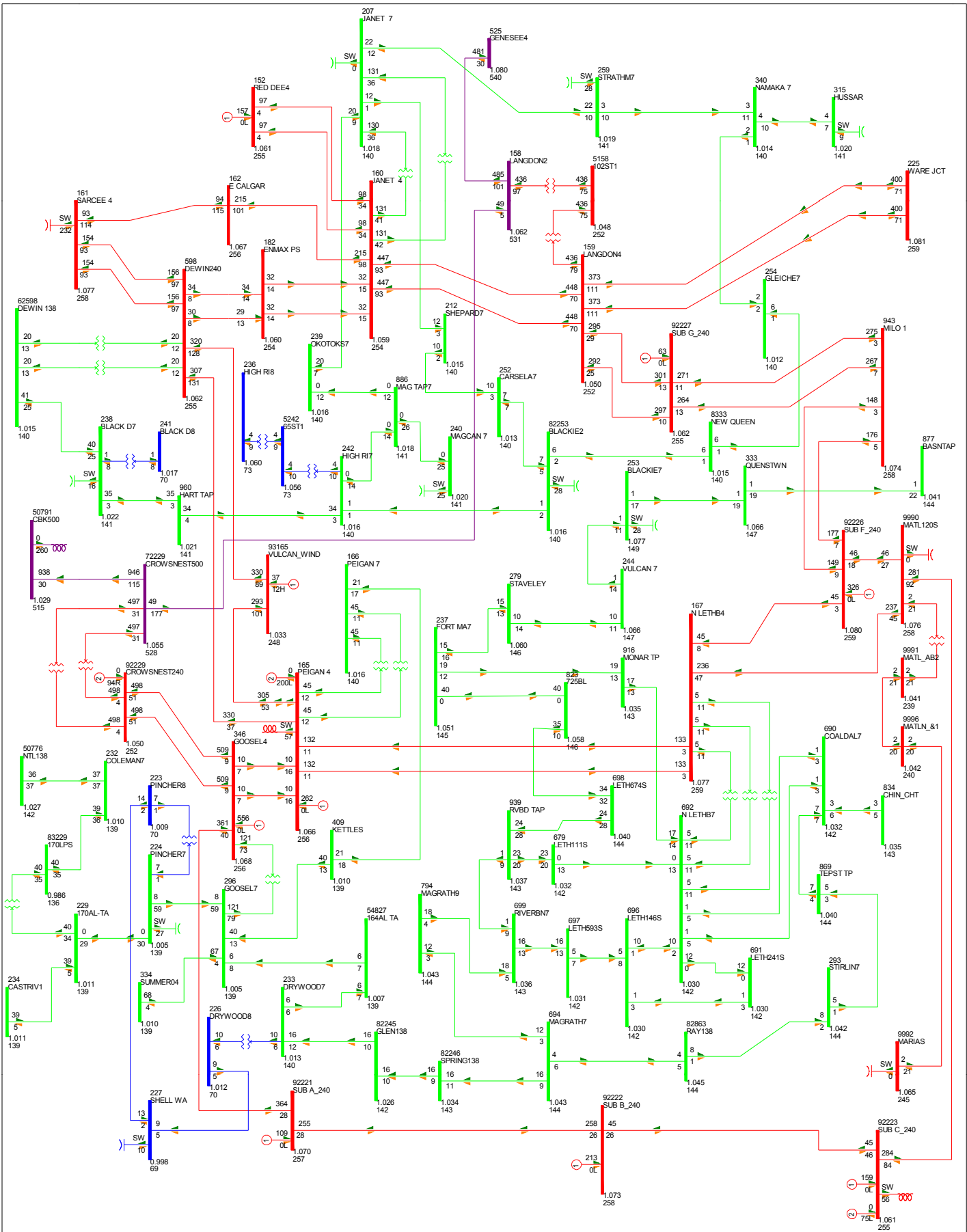


FIG 2017-1A-SL-28: SUB C TO SUB D 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1004 MW

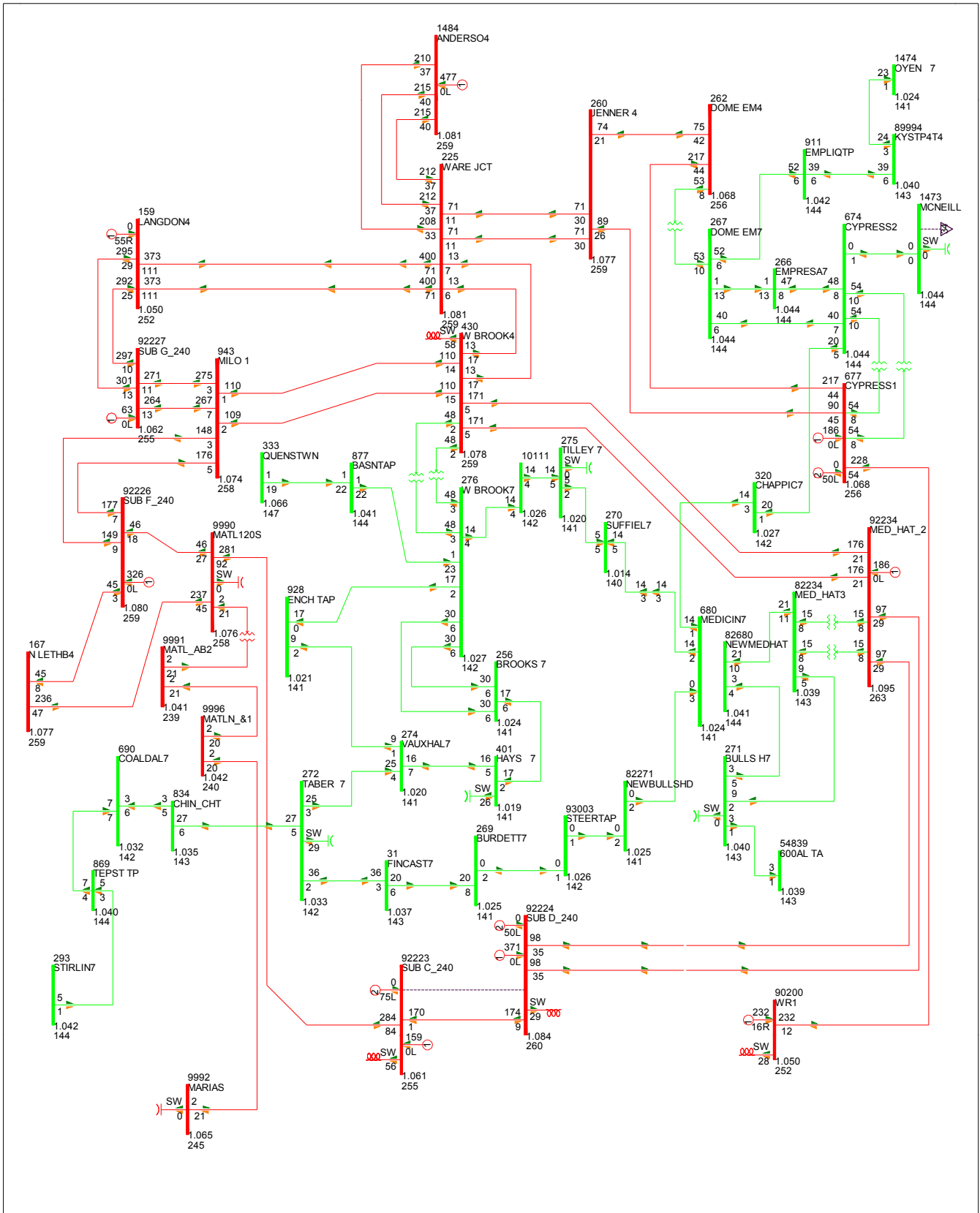


FIG 2017-1A-SL-29: SUB C TO SUB D 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1004 MW

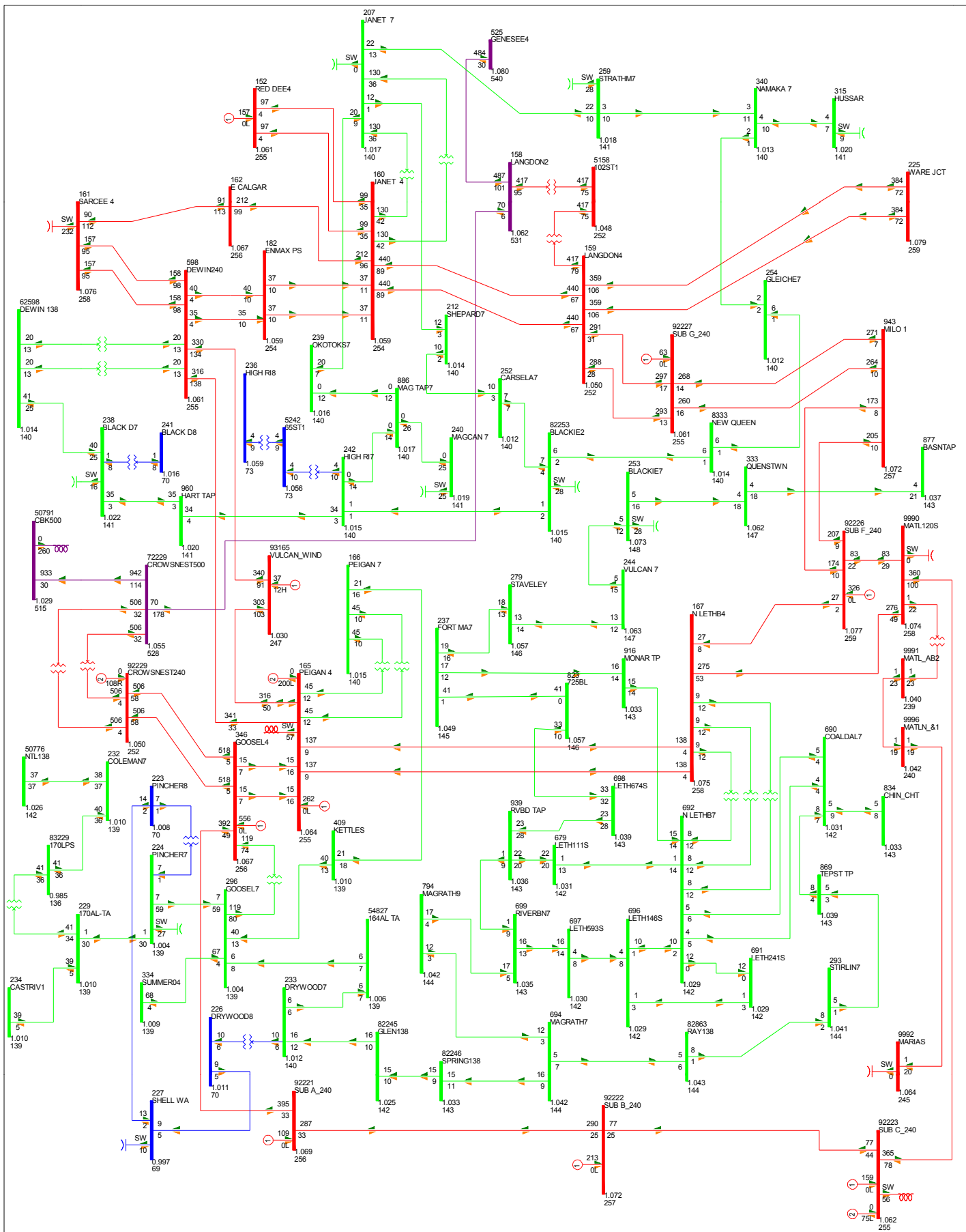


FIG 2017-1A-SL-30: WESTBROOKS TO MEDHAT2 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

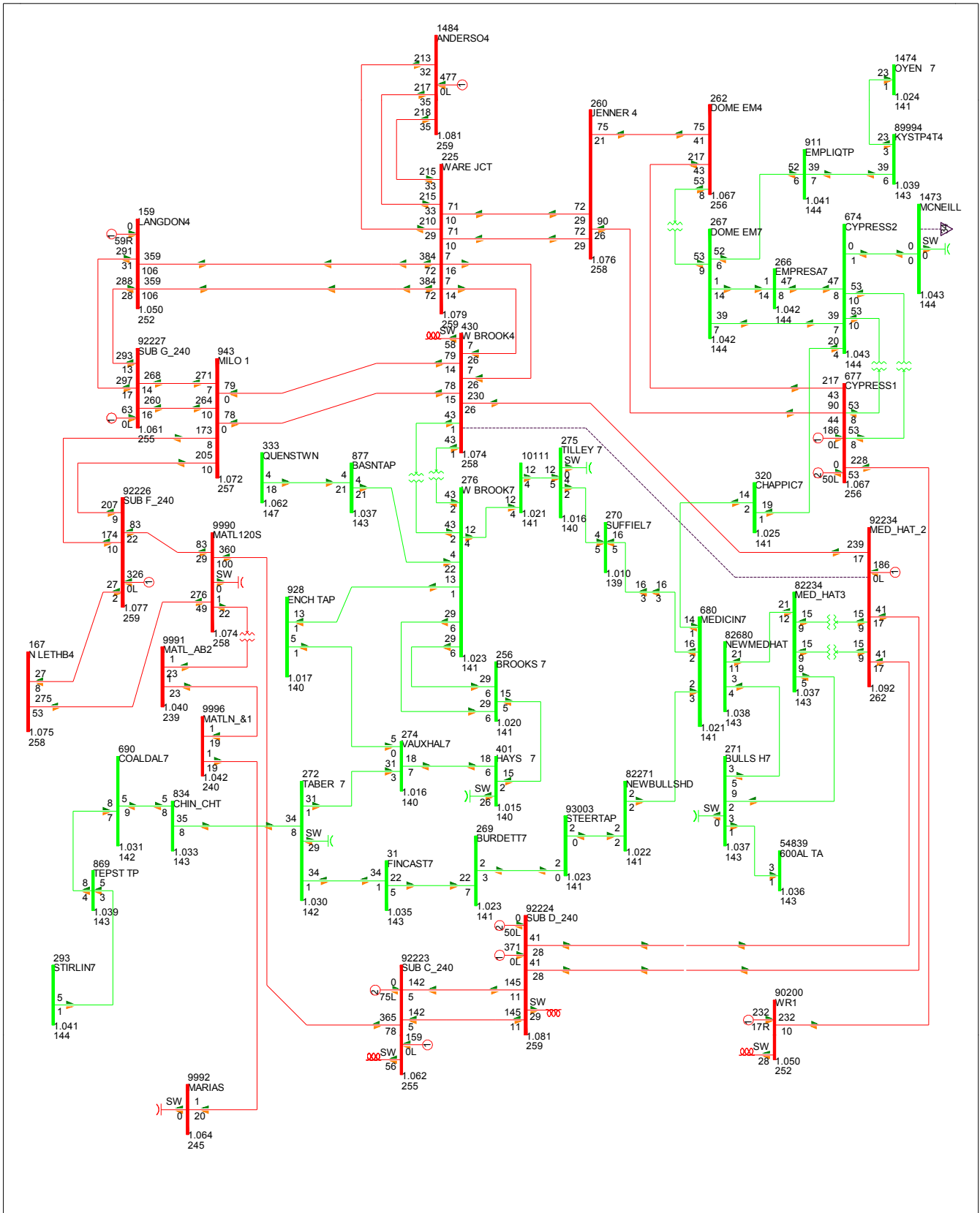


FIG 2017-1A-SL-31: WESTBROOKS TO MEDHAT2 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

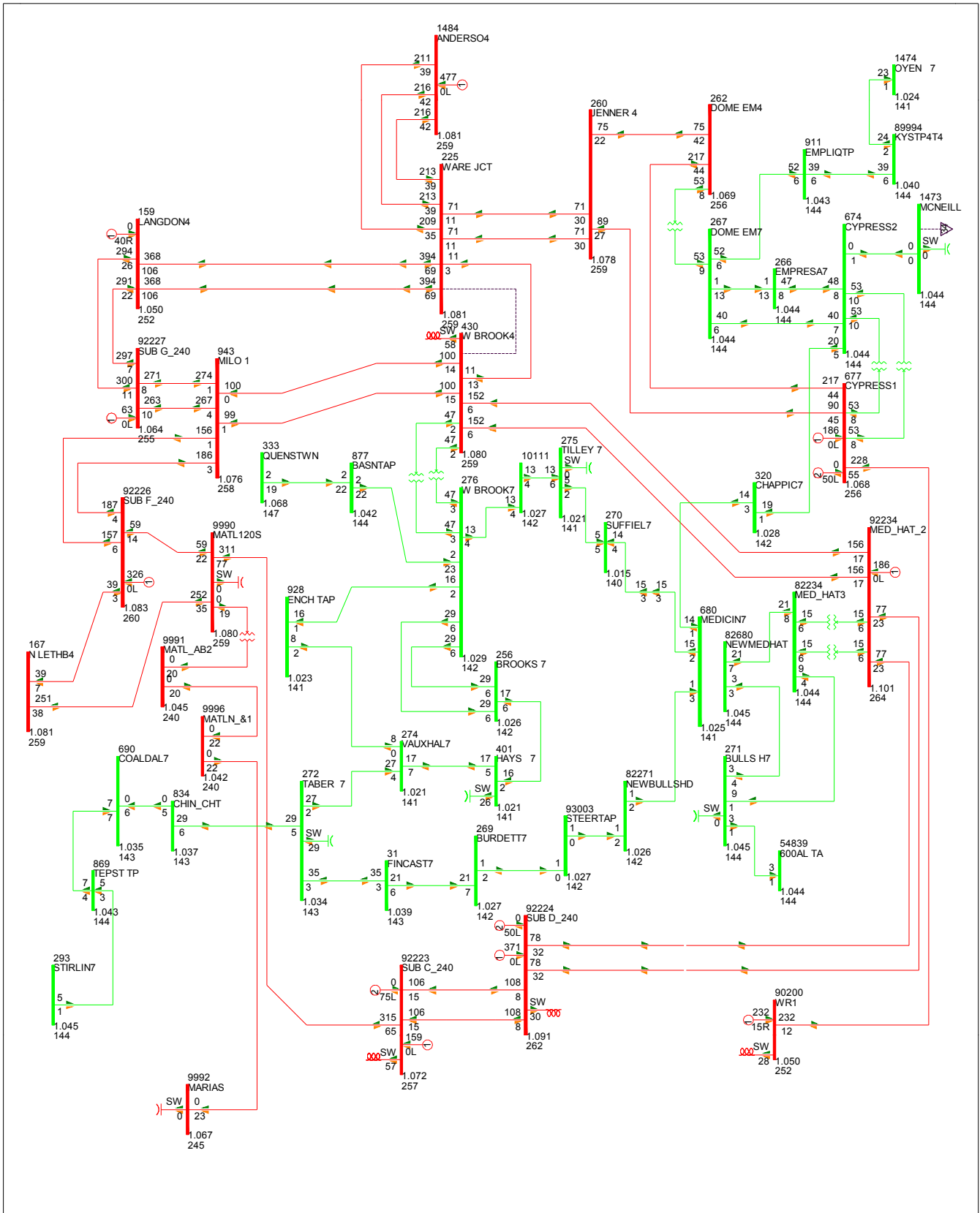


FIG 2017-1A-SL-33: WAREJUNC TO WESTBROOKS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

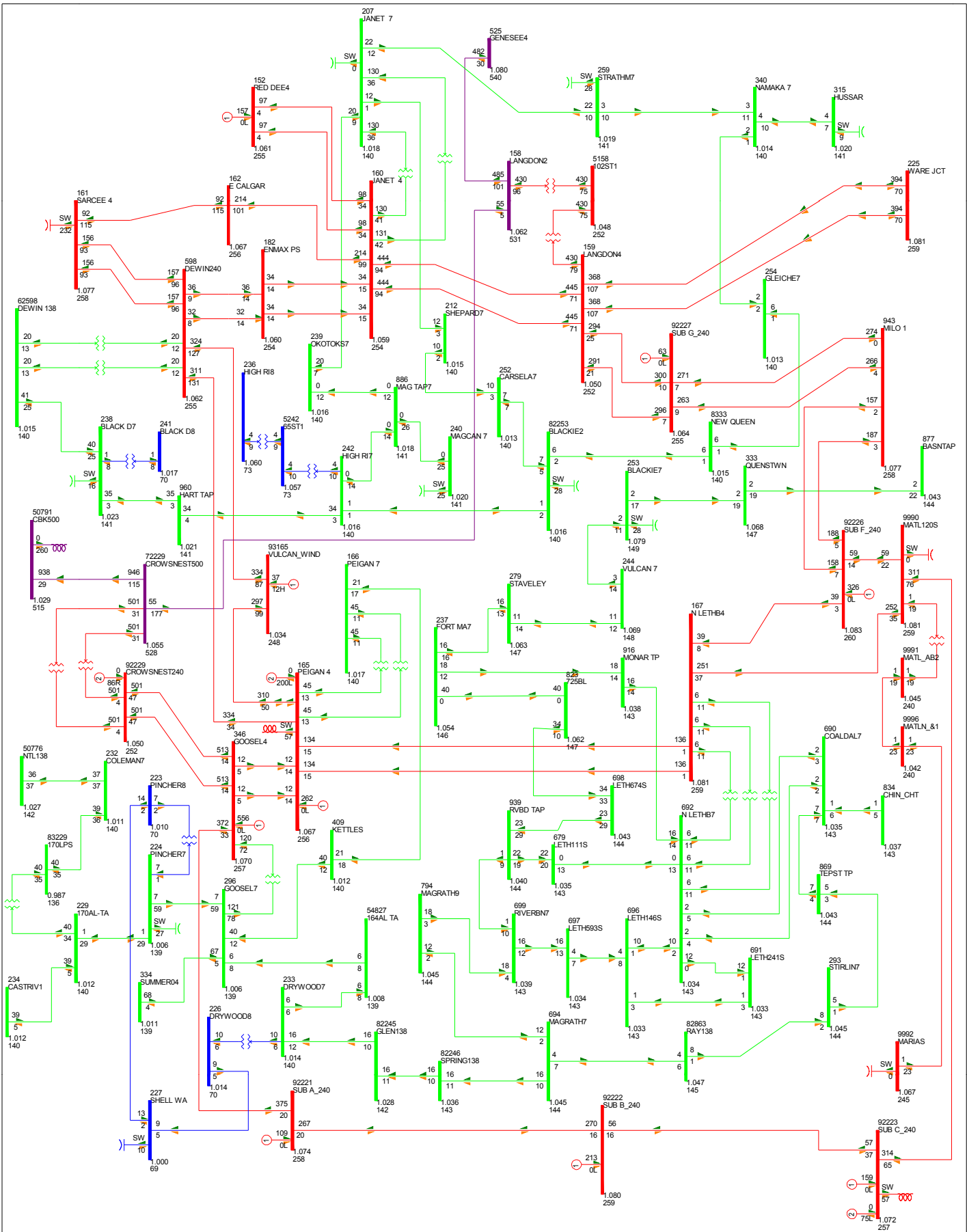


FIG 2017-1A-SL-36: DOME EMPRESS TO CYPRESS 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1005 MW

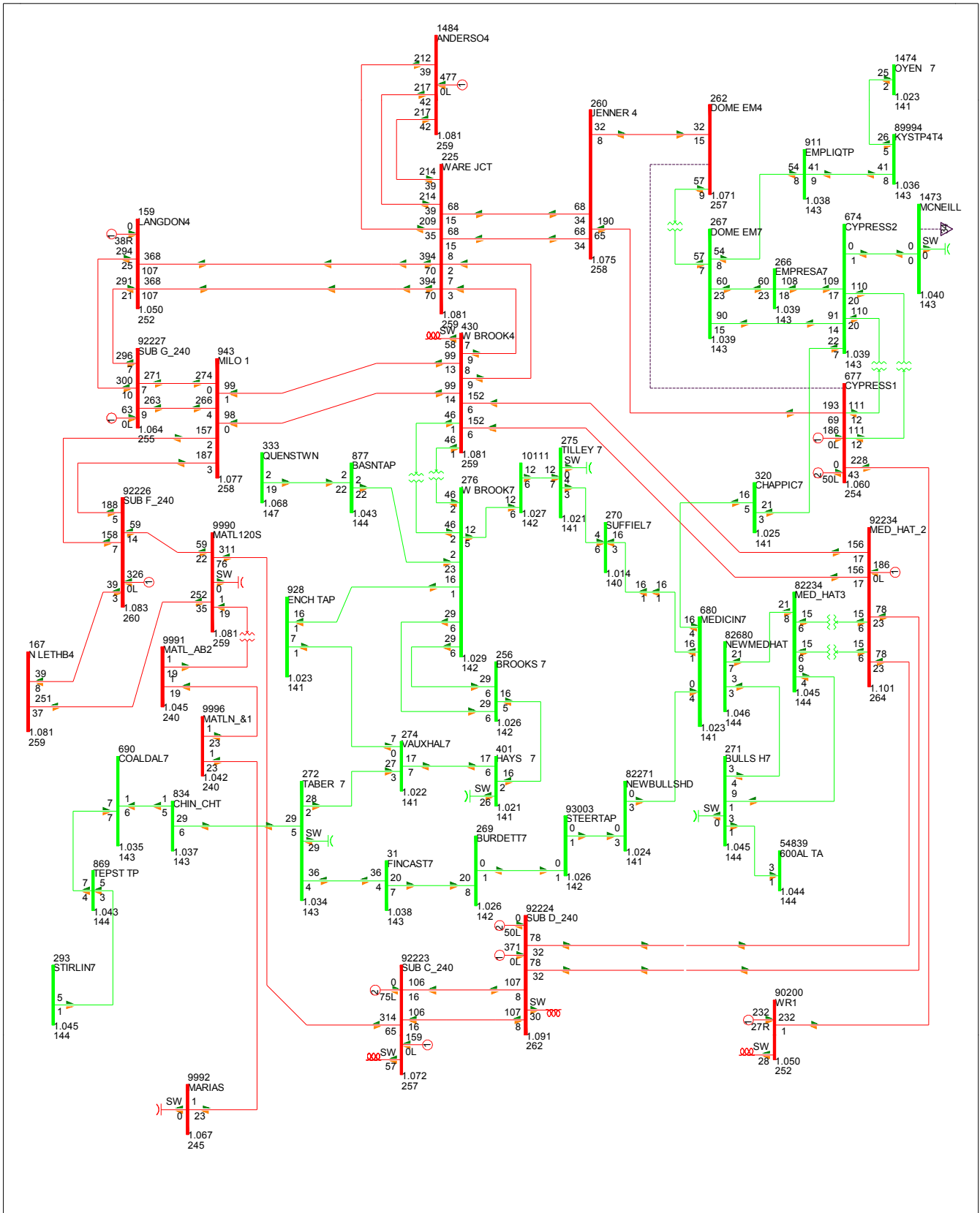


FIG 2017-1A-SL-37: DOME EMPRESS TO CYPRESS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1005 MW

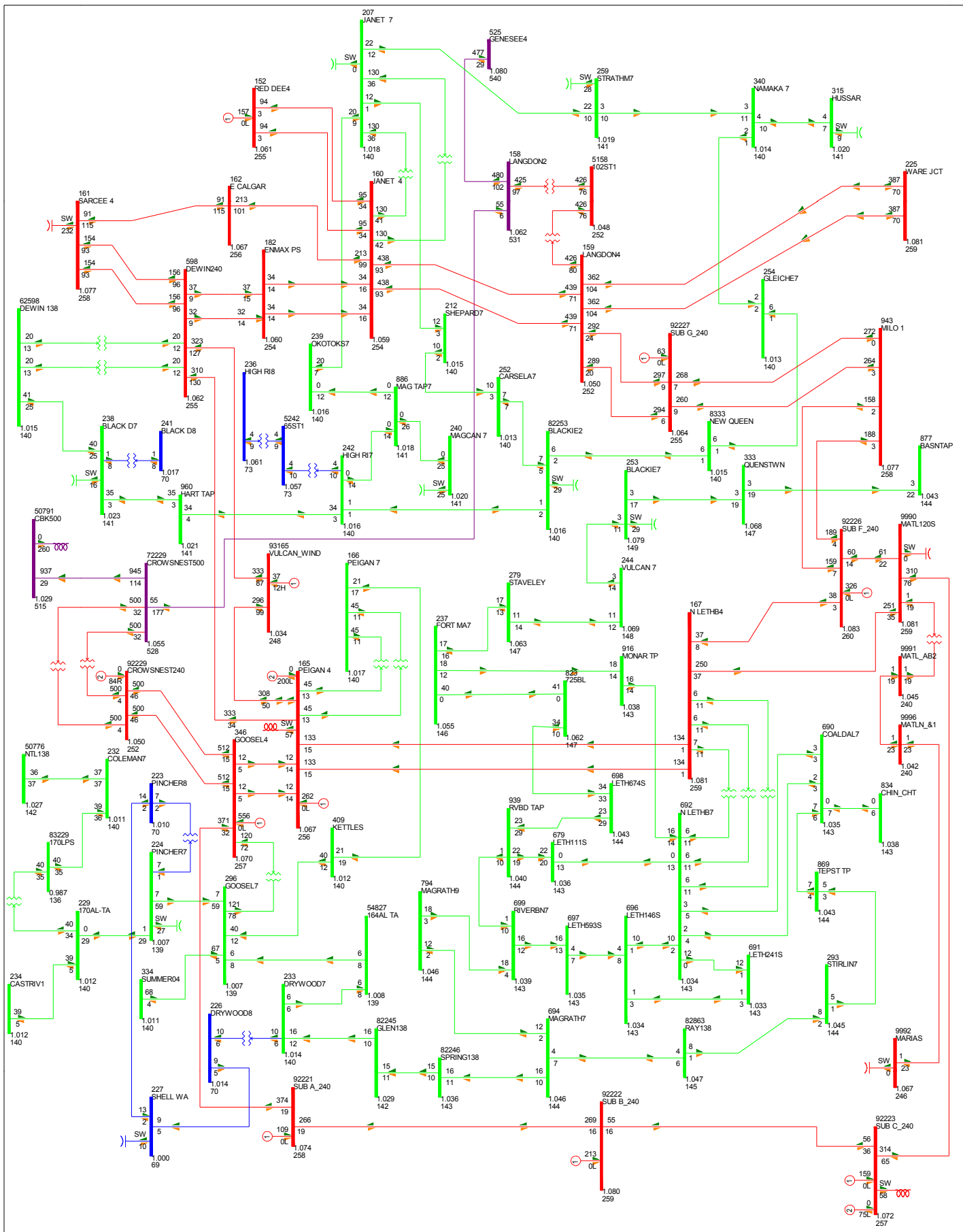


FIG 2017-1A-SL-38: WAREJUNC TO ANDERSON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1003 MW

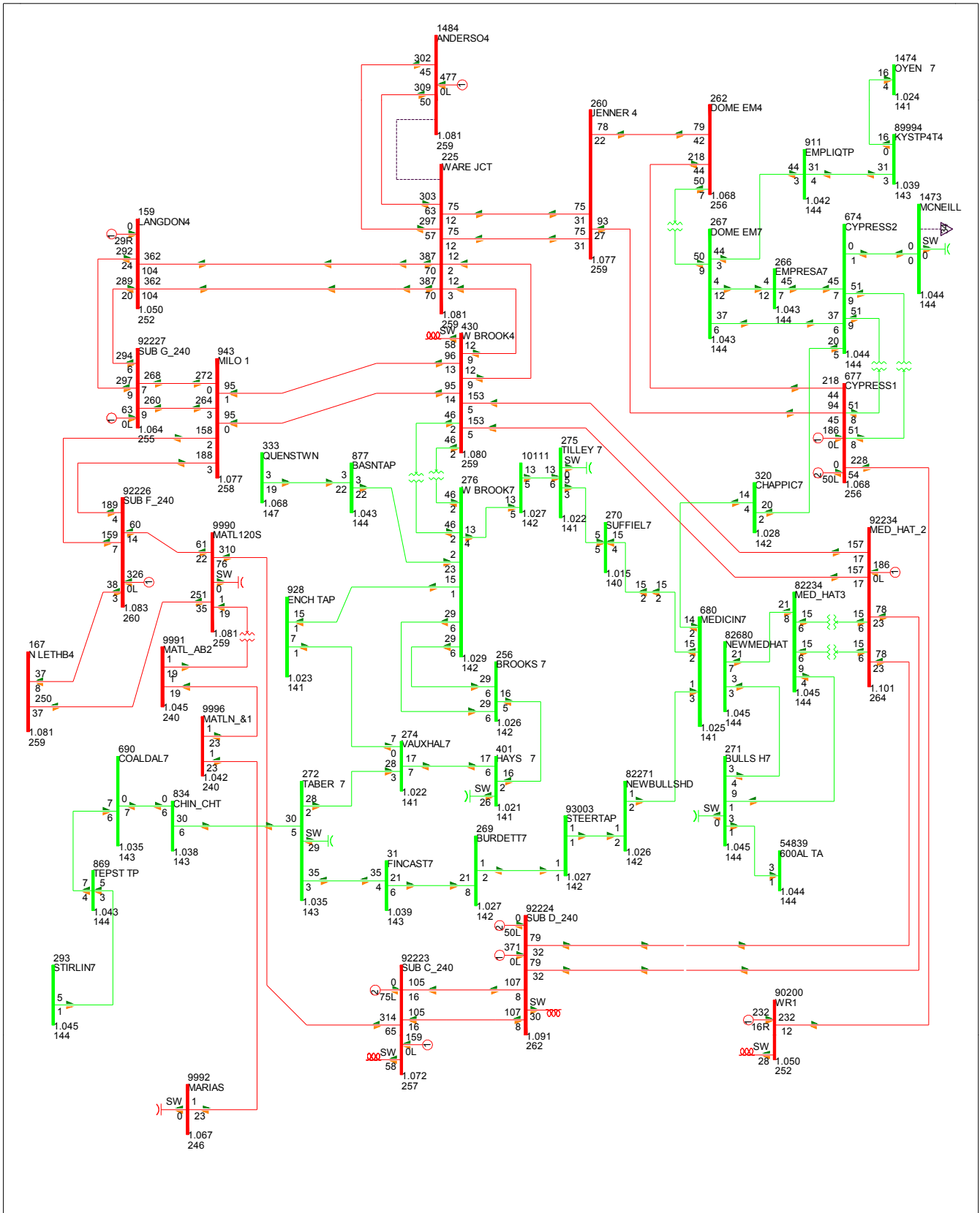


FIG 2017-1A-SL-39: WAREJUNC TO ANDERSON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1003 MW

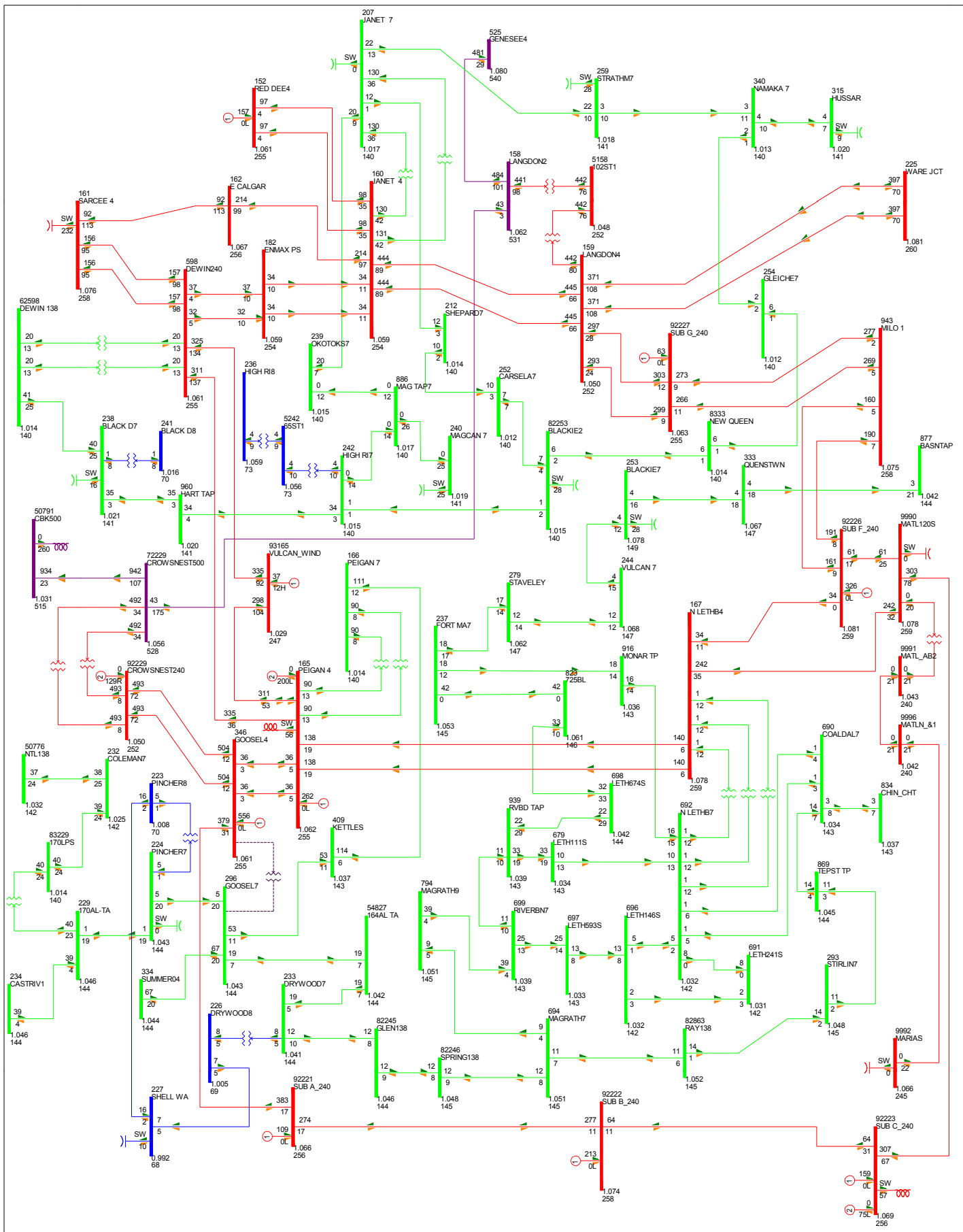


FIG 2017-1A-SL-40: GOOSE LAKE 240/138 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1001 MW

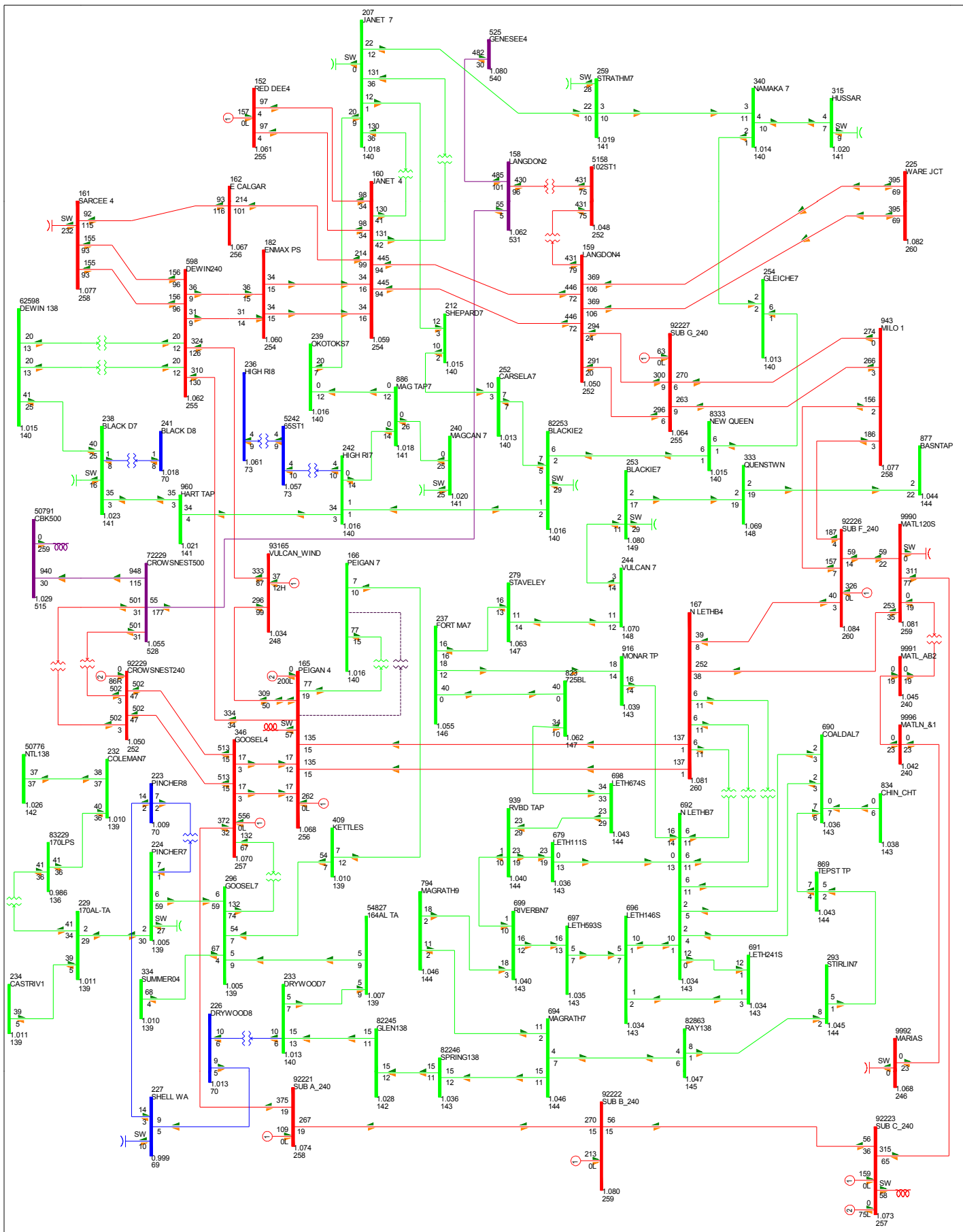


FIG 2017-1A-SL-42: PEIGAN 240/138 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1007 MW

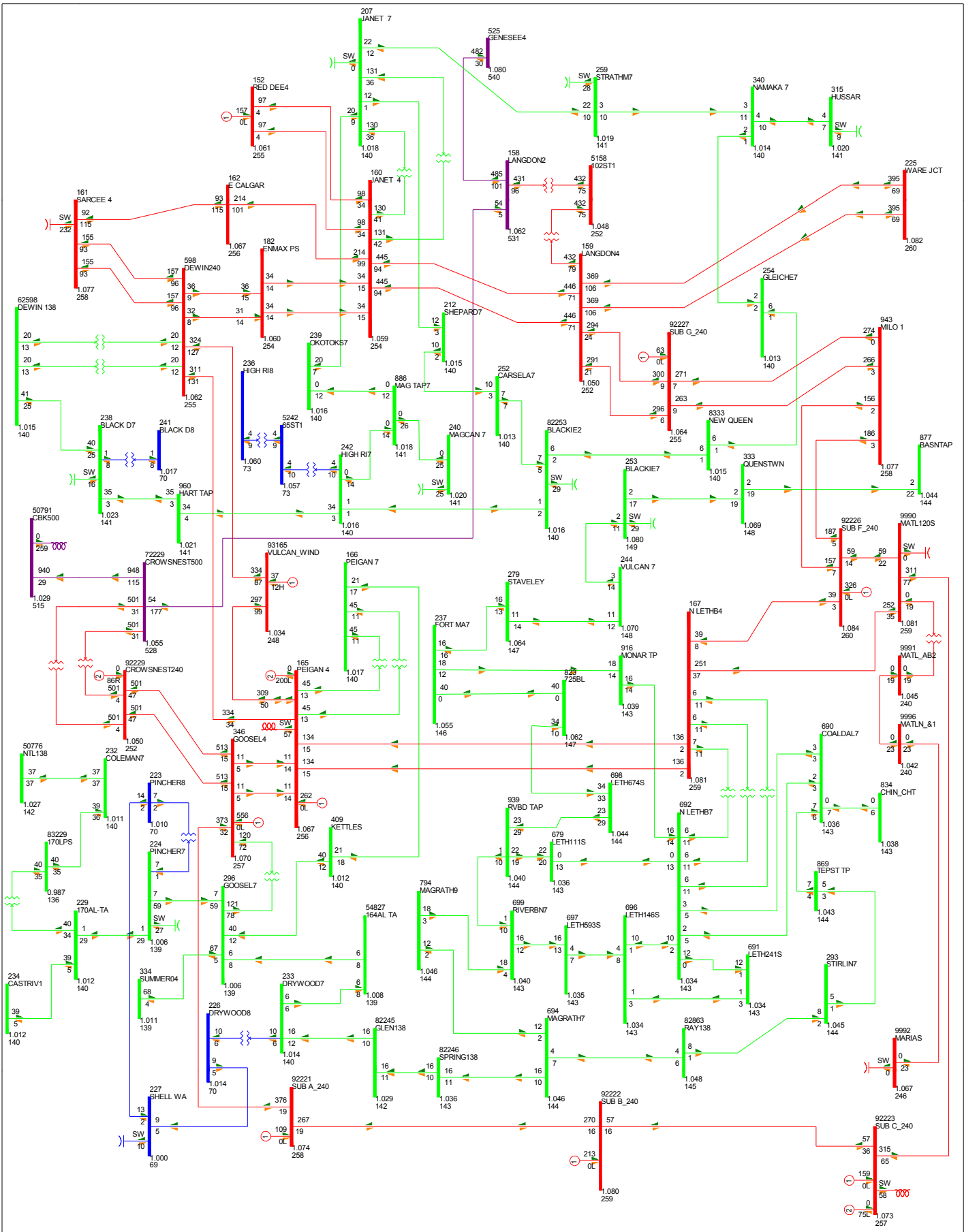


FIG 2017-1A-SL-44: DOME EMPRESS 240/138 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1007 MW

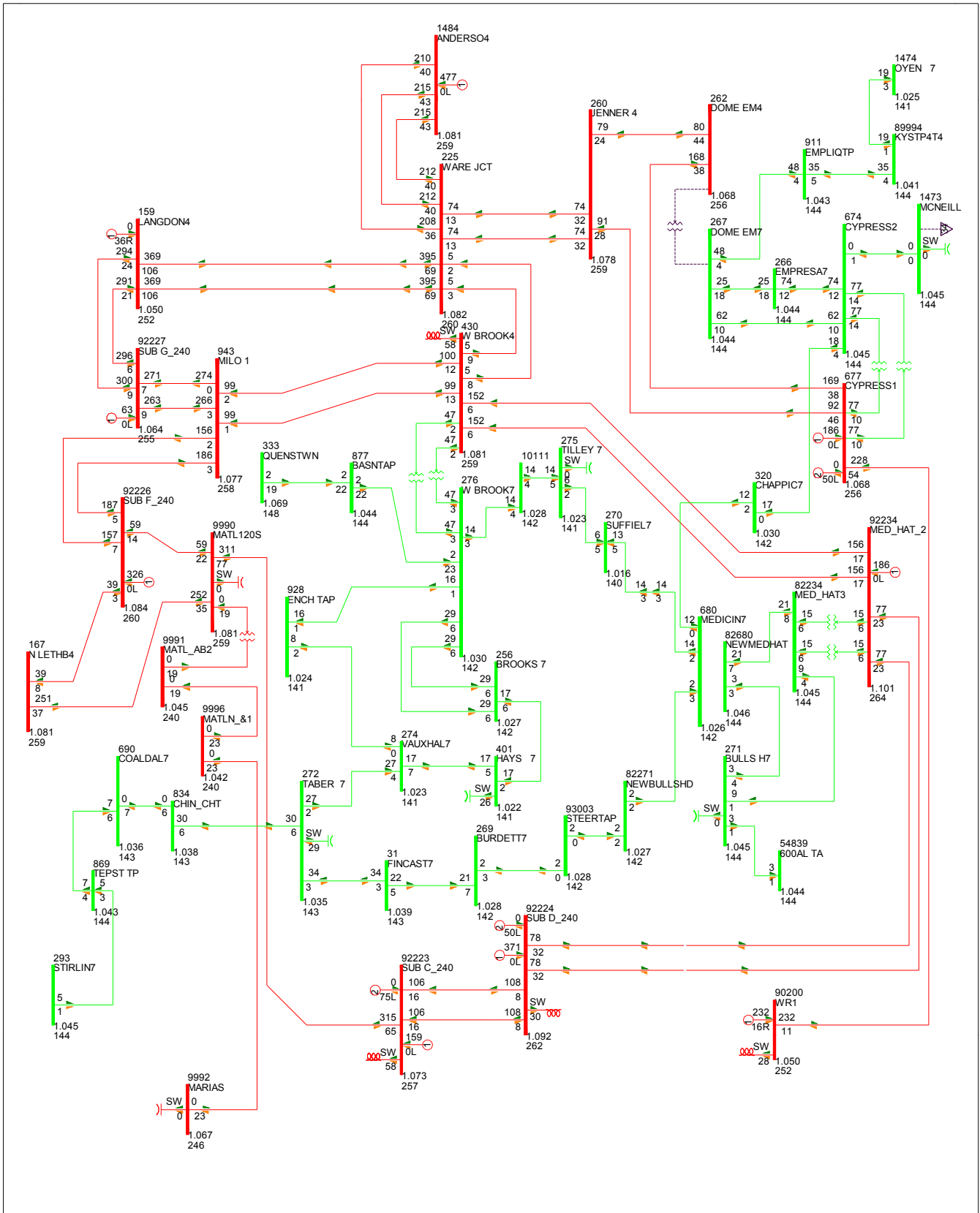


FIG 2017-1A-SL-45: DOME EMPRESS 240/138 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

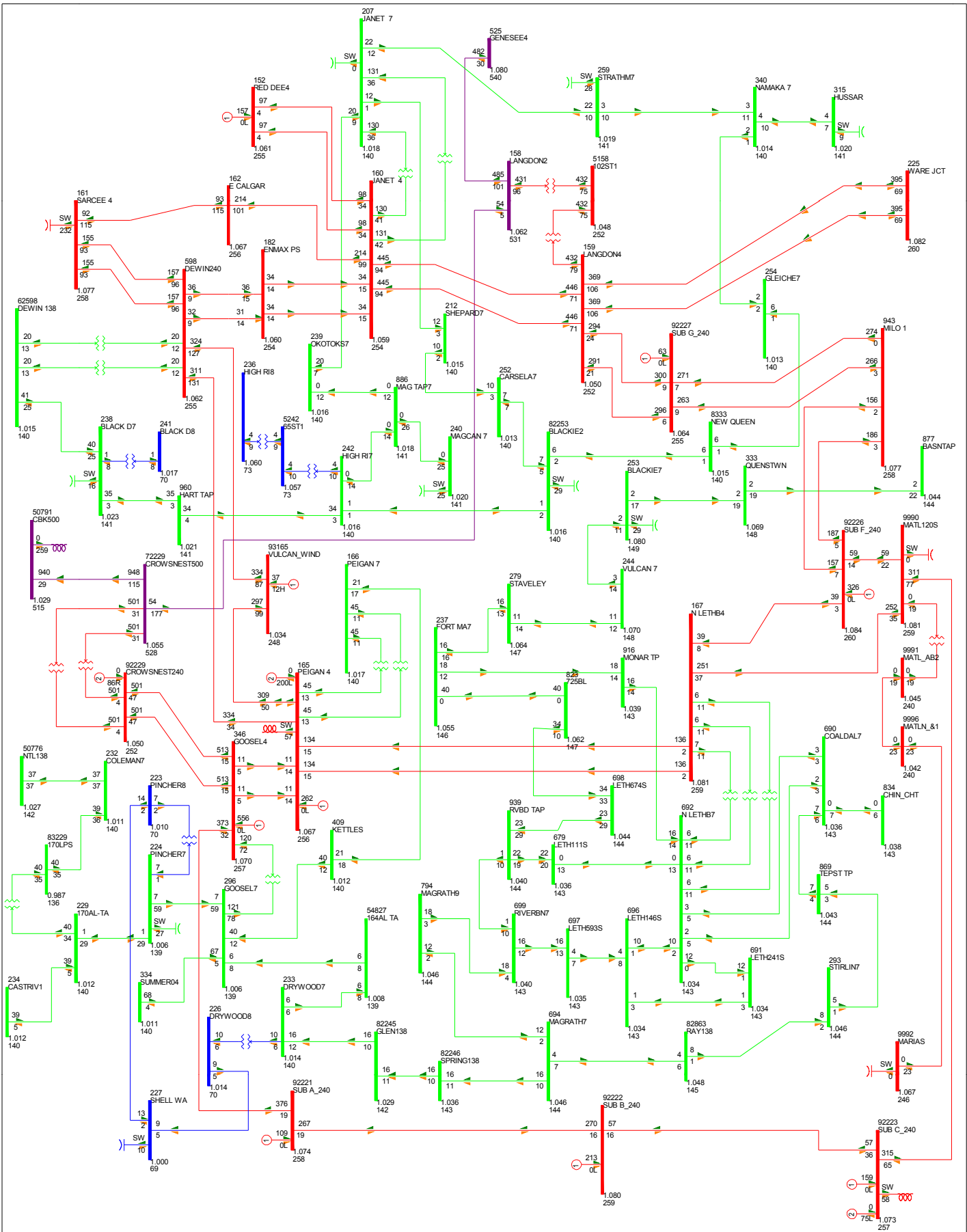


FIG 2017-1A-SL-46: CYPRESS 240/138 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

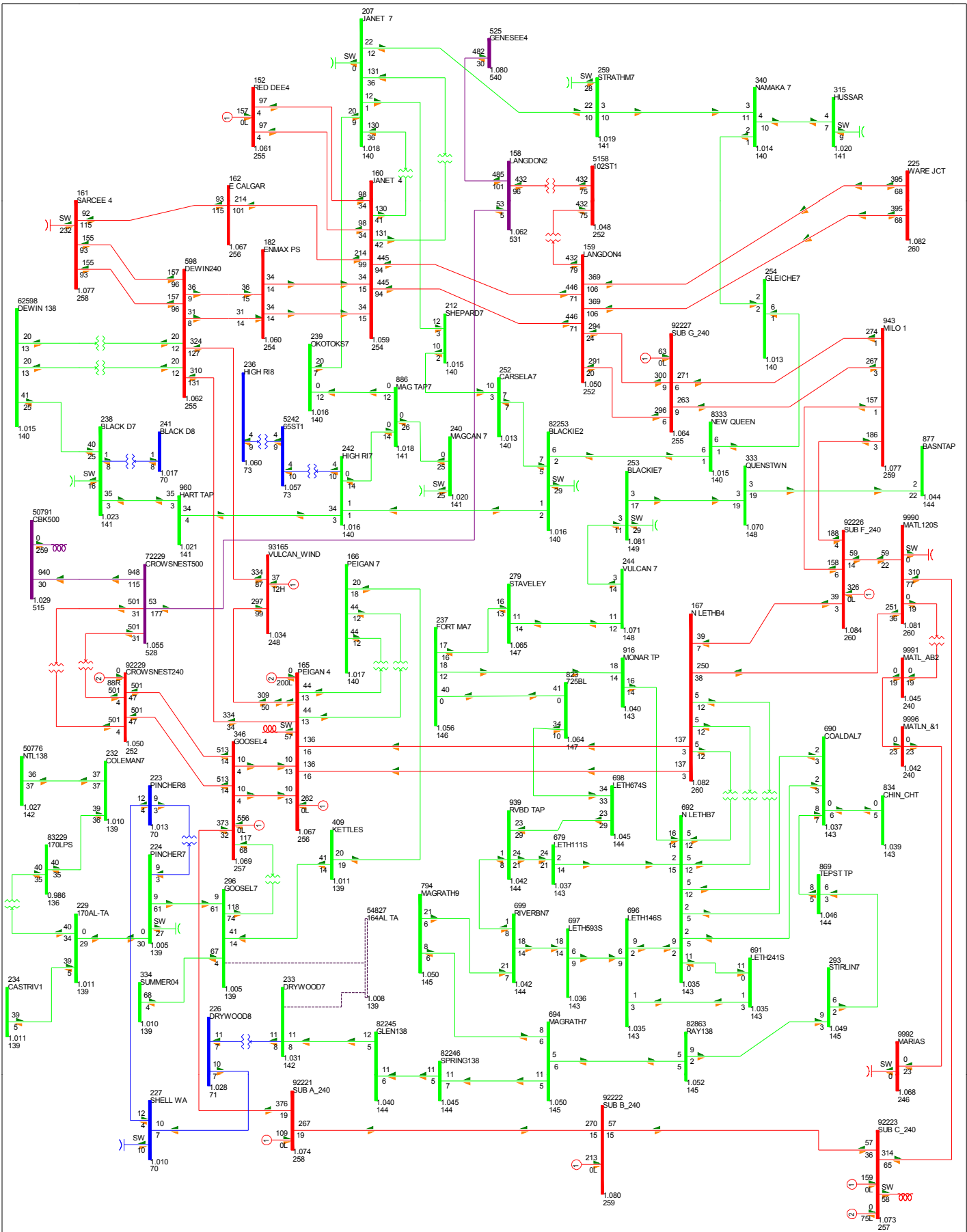


FIG 2017-1A-SL-48: GOOSELAKE TO DRYWOOD 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

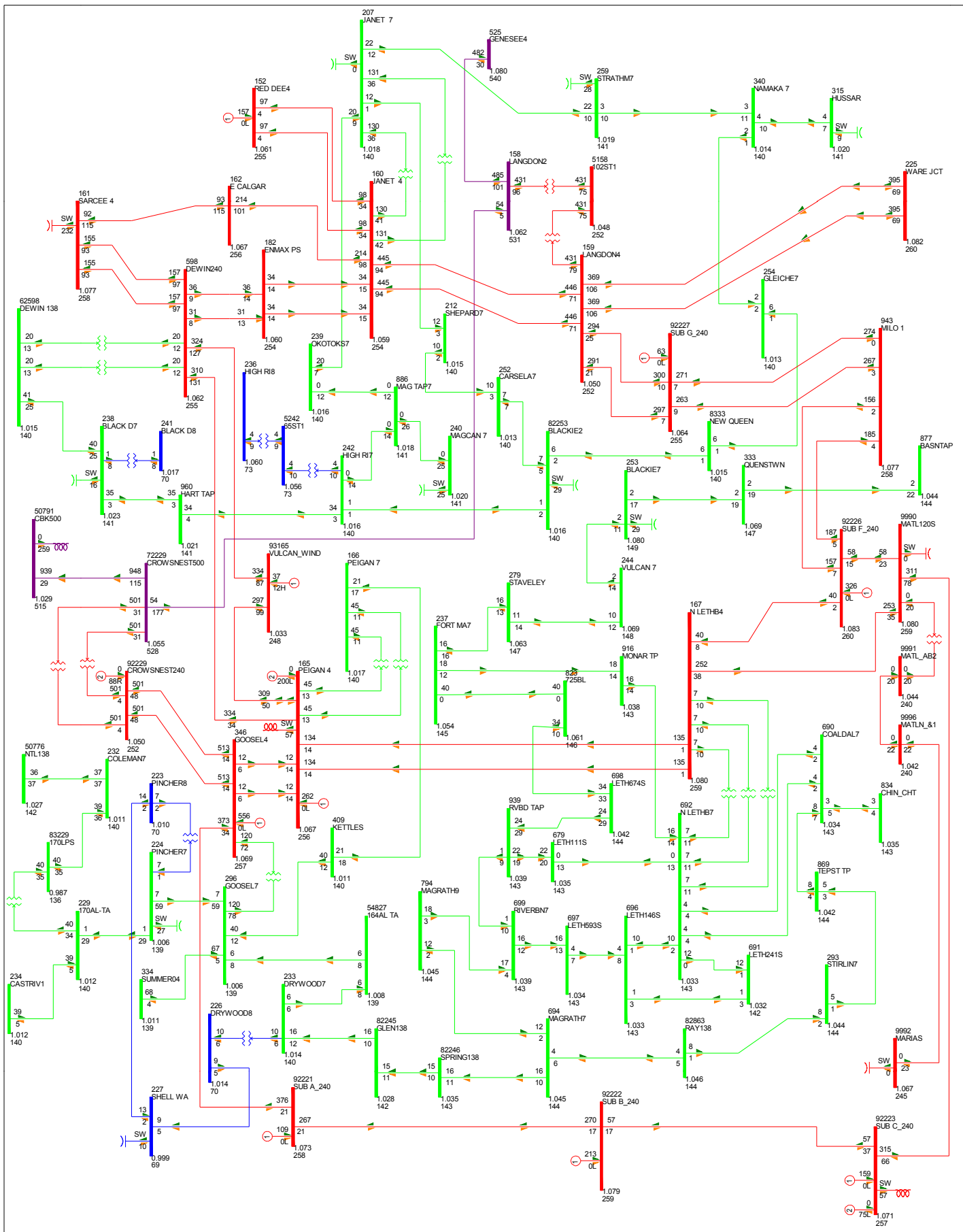


FIG 2017-1A-SL-50: WESTBROOKS TO TILLEY 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1006 MW

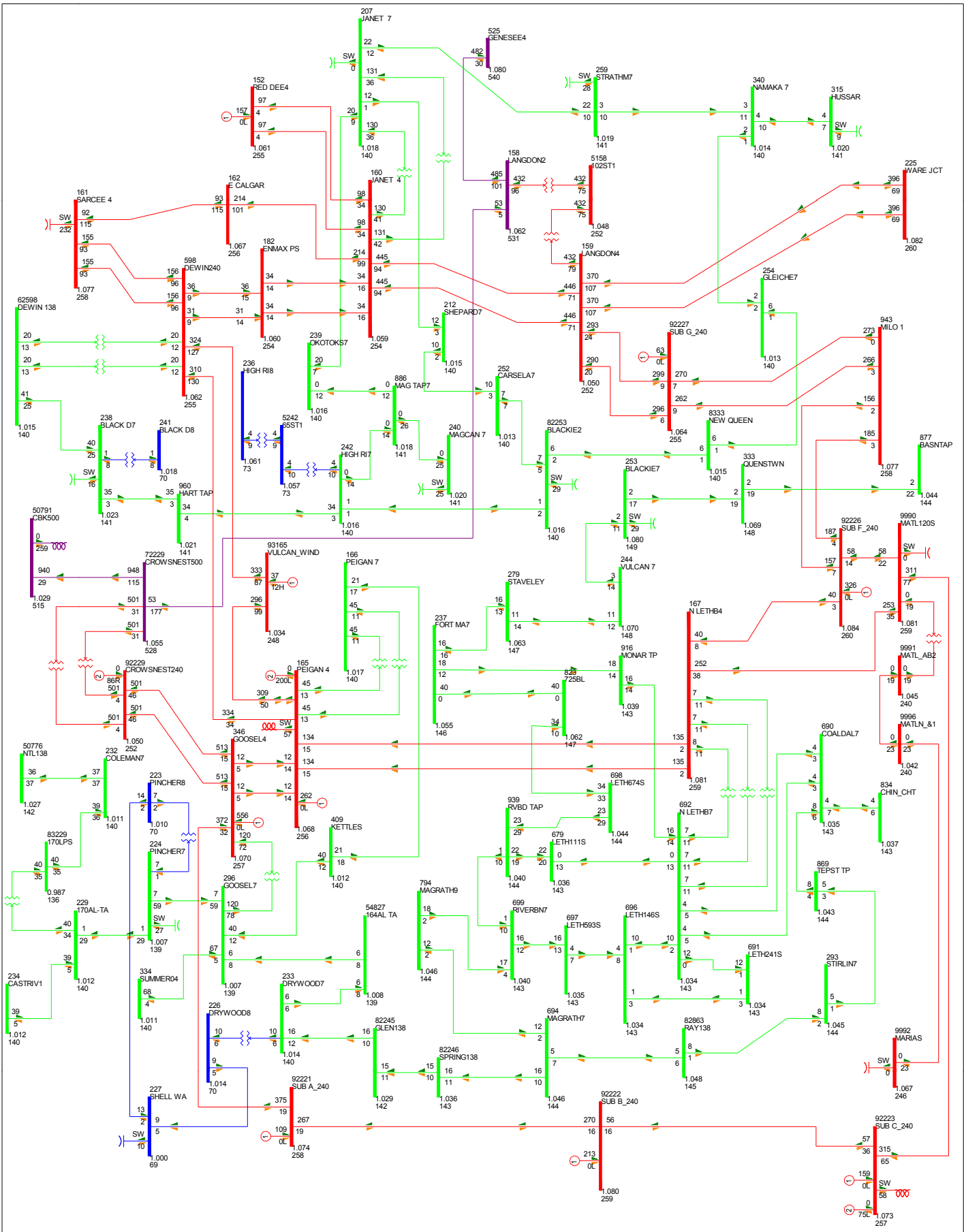


FIG 2017-1A-SL-52: MEDHAT TO CHAPPICE LAKE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

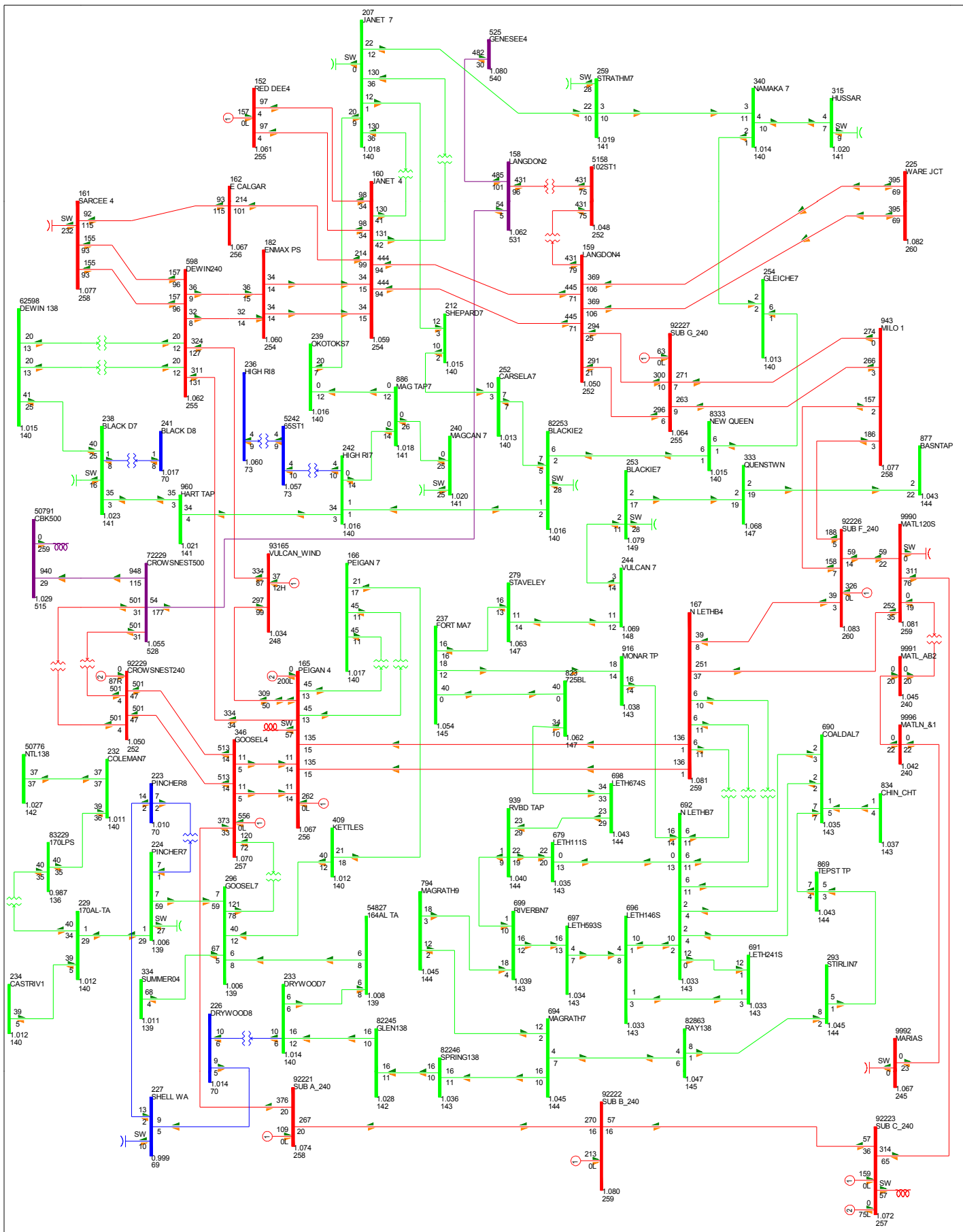


FIG 2017-1A-SL-54: MEDHAT TO BURDETTE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

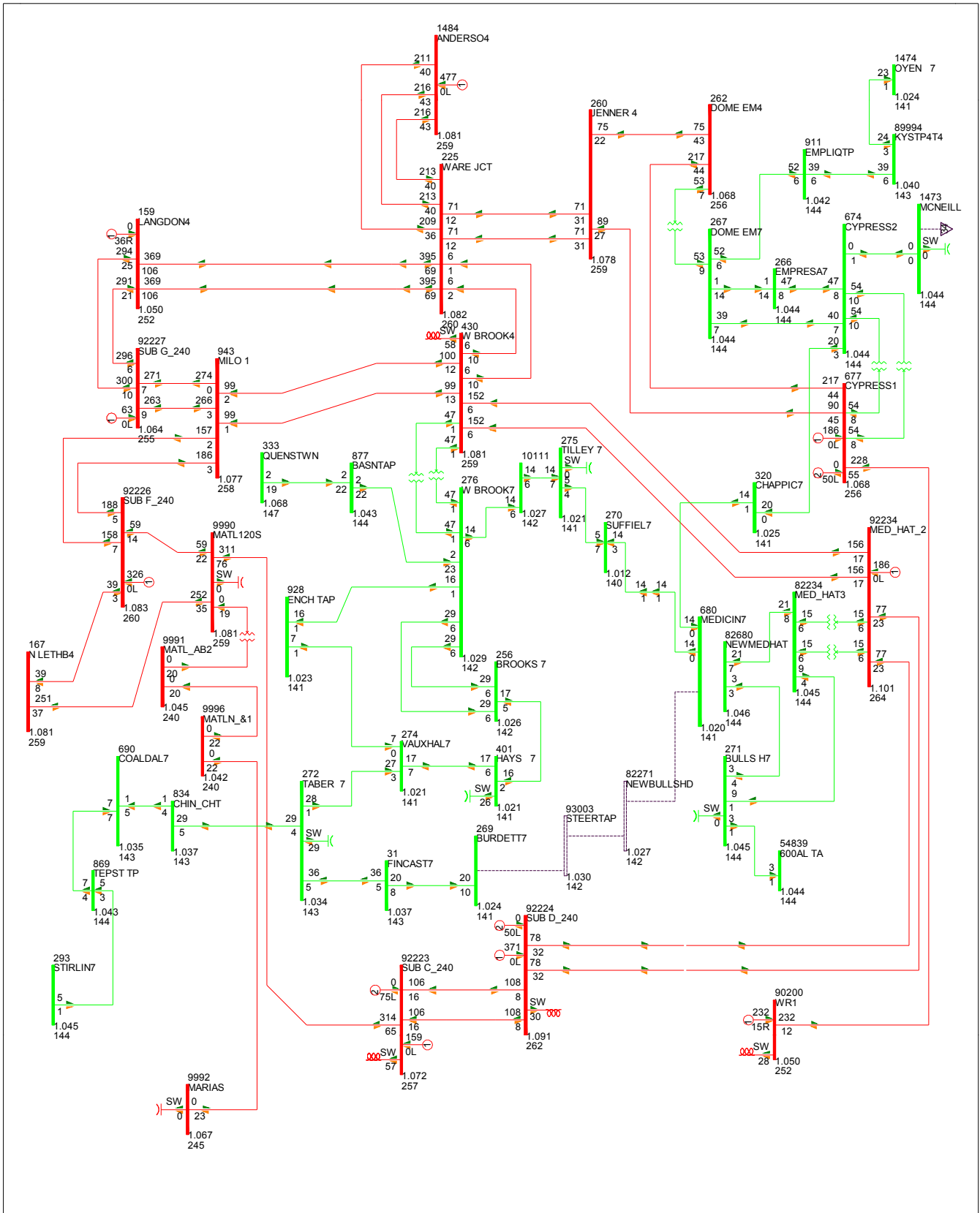


FIG 2017-1A-SL-55: MEDHAT TO BURDETTE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

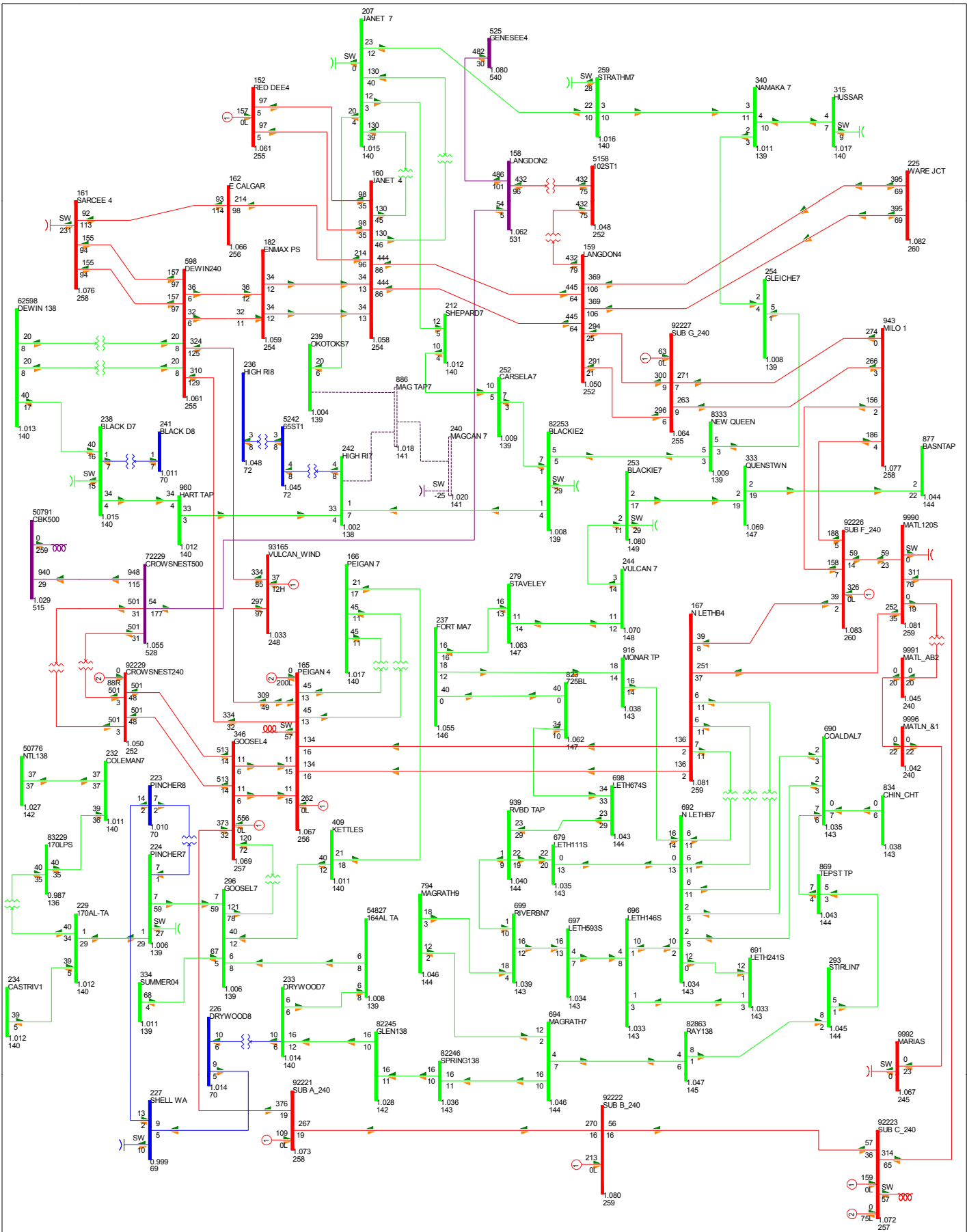


FIG 2017-1A-SL-56: HIGH RIVER TO OKOTOKS 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

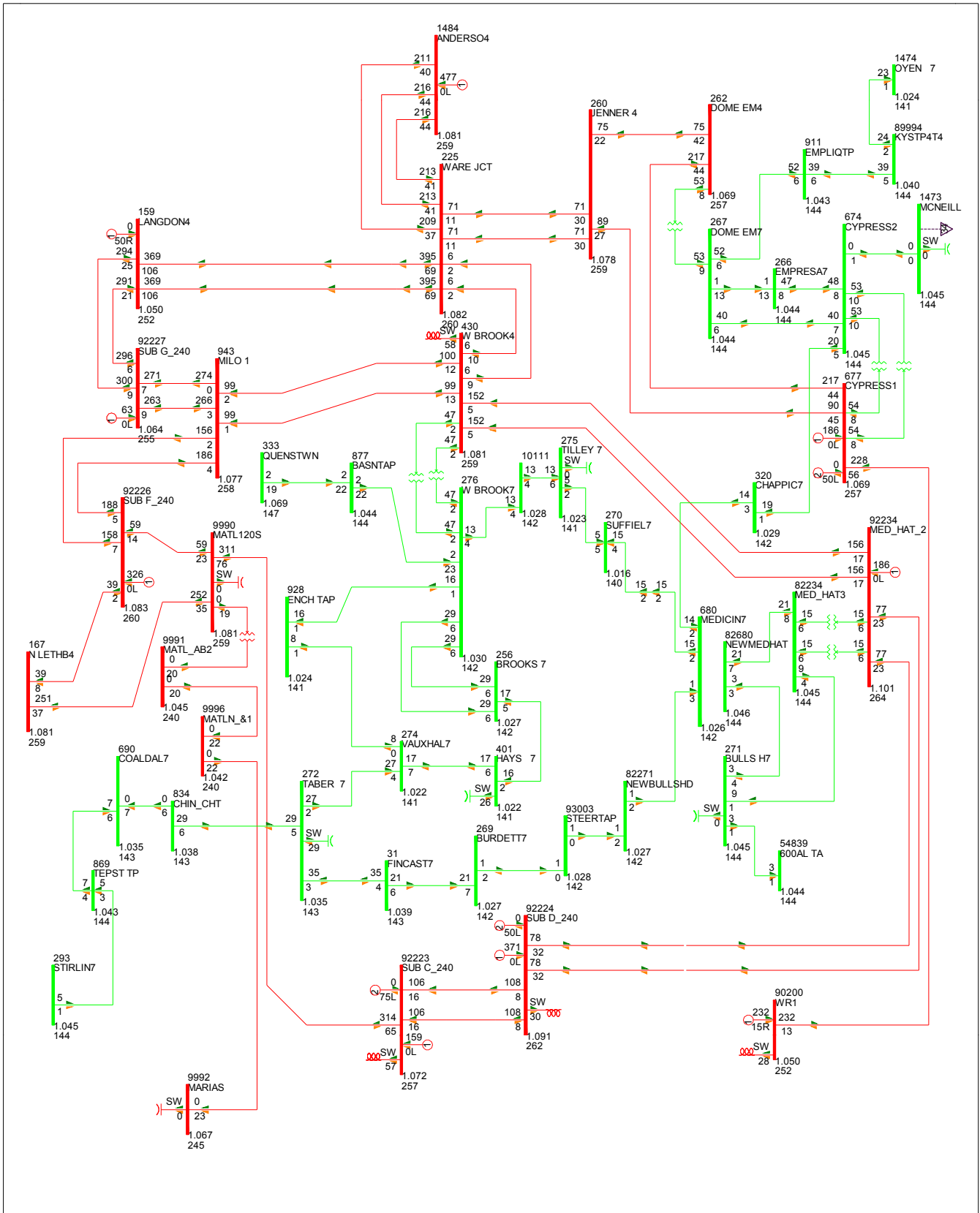


FIG 2017-1A-SL-57: HIGH RIVER TO OKOTOKS 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

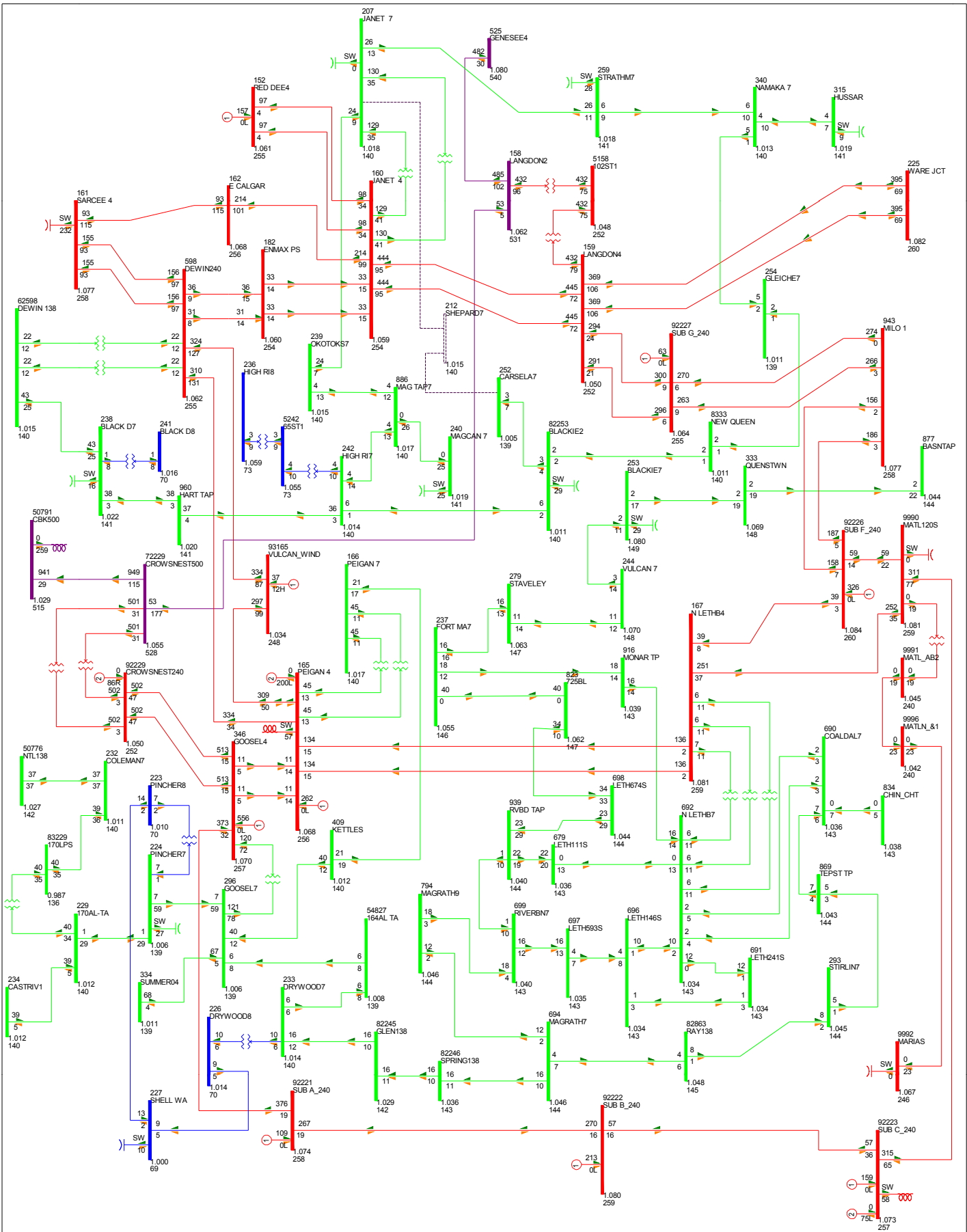


FIG 2017-1A-SL-58: JANET TO CARSELAND 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, DEC 01 2008 16:15

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1008 MW

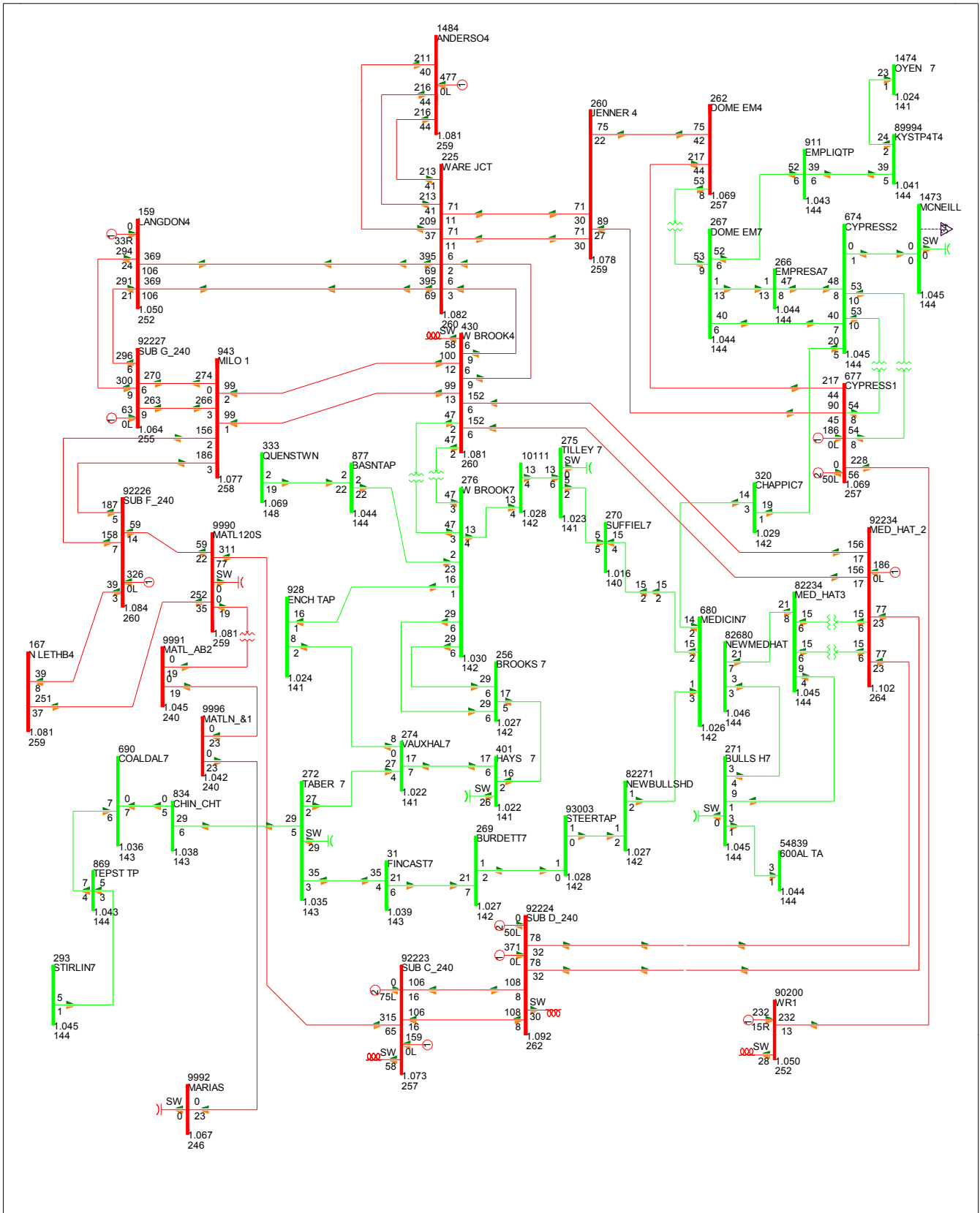


FIG 2017-1A-SL-59: JANET TO CARSELAND 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, DEC 01 2008 16:15

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1008 MW

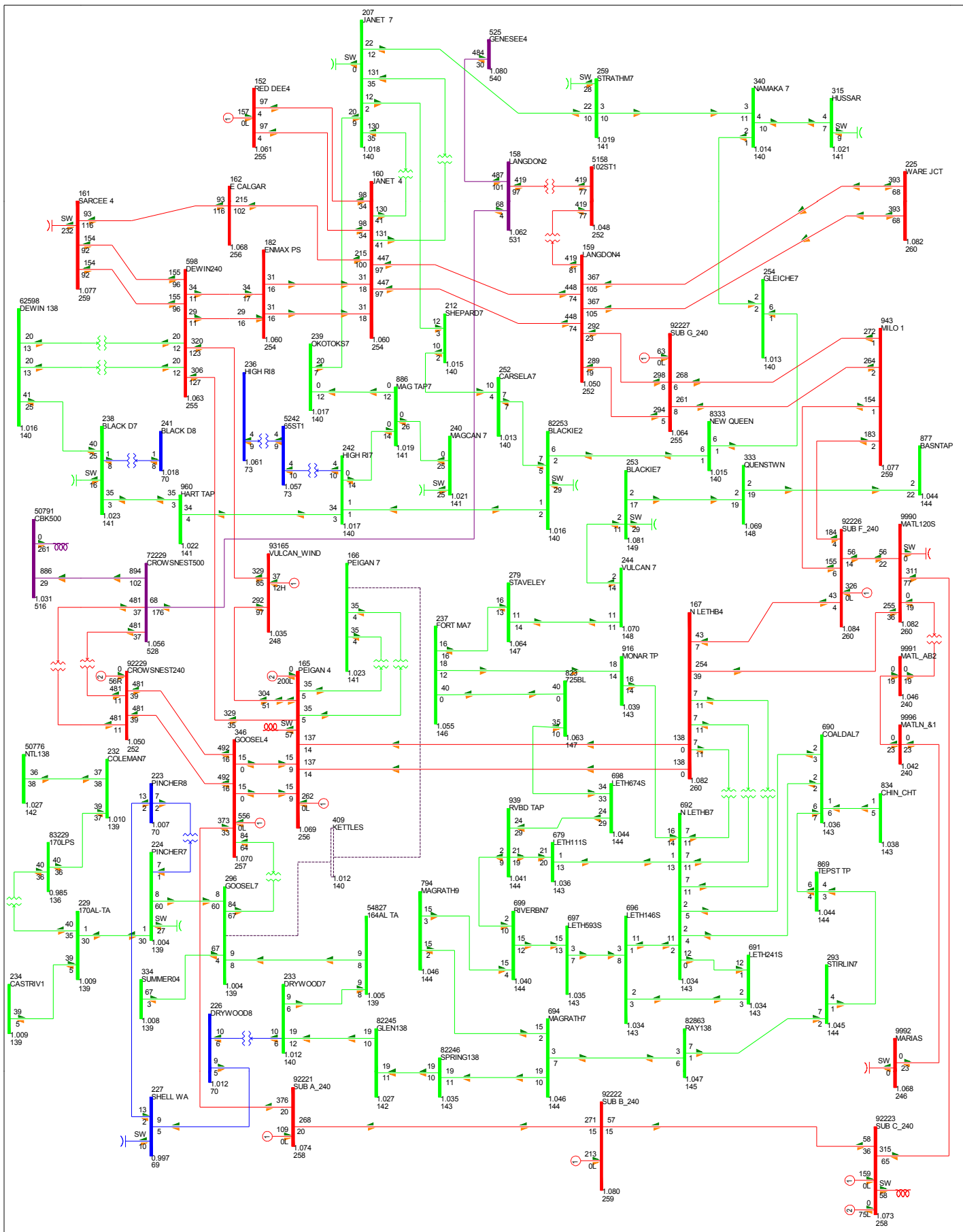


FIG 2017-1A-SL-62: PEIGAN TO GOOSELAKE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 950 MW

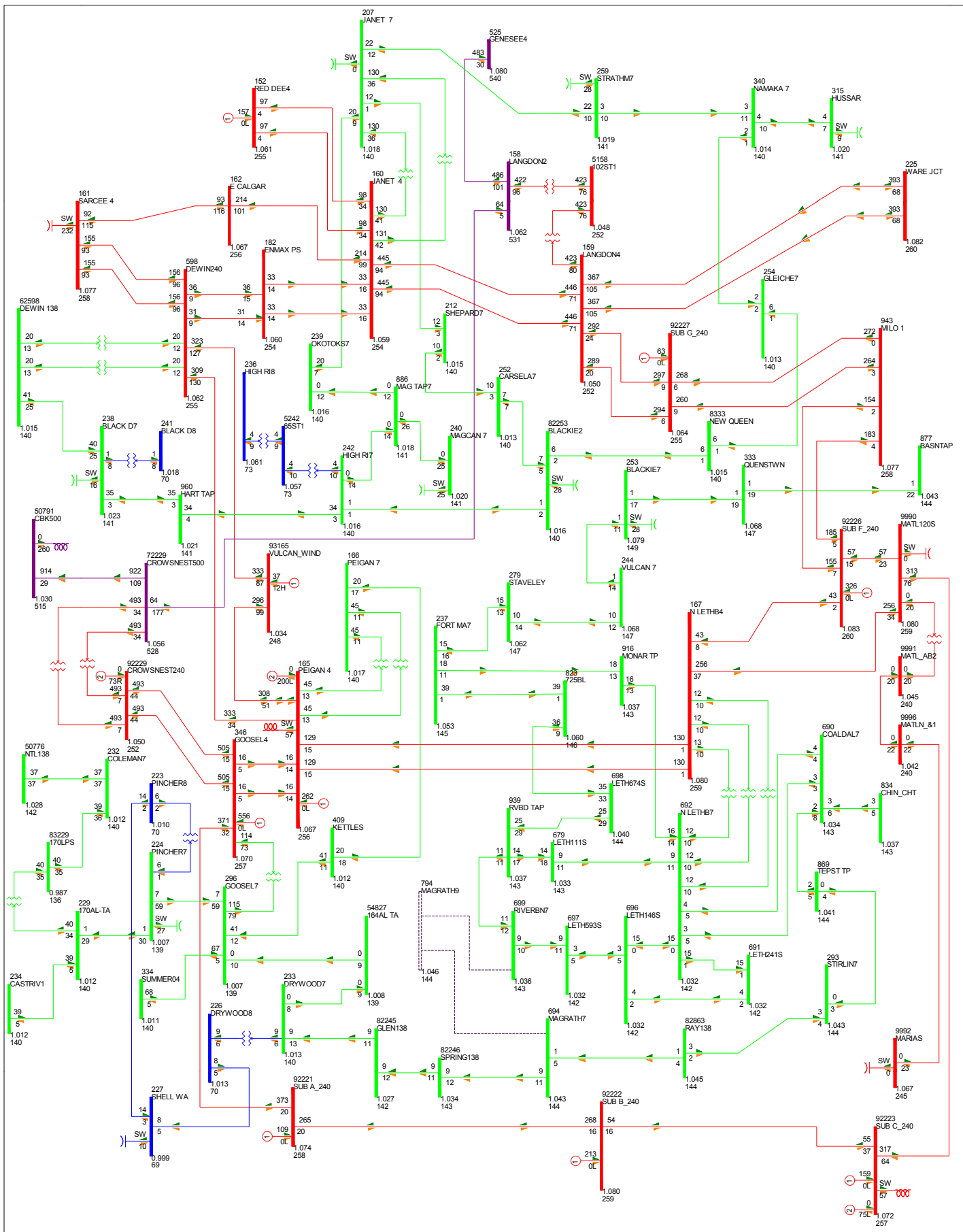


FIG 2017-1A-SL-64: MAGRATH TO RIVERBEND 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 980 MW

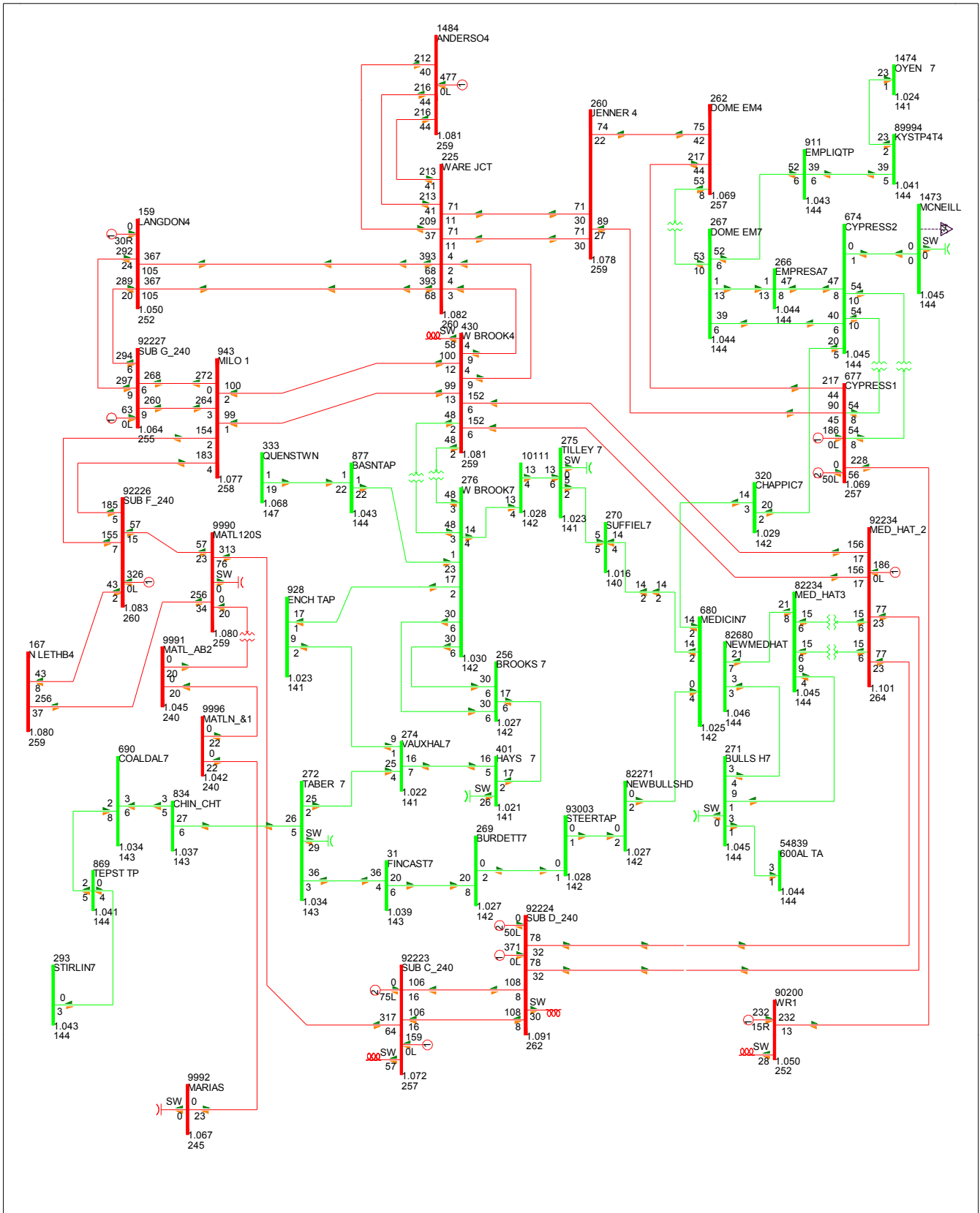


FIG 2017-1A-SL-65: MAGRATH TO RIVERBEND 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 980 MW

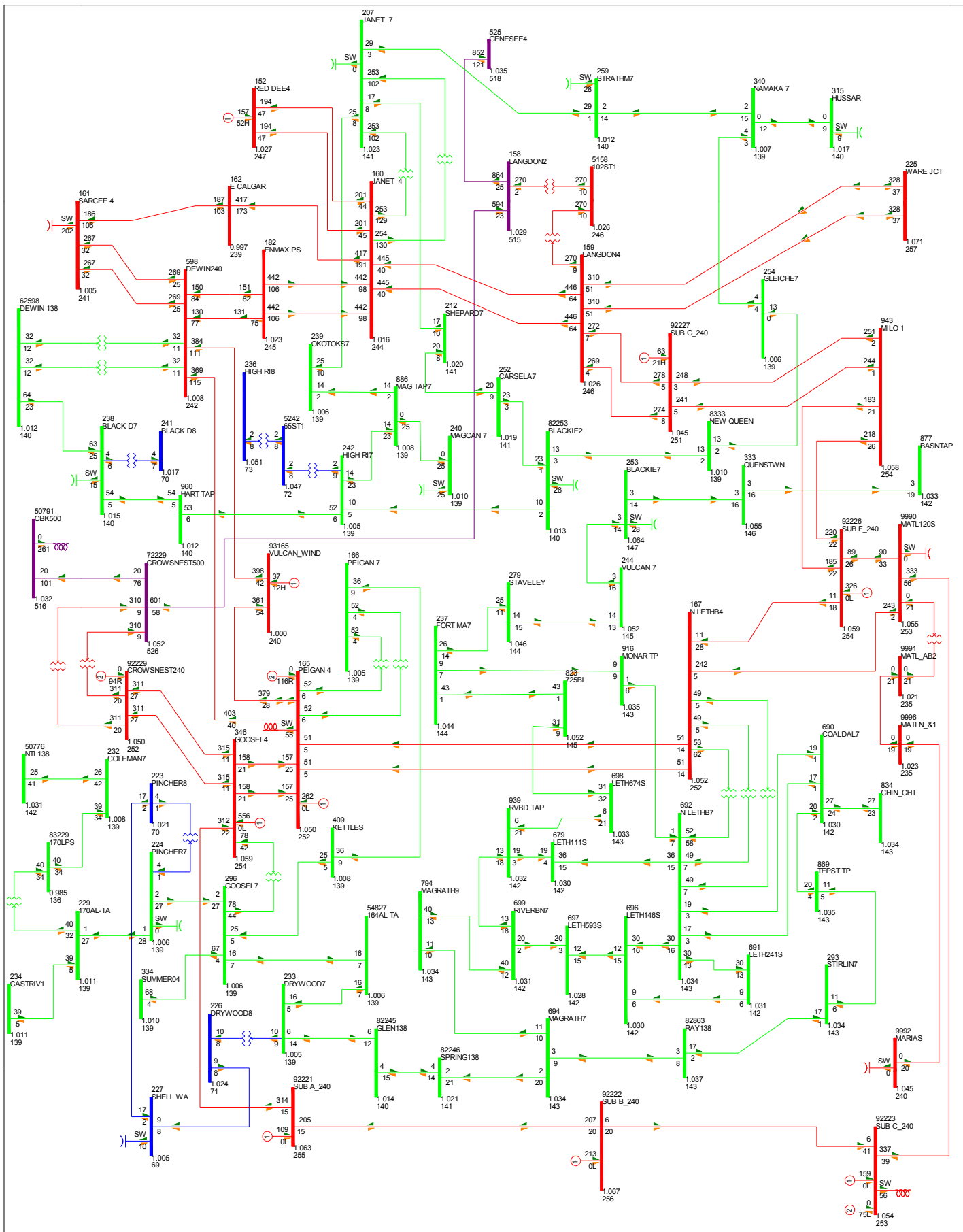


FIG 2017-1A-SP-2: N-0 CONDITION

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 15 MW

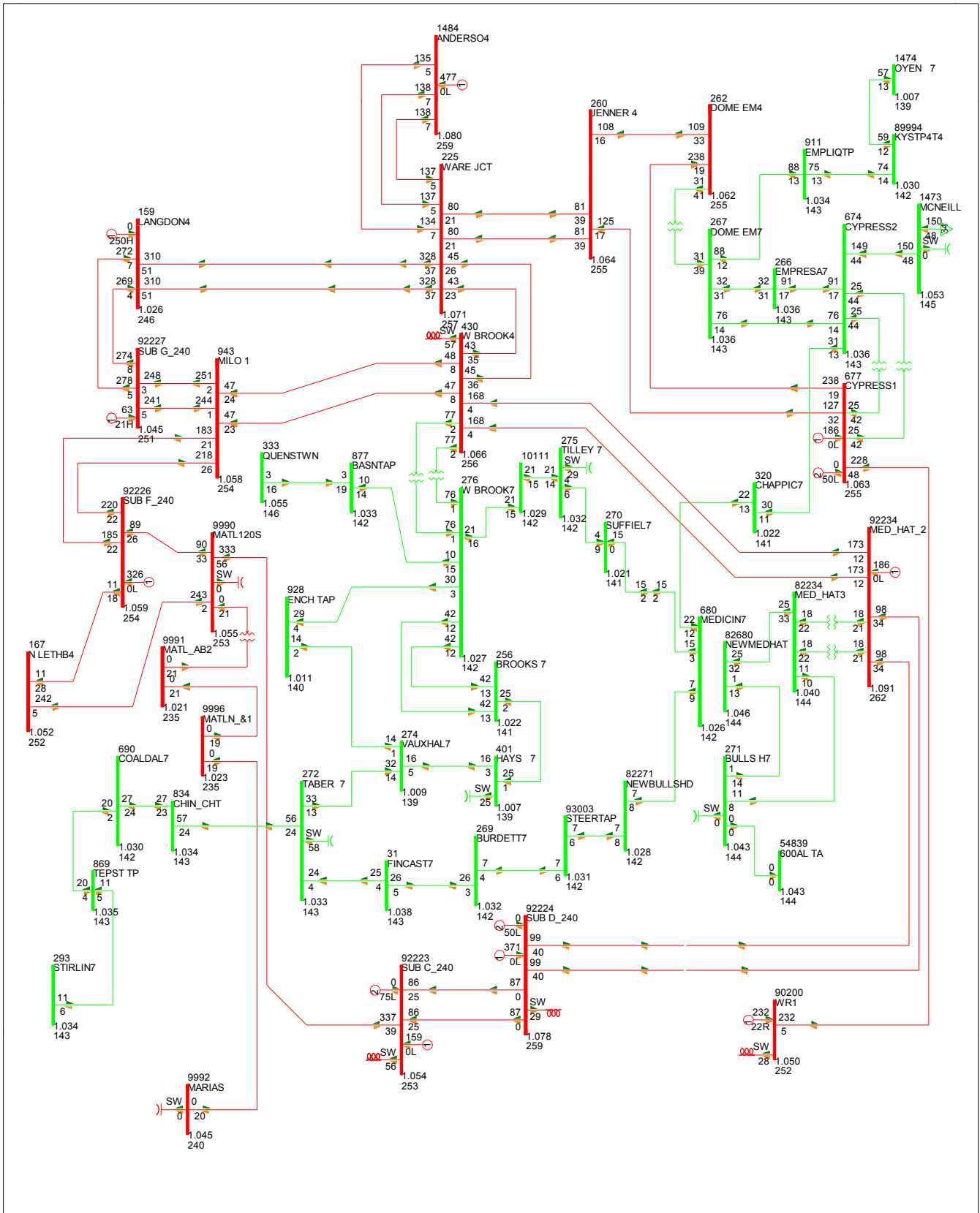


FIG 2017-1A-SP-3: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

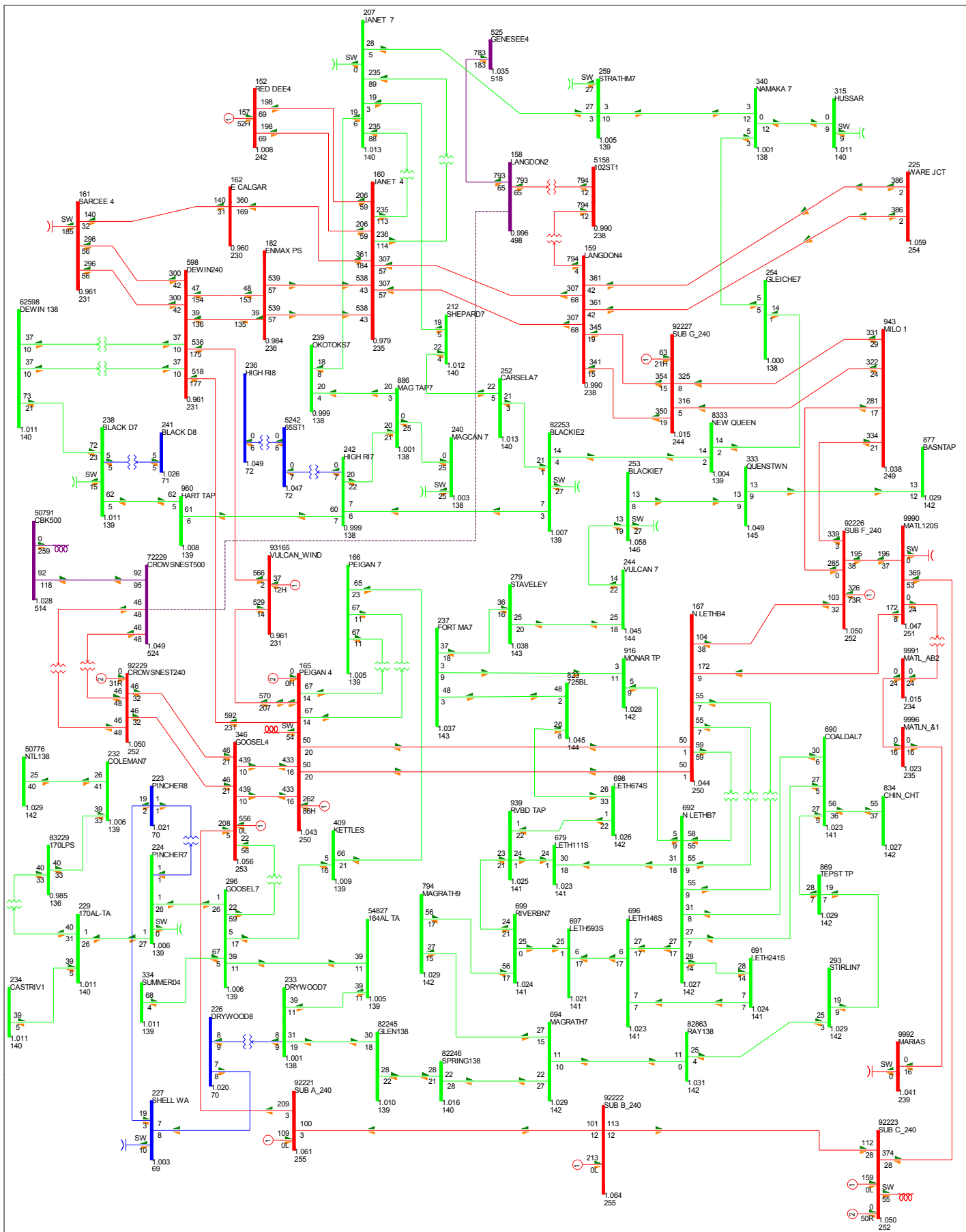


FIG 2017-1A-SP-4: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:40

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 ≤ 500.000 >500.000
 BC Export: -142 MW

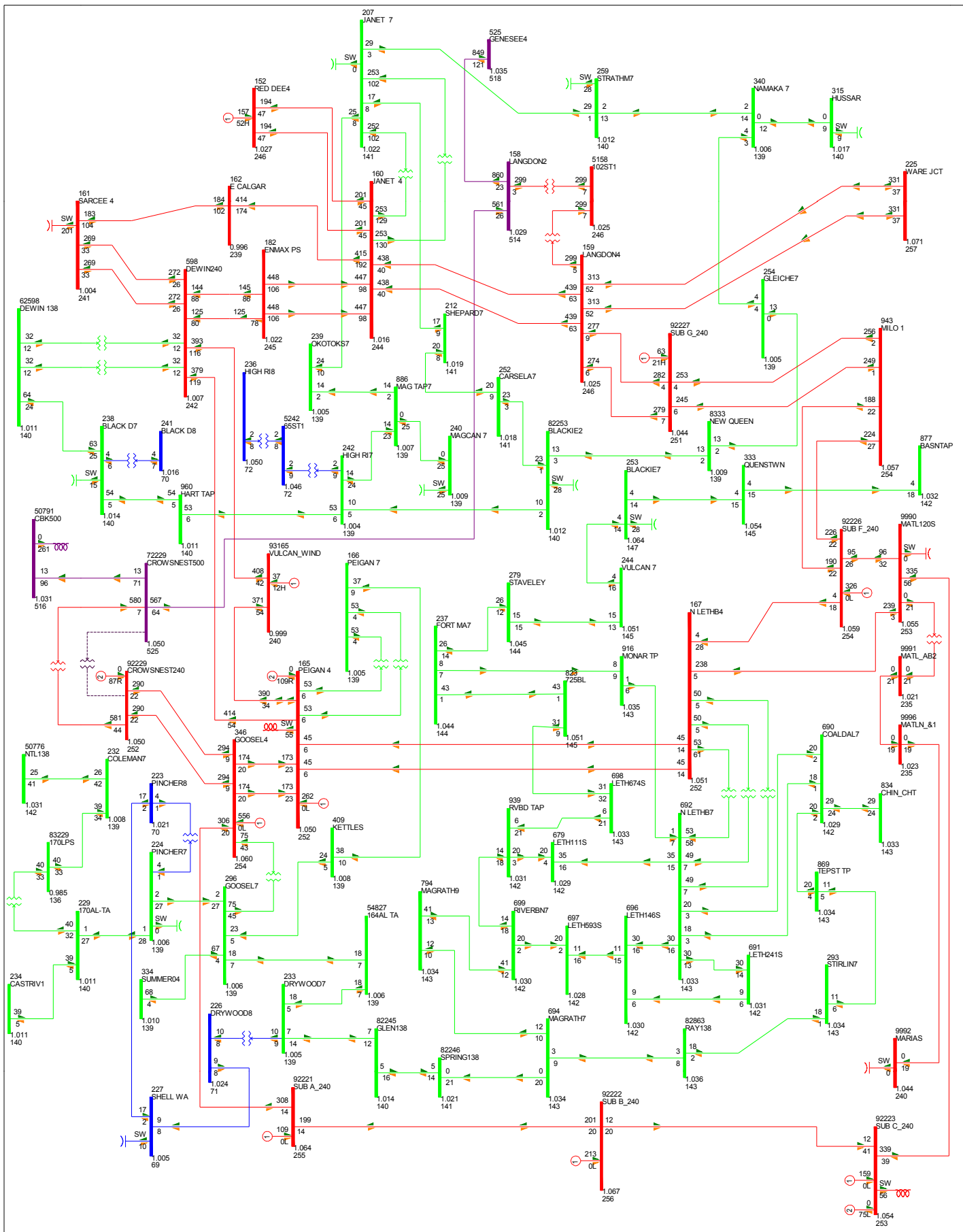


FIG 2017-1A-SP-6: CROWNSNEST 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 9 MW

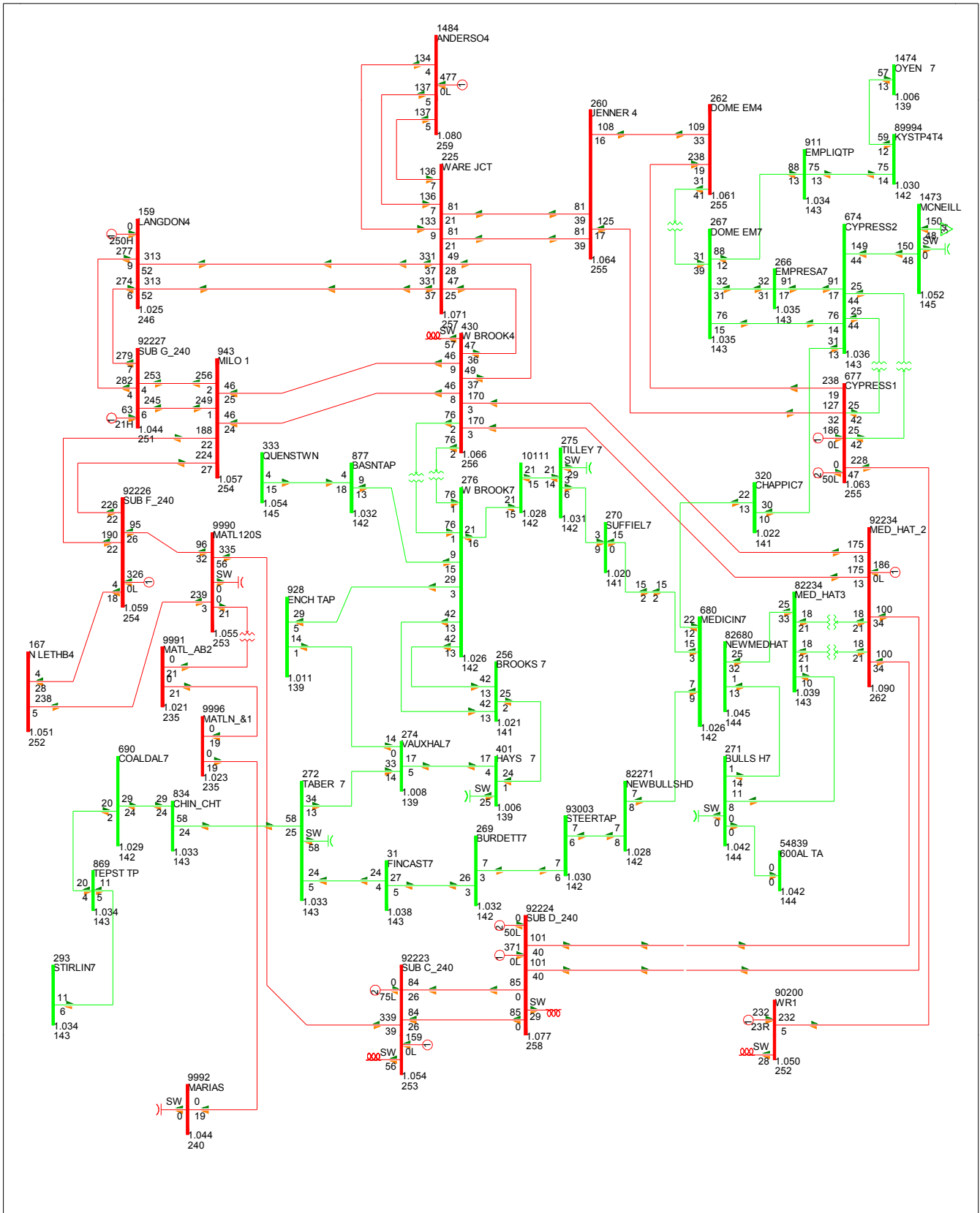


FIG 2017-1A-SP-7: CROWSNEST 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 9 MW

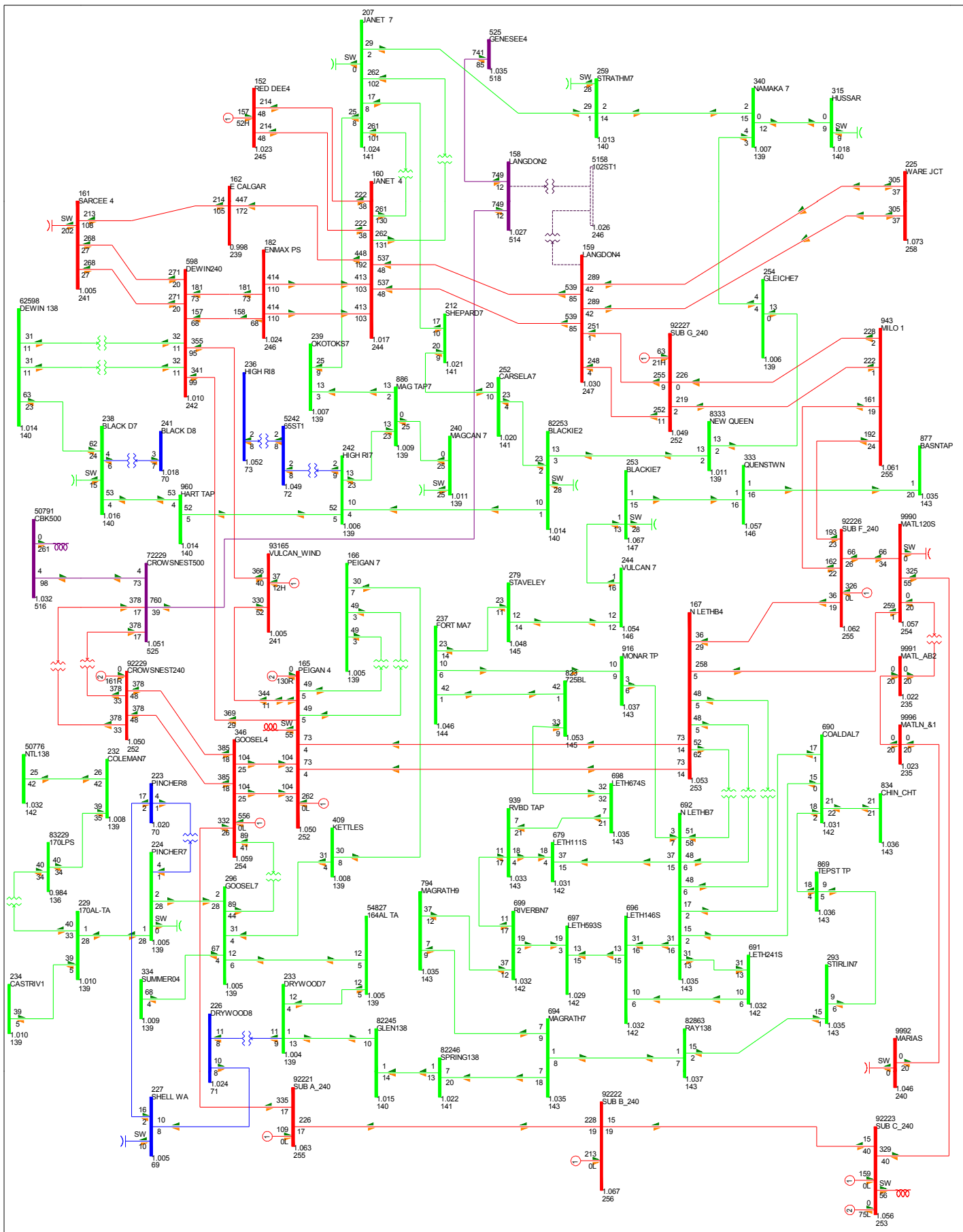


FIG 2017-1A-SP-8: LANGDON 500/240 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -2 MW

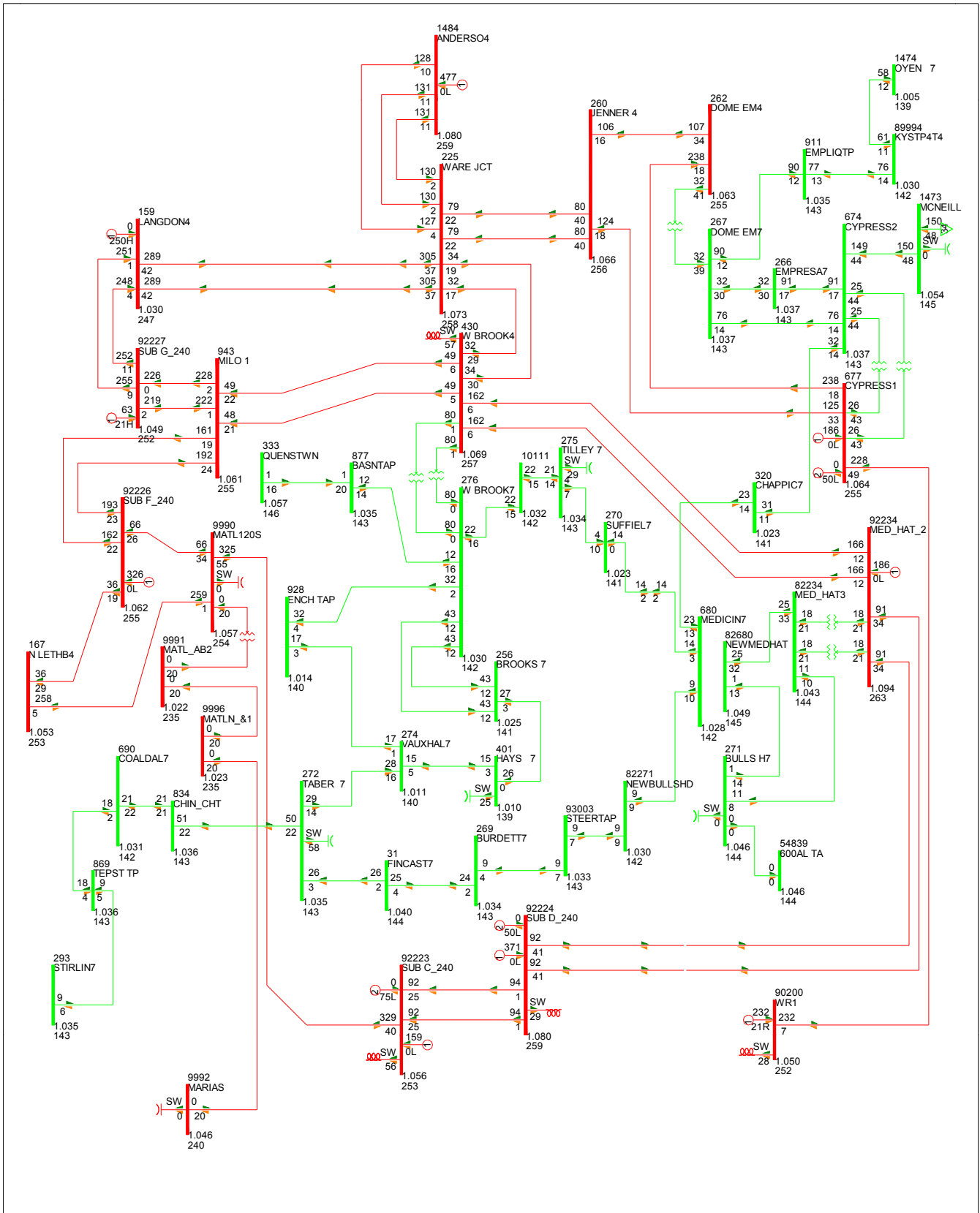


FIG 2017-1A-SP-9: LANGDON 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -2 MW

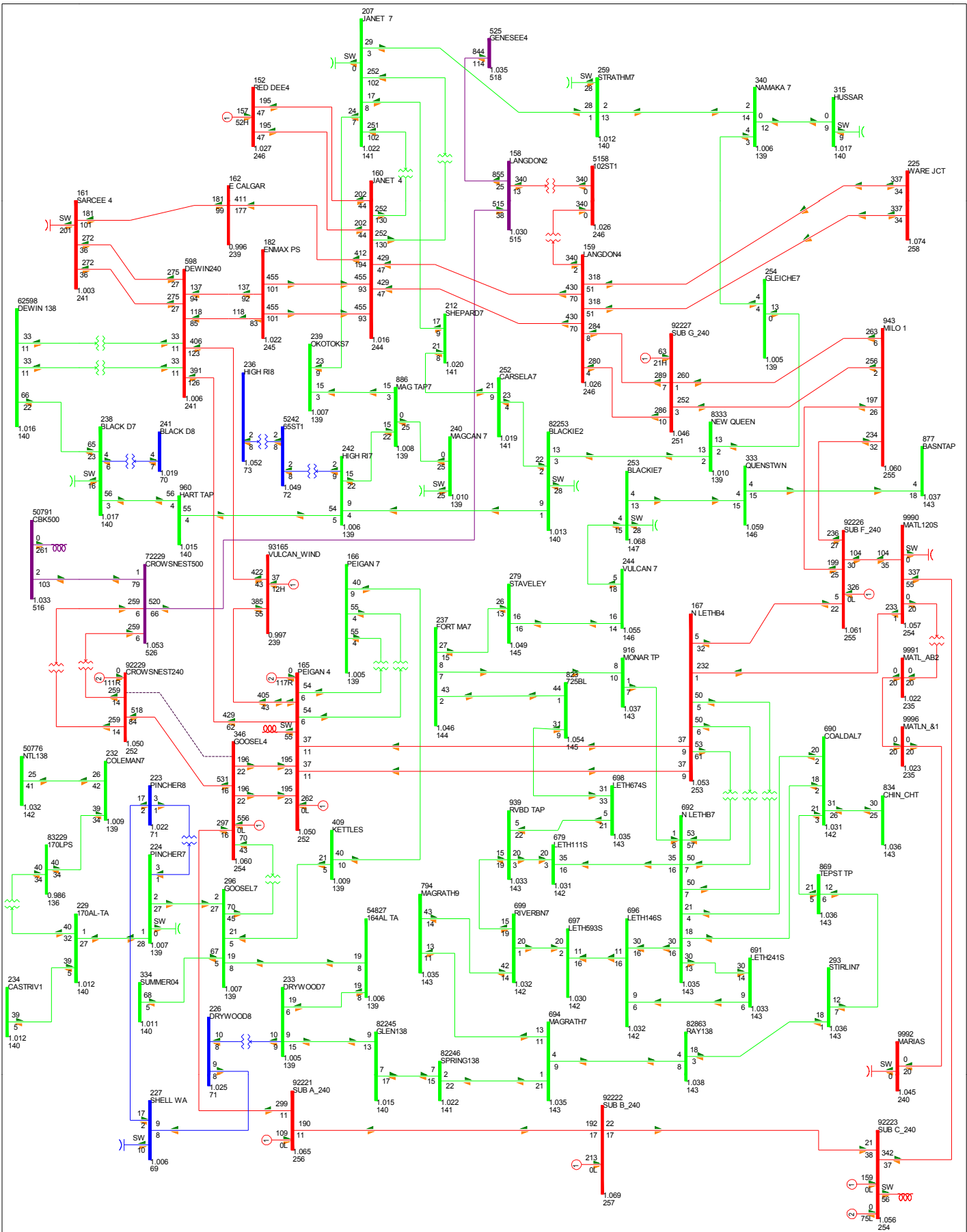


FIG 2017-1A-SP-10: CROWNSNEST TO GOOSELAKE 240KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -4 MW

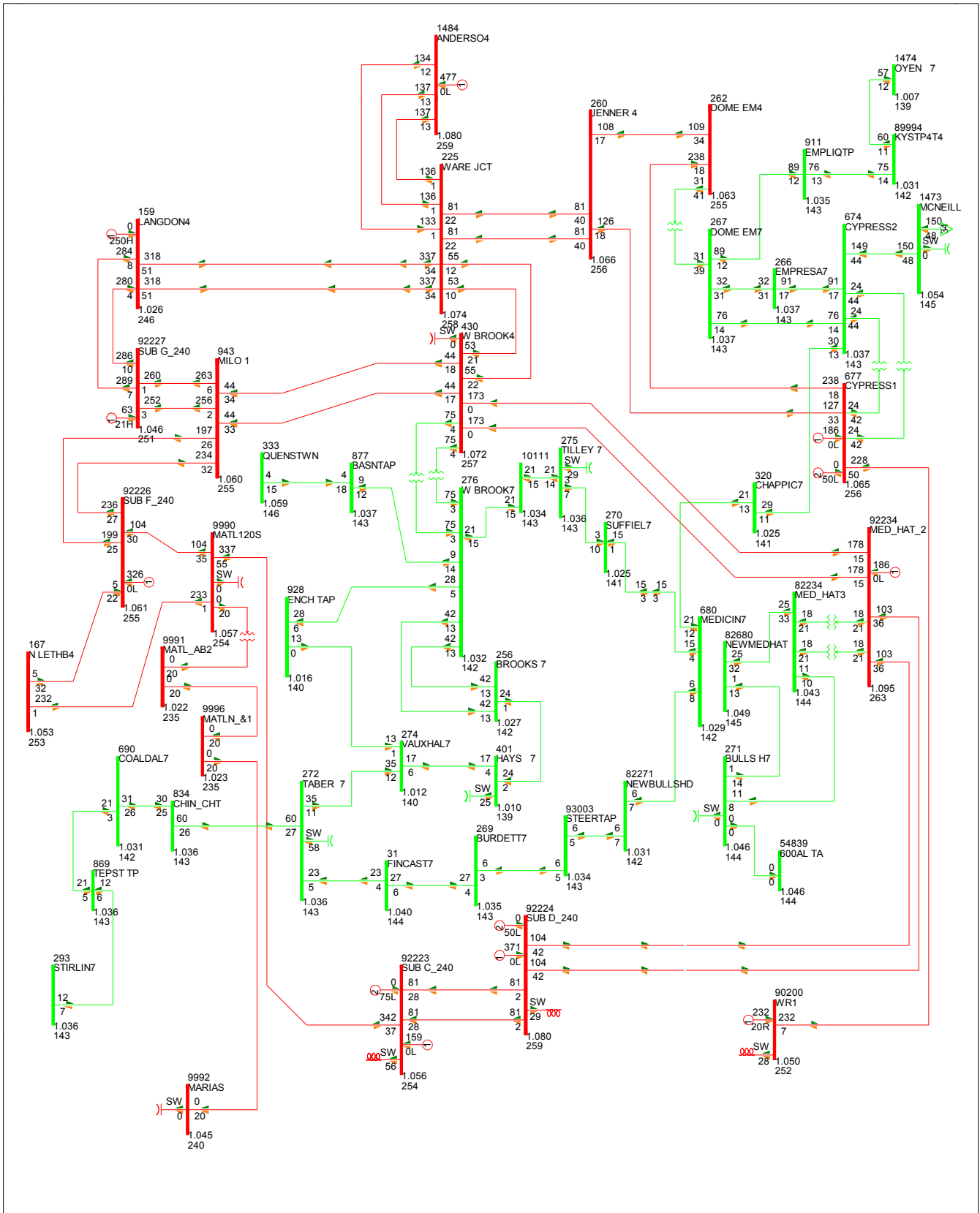


FIG 2017-1A-SP-11: CROWNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -4 MW

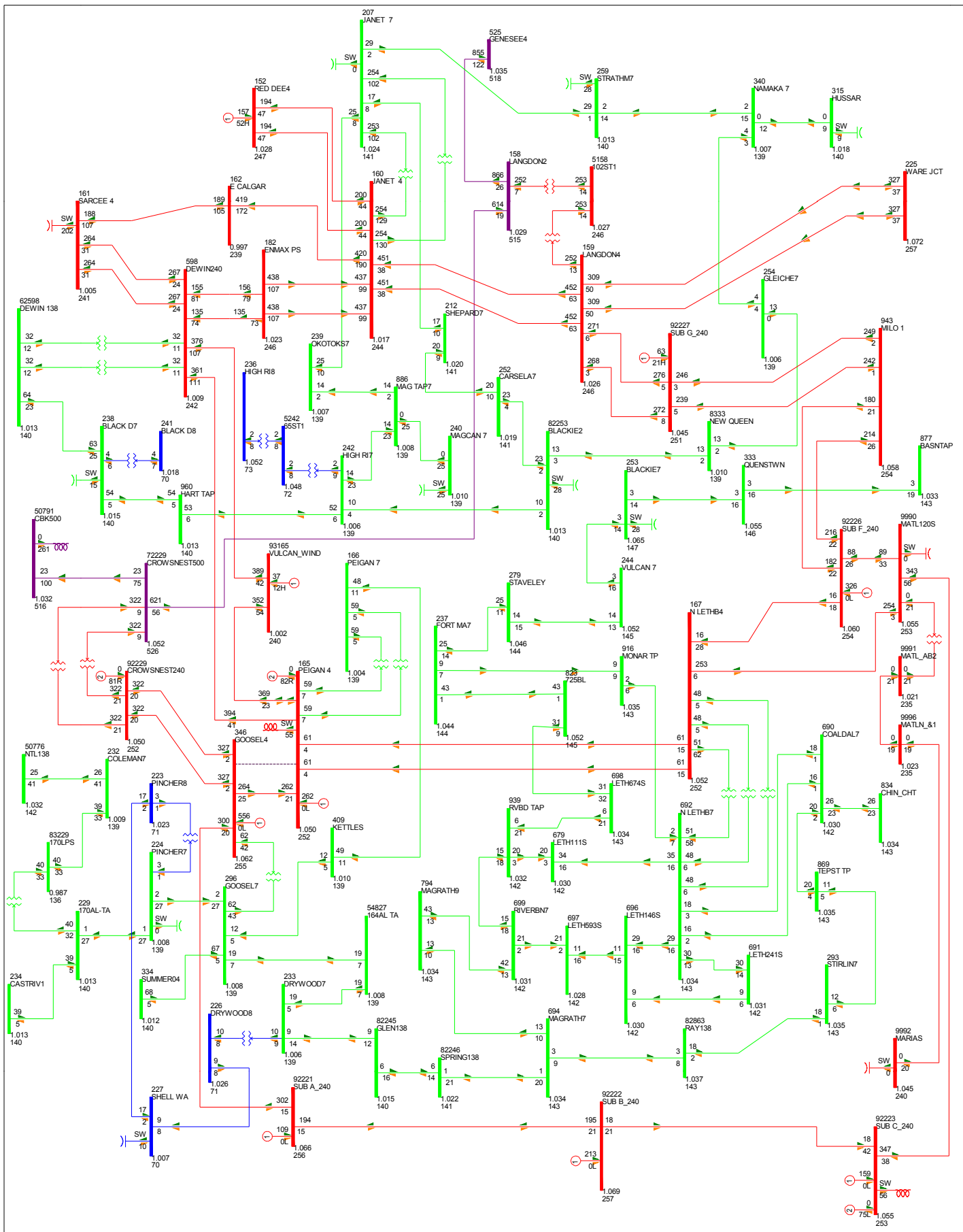


FIG 2017-1A-SP-12: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 17 MW

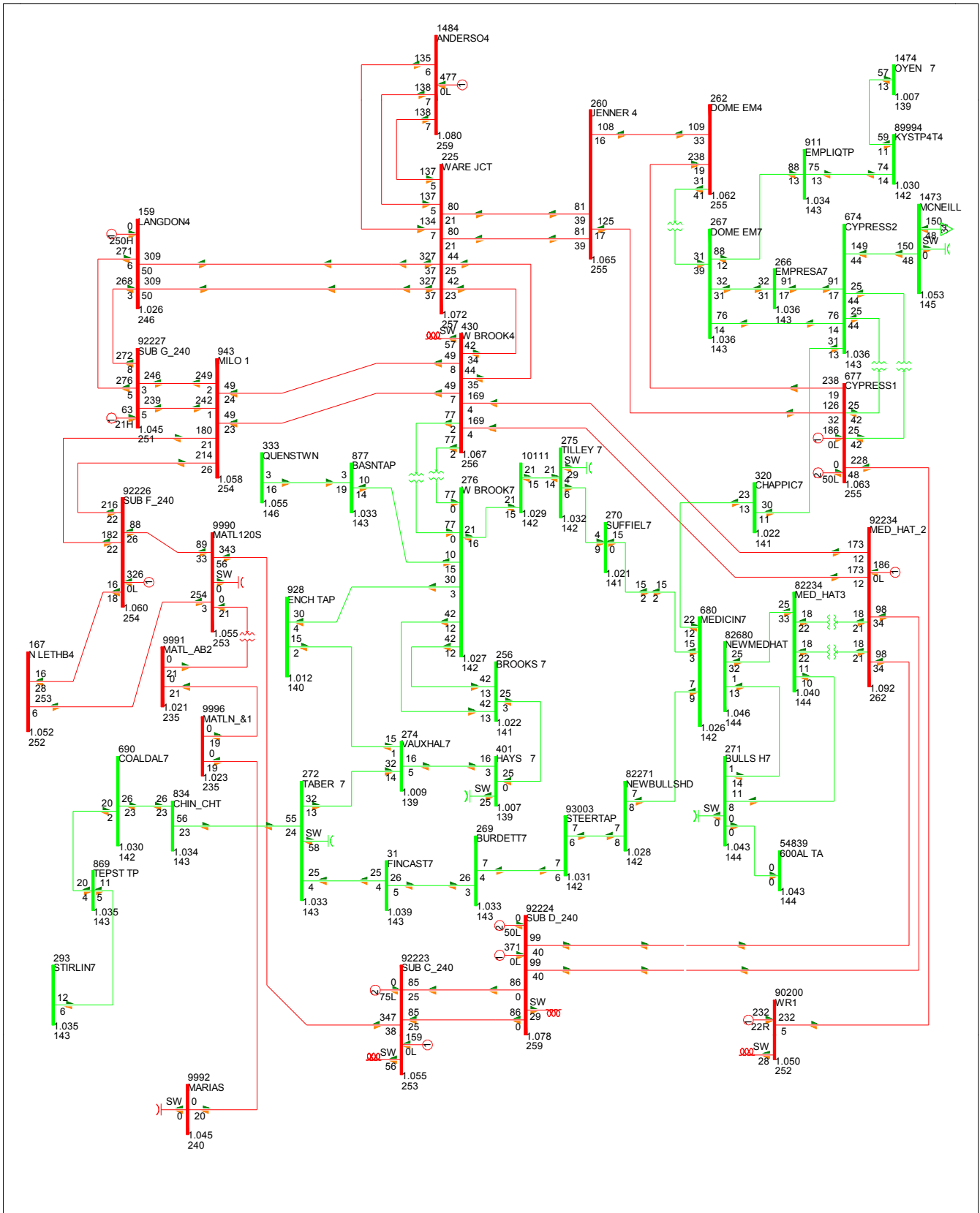


FIG 2017-1A-SP-13: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 17 MW

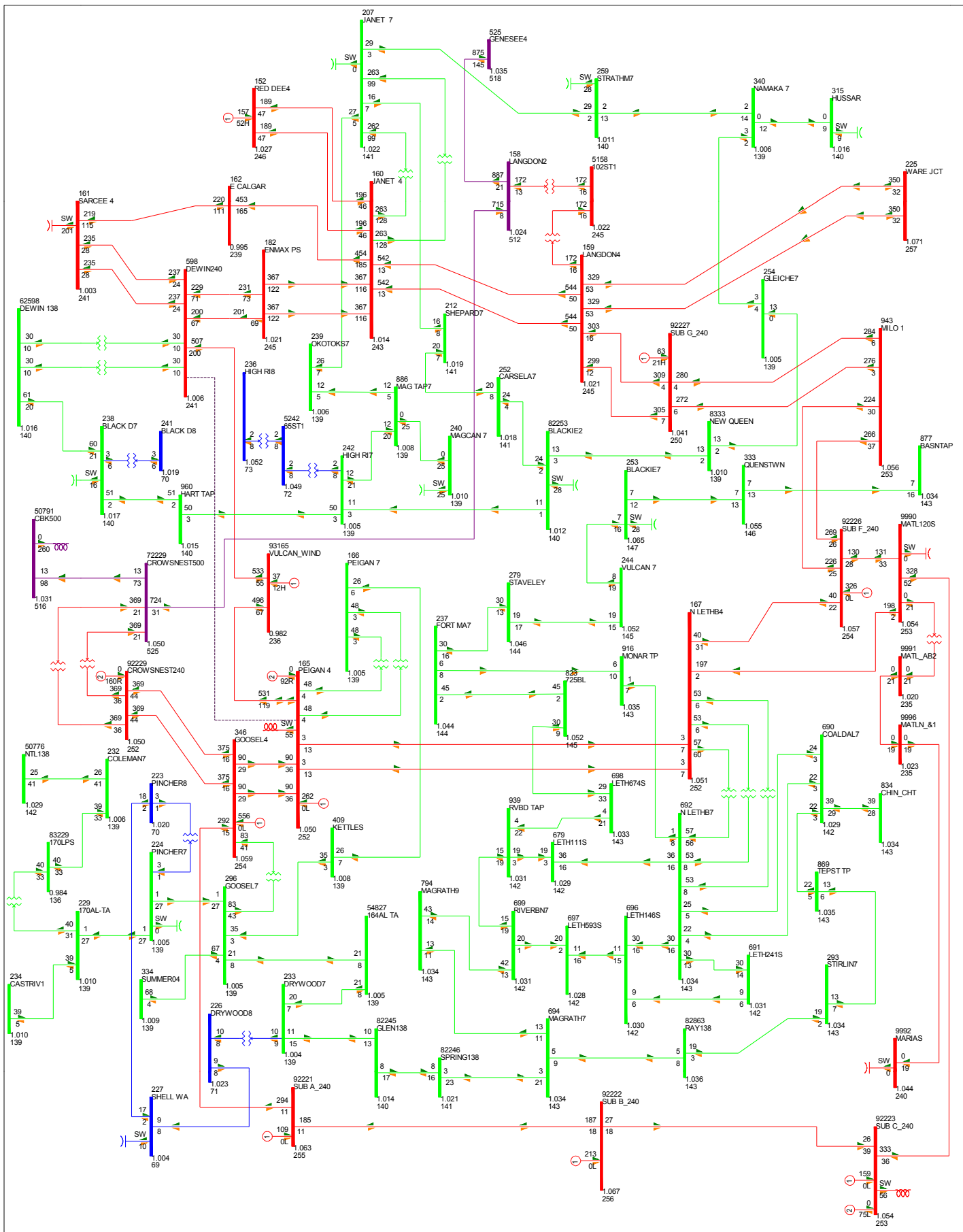


FIG 2017-1A-SP-14: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 0 MW

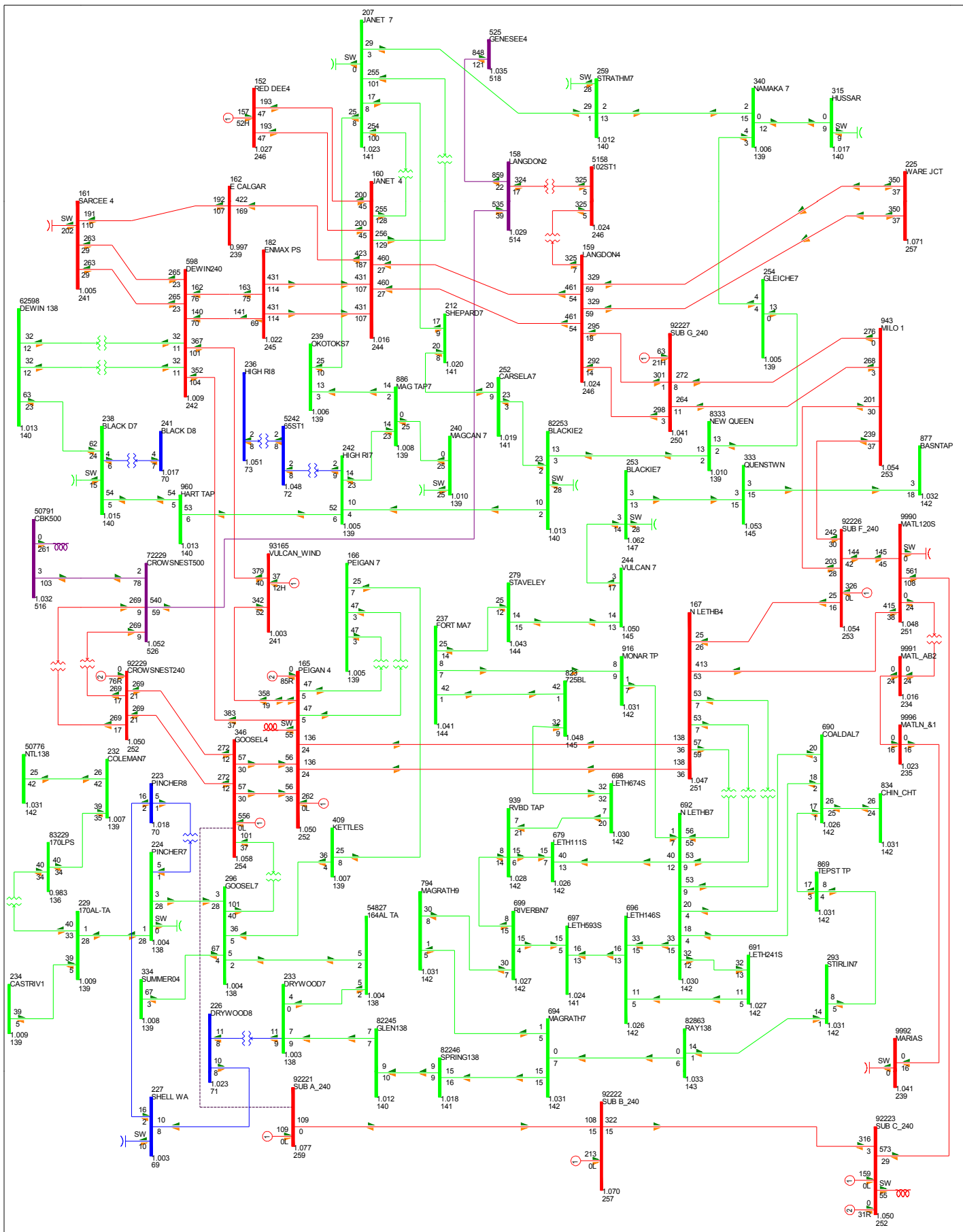


FIG 2017-1A-SP-16: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 >500.000
 BC Export: -6 MW

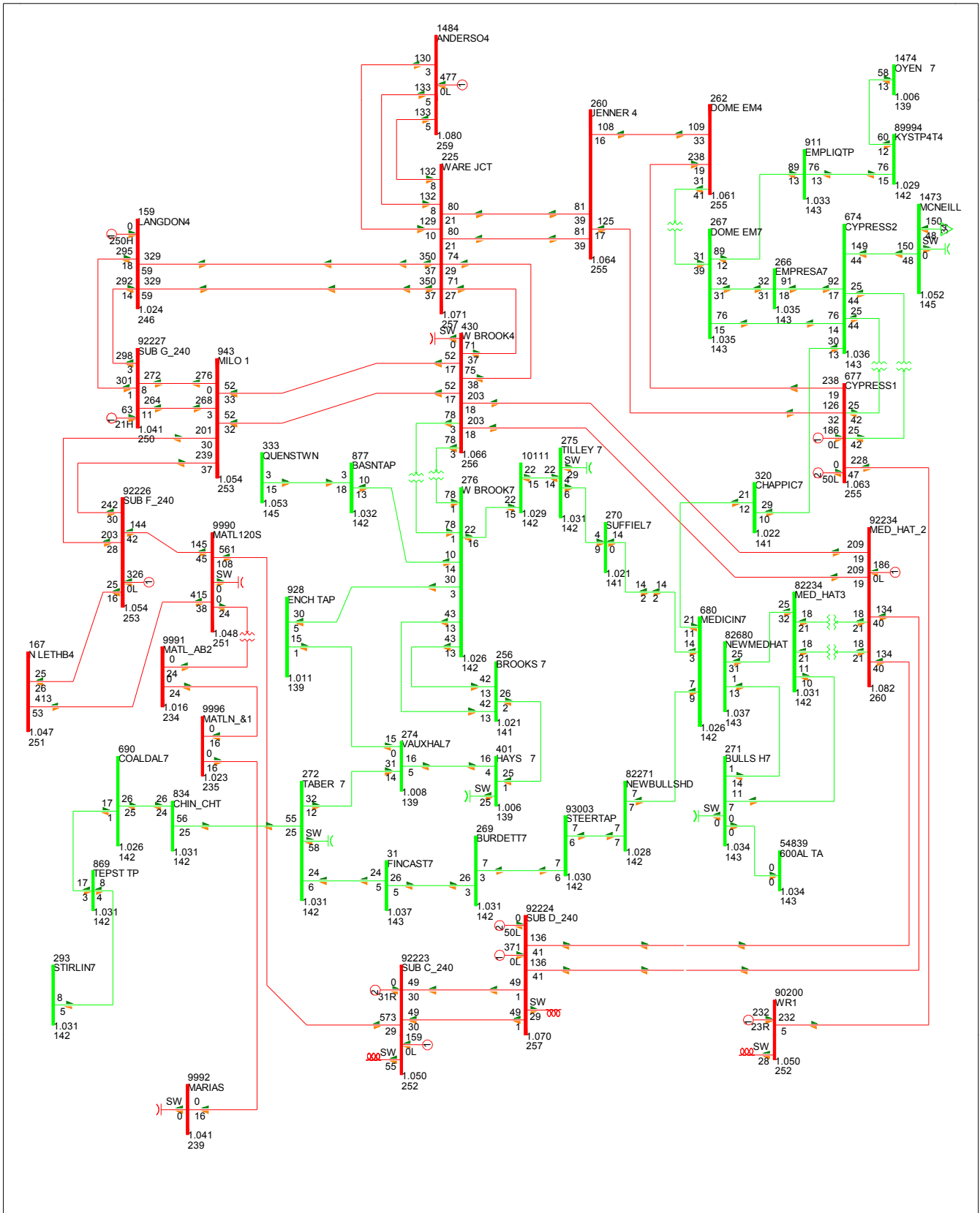


FIG 2017-1A-SP-17: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -6 MW

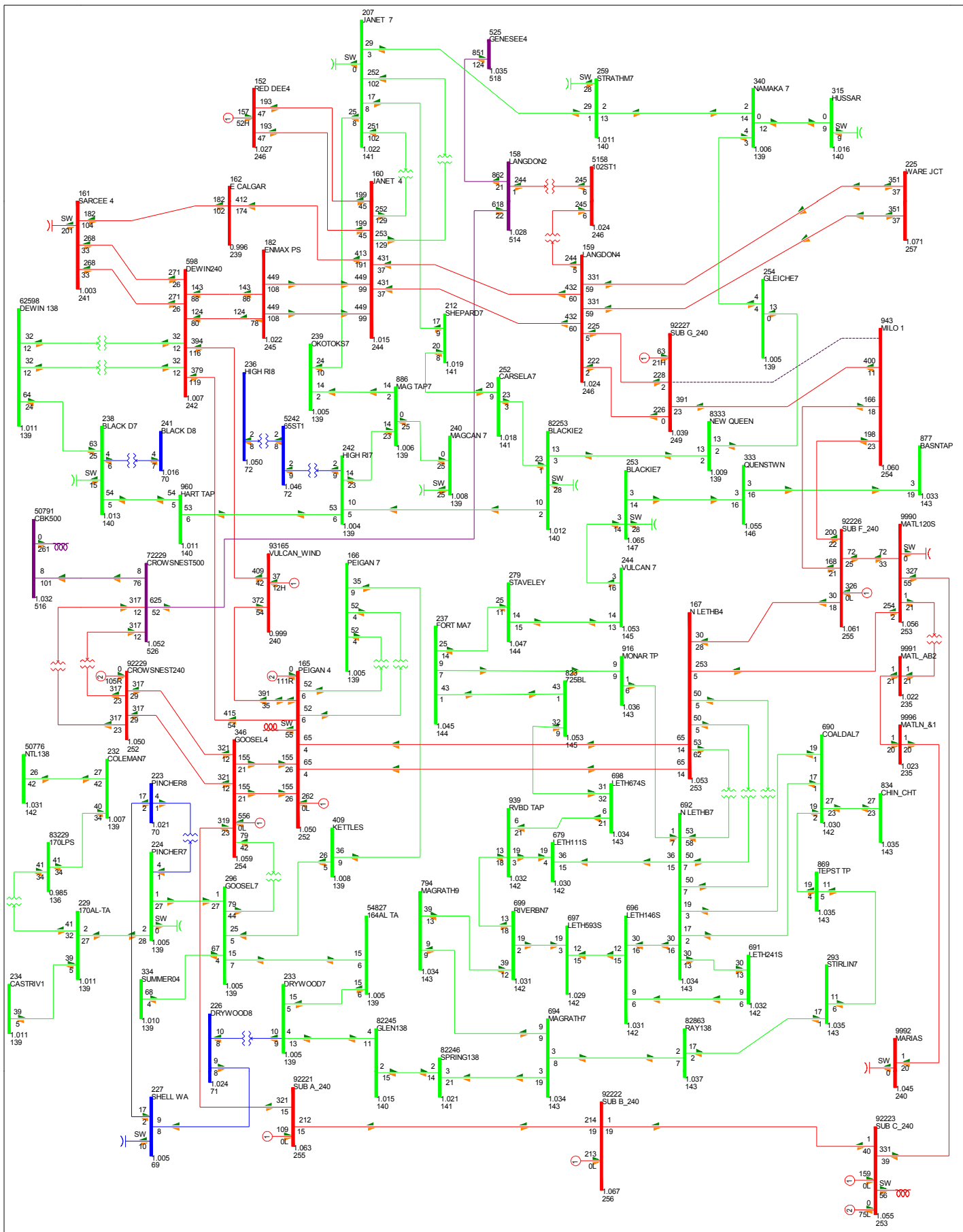


FIG 2017-1A-SP-20: MILO TO SUB G 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 3 MW

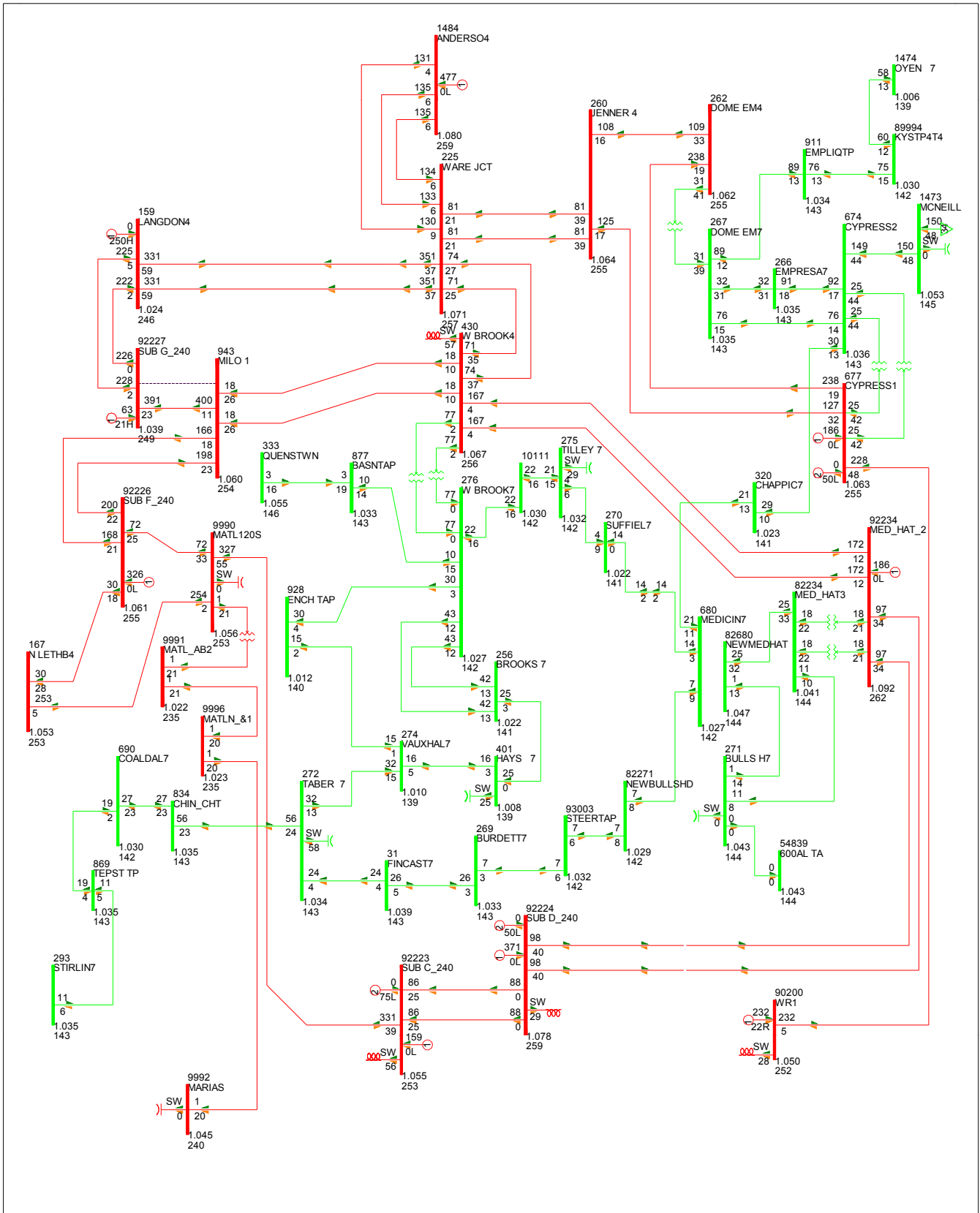


FIG 2017-1A-SP-21: MLO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 3 MW

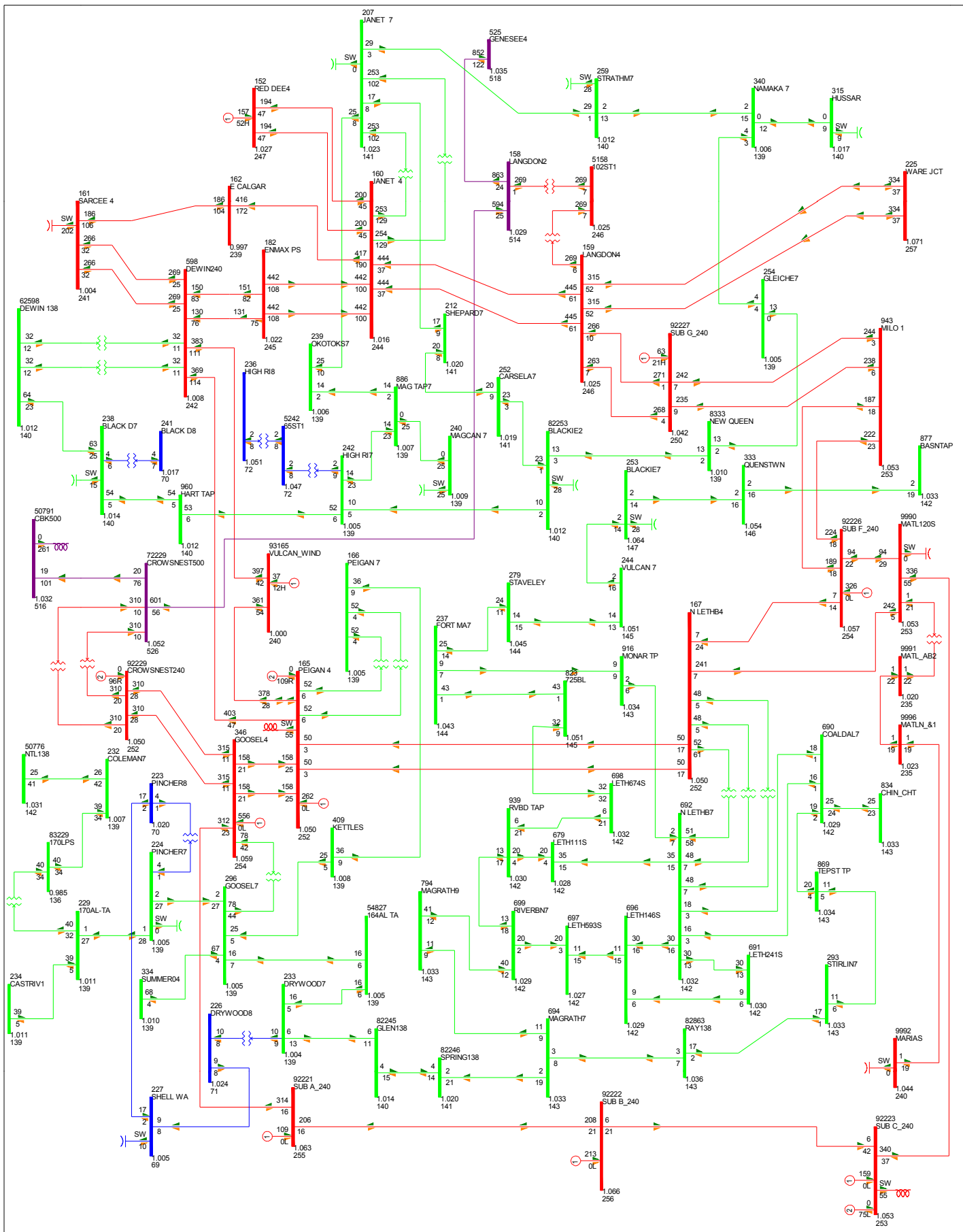


FIG 2017-1A-SP-22: MILO TO WESTBROOKS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 14 MW

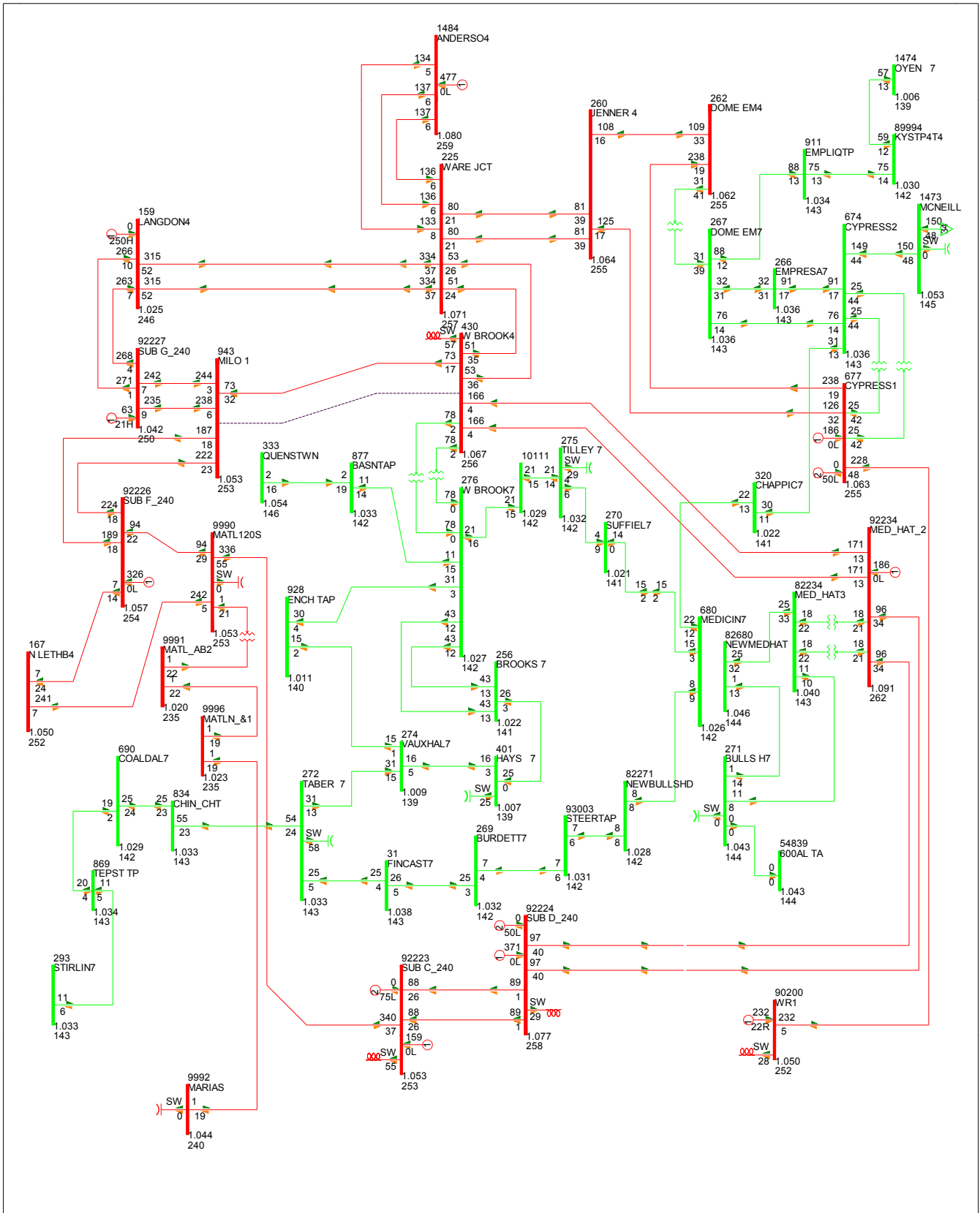


FIG 2017-1A-SP-23: MLO TO WESTBROOKS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 14 MW

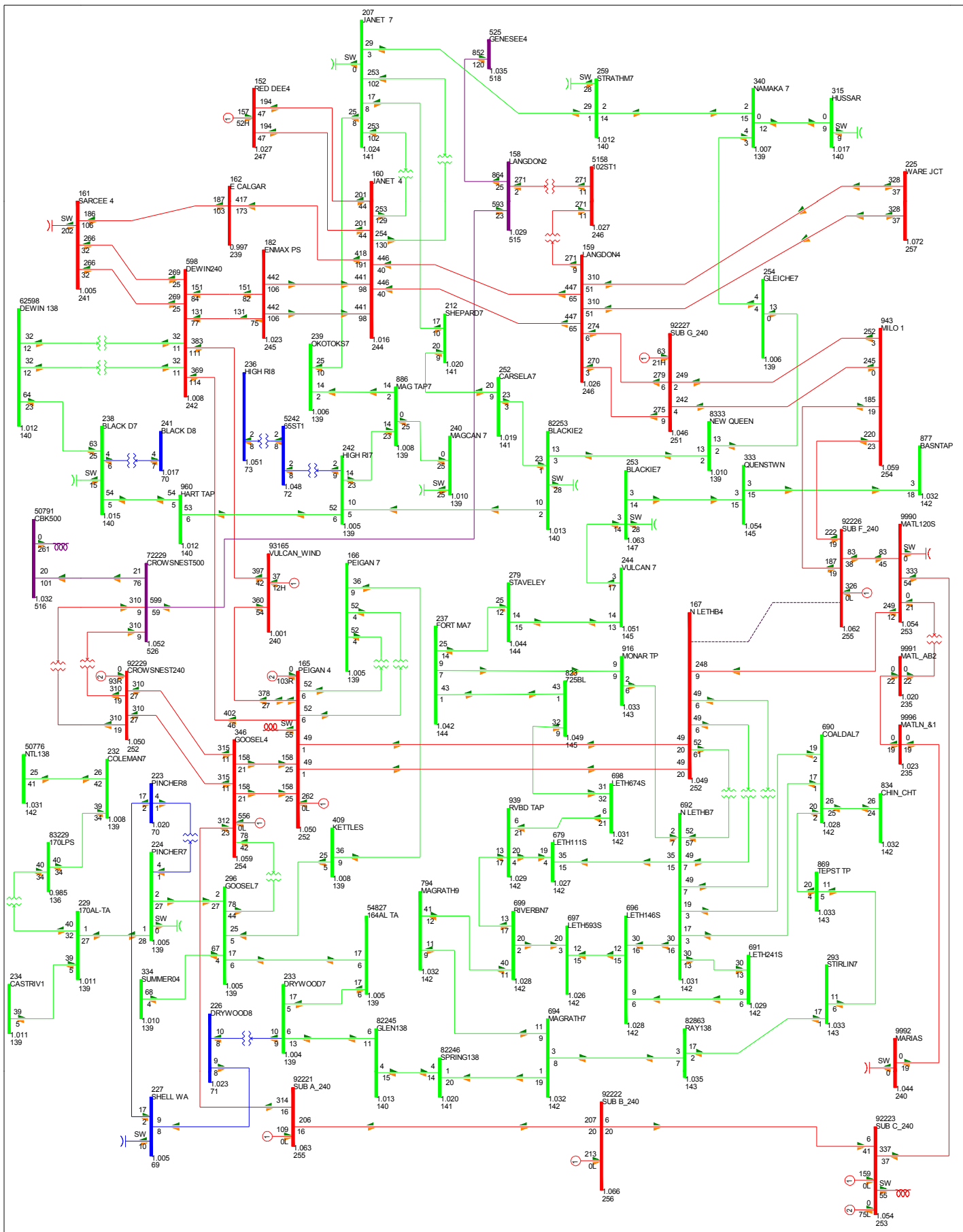


FIG 2017-1A-SP-24: N. LETHBRIDGE TO SUB F 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 >500.000
 BC Export: 15 MW

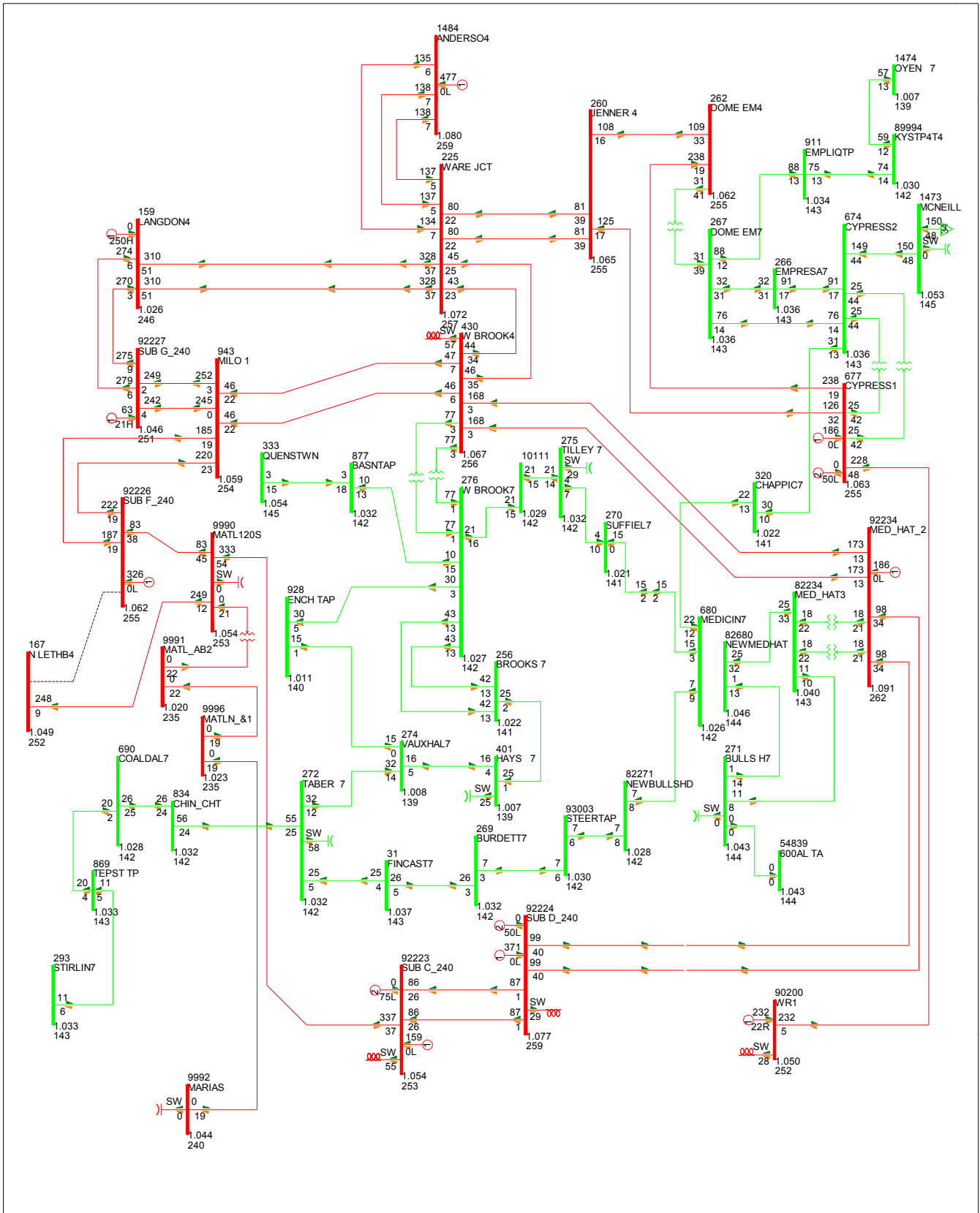


FIG 2017-1A-SP-25: N. LETHBRIDGE TO SUB F 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

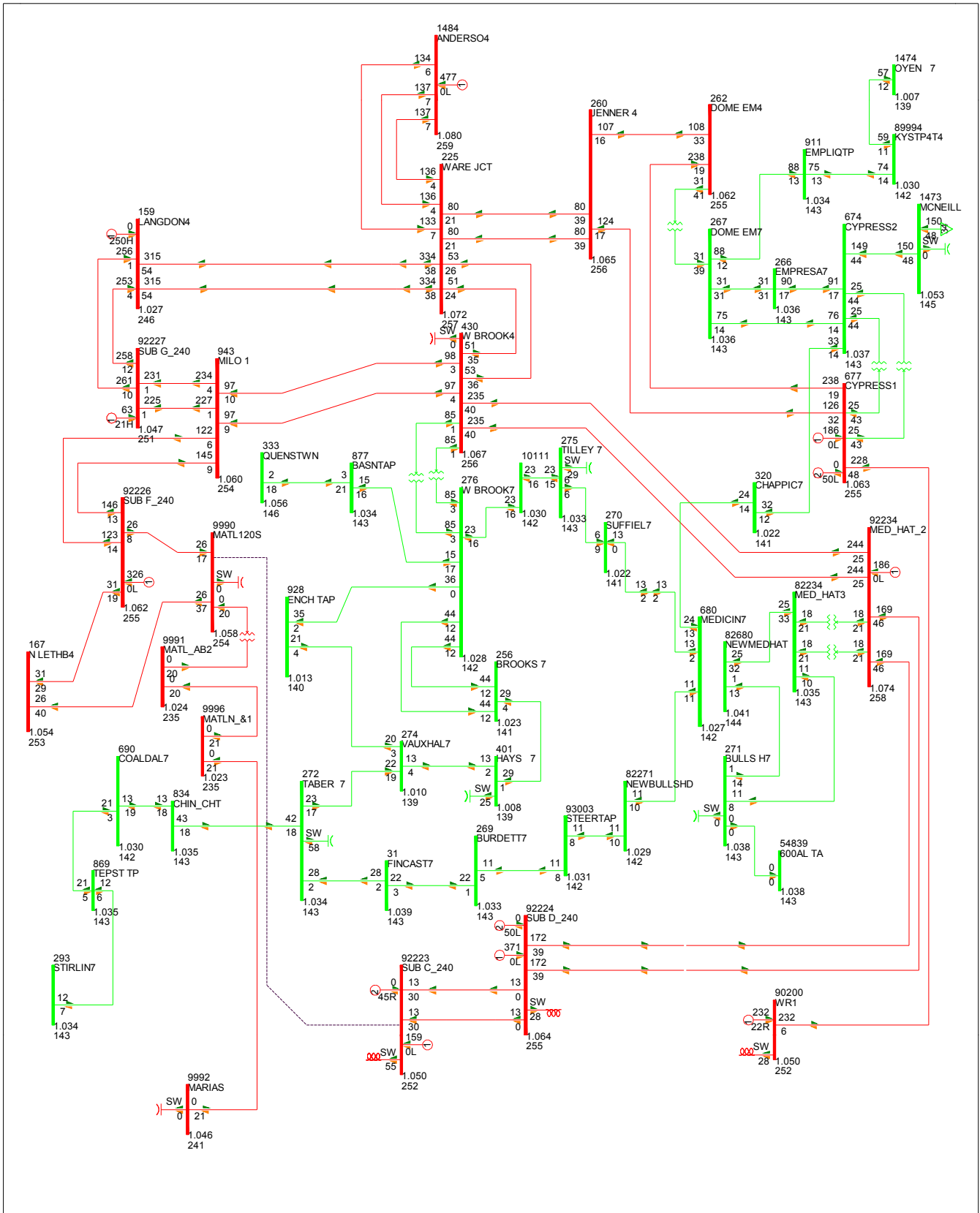


FIG 2017-1A-SP-27: MATL TO SUB C 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -1 MW

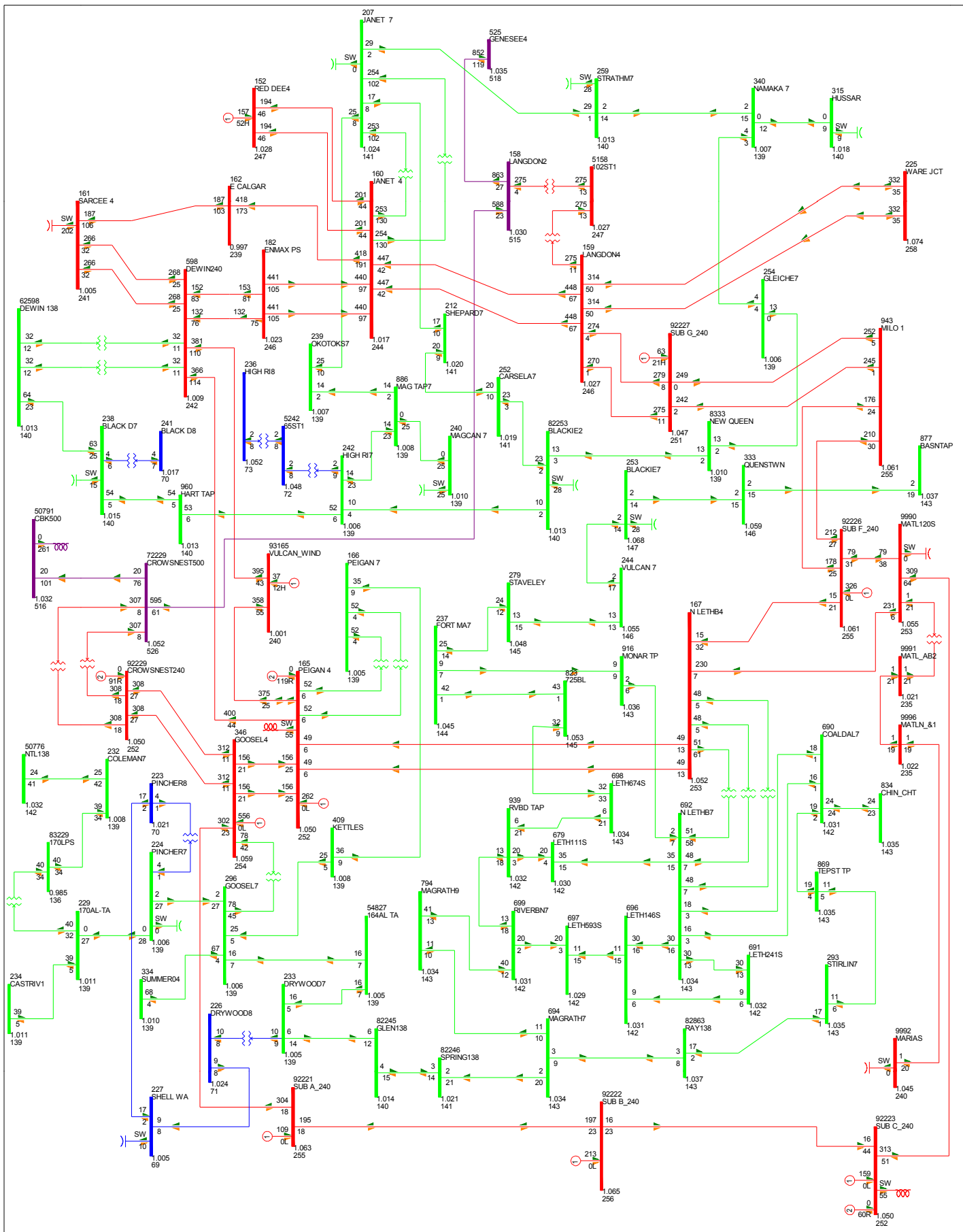


FIG 2017-1A-SP-28: SUB C TO SUB D 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 15 MW

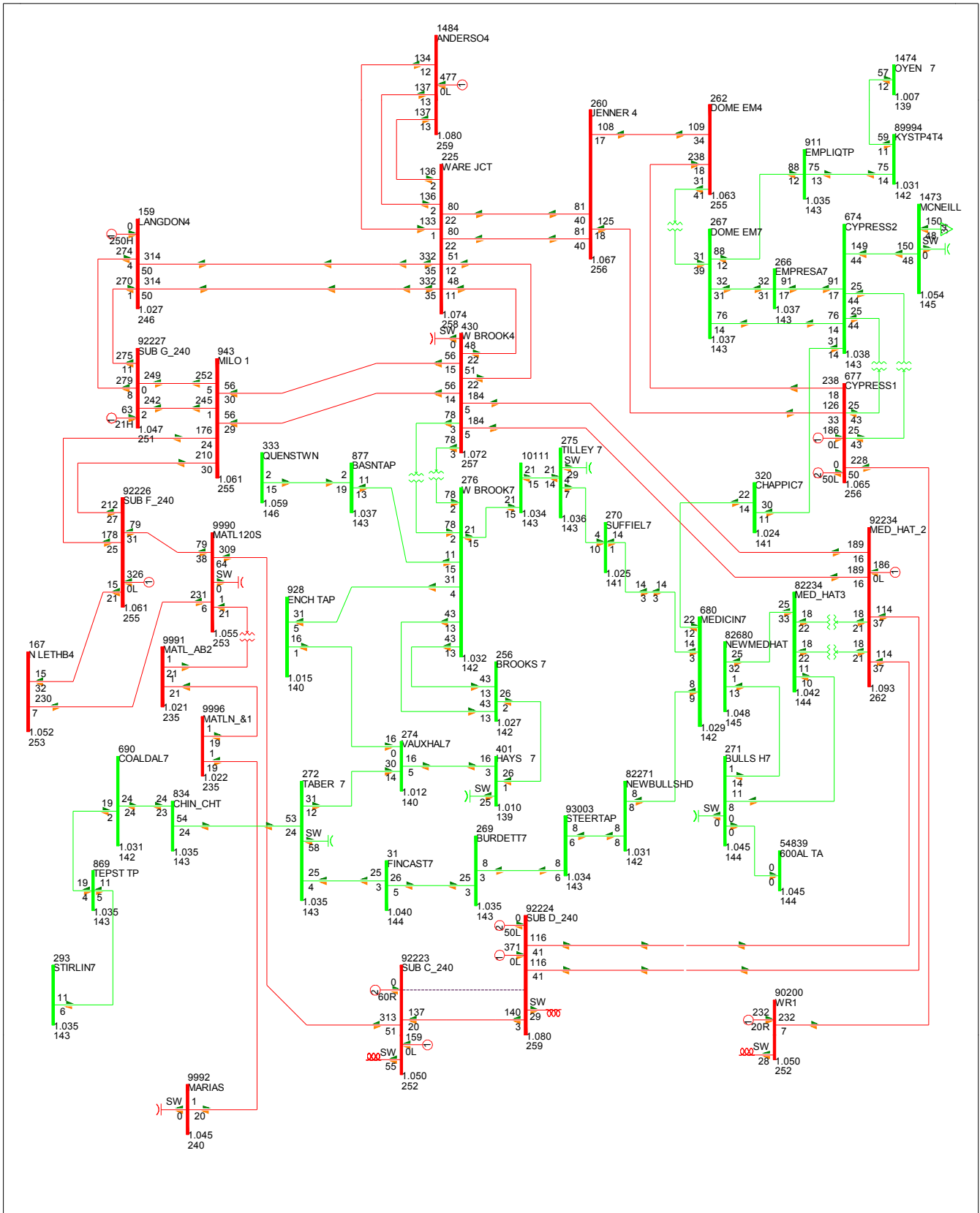


FIG 2017-1A-SP-29: SUB C TO SUB D 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

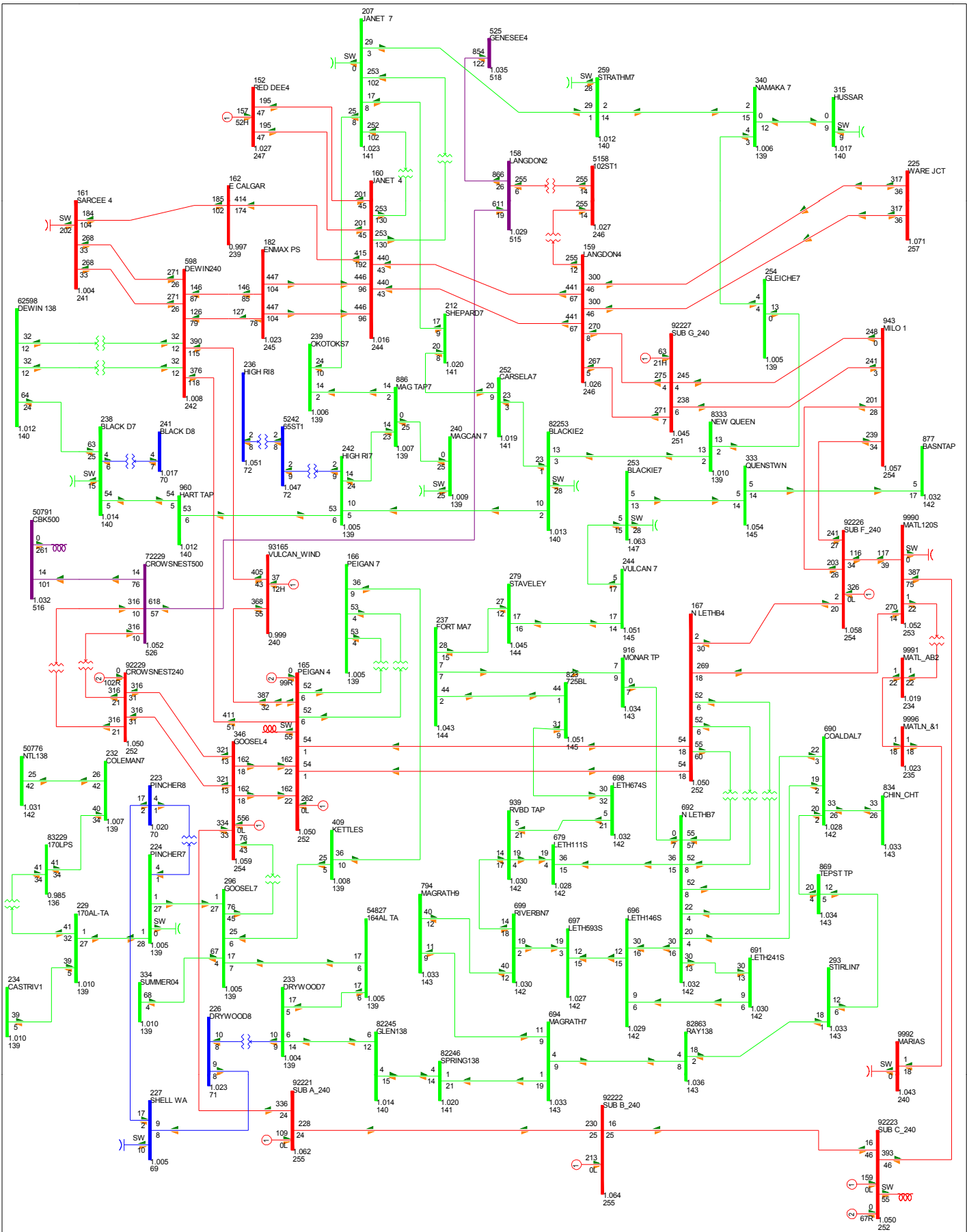


FIG 2017-1A-SP-30: WESTBROOKS TO MEDHAT2 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 8 MW

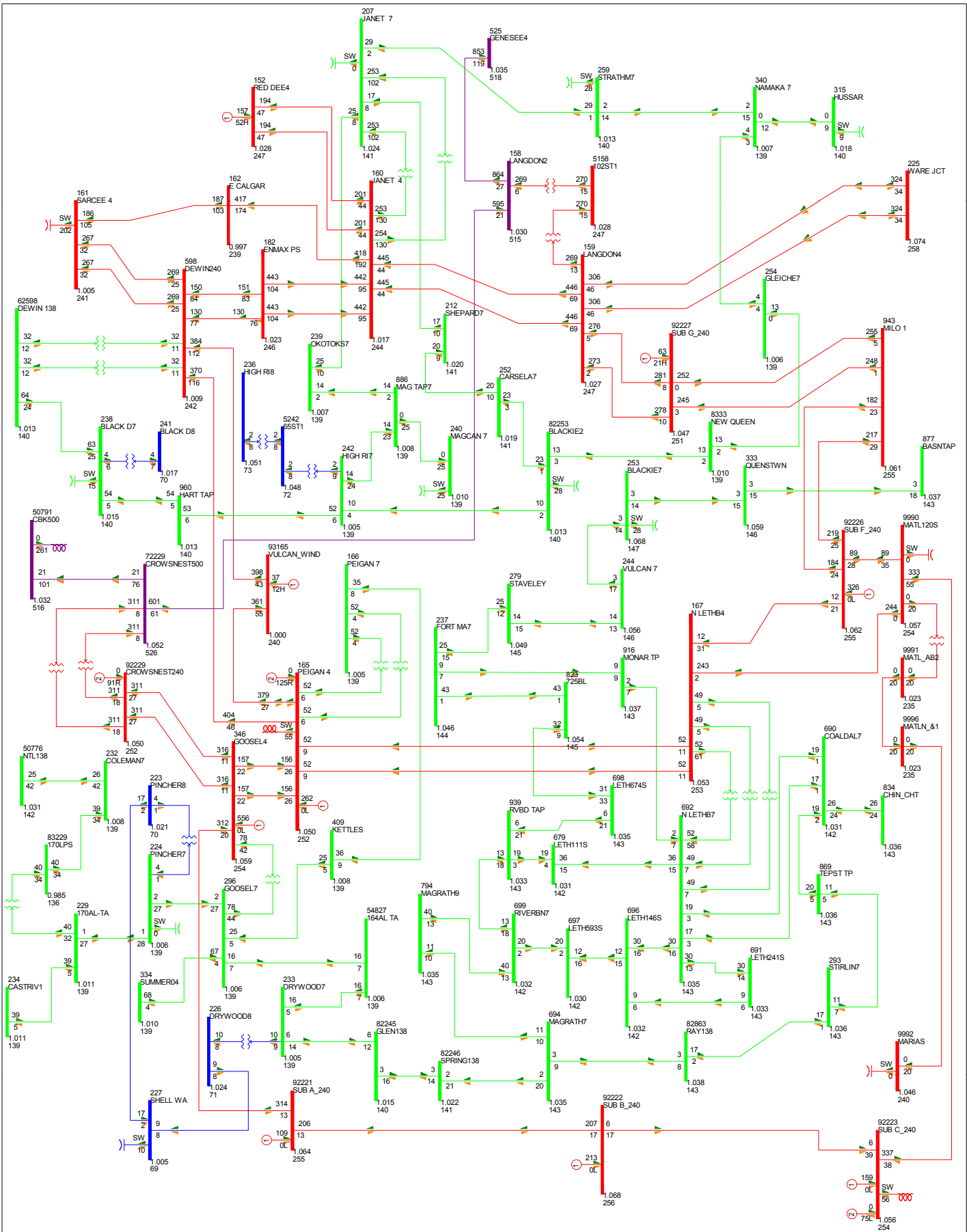


FIG 2017-1A-SP-32: WAREJUNC TO WESTBROOKS 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 16 MW

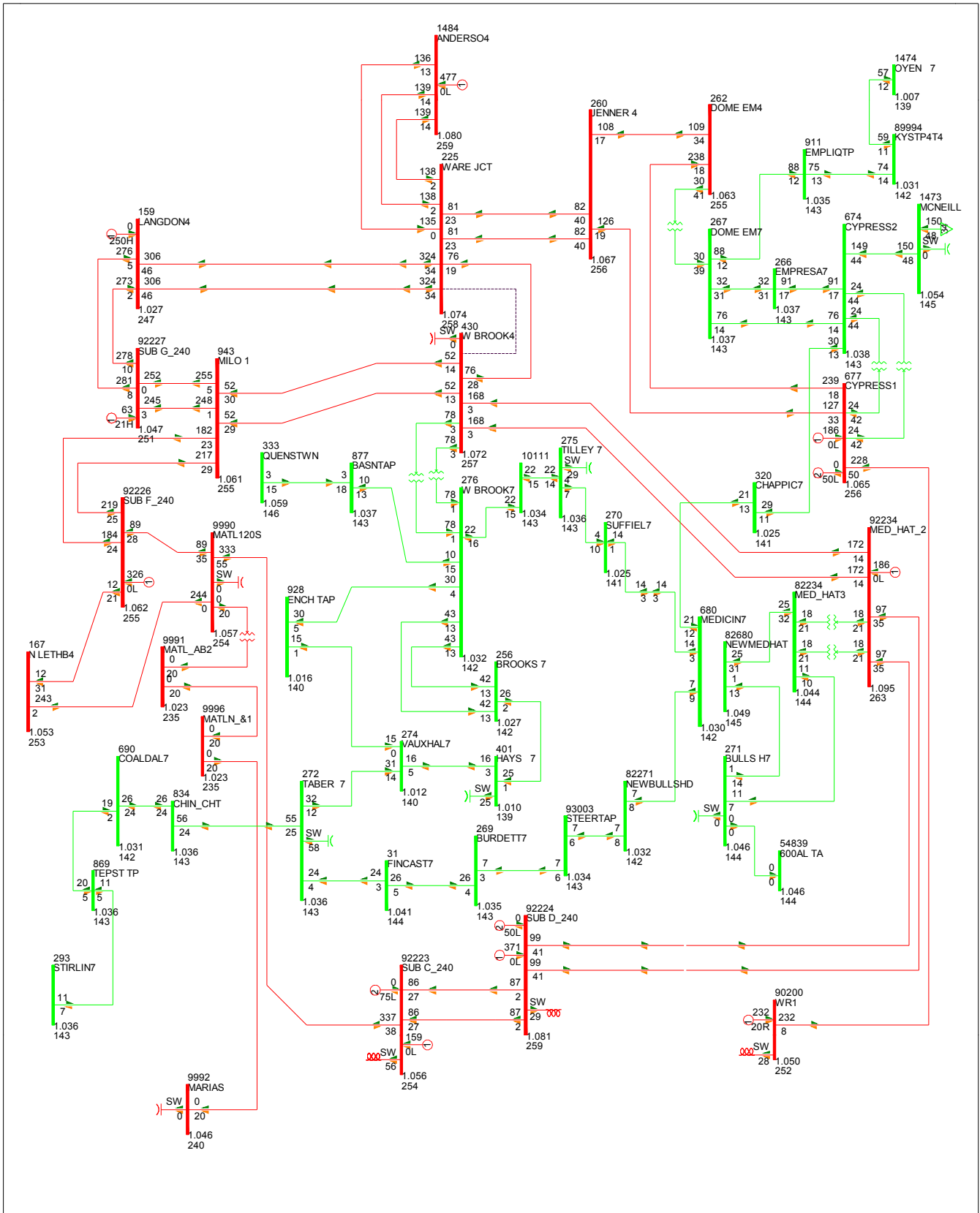


FIG 2017-1A-SP-33: WAREJUNCT TO WESTBROOKS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 16 MW

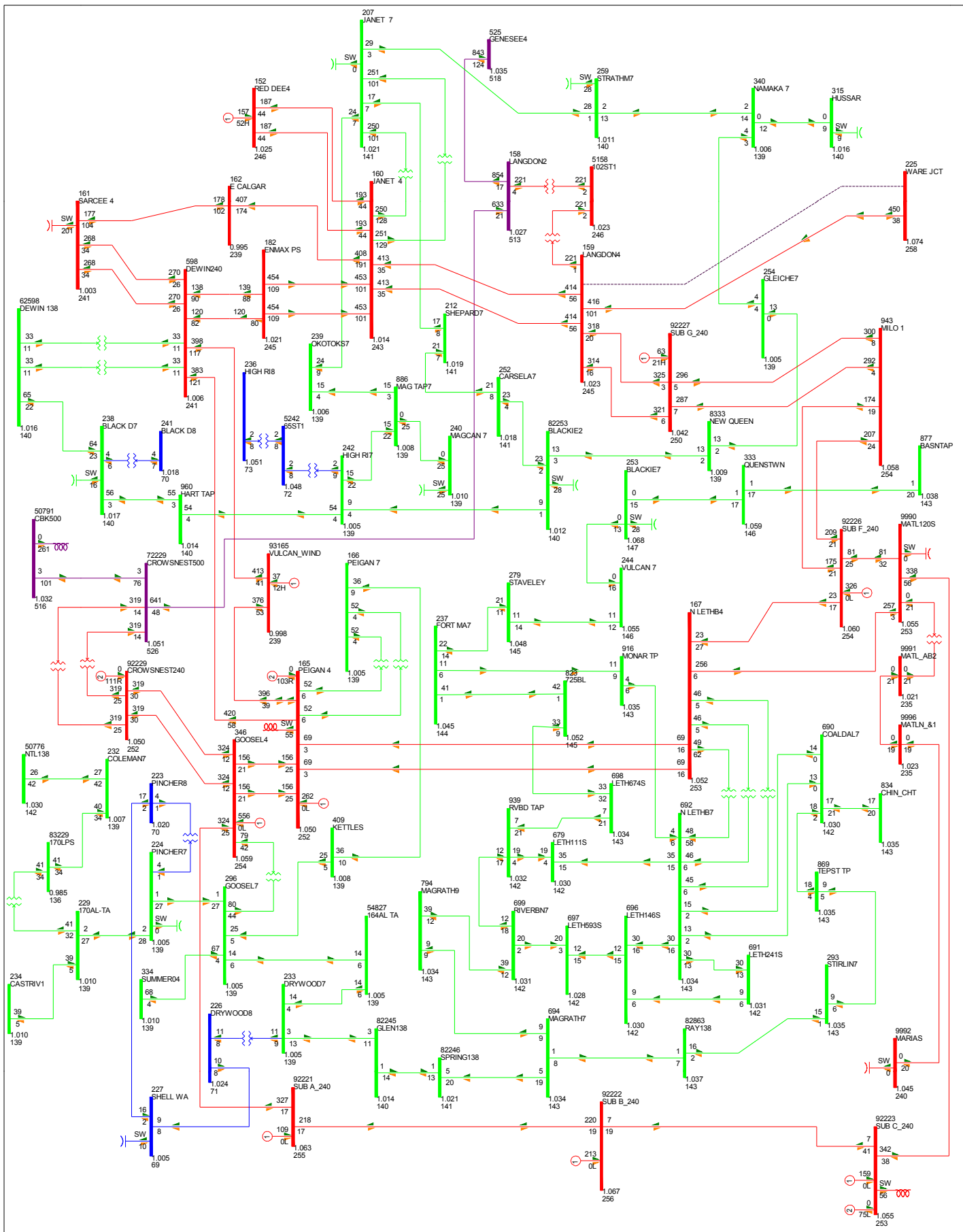


FIG 2017-1A-SP-34: WAREJUNC TO LANGDON 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -9 MW

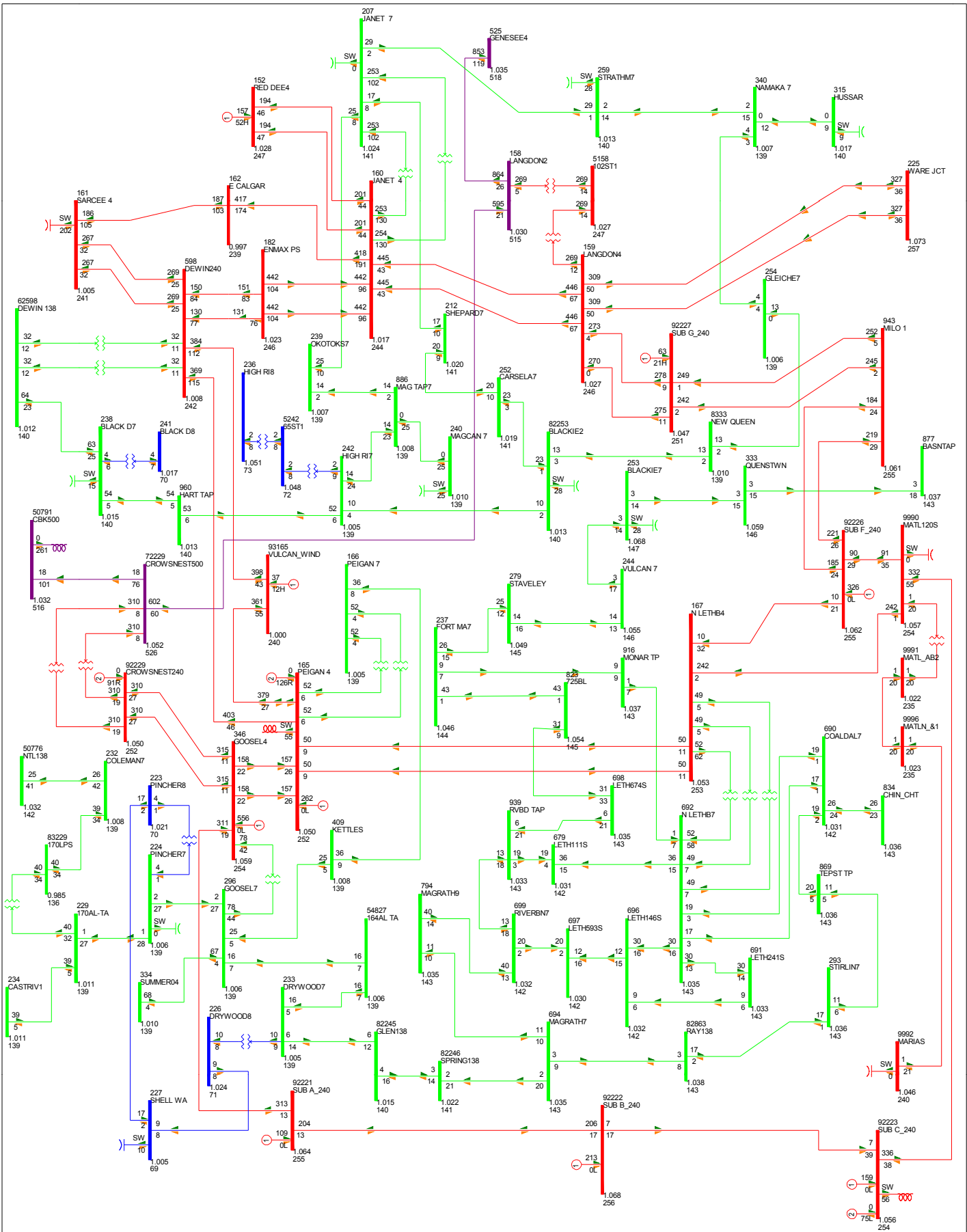


FIG 2017-1A-SP-36: DOME EMPRESS TO CYPRESS 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 13 MW

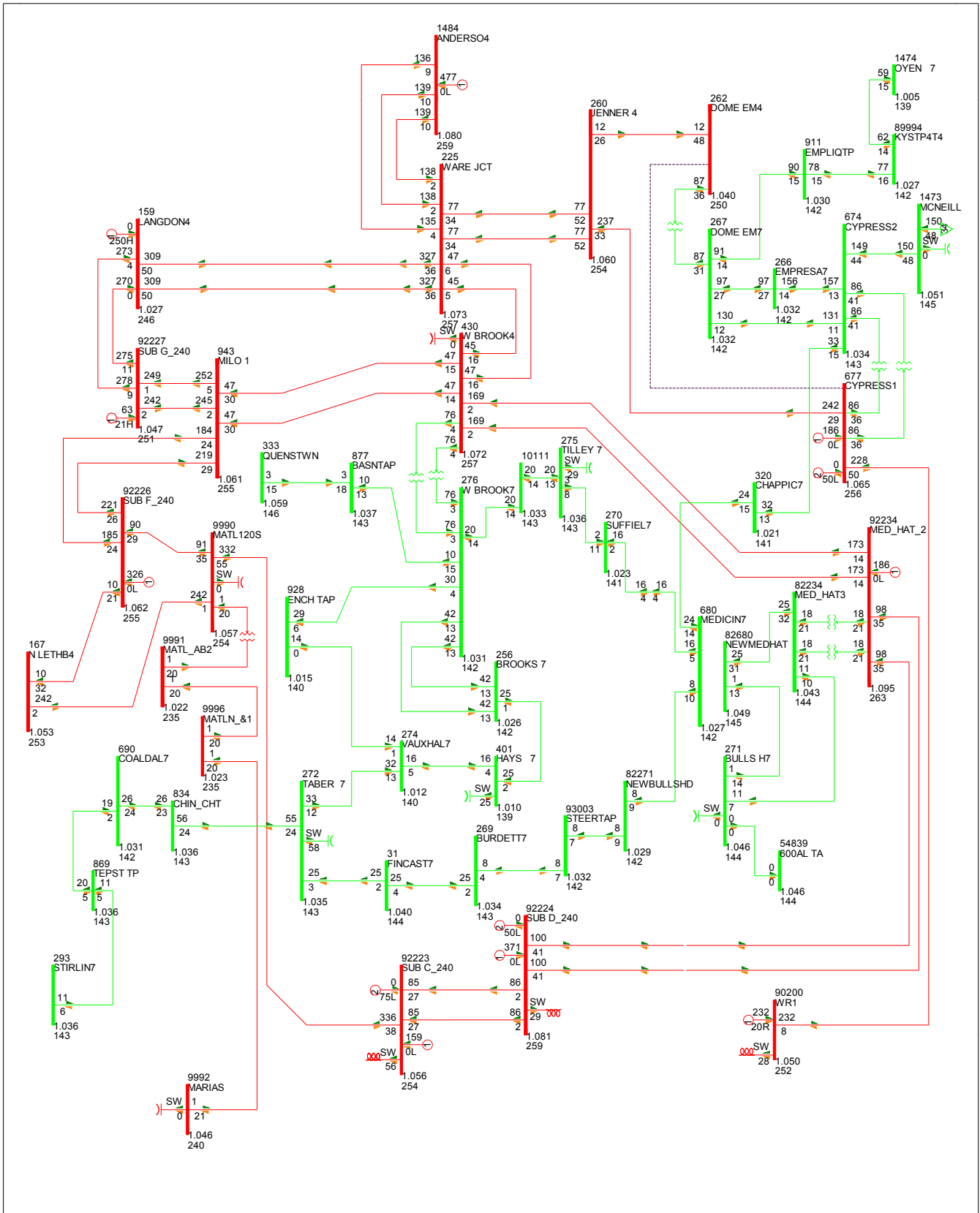


FIG 2017-1A-SP-37: DOME EMPRESS TO CYPRESS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 13 MW

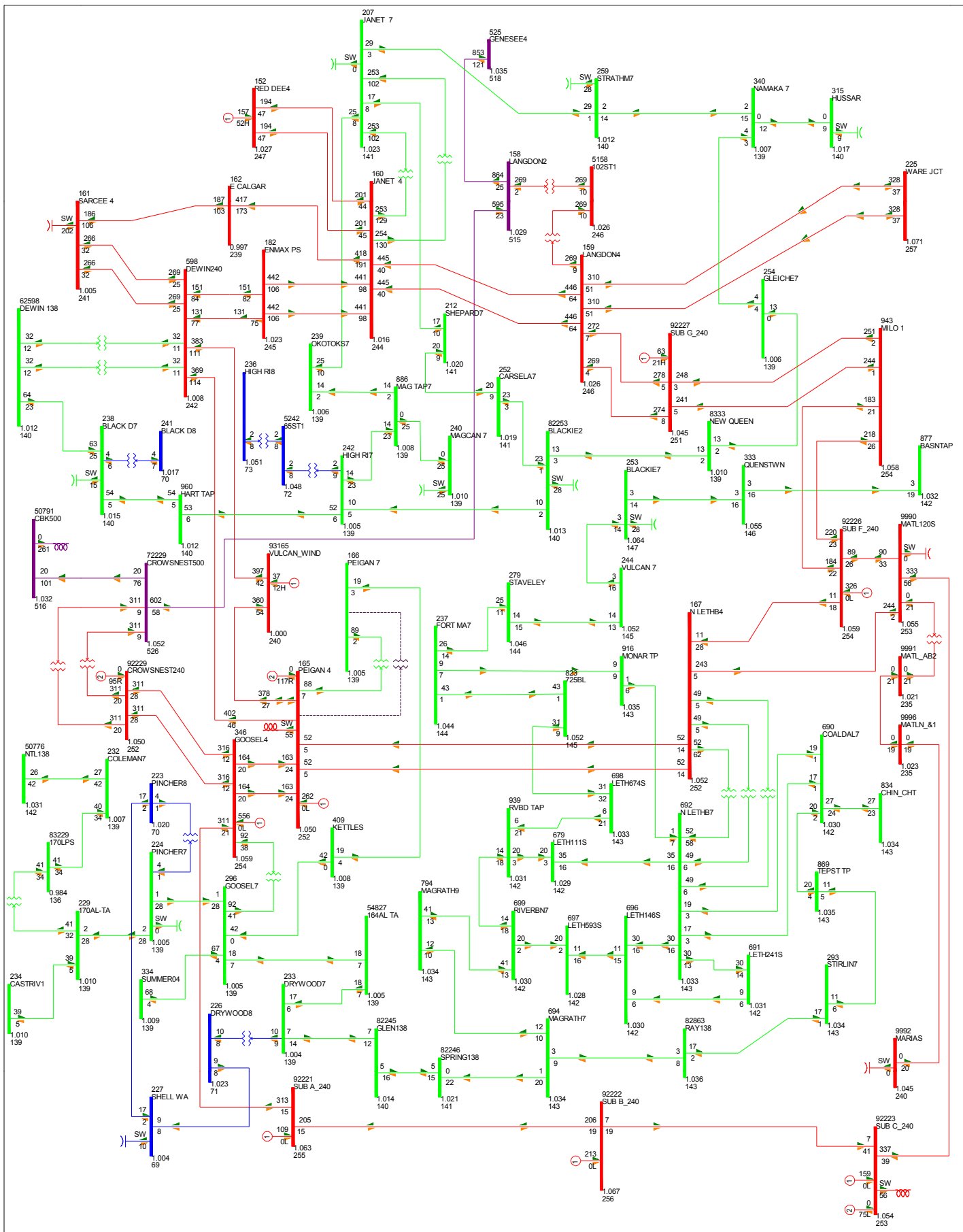


FIG 2017-1A-SP-42: PEIGAN 240/138 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 15 MW

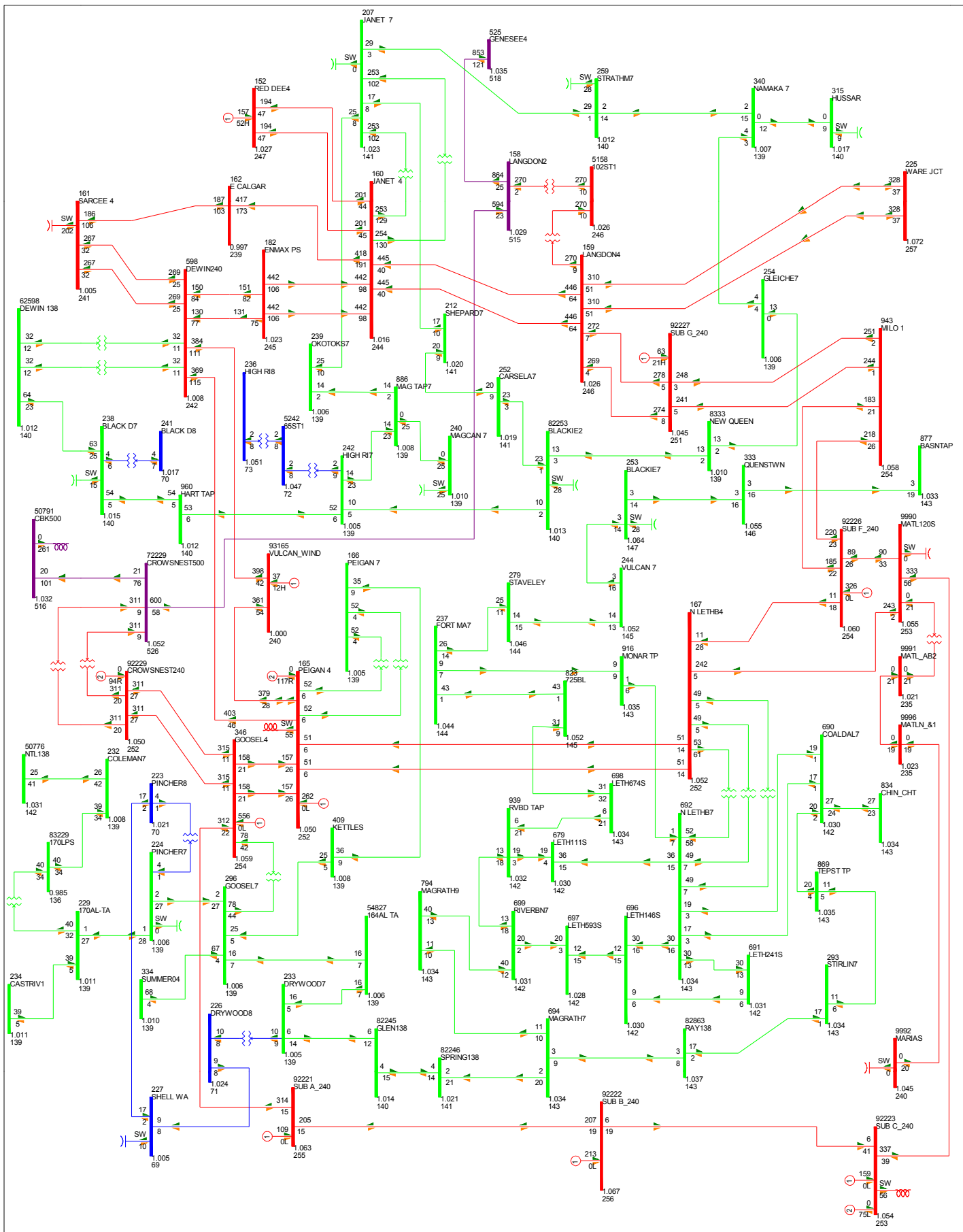


FIG 2017-1A-SP-44: DOME EMPRESS 240/138 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

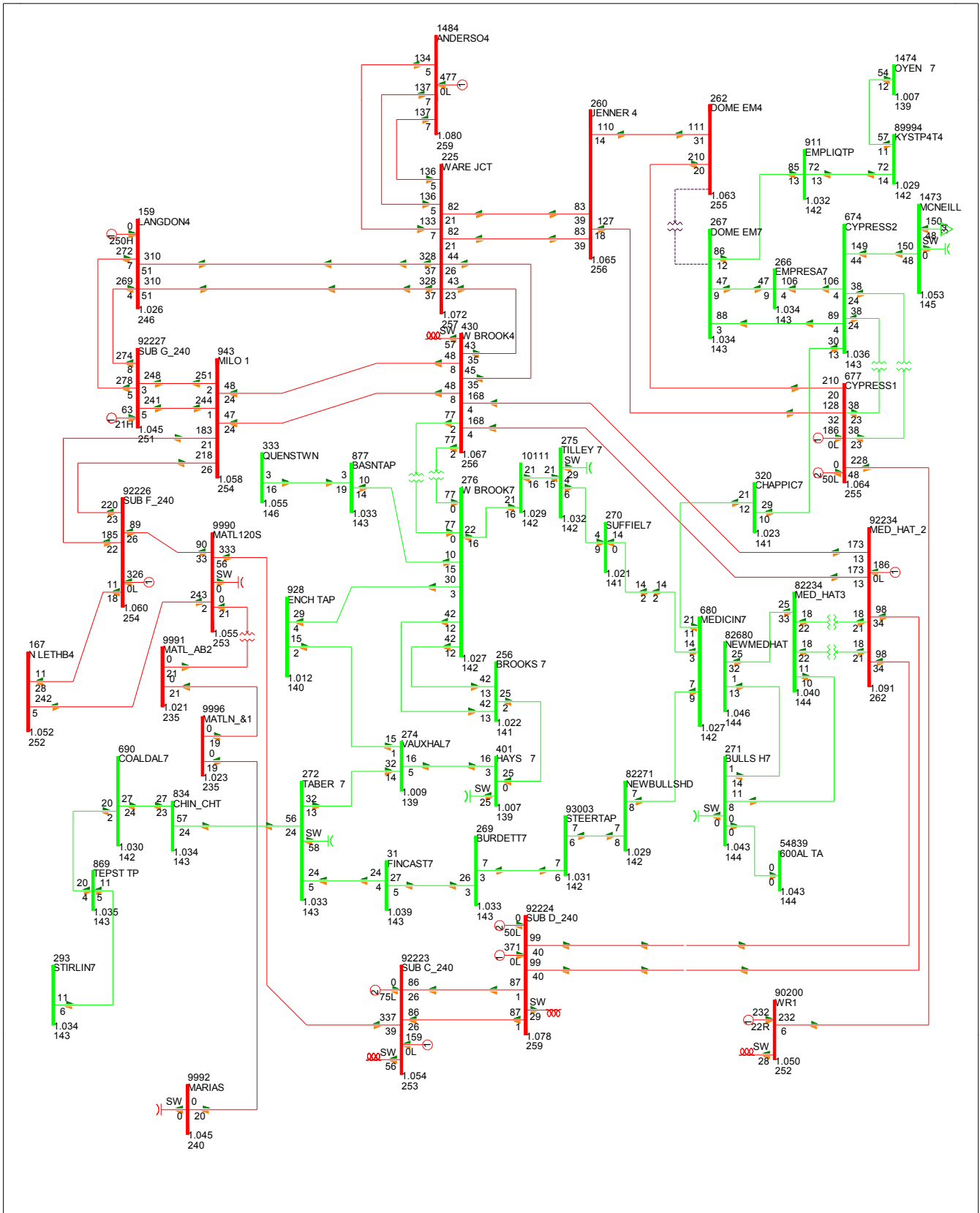


FIG 2017-1A-SP-45: DOME EMPRESS 240/138 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

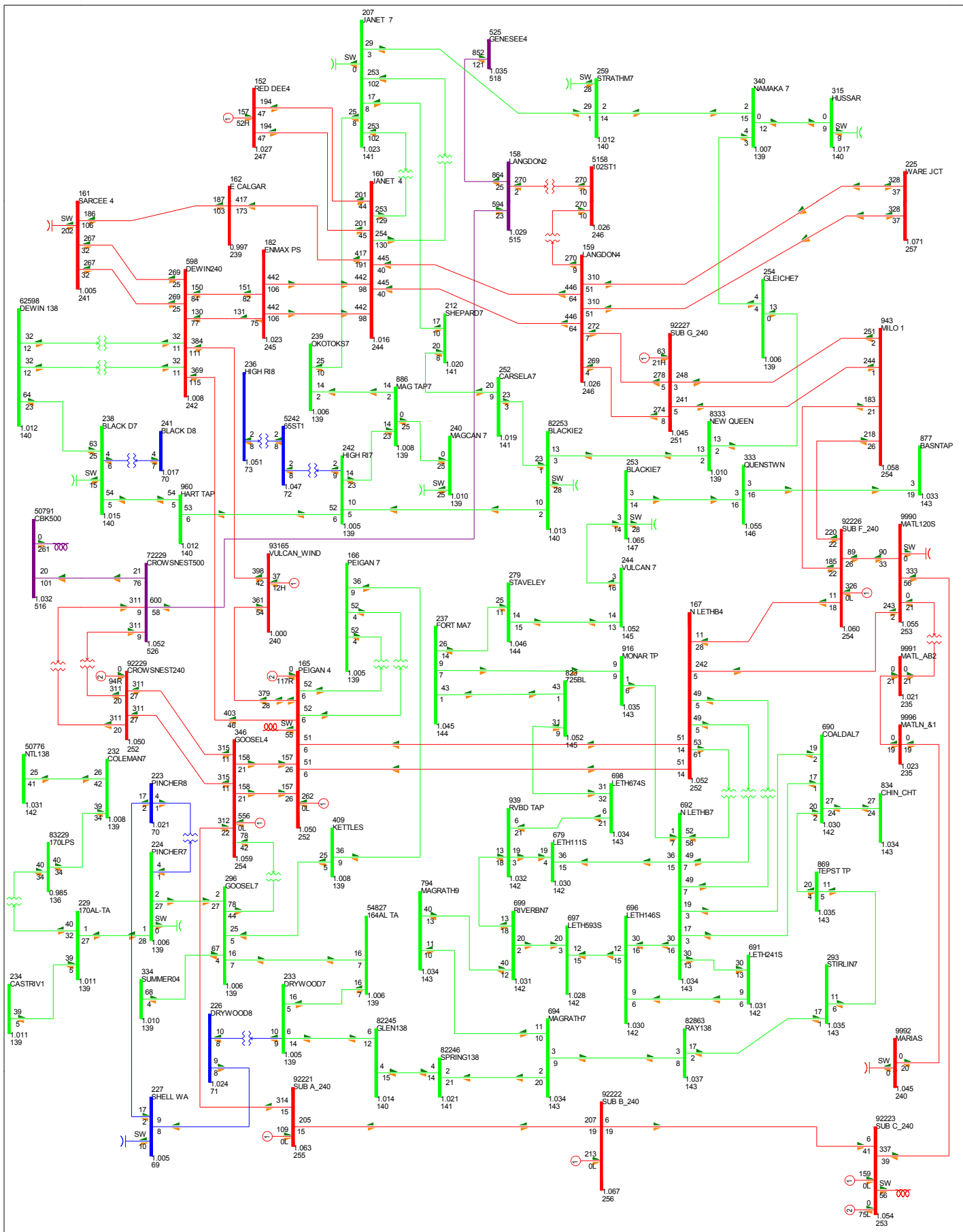


FIG 2017-1A-SP-46: CYPRESS 240/138 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 15 MW

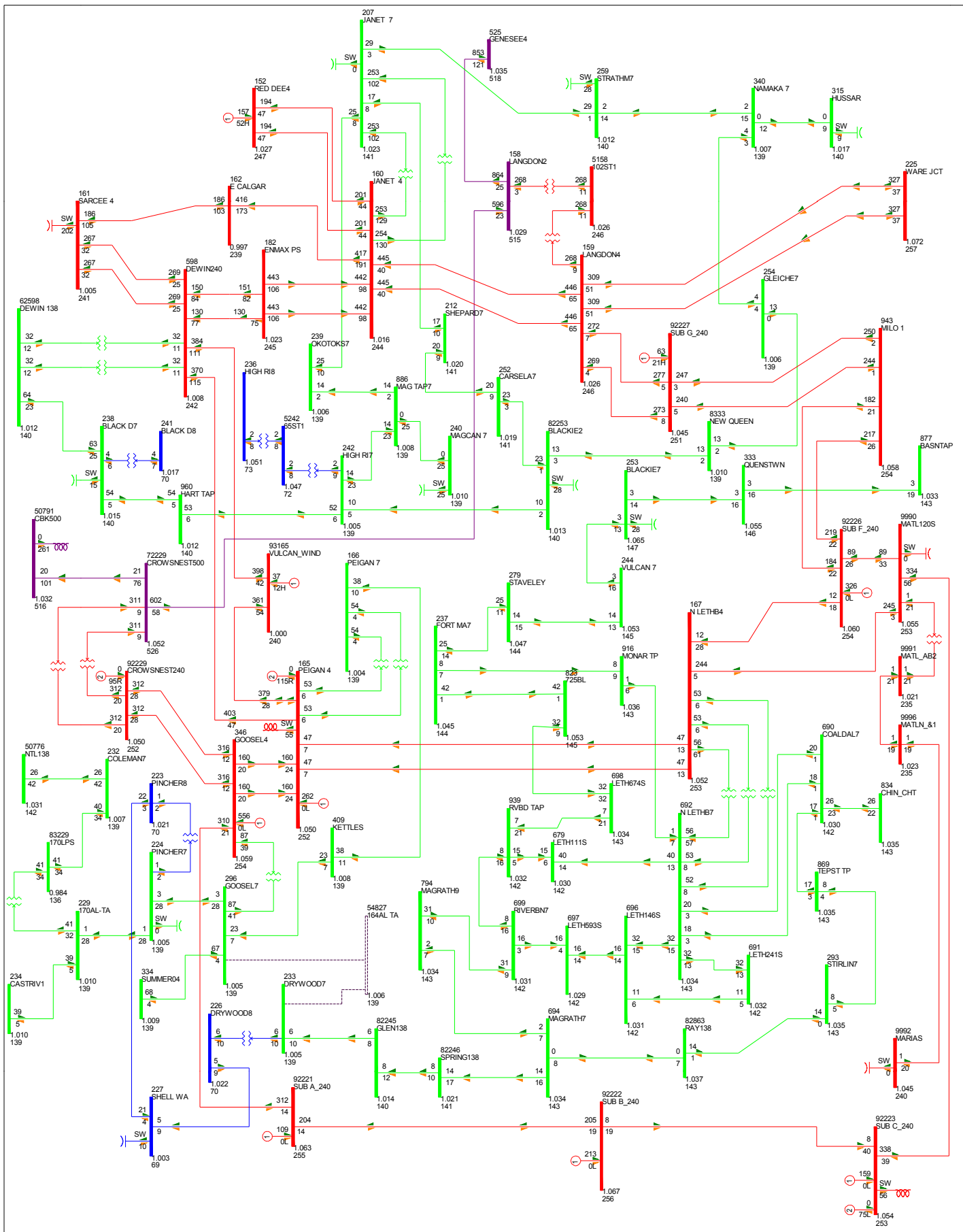


FIG 2017-1A-SP-48: GOOSELAKE TO DRYWOOD 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 16 MW

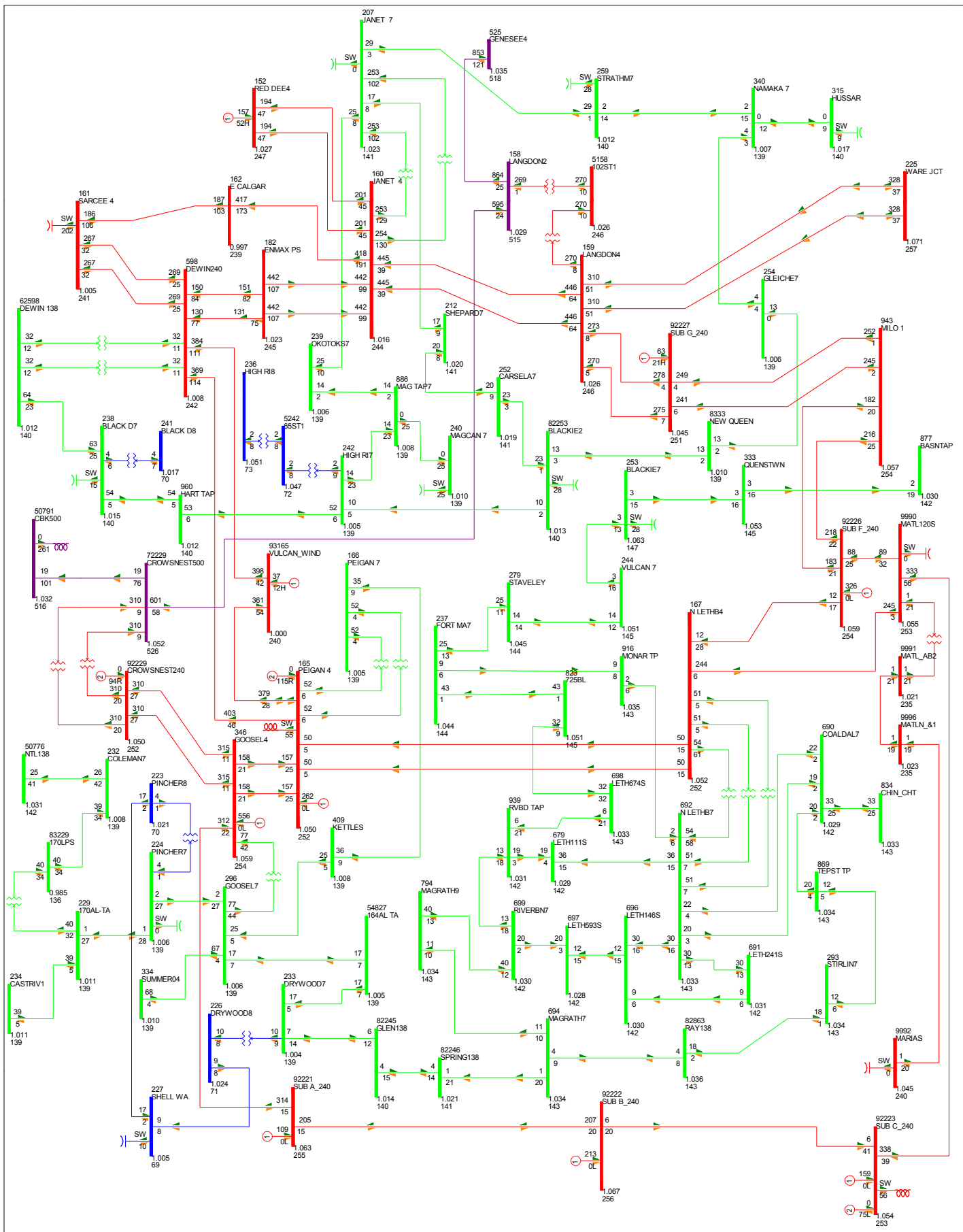


FIG 2017-1A-SP-50: WESTBROOKS TO TILLEY 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 ≤ 500.000 >500.000
 BC Export: 14 MW

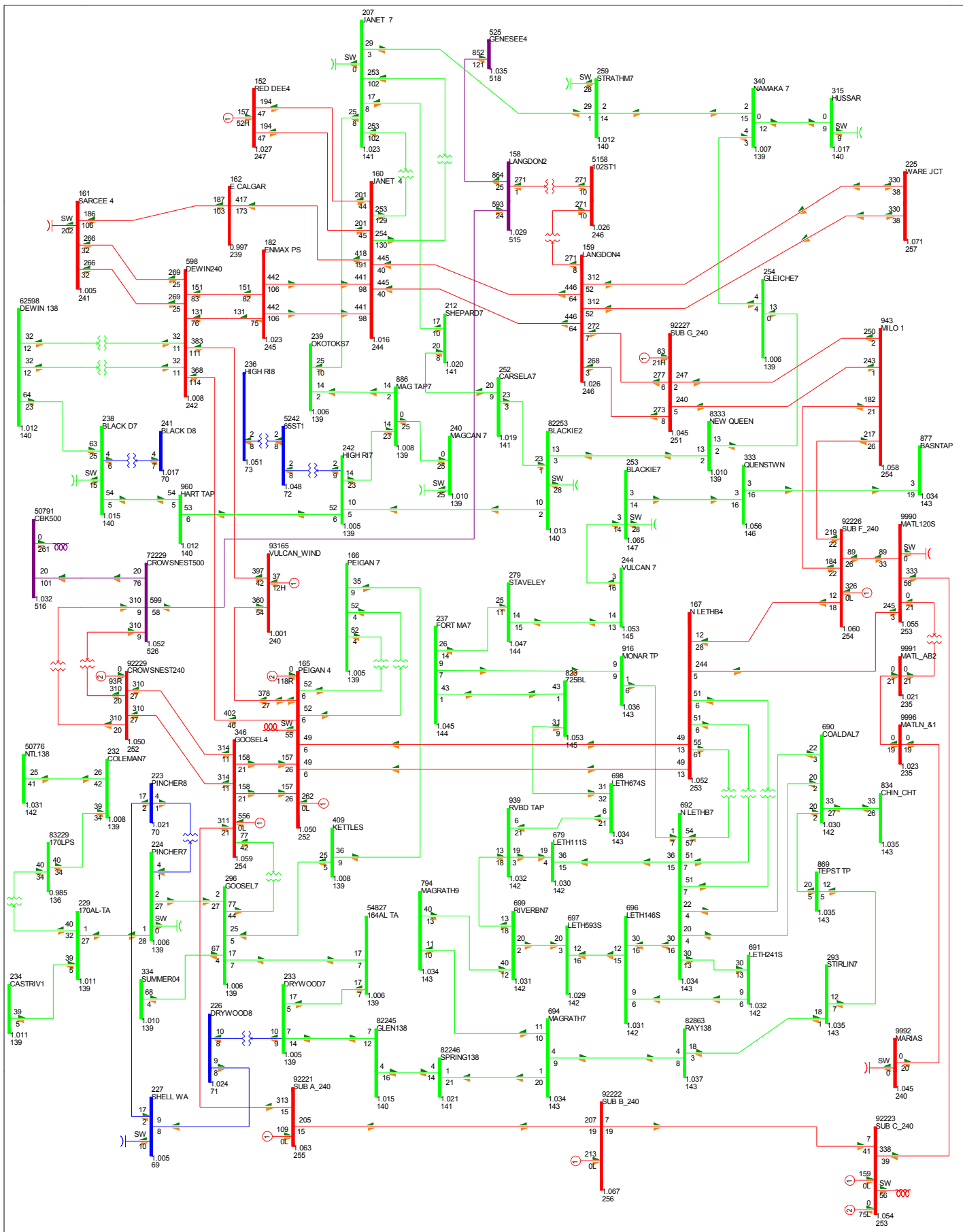


FIG 2017-1A-SP-52: MEDHAT TO CHAPPICE LAKE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

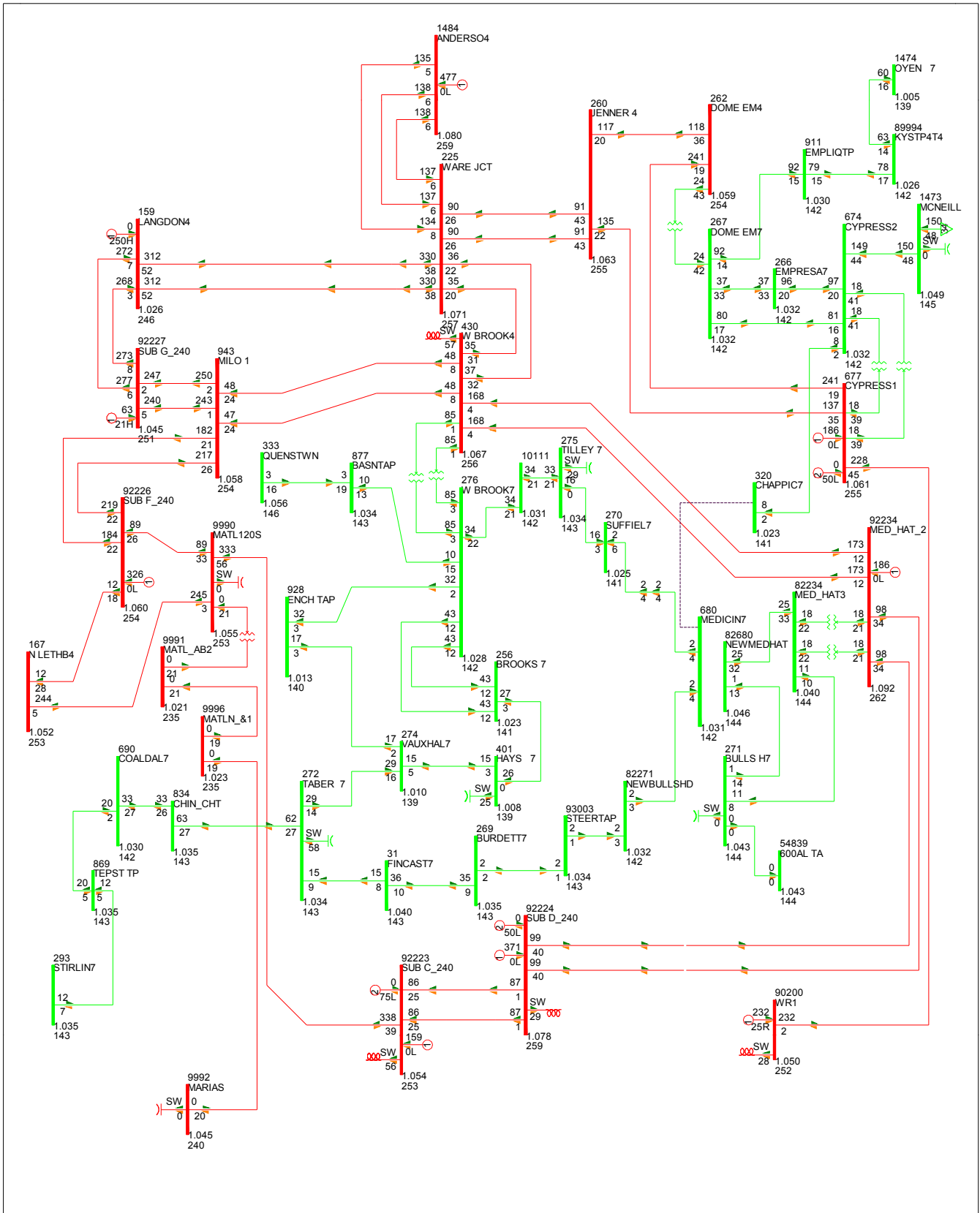


FIG 2017-1A-SP-53: MEDHAT TO CHAPPICE LAKE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

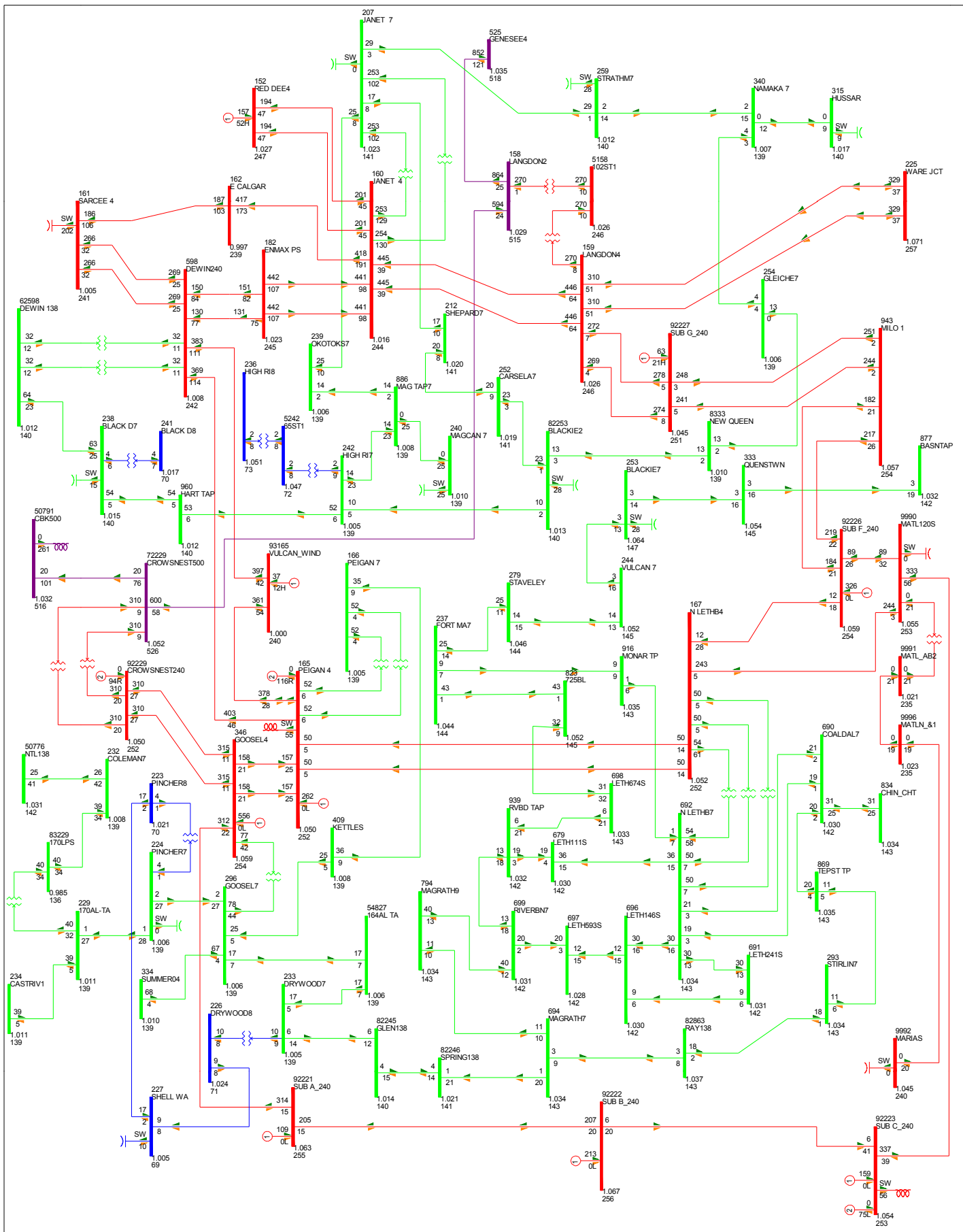


FIG 2017-1A-SP-54: MEDHAT TO BURDETTE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

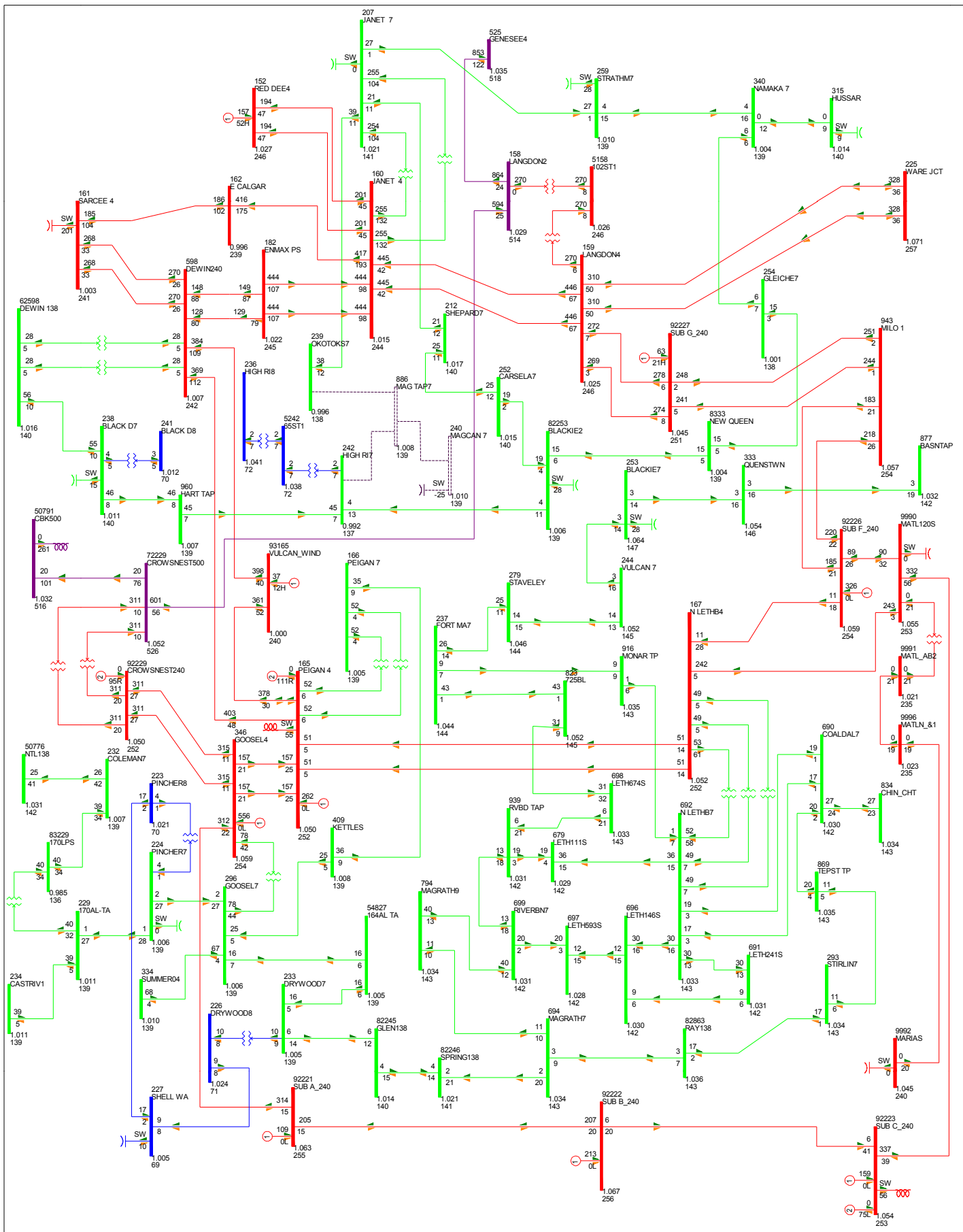


FIG 2017-1A-SP-56: HIGH RIVER TO OKOTOKS 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

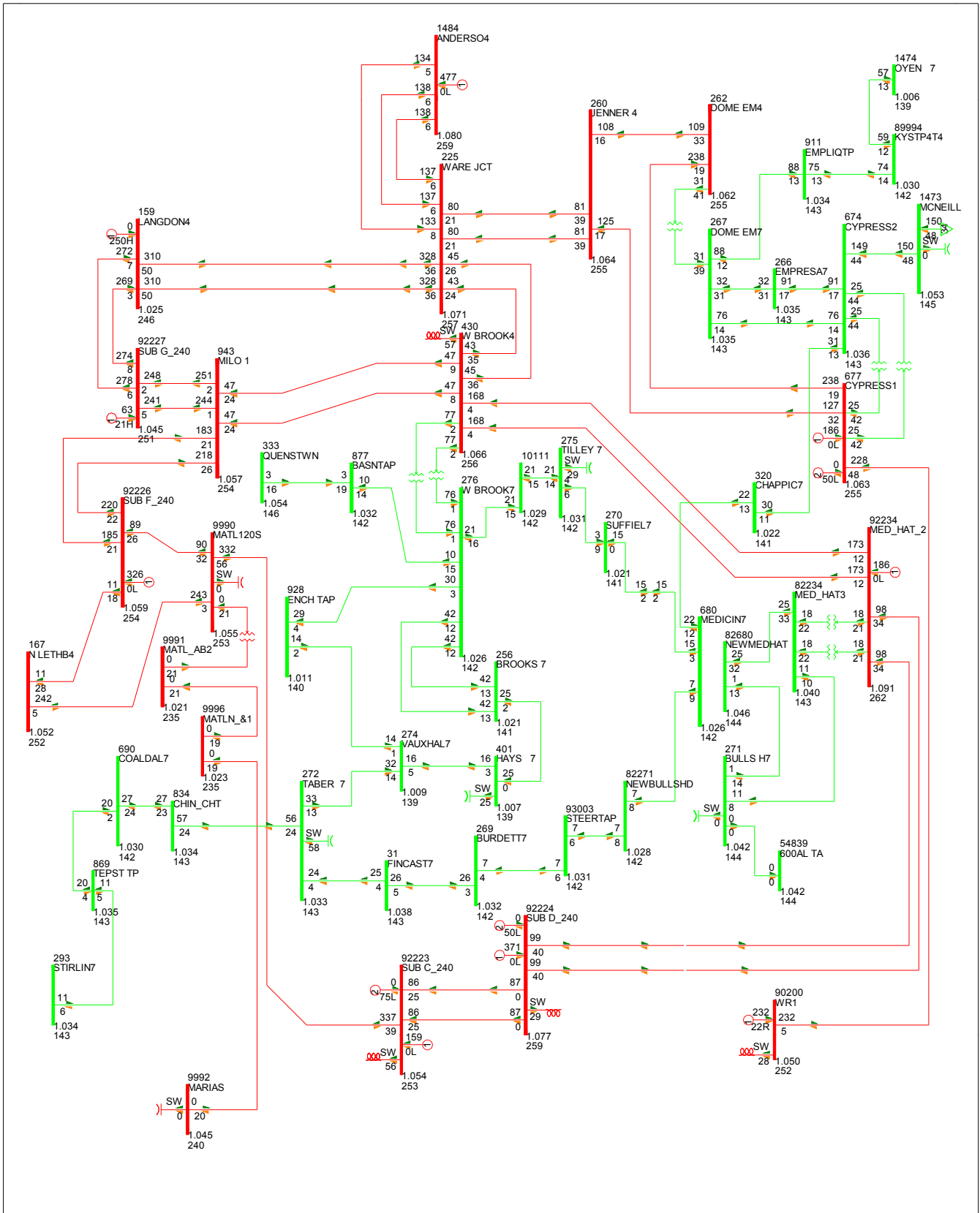


FIG 2017-1A-SP-57: HIGH RIVER TO OKOTOKS 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 15 MW

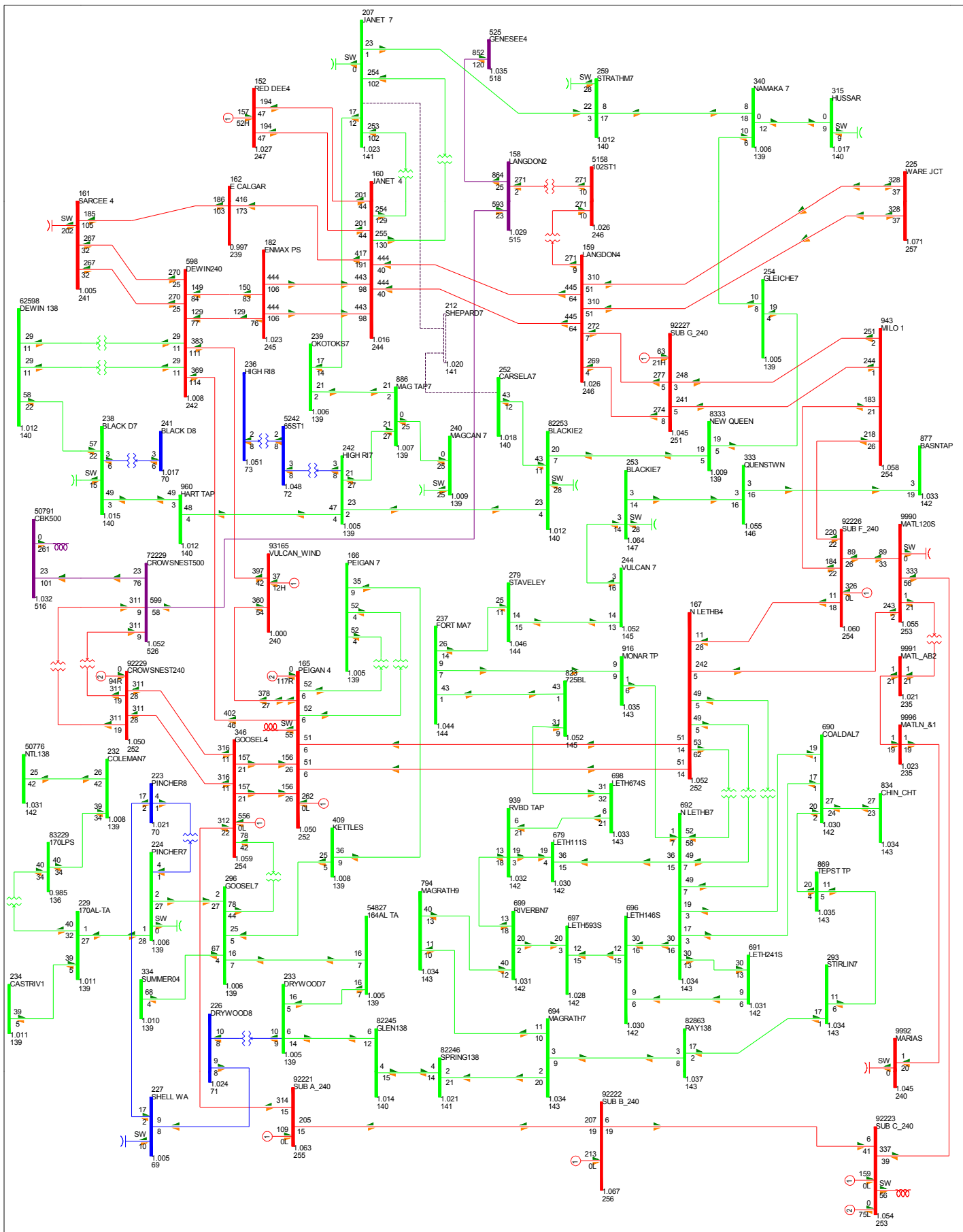


FIG 2017-1A-SP-58: JANET TO CARSELAND 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, DEC 01 2008 16:15

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 18 MW

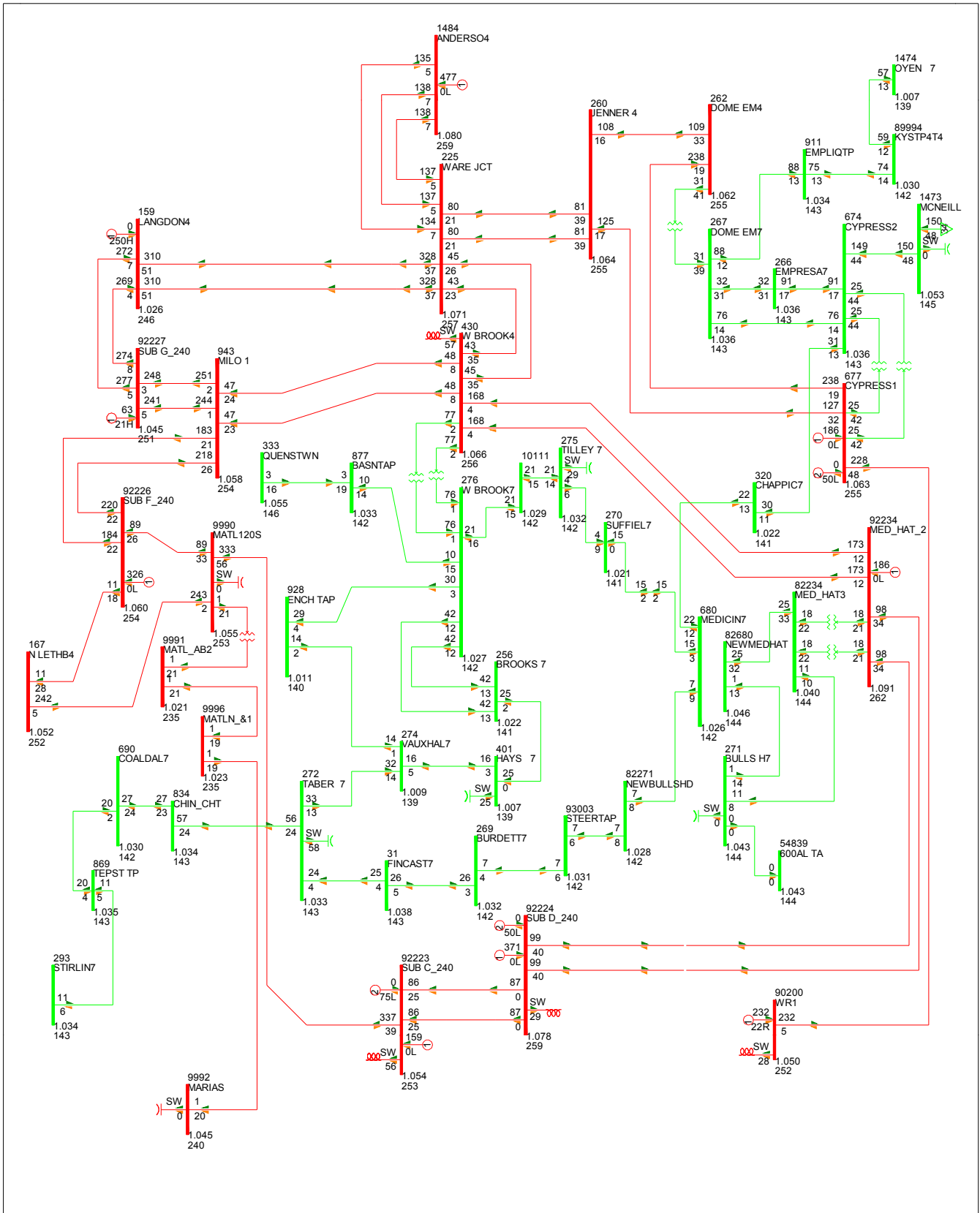


FIG 2017-1A-SP-59: JANET TO CARSELAND 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, DEC 01 2008 16:15

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 18 MW

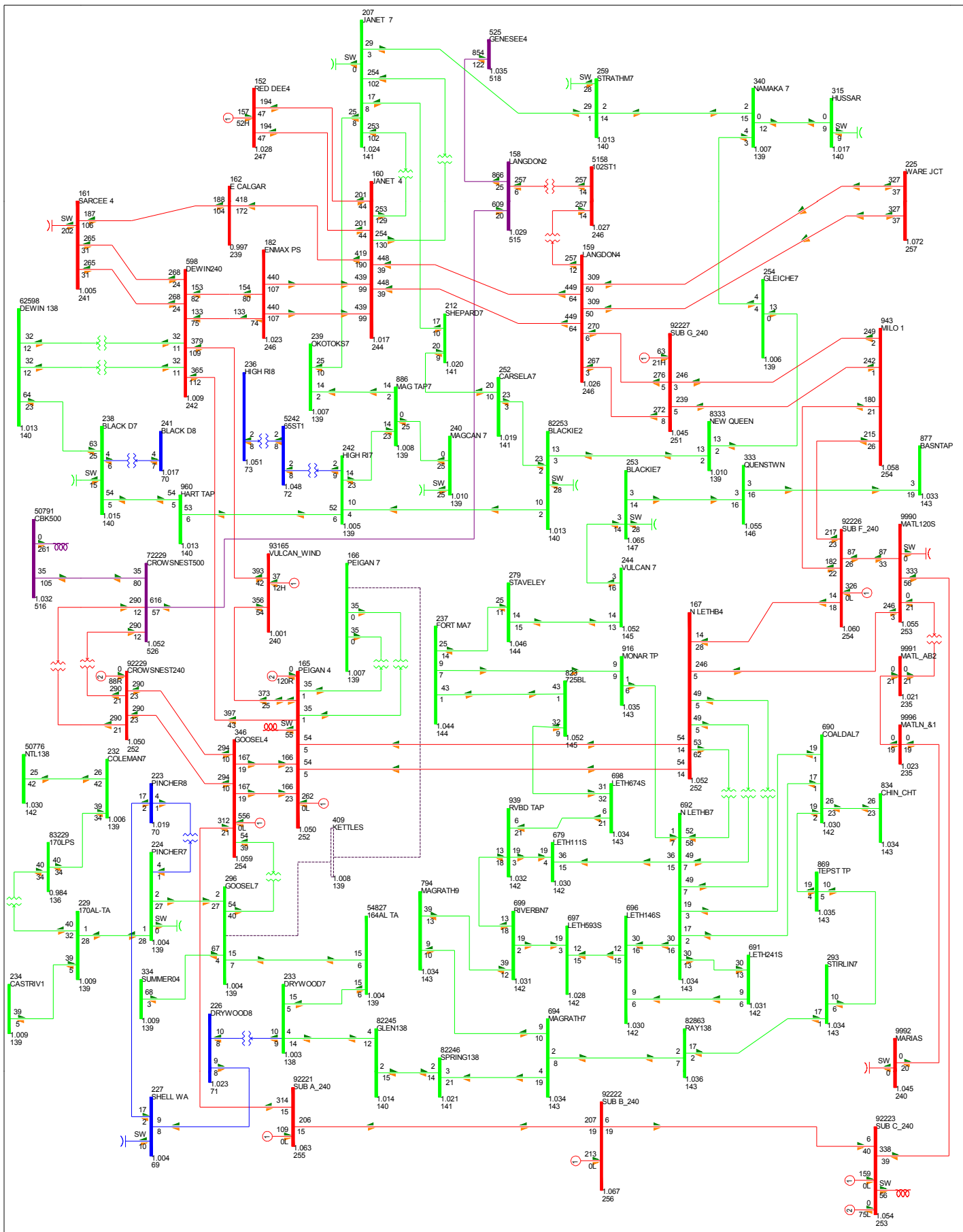


FIG 2017-1A-SP-62: PEIGAN TO GOOSELAKE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -42 MW

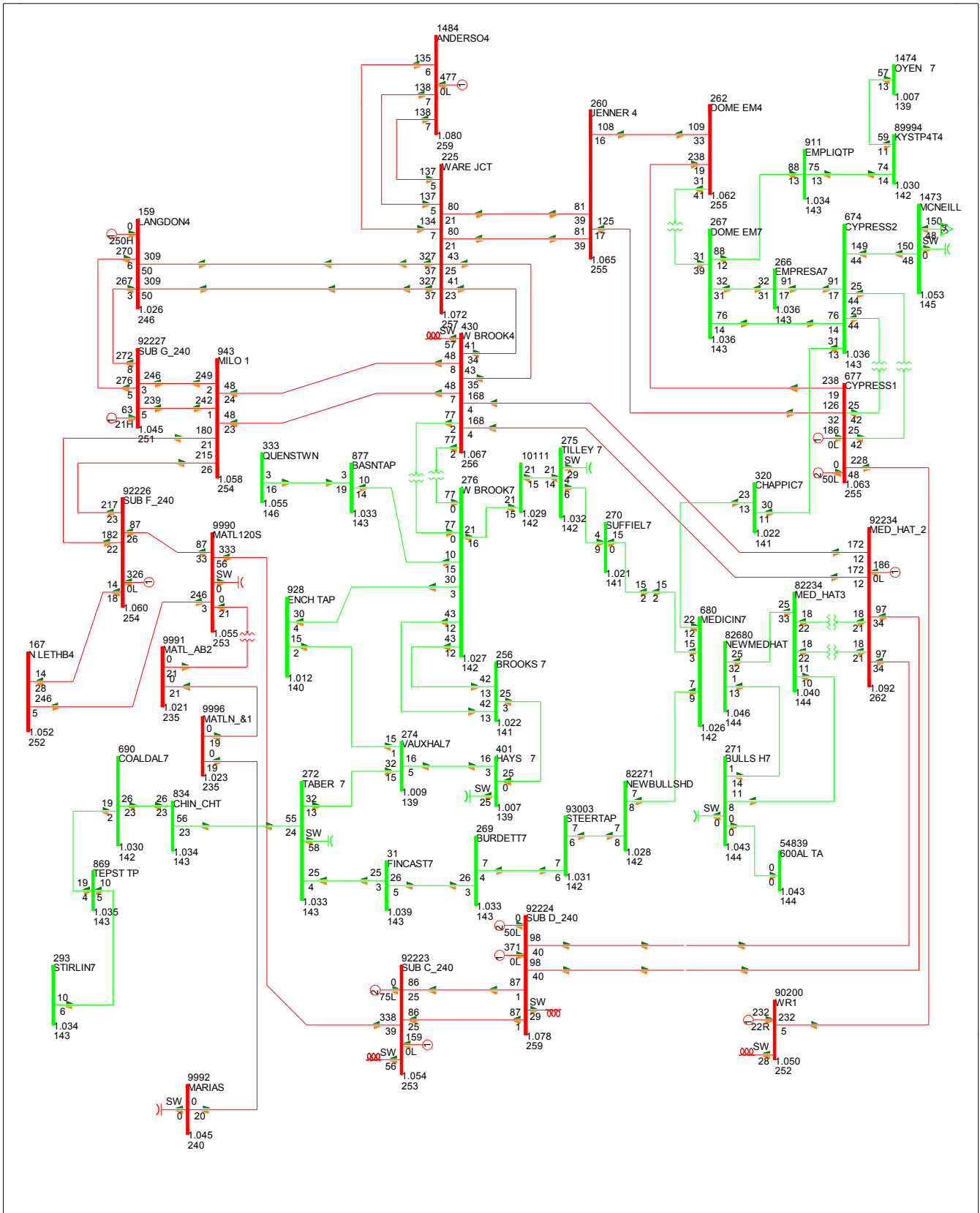


FIG 2017-1A-SP-63: PEIGAN TO GOOSELAKE 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -42 MW

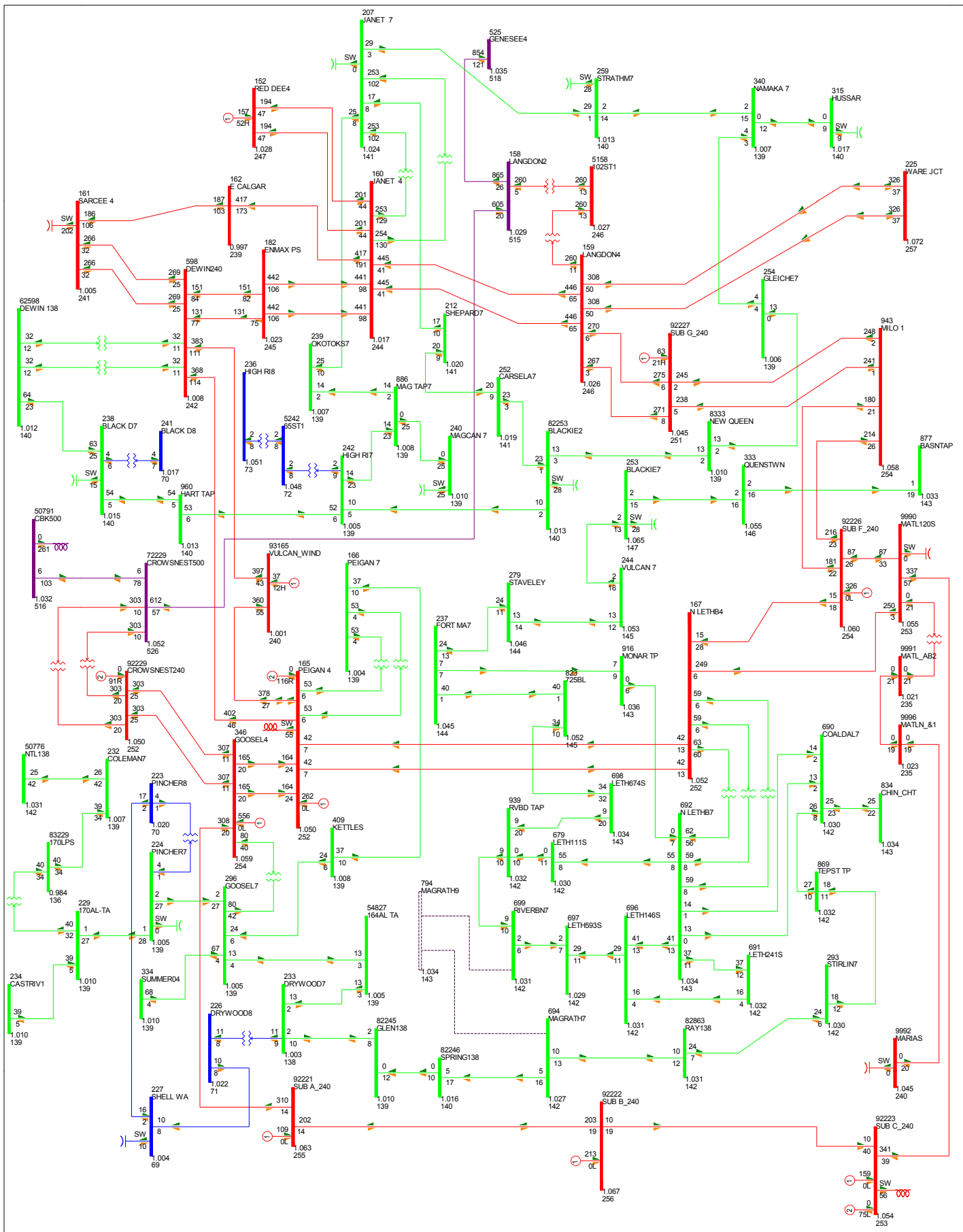


FIG 2017-1A-SP-64: MAGRATH TO RIVERBEND 138 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -12 MW

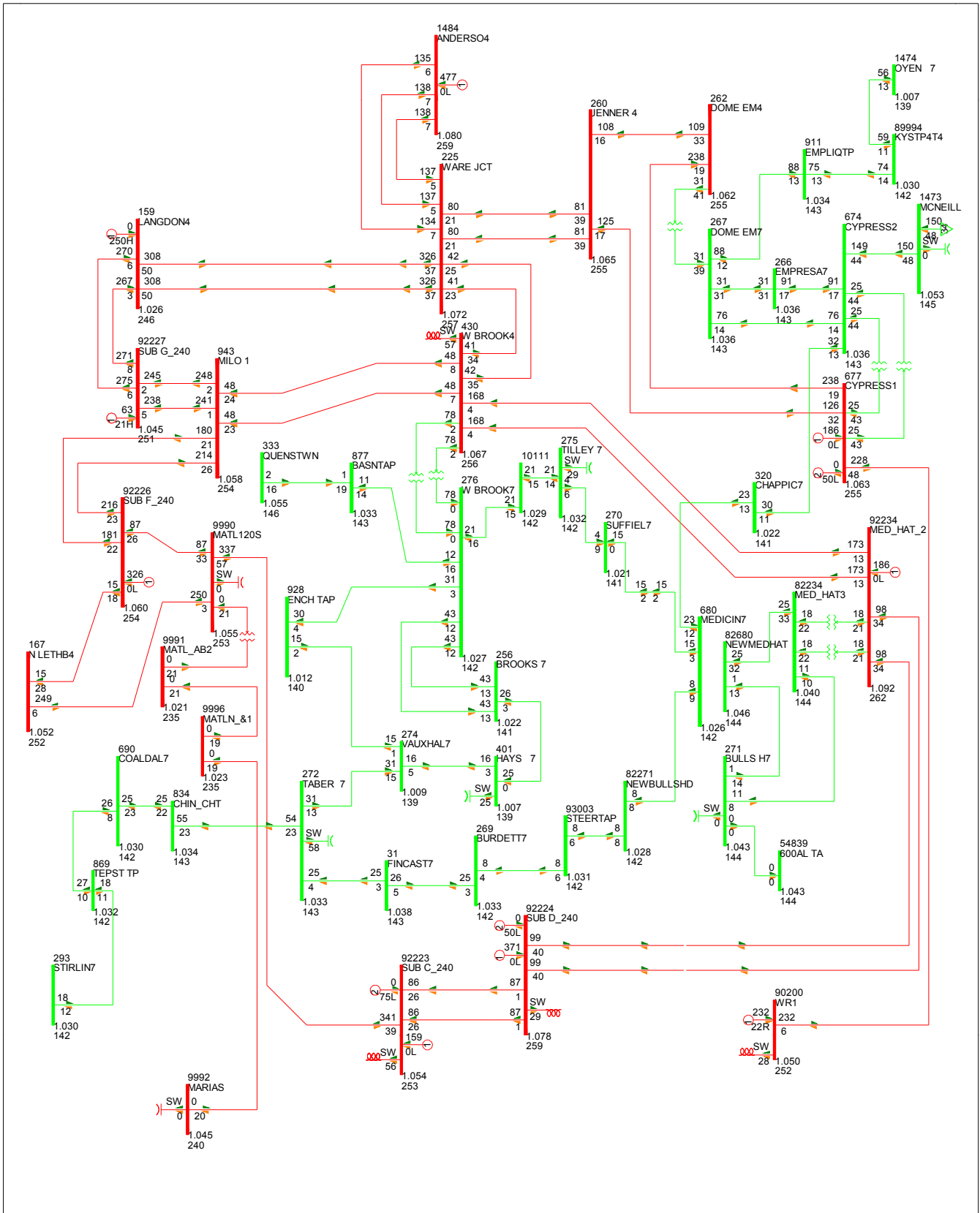


FIG 2017-1A-SP-65: MAGRATH TO RIVERBEND 138 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:41

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -12 MW

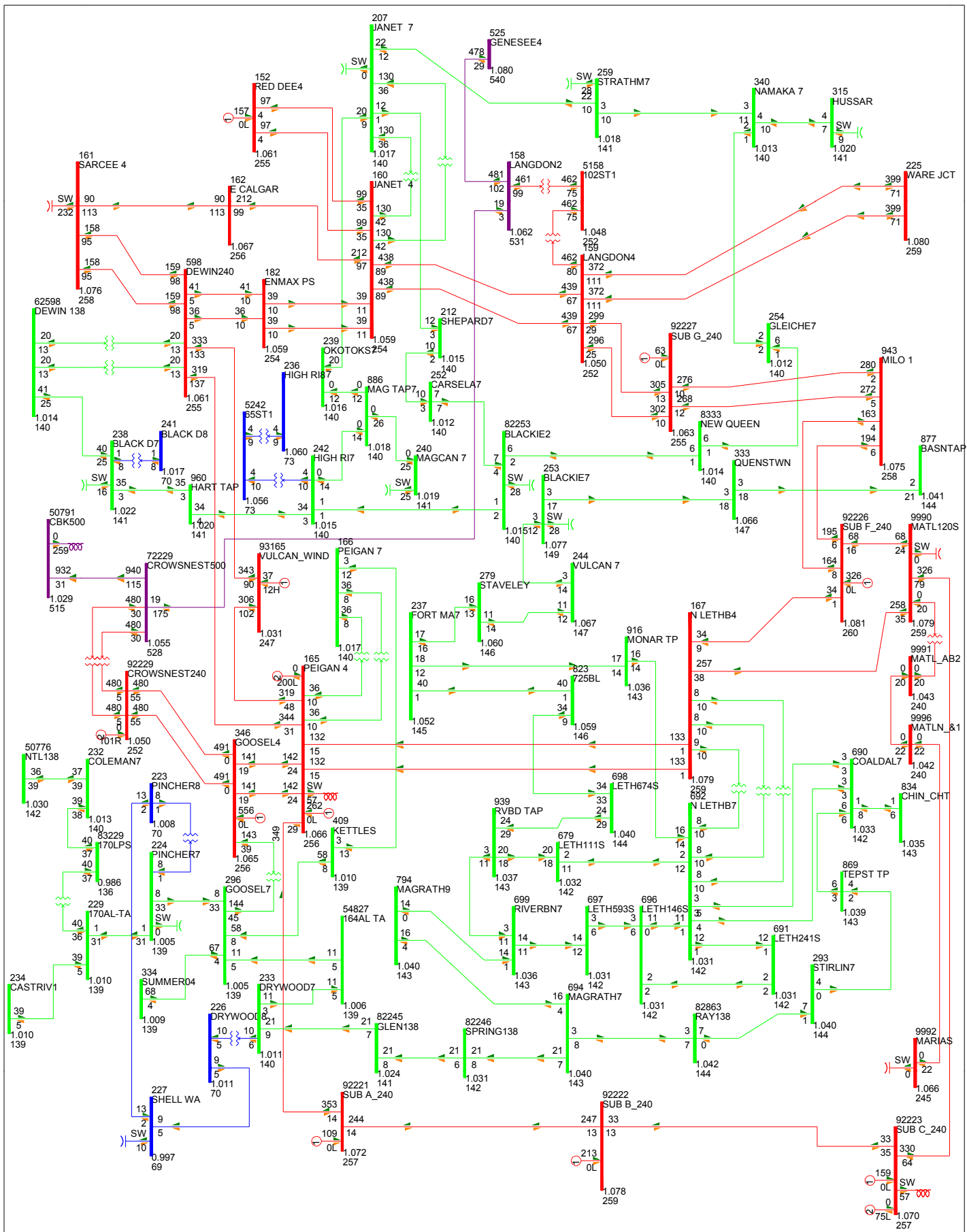


FIG 2017-1B-SL-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

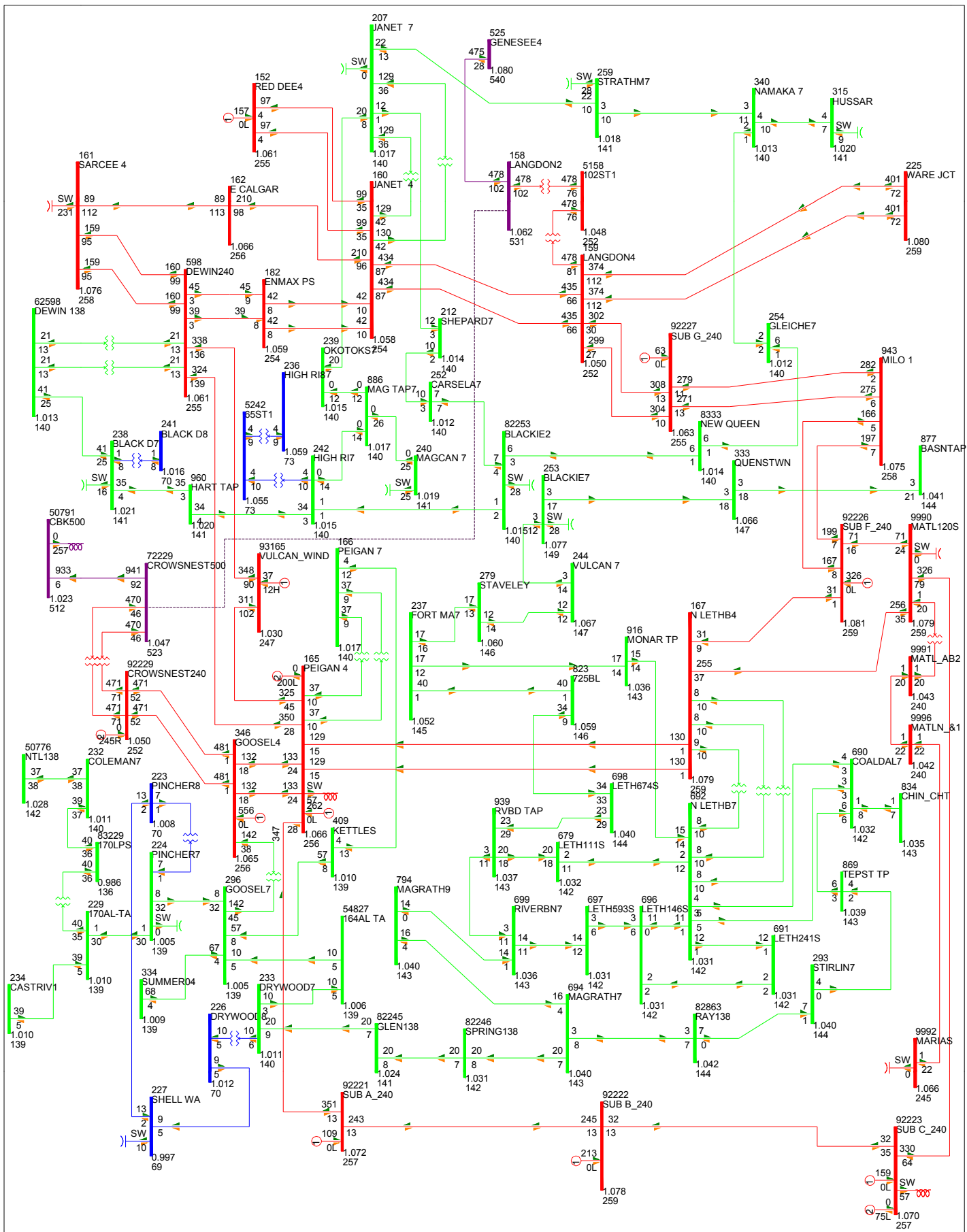


FIG 2017-1B-SL-4: LANGDON TO CROWNSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:11

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

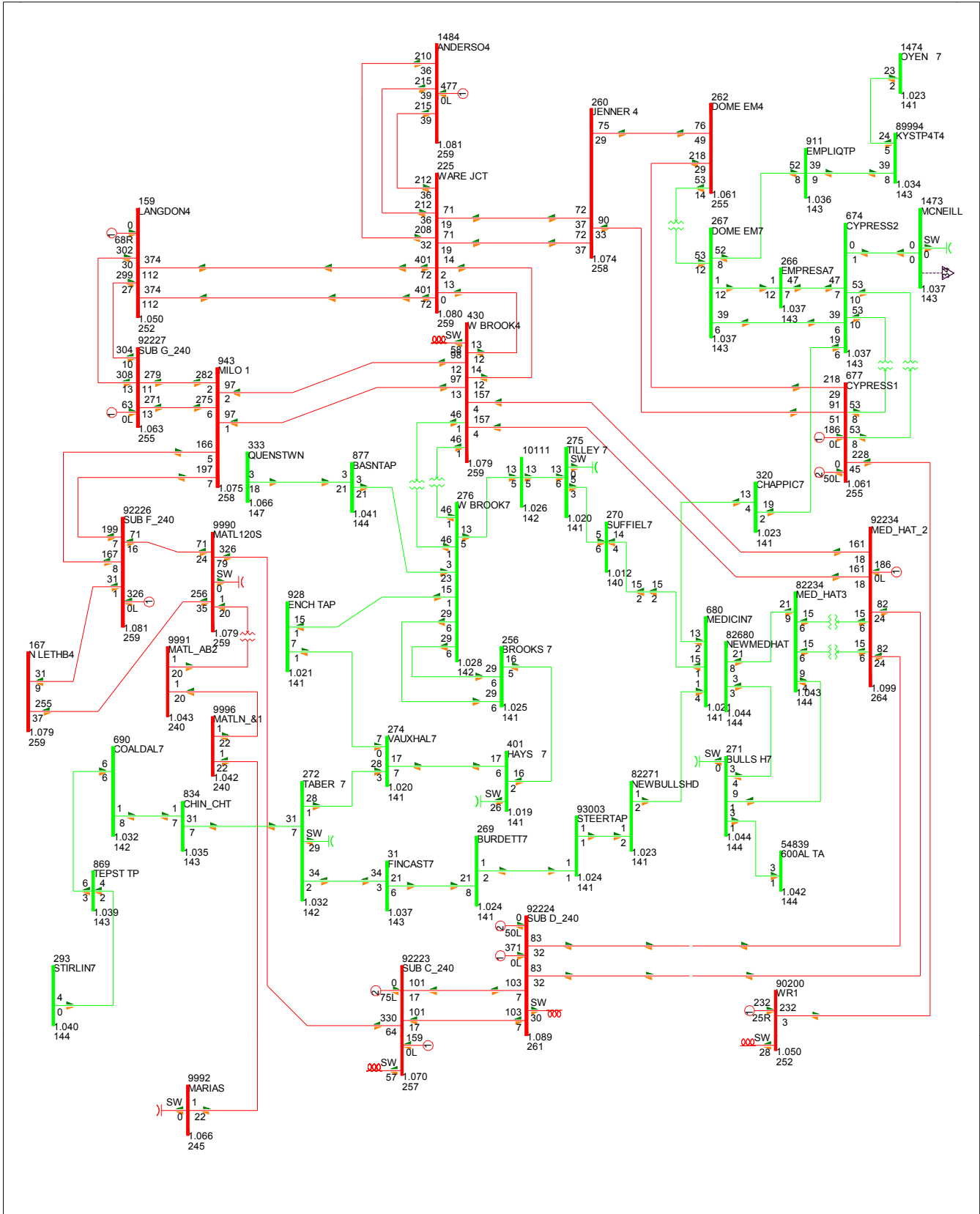


FIG 2017-1B-SL-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:11

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

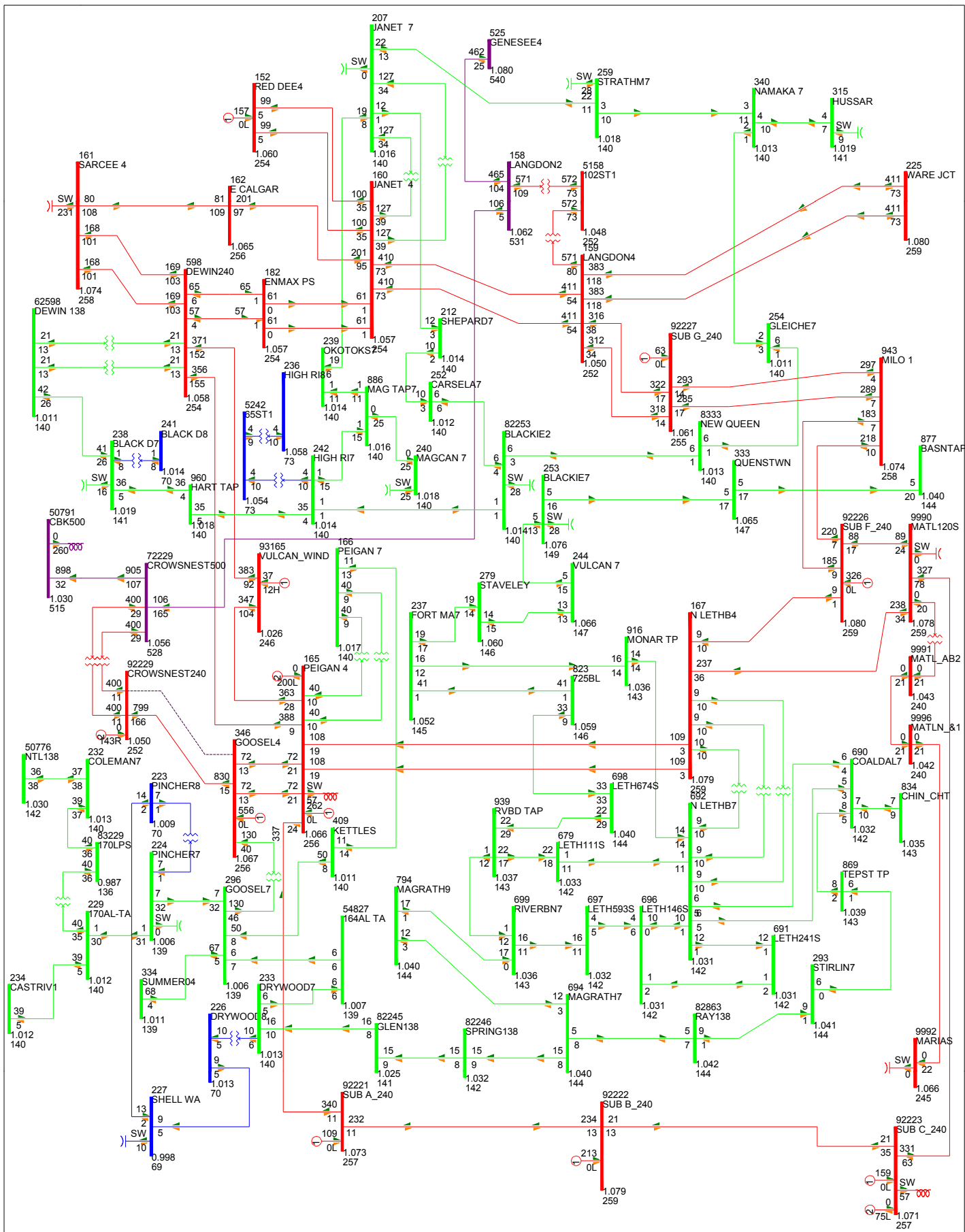


FIG 2017-1B-SL-6: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:41

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 970 MW

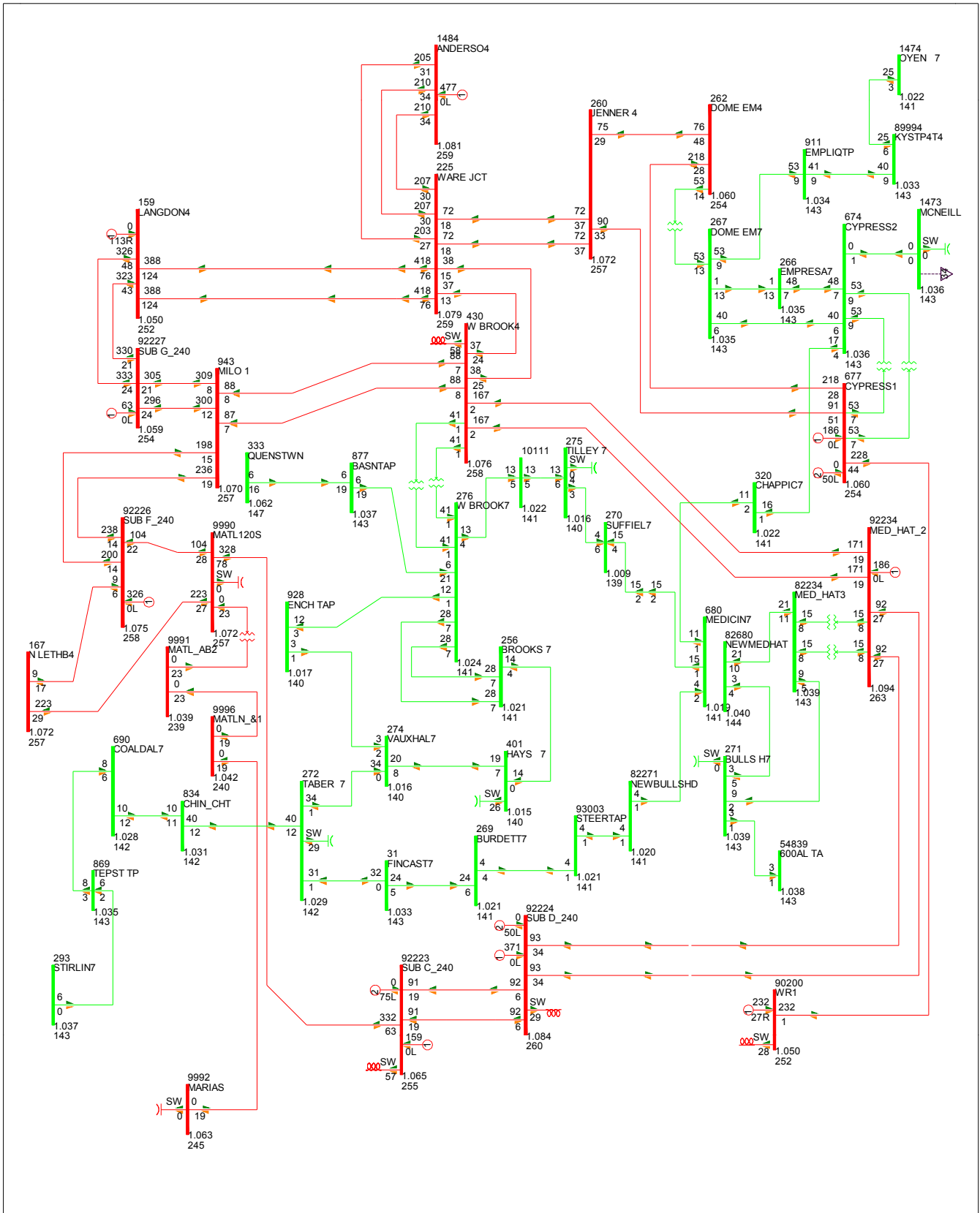


FIG 2017-1B-SL-11: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 986 MW

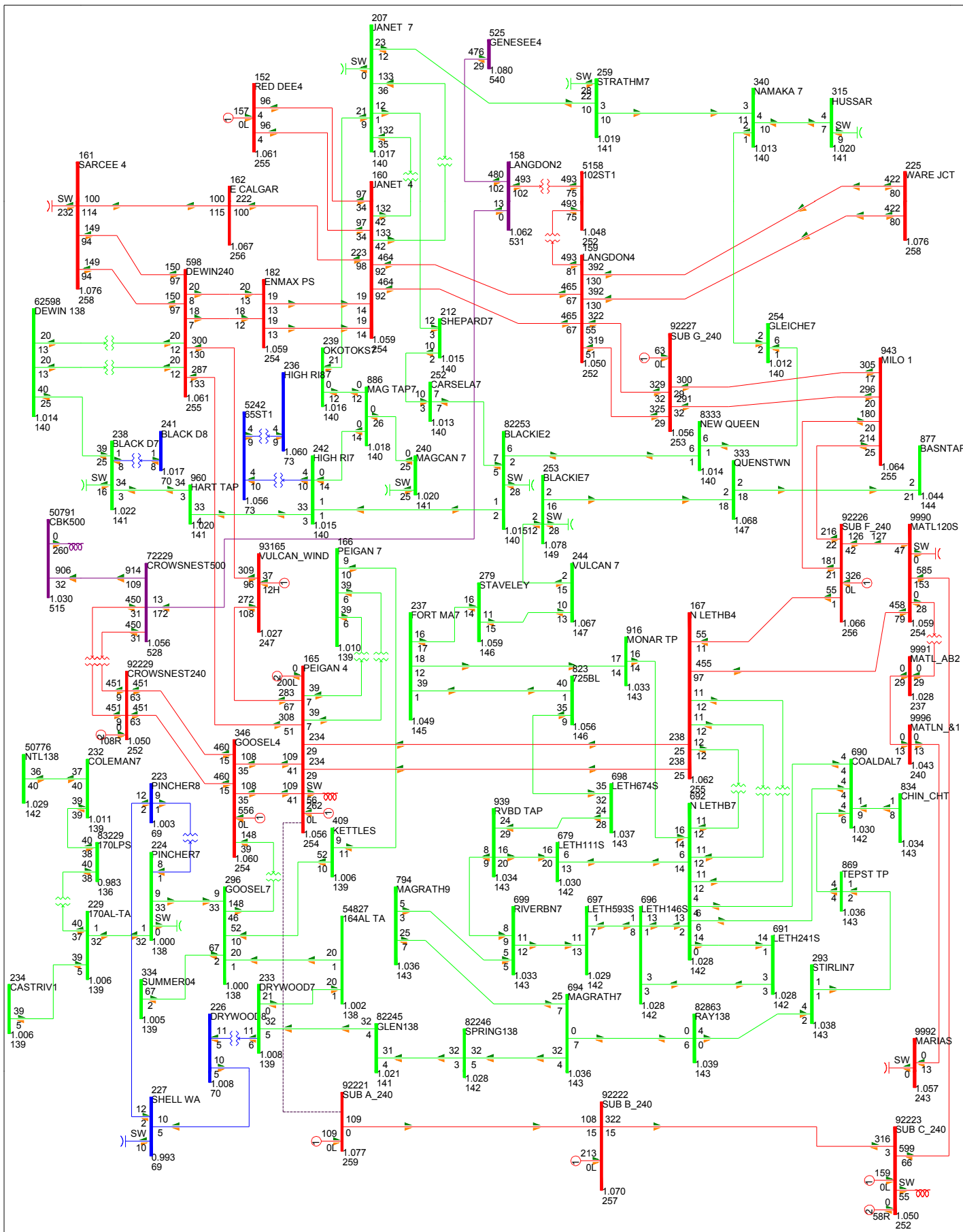


FIG 2017-1B-SL-12: PEIGAN TO SUB A 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR

100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 974 MW

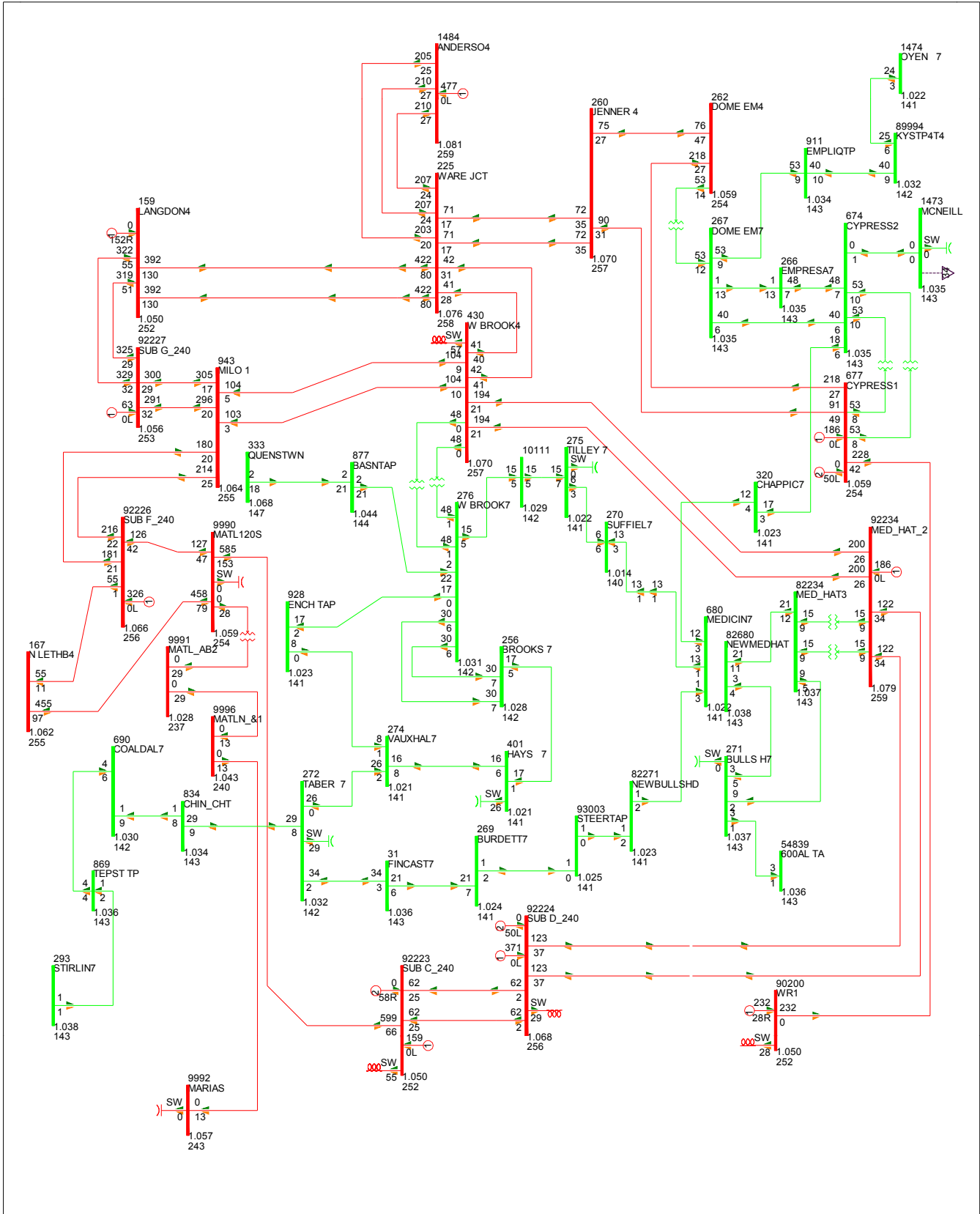


FIG 2017-1B-SL-13: PEIGAN TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 974 MW

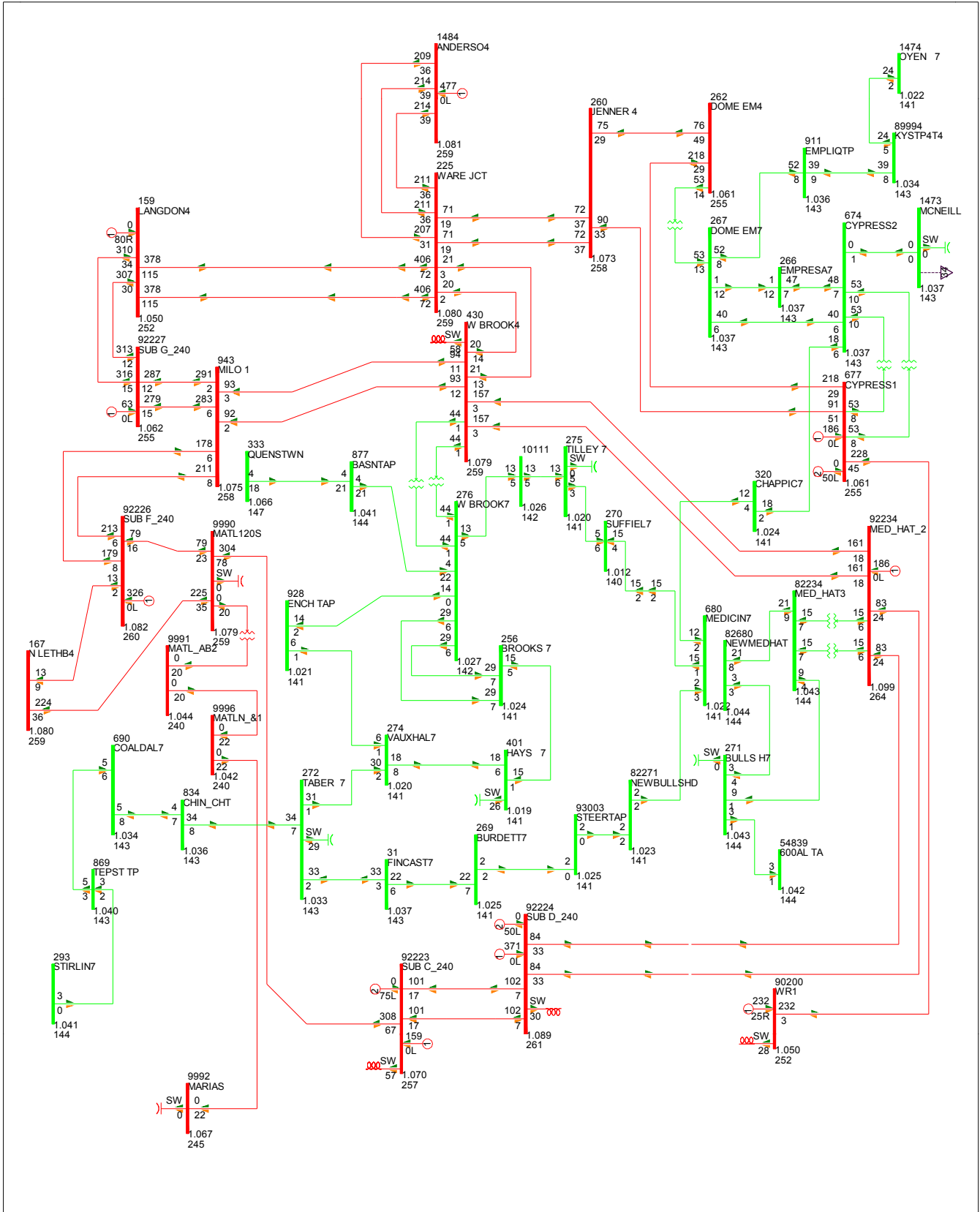


FIG 2017-1B-SL-15: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 998 MW

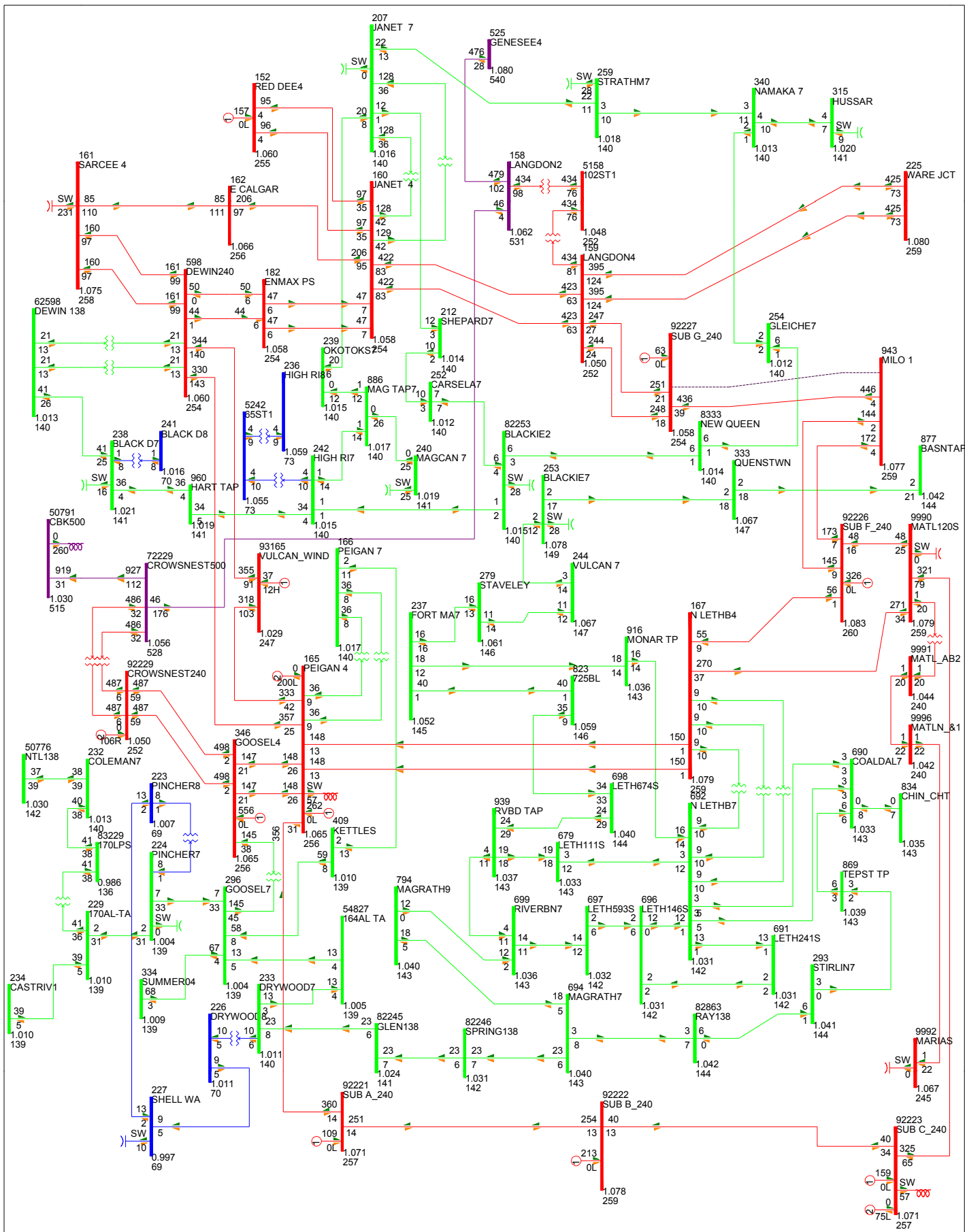


FIG 2017-1B-SL-16: MILO TO SUB G 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR

100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 986 MW

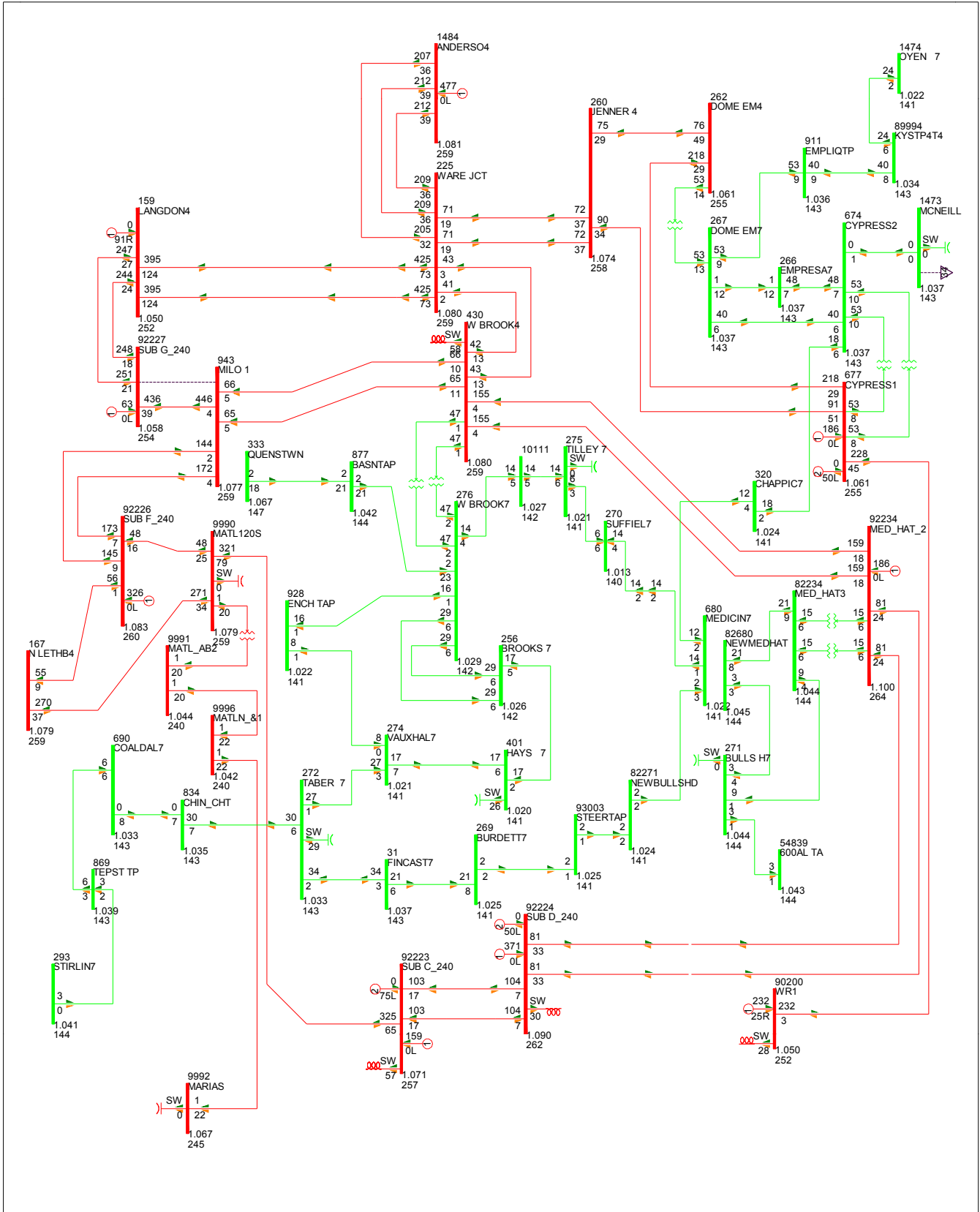


FIG 2017-1B-SL-17: MILO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 986 MW

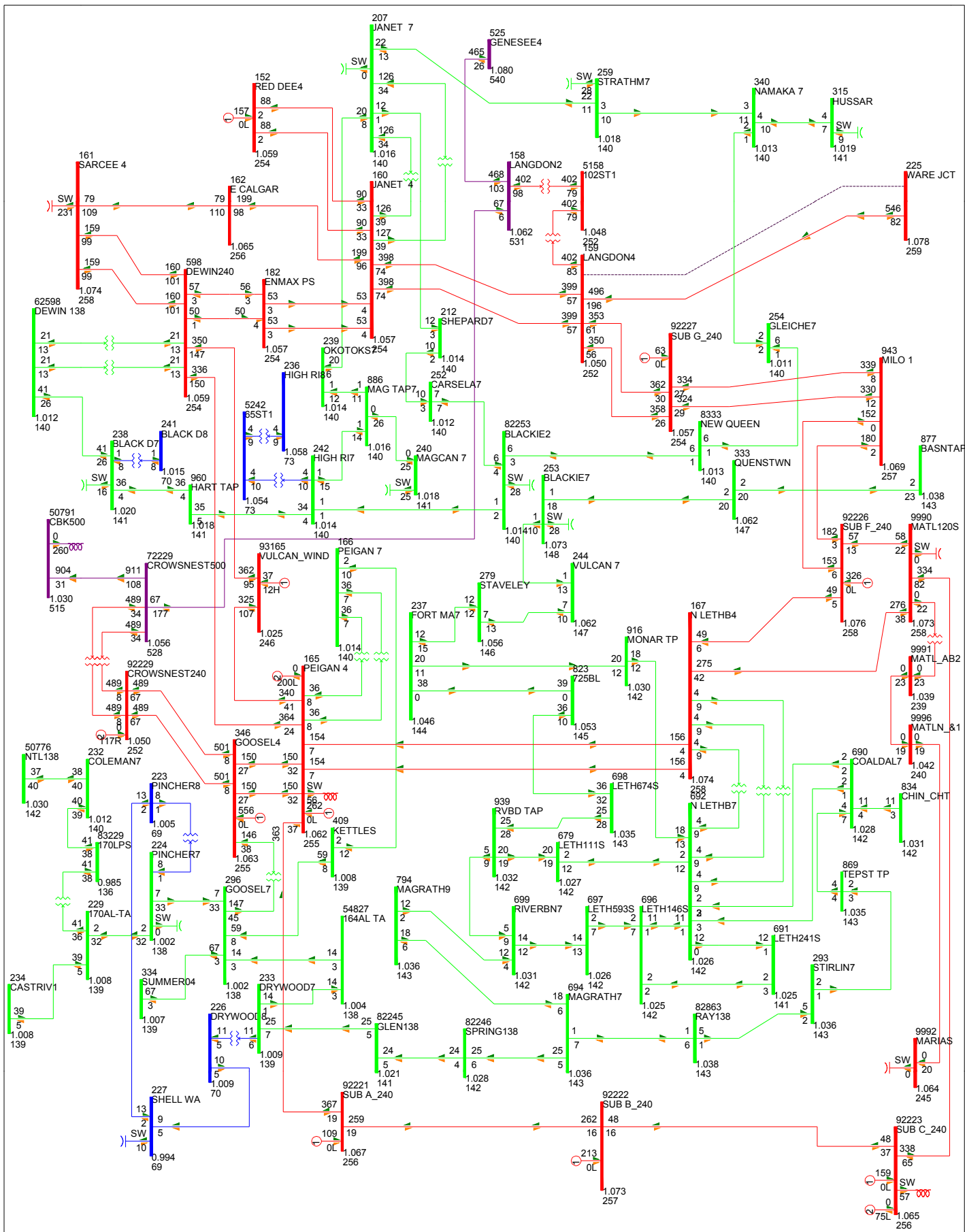


FIG 2017-1B-SL-18: WAREJUNC TO LANGDON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=240.000 <=500.000 >500.000
 BC Export: 970 MW

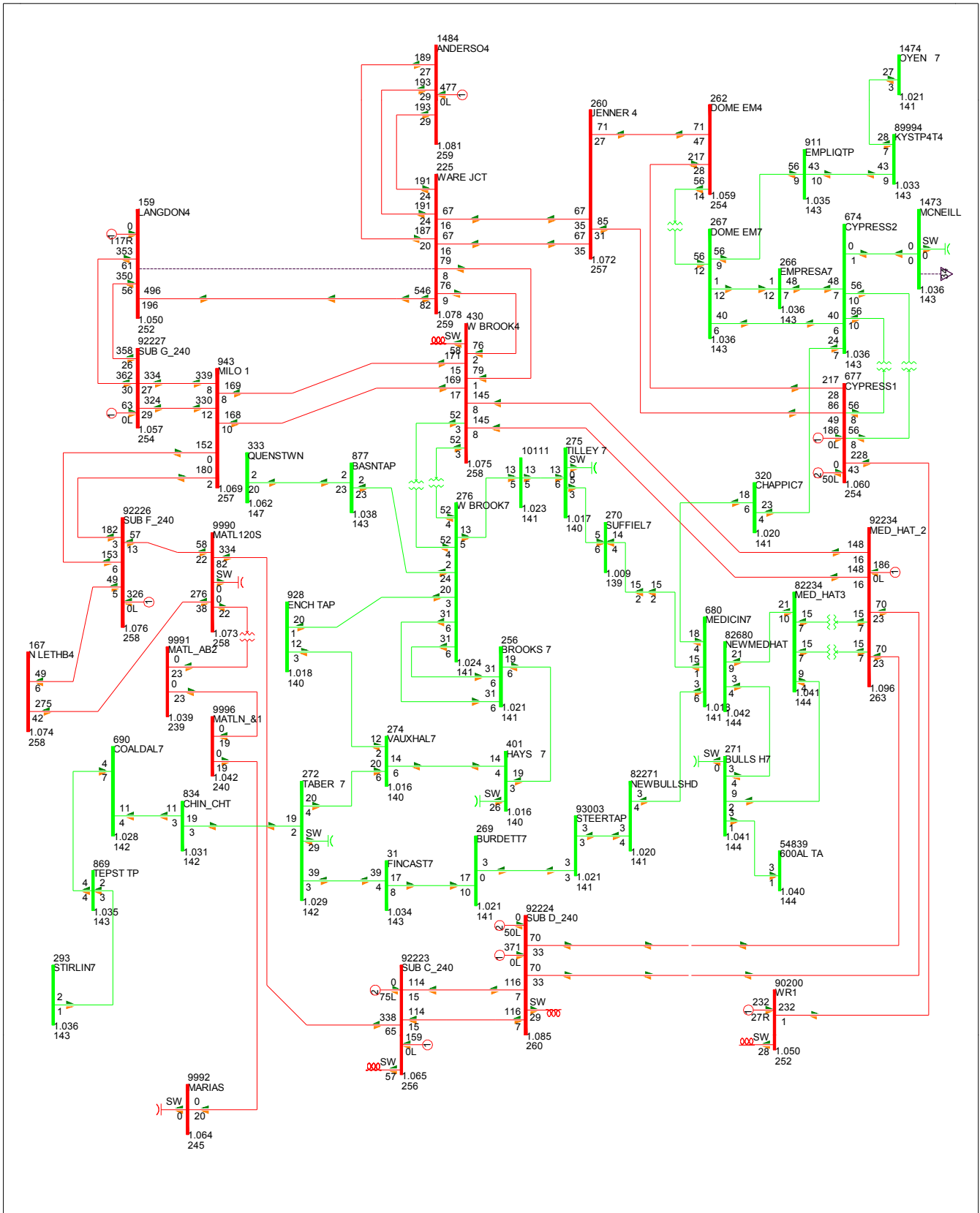


FIG 2017-1B-SL-19: WAREJUNC TO LANGDON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 ≤ 500.000 > 500.000
 BC Export: 970 MW

GENERATION DISPATCH REPORT

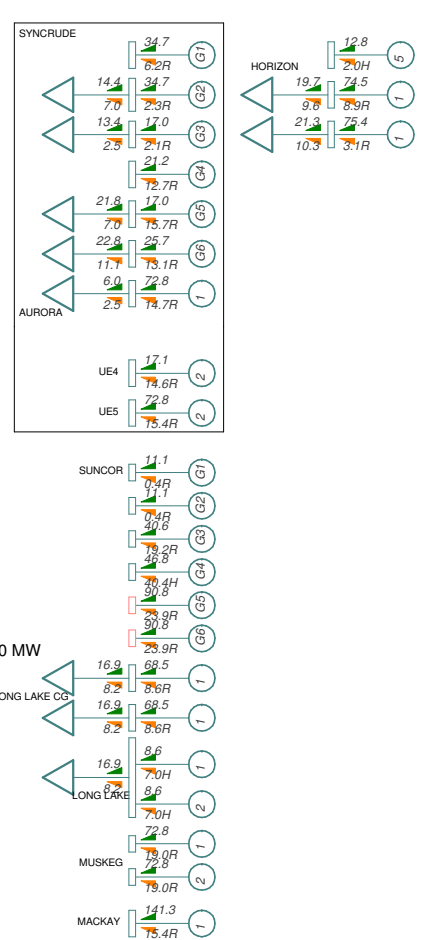
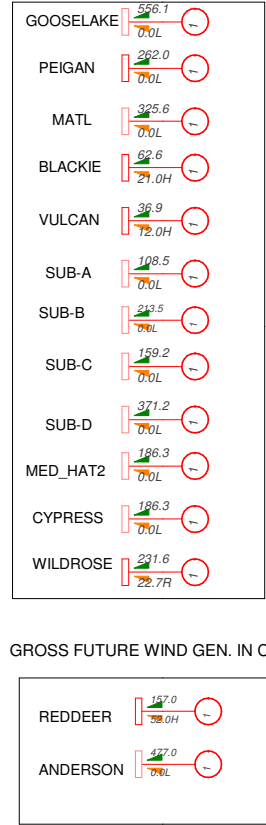
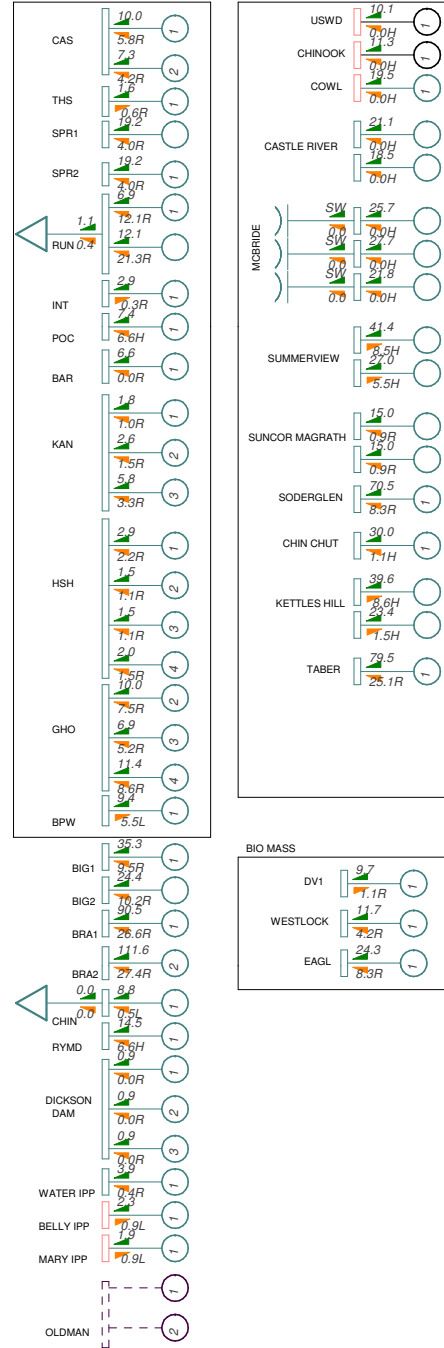
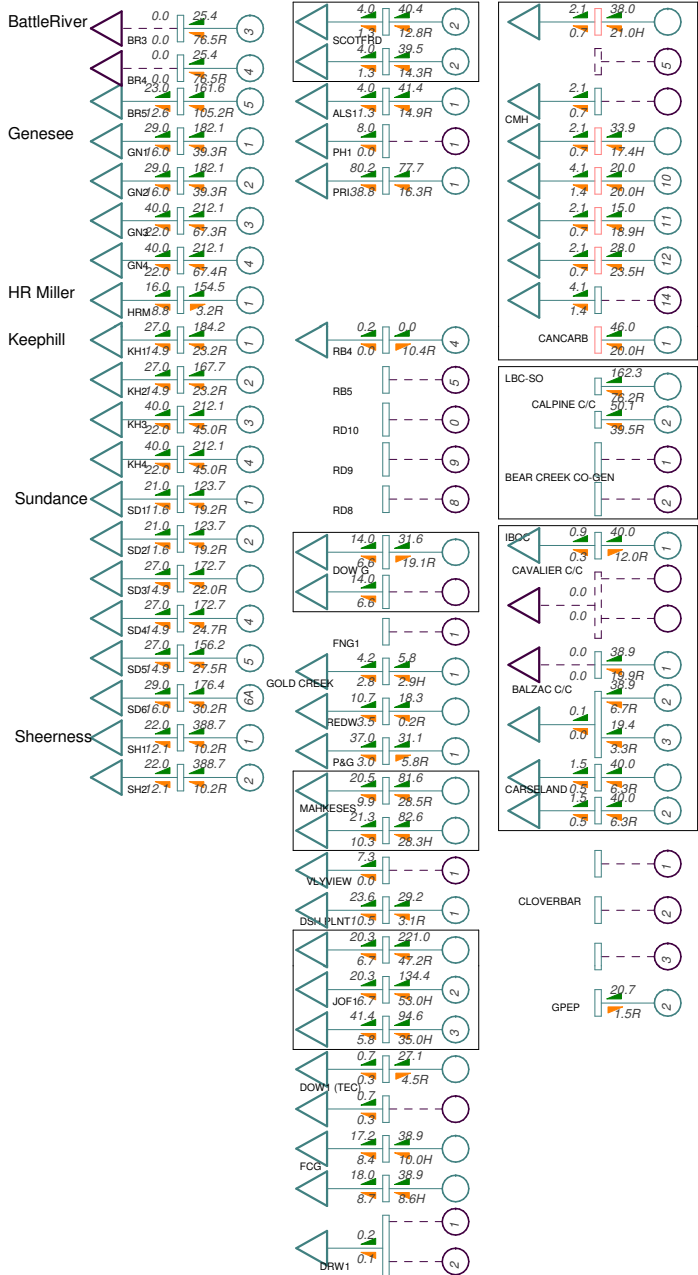
GROSS COAL GEN. 3634.3 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.



2017 SUMMER PEAK CASE
MON, NOV 24 2008 14:43

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
100.0%PATEA
1.050OV 0.950UV
KV: <=25.000 <=34.500 <=69.000 <=138.000 <=240.000 >240.000

Fig 2017-1B-SP-1

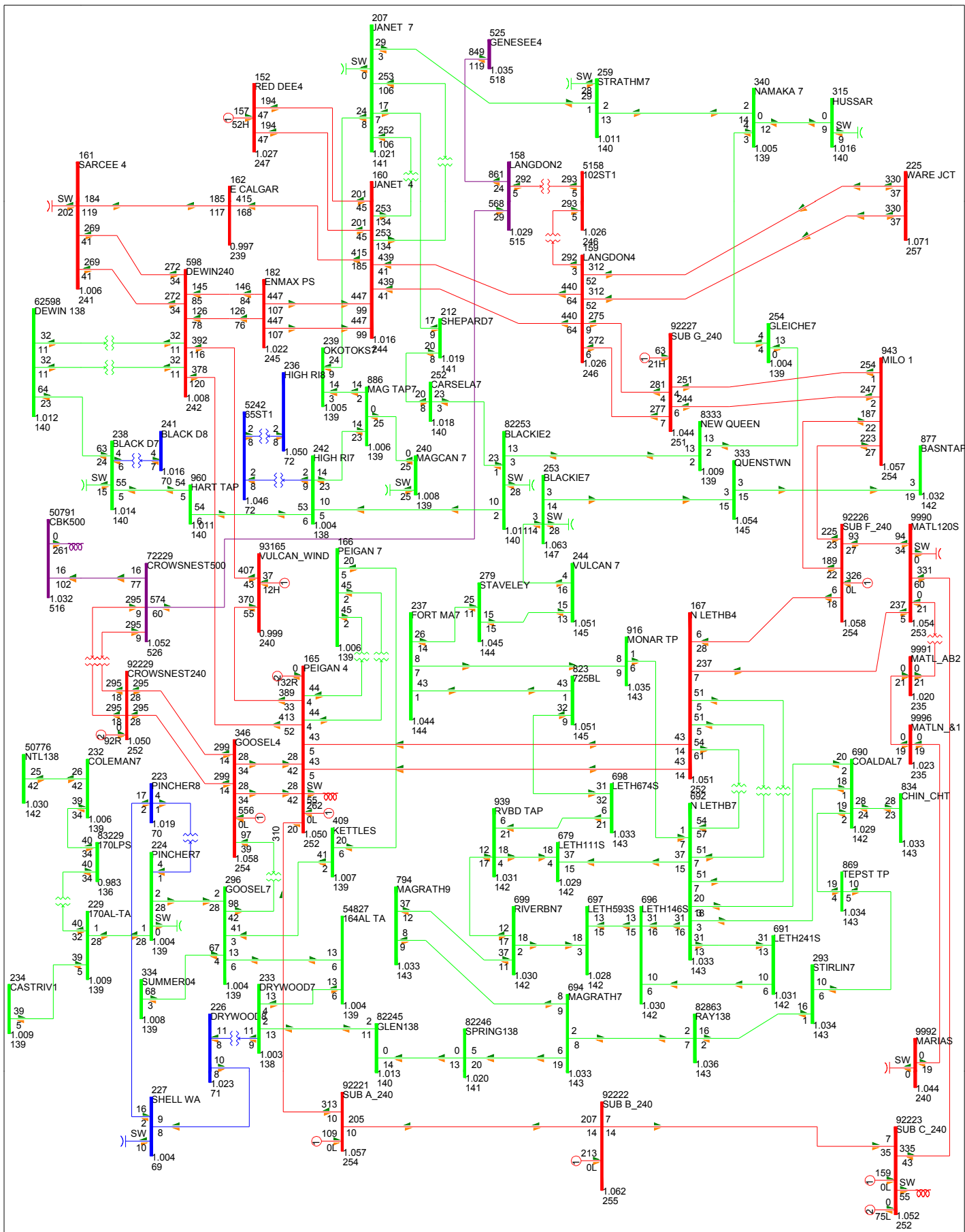


FIG 2017-1B-SP-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 11 MW

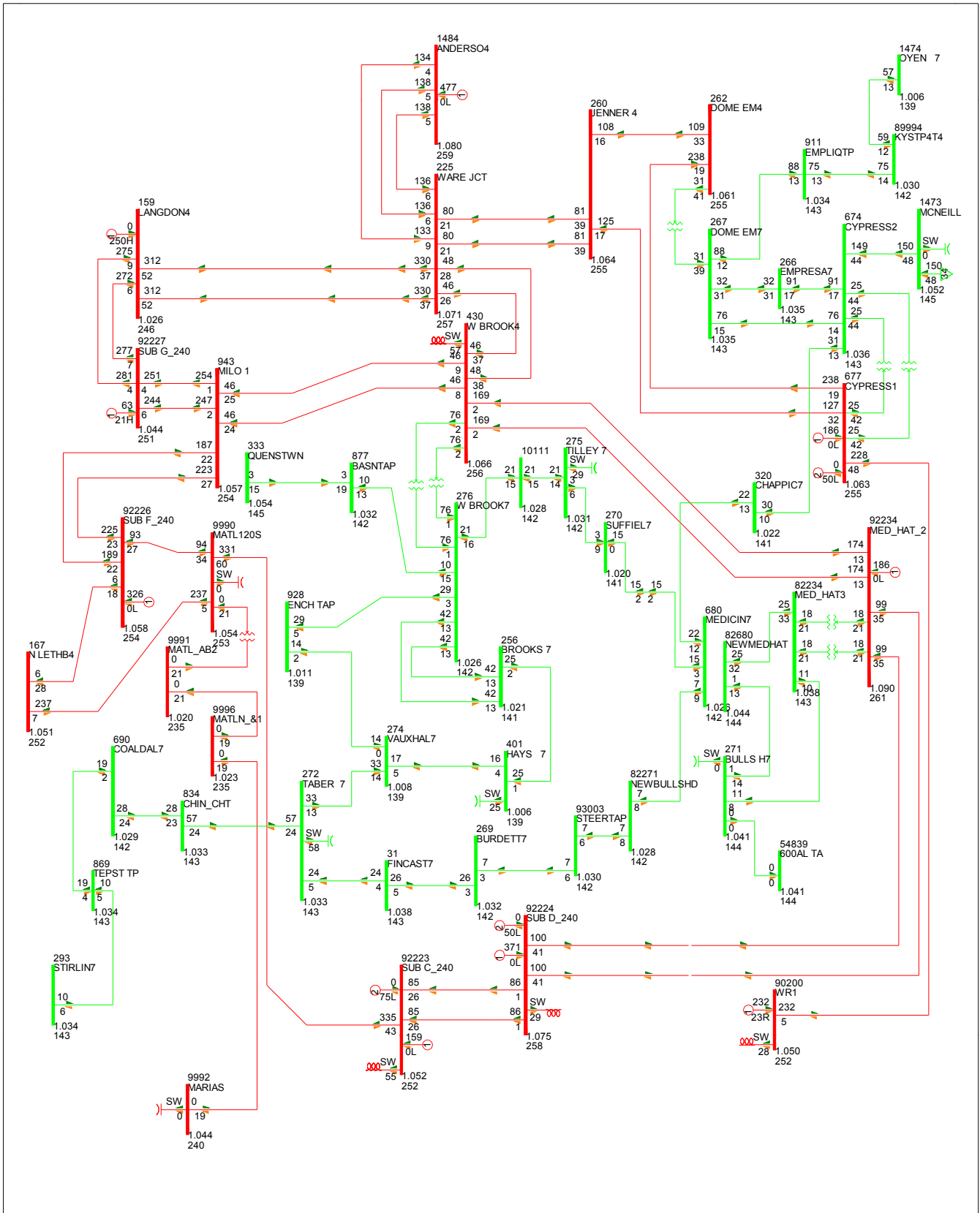


FIG 2017-1B-SP-3: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 11 MW

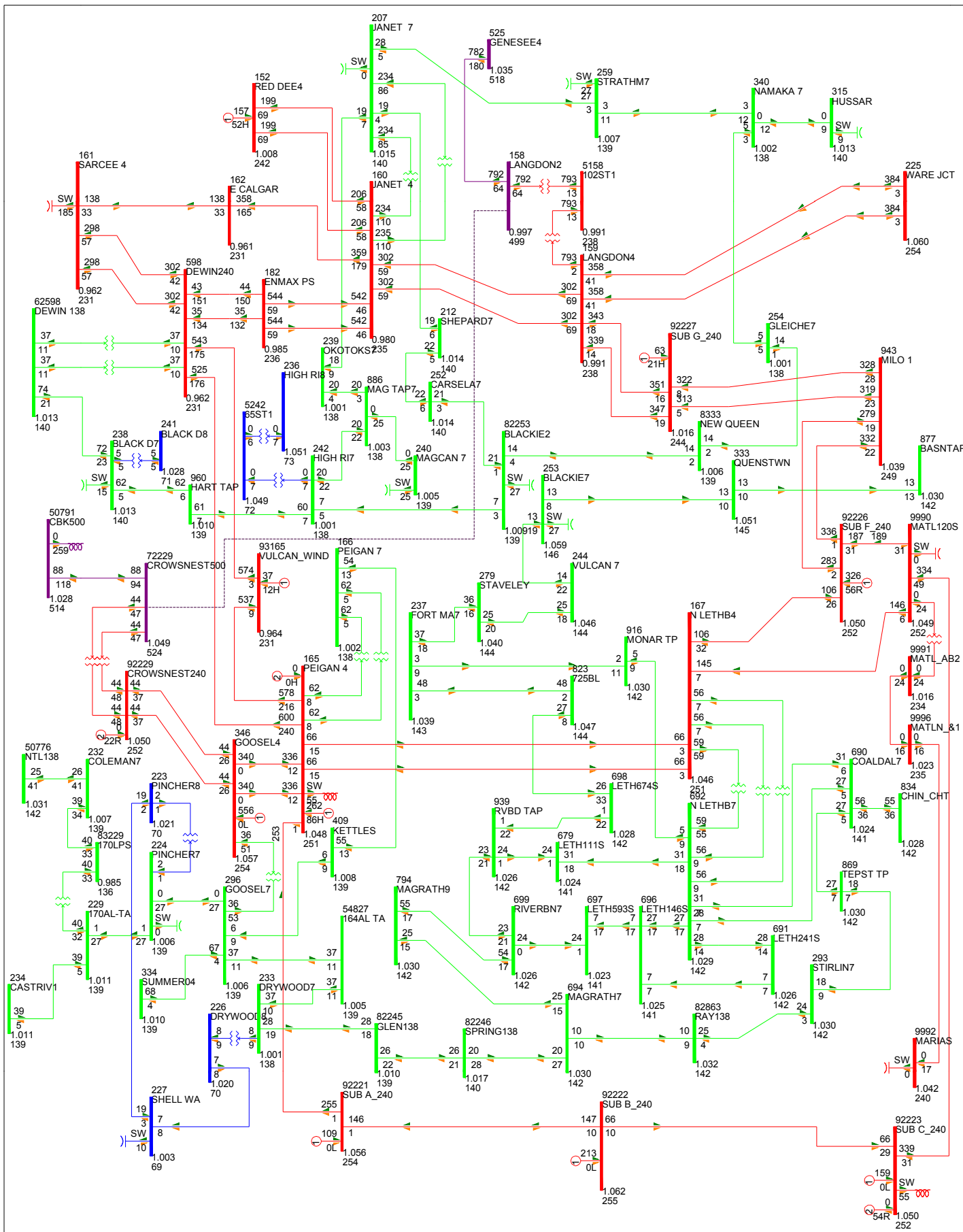


FIG 2017-1B-SP-4: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:12

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -136 MW

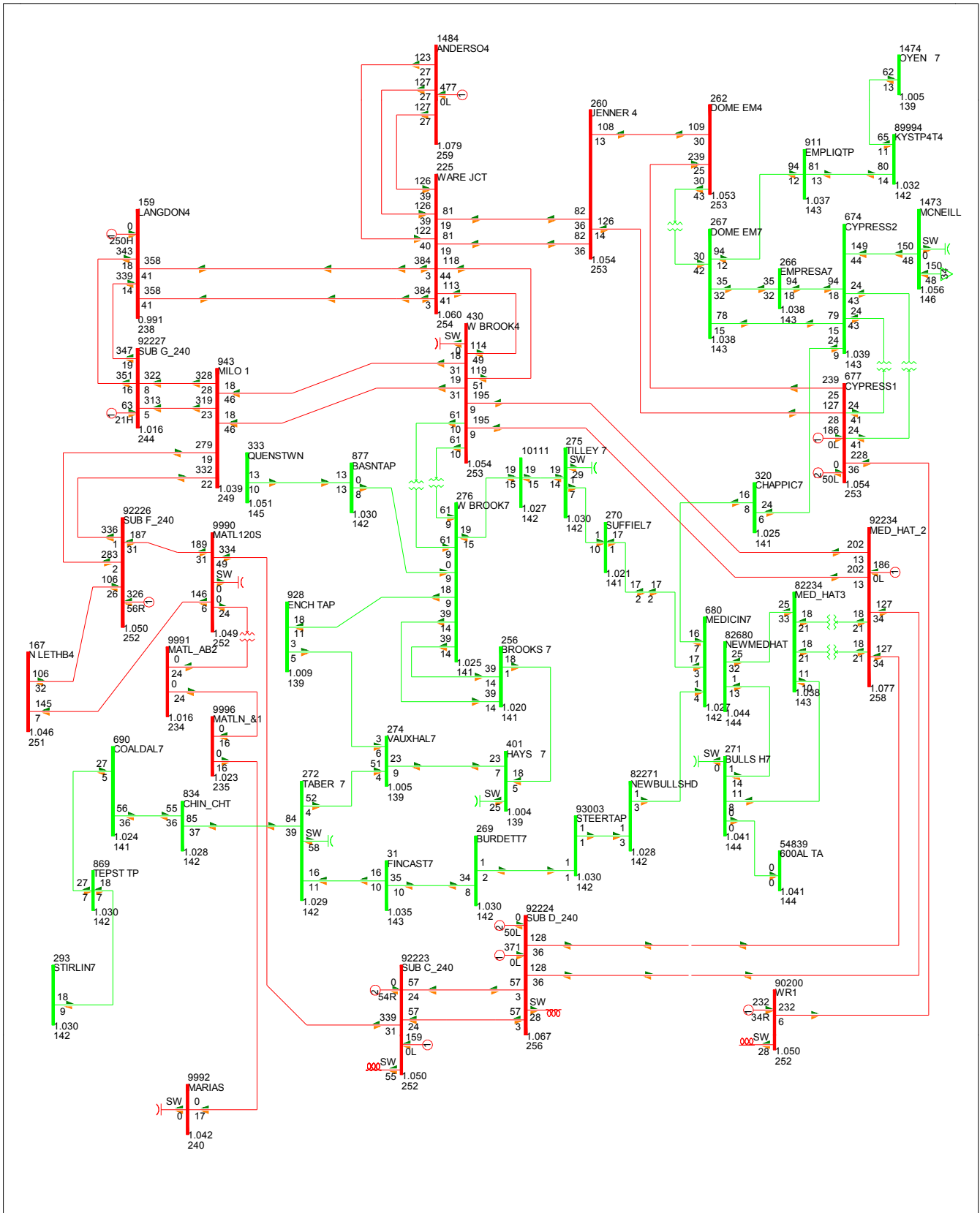


FIG 2017-1B-SP-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:12

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -136 MW

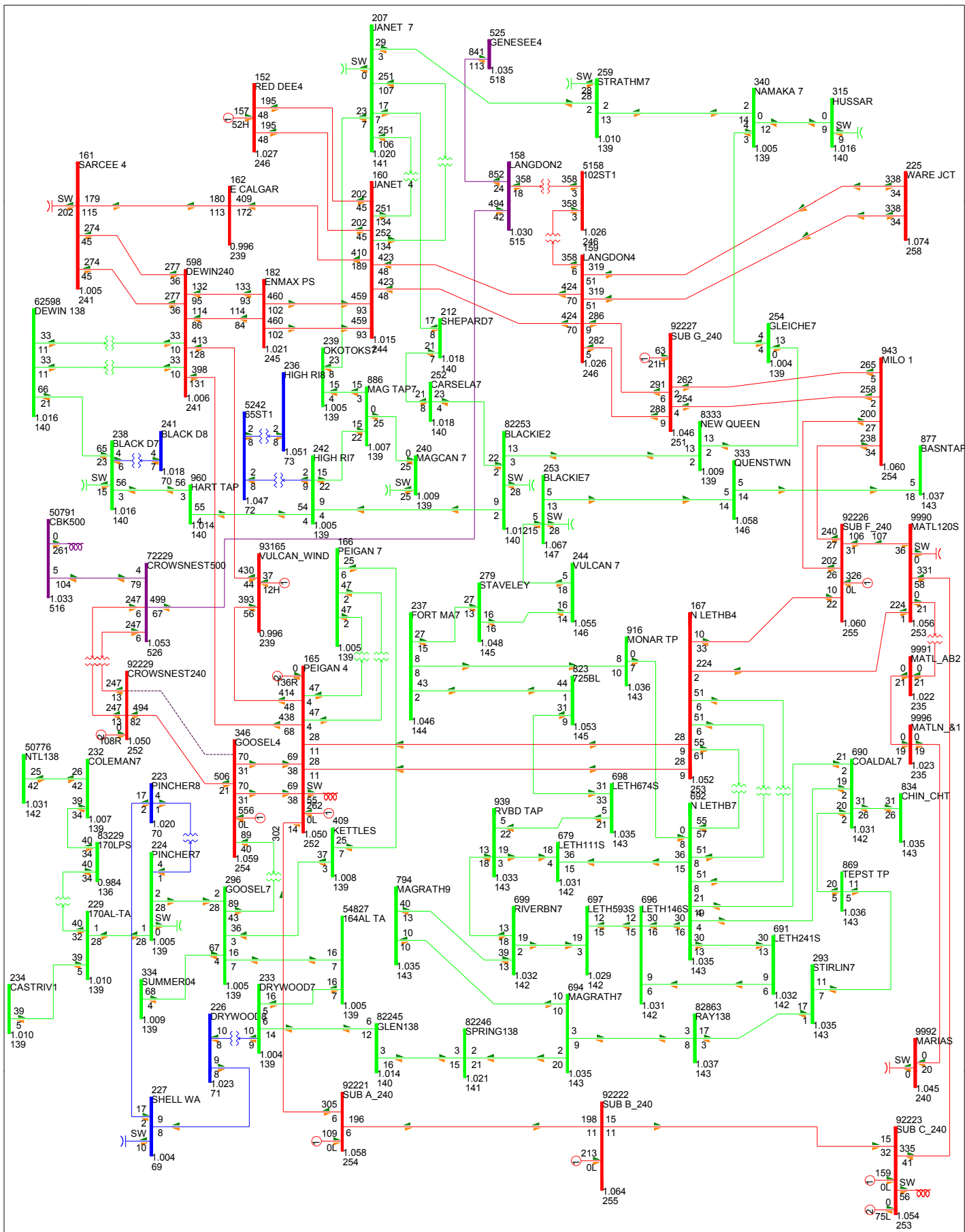


FIG 2017-1B-SP-6: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -6 MW

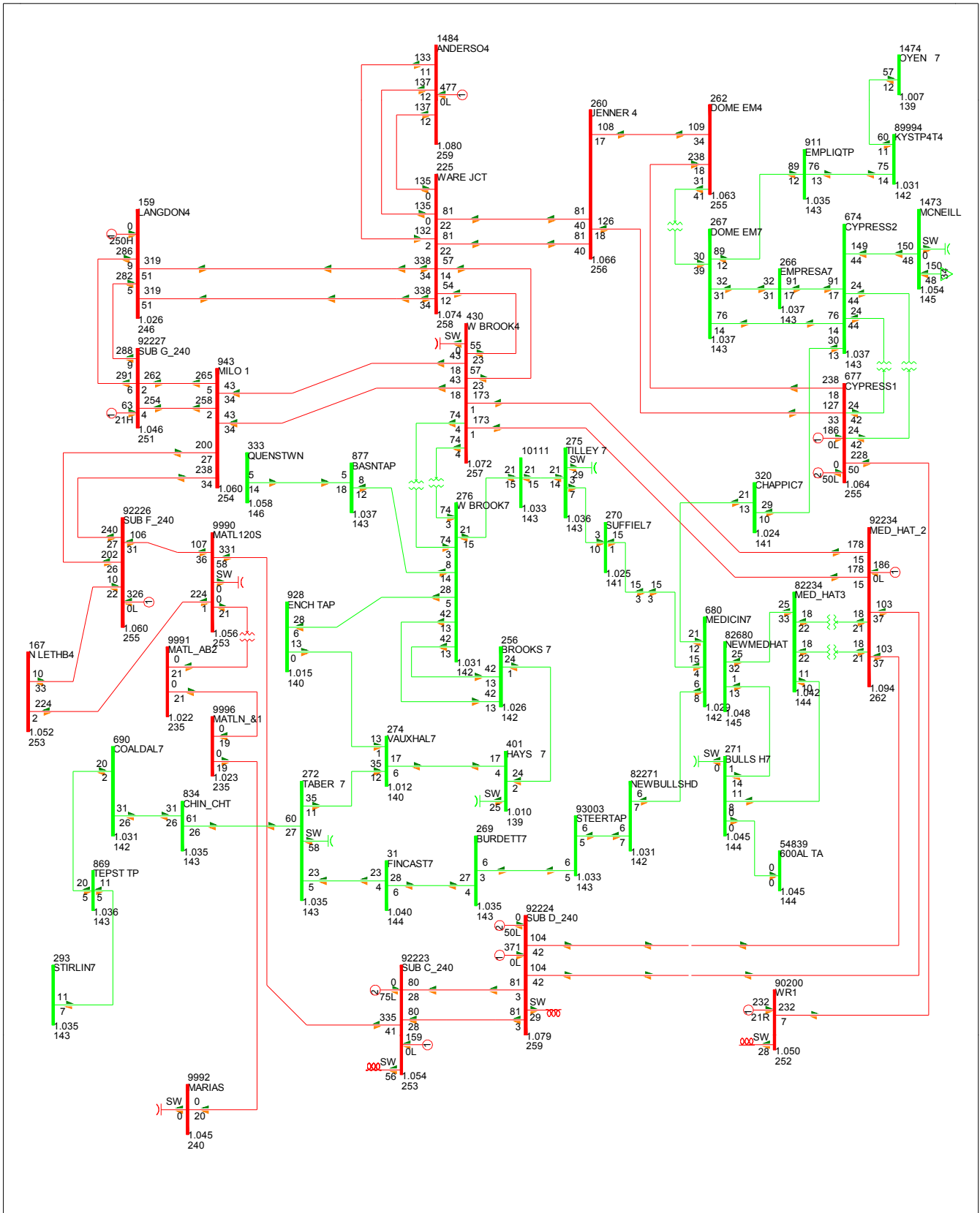


FIG 2017-1B-SP-7: CROWNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -6 MW

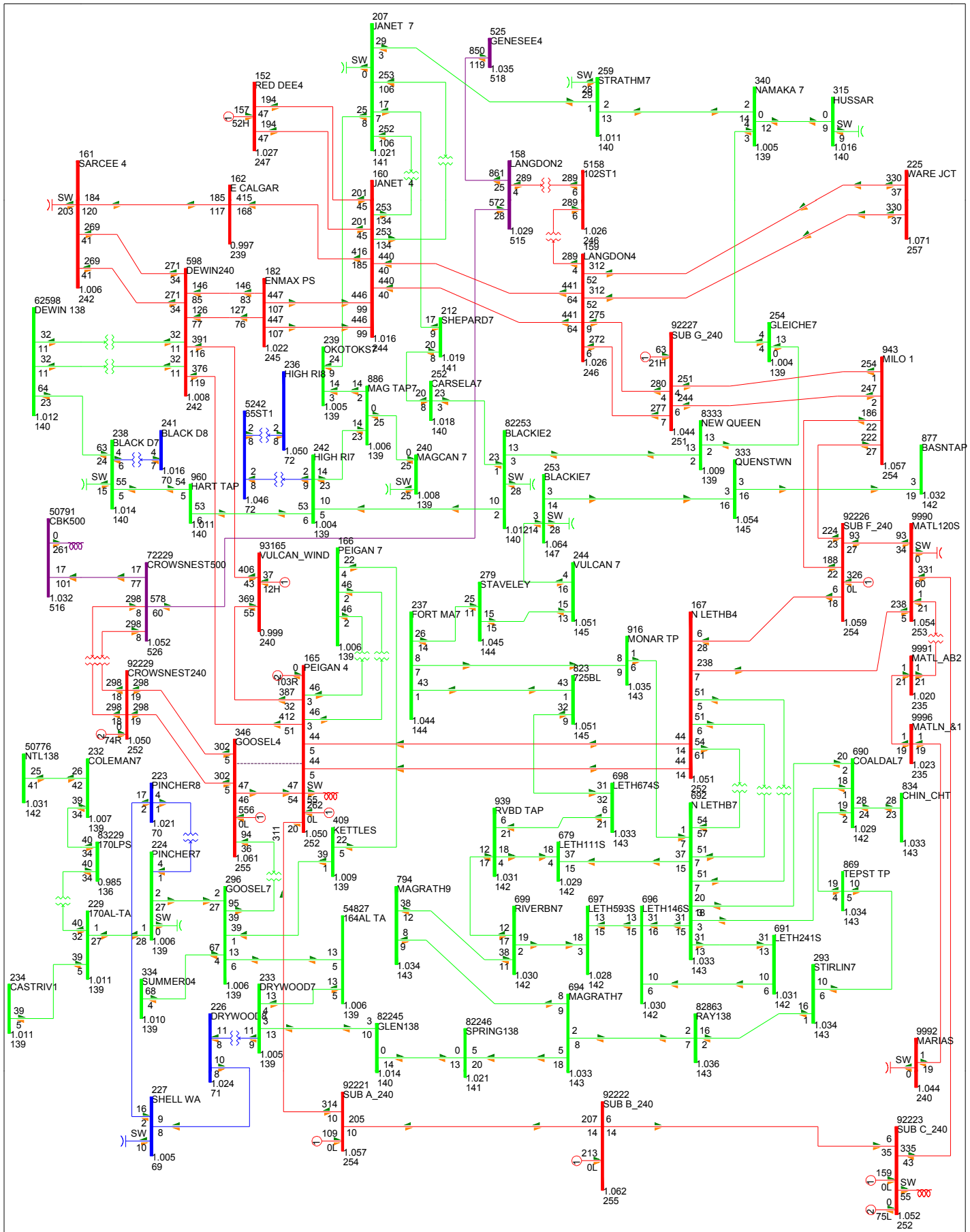


FIG 2017-1B-SP-8: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 13 MW

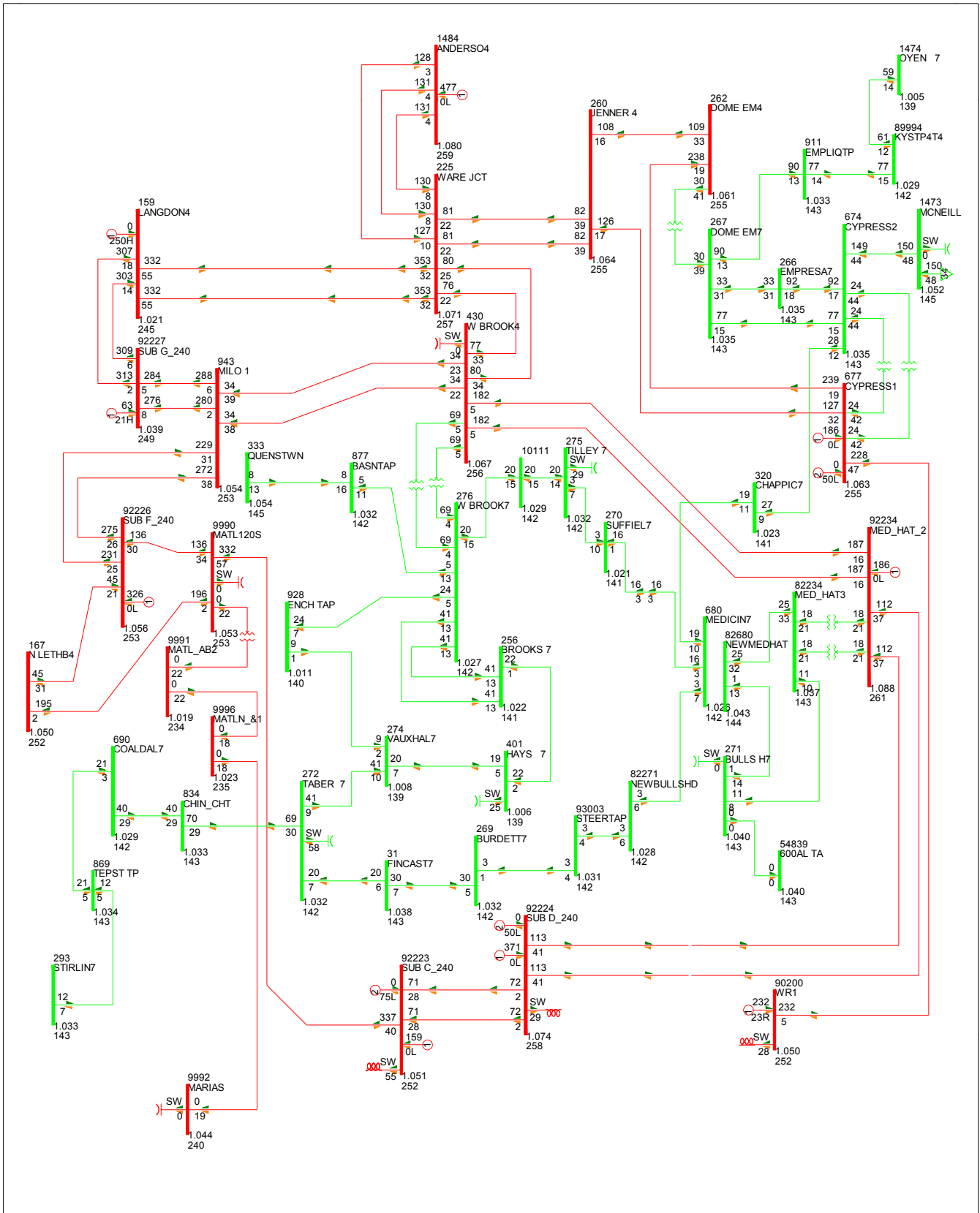


FIG 2017-1B-SP-11: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -4 MW

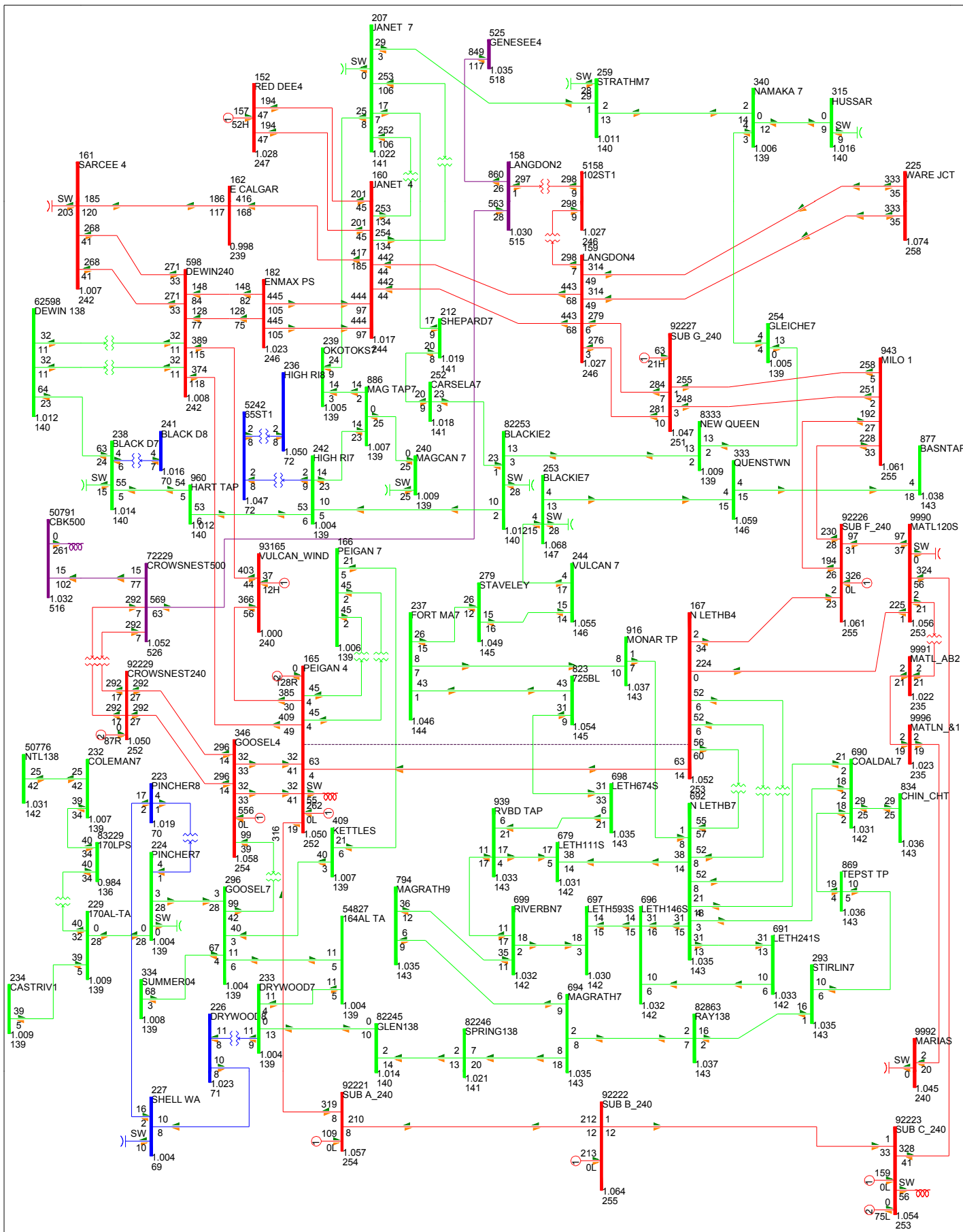


FIG 2017-1B-SP-14: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 11 MW

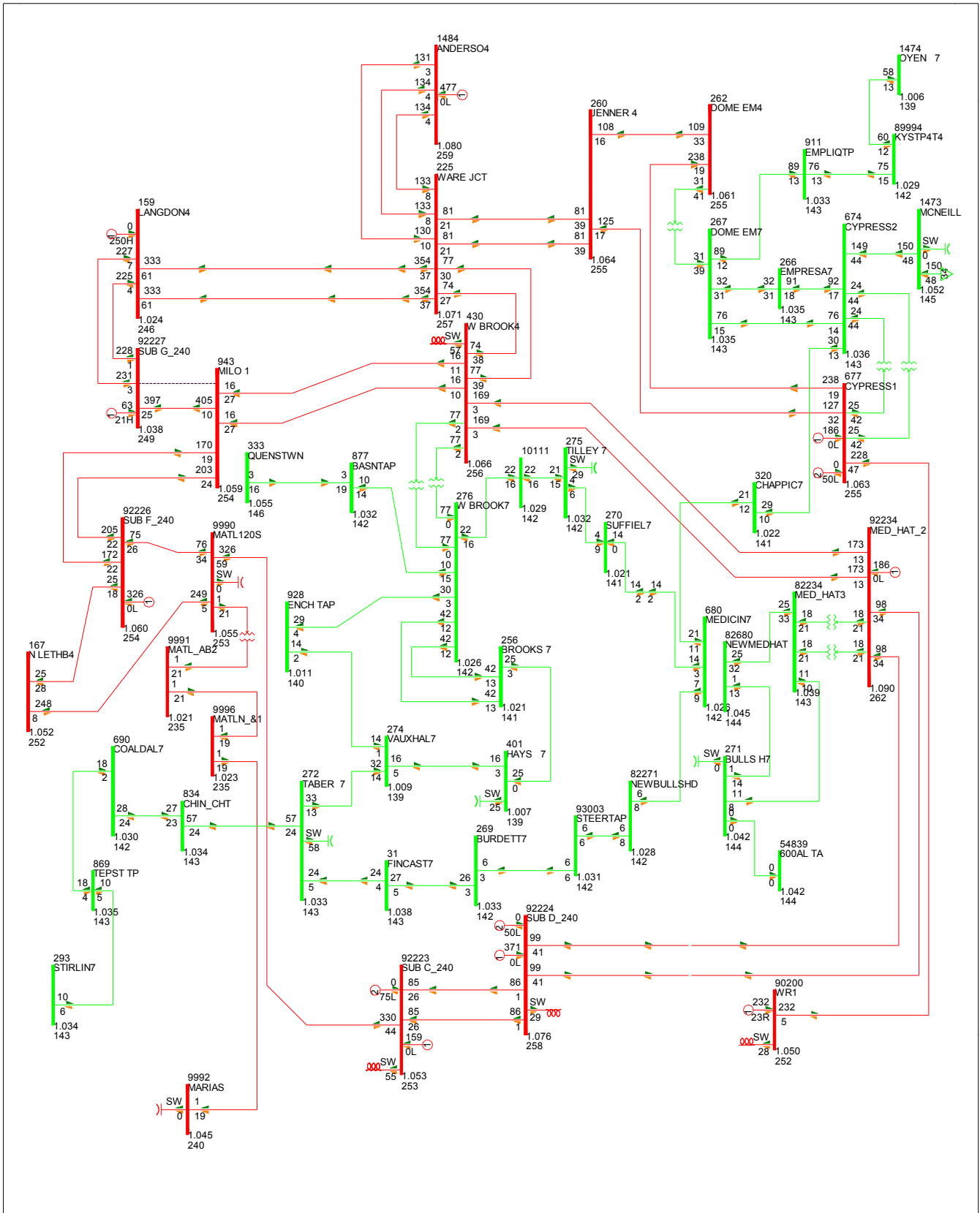


FIG 2017-1B-SP-17: MILO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -2 MW

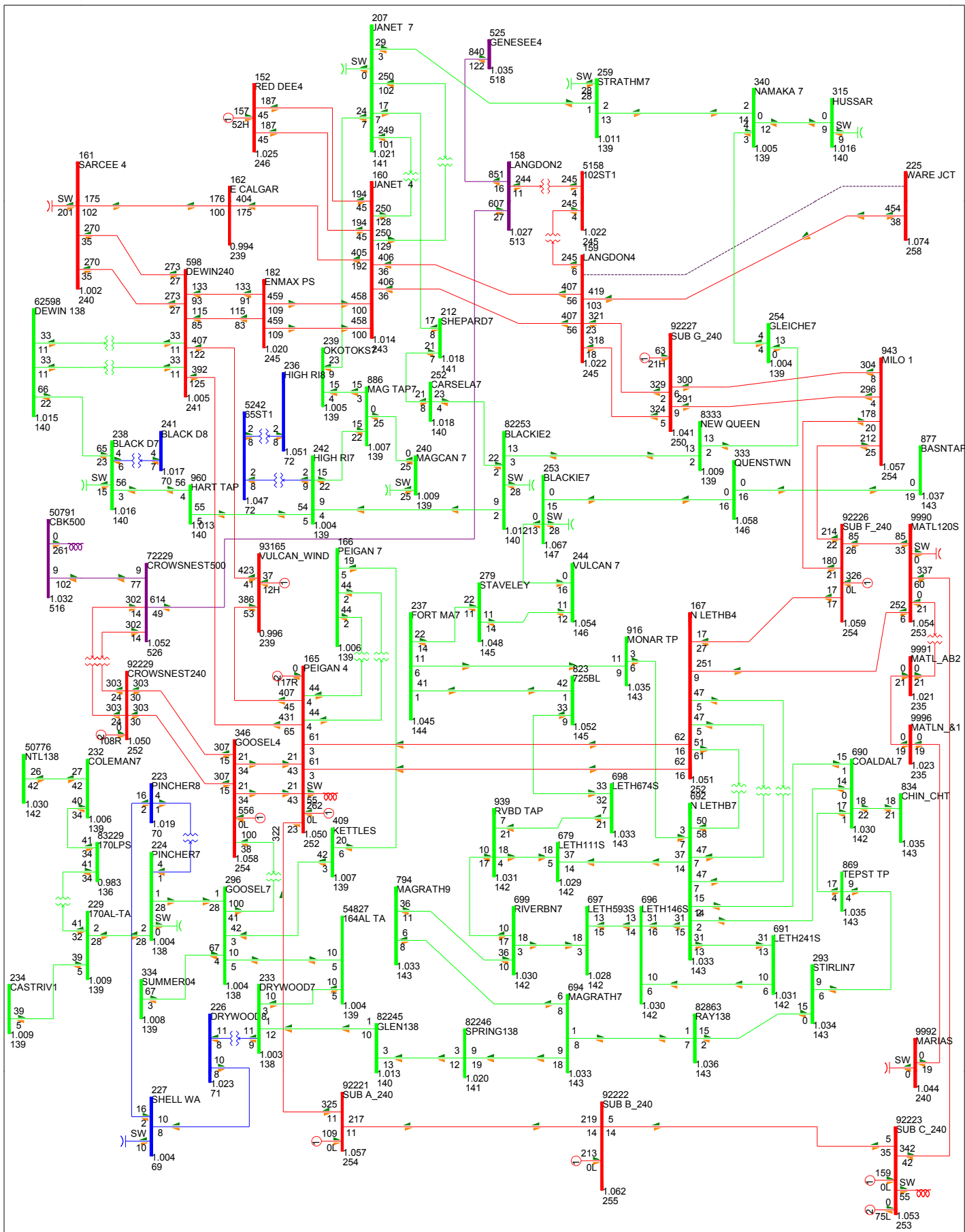


FIG 2017-1B-SP-18: WAREJUNC TO LANGDON 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR

100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -14 MW

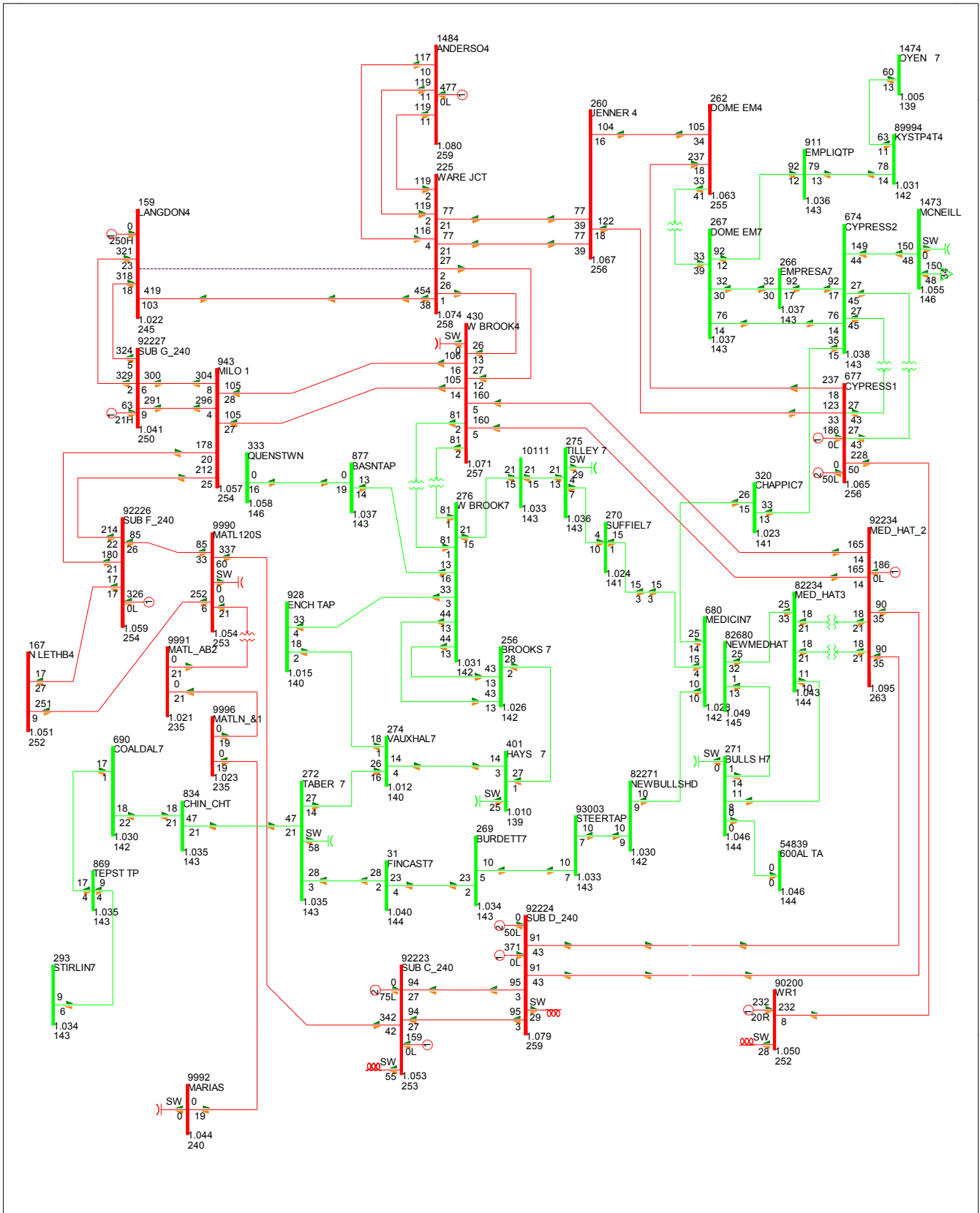


FIG 2017-1B-SP-19: WAREJUNC TO LANGDON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <math>V <= 69.000</math> <math>69.000 < V <= 138.000</math> <math>138.000 < V <= 240.000</math> <math>240.000 < V <= 500.000</math> $V > 500.000$
 BC Export: -14 MW

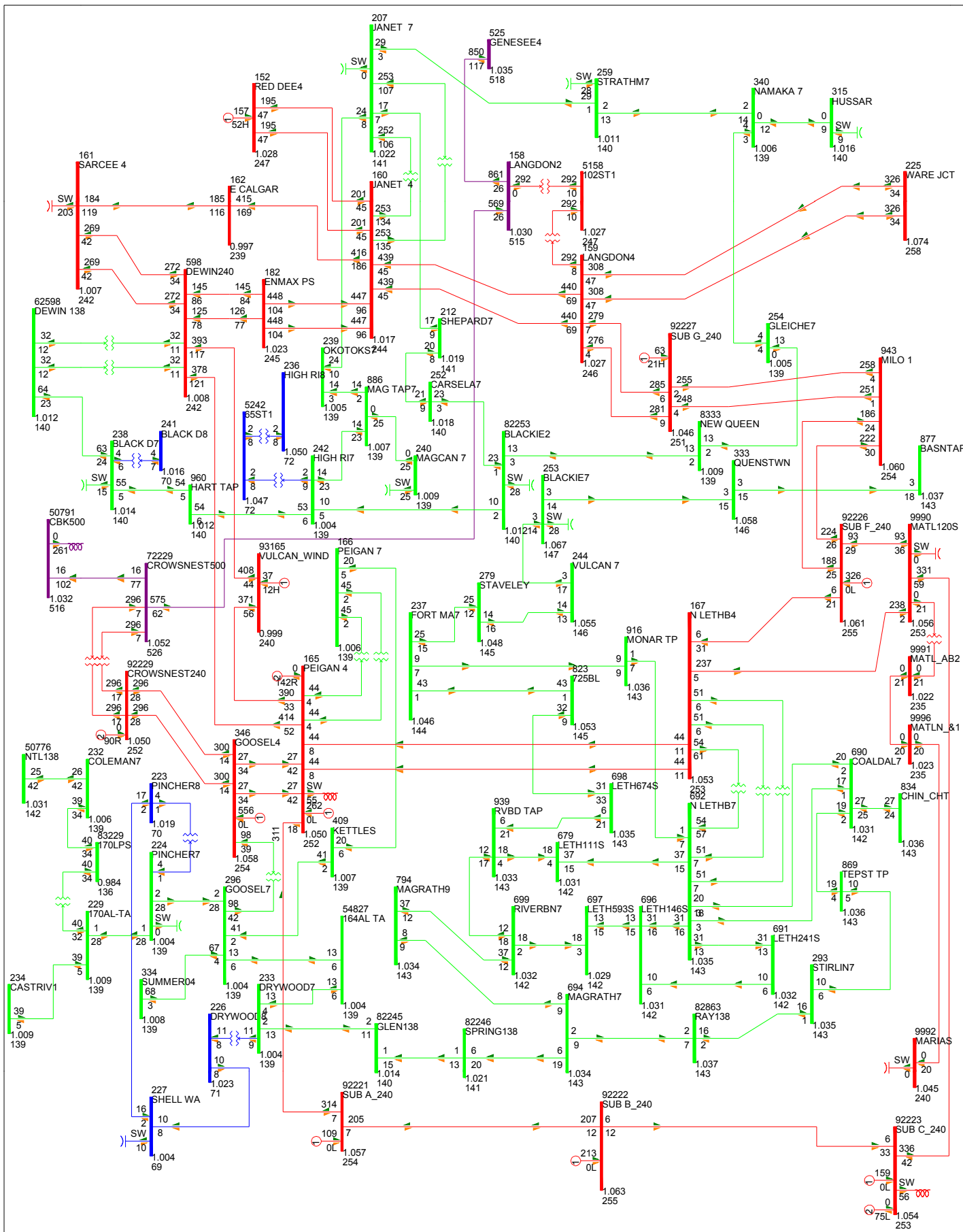


FIG 2017-1B-SP-20: WAREJUNC TO WESTBROOKS 240 KV PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 12 MW

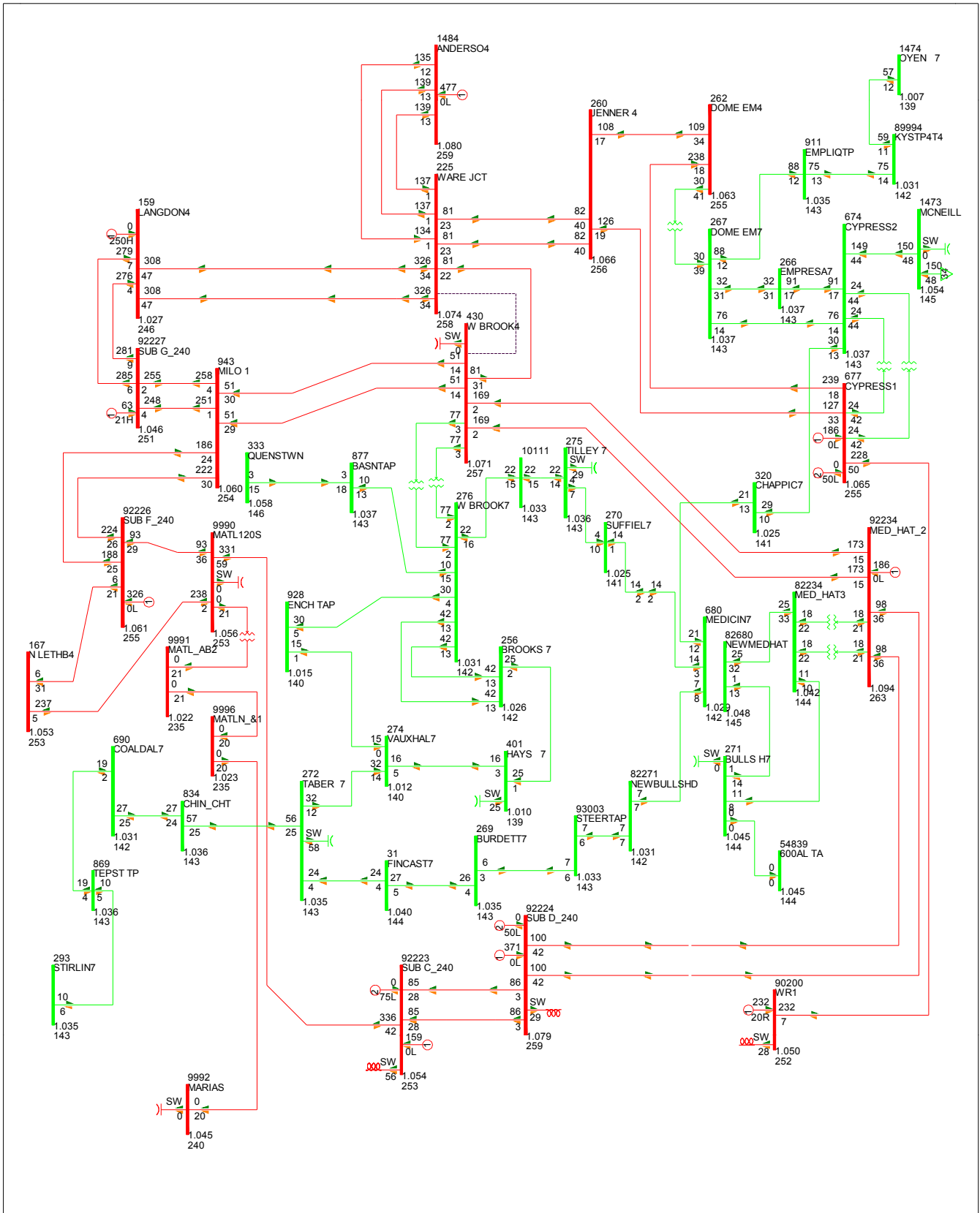


FIG 2017-1B-SP-21: WAREJUNC TO WESTBROOKS 240 KV PROPORTIONAL WIND SCENARIO

2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1B

Bus - VOLTAGE (KV/PU)
Branch - MW/MVAR
Equipment - MW/MVAR

100.0%RATEA
KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 12 MW

GENERATION DISPATCH REPORT

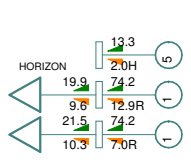
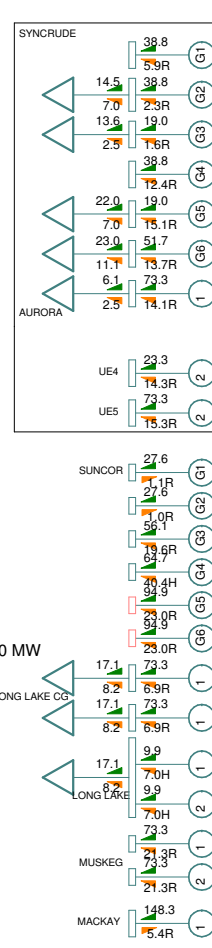
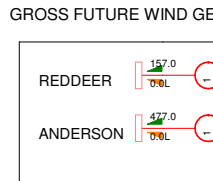
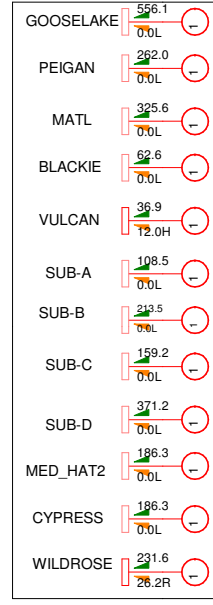
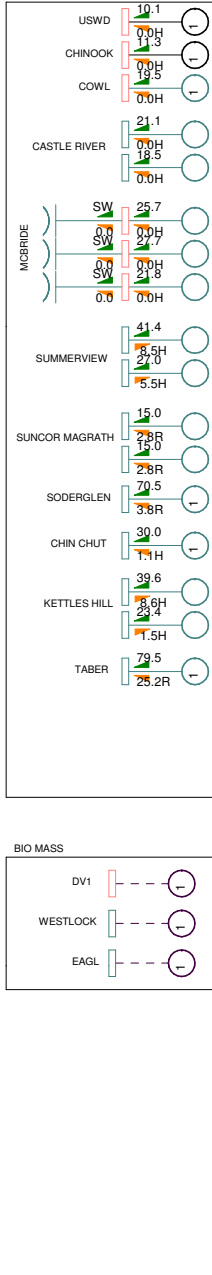
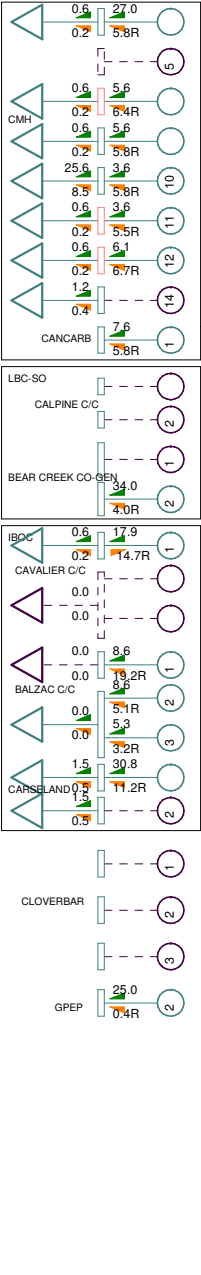
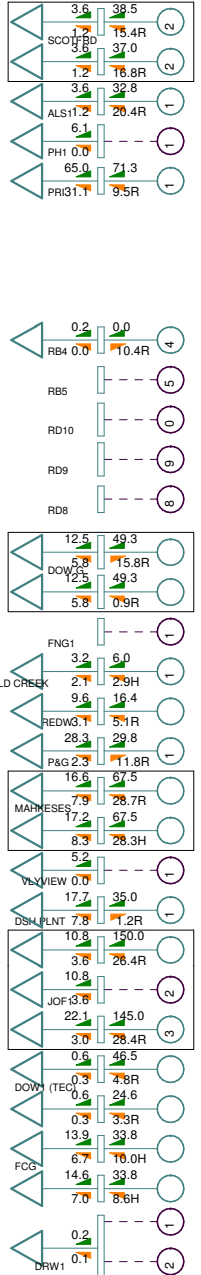
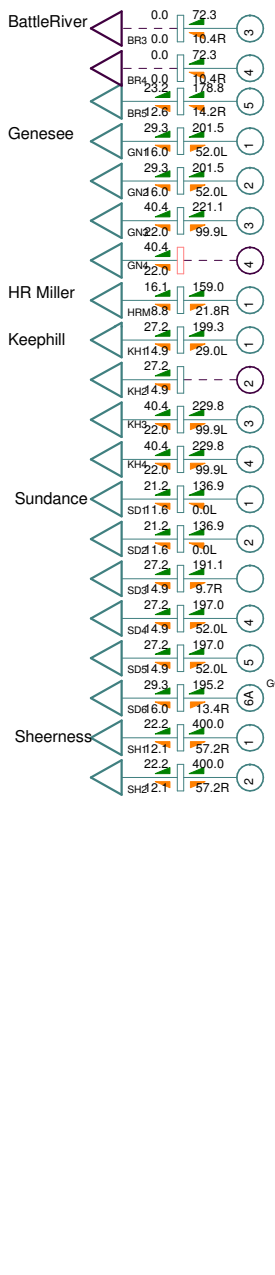
GROSS COAL GEN. 3619.6 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.



2017 SUMMER LIGHT CASE
MON, NOV 24 2008 14:46

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
100.0%PATEA
1.050OV 0.950UV
KV: <=25.000 <=34.500 <=69.000 <=138.000 <=240.000 >240.000

Fig 2017-1C-SL-1

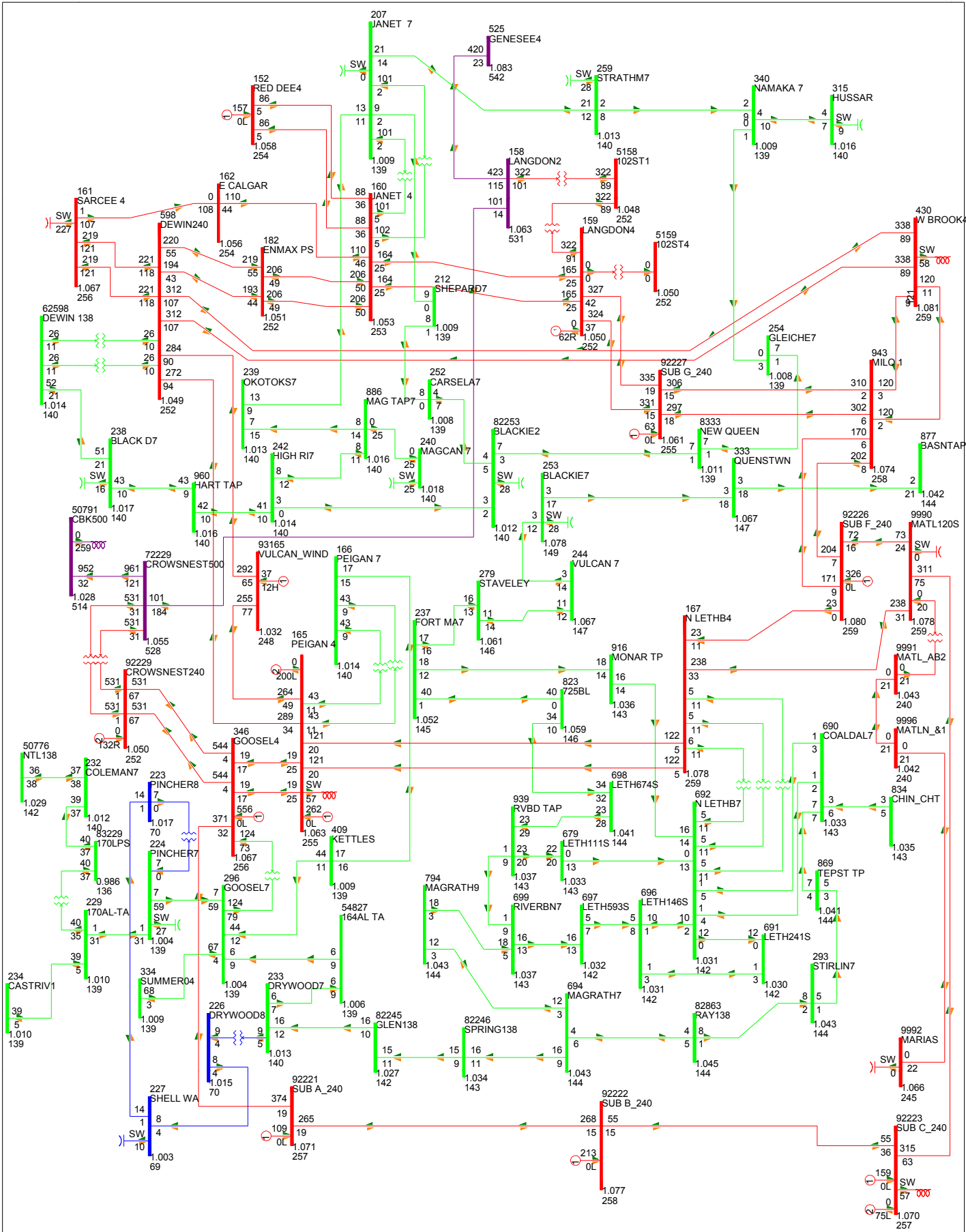


FIG 2017-1C-SL-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

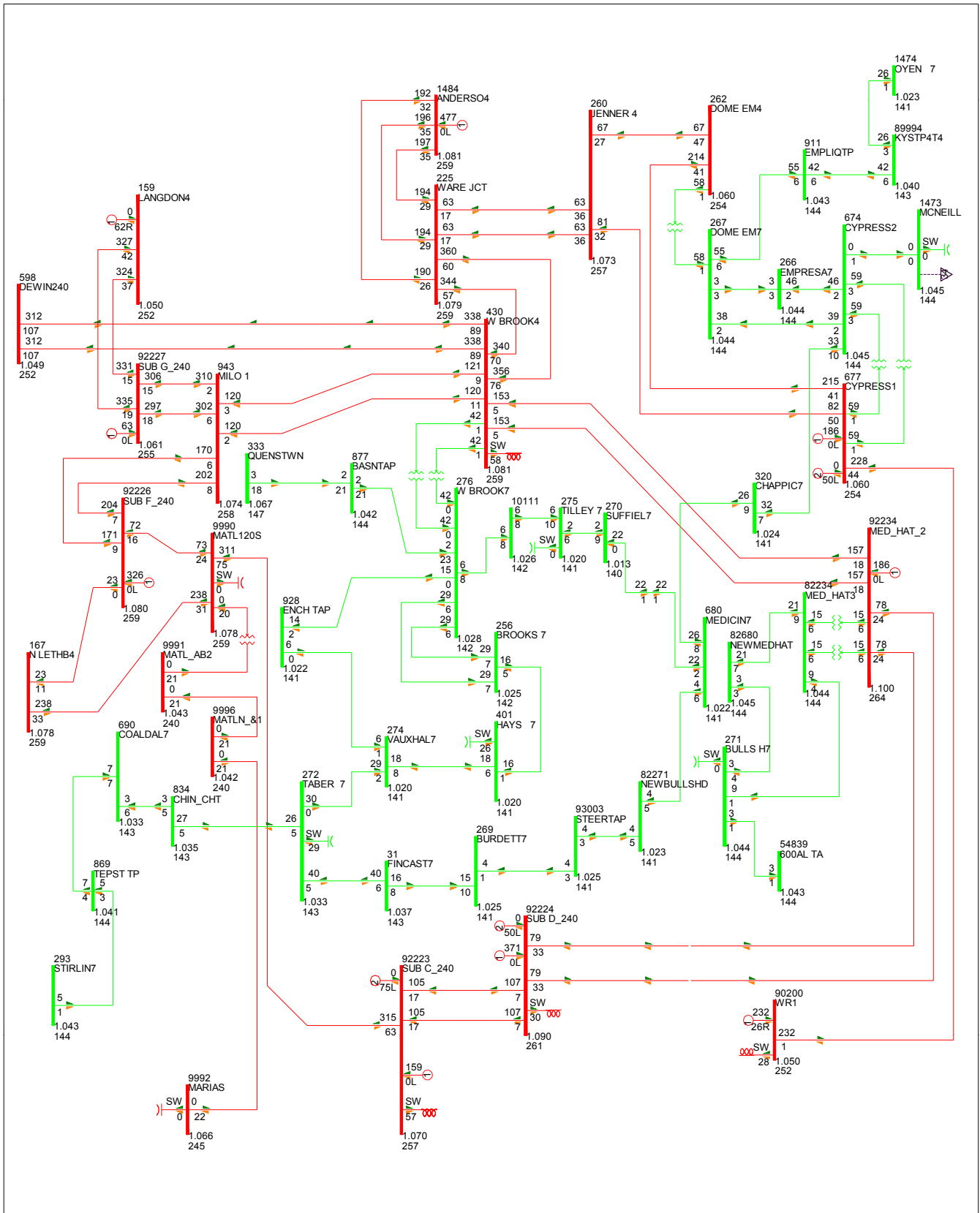


FIG 2017-1C-SL-3: N=0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

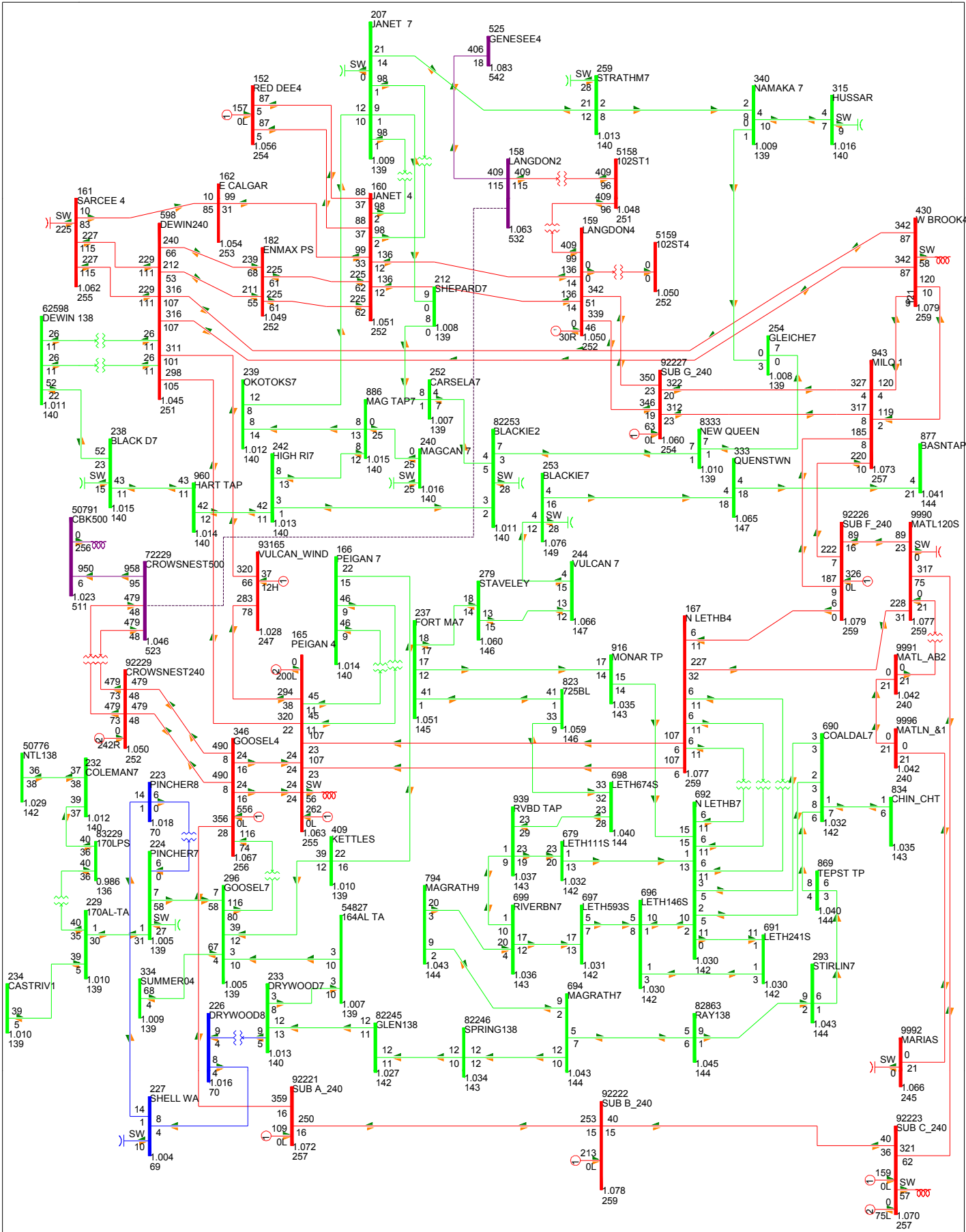


FIG 2017-1C-SL-4: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:16

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1014 MW

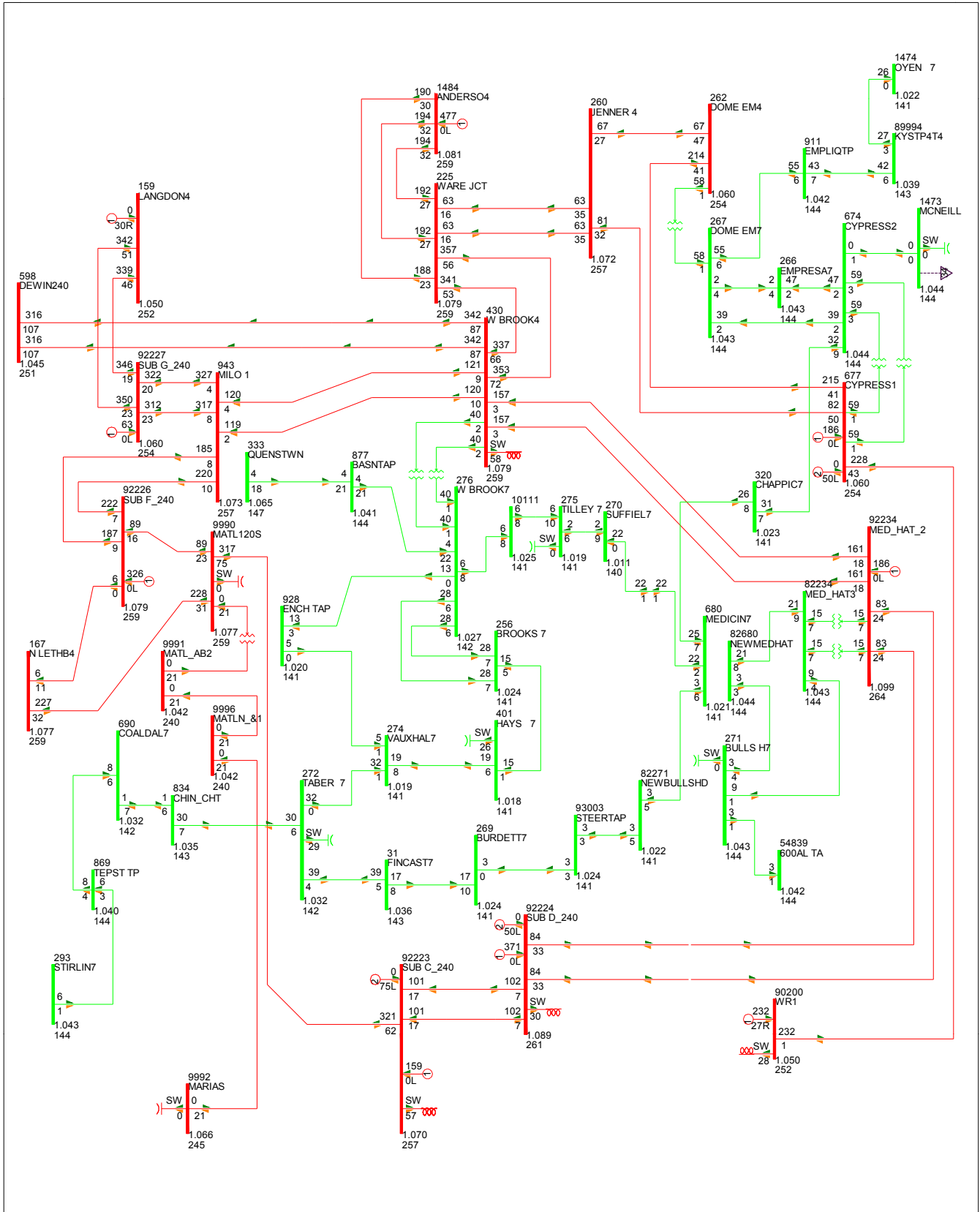


FIG 2017-1C-SL-5: LANGDON TO CROWNSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:16

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1014 MW

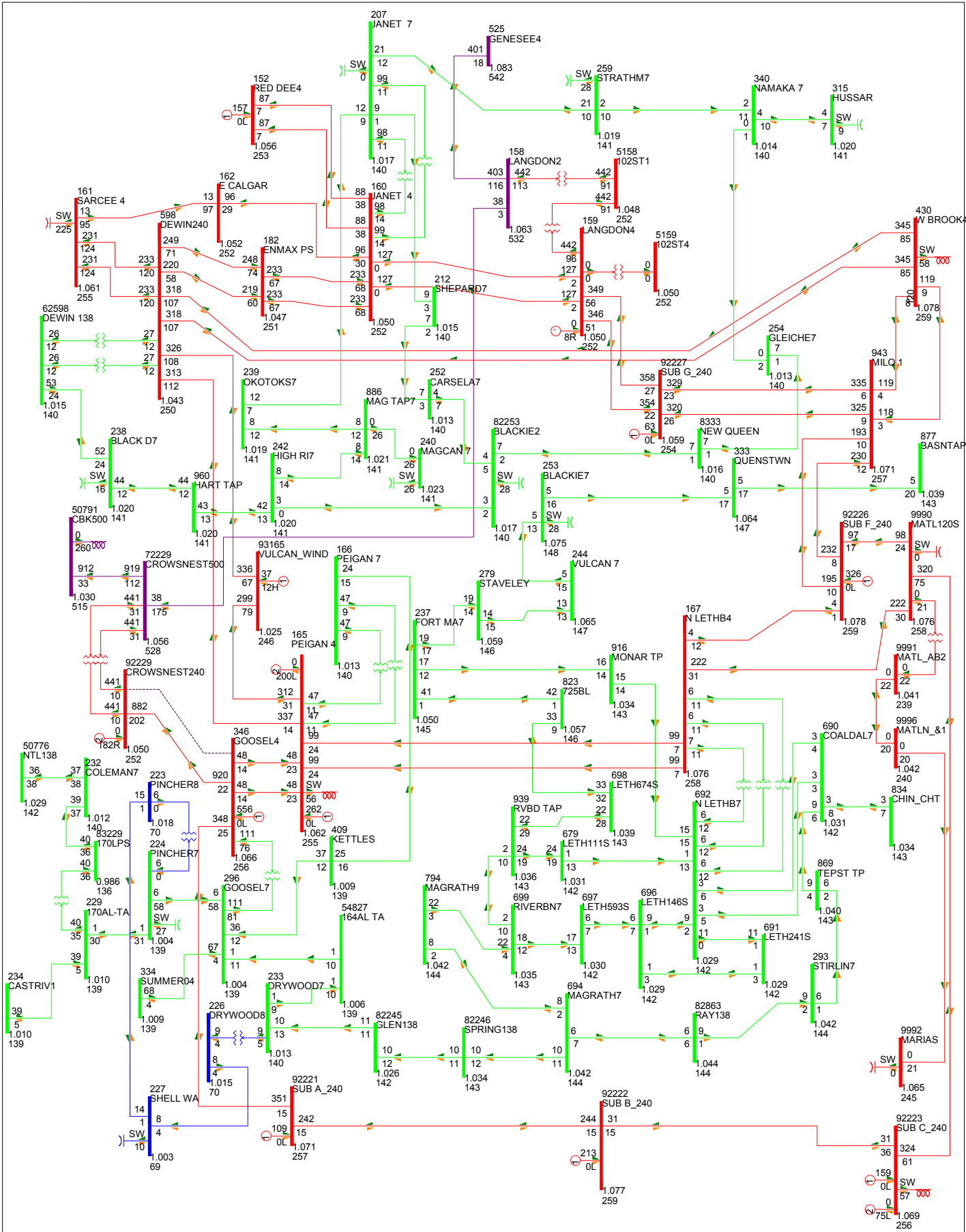


FIG 2017-1C-SL-6: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: $\le 34.500 \le 69.000 \le 138.000 \le 240.000 \le 500.000 > 500.000$
 BC Export: 988 MW

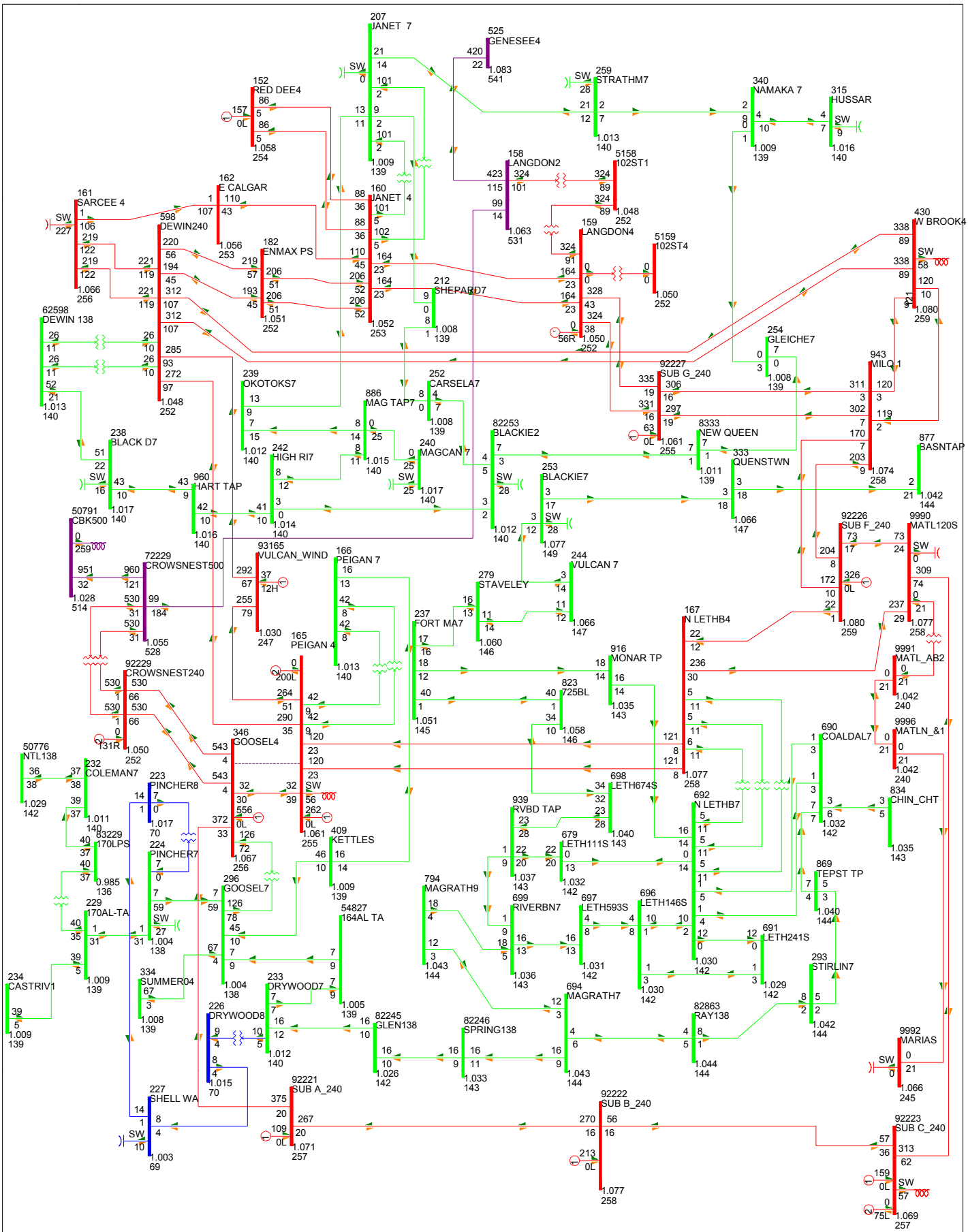


FIG 2017-1C-SL-8: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

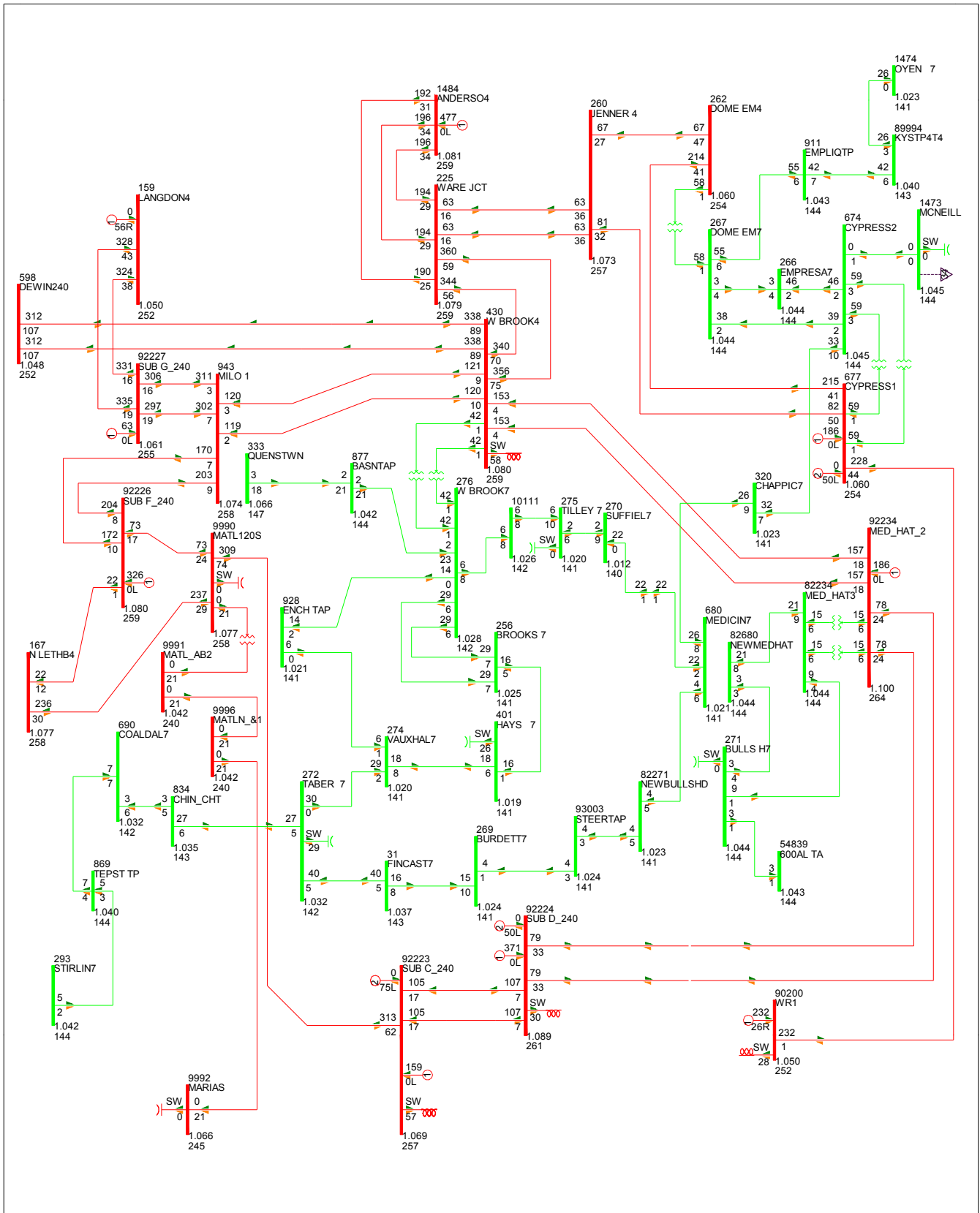


FIG 2017-1C-SL-9: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

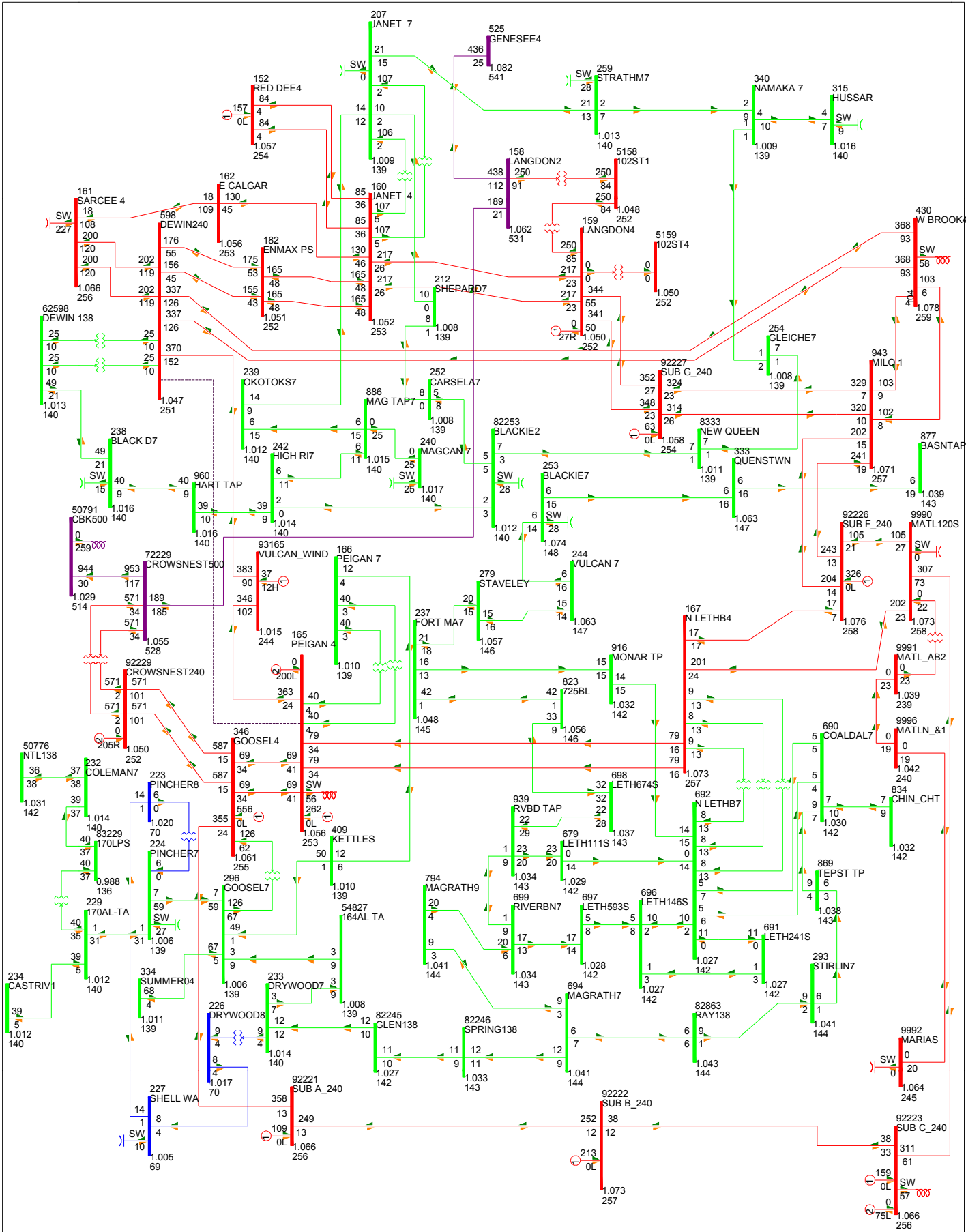


FIG 2017-1C-SL-10: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1010 MW

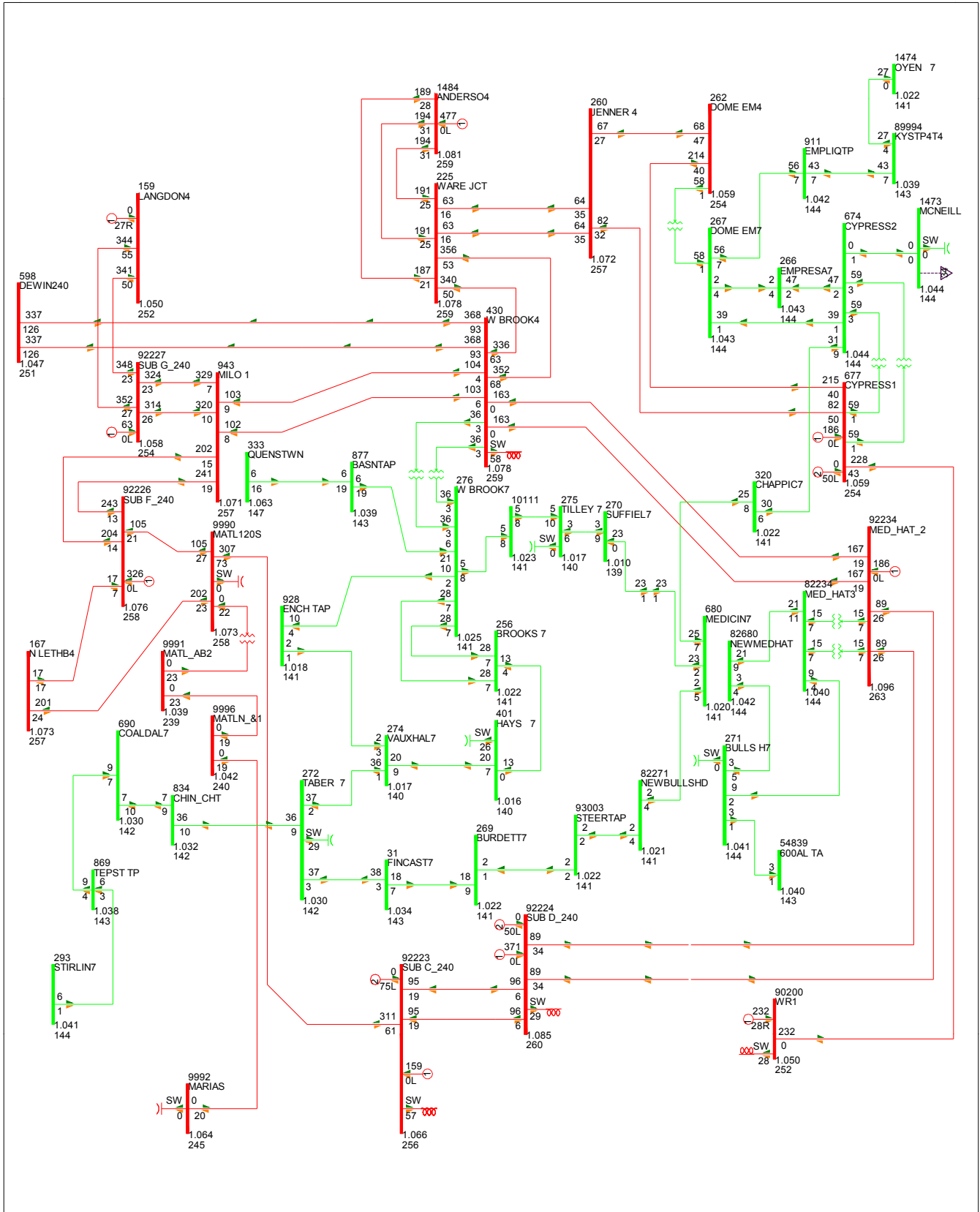


FIG 2017-1C-SL-11: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1010 MW

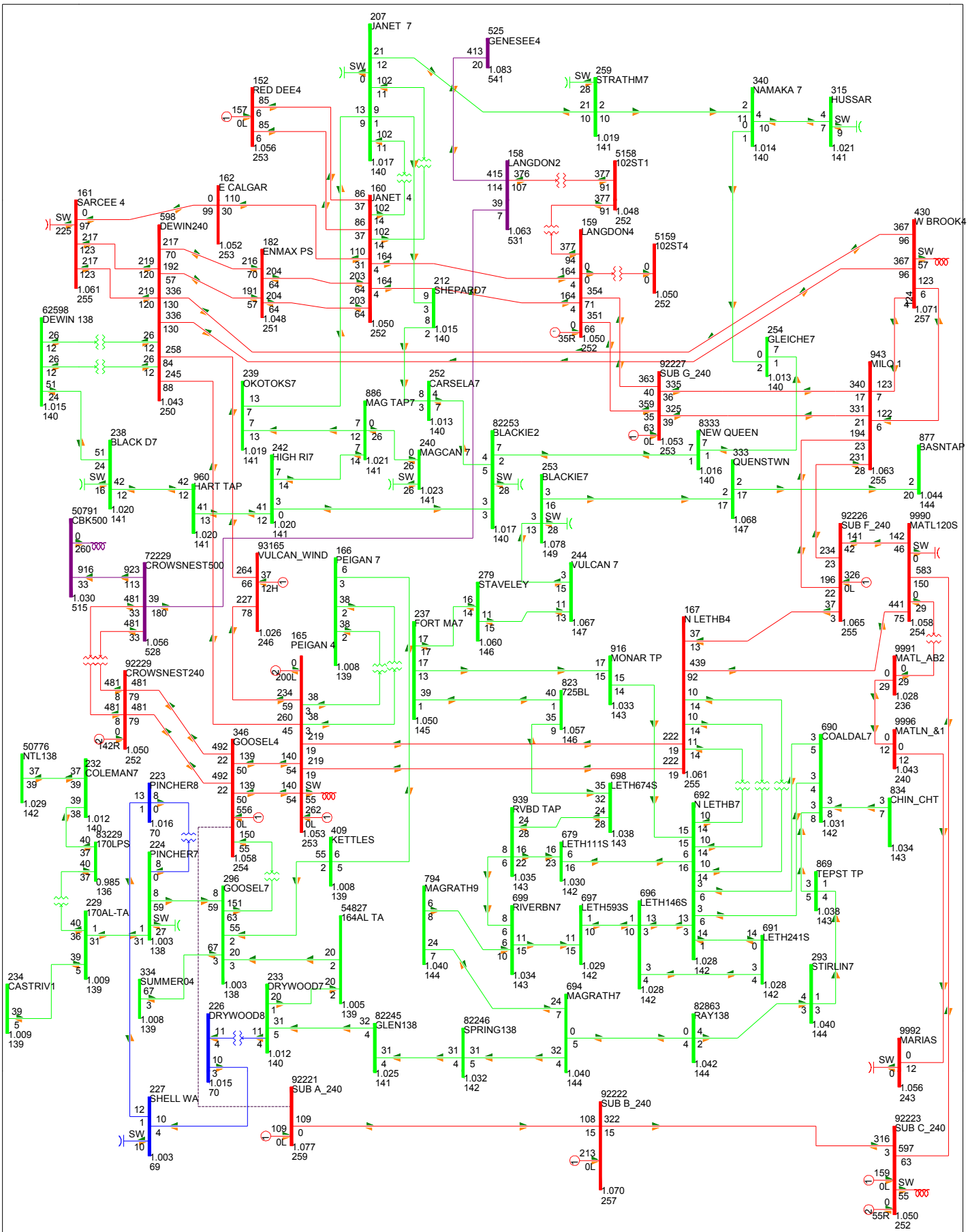


FIG 2017-1C-SL-12: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

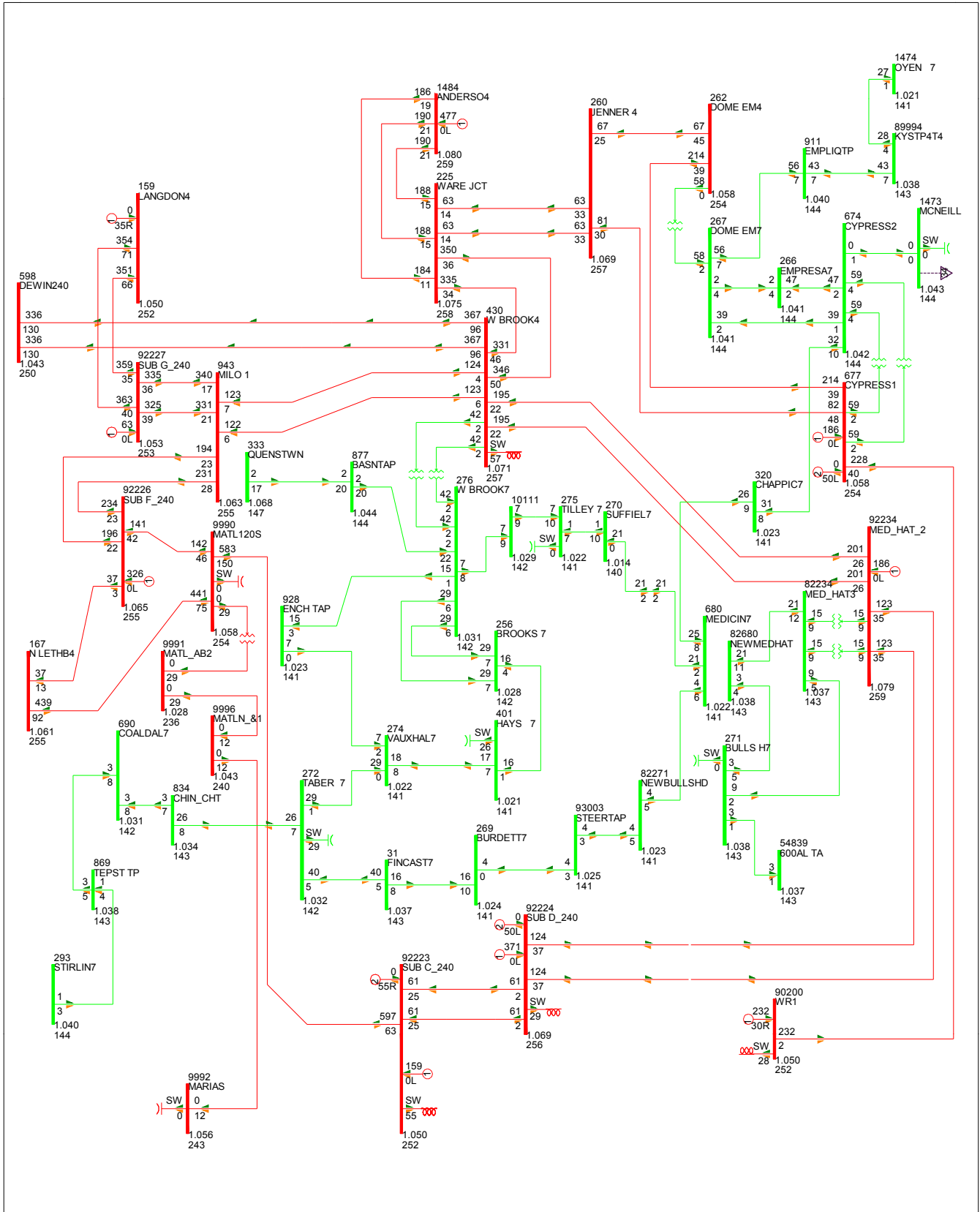


FIG 2017-1C-SL-13: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

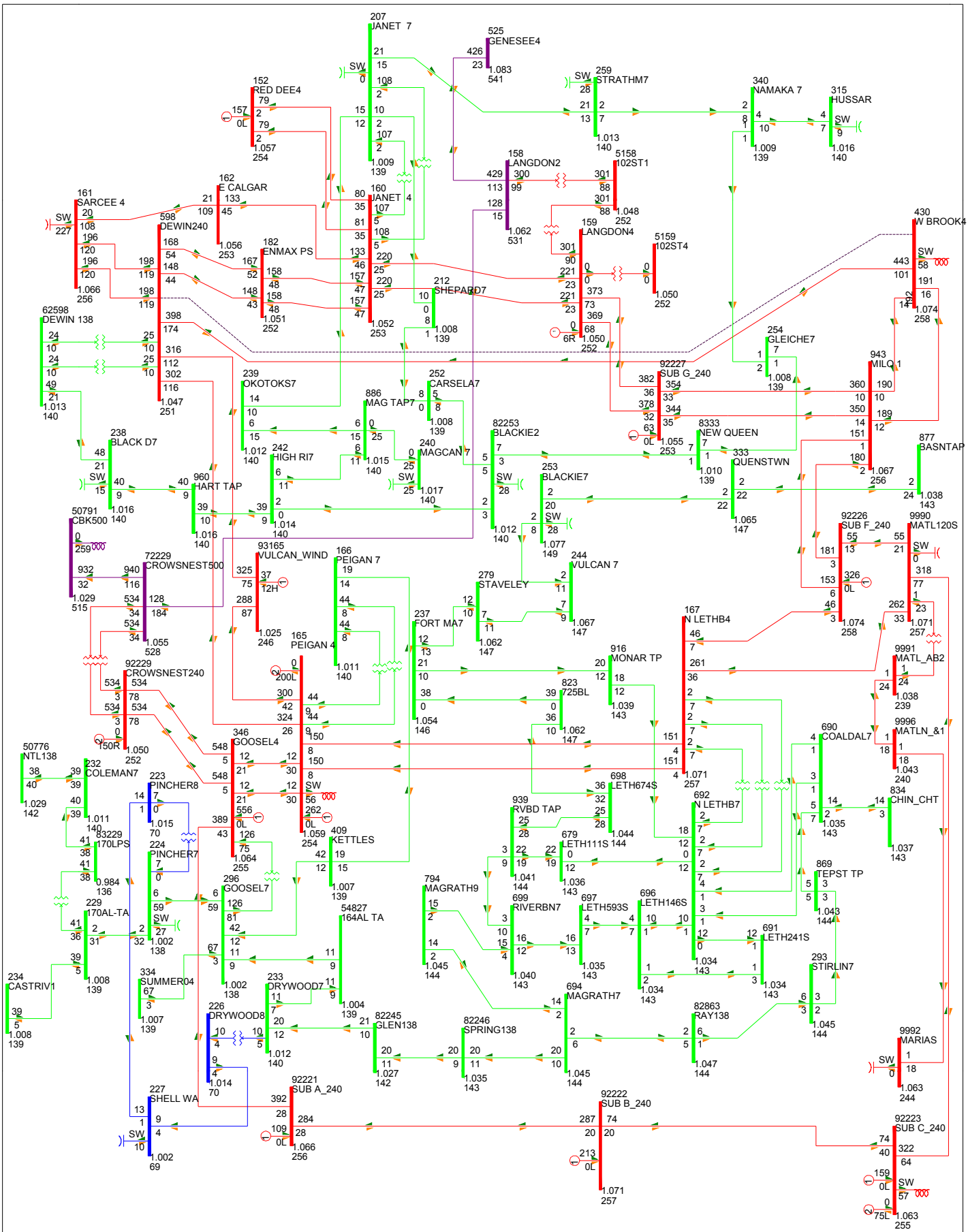


FIG 2017-1C-SL-18: WESTBROOKS TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

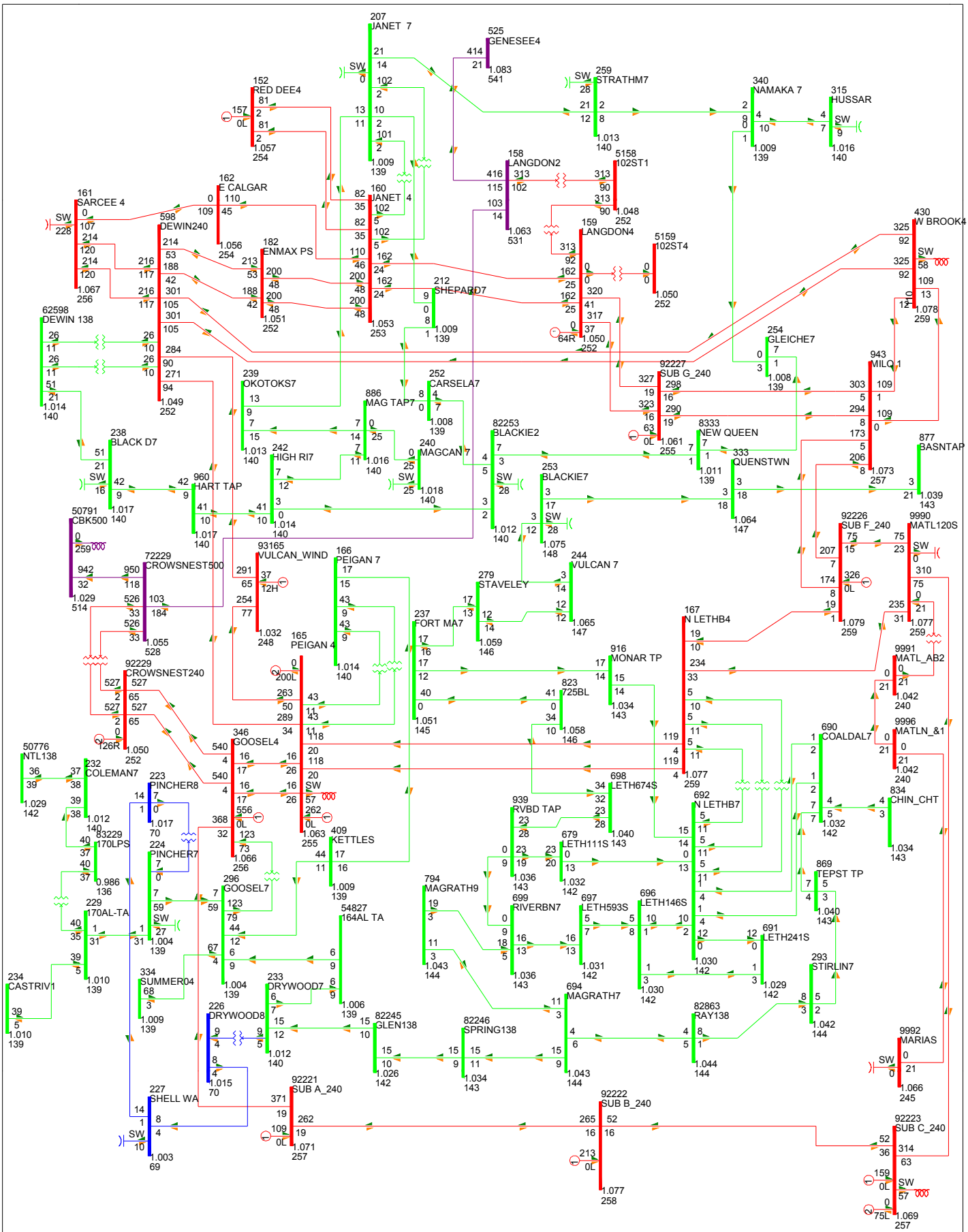


FIG 2017-1C-SL-20: WAREJUNC TO WESTBROOKS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1012 MW

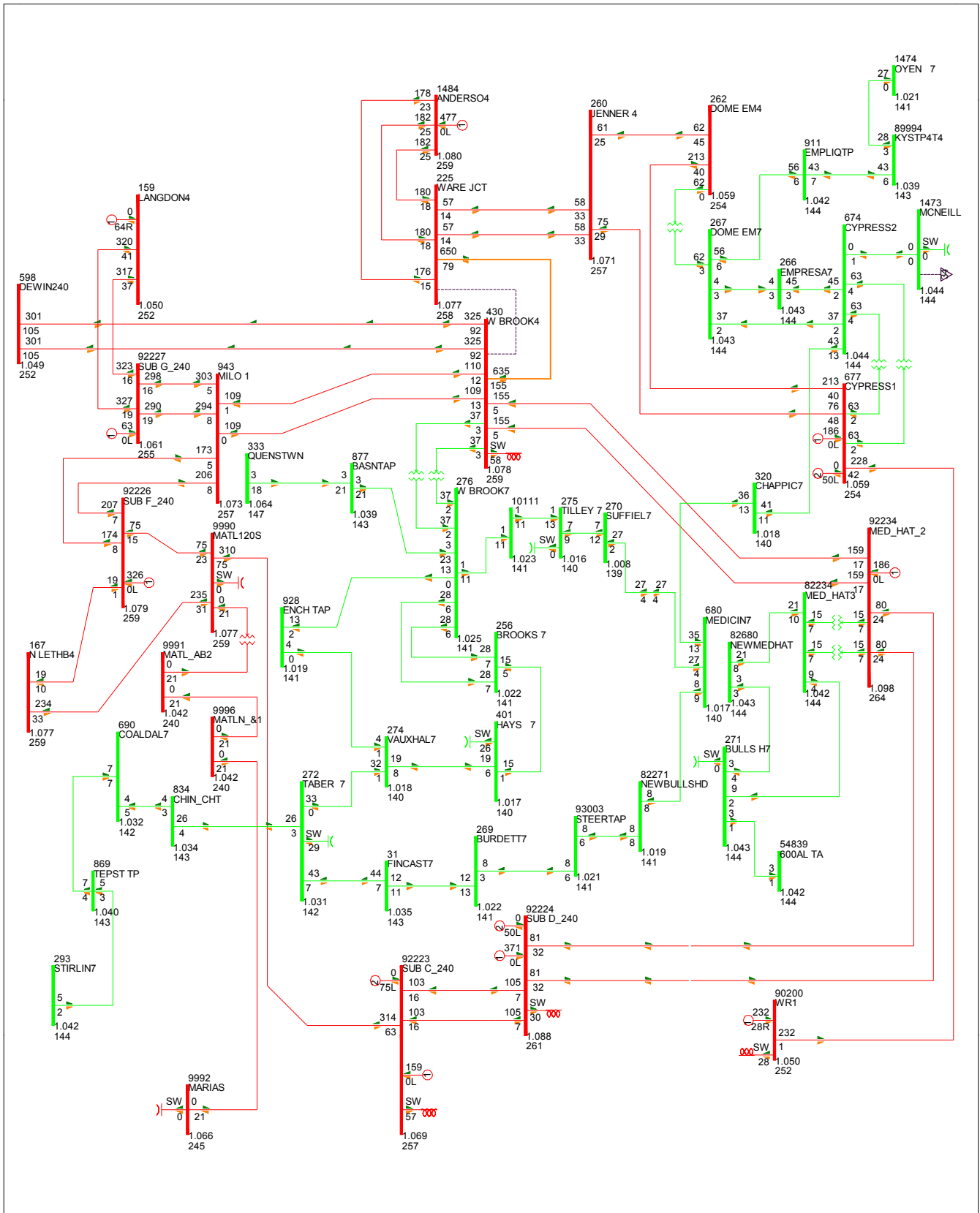


FIG 2017-1C-SL-21: WAREJUNC TO WESTBROOKS 240 KV PROPORTIONAL WIND SCENARIO

2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1012 MW

GENERATION DISPATCH REPORT

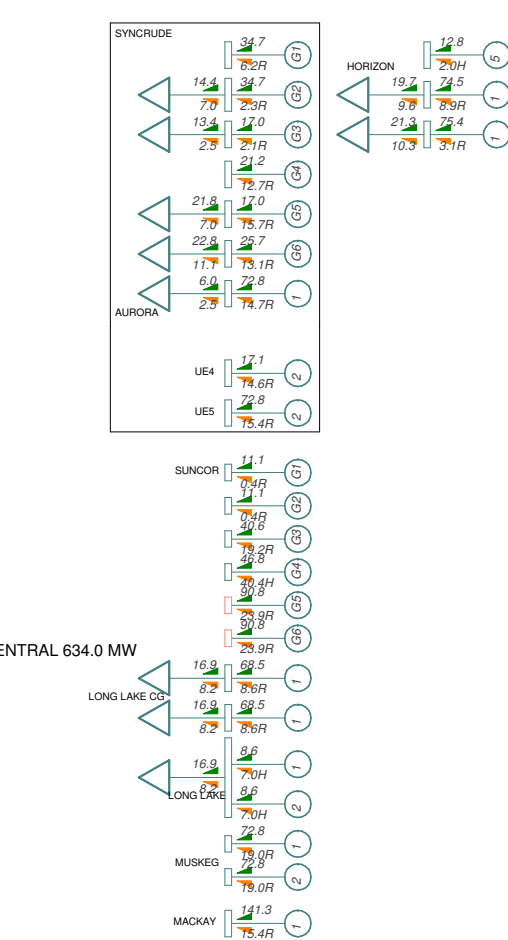
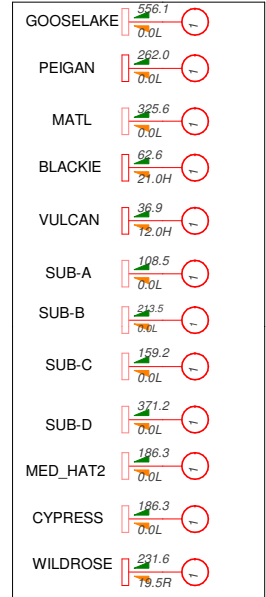
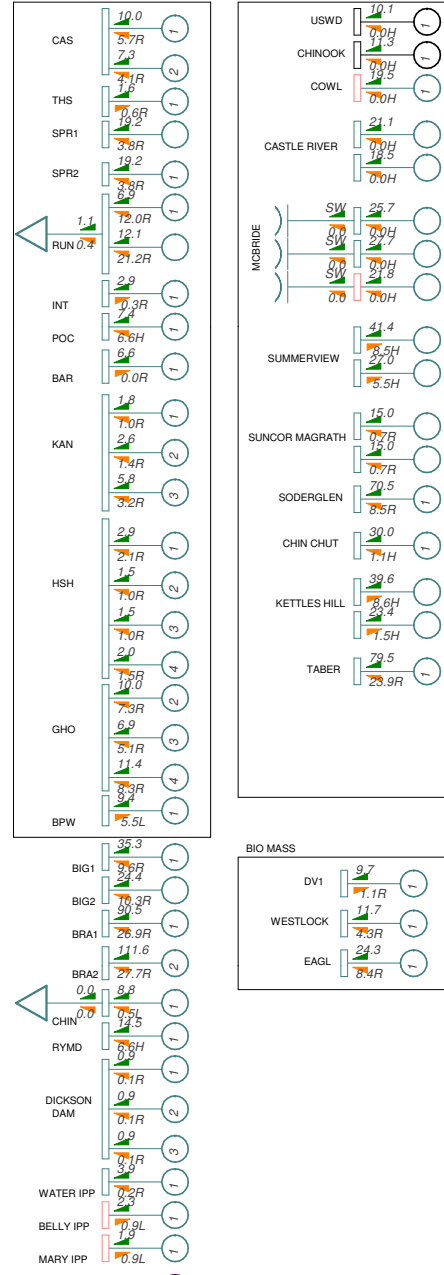
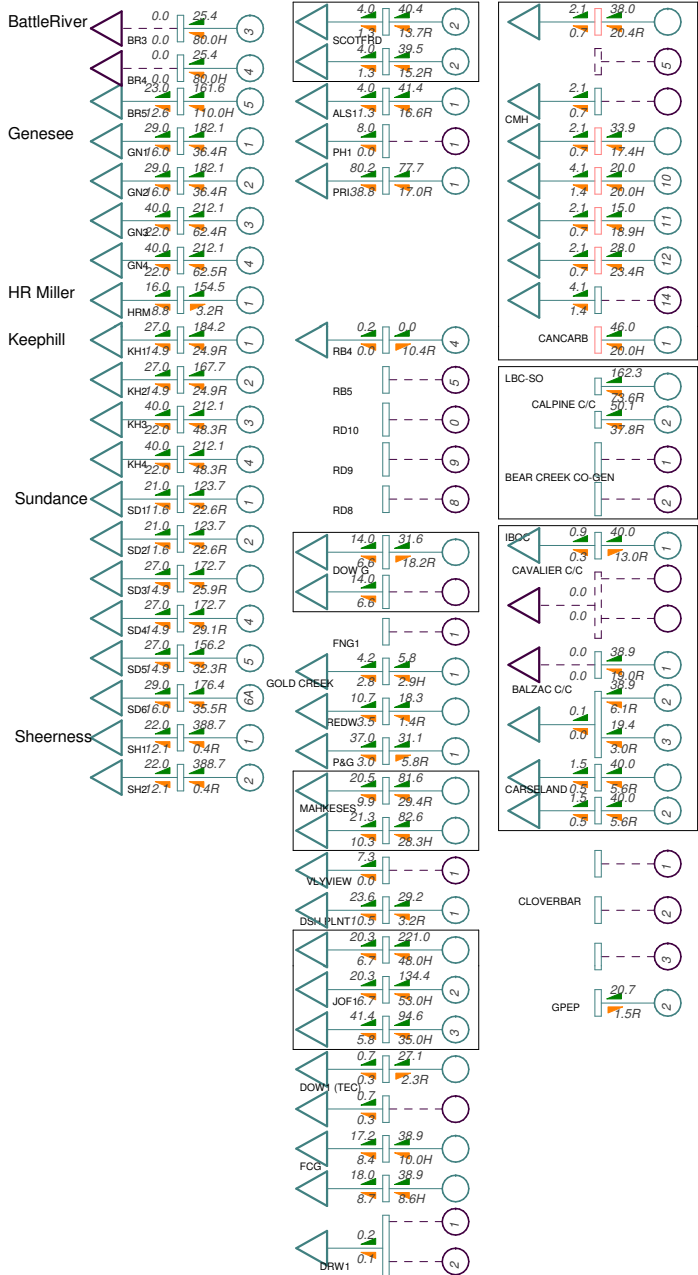
GROSS COAL GEN. 3634.3 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.



2017 SUMMER PEAK CASE
MON, NOV 24 2008 14:46

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
100.0%PATEA
1.050OV 0.950UV
KV: <=25.000 <=34.500 <=69.000 <=138.000 <=240.000 >240.000

Fig 2017-1C-SP-1

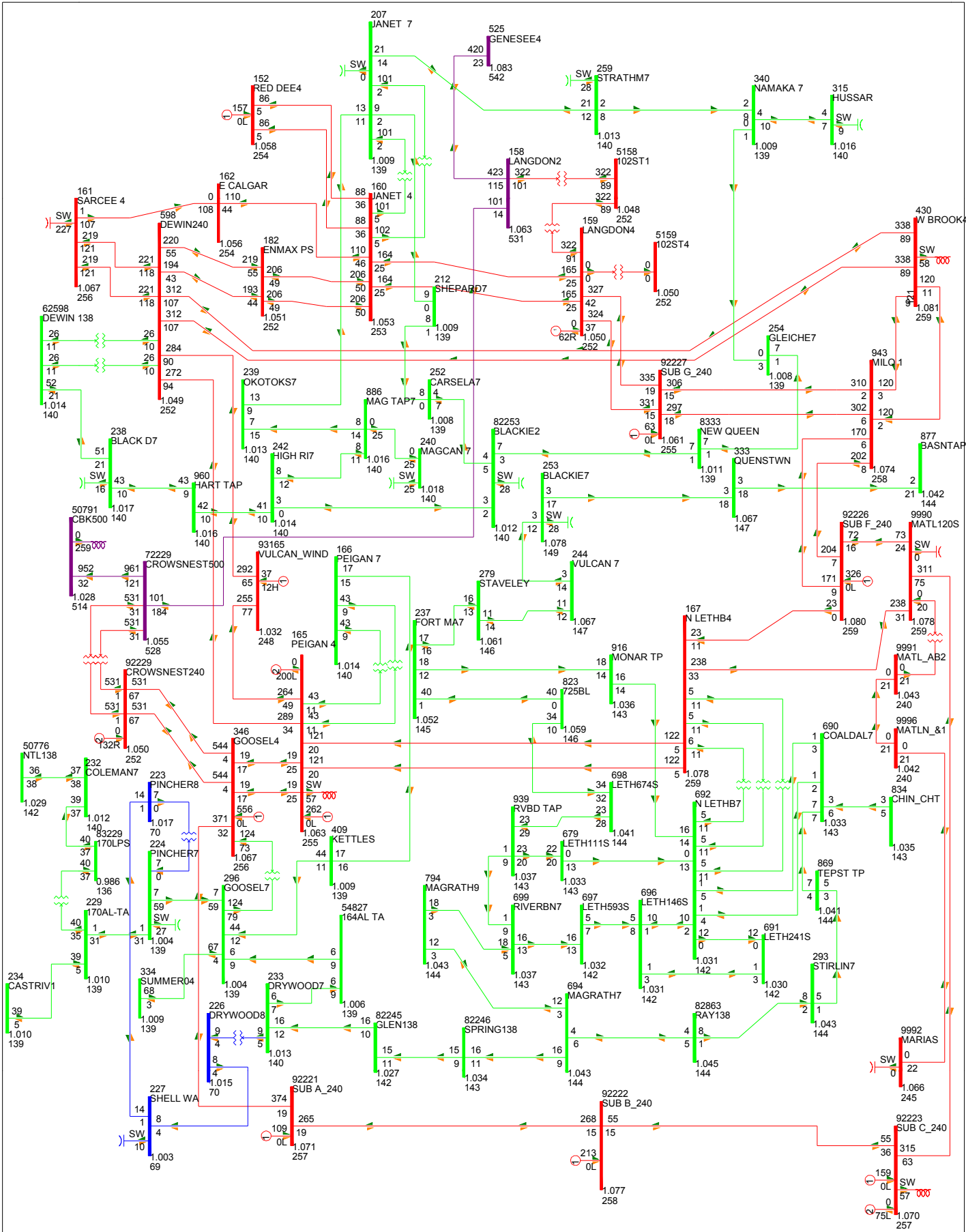


FIG 2017-1C-SP-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

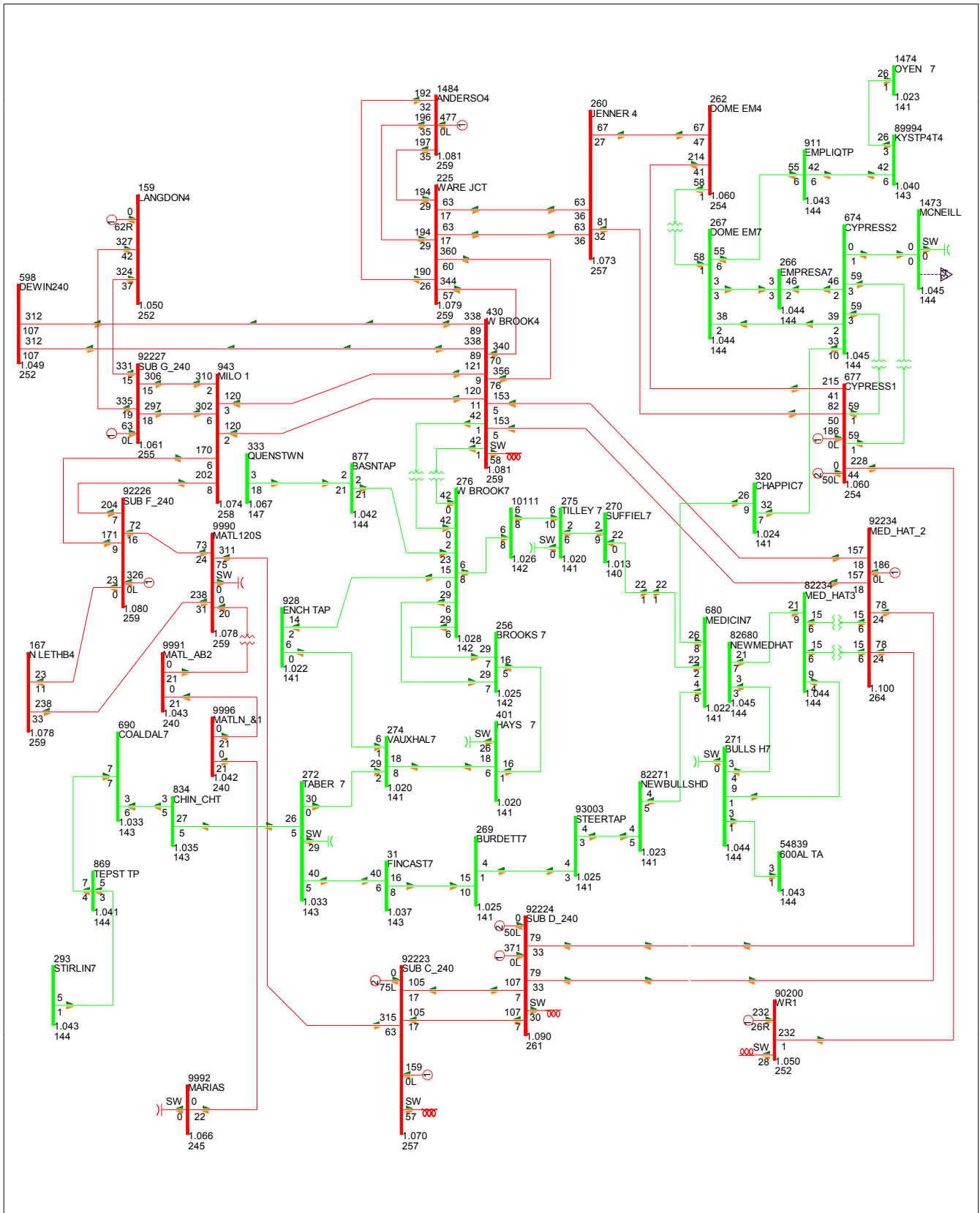


FIG 2017-1C-SP-3: N=0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

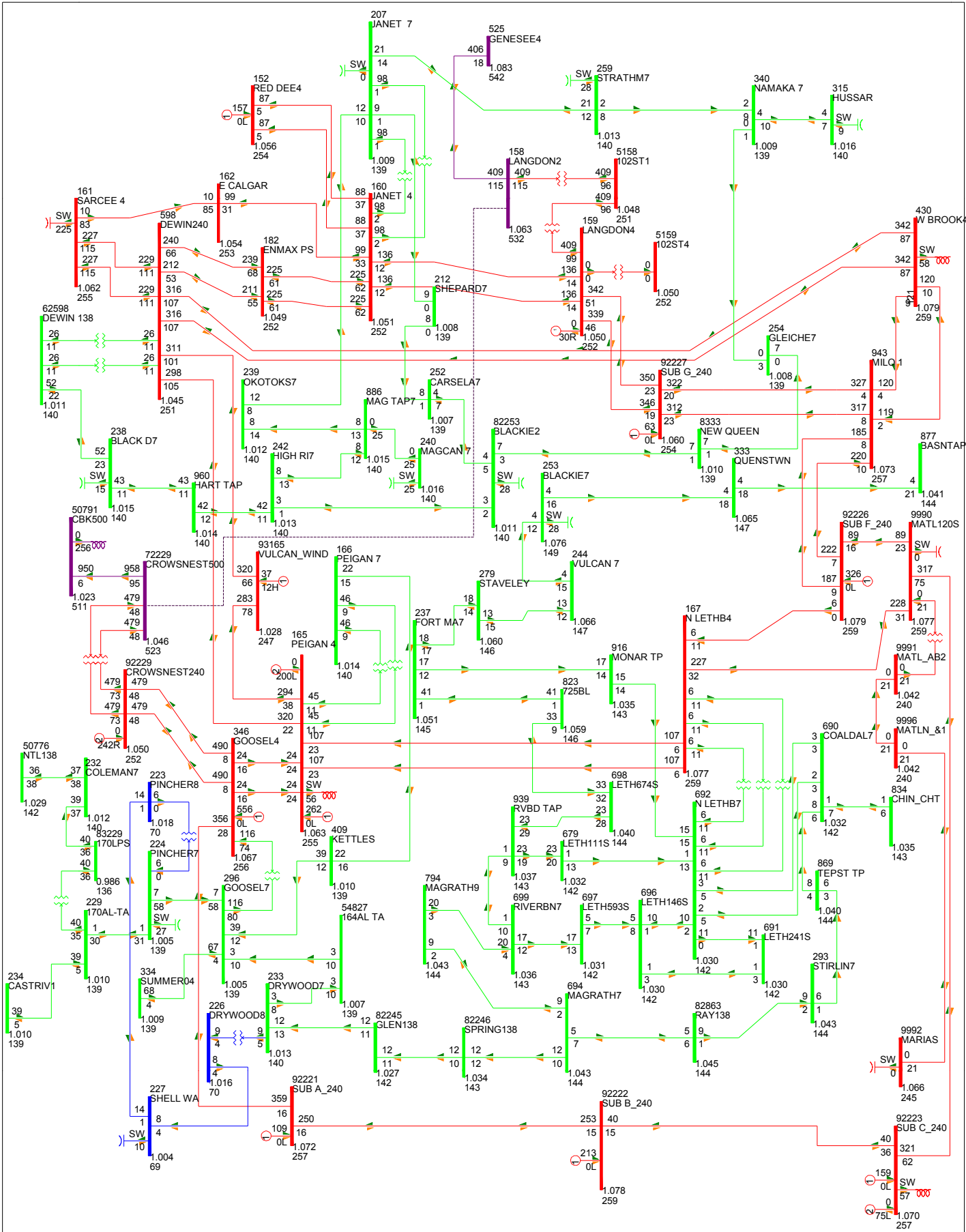


FIG 2017-1C-SP-4: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:16

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1014 MW

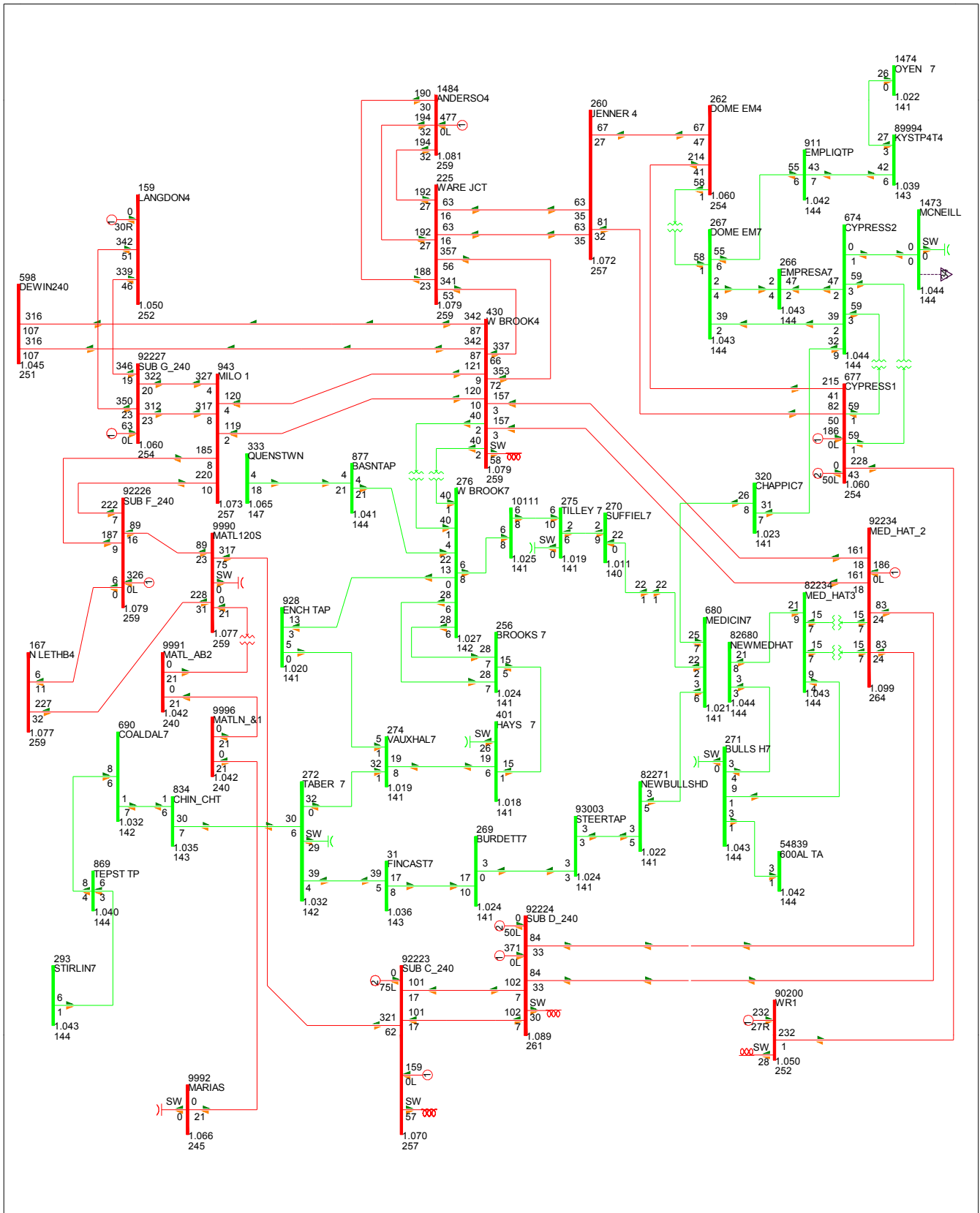


FIG 2017-1C-SP-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:16

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1014 MW

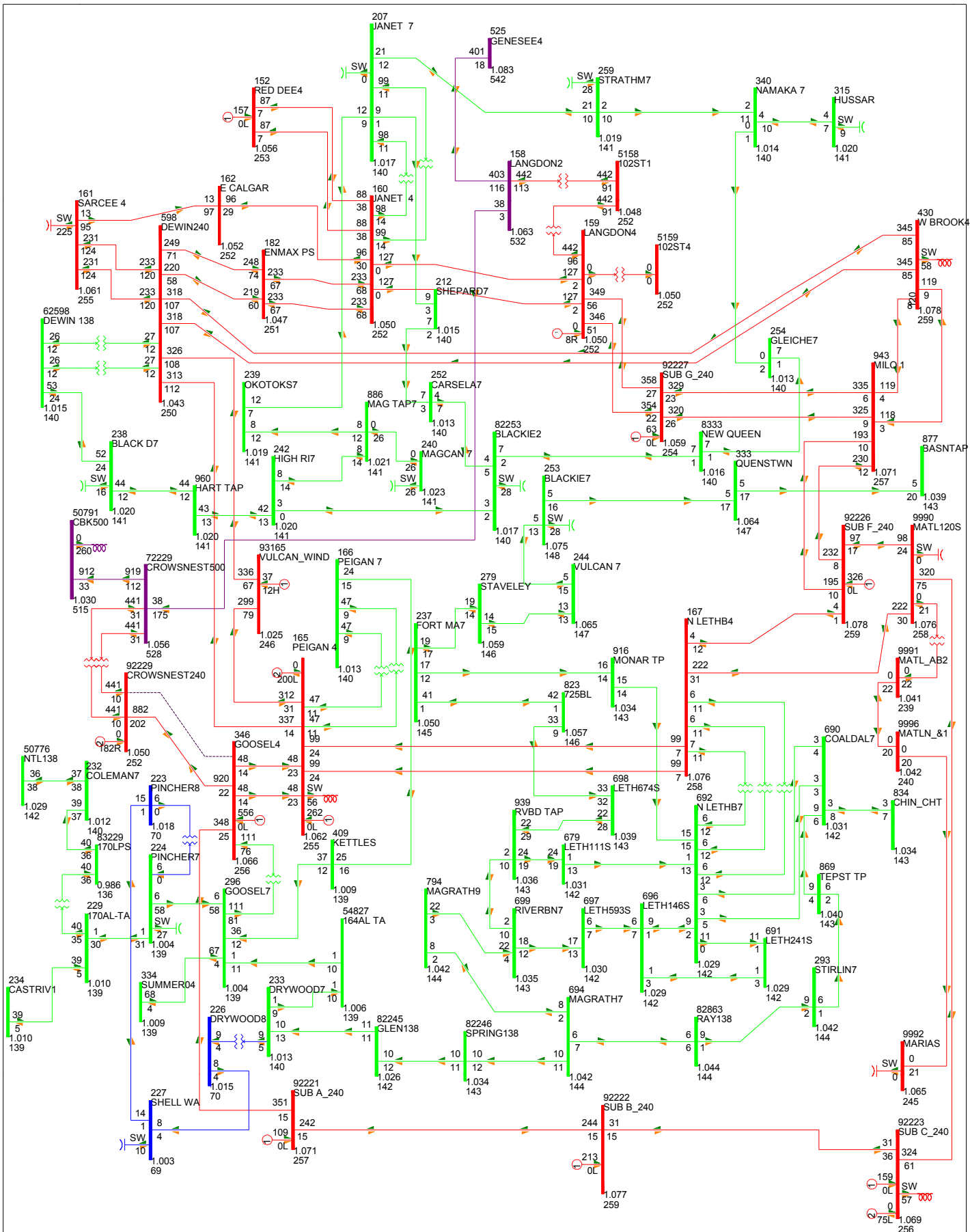


FIG 2017-1C-SP-6: CROWSNEST TO GOOSELAKE 240KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 988 MW

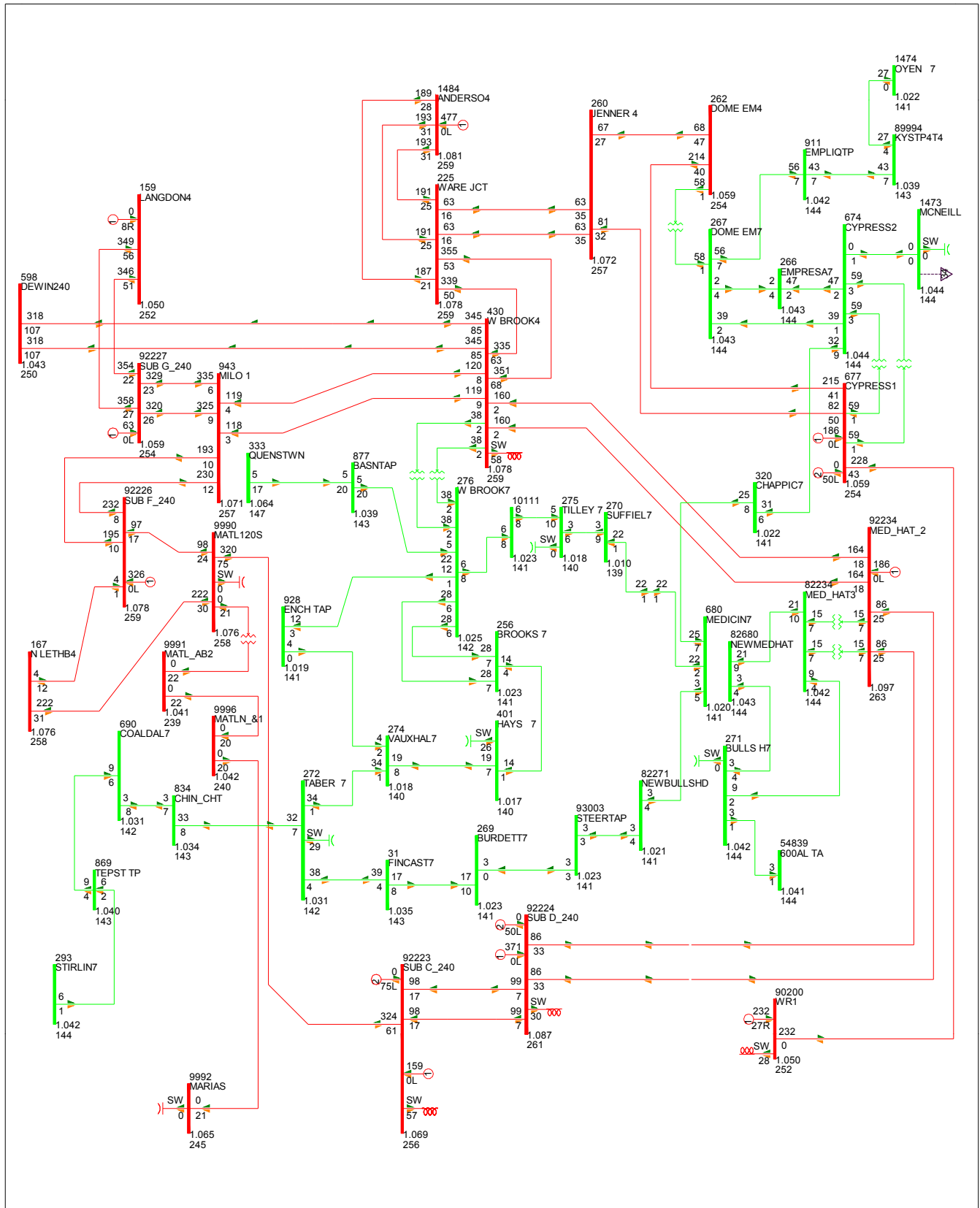


FIG 2017-1C-SP-7: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

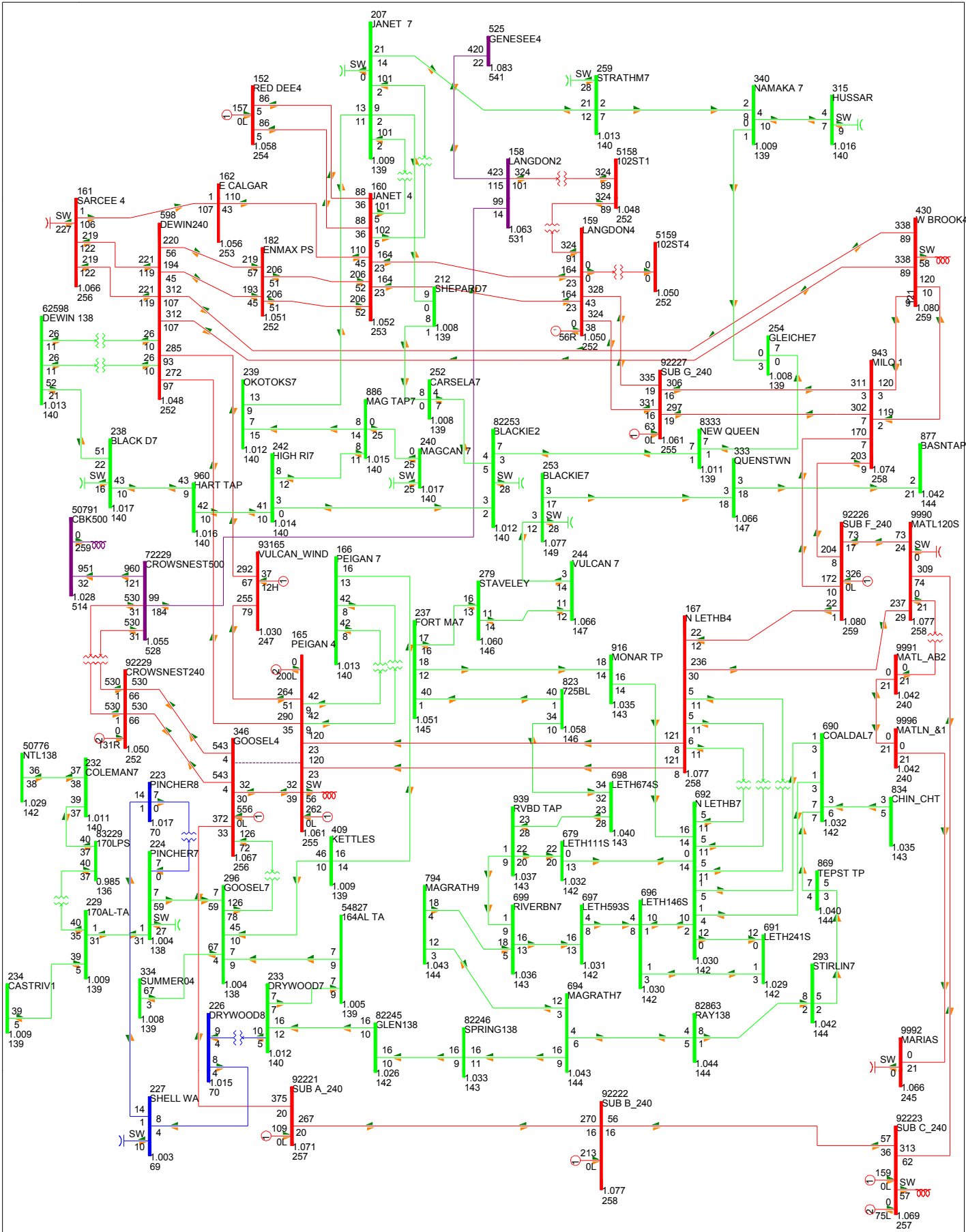


FIG 2017-1C-SP-8: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

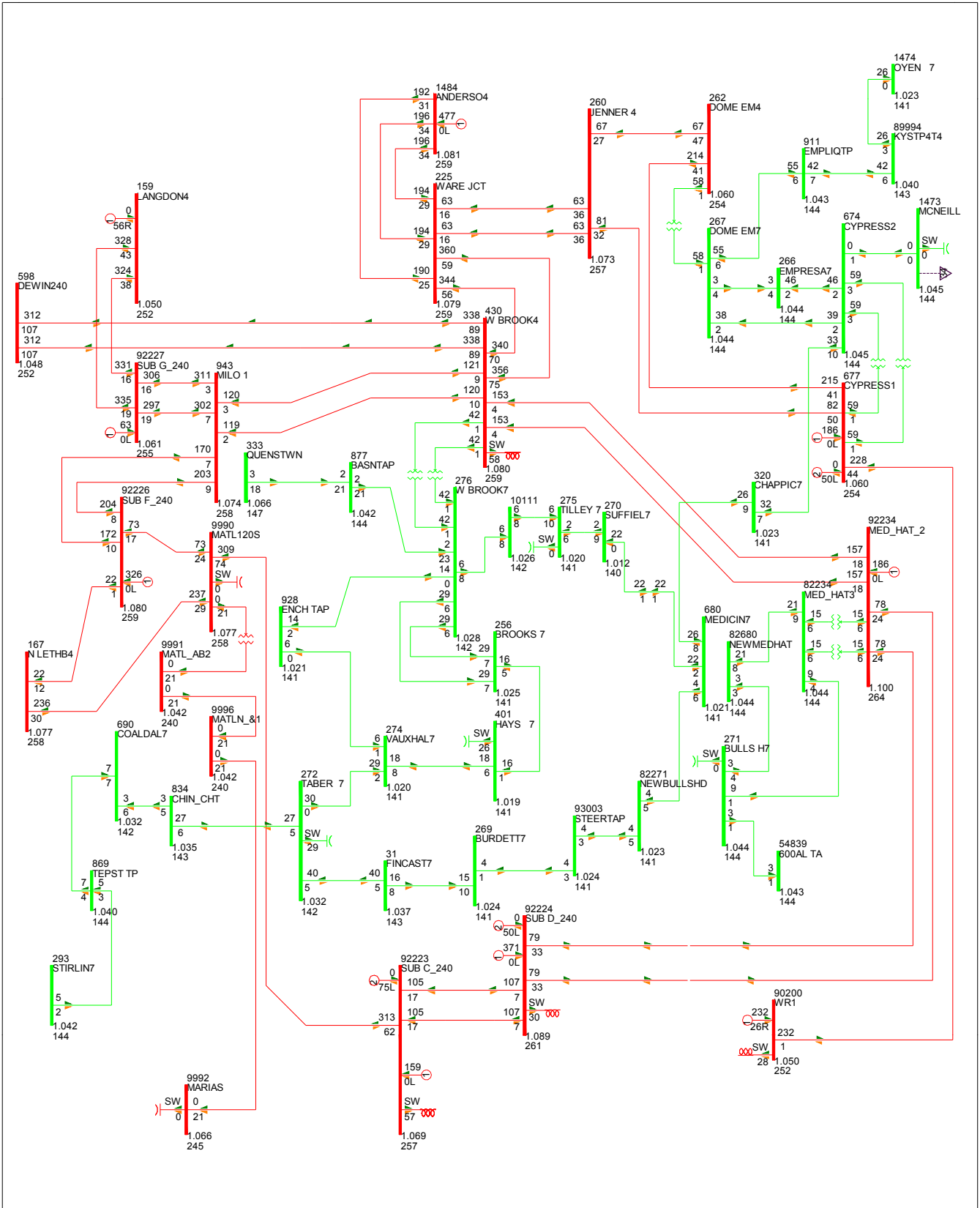


FIG 2017-1C-SP-9: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:42

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1023 MW

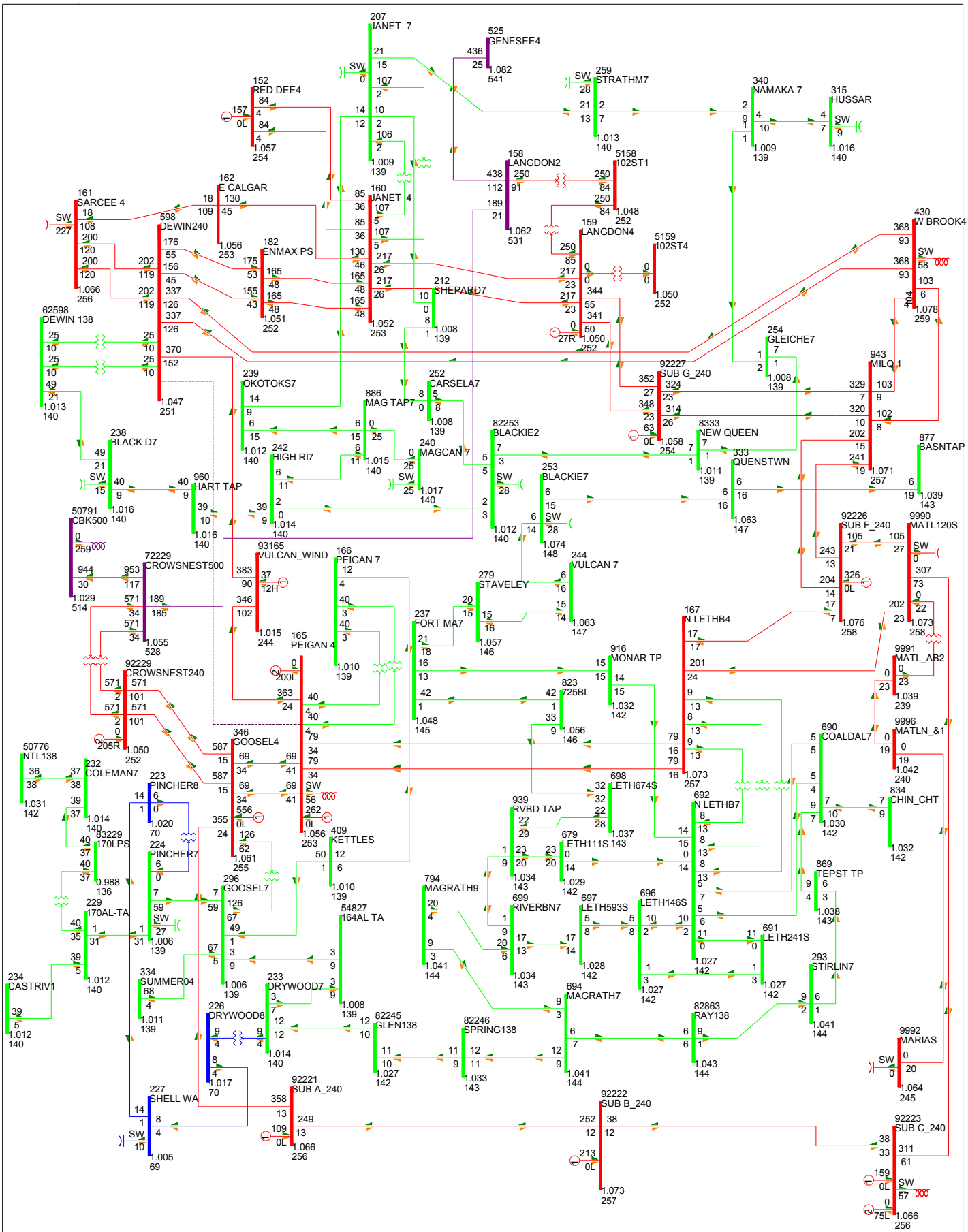


FIG 2017-1C-SP-10: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1010 MW

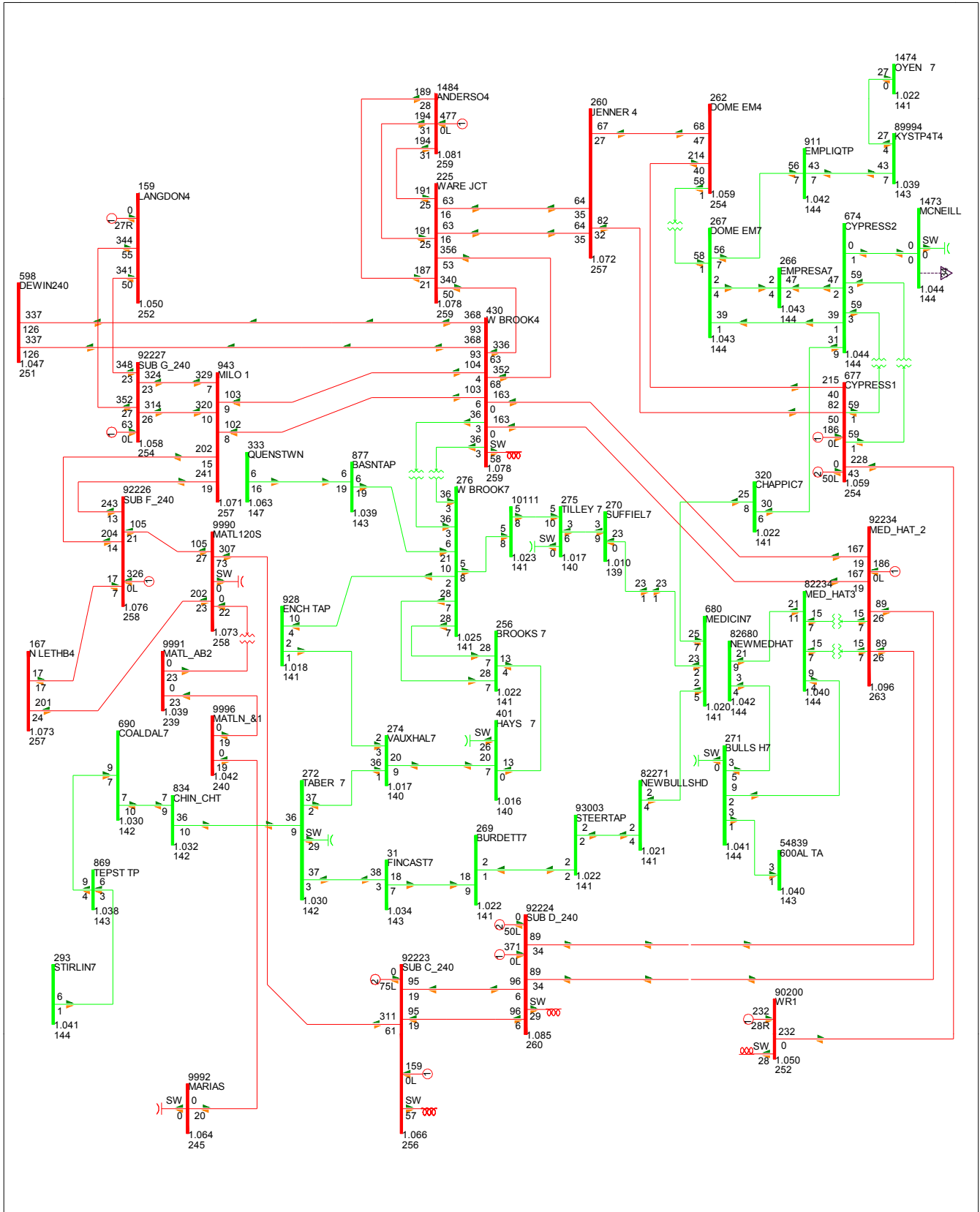


FIG 2017-1C-SP-11: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1010 MW

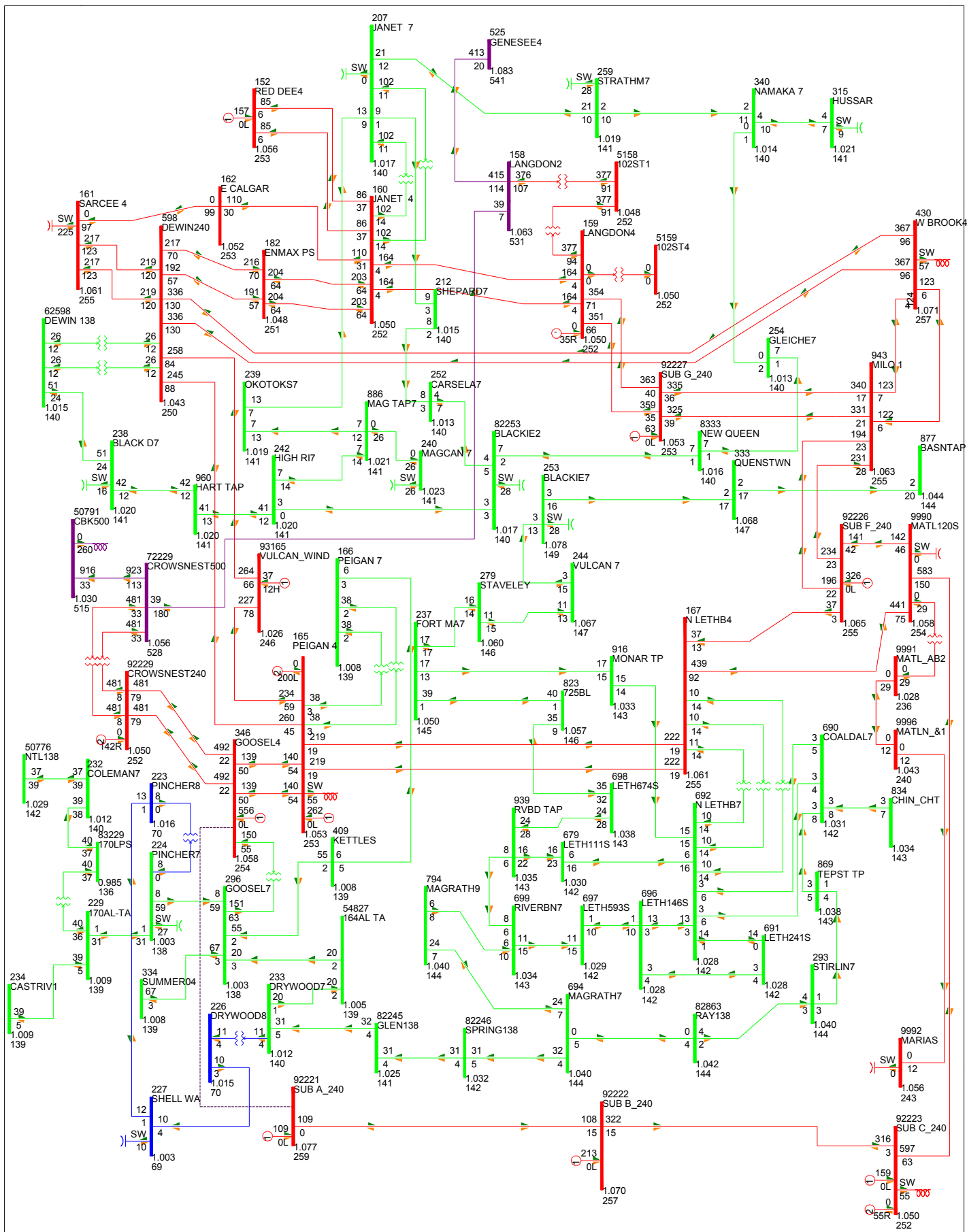


FIG 2017-1C-SP-12: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

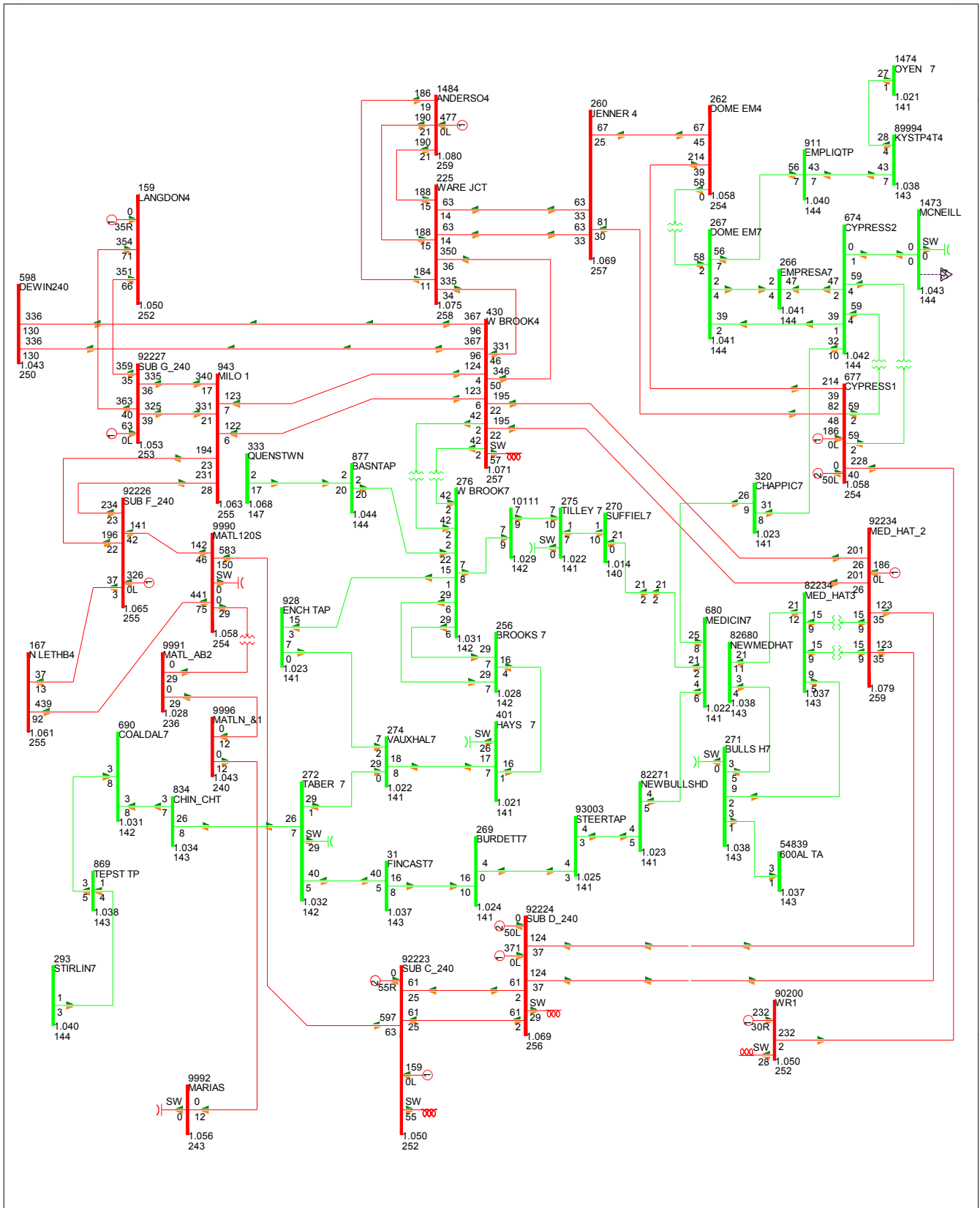


FIG 2017-1C-SP-13: GOOSELAKE TO SUB A 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PV)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

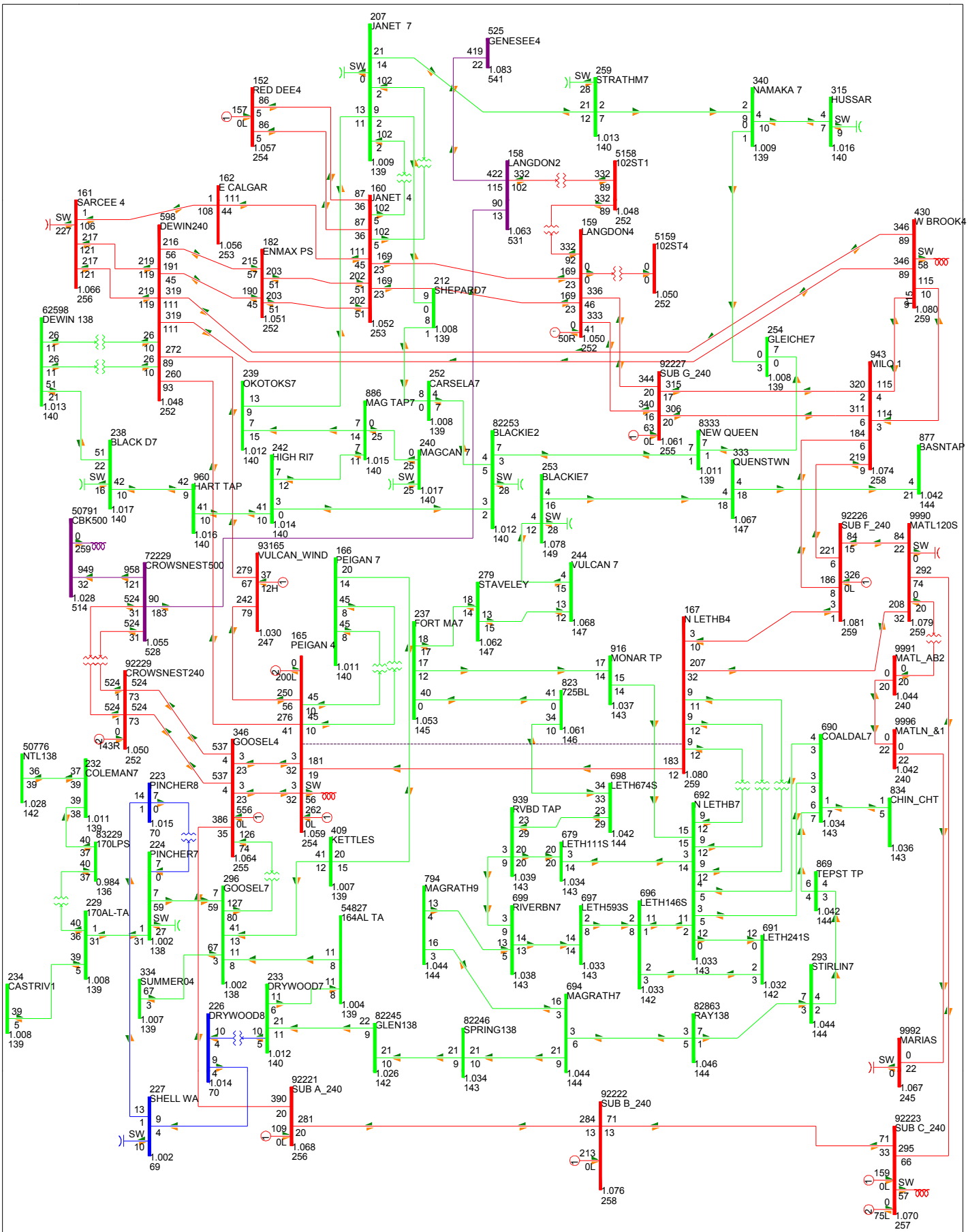


FIG 2017-1C-SP-14: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1021 MW

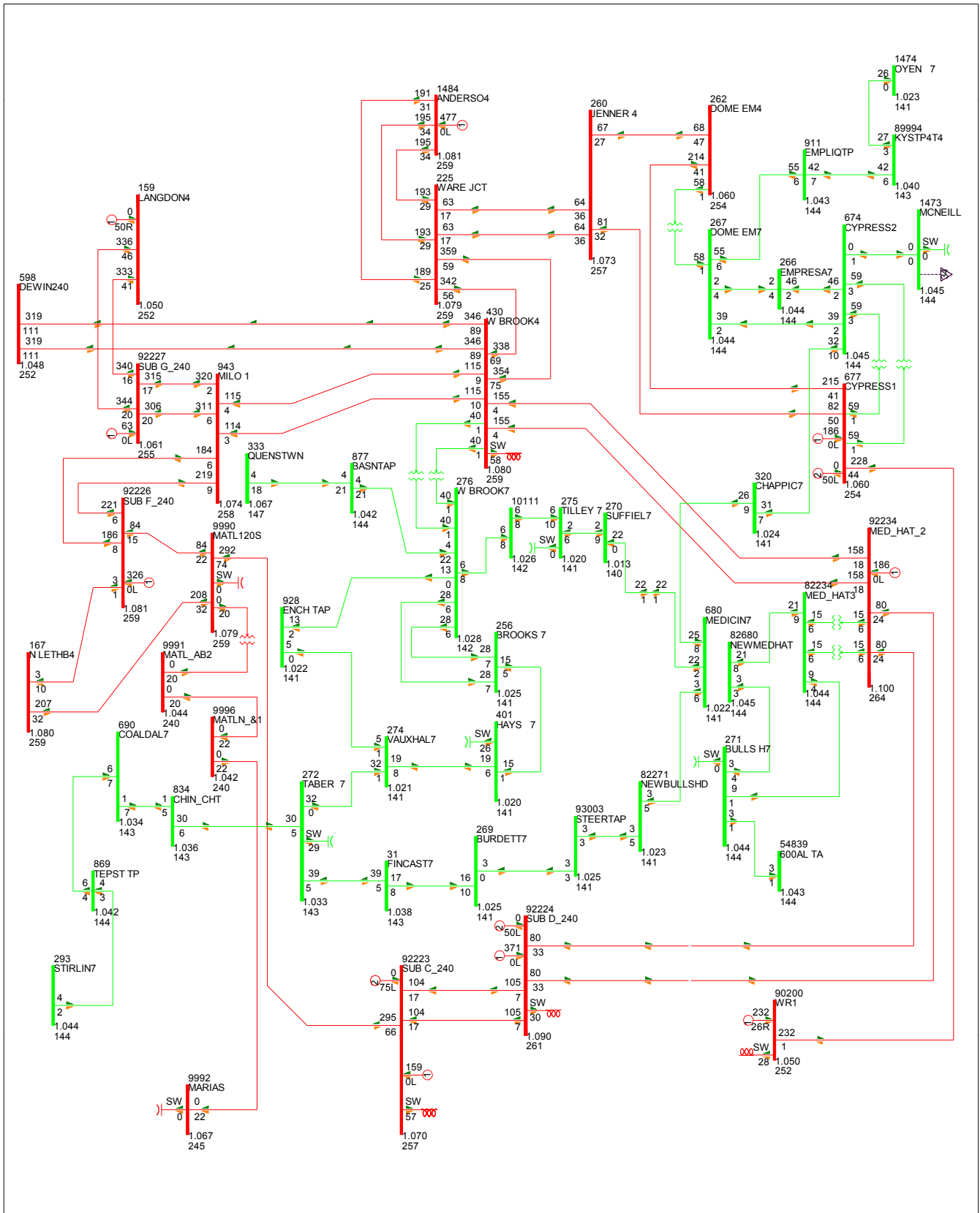


FIG 2017-1C-SP-15: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1021 MW

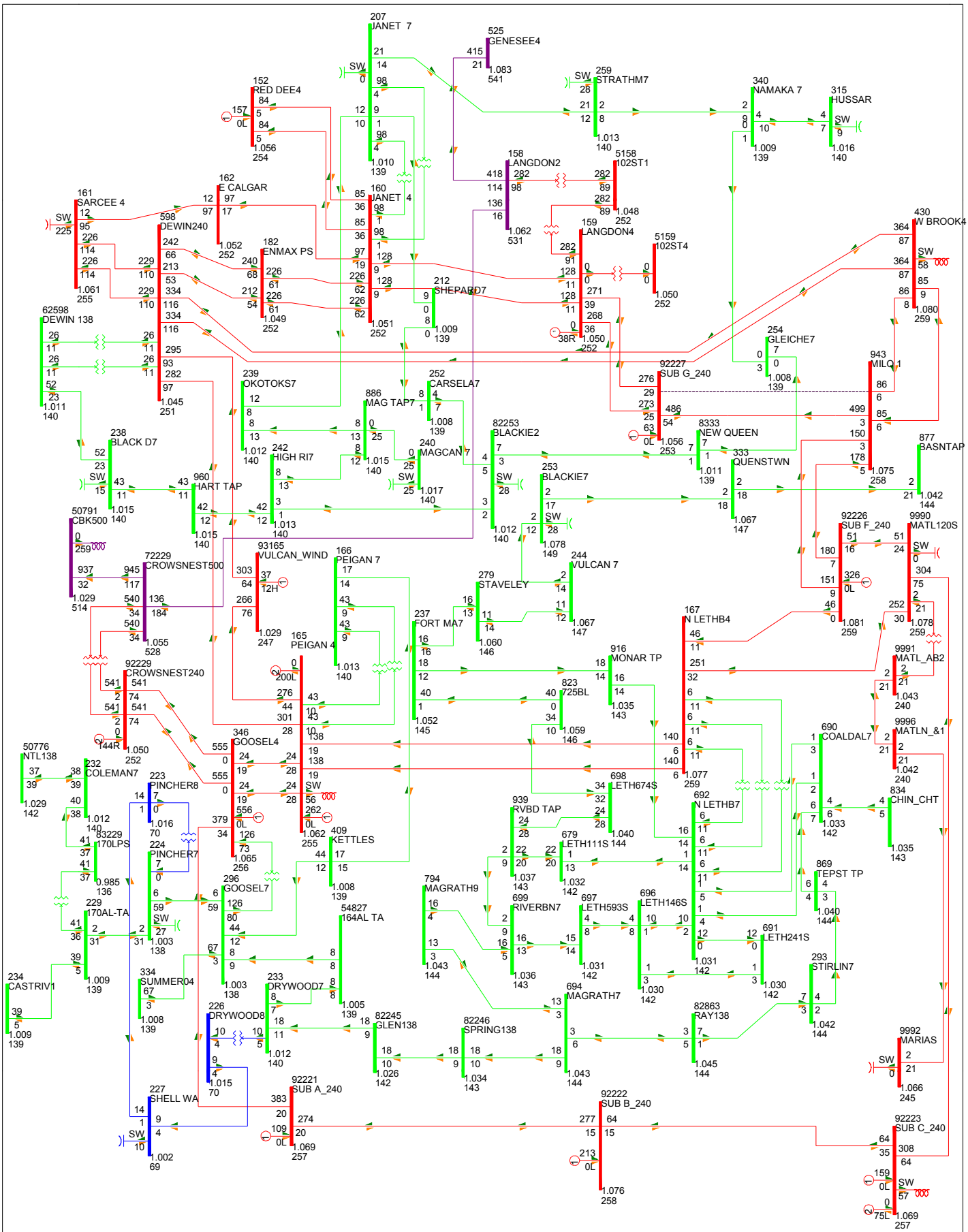


FIG 2017-1C-SP-16: MILO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

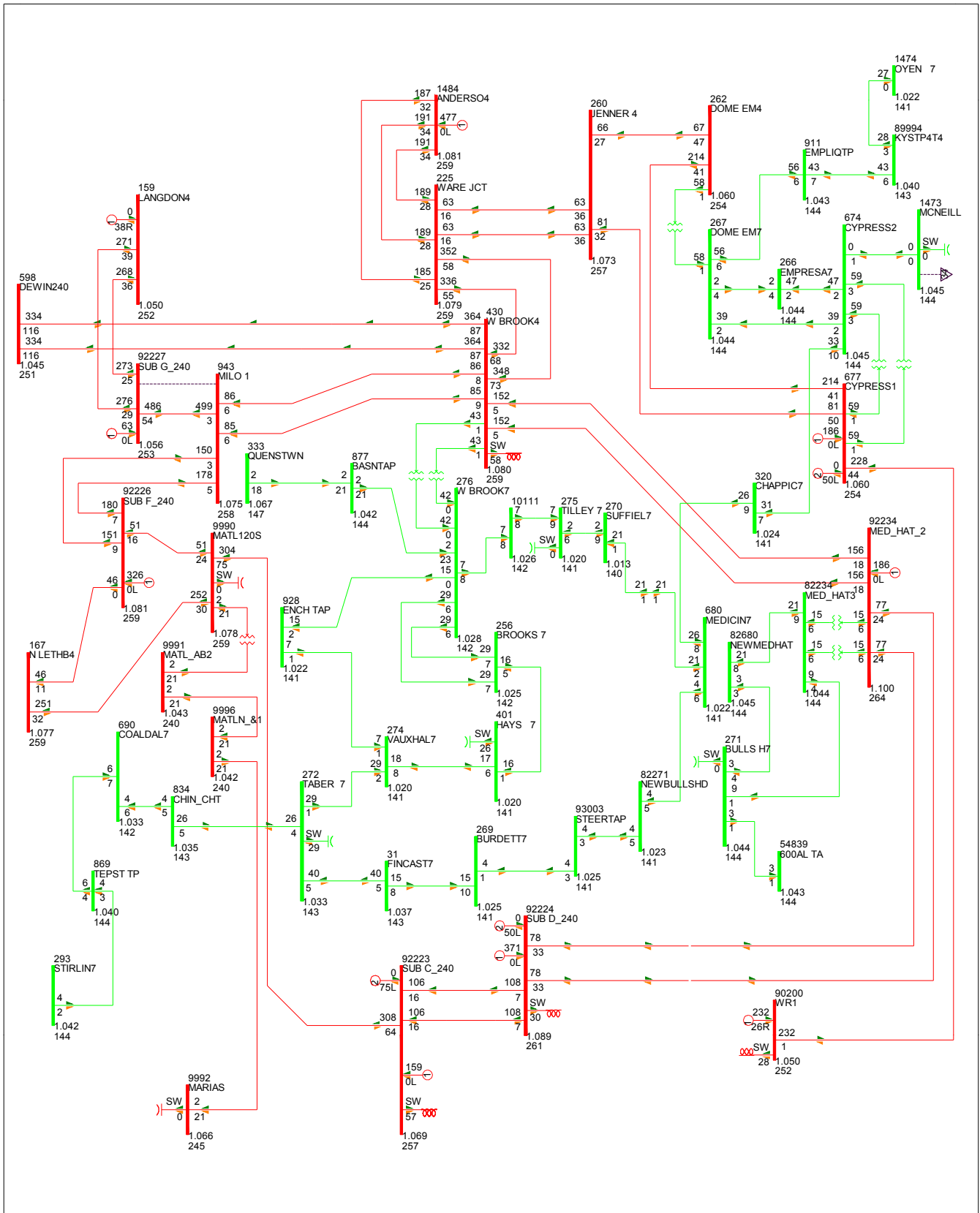


FIG 2017-1C-SP-17: MILO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1007 MW

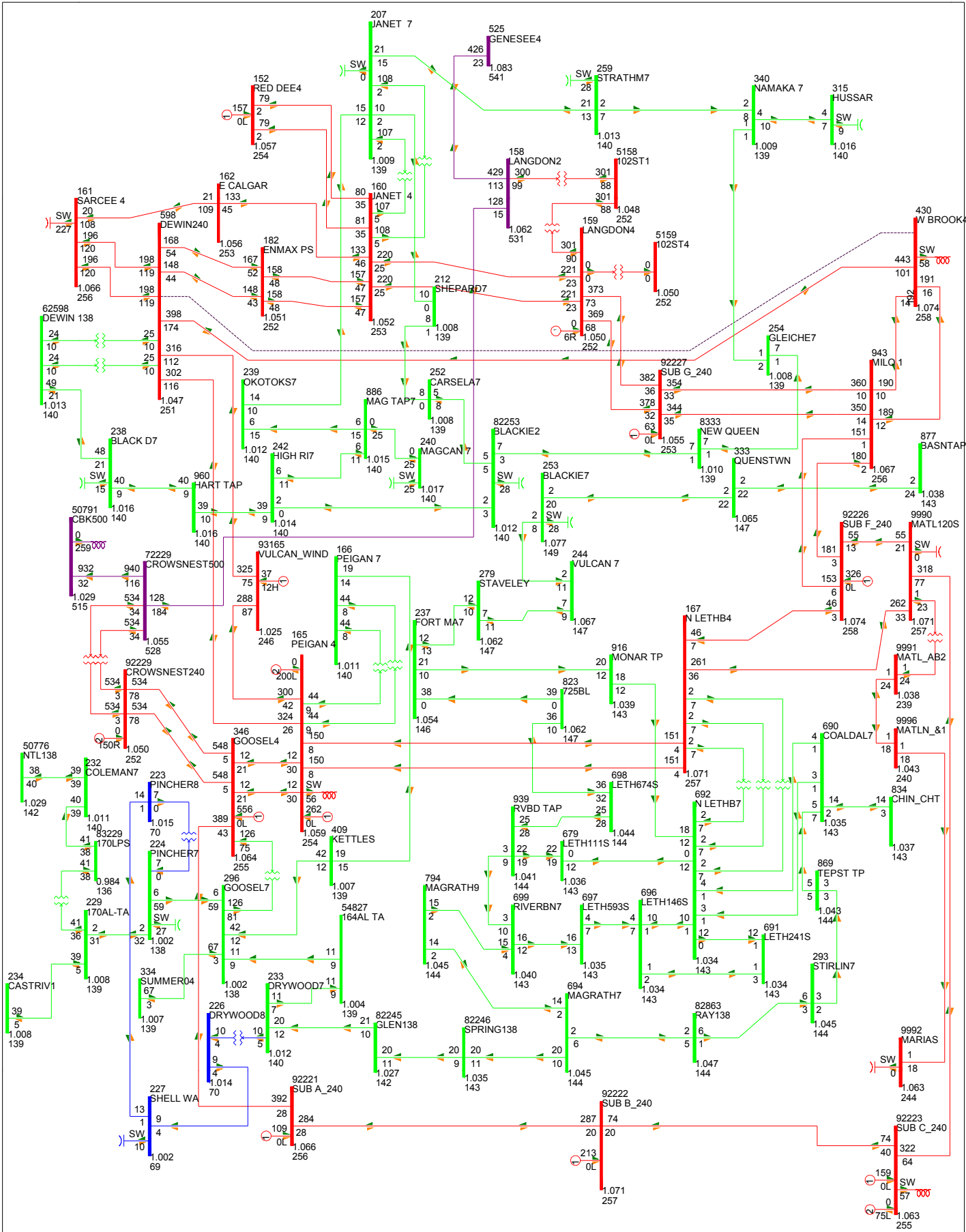


FIG 2017-1C-SP-18: WESTBROOKS TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

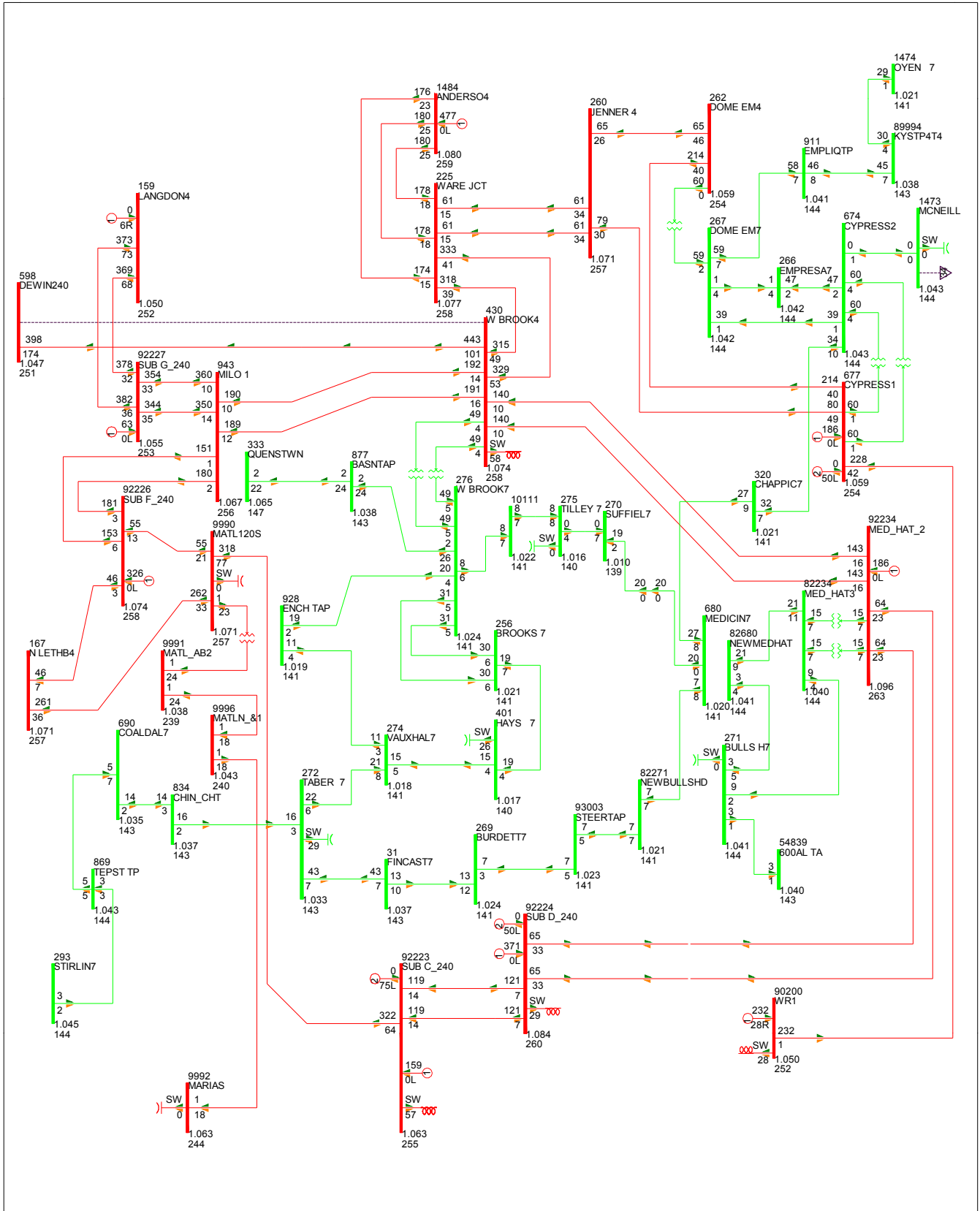


FIG 2017-1C-SP-19: WESTBROOKS TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

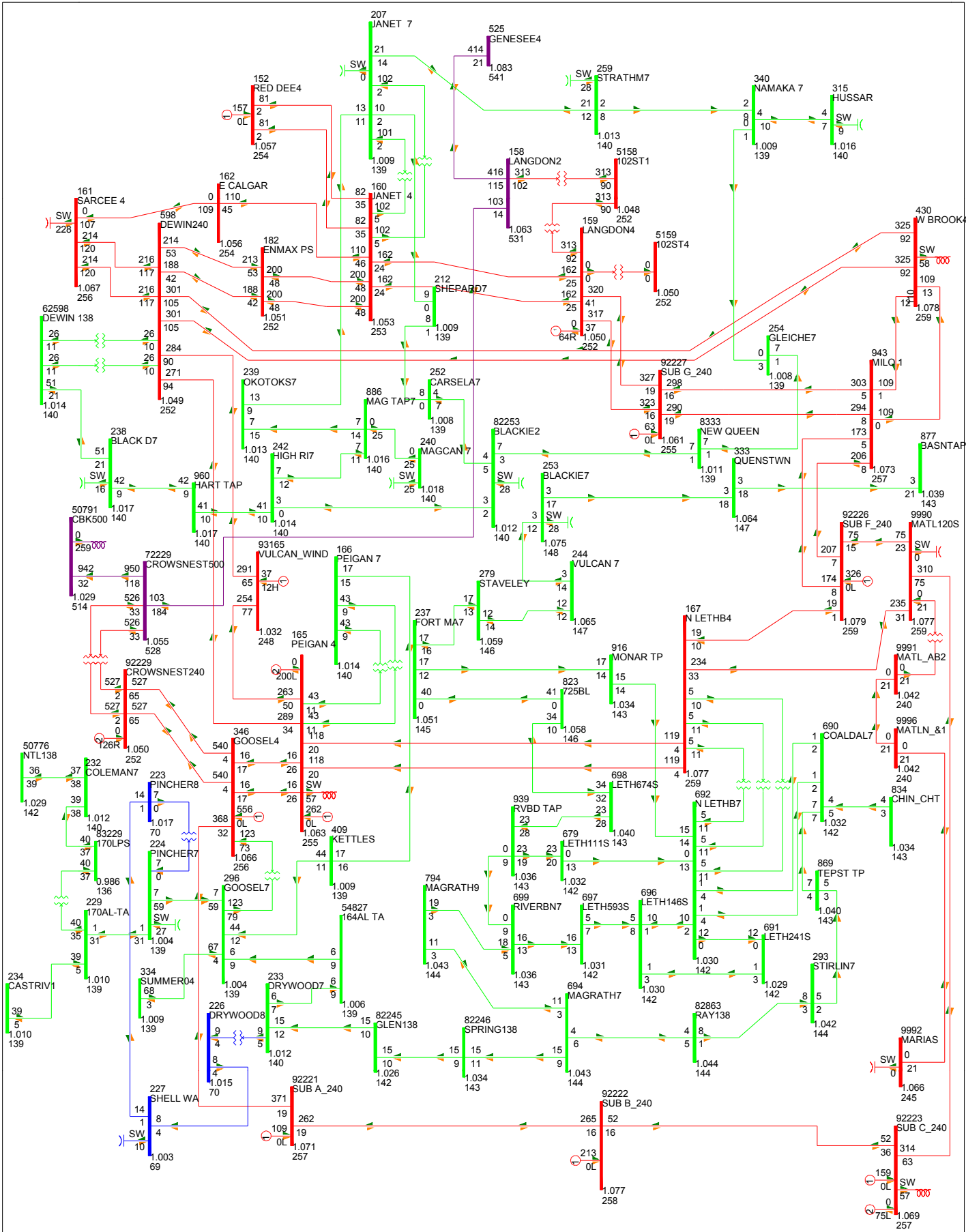


FIG 2017-1C-SP-20: WAREJUNC TO WESTBROOKS 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1012 MW

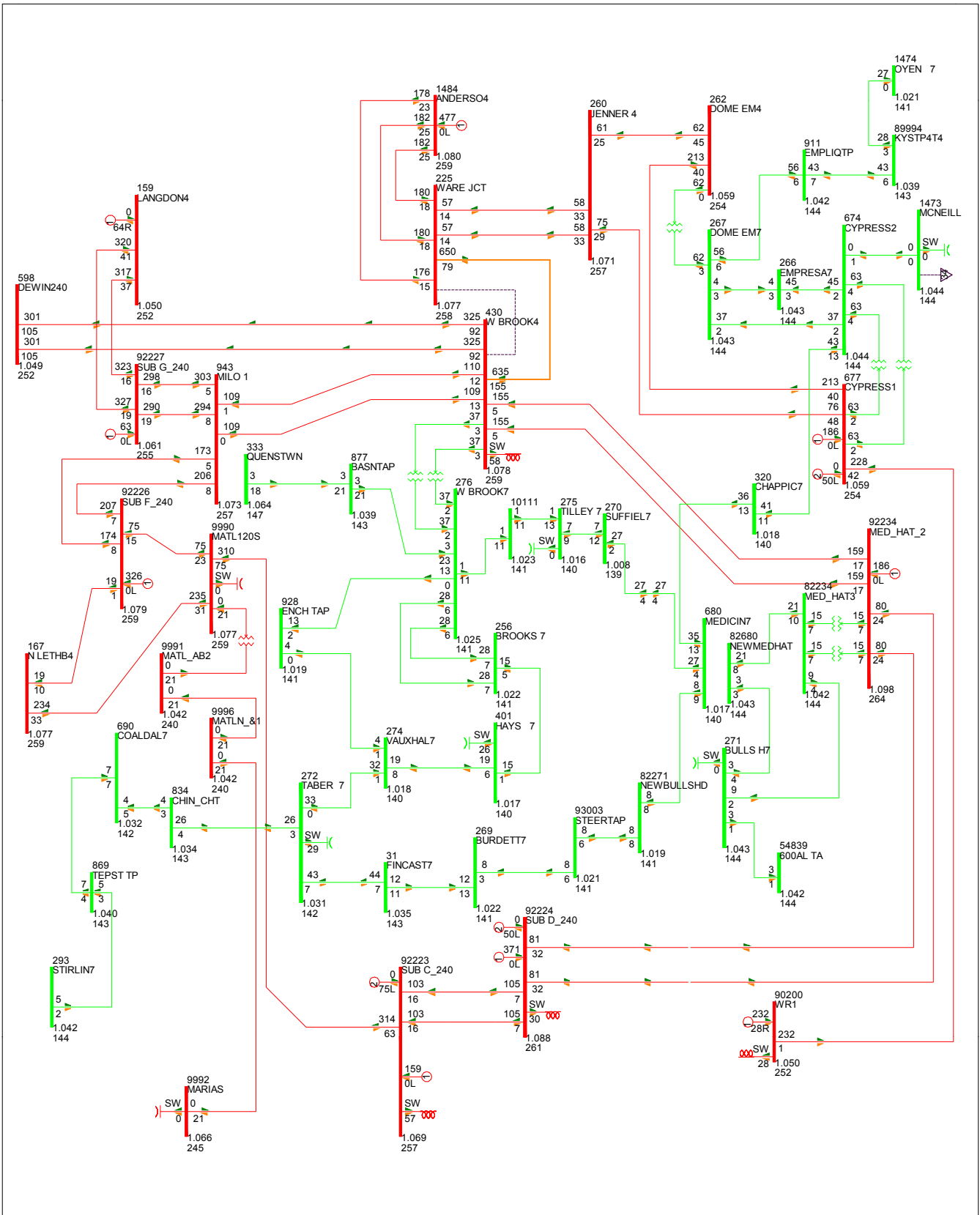


FIG 2017-1C-SP-21: WAREJUNC TO WESTBROOKS 240 KV PROPORTIONAL WIND SCENARIO

2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 1C

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1012 MW

GENERATION DISPATCH REPORT

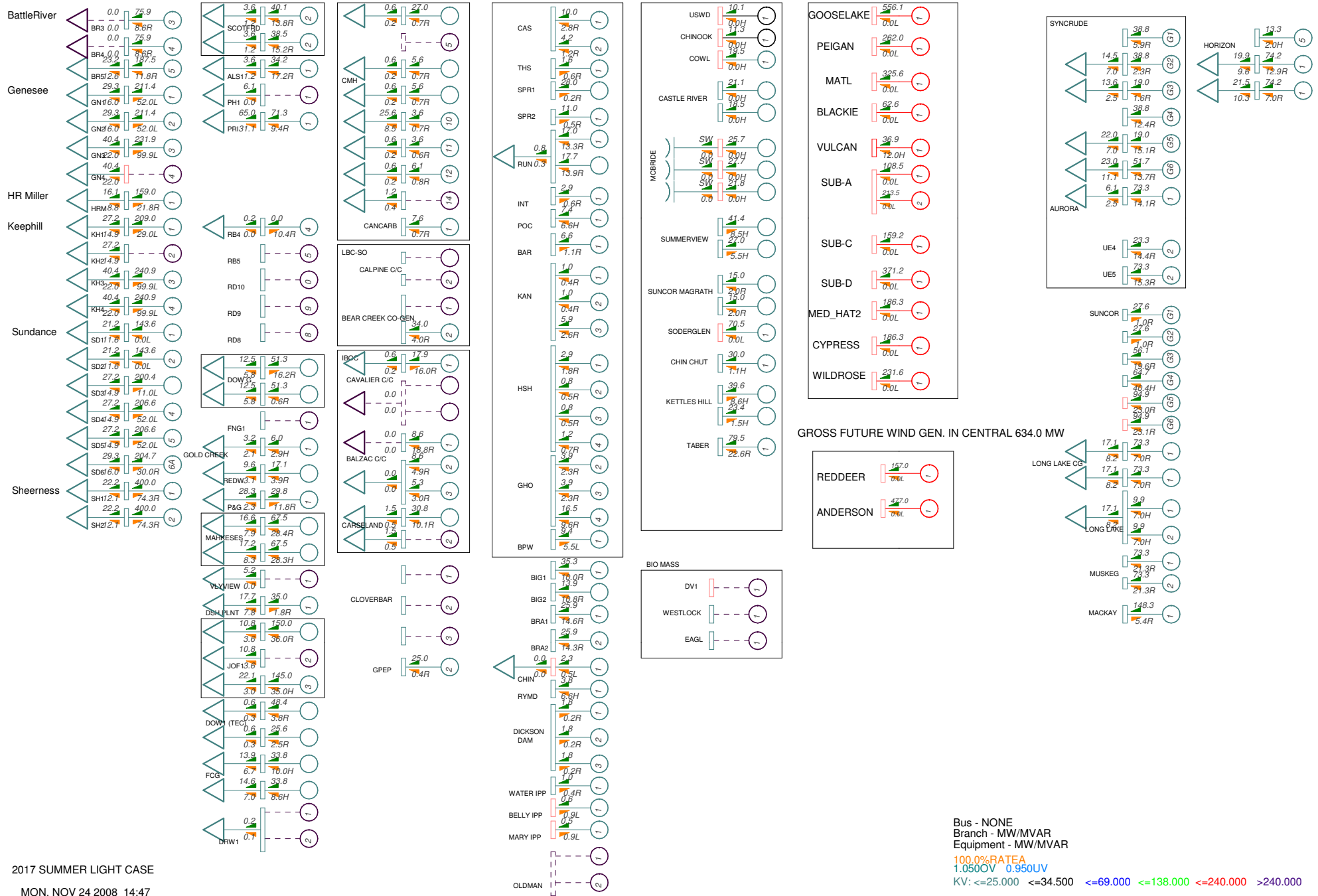
GROSS COAL GEN. 3749.2 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.



2017 SUMMER LIGHT CASE

MON, NOV 24 2008 14:47

Fig 2017-2-SL-1

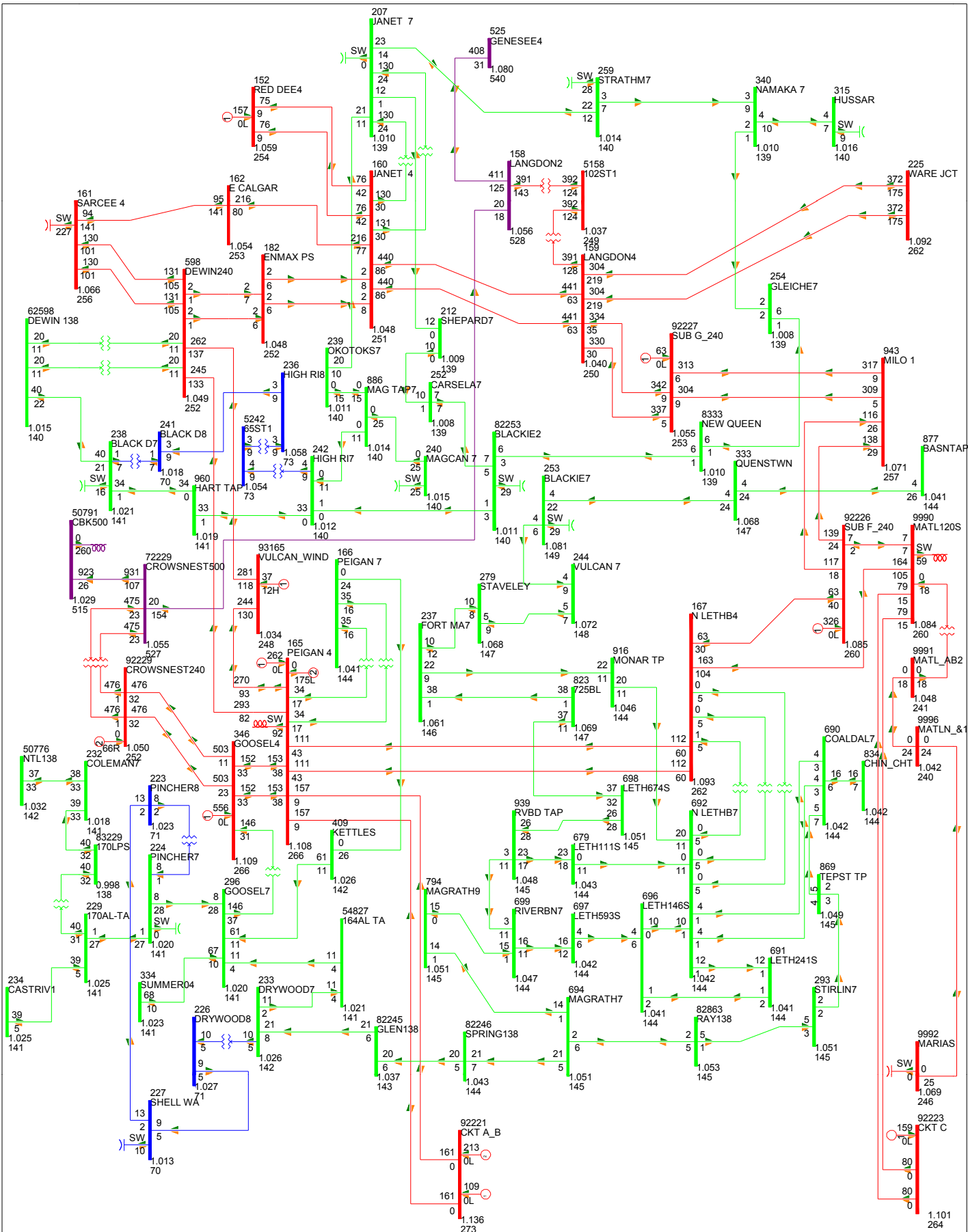


FIG 2017-2-SL-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 990 MW

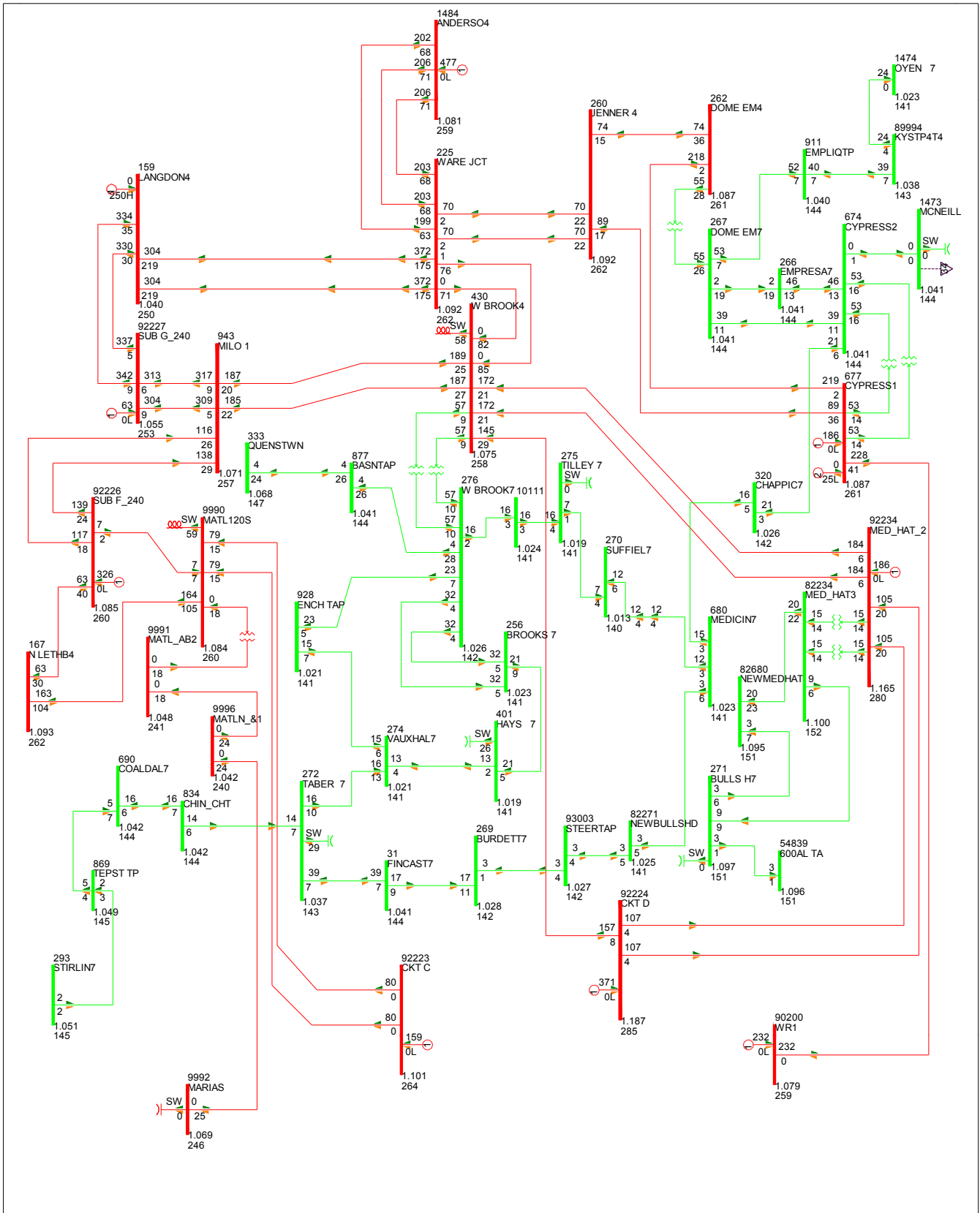


FIG 2017-2-SL-3: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 990 MW

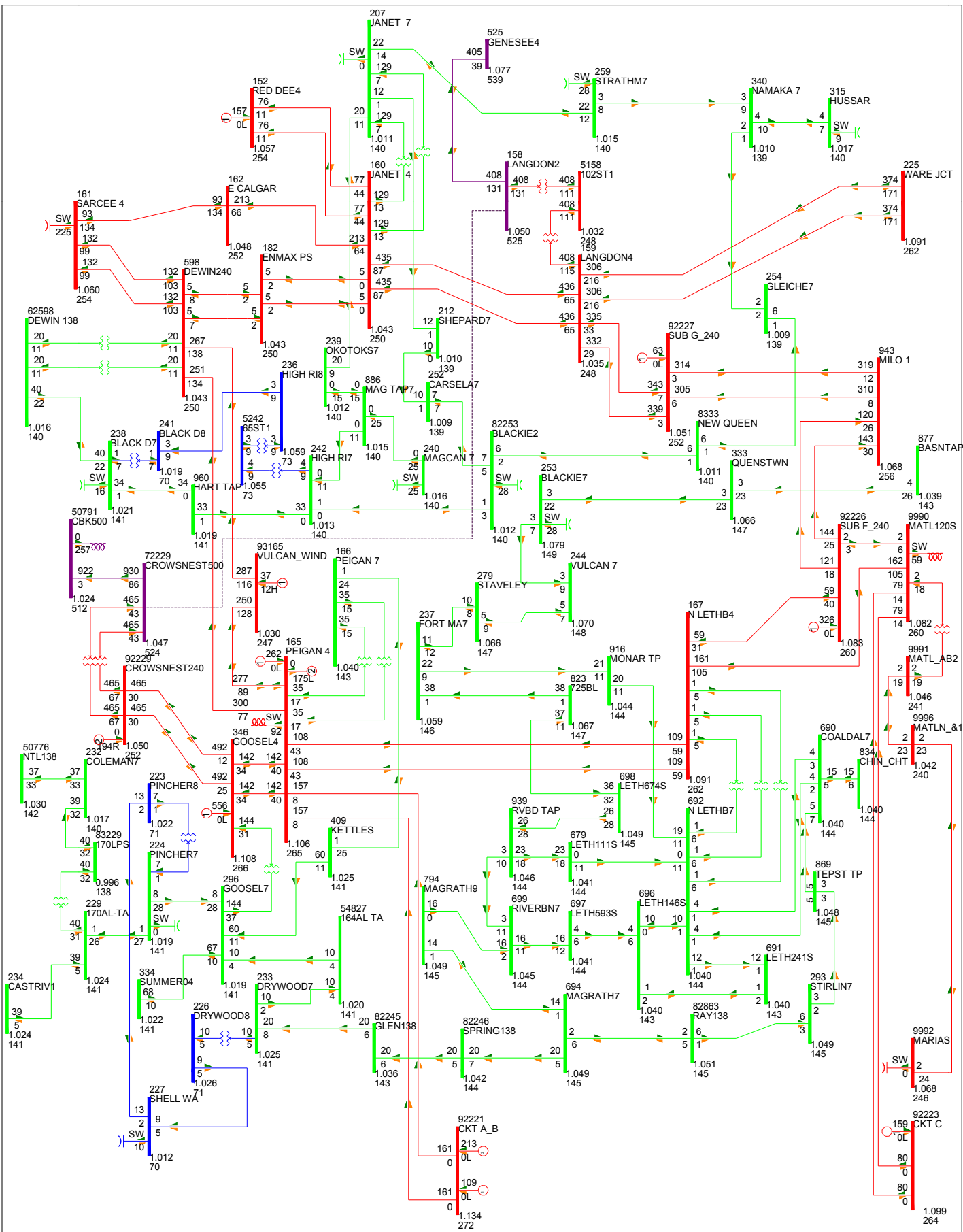


FIG 2017-2-SL-4: LANGDON TO CROWNSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

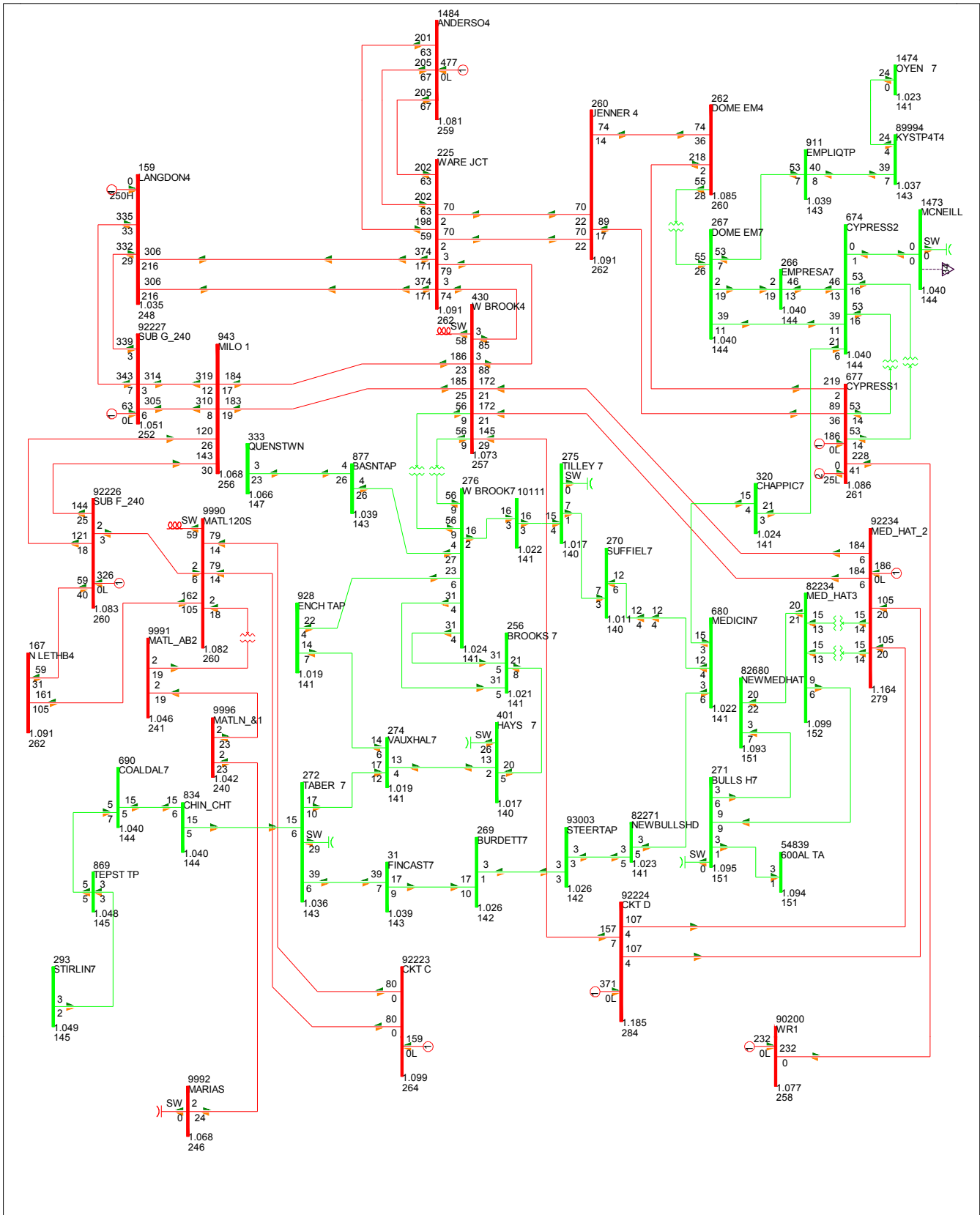


FIG 2017-2-SL-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

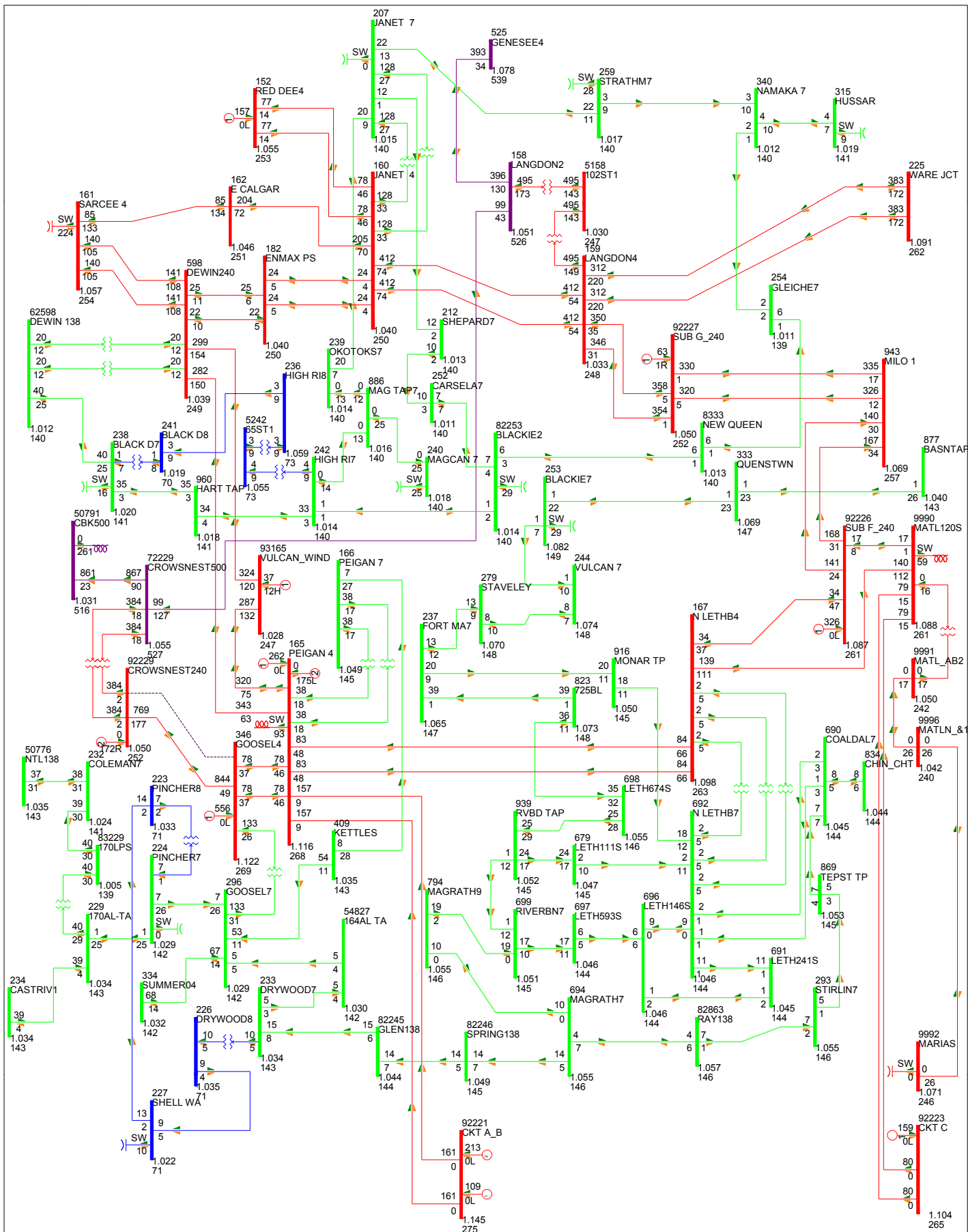


FIG 2017-2-SL-6: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:23

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 931 MW

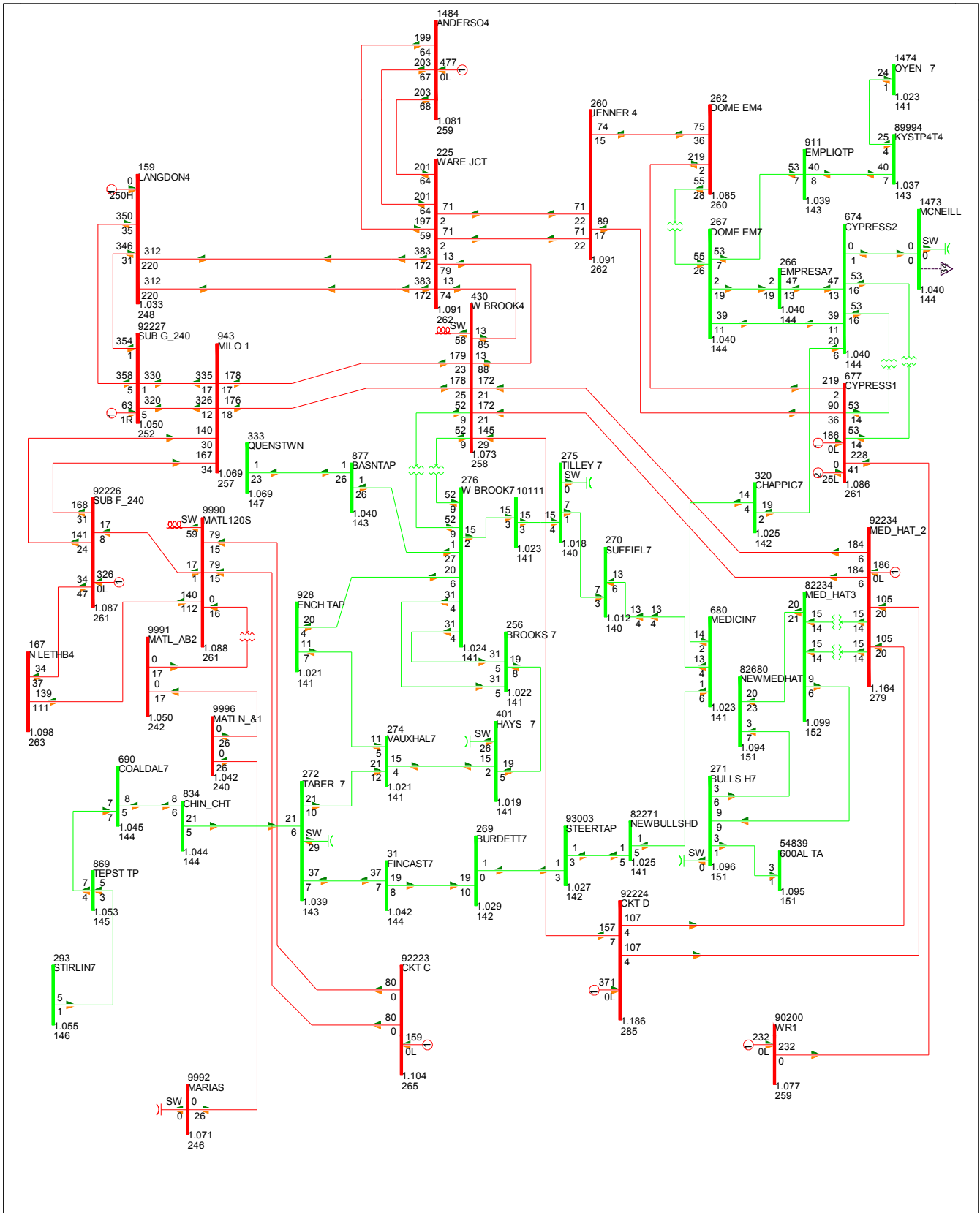


FIG 2017-2-SL-7: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:23

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 931 MW

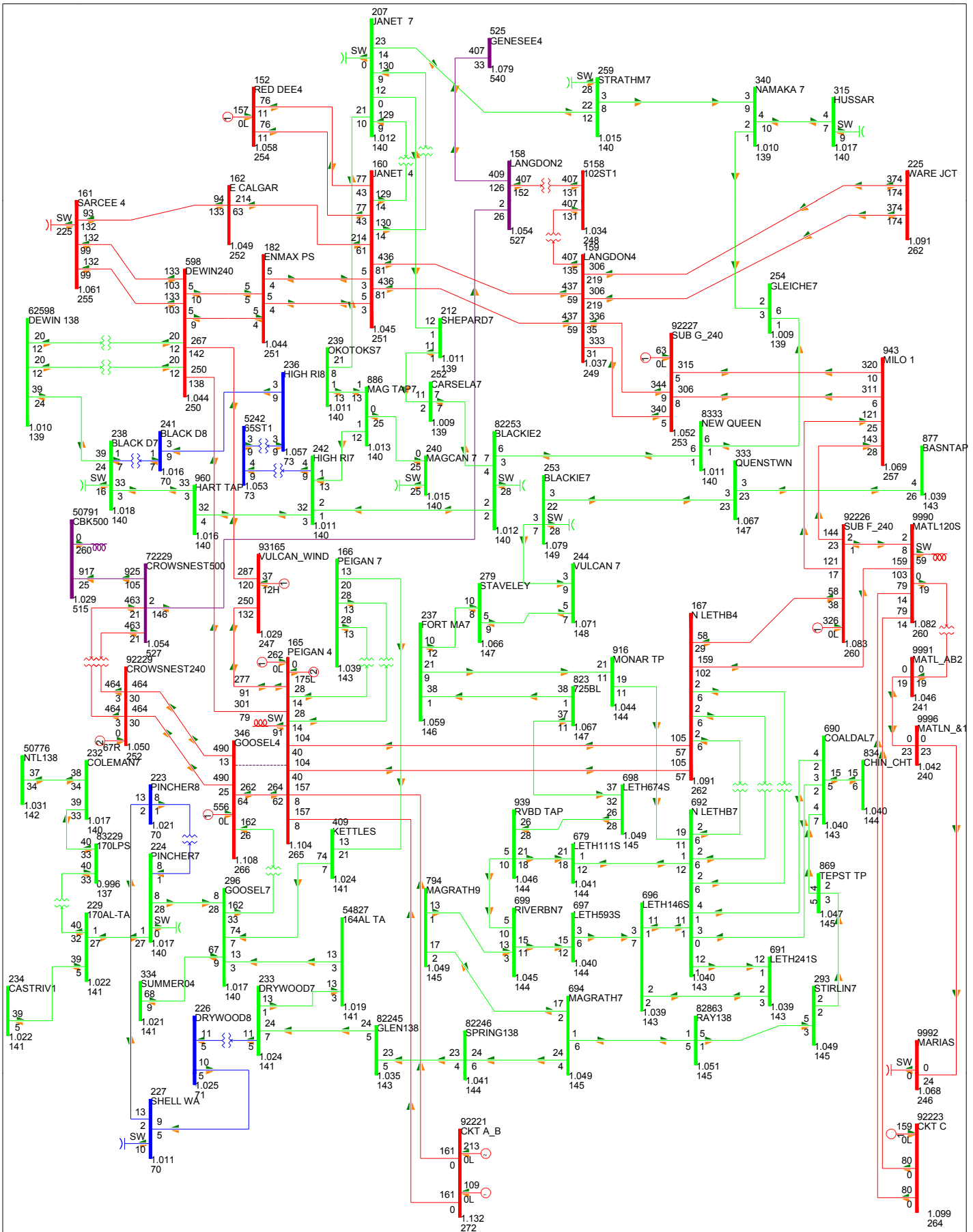


FIG 2017-2-SL-8: PEIGAN TO GOOSELAKE 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 984 MW

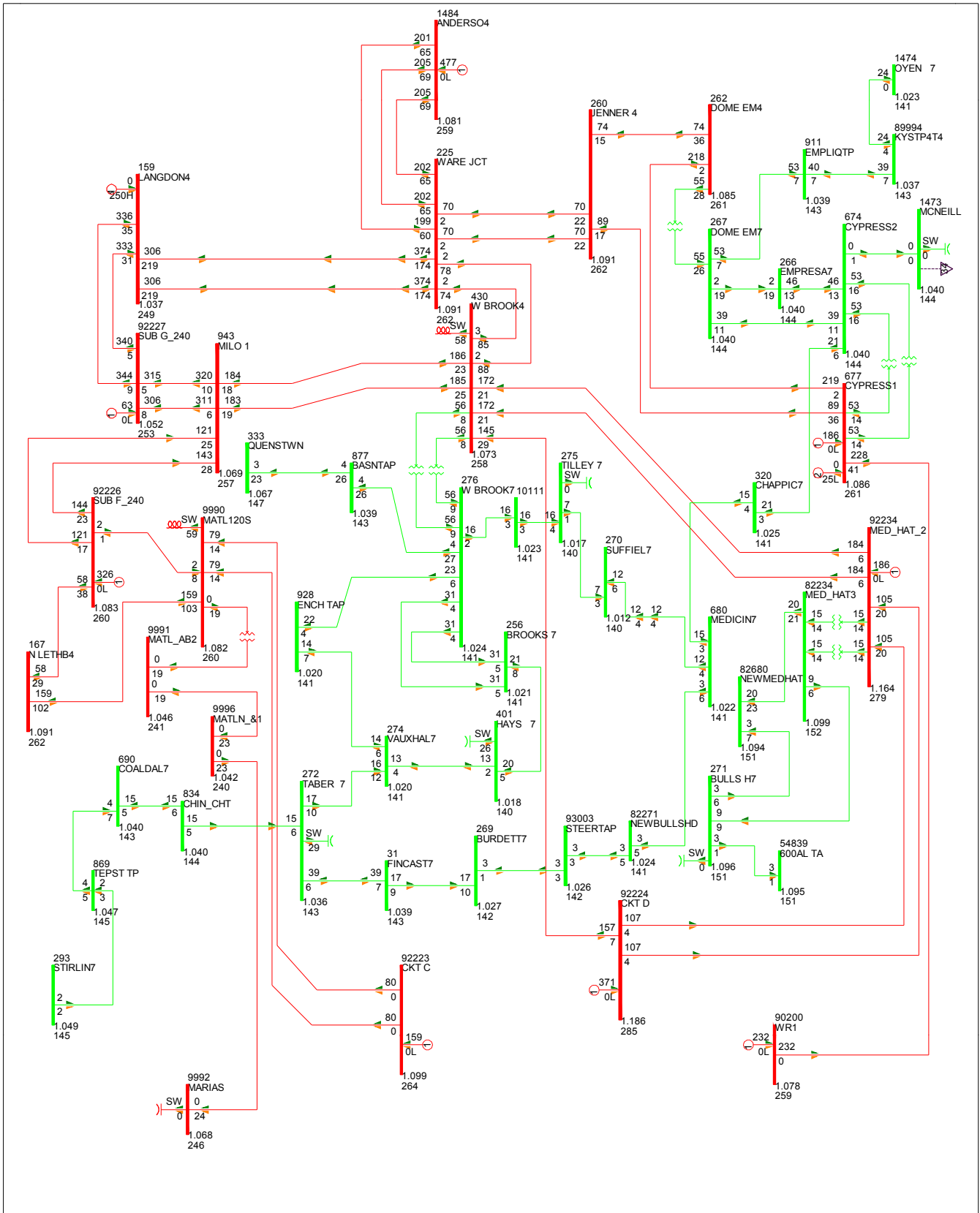


FIG 2017-2-SL-9: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 984 MW

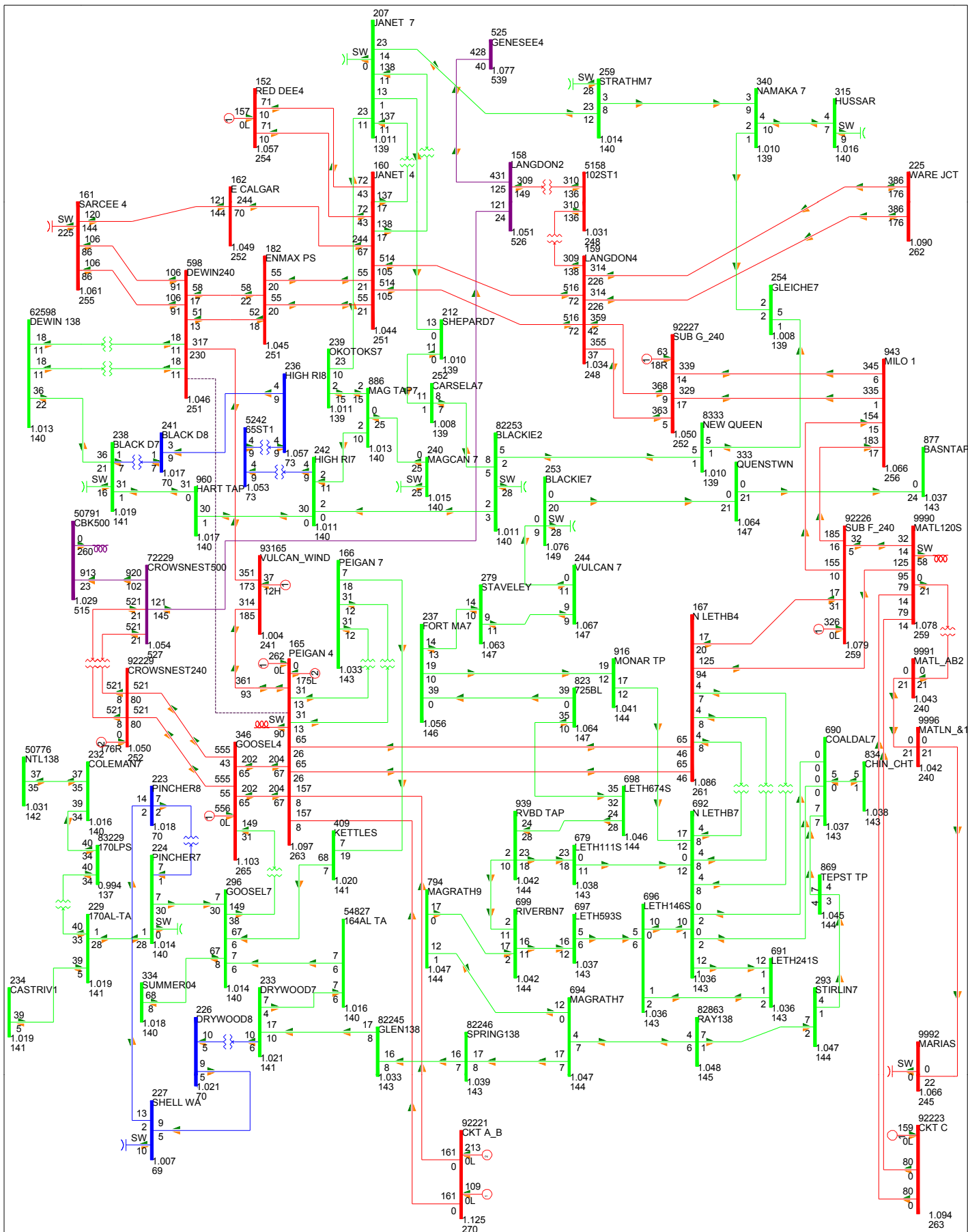


FIG 2017-2-SL-10: PEIGAN TO DEWINTON 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 973 MW

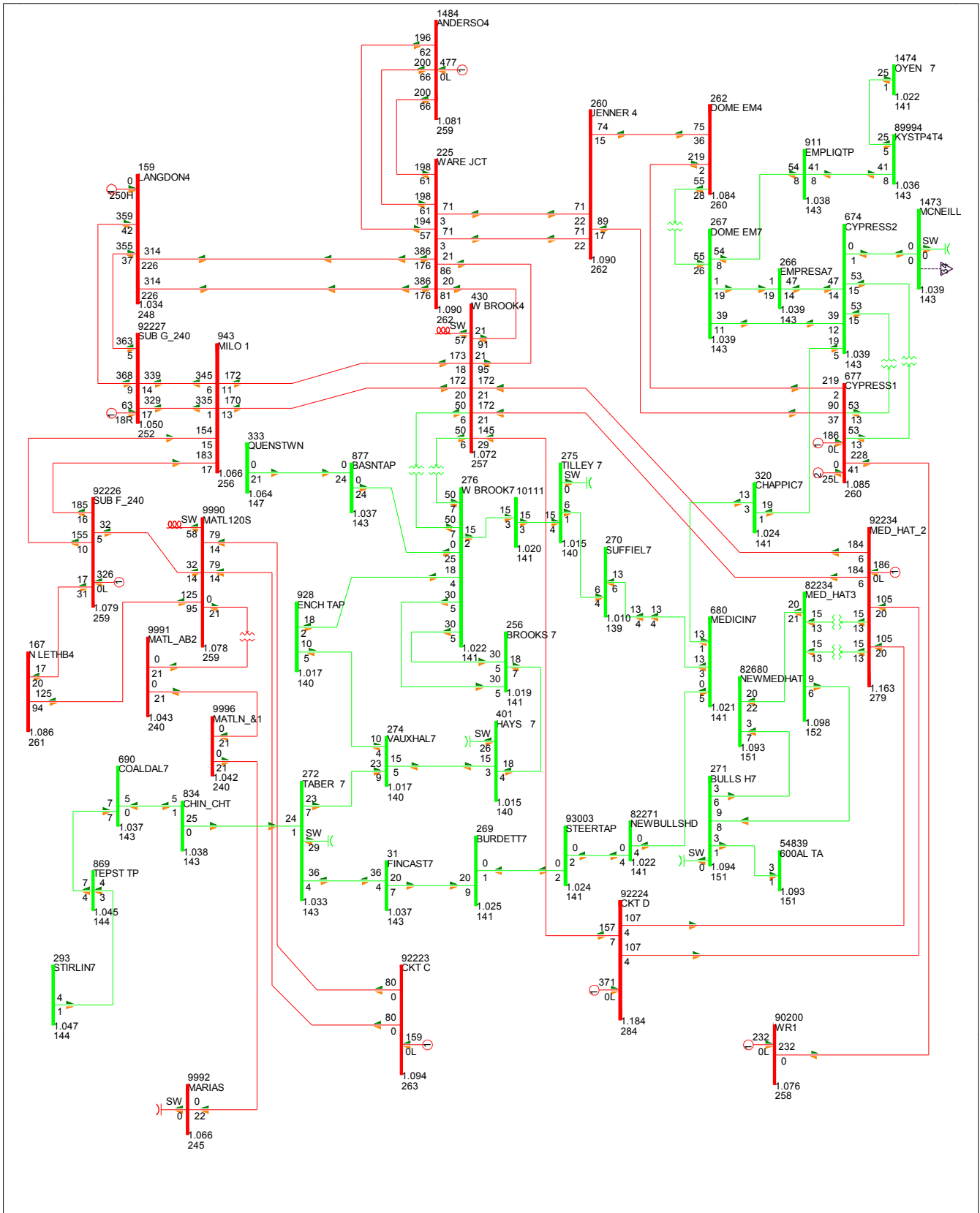


FIG 2017-2-SL-11: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 973 MW

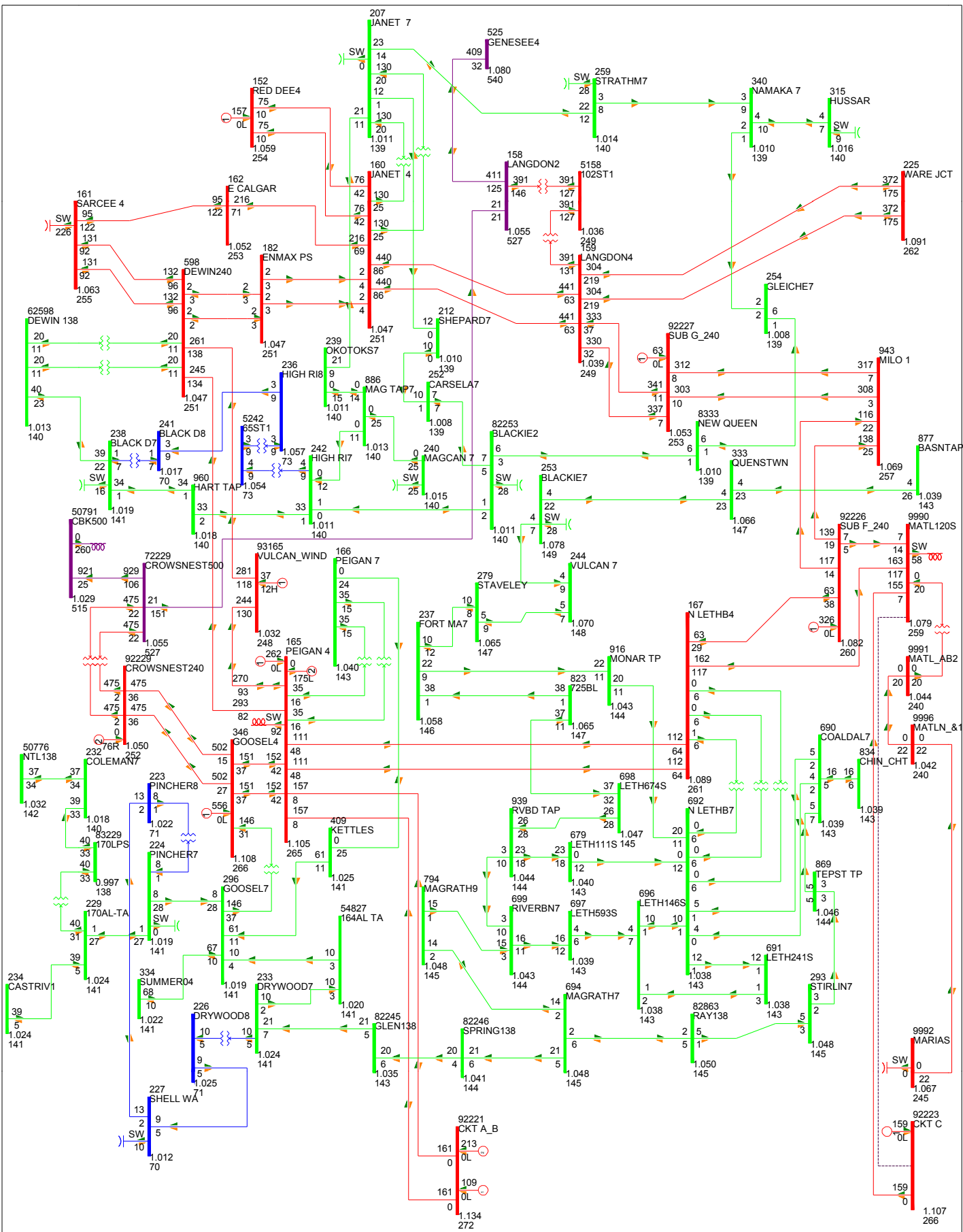


FIG 2017-2-SL-12: MATL TO SUB C 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

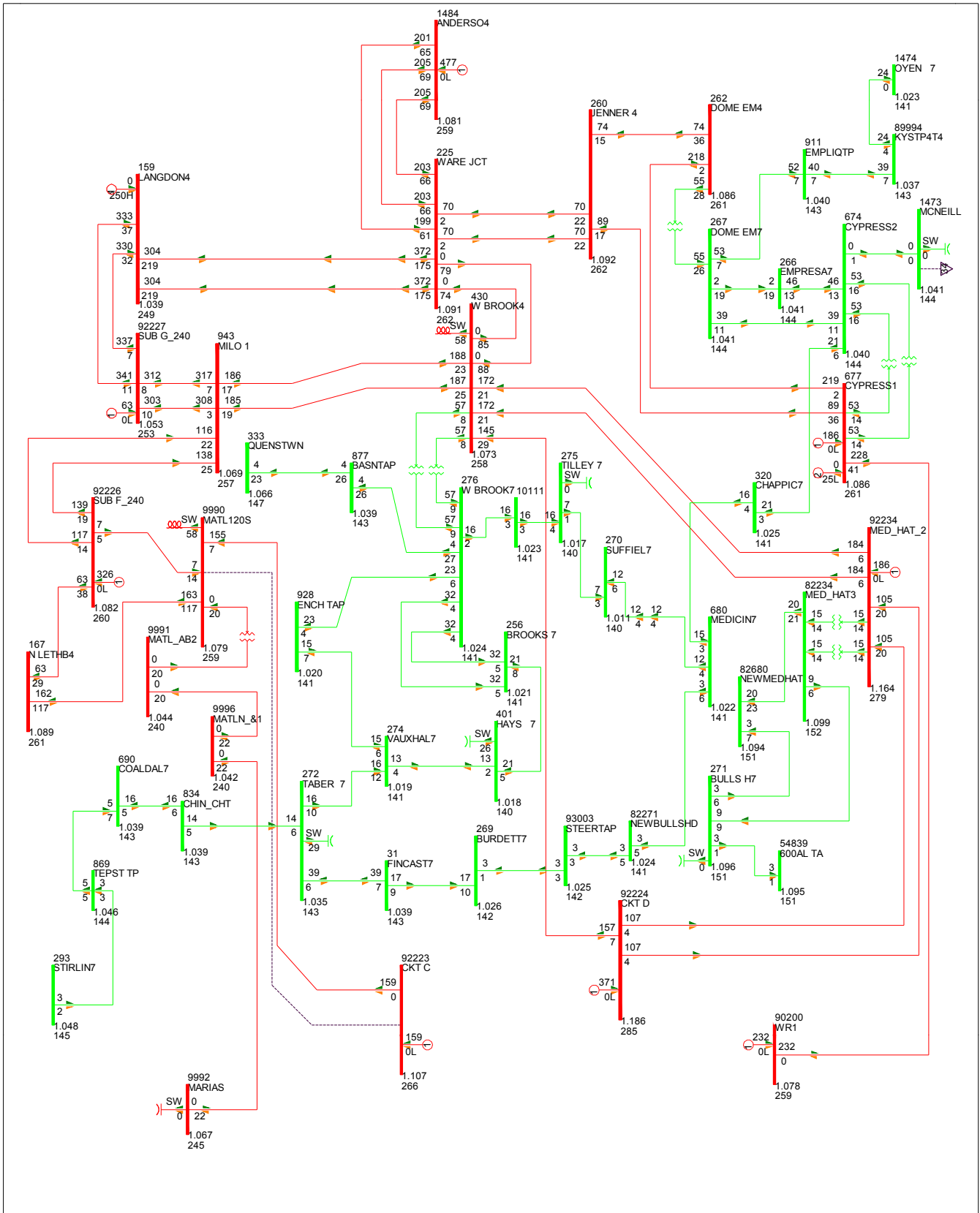


FIG 2017-2-SL-13: MATL TO SUB C 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 988 MW

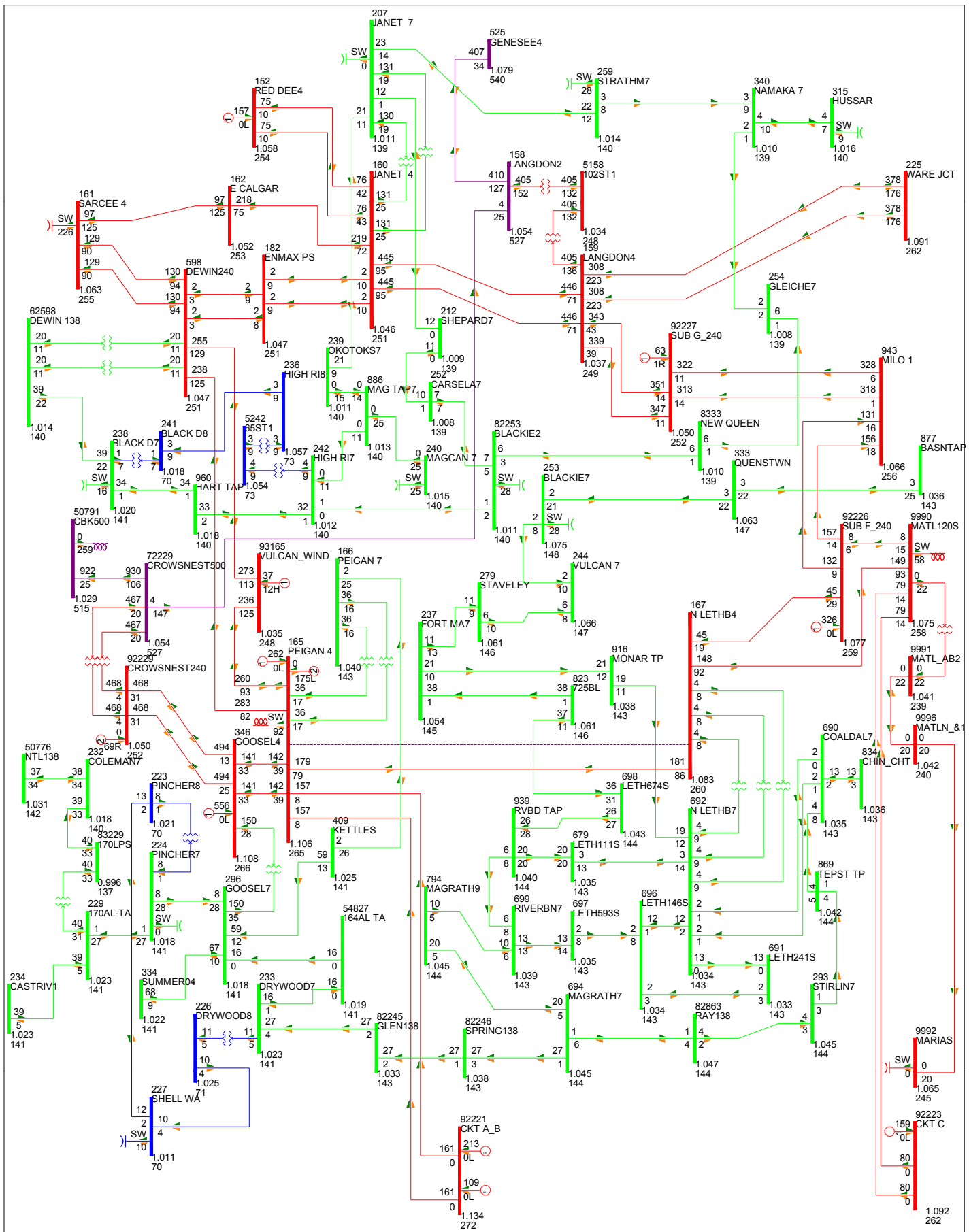


FIG 2017-2-SL-14: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 990 MW

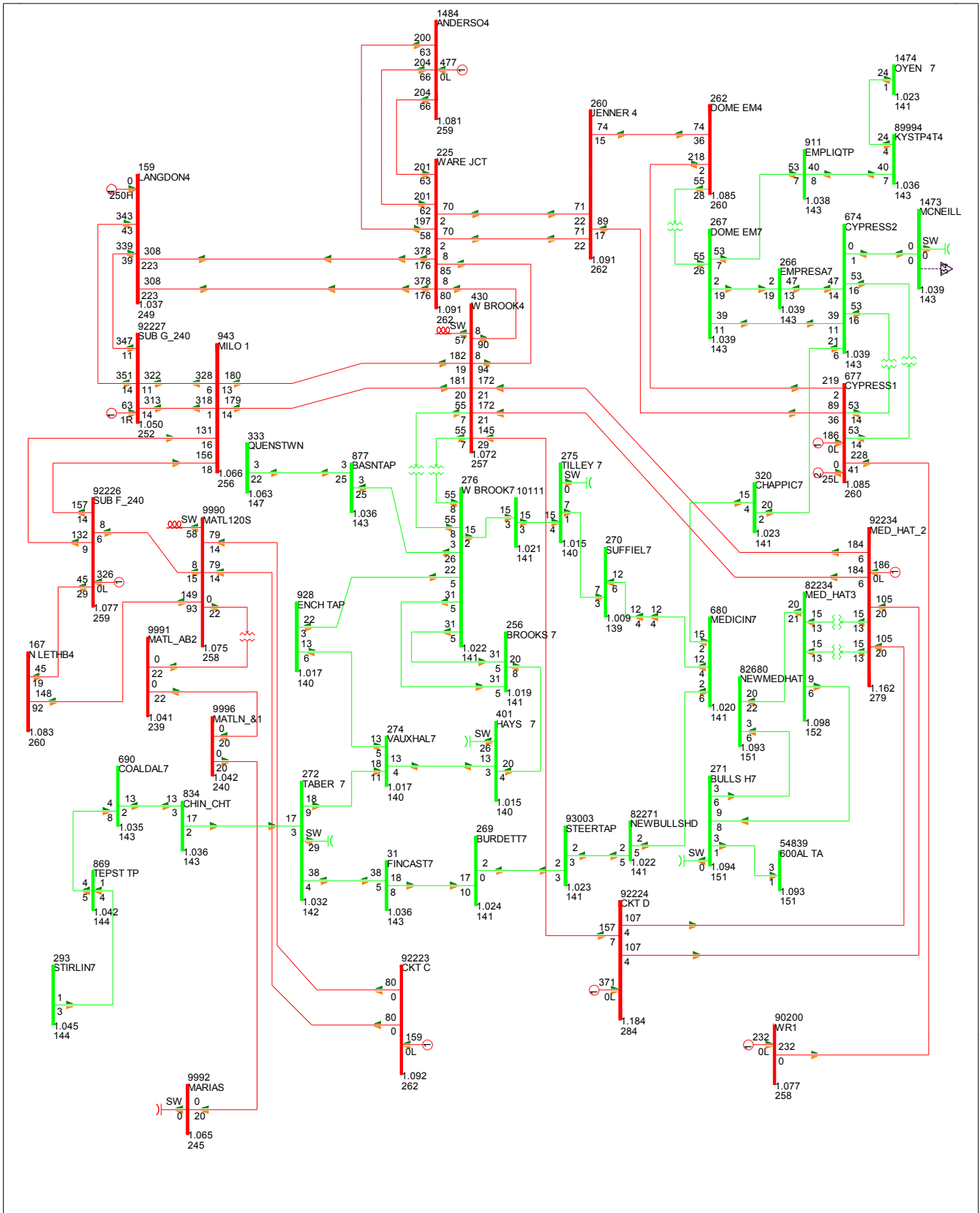


FIG 2017-2-SL-15: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 990 MW

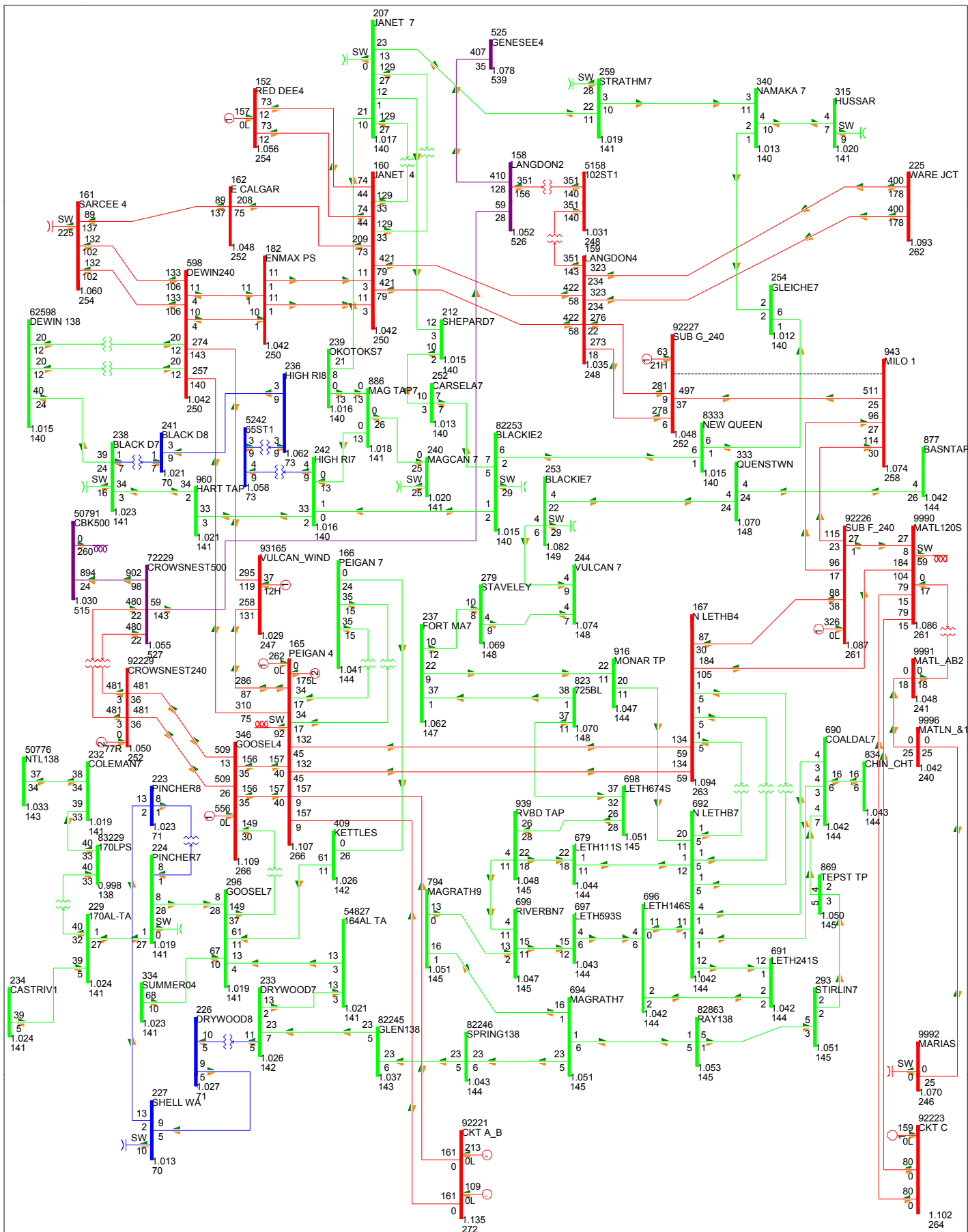


FIG 2017-2-SL-16: MILO TO SUB G 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 959 MW

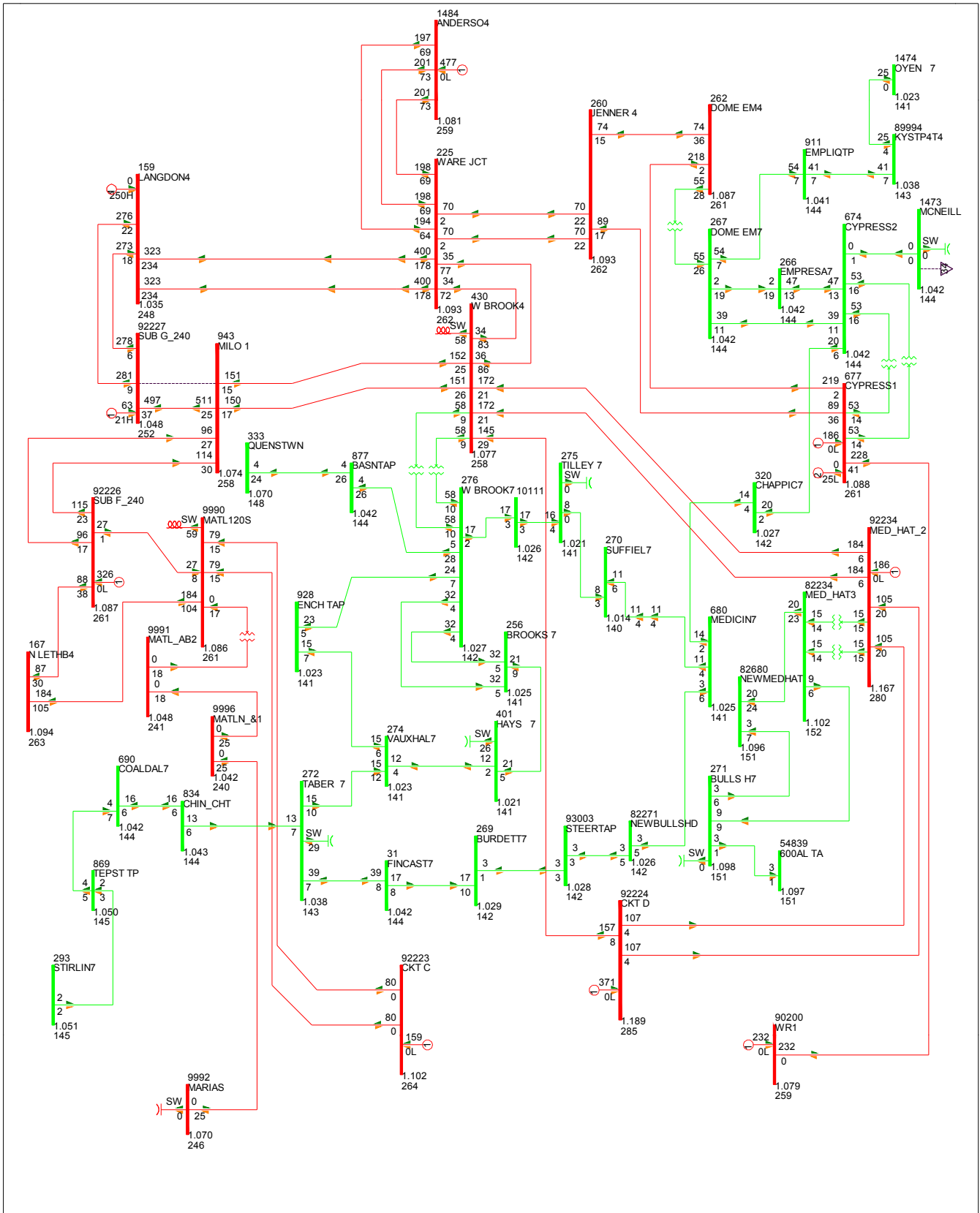


FIG 2017-2-SL-17: MILO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 959 MW

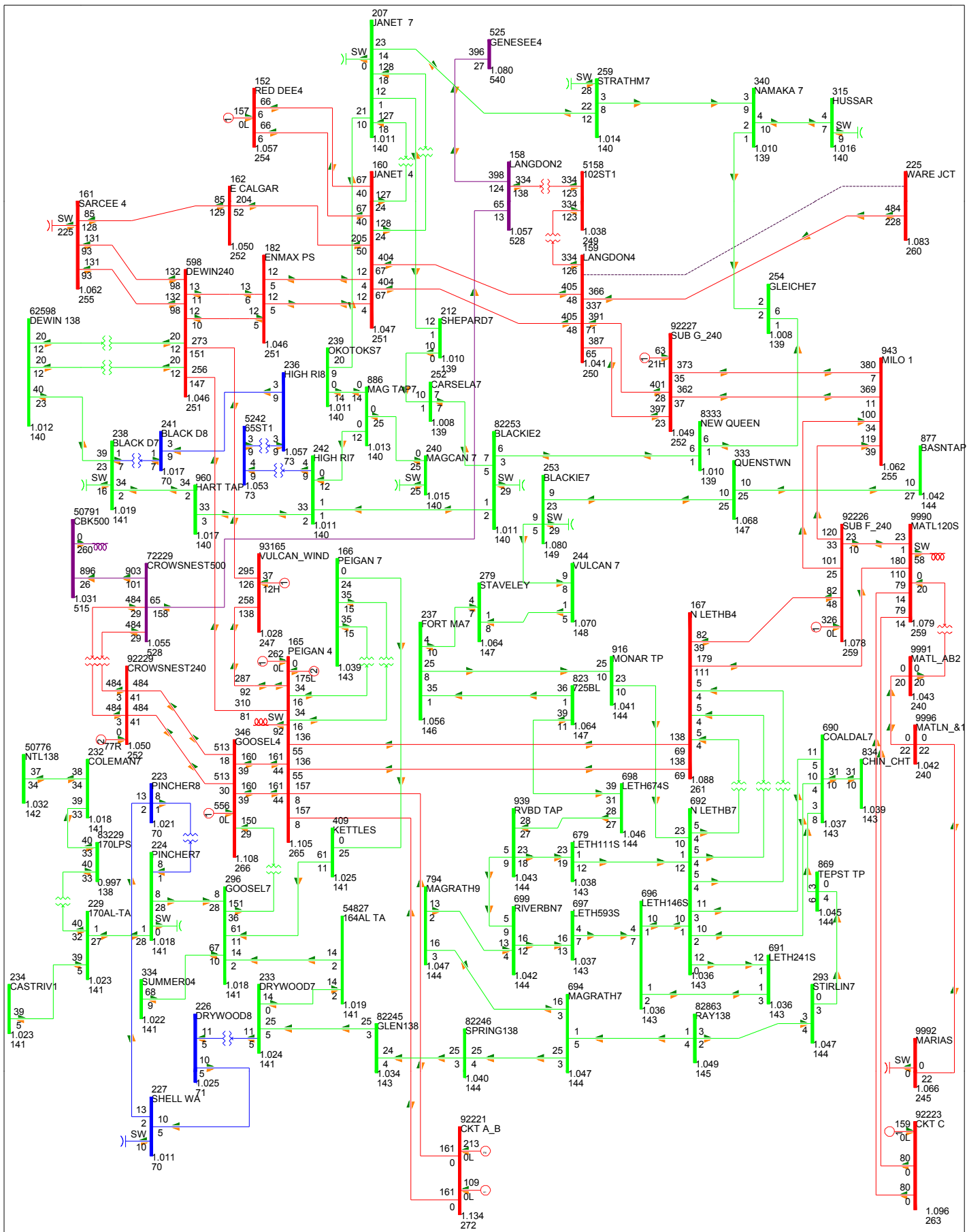


FIG 2017-2-SL-18: WAREJUNC TO LANGDON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 960 MW

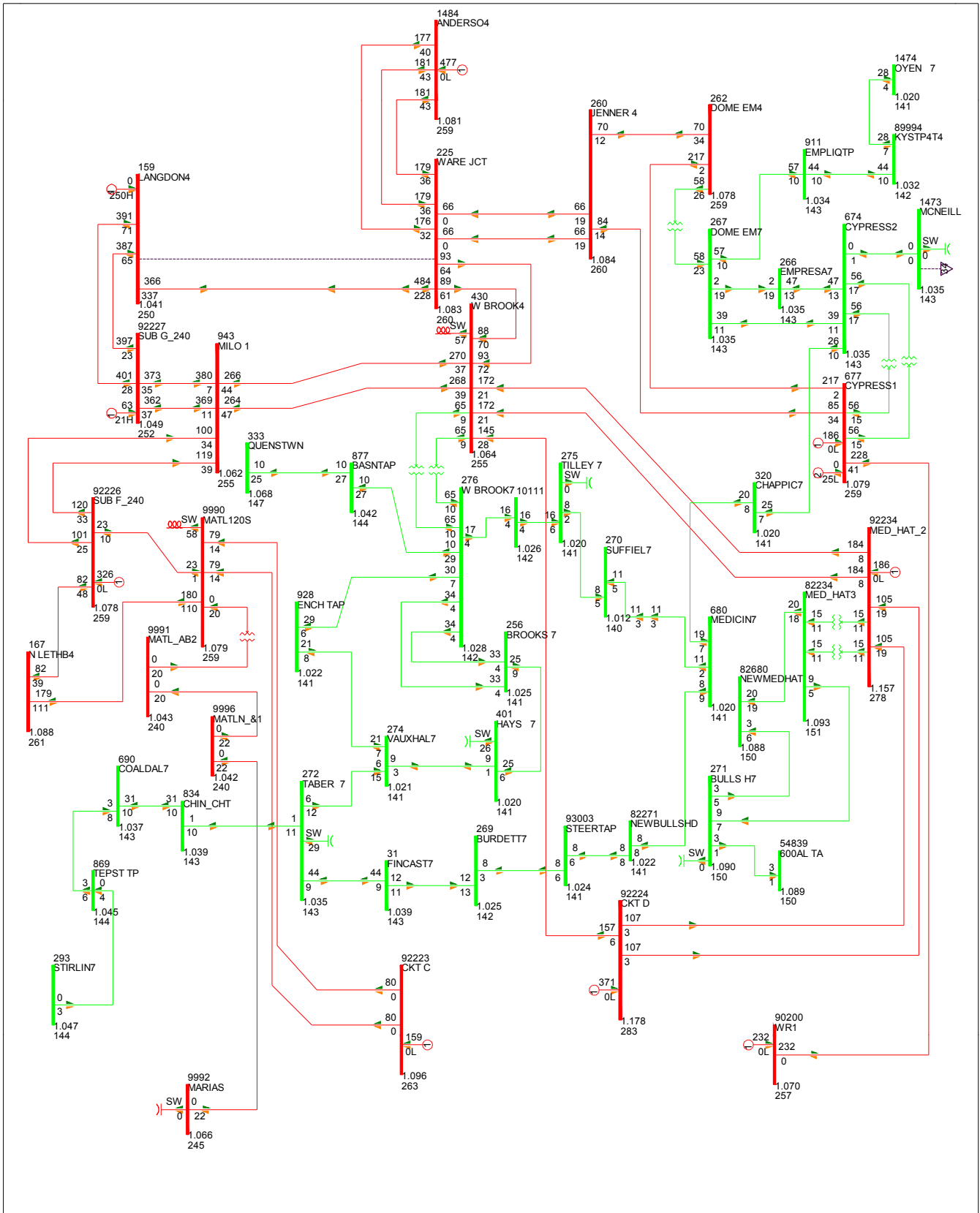


FIG 2017-2-SL-19: WAREJUNC TO LANGDON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 960 MW

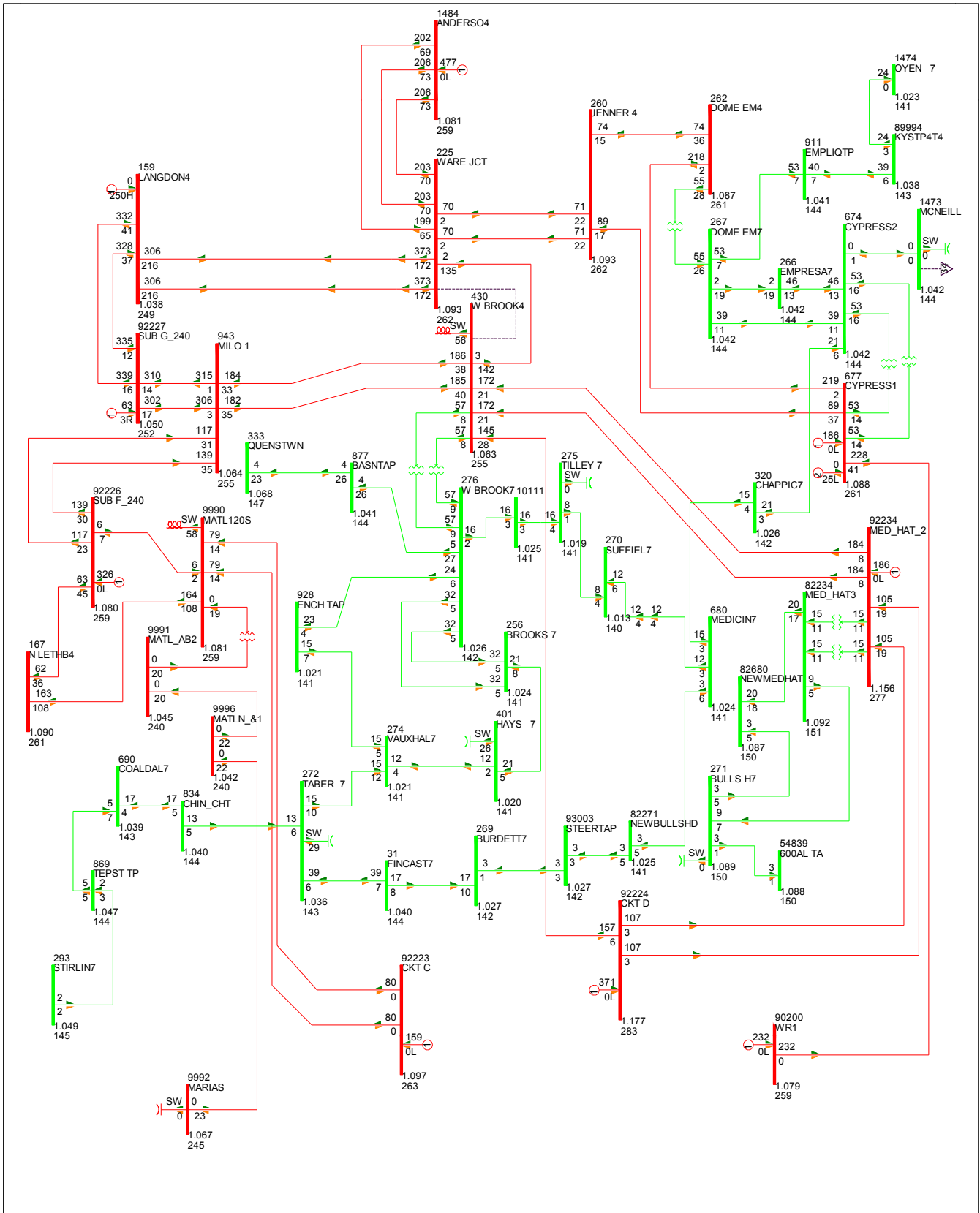


FIG 2017-2-SL-21: WAREJNC TO WESTBROOKS 240 KV PROPORTIONAL WIND SCENARIO

2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR

100.0%RATE
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 988 MW

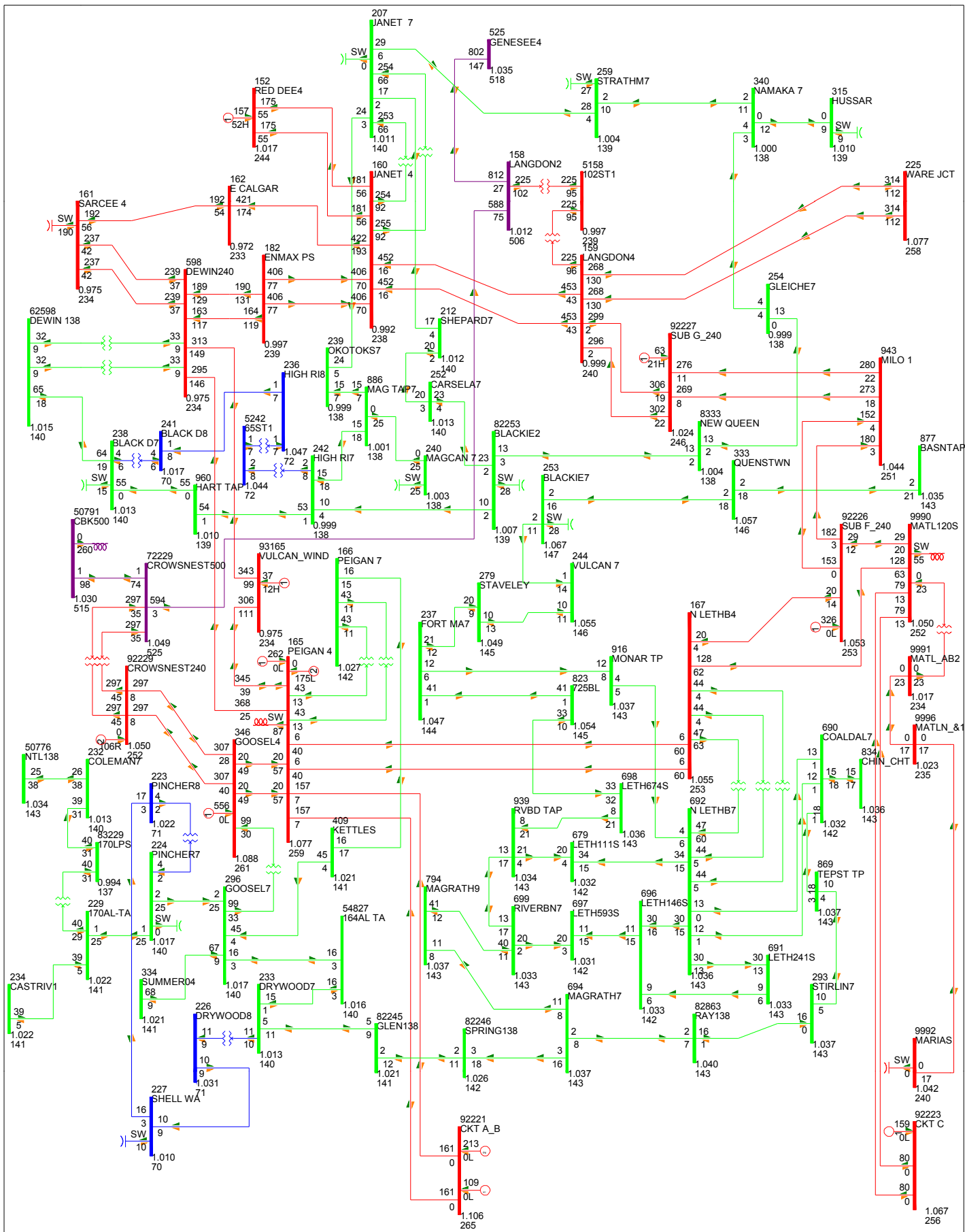


FIG 2017-2-SP-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -8 MW

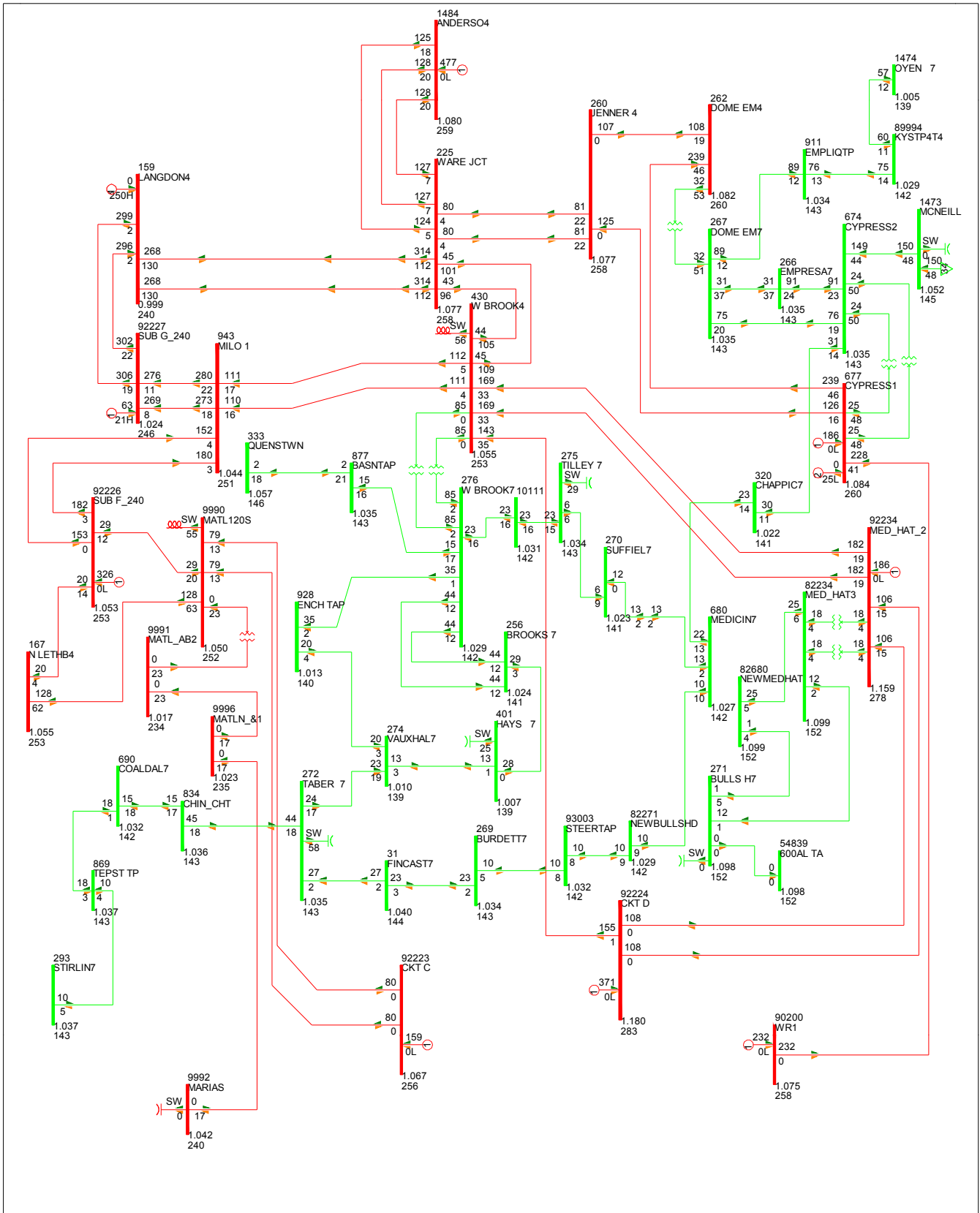


FIG 2017-2-SP-3: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -8 MW

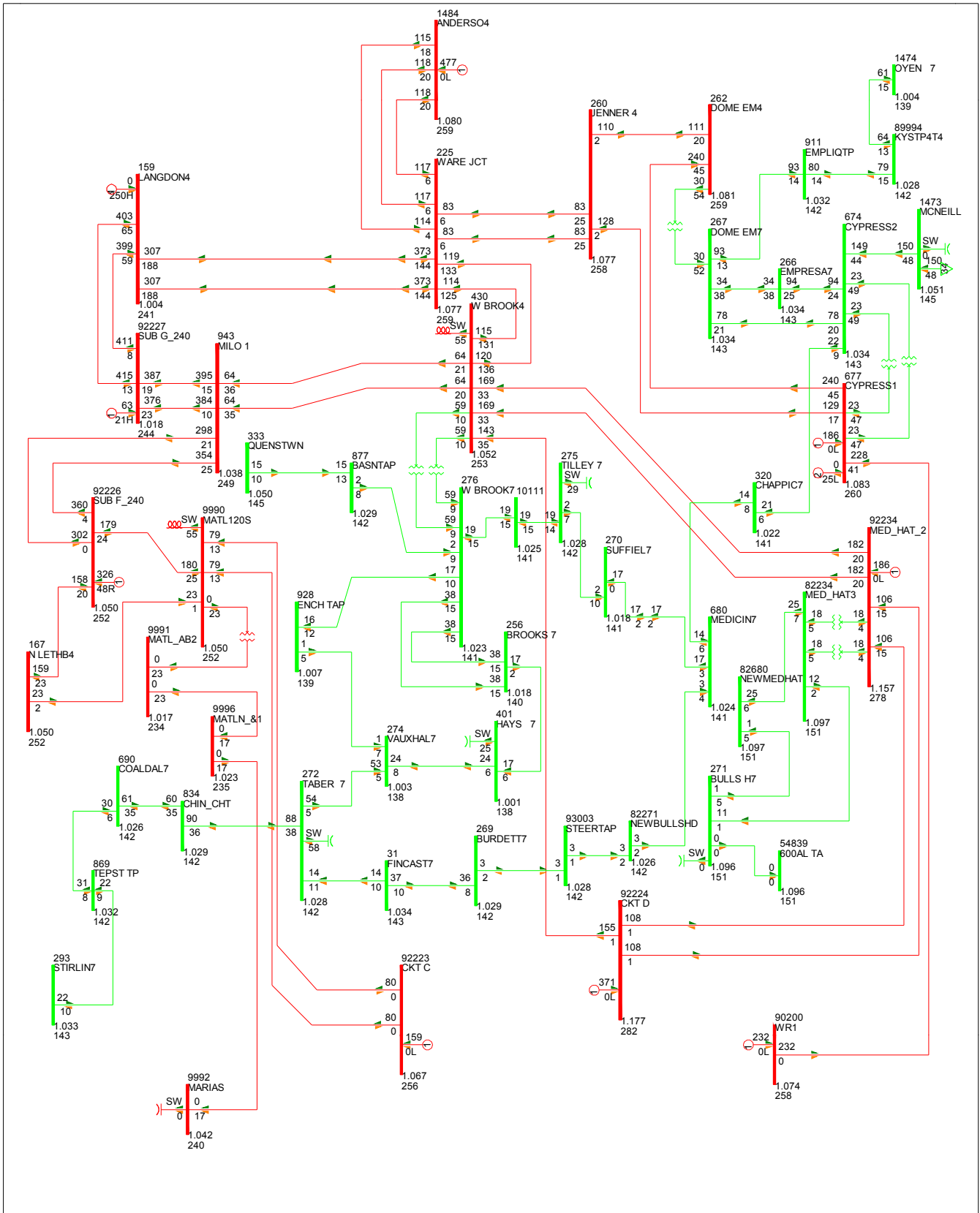


FIG 2017-2-SP-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:36

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -367 MW

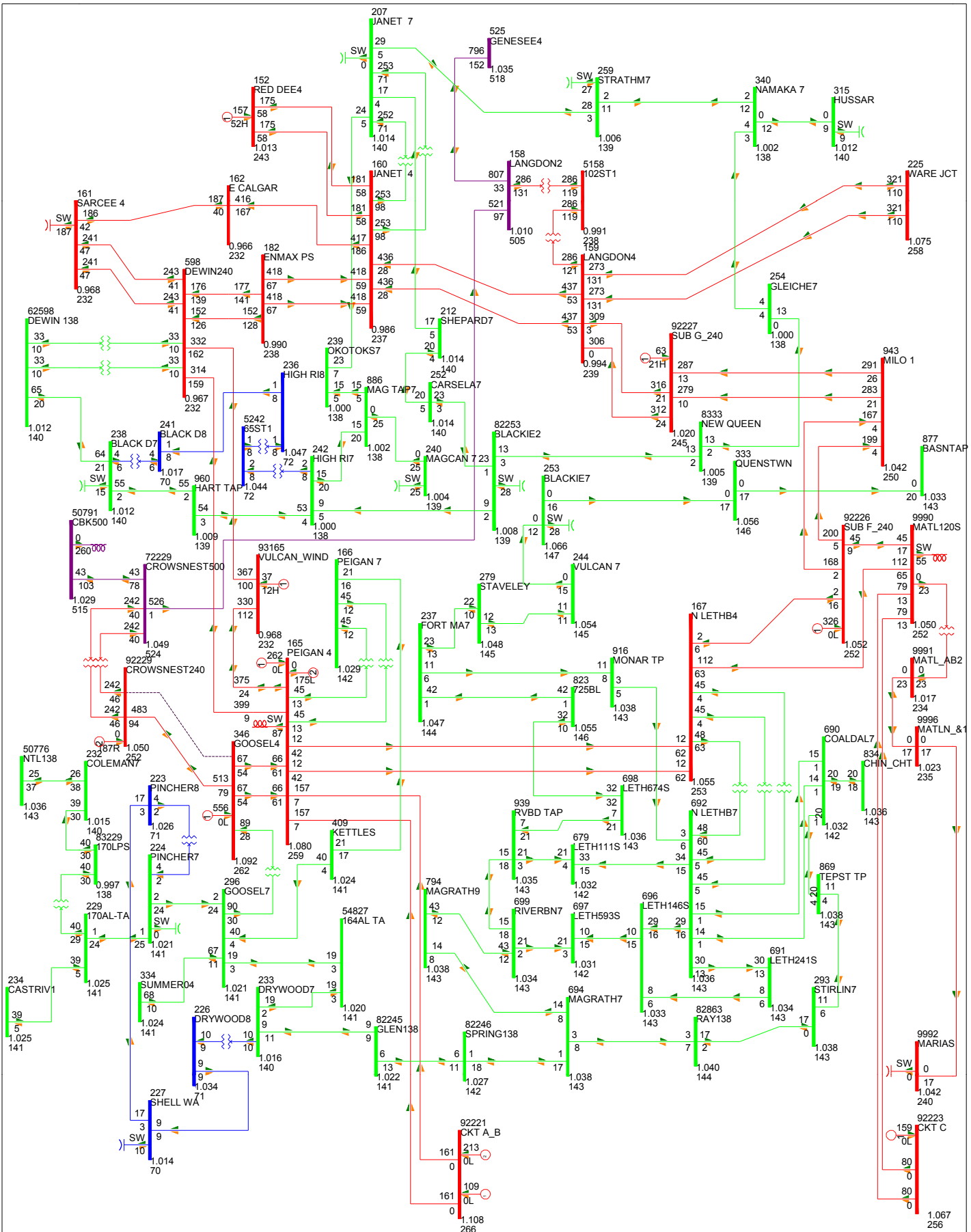


FIG 2017-2-SP-6: CROWNSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:23

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -48 MW

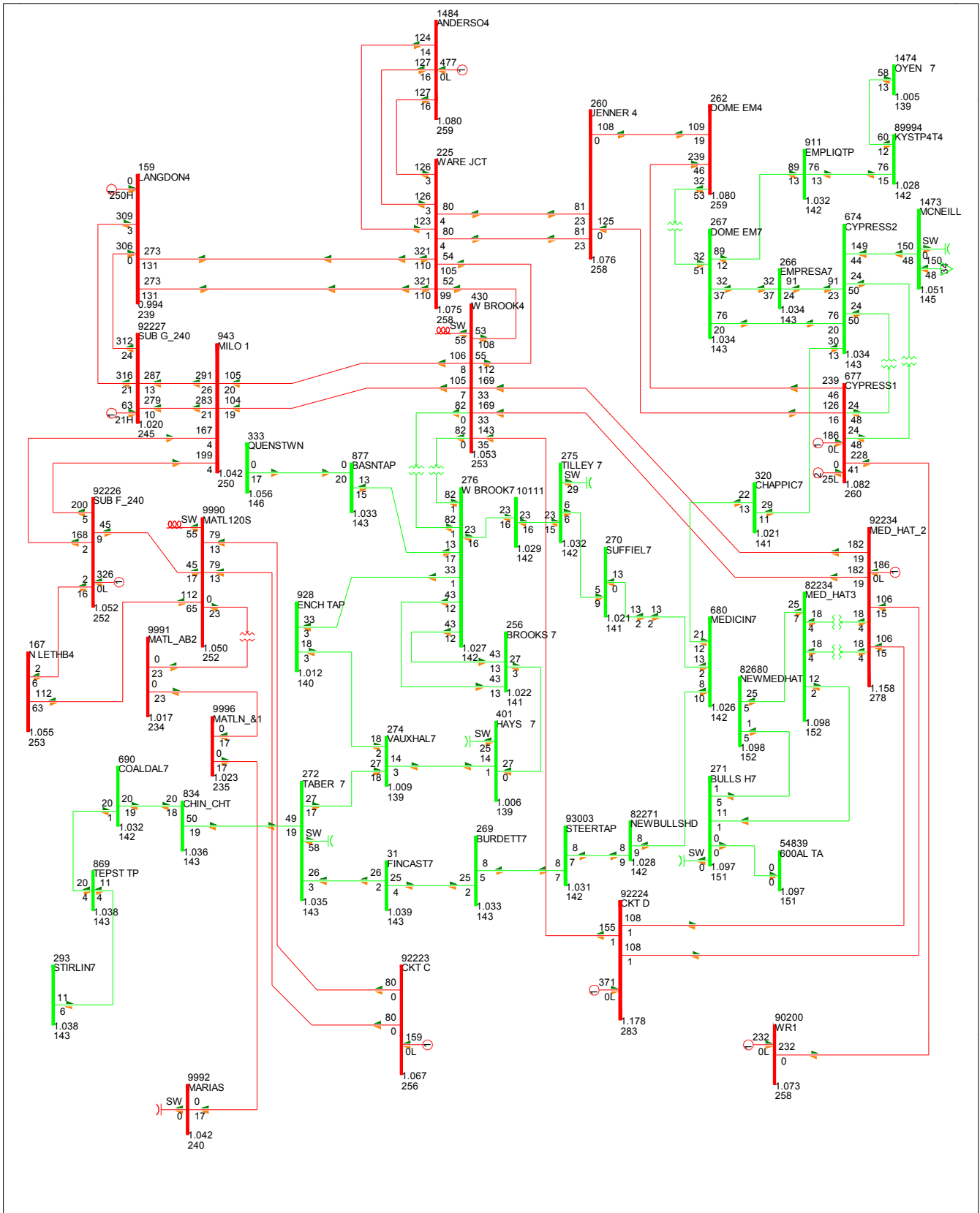


FIG 2017-2-SP-7: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:23

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -48 MW

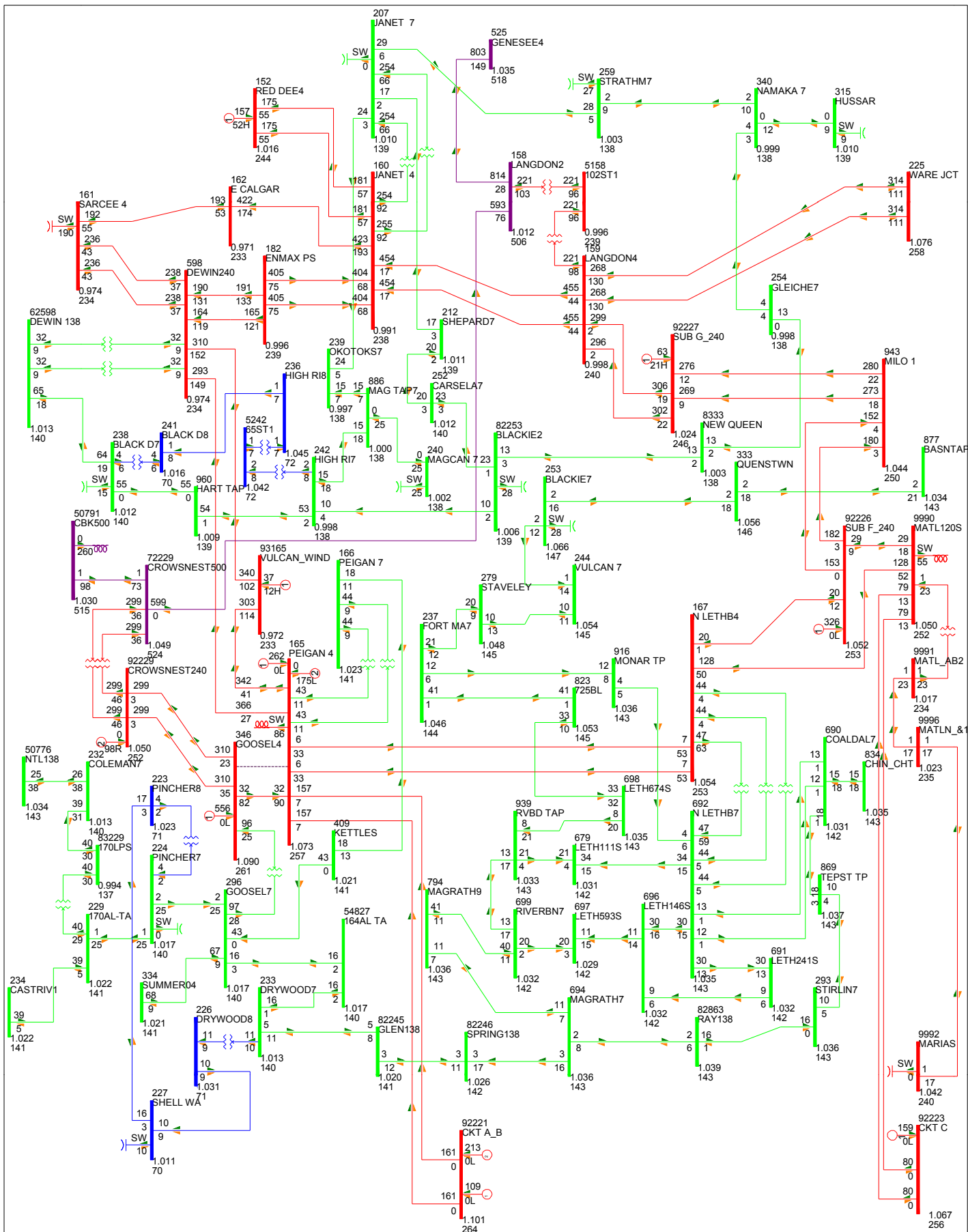


FIG 2017-2-SP-8: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -8 MW

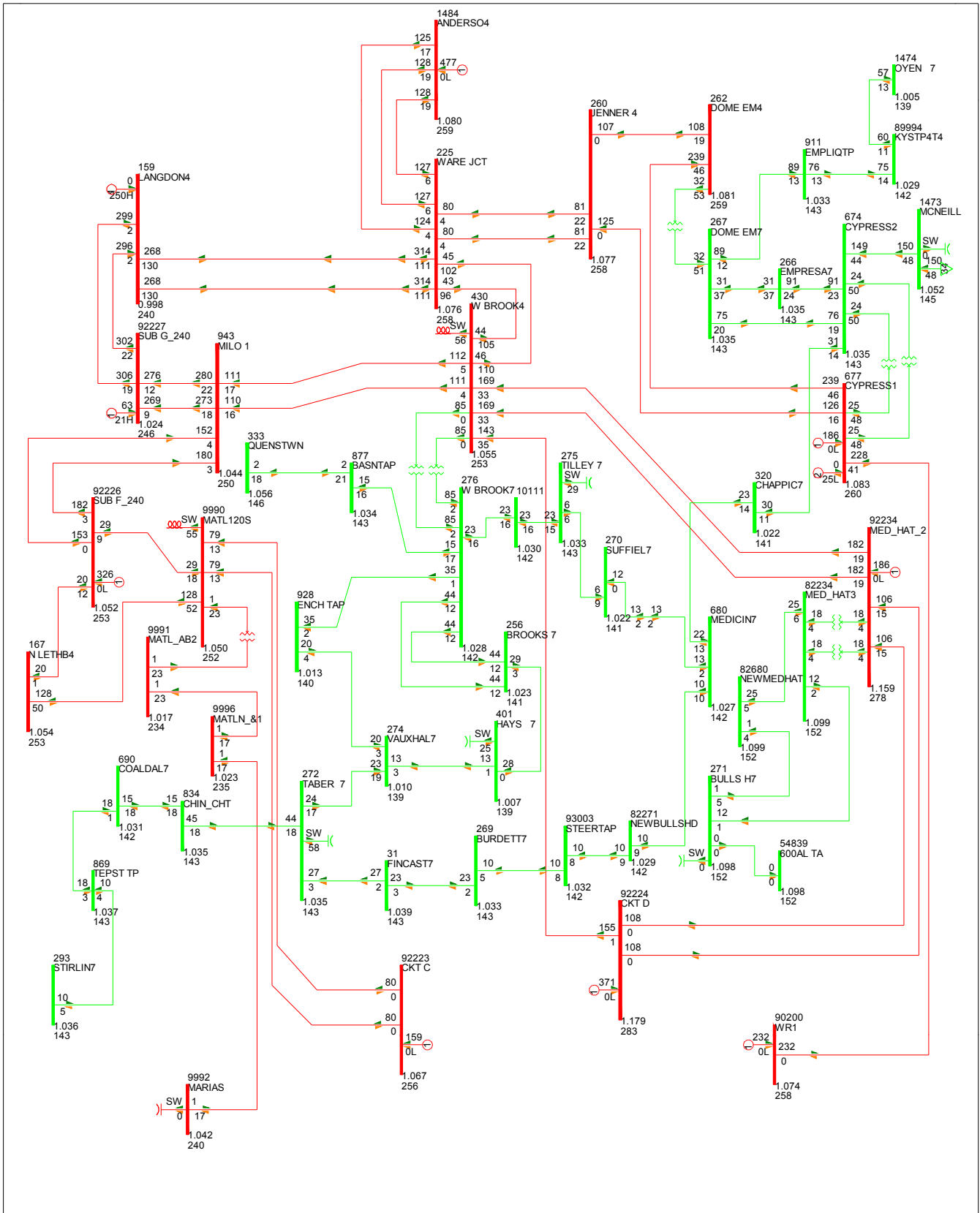


FIG 2017-2-SP-9: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -8 MW

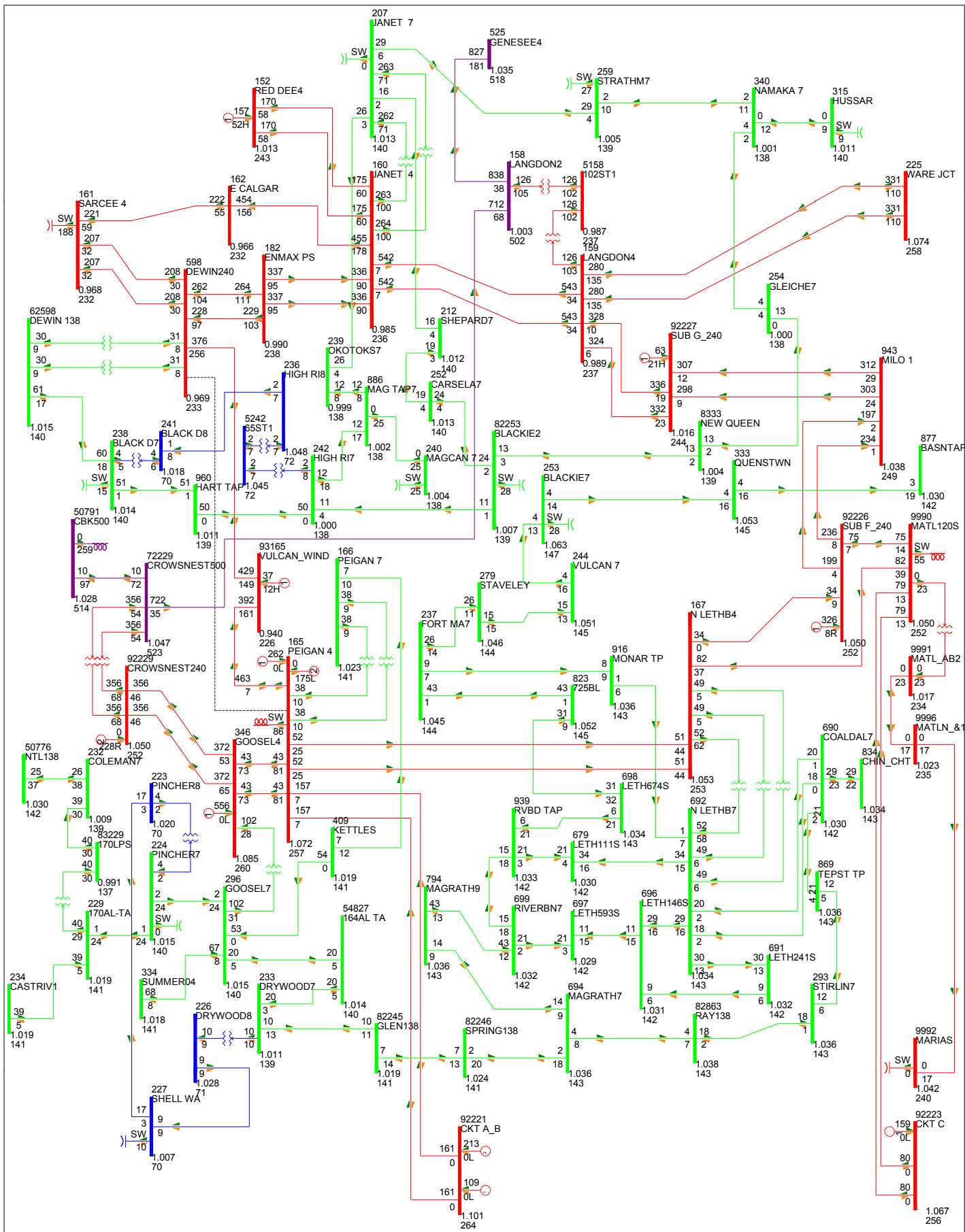


FIG 2017-2-SP-10: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -25 MW

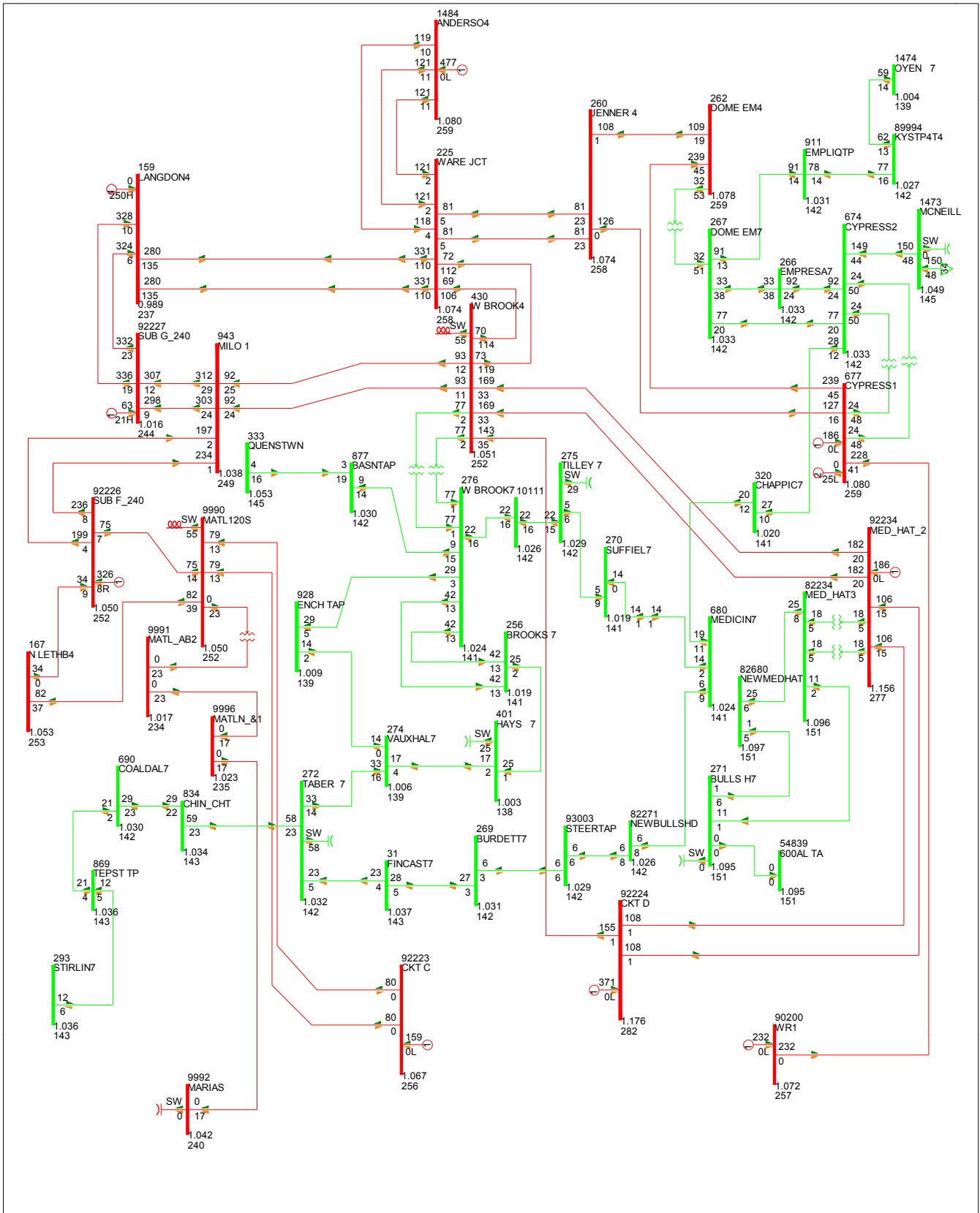


FIG 2017-2-SP-11: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -25 MW

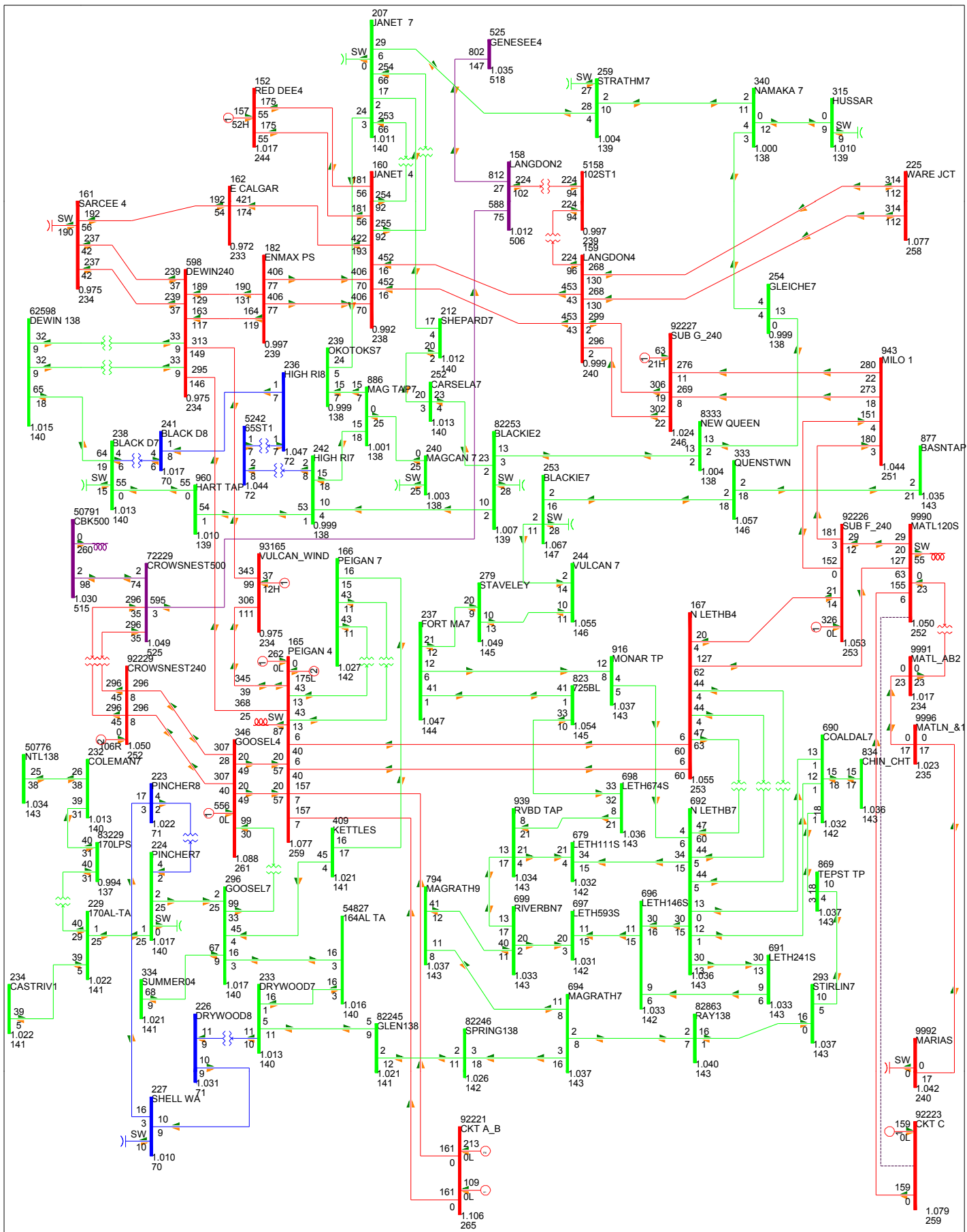


FIG 2017-2-SP-12: MATL TO SUB C 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -10 MW

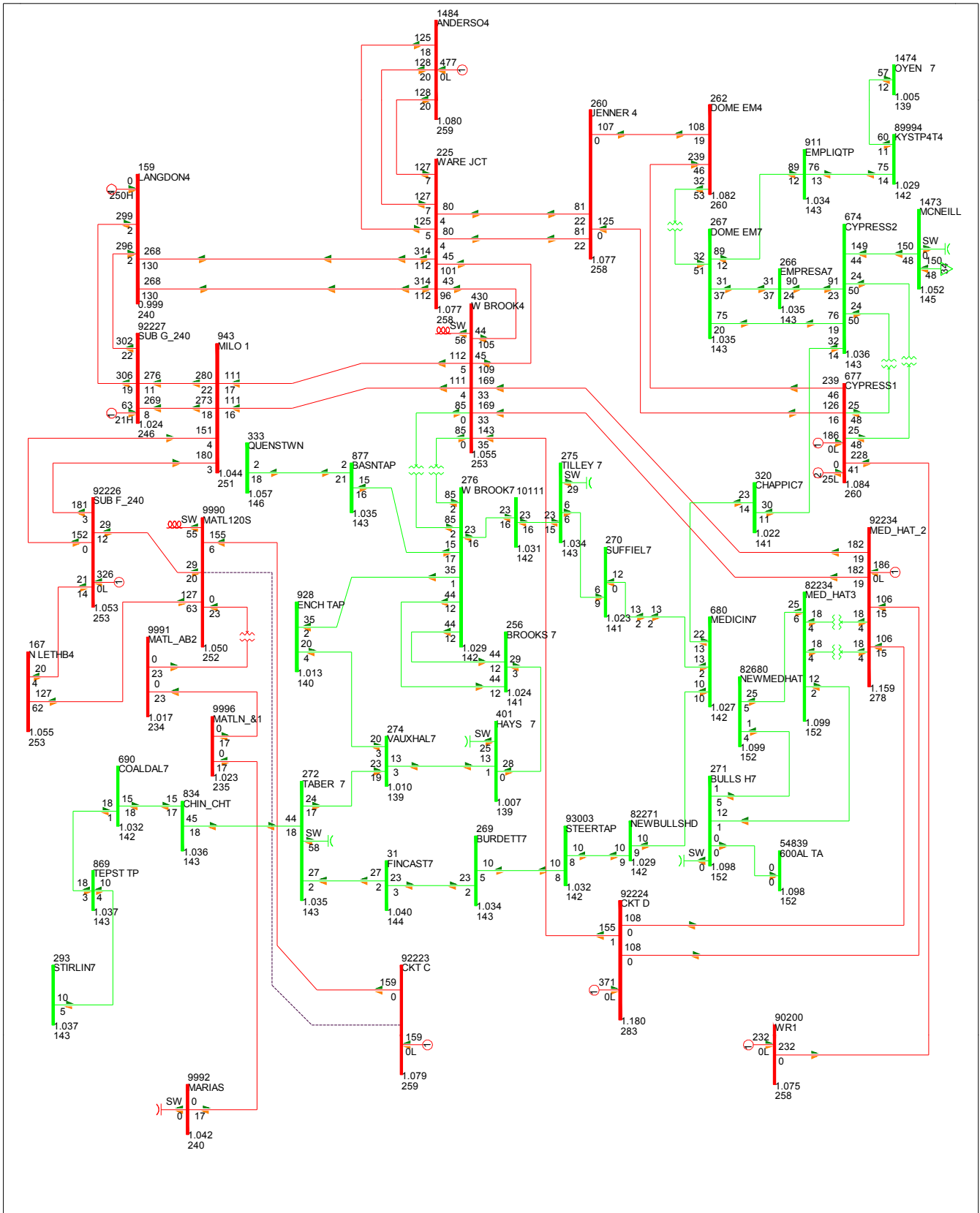


FIG 2017-2-SP-13: MATL TO SUB C 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -10 MW

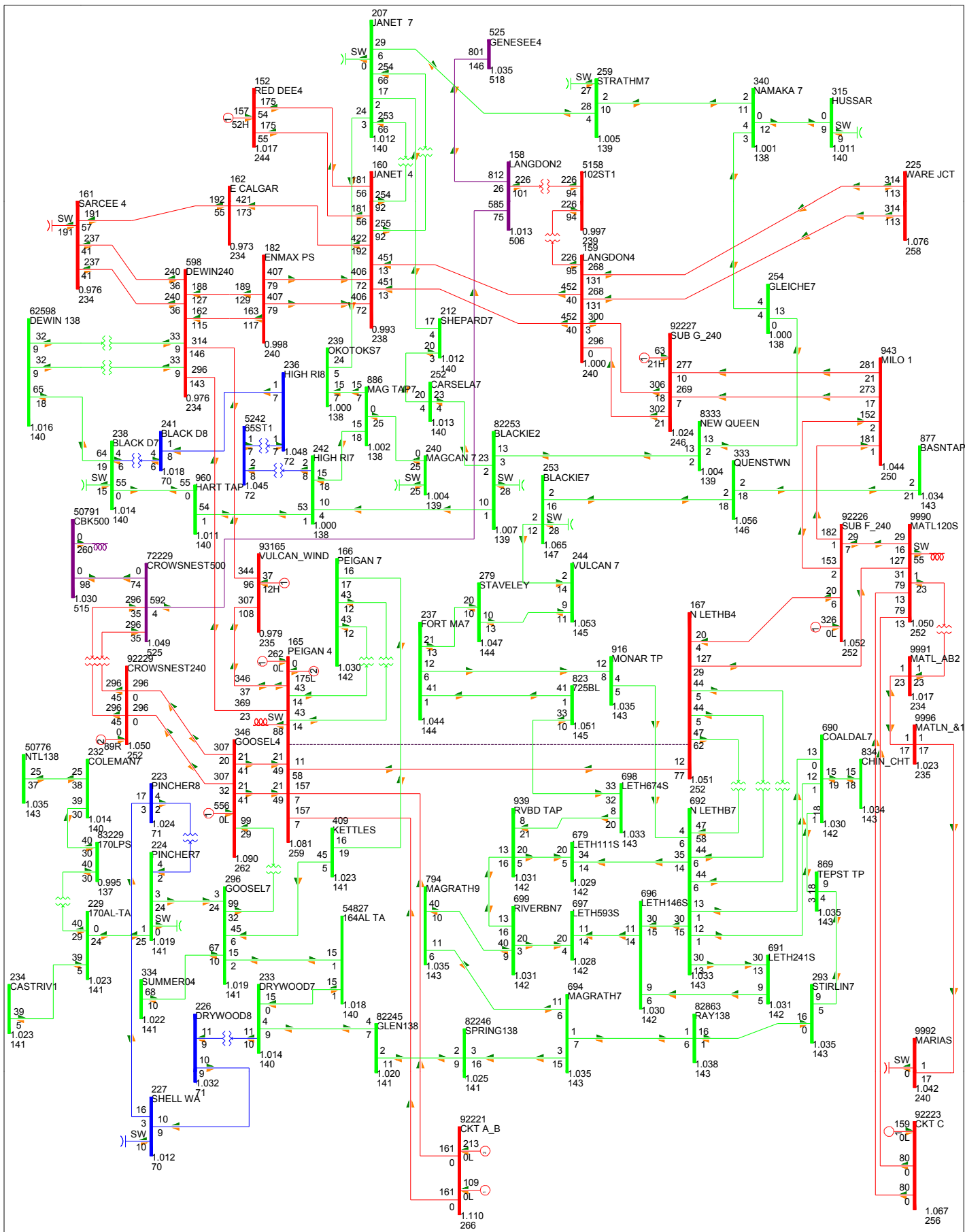


FIG 2017-2-SP-14: PEIGAN TO N. LETHBRIDGE 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -7 MW

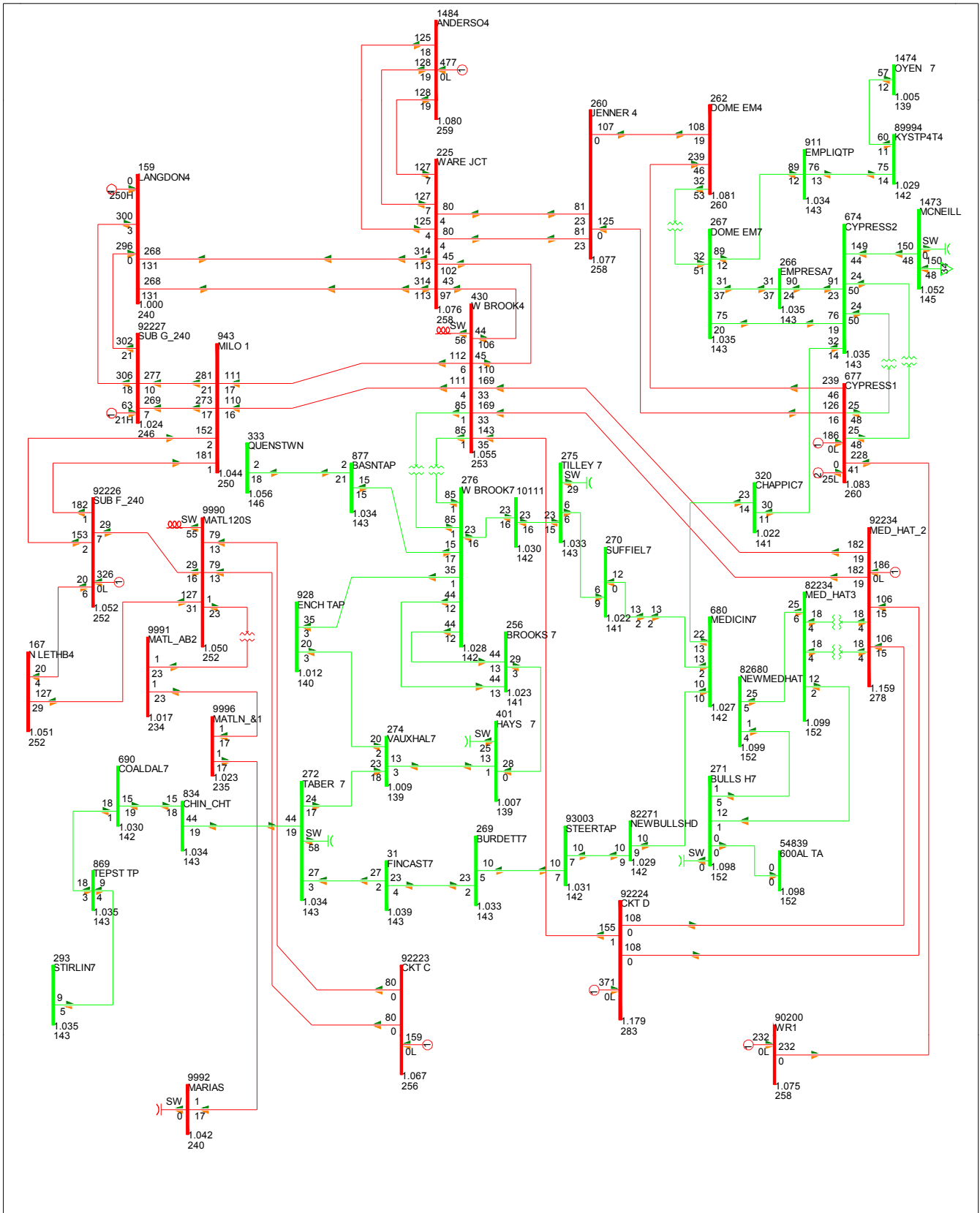


FIG 2017-2-SP-15: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -7 MW

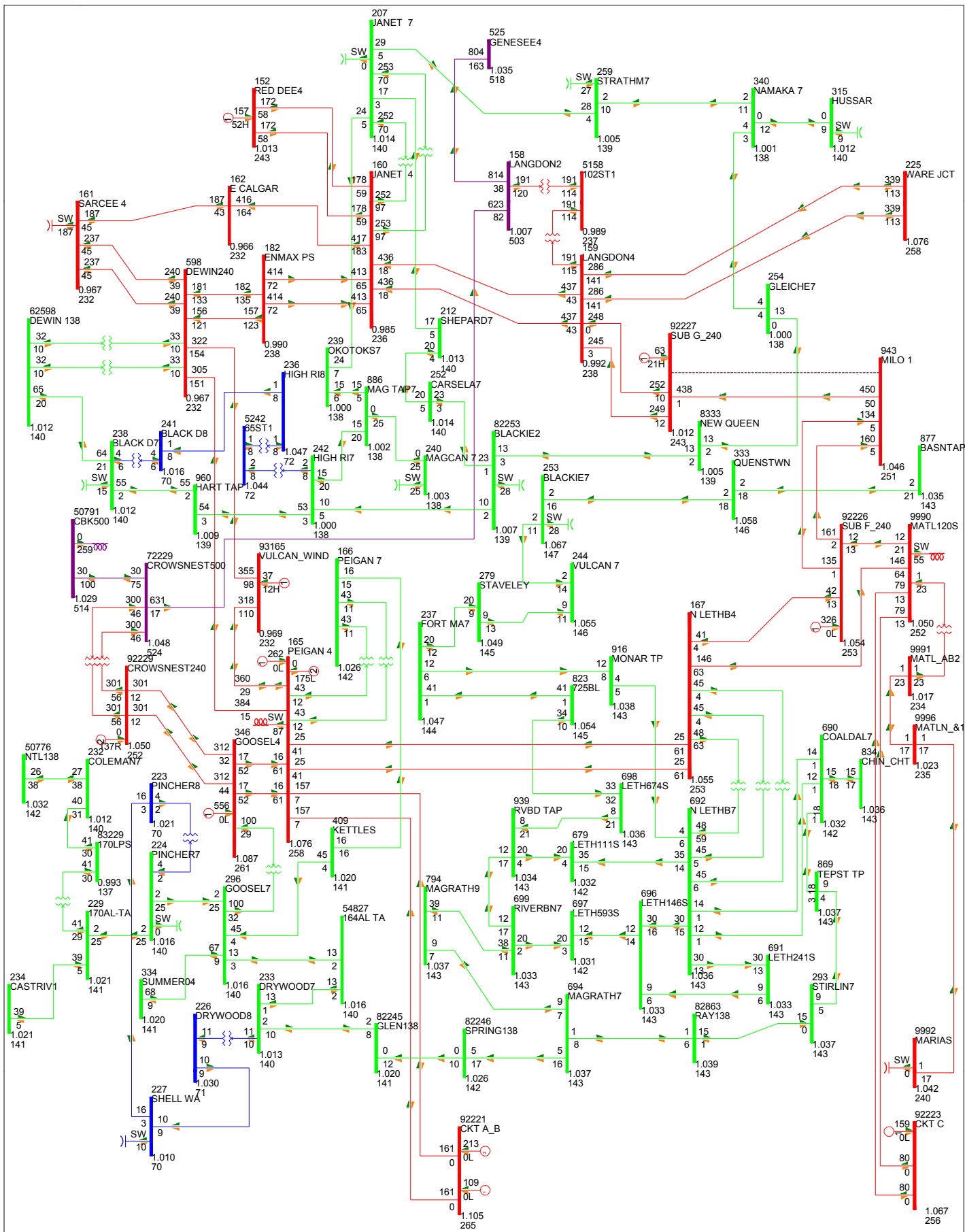


FIG 2017-2-SP-16: MILO TO SUB G 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -38 MW

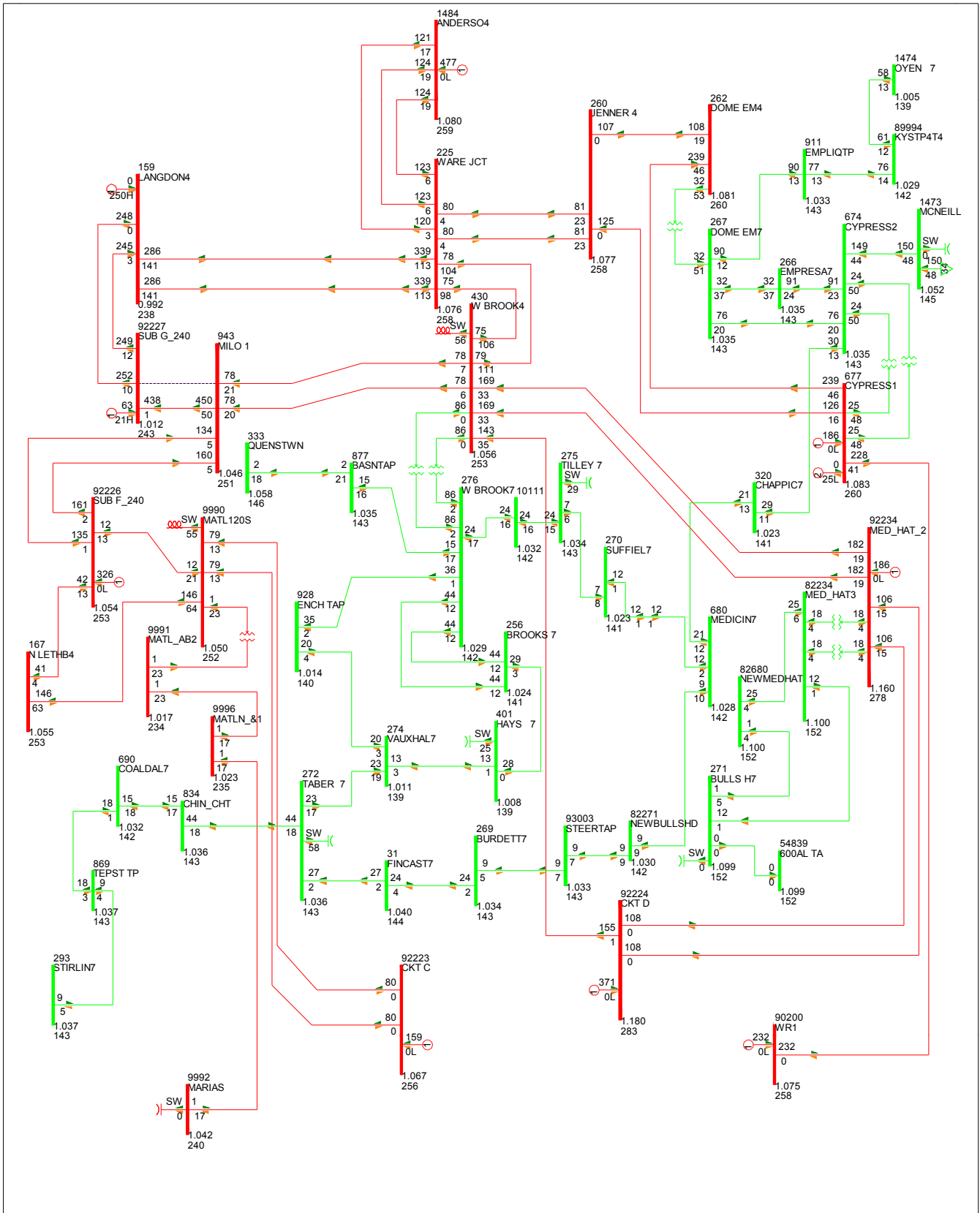


FIG 2017-2-SP-17: MILO TO SUB G 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -38 MW

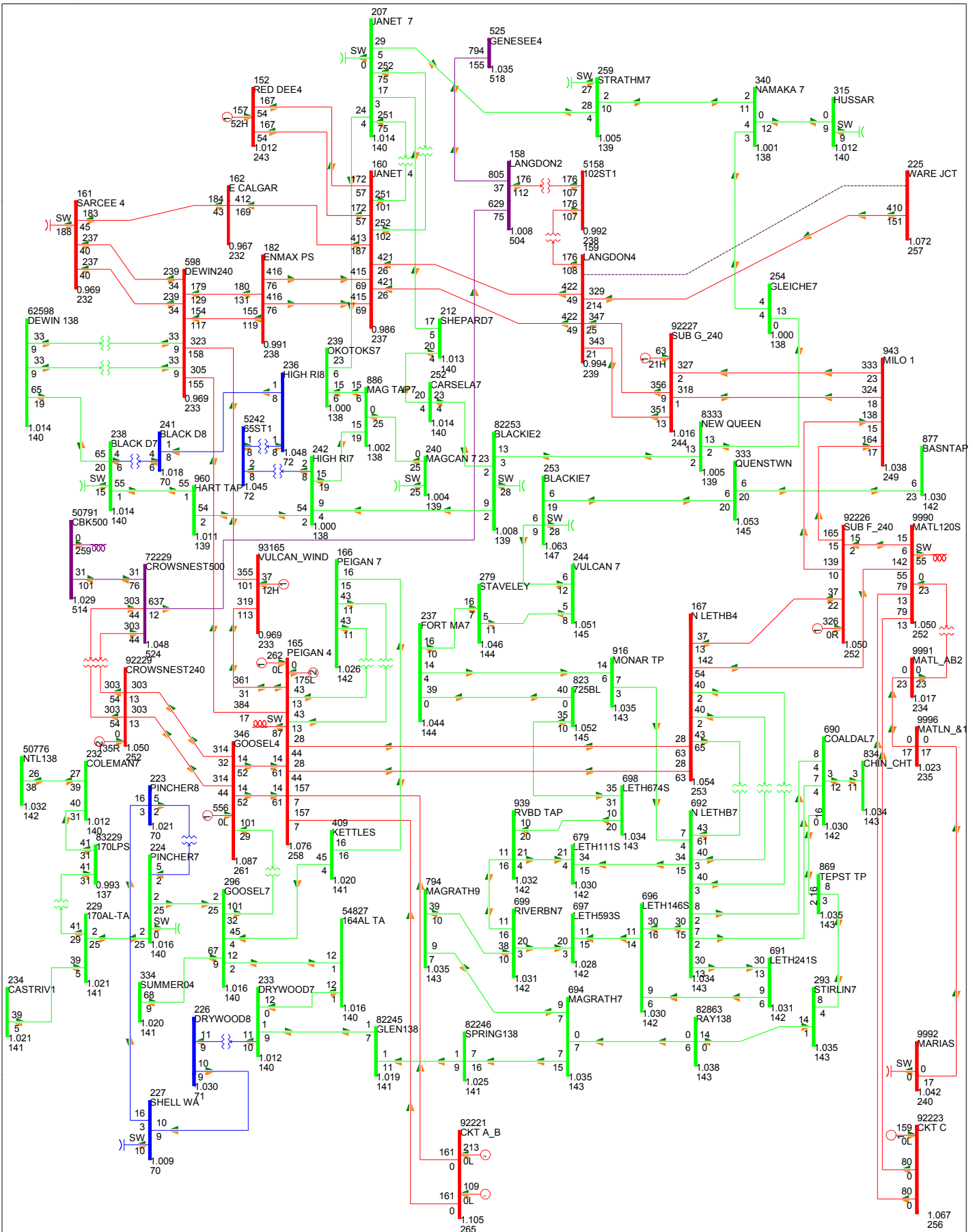


FIG 2017-2-SP-18: WAREJUNC TO LANGDON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -39 MW

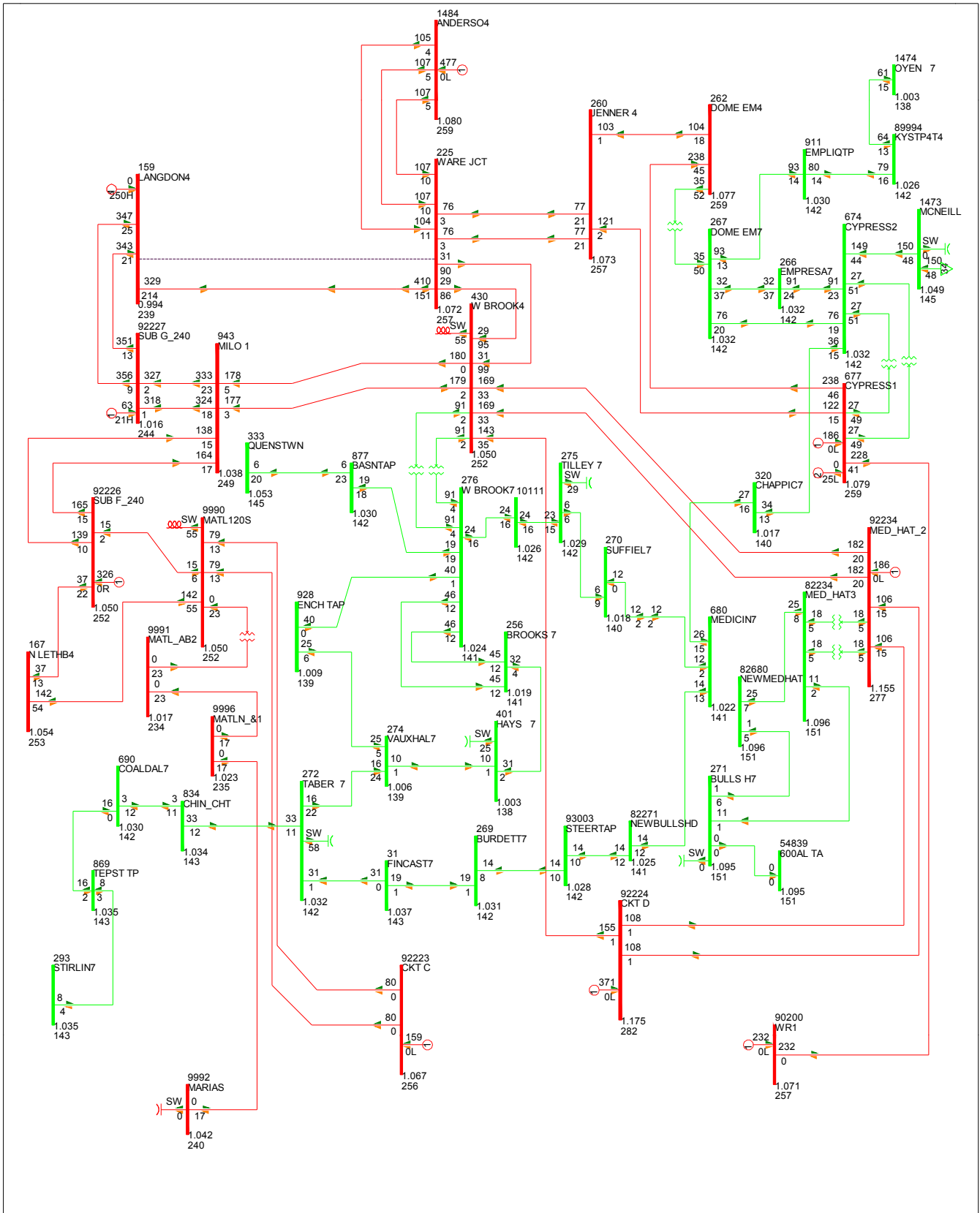


FIG 2017-2-SP-19: WAREJUNC TO LANGDON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -39 MW

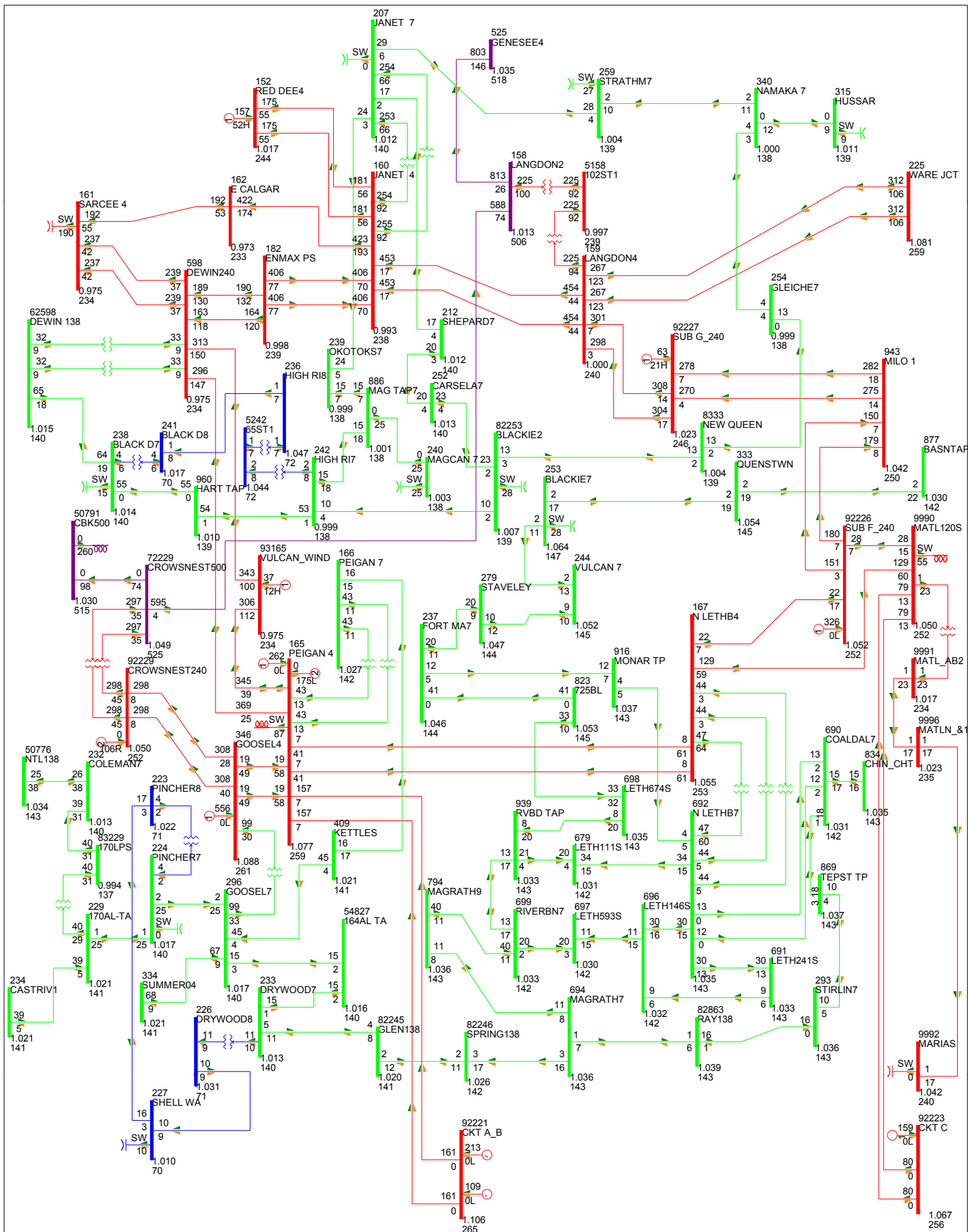


FIG 2017-2-SP-20: WAREJUNC TO WESTBROOKS 240 KV PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 2

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -7 MW

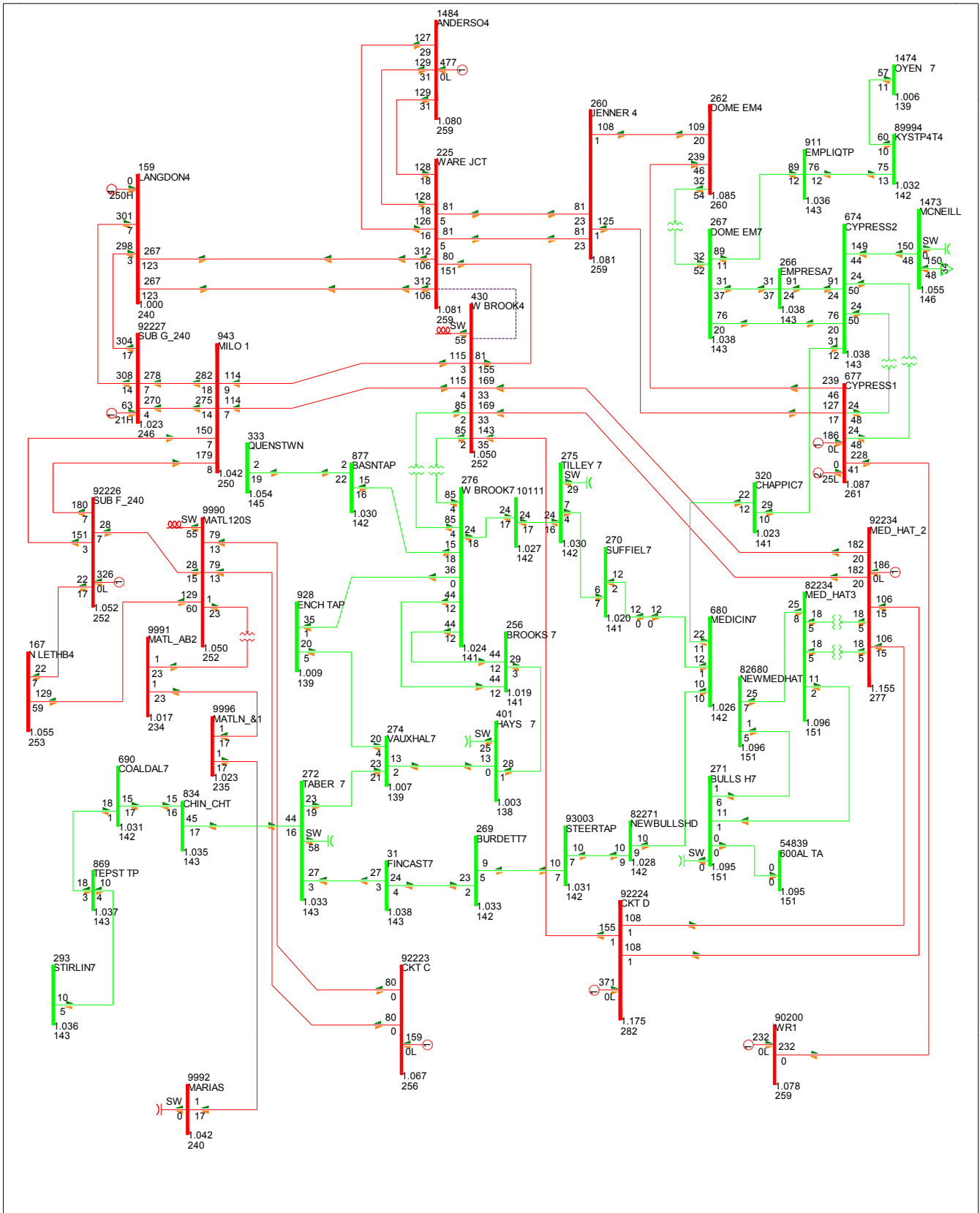


FIG 2017-2-SP-21: WAREJUNC TO WESTBROOKS 240 KV PROPORTIONAL WIND SCENARIO

2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 2

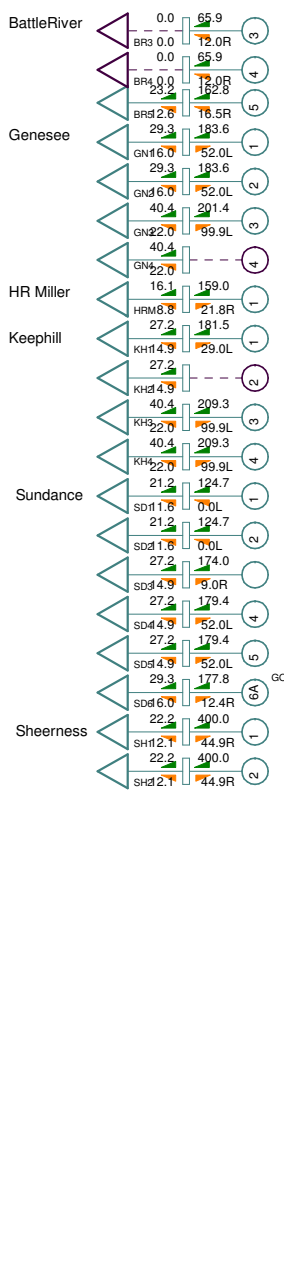
Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR

100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

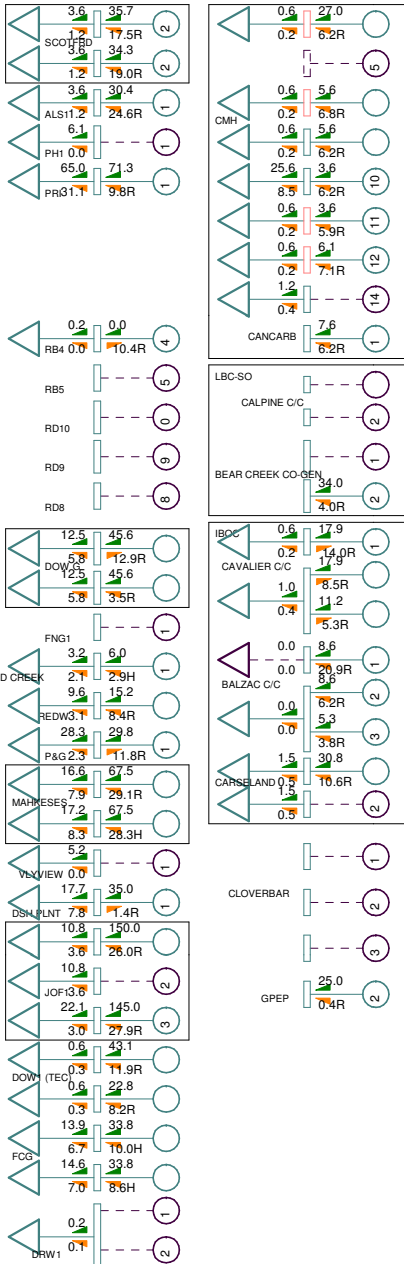
BC Export: -7 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3382.2 MW

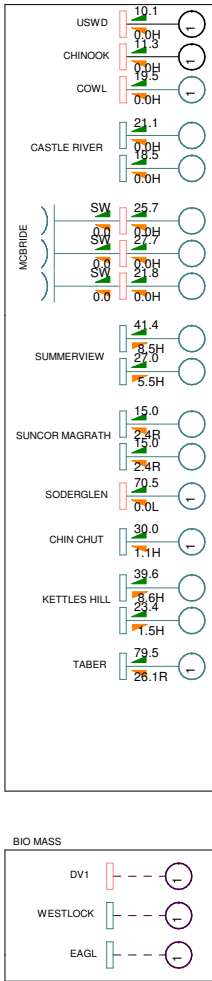
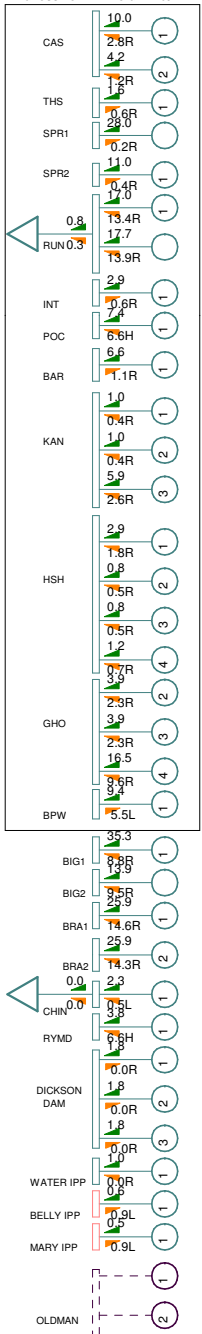


GAS GENERATION

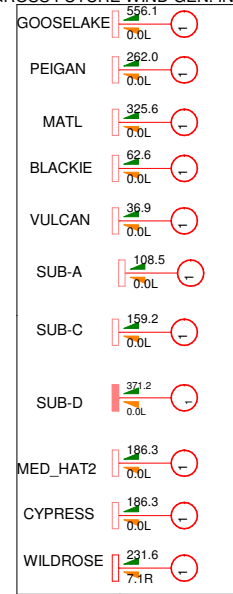


HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

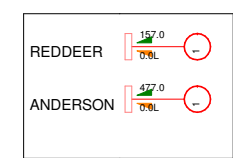
GROSS BOW HYDRO GEN. 153.7 MW



GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW



GROSS FUTURE WIND GEN. IN CENTRAL 634.0 MW



FORT MCMURRAY GEN.

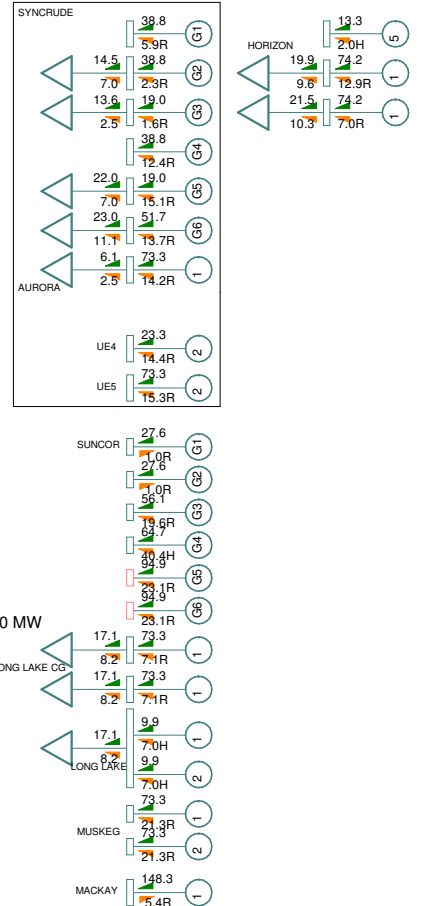


Fig 2017-3-SL-1

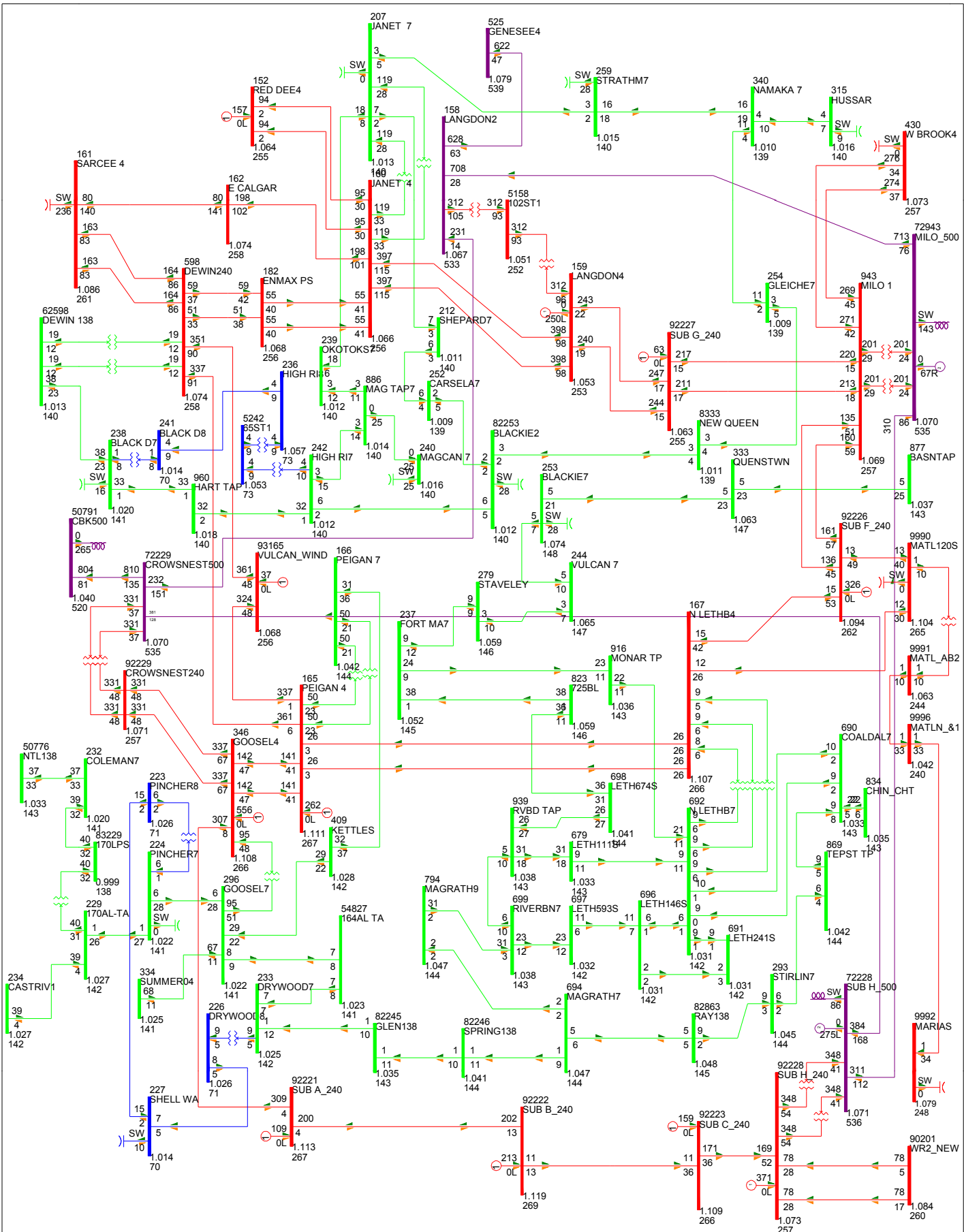


FIG 2017-3-SL-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 852 MW

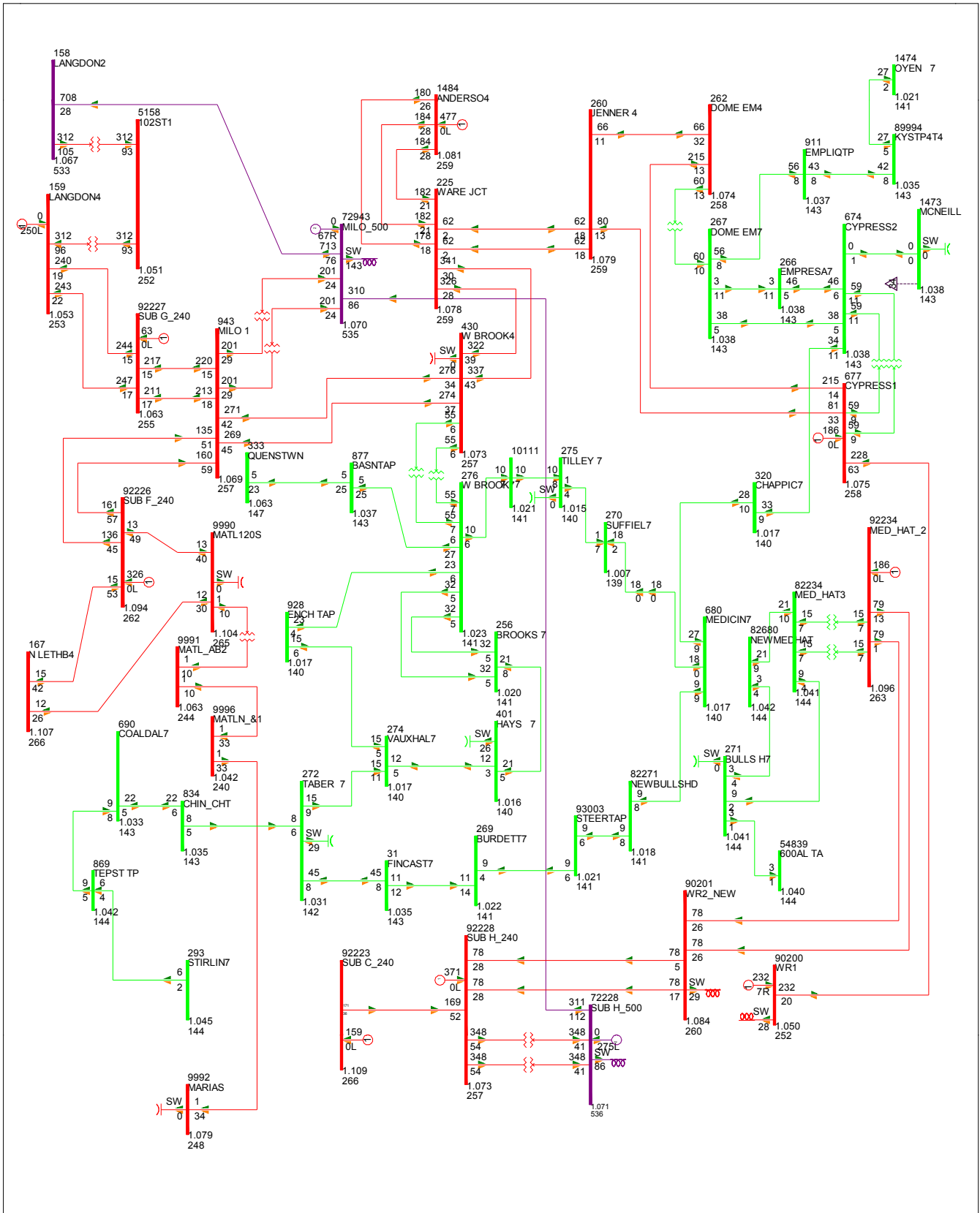


FIG 2017-3-SL-3: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 852 MW

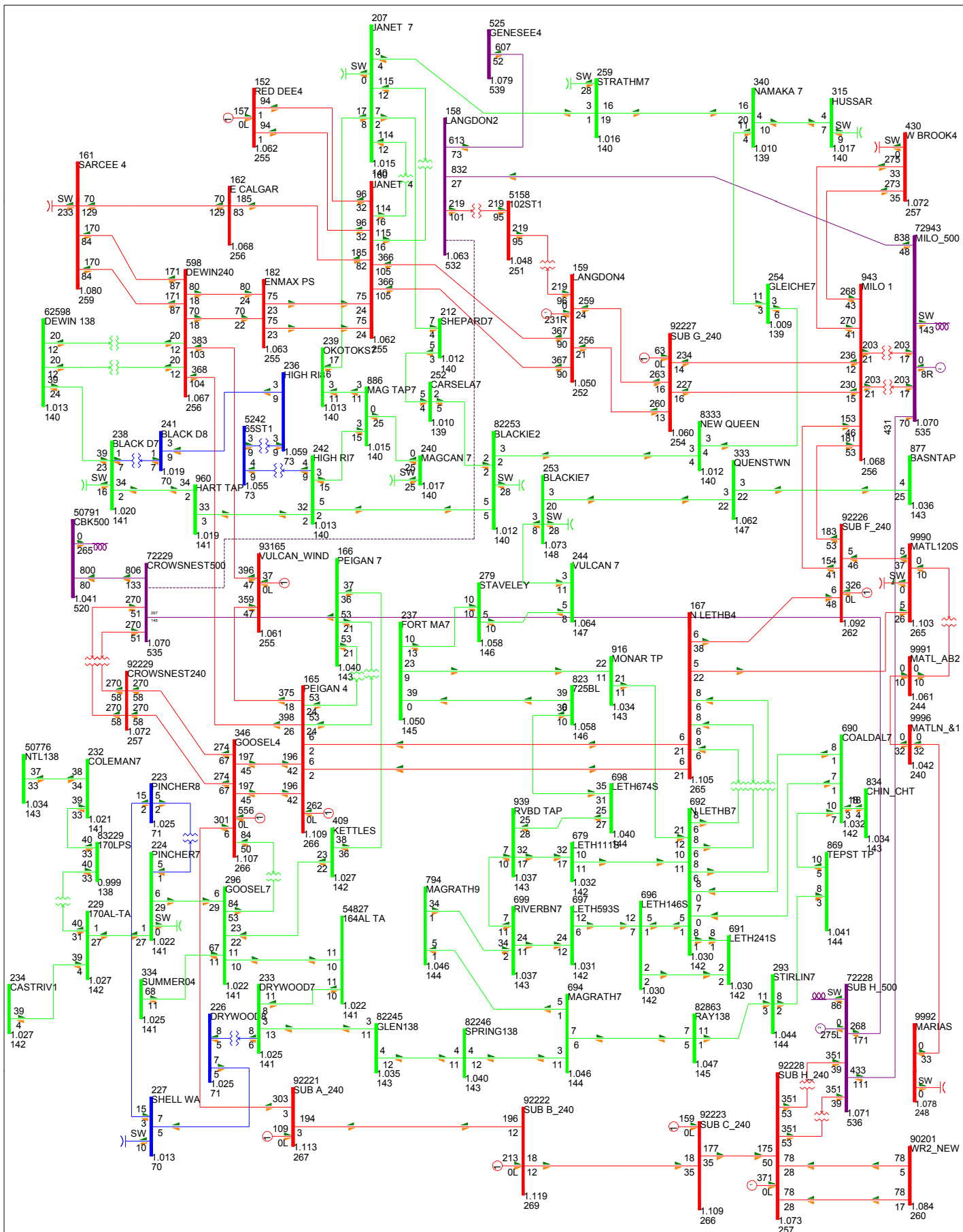


FIG 2017-3-SL-4: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 840 MW

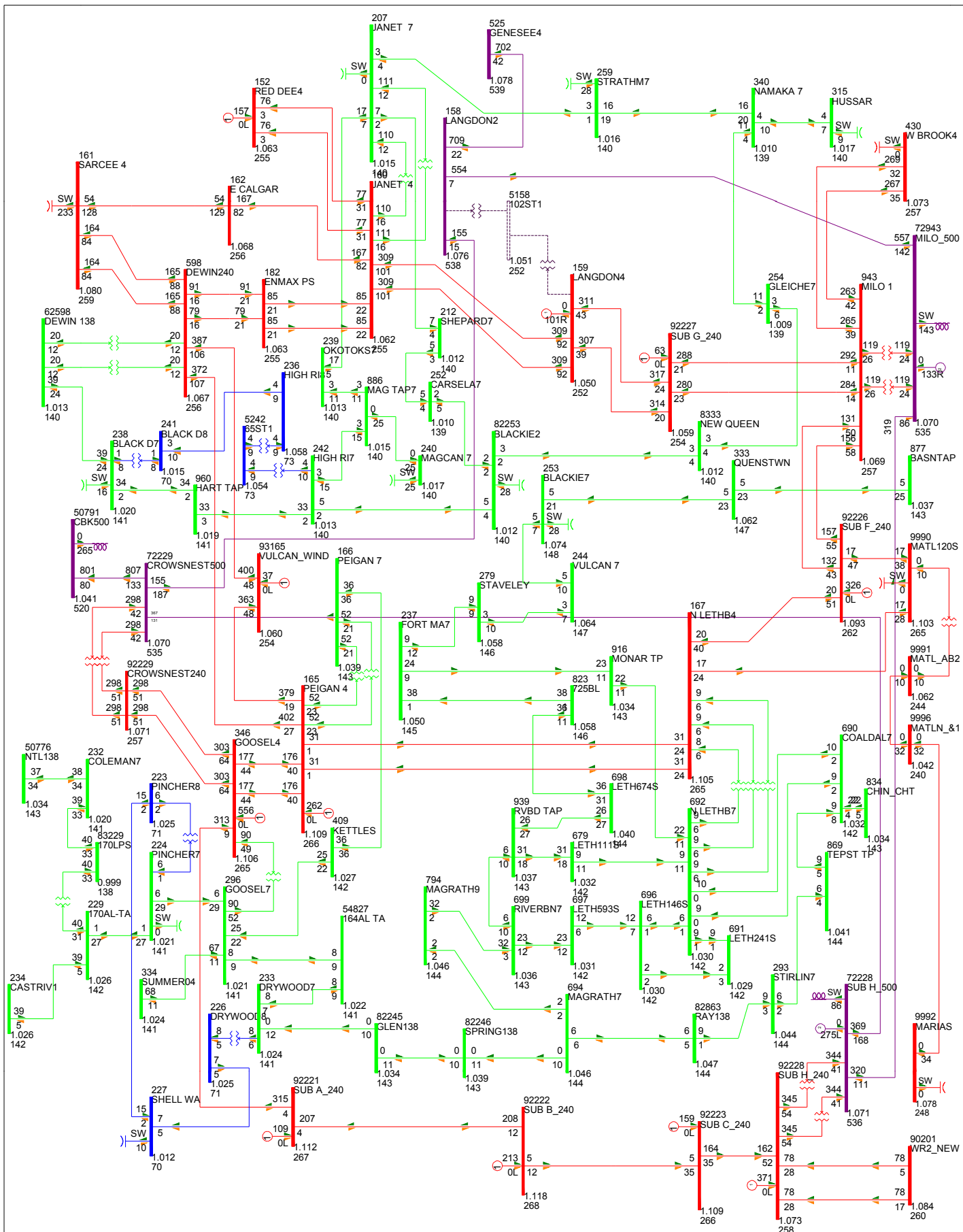


FIG 2017-3-SL-6: LANGDON 500/240 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 843 MW

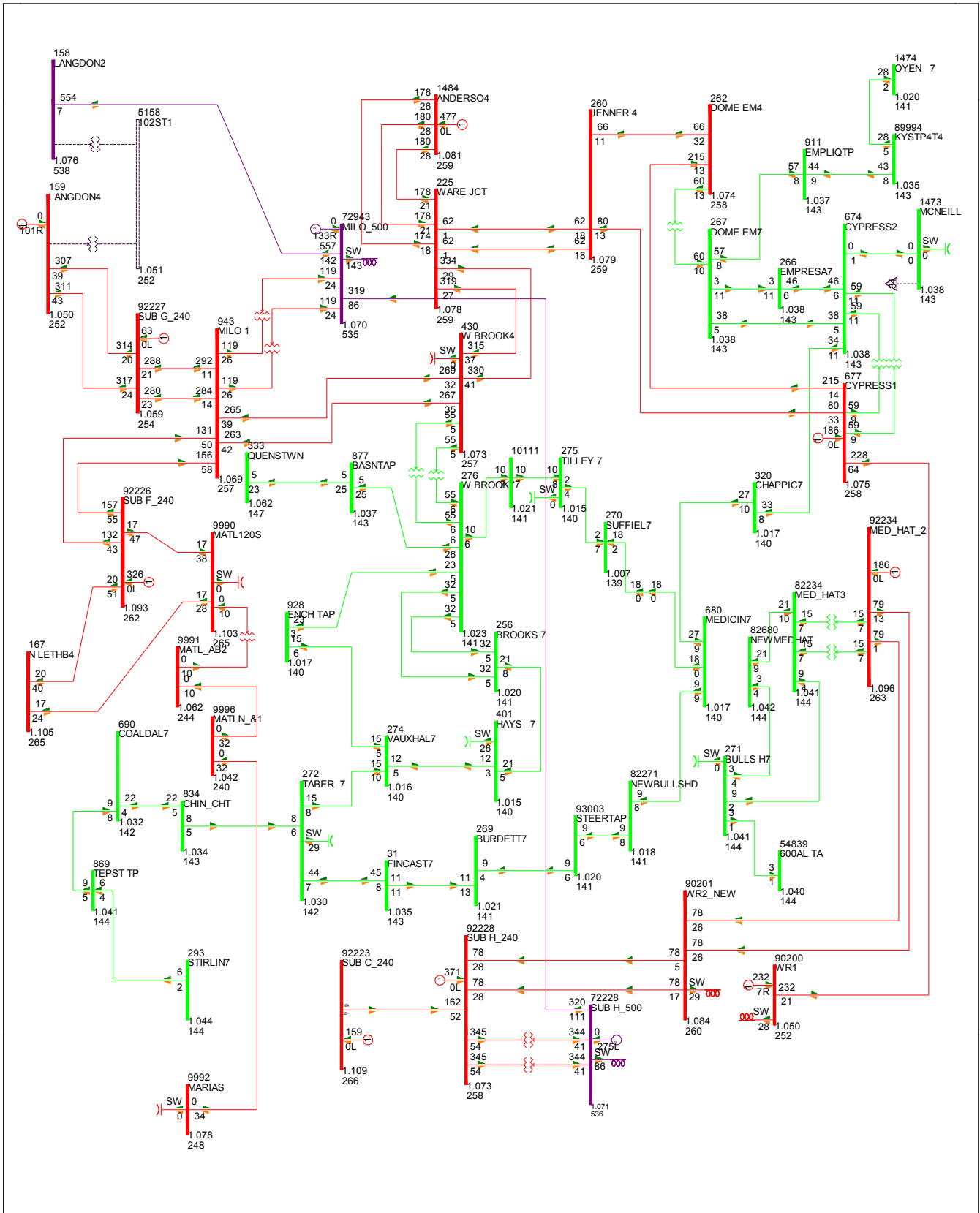


FIG 2017-3-SL-7: LANGDON 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 843 MW

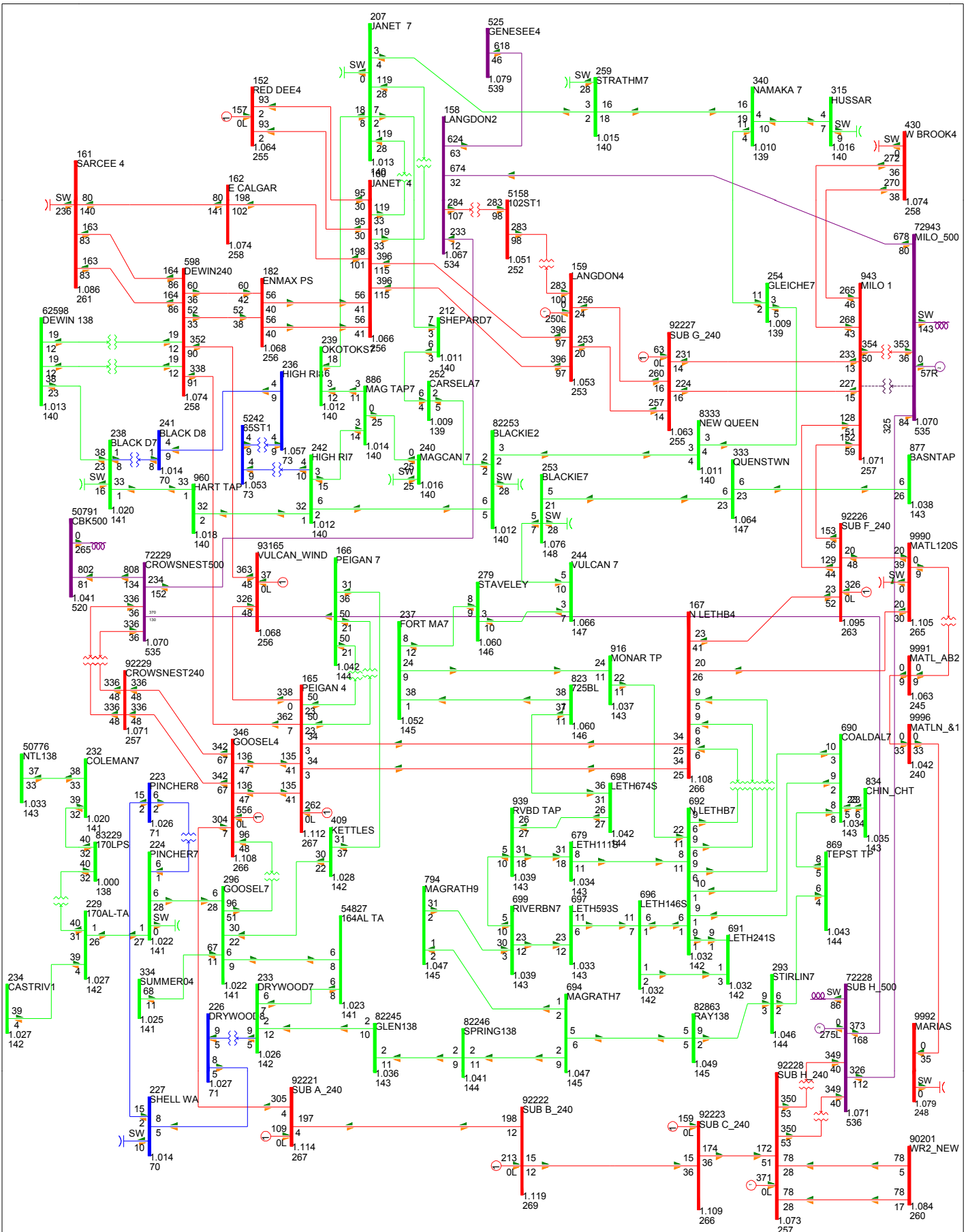


FIG 2017-3-SL-8: MILO 500/240 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000

BC Export: 850 MW

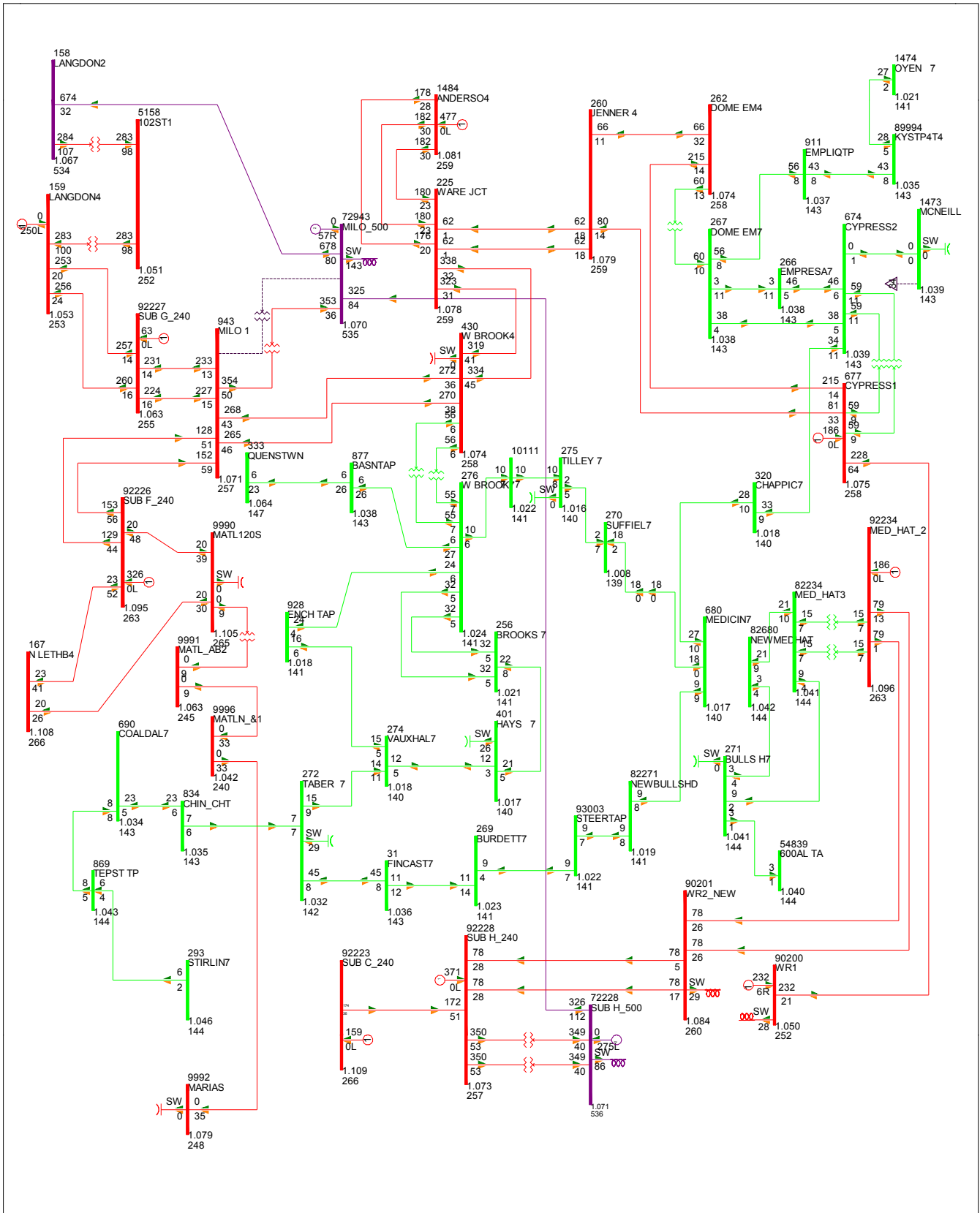


FIG 2017-3-SL-9: MILO 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 850 MW

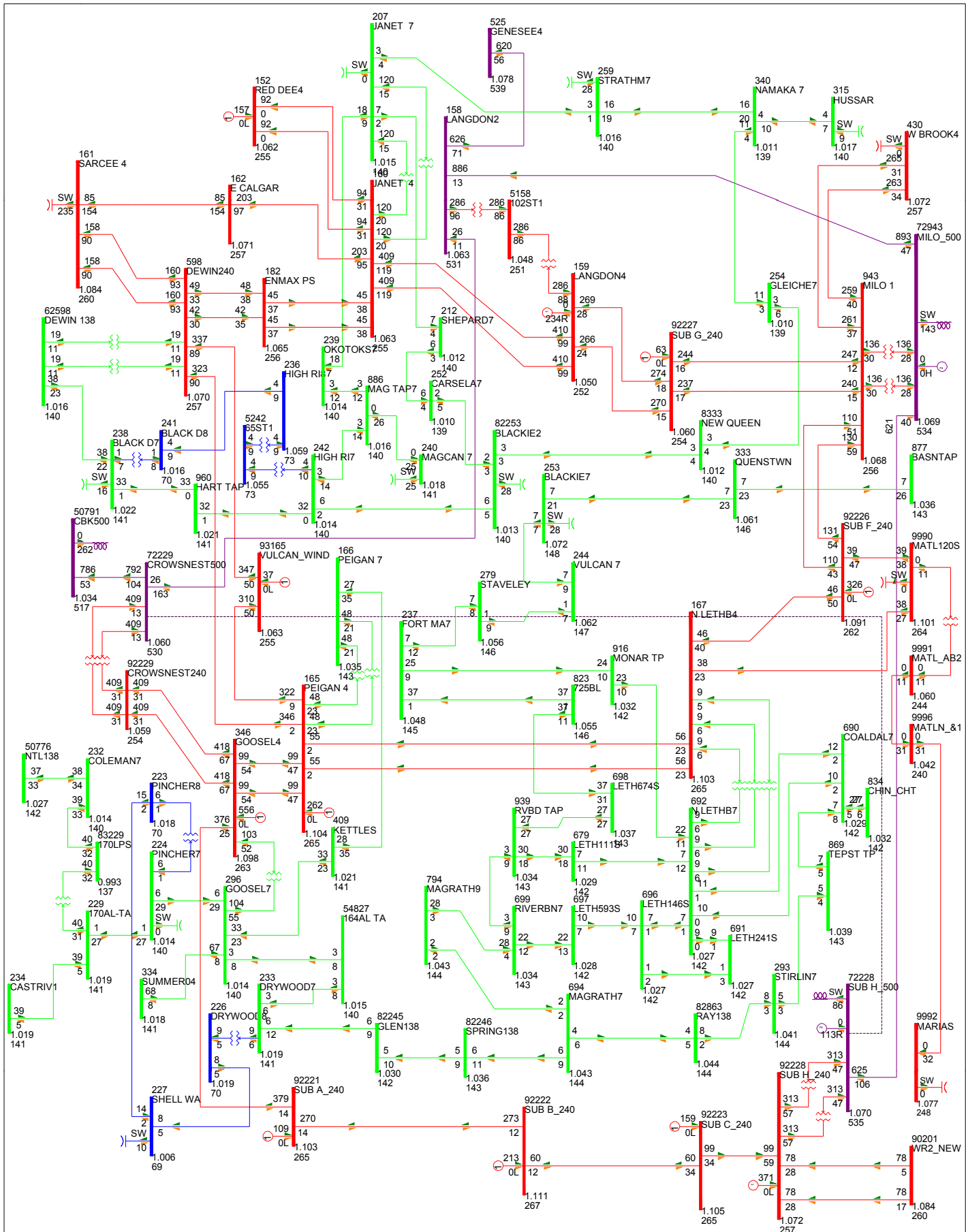


FIG 2017-3-SL-10: CROWNSNEST TO SUB H 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <math>KV <= 34.500</math> <math>KV <= 69.000</math> <math>KV <= 138.000</math> <math>KV <= 240.000</math> <math>KV <= 500.000</math> $KV > 600.000$
 BC Export: 841 MW

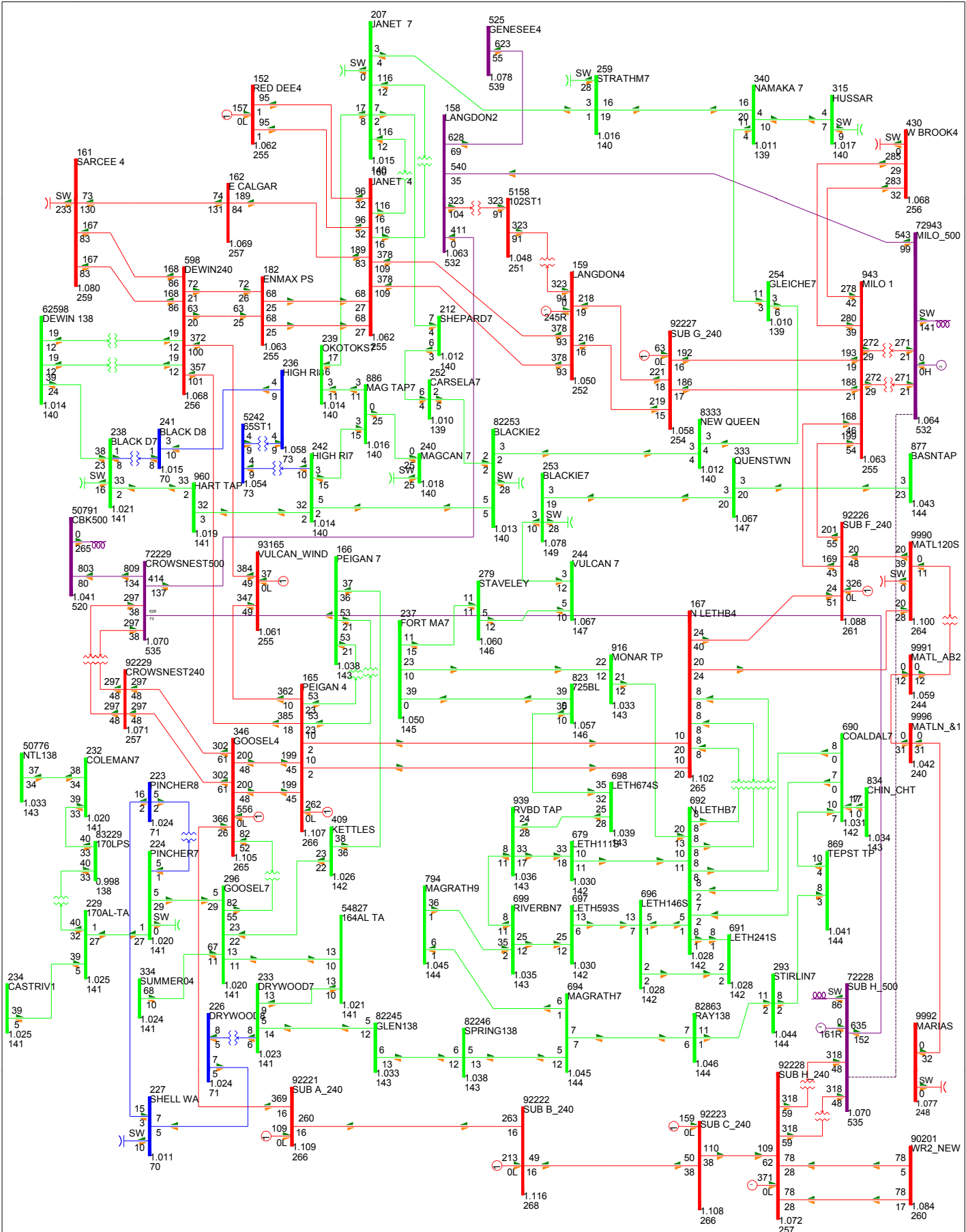


FIG 2017-3-SL-12: MILO TO SUB H 500 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000

BC Export: 845 MW

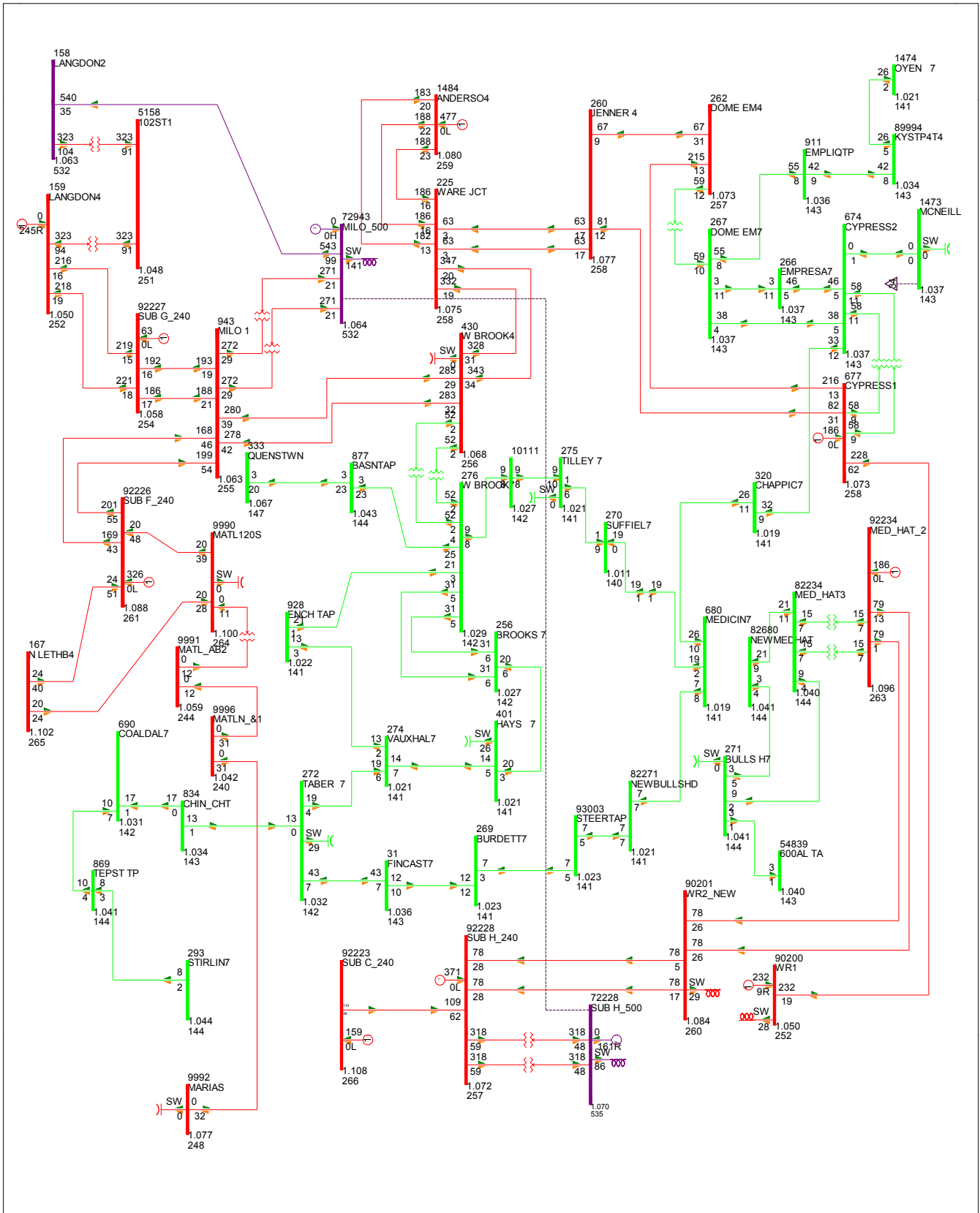


FIG 2017-3-SL-13: MILO TO SUB H 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 845 MW

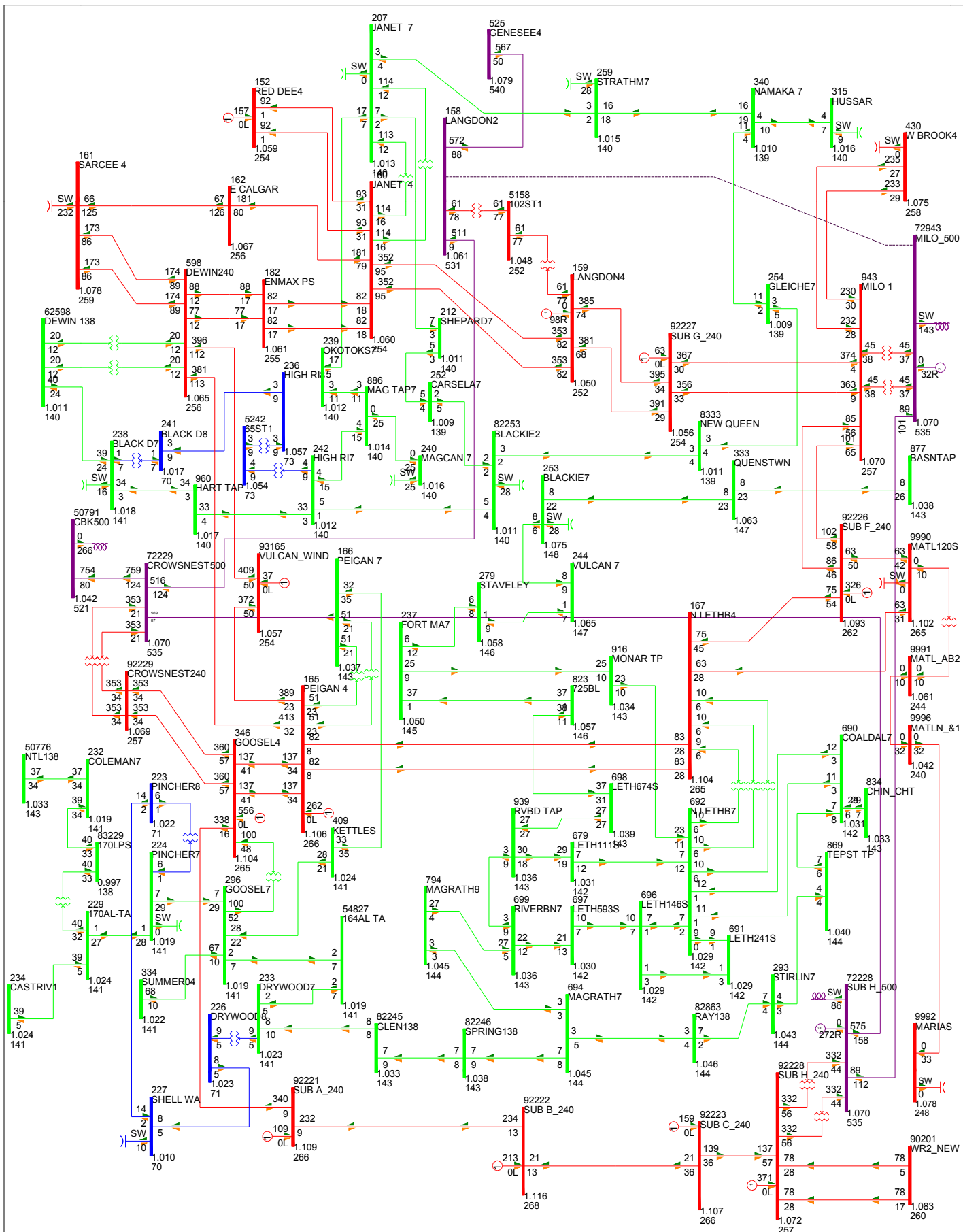


FIG 2017-3-SL-14: LANGDON TO MILO 500 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000

BC Export: 797 MW

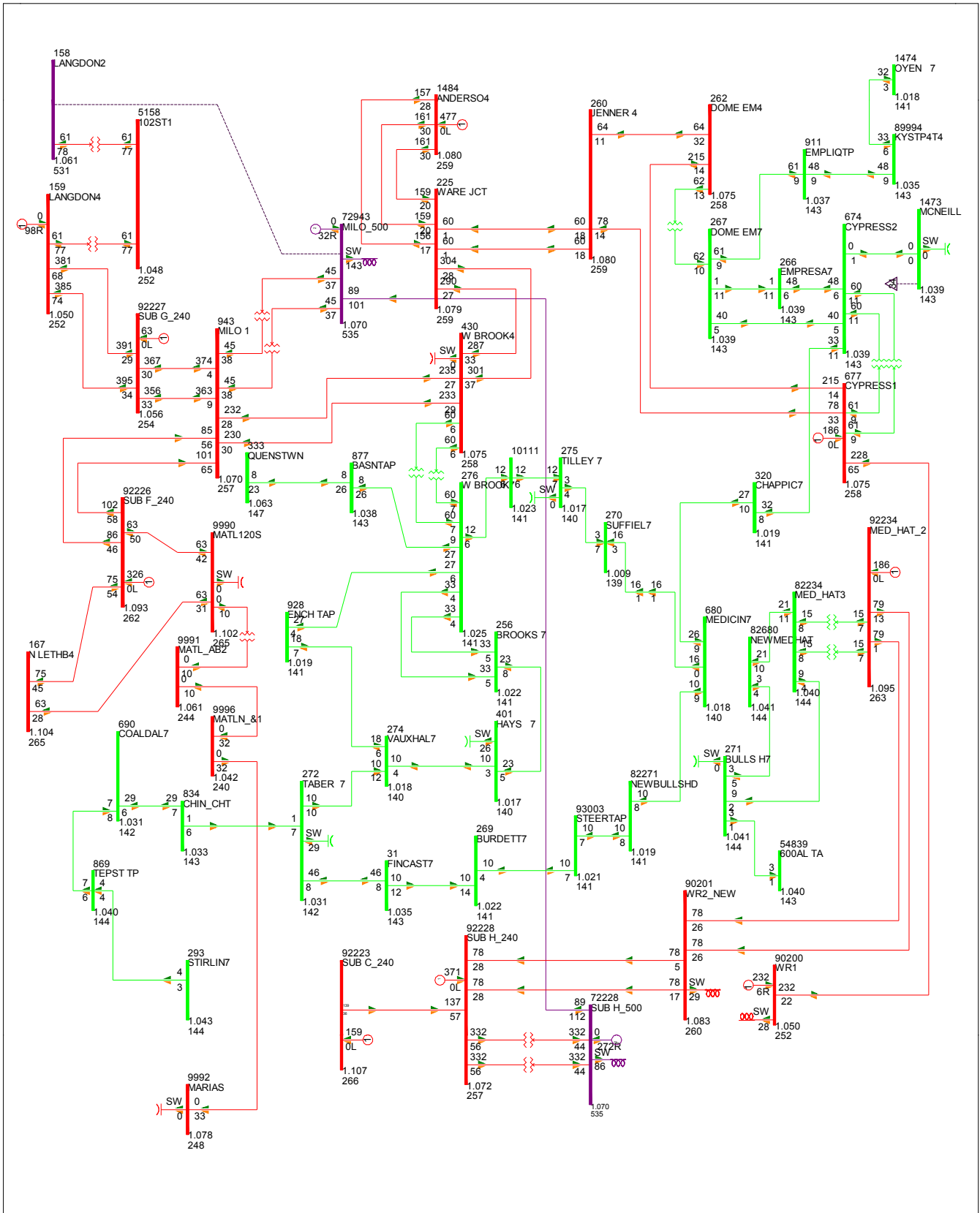


FIG 2017-3-SL-15: LANGDON TO MILO 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 797 MW

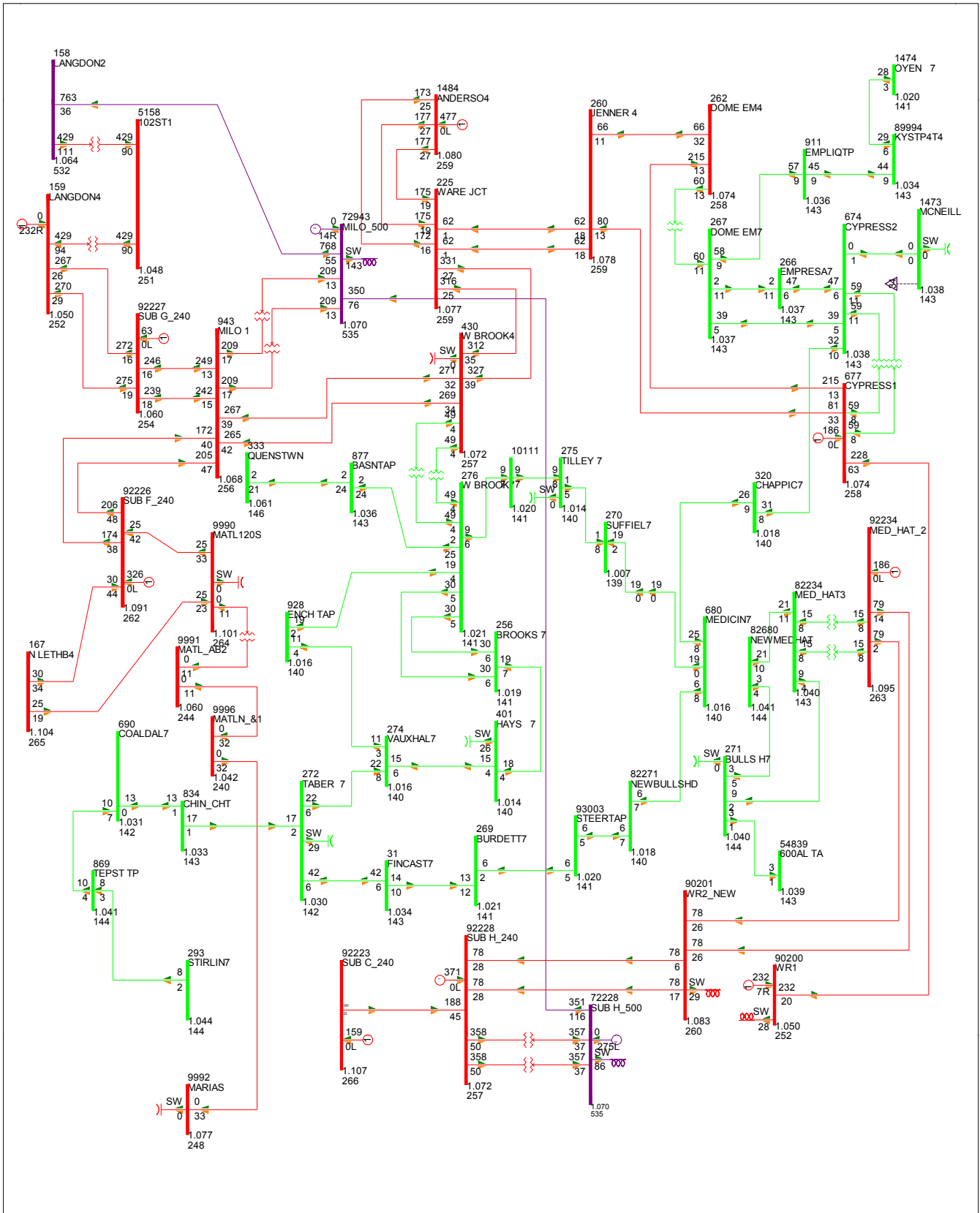


FIG 2017-3-SL-19: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 845 MW

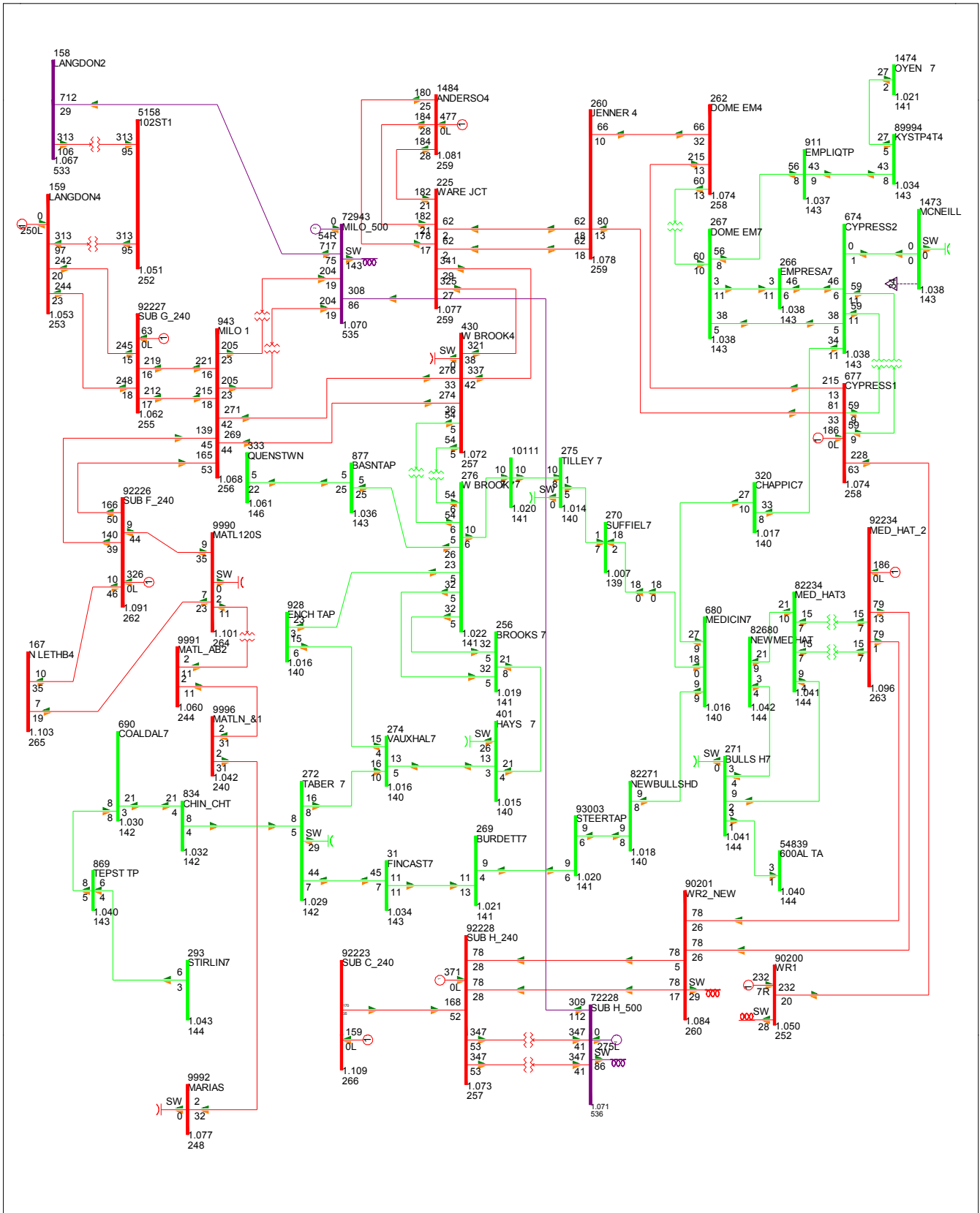


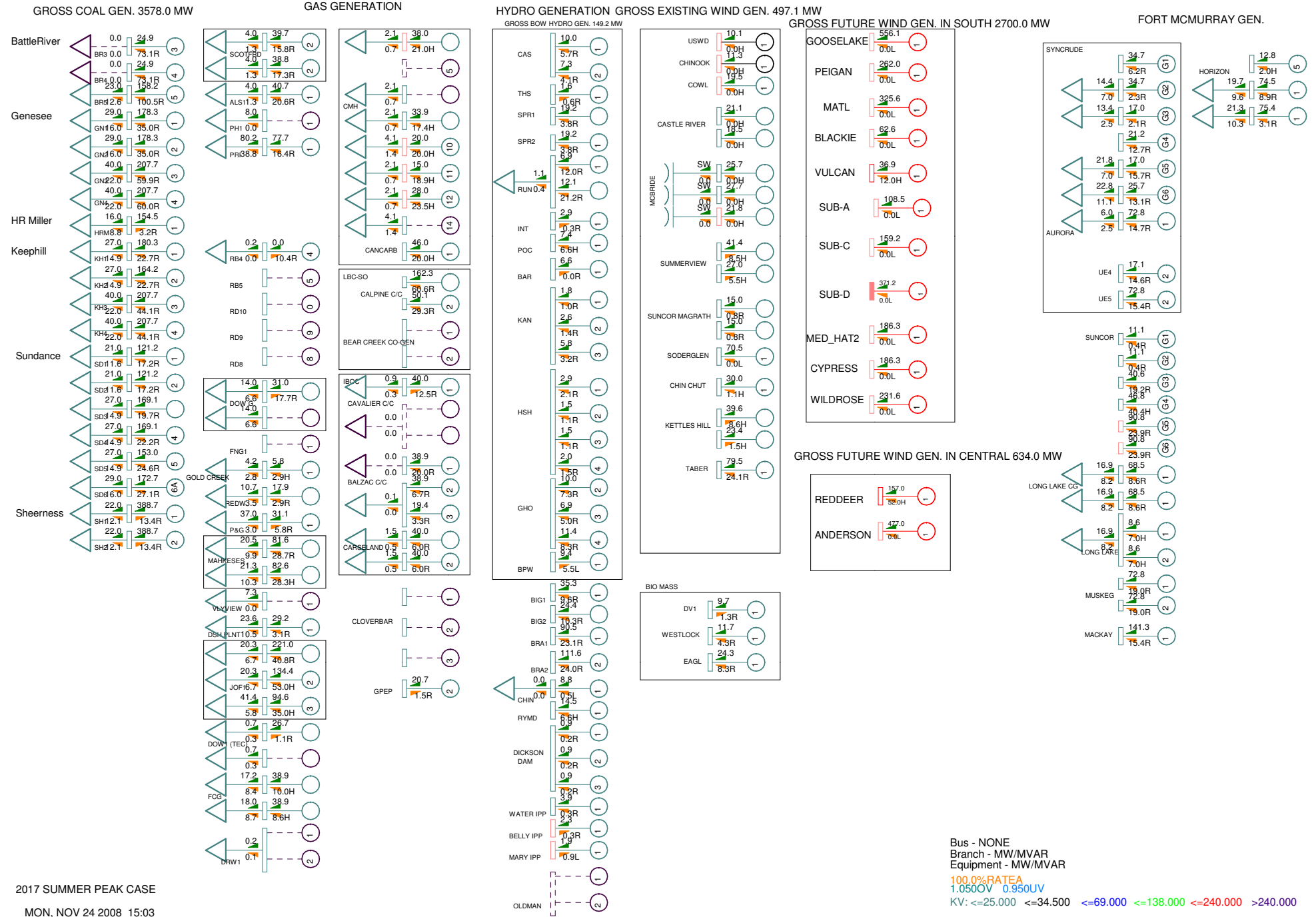
FIG 2017-3-SL-21: PEIGAN TO N. LETHBRIDGE 240 KV PROPORTIONAL WIND SCENARIO

2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 851 MW

GENERATION DISPATCH REPORT



2017 SUMMER PEAK CASE
 MON, NOV 24 2008 15:03

Bus - NONE
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 1.050OV 0.950UV
 KV: <=25.000 <=34.500 <=69.000 <=138.000 <=240.000 >240.000

Fig 2017-3-SP-1

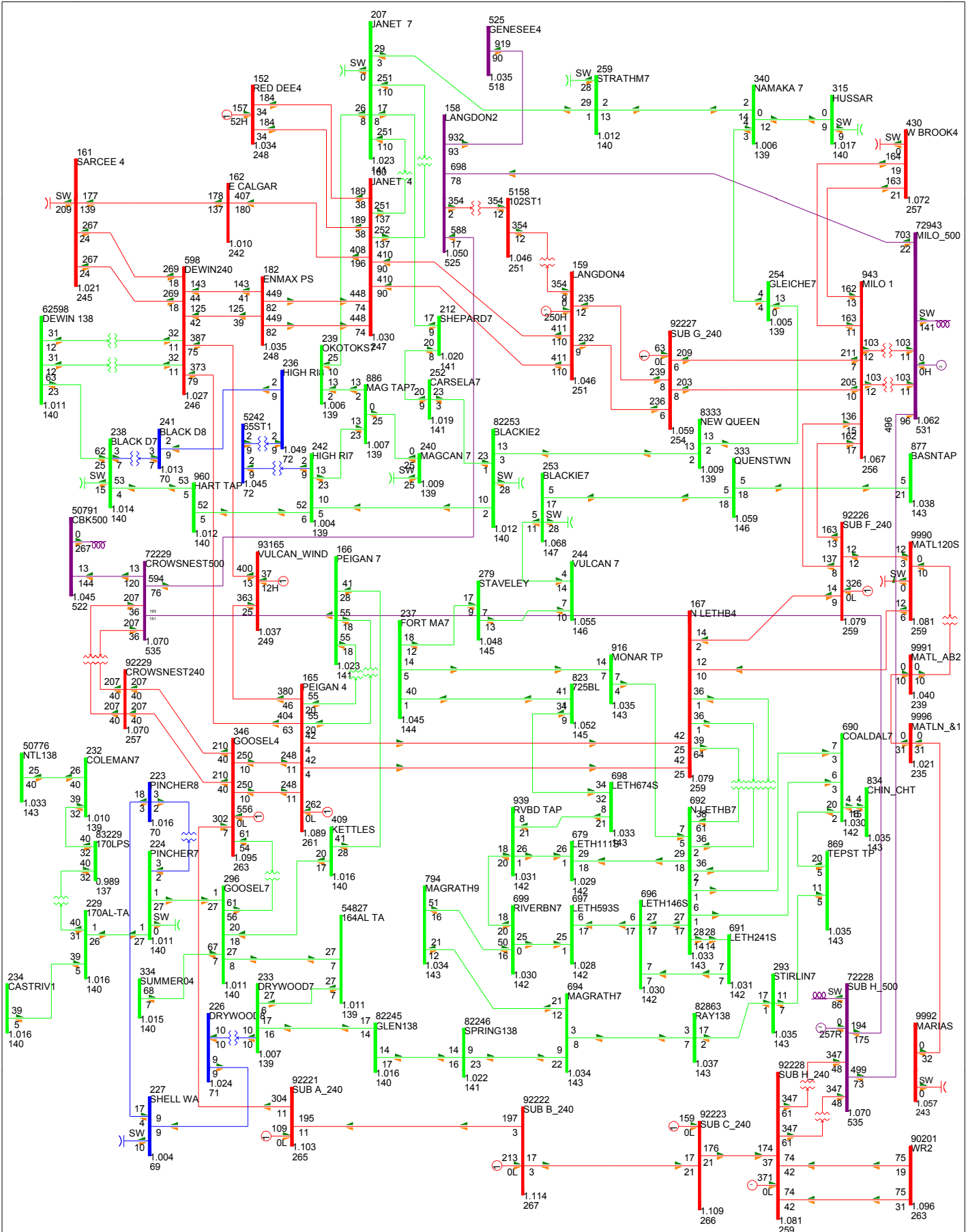


FIG 2017-3-SP-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 3 MW

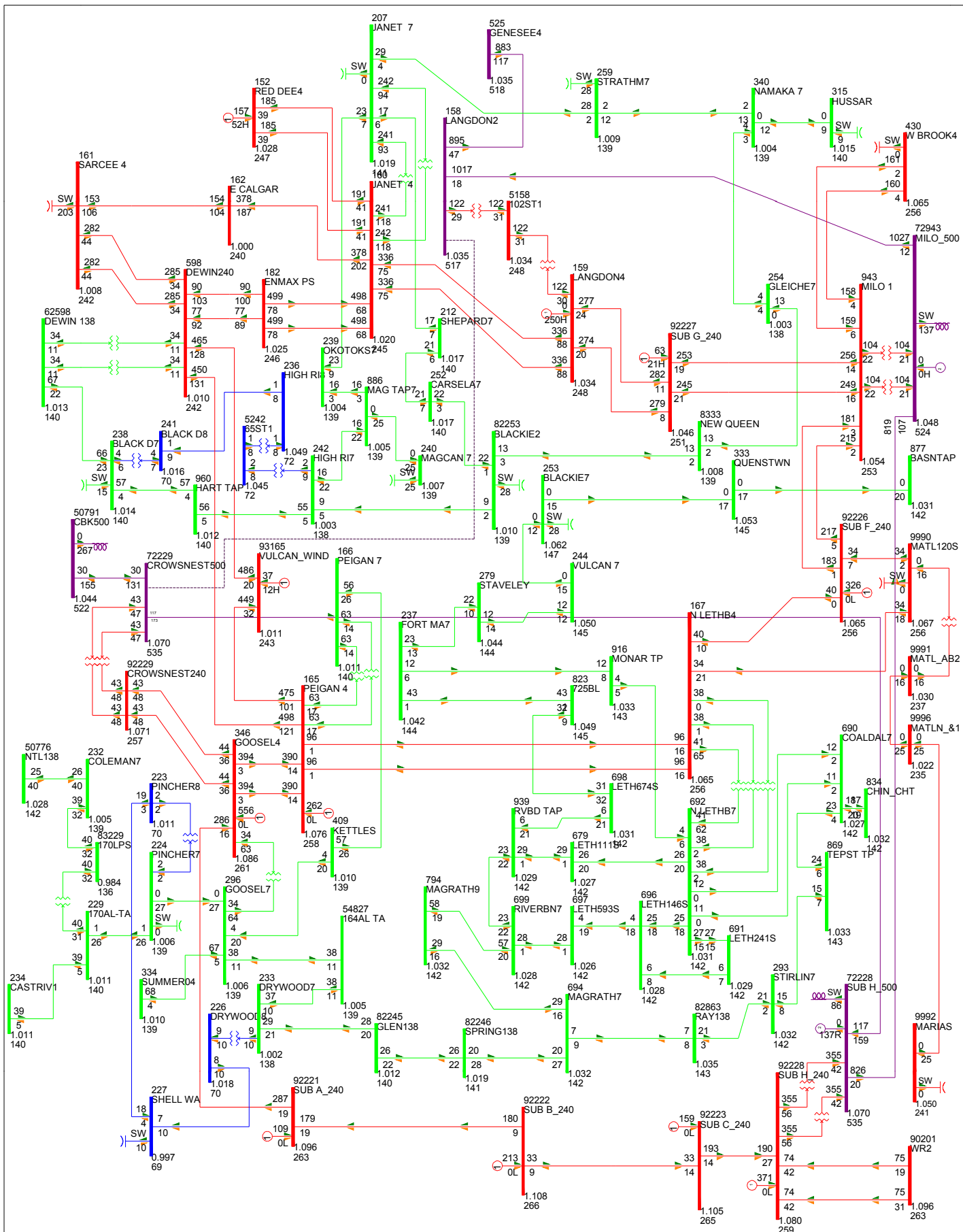


FIG 2017-3-SP-4: LANGDON TO CROWSNEST 500 KV

PROPORTIONAL WIND SCENARIO

2017 South West System TUE, DEC 02 2008 9:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000

BC Export: -61 MW

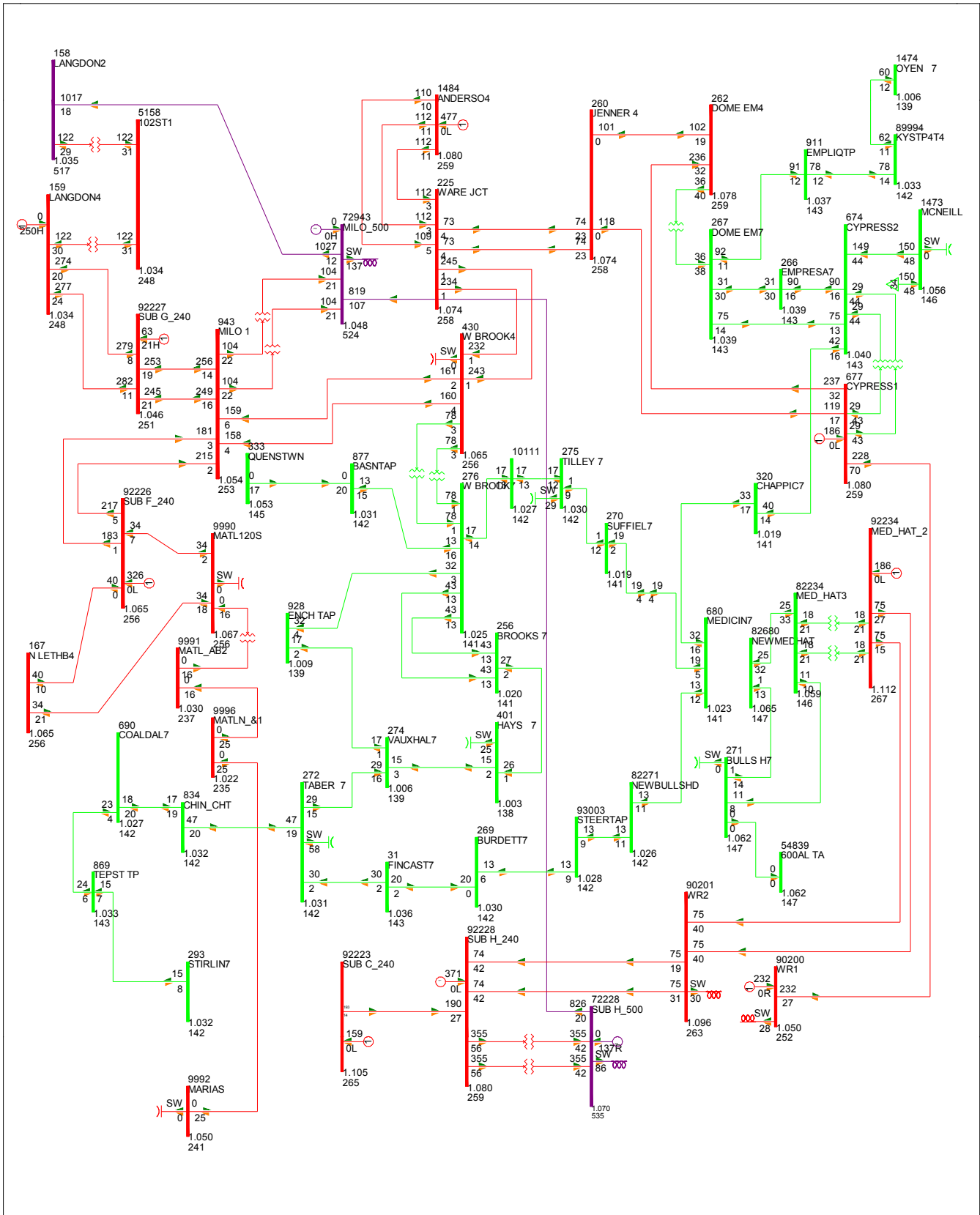


FIG 2017-3-SP-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:43

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -61 MW

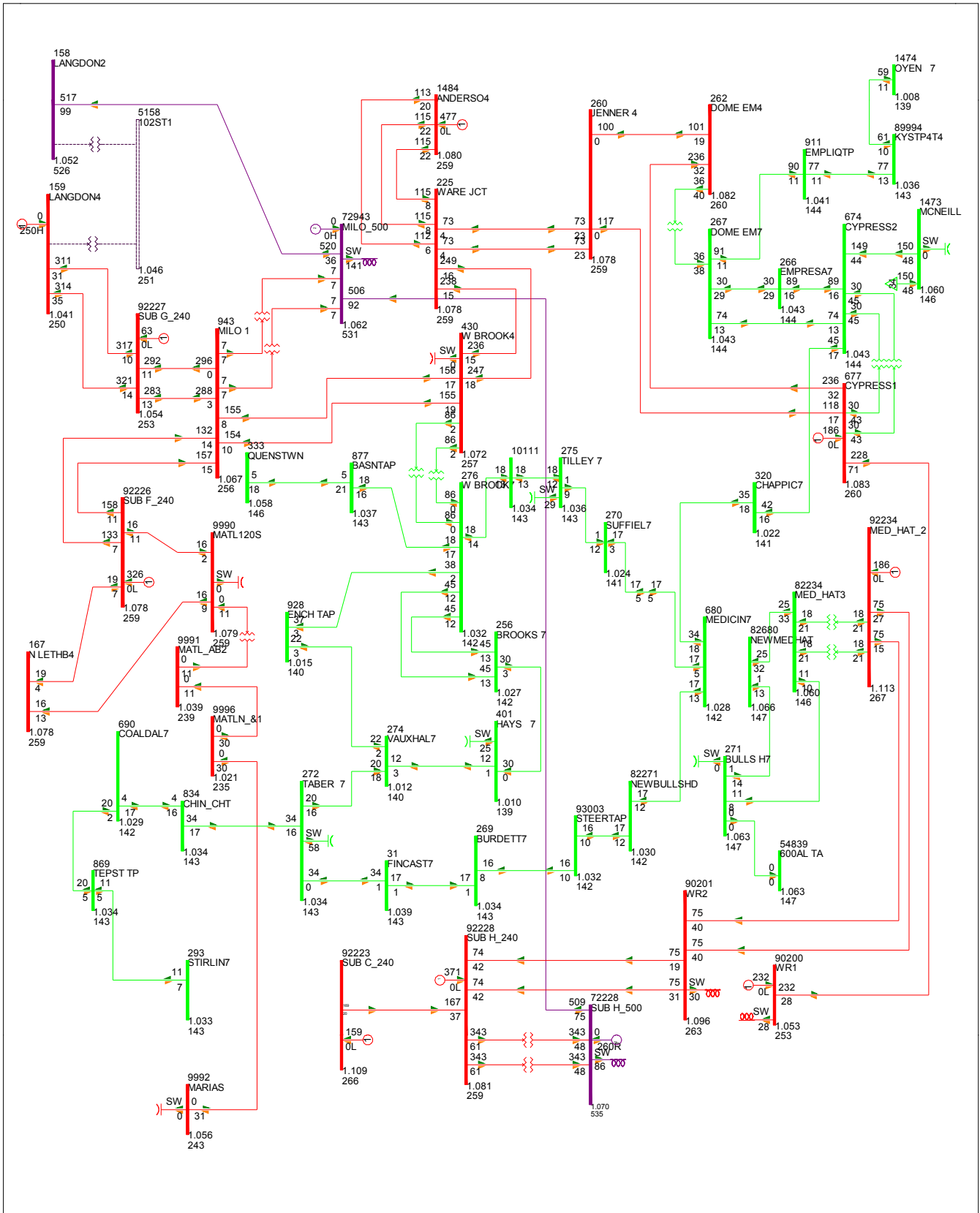


FIG 2017-3-SP-7: LANGDON 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -7 MW

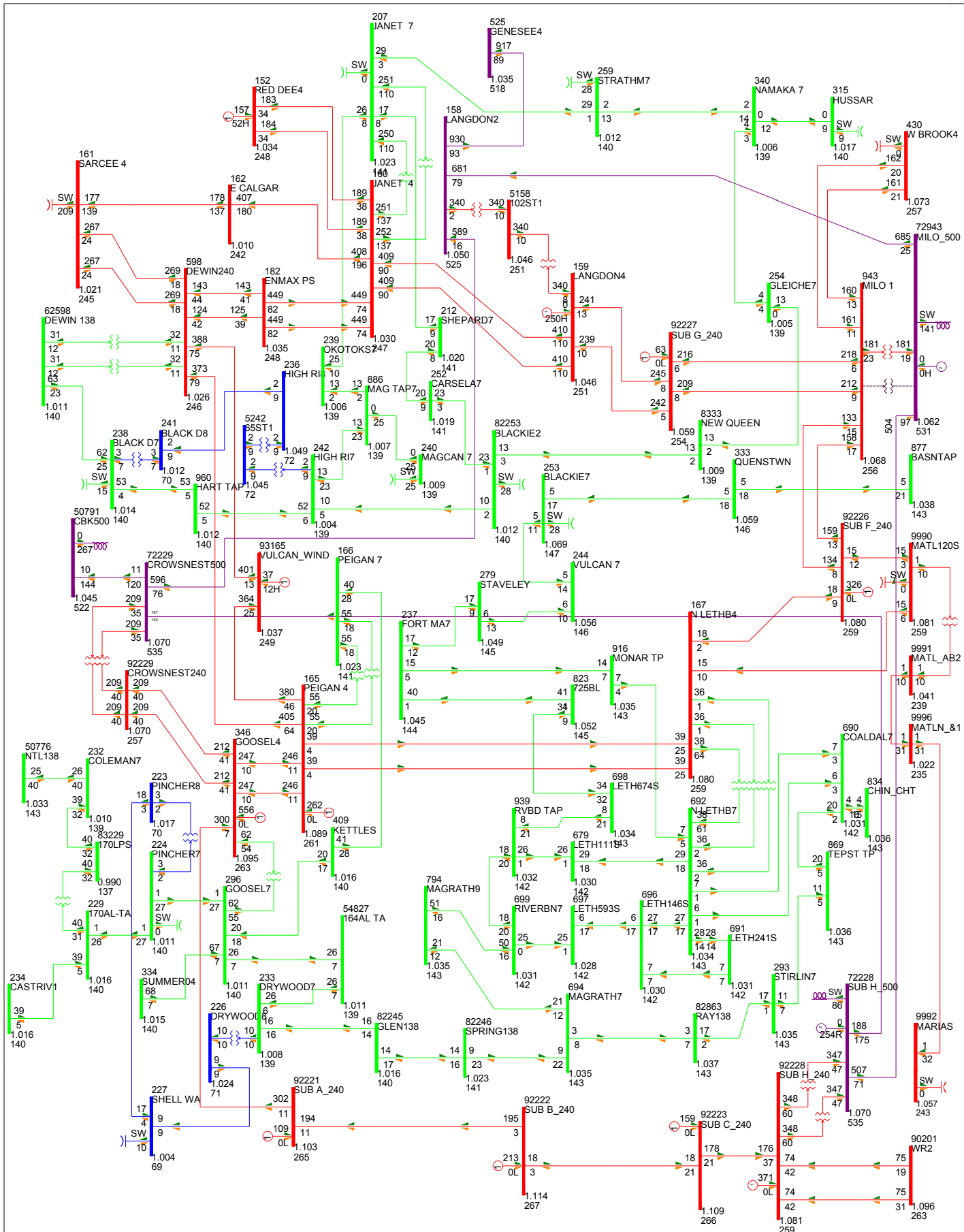


FIG 2017-3-SP-8: MILO 500/240 KV XMER

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 0 MW

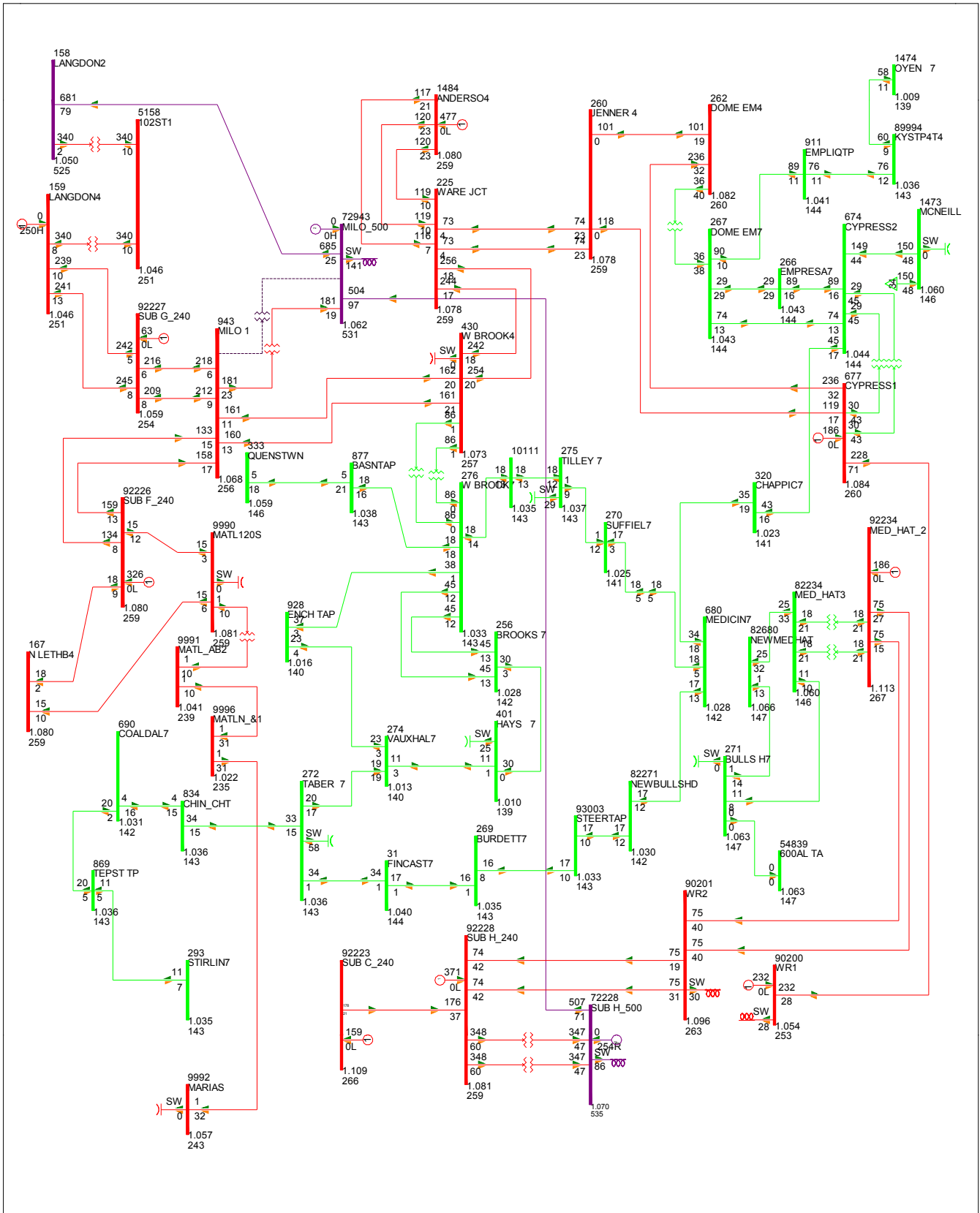


FIG 2017-3-SP-9: MILO 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 0 MW

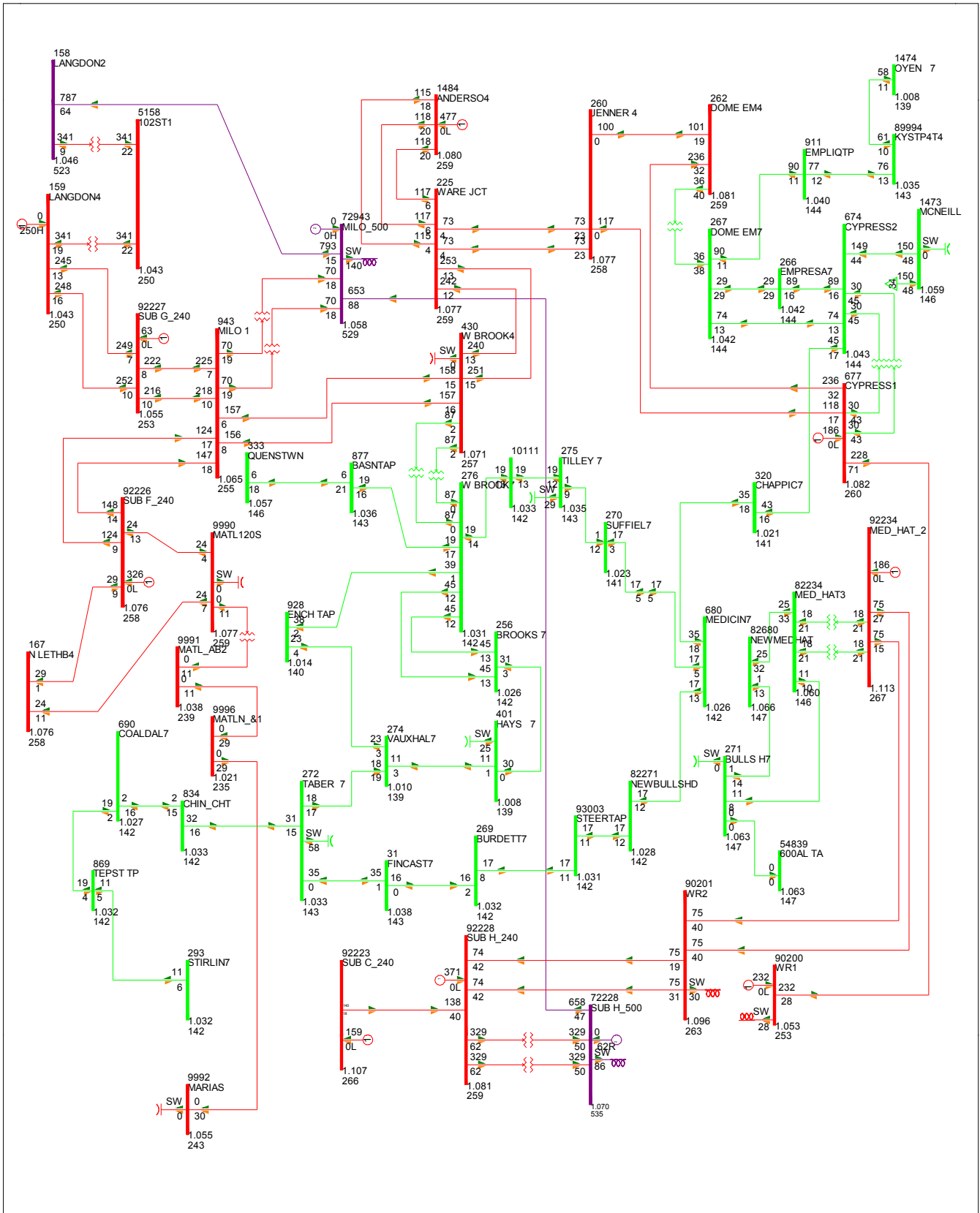


FIG 2017-3-SP-11: CROWSNEST TO SUB H 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -2 MW

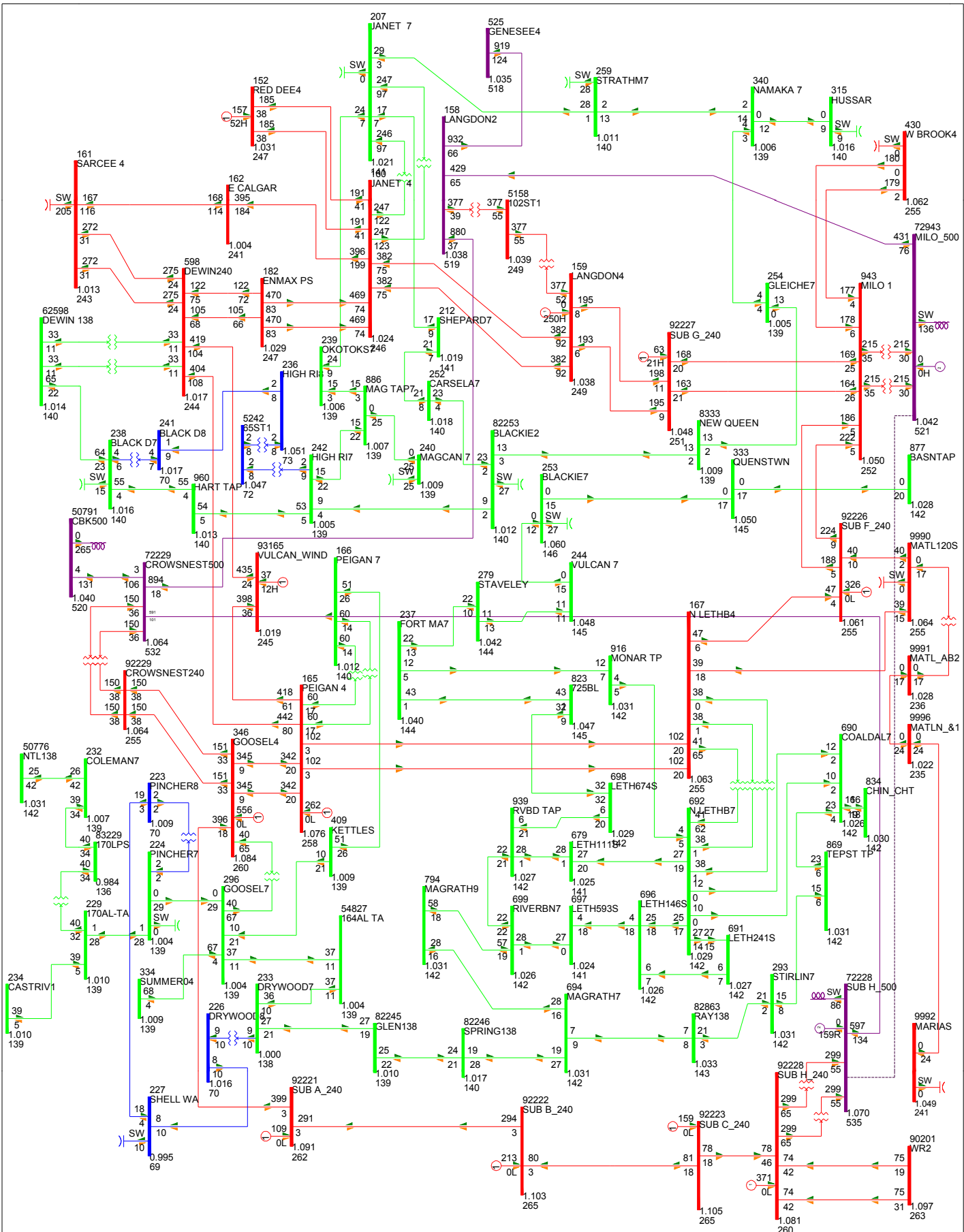


FIG 2017-3-SP-12: MILO TO SUB H 500 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000

BC Export: -23 MW

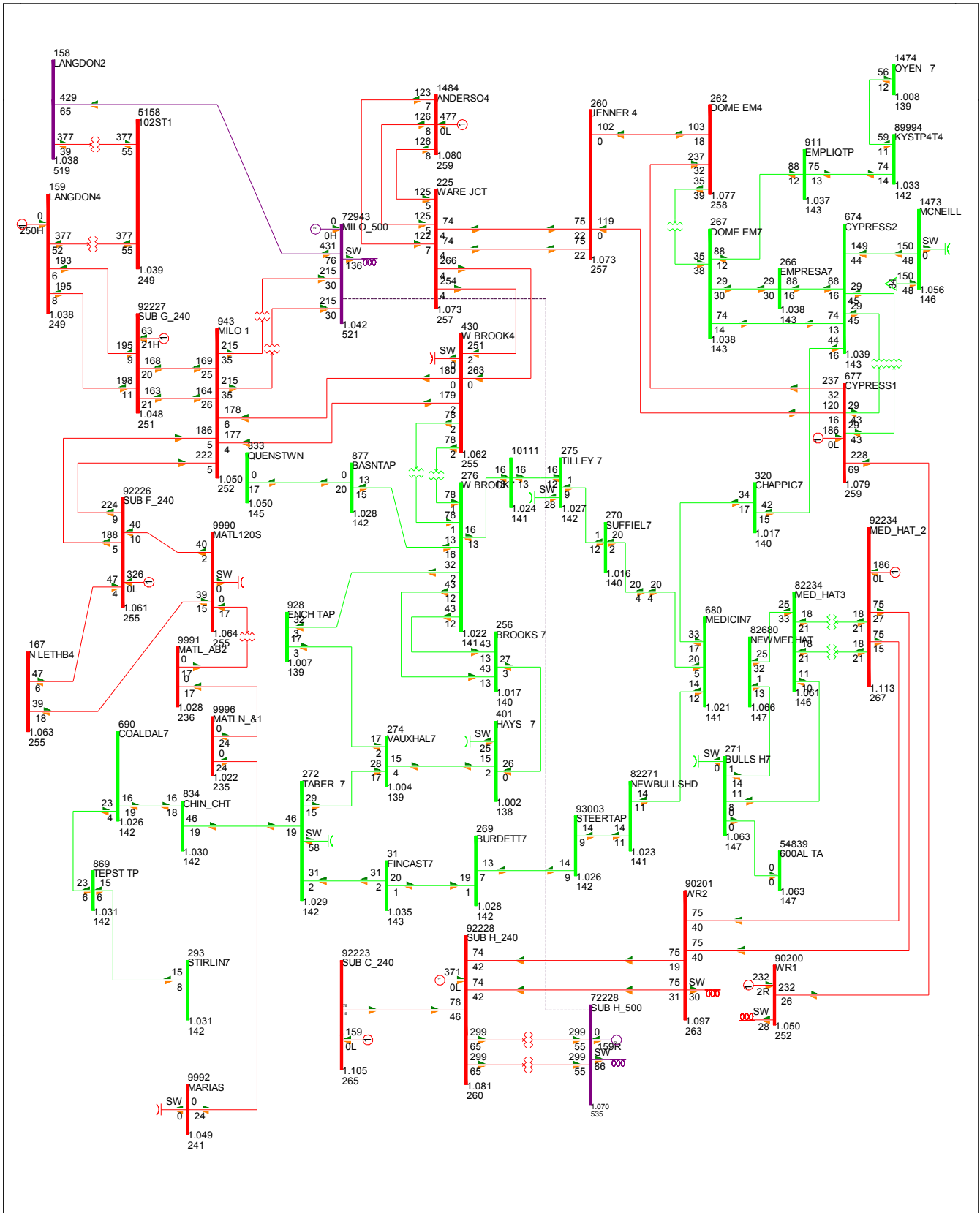


FIG 2017-3-SP-13: MILO TO SUB H 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATED
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -23 MW

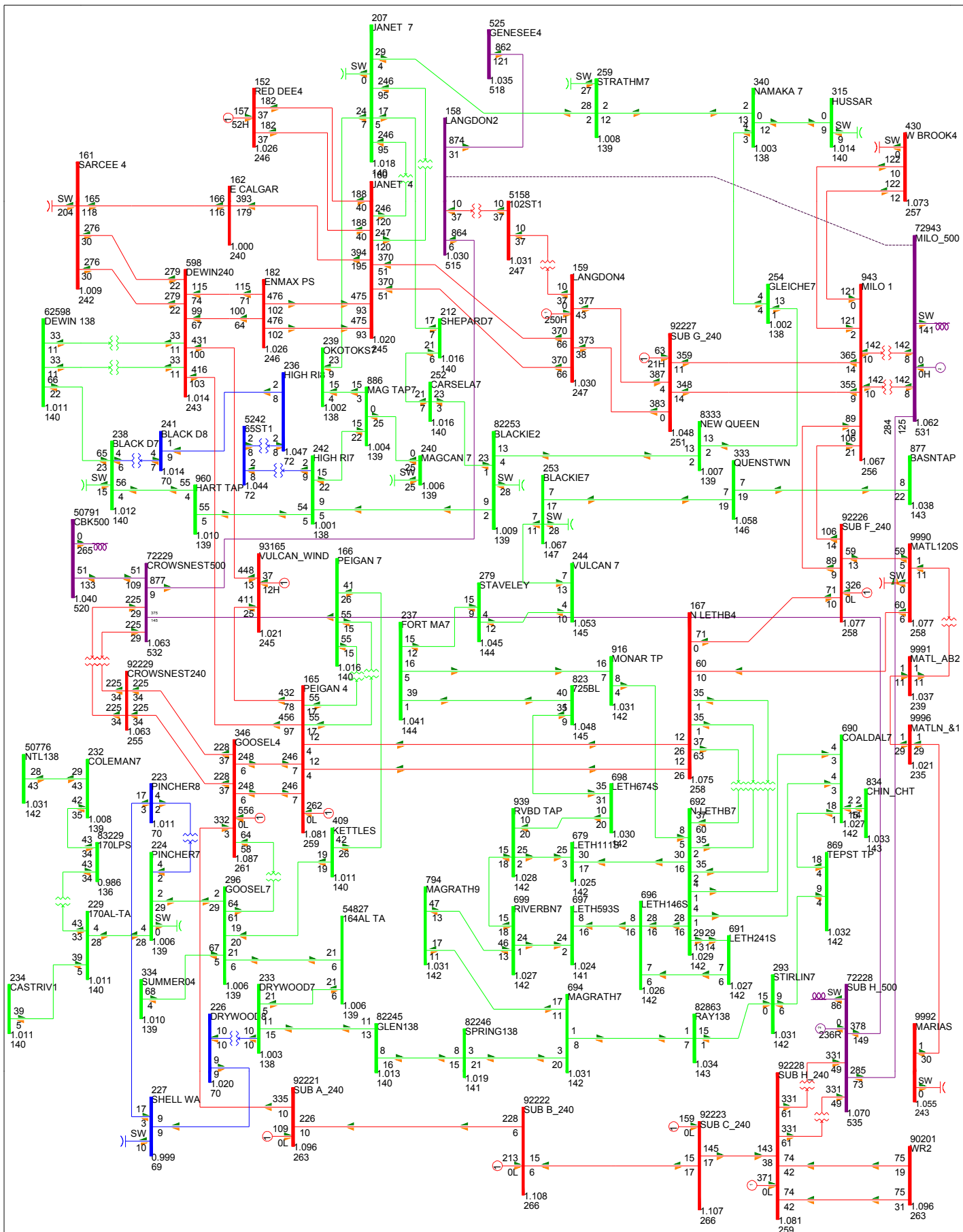


FIG 2017-3-SP-14: LANGDON TO MILO 500 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000

BC Export: -65 MW

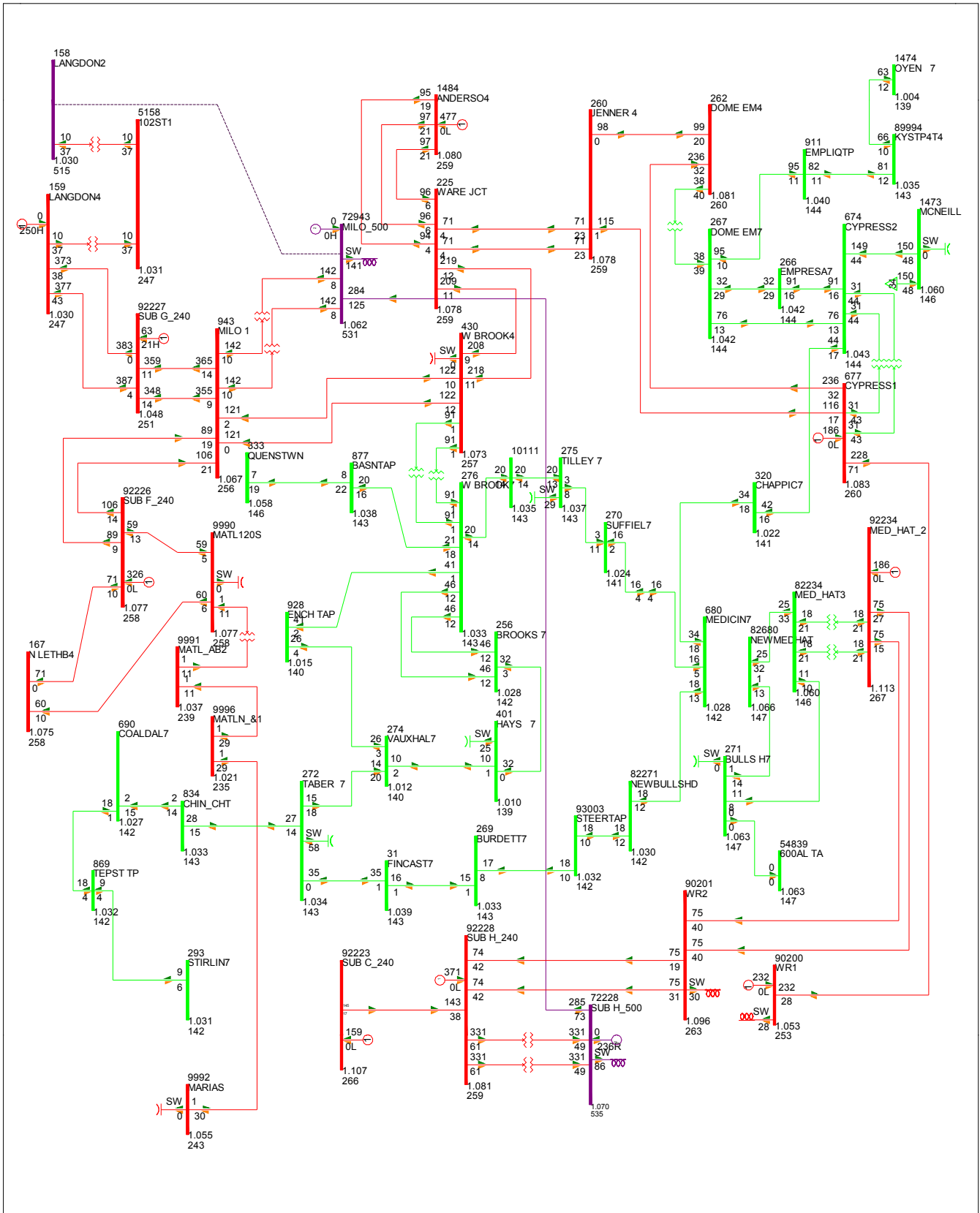


FIG 2017-3-SP-15: LANGDON TO MILO 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -65 MW

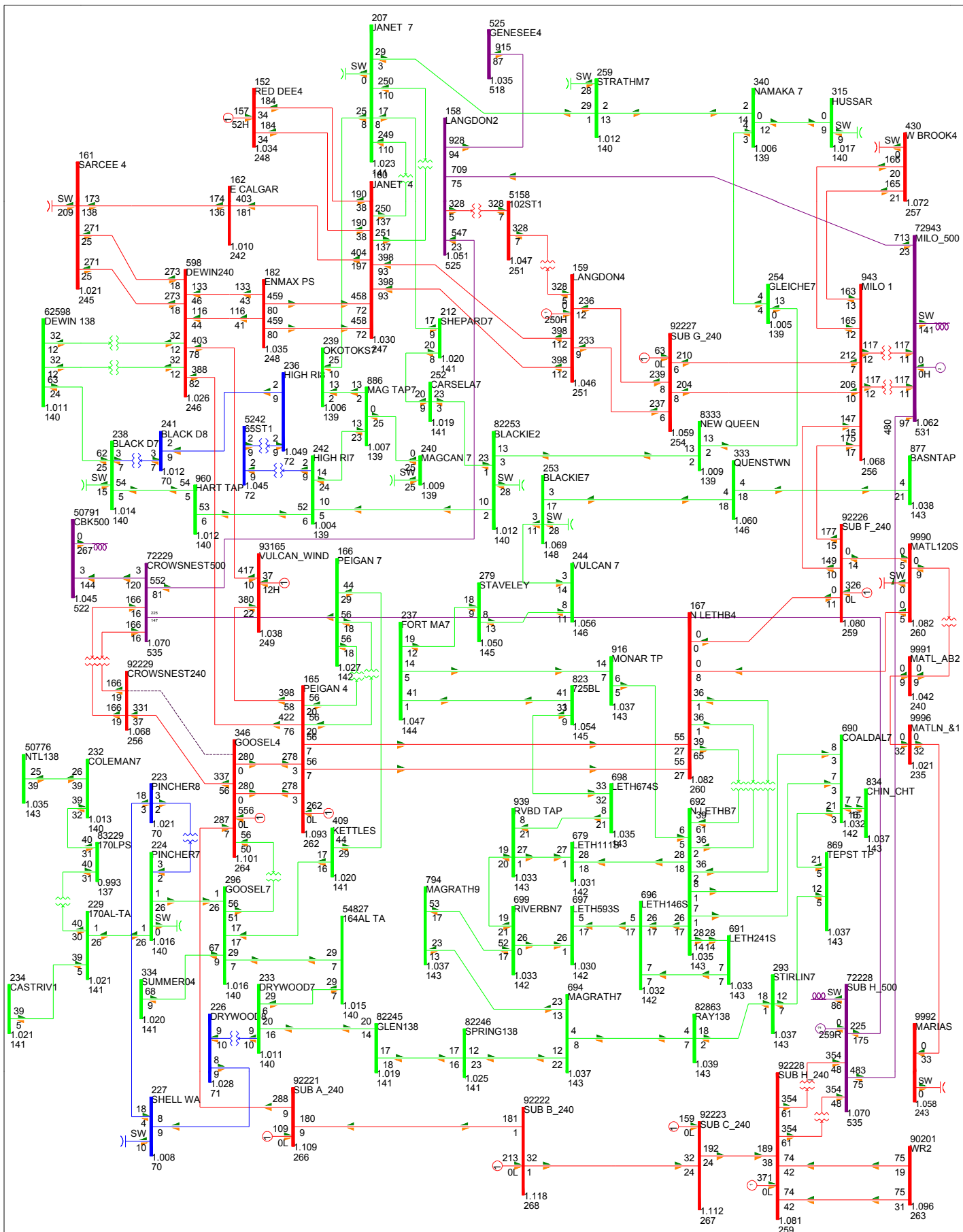


FIG 2017-3-SP-16: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -6 MW

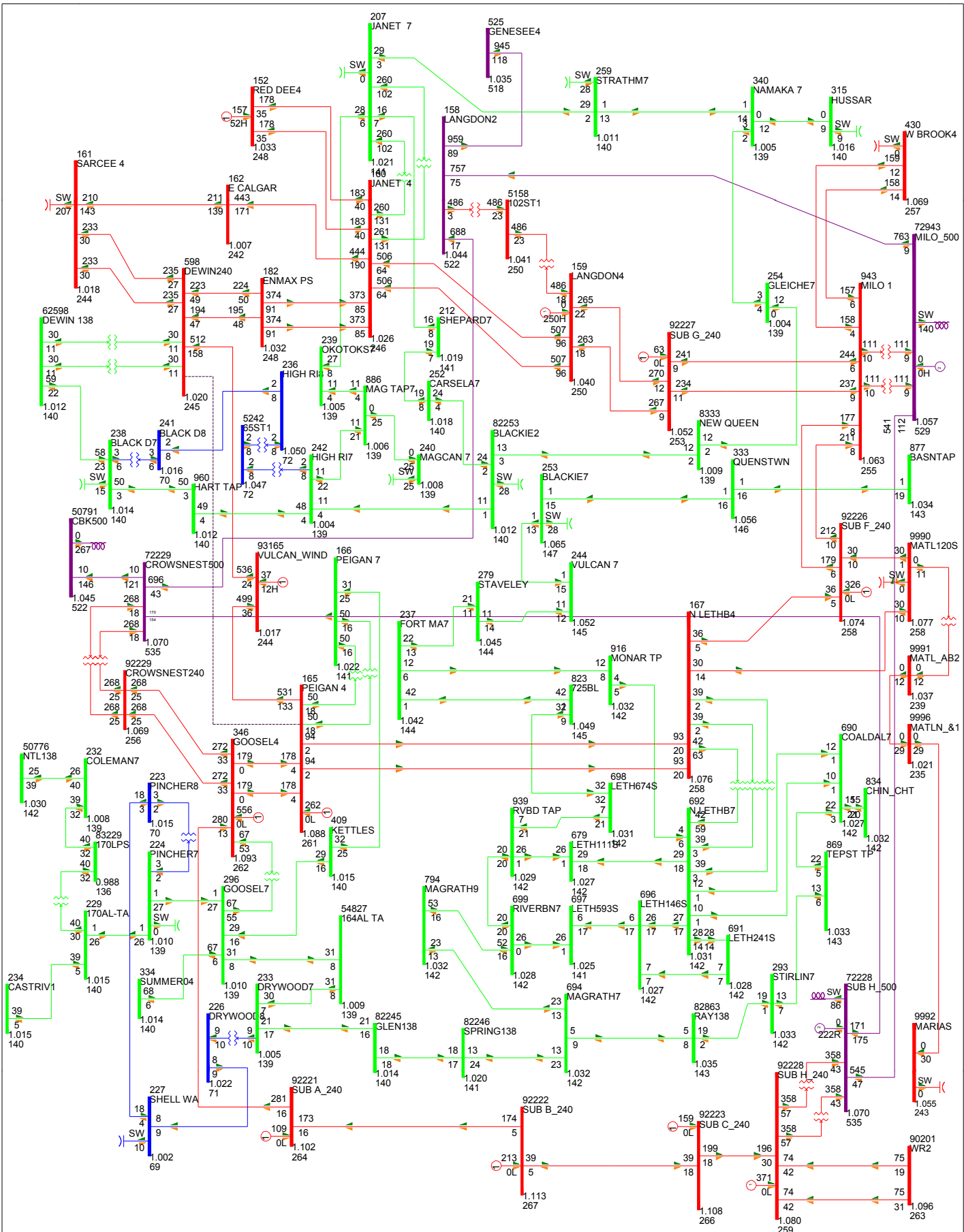


FIG 2017-3-SP-18: PEIGAN TO DEWINTON 240 KV

PROPORTIONAL WIND SCENARIO

2017 South West System MON, NOV 24 2008 14:44

ALTERNATIVE 3

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000

BC Export: -7 MW

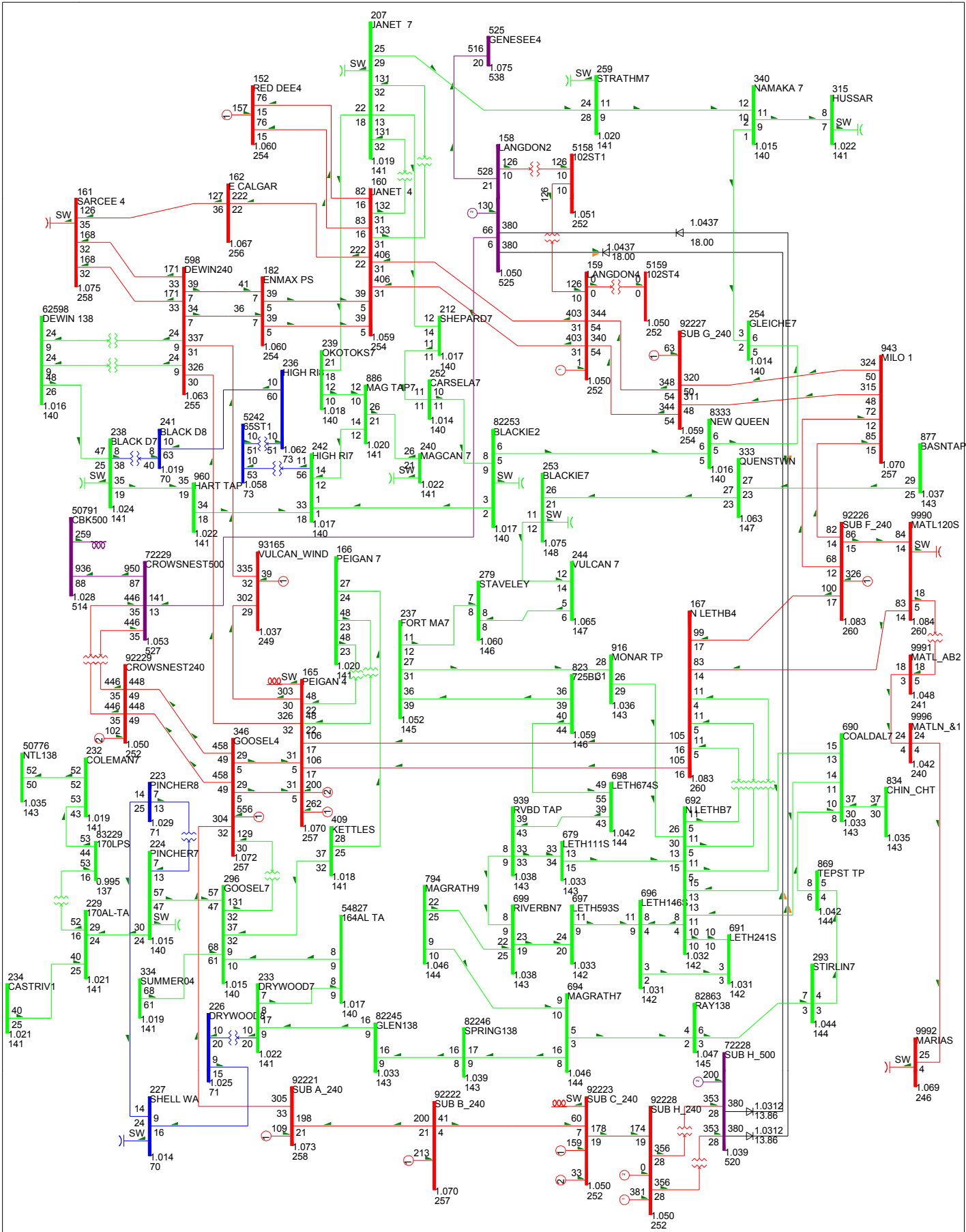


FIG 2017-4-SL-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 1000 MW

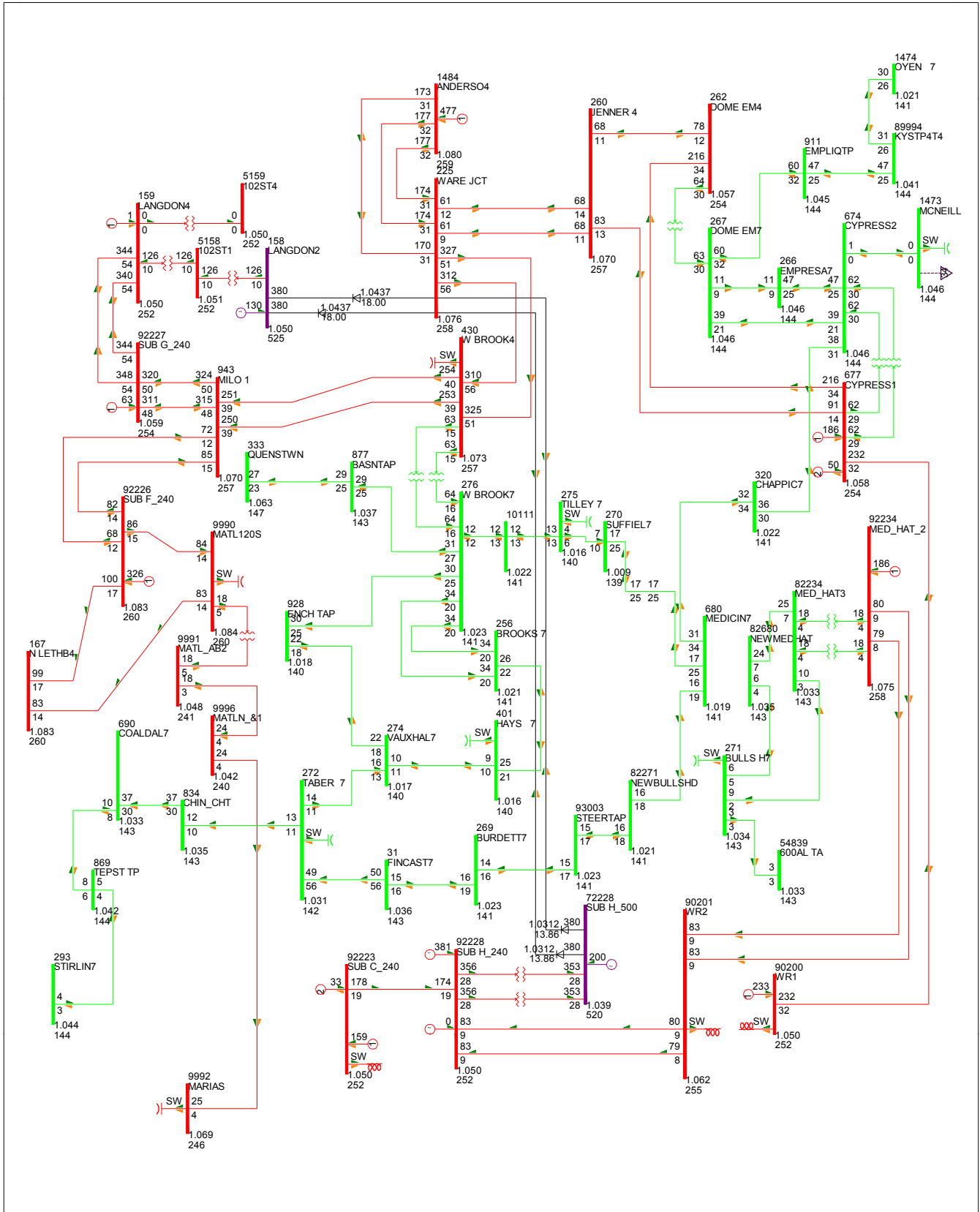


FIG 2017-4-SL-3: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 1000 MW

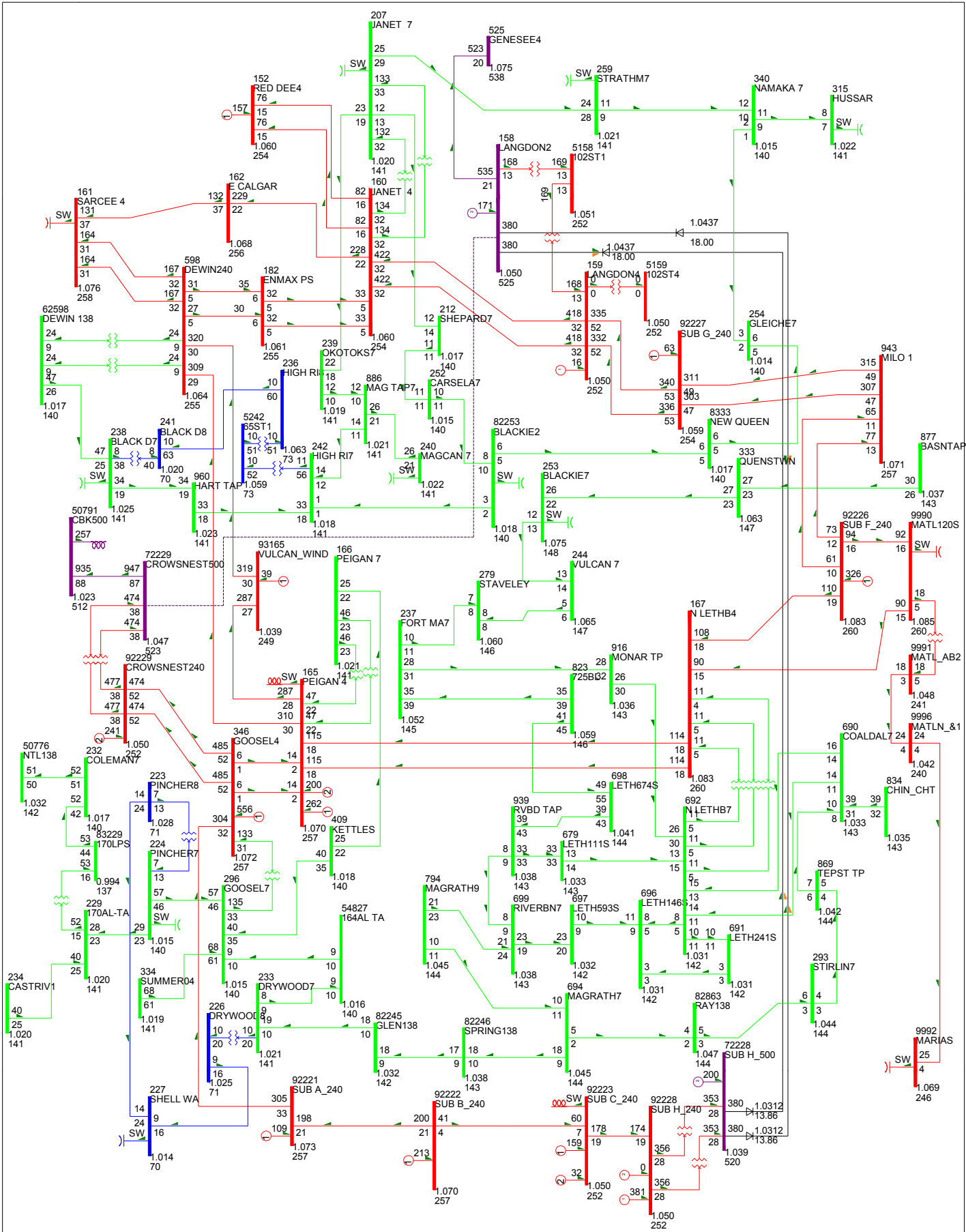


FIG 2017-4-SL-4: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 1004 MW

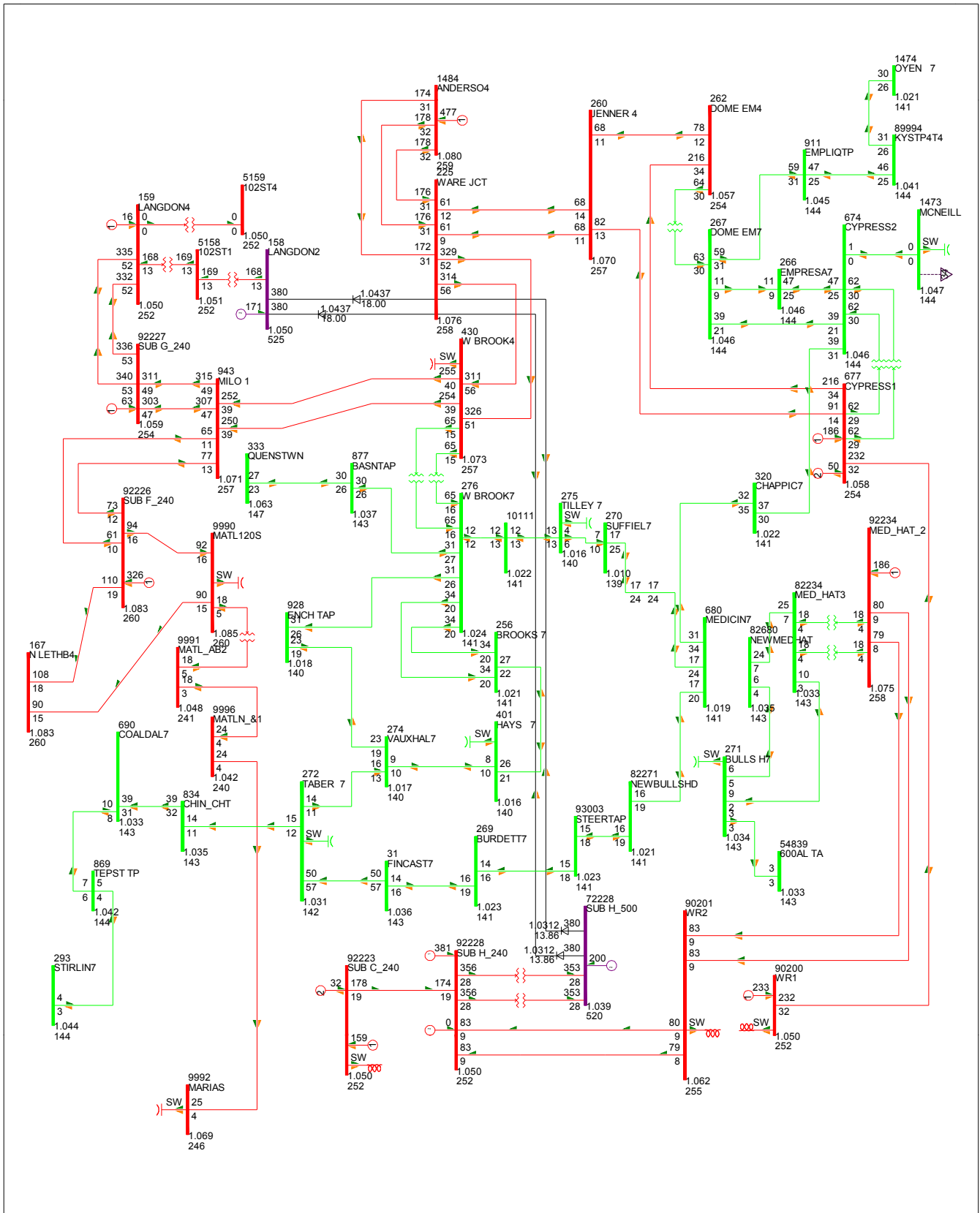


FIG 2017-4-SL-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 1004 MW

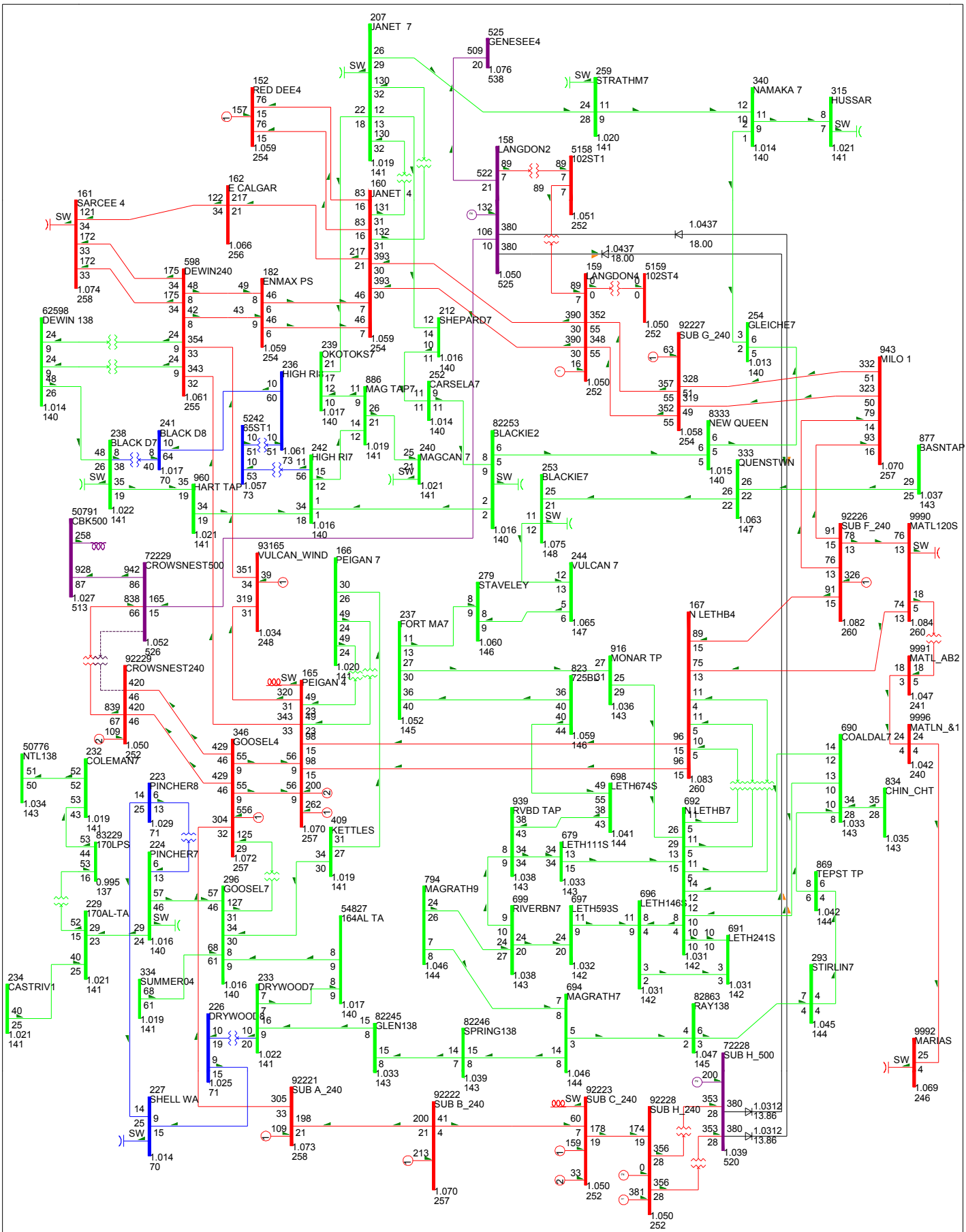


FIG 2017-4-SL-6: CROWNEST 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 995 MW

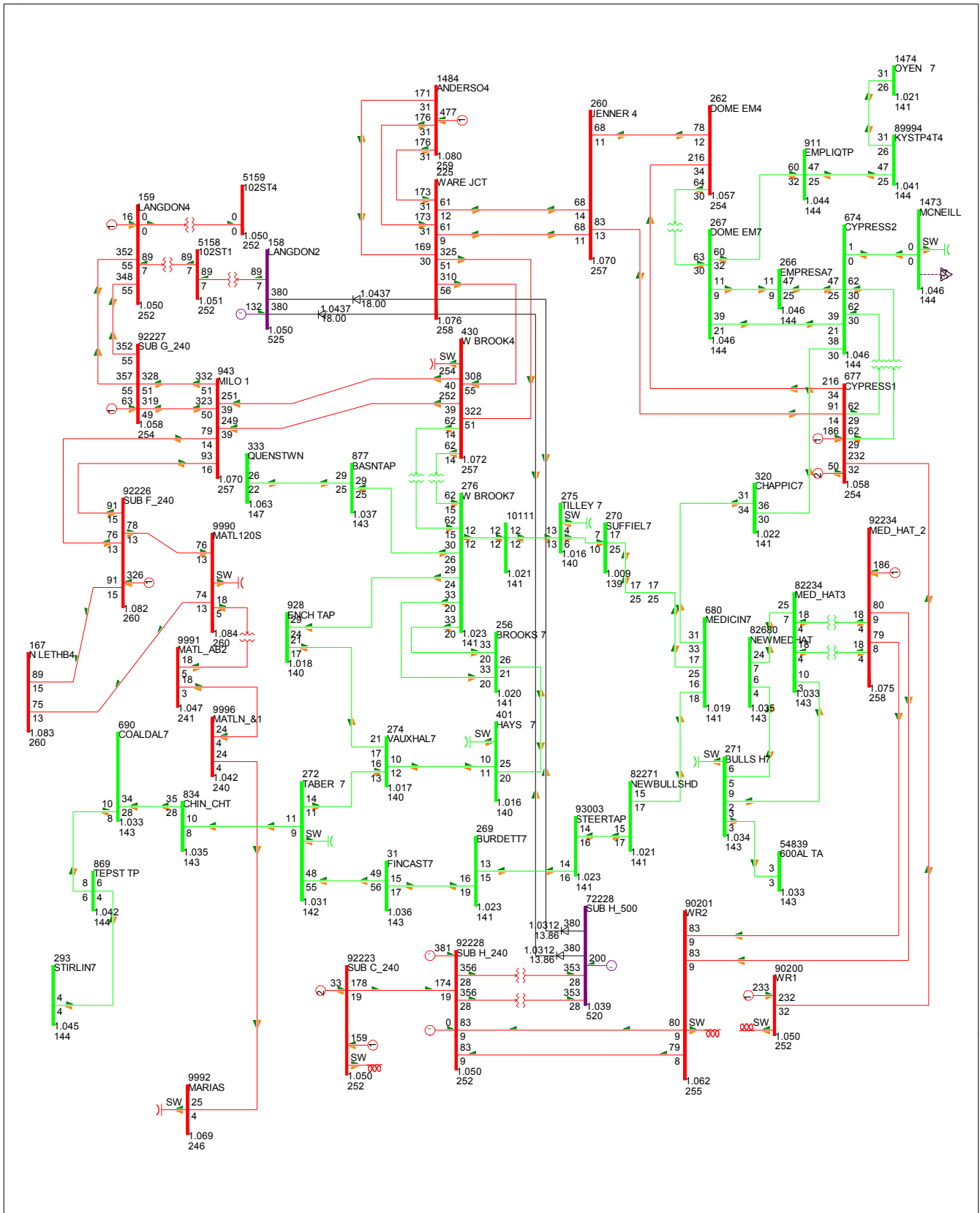


FIG 2017-4-SL-7: CROWSNEST 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >600.000
 BC Export: 995 MW

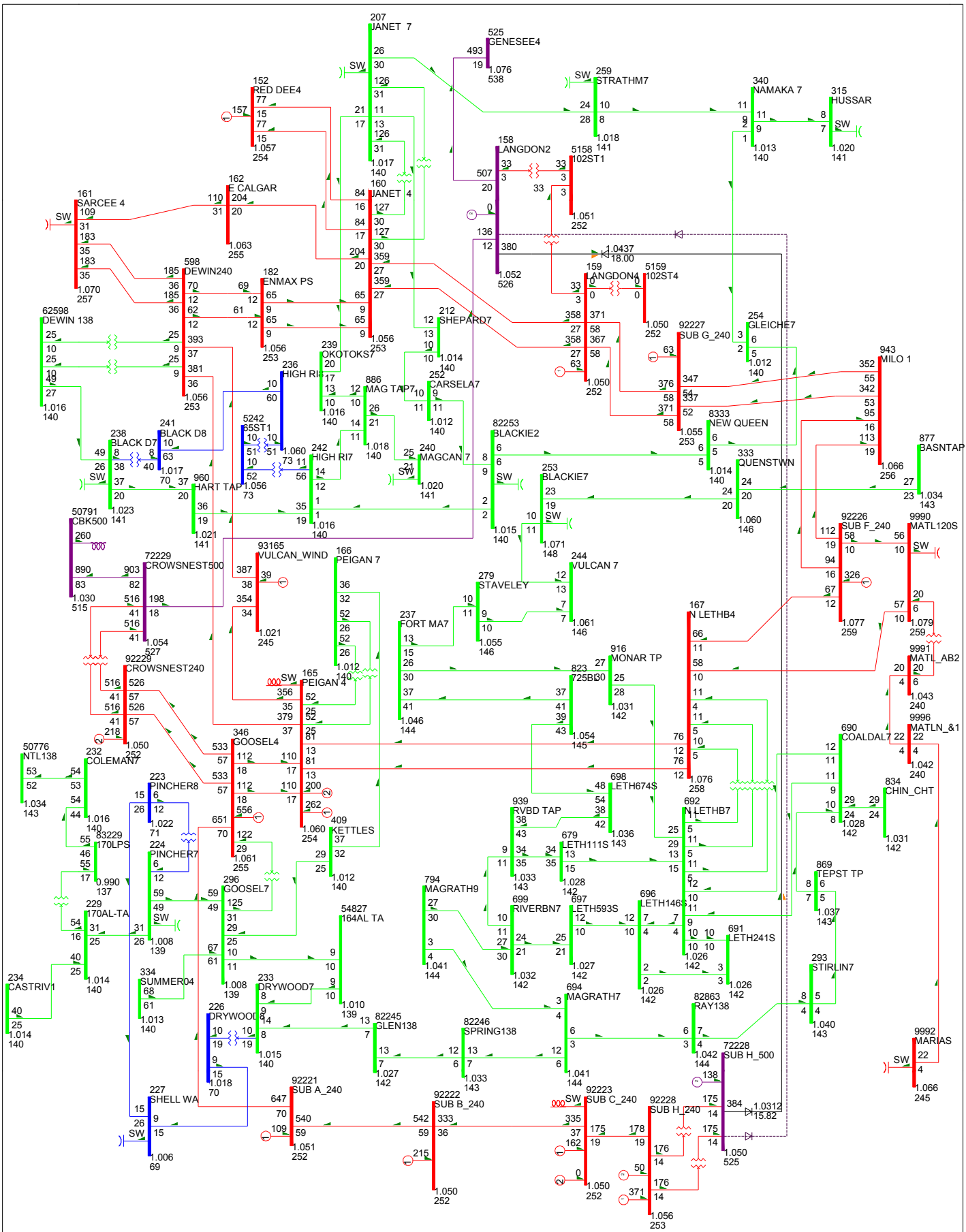


FIG 2017-4-SL-8: LANGDON TO SUB H 500 KV HVDC LINE

PROPORTIONAL WIND SCENARIO

2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 949 MW

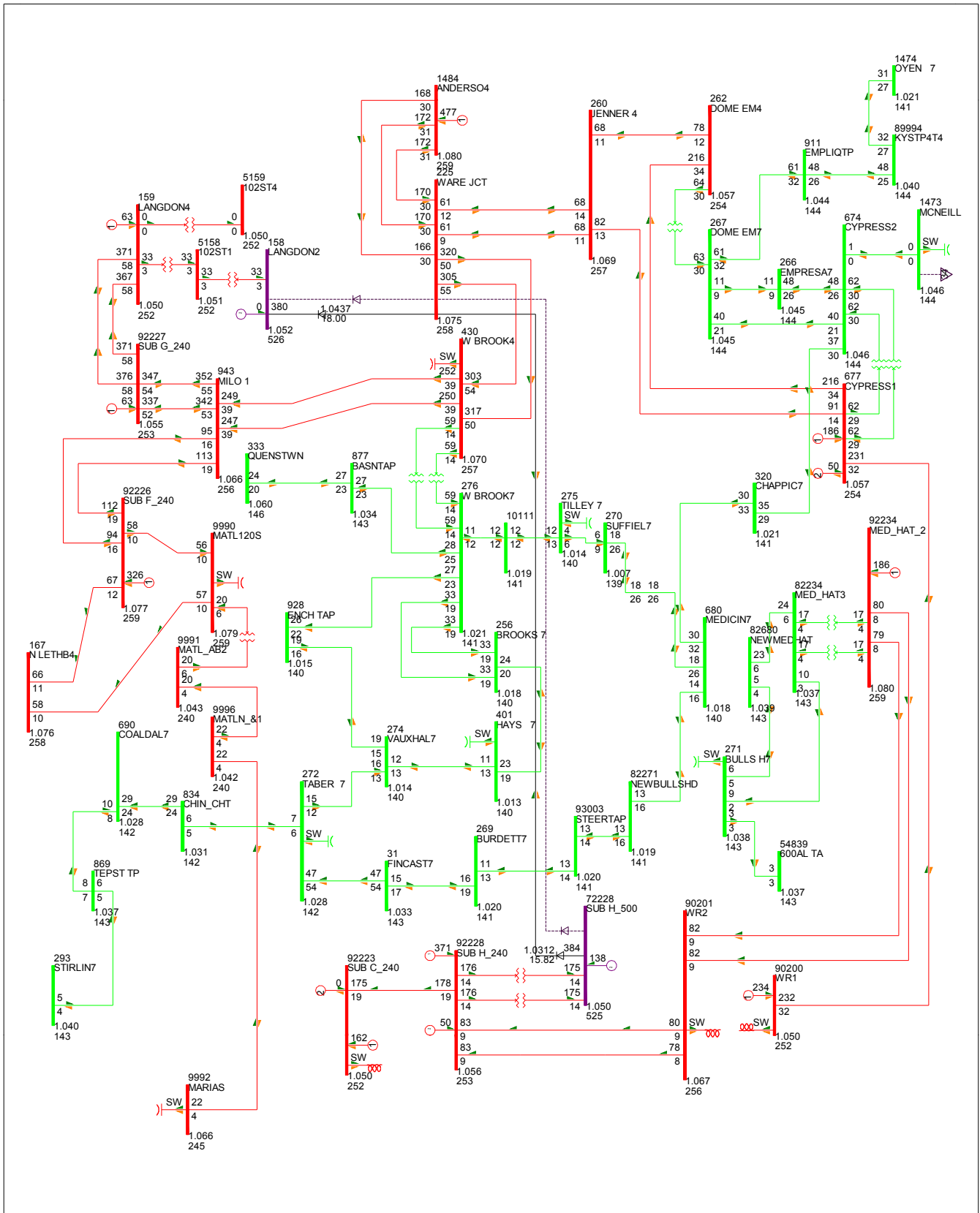


FIG 2017-4-SL-9: LANGDON TO SUB H 500 KV HVDC LINE
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 949 MW

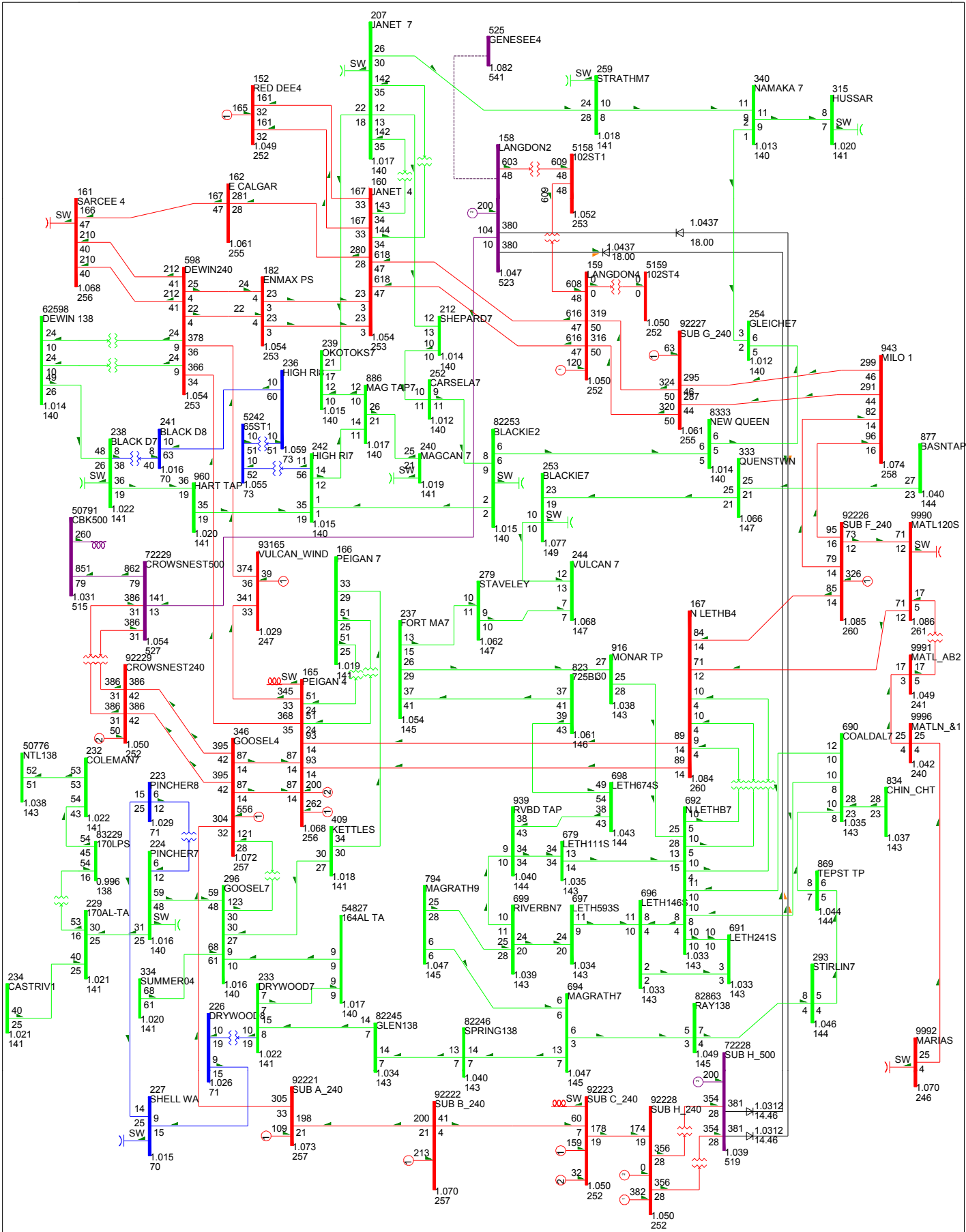


FIG 2017-4-SL-10: LANGDON TO GENESEE 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 901 MW

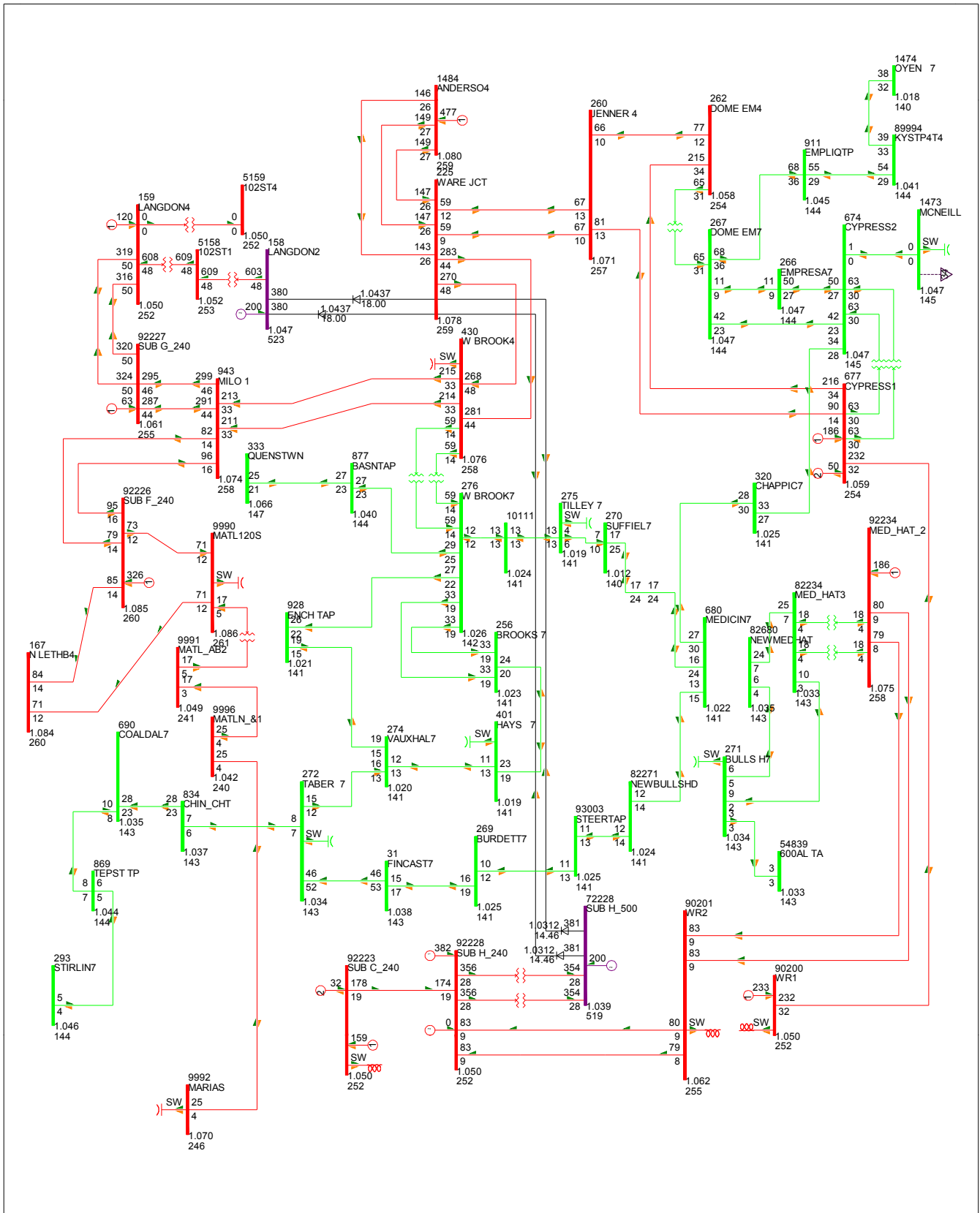


FIG 2017-4-SL-11: LANGDON TO GENESEE 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 901 MW

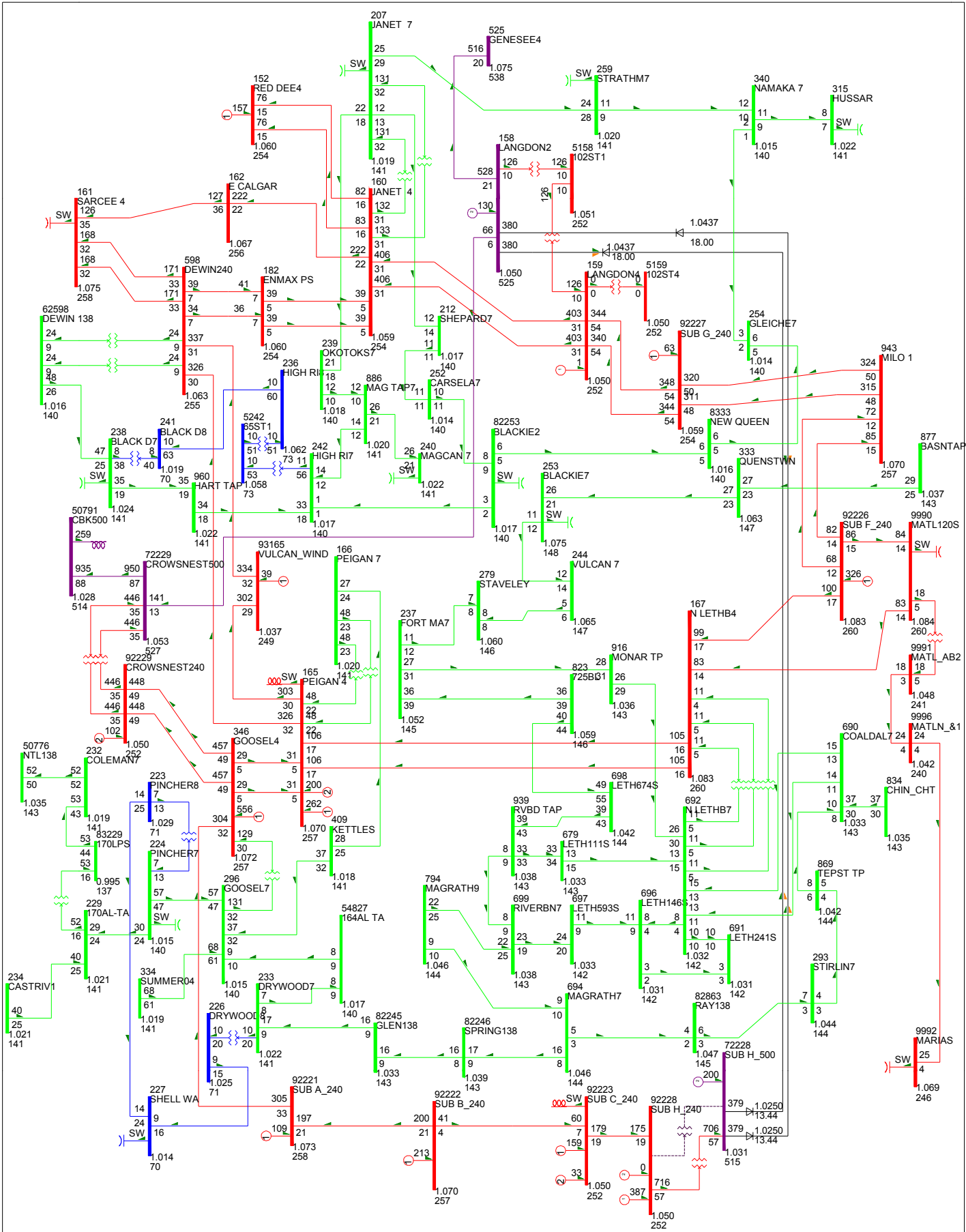


FIG 2017-4-SL-12: SUB H 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATE A
 KV: <=34.500 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 1000 MW

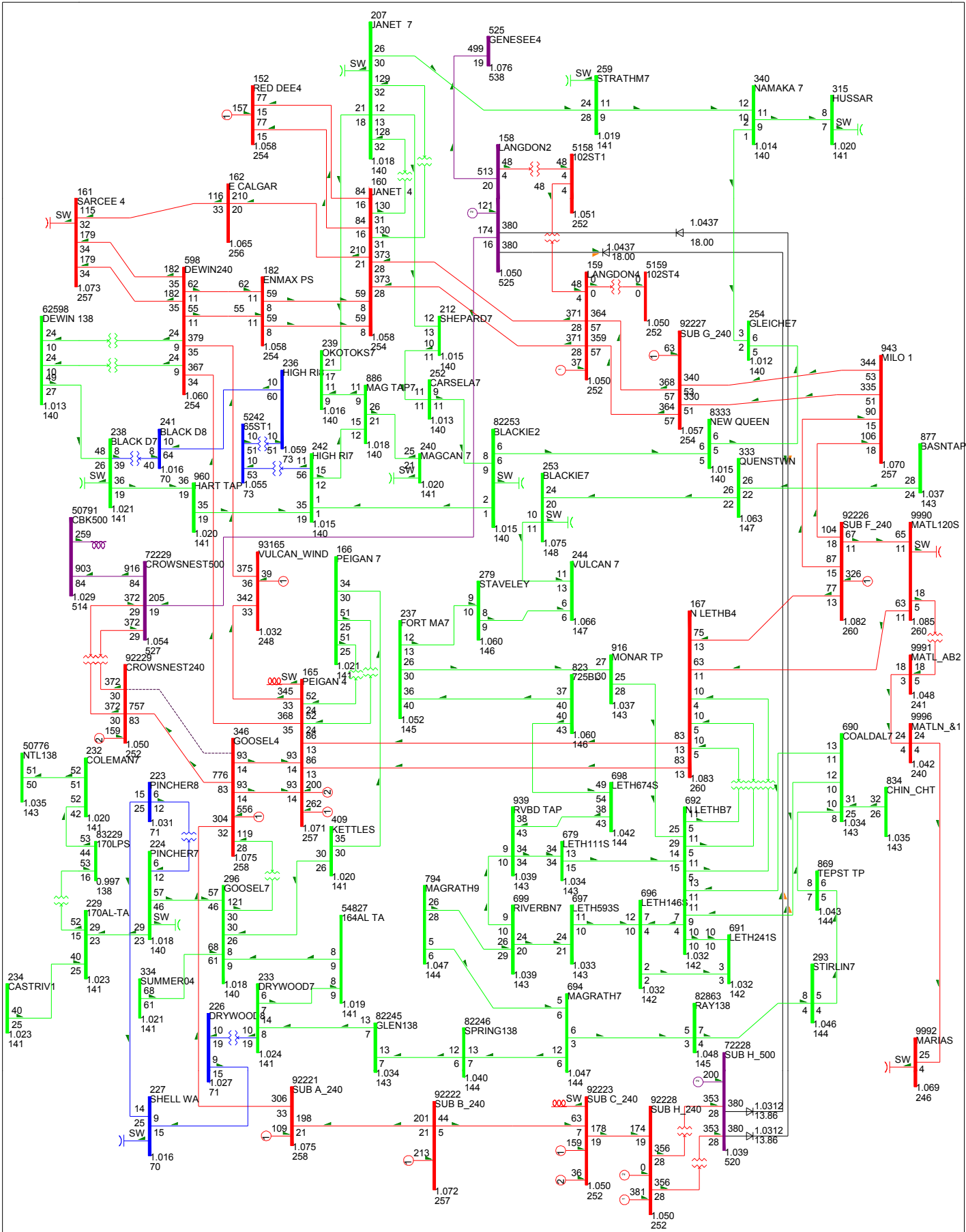


FIG 2017-4-SL-14: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 972 MW

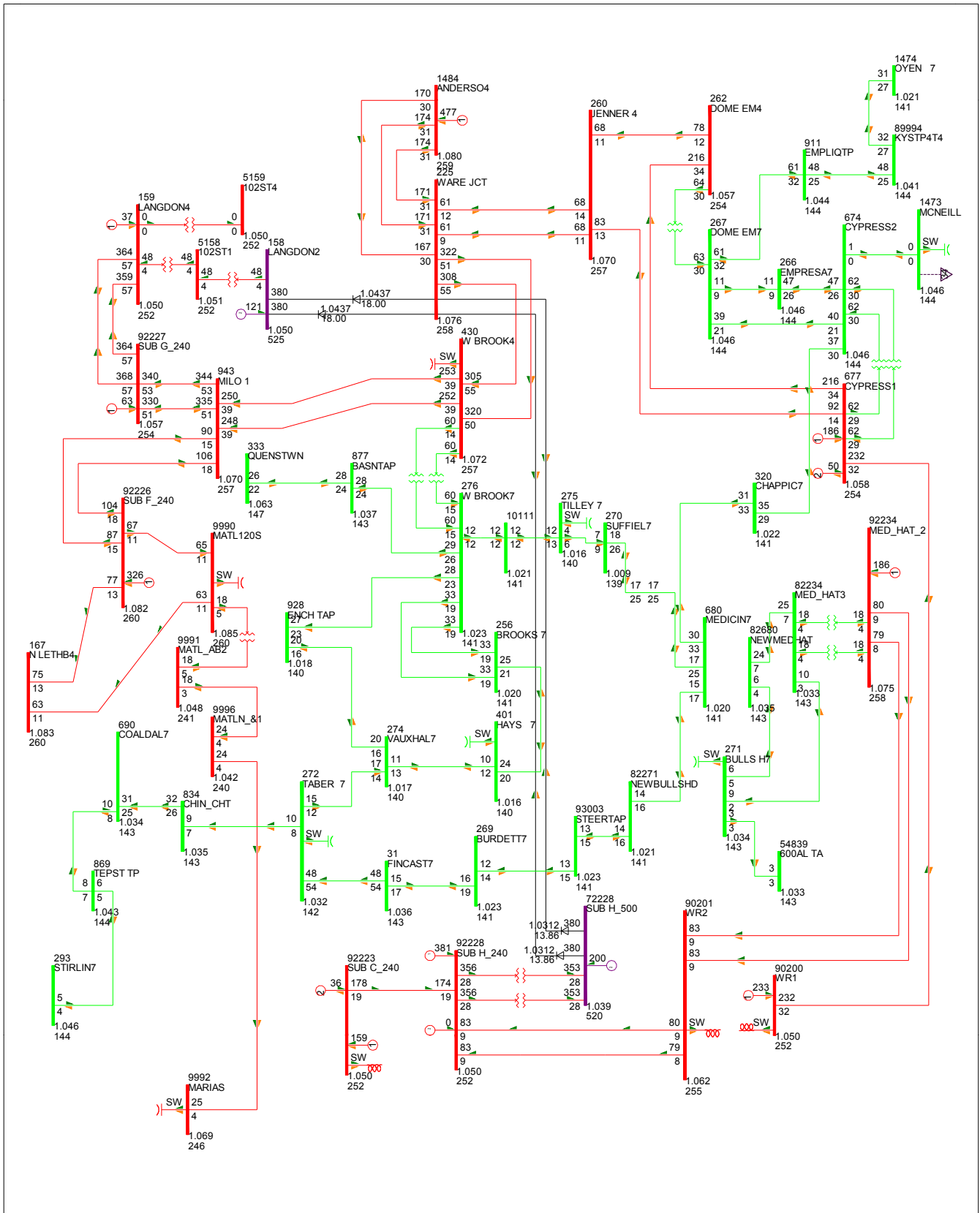


FIG 2017-4-SL-15: CROWSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 972 MW

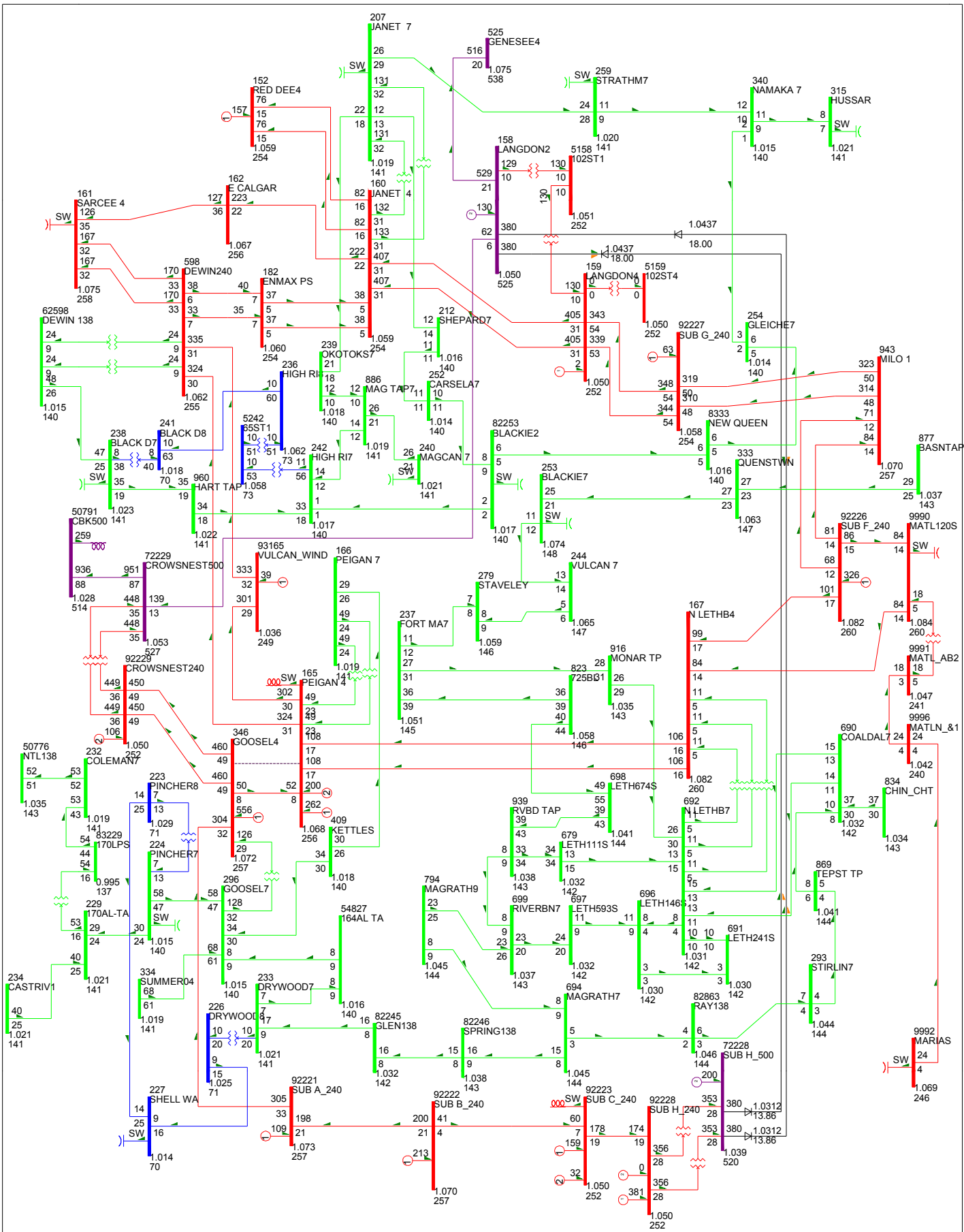


FIG 2017-4-SL-16: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 1001 MW

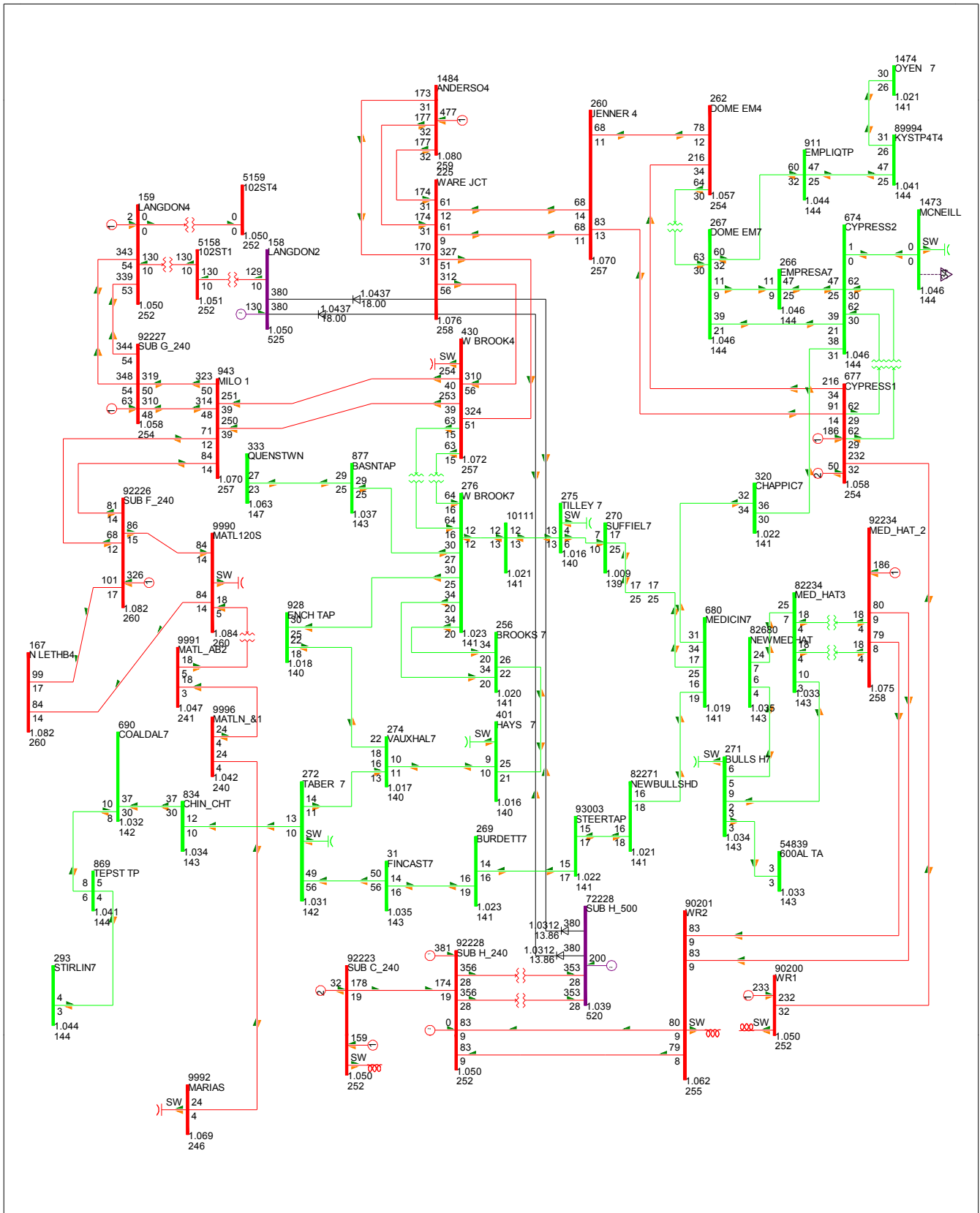


FIG 2017-4-SL-17: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 1001 MW

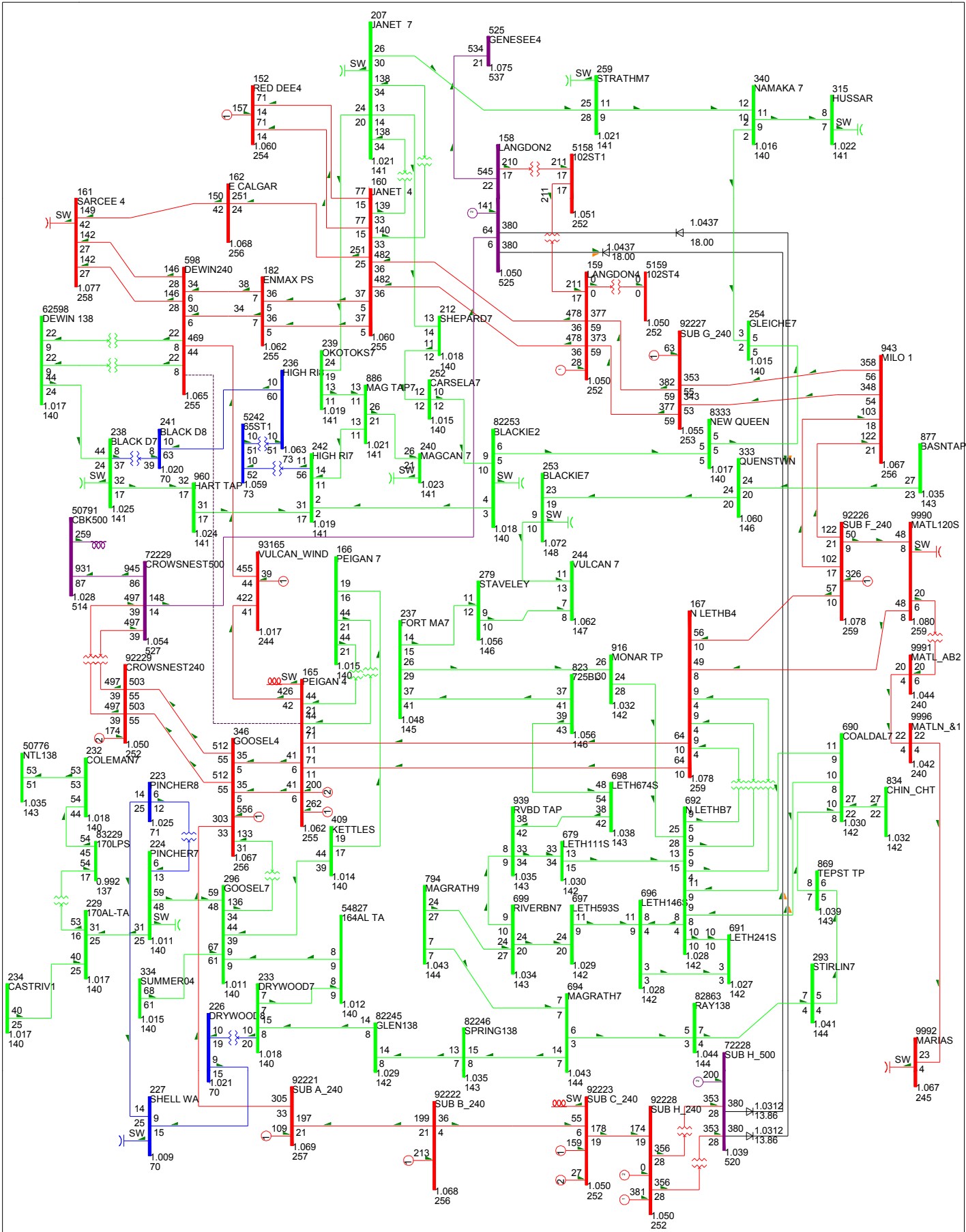


FIG 2017-4-SL-18: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 990 MW

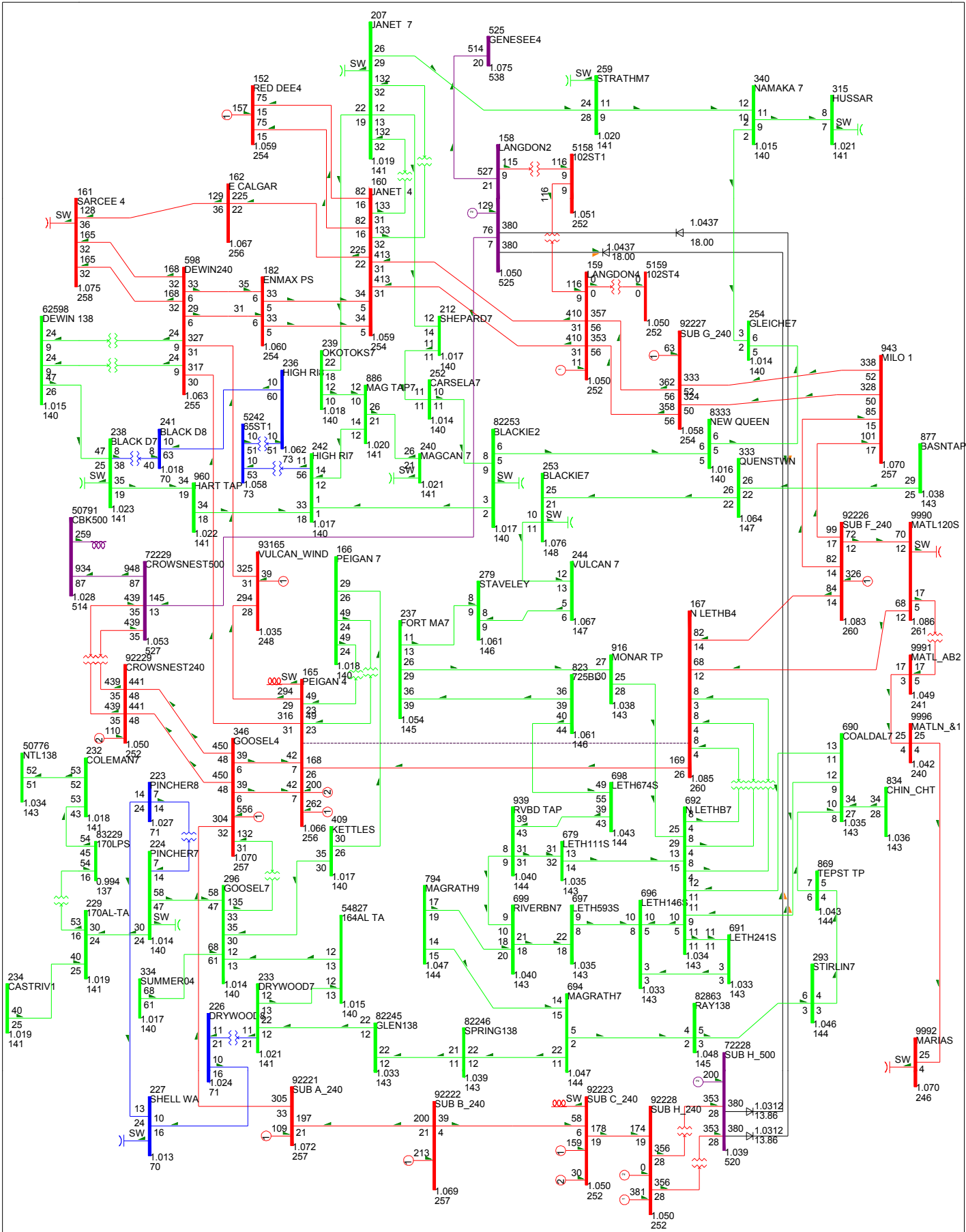


FIG 2017-4-SL-20: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: 999 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3587.4 MW

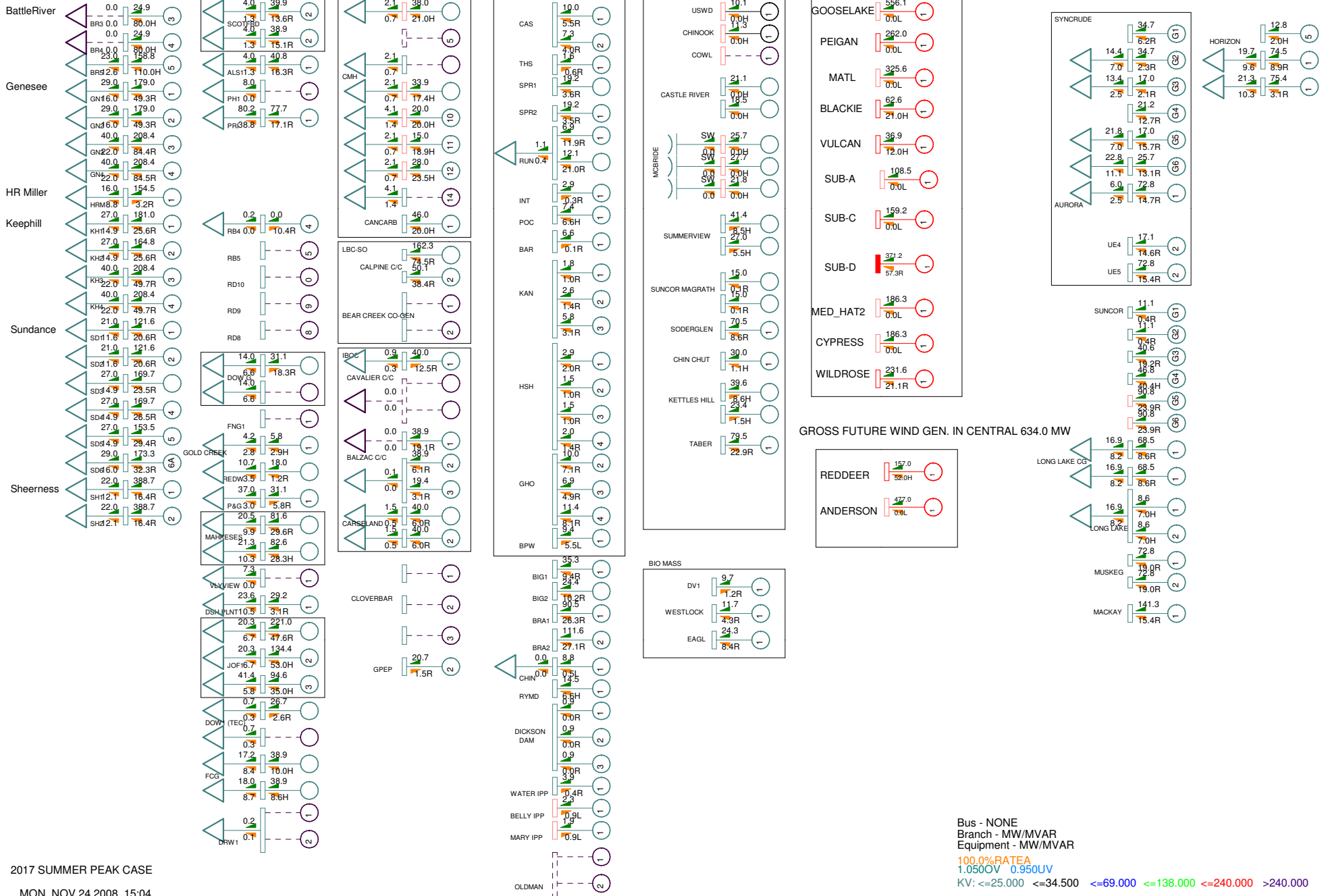
GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 477.6 MW

GROSS BOW HYDRO GEN. 149.2 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.



2017 SUMMER PEAK CASE

MON, NOV 24 2008 15:04

Fig 2017-4-SP-1

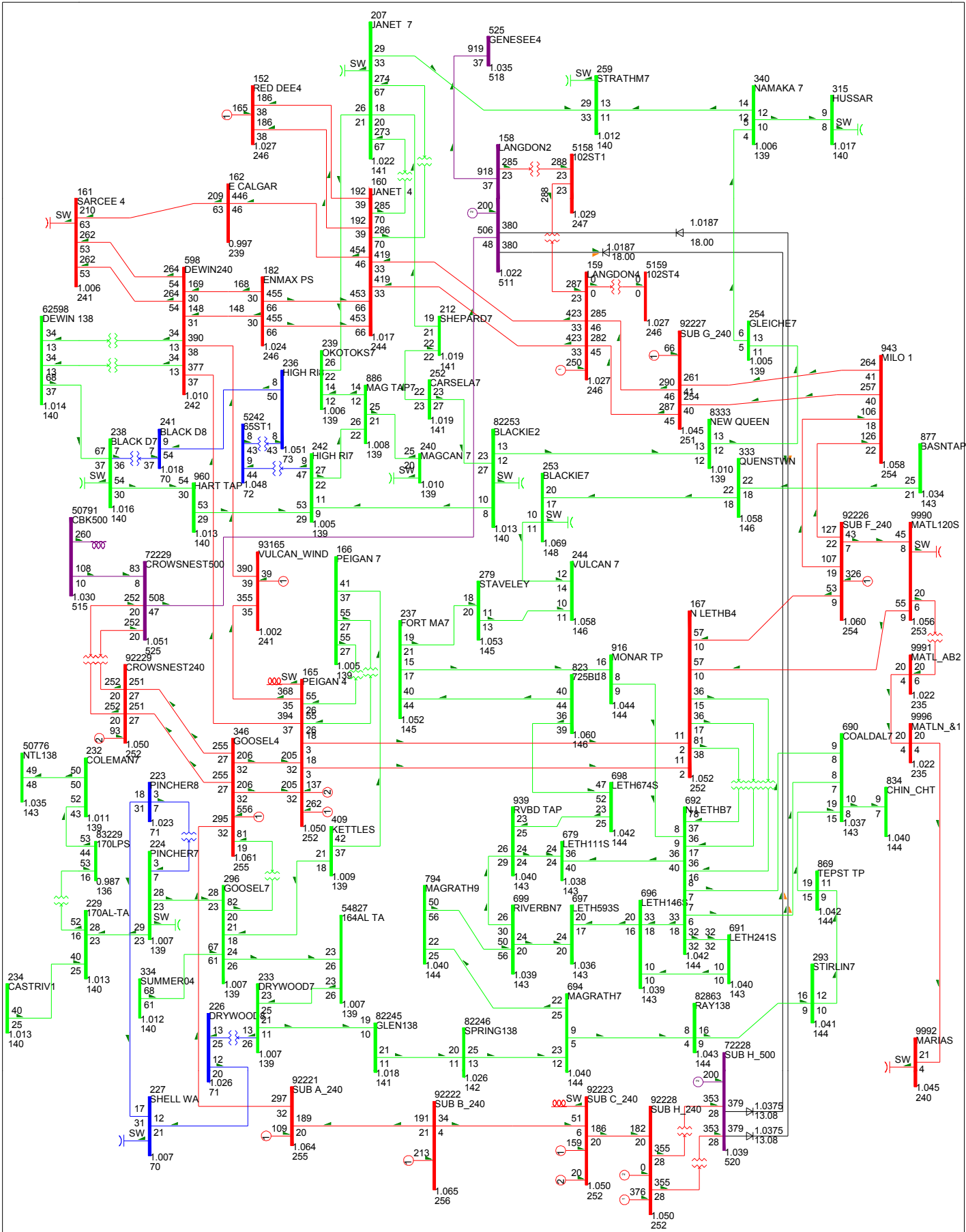


FIG 2017-4-SP-2: N-0 CONDITION
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -14 MW

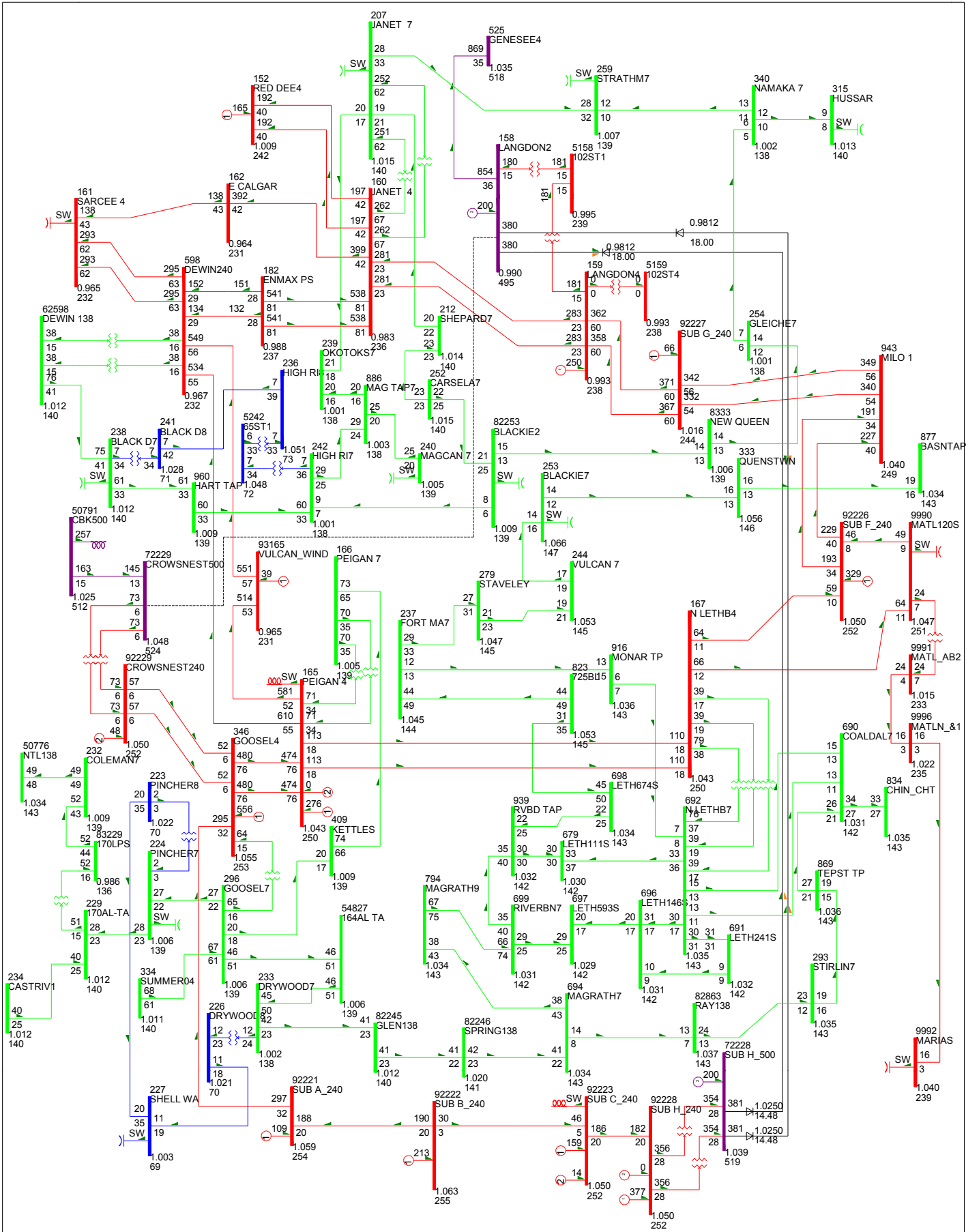


FIG 2017-4-SP-4: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATE
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -146 MW

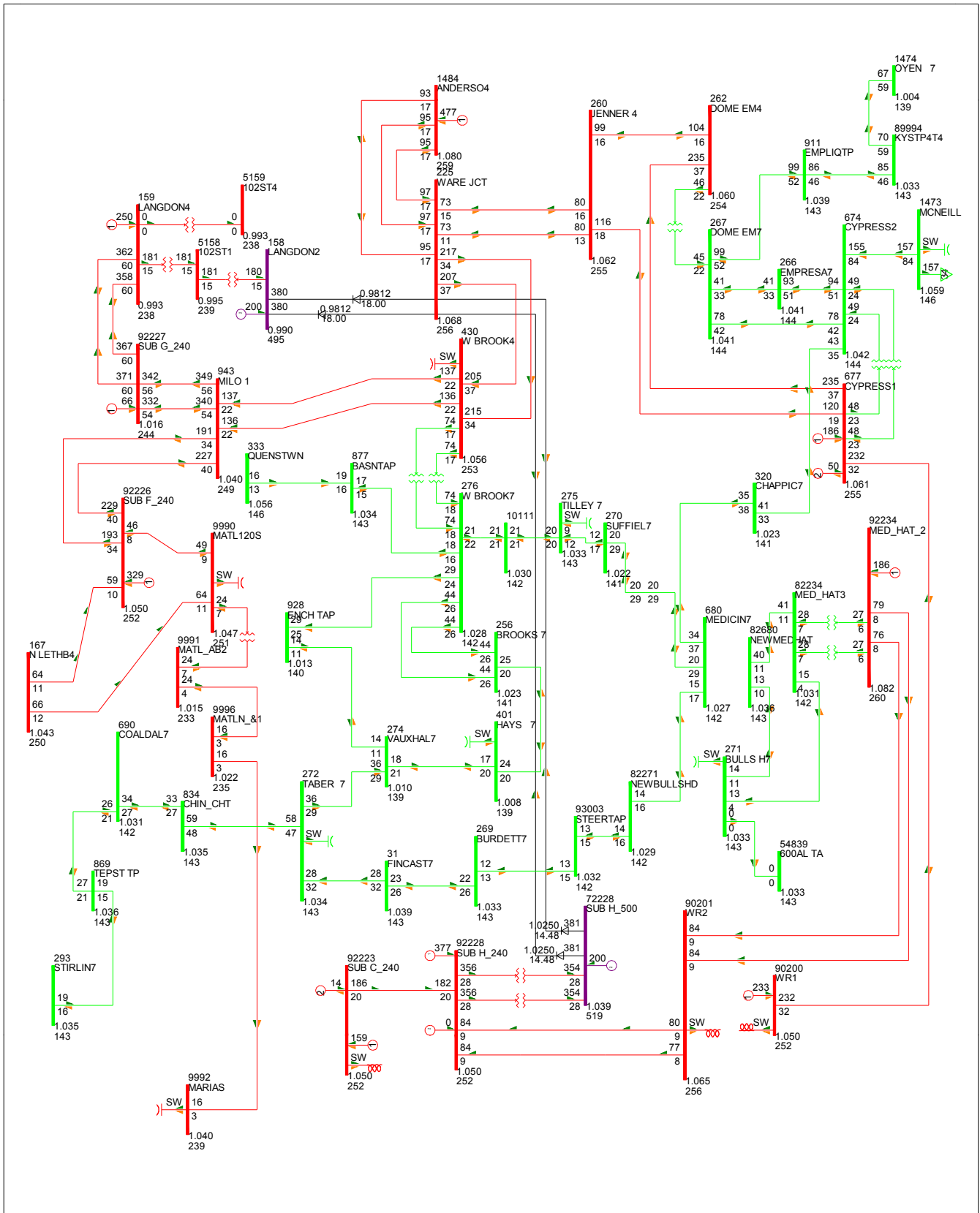


FIG 2017-4-SP-5: LANGDON TO CROWSNEST 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34,500 <=69,000 <=138,000 <=240,000 <=500,000 >600,000
 BC Export: -146 MW

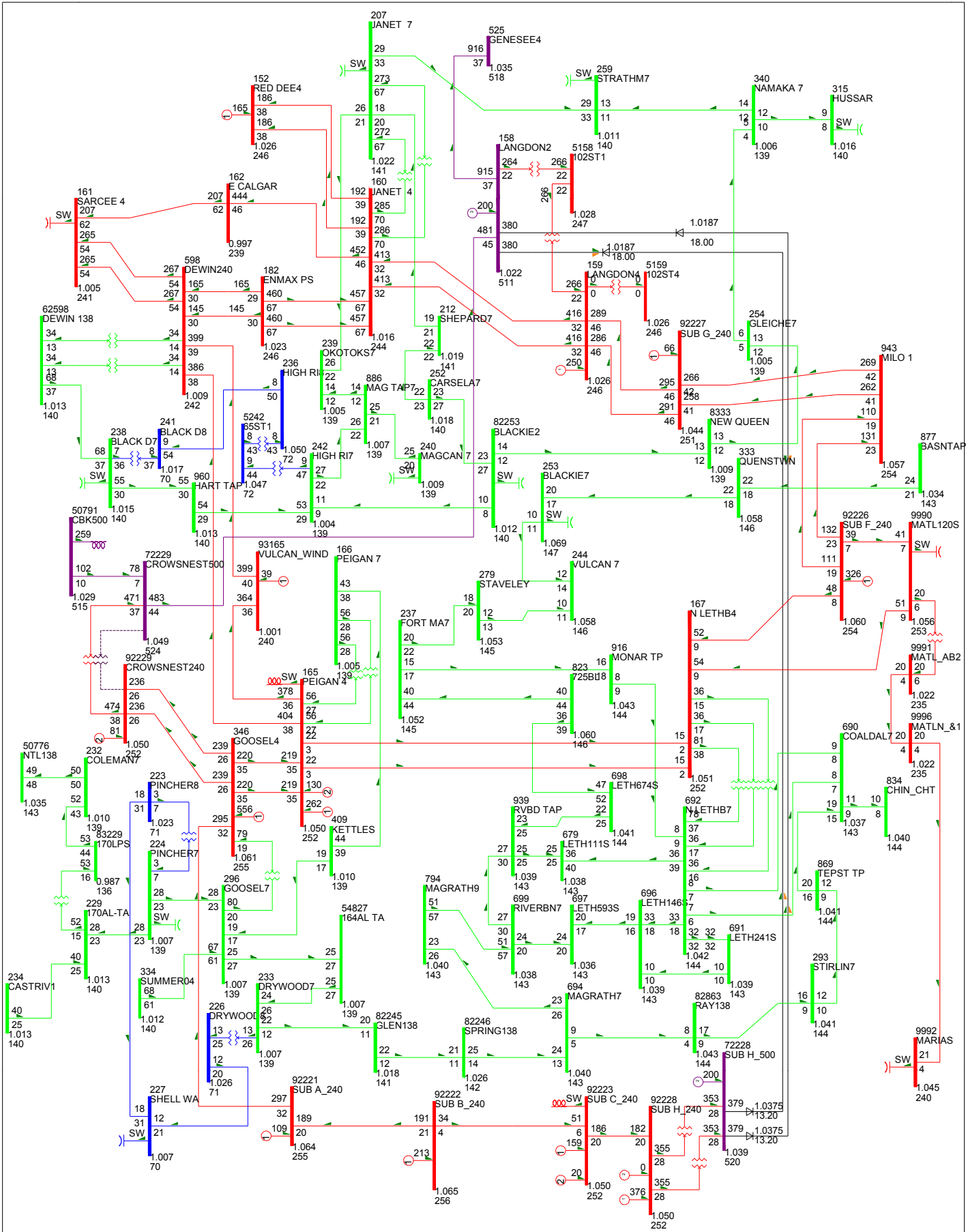


FIG 2017-4-SP-6: CROWNSNEST 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -18 MW

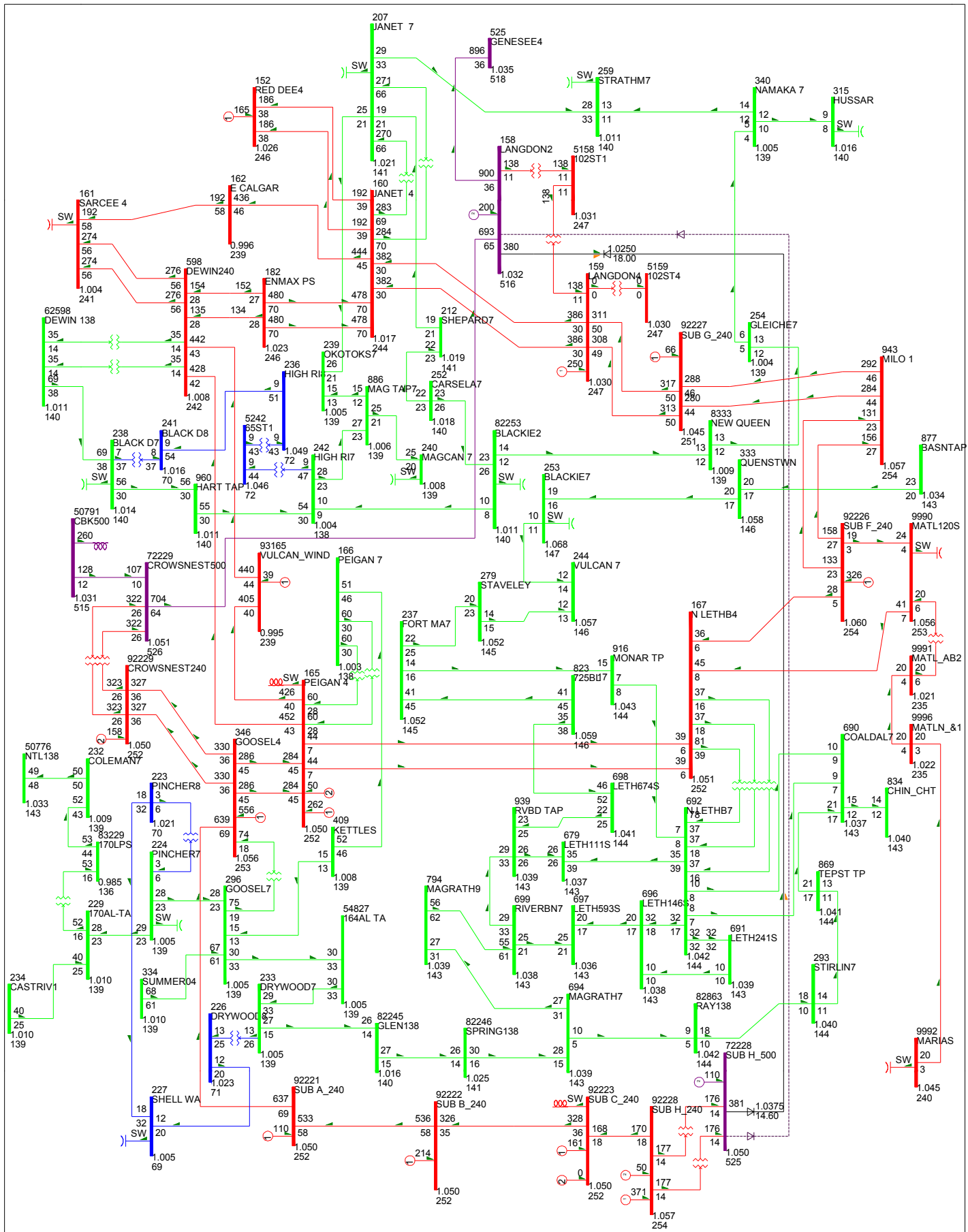


FIG 2017-4-SP-8: LANGDON TO SUB H 500 KV HVDC LINE

PROPORTIONAL WIND SCENARIO

2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -70 MW

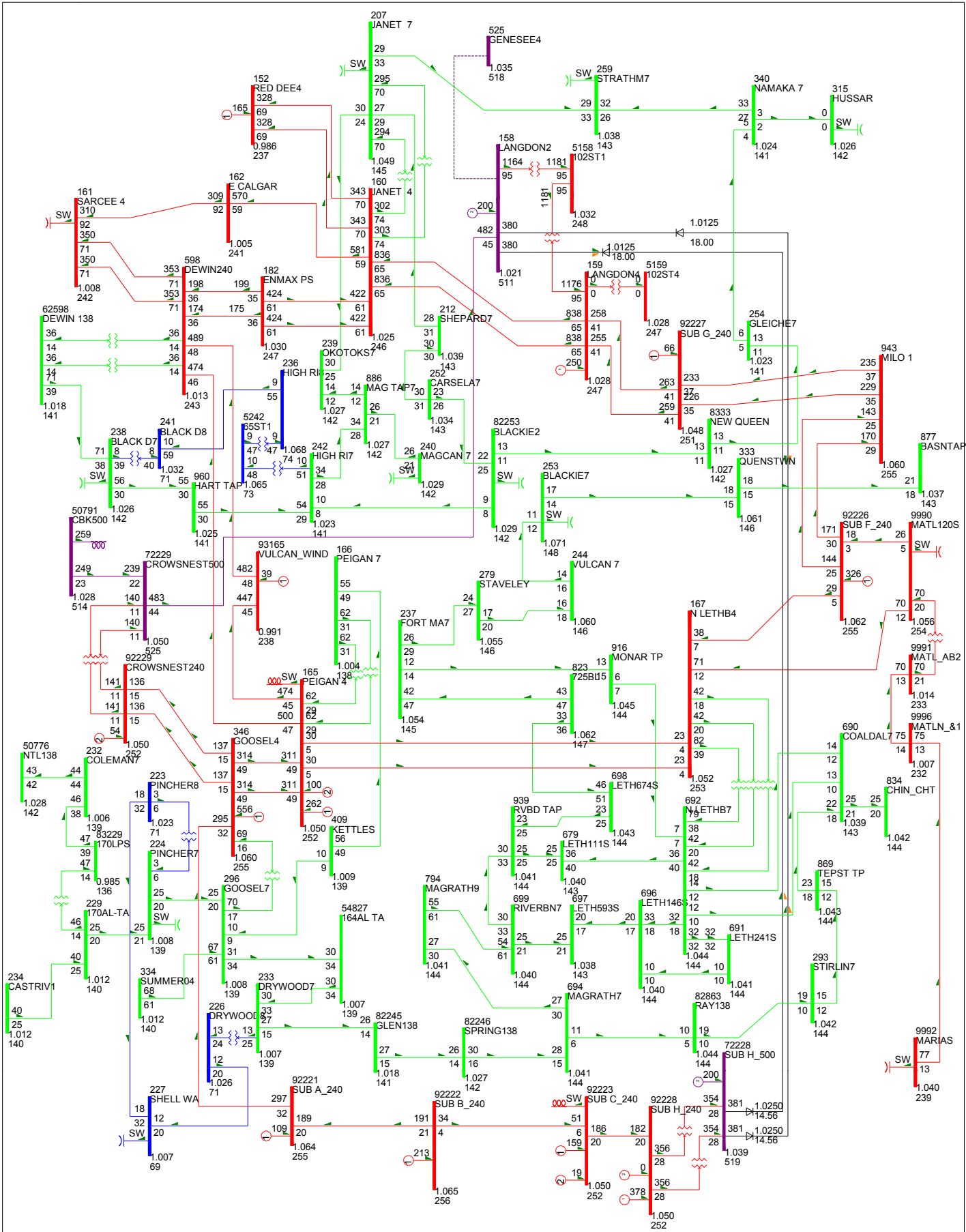


FIG 2017-4-SP-10: LANGDON TO GENESEE 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 10:33

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -245 MW

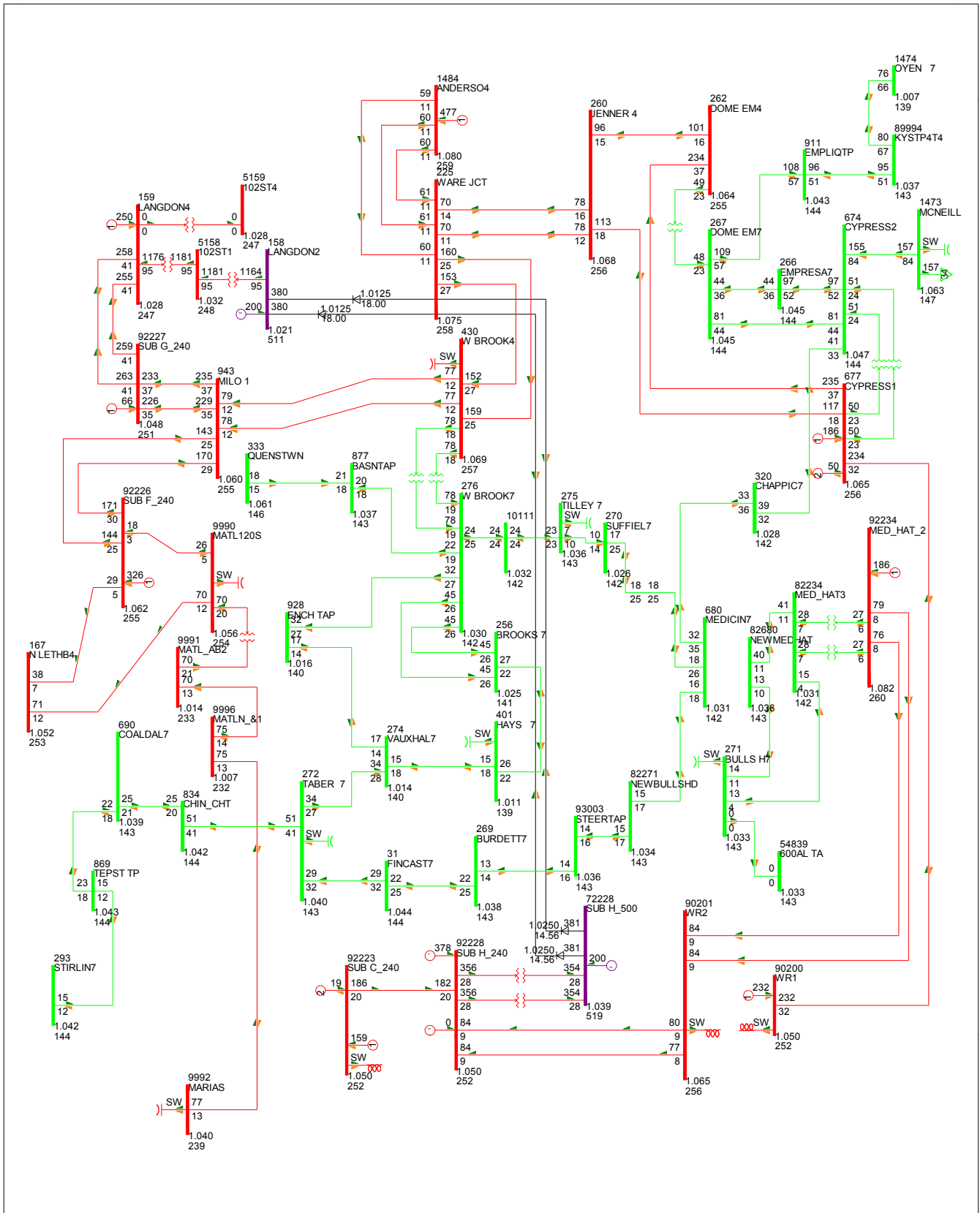


FIG 2017-4-SP-11: LANGDON TO GENESSEE 500 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 10:33

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -245 MW

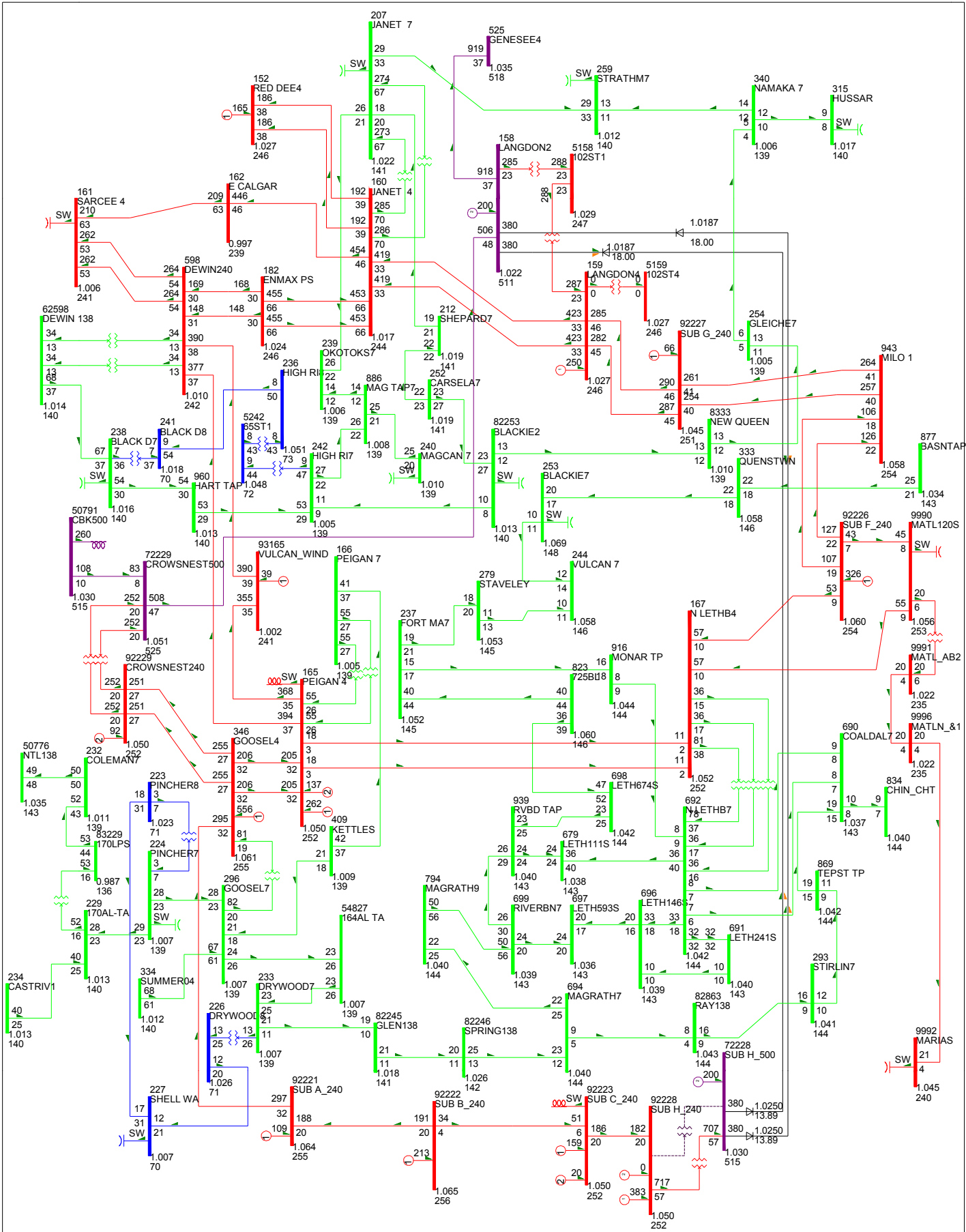


FIG 2017-4-SP-12: SUB H 500/240 KV XMER
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -14 MW

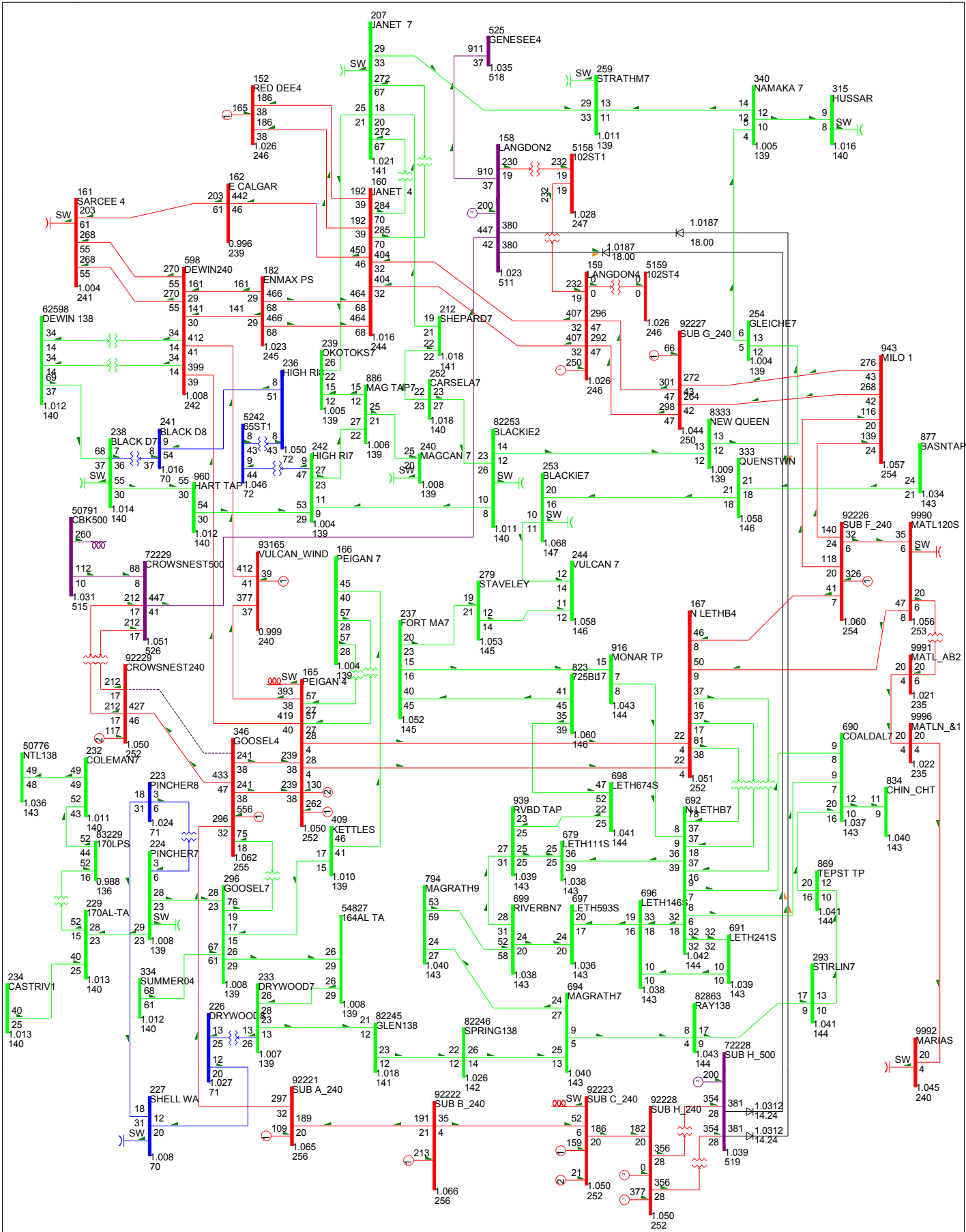


FIG 2017-4-SP-14: CROWNSNEST TO GOOSELAKE 240KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -30 MW

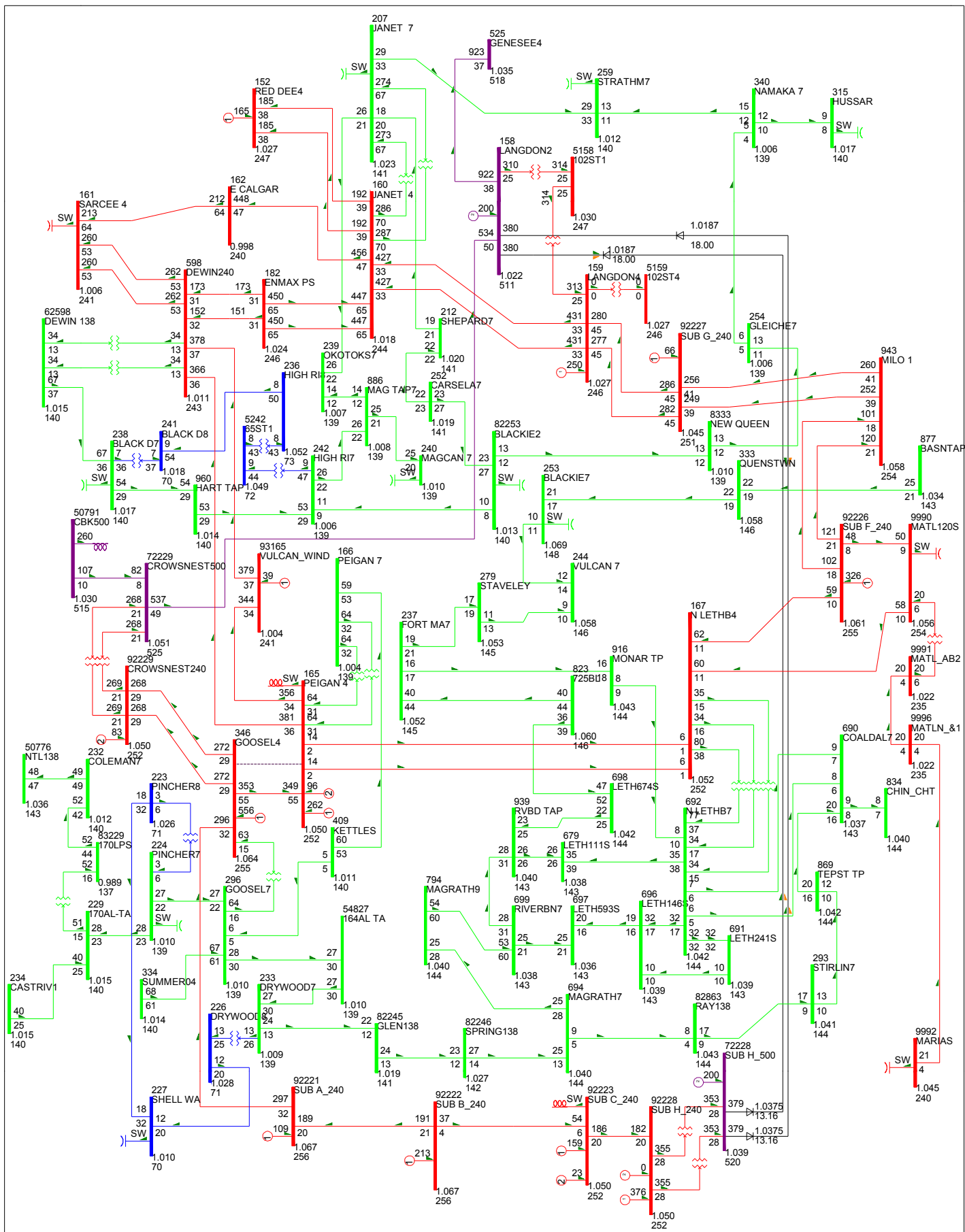


FIG 2017-4-SP-16: PEIGAN TO GOOSELAKE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -11 MW

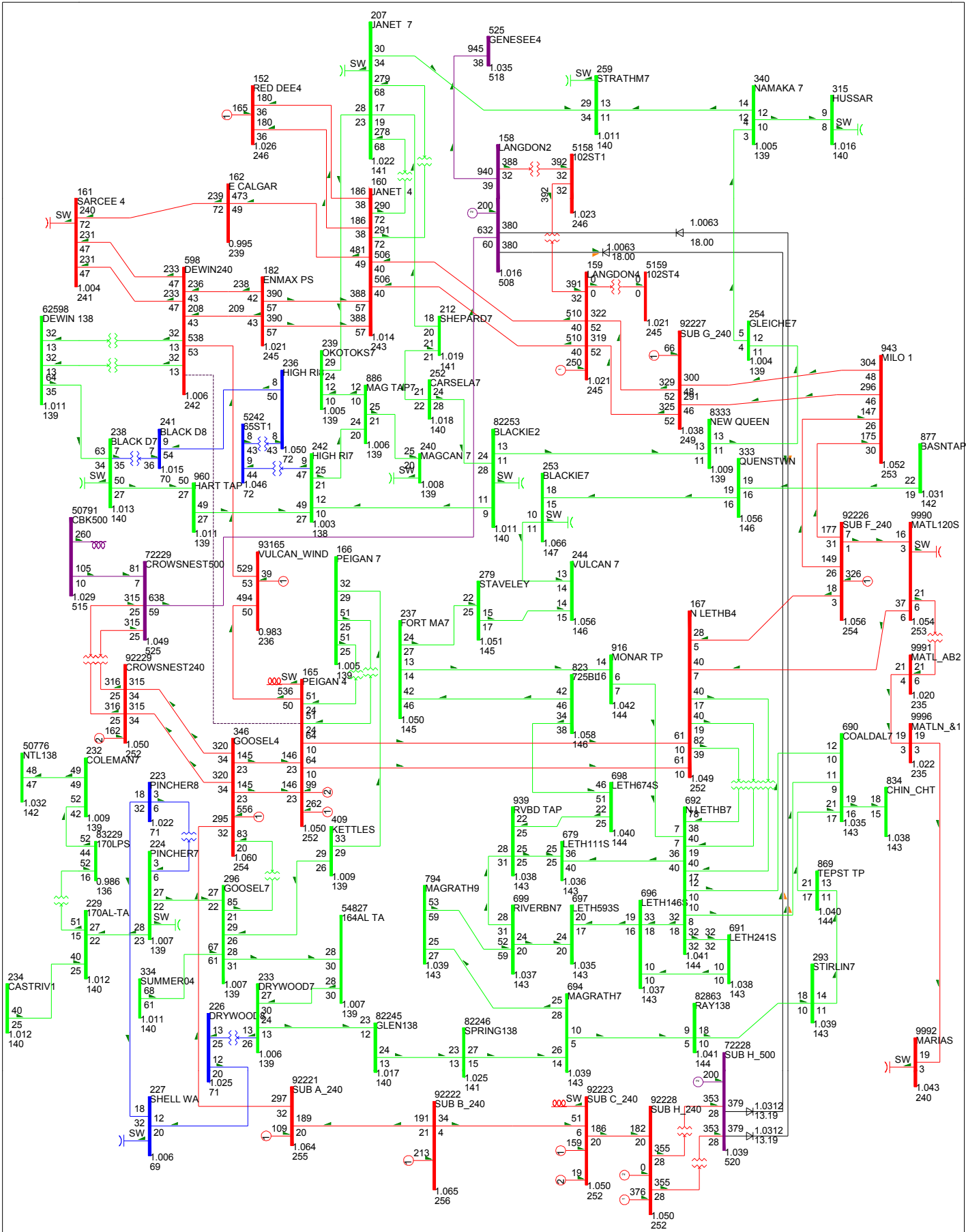


FIG 2017-4-SP-18: PEIGAN TO DEWINTON 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -28 MW

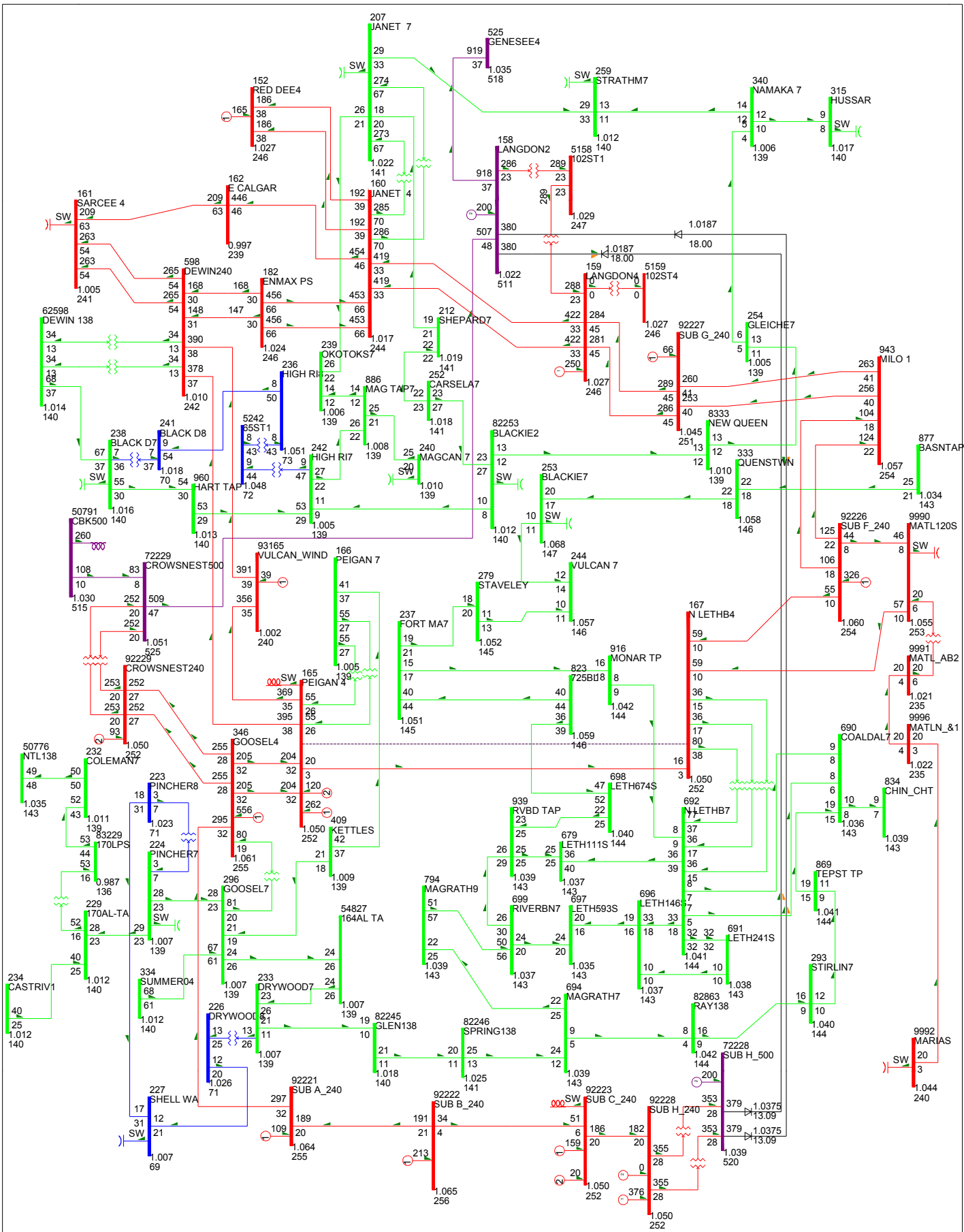


FIG 2017-4-SP-20: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 9:59

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA/% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -13 MW

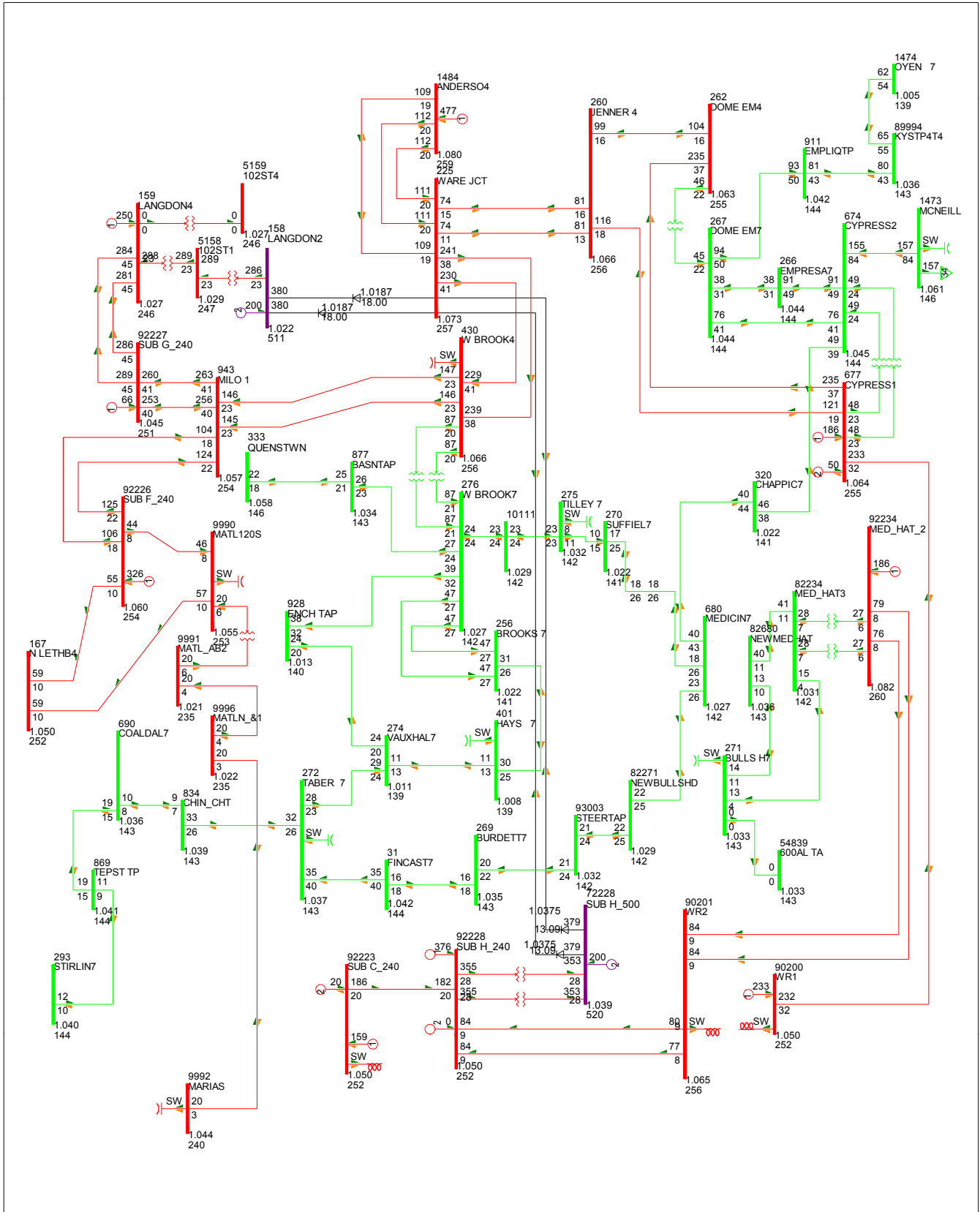


FIG 2017-4-SP-21: PEIGAN TO N. LETHBRIDGE 240 KV
 PROPORTIONAL WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 10:00

ALTERNATIVE 4

Bus - VOLTAGE (KV/PU)
 Branch - MVA% OF RATE A
 Equipment - MVA
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 <=600.000 >600.000
 BC Export: -13 MW

Table D-14: Summary of 2017 Summer Light Contingency Analysis – Alternative 1A West Wind scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SL-W-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SL-W-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SL-W-4/5	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SL-W-6/7	240kV 955L Goose Lake 103S to Peigan 59S	None	N/A	None
Fig 2017-1A-SL-W-8/9	240kV Matl 120S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SL-W-10/11	240kV Line C1 Goose Lake 103S to Sub A	None	N/A	None
Fig 2017-1A-SL-W-12/13	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-1A-SL-W-14/15	240kV Line D MATL 120S to Sub C	None	N/A	None
Fig 2017-1A-SL-W-16/17	240kV 923L Sub F to Matl 120S	None	N/A	None
Fig 2017-1A-SL-W-18/19	240kV Line C1 Sub A to Sub B	None	N/A	None
Fig 2017-1A-SL-W-20/21	240kV Line C1 Sub B to Sub C	None	N/A	None
Fig 2017-1A-SL-W-22/23	500/240kV Transformer at New Crowsnest	None	N/A	None

Table D-15: Summary of 2017 Summer Peak Contingency Analysis – Alternative 1A West Wind scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SP-W-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SP-W-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SP-W-4/5	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SP-W-6/7	240kV 955L Goose Lake 103S to Peigan 59S	None	N/A	None
Fig 2017-1A-SP-W-8/9	240kV Matl 120S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SP-W-10/11	240kV Line C1 Goose Lake 103S to Sub A	None	N/A	None
Fig 2017-1A-SP-W-12/13	240kV Line A Goose Lake 103S to New Crowsnest	None	N/A	None
Fig 2017-1A-SP-W-14/15	240kV Line D MATL 120S to Sub C	None	N/A	None
Fig 2017-1A-SP-W-16/17	240kV 923L Sub F to Matl 120S	None	N/A	None
Fig 2017-1A-SP-W-18/19	240kV Line C1 Sub A to Sub B	None	N/A	None
Fig 2017-1A-SP-W-20/21	240kV Line C1 Sub B to Sub C	None	N/A	None
Fig 2017-1A-SP-W-22/23	500/240kV Transformer at New Crowsnest	None	N/A	None

Table D-16: Summary of 2017 Summer Light Contingency Analysis – Alternative 1A East Wind scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SL-E-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SL-E-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SL-E-4/5	240kV Jenner 275S to Cypress	None	N/A	None
Fig 2017-1A-SL-E-6/7	240kV 945L Amoco Empress 163S to Cypress	None	N/A	None
Fig 2017-1A-SL-E-8/9	240kV Line C1 Goose Lake 103S to Sub A	240kV N.Lethbridge 370S to Matl 120S	134.2%	None
		240kV Matl 120S to Sub C	111.2%	
Fig 2017-1A-SL-E-10/11	240kV Line G W. Brooks 28S to Medicine Hat 2	240kV N. Lethbridge 370S to Matl 120S	102.5%	None
Fig 2017-1A-SL-E-12/13	240kV Line D Sub C to Matl 120S	None	N/A	None
Fig 2017-1A-SL-E-14/15	240kV 923L Sub F to Matl 120S	240kV N. Lethbridge 370S to Matl 120S	110.9%	None
Fig 2017-1A-SL-E-16/17	240kV Line C1 Sub A to Sub B	240kV N.Lethbridge 370S to Matl 120S	134.4%	None
		240kV Matl 120S to Sub C	111.5%	
Fig 2017-1A-SL-E-18/19	240kV Line C1 Sub B to Sub C	240kV N.Lethbridge 370S to Matl 120S	134.6%	None
		240kV Matl 120S to Sub C	111.8%	
Fig 2017-1A-SL-E-20/21	138kV Ameco Empress 163S to Cypress	None	N/A	None
Fig 2017-1A-SL-E-22/23	240/138kV Transformer at Goose Lake 103S	None	N/A	None

Table D-17: Summary of 2017 Summer Peak Contingency Analysis – Alternative 1A East Wind scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SP-E-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SP-E-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SP-E-4/5	240kV Jenner 275S to Cypress	240kV 945L Amoco Empress 163S to Cypress 138kV 760L Oyen 767S to Empress Liquids 164S	100.6% 120.1%	None
Fig 2017-1A-SP-E-6/7	240kV 945L Amoco Empress 163S to Cypress	138kV 760L Amoco Empress 163S to Empress 394S 138kV 760L Empress 394S to Cypress	127.9% 117.8%	None
Fig 2017-1A-SP-E-8/9	240kV Line C1 Goose Lake 103S to Sub A	240kV N.Lethbridge 370S to Matl 120S 240kV Matl 120S to Sub C	127.1% 109.5%	None
Fig 2017-1A-SP-E-10/11	240kV Line G W. Brooks 28S to Medicine Hat 2	None	N/A	None
Fig 2017-1A-SP-E-12/13	240kV Line D Sub C to Matl 120S	None	N/A	None
Fig 2017-1A-SP-E-14/15	240kV 923L Sub F to Matl 120S	240kV N. Lethbridge 370S to Matl 120S	113.6%	None
Fig 2017-1A-SP-E-16/17	240kV Line C1 Sub A to Sub B	240kV N.Lethbridge 370S to Matl 120S 240kV Matl 120S to Sub C	126.8% 109.6%	None
Fig 2017-1A-SP-E-18/19	240kV Line C1 Sub B to Sub C	240kV N.Lethbridge 370S to Matl 120S 240kV Matl 120S to Sub C	127.0% 109.9%	None
Fig 2017-1A-SP-E-20/21	138kV Ameco Empress 163S to Cypress	138kV 760L Amoco Empress 163S to Empress 394S 138kV 760L Empress 394S to Cypress	105.0% 101%	None
Fig 2017-1A-SP-E-22/23	240/138kV Transformer at Goose Lake 103S	None	N/A	None

Table D-18: Summary of 2017 Summer Light Contingency Analysis – Alternative 1A Matl Scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SL-M-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SL-M-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SL-M-4/5	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SL-M-6/7	240kV Matl 120S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SL-M-8/9	240kV 931L Ware Junction 132S to W. Brooks 28S	None	N/A	None
Fig 2017-1A-SL-M-10/11	240kV Jenner 275S to Cypress	None	N/A	None
Fig 2017-1A-SL-M-12/13	240kV Line C1 Goose Lake 103S to Sub A	240kV N. Lethbridge 370S to Matl 120S	111.3%	None
Fig 2017-1A-SL-M-14/15	240kV Line G W. Brooks 28S to Medicine Hat 2	None	N/A	None
Fig 2017-1A-SL-M-16/17	240kV Line D Sub C to Matl 120S	None	N/A	None
Fig 2017-1A-SL-M-18/19	240kV Line H Ware Junction 132S to Langdon 102S	None	N/A	None
Fig 2017-1A-SL-M-20/21	240kV Line J Dewinton to Peigan 59S	None	N/A	None

Table D-19: Summary of 2017 Summer Peak Contingency Analysis – Alternative 1A Matl Scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SP-M-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SP-M-2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SP-M-4/5	240kV 967L Peigan 59S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SP-M-6/7	240kV Matl 120S to N. Lethbridge 370S	None	N/A	None
Fig 2017-1A-SP-M-8/9	240kV 931L Ware Junction 132S to W. Brooks 28S	None	N/A	None
Fig 2017-1A-SP-M-10/11	240kV Jenner 275S to Cypress	None	N/A	None
Fig 2017-1A-SP-M-12/13	240kV Line C1 Goose Lake 103S to Sub A	240kV N. Lethbridge 370S to Matl 120S	103.8%	None
Fig 2017-1A-SP-M-14/15	240kV Line G W. Brooks 28S to Medicine Hat 2	None	N/A	None
Fig 2017-1A-SP-M-16/17	240kV Line D Sub C to Matl 120S	None	N/A	None
Fig 2017-1A-SP-M-18/19	240kV Line H Ware Junction 132S to Langdon 102S	None	N/A	None
Fig 2017-1A-SP-M-20/21	240kV Line J Dewinton to Peigan 59S	None	N/A	None

Table D-20: Summary of 2017 Summer Light Contingency Analysis – Alternative 1A Bow City Scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SL-BOW-1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SL- BOW -2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SL- BOW -4/5	240kV 927L Milo Junction to Sub G	None	N/A	None
Fig 2017-1A-SL- BOW -6/7	240kV Line G W. Brooks 28S to Medicine Hat 2	None	N/A	None
Fig 2017-1A-SL- BOW -8/9	240kV Line H Ware Junction 132S to Langdon 102S	None	N/A	None
Fig 2017-1A-SL- BOW -10/11	240kV 923L W. Brooks 28S to Milo Junction	None	N/A	None
Fig 2017-1A-SL- BOW -12/13	240kV 931L Ware Junction 132S to W. Brooks 28S	None	N/A	None
Fig 2017-1A-SL- BOW -14/15	240kV Line D Sub C to Matl 120S	None	N/A	None
Fig 2017-1A-SL- BOW -16/17	240kV Jenner 275S to Cypress	None	N/A	None
Fig 2017-1A-SL- BOW -18/19	240kV Line C1 Goose Lake 103S to Sub A	None	N/A	None
Fig 2017-1A-SL- BOW -20/21	240kV Line J Dewinton to Peigan 59S	None	N/A	None

Table D-21: Summary of 2017 Summer Peak Contingency Analysis – Alternative 1A Bow City Scenario

Figure No.	Contingency	Overloaded Element	Percent Overload	Other System Performance Concerns
Fig 2017-1A-SP- BOW -1	Generation Dispatch	None	N/A	None
Fig 2017-1A-SP- BOW -2/3	All Elements in Service	None	N/A	None
Fig 2017-1A-SP- BOW -4/5	240kV 927L Milo Junction to Sub G	None	N/A	None
Fig 2017-1A-SP- BOW -6/7	240kV Line G W. Brooks 28S to Medicine Hat 2	None	N/A	None
Fig 2017-1A-SP- BOW -8/9	240kV Line H Ware Junction 132S to Langdon 102S	None	N/A	None
Fig 2017-1A-SP- BOW -10/11	240kV 923L W. Brooks 28S to Milo Junction	None	N/A	None
Fig 2017-1A-SP- BOW -12/13	240kV 931L Ware Junction 132S to W. Brooks 28S	None	N/A	None
Fig 2017-1A-SP- BOW -14/15	240kV Line D Sub C to Matl 120S	None	N/A	None
Fig 2017-1A-SP- BOW -16/17	240kV Jenner 275S to Cypress	None	N/A	None
Fig 2017-1A-SP- BOW -18/19	240kV Line C1 Goose Lake 103S to Sub A	None	N/A	None
Fig 2017-1A-SP- BOW -20/21	240kV Line J Dewinton to Peigan 59S	None	N/A	None

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3611.8 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 477.6 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.

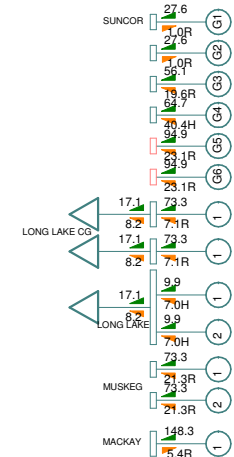
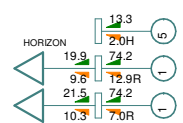
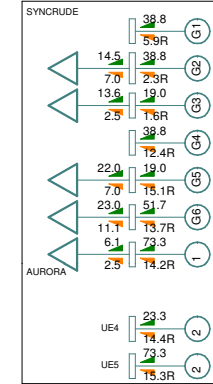
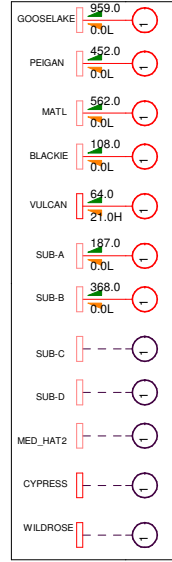
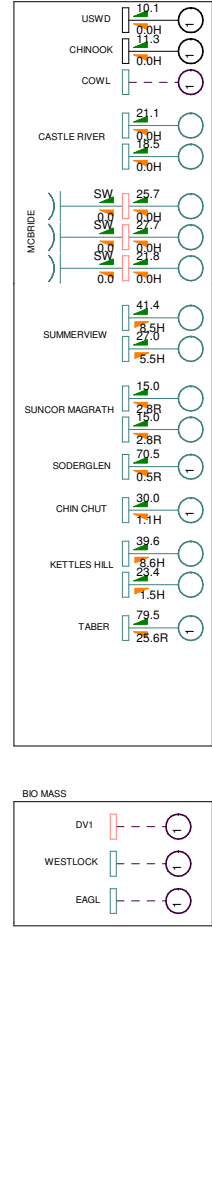
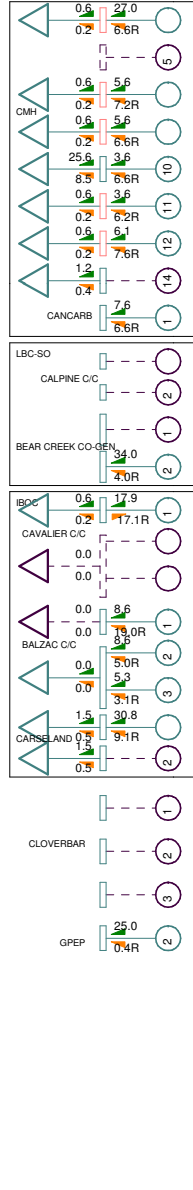
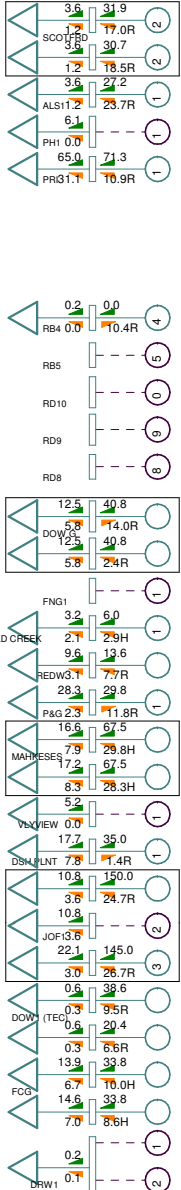
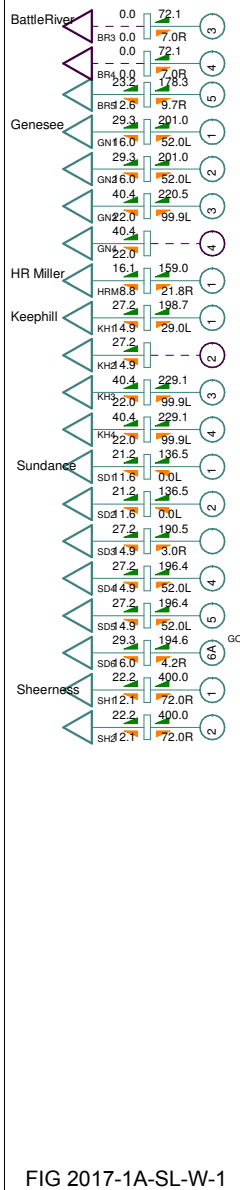


FIG 2017-1A-SL-W-1
GENERATION DISPATCH

2017 SUMMER LIGHT SCENARIO 5 SK IMPORT IN WCC
SUN, NOV 23 2008 11:25

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
KV: <-25,000 <-34,500 <-69,000 <-138,000 <-240,000 >240,000

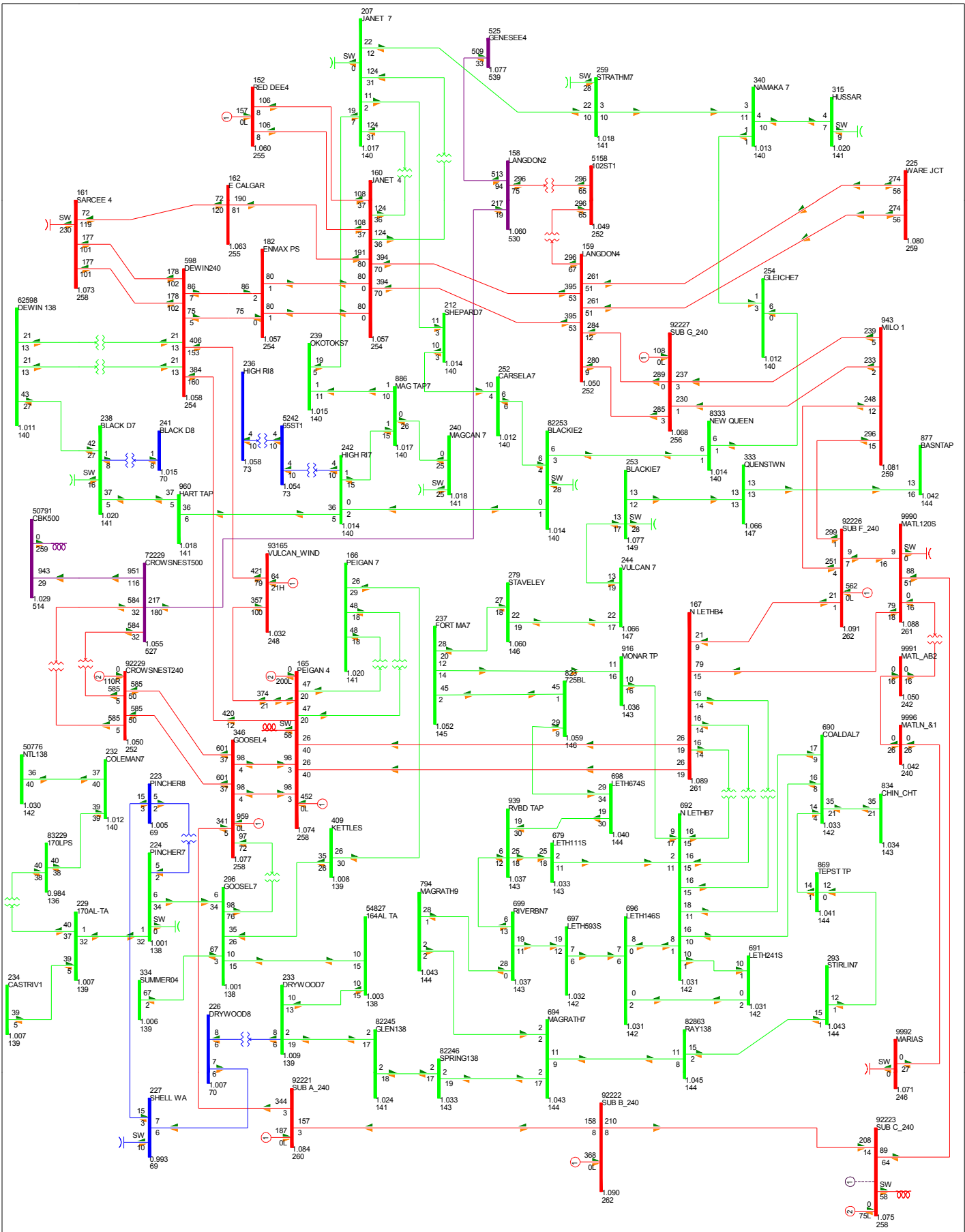


FIG 2017-1A-SL-W-2: N-0 CONDITION

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=240.000 <=500.000 >500.000
 BC Export: 1004 MW

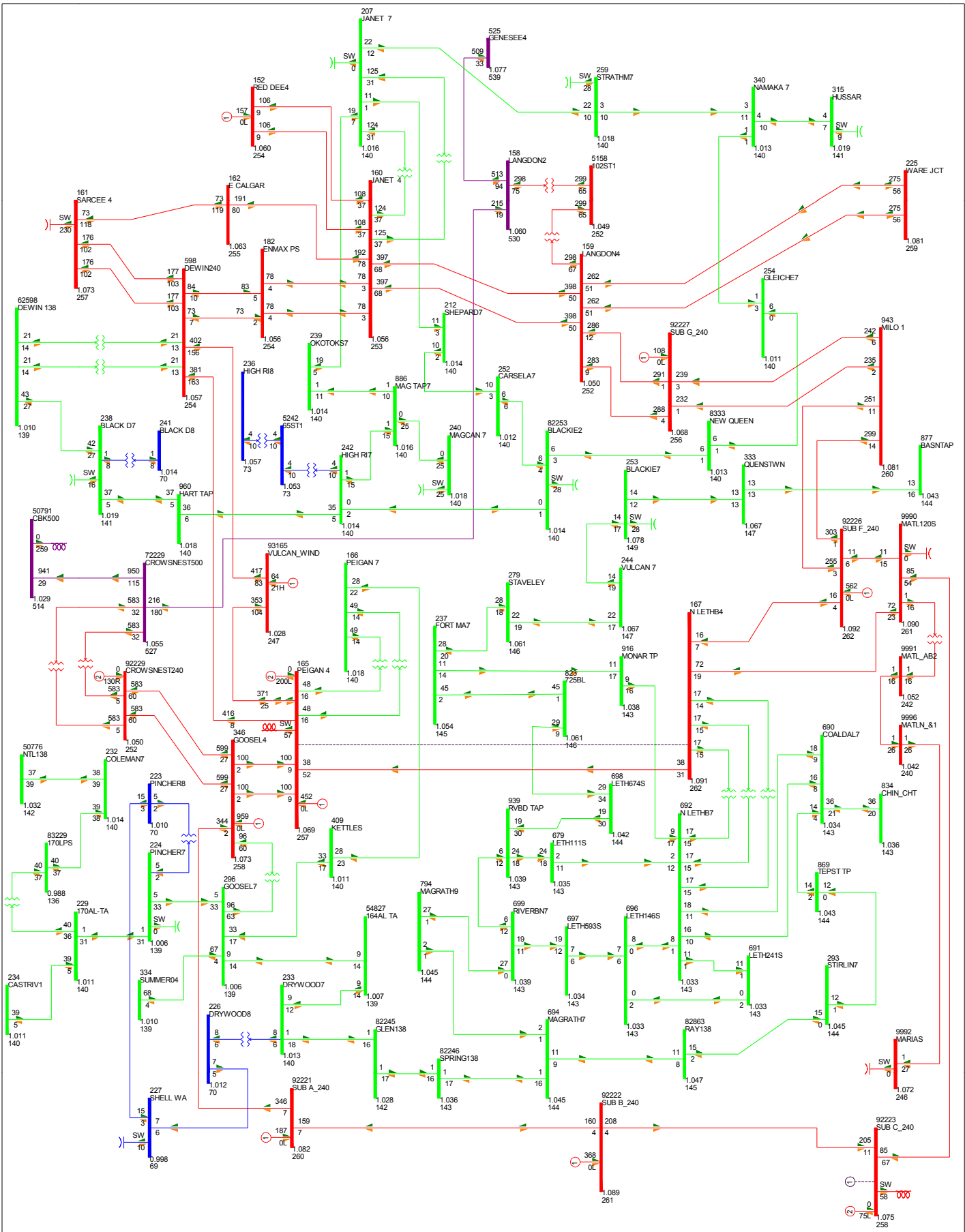


FIG 2017-1A-SL-W-4: PEIGAN TO N. LETHBRIDGE 240 KV
 WEST WIND SCENARIO
 2017 South West System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1002 MW

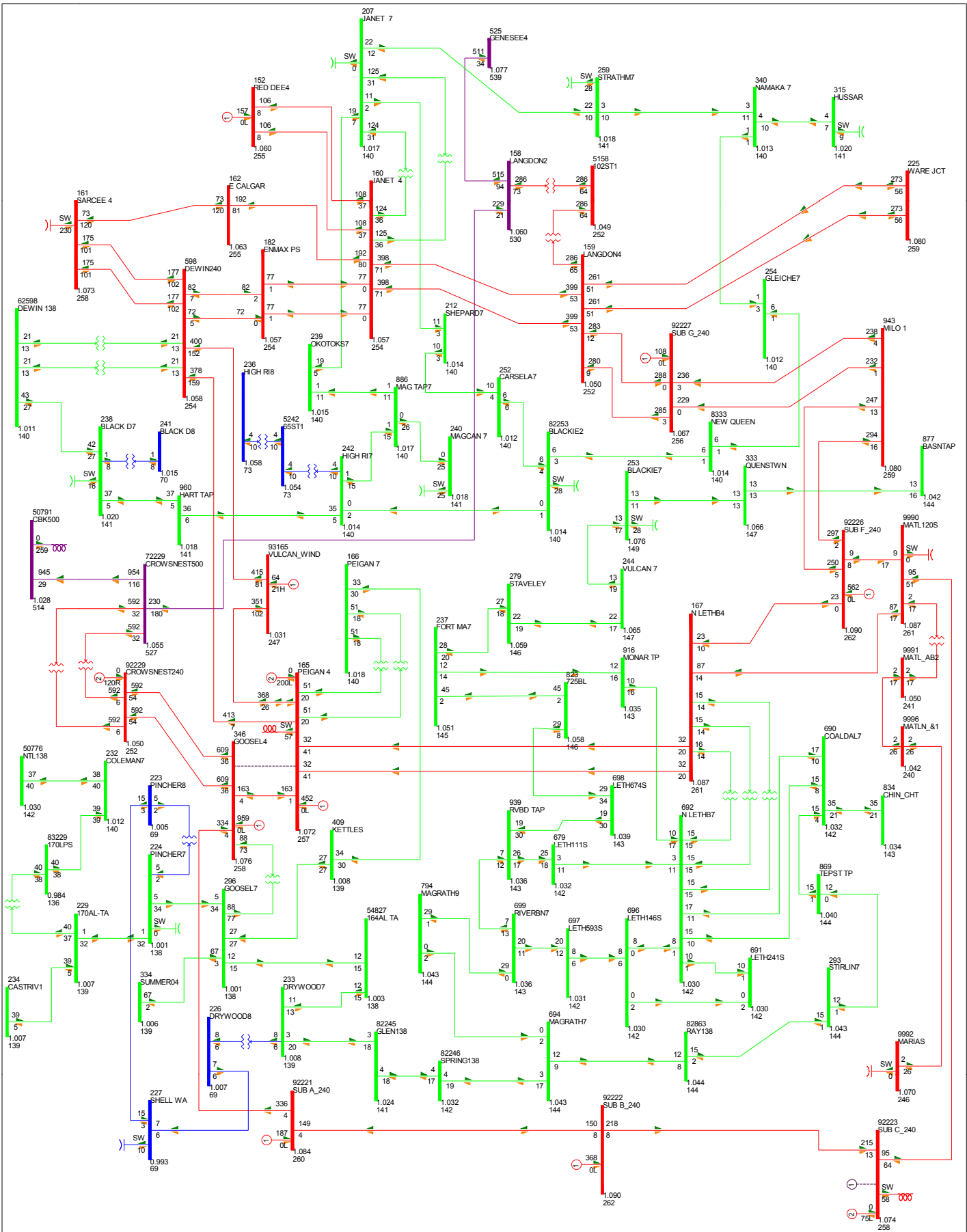


FIG 2017-1A-SL-W-6: PEIGAN TO GOOSELAKE 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1006 MW

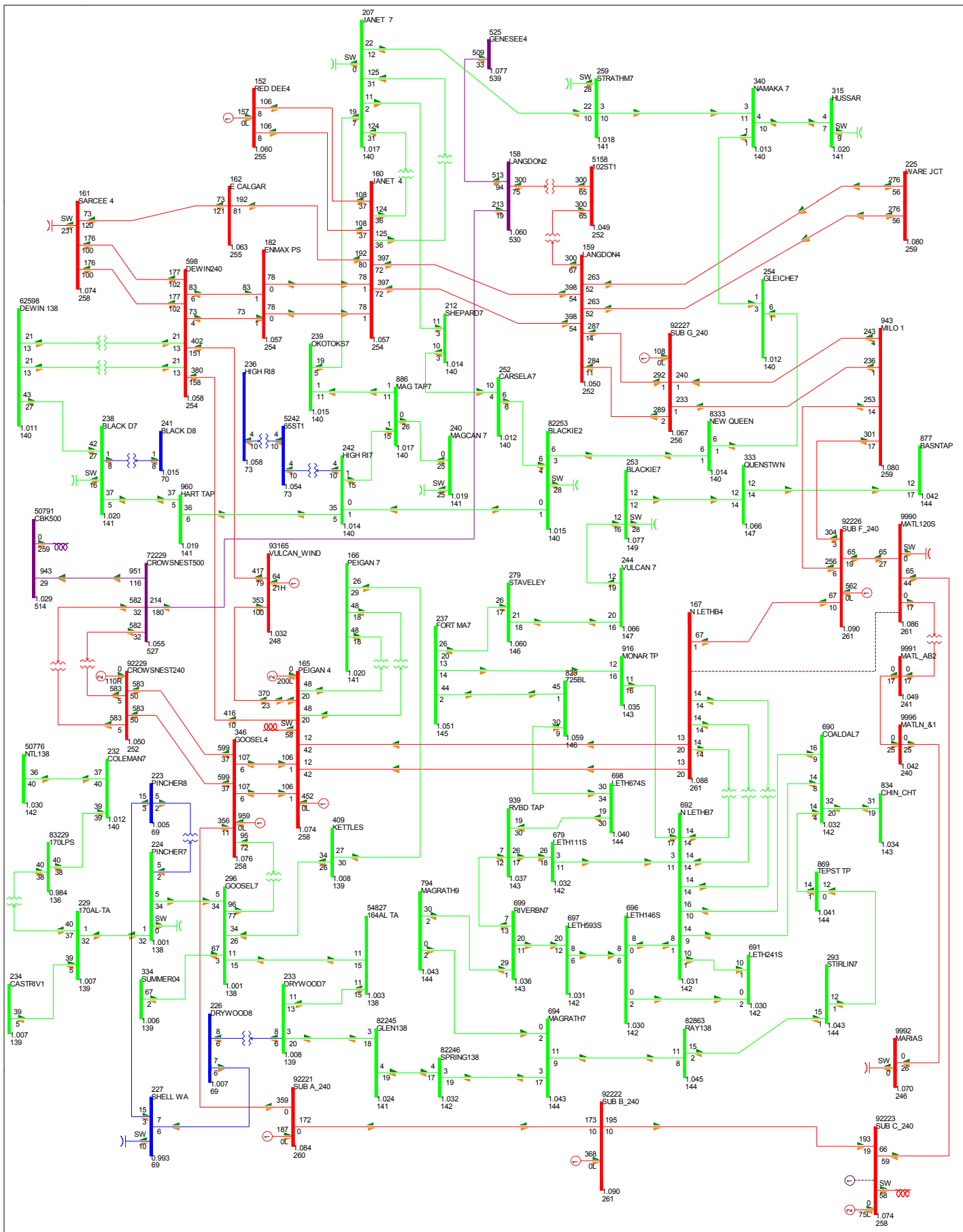


FIG 2017-1A-SL-W-8: N. LETHBRIDGE TO MATL 240 KV
 WEST WIND SCENARIO
 2017 South West System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1004 MW

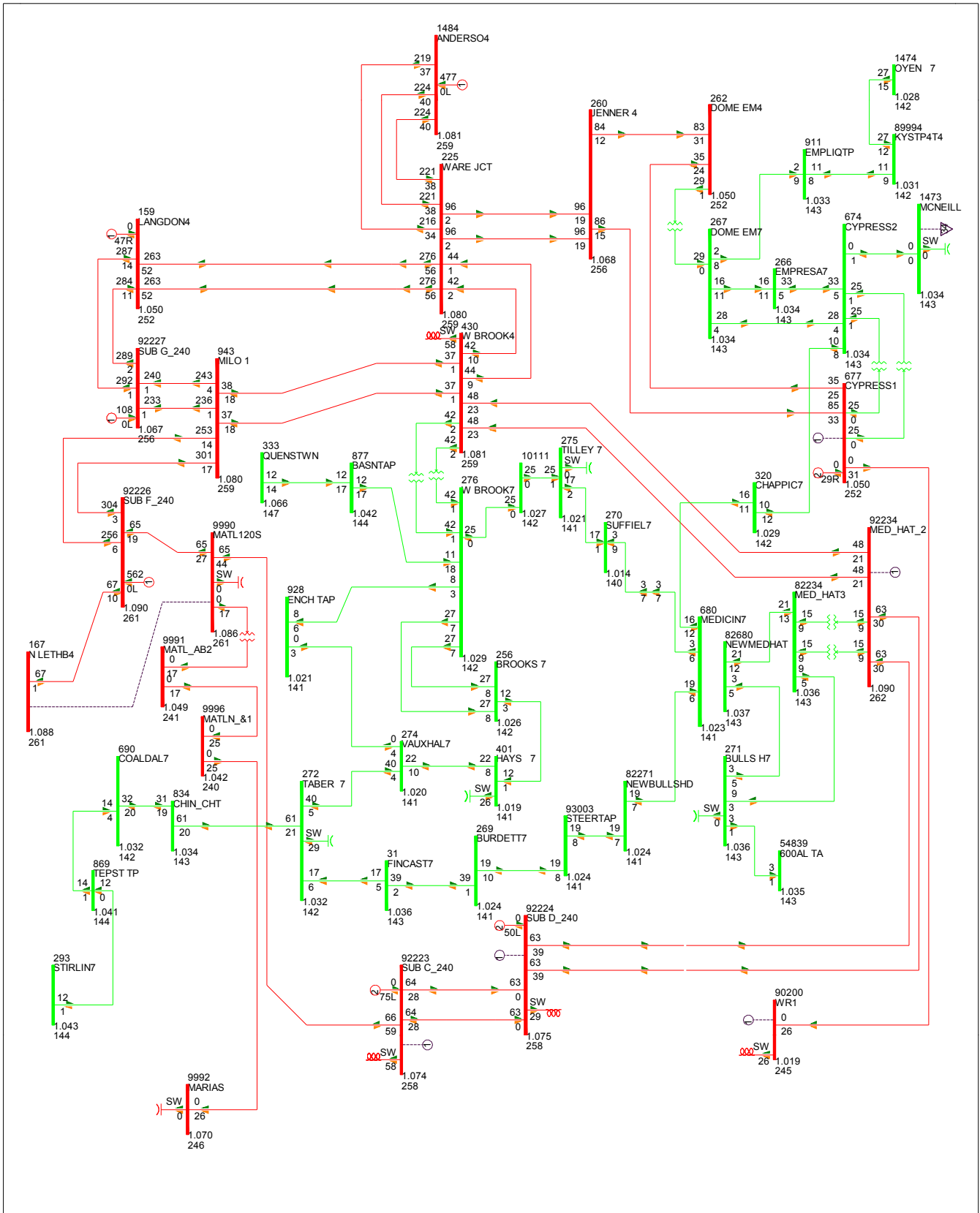


FIG 2017-1A-SL-W-9: N. LETHBRIDGE TO MATL 240 KV
 WEST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1004 MW

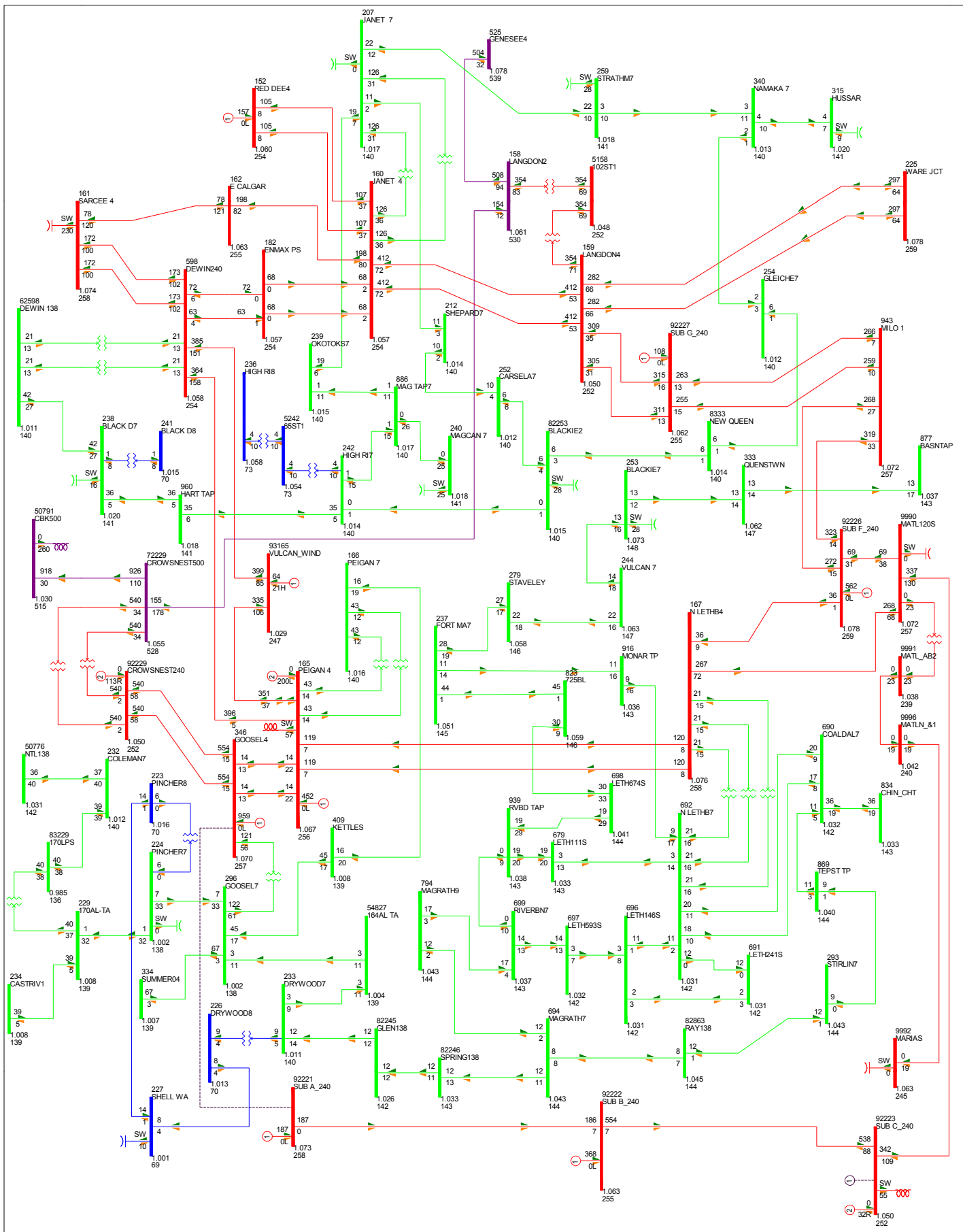


FIG 2017-1A-SL-W-10: GOOSELAKE TO SUB A 240 KV
 WEST WIND SCENARIO
 2017 South West System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 980 MW

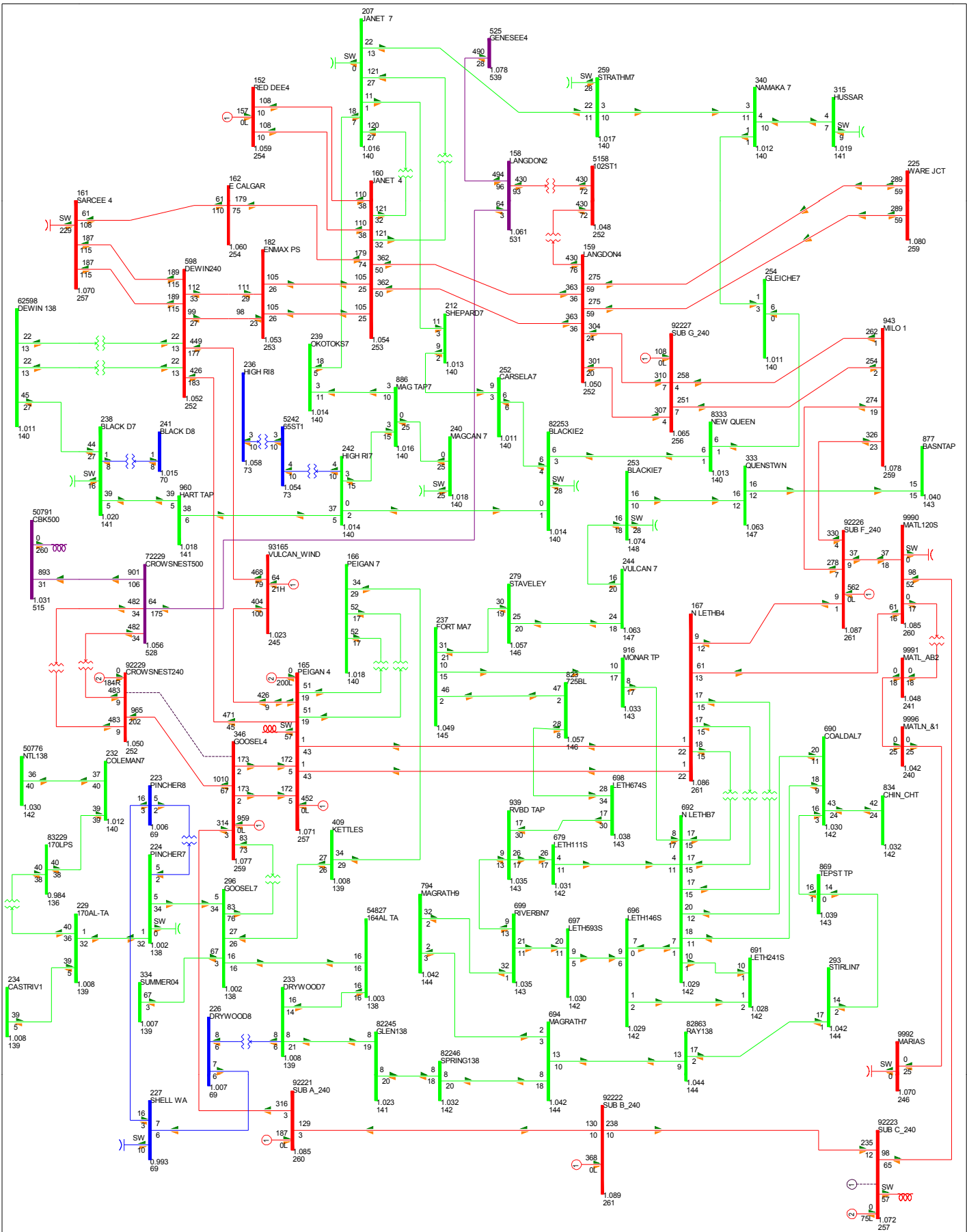


FIG 2017-1A-SL-W-12: GOOSELAKE TO CROWNSNEST 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 960 MW

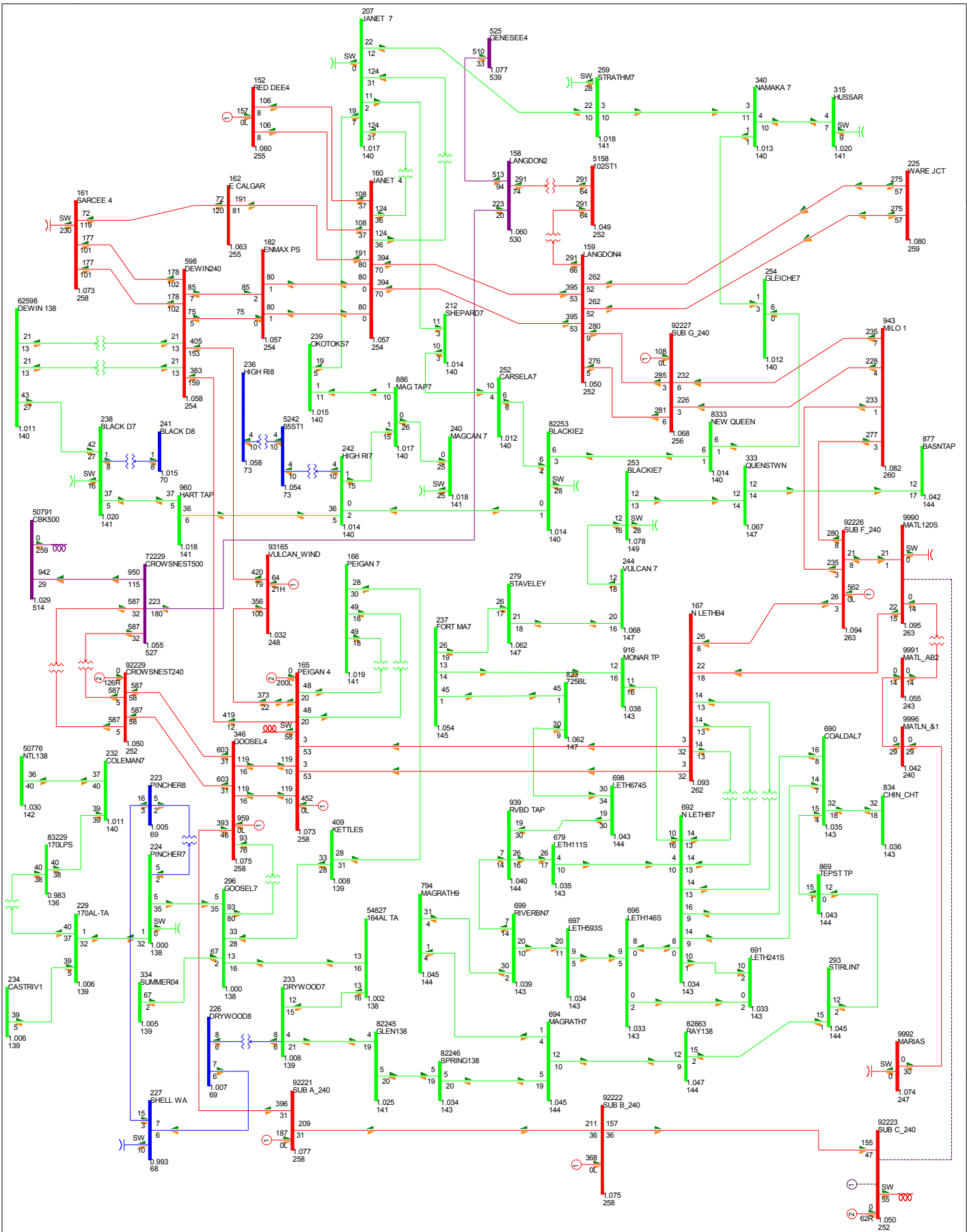


FIG 2017-1A-SL-W-14: SUB C TO MATL 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:31

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1002 MW

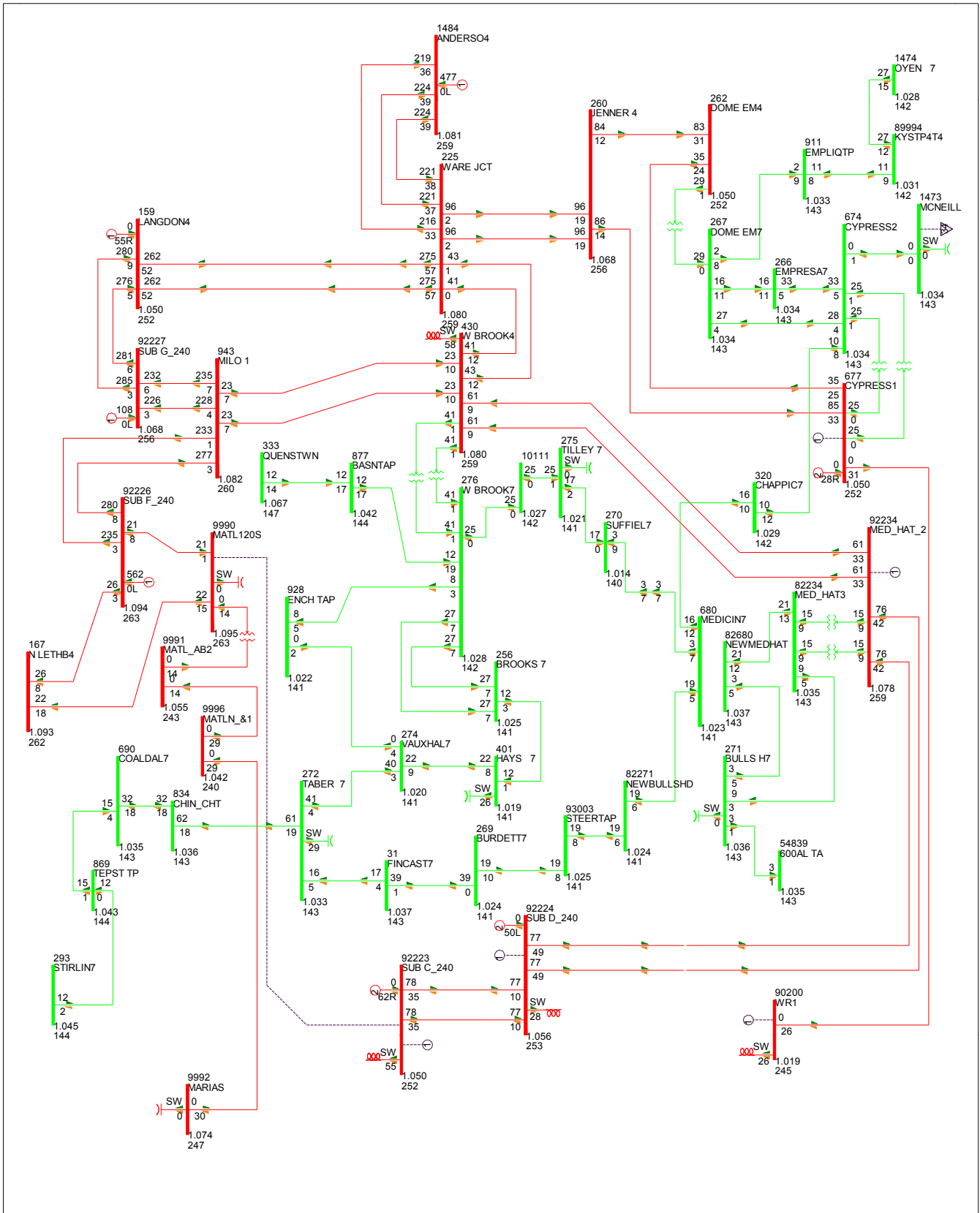


FIG 2017-1A-SL-W-15: SUB C TO MATL 240 KV
 WEST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1002 MW

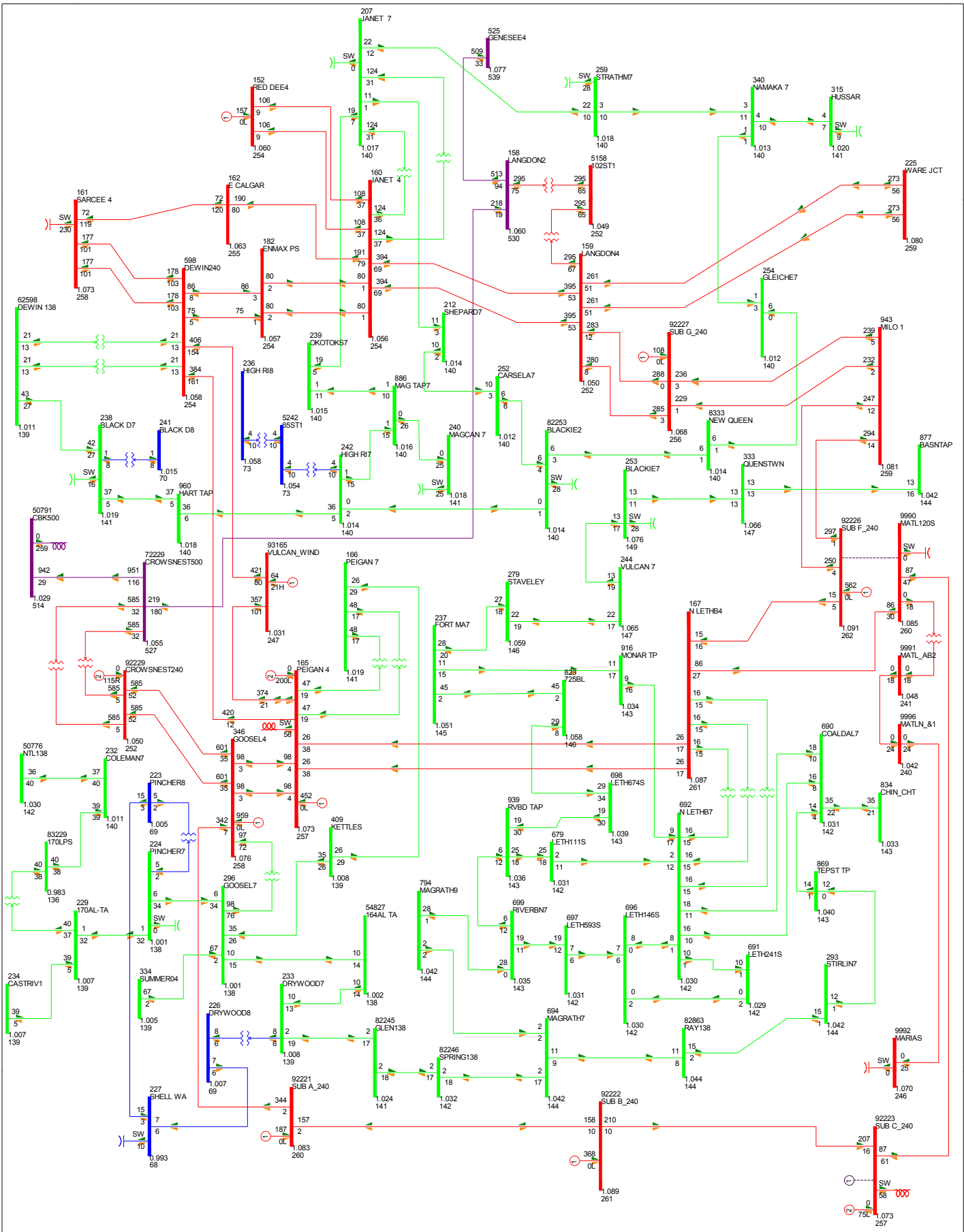


FIG 2017-1A-SL-W-16: SUB F TO MATL 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1003 MW

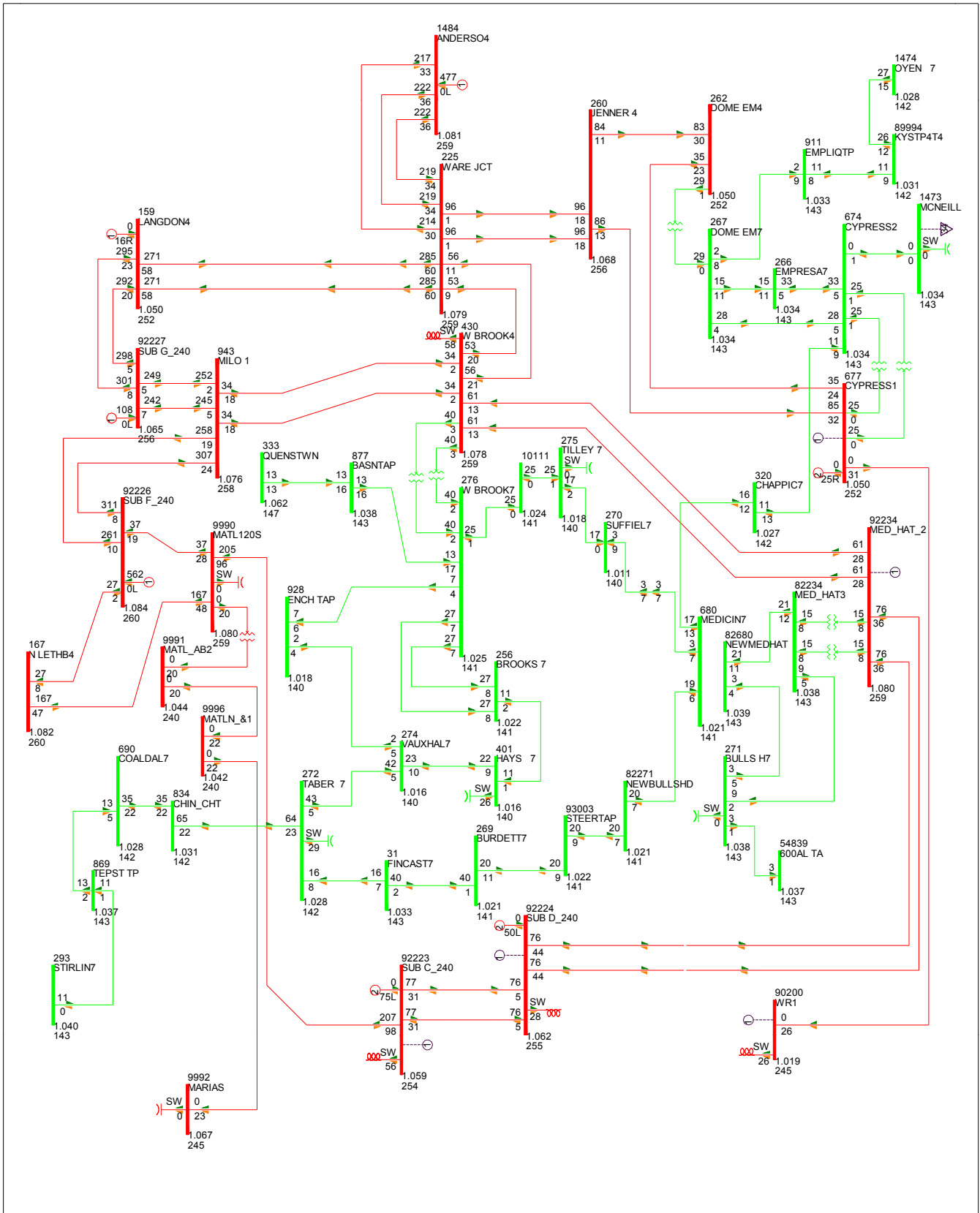


FIG 2017-1A-SL-W-19: SUB A TO SUB B 240 KV
 WEST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 998 MW

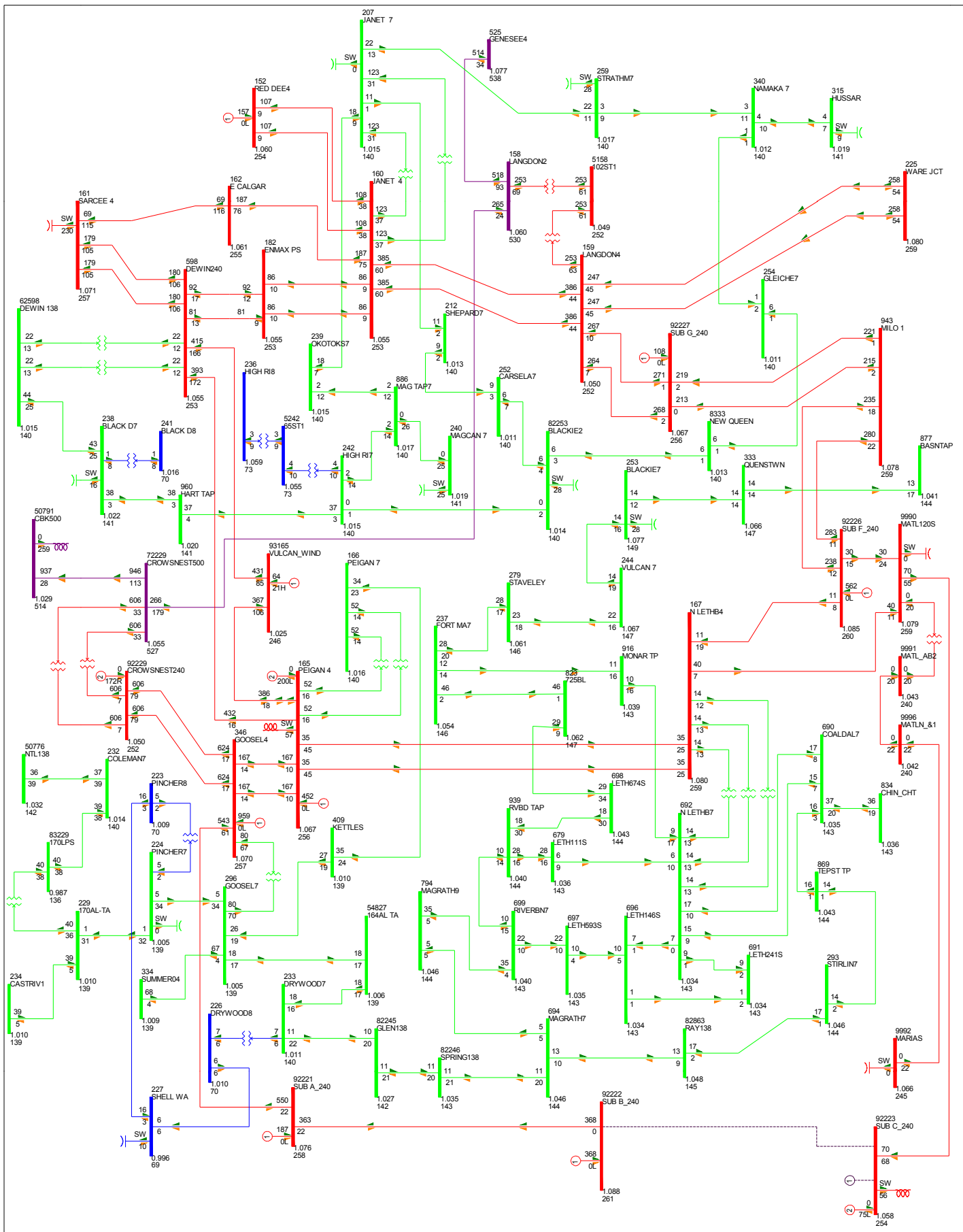


FIG 2017-1A-SL-W-20: SUB B TO SUB C 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 996 MW

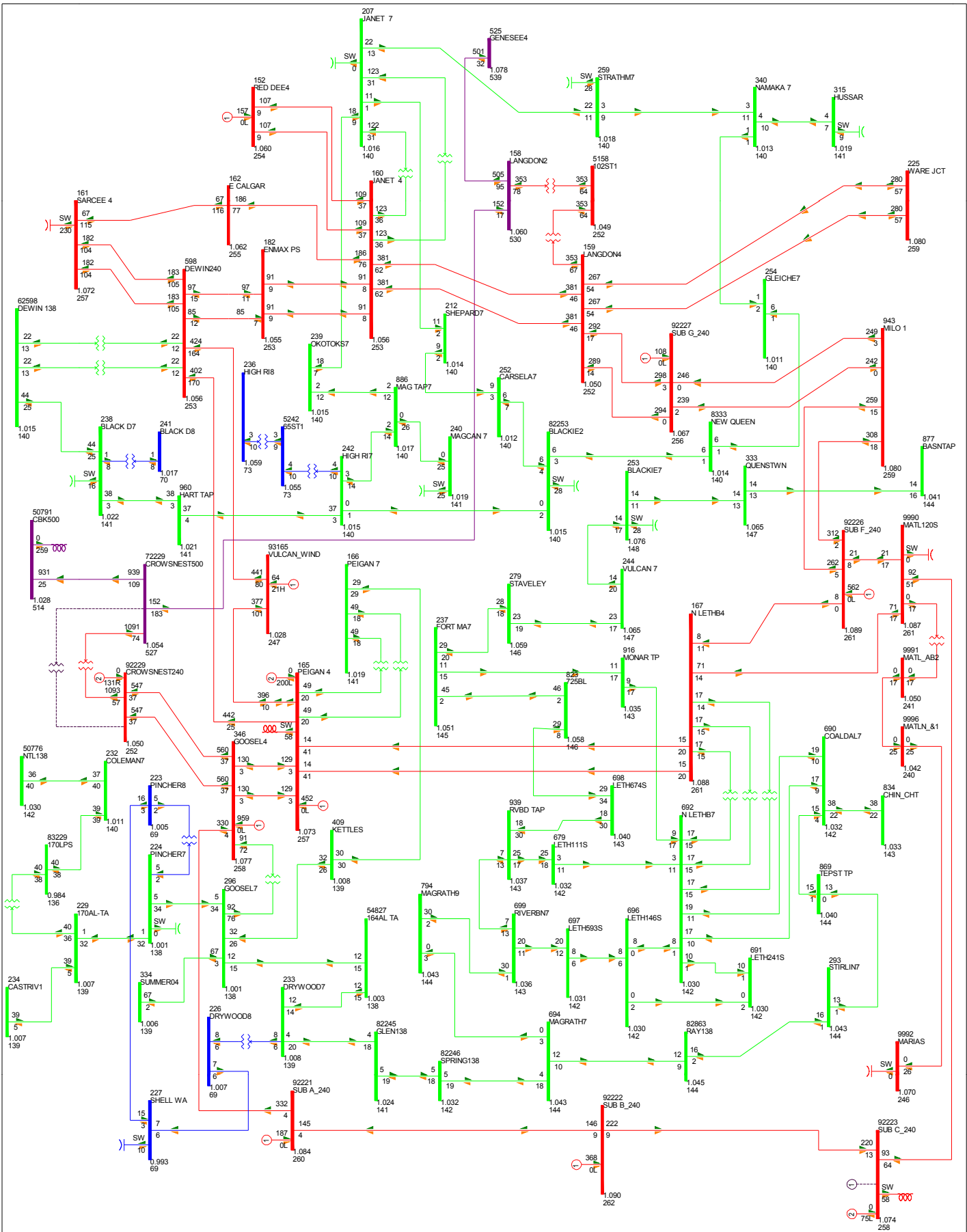


FIG 2017-1A-SL-W-22: CROWSNEST 500/240 KV XMR

WEST WIND SCENARIO

2017 South West System TUE, DEC 02 2008 19:20

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 >500.000

BC Export: 994 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3657.8 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 477.6 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.

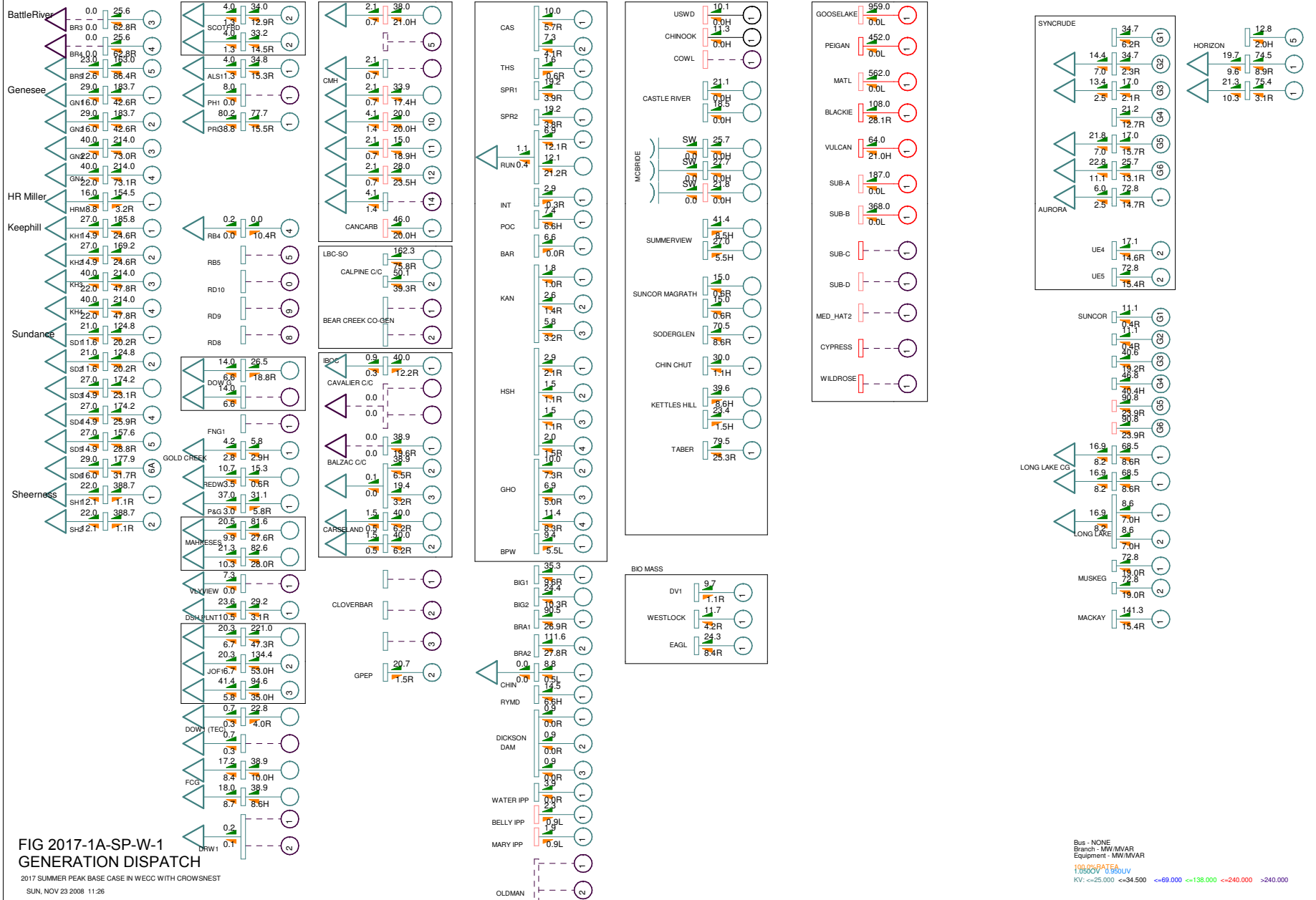


FIG 2017-1A-SP-W-1
GENERATION DISPATCH

2017 SUMMER PEAK BASE CASE IN WECC WITH CROWSNEST
SUN, NOV 23 2008 11:26

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
FILED DATE: 11/25/08 0:55:00
KV: <-25,000 <-34,500 <-69,000 <-138,000 <-240,000 >240,000

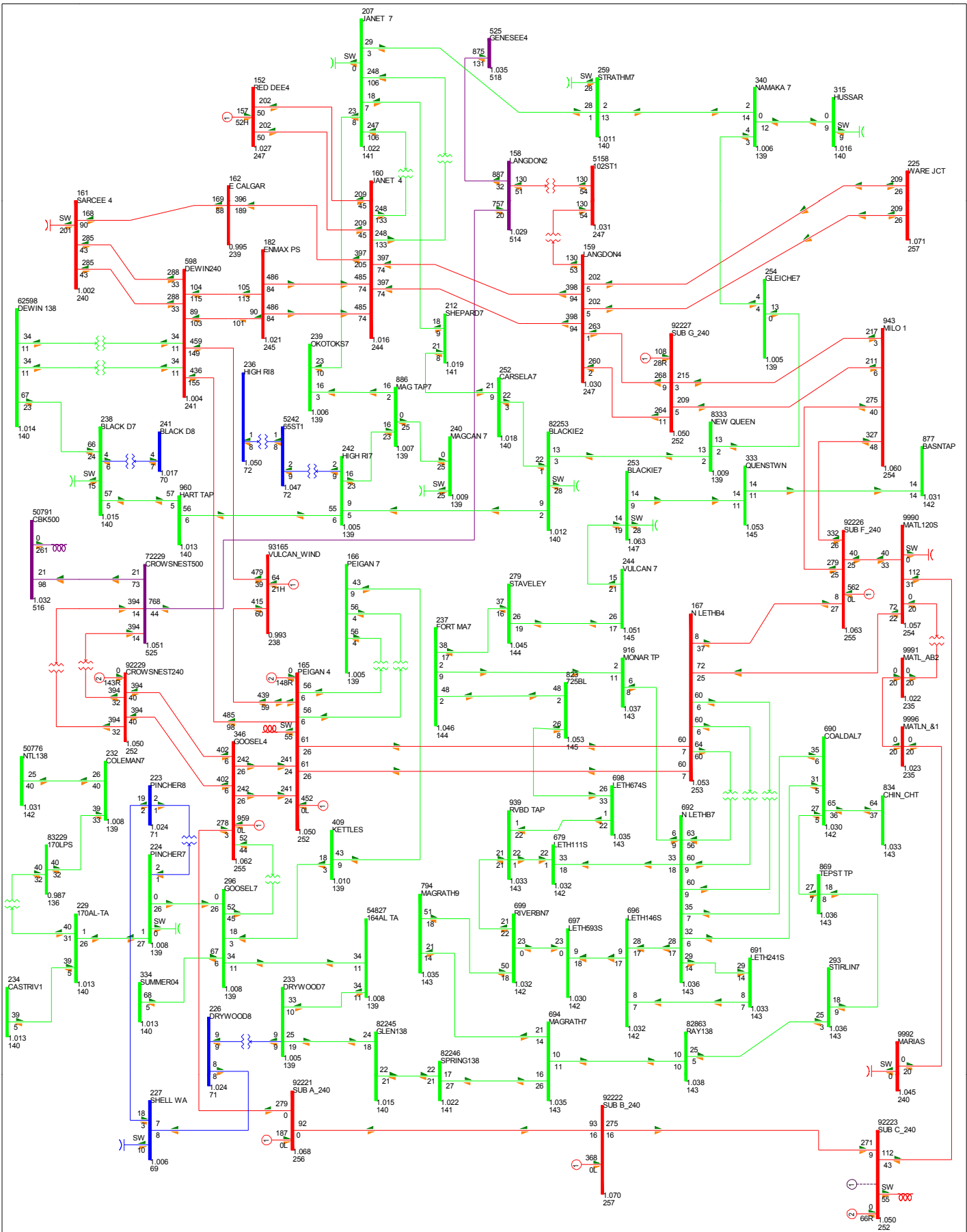


FIG 2017-1A-SP-W-2: N-0 CONDITION

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 10 MW

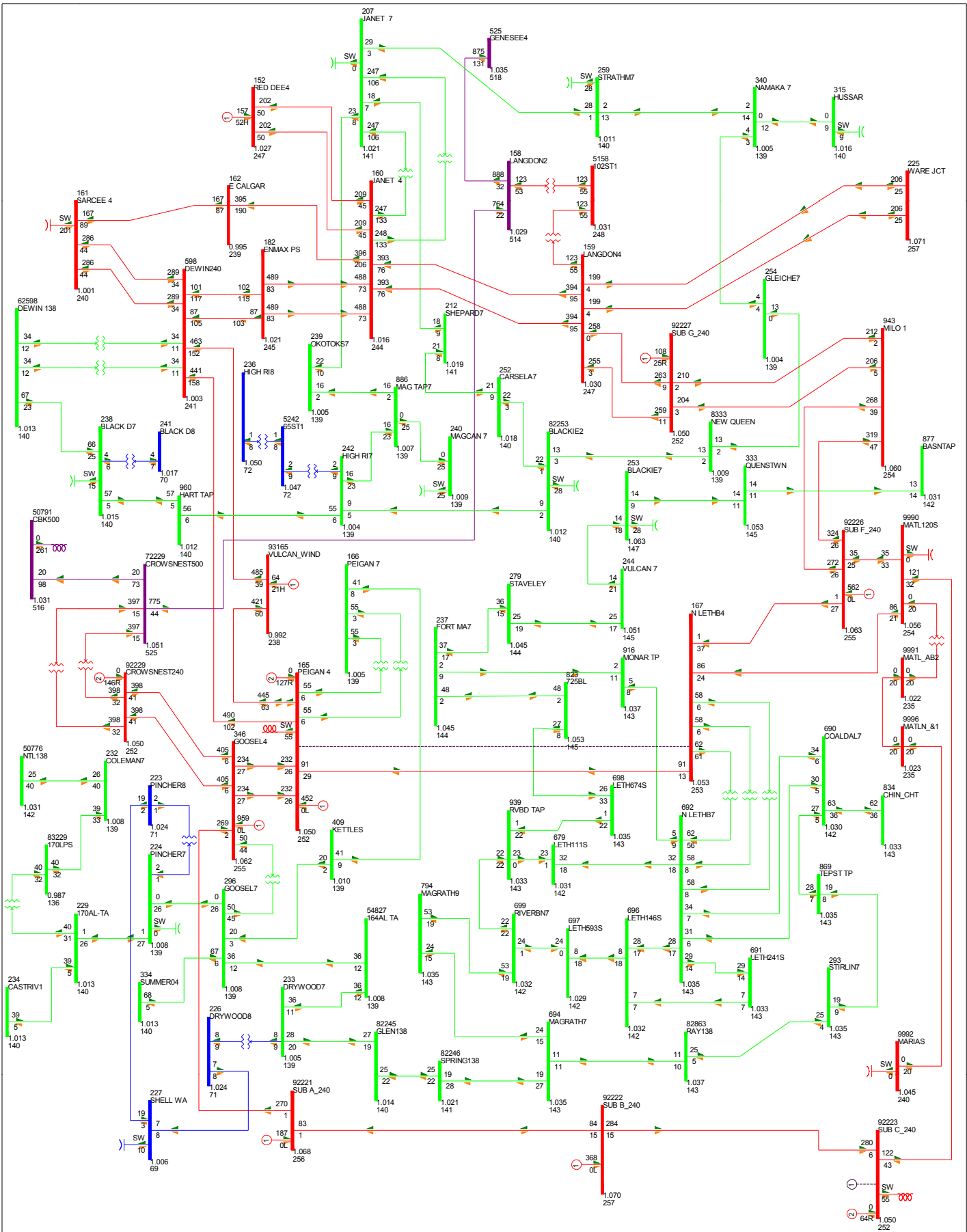


FIG 2017-1A-SP-W-4: PEIGAN TO N. LETHBRIDGE 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 9 MW

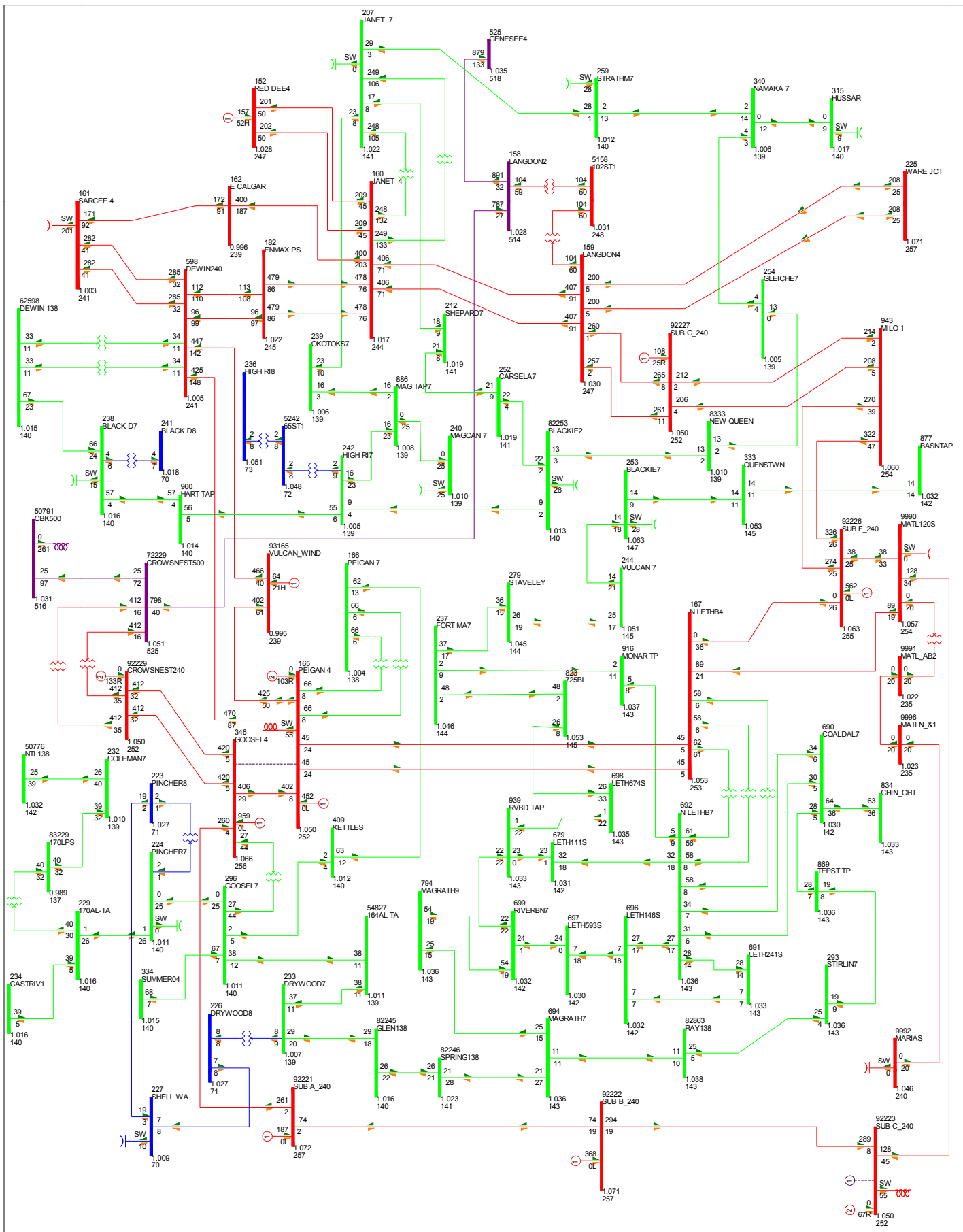


FIG 2017-1A-SP-W-6: PEIGAN TO GOOSELAKE 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 13 MW

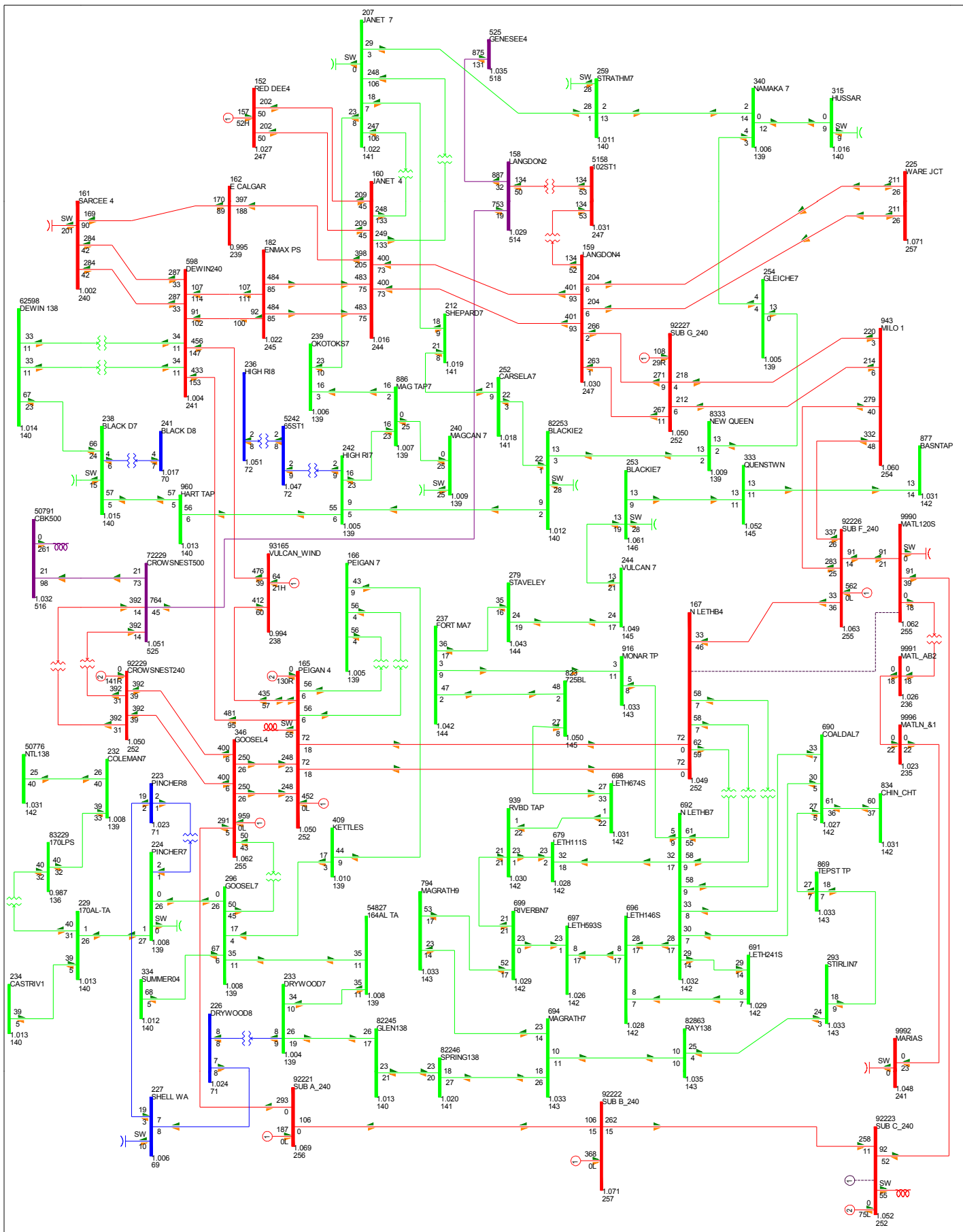


FIG 2017-1A-SP-W-8: N. LETHBRIDGE TO MATL 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 10 MW

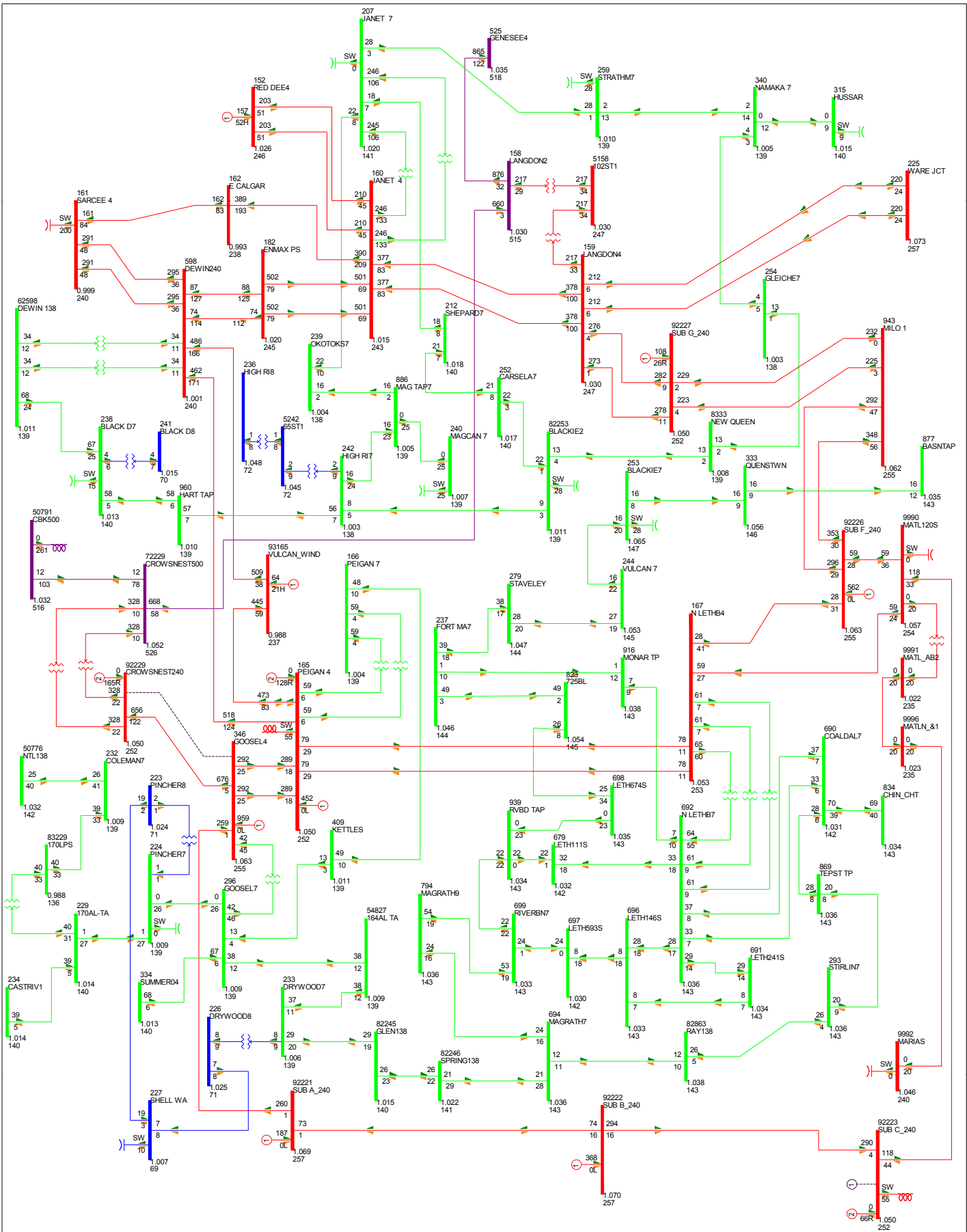


FIG 2017-1A-SP-W-12: GOOSELAKE TO CROWNSNEST 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATE A

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -20 MW

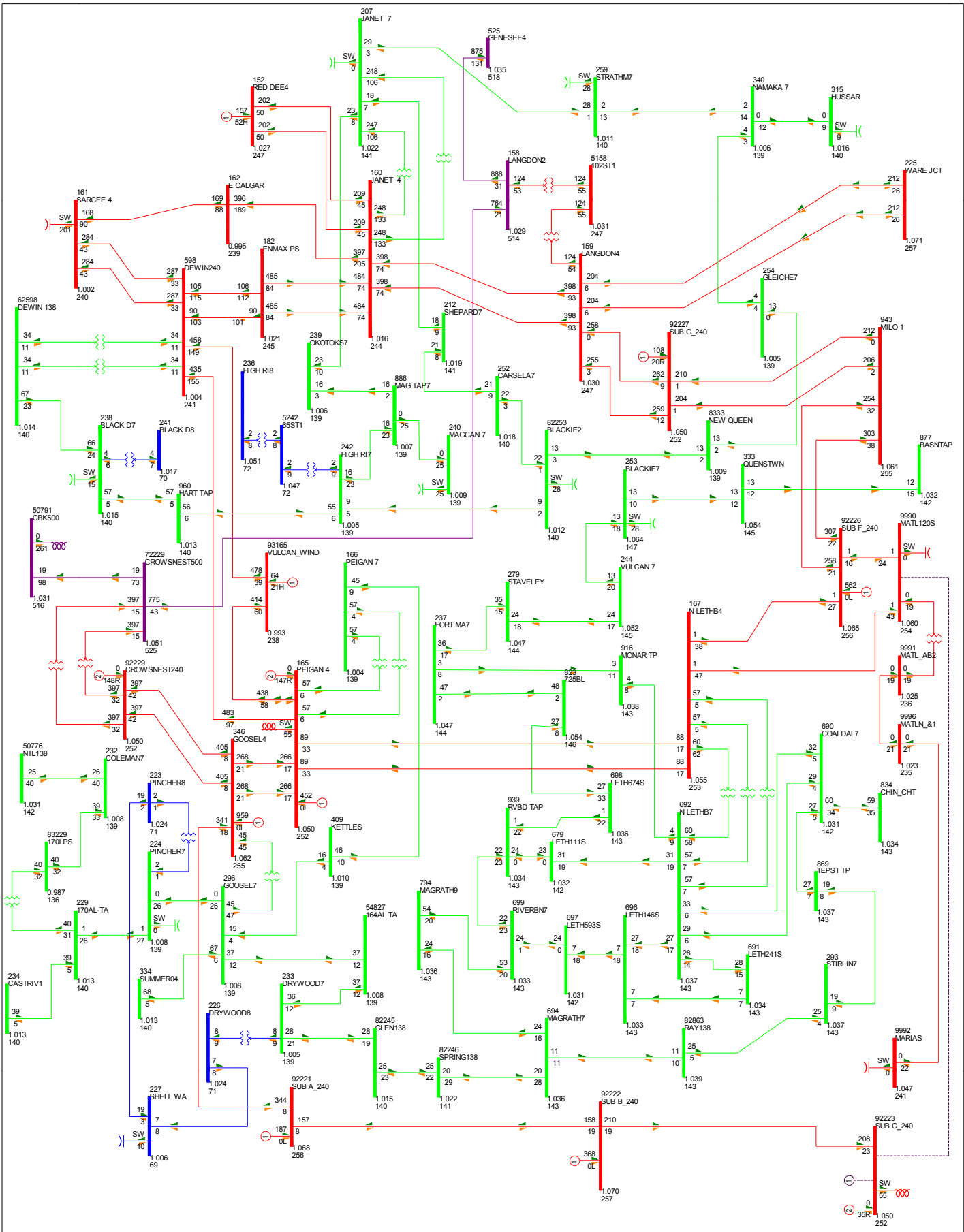


FIG 2017-1A-SP-W-14: SUB C TO MATL 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 8 MW

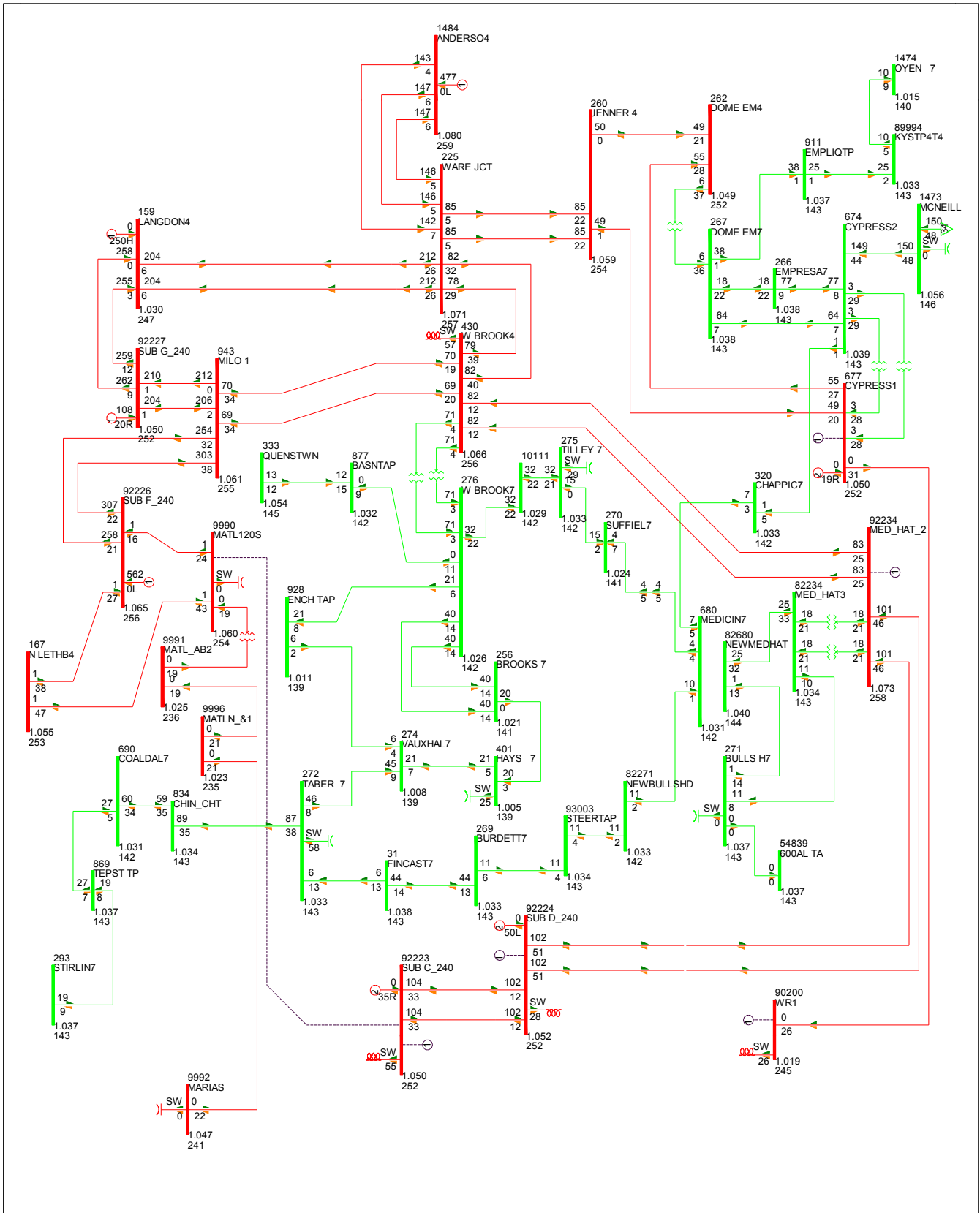


FIG 2017-1A-SP-W-15: SUB C TO MATL 240 KV
 WEST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 8 MW

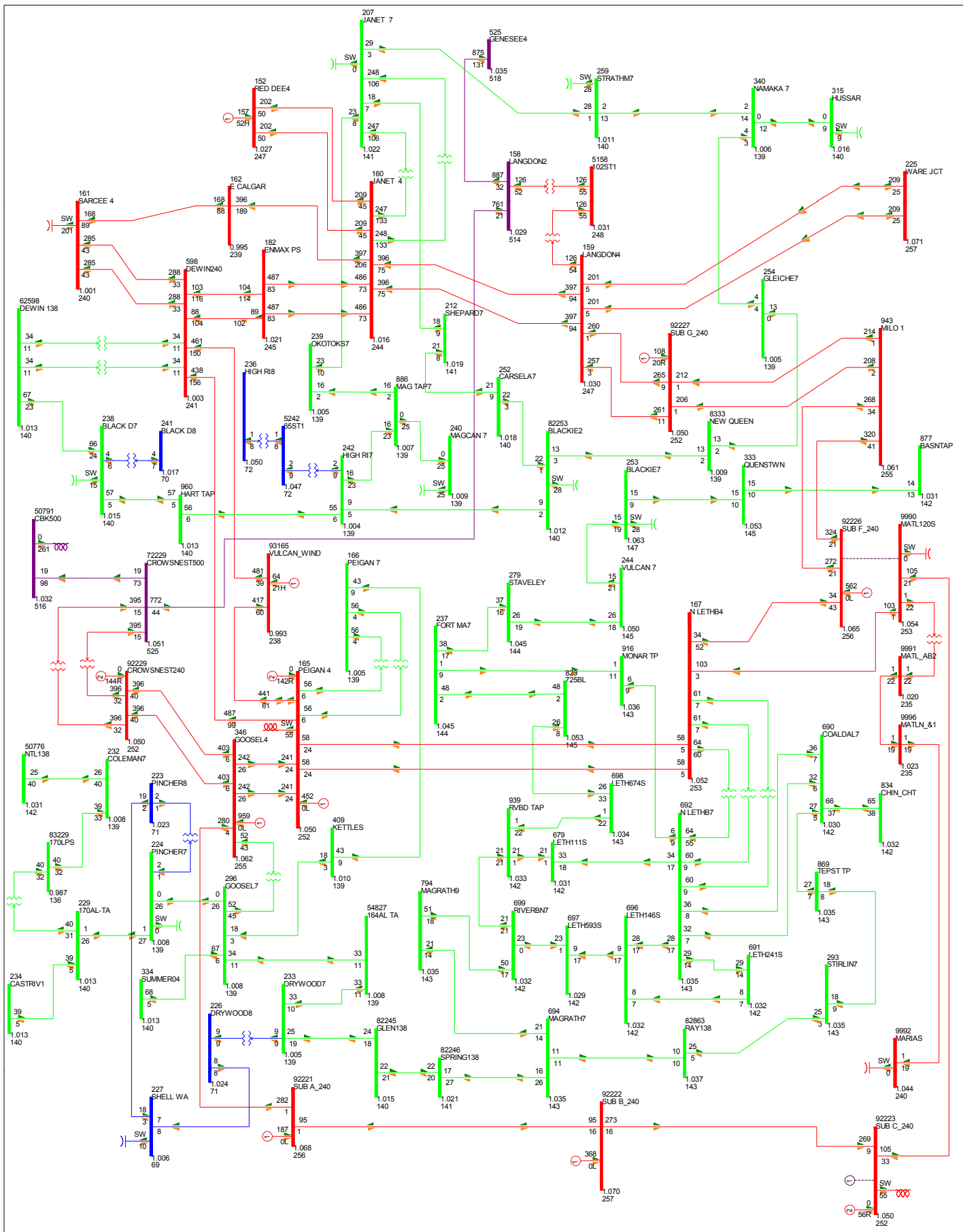


FIG 2017-1A-SP-W-16: SUB F TO MATL 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 8 MW

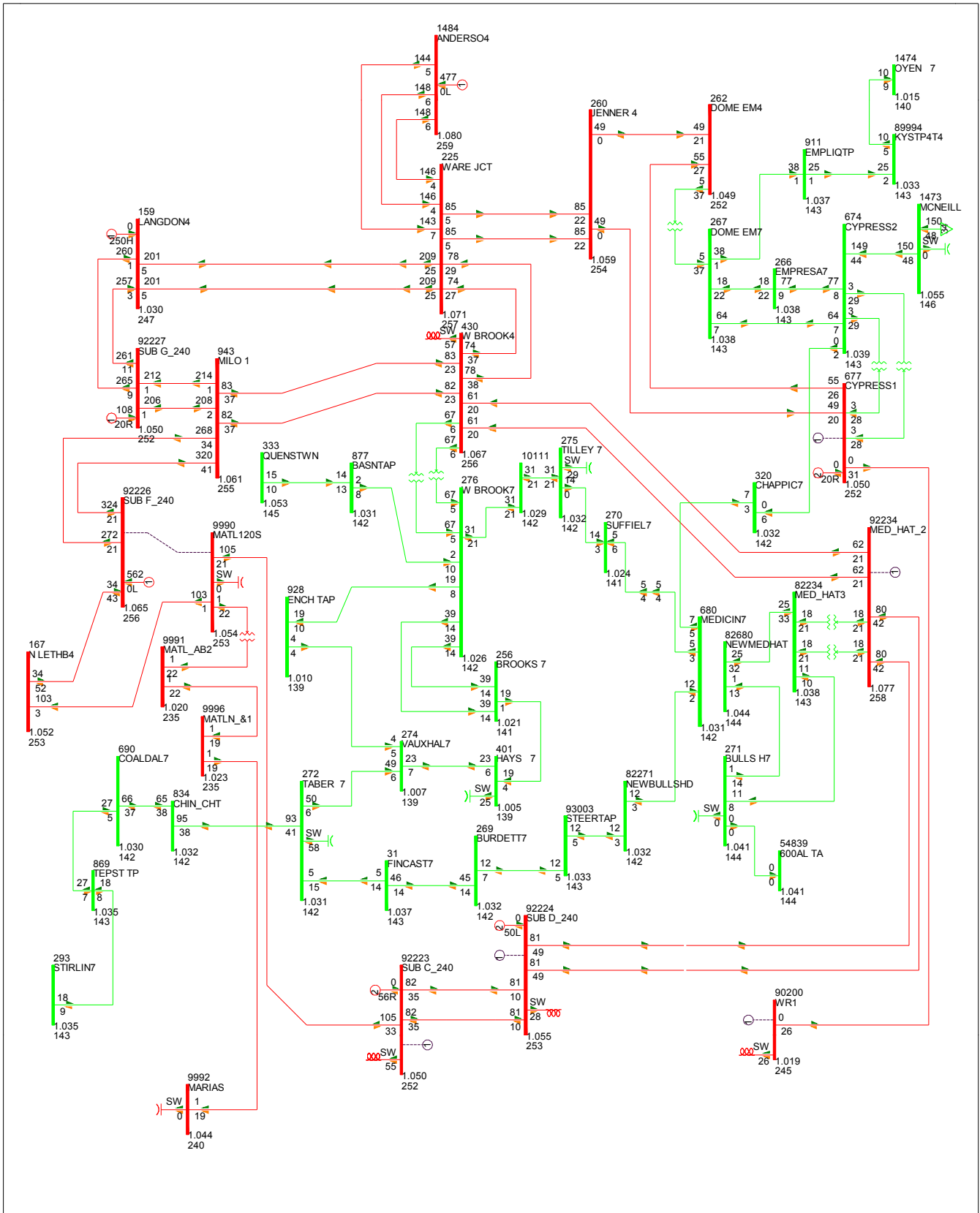


FIG 2017-1A-SP-W-17: SUB F TO MATL 240 KV
 WEST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 8 MW

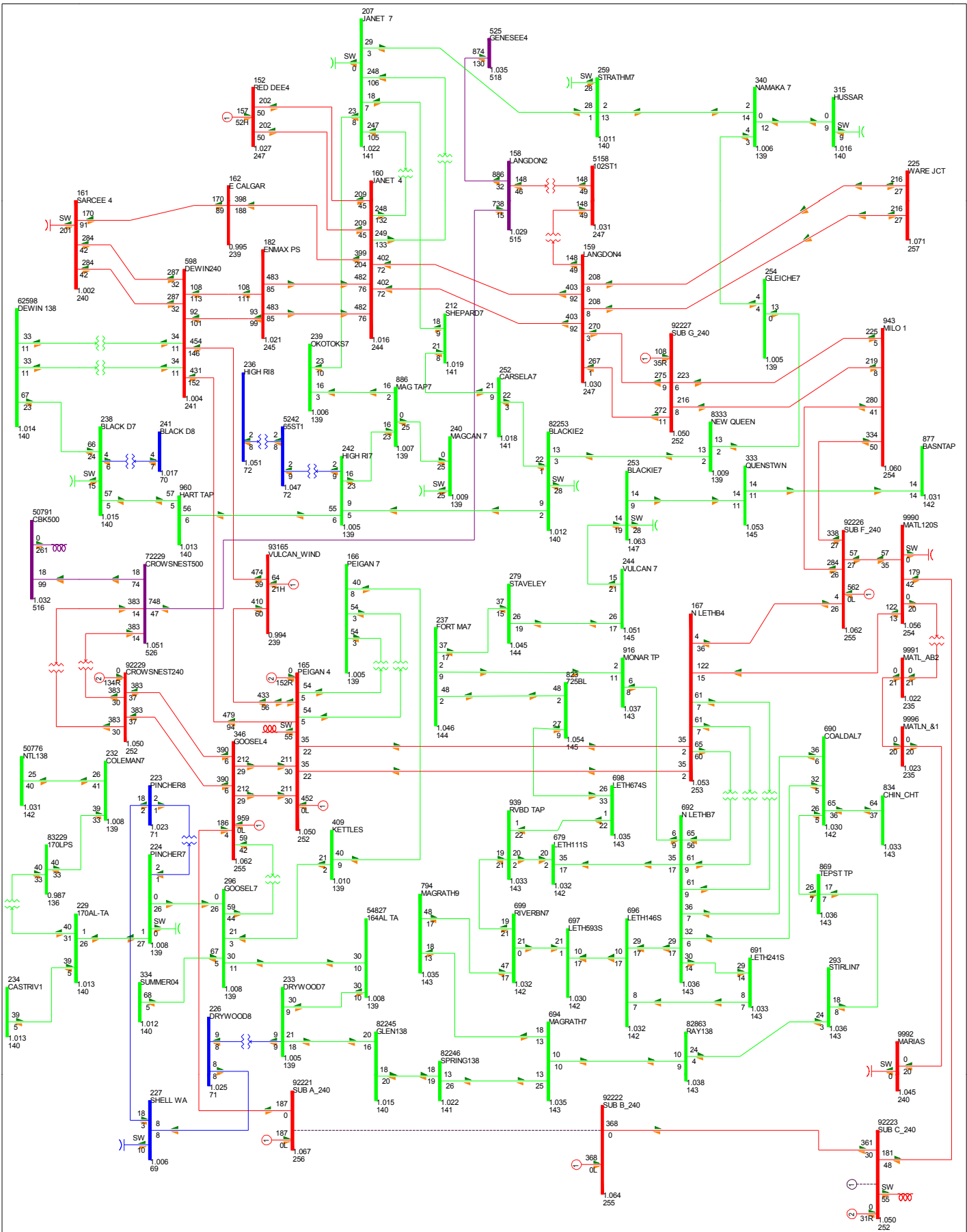


FIG 2017-1A-SP-W-18: SUB A TO SUB B 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 7 MW

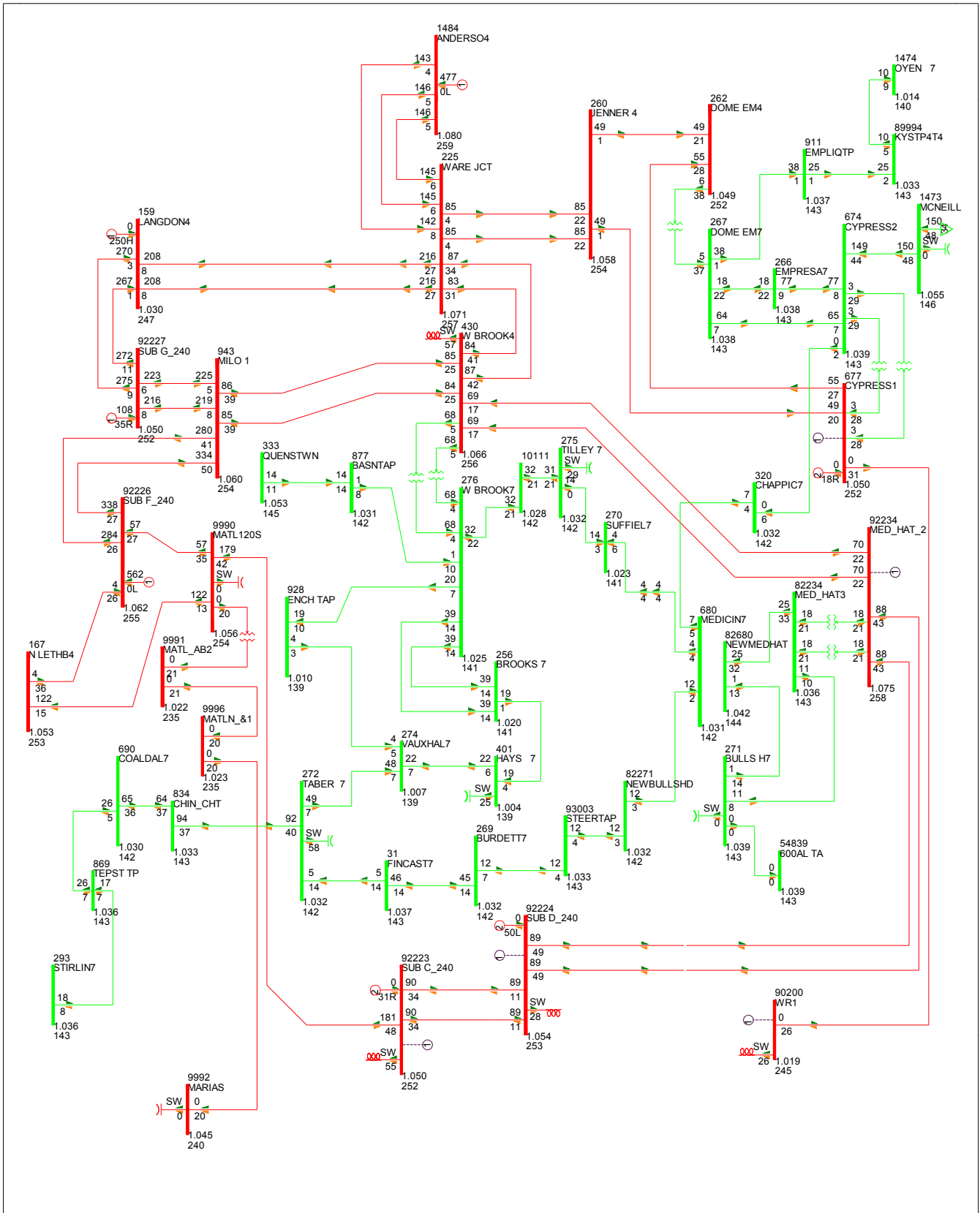


FIG 2017-1A-SW-P-19: SUB A TO SUB B 240 KV
 WEST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 7 MW

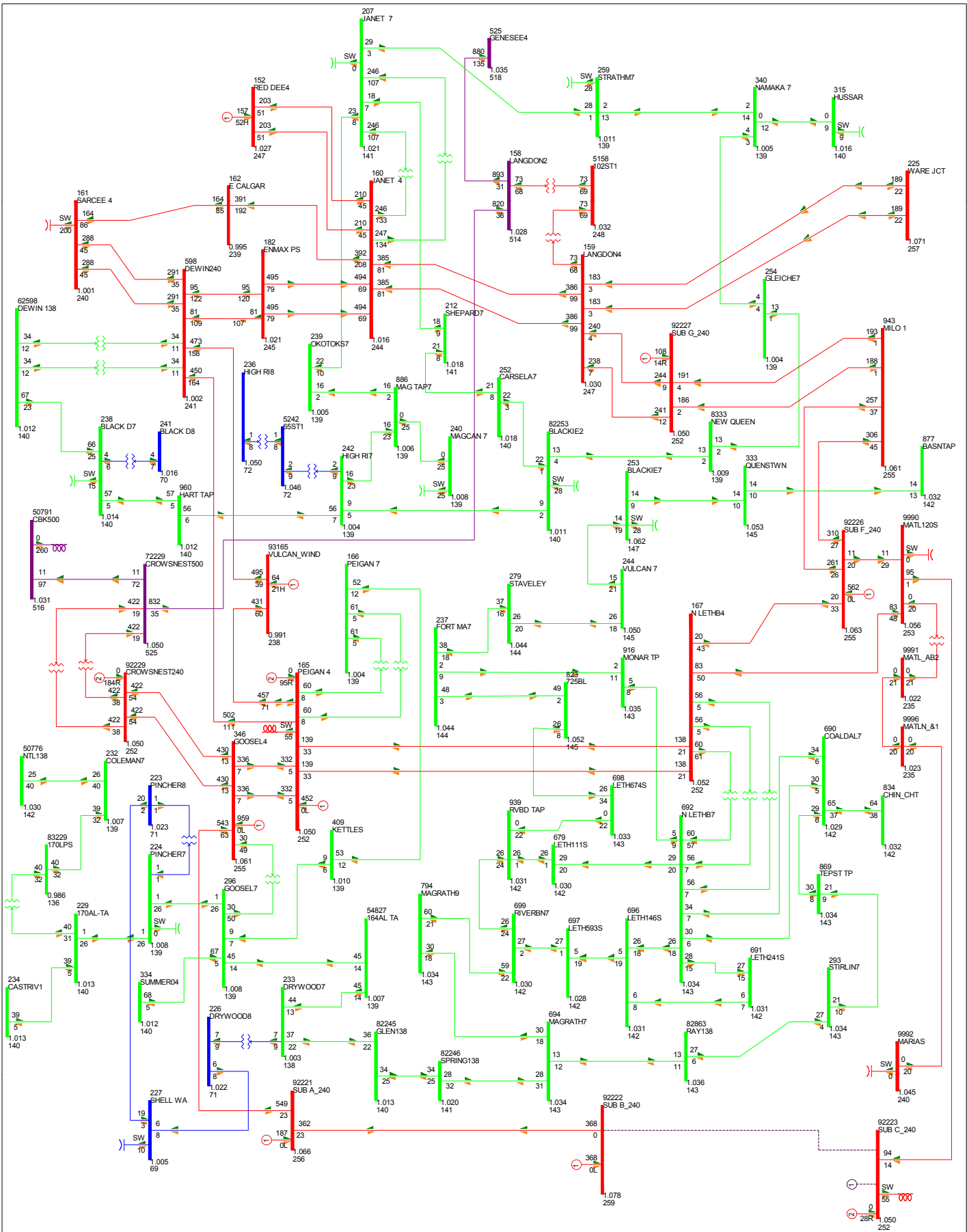


FIG 2017-1A-SP-W-20: SUB B TO SUB C 240 KV

WEST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -3 MW

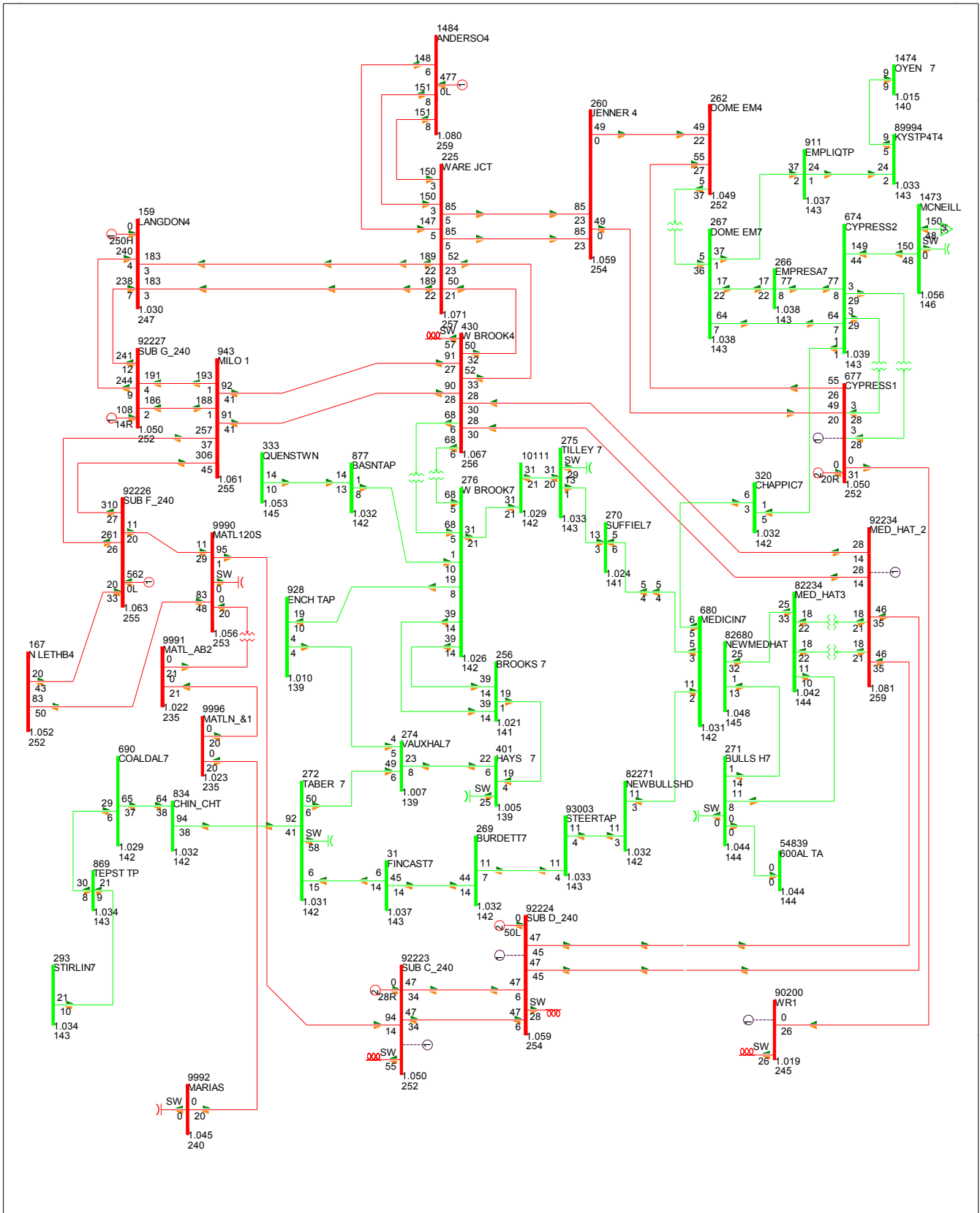


FIG 2017-1A-SP-W-21: SUB B TO SUB C 240 KV
 WEST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -3 MW

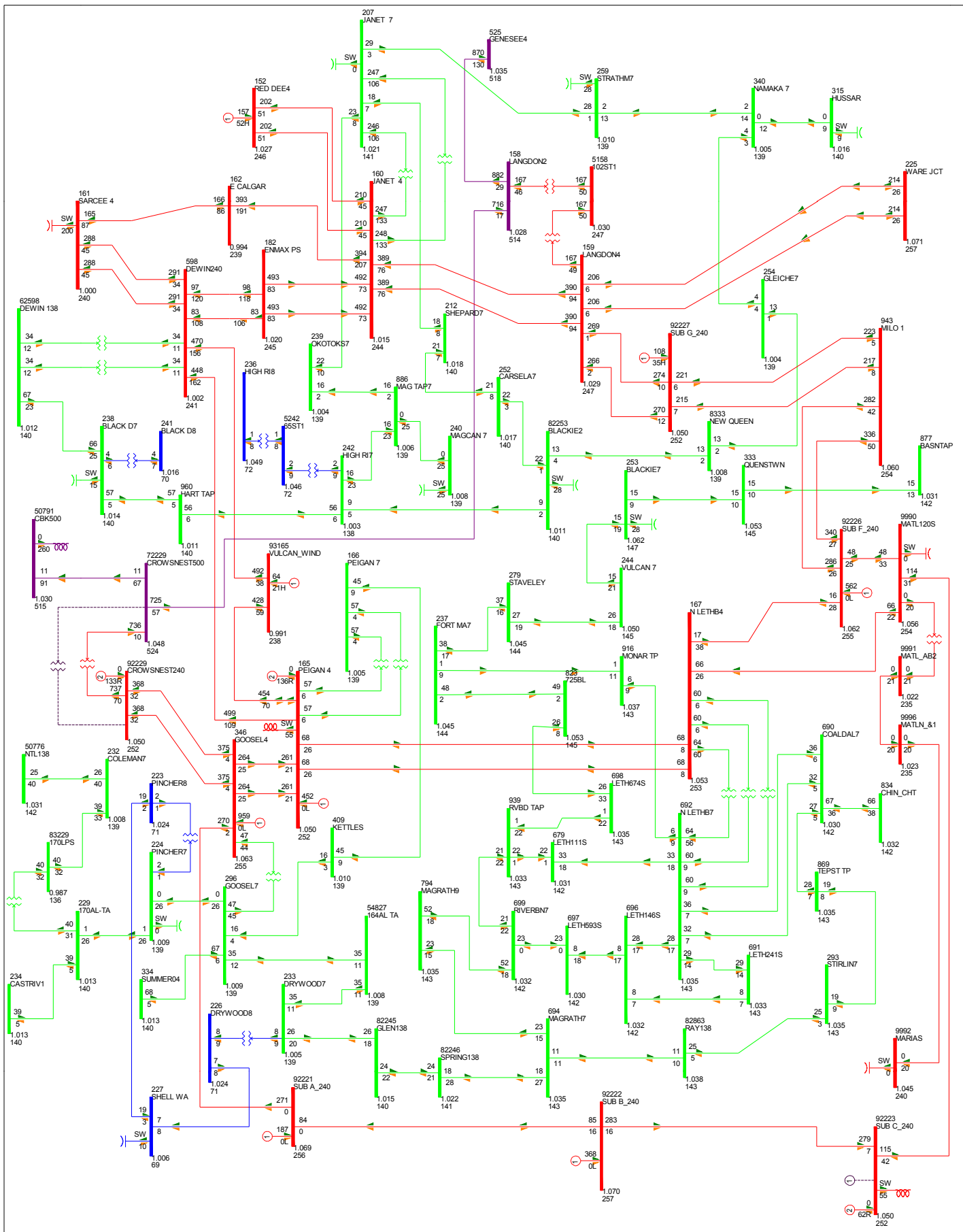


FIG 2017-1A-SP-W-22: CROWSNEST 500/240 KV XMR

WEST WIND SCENARIO

2017 South West System TUE, DEC 02 2008 19:21

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1 MW

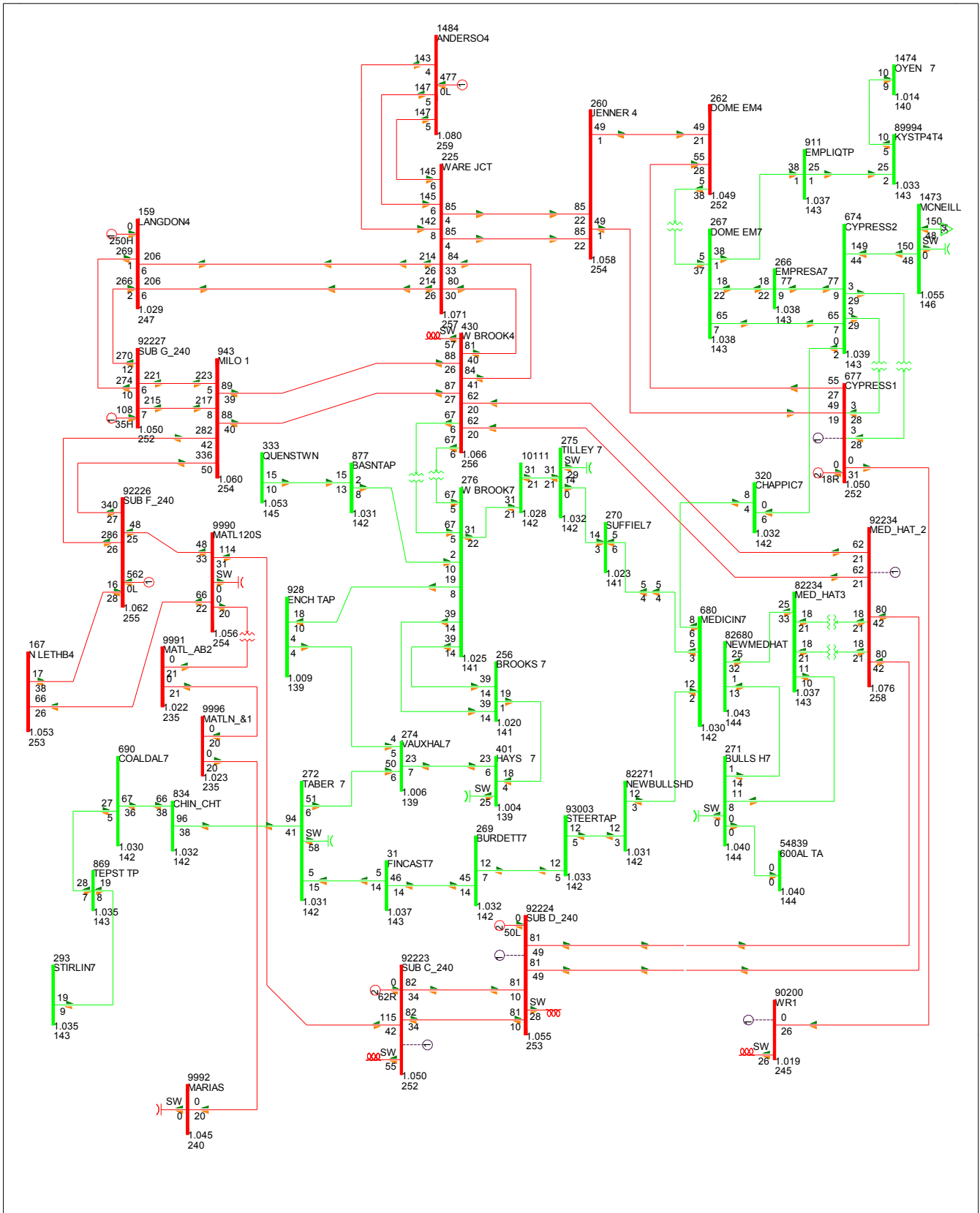


FIG 2017-1A-SP-W-23: CROWNEST 500/240 KV XMER
 WEST WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 19:21

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3783.9 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 477.6 MW

GROSS BOW HYDRO GEN. 153.7 MW

GROSS FUTURE WIND GEN. IN SOUTH 2699.0 MW

FORT MCMURRAY GEN.

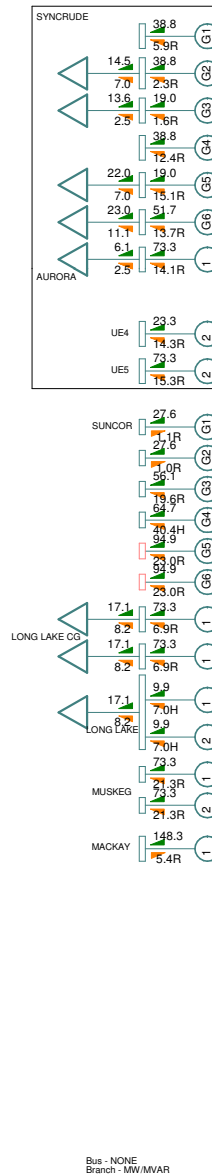
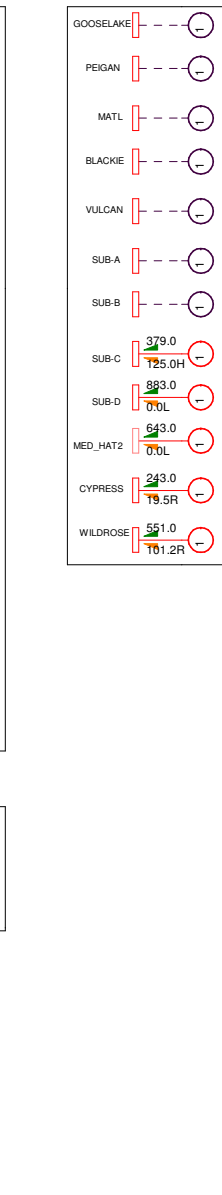
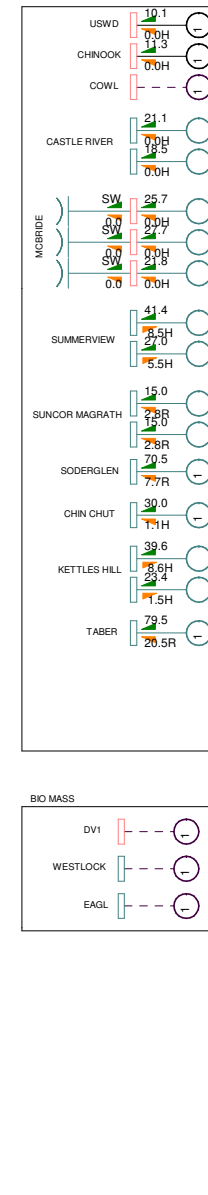
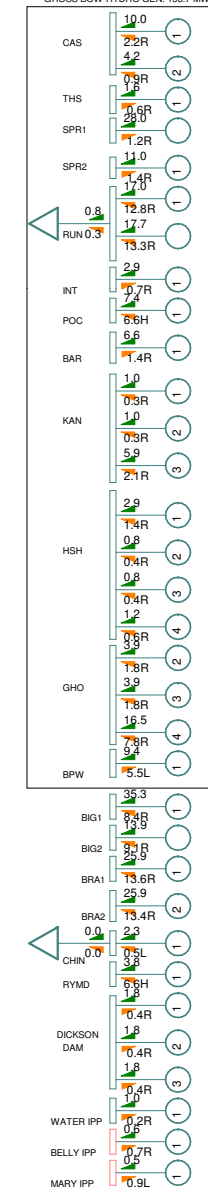
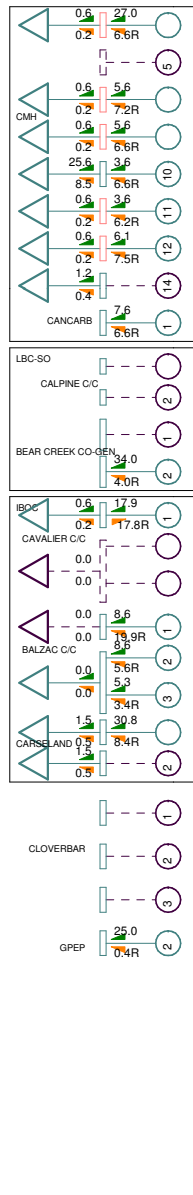
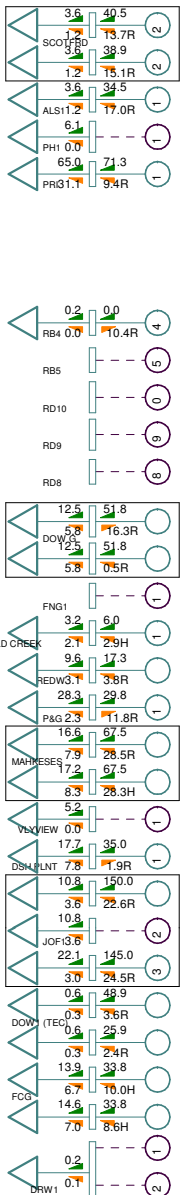
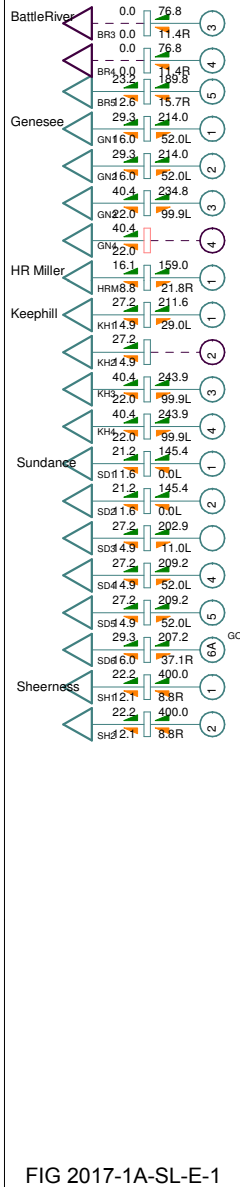


FIG 2017-1A-SL-E-1
GENERATION DISPATCH

2017 SUMMER LIGHT SCENARIO 5 SK IMPORT IN WCC
SUN, NOV 23 2008 11:26

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
KV: <-25,000 <-34,500 <-69,000 <-138,000 <-240,000 >240,000

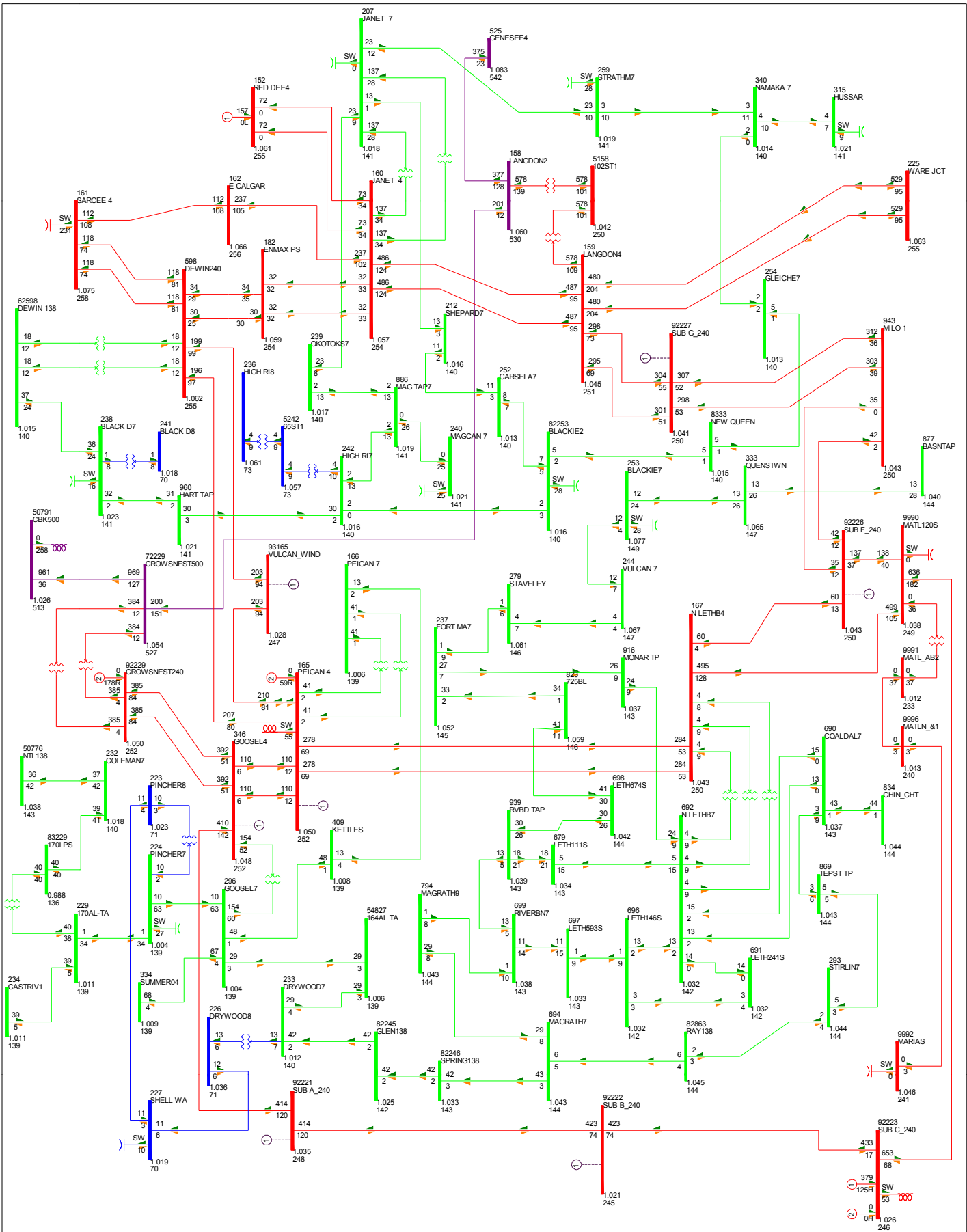


FIG 2017-1A-SL-E-2: N-0 CONDITION

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 ≤ 500.000 >500.000
 BC Export: 1038 MW

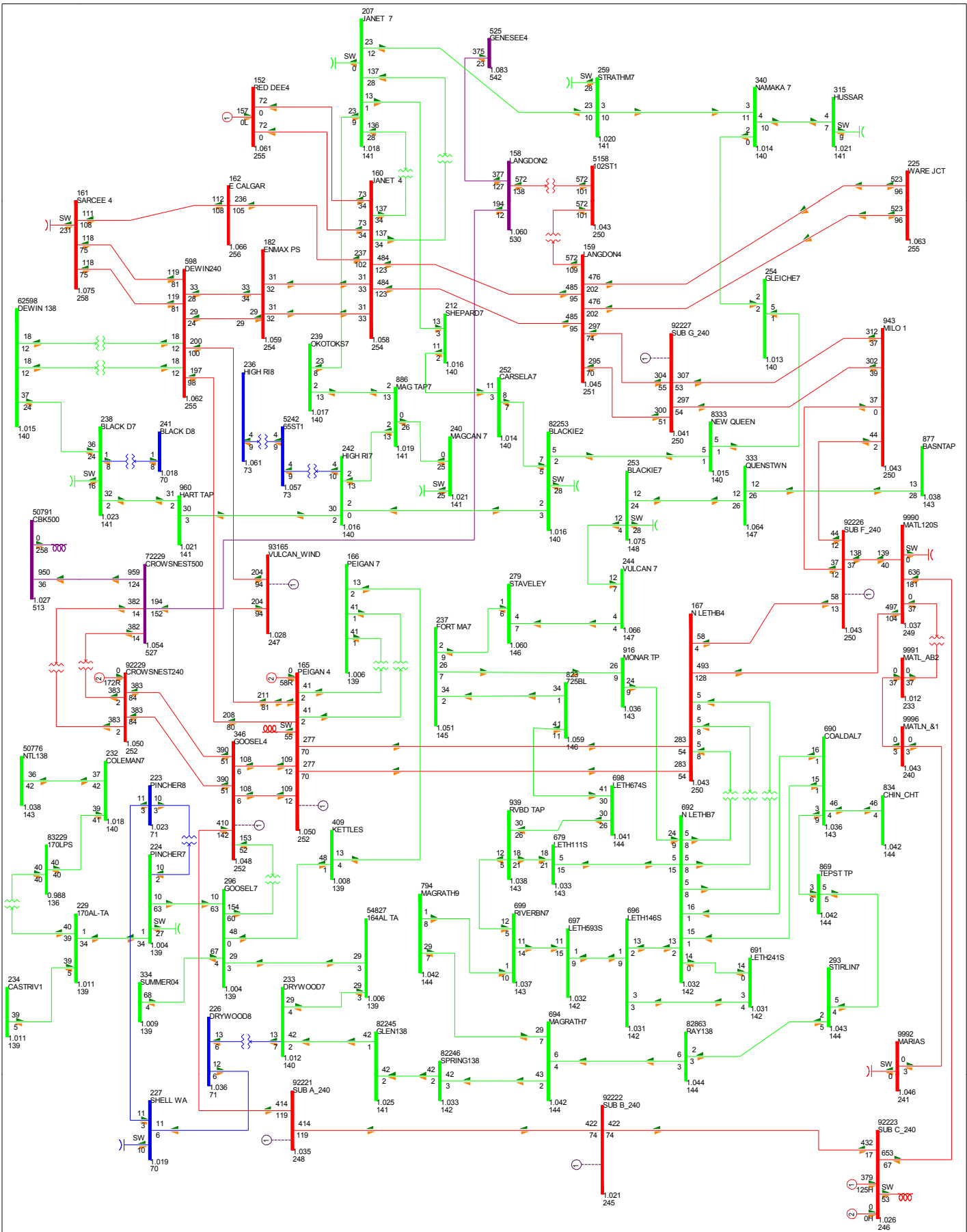


FIG 2017-1A-SL-E-4: JENNER TO CYPRESS 240 KV
 EAST WIND SCENARIO
 2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1026 MW

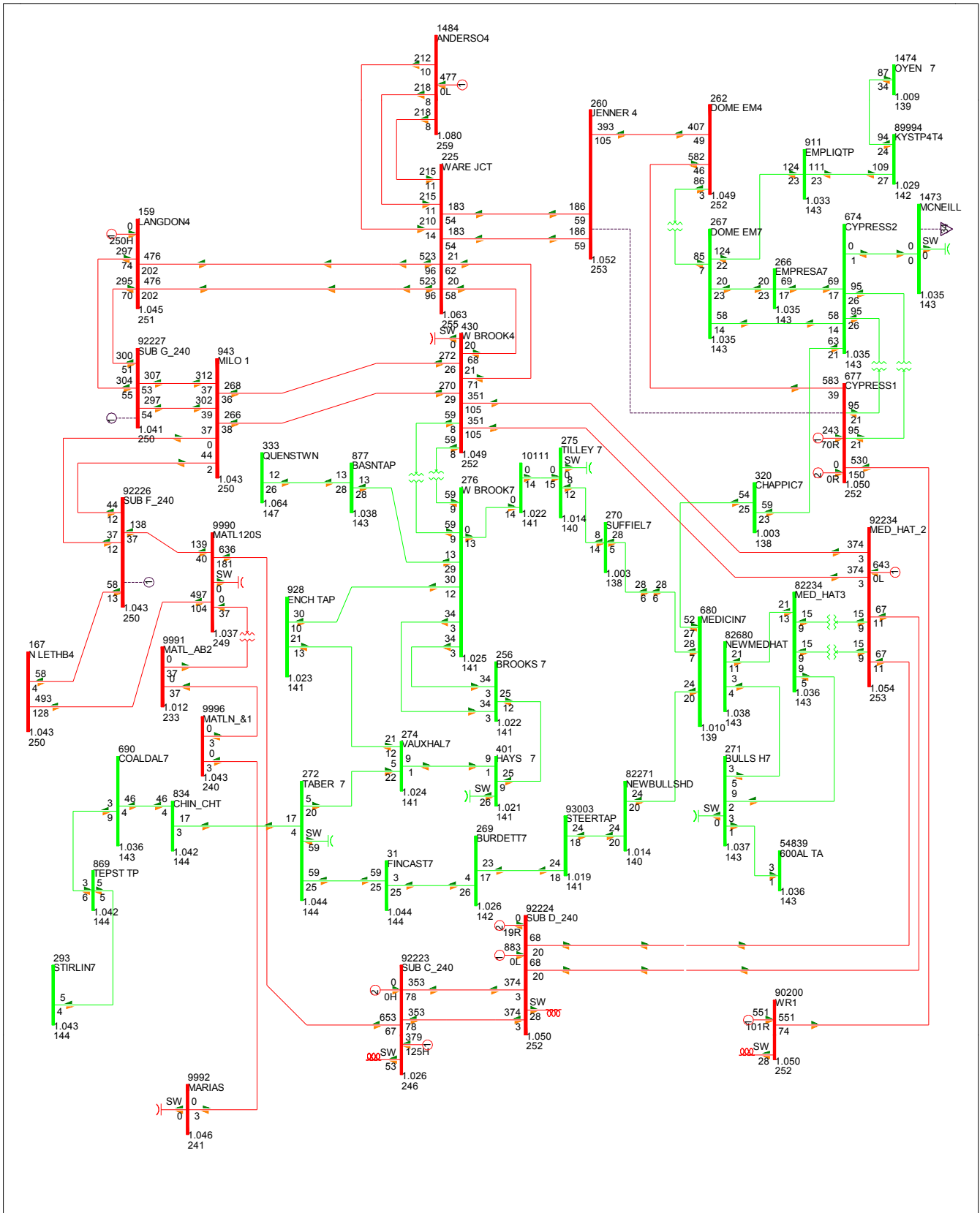


FIG 2017-1A-SL-E-5: JENNER TO CYPRESS 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1026 MW

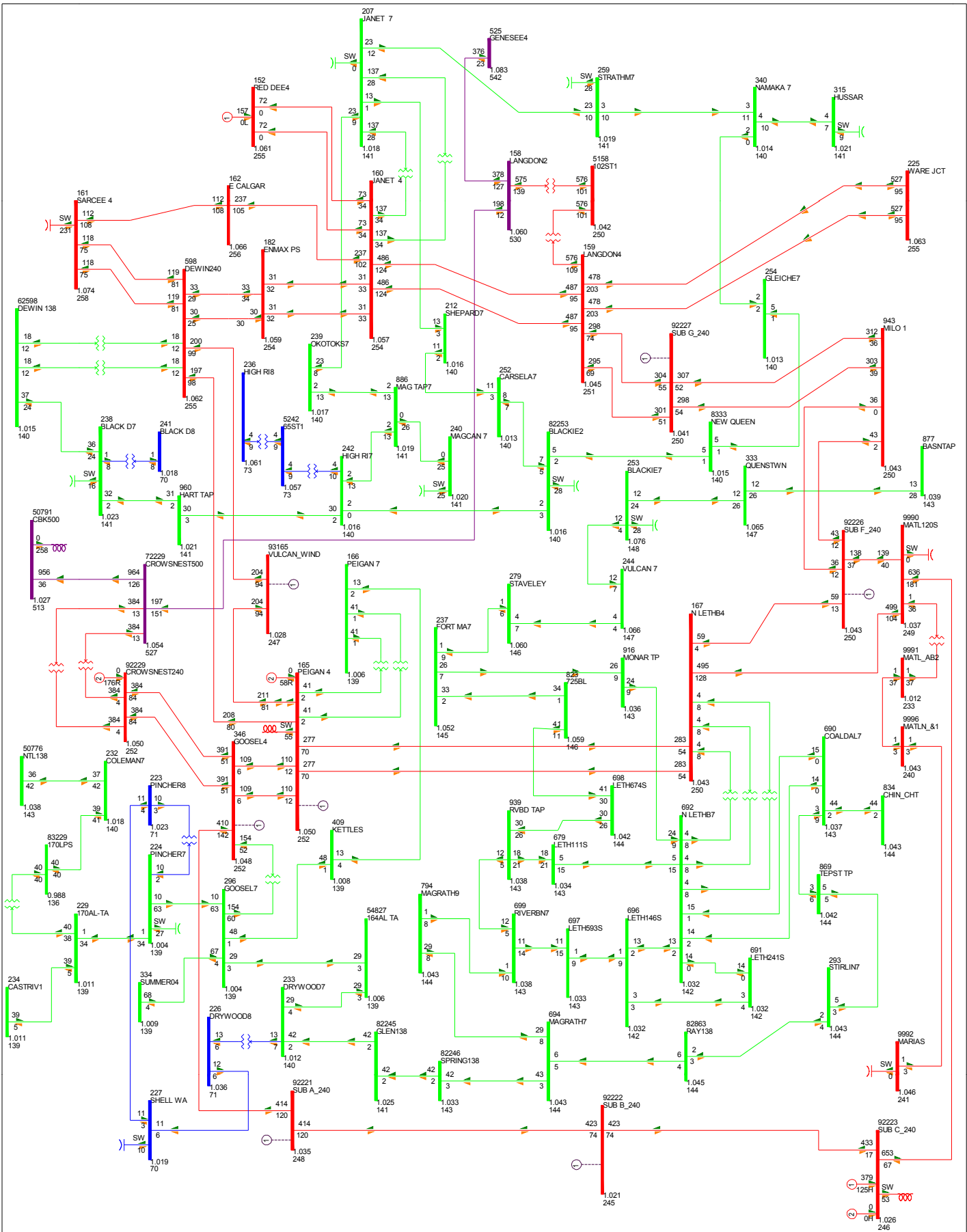


FIG 2017-1A-SL-E-6: DOME EMPRESS TO CYPRESS 240 KV
 EAST WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 19:26

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1032 MW

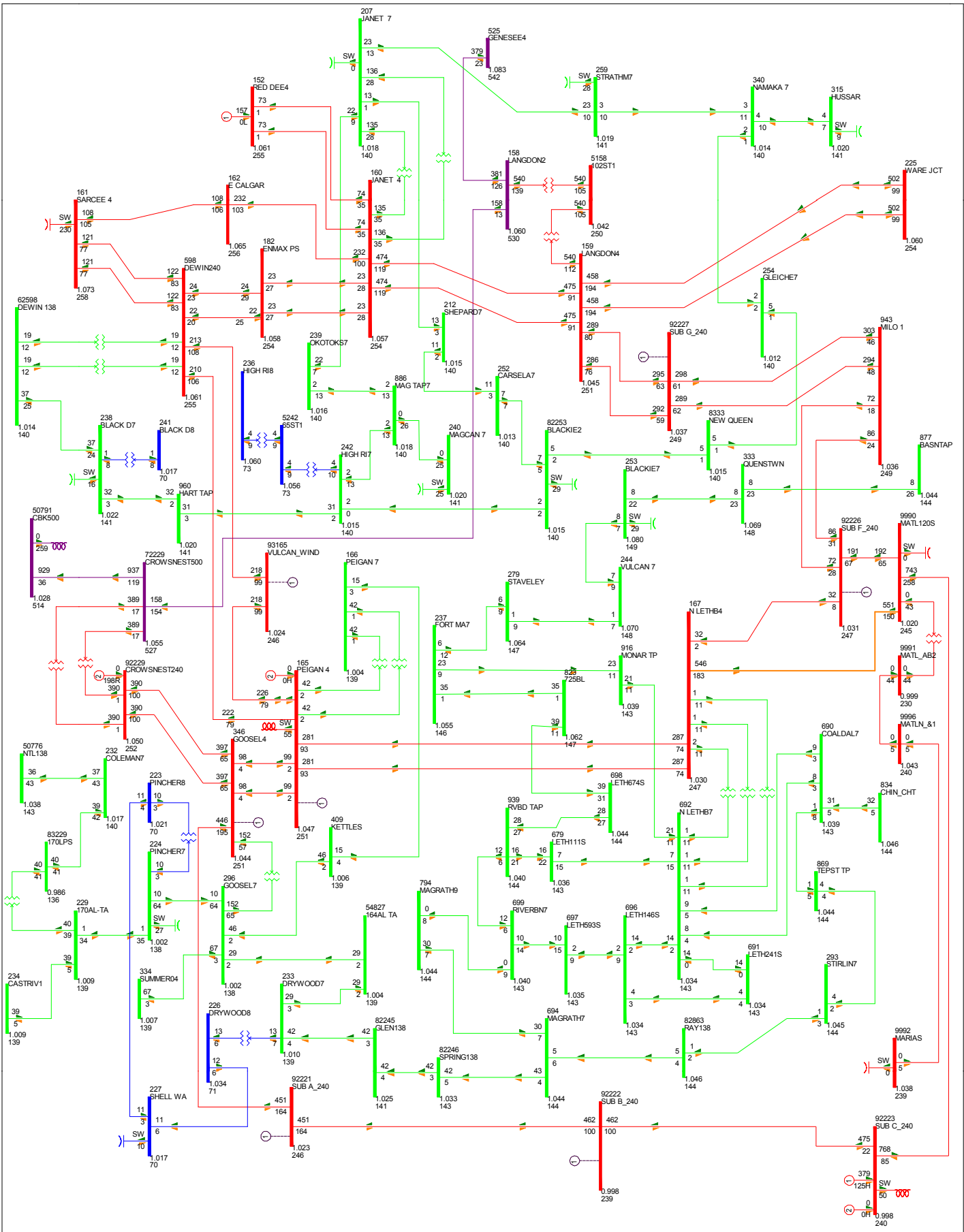


FIG 2017-1A-SL-E-10: WESTBROOKS TO MEDHAT2 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1002 MW

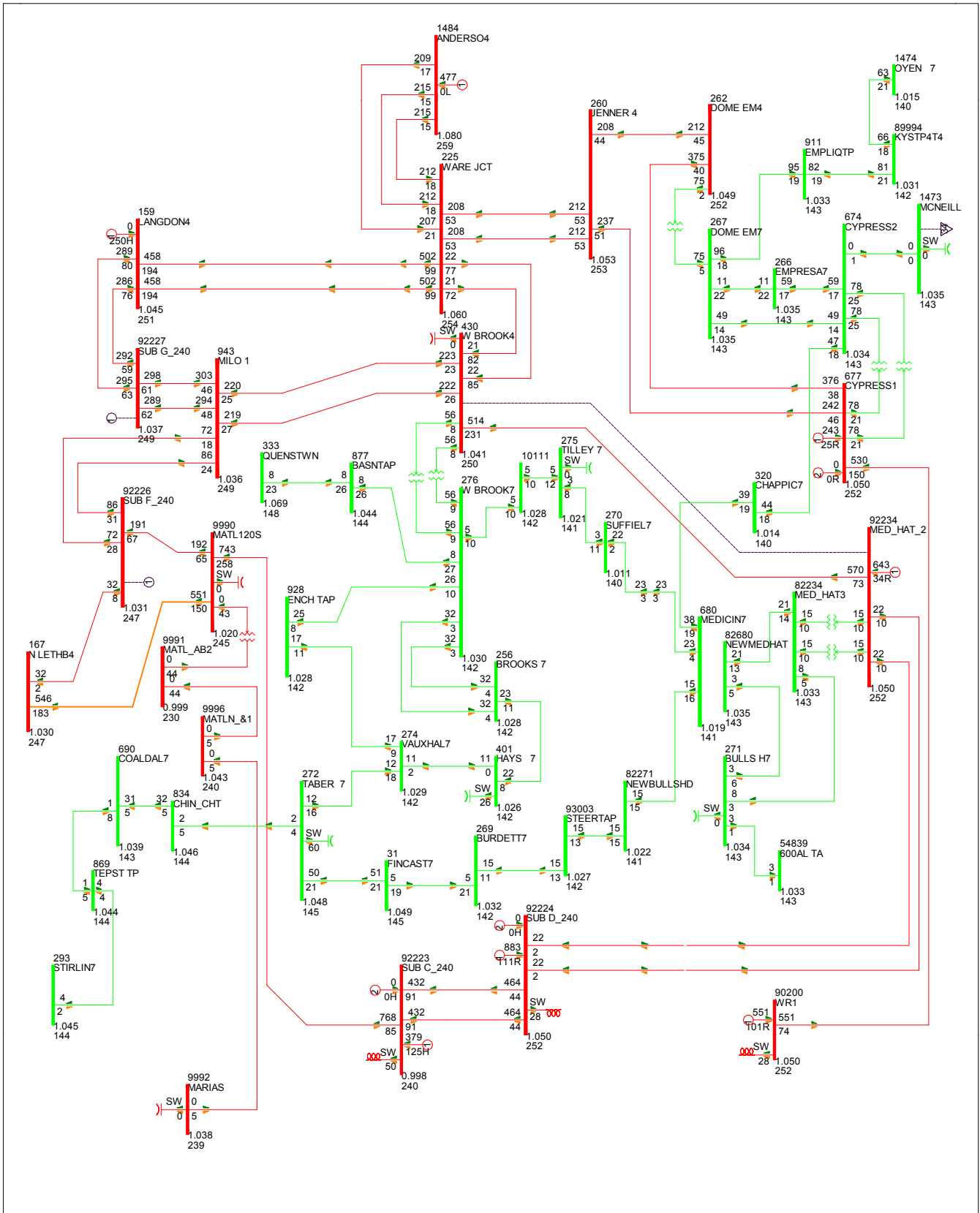


FIG 2017-1A-SL-E-11: WESTBROOKS TO MEDHAT2 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1002 MW

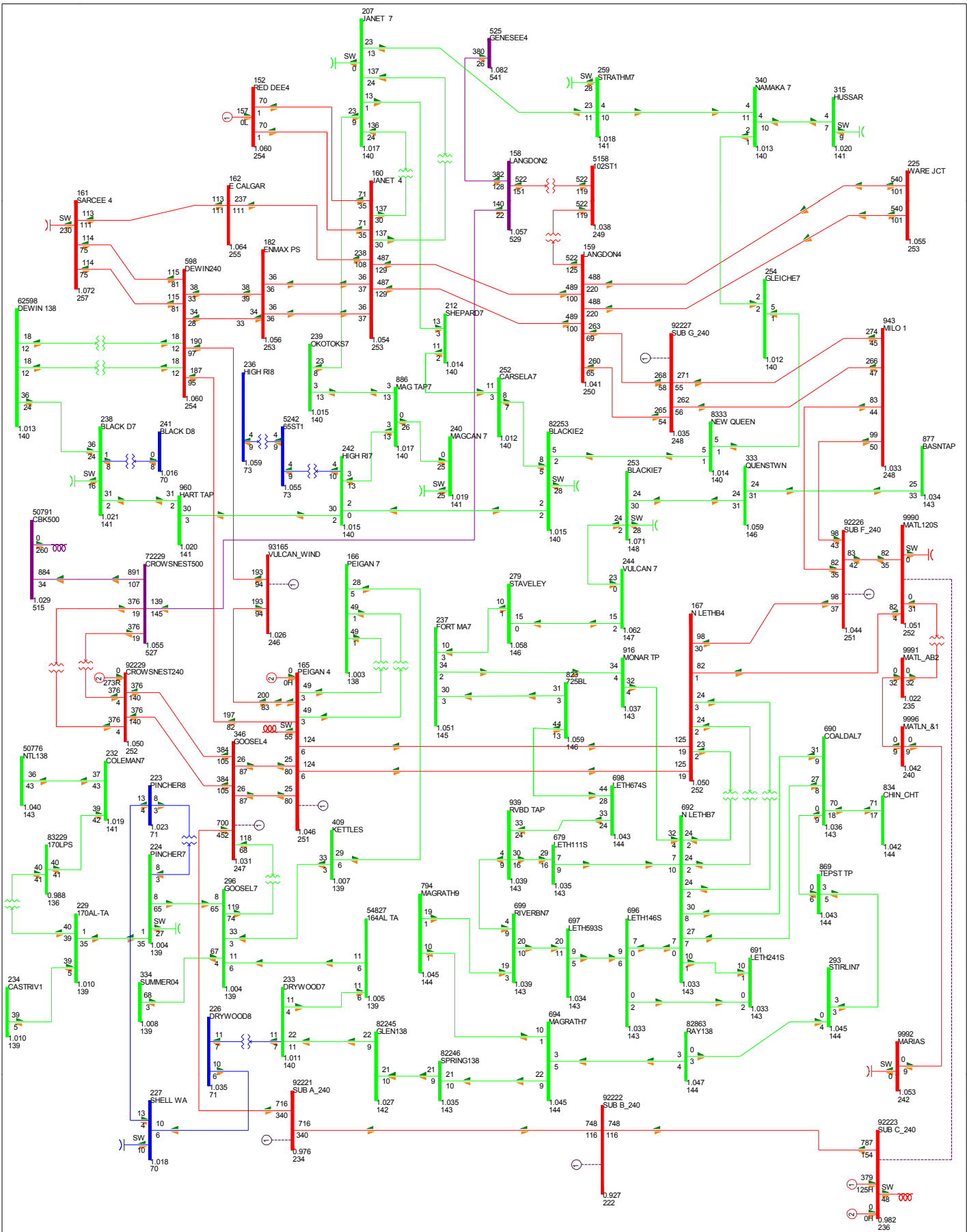


FIG 2017-1A-SL-E-12: SUB C TO MATL 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 ≤ 500.000 >500.000
 BC Export: 955 MW

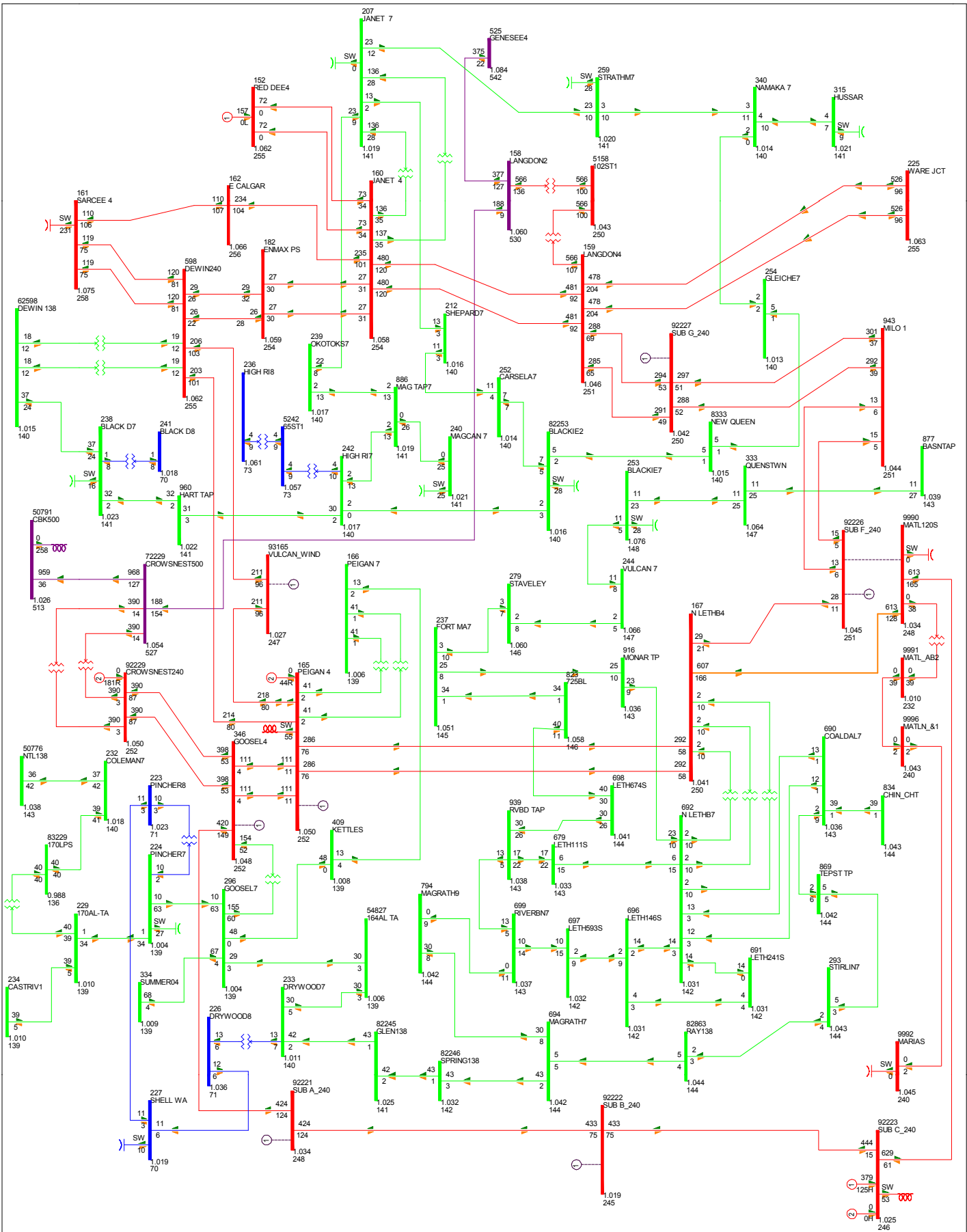


FIG 2017-1A-SL-E-14: SUB F TO MATL 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: ≤ 34.500 ≤ 69.000 ≤ 138.000 ≤ 240.000 > 500.000

BC Export: 1036 MW

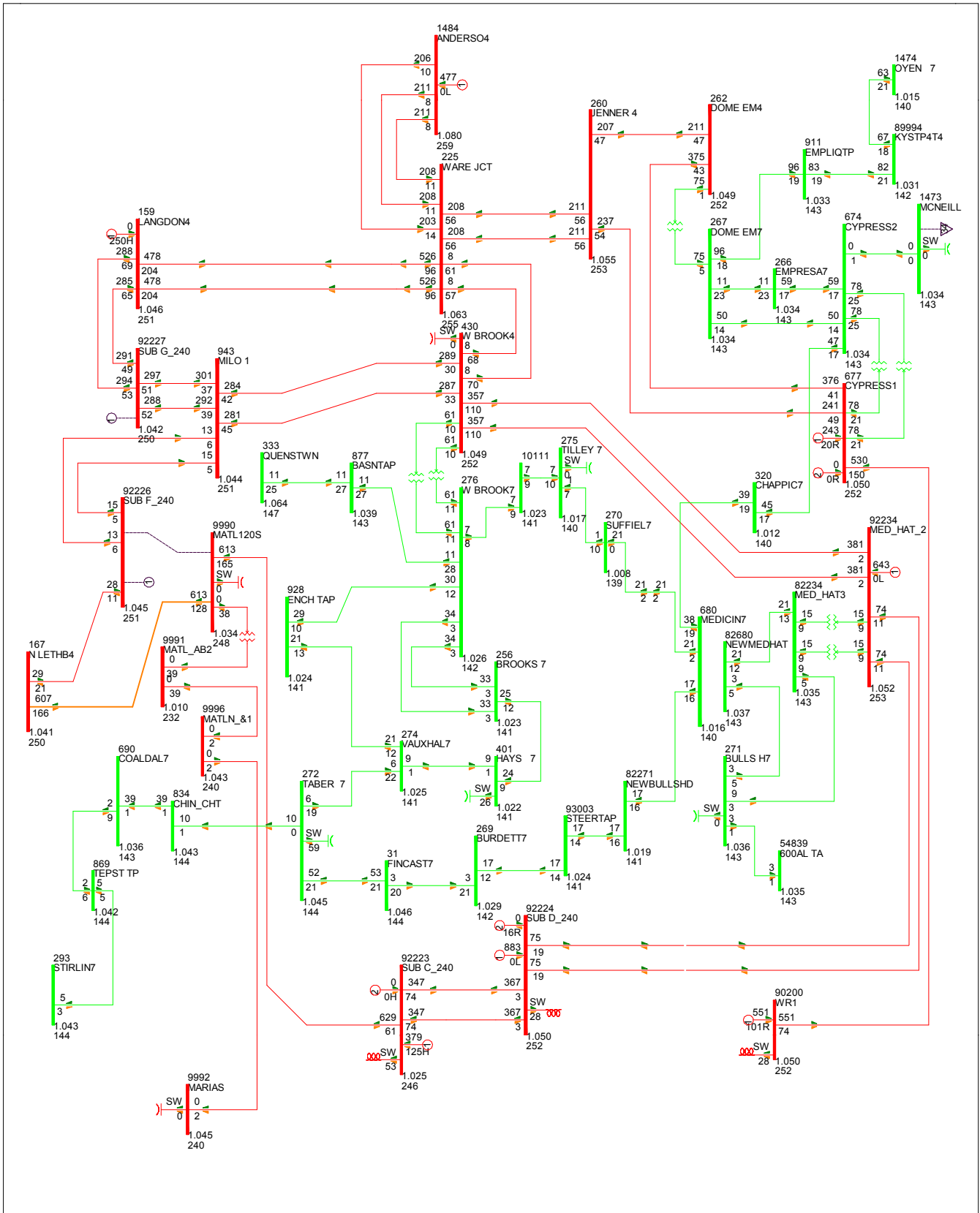


FIG 2017-1A-SL-E-15: SUB F TO MATL 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1036 MW

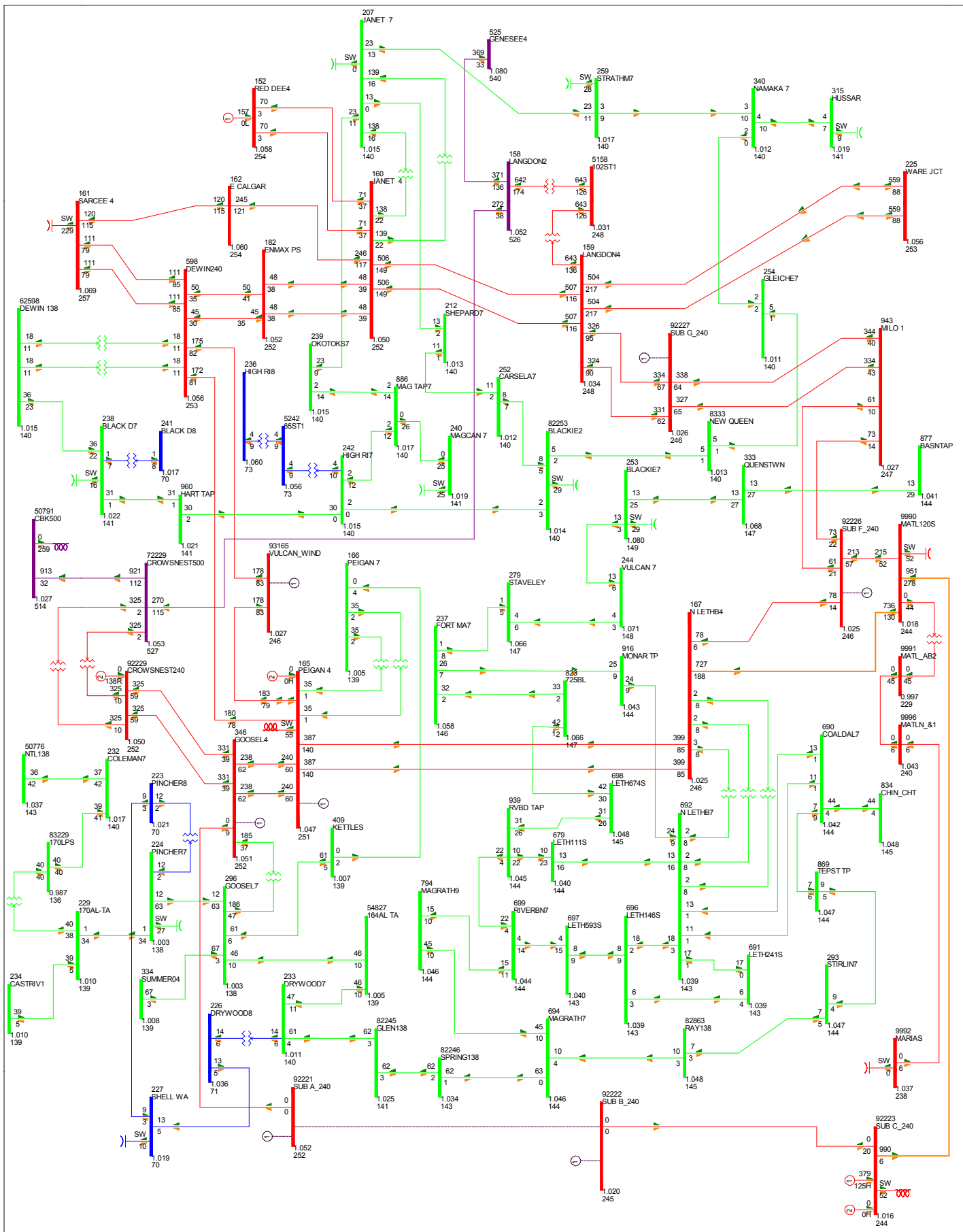


FIG 2017-1A-SL-E-16: SUB A TO SUB B 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 991 MW

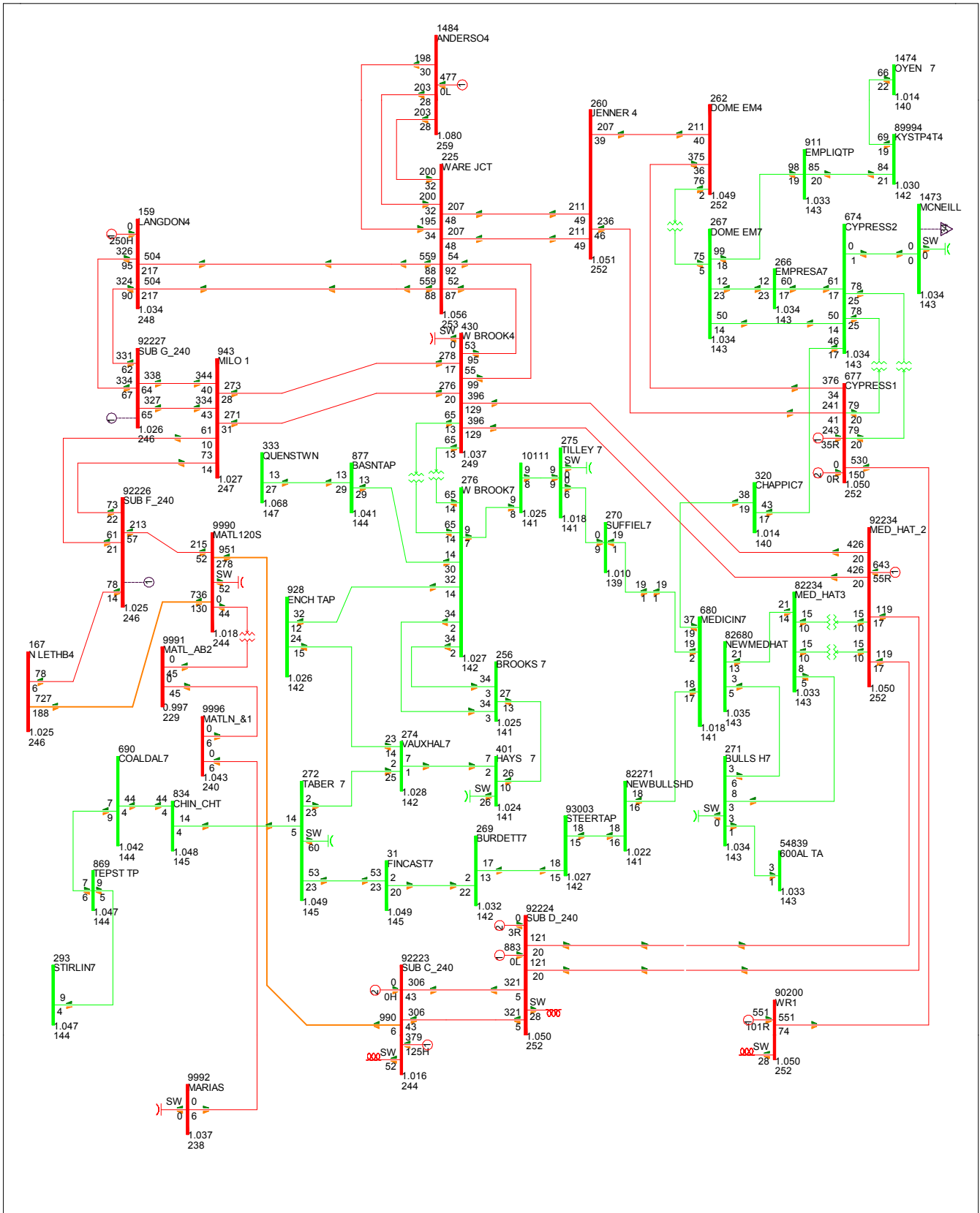


FIG 2017-1A-SL-E-17: SUB A TO SUB B 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 991 MW

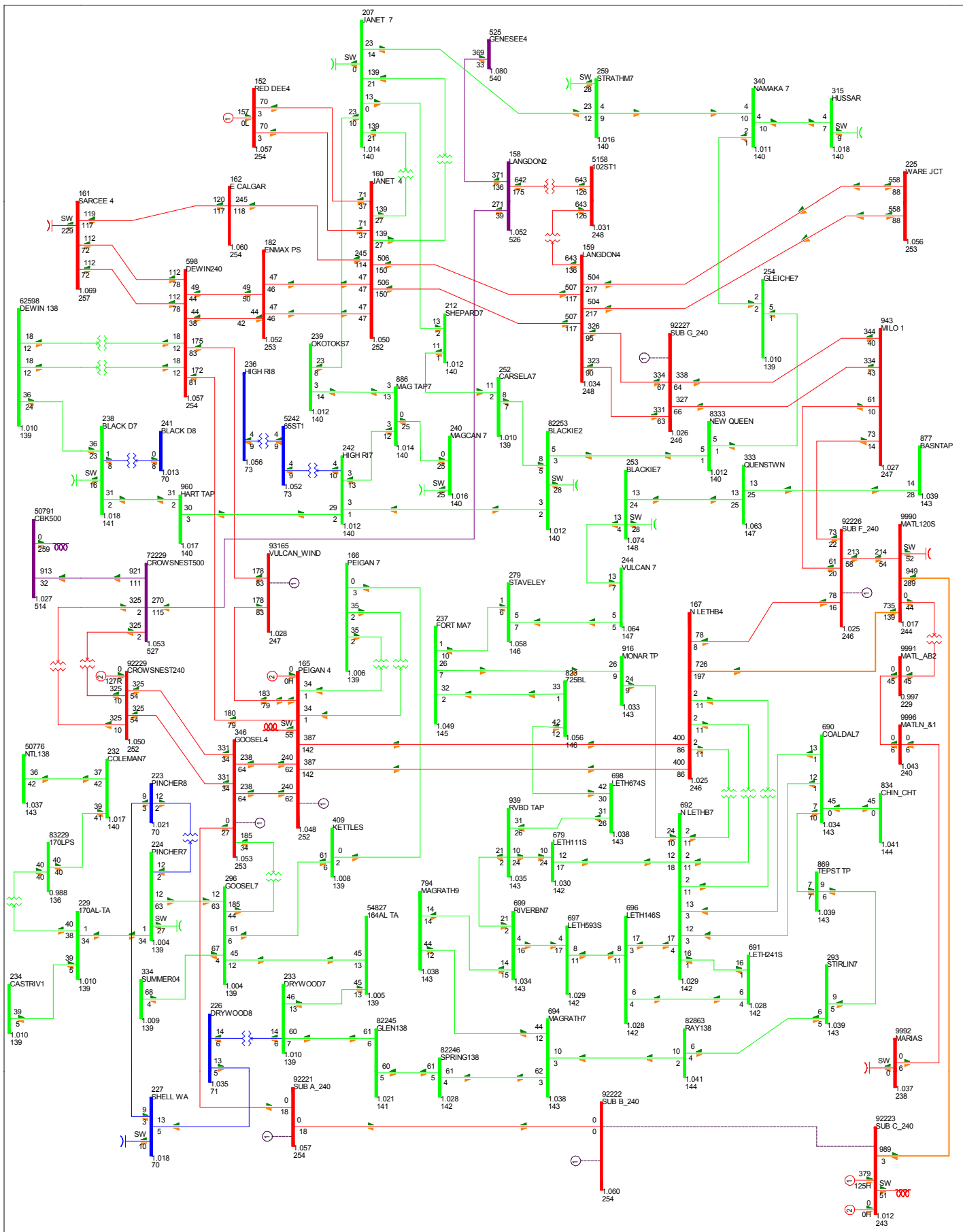


FIG 2017-1A-SL-E-18: SUB B TO SUB C 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 990 MW

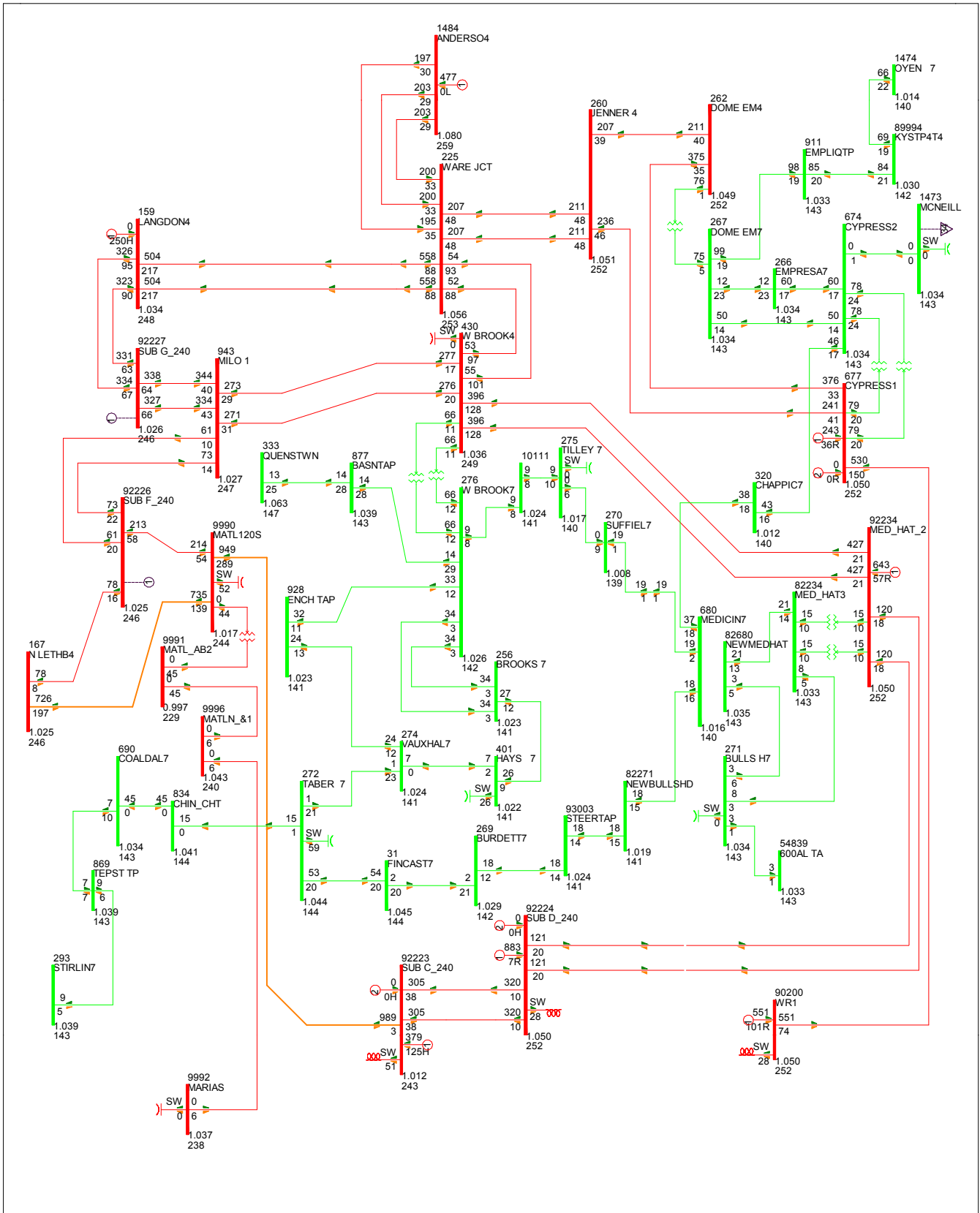


FIG 2017-1A-SL-E-19: SUB B TO SUB C 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 990 MW

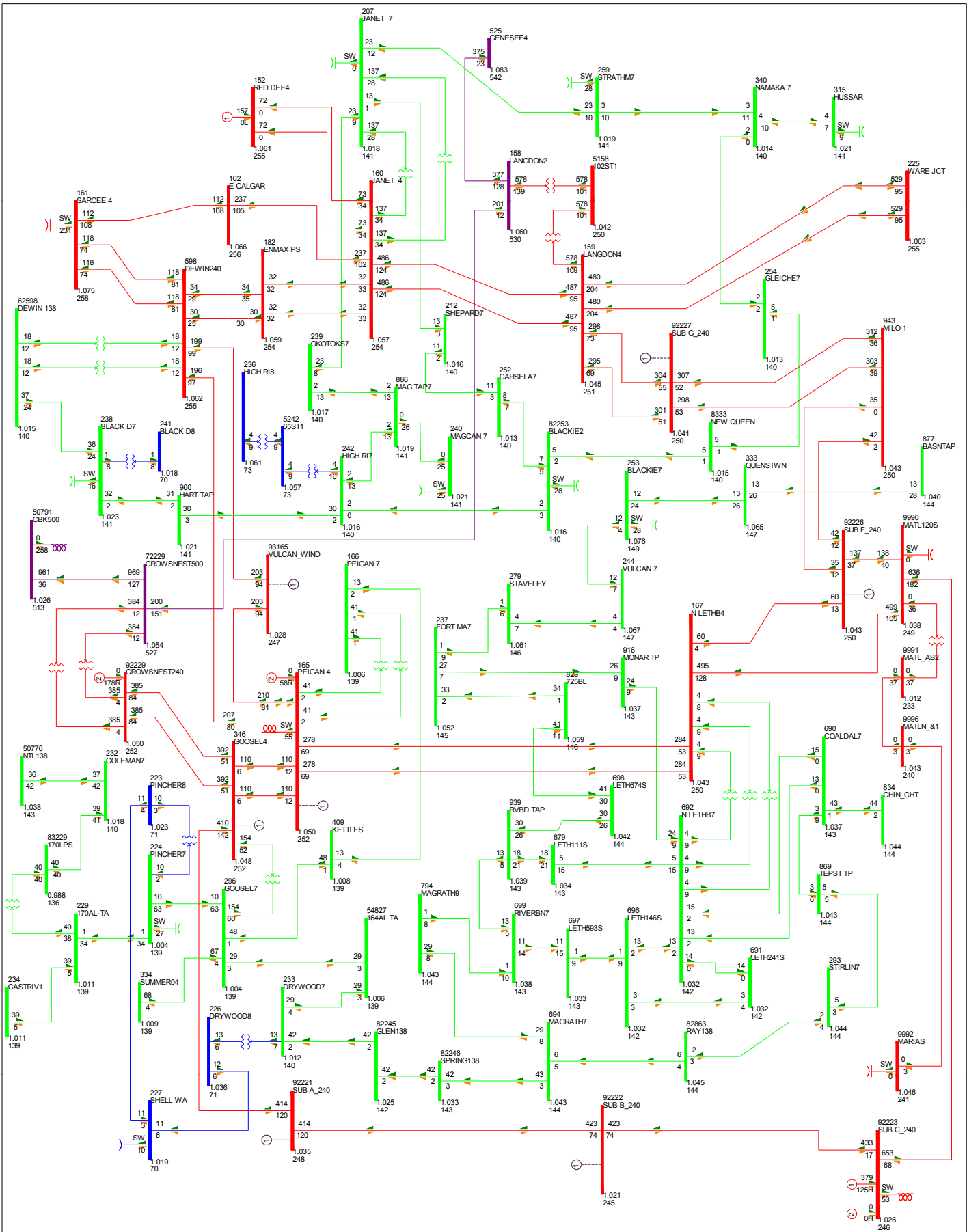


FIG 2017-1A-SL-E-20: DOME EMPRESS TO CYPRESS 138 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1038 MW

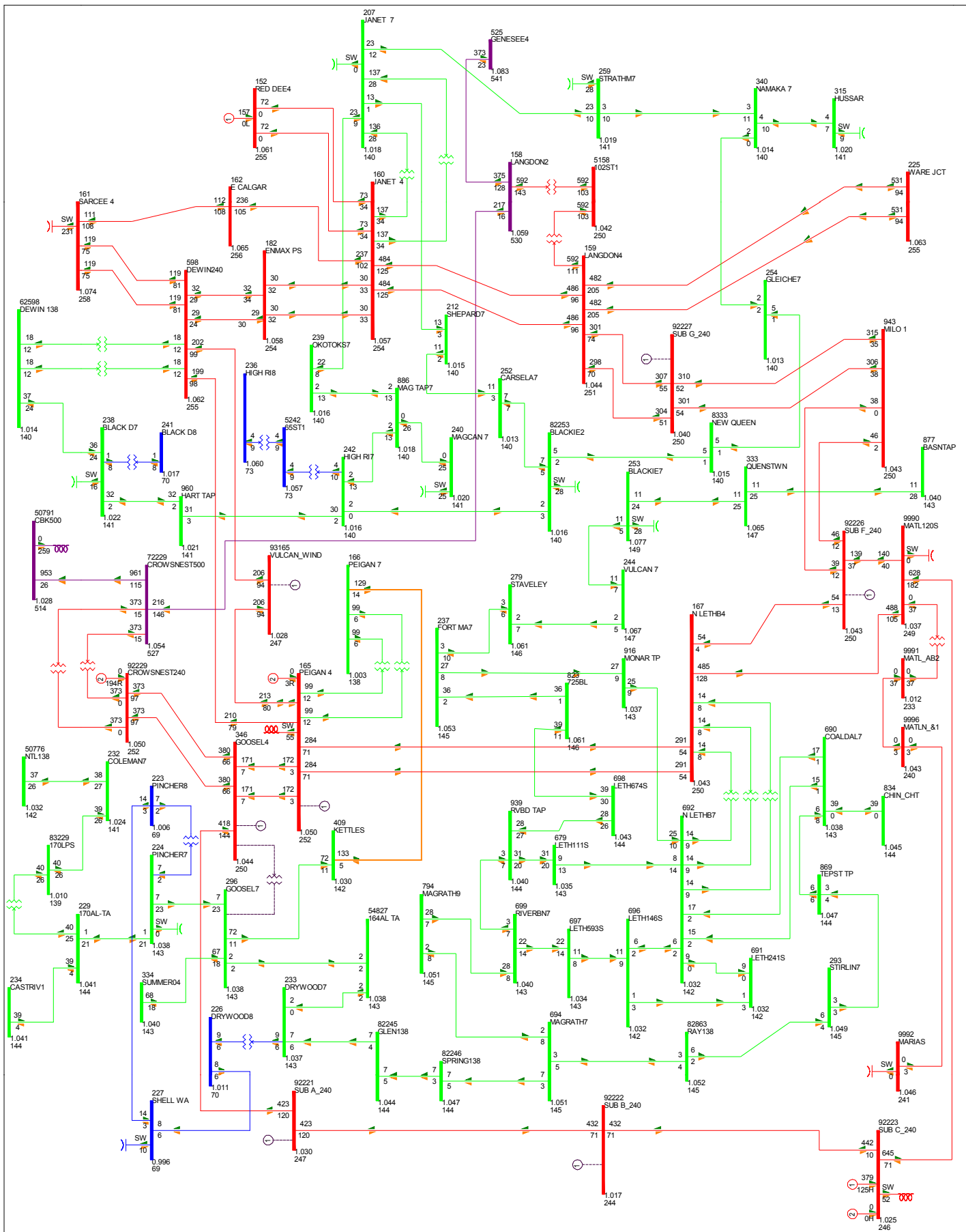


FIG 2017-1A-SL-E-22: GOOSELAKE 240/138 KV XMER
 EAST WIND SCENARIO
 2017 South West System TUE, DEC 02 2008 19:27

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1031 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3810.0 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 477.6 MW

GROSS FUTURE WIND GEN. IN SOUTH 2699.0 MW

FORT MCMURRAY GEN.

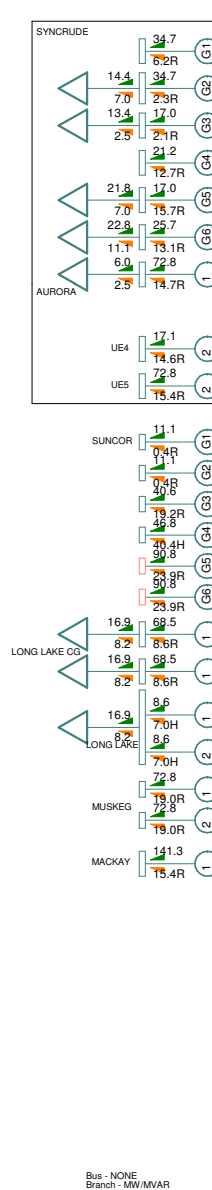
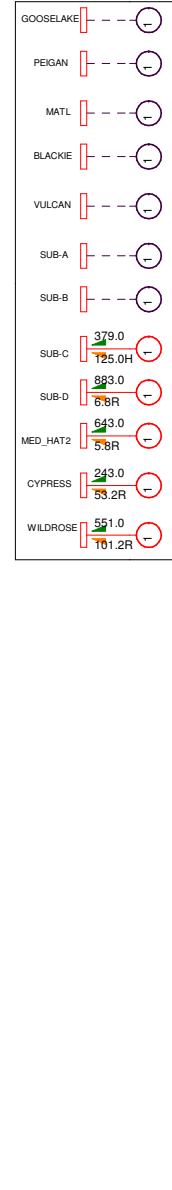
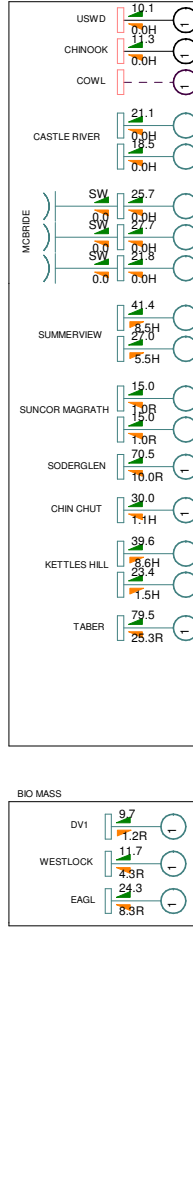
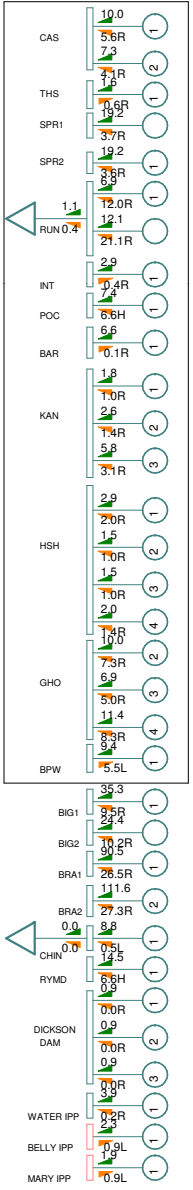
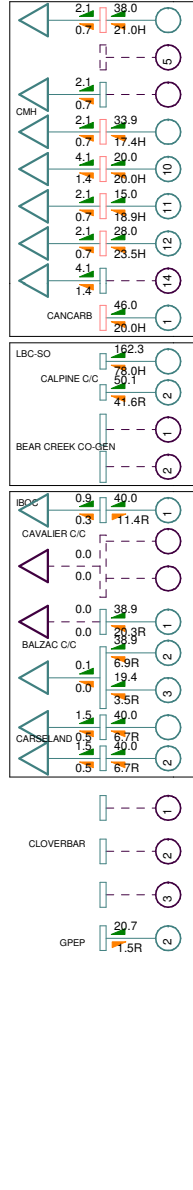
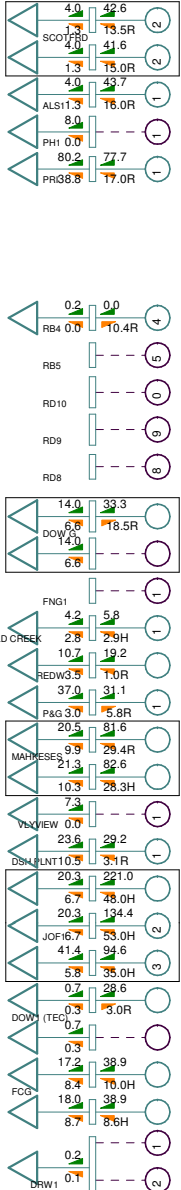
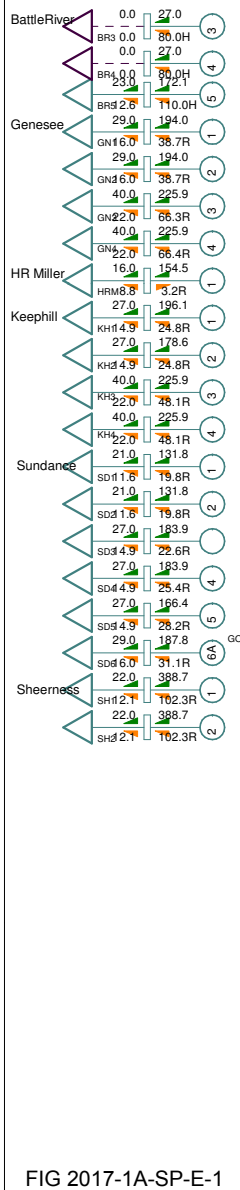


FIG 2017-1A-SP-E-1
GENERATION DISPATCH

2017 SUMMER PEAK BASE CASE IN WECC WITH CROWSNEST
SUN, NOV 23 2008 11:27

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
TODAY DATE
13550V 0.950vuv
KV: <-25,000 <-34,500 <-69,000 <-138,000 <-240,000 >240,000

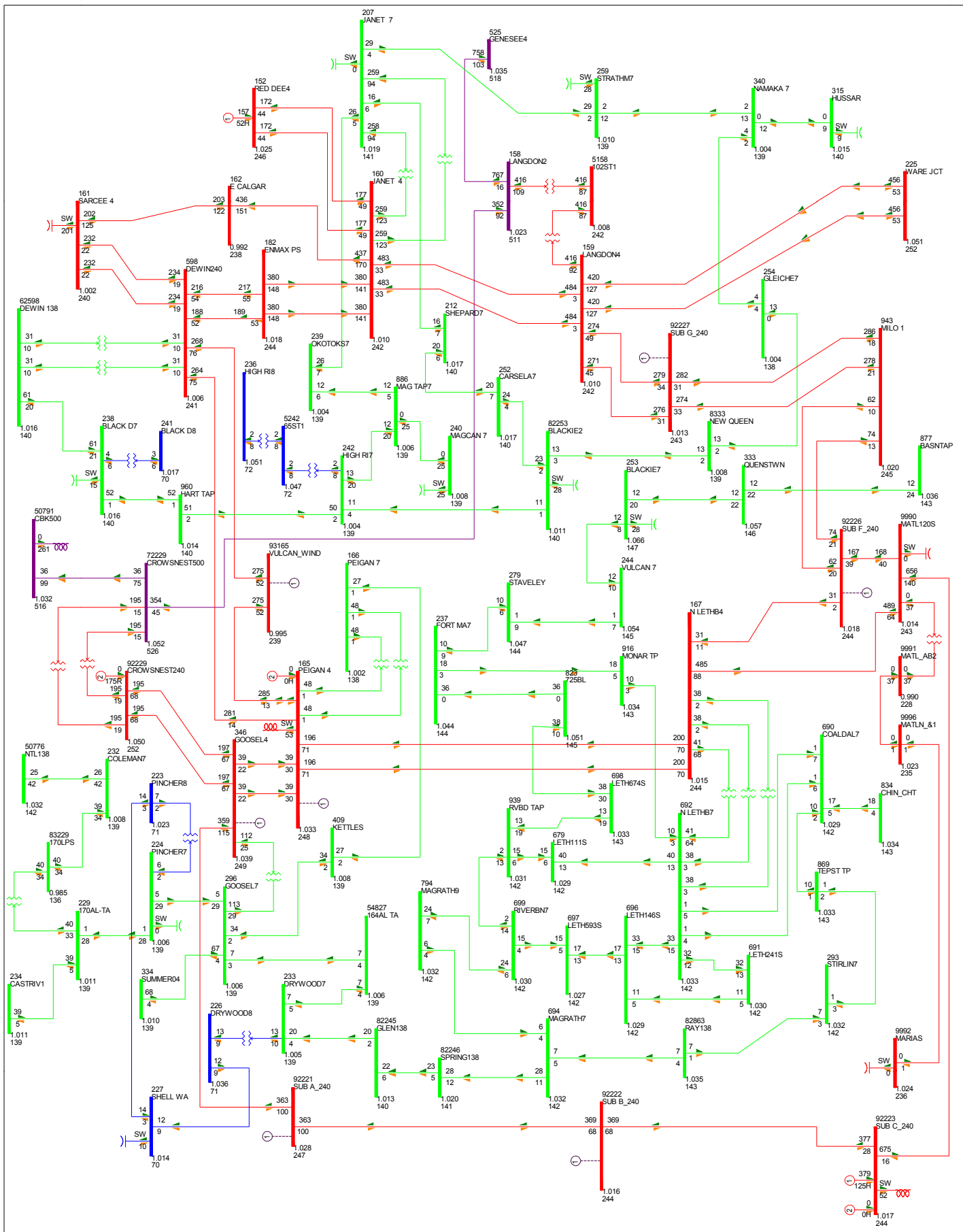


FIG 2017-1A-SP-E-2: N-0 CONDITION

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 39 MW

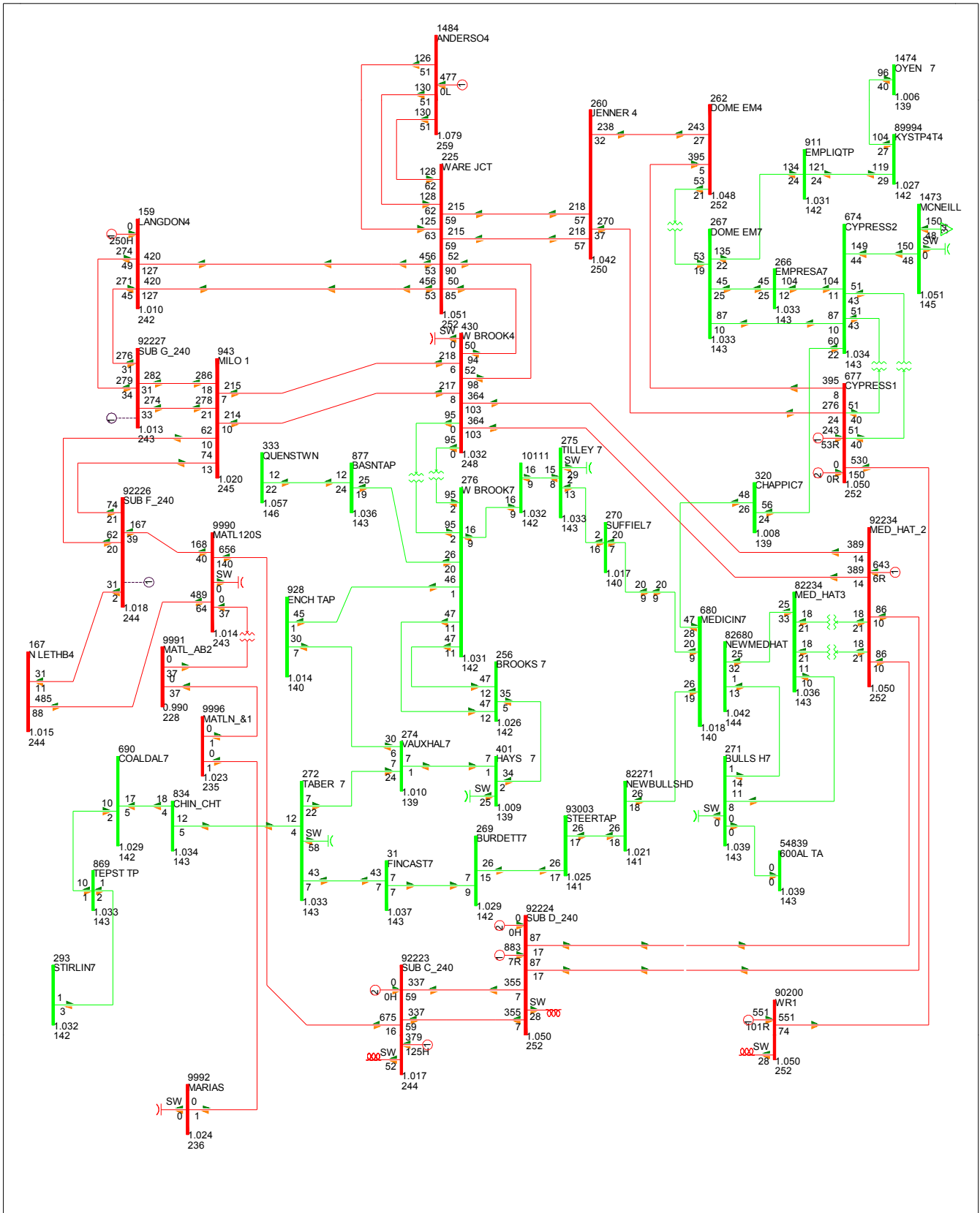


FIG 2017-1A-SP-E-3: N-0 CONDITION

EAST WIND SCENARIO

2017 South East System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 39 MW

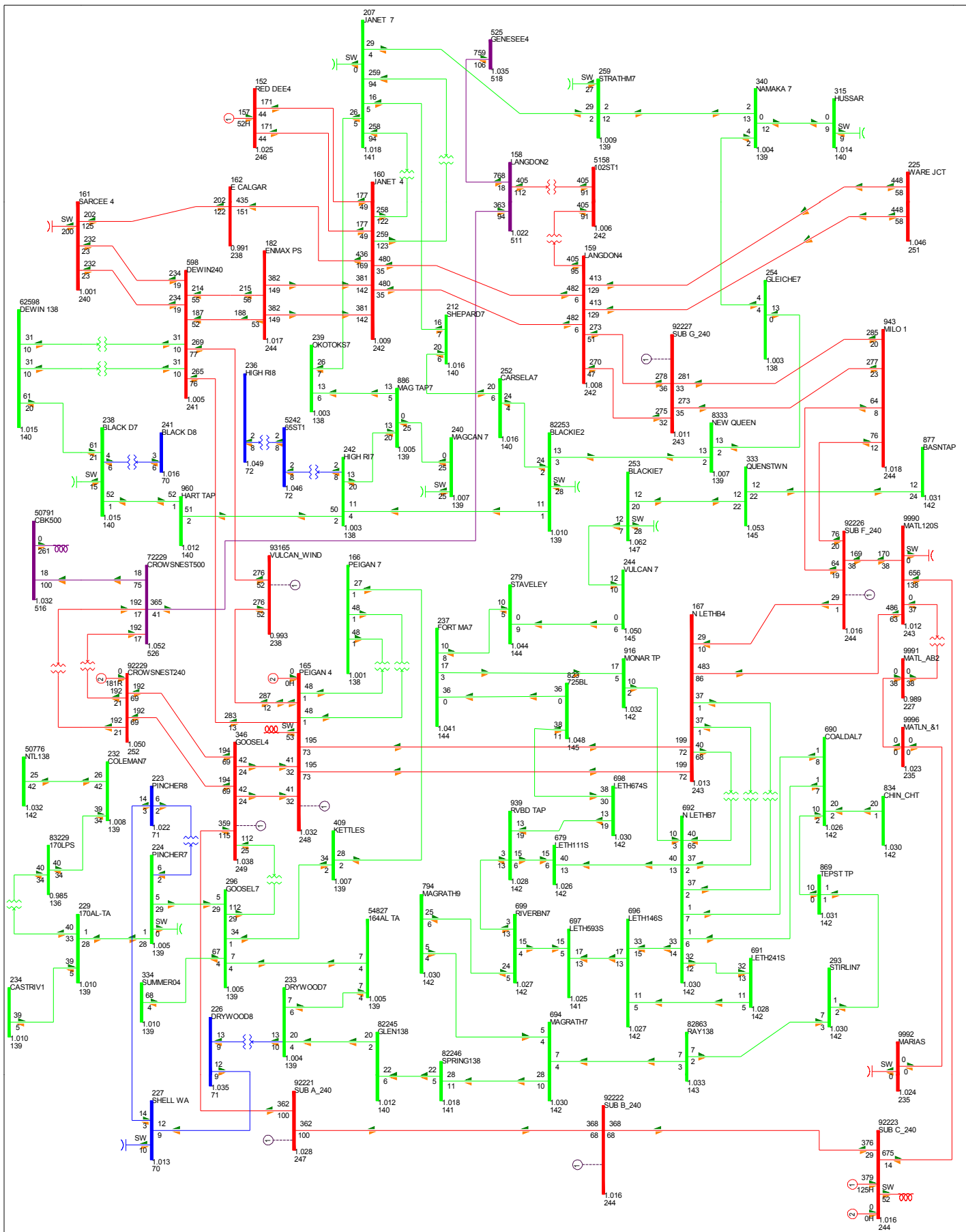


FIG 2017-1A-SP-E-4: JENNER TO CYPRESS 240 KV
 EAST WIND SCENARIO
 2017 South West System MON, NOV 24 2008 18:32

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 20 MW

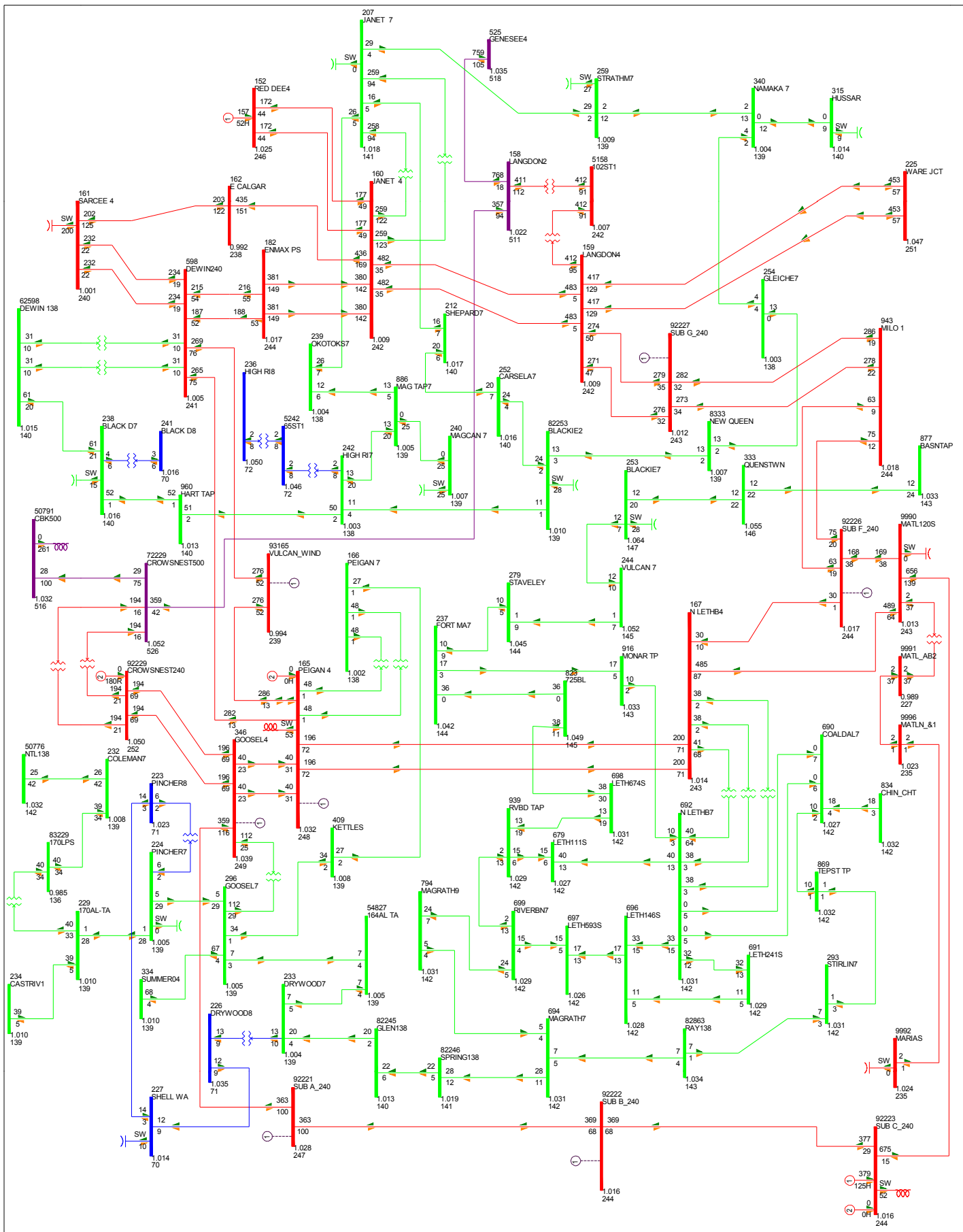


FIG 2017-1A-SP-E-6: DOME EMPRESS TO CYPRESS 240 KV

EAST WIND SCENARIO

2017 South West System TUE, DEC 02 2008 19:28

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 31 MW

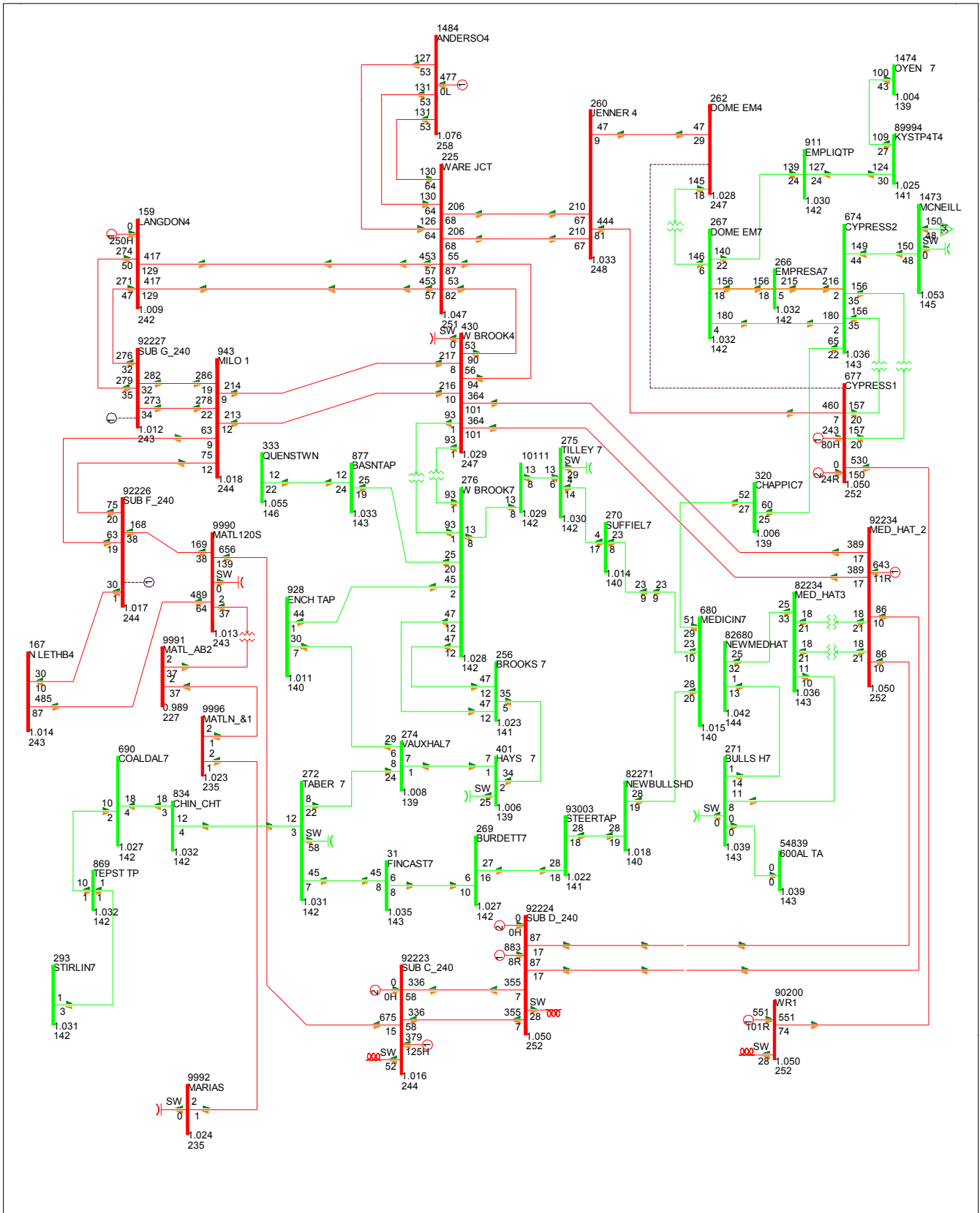


FIG 2017-1A-SP-E-7: DOME EMPRESS TO CYPRESS 240 KV
 EAST WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 19:28

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 31 MW

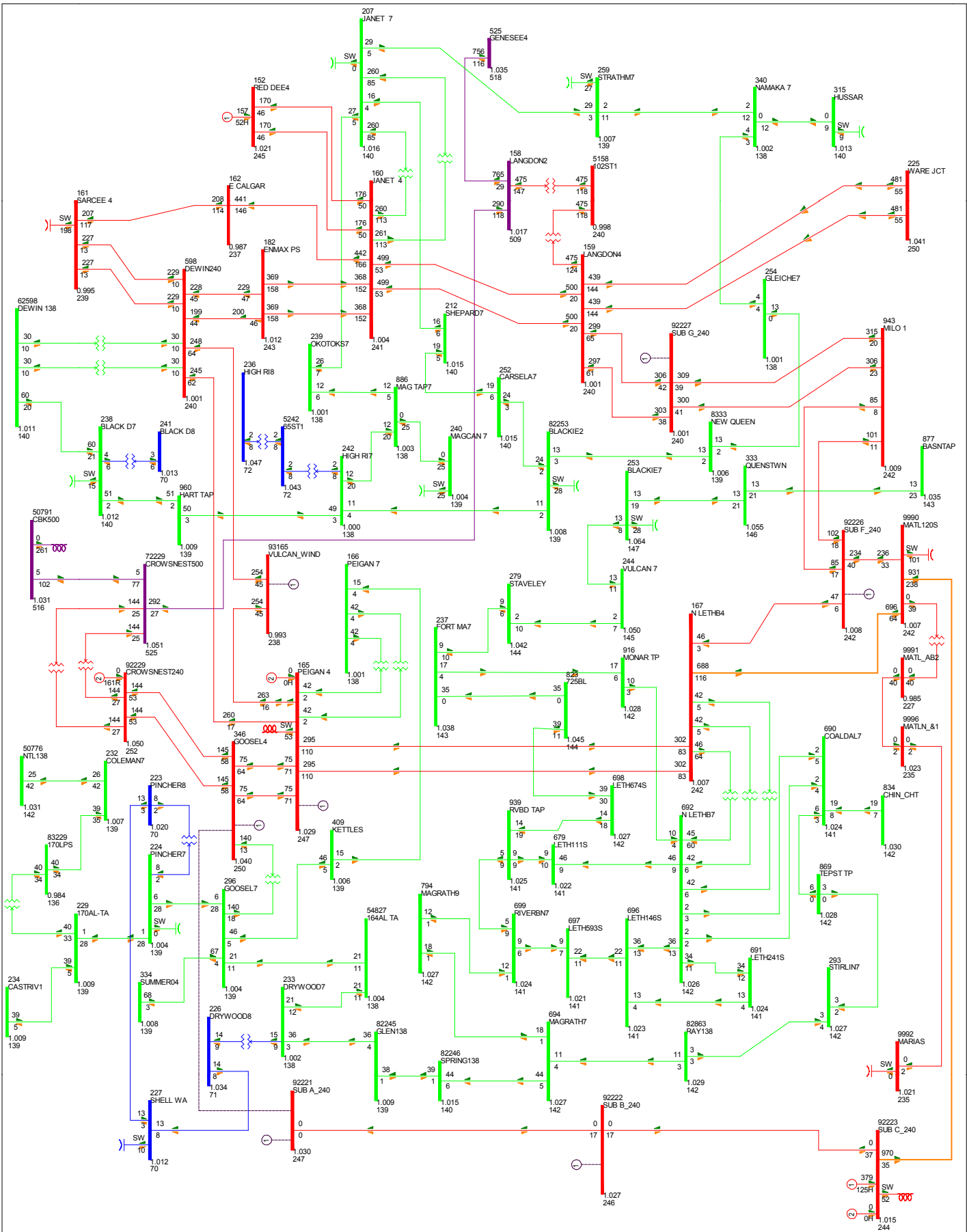


FIG 2017-1A-SP-E-8: GOOSELAKE TO SUB A 240 KV
 EAST WIND SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0% RATE A
 KV: <=34.500 <=69.000 <=138.000 <=240.000 >500.000
 BC Export: -0 MW

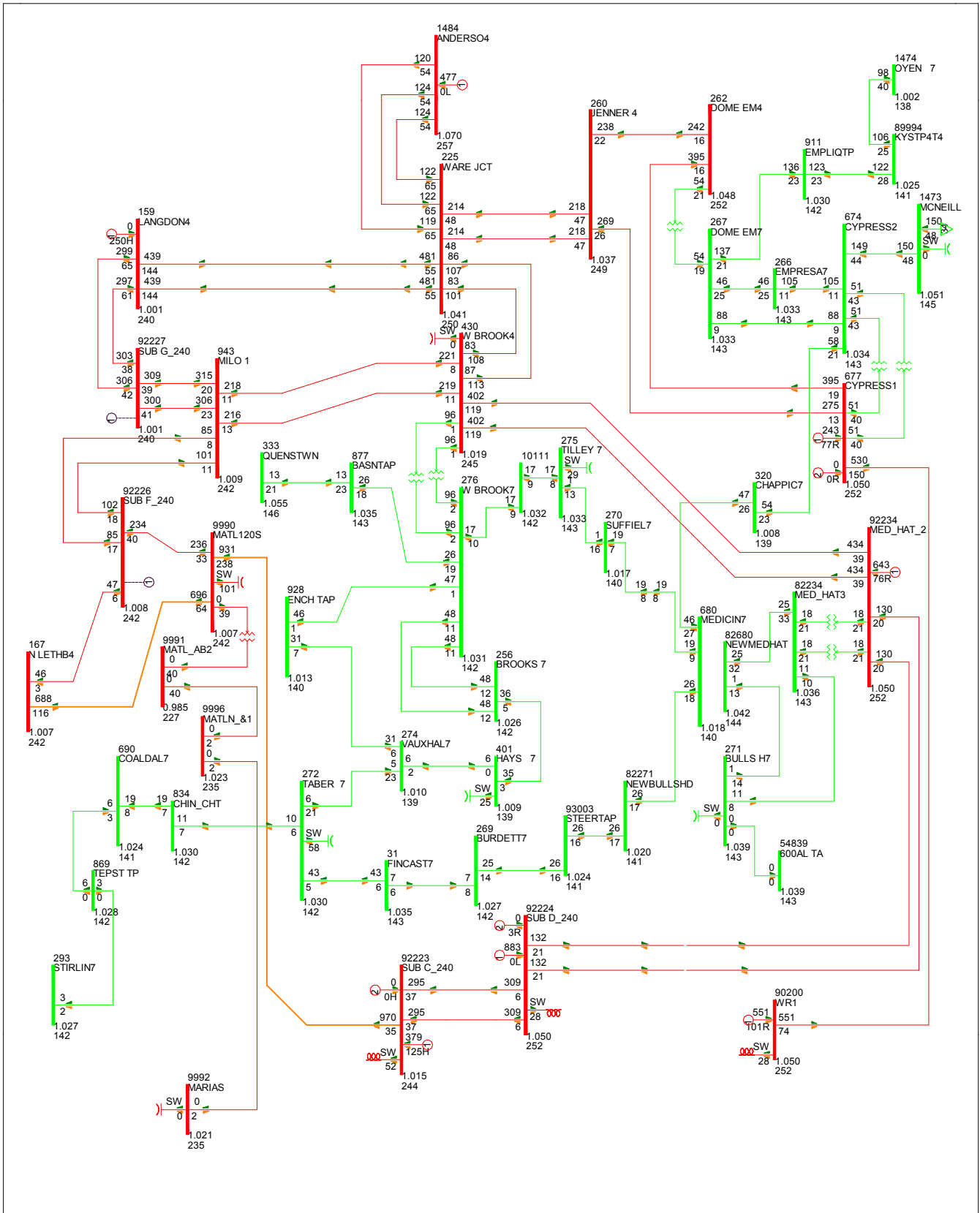


FIG 2017-1A-SP-E-9: GOOSELAKE TO SUB A 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -0 MW

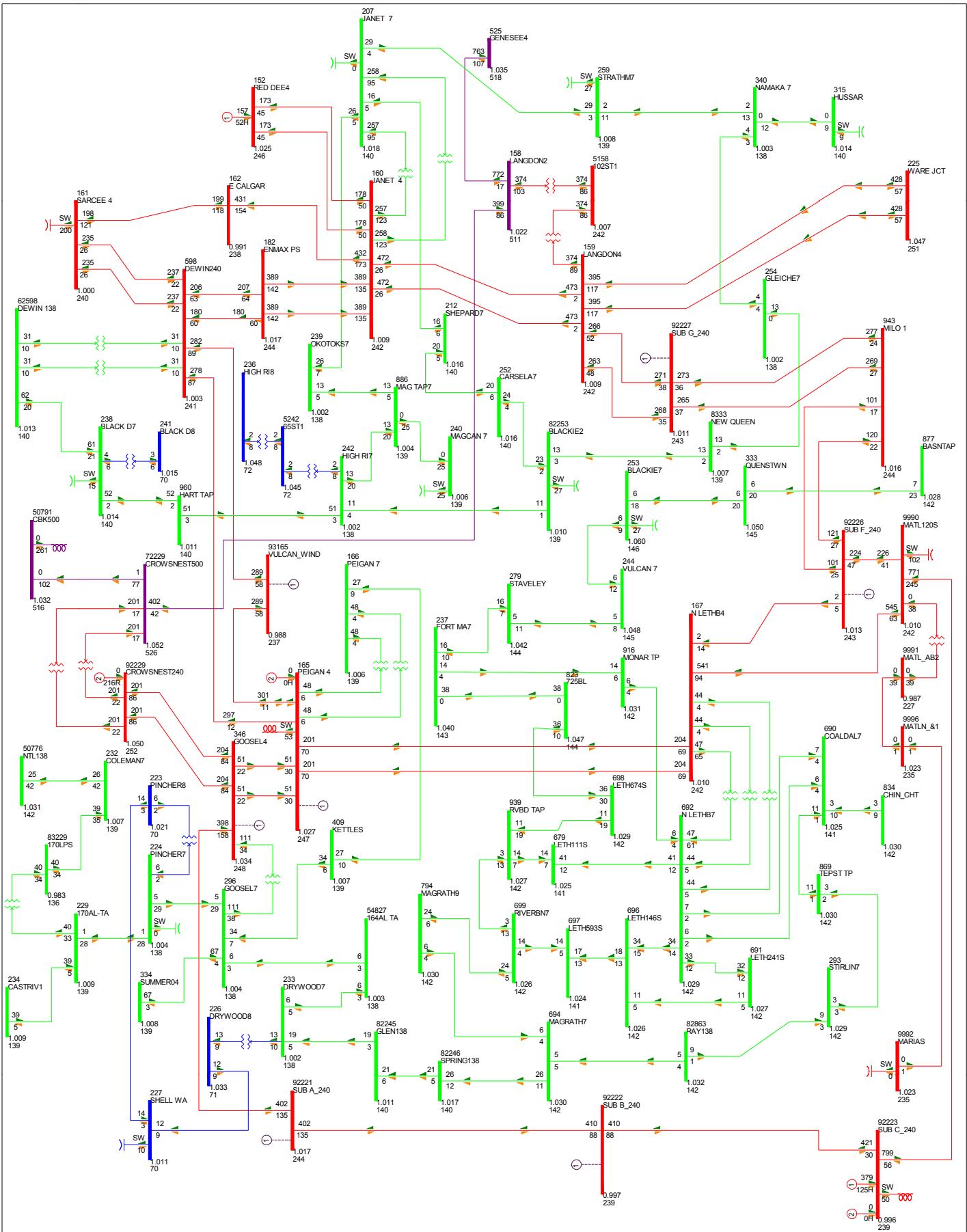


FIG 2017-1A-SP-E-10: WESTBROOKS TO MEDHAT2 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1 MW

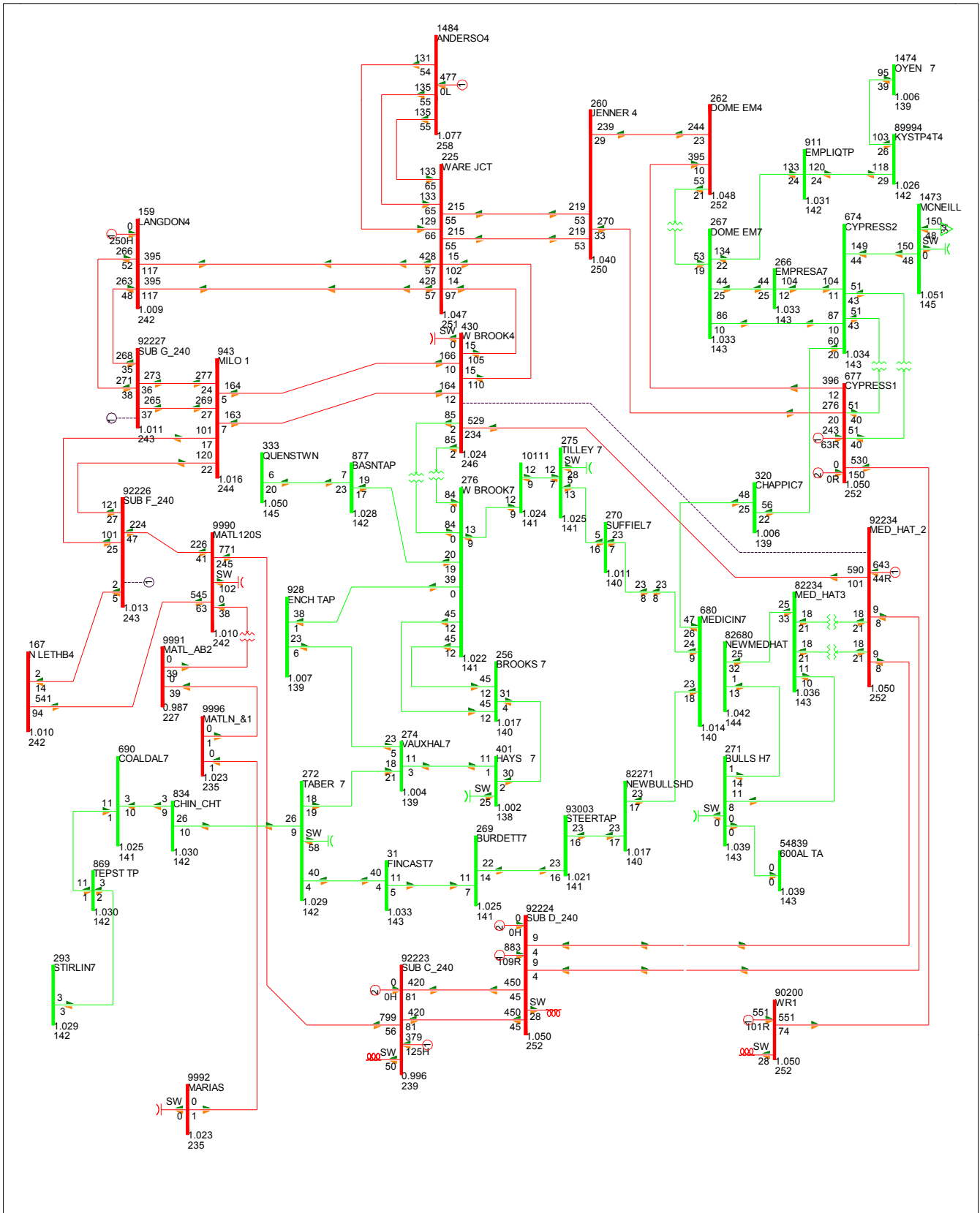


FIG 2017-1A-SP-E-11: WESTBROOKS TO MEDHAT2 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1 MW

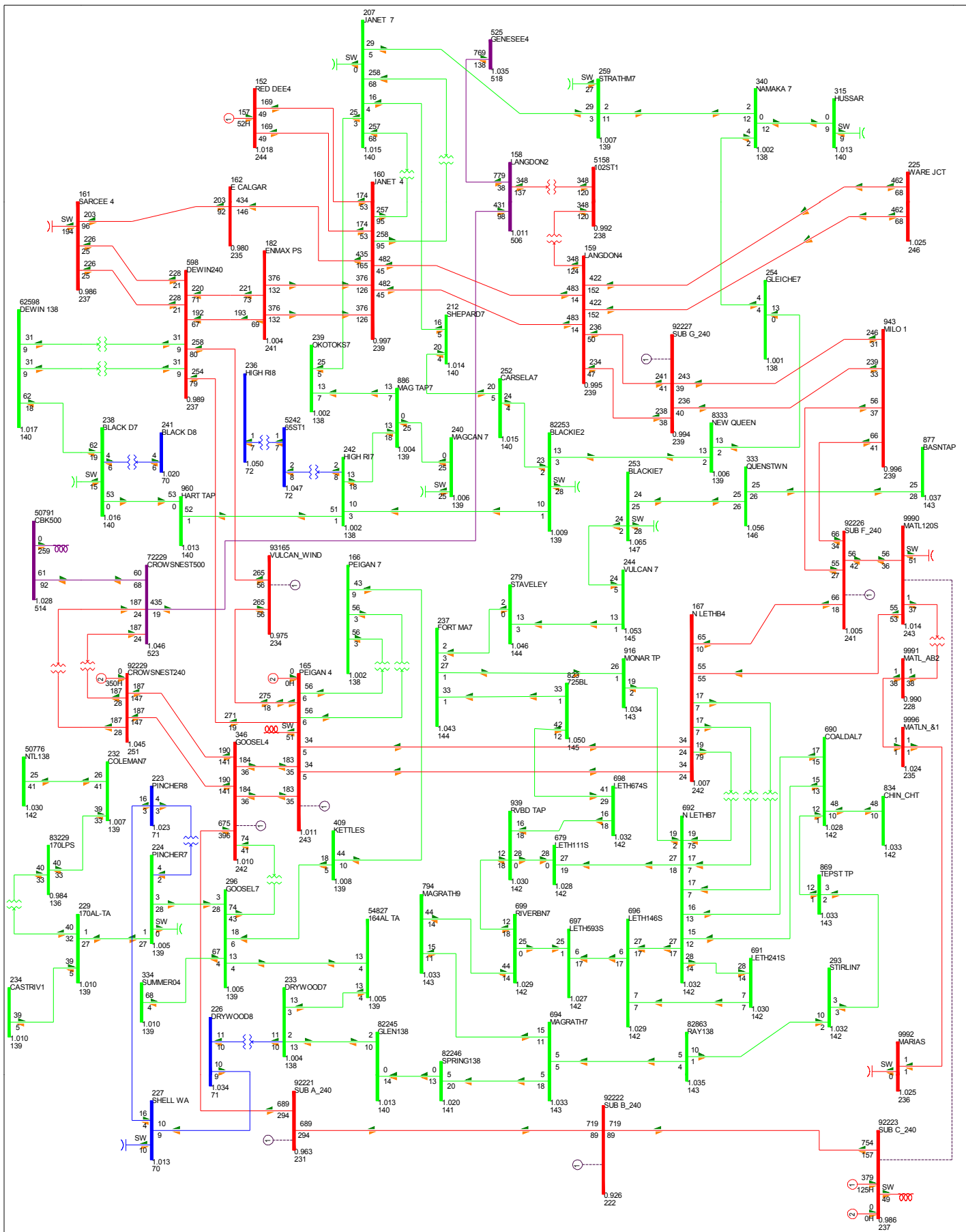


FIG 2017-1A-SP-E-12: SUB C TO MATL 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -63 MW

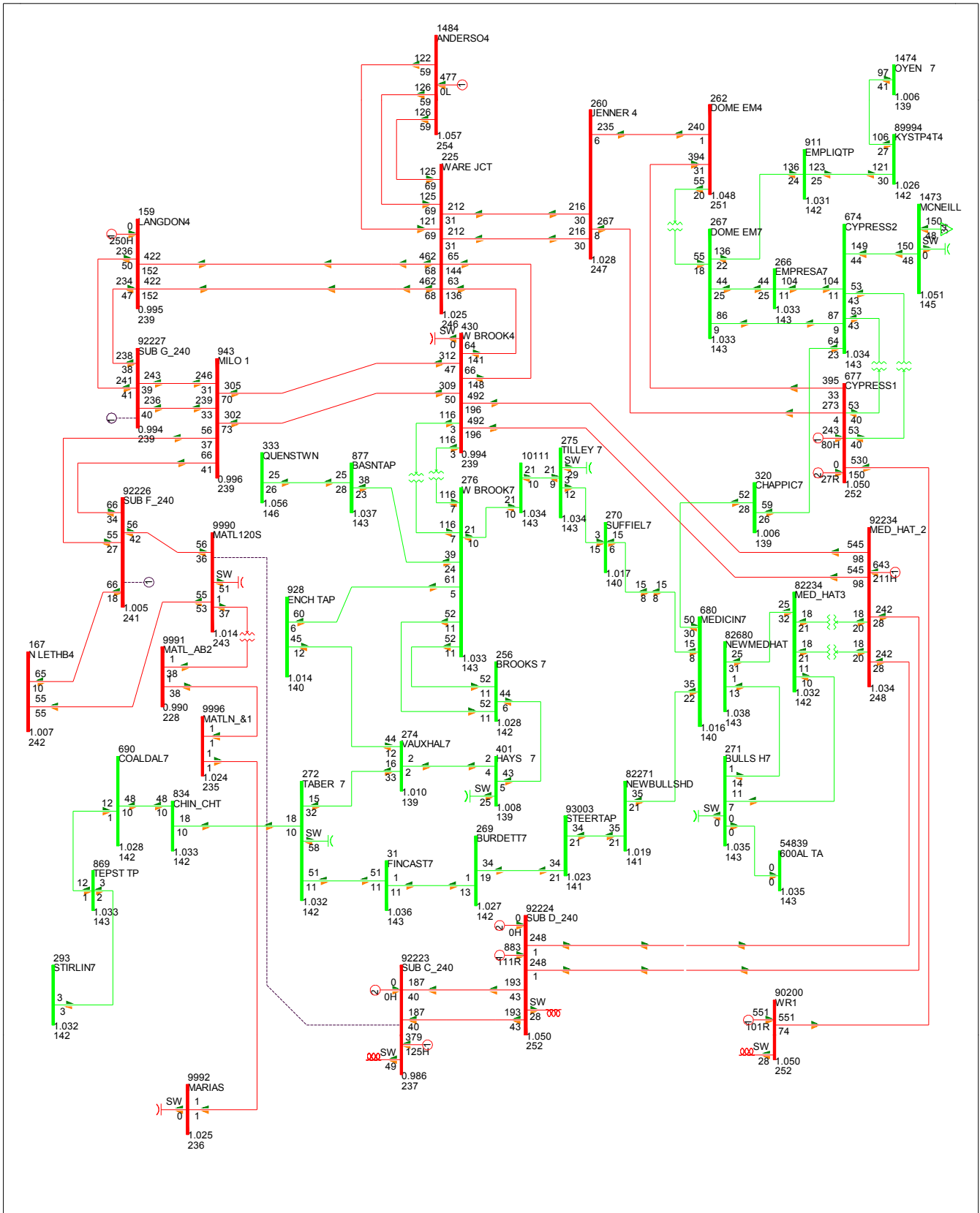


FIG 2017-1A-SP-E-13: SUB C TO MATL 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -63 MW

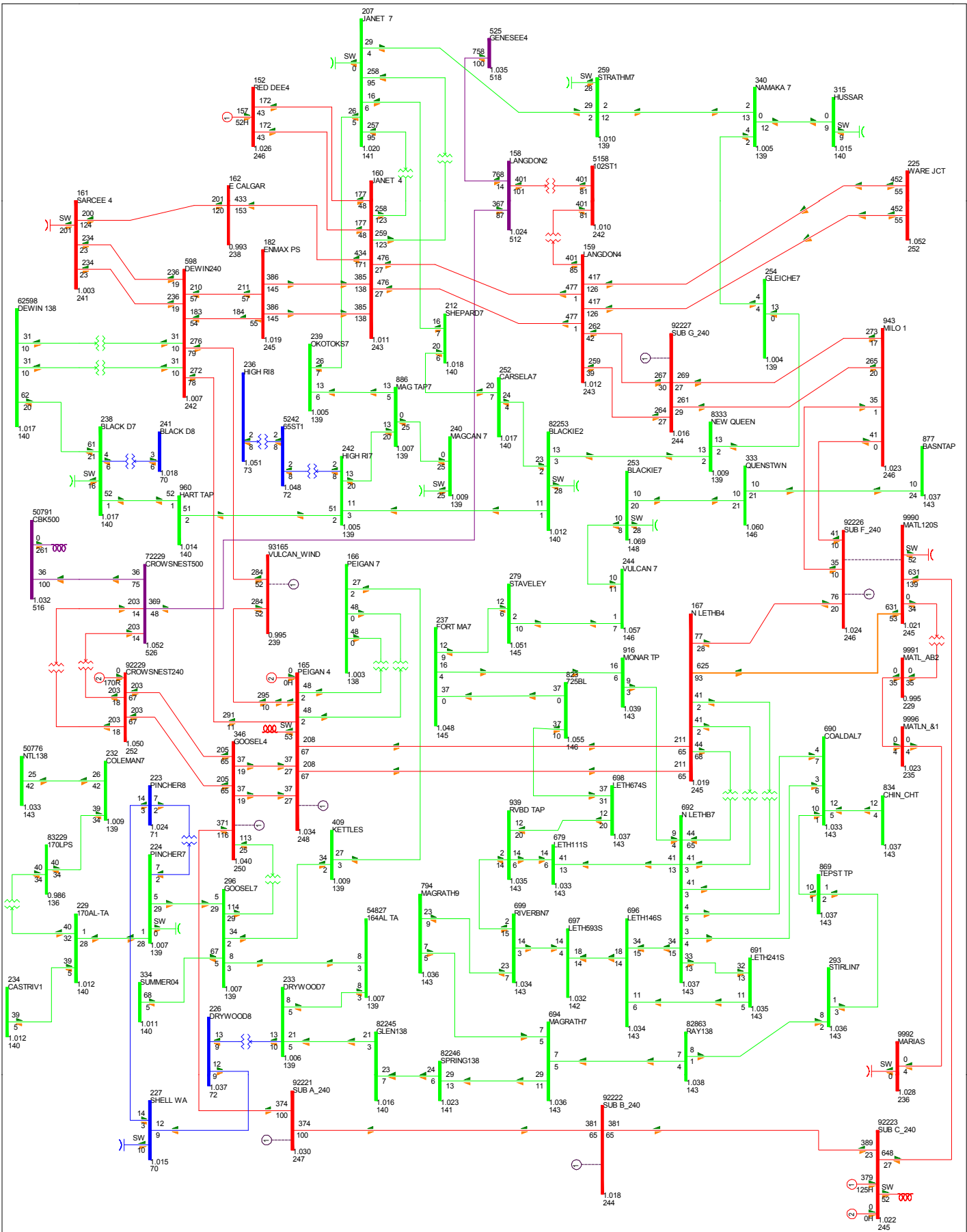


FIG 2017-1A-SP-E-14: SUB F TO MATL 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 39 MW

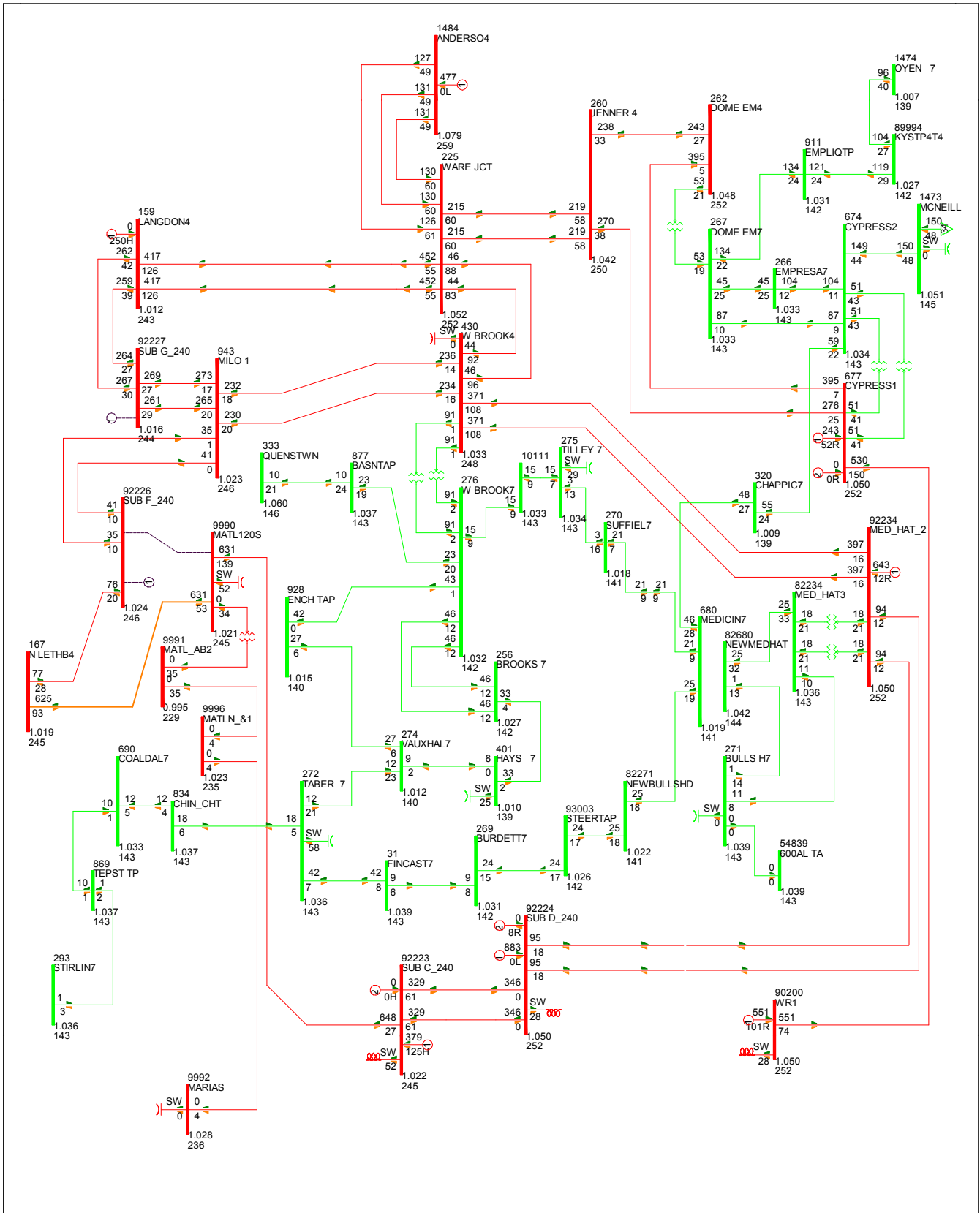


FIG 2017-1A-SP-E-15: SUB F TO MATL 240 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 39 MW

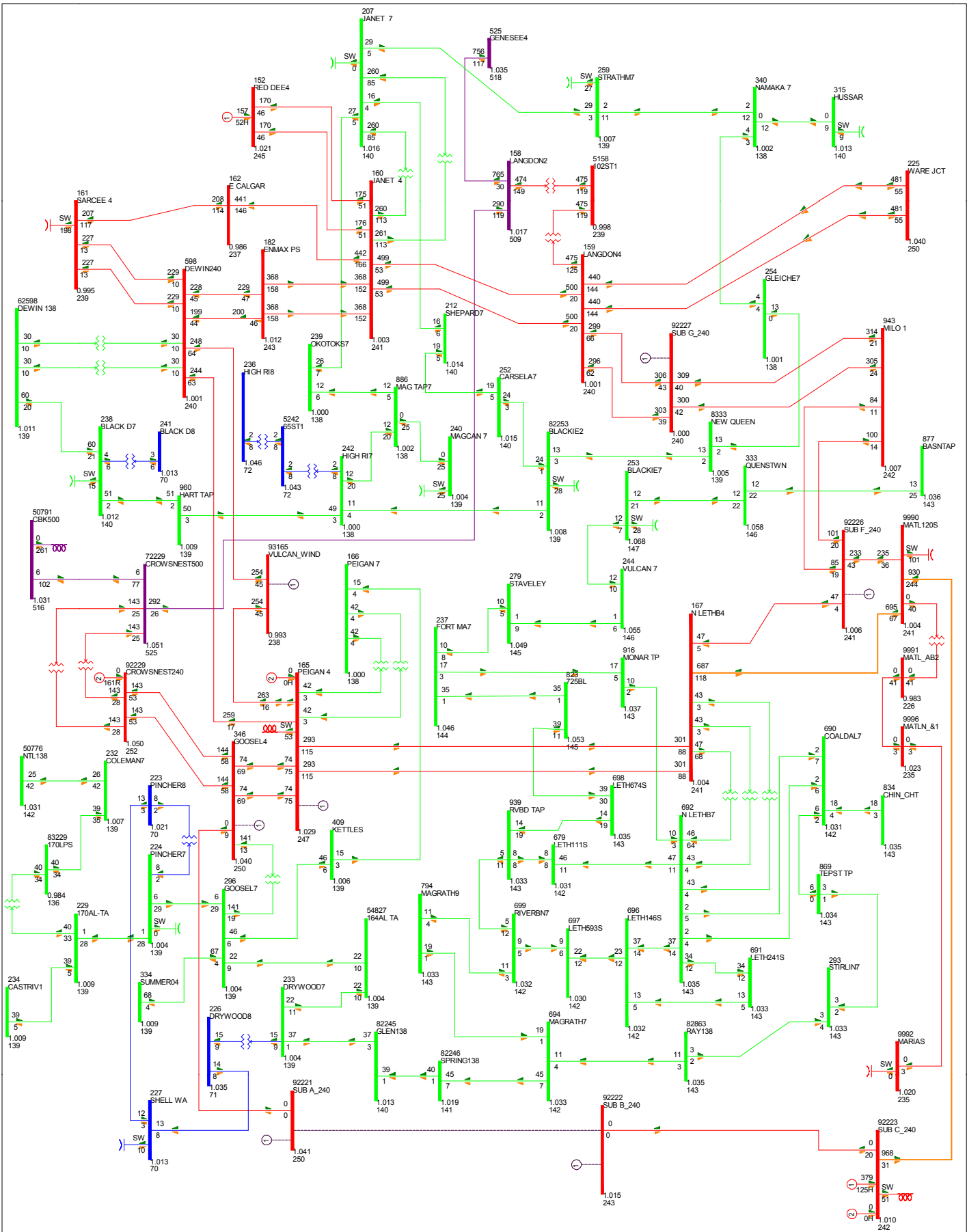


FIG 2017-1A-SP-E-16: SUB A TO SUB B 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -1 MW

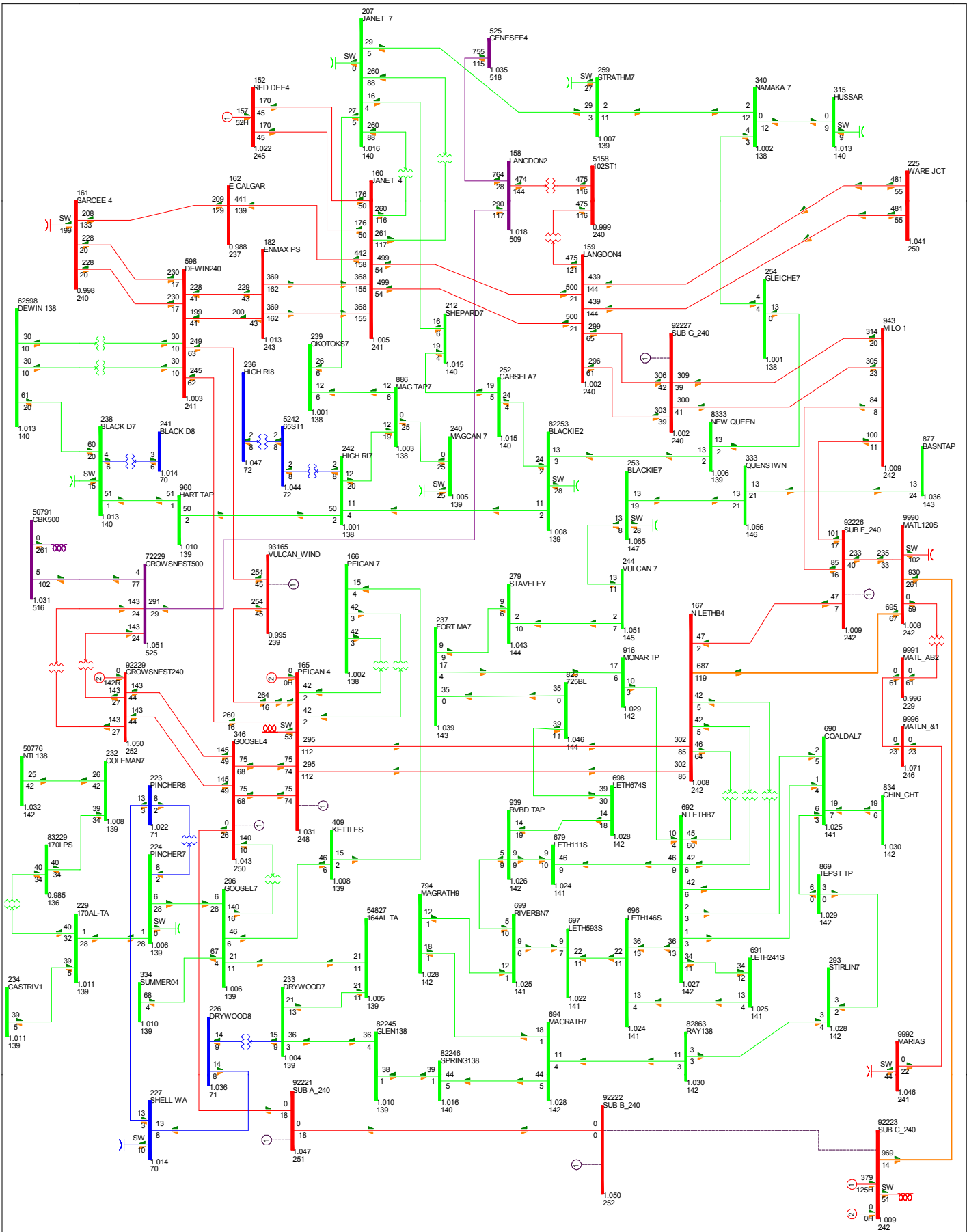


FIG 2017-1A-SP-E-18: SUB B TO SUB C 240 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 0 MW

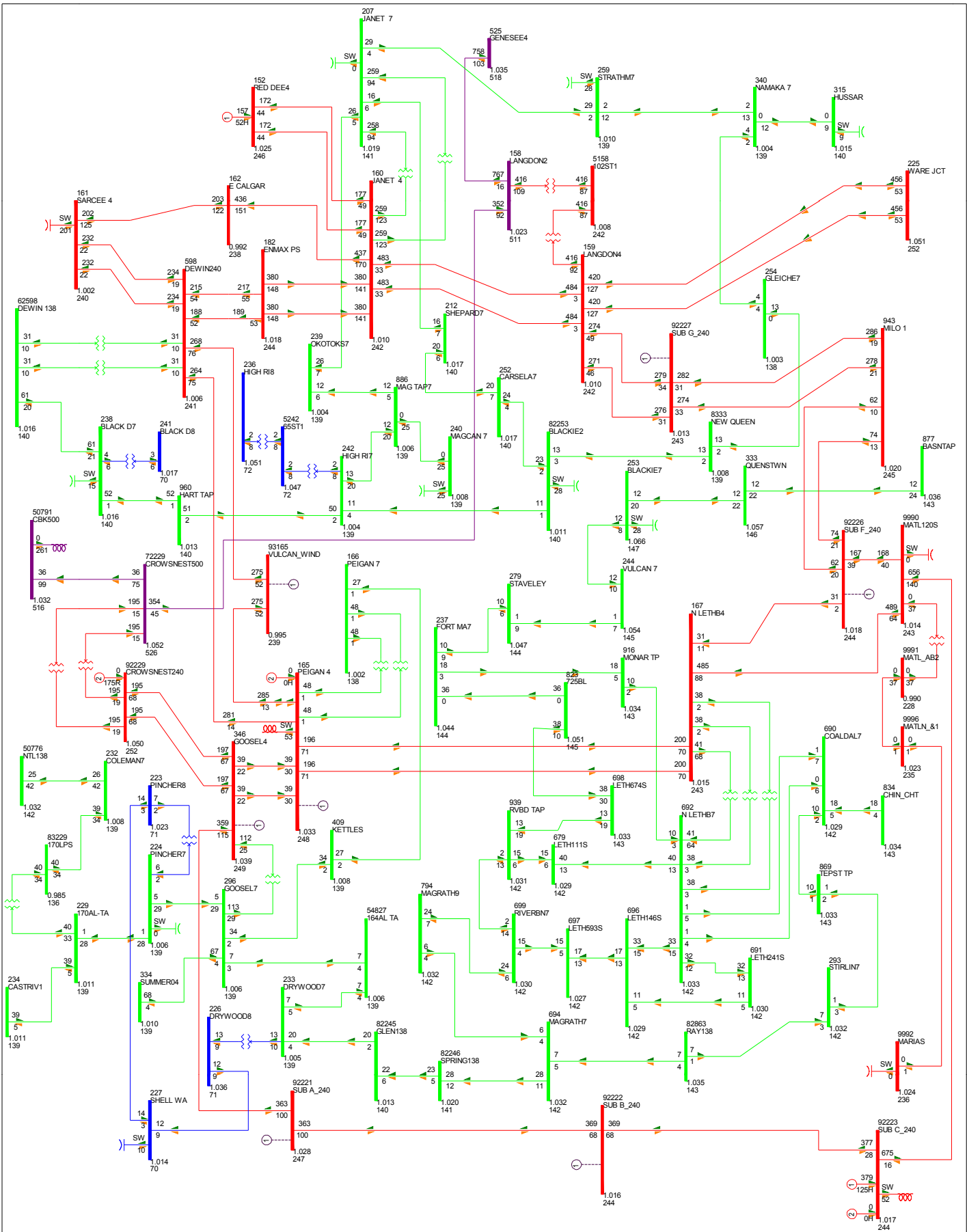


FIG 2017-1A-SP-E-20: DOME EMPRESS TO CYPRESS 138 KV

EAST WIND SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 39 MW

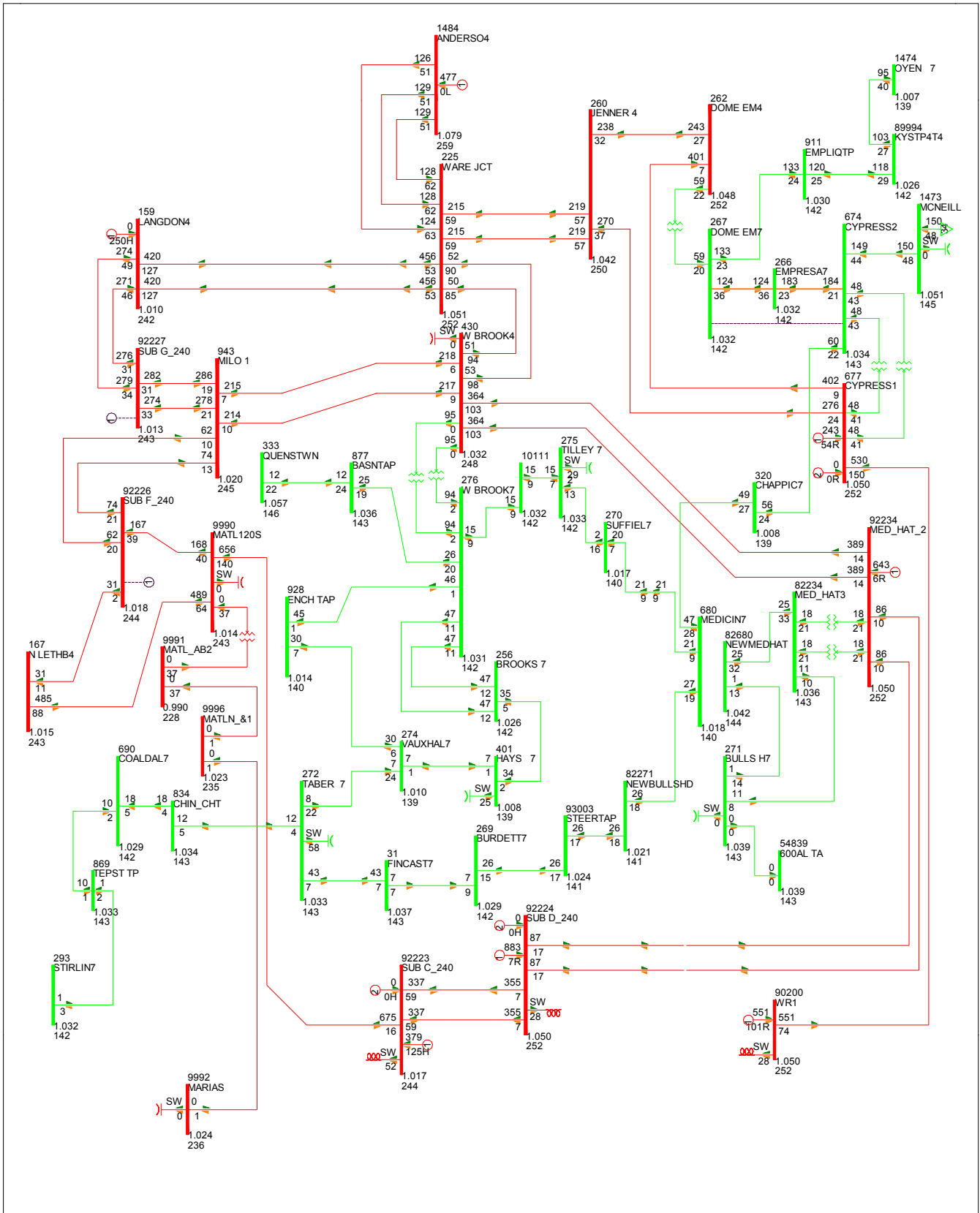


FIG 2017-1A-SP-E-21: DOME EMPRESS TO CYPRESS 138 KV
 EAST WIND SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 39 MW

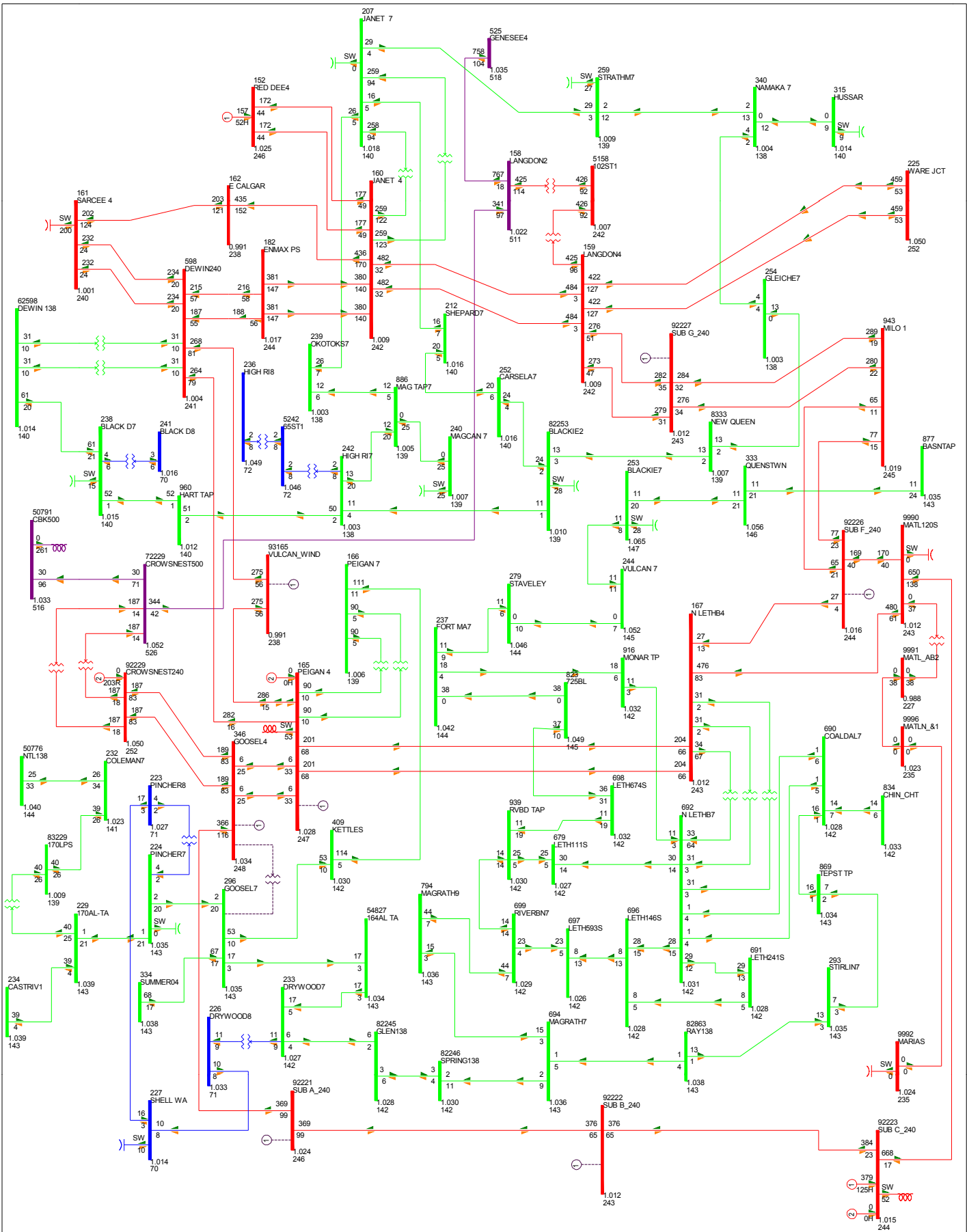


FIG 2017-1A-SP-E-22: GOOSELAKE 240/138 KV XMER

EAST WIND SCENARIO

2017 South West System TUE, DEC 02 2008 19:29

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 33 MW

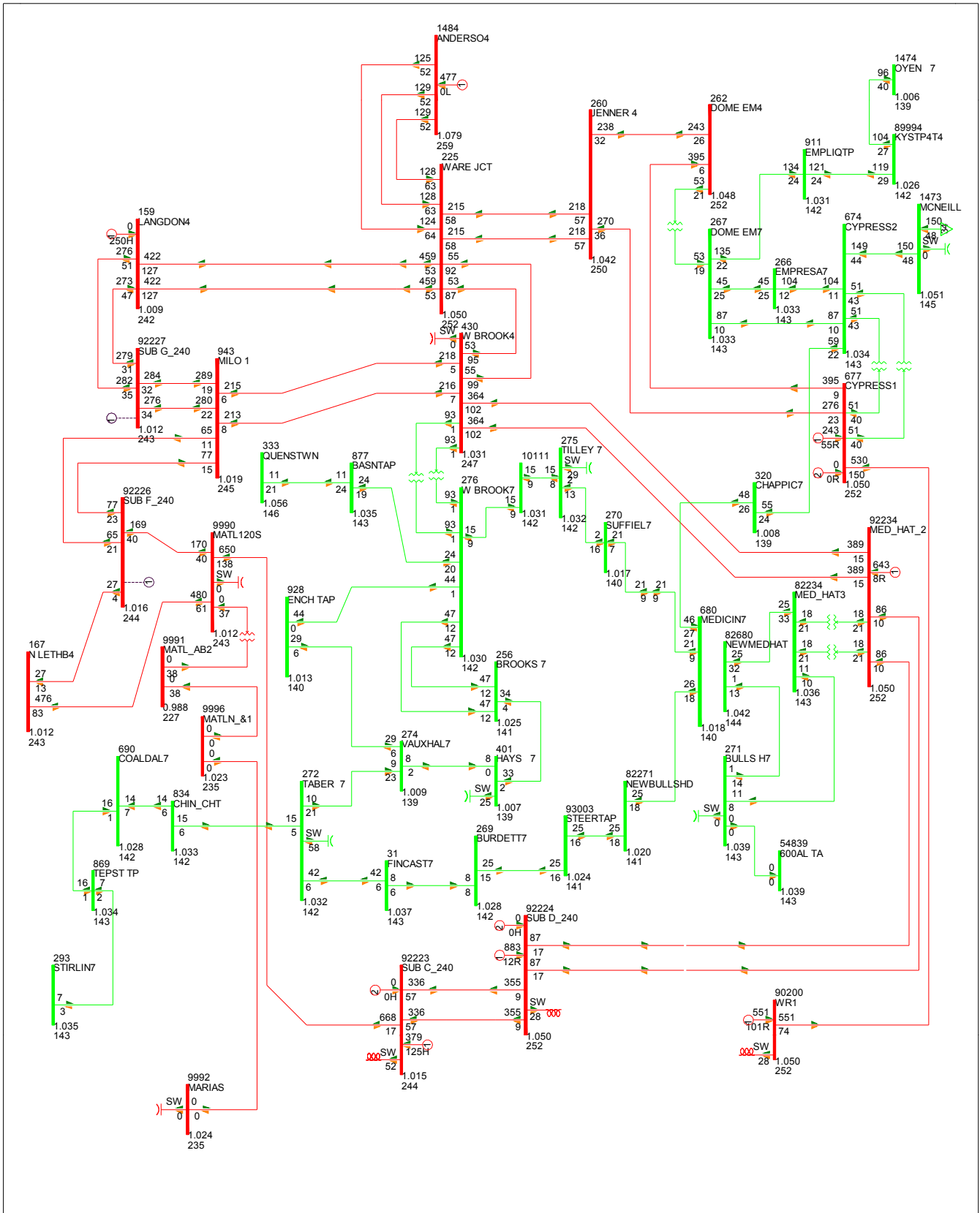


FIG 2017-1A-SP-E-23: GOOSELAKE 240/138 KV XMER
 EAST WIND SCENARIO
 2017 South East System TUE, DEC 02 2008 19:29

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 33 MW

GENERATION DISPATCH REPORT

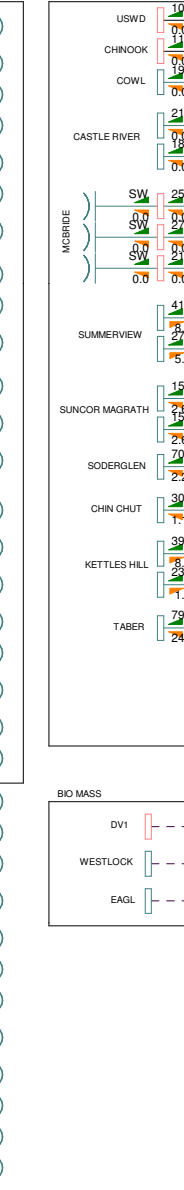
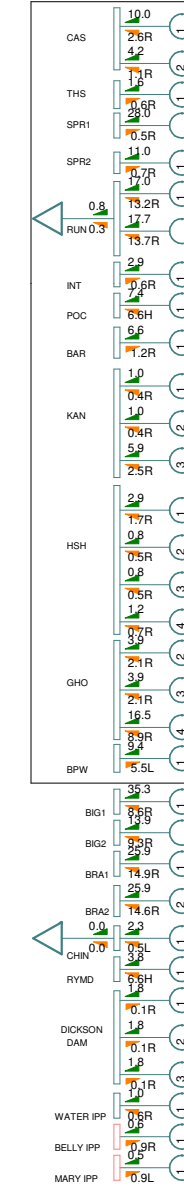
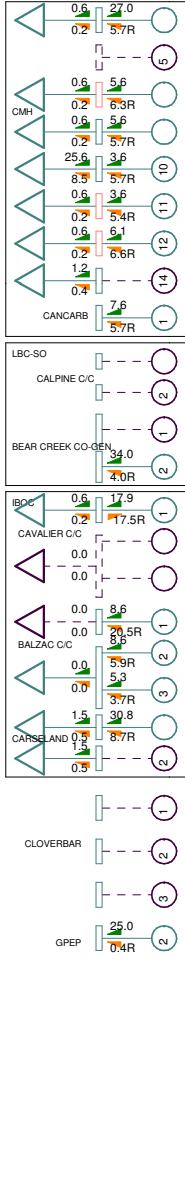
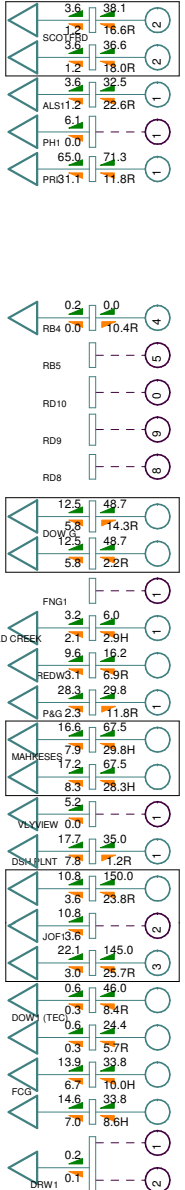
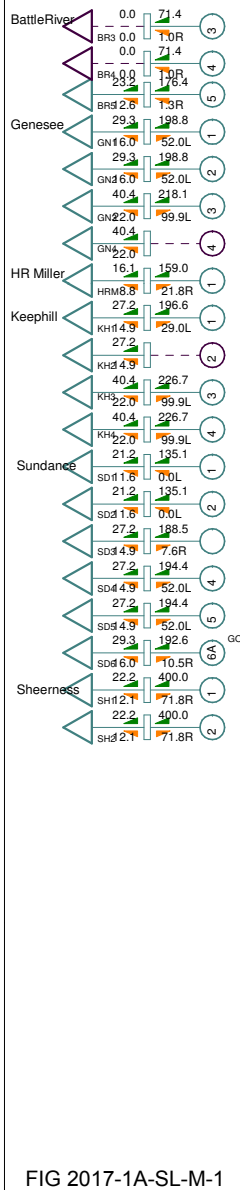
GROSS COAL GEN. 3584.0 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.



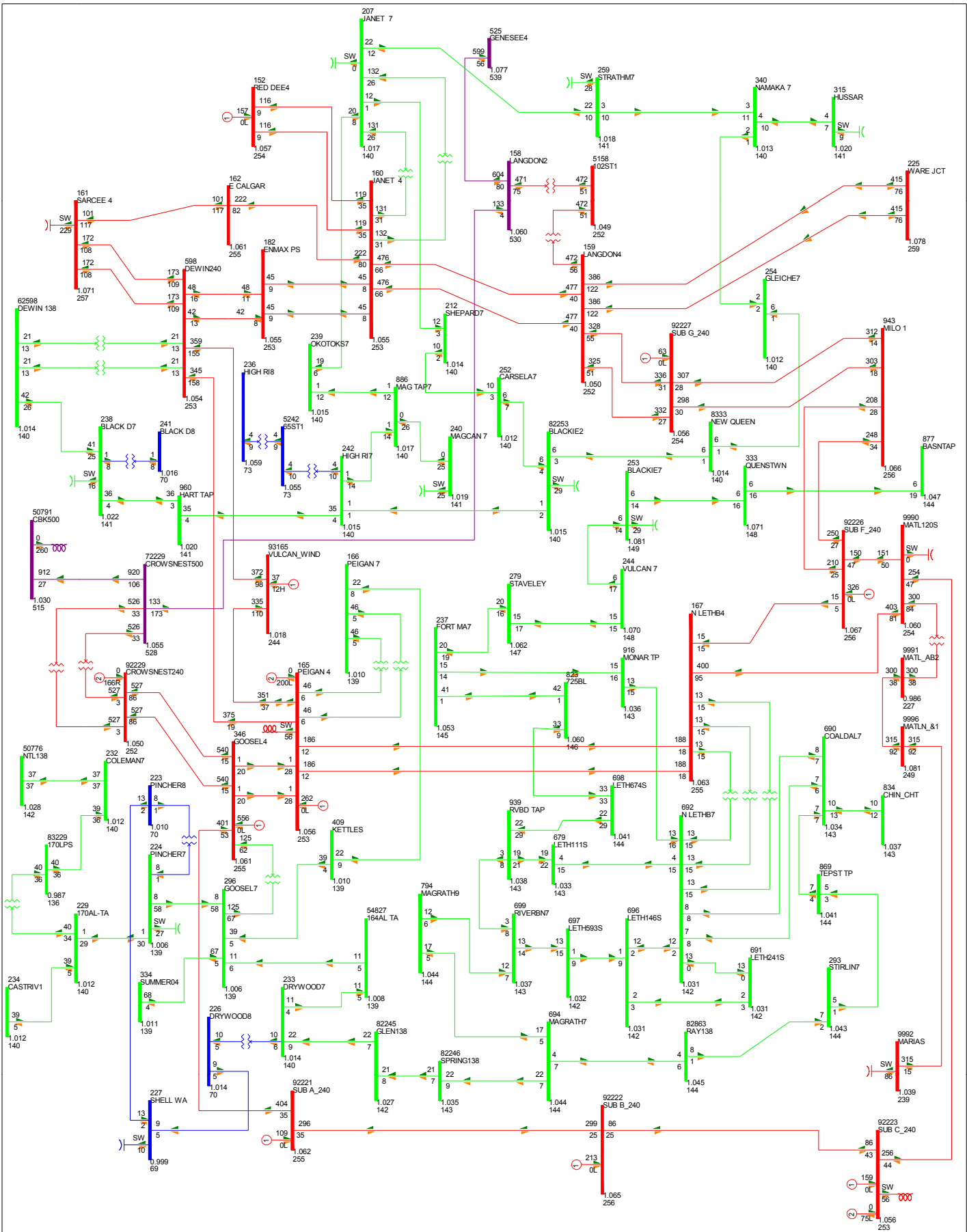


FIG 2017-1A-SL-M-2: N-0 CONDITION

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 975 MW

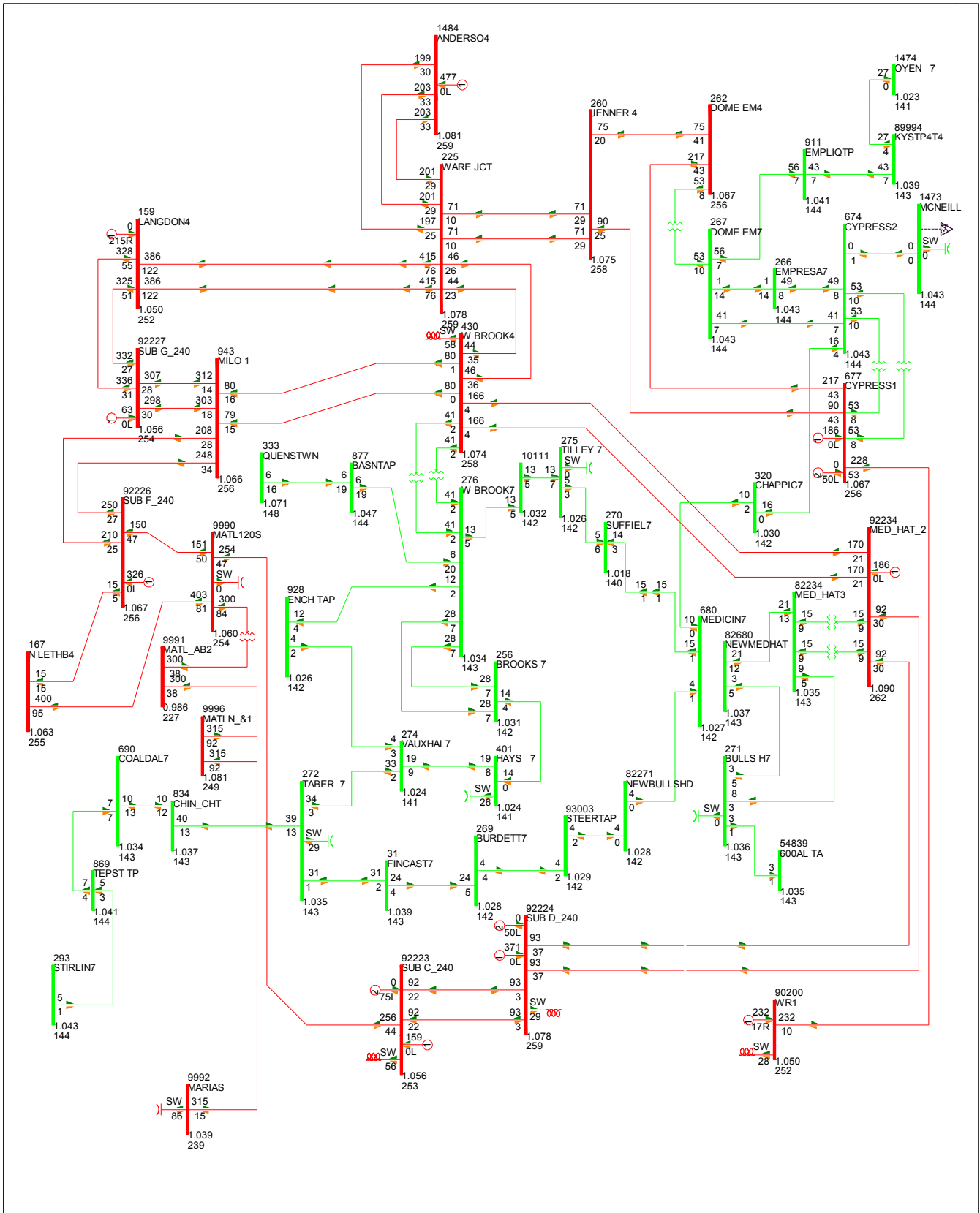


FIG 2017-1A-SL-M-3: N-0 CONDITION
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 975 MW

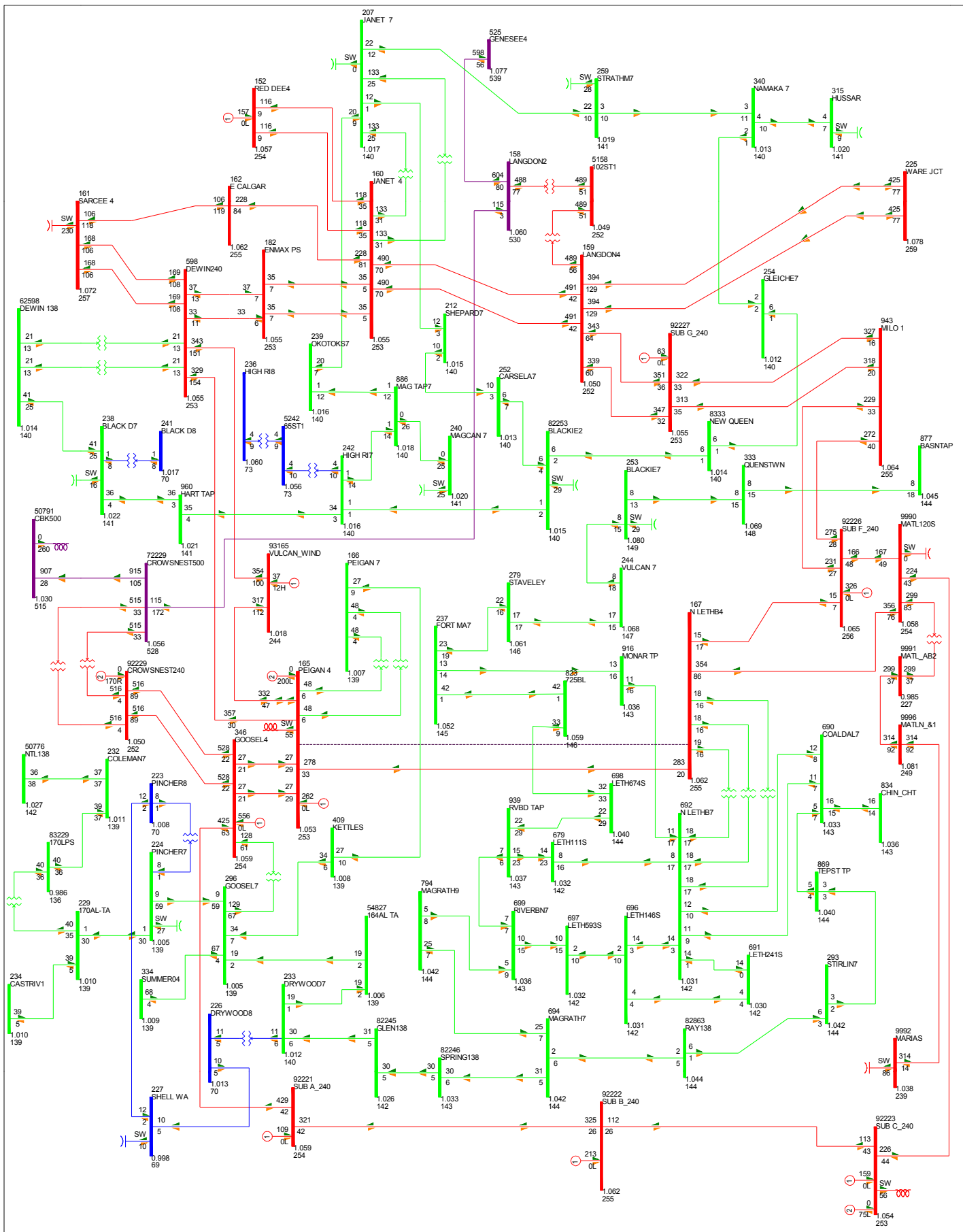


FIG 2017-1A-SL-M-4: PEIGAN TO N. LETHBRIDGE 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 970 MW

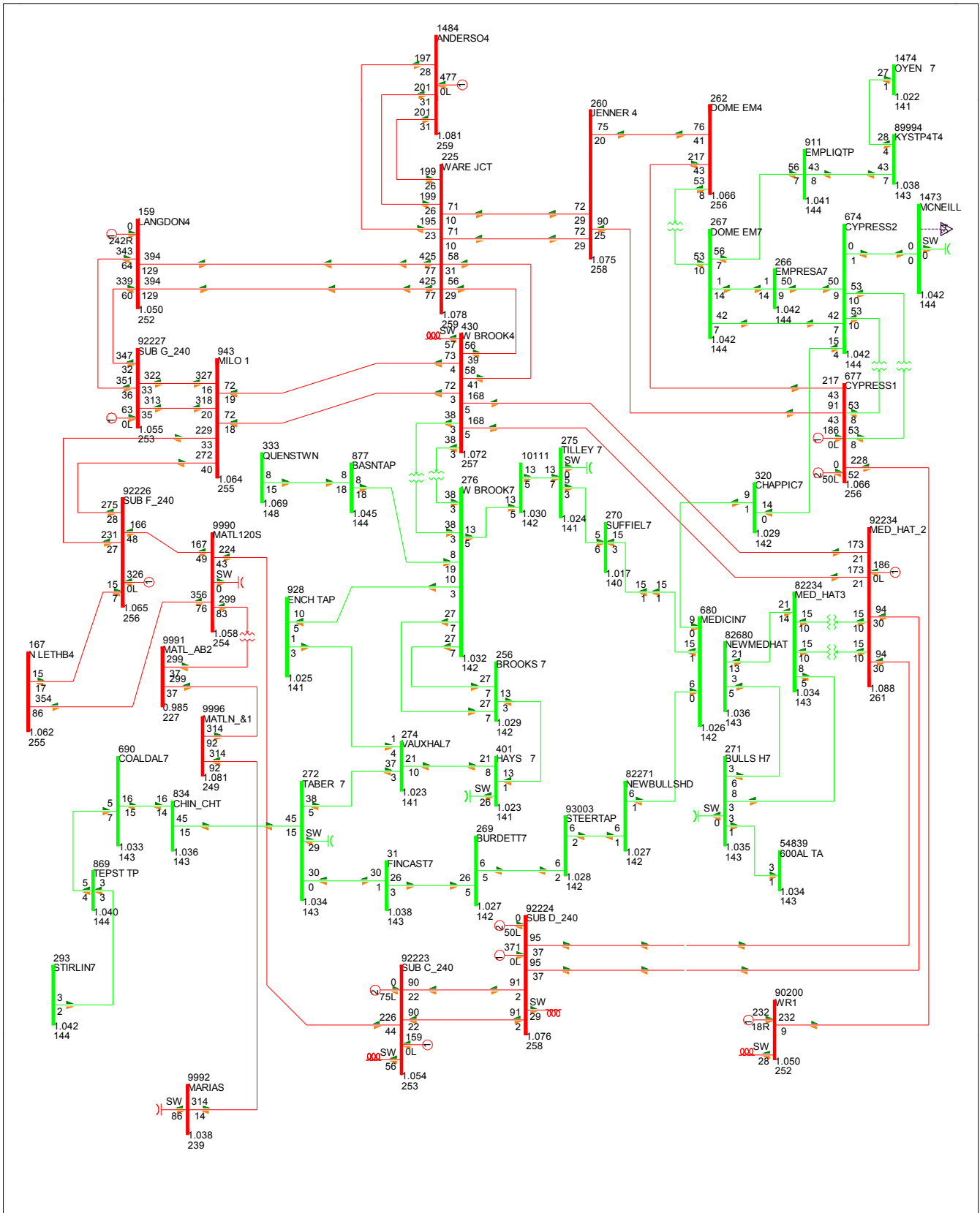


FIG 2017-1A-SL-M-5: PEIGAN TO N. LETHBRIDGE 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 970 MW

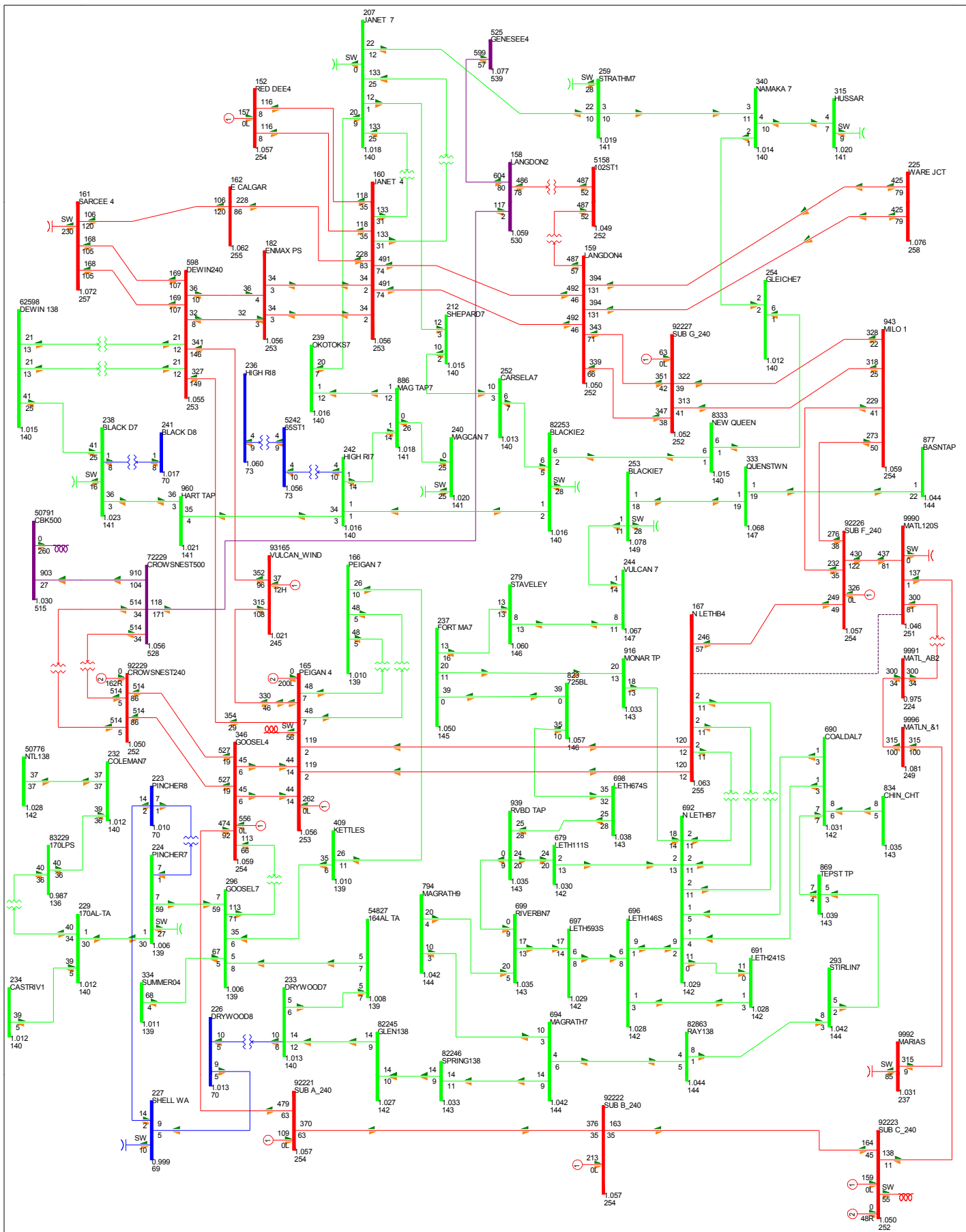


FIG 2017-1A-SL-M-6: N. LETHBRIDGE TO MATL 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 >500.000
 BC Export: 965 MW

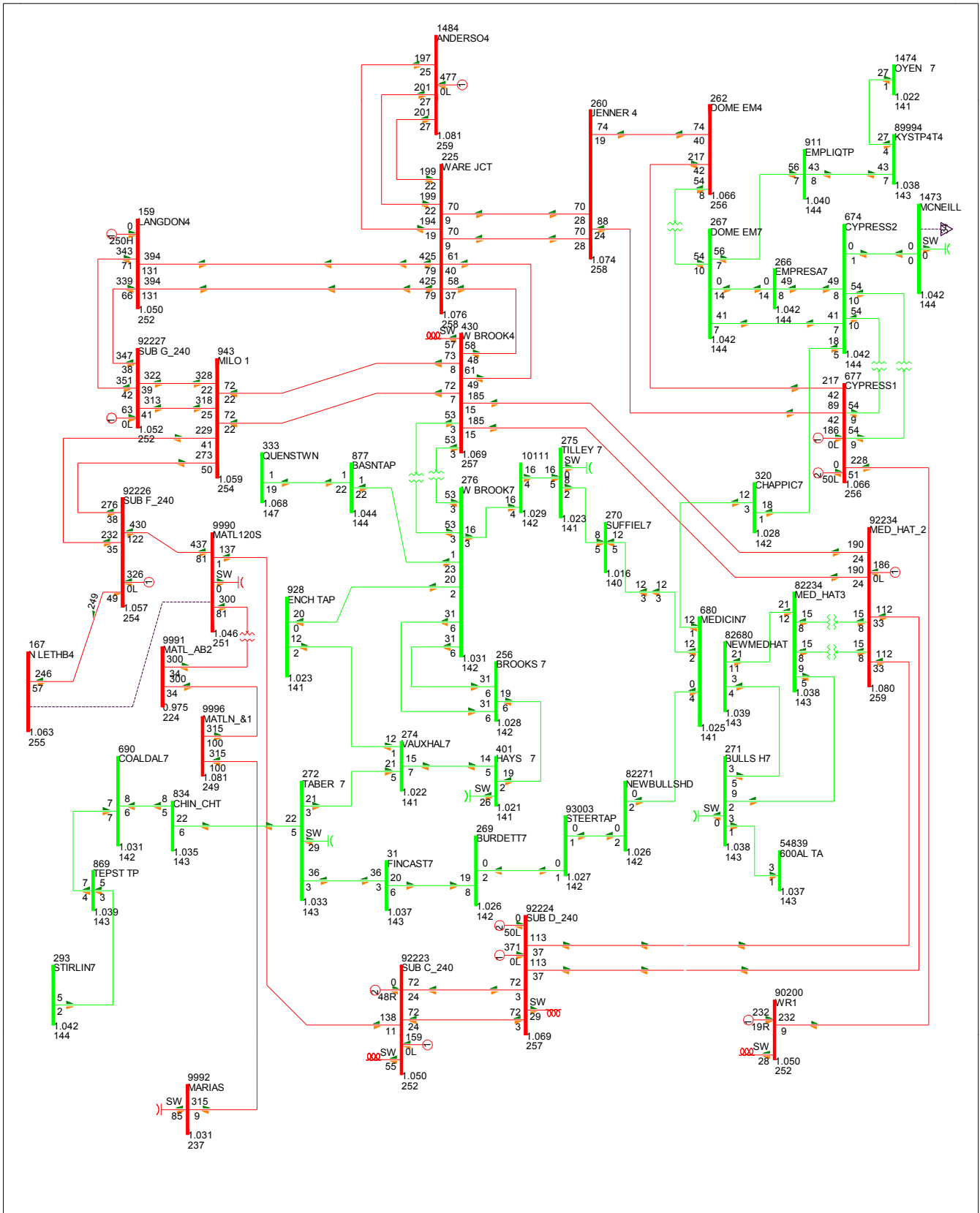


FIG 2017-1A-SL-M-7: N. LETHBRIDGE TO MATL 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 965 MW

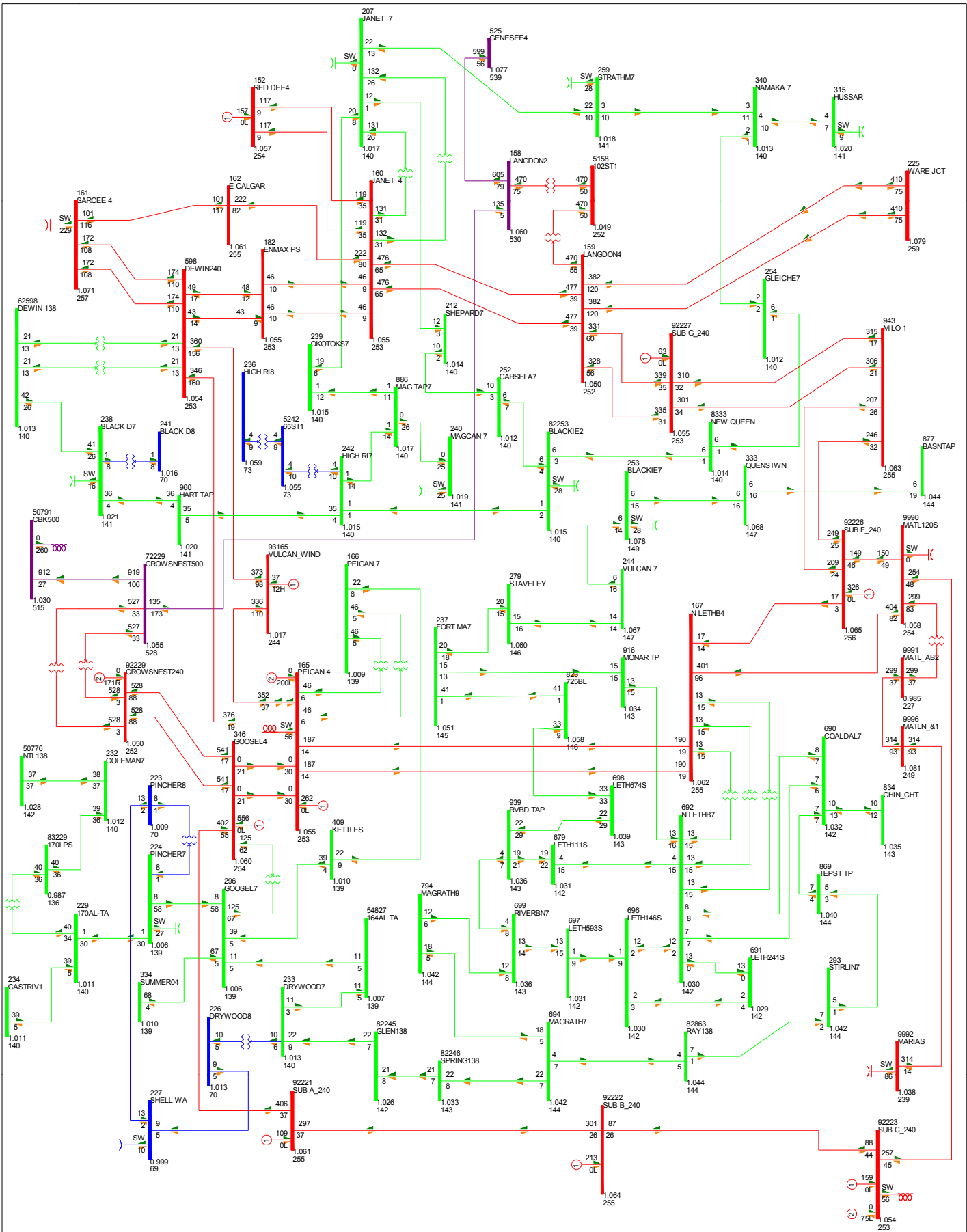


FIG 2017-1A-SL-M-8: WARE JUNCTION TO WESTBROOKS 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 974 MW

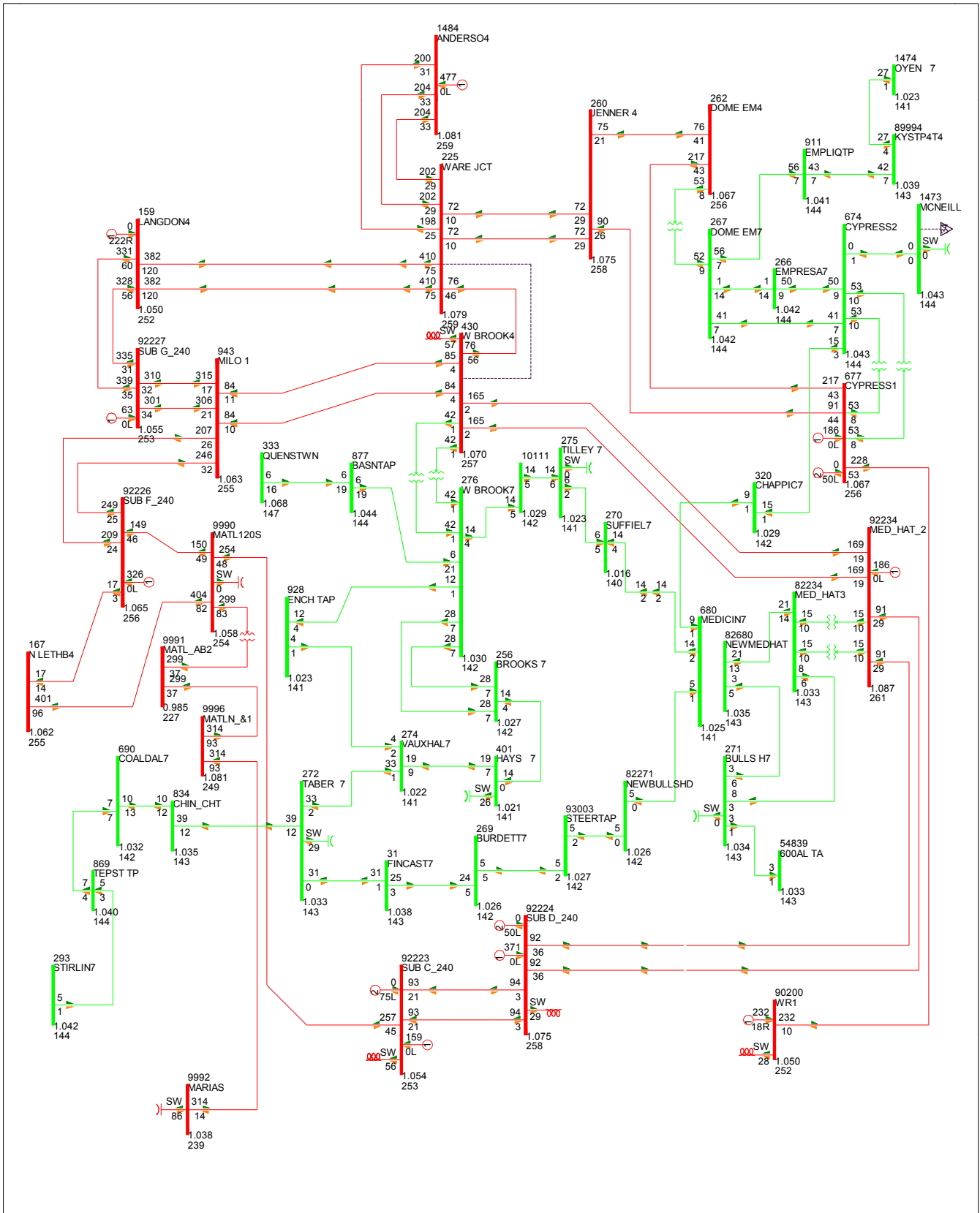


FIG 2017-1A-SL-M-9: WARE JUNCTION TO WESTBROOKS 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 974 MW

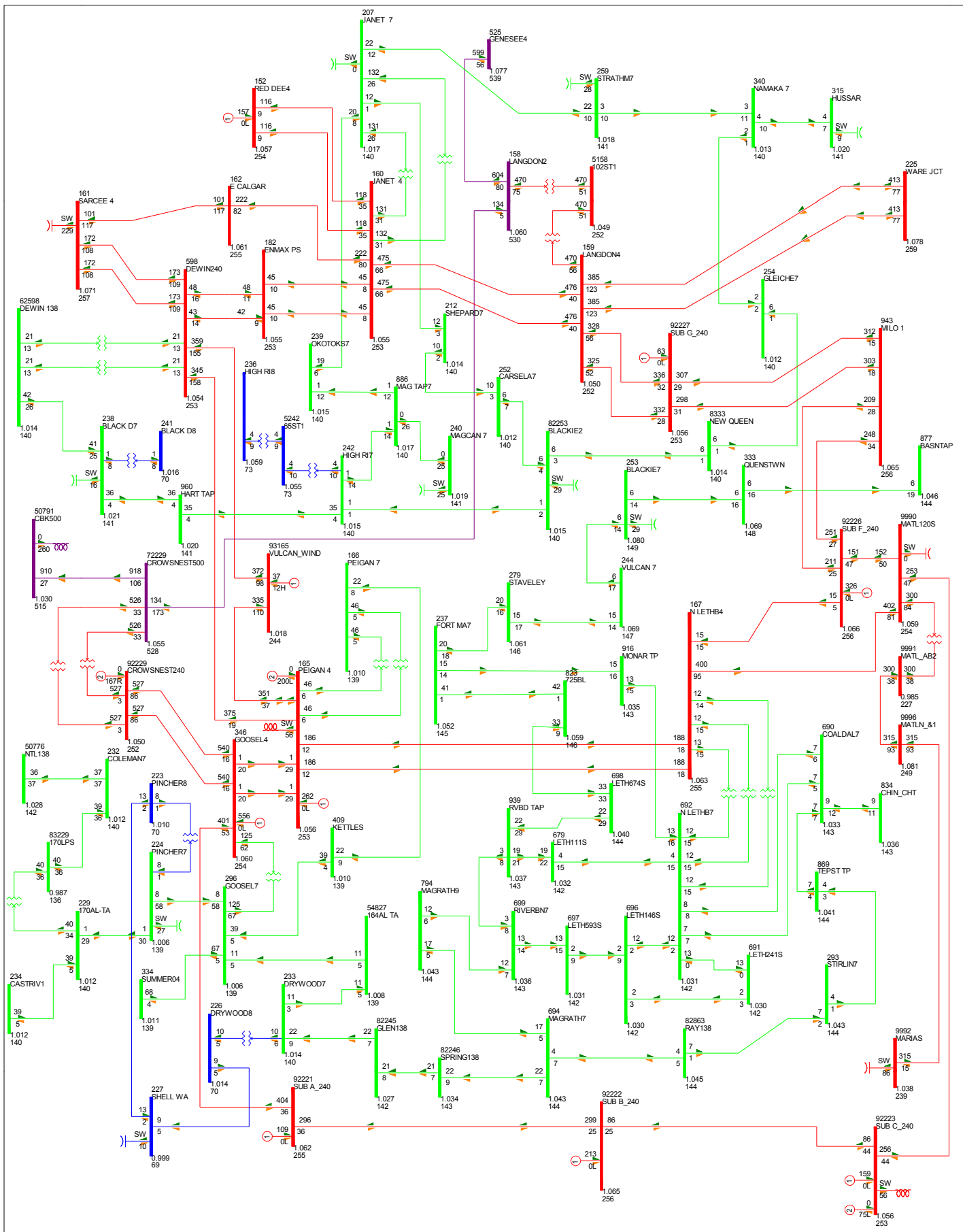


FIG 2017-1A-SL-M-10: JENNER TO CYPRESS 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 973 MW

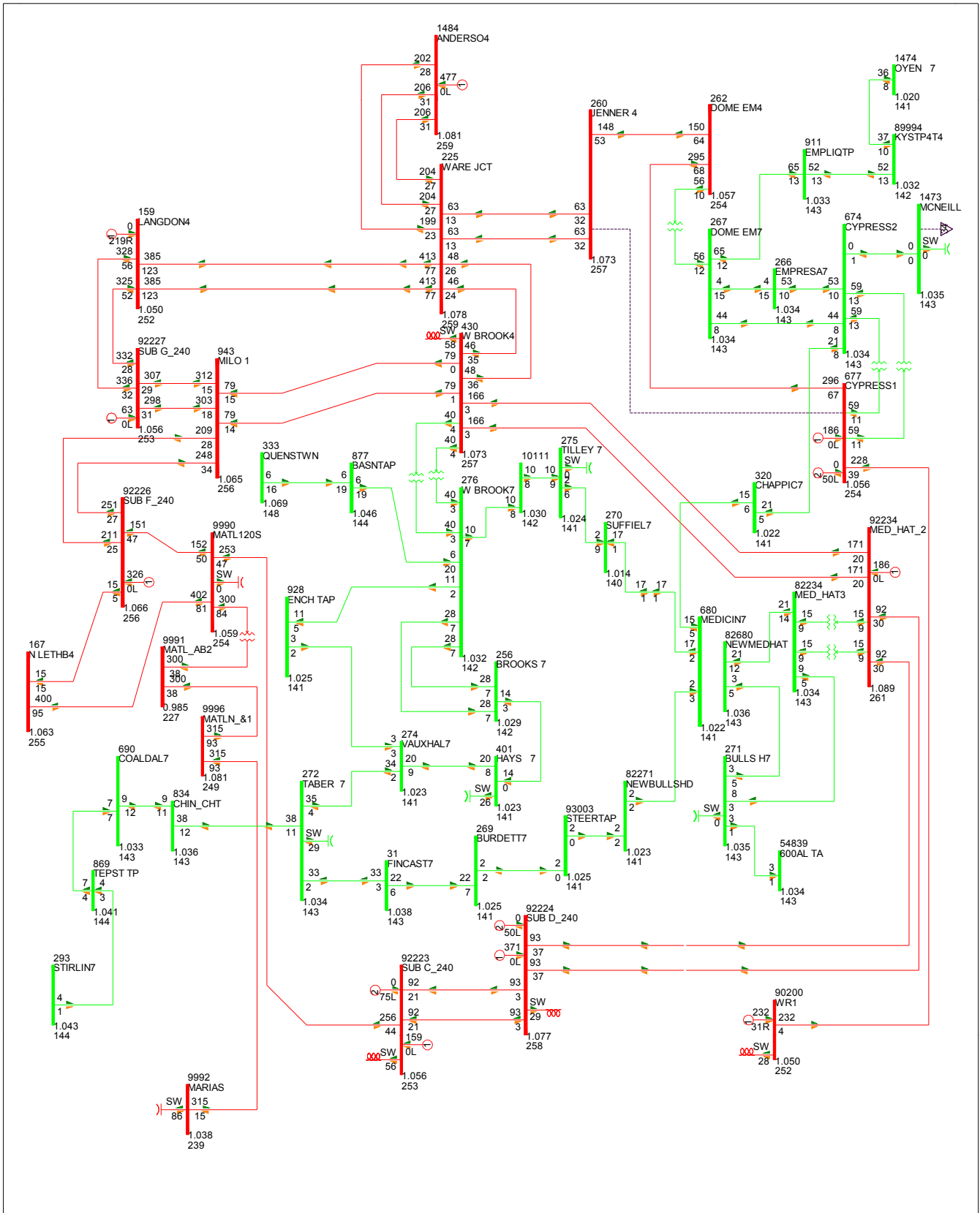


FIG 2017-1A-SL-M-11: JENNER TO CYPRESS 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 973 MW

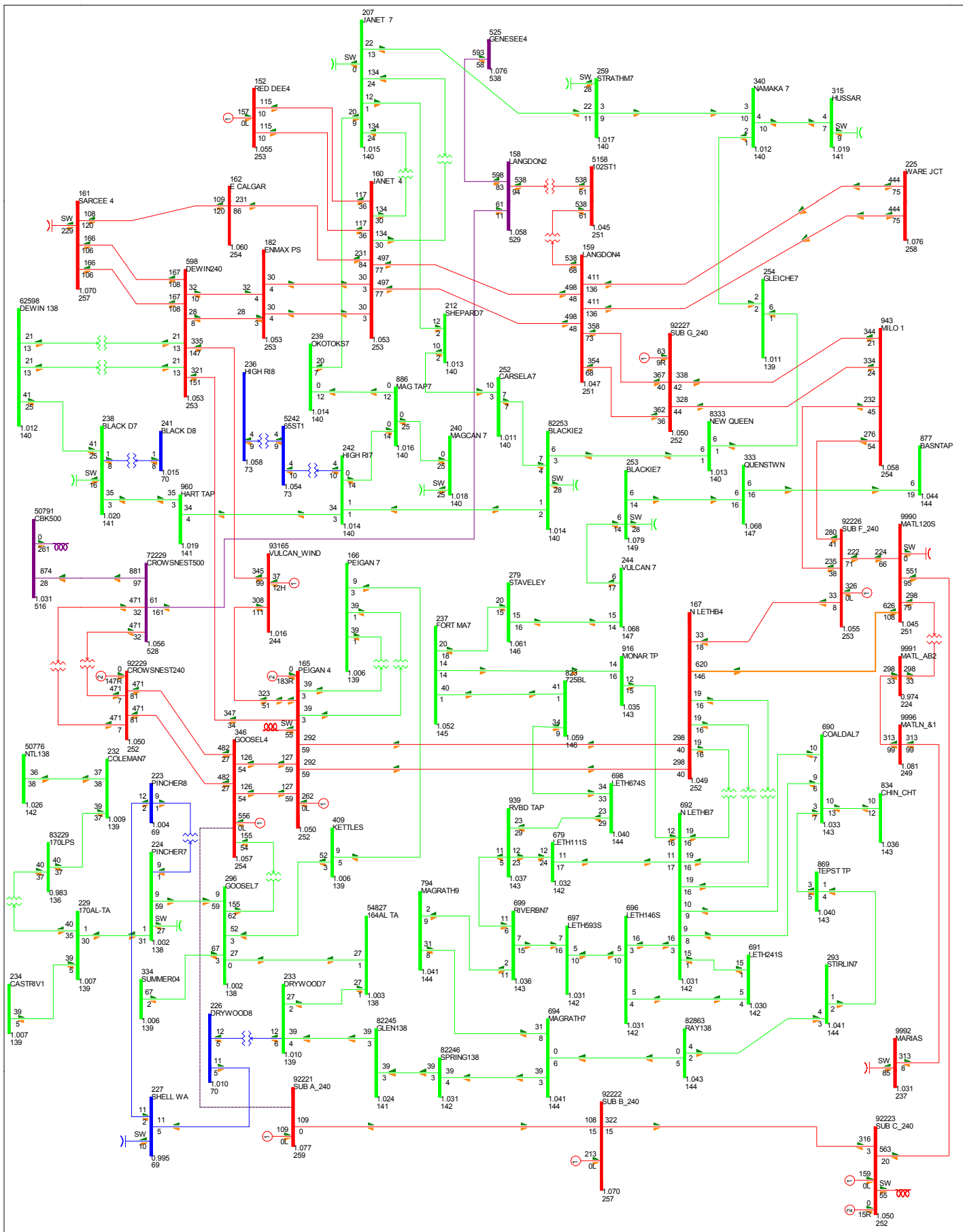


FIG 2017-1A-SL-M-12: GOOSELAKE TO SUB A 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 937 MW

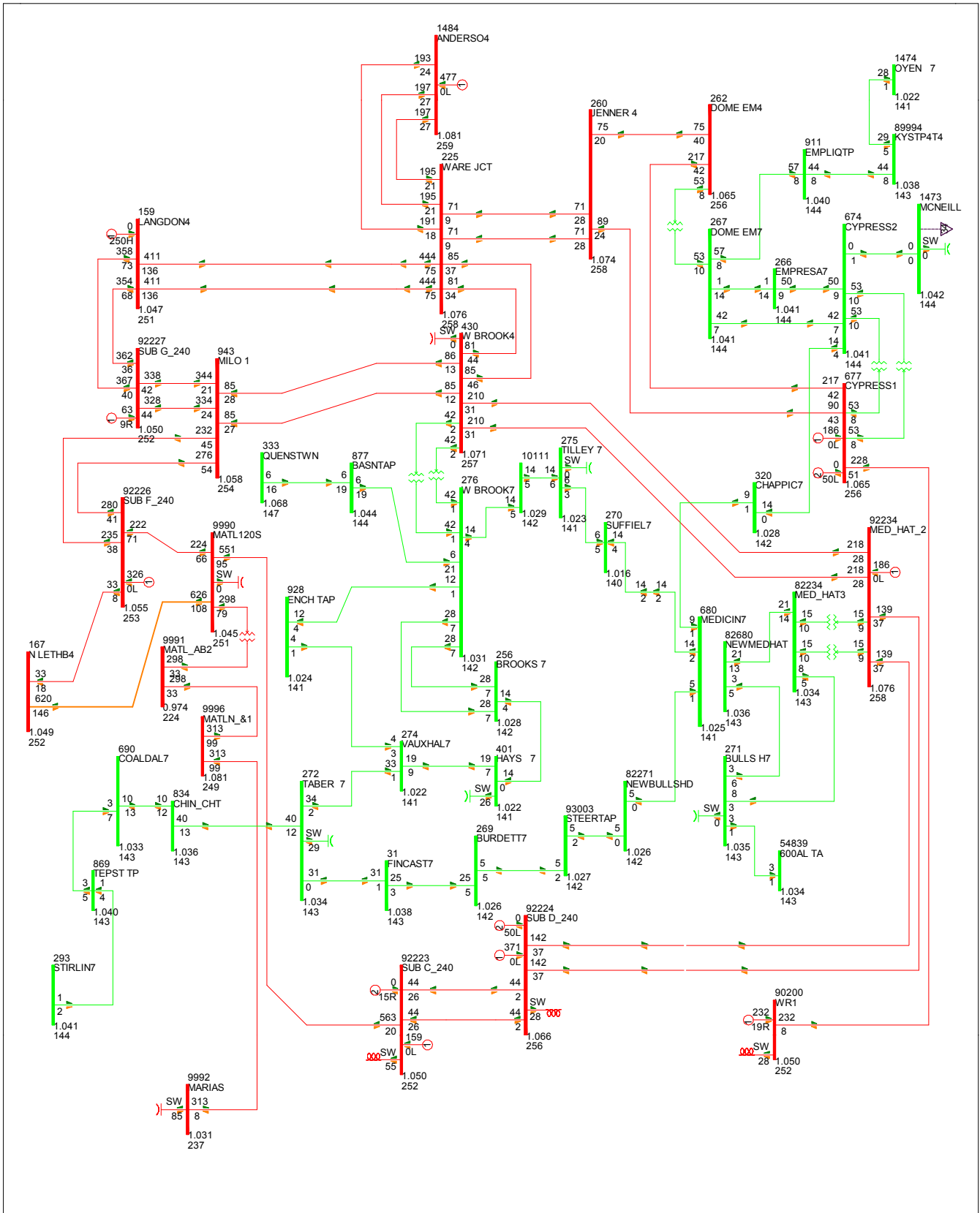


FIG 2017-1A-SL-M-13: GOOSELAKE TO SUB A 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 937 MW

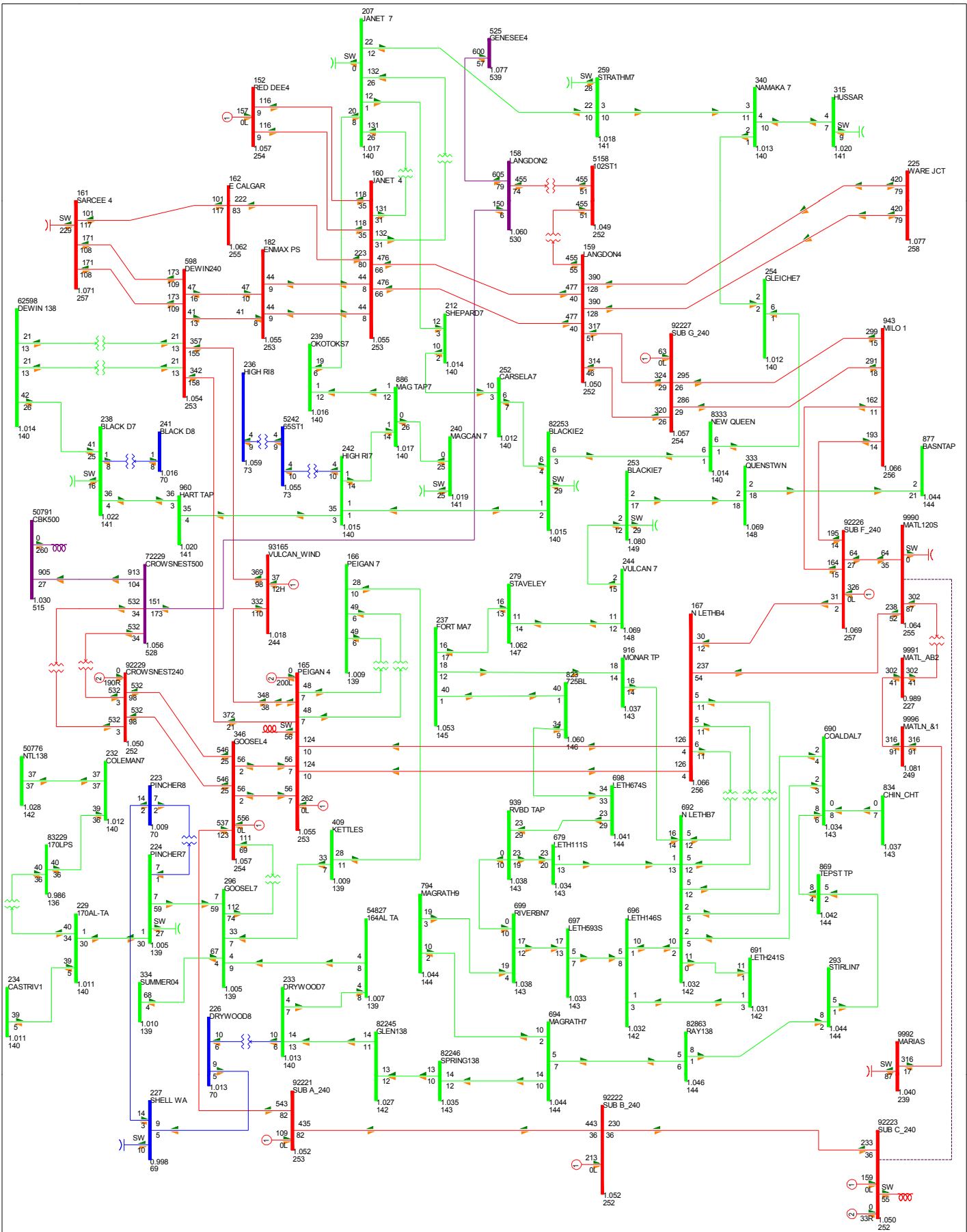


FIG 2017-1A-SL-M-16: SUB C TO MATL 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0% RATEA

KV: $\le 34,500$ $\le 69,000$ $\le 240,000$ $\le 500,000$ >500,000

BC Export: 967 MW

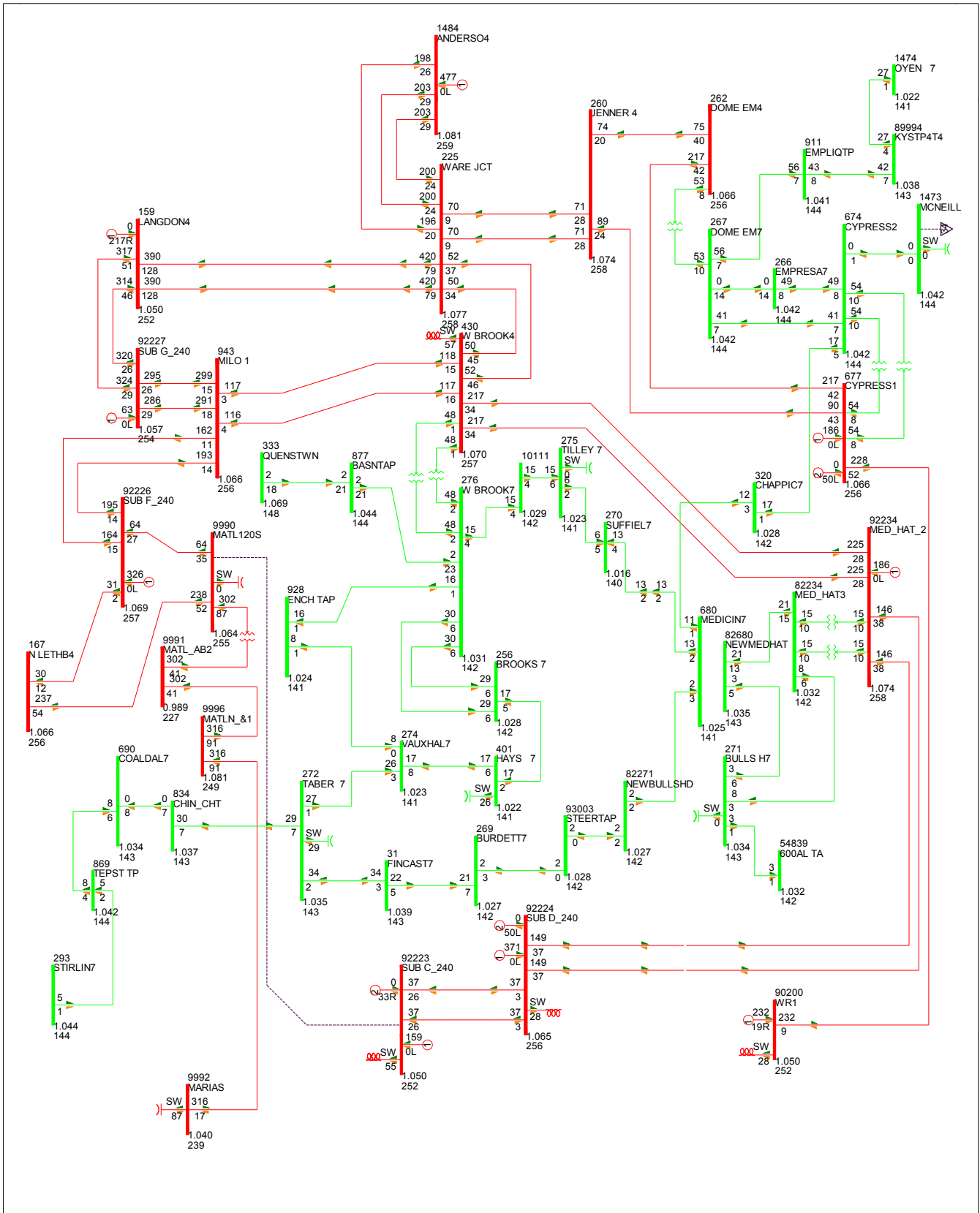


FIG 2017-1A-SL-M-17: SUB C TO MATL 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 967 MW

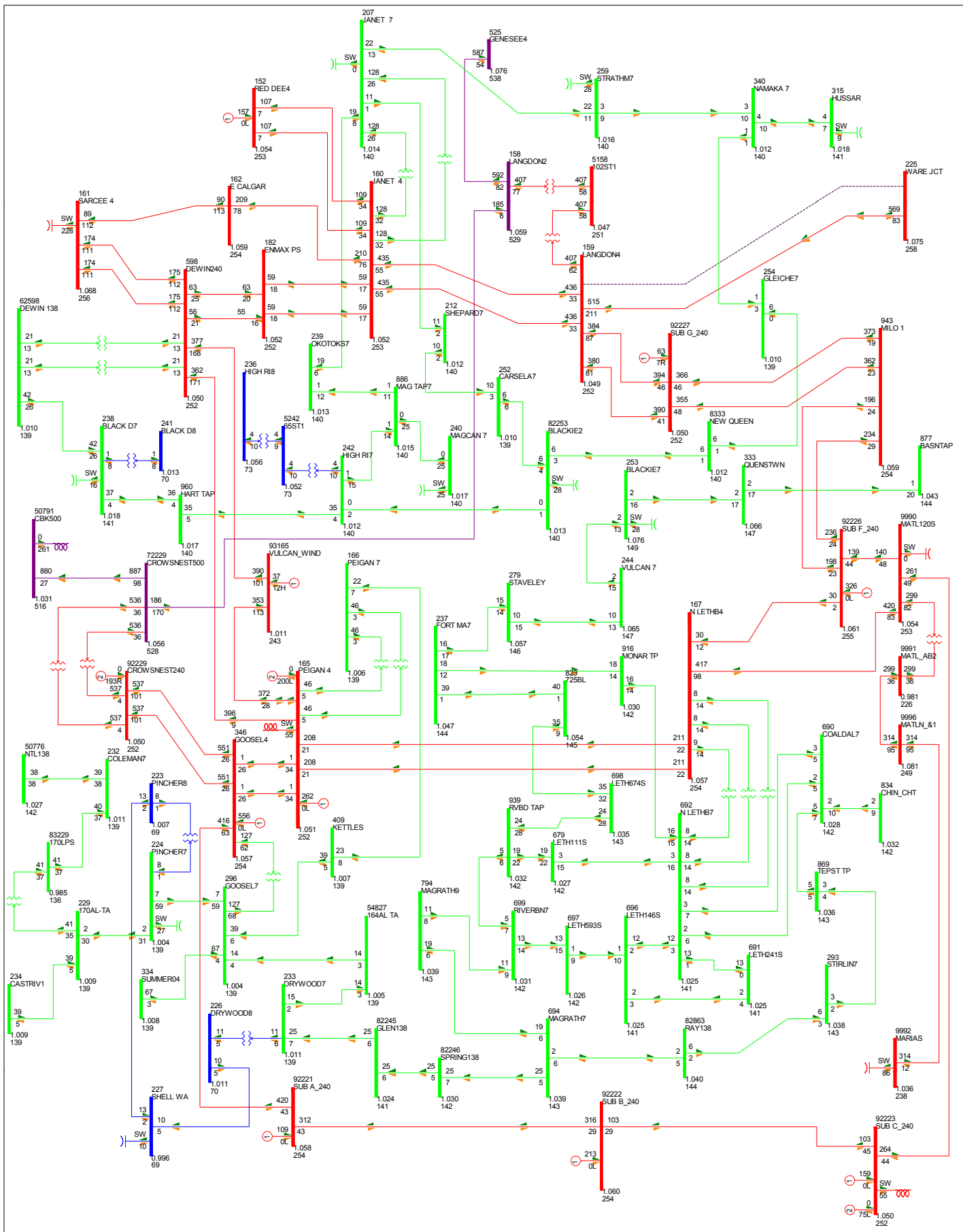


FIG 2017-1A-SL-M-18: WARE JUNCTION TO LANGDON 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 940 MW

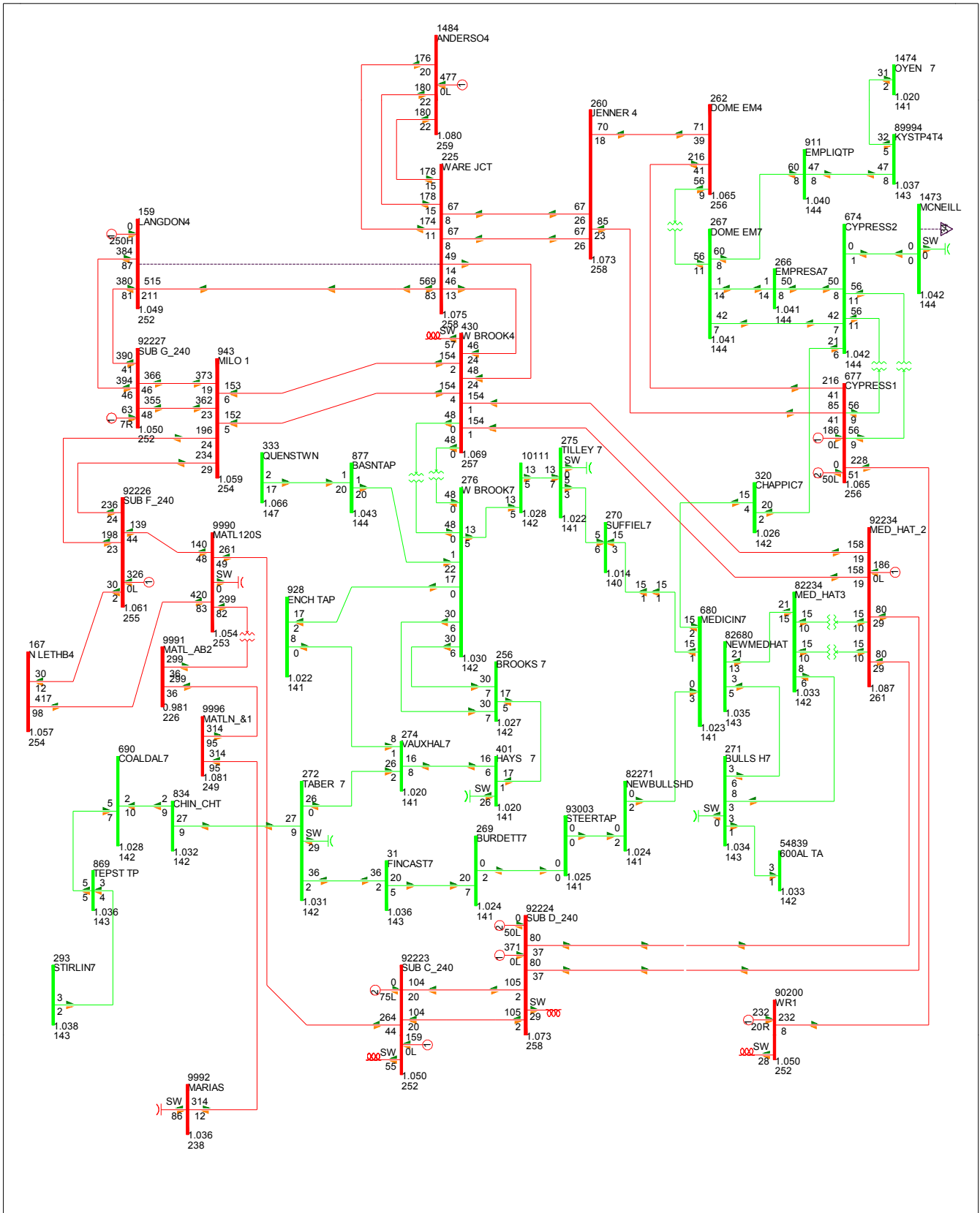


FIG 2017-1A-SL-M-19: WARE JUNCTION TO LANGDON 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 940 MW

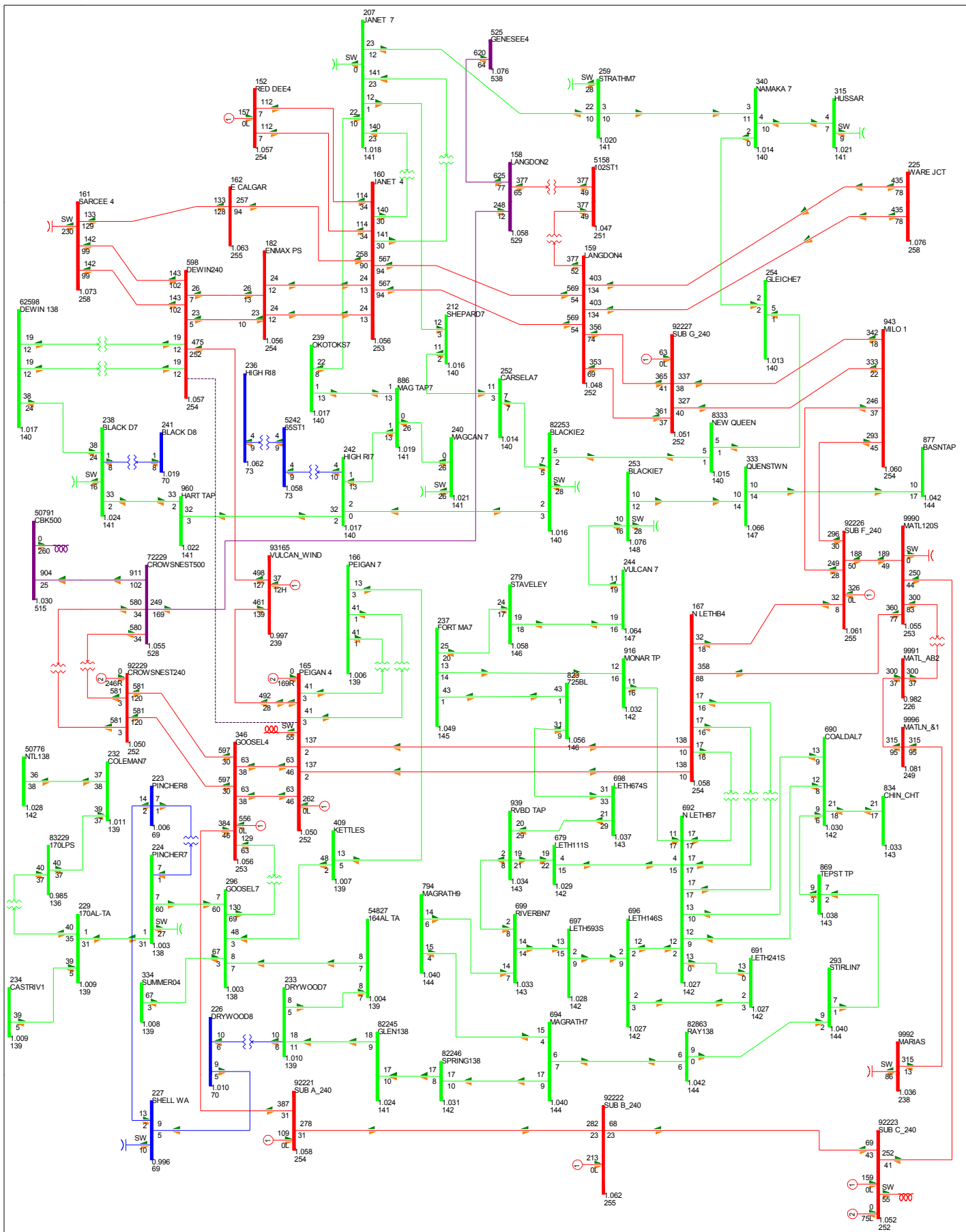


FIG 2017-1A-SL-M-20: PEIGAN TO DEWINTON 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 959 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3634.3 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 497.1 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.

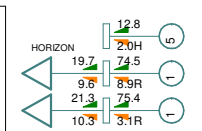
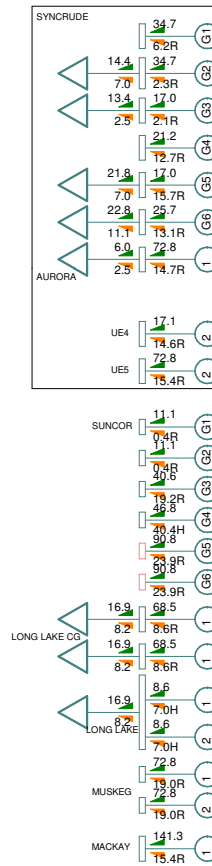
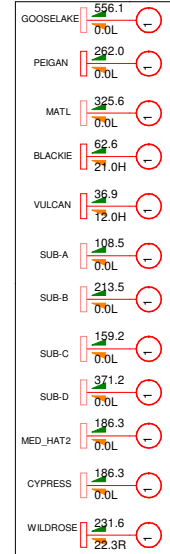
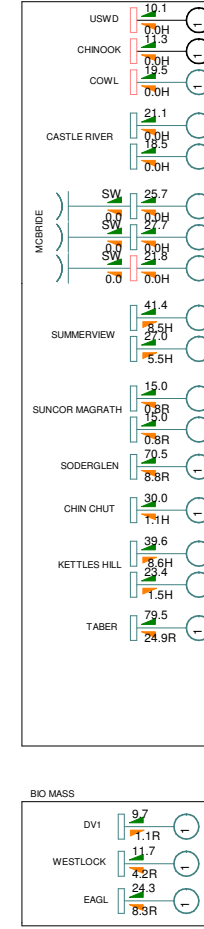
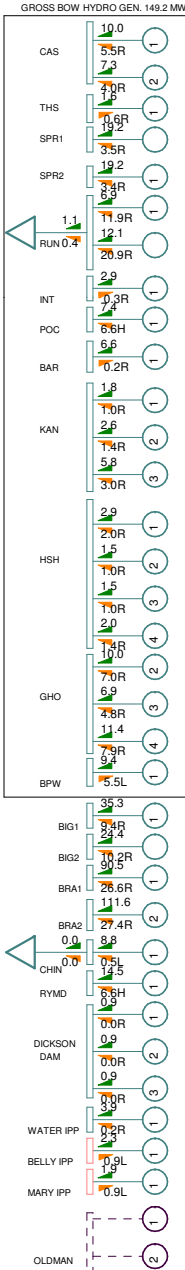
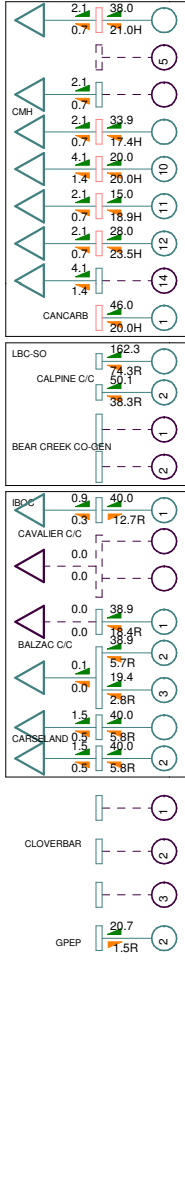
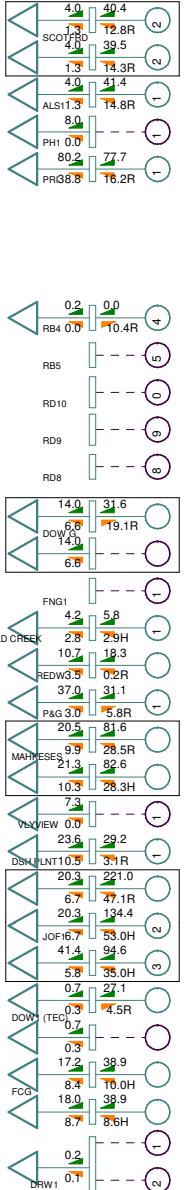
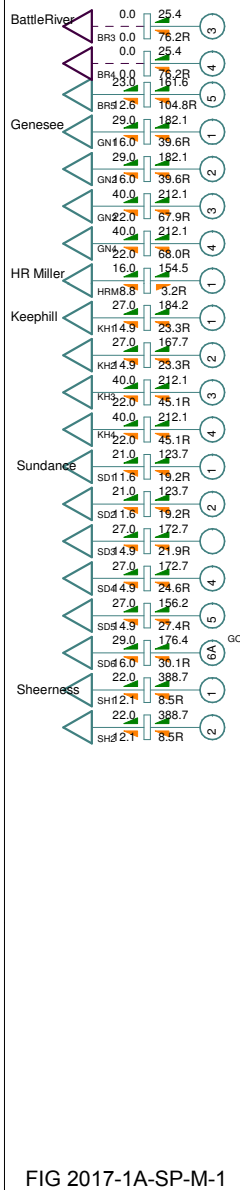


FIG 2017-1A-SP-M-1
GENERATION DISPATCH

2017 SUMMER PEAK CASE
SUN, NOV 23 2009 11:28

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
Tolerance - 0.0500V 0.0500MVA
KV: <-25,000 <-34,500 <-69,000 <-138,000 <-240,000 >240,000

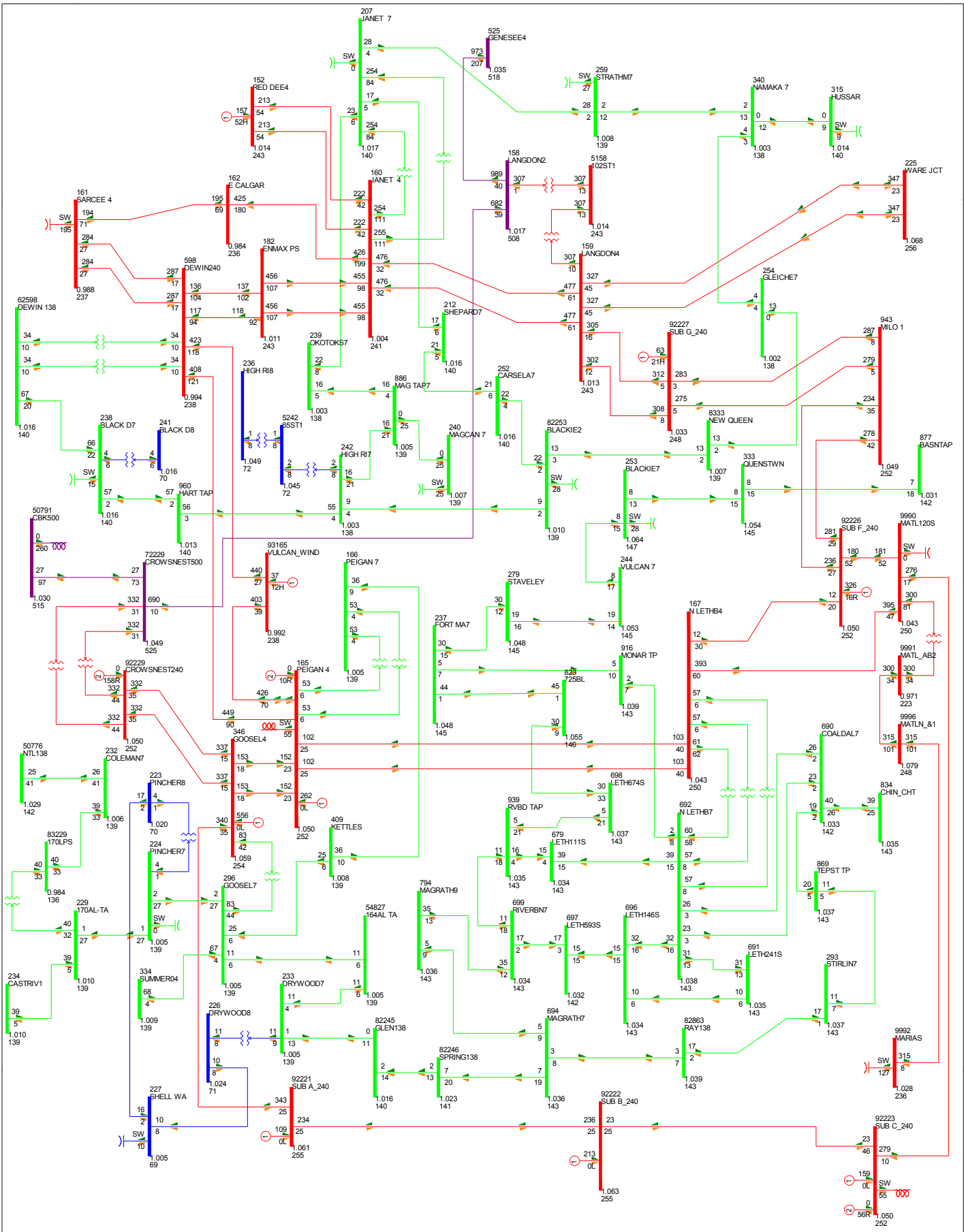


FIG 2017-1A-SP-M-2: N-0 CONDITION

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -37 MW

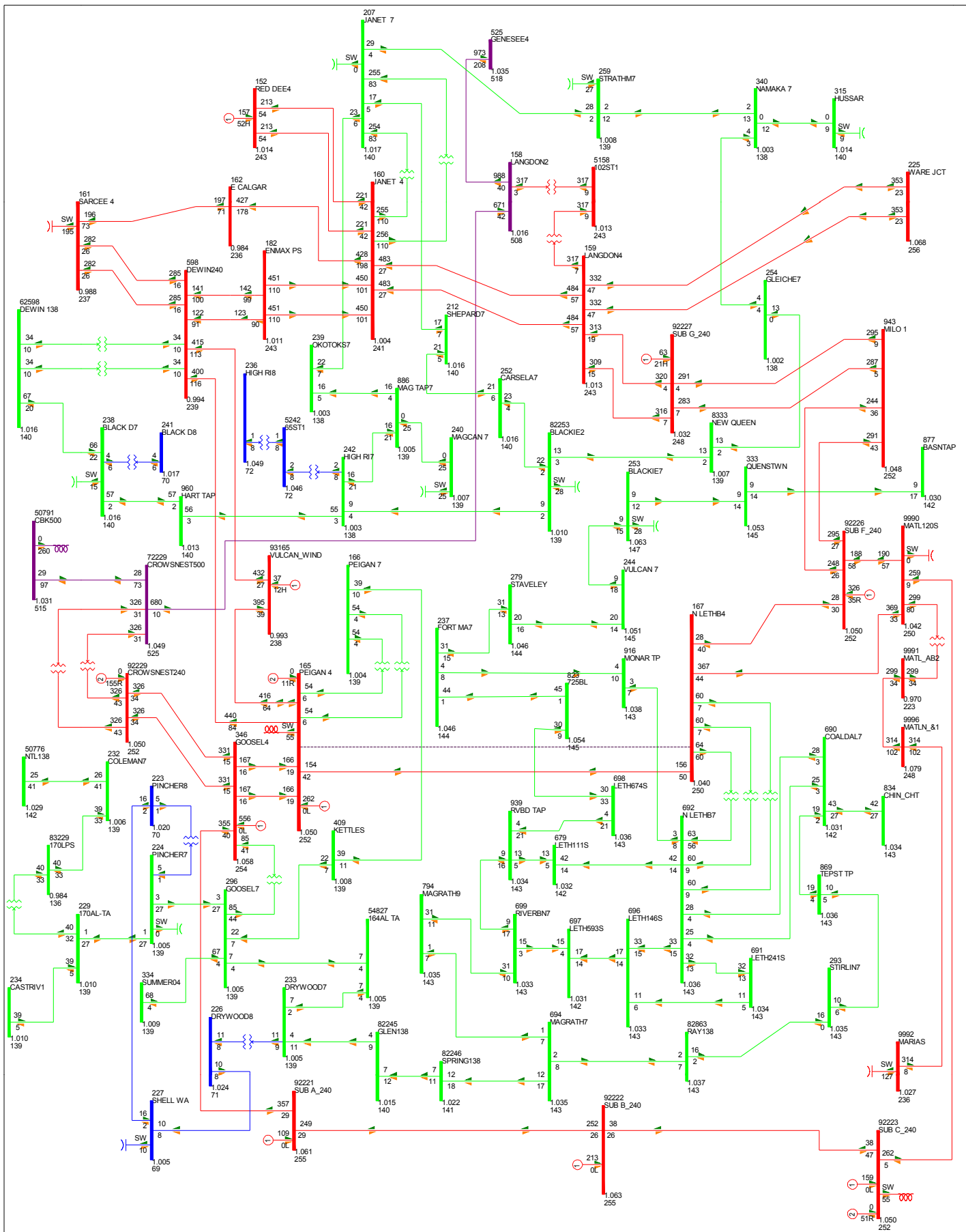


FIG 2017-1A-SP-M-4: PEIGAN TO N. LETHBRIDGE 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -38 MW

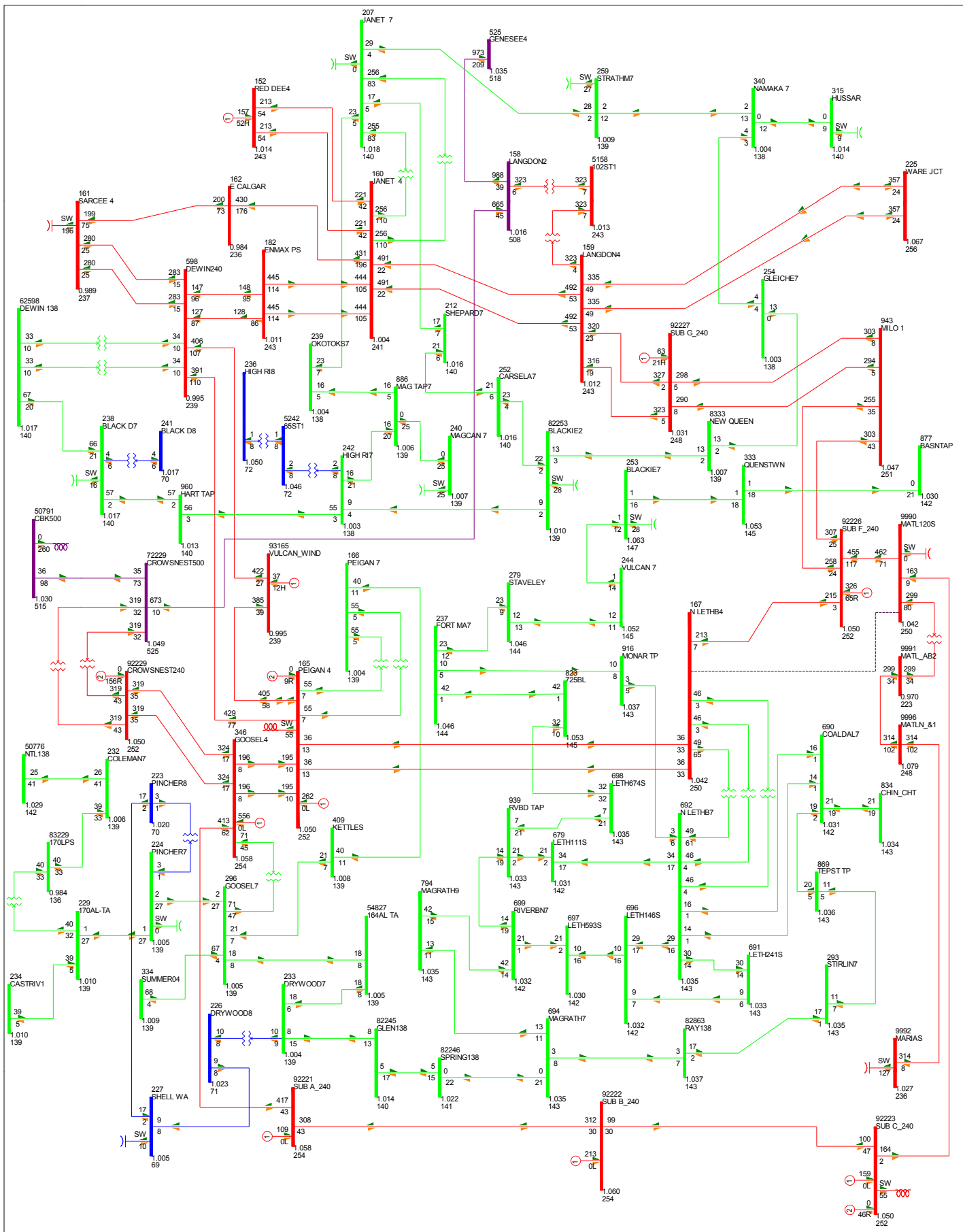


FIG 2017-1A-SP-M-6: N. LETHBRIDGE TO MATL 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -45 MW

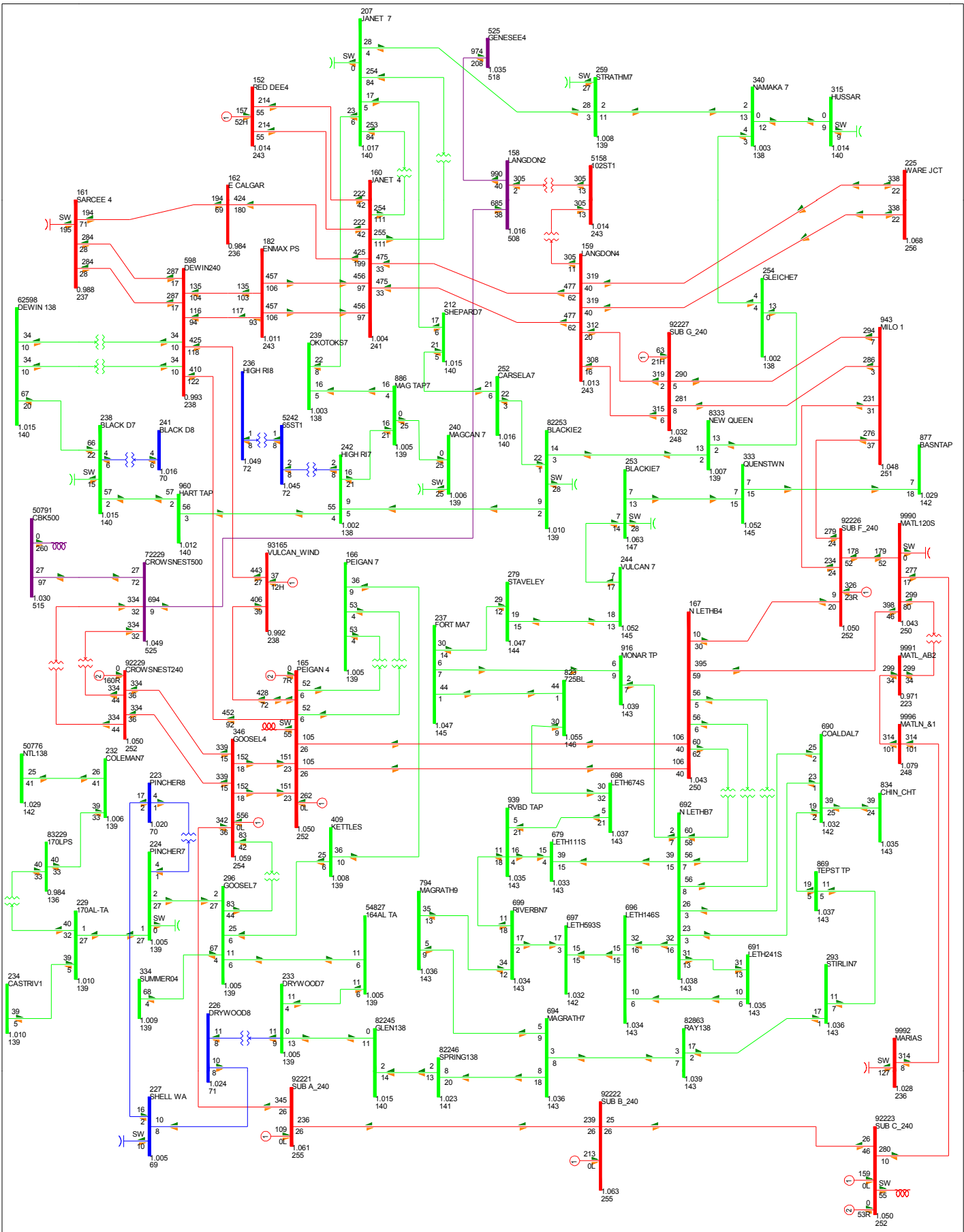


FIG 2017-1A-SP-M-8: WARE JUNCTION TO WESTBROOKS 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -37 MW

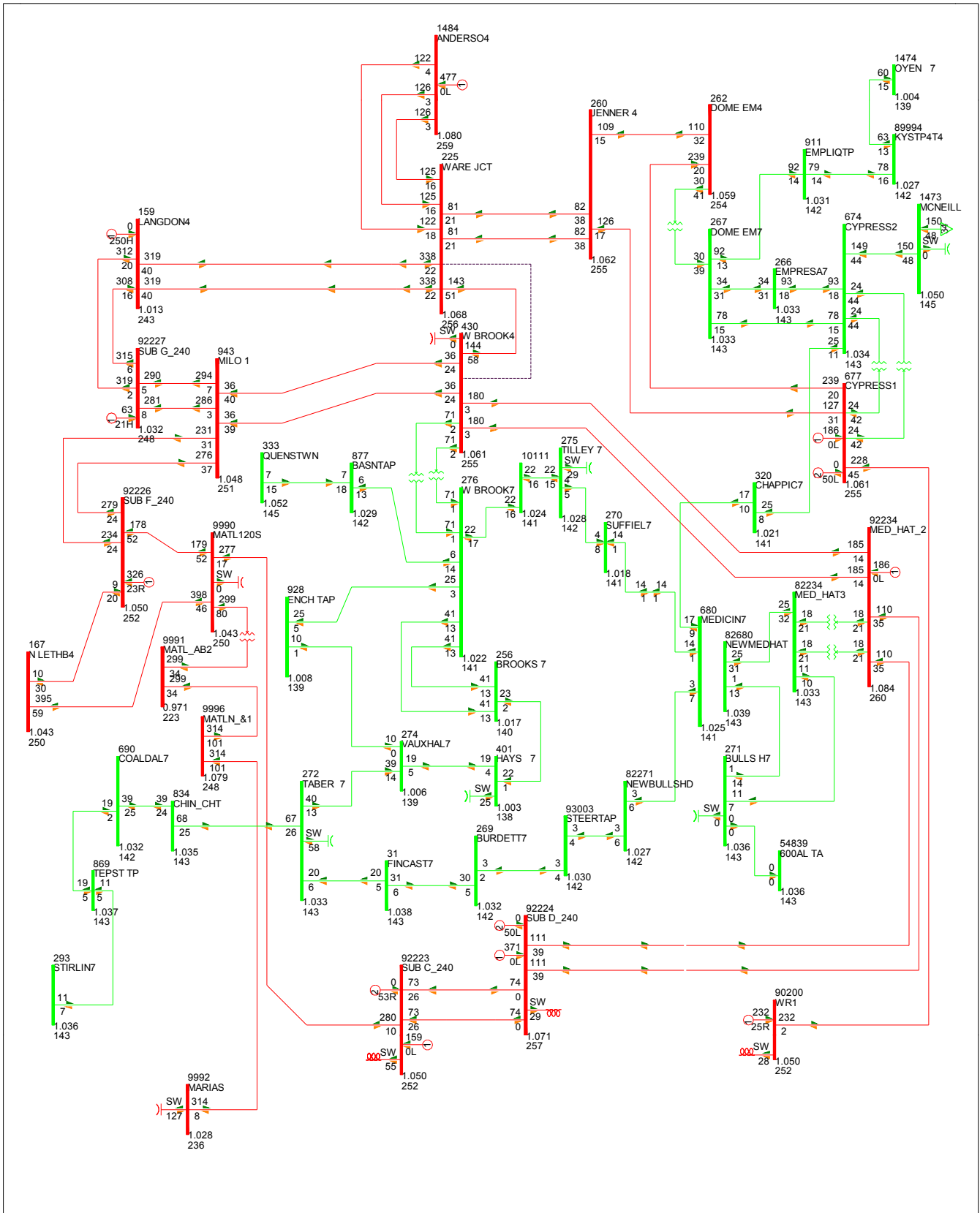


FIG 2017-1A-SP-M-9: WARE JUNCTION TO WESTBROOKS 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -37 MW

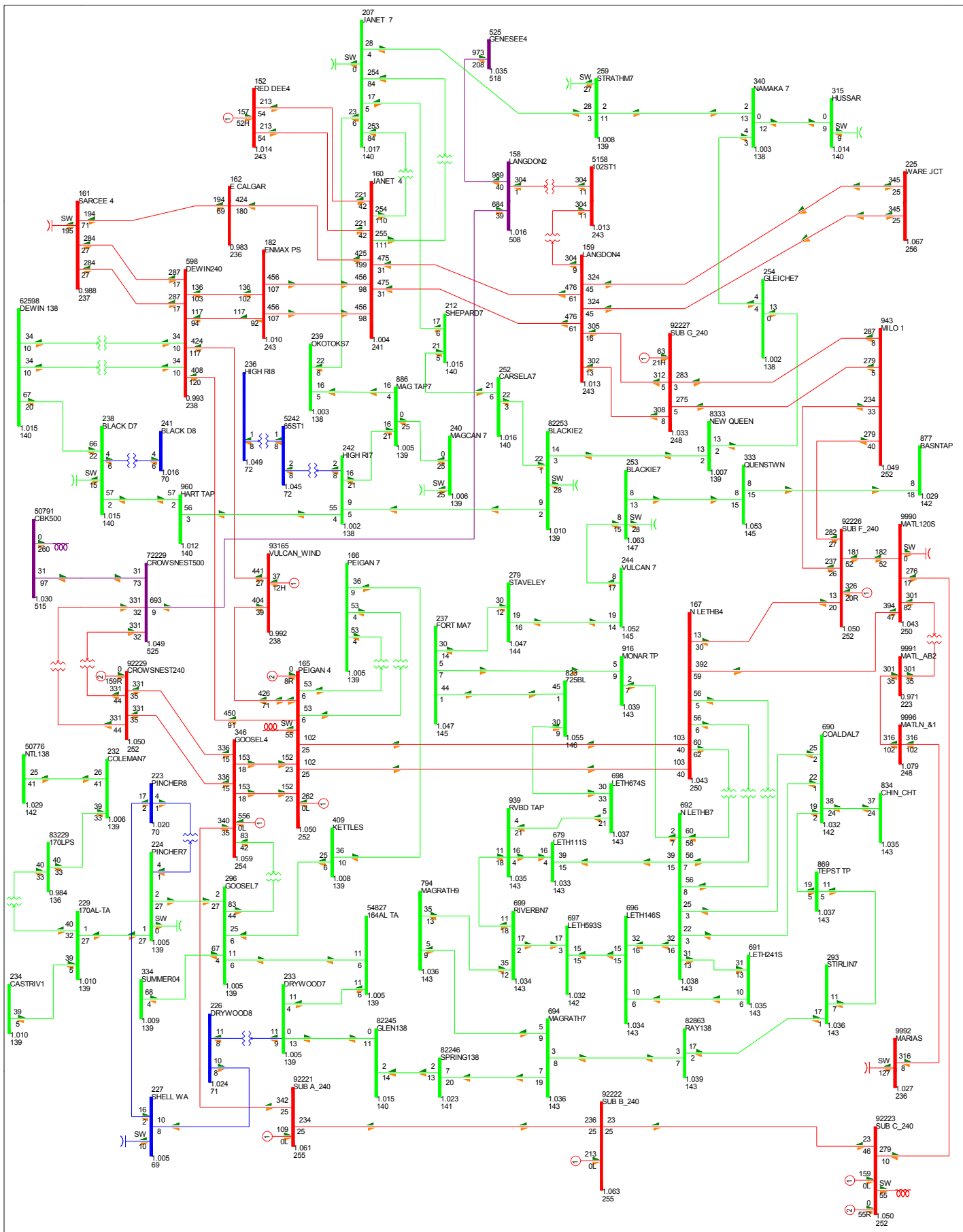


FIG 2017-1A-SP-M-10: JENNER TO CYPRESS 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -41 MW

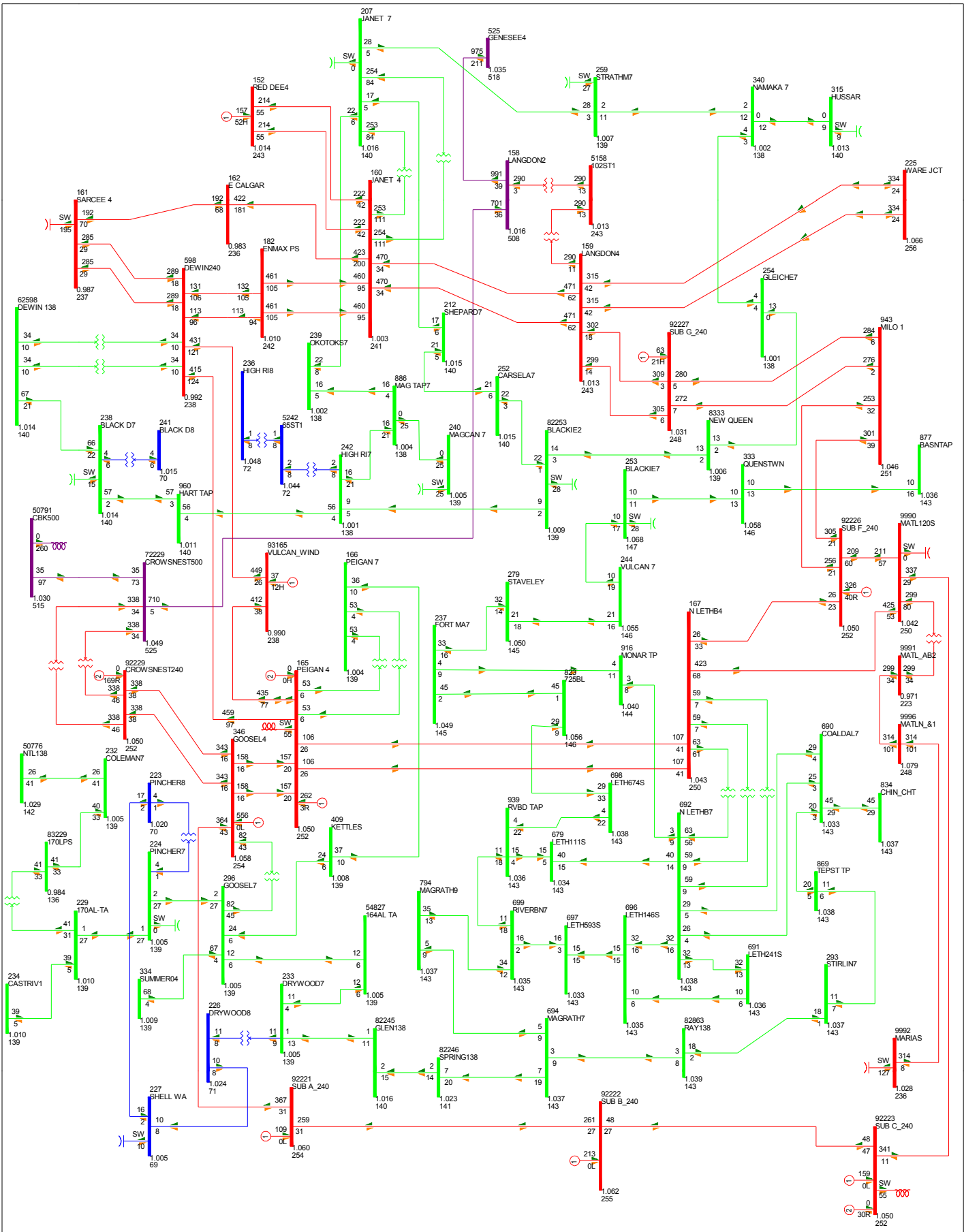


FIG 2017-1A-SP-M-14: WESTBROOKS TO MEDHAT 2 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -45 MW

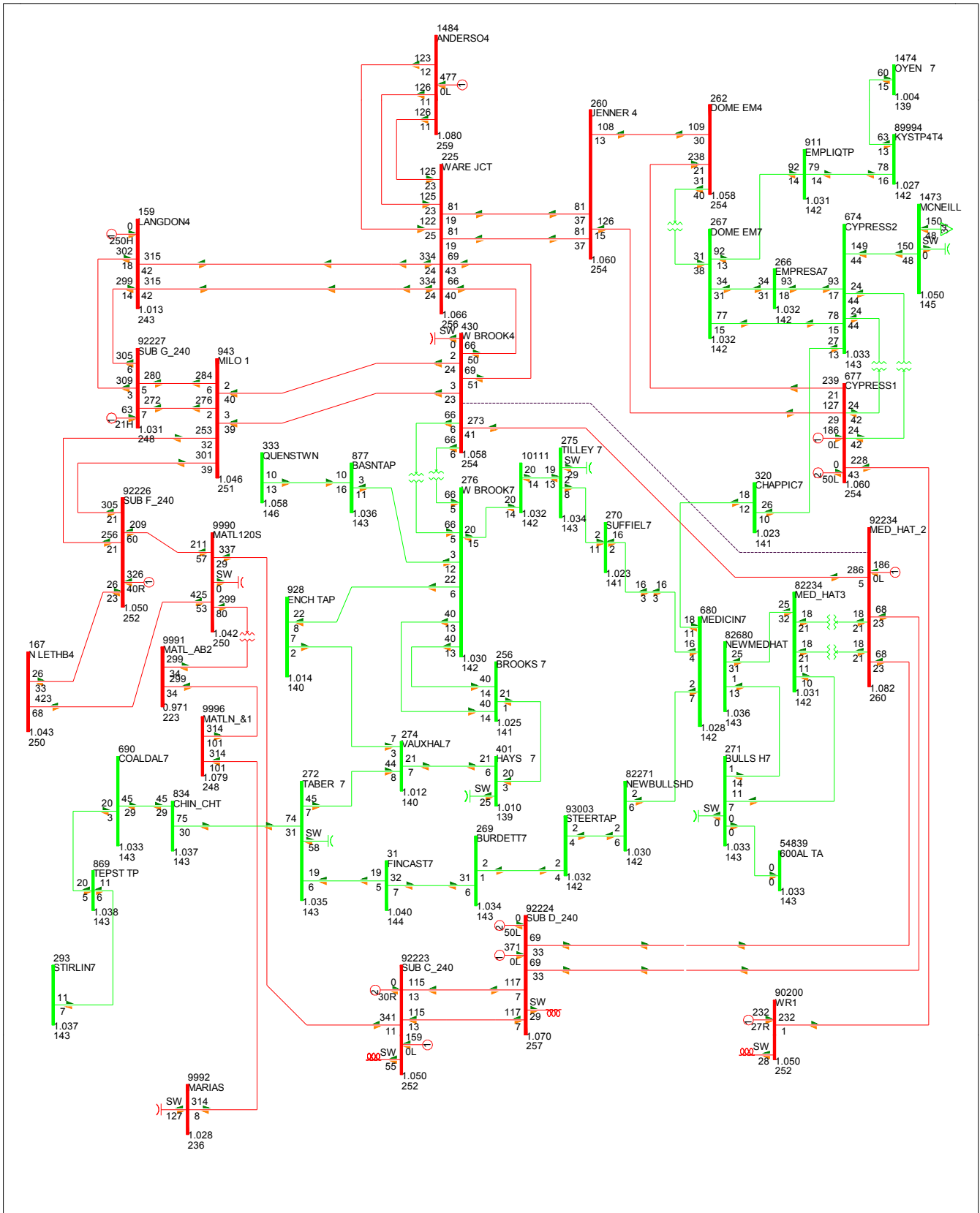


FIG 2017-1A-SP-M-15: WESTBROOKS TO MEDHAT 2 240 KV
 MATL 300 MW IMPORT SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -45 MW

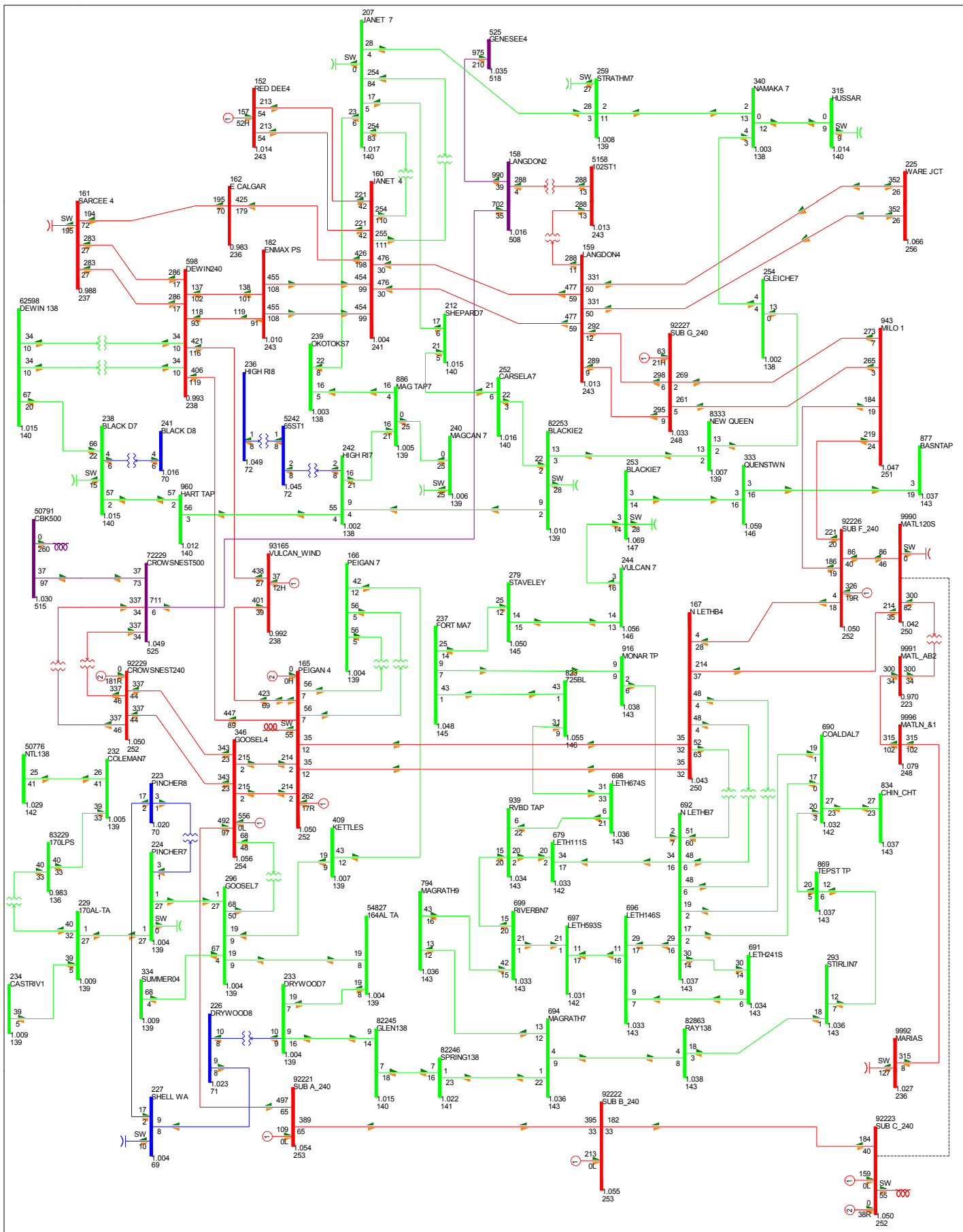


FIG 2017-1A-SP-M-16: SUB C TO MATL 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -48 MW

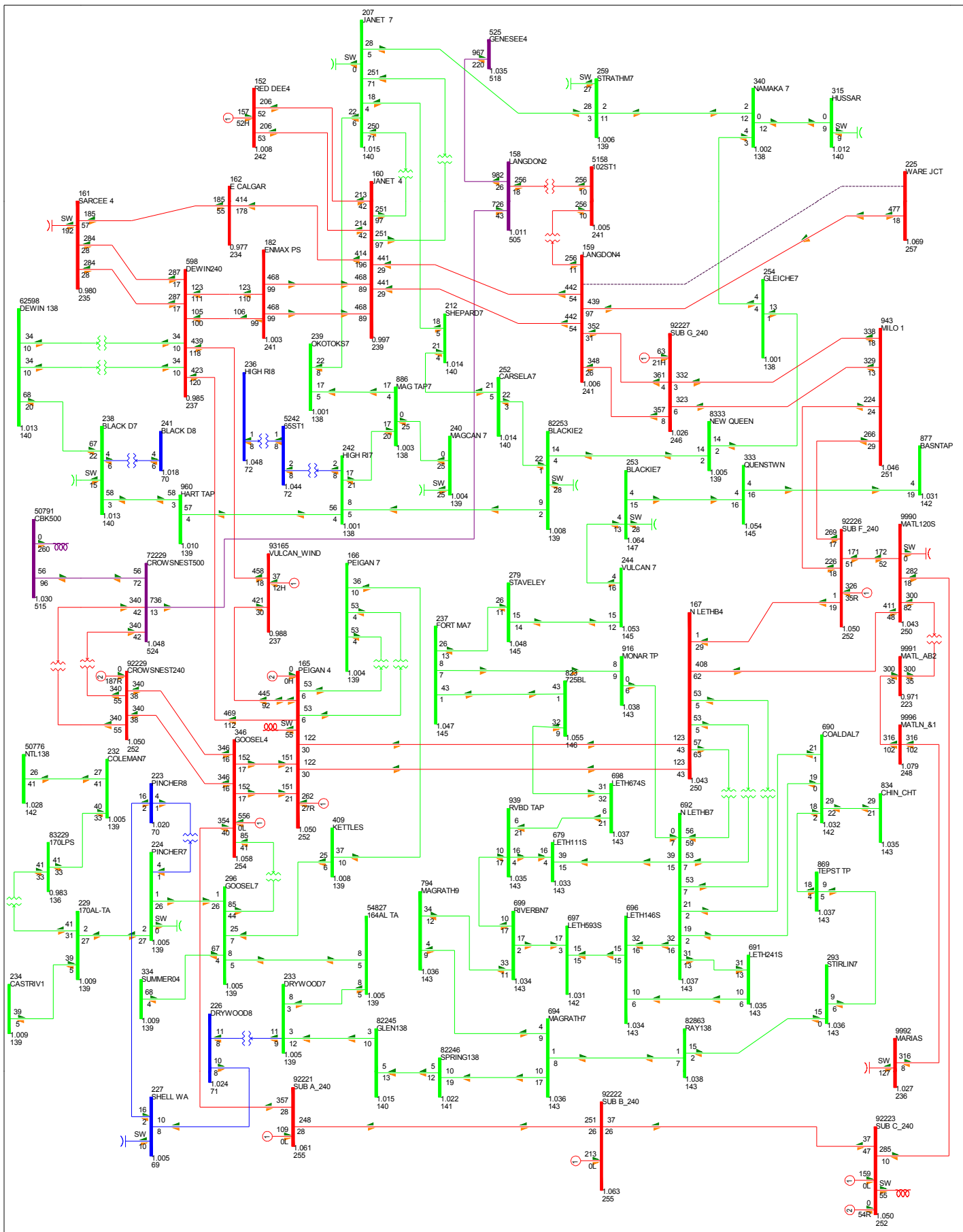


FIG 2017-1A-SP-M-18: WARE JUNCTION TO LANGDON 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -67 MW

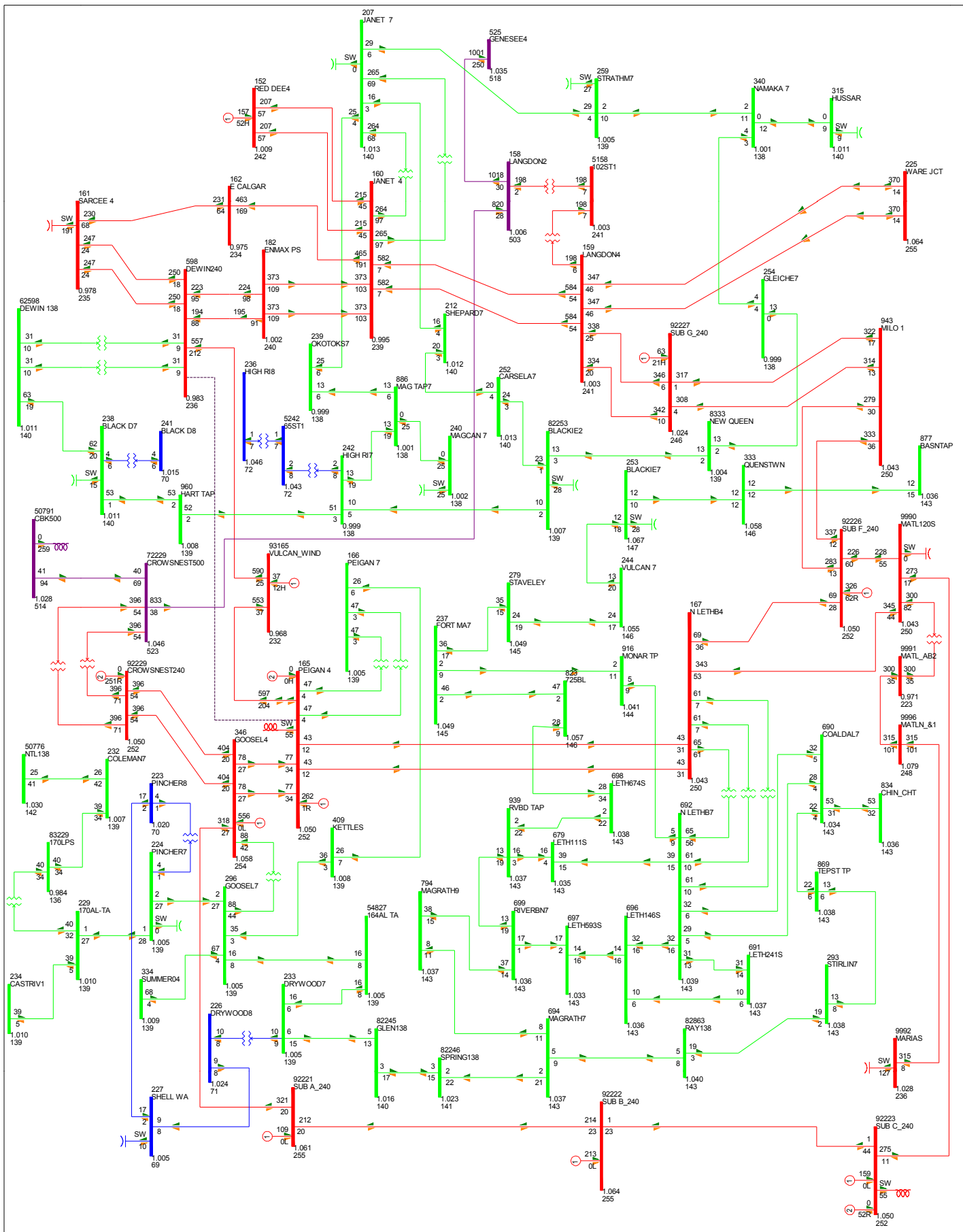


FIG 2017-1A-SP-M-20: PEIGAN TO DEWINTON 240 KV

MATL 300 MW IMPORT SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -60 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3241.5 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 477.6 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.

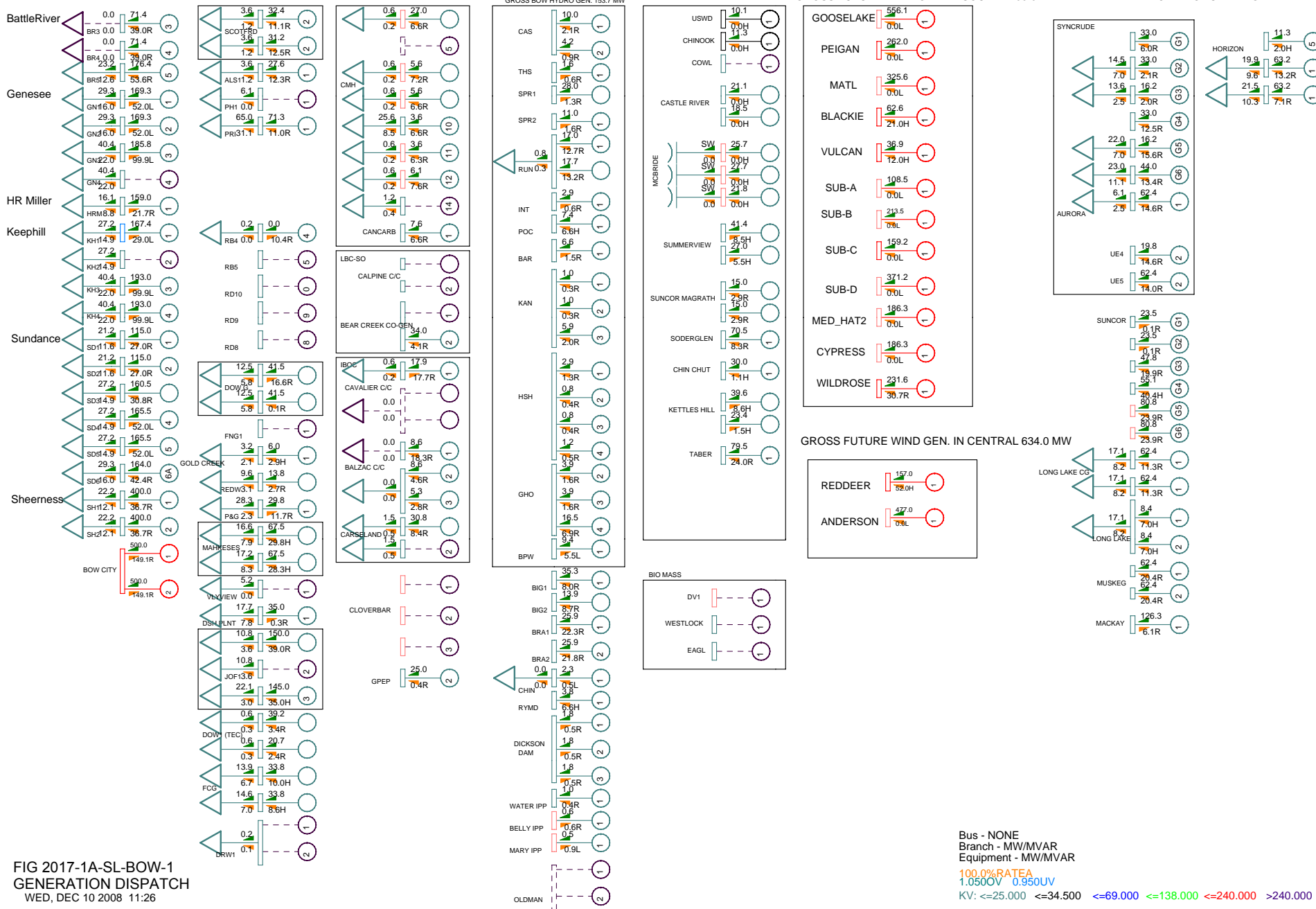


FIG 2017-1A-SL-BOW-1
GENERATION DISPATCH
WED, DEC 10 2008 11:26

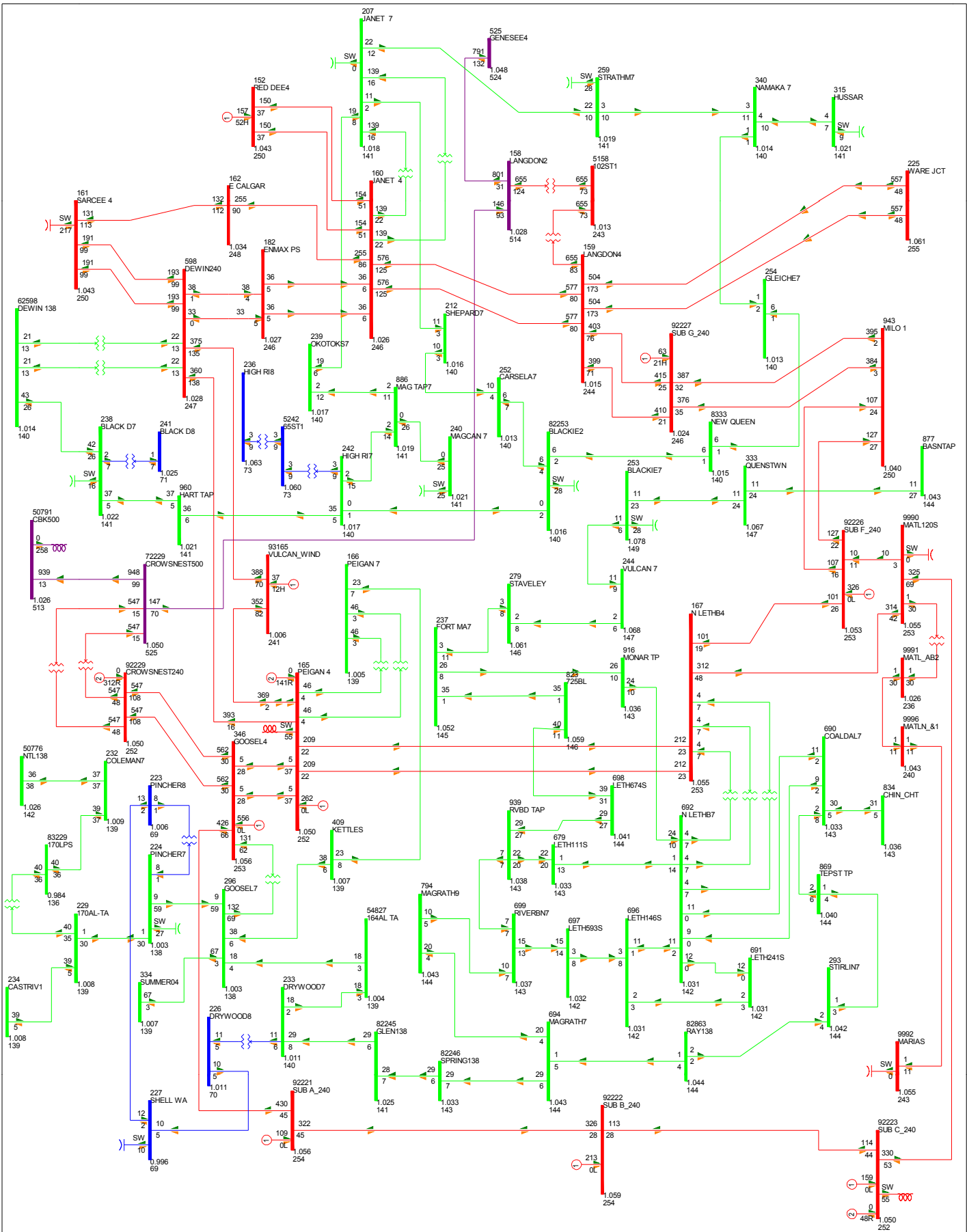


FIG 2017-1A-SL-BOW-2: N-0 CONDITION

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 1001 MW

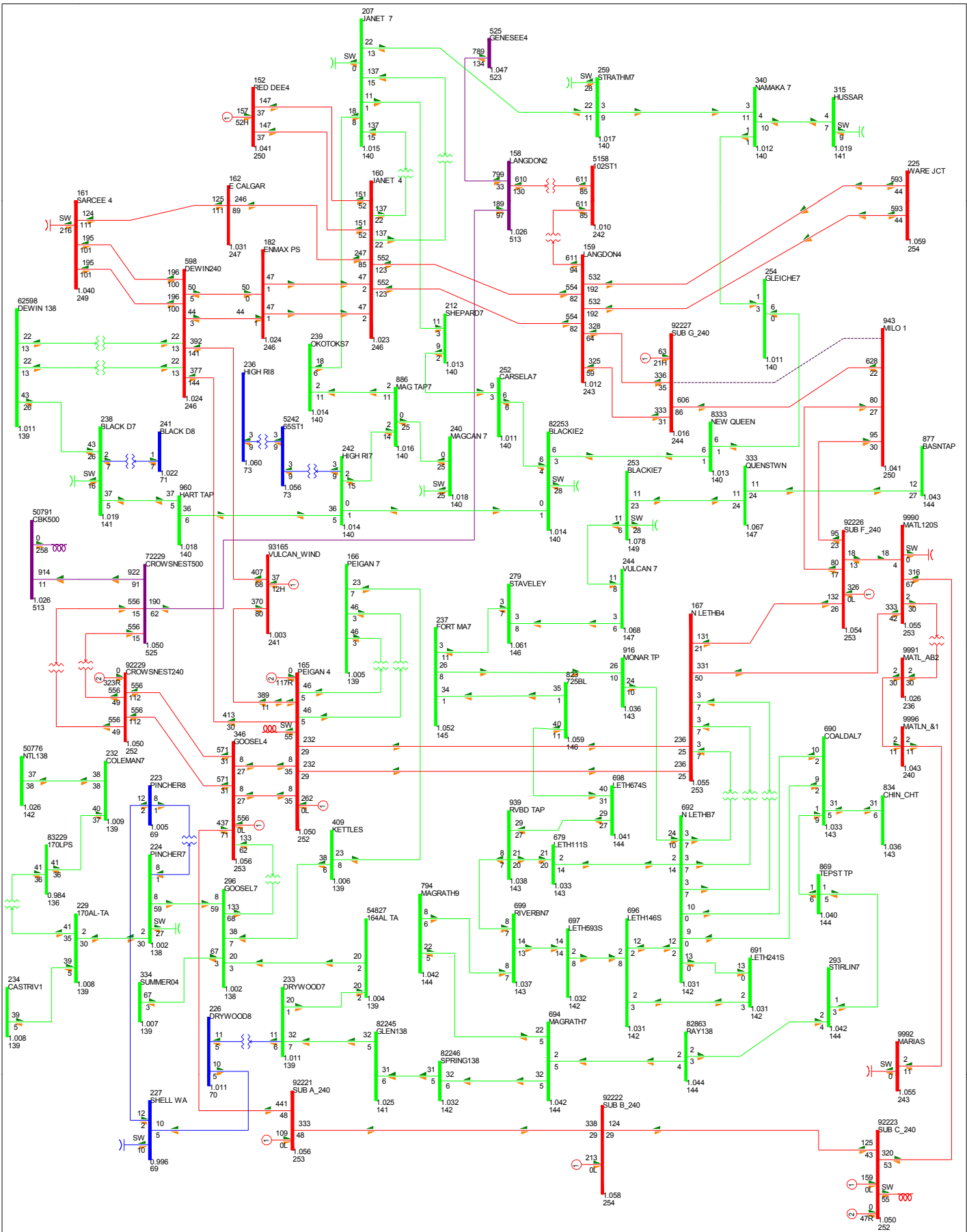


FIG 2017-1A-SL-BOW-4: MILO TO SUB G 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 974 MW

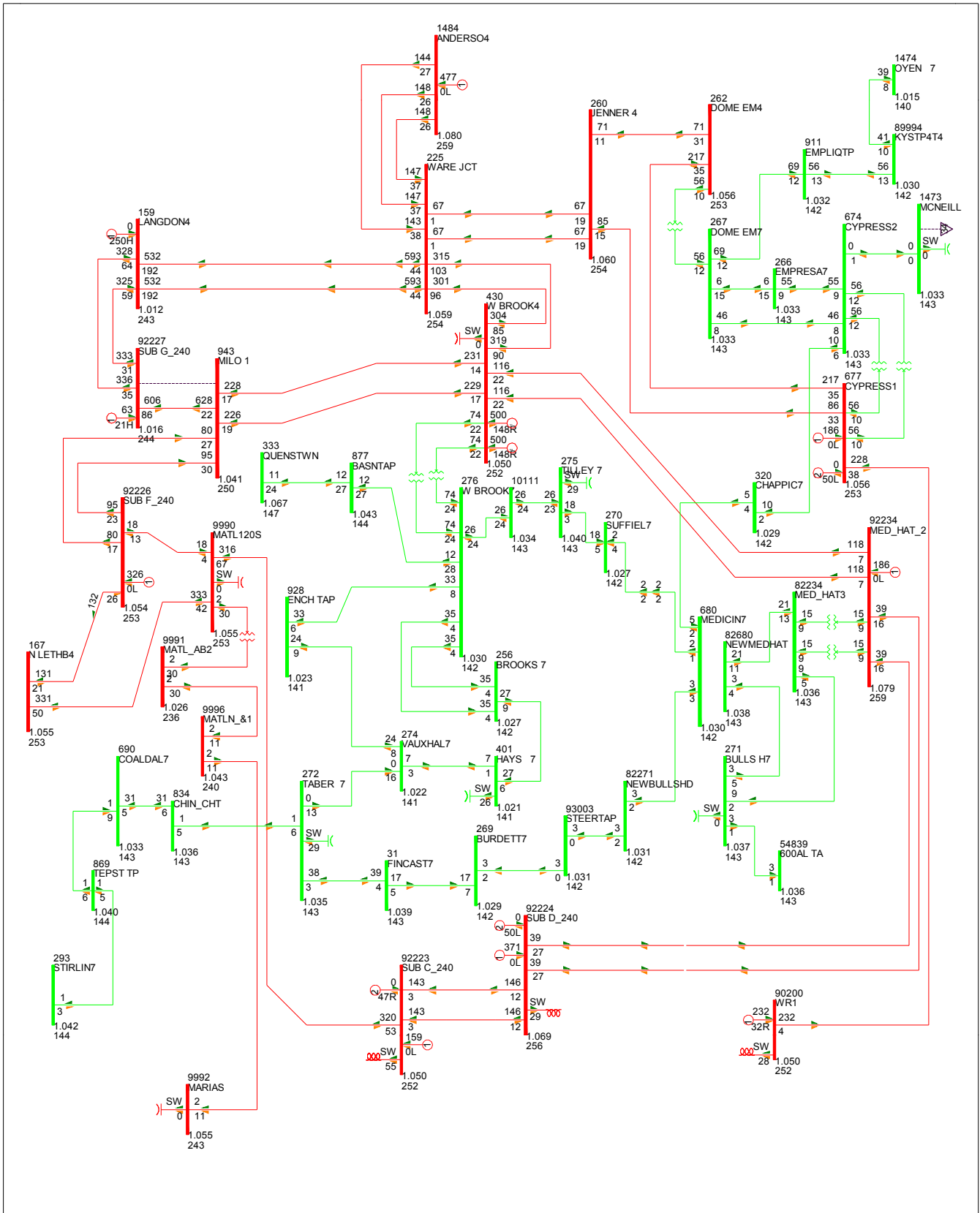


FIG 2017-1A-SL-BOW-5: MILO TO SUB G 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 974 MW

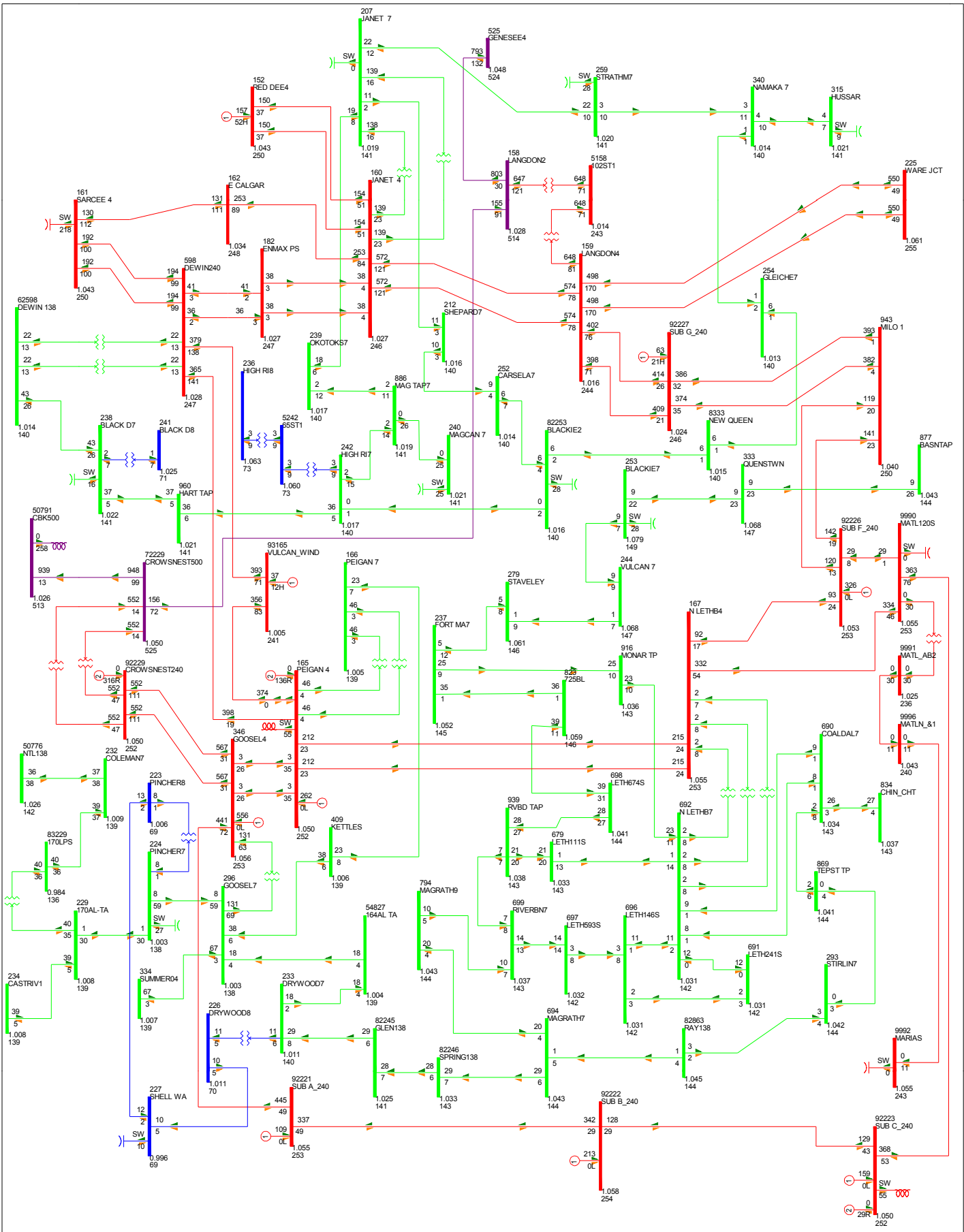


FIG 2017-1A-SL-BOW-6: WESTBROOKS TO MEDHAT2 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1001 MW

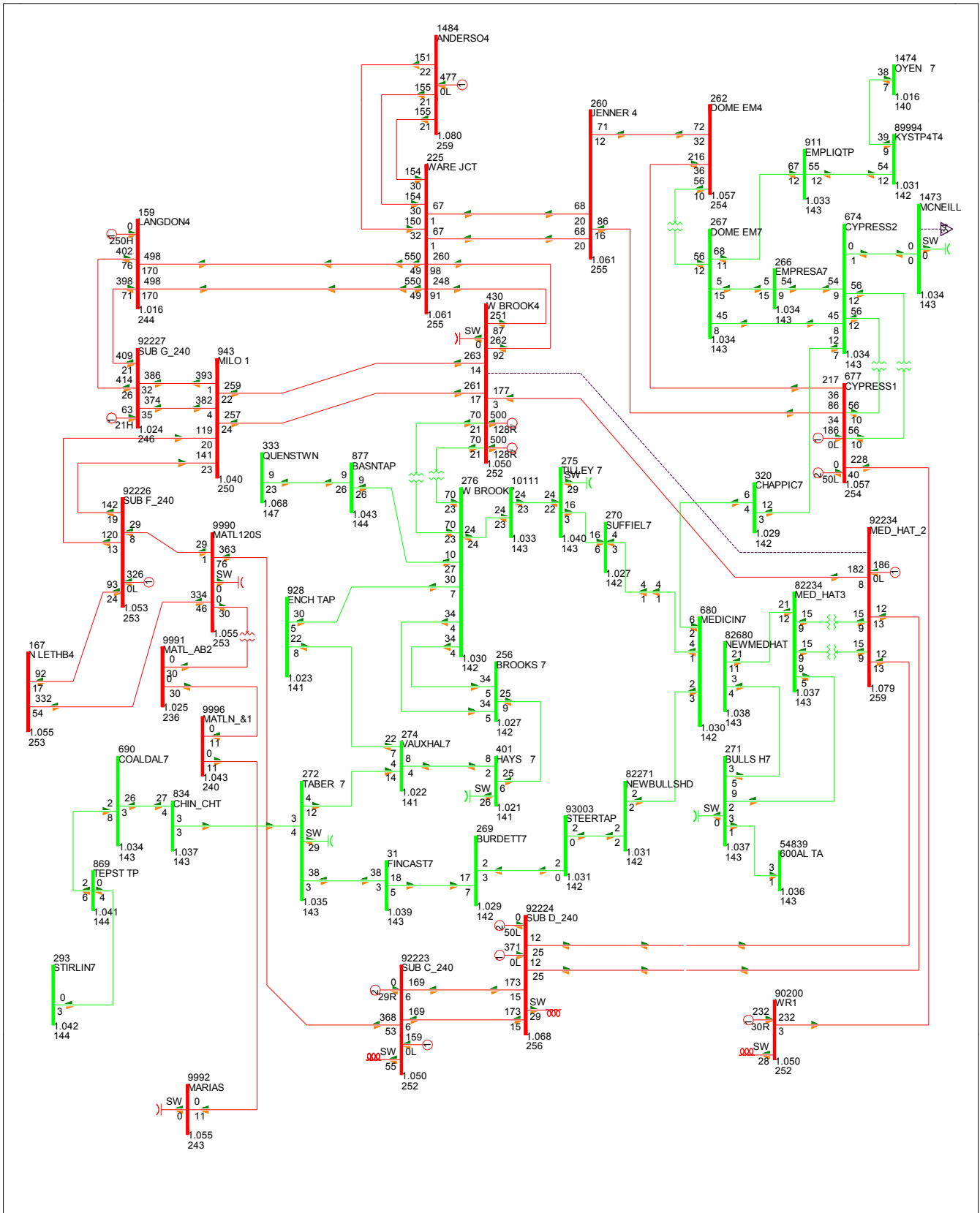


FIG 2017-1A-SL-BOW-7: WESTBROOKS TO MEDHAT2 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:33

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1001 MW

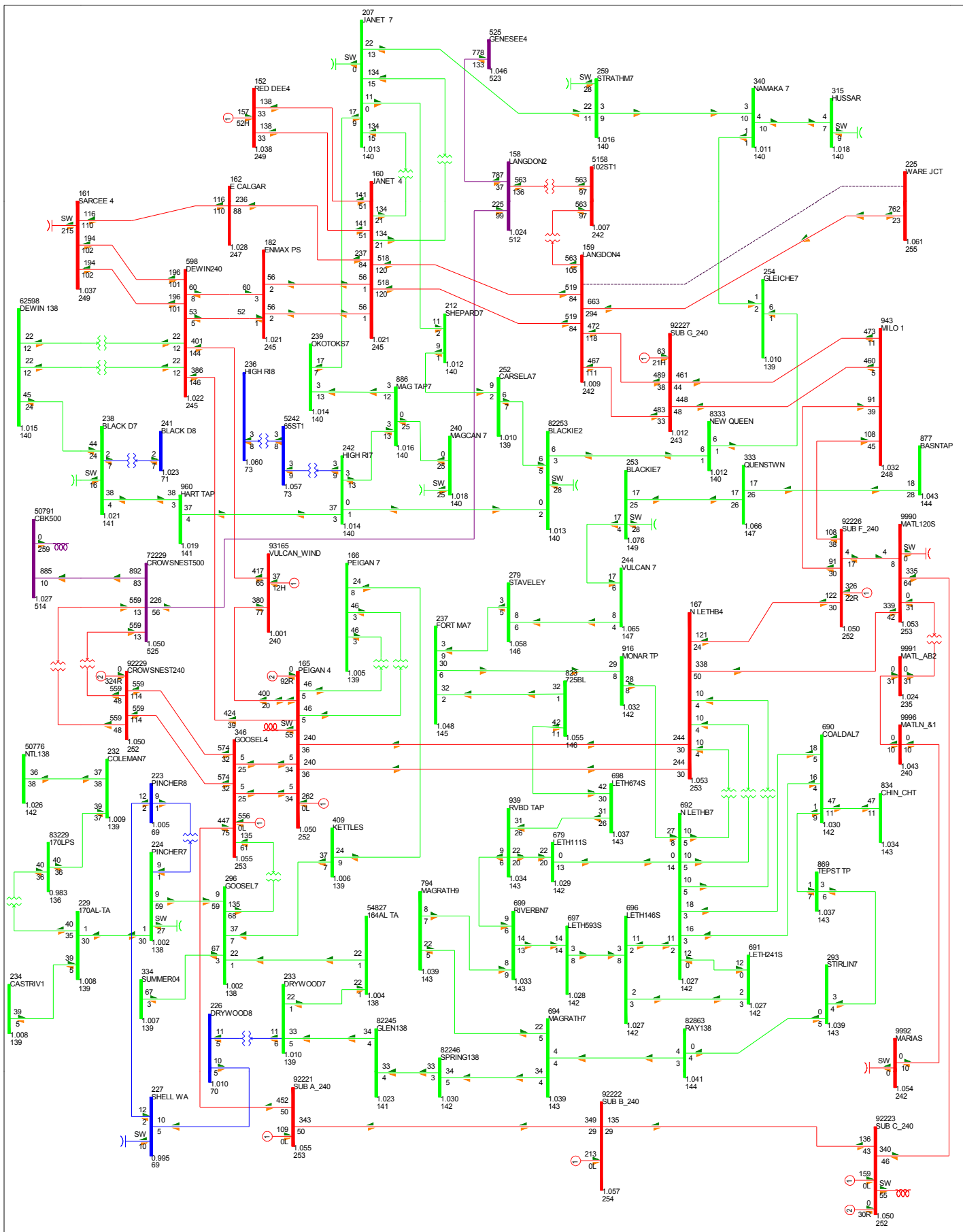


FIG 2017-1A-SL-BOW-8: WARE JUNCTION TO LANGDON 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 942 MW

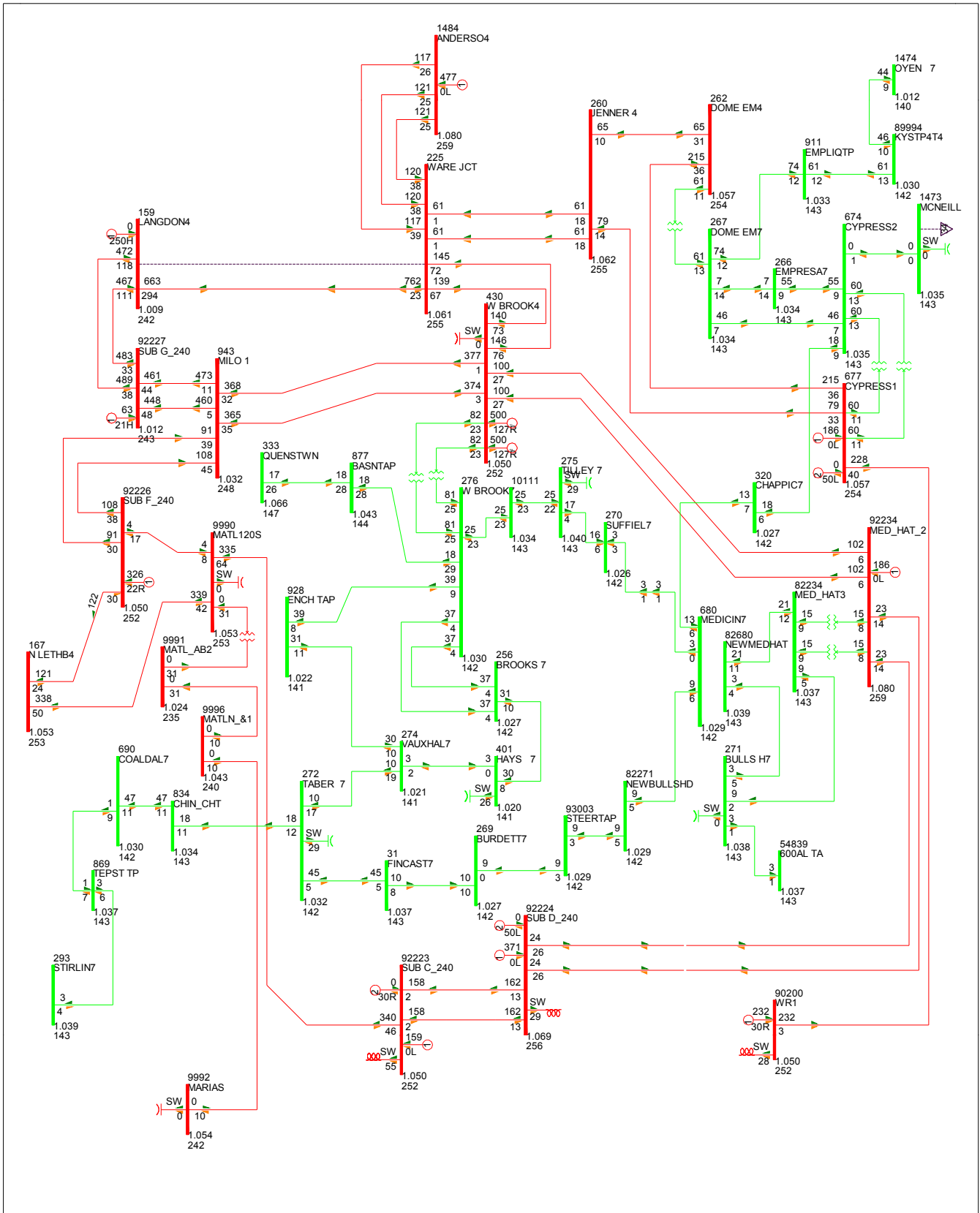


FIG 2017-1A-SL-BOW-9: WARE JUNCTION TO LANGDON 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 942 MW

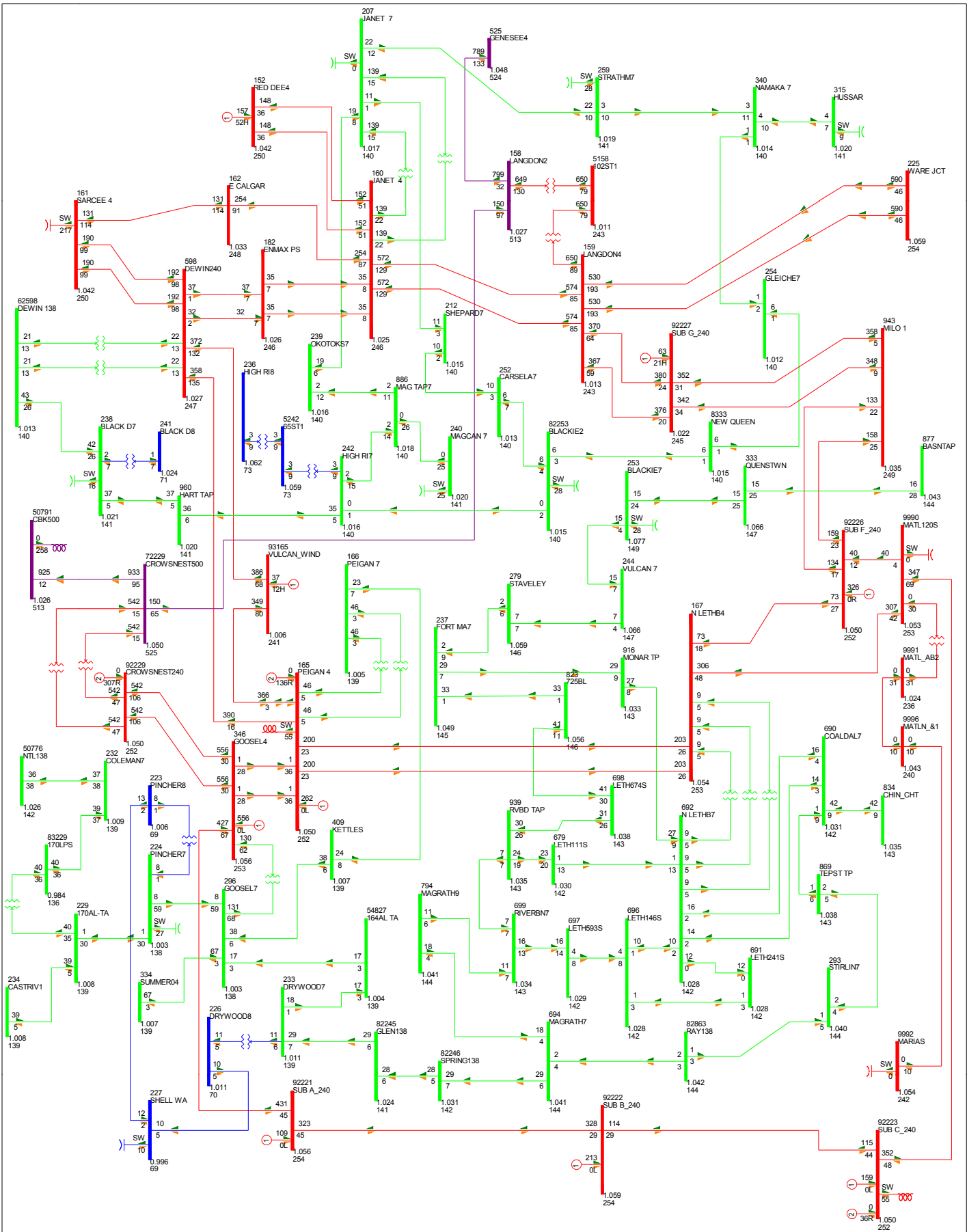


FIG 2017-1A-SL-BOW-10: WESTBROOKS TO MILO 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 987 MW

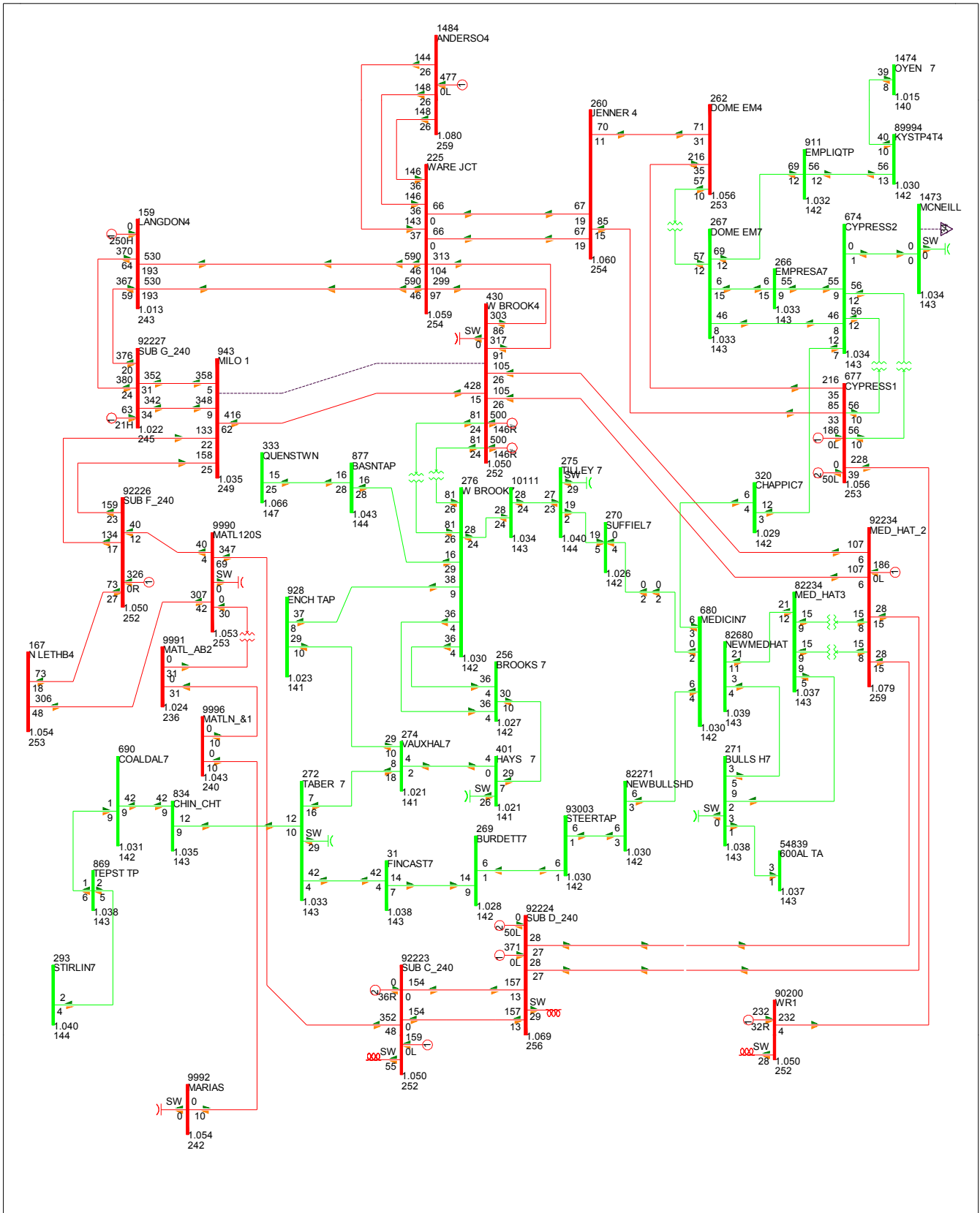


FIG 2017-1A-SL-BOW-11: WESTBROOKS TO MILO 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 987 MW

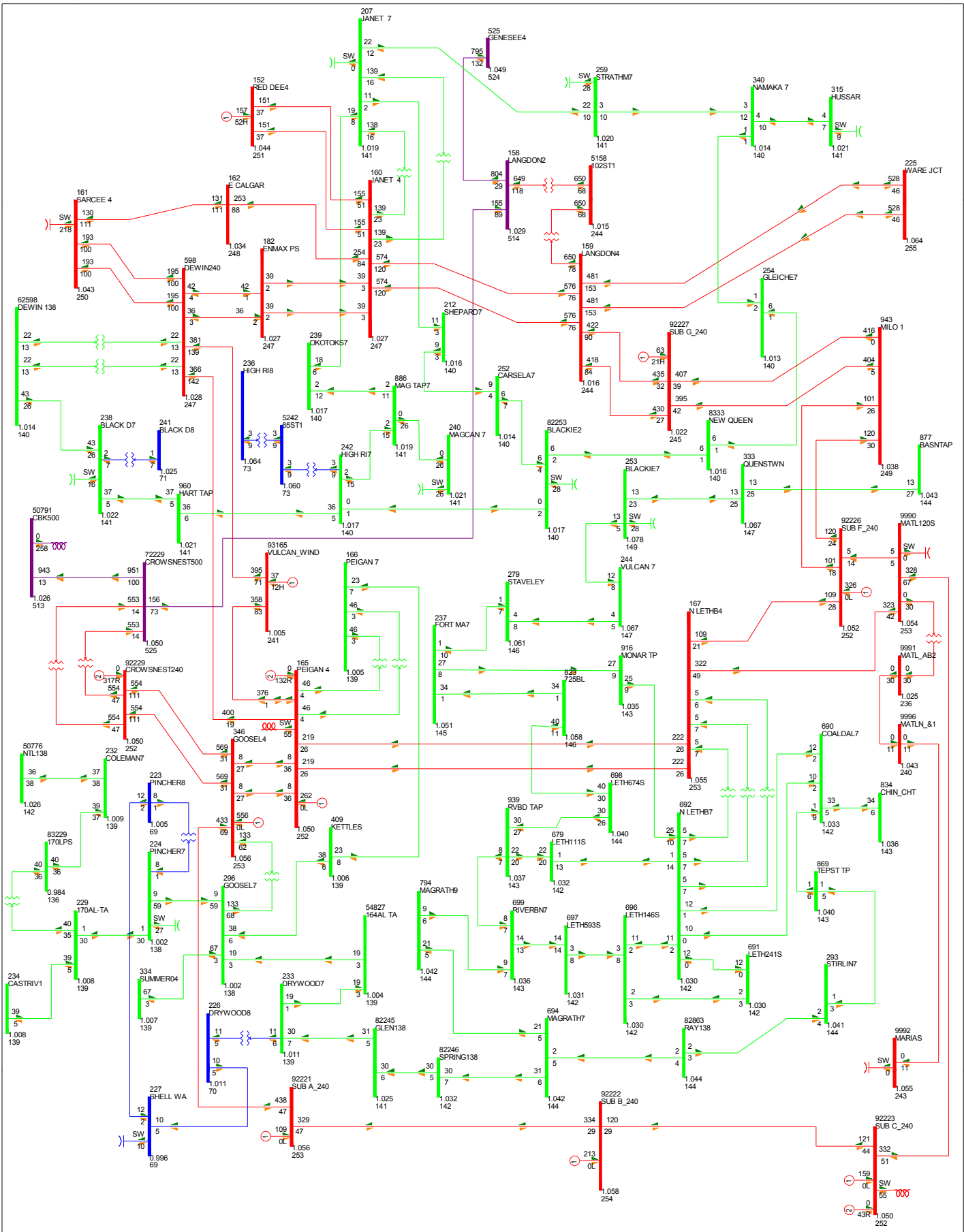


FIG 2017-1A-SL-BOW-12: WEST BROOKS TO WARE JUNC 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1005 MW

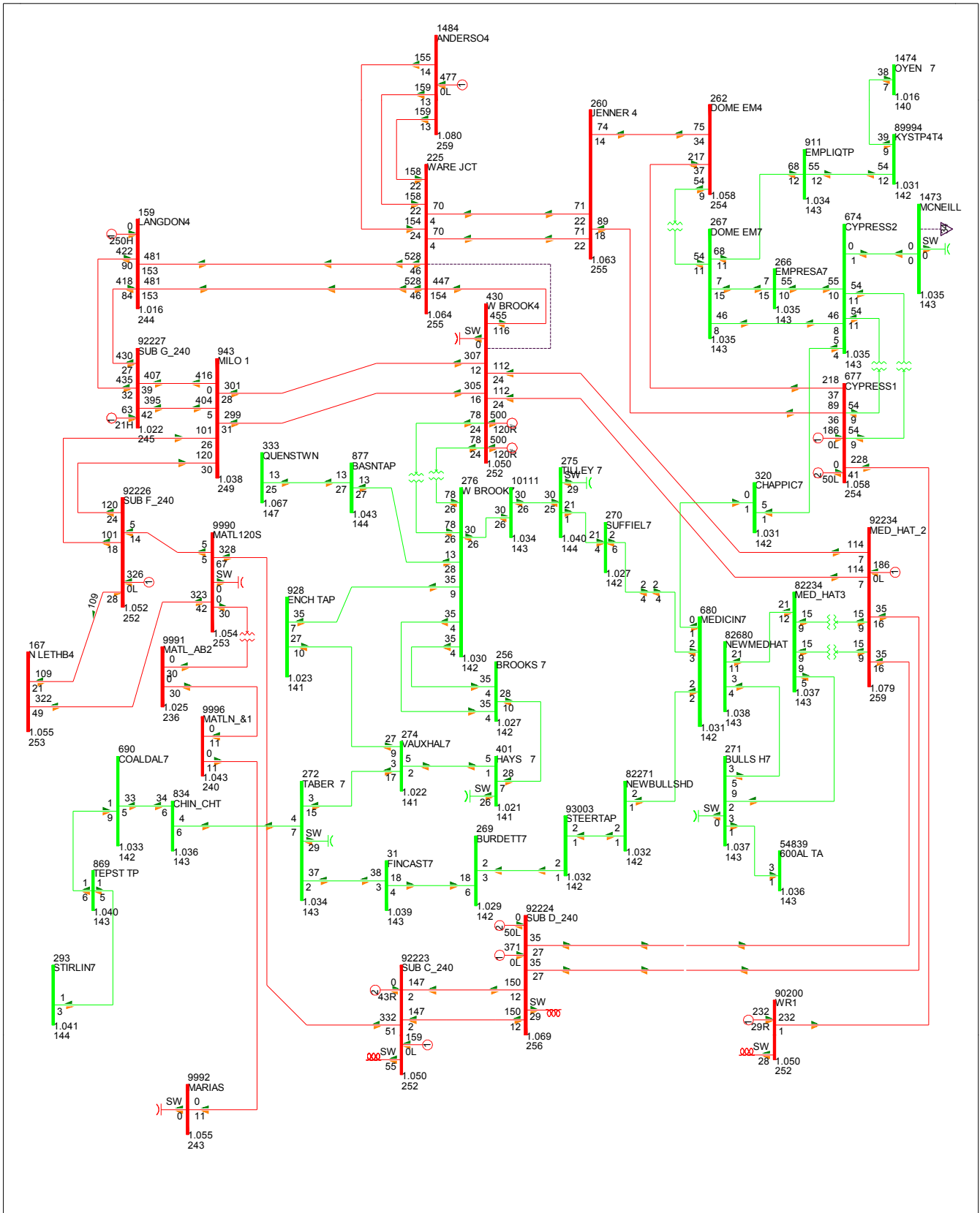


FIG 2017-1A-SL-BOW-13: WEST BROOKS TO WARE JUNC 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1005 MW

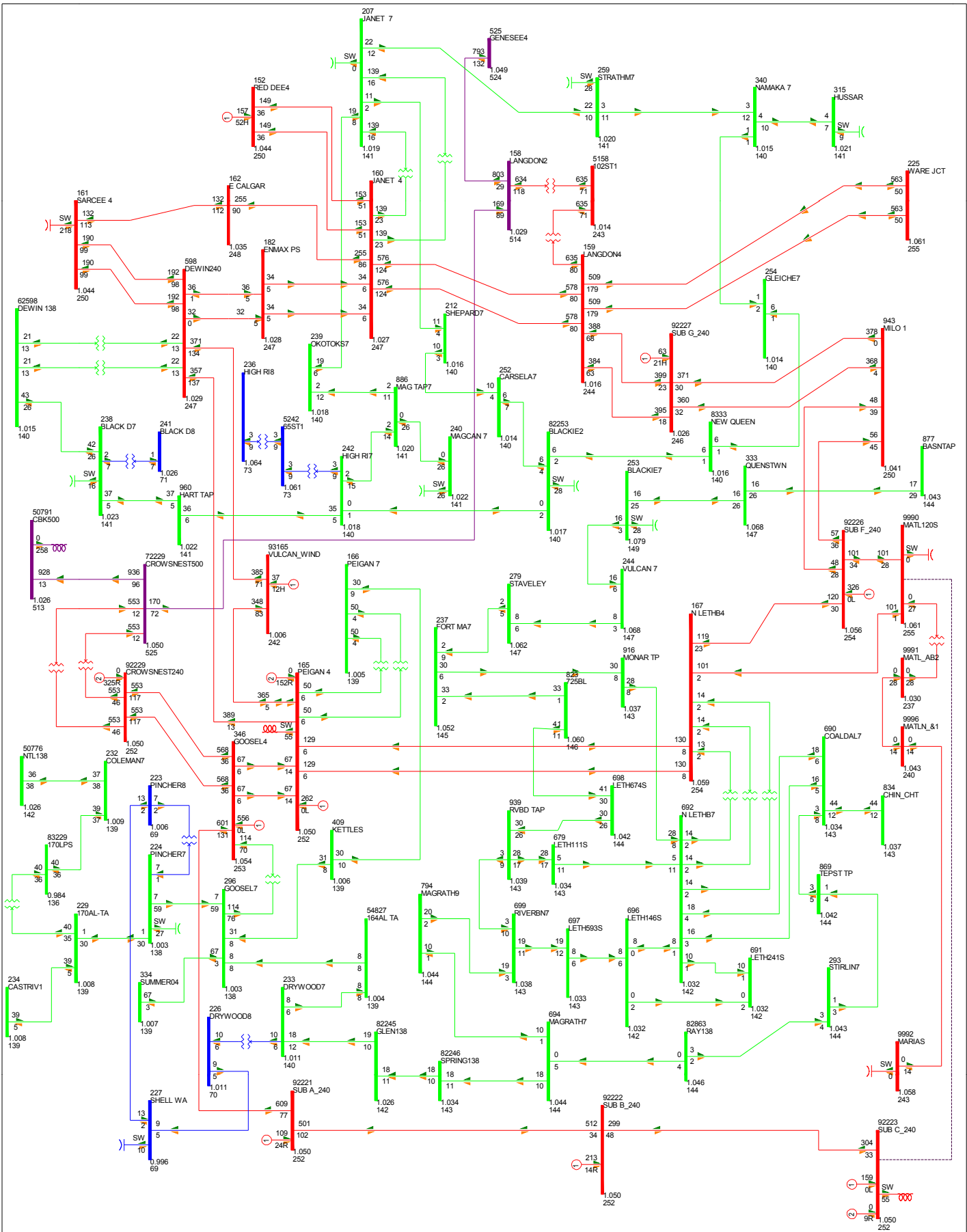


FIG 2017-1A-SL-BOW-14: SUB C TO MATL 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: 989 MW

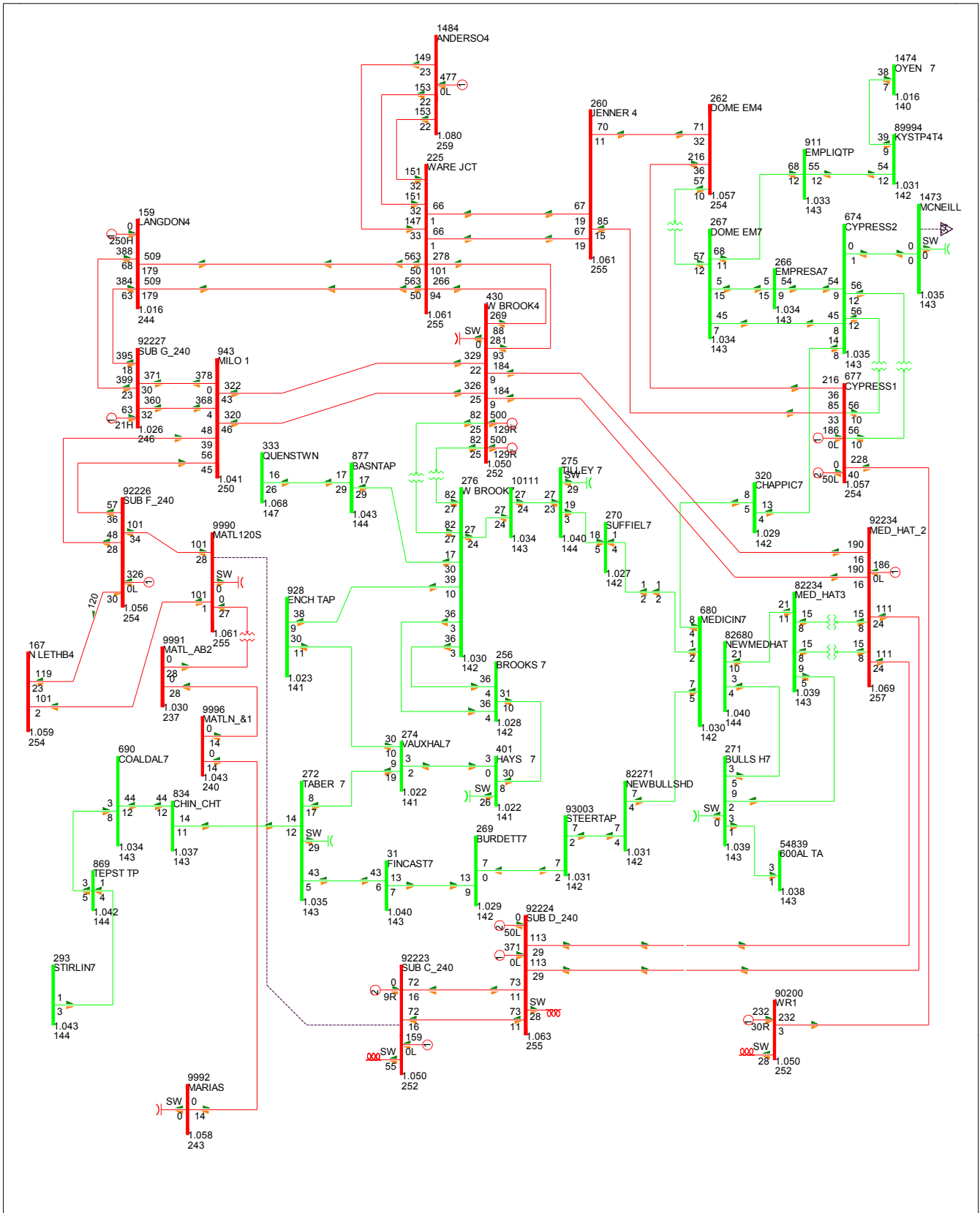


FIG 2017-1A-SL-BOW-15: SUB C TO MATL 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 989 MW

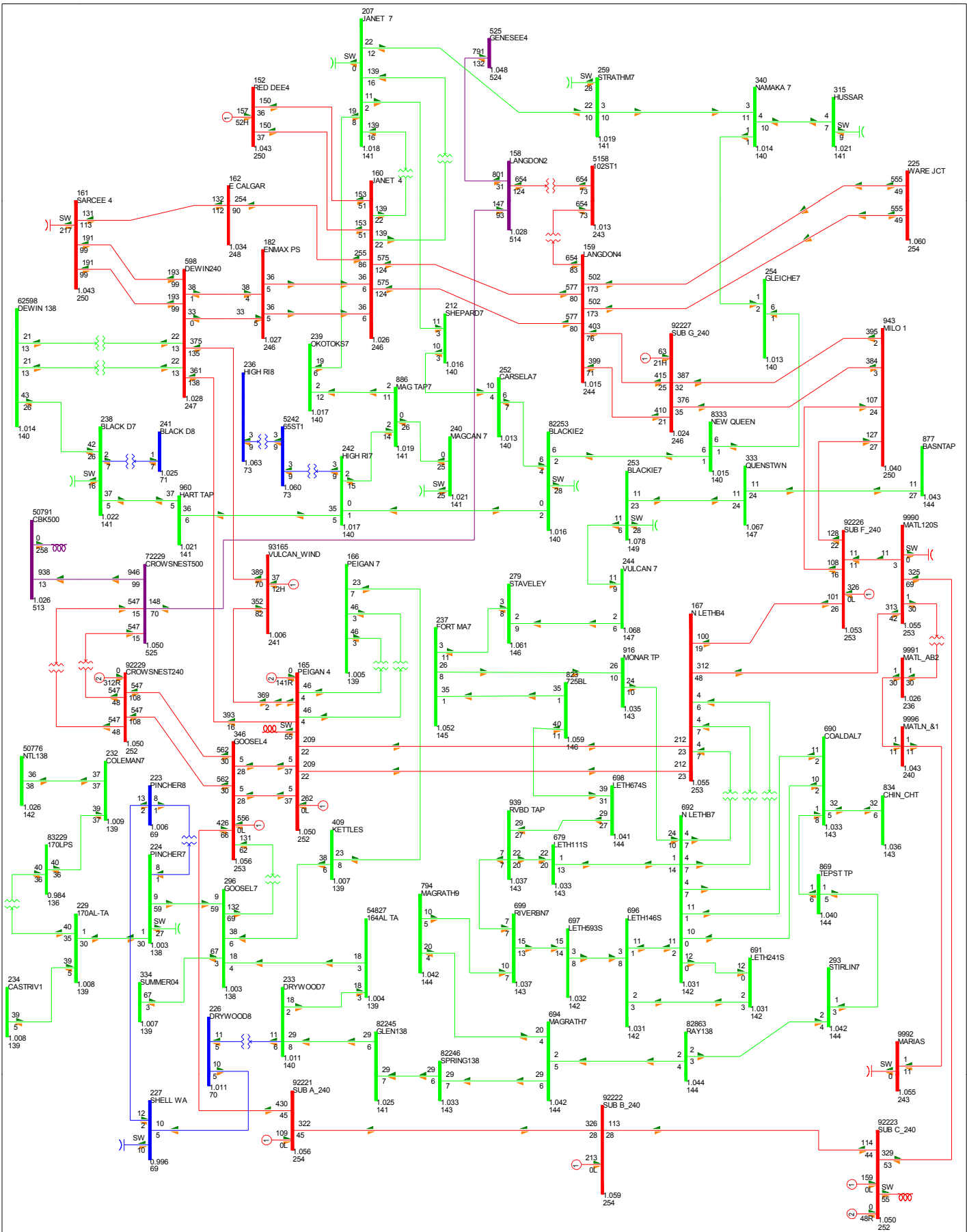


FIG 2017-1A-SL-BOW-16: JENNER TO CYPRESS 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 1000 MW

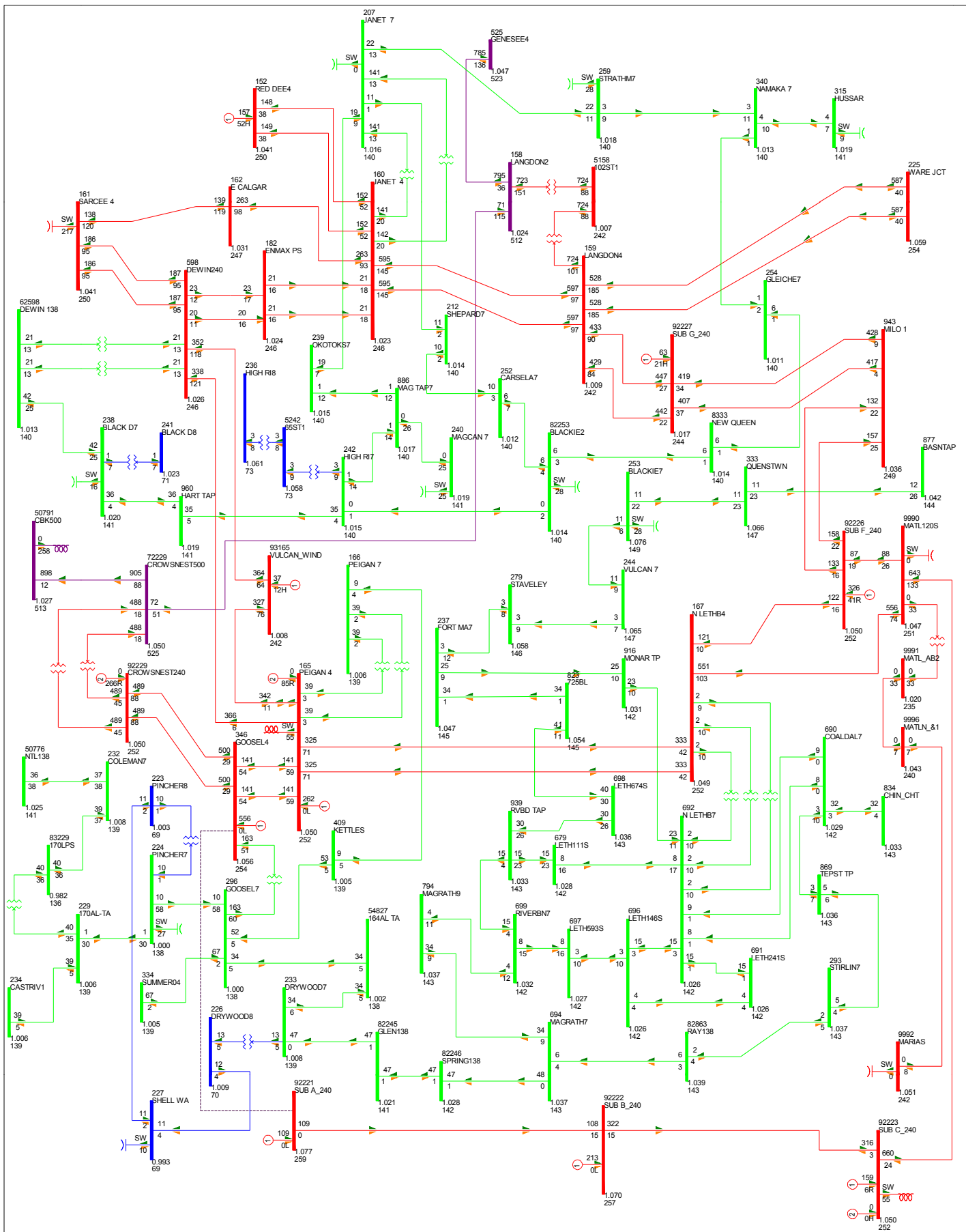


FIG 2017-1A-SL-BOW-18: GOOSELAKE TO SUB A 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 961 MW

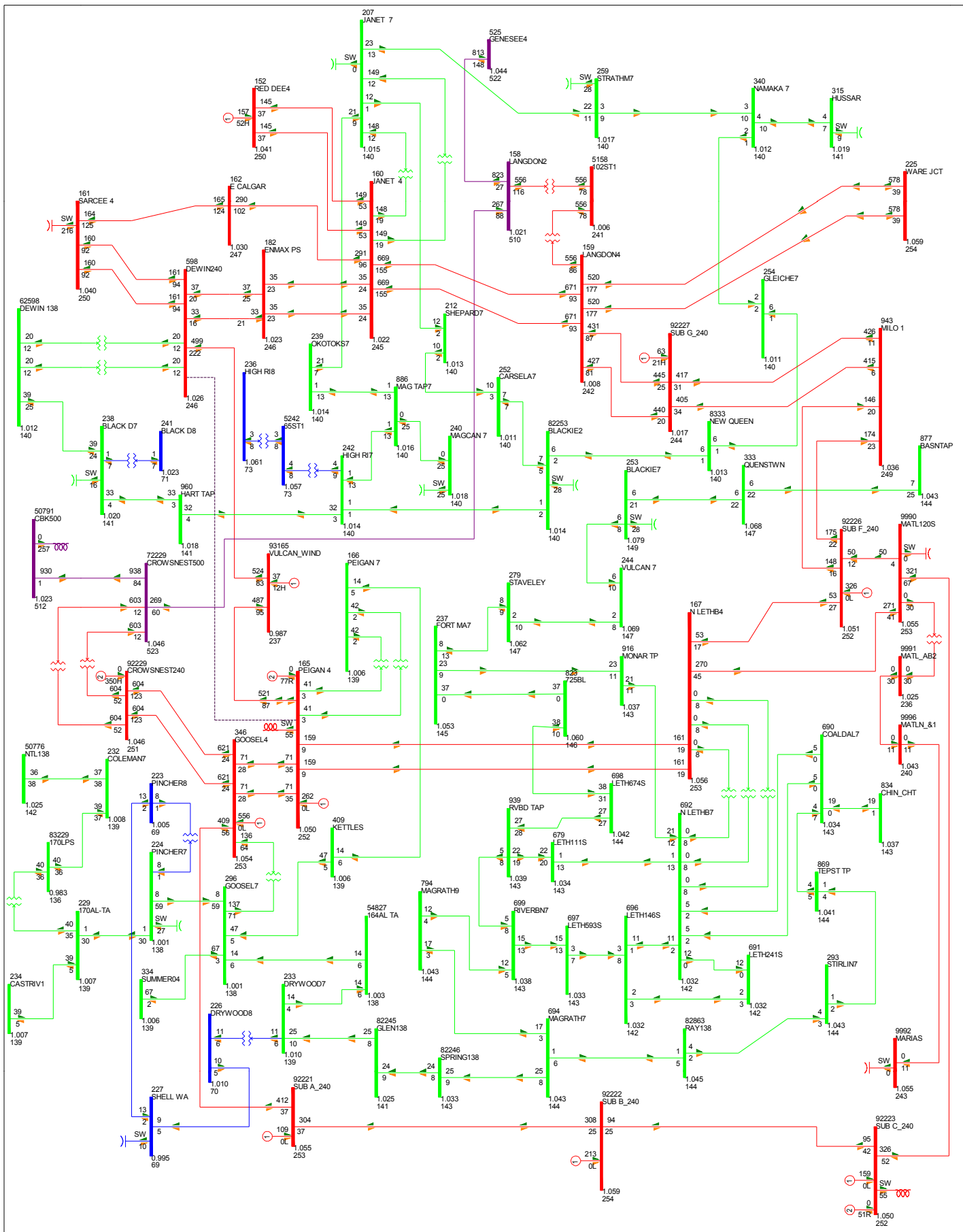


FIG 2017-1A-SL-BOW-20: PEIGAN TO DEWINTON 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 983 MW

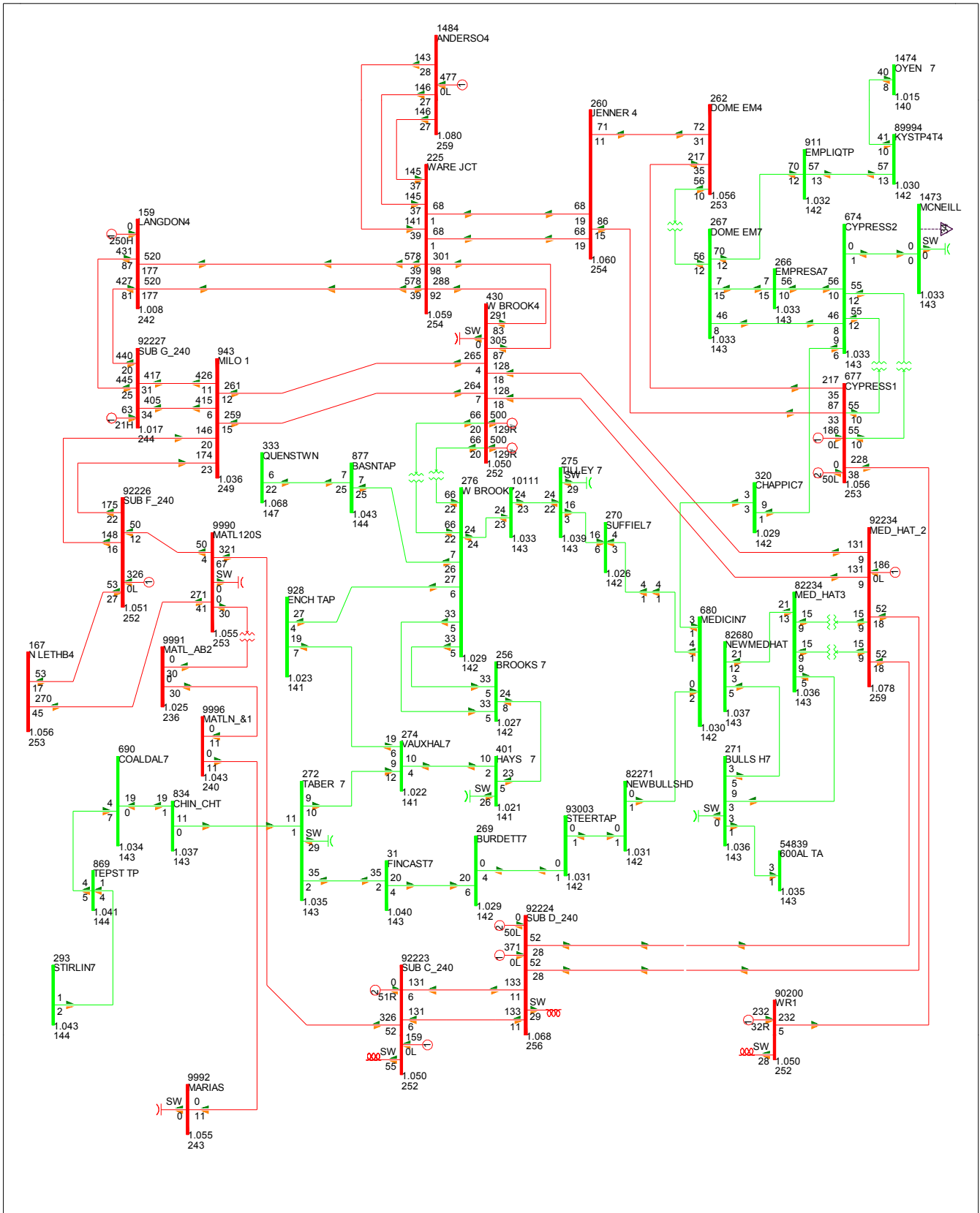


FIG 2017-1A-SL-BOW-21: PEIGAN TO DEWINTON 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: 983 MW

GENERATION DISPATCH REPORT

GROSS COAL GEN. 3278.3 MW

GAS GENERATION

HYDRO GENERATION GROSS EXISTING WIND GEN. 477.6 MW

GROSS FUTURE WIND GEN. IN SOUTH 2700.0 MW

FORT MCMURRAY GEN.

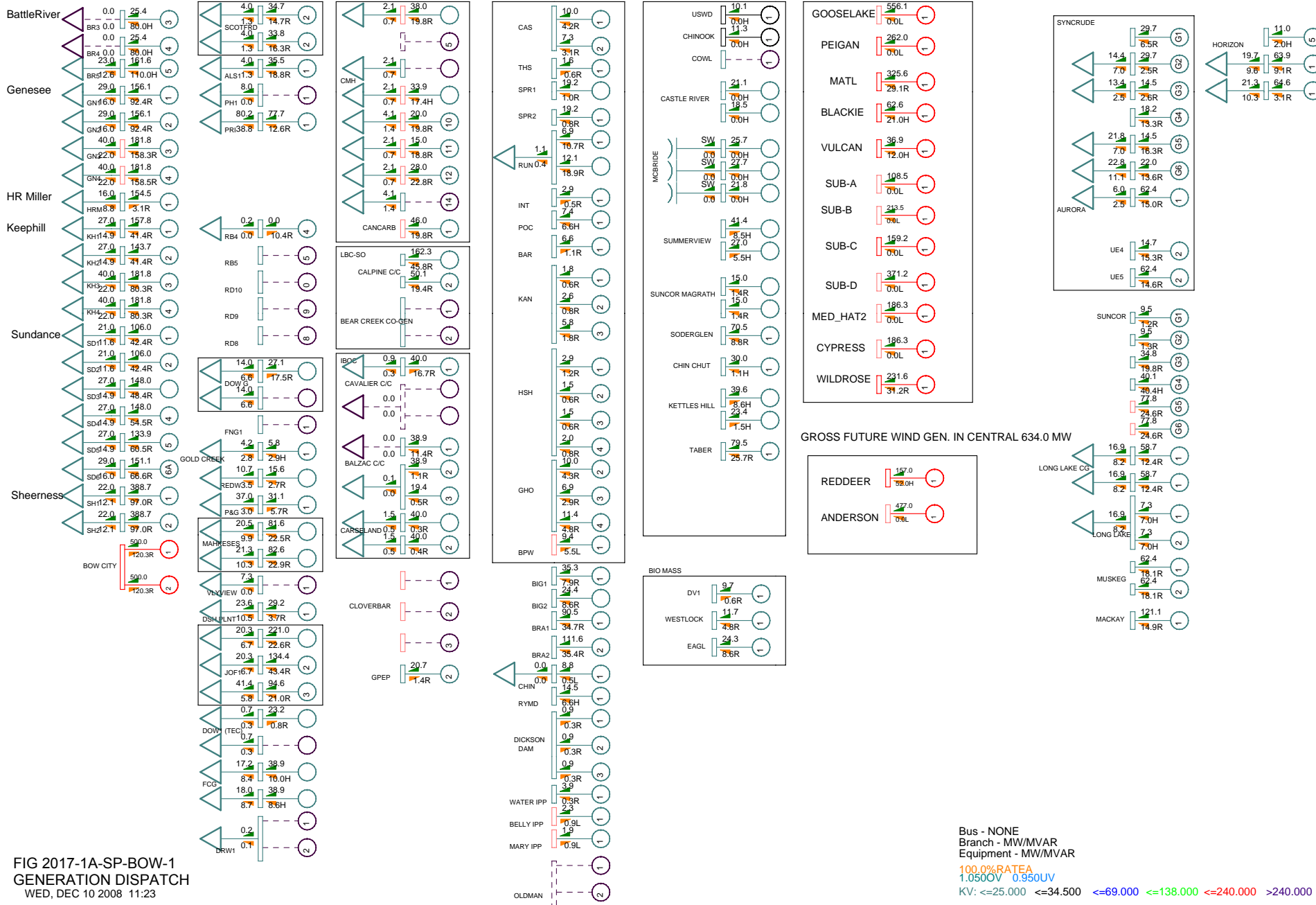


FIG 2017-1A-SP-BOW-1
GENERATION DISPATCH
WED, DEC 10 2008 11:23

Bus - NONE
Branch - MW/MVAR
Equipment - MW/MVAR
100.0% RATEA
1.0500V 0.950LV
KV: <=25.000 <=34.500 <=69.000 <=138.000 <=240.000 >240.000

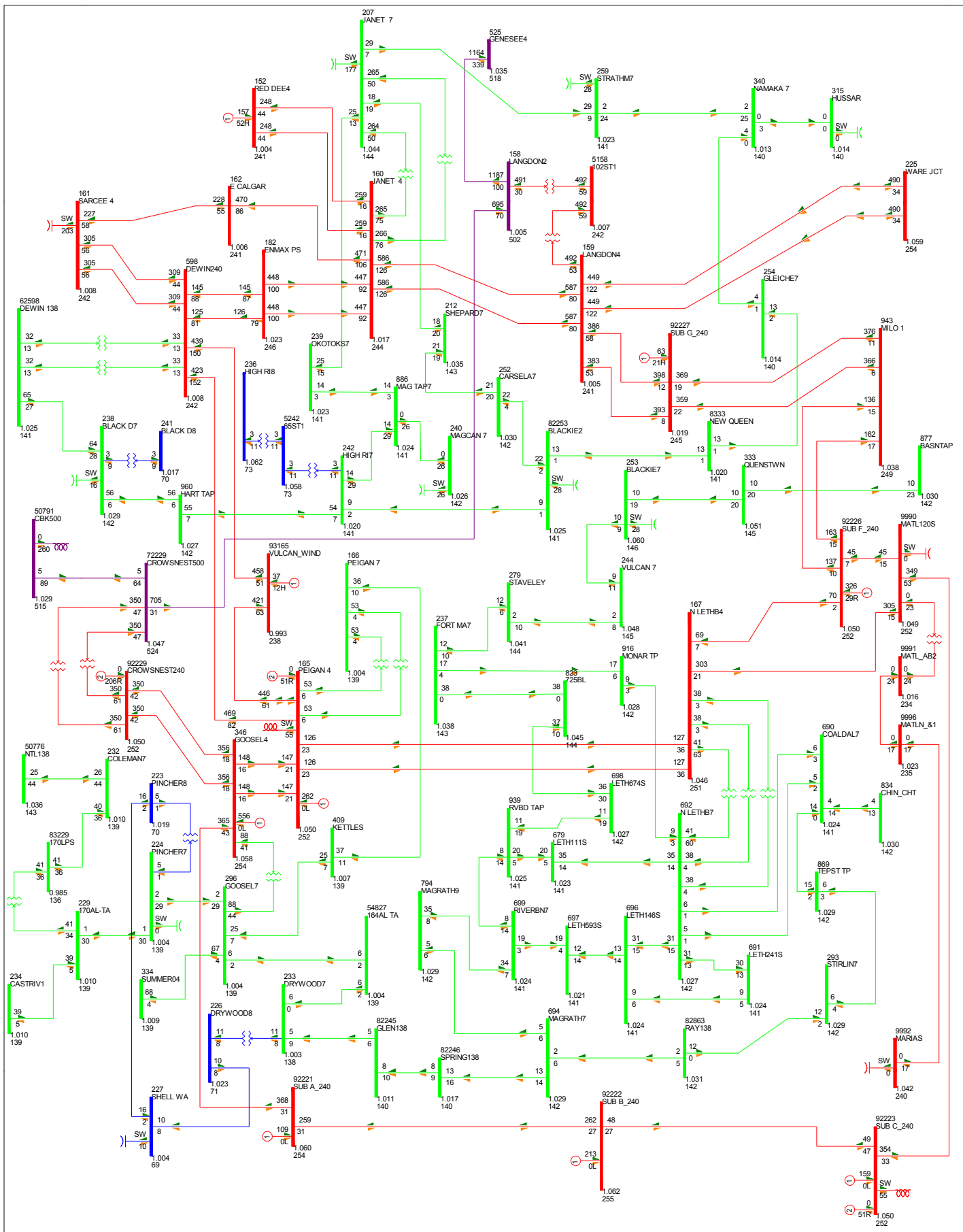


FIG 2017-1A-SP-BOW-2: N-0 CONDITION

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -15 MW

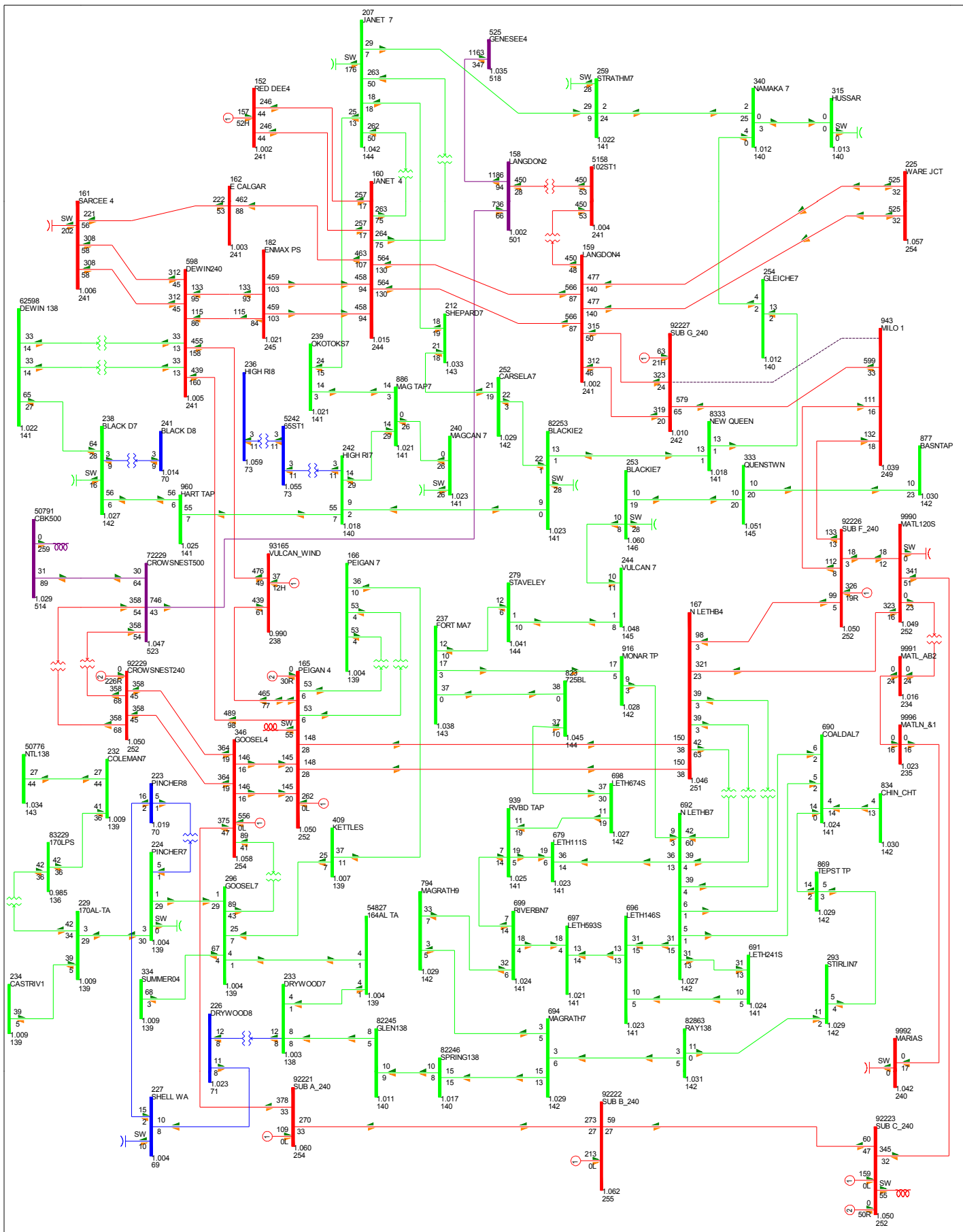


FIG 2017-1A-SP-BOW-4: MILO TO SUB G 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -42 MW

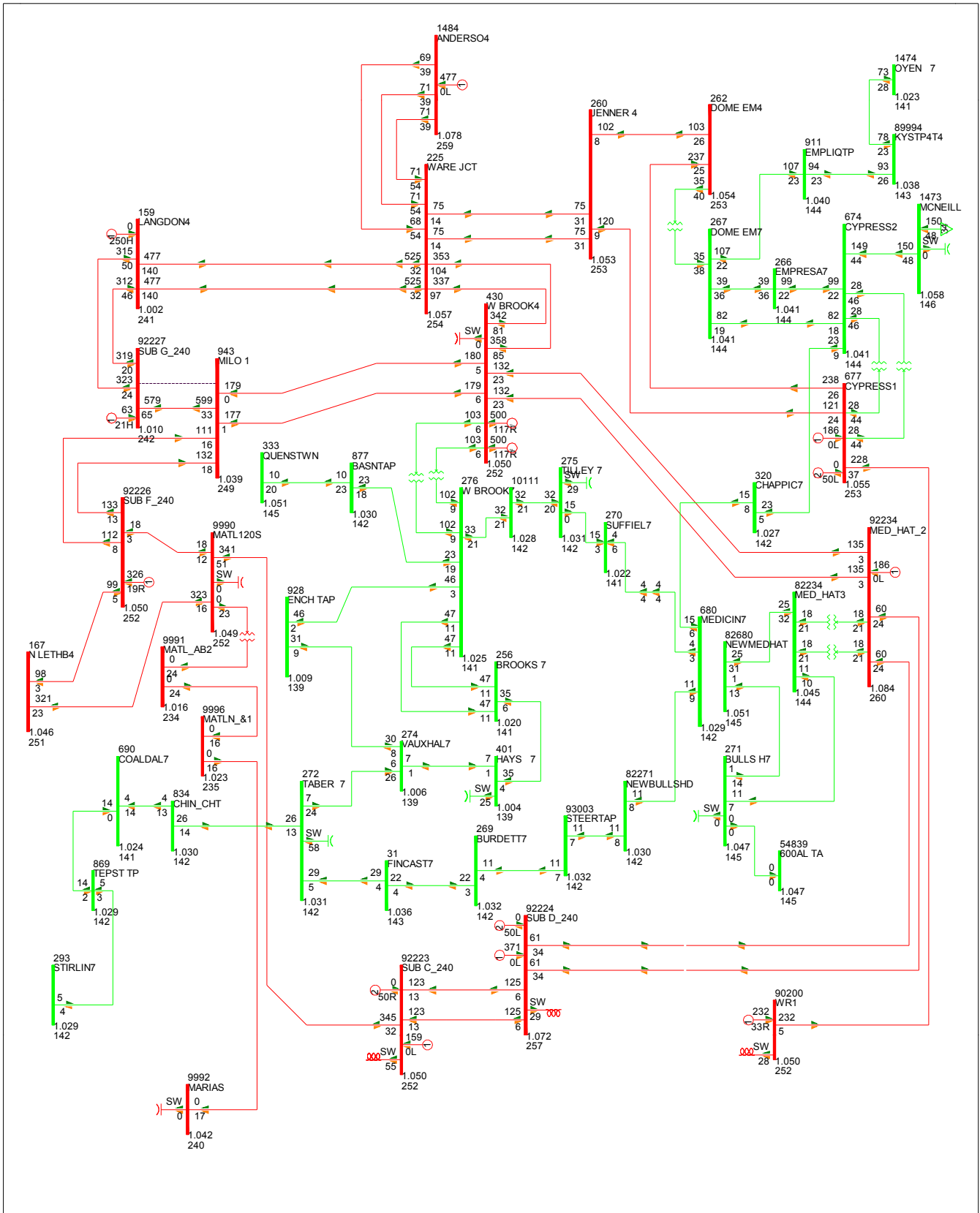


FIG 2017-1A-SP-BOW-5: MILO TO SUB G 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -42 MW

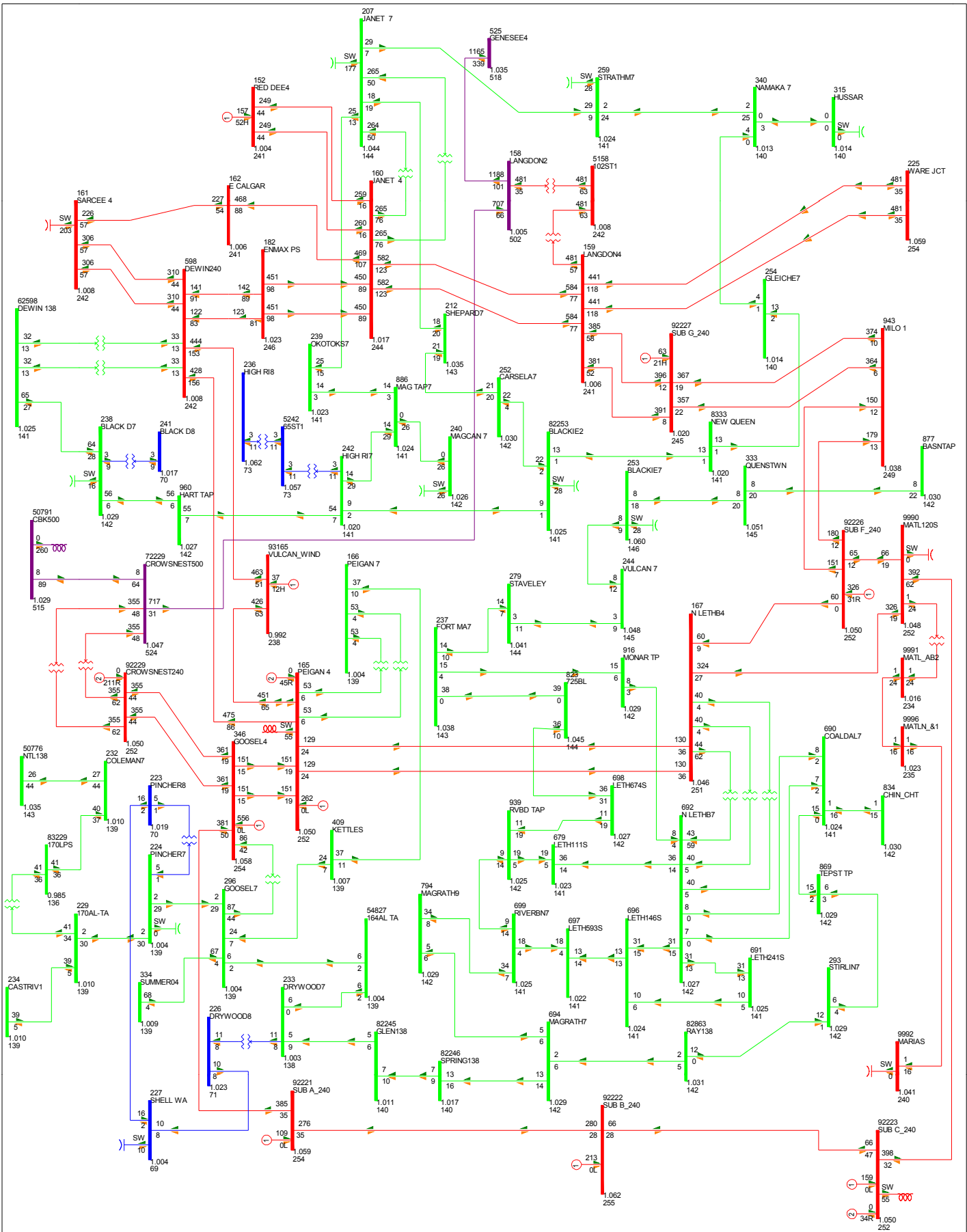


FIG 2017-1A-SP-BOW-6: WESTBROOKS TO MEDHAT2 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -18 MW

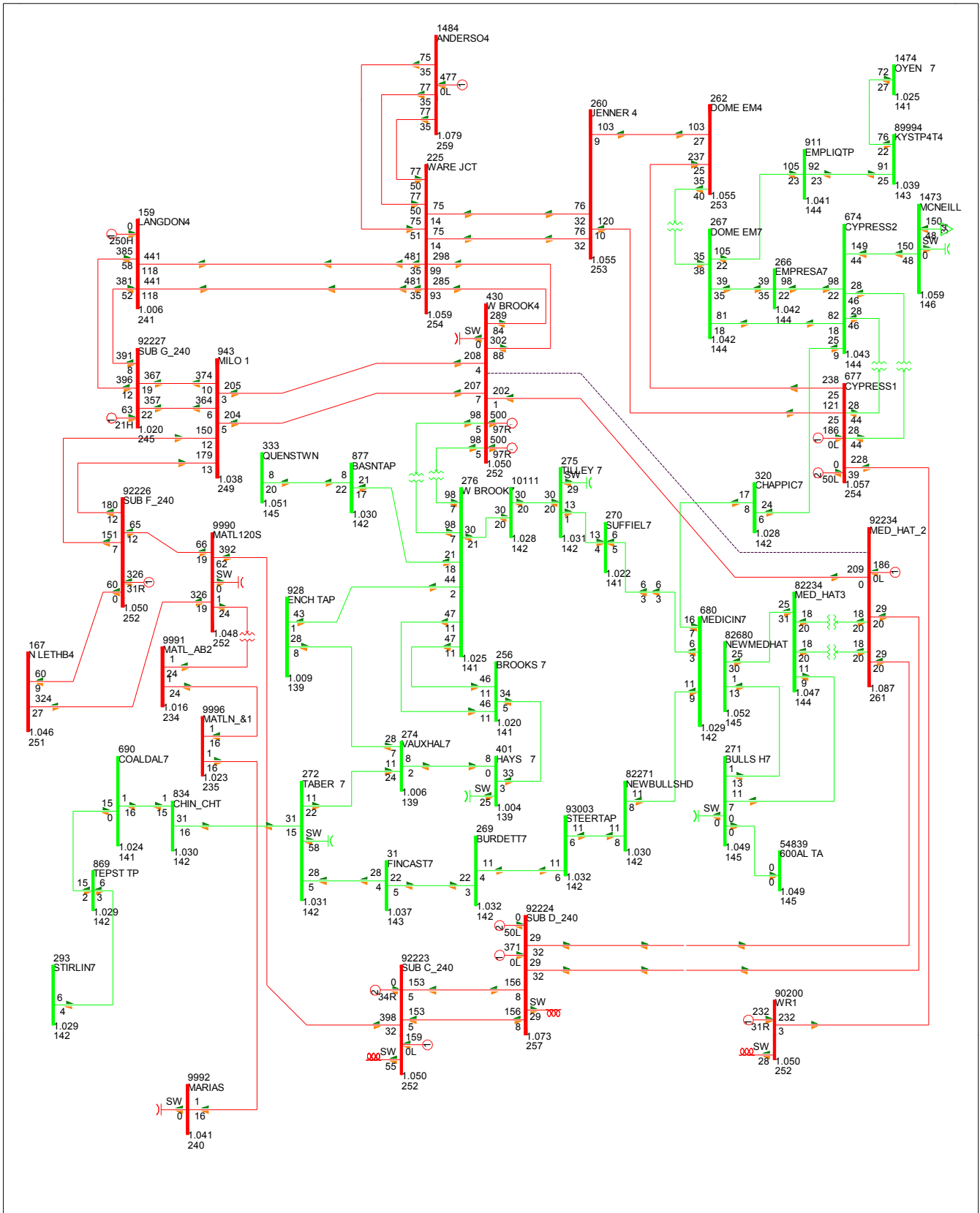


FIG 2017-1A-SP-BOW-7: WESTBROOKS TO MEDHAT2 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -18 MW

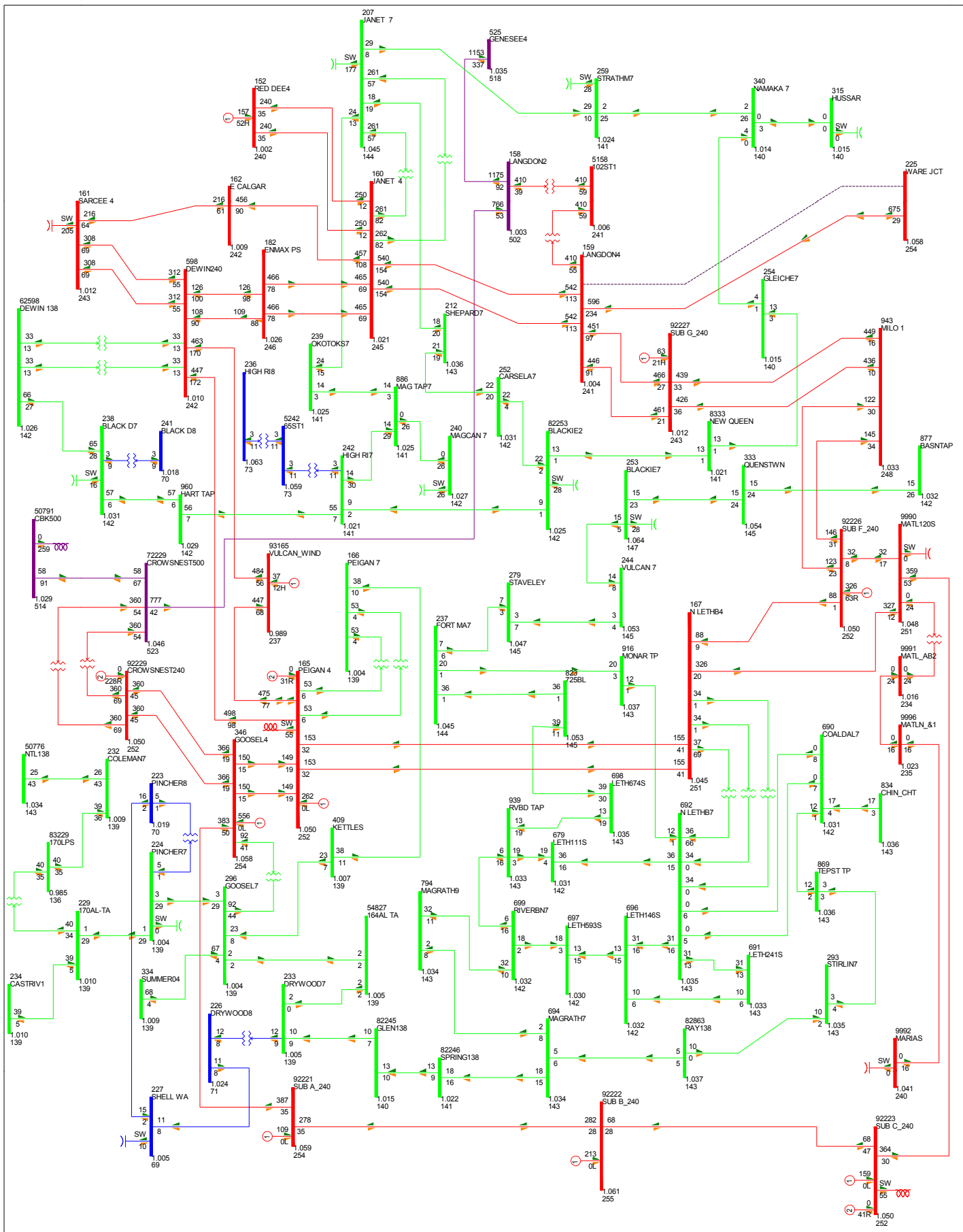


FIG 2017-1A-SP-BOW-8: WARE JUNCTION TO LANGDON 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -72 MW

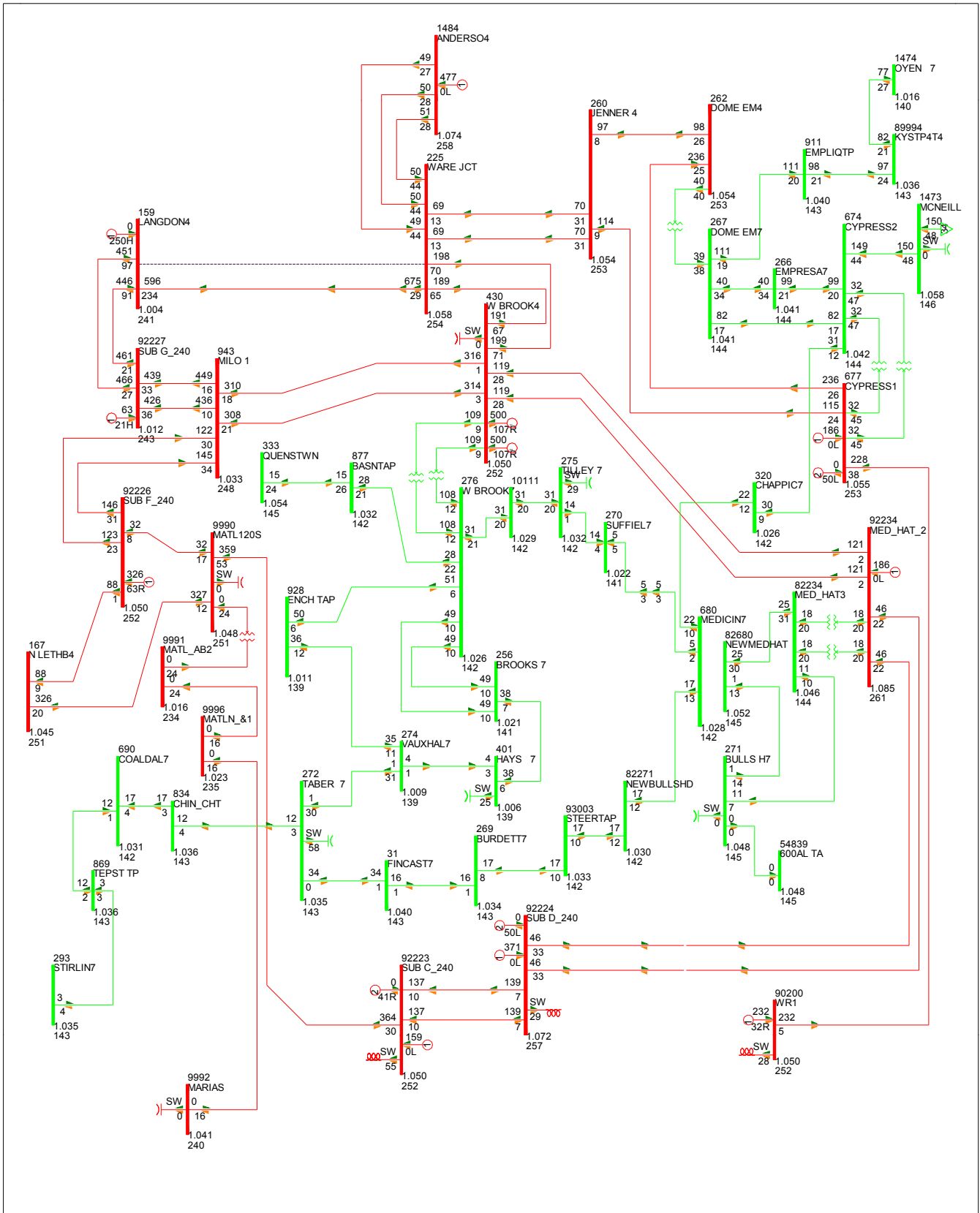


FIG 2017-1A-SP-BOW-9: WARE JUNCTION TO LANGDON 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -72 MW

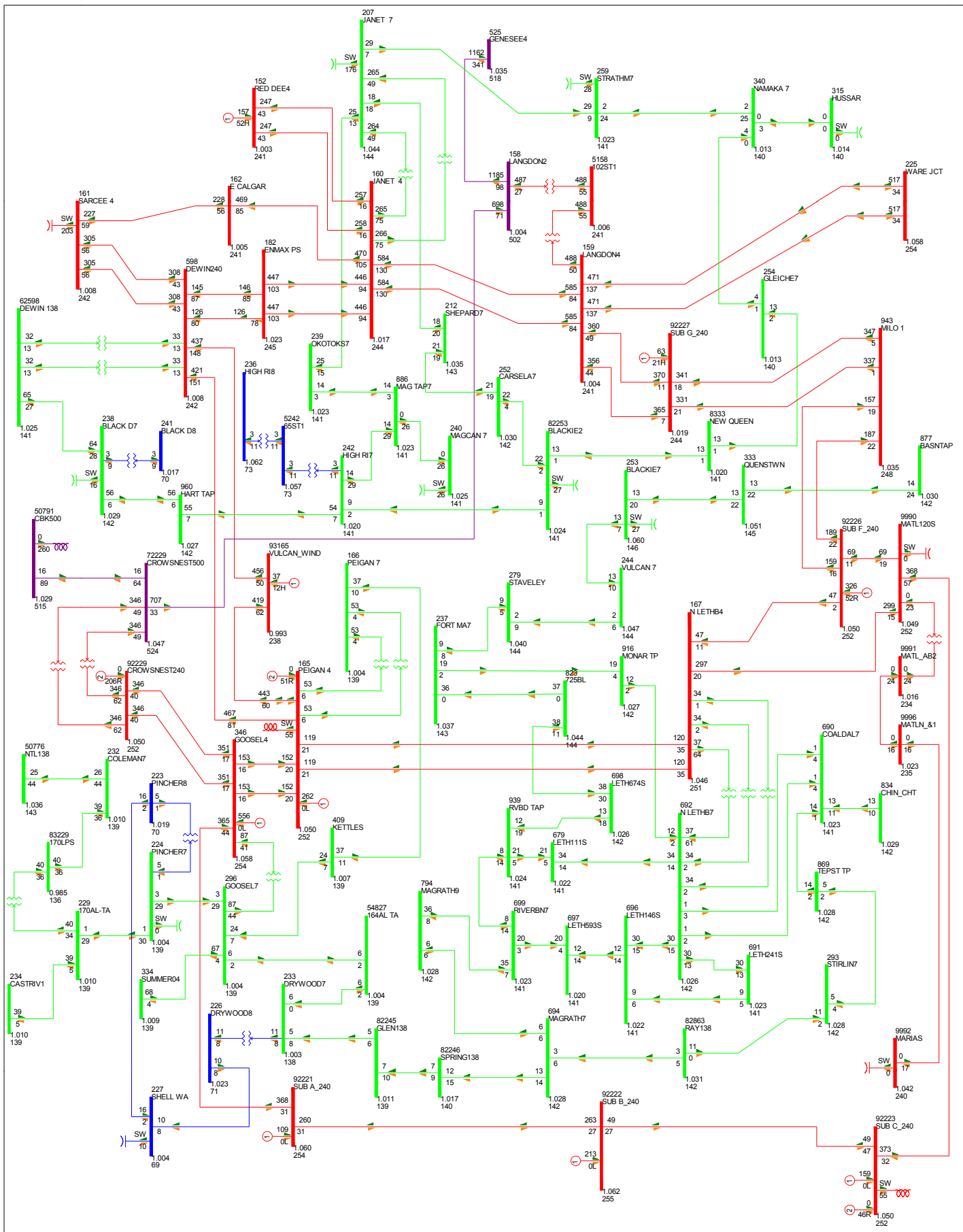


FIG 2017-1A-SP-BOW-10: WESTBROOKS TO MILO 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -27 MW

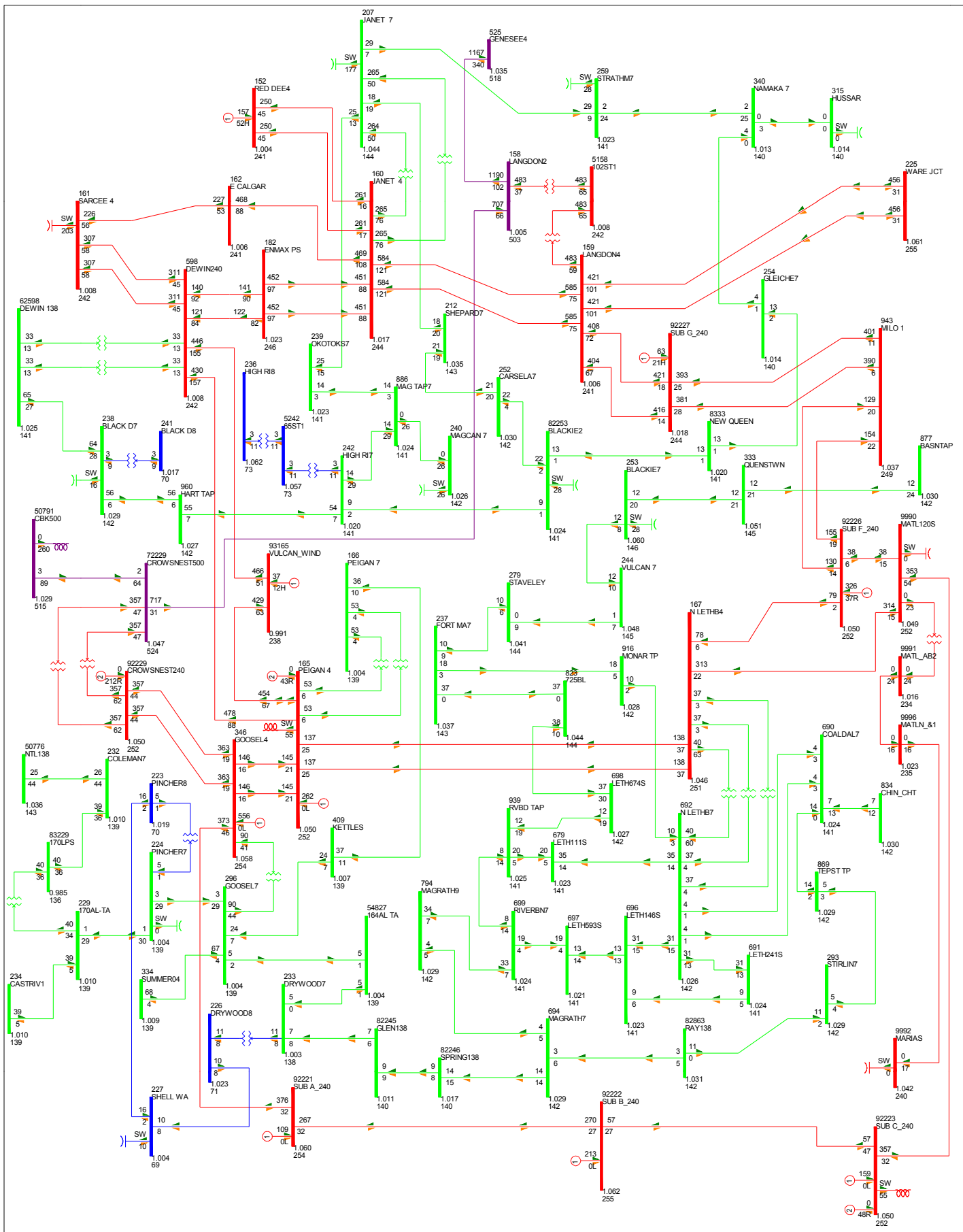


FIG 2017-1A-SP-BOW-12: WEST BROOKS TO WARE JUNC 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -13 MW

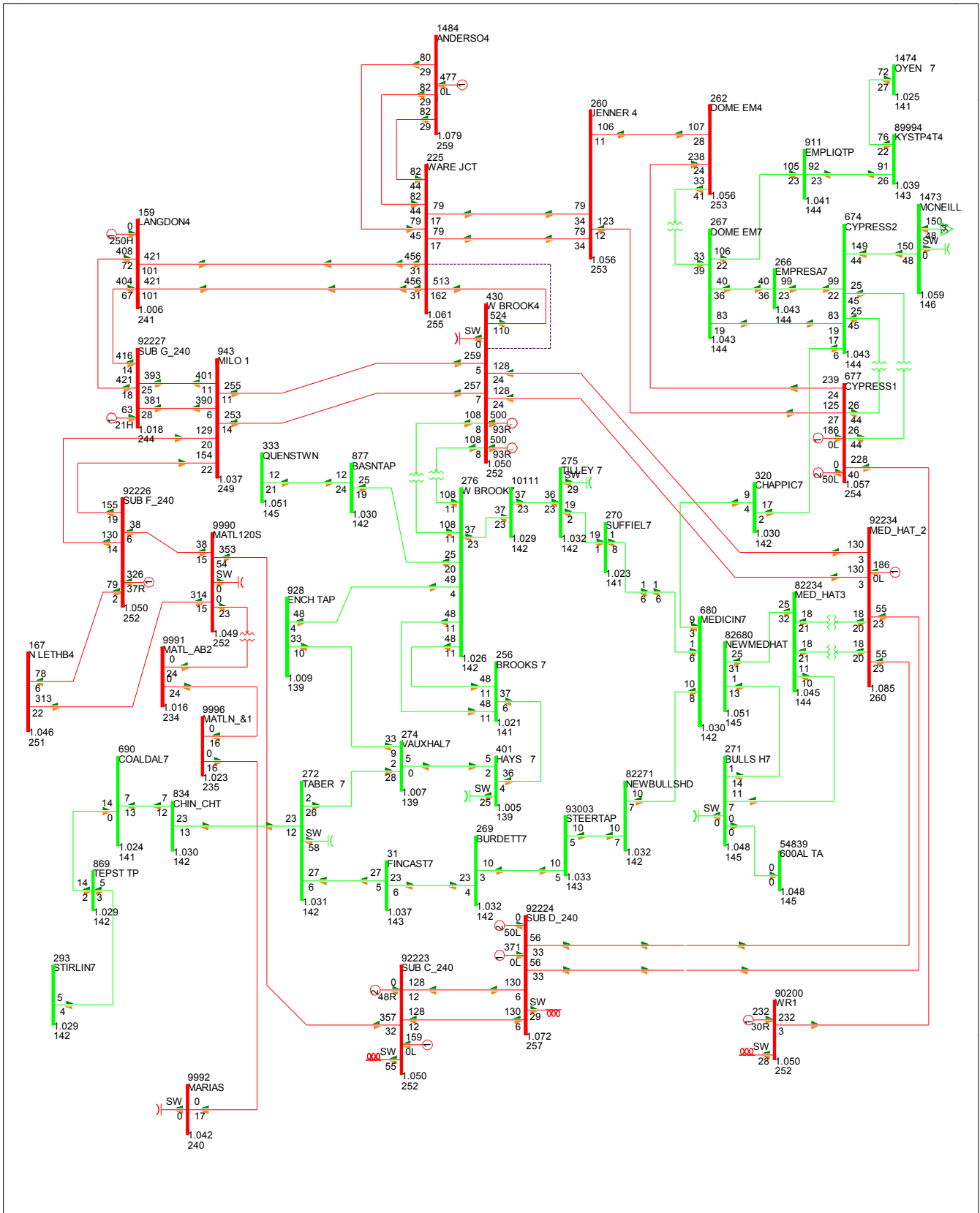


FIG 2017-1A-SP-BOW-13: WEST BROOKS TO WARE JUNC 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -13 MW

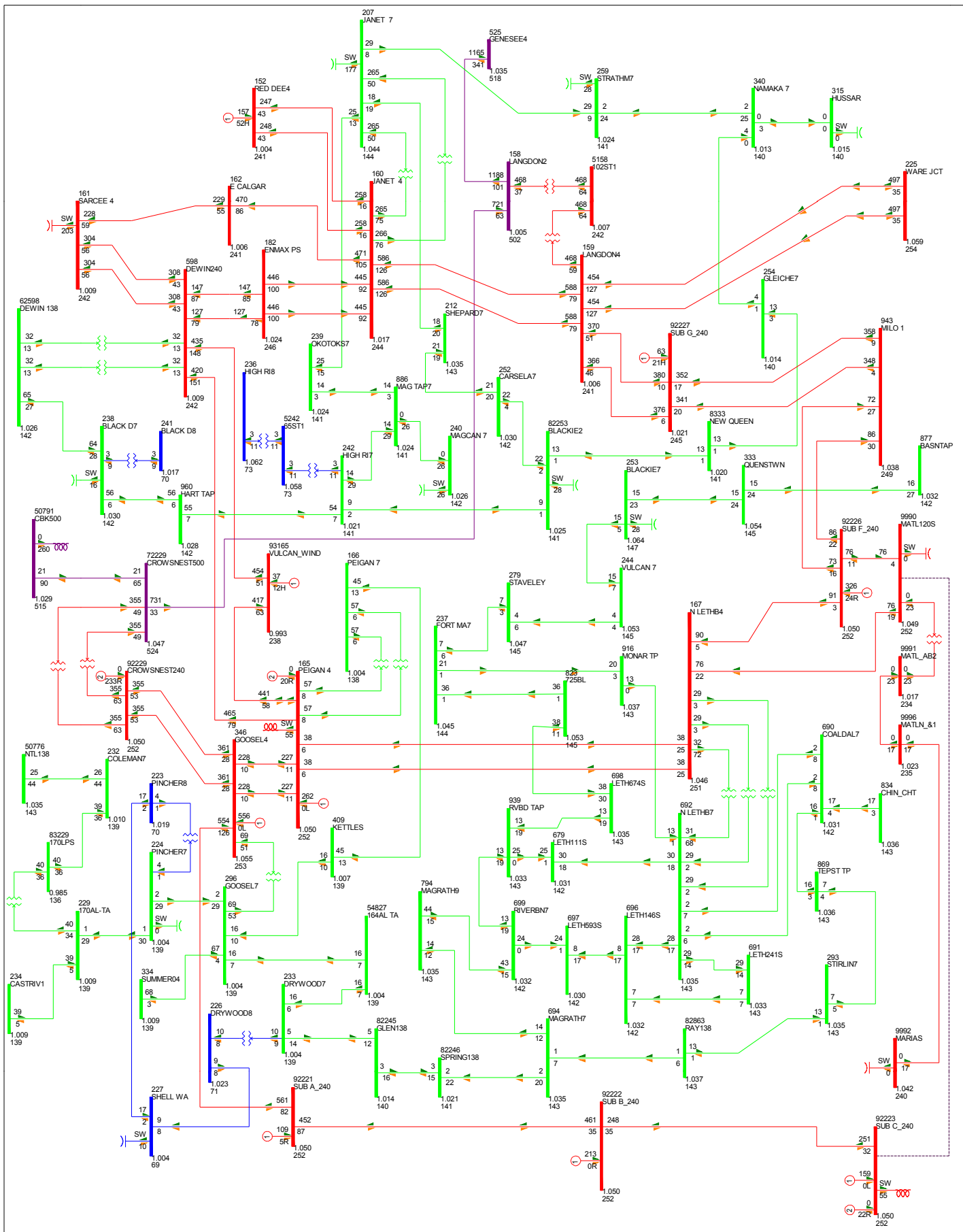


FIG 2017-1A-SP-BOW-14: SUB C TO MATL 240 KV

1000 MW BOW CITY GENERATION SCENARIO

2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)

Branch - MW/MVAR

Equipment - MW/MVAR

100.0%RATEA

KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000

BC Export: -33 MW

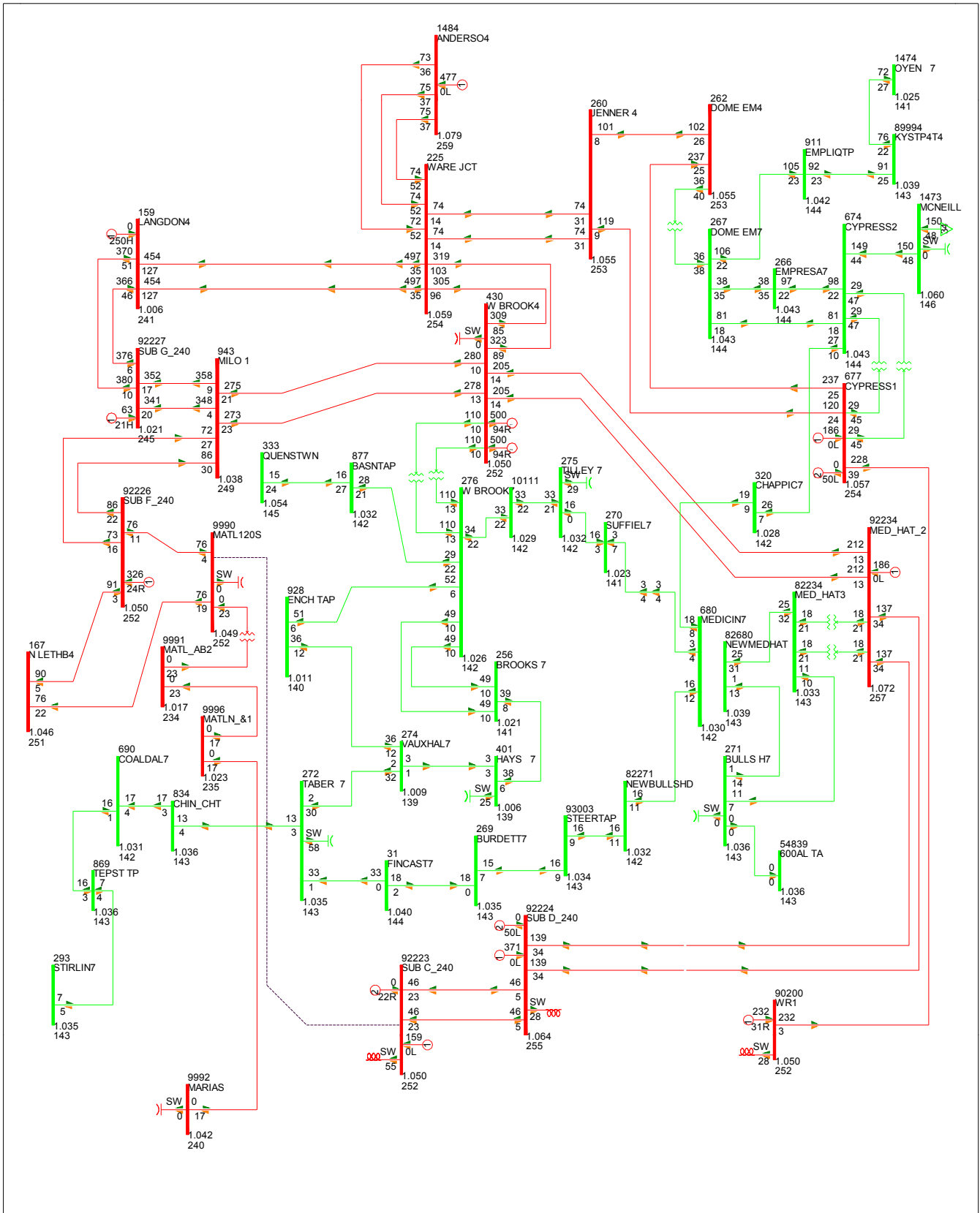


FIG 2017-1A-SP-BOW-15: SUB C TO MATL 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South East System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -33 MW

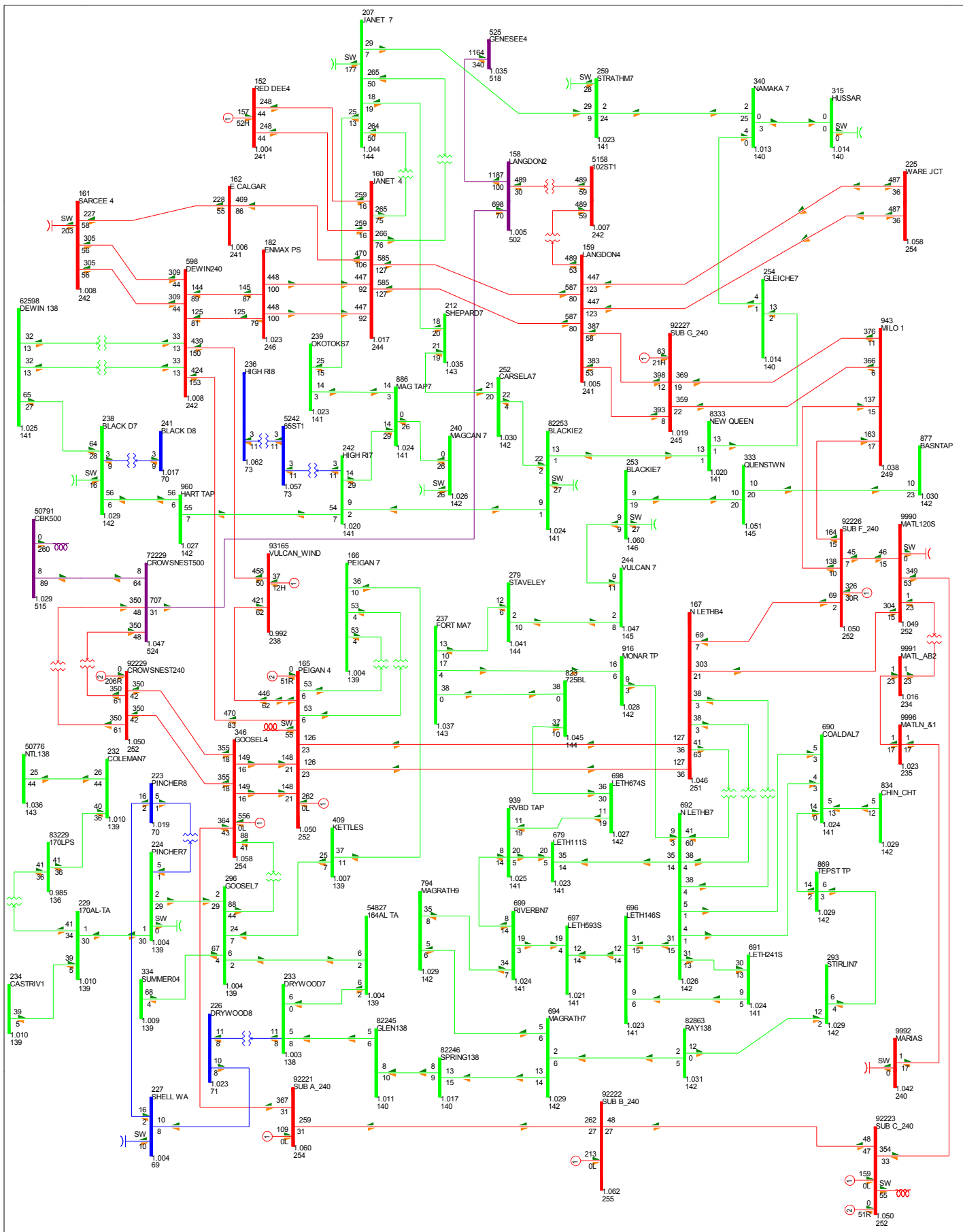


FIG 2017-1A-SP-BOW-16: JENNER TO CYPRESS 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -18 MW

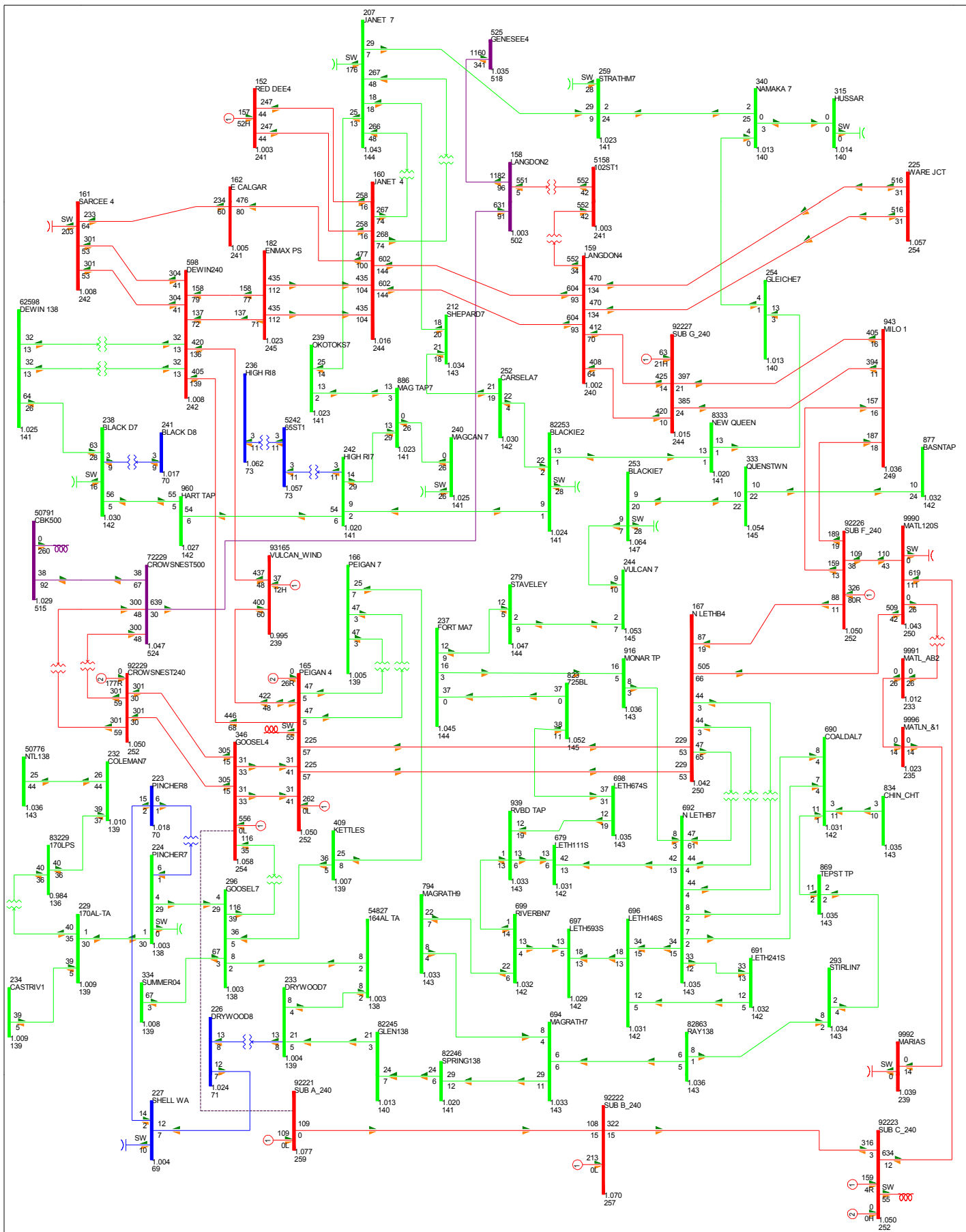


FIG 2017-1A-SP-BOW-18: GOOSELAKE TO SUB A 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -47 MW

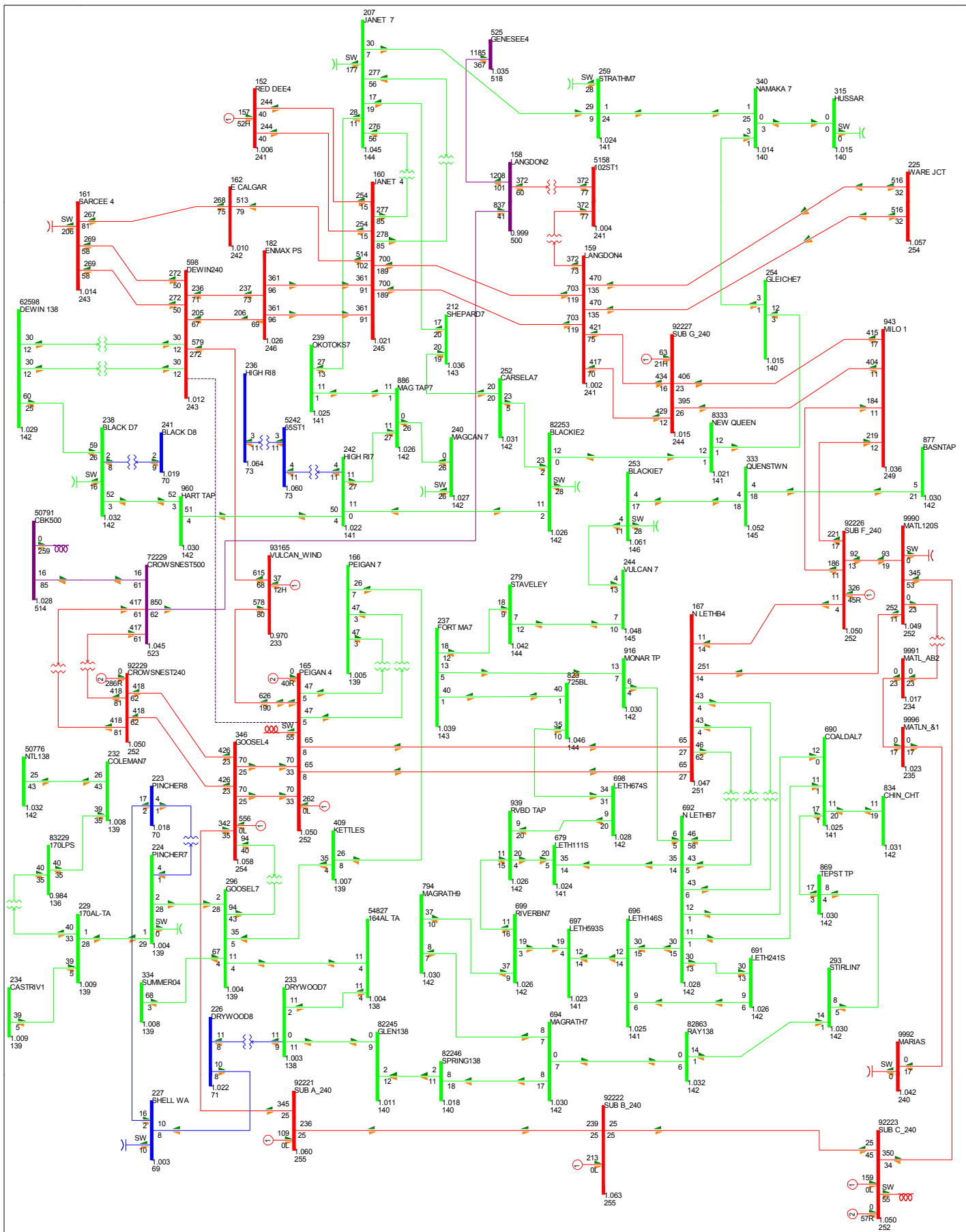


FIG 2017-1A-SP-BOW-20: PEIGAN TO DEWINTON 240 KV
 1000 MW BOW CITY GENERATION SCENARIO
 2017 South West System MON, NOV 24 2008 18:34

ALTERNATIVE 1A

Bus - VOLTAGE (KV/PU)
 Branch - MW/MVAR
 Equipment - MW/MVAR
 100.0%RATEA
 KV: <=34.500 <=69.000 <=138.000 <=240.000 <=500.000 >500.000
 BC Export: -35 MW

P-V & V-Q Analysis

The power flow and contingency analysis determined the sizes of the reactive power compensation required to maintain an acceptable voltage profile during normal and contingency conditions. However, voltages alone are poor indicators of the distance of the system operating point from the voltage collapse. A system may be operating close to a voltage collapse with a normal voltage profile. For this reason, P-V analysis was carried out to determine the real power margins available under normal as well as contingency conditions and to ensure the adequacy of the proposed reactive power compensation.

The P-V analysis was carried out for Alternative 1A for the critical buses which were determined through power flow and contingency analysis. The generation source was British Columbia system while the sink load was in southern region. Several 500kV and 240kV critical contingencies were simulated and the real power margins for the identified buses were calculated. The forecast 2017 summer peak load for the southern Alberta region is 1376MW based on the FC2007 AESO forecast. Table D-22 shows that voltage collapse nose points under various contingency are much greater than 1445MW to meet the required 5% voltage stability margin.

The Q-V analysis for 2017 was also carried out to ensure that the proposed network have enough reactive power reserve during normal and contingency conditions. All the Q-V curves show that during normal or contingency conditions, there is no deficiency of reactive power at these locations. All the critical cases show that with the implementation of Alternative 1A, the system has adequate voltage stability margin and also shows the adequacy of the proposed reactive power support.

Table D-22: Summary of P-V Analysis Results: 2017 Summer Peak- Alternative 1A

Contingency			Area loading at Voltage collapse (nose) point		Voltage stability Criteria Met?
Figure No.	Identifier	Description	Scenario 1 (two sheerness units in service	Scenario 2 (One sheerness unit in service	
Fig PV-1		Base Case	3090	2180	Yes
		240 kV Contingencies			
Fig PV-2	967L	Peigan 59S to N. Lethbridge 370S	2930	2090	Yes
Fig PV-3	955L	Goose Lake 102S to Peigan 59S	2810	2020	Yes
Fig PV-4	Line J	Dewinton to Peigan 59S	2900	1910	Yes
Fig PV-5	924L	Milo JK to N. Lethbridge 370S	3100	2160	Yes
Fig PV-6	944L	W. Junction 132S to Jenner 275S	3090	2180	Yes
Fig PV-7	931L	W. Brooks 28S to W. Junction 132S	3080	2180	Yes
Fig PV-8	Line H	Langdon 102S to W. Junction 132S	3140	2160	Yes
Fig PV-9	945L	New Cypress 132S to Jenner 275S	3090	2180	Yes
Fig PV-10	Line C1	Goose Lake 103S to Sub C	2840	2090	Yes
Fig PV-11	Line A	Goose Lake 103S to New Crowsnest	2750	1970	Yes
Fig PV-12	923L	Milo JK to W.Brooks 28S	3100	2180	Yes
Fig PV-13	Line G	W. Brook 28S to MH2 41S	3100	2170	Yes
Fig PV-14	New line	Cypress to wildrose	2760	1810	Yes
Fig PV-15	Line D	MATL 120S to Sub C	3040	2080	Yes
Fig PV-16	New Transformer	New Crowsnest 500/240 Transformer	2930	2100	Yes
Fig PV-17	Line C1	Goose Lake 103S to Sub C	2790	2010	Yes
Fig PV-18	Line E	Sub C to Sub D	3110	2180	Yes

Table D23: Summary of Q-V Analysis Results: 2017 Summer Peak- Alternative 1A Scenario 1 (with both Sheerness units in-service)

Both sheerness units in service				
Figure No.	Langdon 102S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-1		Base Case	1632	Yes
	1	977L Peigan to N Lethbridge	1624	Yes
	2	500240kV Transformer at Crowsnest	1623	Yes
	3	975L Peigan to Goose Lake	1616	Yes
	4	240kV from Goose Lake to Crowsnest	1613	Yes

Both sheerness units in service				
Figure No.	Janet 74S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-2		Base Case	1041	Yes
	1	977L Peigan to N Lethbridge	1038	Yes
	2	500240kV Transformer at Crowsnest	1027	Yes
	3	975L Peigan to Goose Lake	1018	Yes
	4	240kV from Goose Lake to Crowsnest	1003	Yes

Both sheerness units in service				
Figure No.	Peigan 59S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-3		Base Case	1204	Yes
	1	977L Peigan to N Lethbridge	1188	Yes
	2	500240kV Transformer at Crowsnest	1170	Yes
	3	975L Peigan to Goose Lake	1187	Yes
	4	240kV from Goose Lake to Crowsnest	1124	Yes

Both sheerness units in service				
Figure No.	N.Lethbridge 370S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-4		Base Case	1433	Yes
	1	977L Peigan to N Lethbridge	1322	Yes
	2	500240kV Transformer at Crowsnest	1409	Yes
	3	975L Peigan to Goose Lake	1391	Yes
	4	240kV from Goose Lake to Crowsnest	1358	Yes

Both sheerness units in service				
Figure No.	Ware Junction 132S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-5		Base Case	1287	Yes
	1	977L Peigan to N Lethbridge	1274	Yes
	2	500240kV Transformer at Crowsnest	1280	Yes
	3	975L Peigan to Goose Lake	1277	Yes
	4	240kV from Goose Lake to Crowsnest	1287	Yes

Both sheerness units in service				
Figure No.	New Cypress Substation	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-6		Base Case	678	Yes
	1	977L Peigan to N Lethbridge	678	Yes
	2	500240kV Transformer at Crowsnest	677	Yes
	3	975L Peigan to Goose Lake	676	Yes
	4	240kV from Goose Lake to Crowsnest	678	Yes

Both sheerness units in service				
Figure No.	Goose Lake 103S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-7		Base Case	1427	Yes
	1	977L Peigan to N Lethbridge	1369	Yes
	2	500240kV Transformer at Crowsnest	1330	Yes
	3	975L Peigan to Goose Lake	1459	Yes
	4	240kV from Goose Lake to Crowsnest	1234	Yes

Both sheerness units in service				
Figure No.	W. Brooks 28S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-8		Base Case	1516	Yes
	1	977L Peigan to N Lethbridge	1499	Yes
	2	500240kV Transformer at Crowsnest	1504	Yes
	3	975L Peigan to Goose Lake	1498	Yes
	4	240kV from Goose Lake to Crowsnest	1492	Yes

Both sheerness units in service				
Figure No.	New Milo Junction	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-9		Base Case	1572	Yes
	1	977L Peigan to N Lethbridge	1536	Yes
	2	500240kV Transformer at Crowsnest	1514	Yes
	3	975L Peigan to Goose Lake	1510	Yes
	4	240kV from Goose Lake to Crowsnest	1500	Yes

Both sheerness units in service				
Figure No.	New Crowsnest Substation	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-10		Base Case	2166	Yes
	1	977L Peigan to N Lethbridge	2089	Yes
	2	500240kV Transformer at Crowsnest	1824	Yes
	3	975L Peigan to Goose Lake	2129	Yes
	4	240kV from Goose Lake to Crowsnest	2120	Yes

Both sheerness units in service				
Figure No.	New Medicine Hat 2 Substation	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S1-11		Base Case	714	Yes
	1	977L Peigan to N Lethbridge	715	Yes
	2	500240kV Transformer at Crowsnest	715	Yes
	3	975L Peigan to Goose Lake	715	Yes
	4	240kV from Goose Lake to Crowsnest	712	Yes

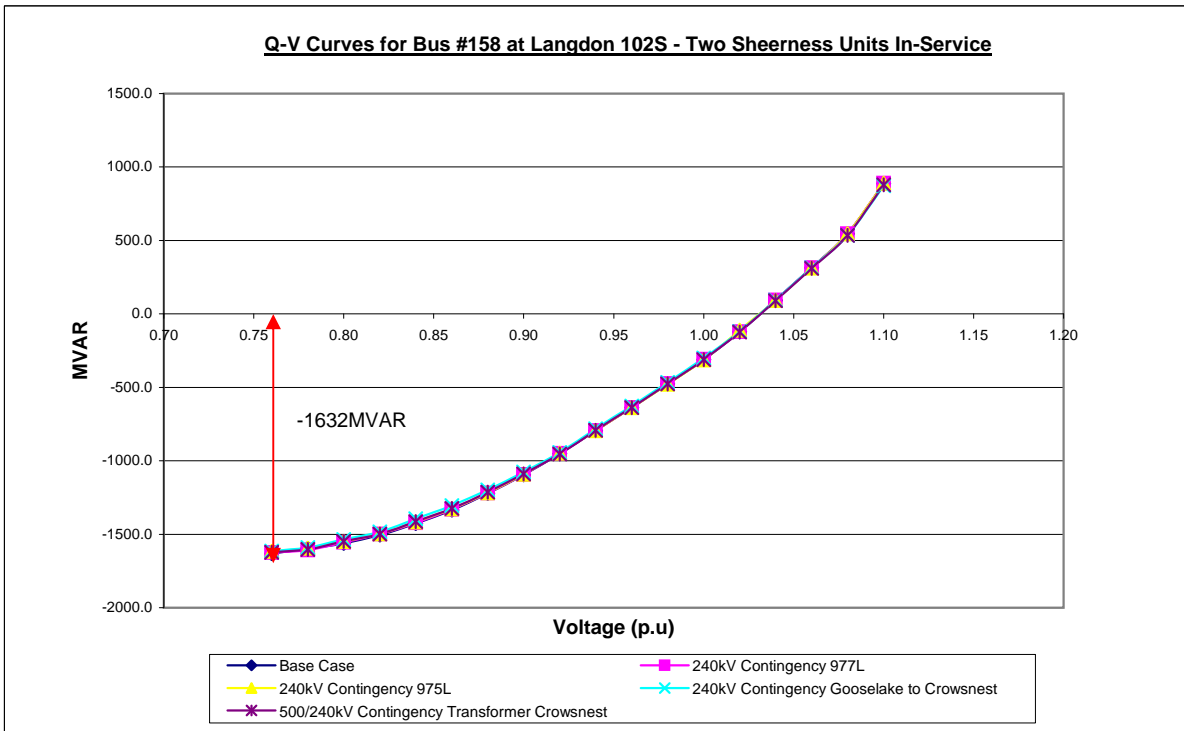


Figure QV-S1-1

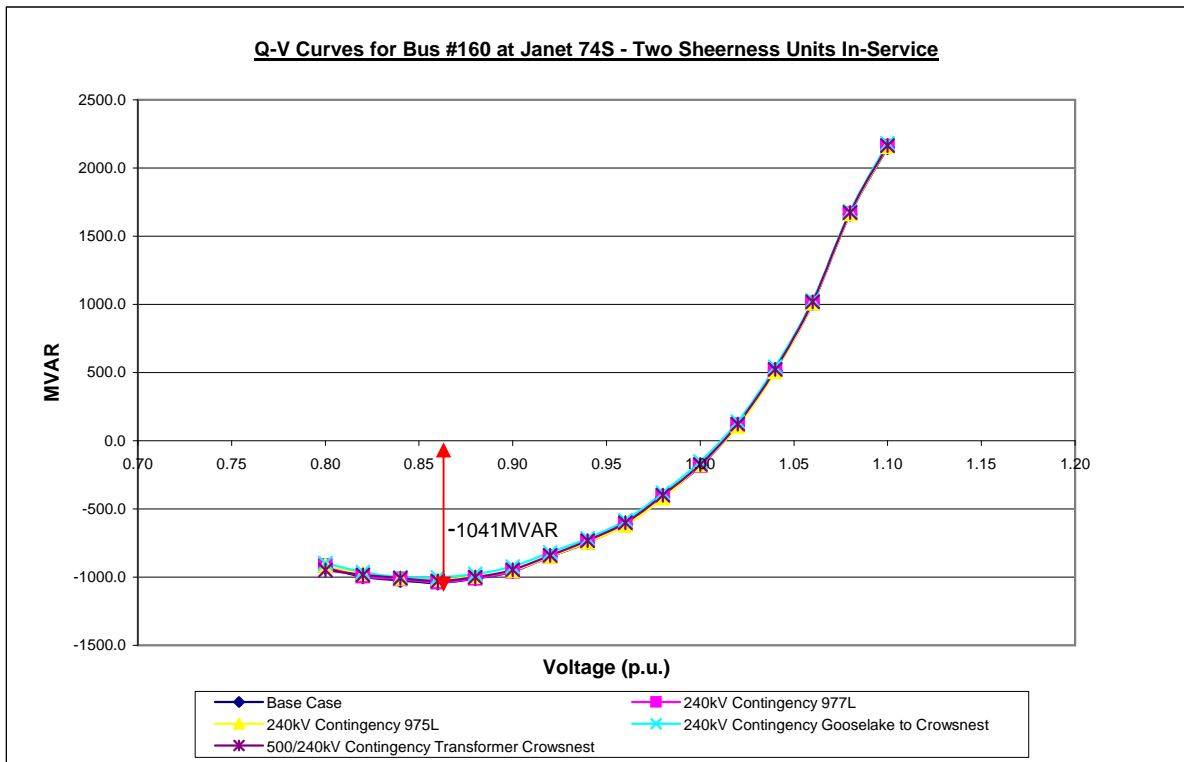


Figure QV-S1-2

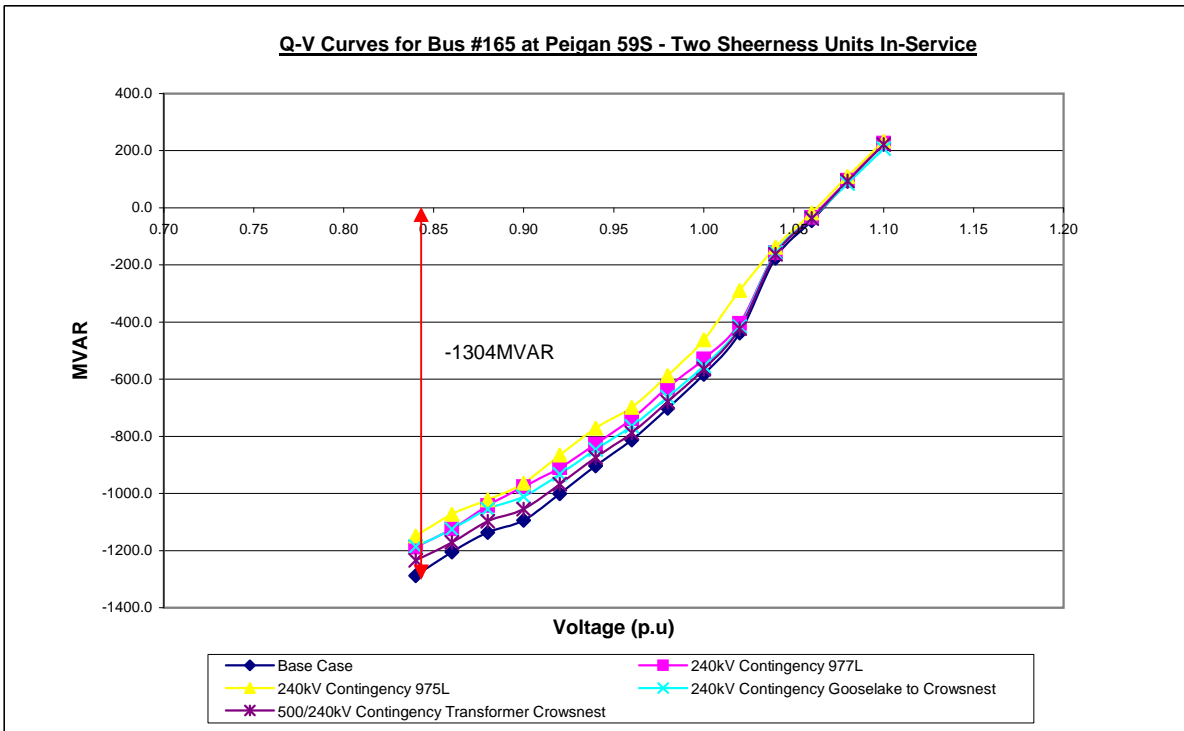


Figure QV-S1-3

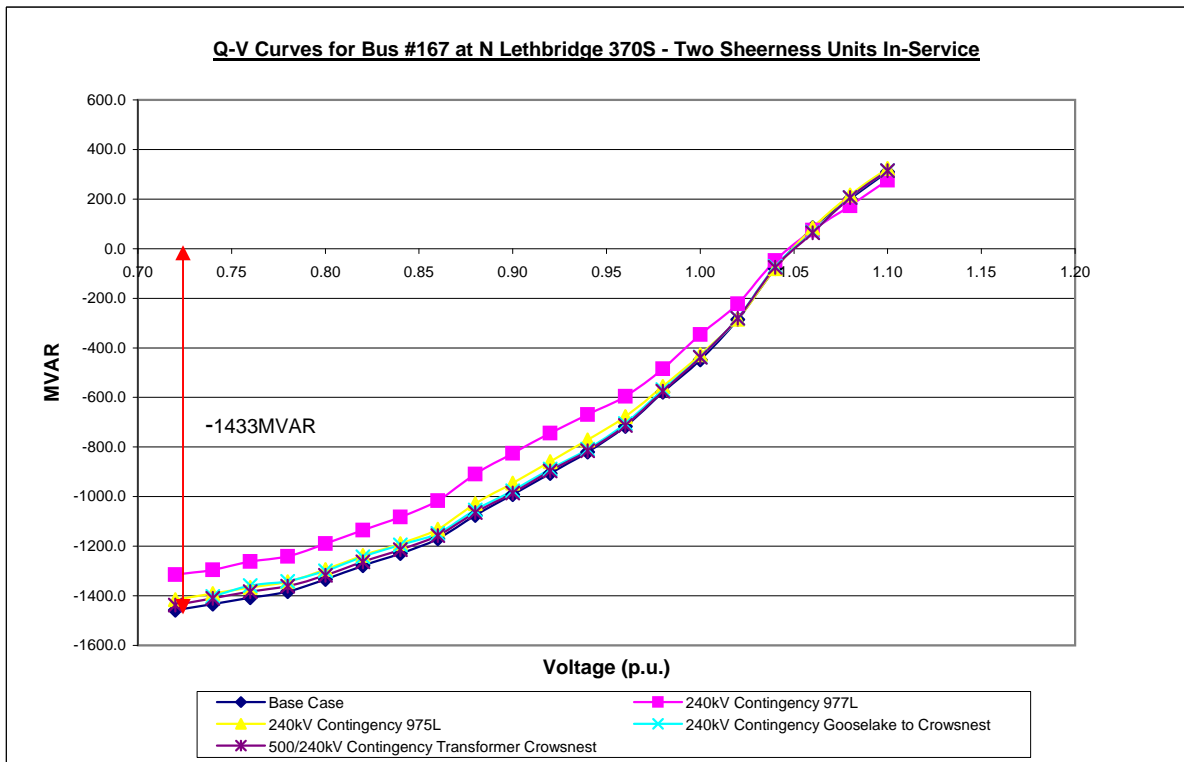


Figure QV-S1-4

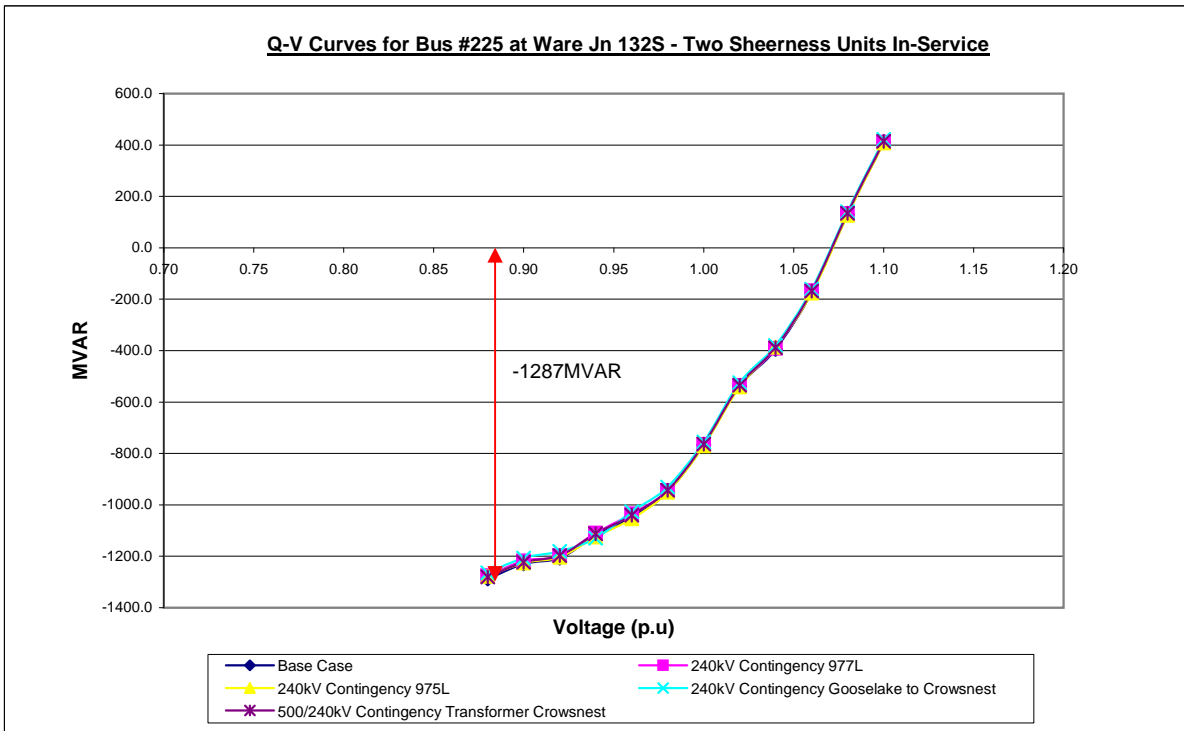


Figure QV-S1-5

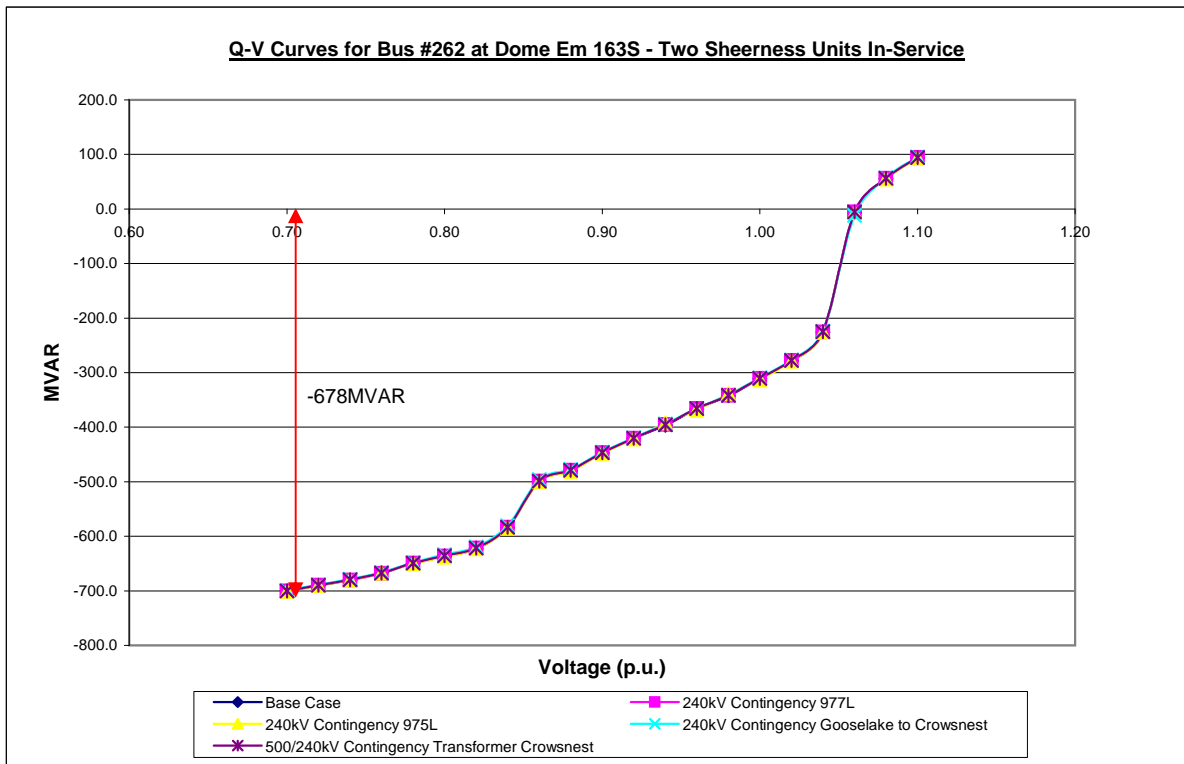


Figure QV-S1-6

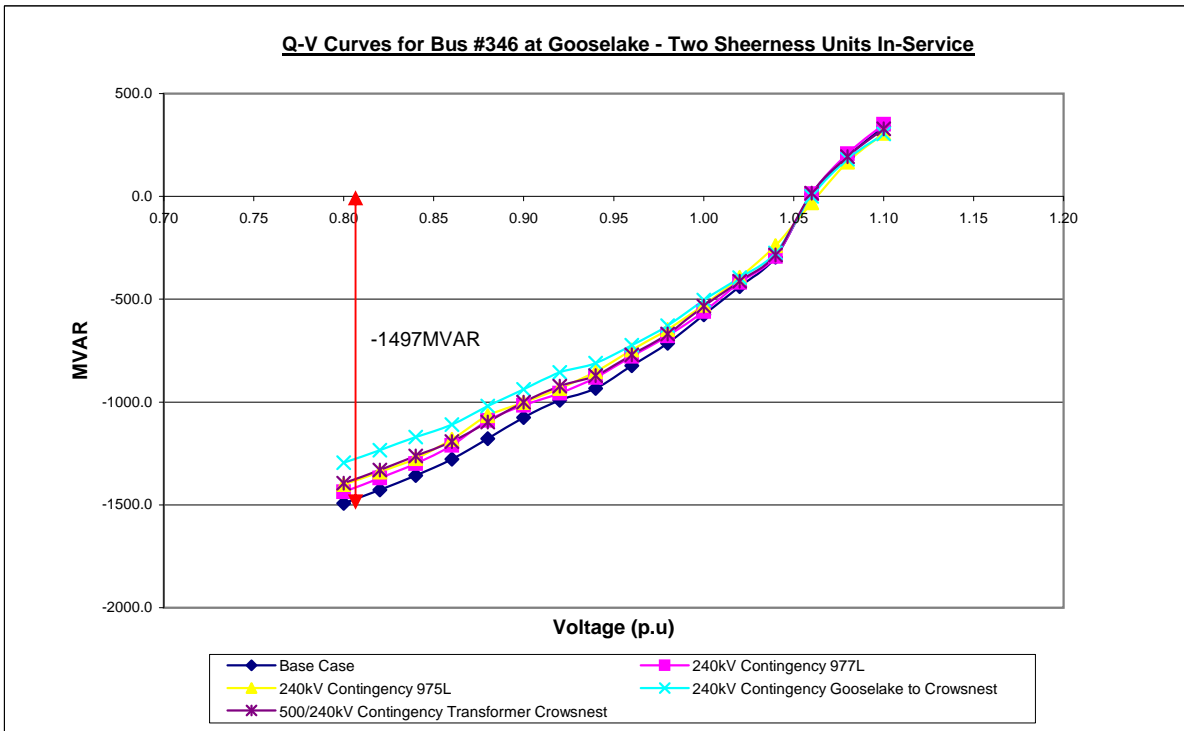


Figure QV-S1-7

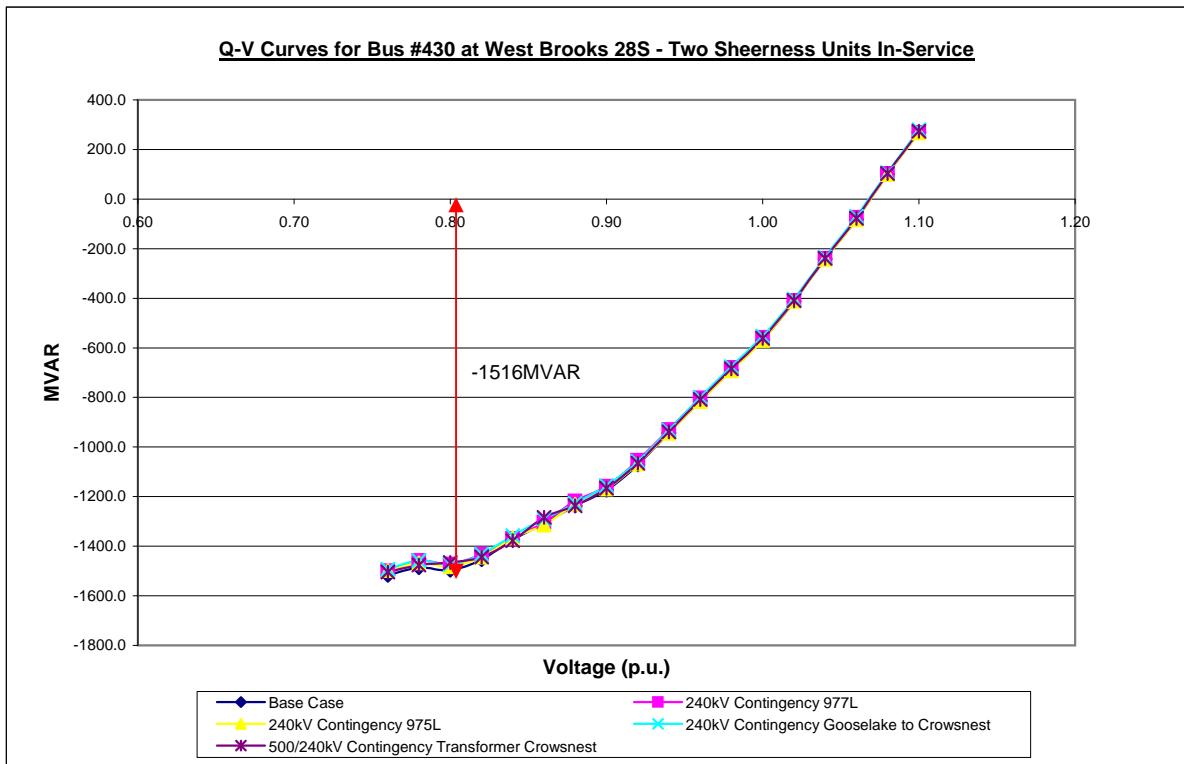


Figure QV-S1-8

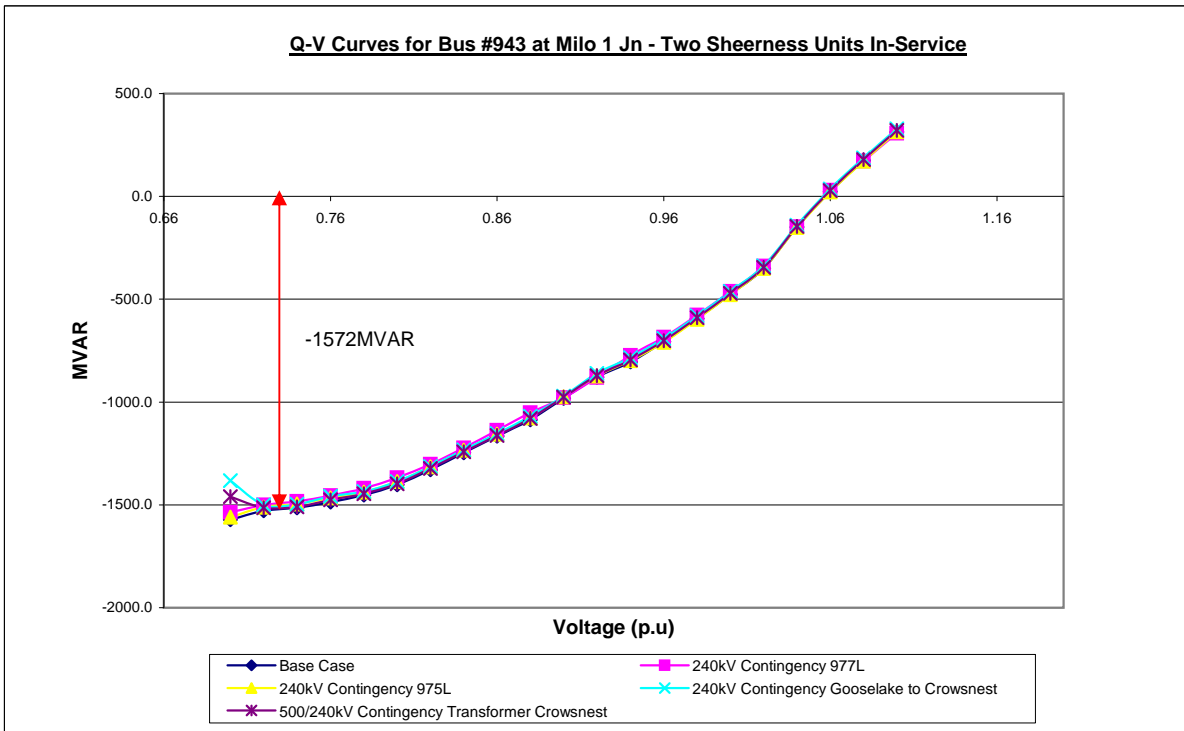


Figure QV-S1-9

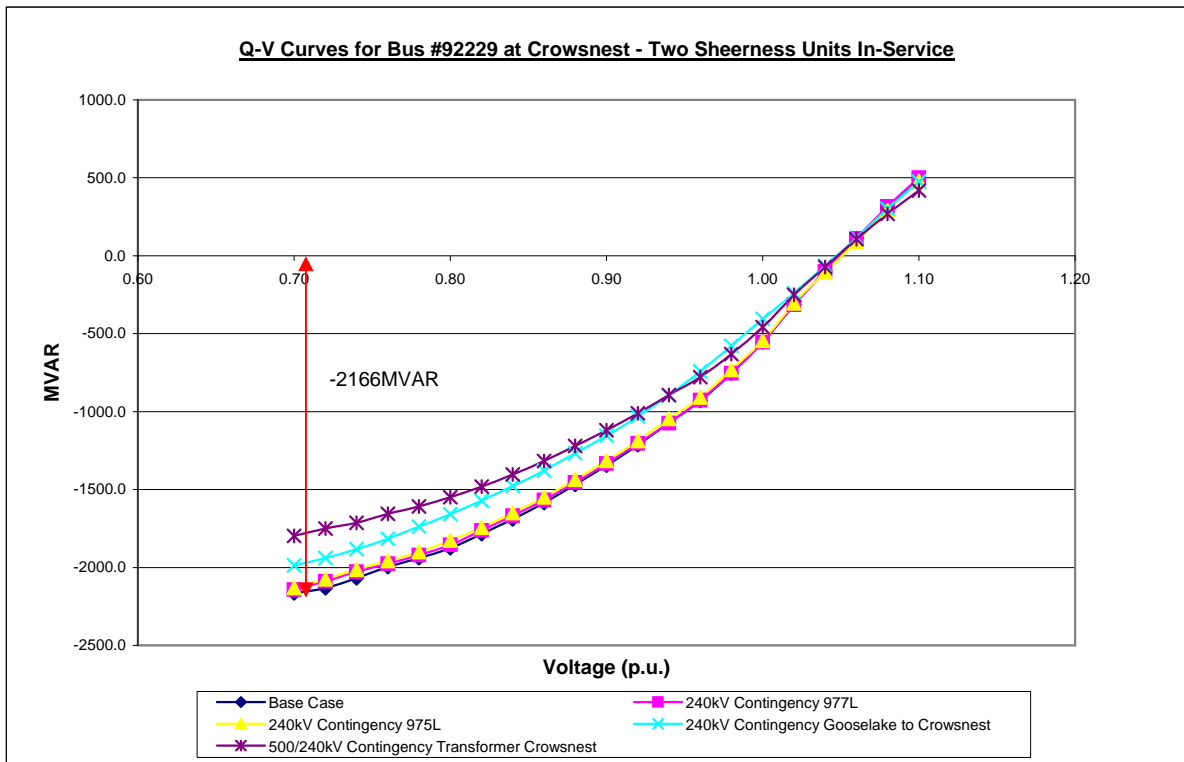


Figure QV-S1-10

Q-V Curves for Bus #92234 at Medicine Hat 41S - Two Sheerness Units In-Service

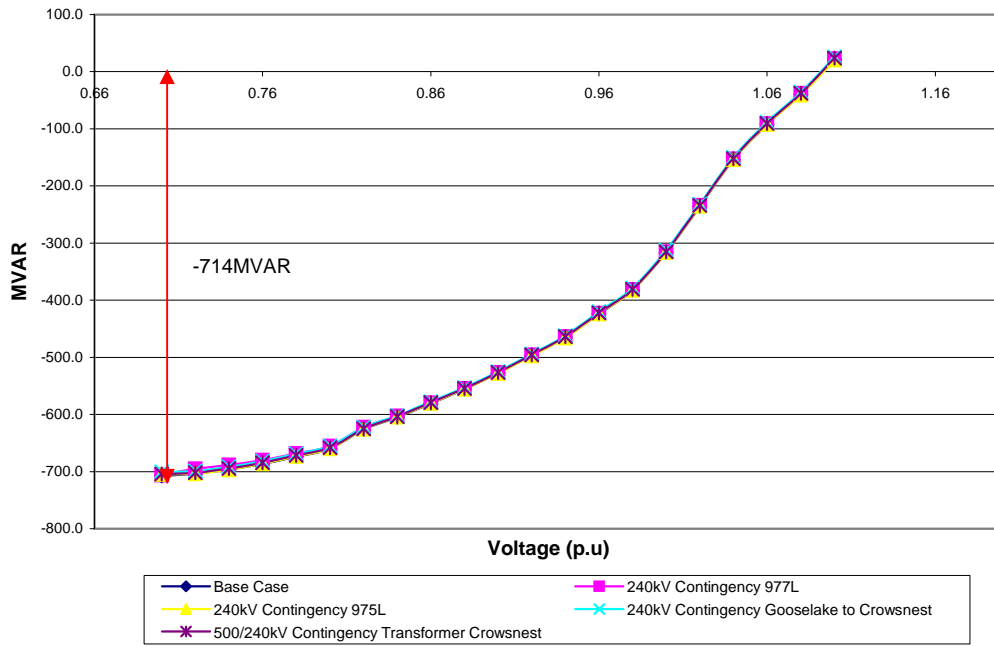


Figure QV-S1-11

Table D-25: Summary of Q-V Analysis Results: 2017 Summer Peak- Alternative 1A Scenario 2 (with one Sheerness units out of service)

One sheerness unit in service				
Figure No.	Langdon 102S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-1		Base Case	1575	Yes
	1	977L Peigan to N Lethbridge	1562	Yes
	2	500240kV Transformer at Crowsnest	1568	Yes
	3	975L Peigan to Goose Lake	1548	Yes
	4	240kV from Goose Lake to Crowsnest	1564	Yes

One sheerness unit in service				
Figure No.	Janet 74S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-2		Base Case	1009	Yes
	1	977L Peigan to N Lethbridge	1003	Yes
	2	500240kV Transformer at Crowsnest	998	Yes
	3	975L Peigan to Goose Lake	987	Yes
	4	240kV from Goose Lake to Crowsnest	980	Yes

One sheerness unit in service				
Figure No.	Peigan 59S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-3		Base Case	1192	Yes
	1	977L Peigan to N Lethbridge	1103	Yes
	2	500240kV Transformer at Crowsnest	1110	Yes
	3	975L Peigan to Goose Lake	1154	Yes
	4	240kV from Goose Lake to Crowsnest	1121	Yes

One sheerness unit in service				
Figure No.	N.Lethbridge 370S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-4		Base Case	1435	Yes
	1	977L Peigan to N Lethbridge	1309	Yes
	2	500240kV Transformer at Crowsnest	1414	Yes
	3	975L Peigan to Goose Lake	1390	Yes
	4	240kV from Goose Lake to Crowsnest	1351	Yes

One sheerness unit in service				
Figure No.	Ware Junction 132S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-5		Base Case	1145	Yes
	1	977L Peigan to N Lethbridge	1139	Yes
	2	500240kV Transformer at Crowsnest	1138	Yes
	3	975L Peigan to Goose Lake	1139	Yes
	4	240kV from Goose Lake to Crowsnest	1131	Yes

One sheerness unit in service				
Figure No.	New Cypress Substation	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-6		Base Case	693	Yes
	1	977L Peigan to N Lethbridge	692	Yes
	2	500240kV Transformer at Crowsnest	692	Yes
	3	975L Peigan to Goose Lake	694	Yes
	4	240kV from Goose Lake to Crowsnest	690	Yes

One sheerness unit in service				
Figure No.	Goose Lake 103S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-7		Base Case	1414	Yes
	1	977L Peigan to N Lethbridge	1356	Yes
	2	500240kV Transformer at Crowsnest	1326	Yes
	3	975L Peigan to Goose Lake	1447	Yes
	4	240kV from Goose Lake to Crowsnest	1233	Yes

One sheerness unit in service				
Figure No.	W. Brooks 28S	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-8		Base Case	1298	Yes
	1	977L Peigan to N Lethbridge	1298	Yes
	2	500240kV Transformer at Crowsnest	1289	Yes
	3	975L Peigan to Goose Lake	1292	Yes
	4	240kV from Goose Lake to Crowsnest	1278	Yes

One sheerness unit in service				
Figure No.	New Milo Junction	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-9		Base Case	1378	Yes
	1	977L Peigan to N Lethbridge	1387	Yes
	2	500240kV Transformer at Crowsnest	1372	Yes
	3	975L Peigan to Goose Lake	1357	Yes
	4	240kV from Goose Lake to Crowsnest	1364	Yes

One sheerness unit in service				
Figure No.	New Crowsnest Substation	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-10		Base Case	1910	Yes
	1	977L Peigan to N Lethbridge	1863	Yes
	2	500240kV Transformer at Crowsnest	1674	Yes
	3	975L Peigan to Goose Lake	1983	Yes
	4	240kV from Goose Lake to Crowsnest	1902	Yes

One sheerness unit in service				
Figure No.	New Medicine Hat 2 Substation	Contingency	Reactive Power Reserve (MVAR)	Reactive Power Margin Requirement Met?
Fig QV-S2-11		Base Case	707	Yes
	1	977L Peigan to N Lethbridge	704	Yes
	2	500240kV Transformer at Crowsnest	705	Yes
	3	975L Peigan to Goose Lake	704	Yes
	4	240kV from Goose Lake to Crowsnest	703	Yes

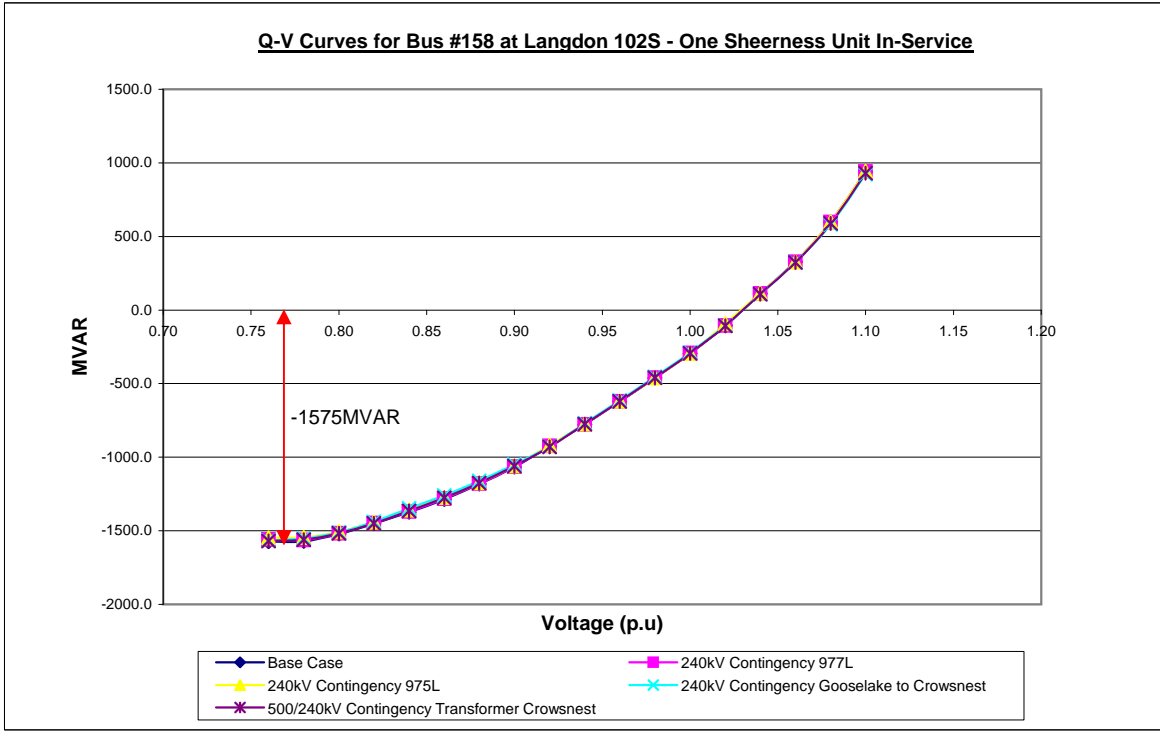


Figure QV-S2-1

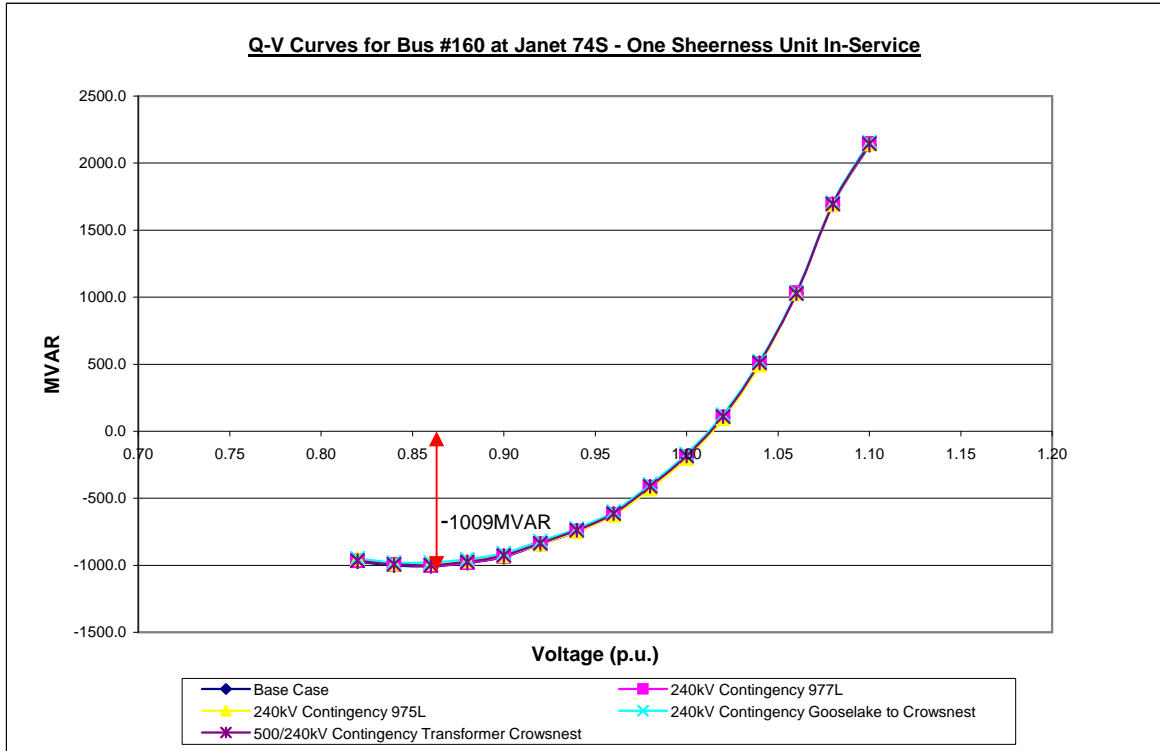


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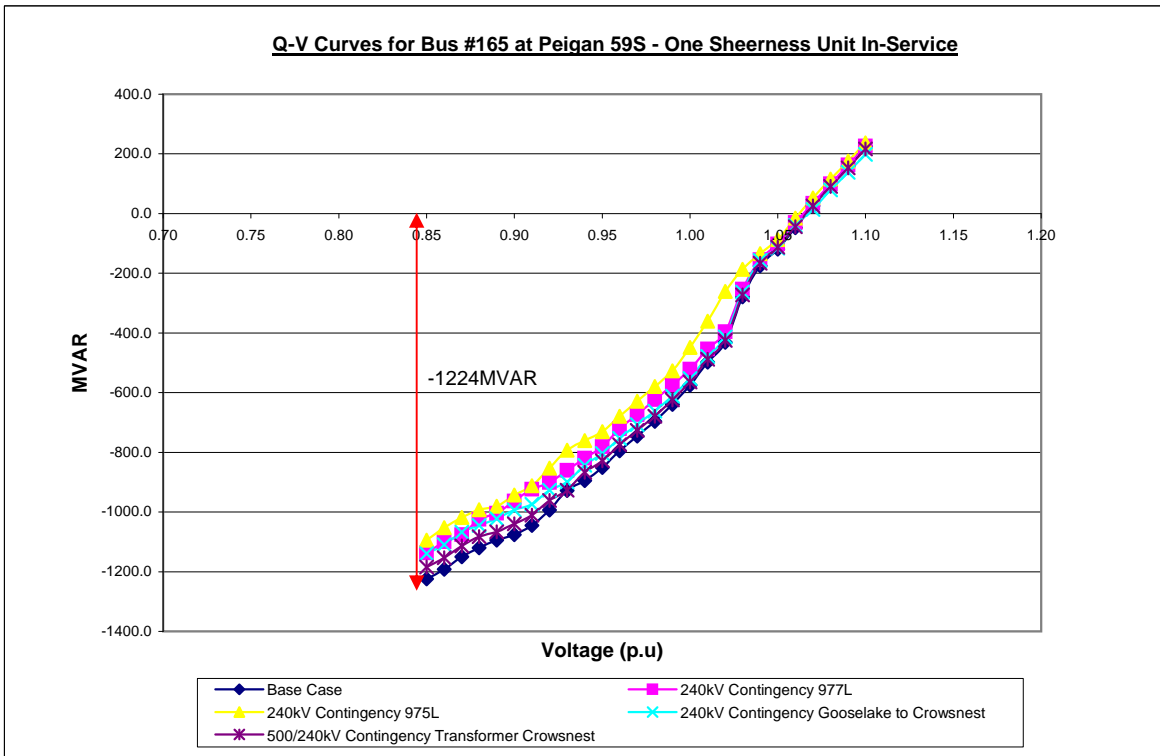


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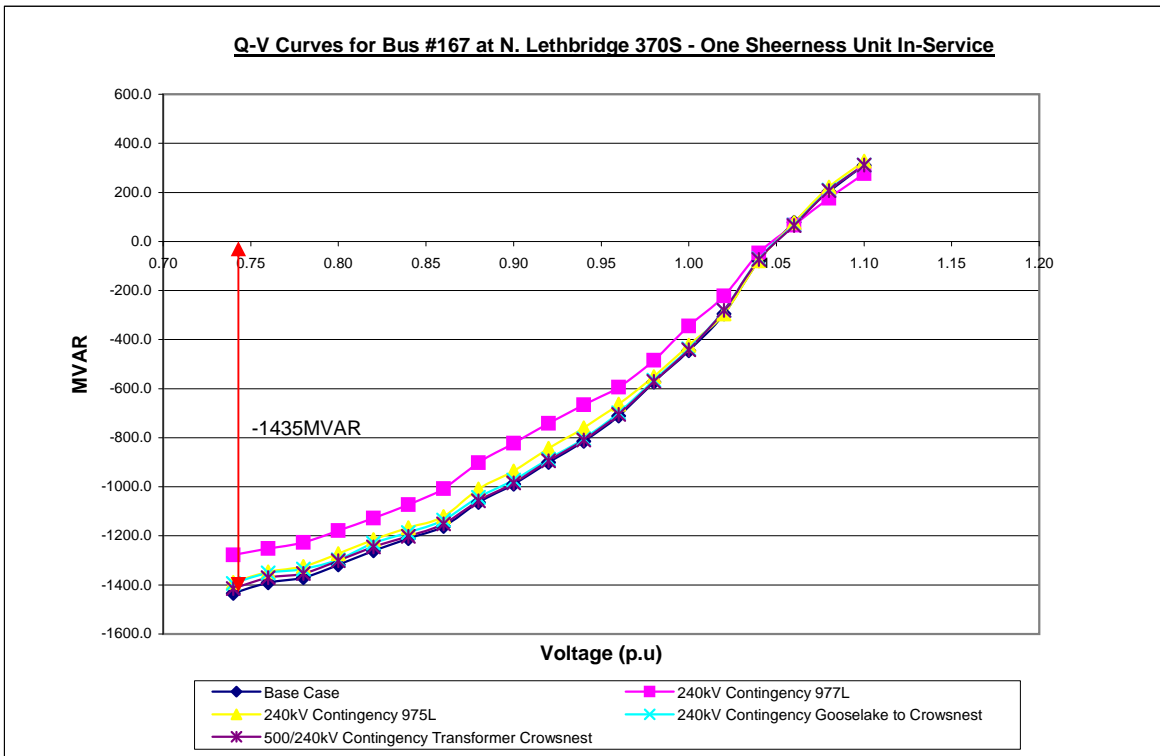


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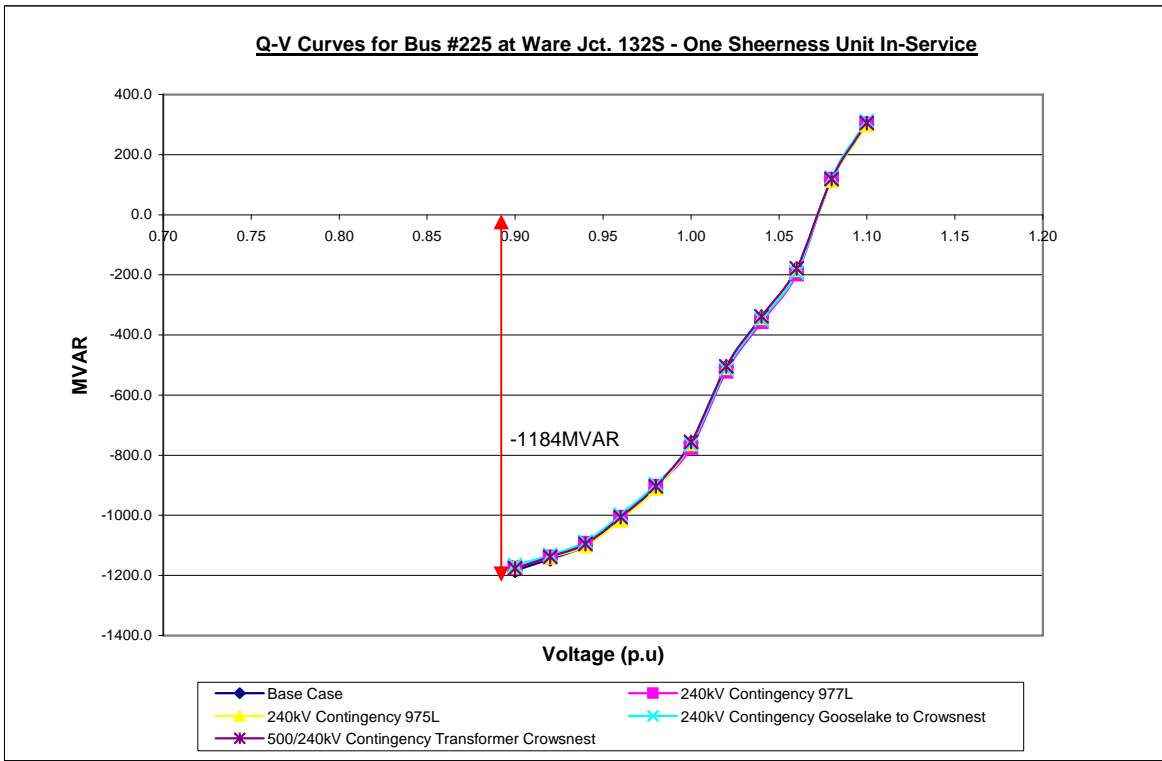


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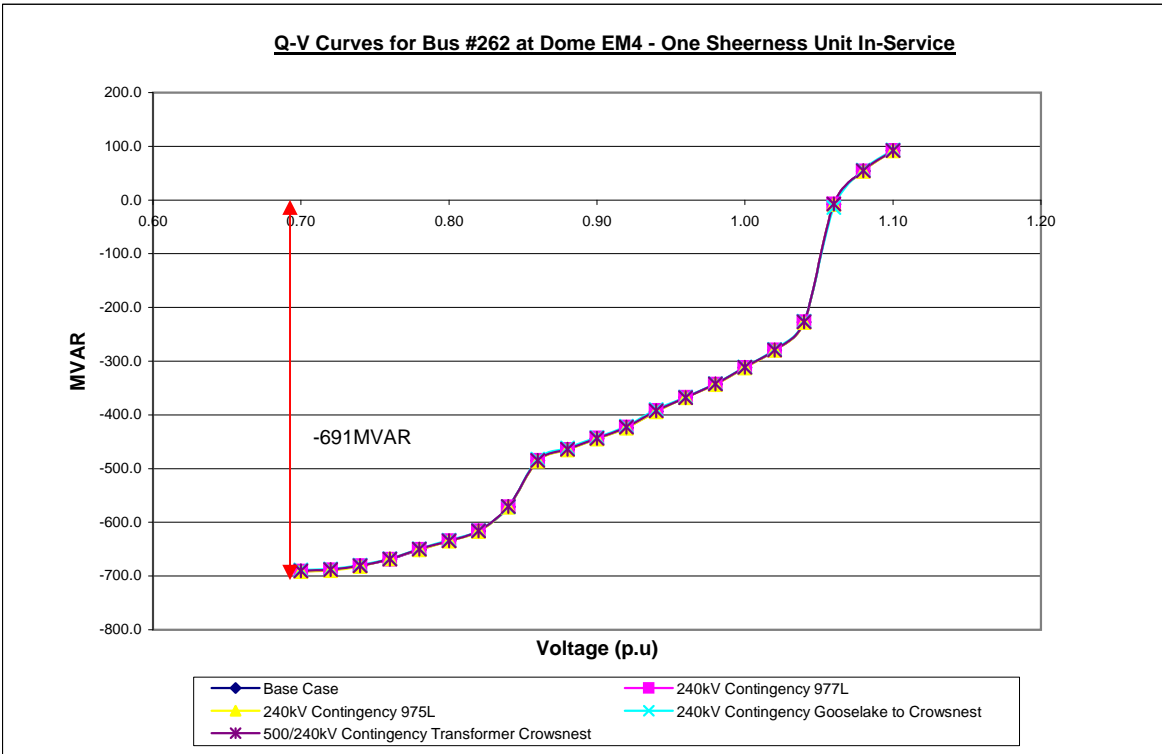


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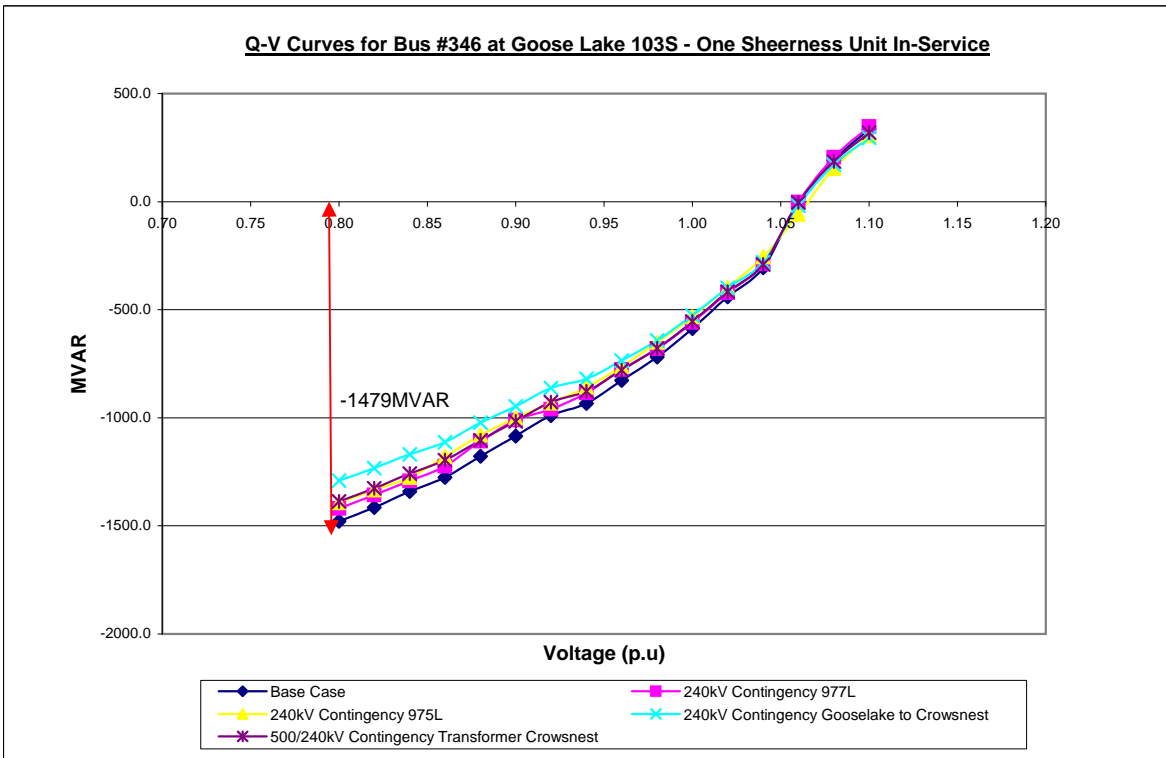


Figure QV-S2-7

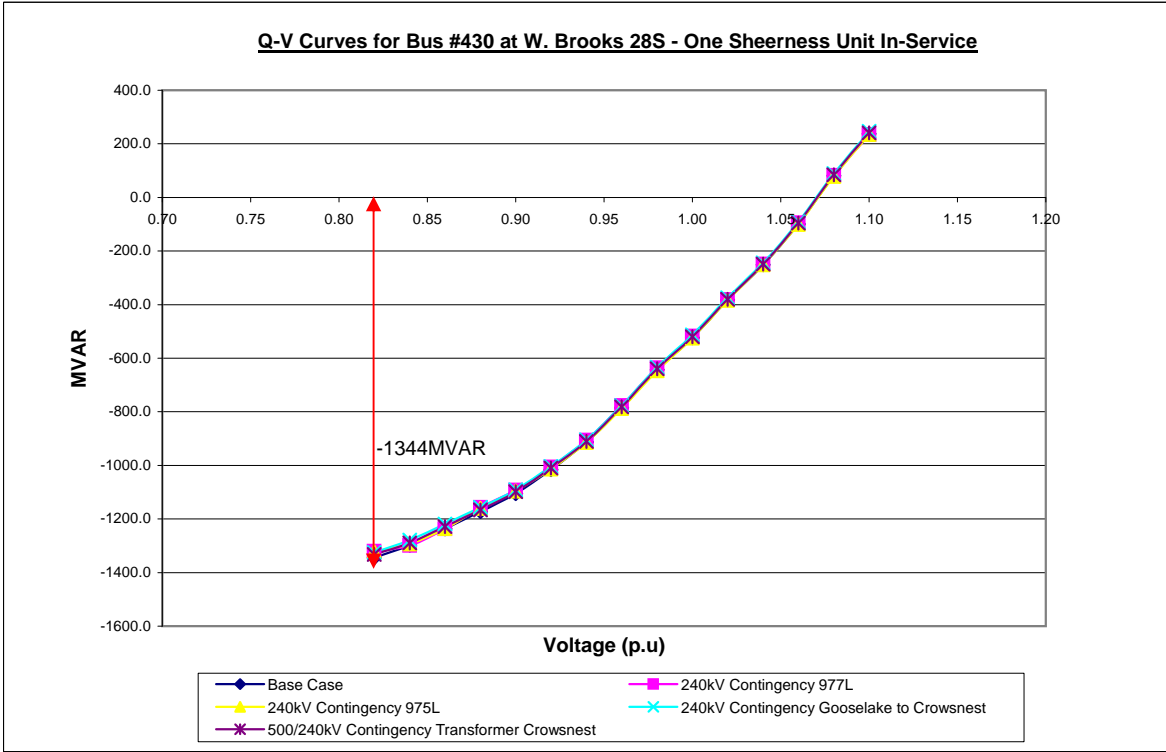


Figure QV-S2-8

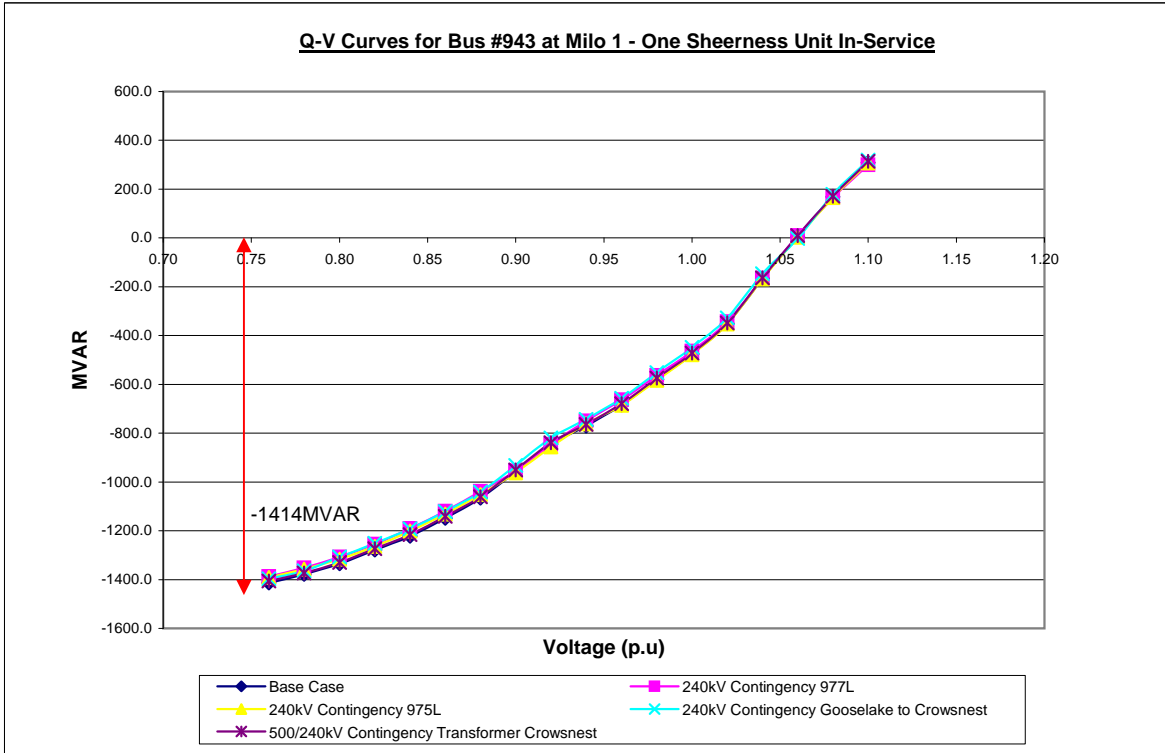


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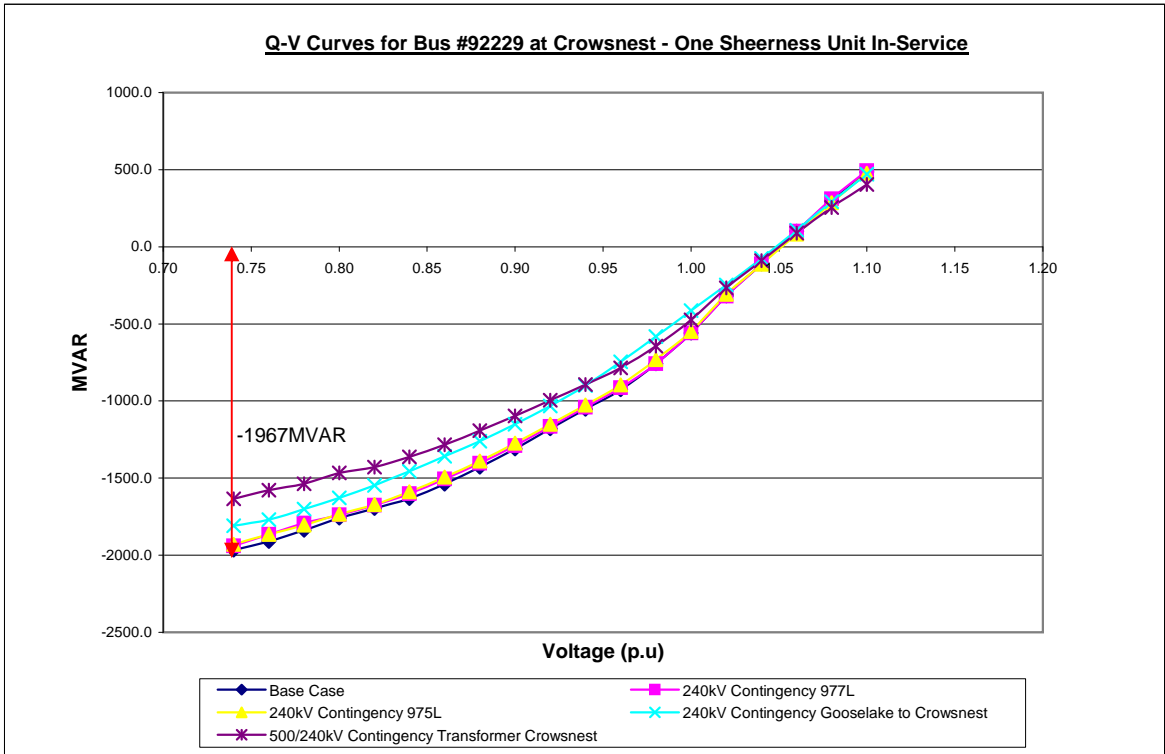
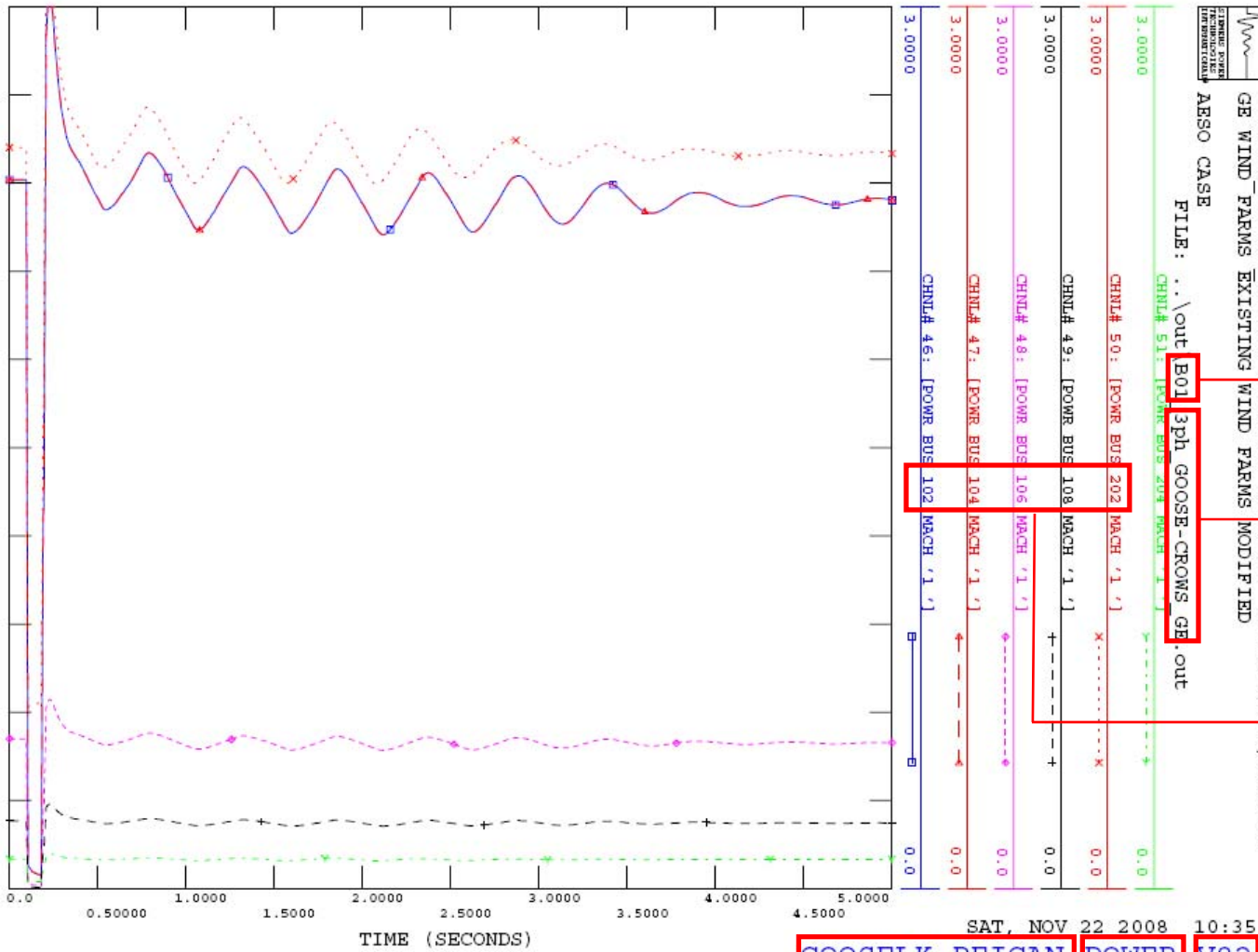


Figure QV-S2-10

APPENDIX E TRANSIENT STABILITY ANALYSIS



[Fault Case ID]

[Fault Description]

[Wind Farm Bus Number]

[Monitored Generator]

[Monitored Parameter]

[Turbine Type]

Stability Plots Reference Table

Substation Name	POI 240 kV Bus Number	Wind Farm 600 V Bus Number	DVAR Bus Number (V82 model only)
Goose lake	54367	102, 104, 106, 108	101, 103, 105, 107
Peigan	54165	202, 204	201, 203
Sub F	92226	302, 304, 306	301, 303, 305, 307
Sub G	92227	402, 404	401, 403
Vulcan	93165	502	501
Sub A	92221	602, 604, 606	601, 603, 605
Sub B	92222	702, 704, 706	701, 703, 705
Sub C	92223	802, 804	801, 803
Sub D	92224	902, 904, 906, 908	901, 903, 905, 907
Medicine Hat 2	92234	1002, 1004	1001, 1003
Cypress	54677	1102, 1104	1101, 1103
WR	90200	1202	1201
Anderson	55484	1302, 1304	1301, 1303
Red dee	54152	1402, 1404	1401, 1403

Category B Fault Analysis Results

Category B fault analysis was performed for Alternative 1A. Category B faults are defined as three-phase faults of a transmission line or transformer with normal clearing time. Figures E-1 E-2 and E-3 show the locations where the Category B faults were applied to the system. Table E-1 summarizes the fault descriptions and results for the Category B fault analysis. Specific transient simulation plots for Category B contingencies can be found in Appendix E.

FIGURE E-1

CATEGORY B FAULT LOCATIONS - SOUTHWESTERN PART OF THE SOUTH SYSTEM

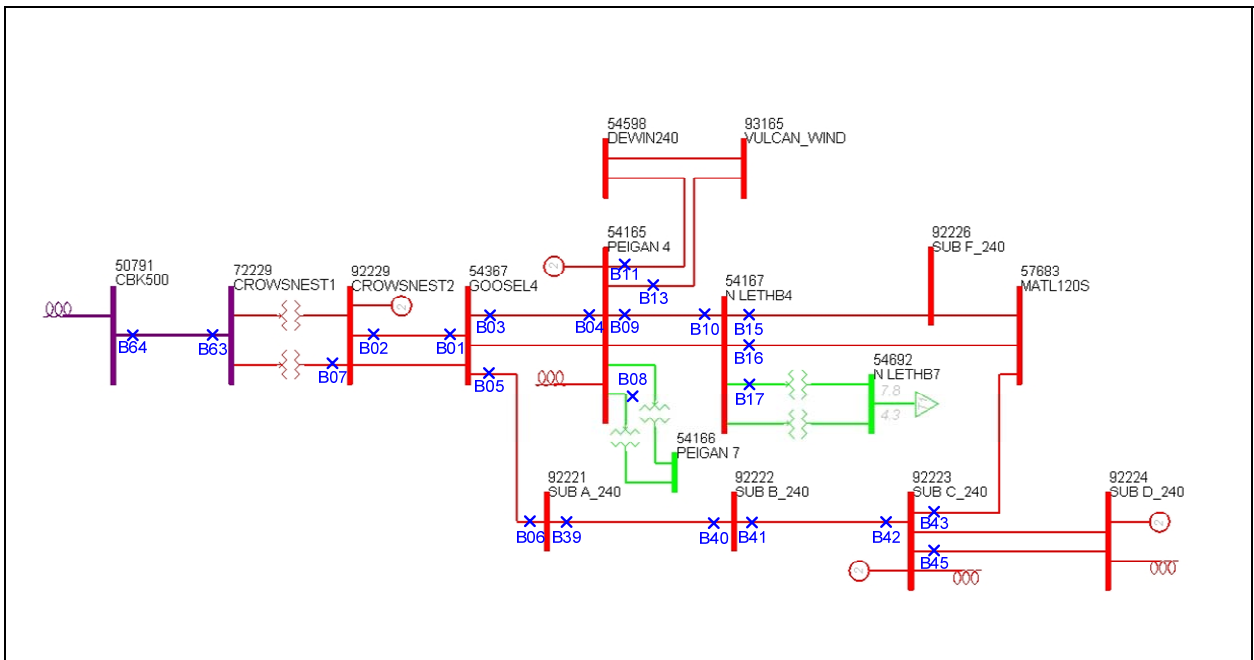


TABLE E-1
STABILITY RESULTS FOR CATEGORY B FAULTS
V82 AND GE1.5 TURBINE

Case ID	Description	Observations
B01**	3ph fault at Gooselake 240kV line to Crowsnest 5 cycles: trip Gooselake CB on Gooselake - Crowsnest line 6 cycles: trip Crowsnest CB on Gooselake - Crowsnest line	System stable Good voltage recovery No load shedding
B02	3ph fault at Crowsnest 240kV line to Gooselake 5 cycles: trip Crowsnest CB on Crowsnest - Gooselake line 6 cycles: trip Gooselake CB on Crowsnest - Gooselake line	System stable Good voltage recovery No load shedding
B03	3ph fault at Gooselake 240kV line to Peigan 5 cycles: trip Gooselake CB on Gooselake - Peigan line 6 cycles: trip Peigan CB on Gooselake - Peigan line	System stable Good voltage recovery No load shedding
B04*	3ph fault at Peigan 240kV line to Gooselake 5 cycles: trip Peigan CB on Peigan - Gooselake line 6 cycles: trip Gooselake CB on Peigan - Gooselake line	System stable Good voltage recovery No load shedding
B05	3ph fault at Gooselake 240kV line to SubA 5 cycles: trip Gooselake CB on Gooselake - SubA line 6 cycles: trip SubA CB on Gooselake - SubA line	System stable Good voltage recovery No load shedding
B06	3ph fault at SubA 240kV line to Gooselake 5 cycles: trip SubA CB on SubA - Gooselake line 6 cycles: trip Gooselake CB on SubA - Gooselake line	System stable Good voltage recovery No load shedding
B07	3ph fault at Crowsnest transformer 5 cycles: trip Crowsnest CB on transformer	System stable Good voltage recovery No load shedding
B08	3ph fault at Peigan transformer 5 cycles: trip Peigan CB on transformer	System stable Good voltage recovery No load shedding
B09	3ph fault at Peigan 240kV line to N_Leth 5 cycles: trip Peigan CB on Peigan - N_Leth line 6 cycles: trip N_Leth CB on Peigan - N_Leth line	System stable Good voltage recovery No load shedding
B10*	3ph fault at N_Leth 240kV line to Peigan 5 cycles: trip N_Leth CB on N_Leth - Peigan line 6 cycles: trip Peigan CB on N_Leth - Peigan line	System stable Good voltage recovery No load shedding
B11	3ph fault at Peigan 240kV line to Dewin 5 cycles: trip Peigan CB on Peigan - Dewin line 6 cycles: trip Dewin CB on Peigan - Dewin line	System stable Good voltage recovery No load shedding
B12*	3ph fault at Dewin 240kV line to Peigan 5 cycles: trip Dewin CB on Dewin - Peigan line 6 cycles: trip Peigan CB on Dewin - Peigan line	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

** Stability simulation plots for V82 and GE machines are included in Appendix E.

TABLE E-1
STABILITY RESULTS FOR CATEGORY B FAULTS
V82 AND GE1.5 TURBINE

Case ID	Description	Observations
B13 [*]	3ph fault at Peigan 240kV line to Vulcan 5 cycles: trip Peigan CB on Peigan - Vulcan line 6 cycles: trip Vulcan CB on Peigan - Vulcan line	System stable Good voltage recovery No load shedding
B14	3ph fault at Vulcan 240kV line to Peigan 5 cycles: trip Vulcan CB on Vulcan - Peigan line 6 cycles: trip Peigan CB on Vulcan - Peigan line	System stable Good voltage recovery No load shedding
B15	3ph fault at N_Leth 240kV line to SubF 5 cycles: trip N_Leth CB on N_Leth - SubF line 6 cycles: trip SubF CB on N_Leth - SubF line	System stable Good voltage recovery No load shedding
B16	3ph fault at N_Leth 240kV line to Matl 5 cycles: trip N_Leth CB on N_Leth - Matl line 6 cycles: trip Matl CB on N_Leth - Matl line	System stable Good voltage recovery No load shedding
B17	3ph fault at N_Leth transformer 5 cycles: trip N_Leth CB on transformer	System stable Good voltage recovery No load shedding
B18 [*]	3ph fault at Vulcan 240kV line to Dewin 5 cycles: trip Vulcan CB on Vulcan - Dewin line 6 cycles: trip Dewin CB on Vulcan - Dewin line	System stable Good voltage recovery No load shedding
B19	3ph fault at Dewin 240kV line to Vulcan 5 cycles: trip Dewin CB on Dewin - Vulcan line 6 cycles: trip Vulcan CB on Dewin - Vulcan line	System stable Good voltage recovery No load shedding
B20	3ph fault at SubF 240kV line to Milo 5 cycles: trip SubF CB on SubF - Milo line 6 cycles: trip Milo CB on SubF - Milo line	System stable Good voltage recovery No load shedding
B21 [*]	3ph fault at Milo 240kV line to SubF 5 cycles: trip Milo CB on Milo - SubF line 6 cycles: trip SubF CB on Milo - SubF line	System stable Good voltage recovery No load shedding
B22	3ph fault at SubF 240kV line to Milo 5 cycles: trip SubF CB on SubF - Milo line 6 cycles: trip Milo CB on SubF - Milo line	System stable Good voltage recovery No load shedding
B23	3ph fault at Milo 240kV line to SubF 5 cycles: trip Milo CB on Milo - SubF line 6 cycles: trip SubF CB on Milo - SubF line	System stable Good voltage recovery No load shedding
B24 [*]	3ph fault at SubF 240kV line to N_Leth 5 cycles: trip SubF CB on SubF - N_Leth line 6 cycles: trip N_Leth CB on SubF - N_Leth line	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

** Stability simulation plots for V82 and GE machines are included in Appendix E.

TABLE E-1
STABILITY RESULTS FOR CATEGORY B FAULTS
V82 AND GE1.5 TURBINE

Case ID	Description	Observations
B25	3ph fault at SubF 240kV line to Matl 5 cycles: trip SubF CB on SubF - Matl line 6 cycles: trip Matl CB on SubF - Matl line	System stable Good voltage recovery No load shedding
B26	3ph fault at Matl 240kV line to SubF 5 cycles: trip Matl CB on Matl - SubF line 6 cycles: trip SubF CB on Matl - SubF line	System stable Good voltage recovery No load shedding
B27**	3ph fault at Milo 240kV line to WBrook 5 cycles: trip Milo CB on Milo - WBrook line 6 cycles: trip WBrook CB on Milo - WBrook line	System stable Good voltage recovery No load shedding
B28	3ph fault at WBrook 240kV line to Milo 5 cycles: trip WBrook CB on WBrook - Milo line 6 cycles: trip Milo CB on WBrook - Milo line	System stable Good voltage recovery No load shedding
B29	3ph fault at Milo 240kV line to SubG 5 cycles: trip Milo CB on Milo - SubG line 6 cycles: trip SubG CB on Milo - SubG line	System stable Good voltage recovery No load shedding
B30*	3ph fault at SubG 240kV line to Milo 5 cycles: trip SubG CB on SubG - Milo line 6 cycles: trip Milo CB on SubG - Milo line	System stable Good voltage recovery No load shedding
B31	3ph fault at SubG 240kV line to Langdon 5 cycles: trip SubG CB on SubG - Langdon line 6 cycles: trip Langdon CB on SubG - Langdon line	System stable Good voltage recovery No load shedding
B32	3ph fault at Langdon 240kV line to SubG 5 cycles: trip Langdon CB on Langdon - SubG line 6 cycles: trip SubG CB on Langdon - SubG line	System stable Good voltage recovery No load shedding
B33	3ph fault at Langdon 240kV line to Jannet 5 cycles: trip Langdon CB on Langdon - Jannet line 6 cycles: trip Jannet CB on Langdon - Jannet line	System stable Good voltage recovery No load shedding
B34	3ph fault at Langdon transformer 5 cycles: trip Langdon CB on transformer	System stable Good voltage recovery No load shedding
B35*	3ph fault at Langdon 240kV line to Ware_Junction 5 cycles: trip Langdon CB on Langdon - Ware_Junction line 6 cycles: trip Ware_Junction CB on Langdon - Ware_Junction	System stable Good voltage recovery No load shedding
B36	3ph fault at Dewin transformer 5 cycles: trip Dewin CB on transformer	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

** Stability simulation plots for V82 and GE machines are included in Appendix E.

TABLE E-1
STABILITY RESULTS FOR CATEGORY B FAULTS
V82 AND GE1.5 TURBINE

Case ID	Description	Observations
B37	3ph fault at Dewin 240kV line to Enmax 5 cycles: trip Dewin CB on Dewin - Enmax line 6 cycles: trip Enmax CB on Dewin - Enmax line	System stable Good voltage recovery No load shedding
B38	3ph fault at Dewin 240kV line to Sarcee 5 cycles: trip Dewin CB on Dewin - Sarcee line 6 cycles: trip Sarcee CB on Dewin - Sarcee line	System stable Good voltage recovery No load shedding
B39	3ph fault at SubA 240kV line to SubB 5 cycles: trip SubA CB on SubA - SubB line 6 cycles: trip SubB CB on SubA - SubB line	System stable Good voltage recovery No load shedding
B40	3ph fault at SubB 240kV line to SubA 5 cycles: trip SubB CB on SubB - SubA line 6 cycles: trip SubA CB on SubB - SubA line	System stable Good voltage recovery No load shedding
B41	3ph fault at SubB 240kV line to SubC 5 cycles: trip SubB CB on SubB - SubC line 6 cycles: trip SubC CB on SubB - SubC line	System stable Good voltage recovery No load shedding
B42 [*]	3ph fault at SubC 240kV line to SubB 5 cycles: trip SubC CB on SubC - SubB line 6 cycles: trip SubB CB on SubC - SubB line	System stable Good voltage recovery No load shedding
B43	3ph fault at SubC 240kV line to Matl 5 cycles: trip SubC CB on SubC - Matl line 6 cycles: trip Matl CB on SubC - Matl line	System stable Good voltage recovery No load shedding
B44 [*]	3ph fault at Matl 240kV line to SubC 5 cycles: trip Matl CB on Matl - SubC line 6 cycles: trip SubC CB on Matl - SubC line	System stable Good voltage recovery No load shedding
B45 [*]	3ph fault at SubC 240kV line to SubD 5 cycles: trip SubC CB on SubC - SubD line 6 cycles: trip SubD CB on SubC - SubD line	System stable Good voltage recovery No load shedding
B46	3ph fault at SubD 240kV line to SubC 5 cycles: trip SubD CB on SubD - SubC line 6 cycles: trip SubC CB on SubD - SubC line	System stable Good voltage recovery No load shedding
B47 [*]	3ph fault at SubD 240kV line to Med_Hat 5 cycles: trip SubD CB on SubD - Med_Hat line 6 cycles: trip Med_Hat CB on SubD - Med_Hat line	System stable Good voltage recovery No load shedding
B48	3ph fault at Med_Hat 240kV line to SubD 5 cycles: trip Med_Hat CB on Med_Hat - SubD line 6 cycles: trip SubD CB on Med_Hat - SubD line	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

** Stability simulation plots for V82 and GE machines are included in Appendix E.

TABLE E-1
STABILITY RESULTS FOR CATEGORY B FAULTS
V82 AND GE1.5 TURBINE

Case ID	Description	Observations
B49	3ph fault at Matl 240kV line to N_Leth 5 cycles: trip Matl CB on Matl - N_Leth line 6 cycles: trip N_Leth CB on Matl - N_Leth line	System stable Good voltage recovery No load shedding
B50*	3ph fault at Med_Hat 240kV line to WBrook 5 cycles: trip Med_Hat CB on Med_Hat - WBrook line 6 cycles: trip WBrook CB on Med_Hat - WBrook line	System stable Good voltage recovery No load shedding
B51*	3ph fault at WBrook 240kV line to Med_Hat 5 cycles: trip WBrook CB on WBrook - Med_Hat line 6 cycles: trip Med_Hat CB on WBrook - Med_Hat line	System stable Good voltage recovery No load shedding
B52	3ph fault at WBrook 240kV line to Ware_Junction 5 cycles: trip WBrook CB on WBrook - Ware_Junction line 6 cycles: trip Ware_Junction CB on WBrook - Ware_Junction	System stable Good voltage recovery No load shedding
B53	3ph fault at Cypress 240kV line to Dome_Empress 5 cycles: trip Cypress CB on Cypress - Dome_Empress line 6 cycles: trip Dome_Empress CB on Cypress -	System stable Good voltage recovery No load shedding
B54	3ph fault at Dome_Empress 240kV line to Cypress 5 cycles: trip Dome_Empress CB on Dome_Empress - 6 cycles: trip Cypress CB on Dome_Empress - Cypress line	System stable Good voltage recovery No load shedding
B55	3ph fault at WBrook transformer 5 cycles: trip WBrook CB on transformer	System stable Good voltage recovery No load shedding
B56*	3ph fault at Cypress 240kV line to Jenner 5 cycles: trip Cypress CB on Cypress - Jenner line 6 cycles: trip Jenner CB on Cypress - Jenner line	System stable Good voltage recovery No load shedding
B57	3ph fault at Jenner 240kV line to Cypress 5 cycles: trip Jenner CB on Jenner - Cypress line 6 cycles: trip Cypress CB on Jenner - Cypress line	System stable Good voltage recovery No load shedding
B58	3ph fault at Cypress 240kV line to WR 5 cycles: trip Cypress CB on Cypress - WR line; trip WR 6 cycles: trip WR CB on Cypress - WR line	System stable Good voltage recovery No load shedding
B59	3ph fault at WR 240kV line to Cypress 5 cycles: trip WR CB on WR - Cypress line; trip WR 6 cycles: trip Cypress CB on WR - Cypress line	System stable Good voltage recovery No load shedding
B60	3ph fault at Cypress transformer 5 cycles: trip Cypress CB on transformer	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

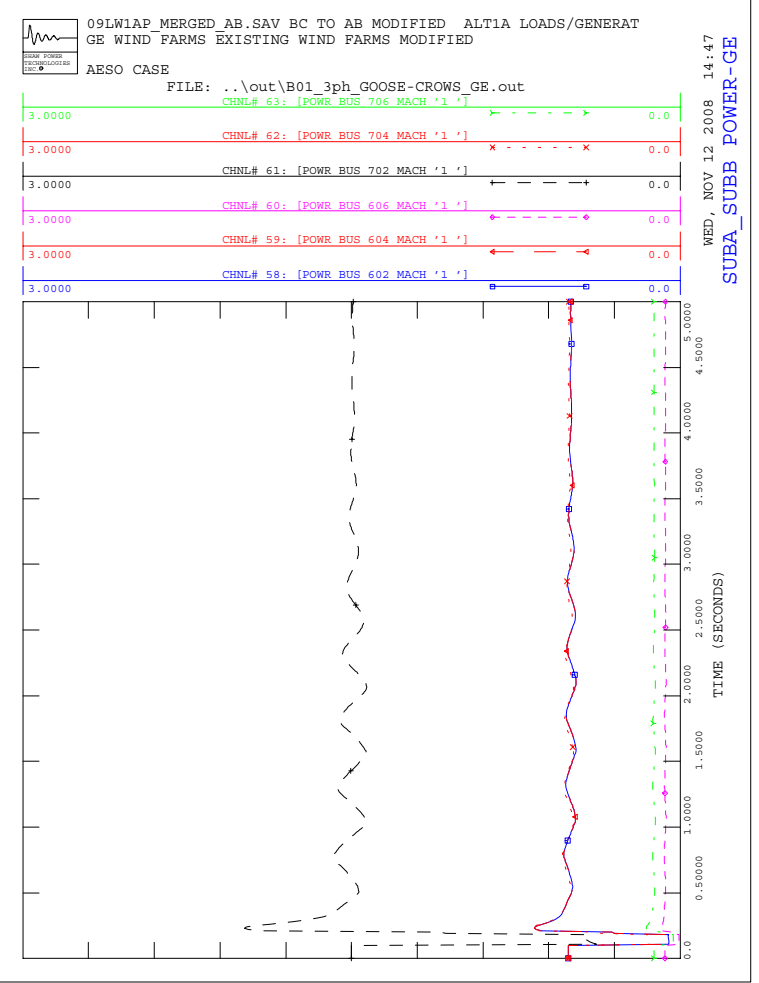
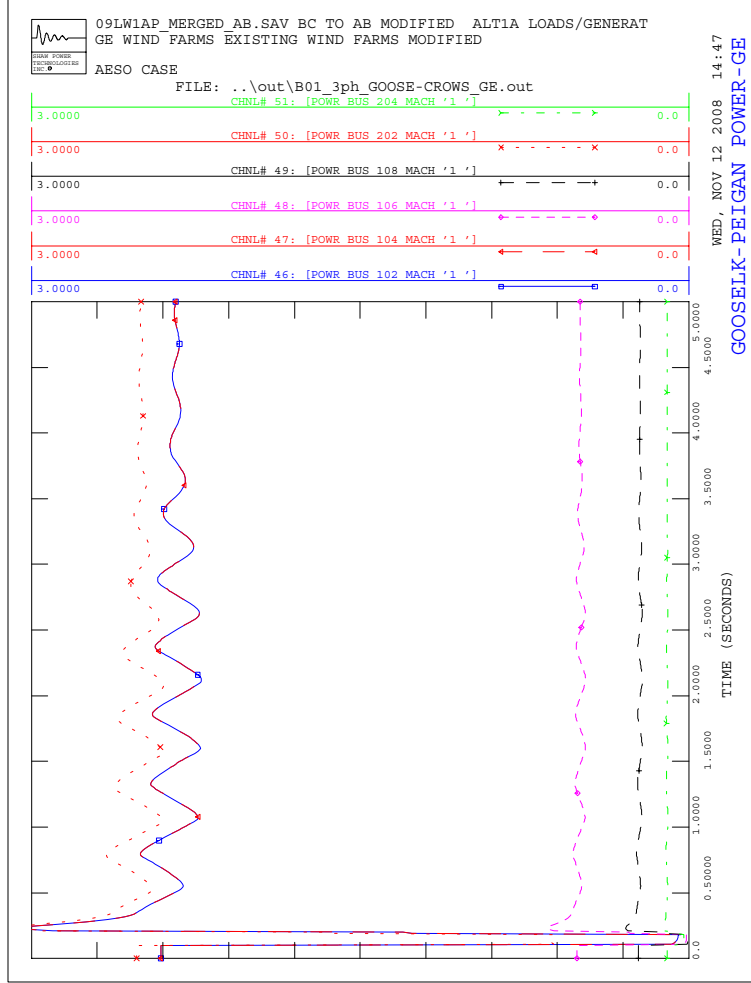
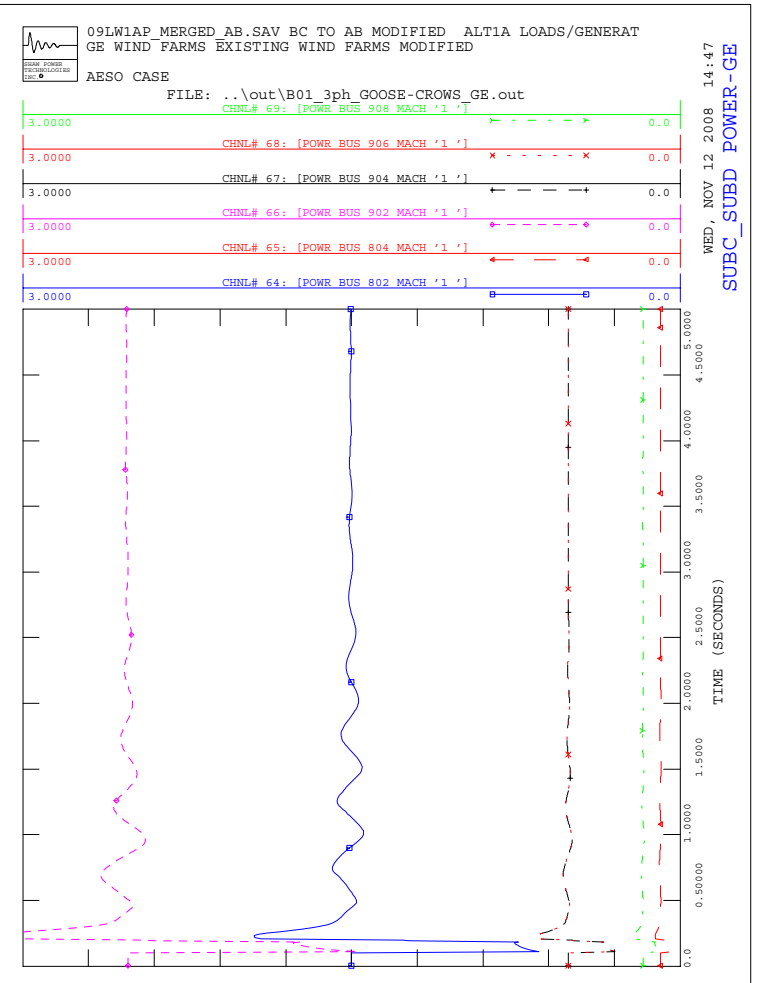
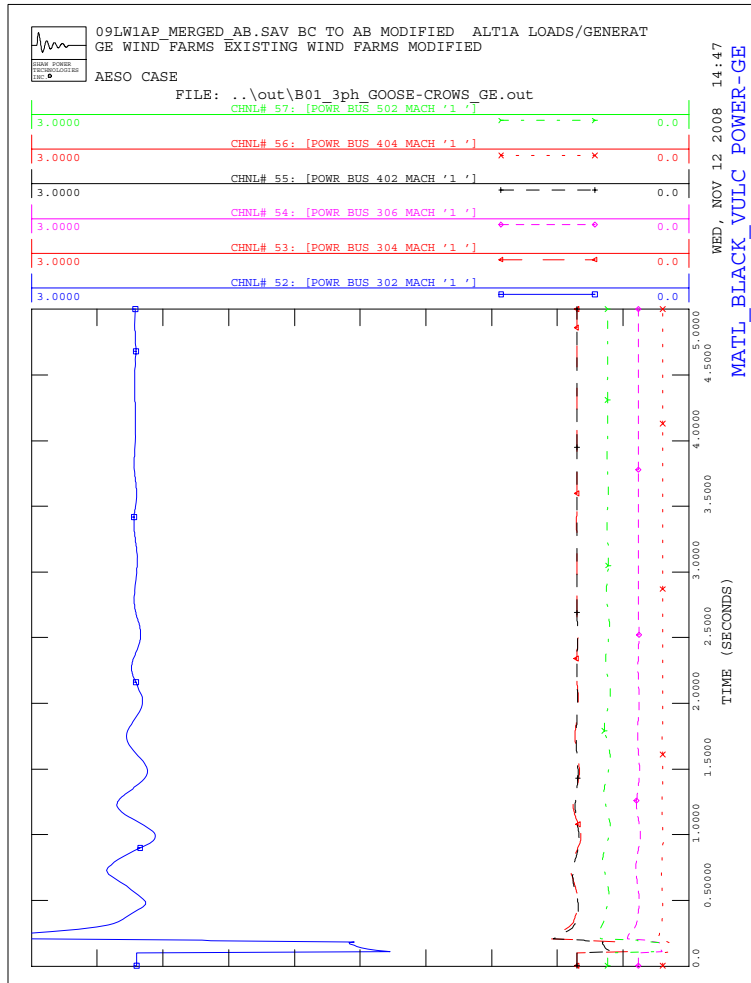
** Stability simulation plots for V82 and GE machines are included in Appendix E.

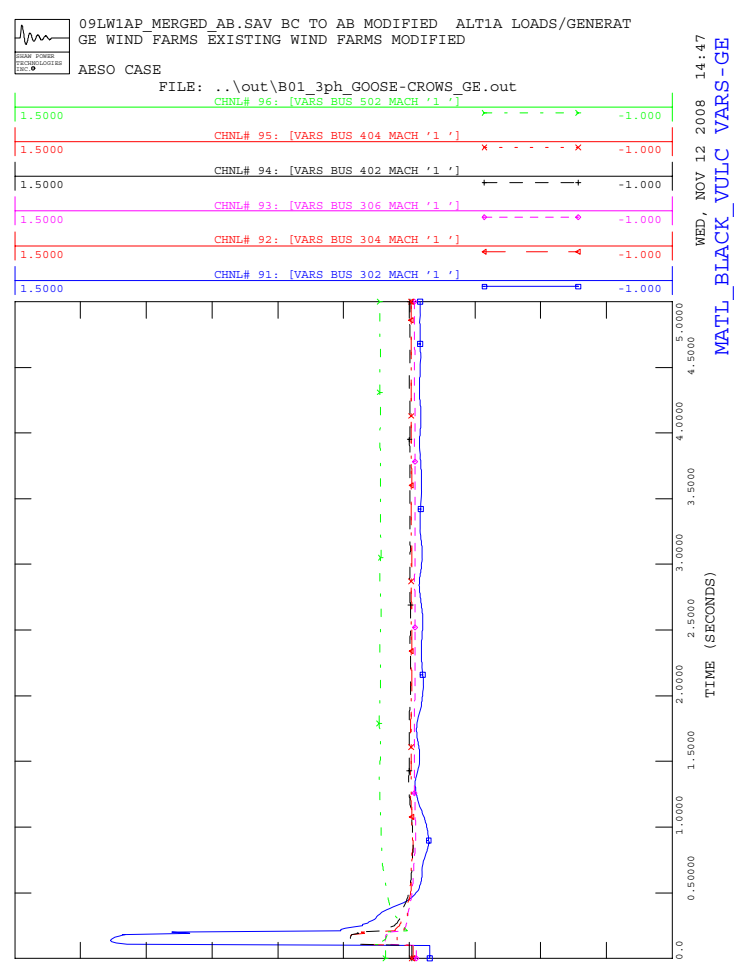
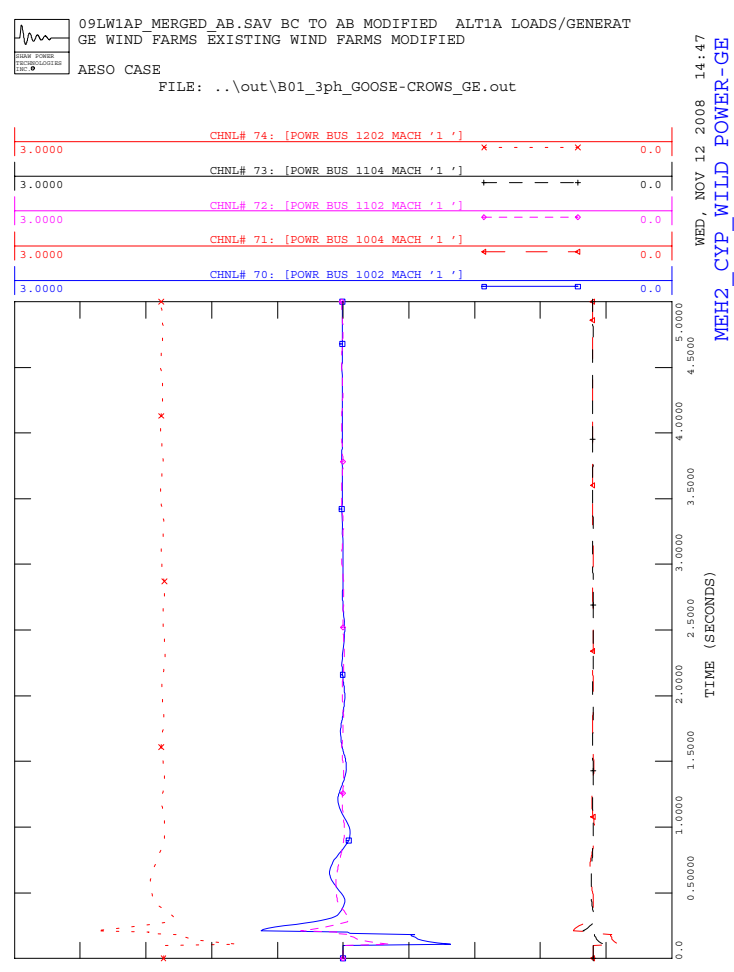
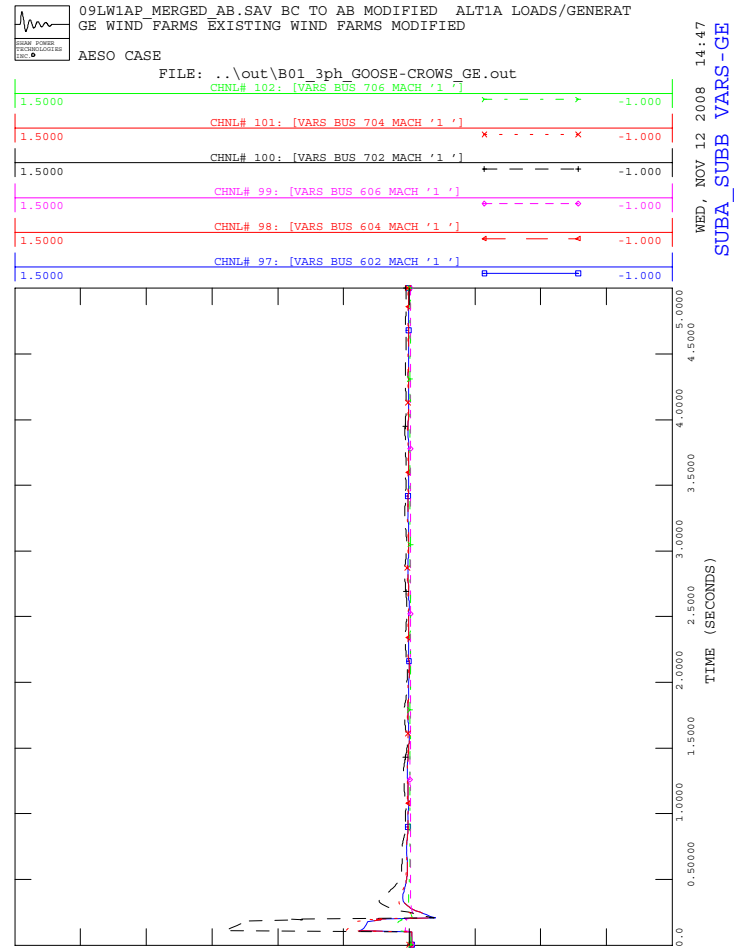
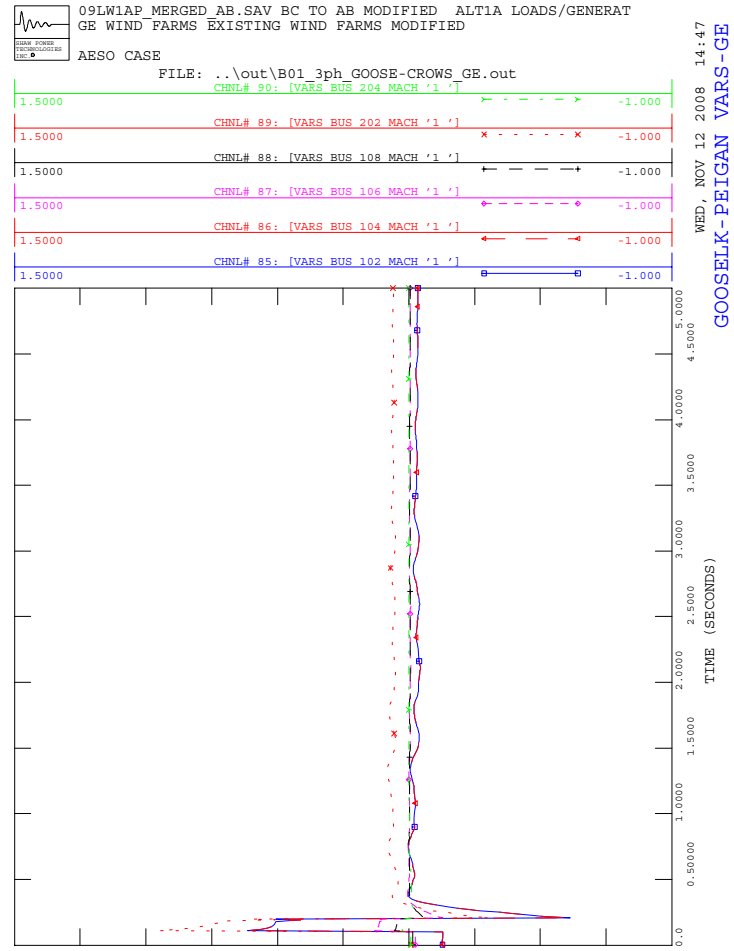
TABLE E-1
STABILITY RESULTS FOR CATEGORY B FAULTS
V82 AND GE1.5 TURBINE

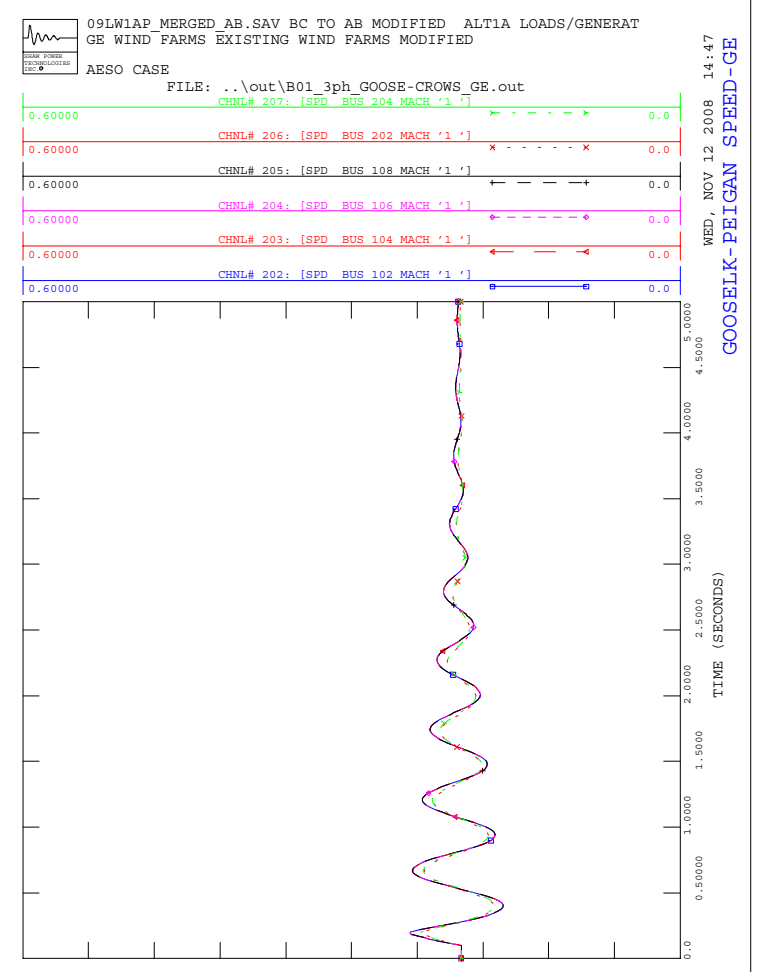
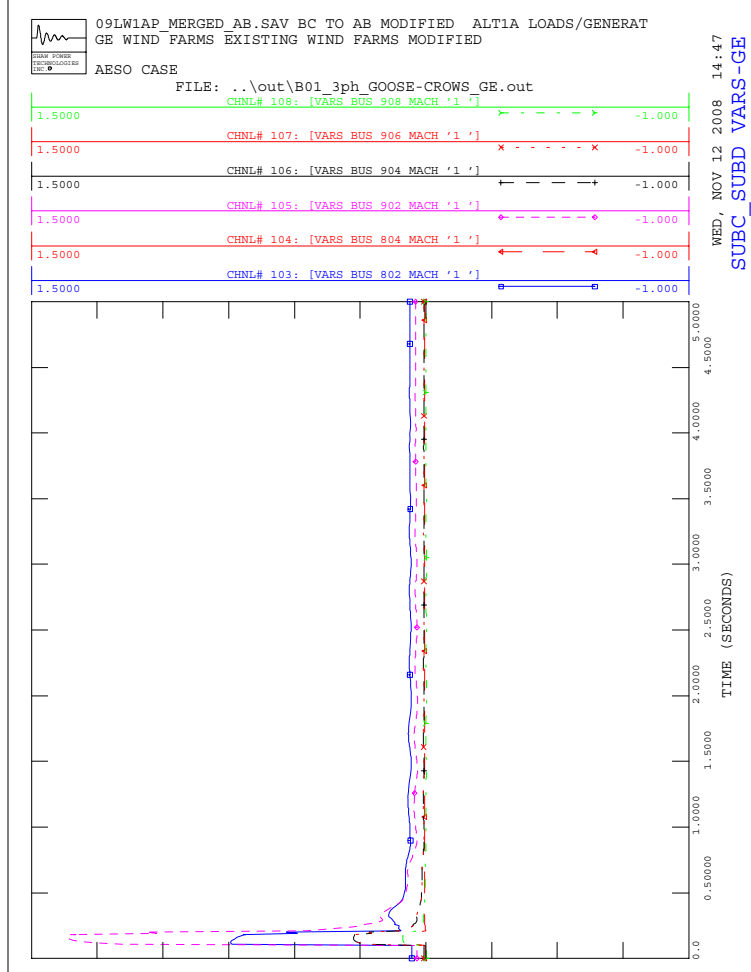
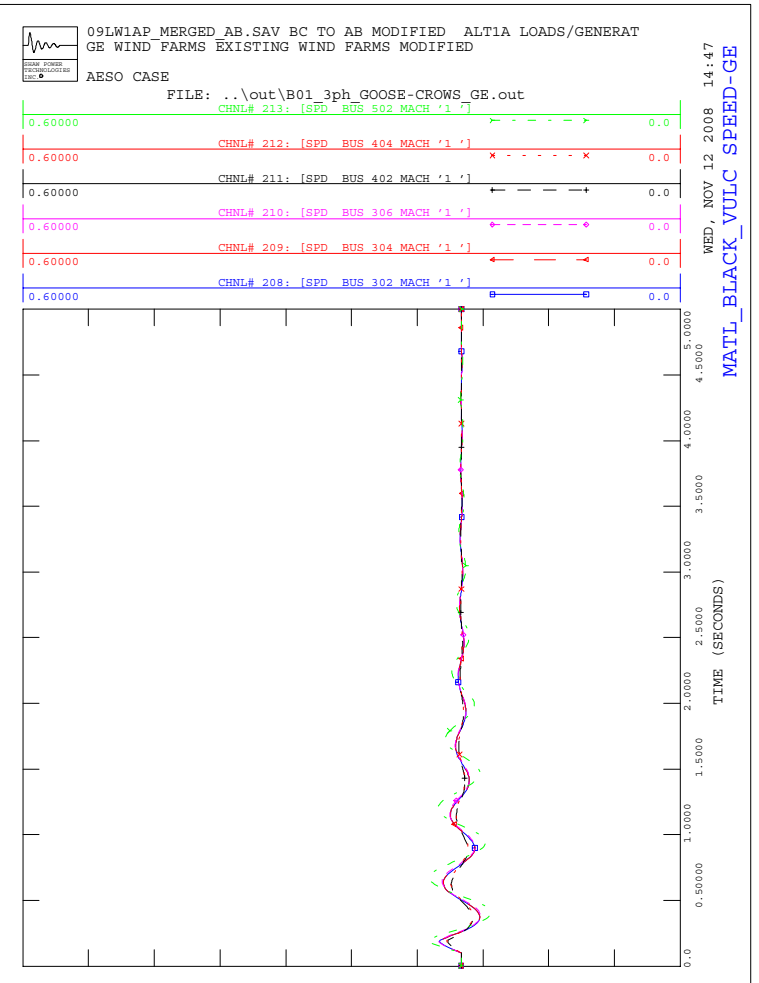
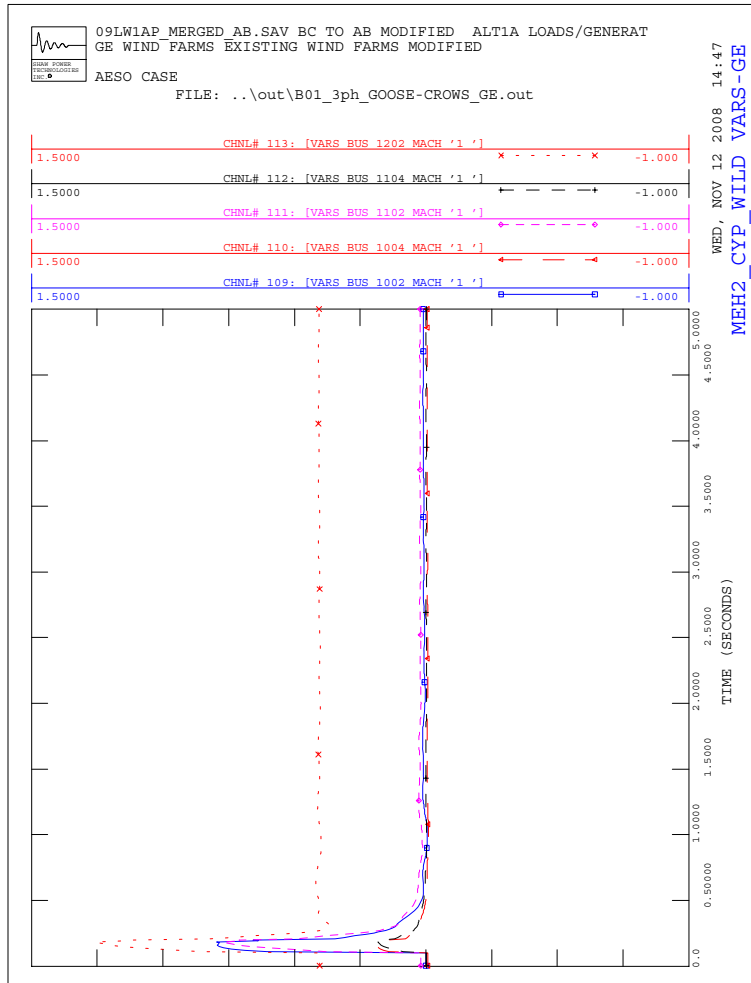
Case ID	Description	Observations
B61**	3ph fault at Langdon 500kV line to Genesee 4 cycles: trip Langdon CB on Langdon - Genesee line 5 cycles: trip Genesee CB on Langdon - Genesee line	System stable Good voltage recovery No load shedding
B62	3ph fault at Genesee 500kV line to Langdon 4 cycles: trip Genesee CB on Genesee - Langdon line 5 cycles: trip Langdon CB on Genesee - Langdon line	System stable Good voltage recovery No load shedding
B63**	3ph fault at Crowsnest 500kV line to Cranbook 4 cycles: trip Crowsnest CB on Crowsnest - Cranbook line 5 cycles: trip Cranbook CB on Crowsnest - Cranbook line	System stable Good voltage recovery No load shedding
B64	3ph fault at Cranbook 500kV line to Crowsnest 4 cycles: trip Cranbook CB on Cranbook - Crowsnest line 5 cycles: trip Crowsnest CB on Cranbook - Crowsnest line	System stable Good voltage recovery No load shedding

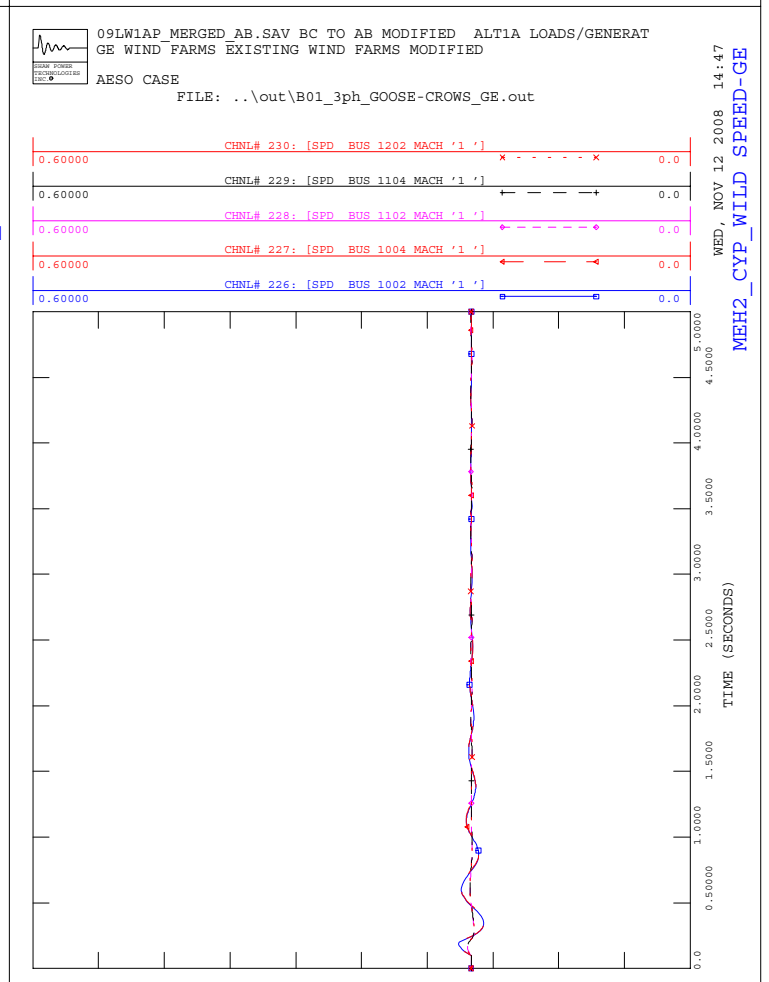
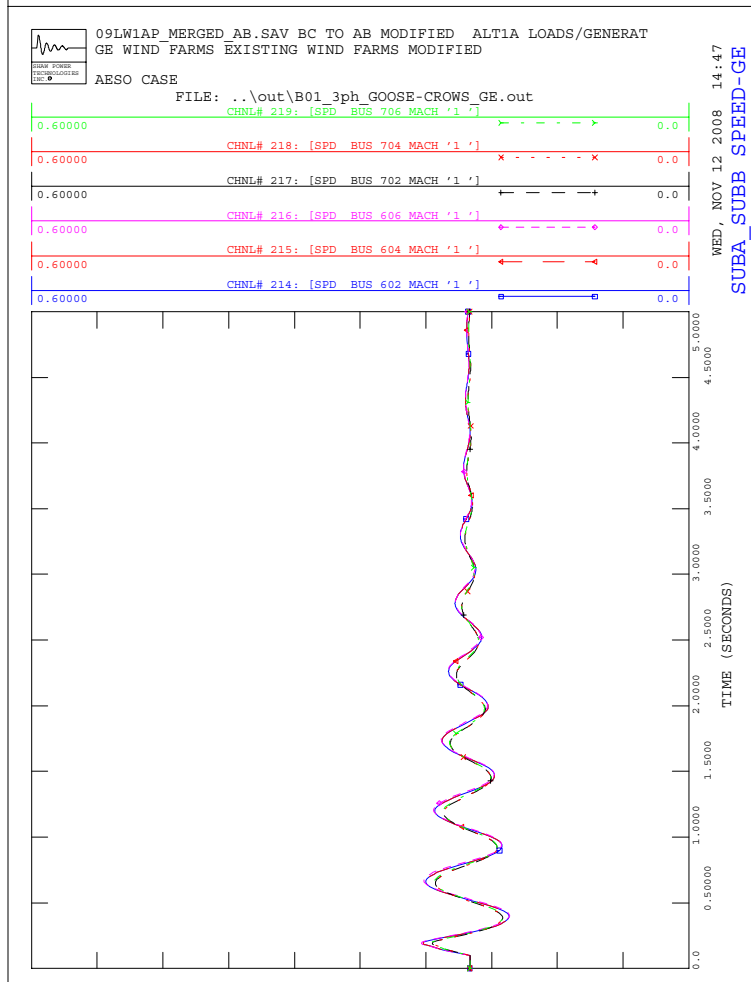
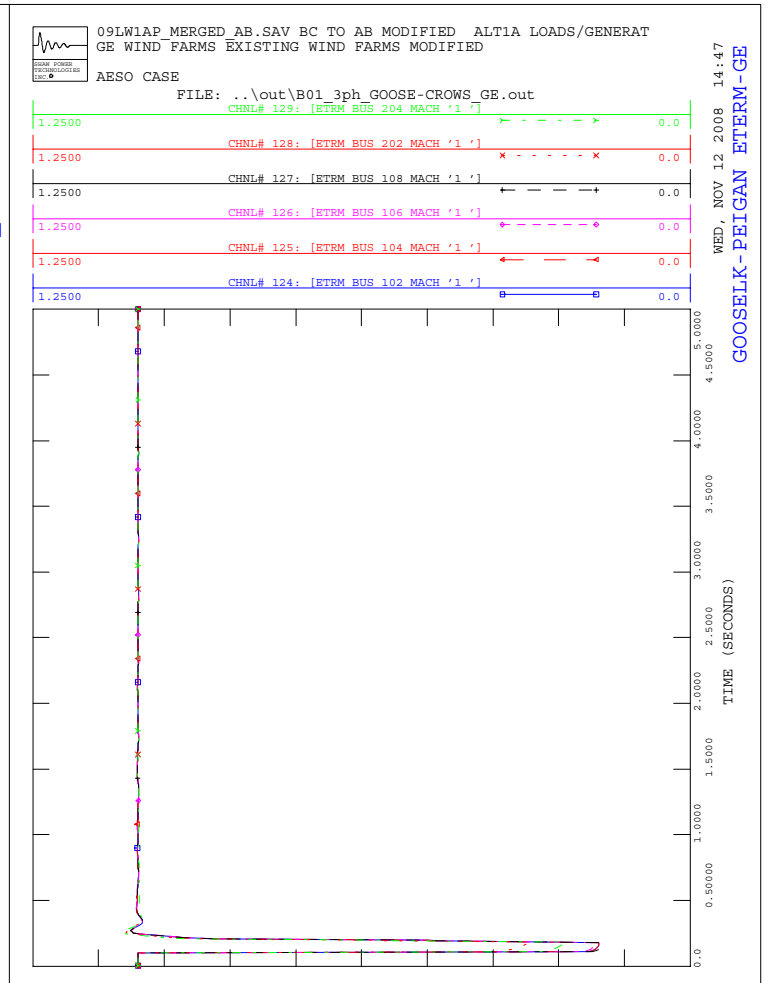
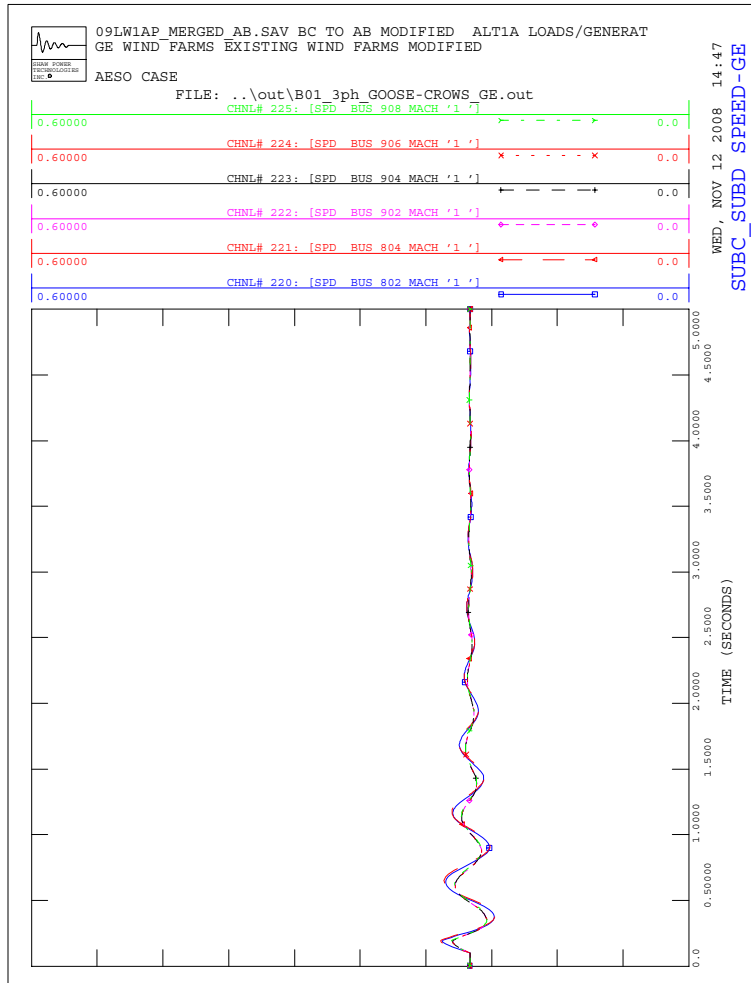
* Stability simulation plots for V82 machine are included in Appendix E.

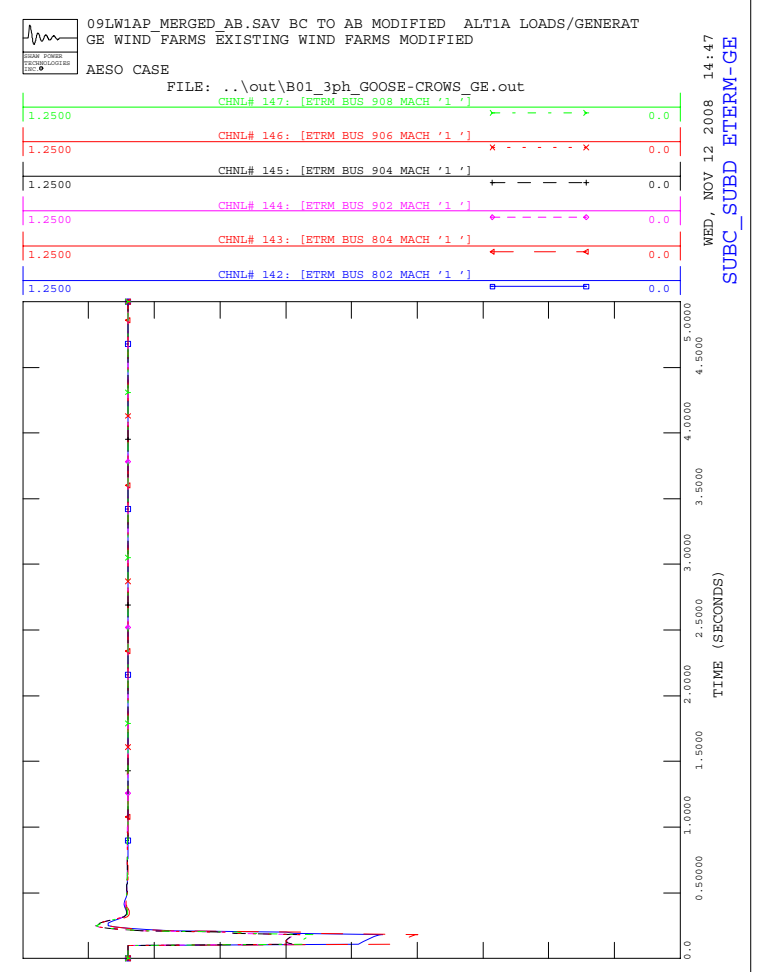
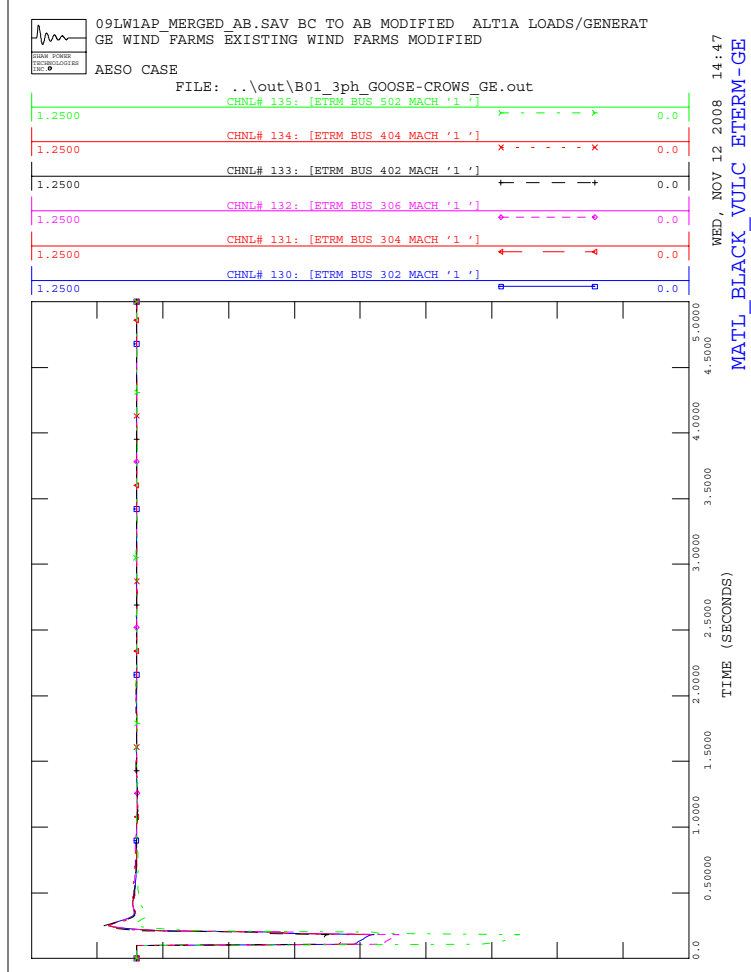
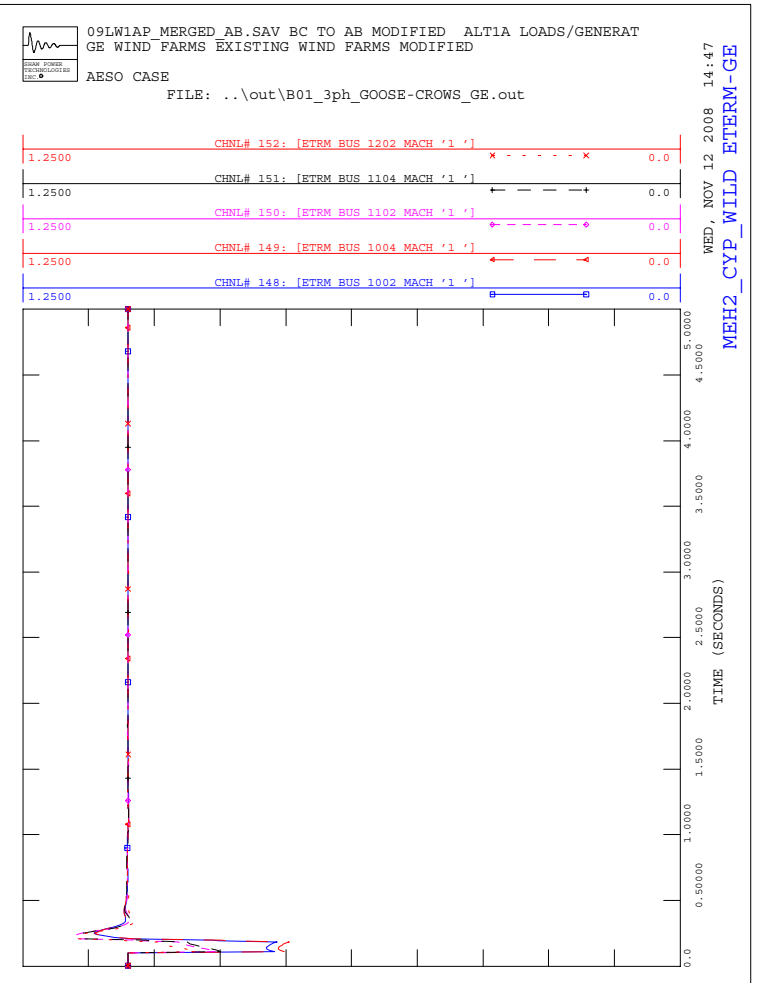
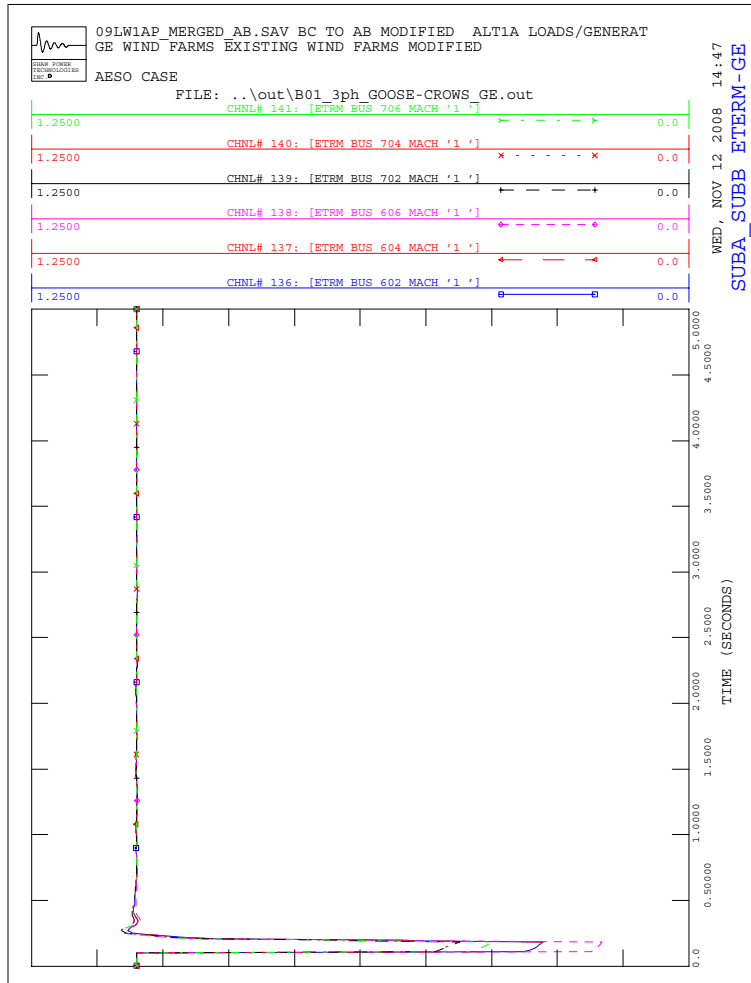
** Stability simulation plots for V82 and GE machines are included in Appendix E.

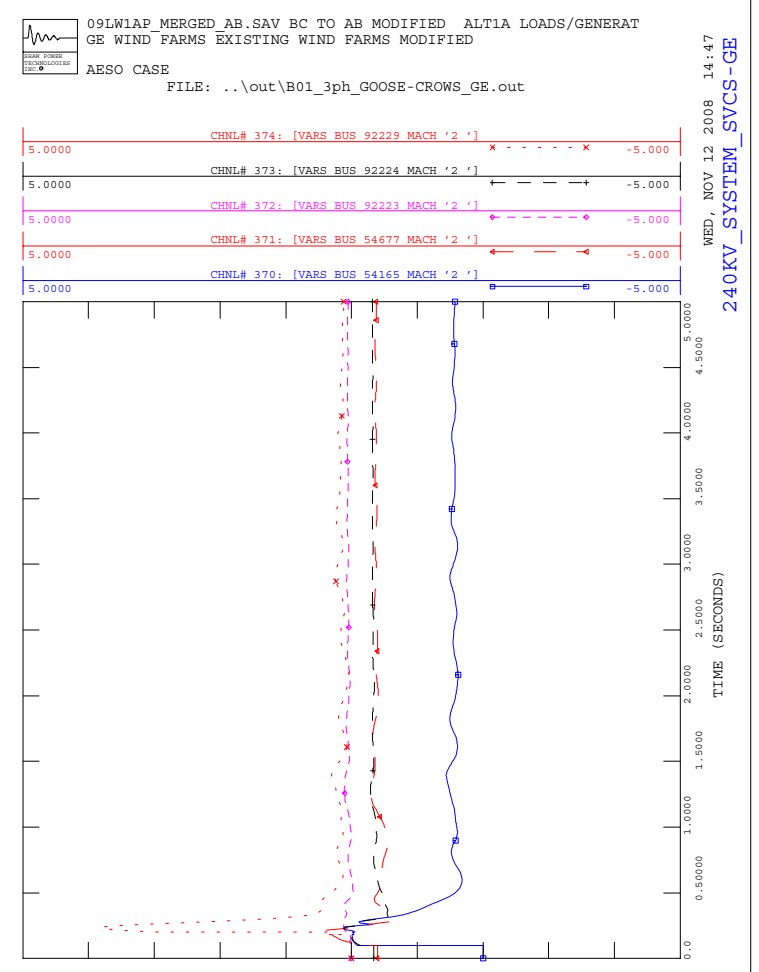
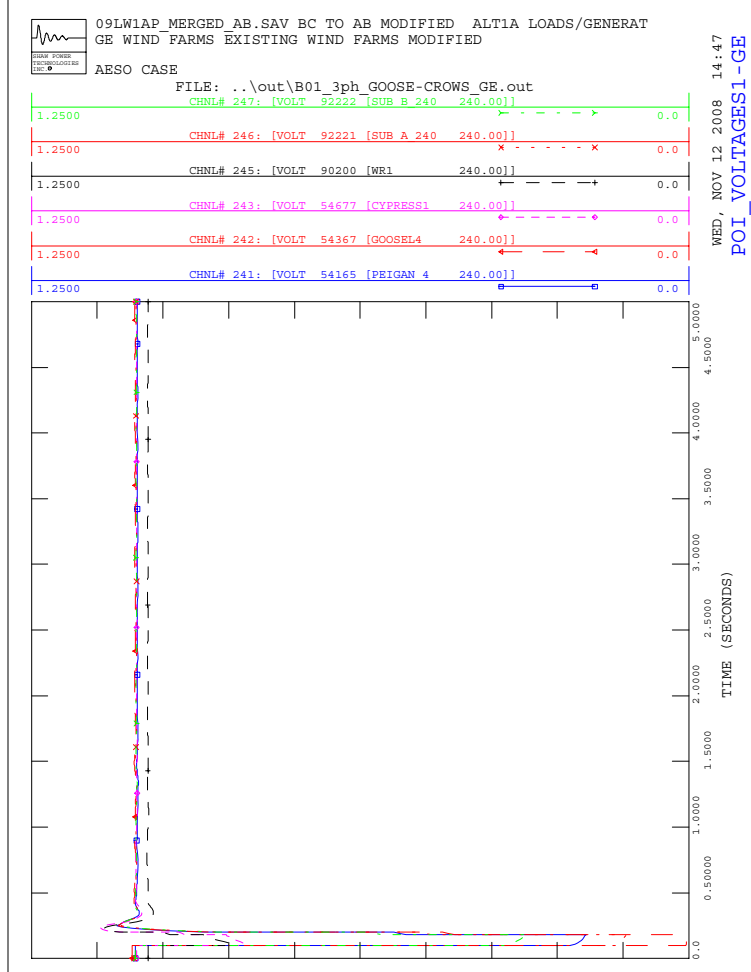
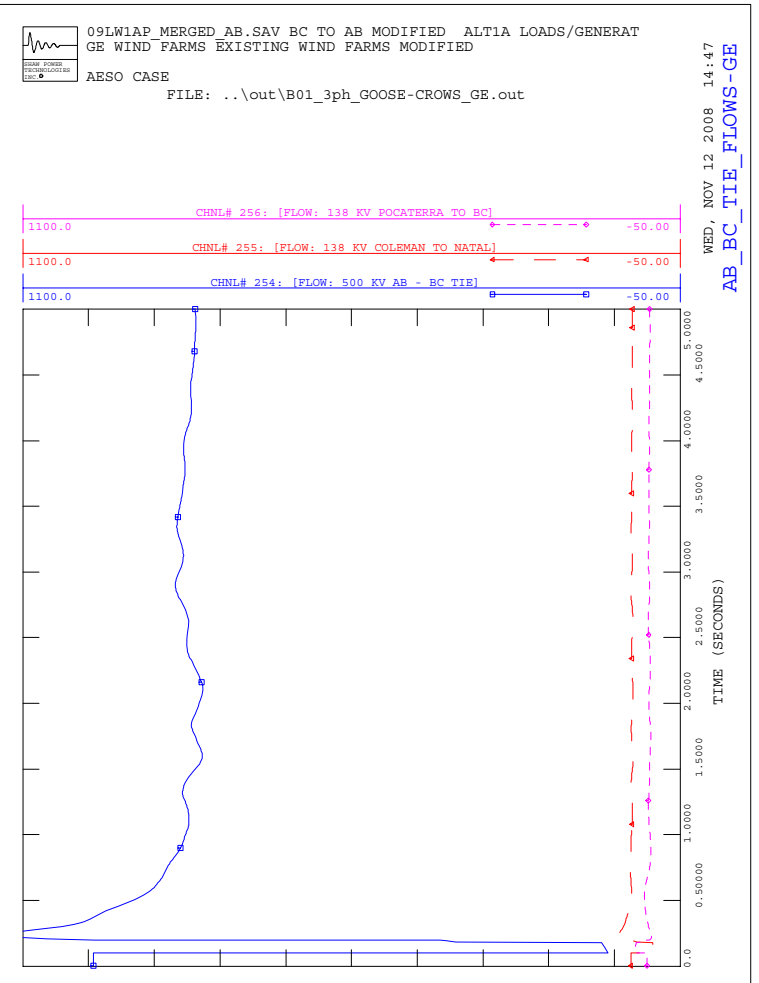
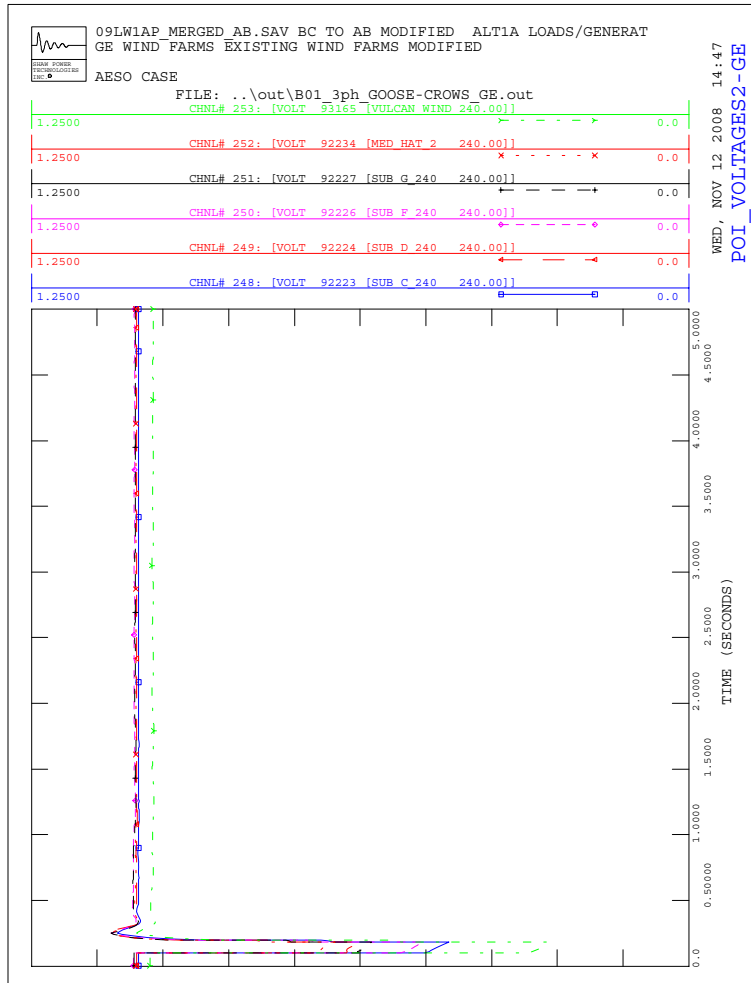






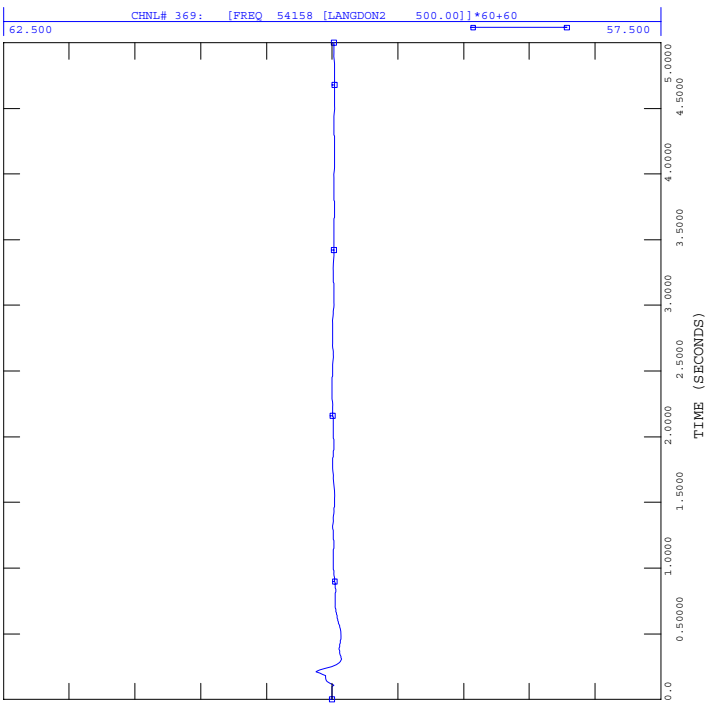


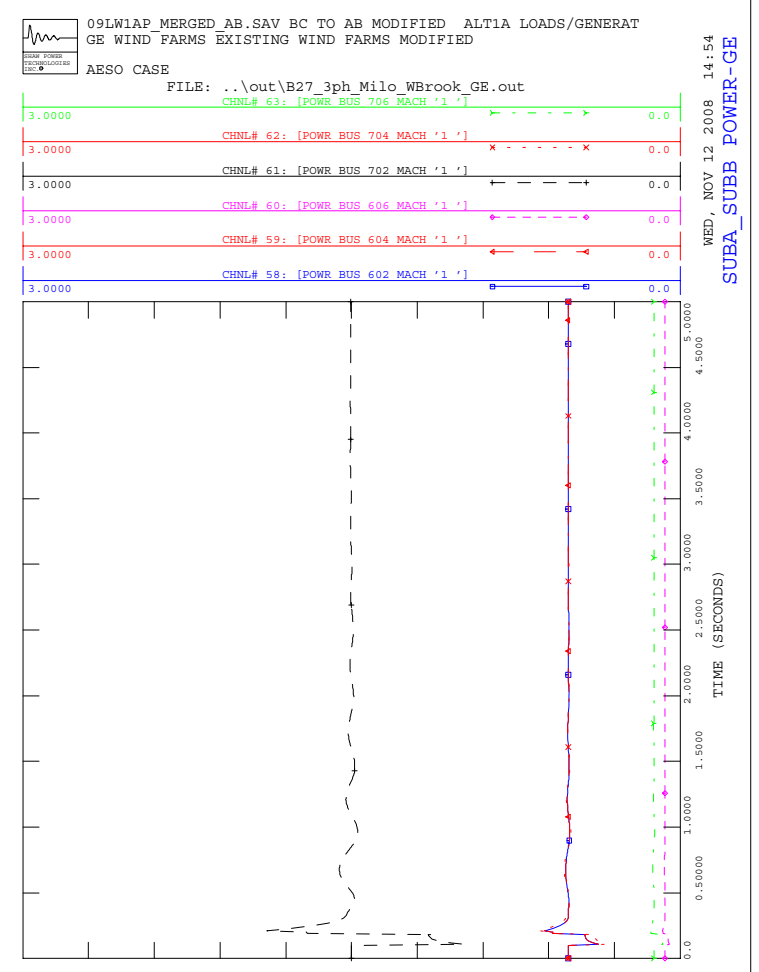
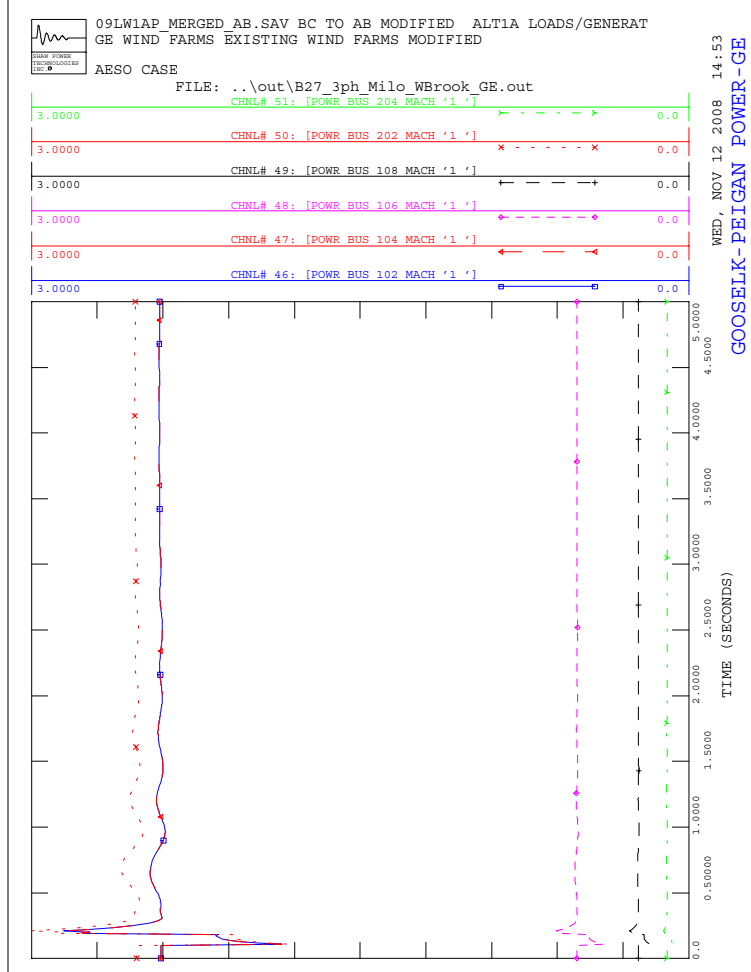
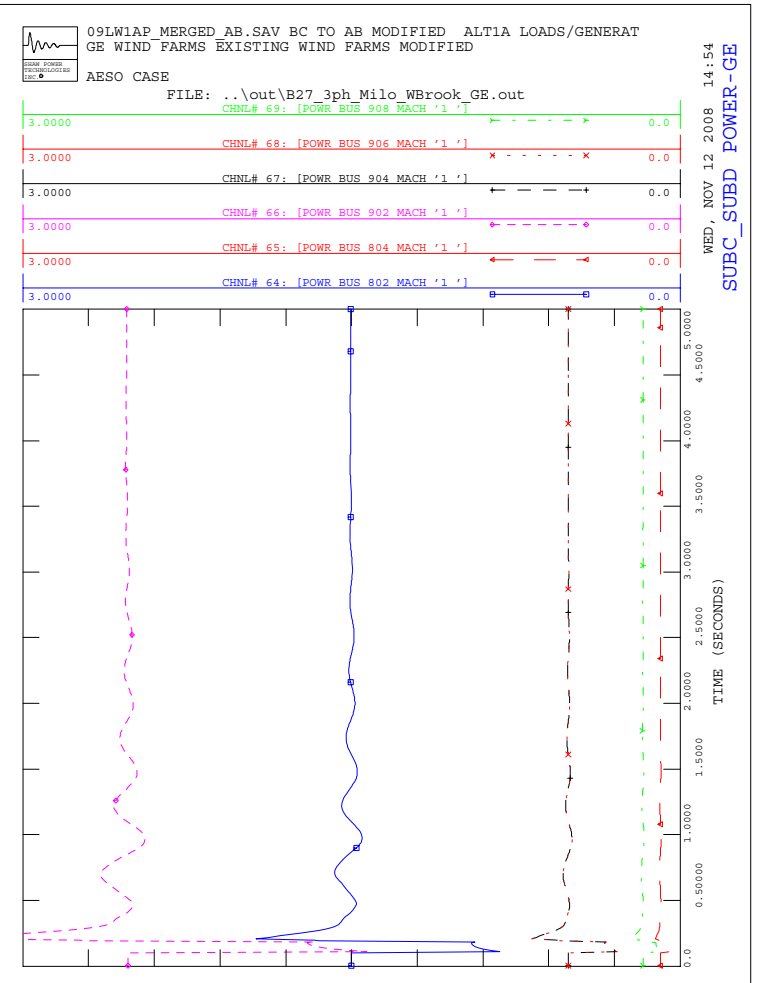
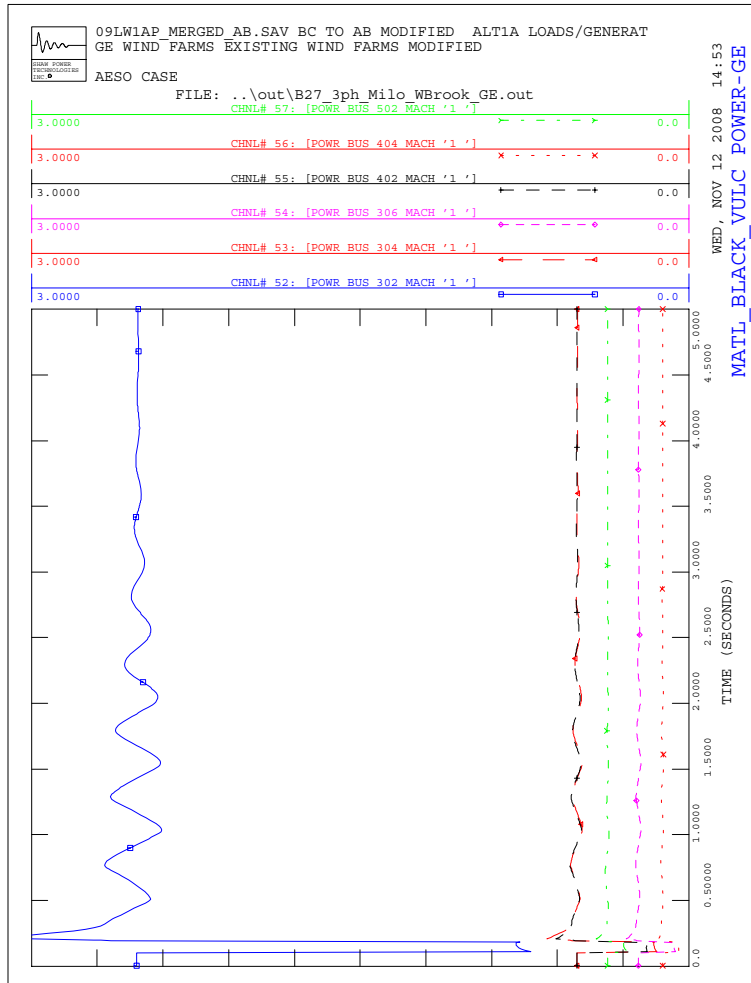


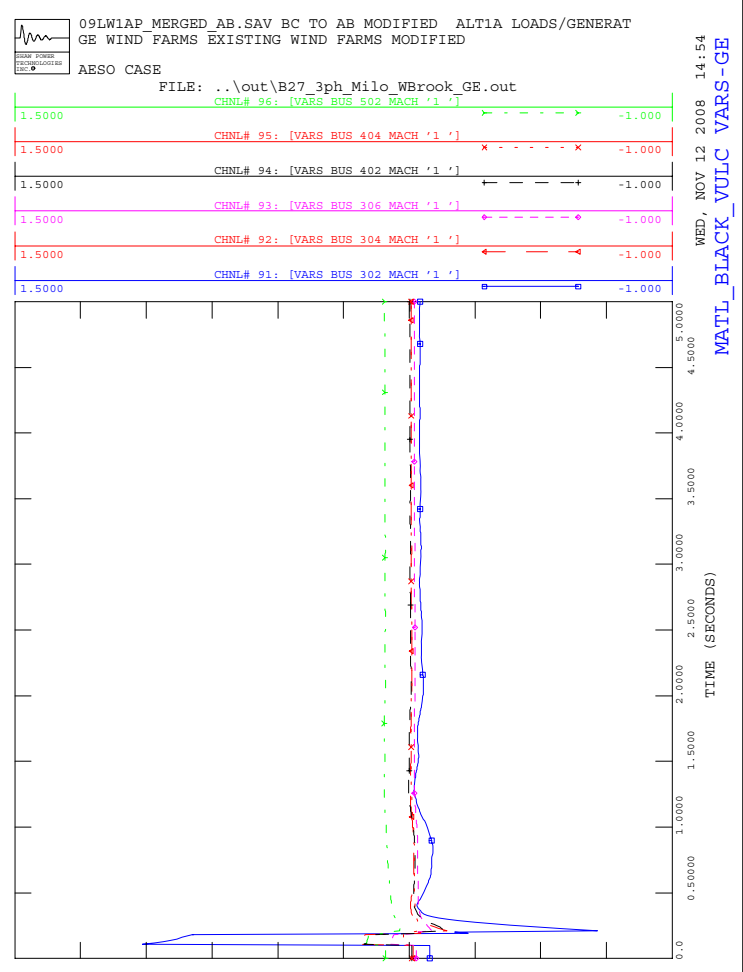
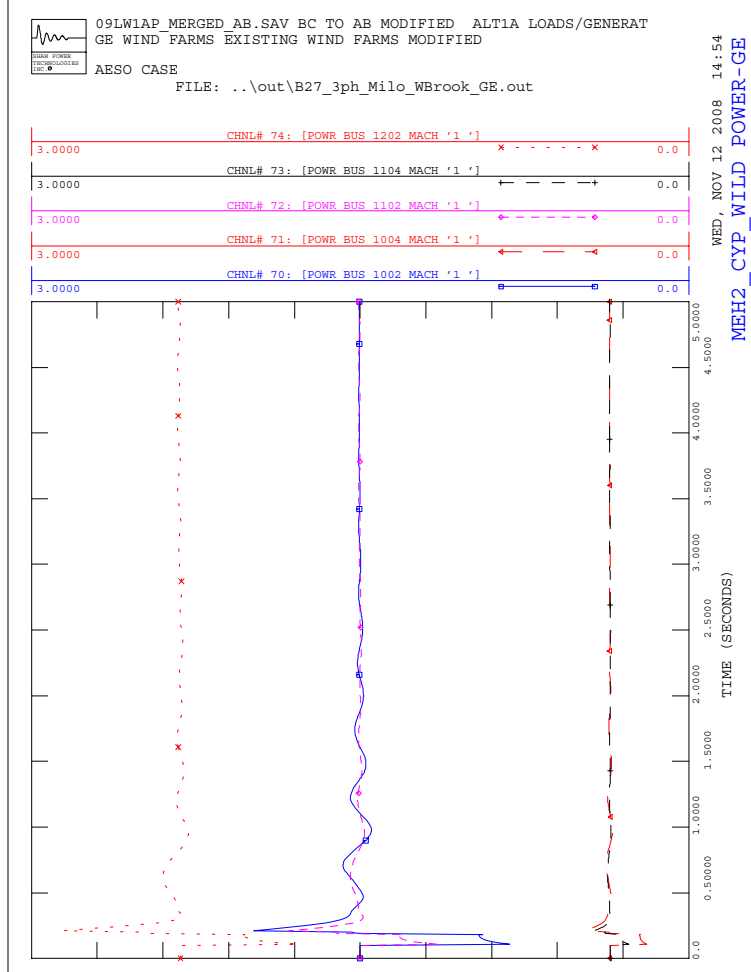
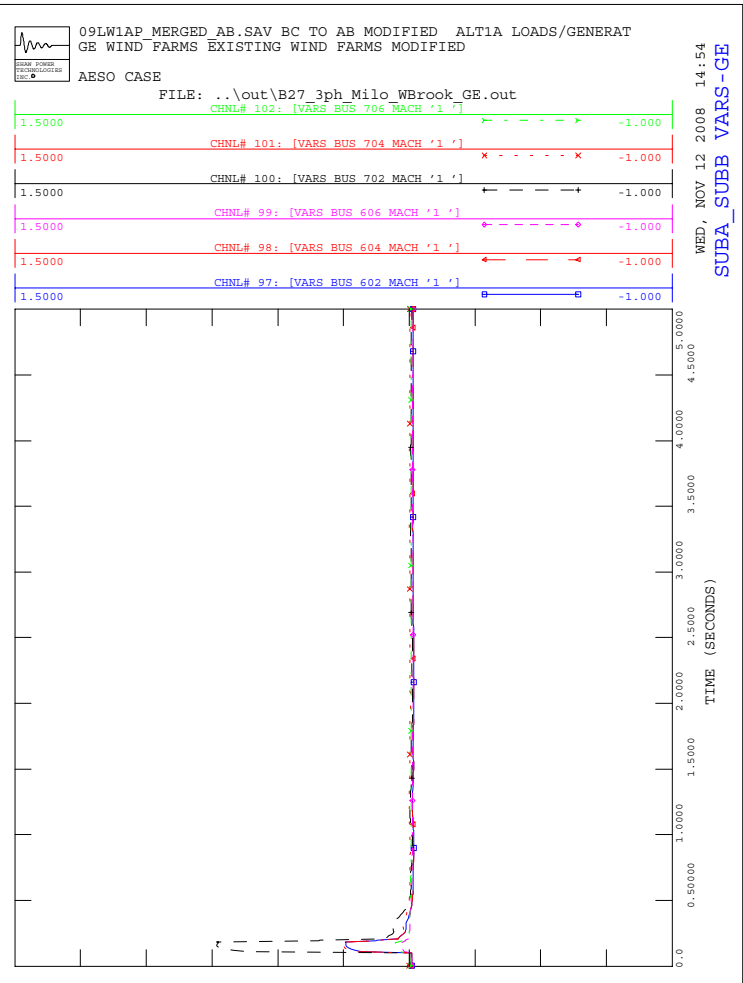
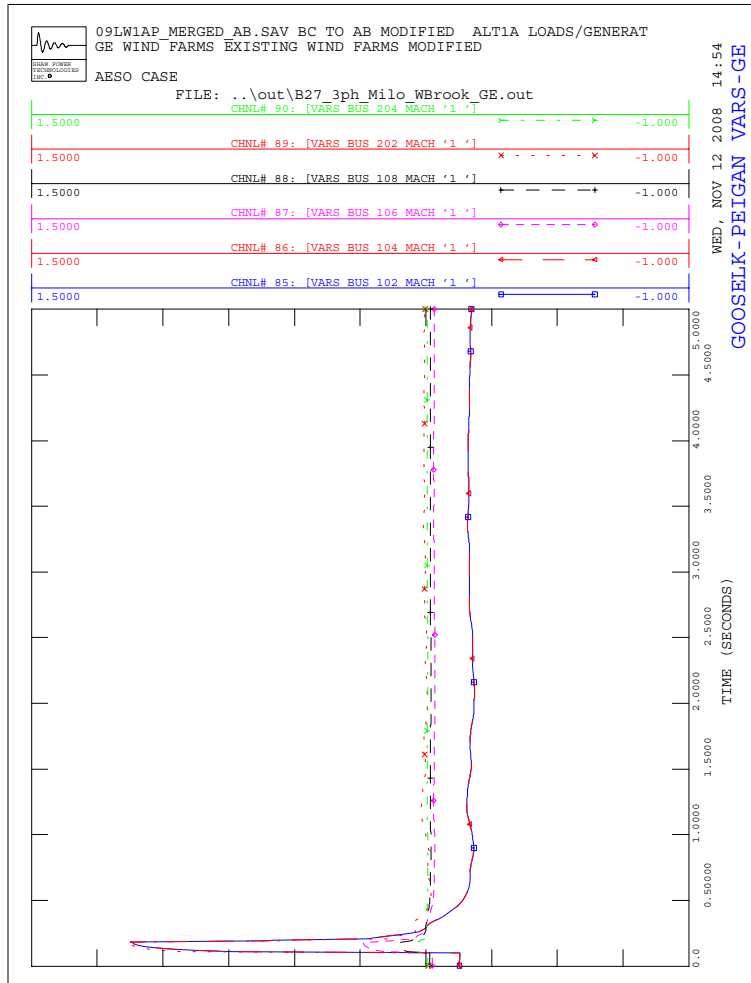


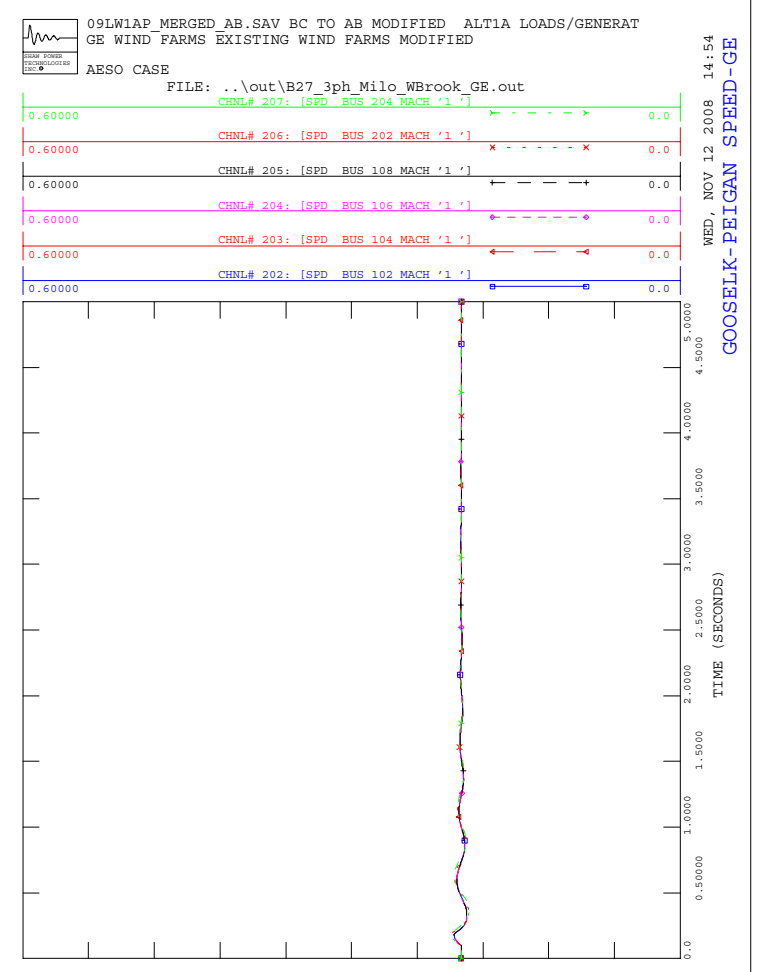
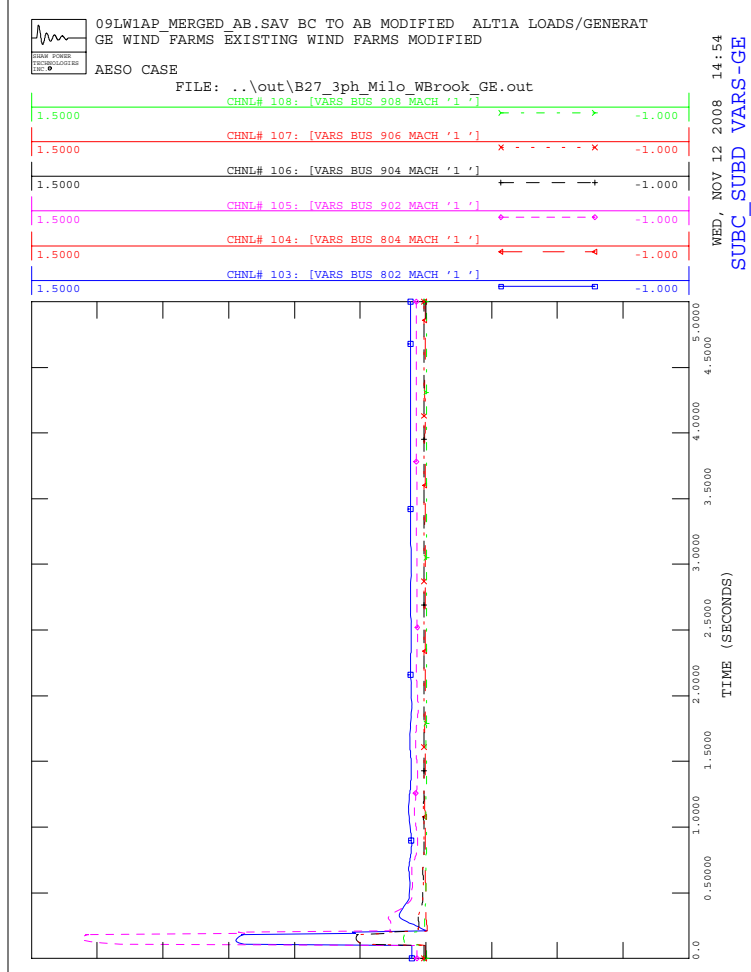
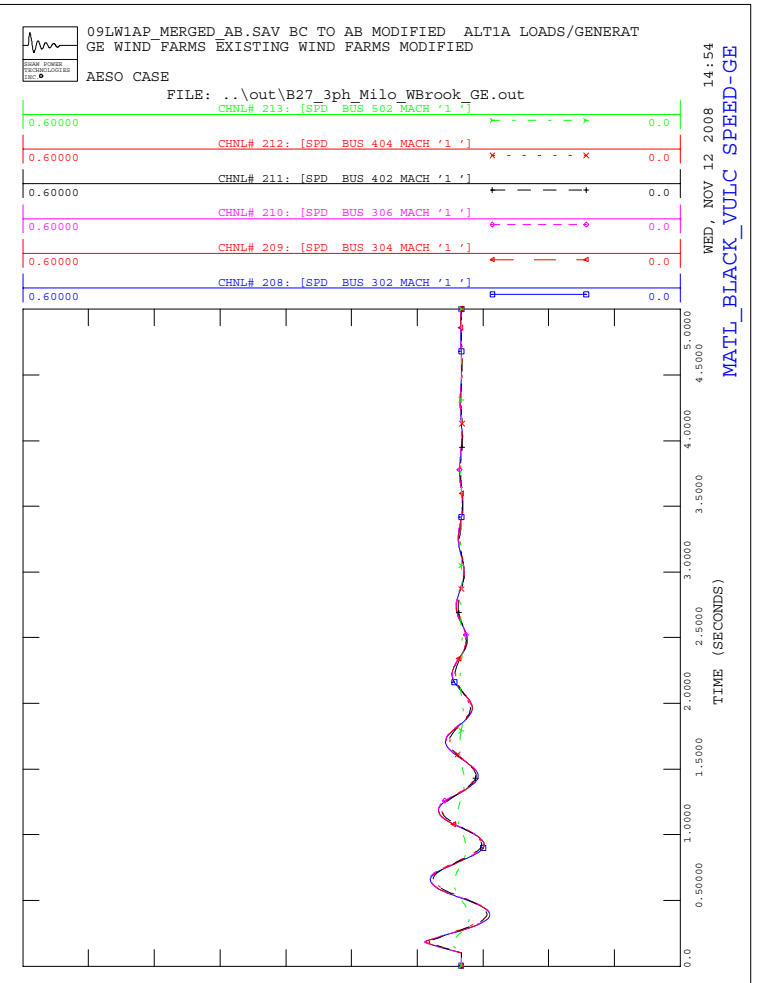
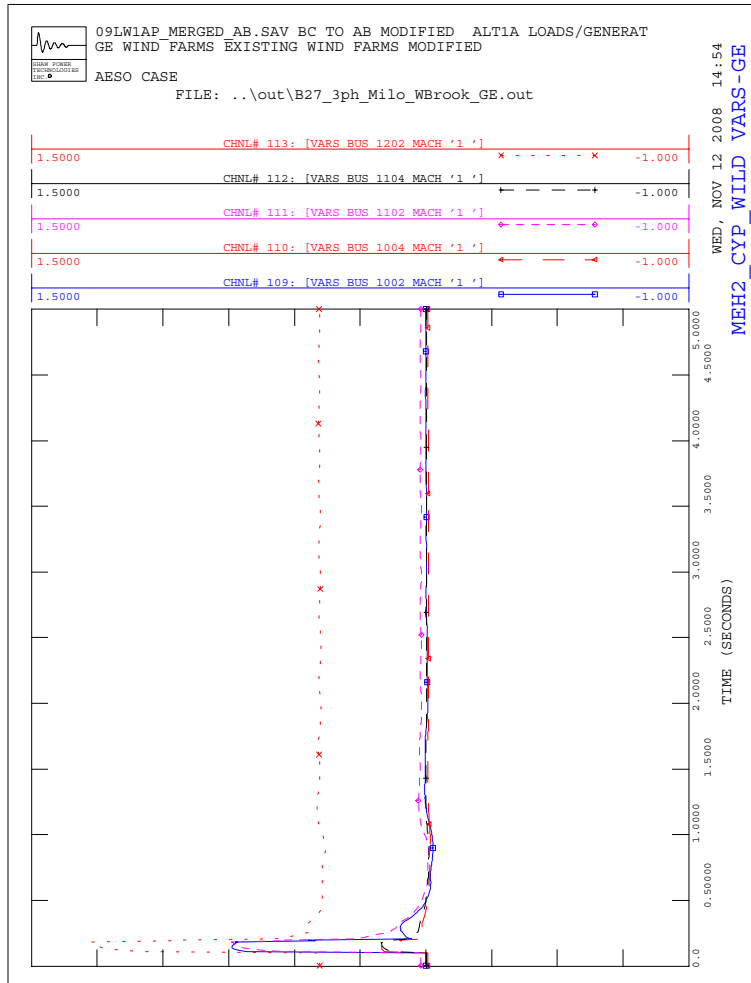
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
GE WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE
FILE: ..\out\B01_3ph_GOOSE-CROWS_GE.out

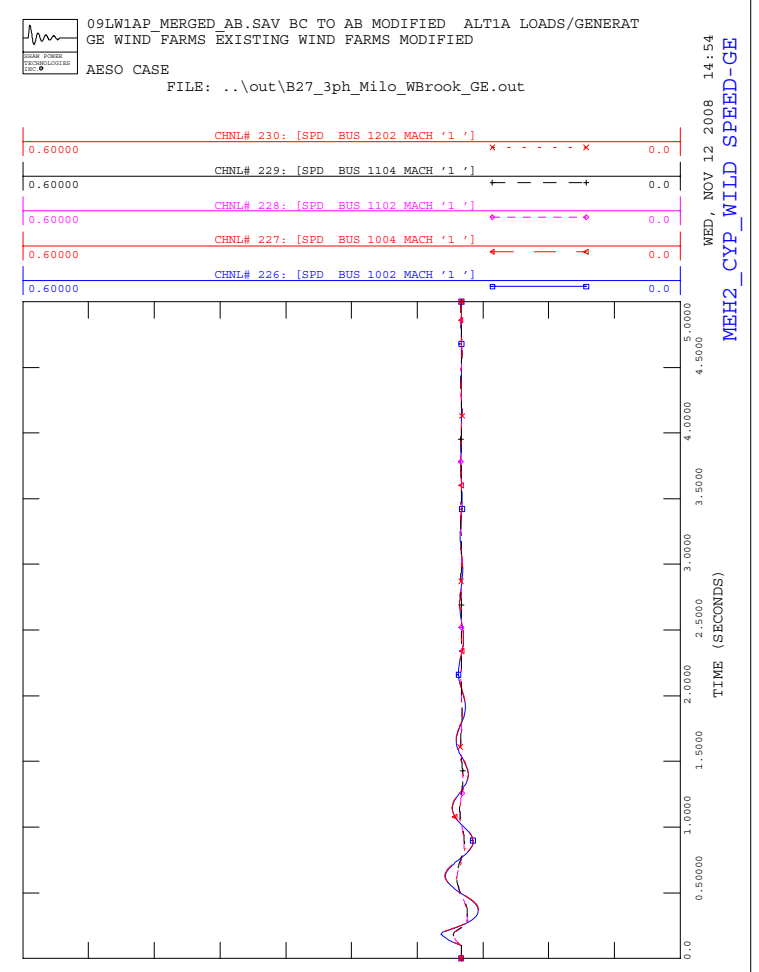
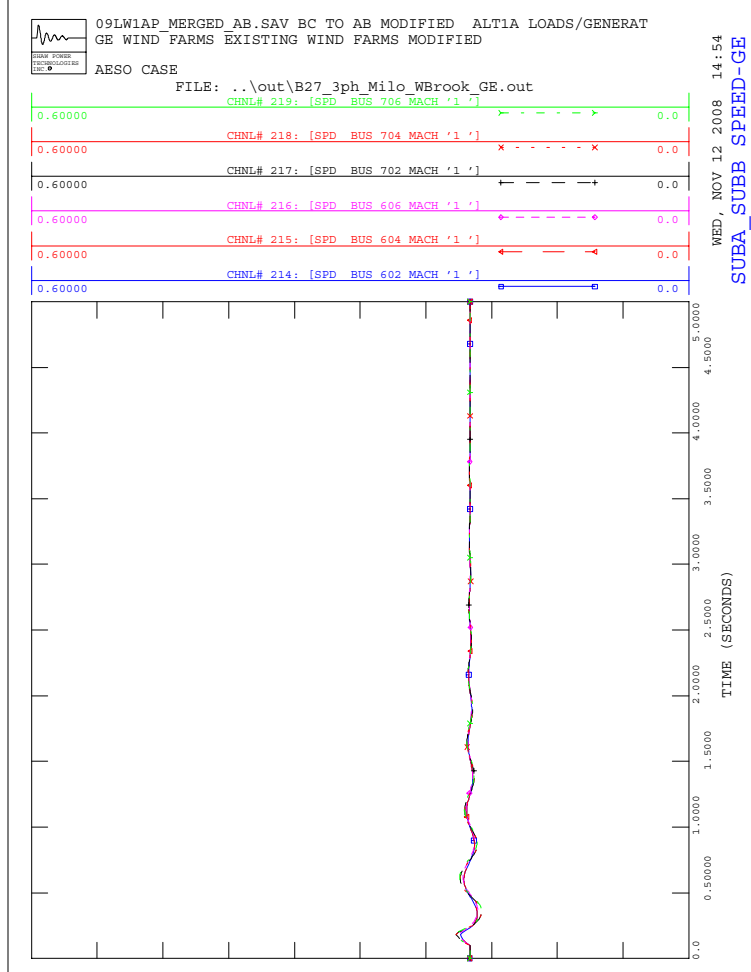
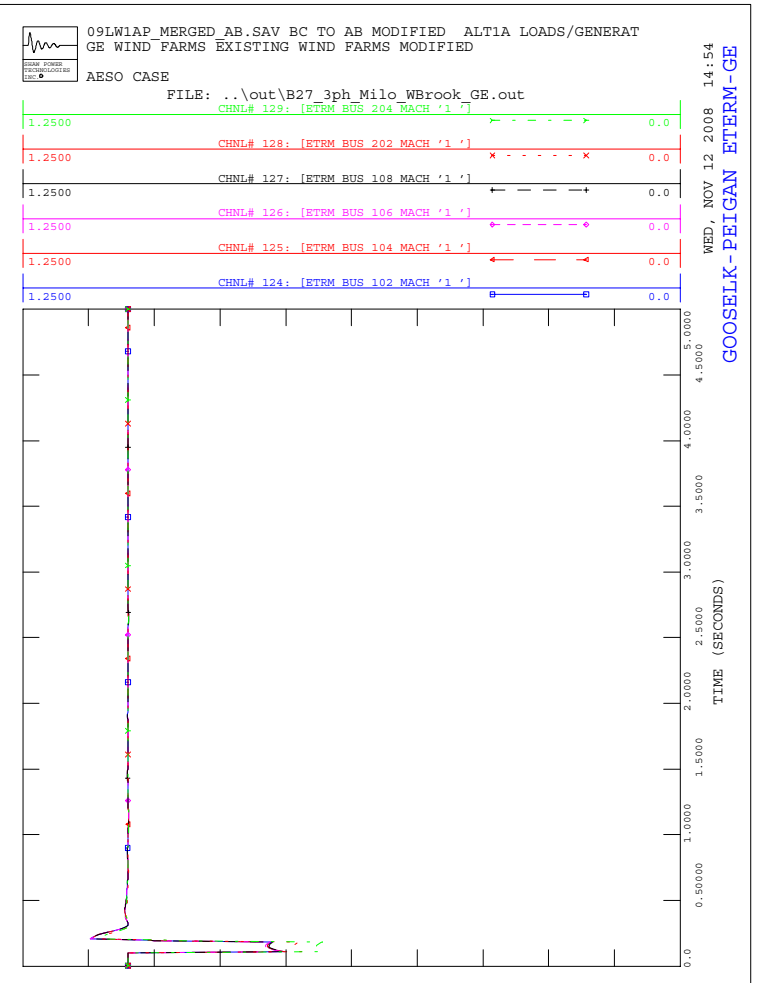
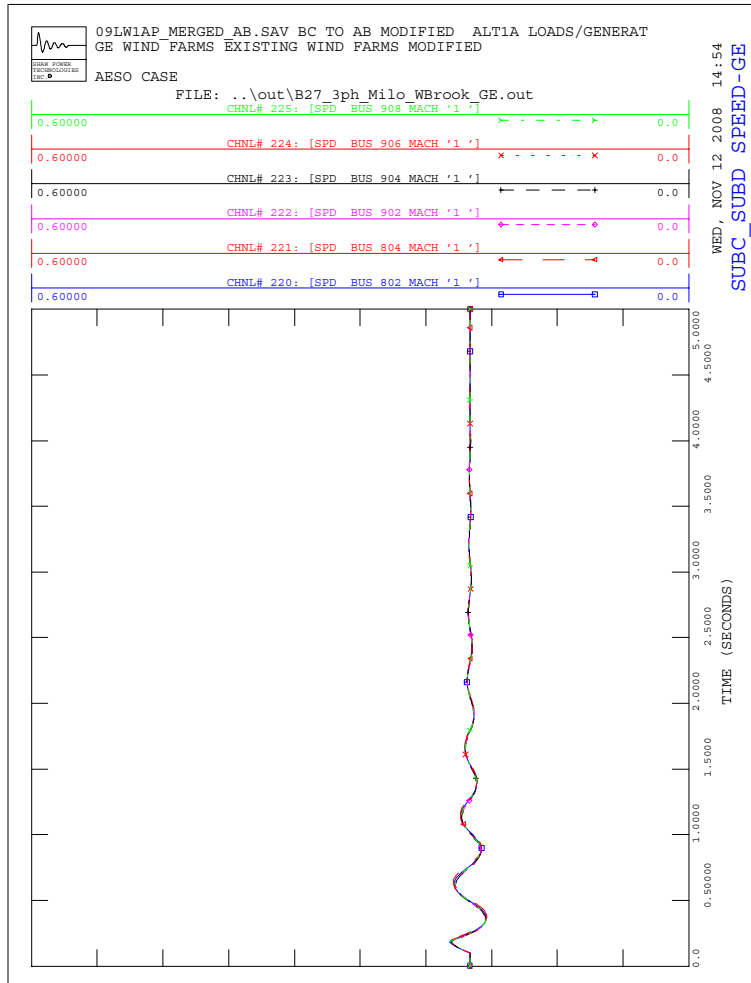
WED, NOV 12 2008 14:47
LANGDON_FRQ-GE

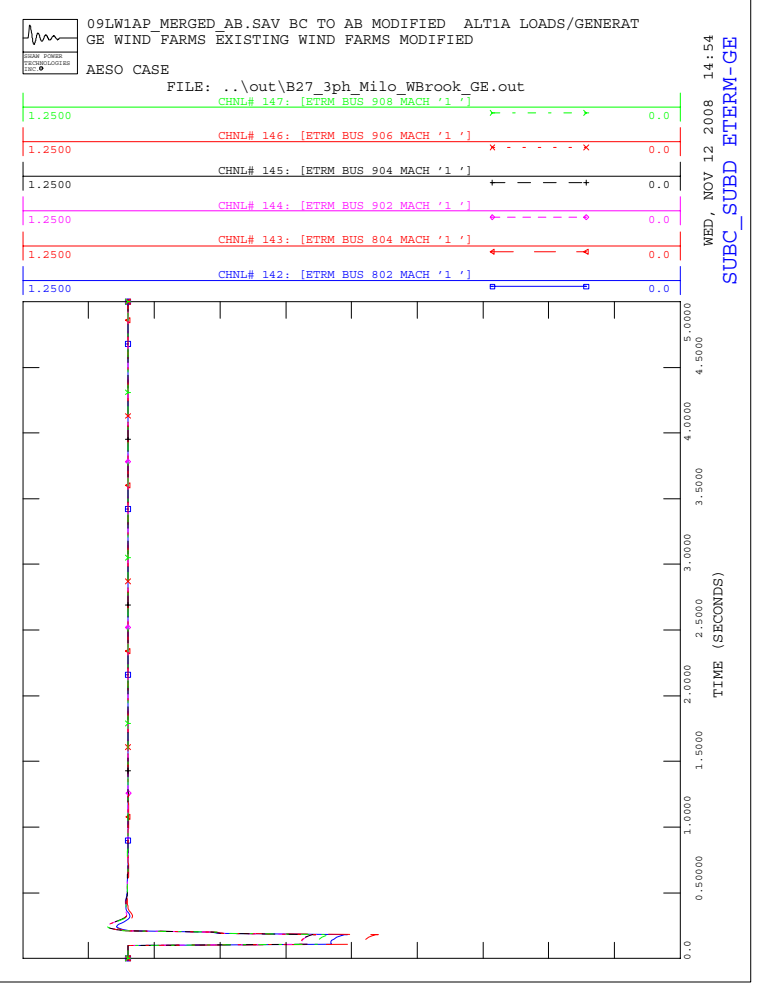
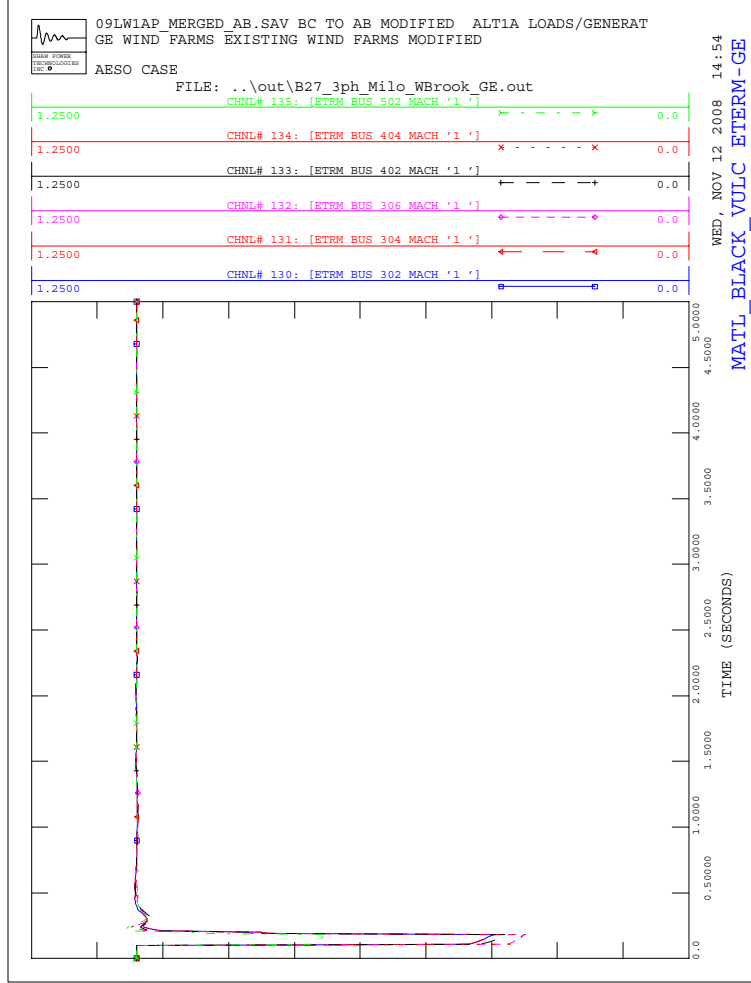
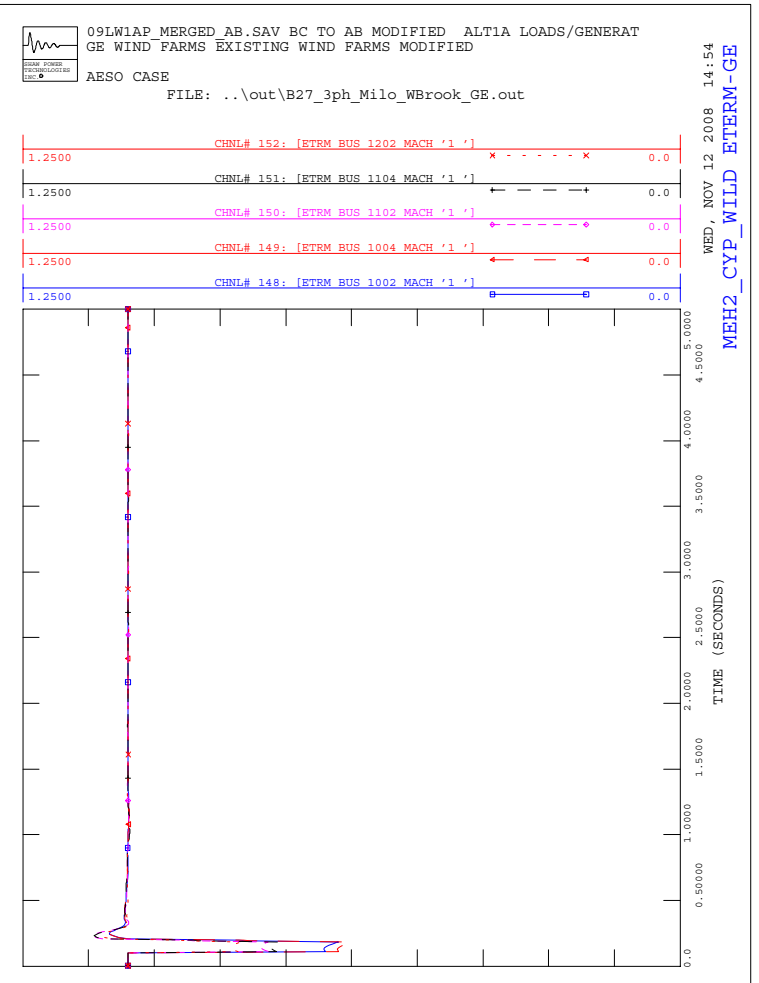
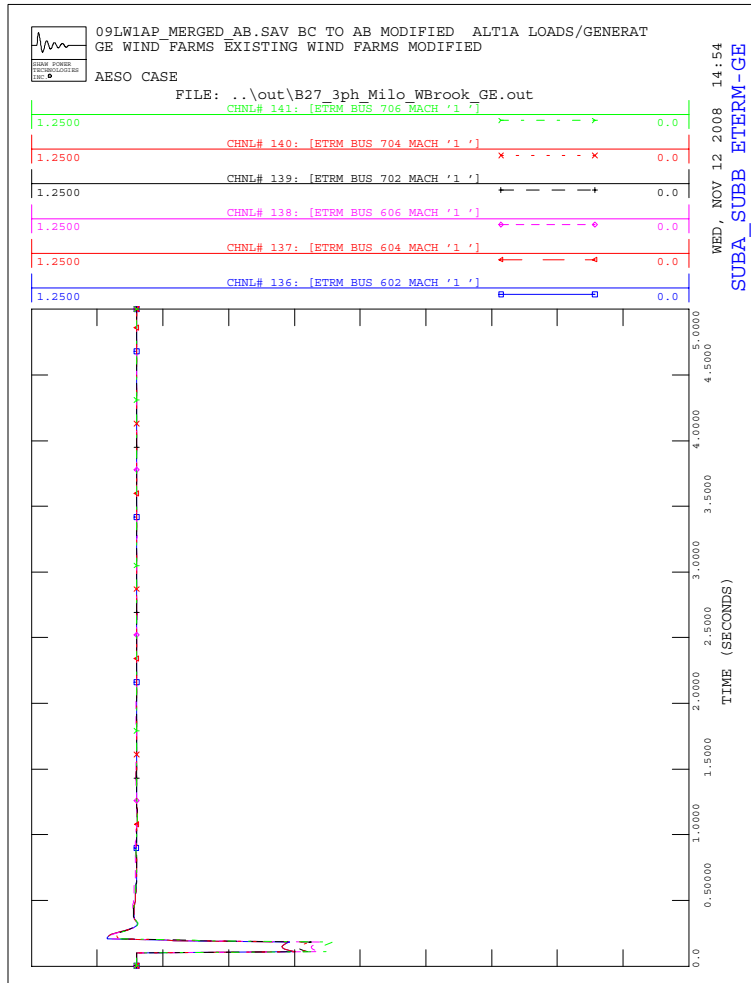


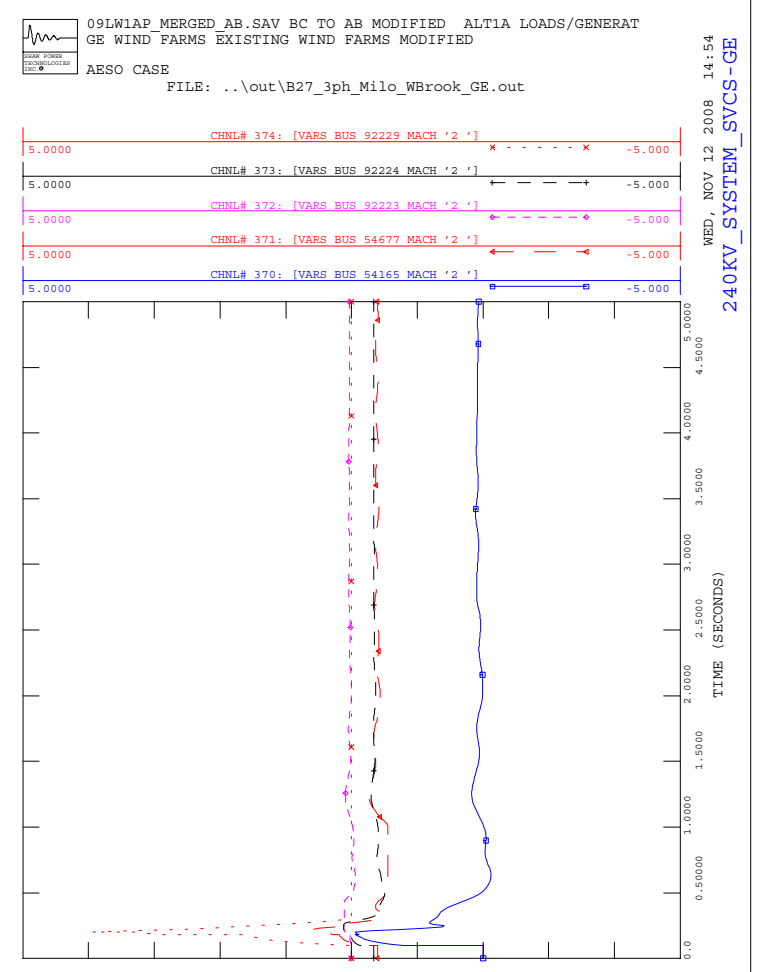
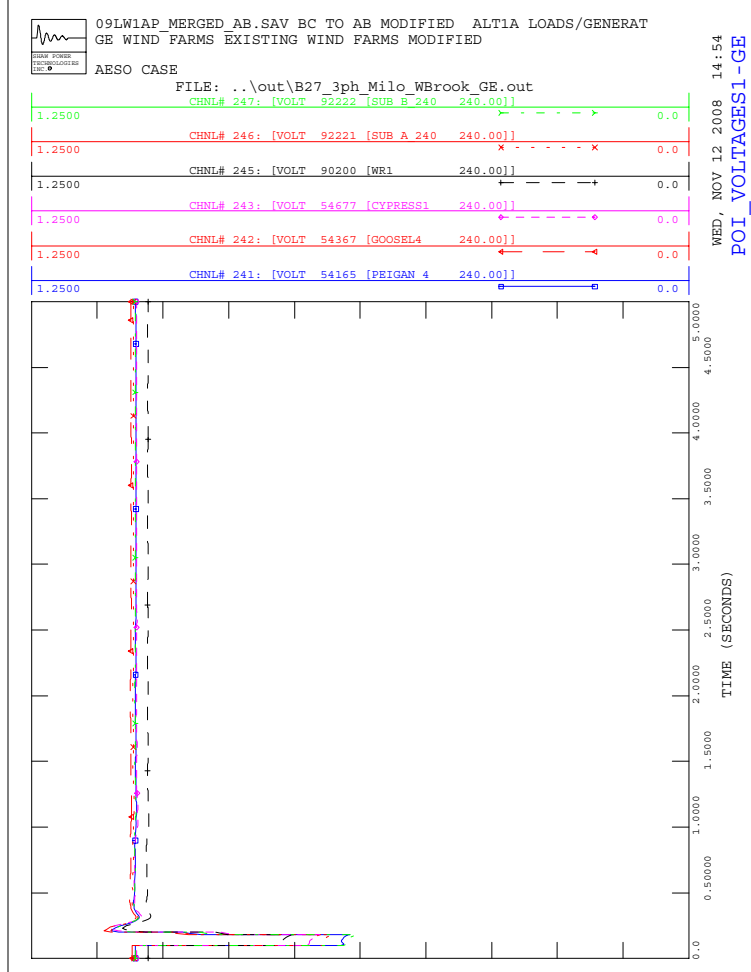
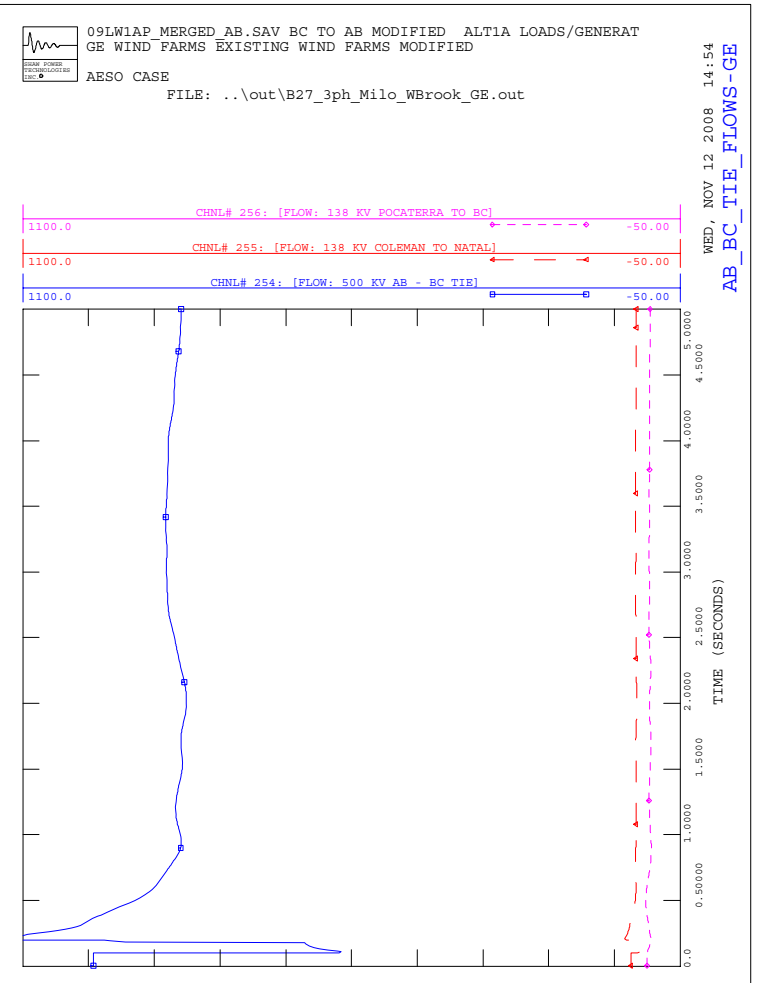
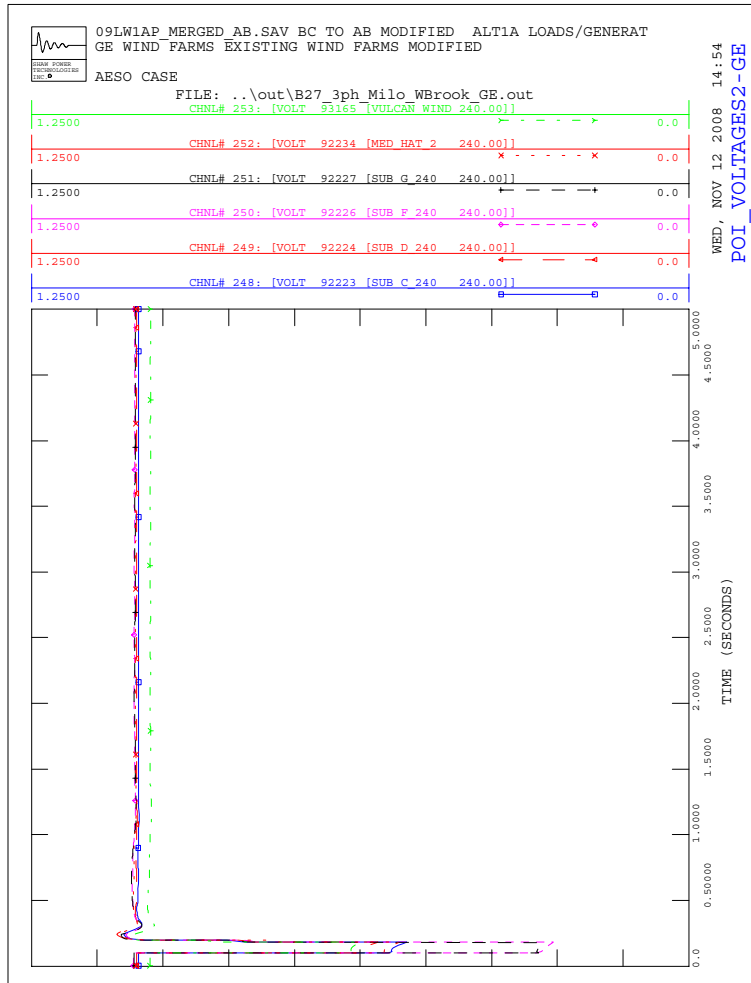












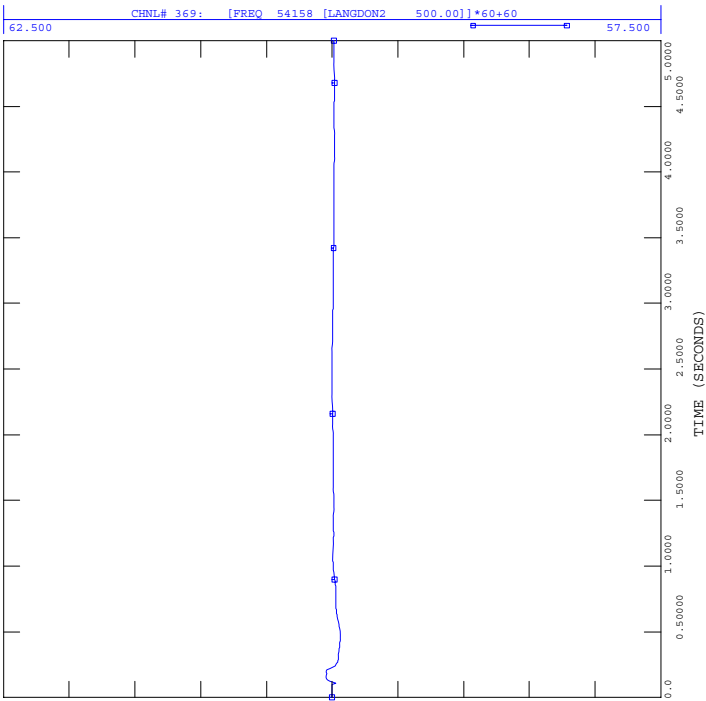


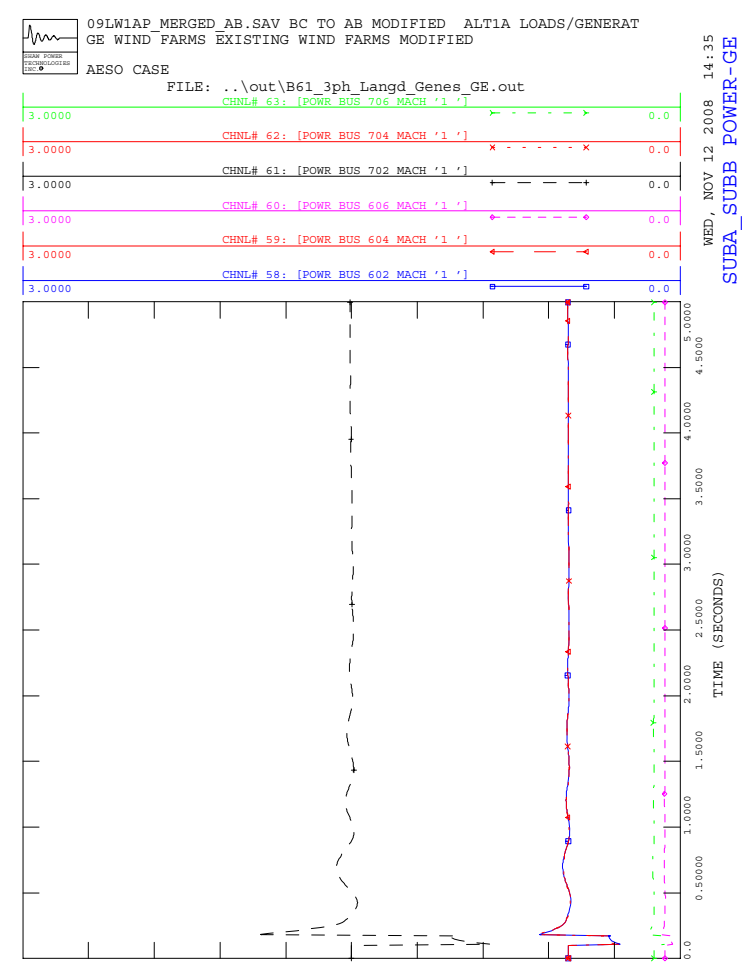
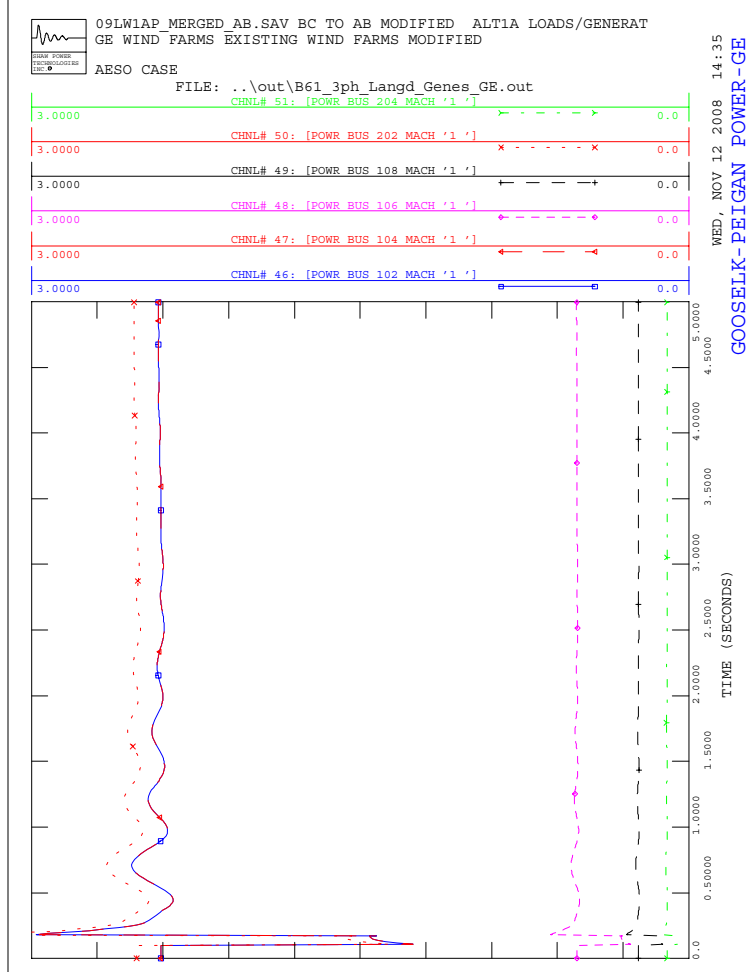
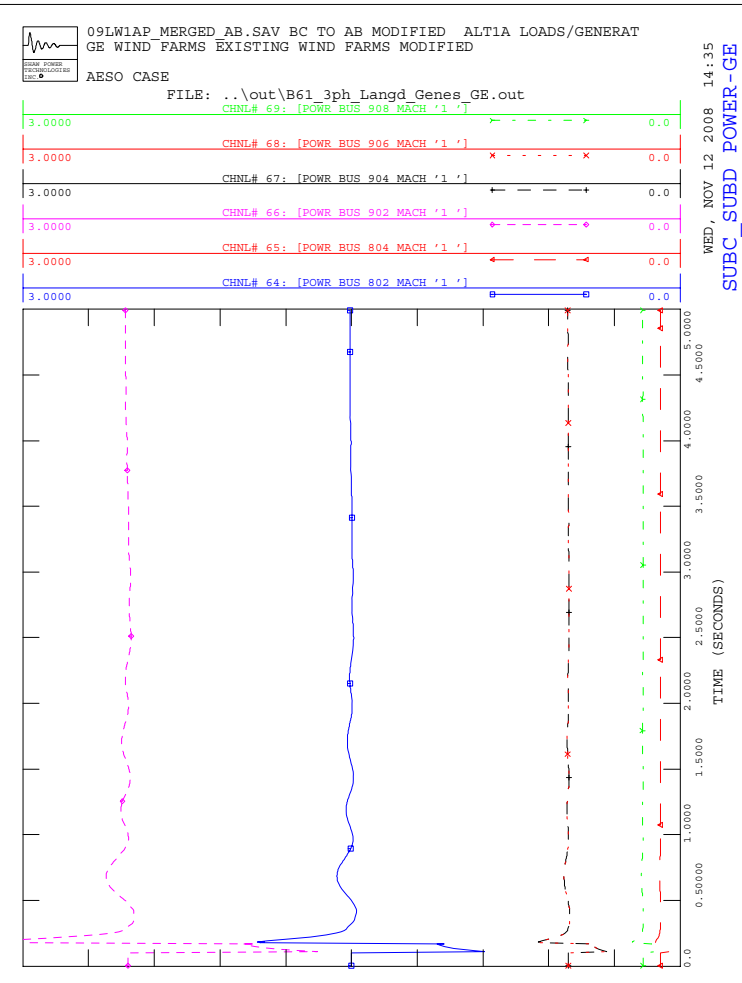
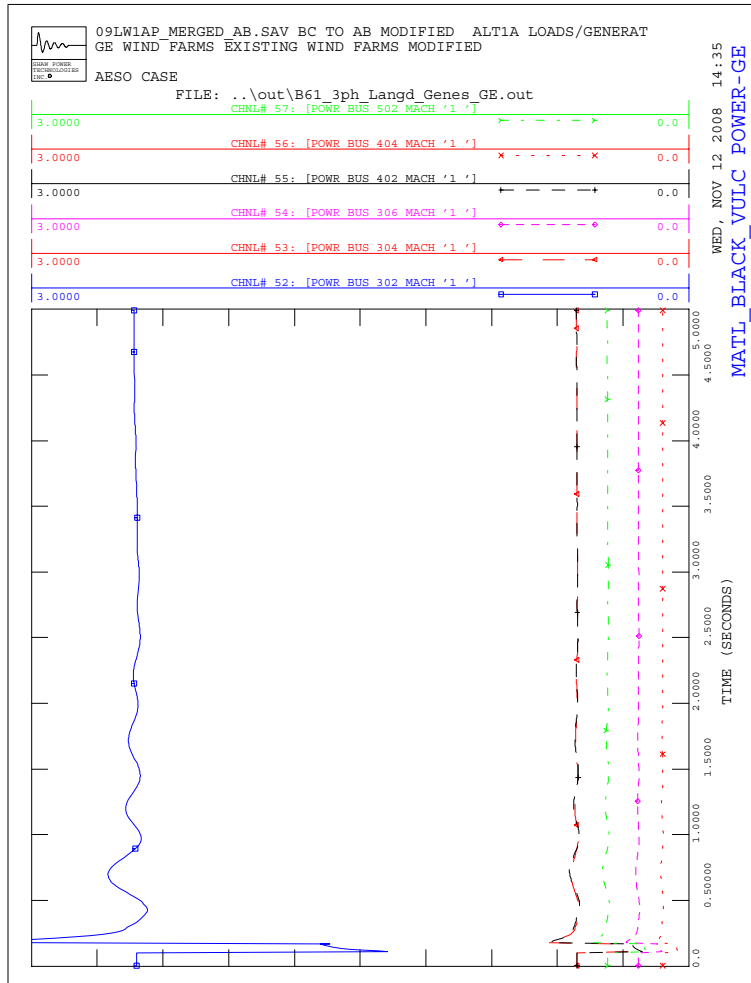
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
GE WIND FARMS EXISTING WIND FARMS MODIFIED

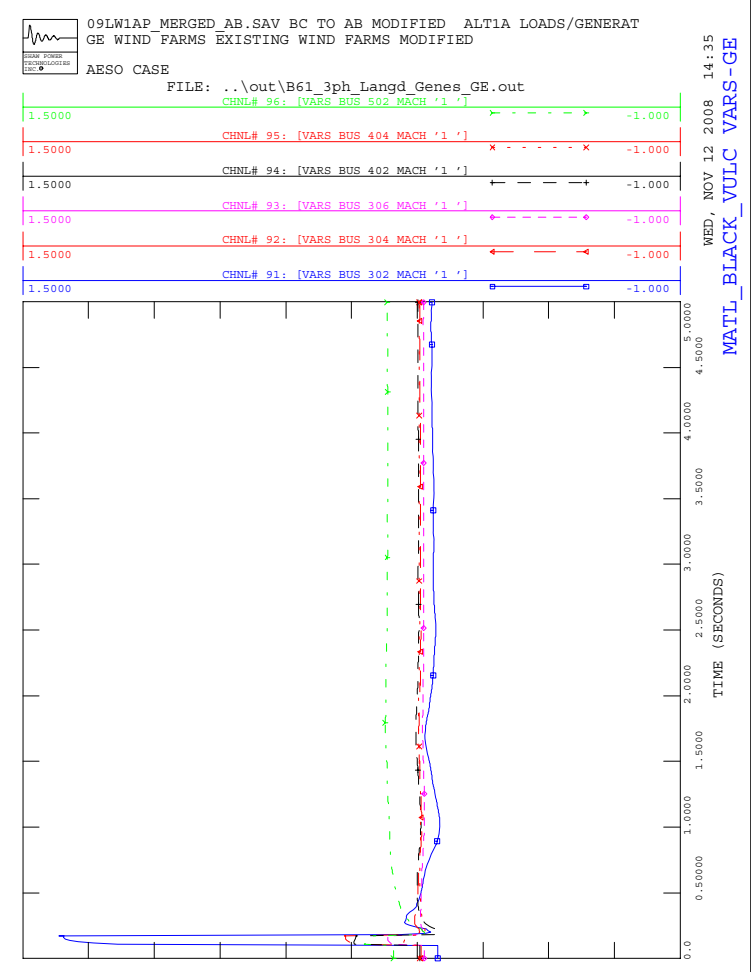
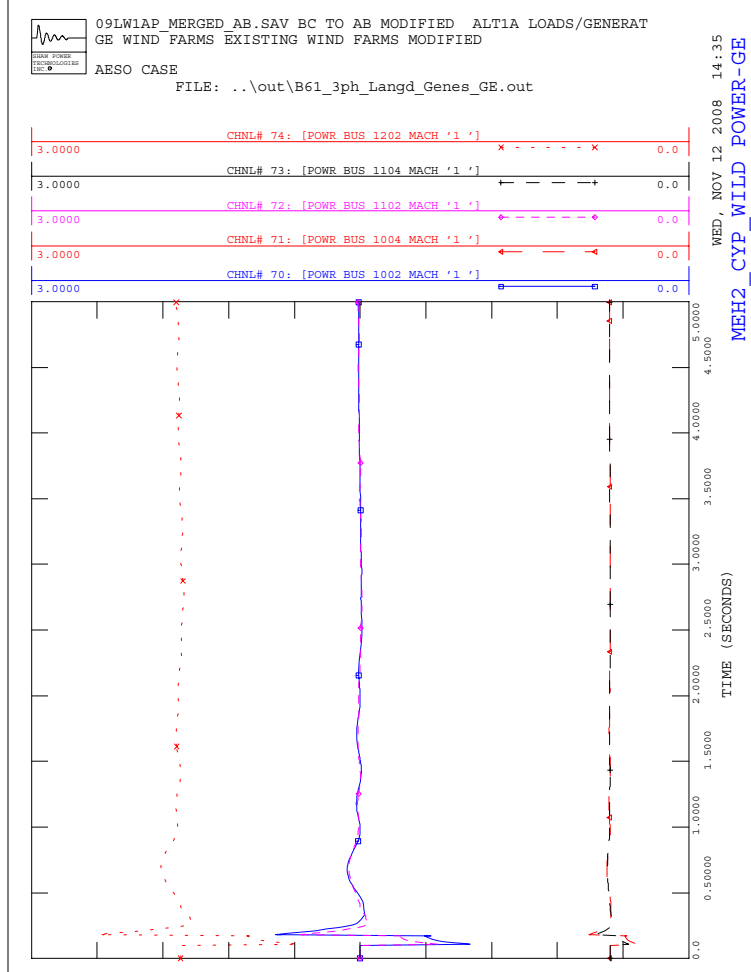
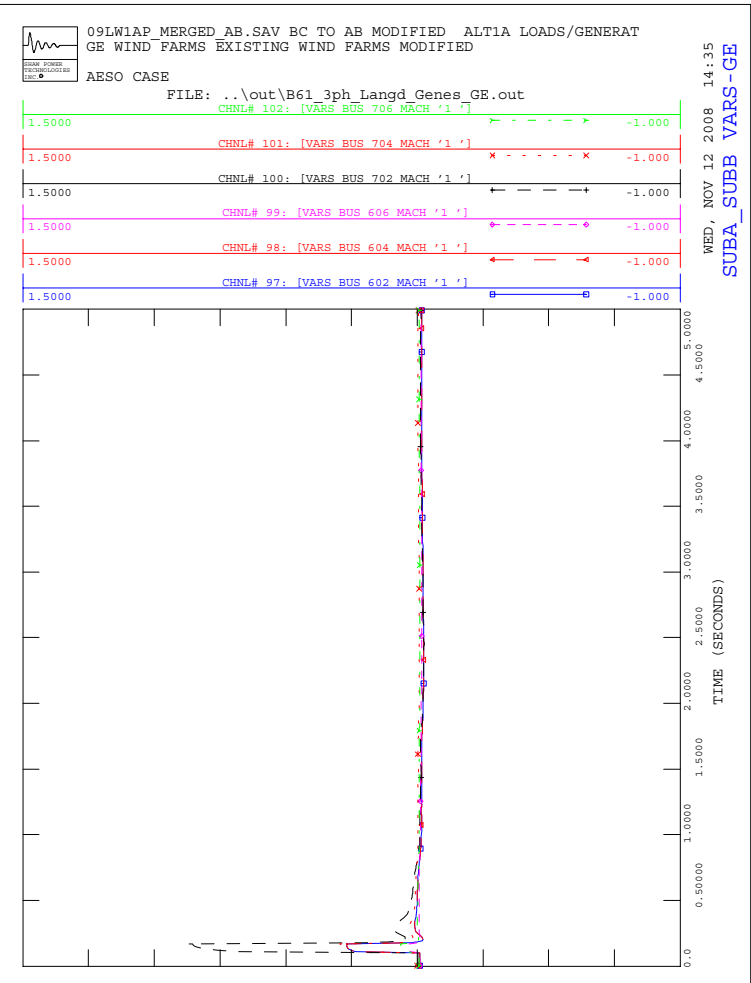
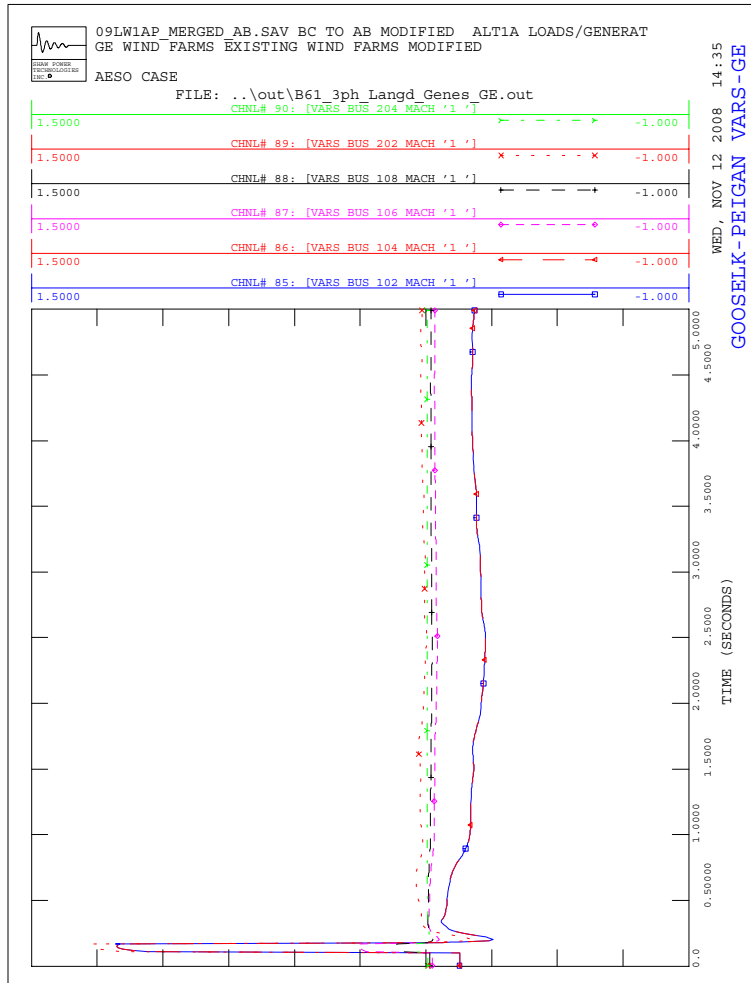
ABSO CASE

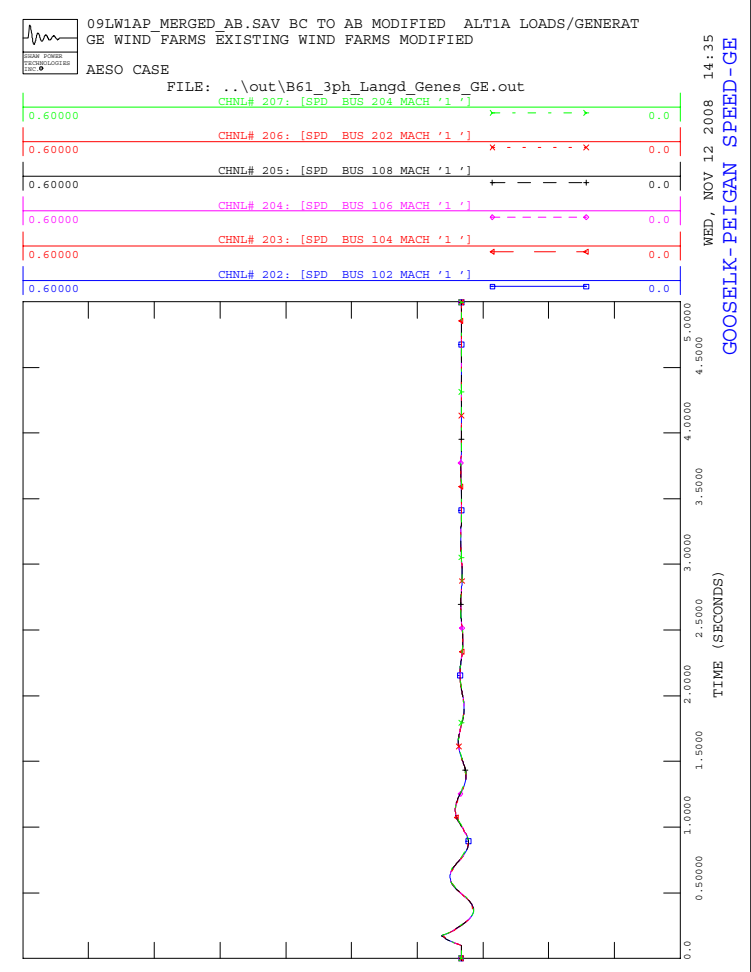
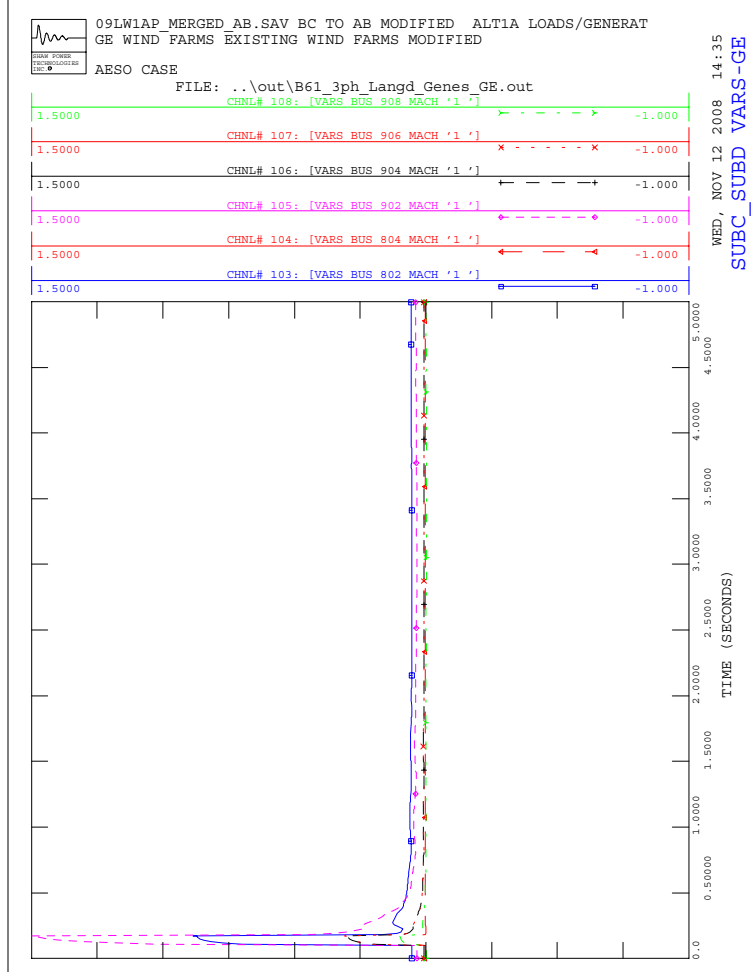
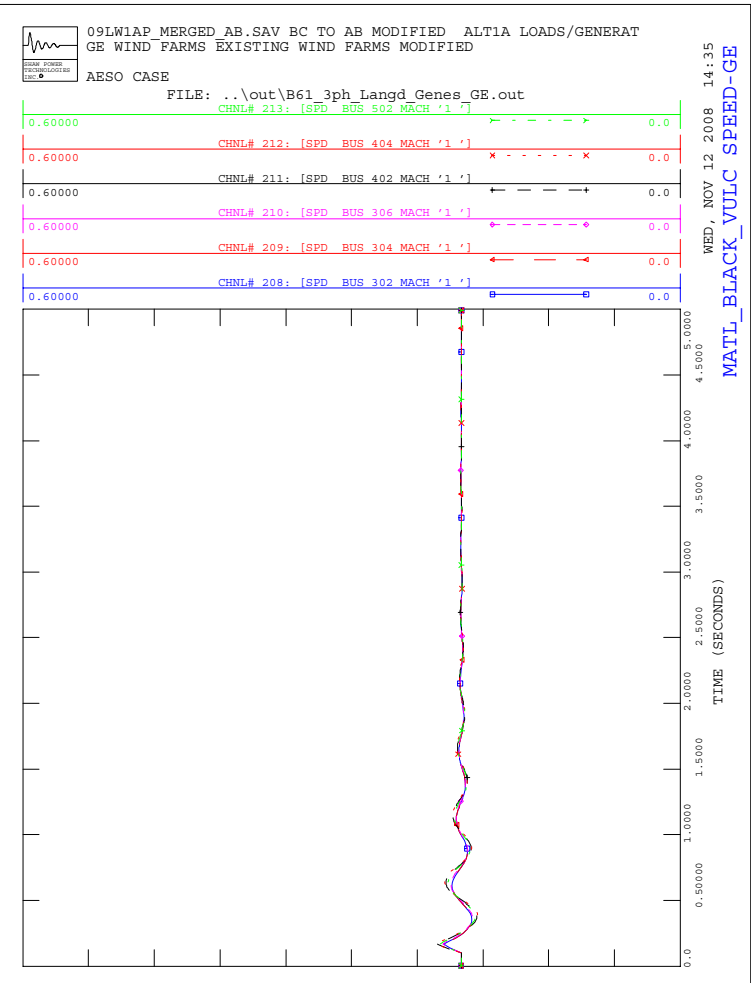
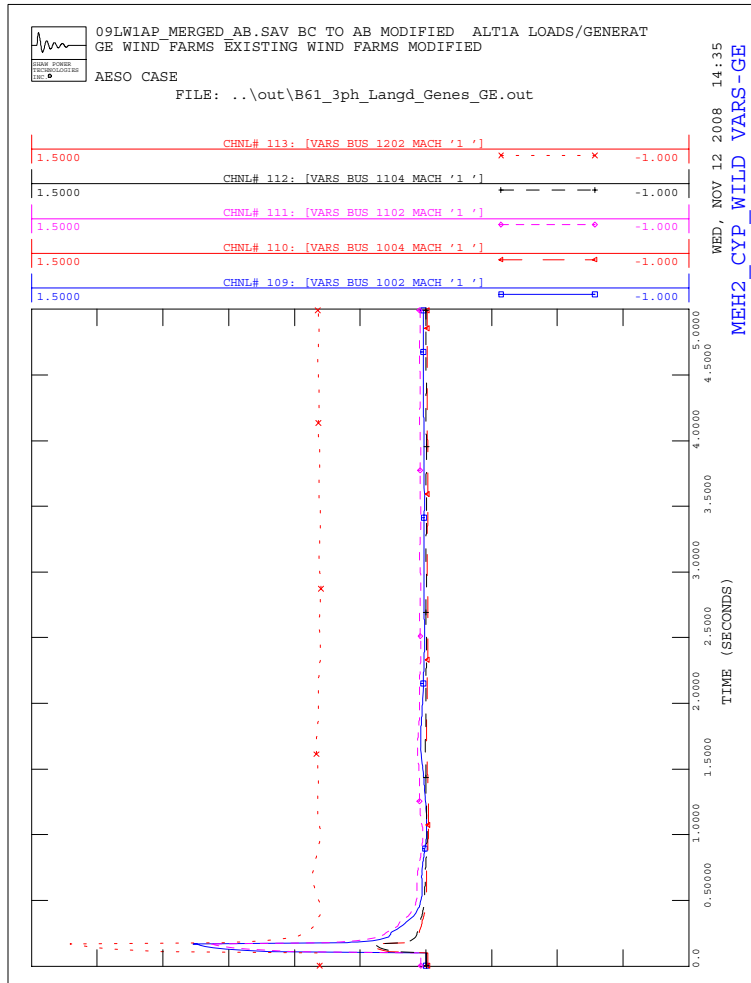
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WED, NOV 12 2008 14:54
LANGDON_FRQ-GE



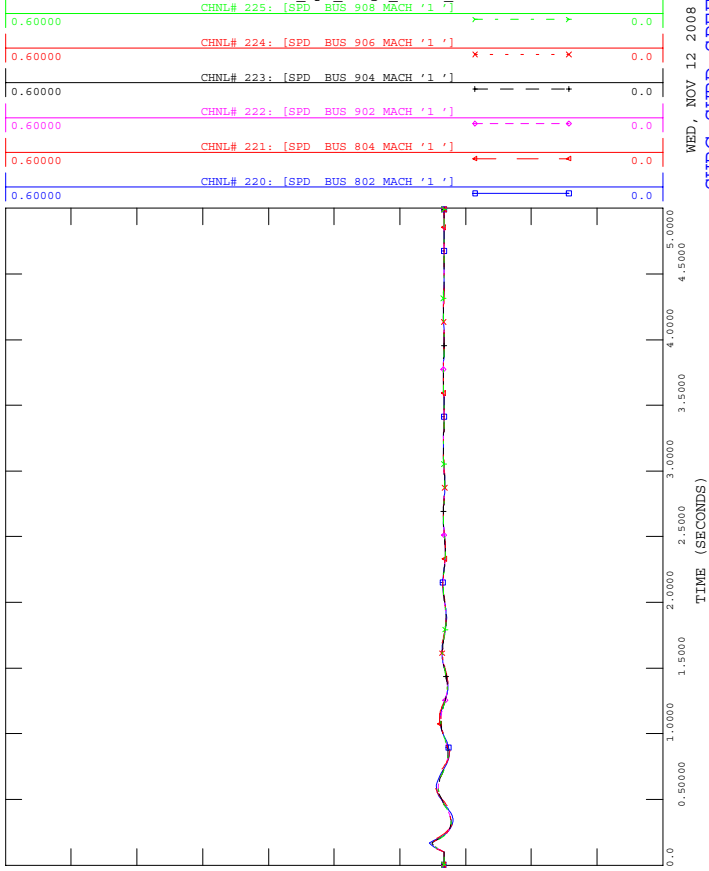






09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
GE WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

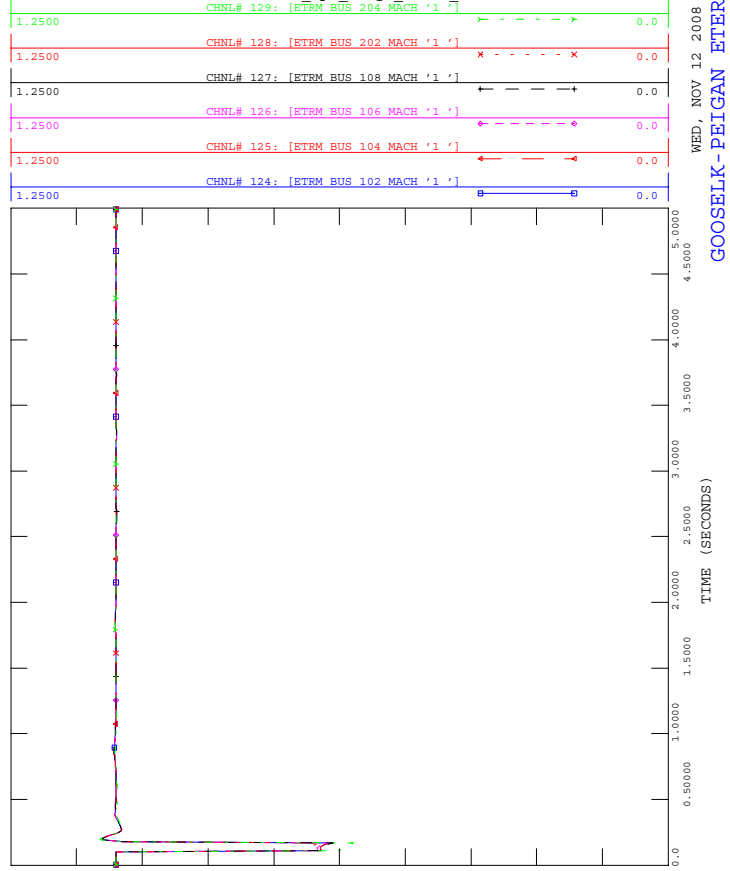
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WED, NOV 12 2008 14:35
SUBC_SUBD SPEED-GE

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
GE WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

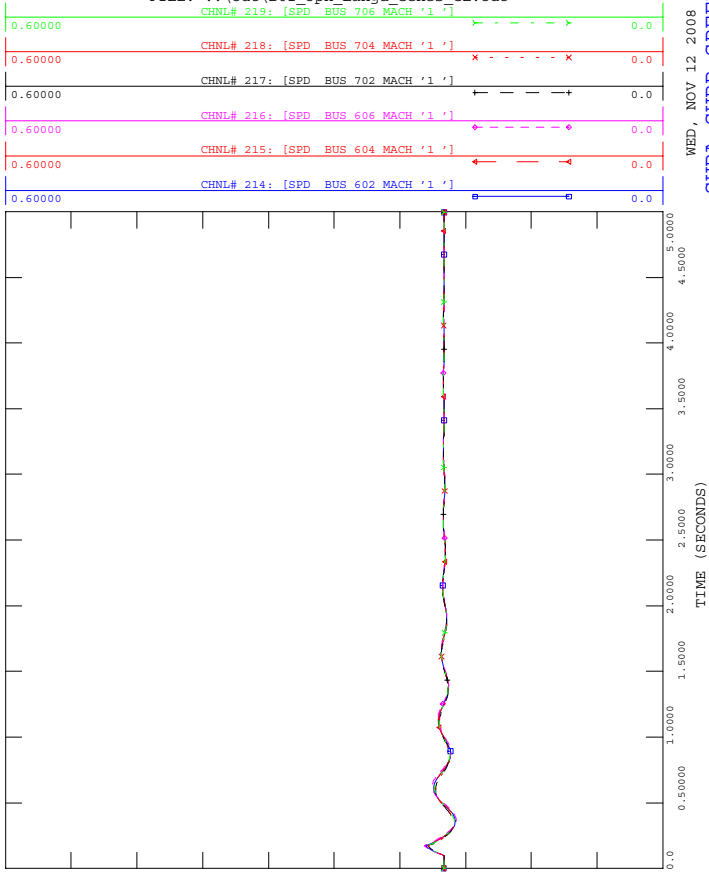
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WED, NOV 12 2008 14:35
GOOSELK-PEIGAN ETERM-GE

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GE WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

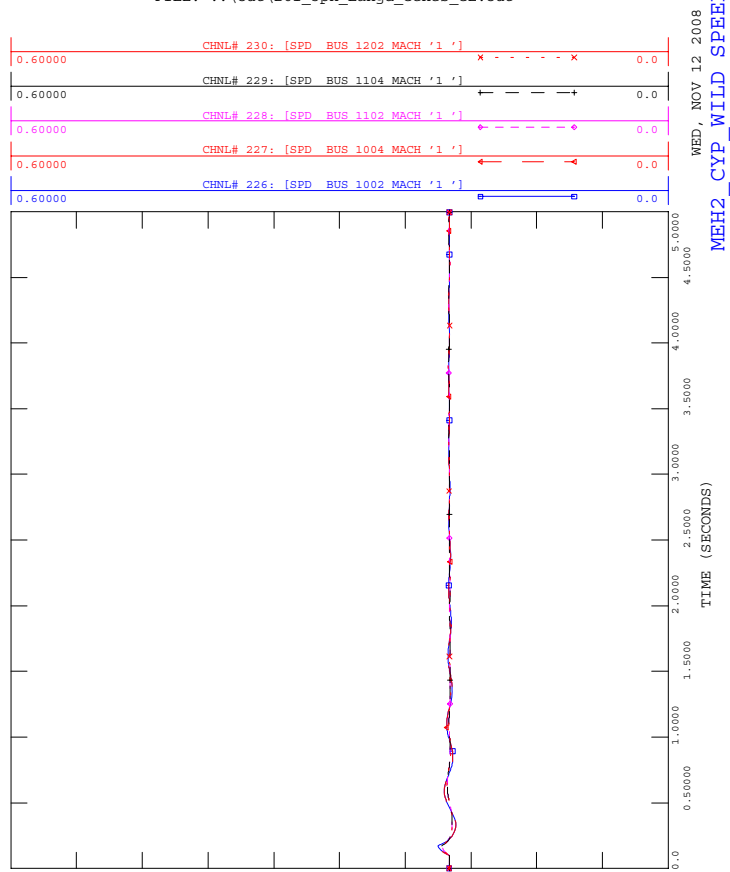
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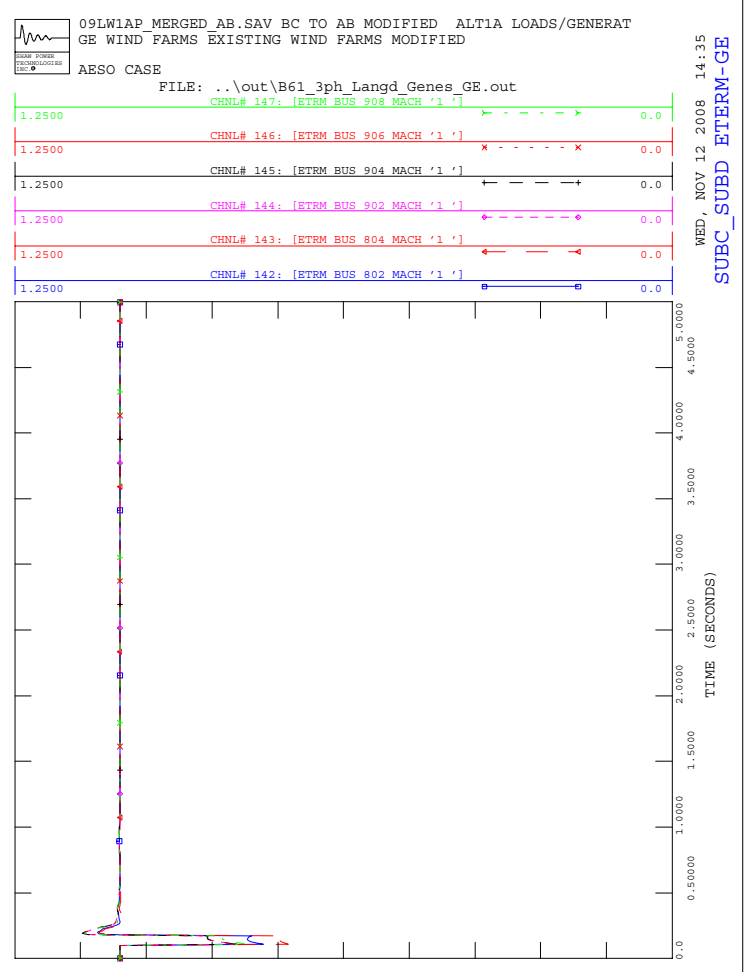
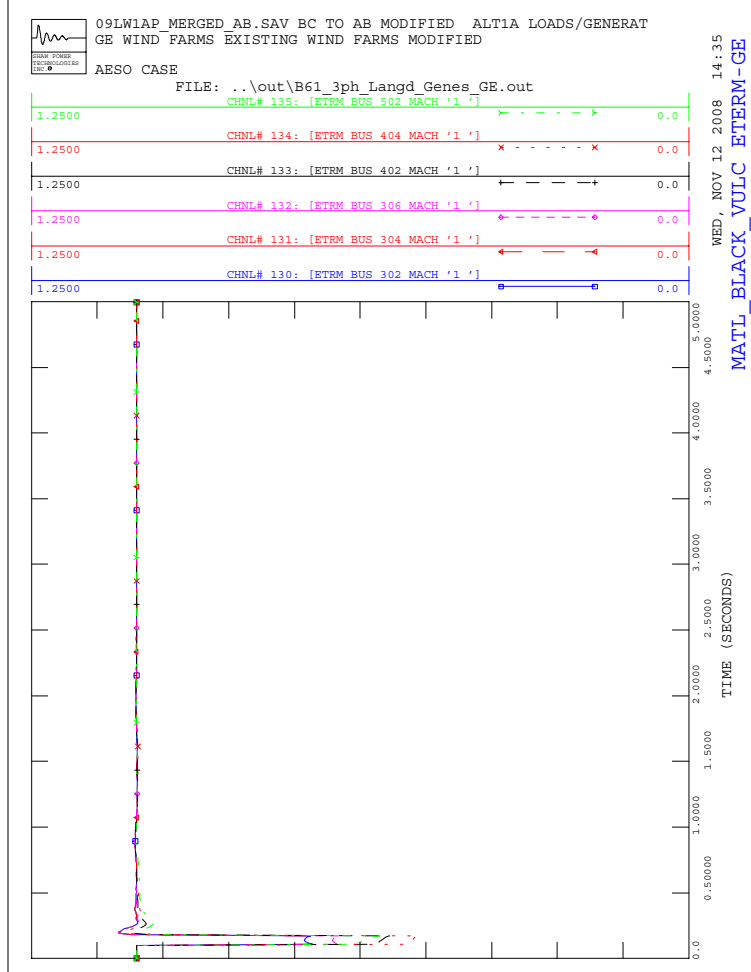
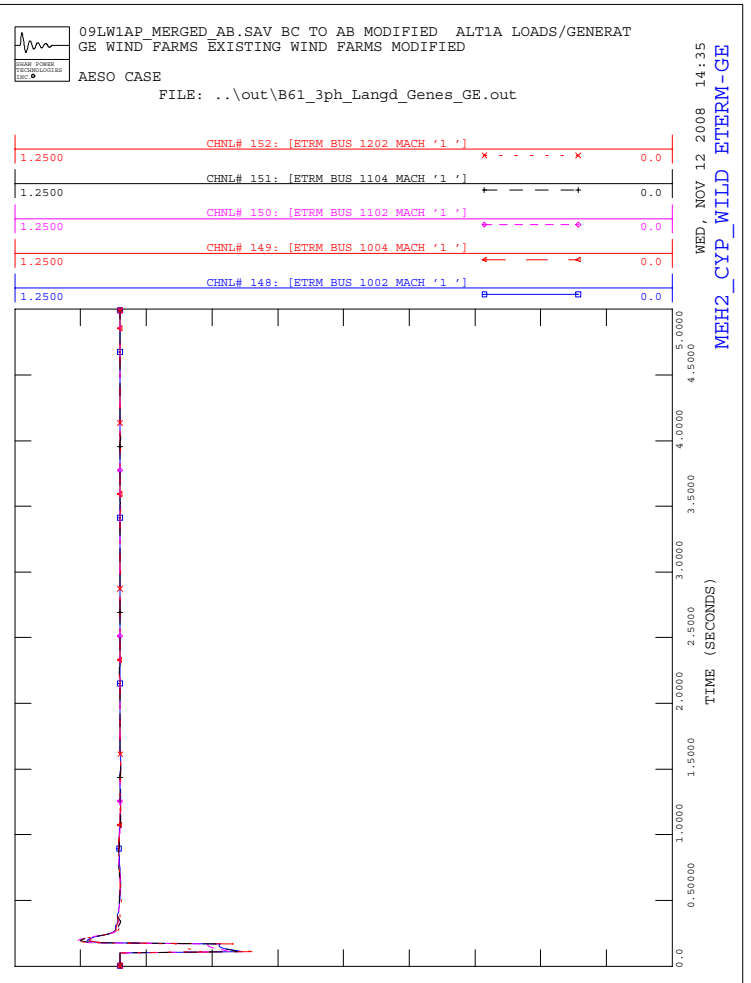
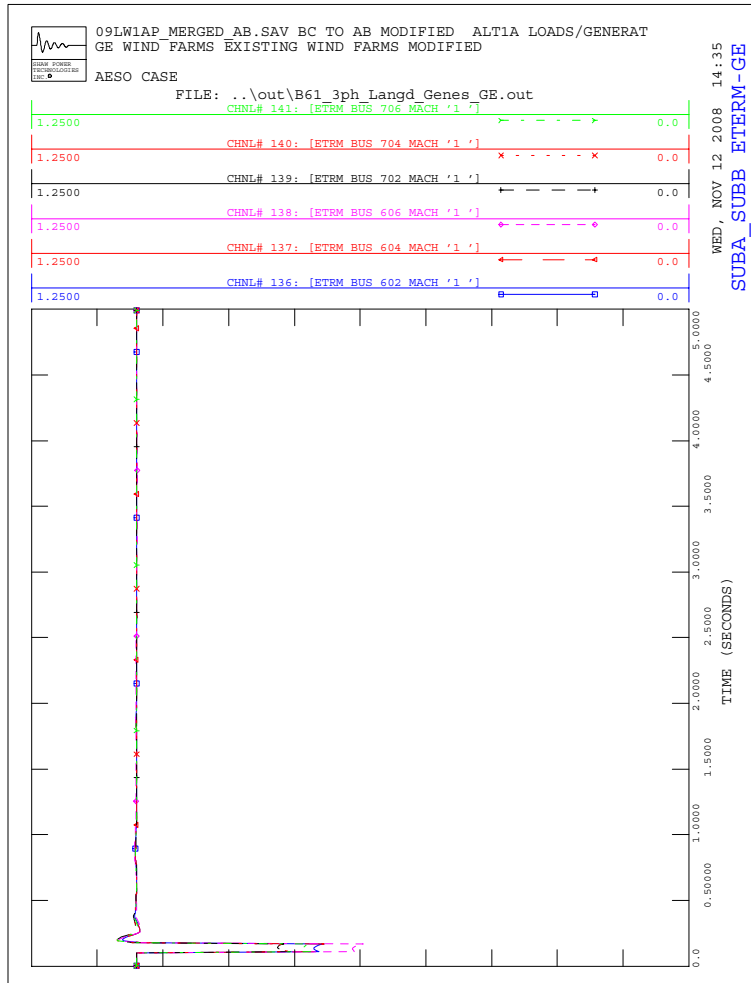
WED, NOV 12 2008 14:35
SUBA_SUBD SPEED-GE

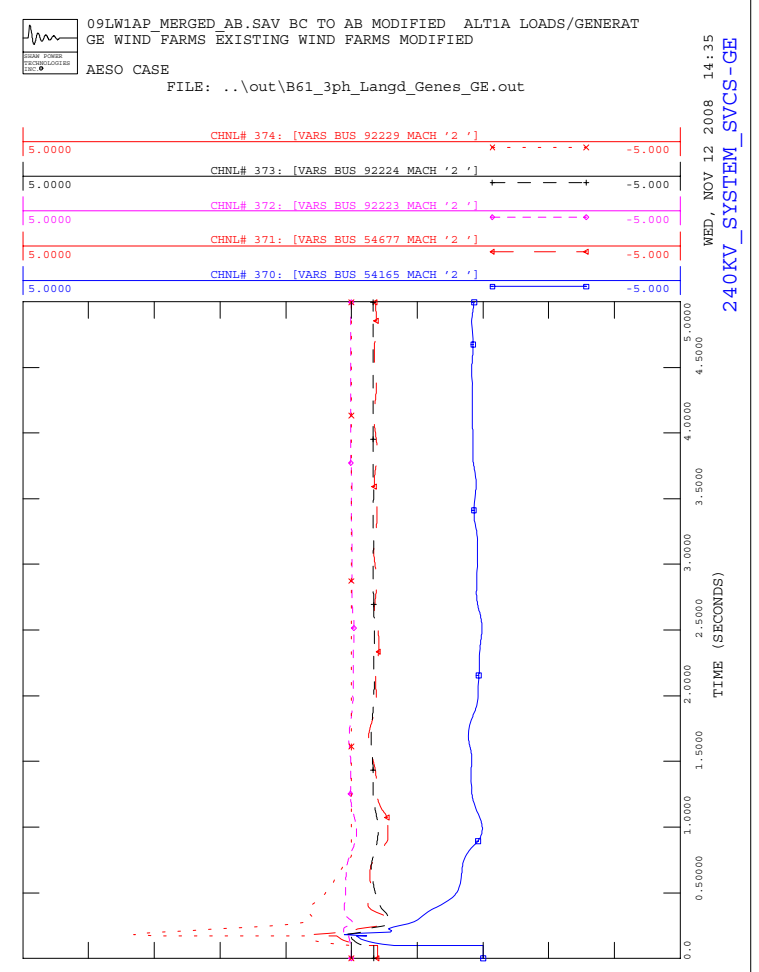
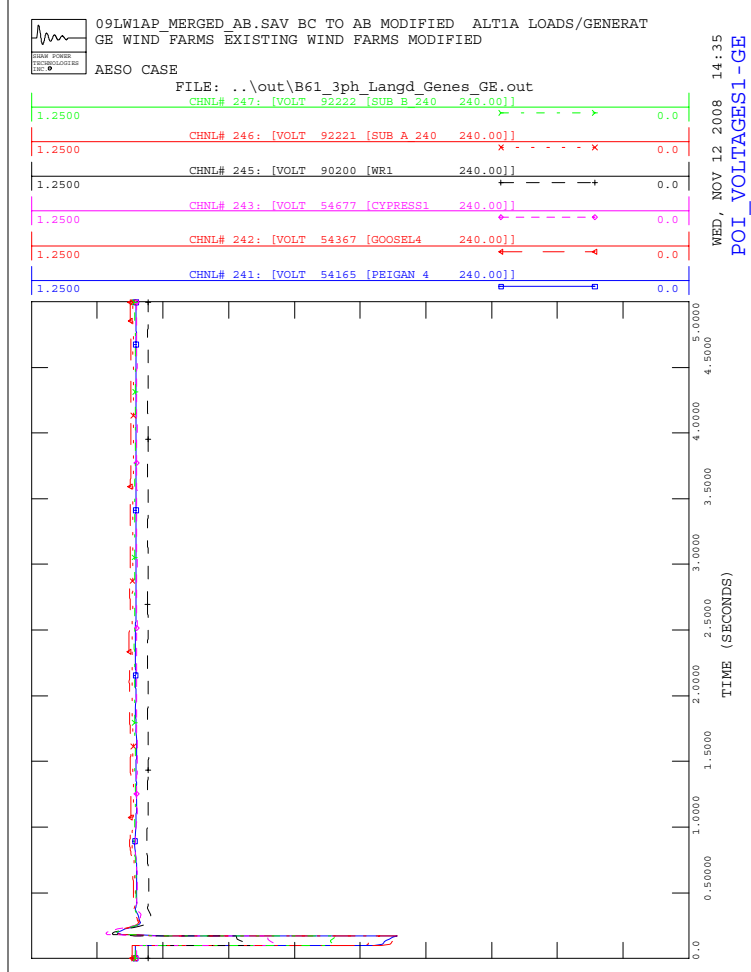
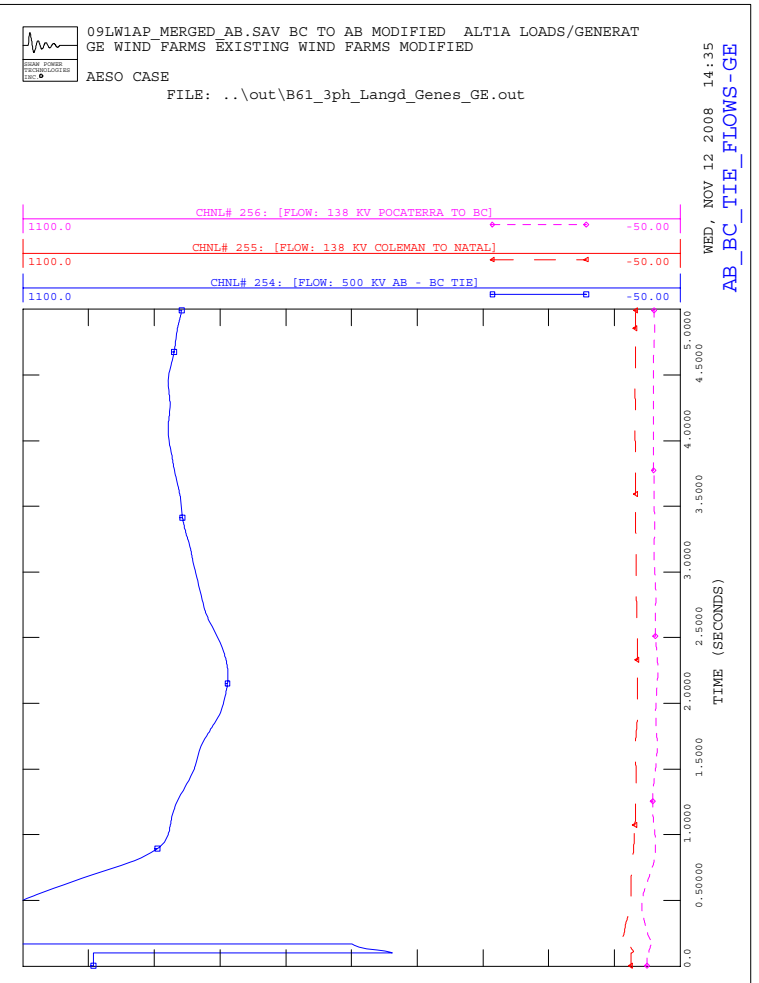
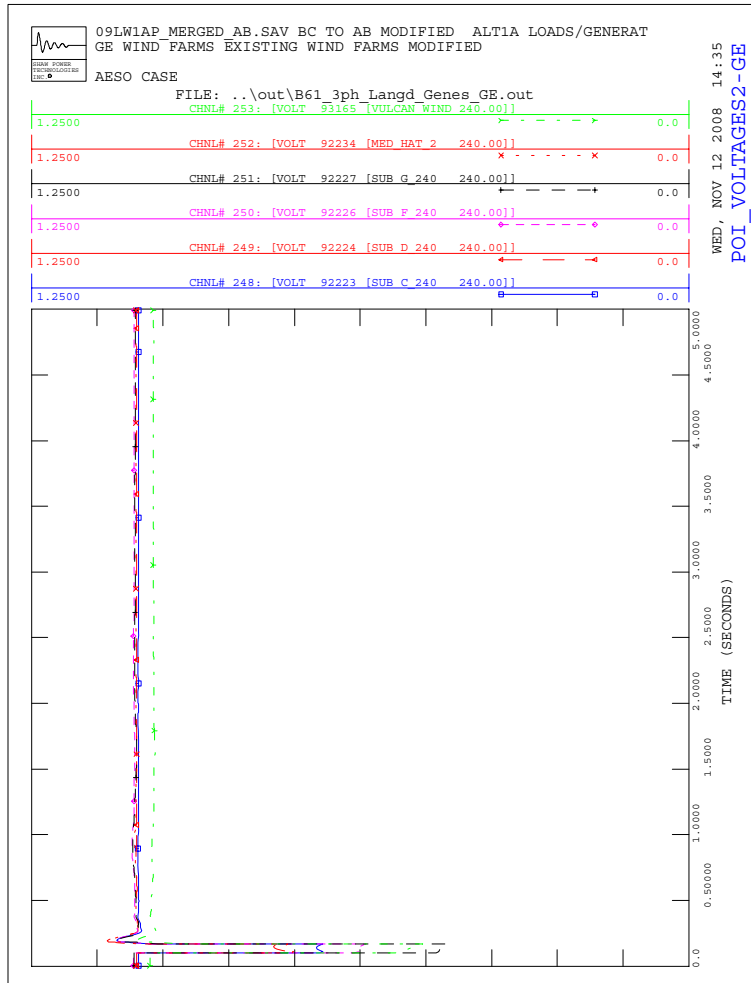
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
GE WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\B61_3ph_Langd_Genes_GE.out



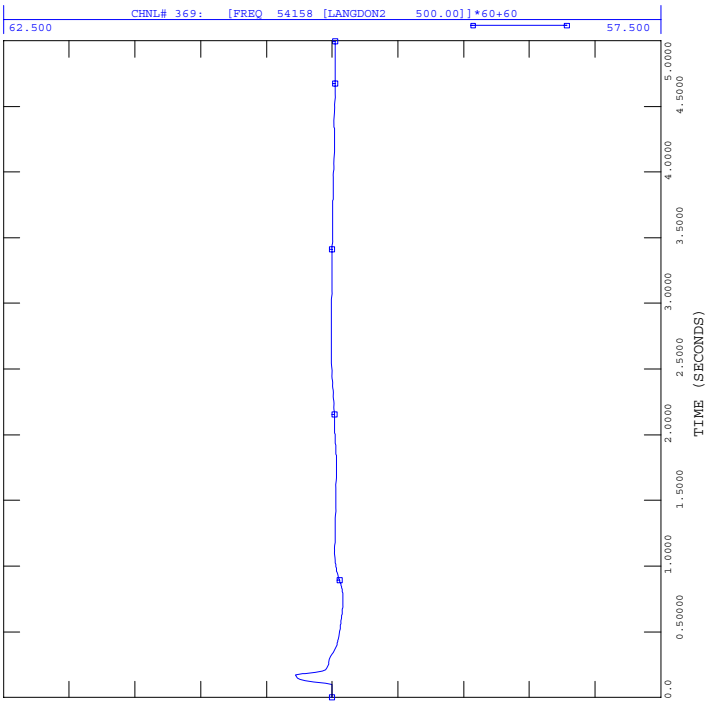
WED, NOV 12 2008 14:35
MEH2_CYP_WILD SPEED-GE

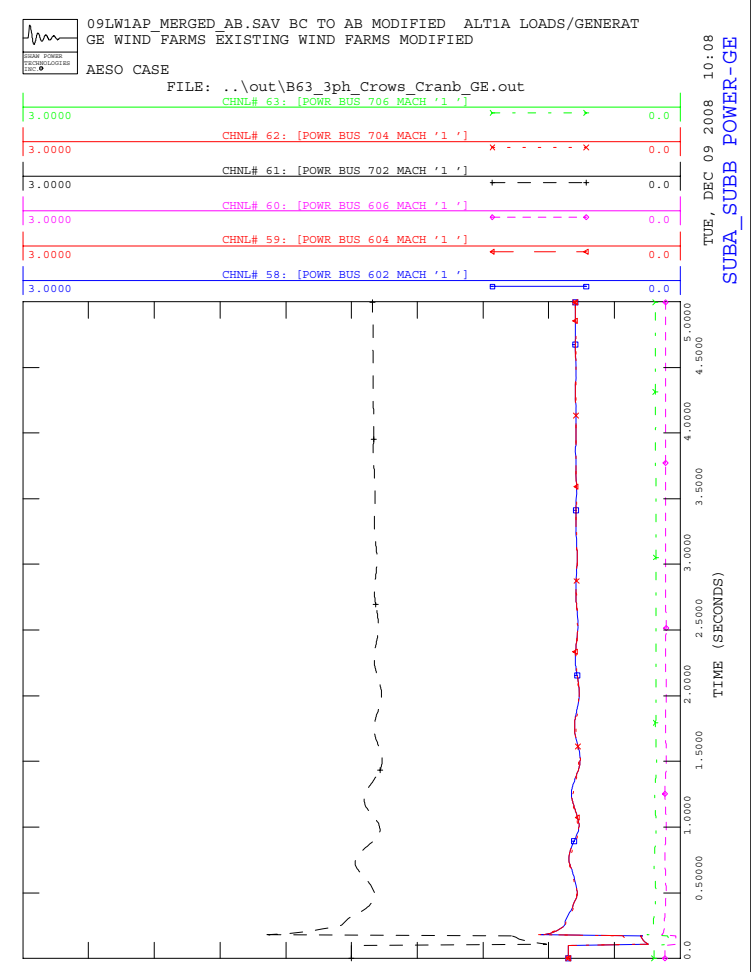
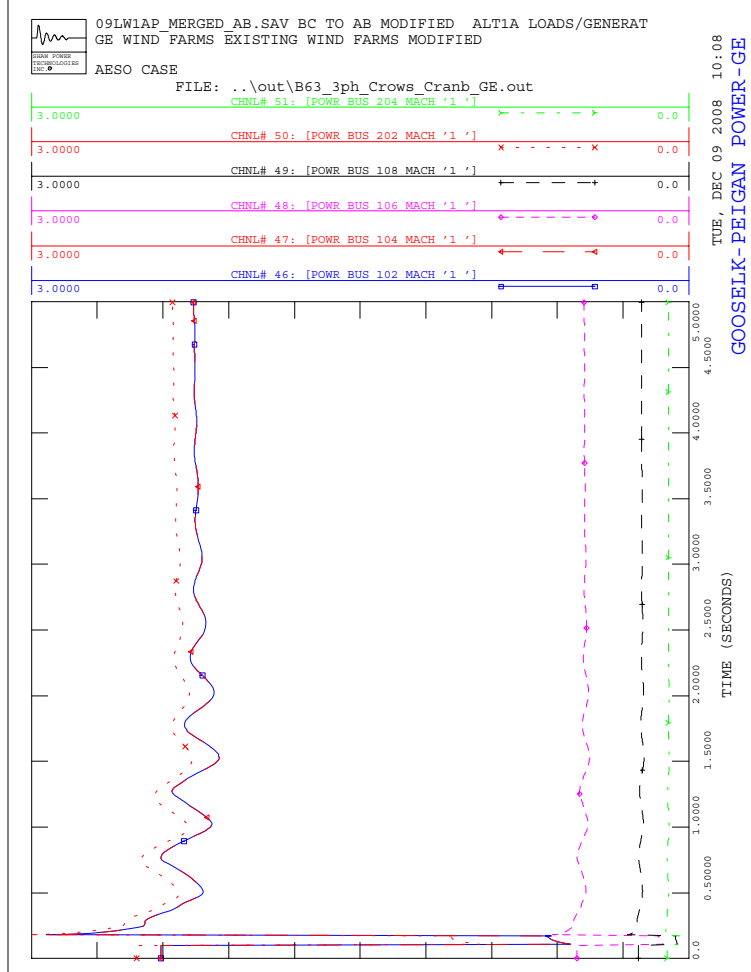
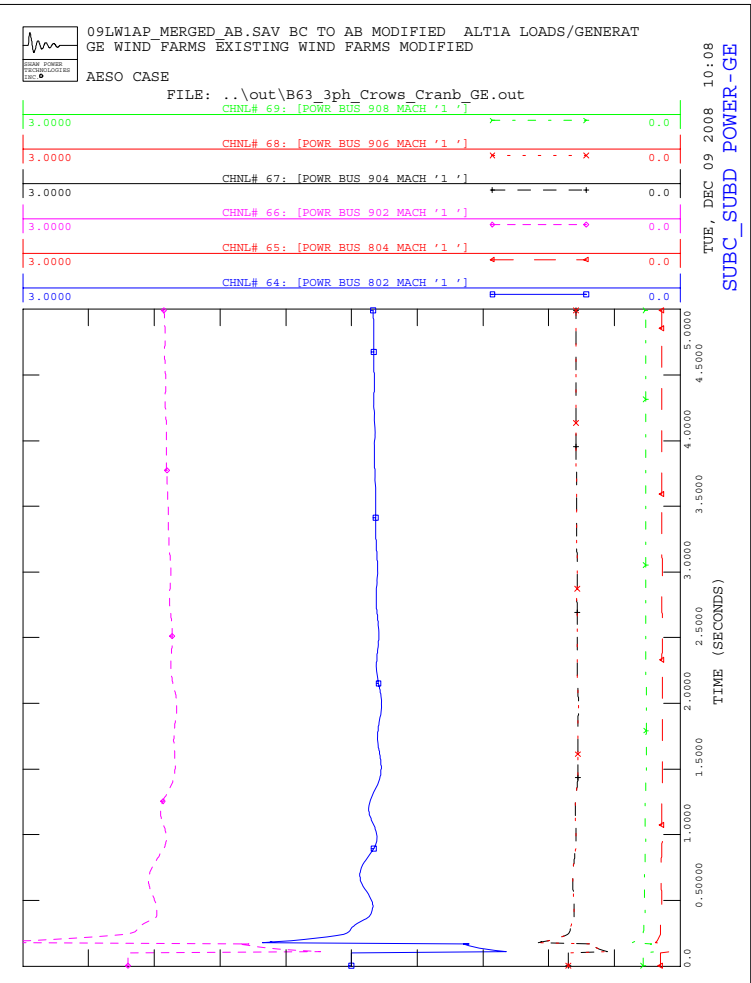
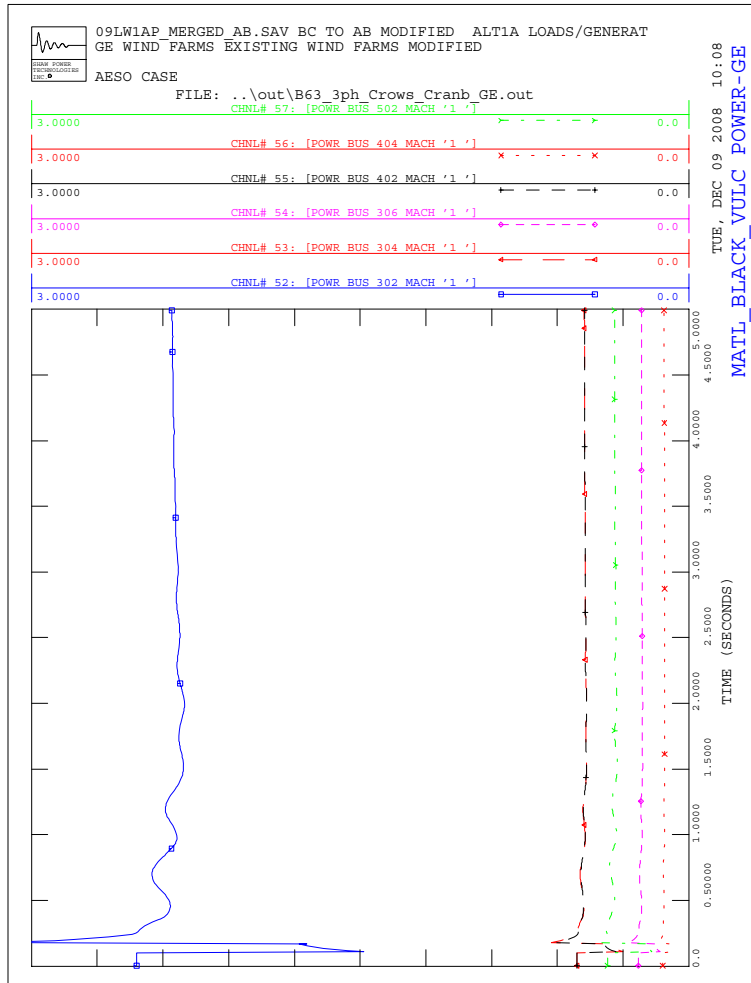


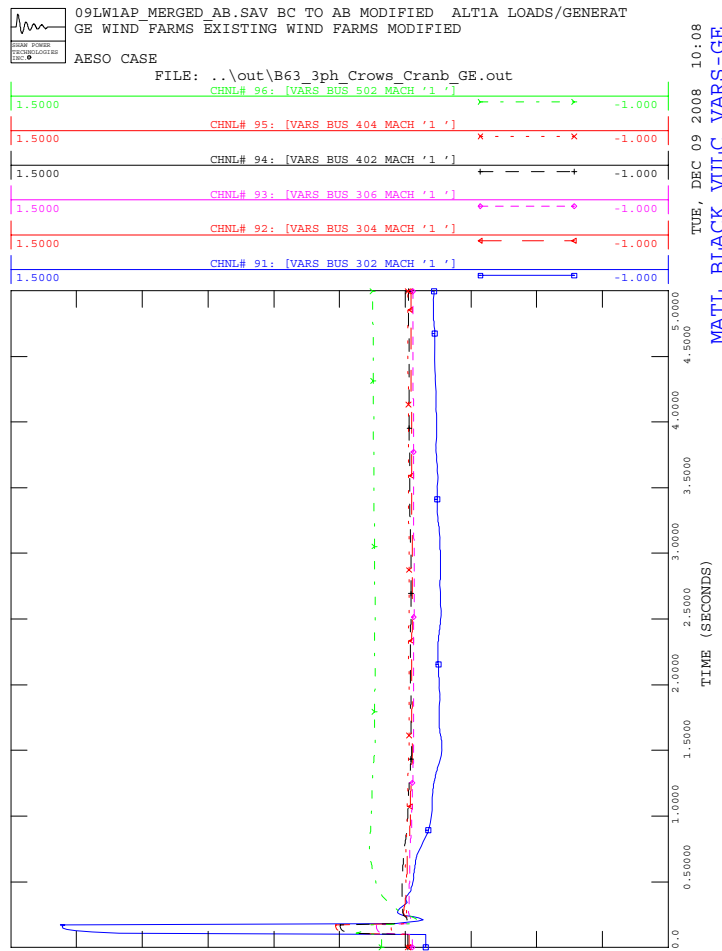
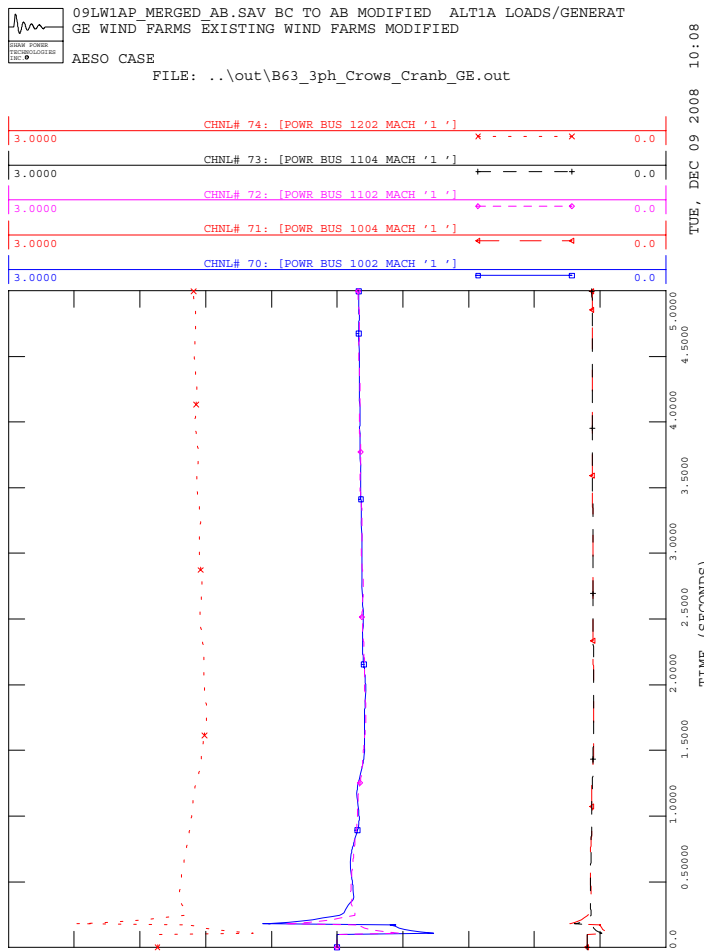
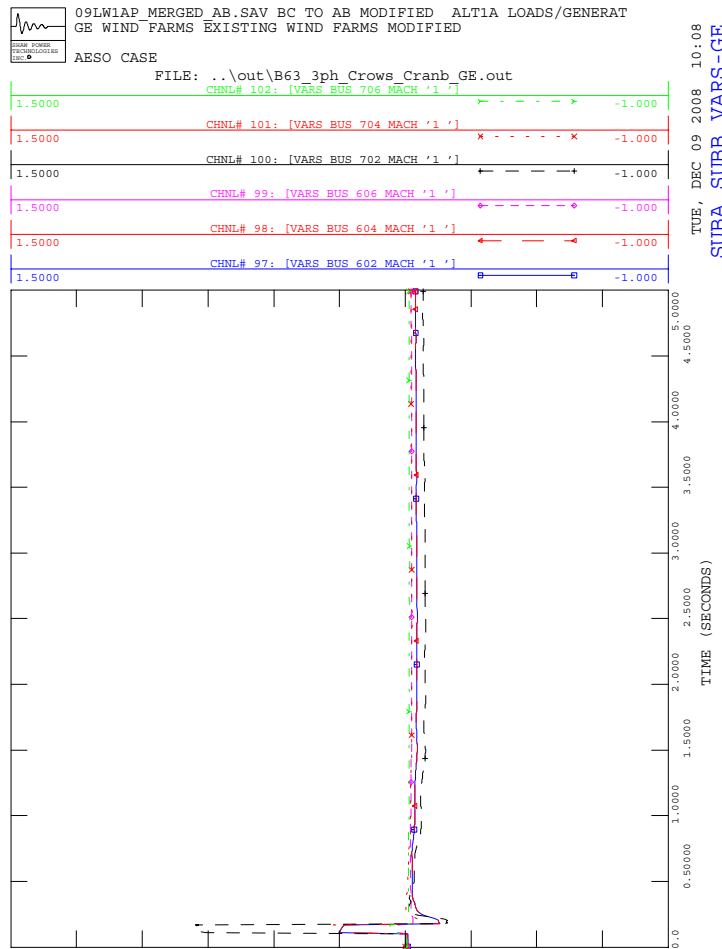
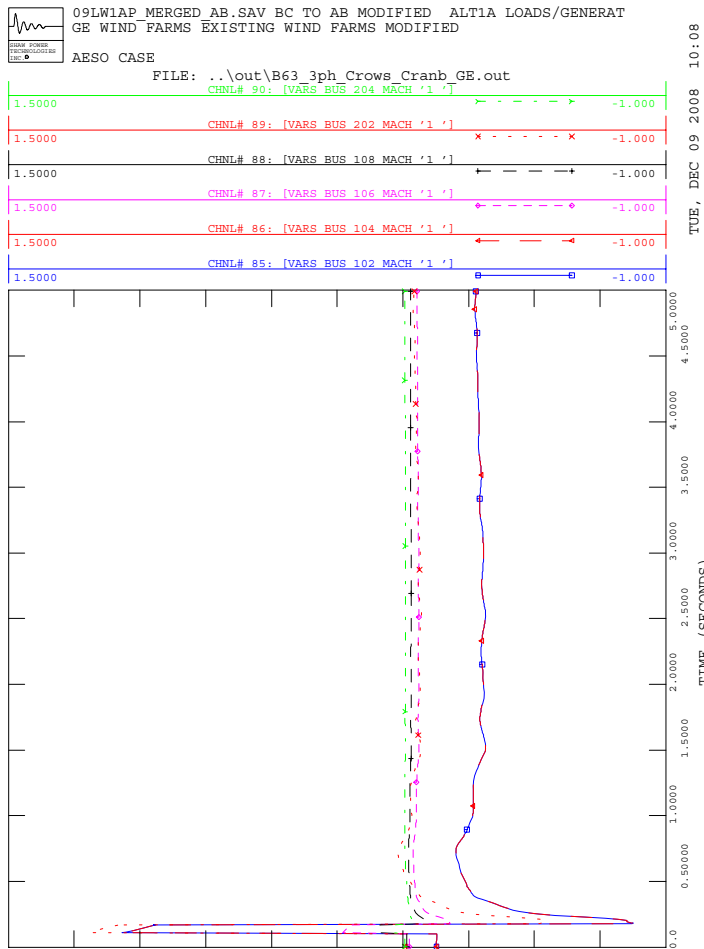


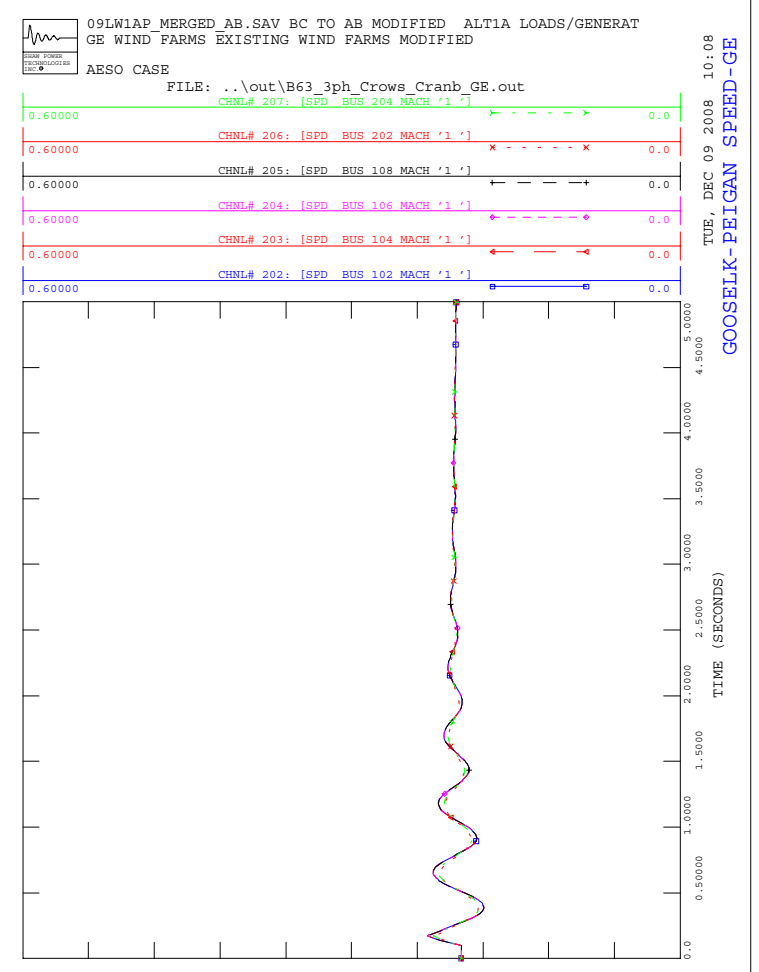
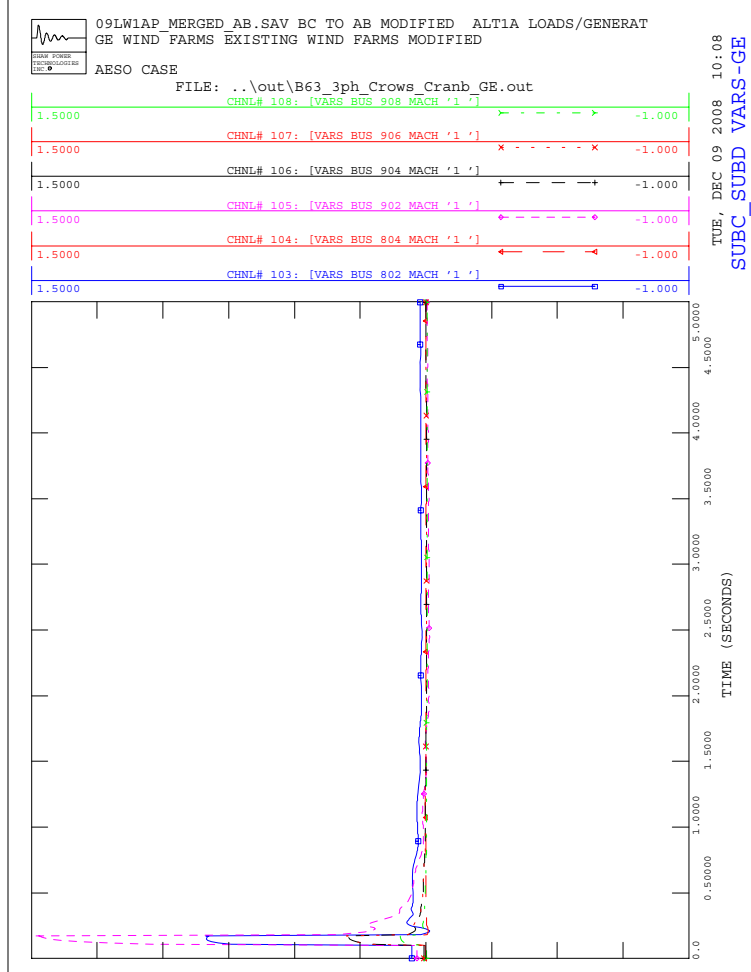
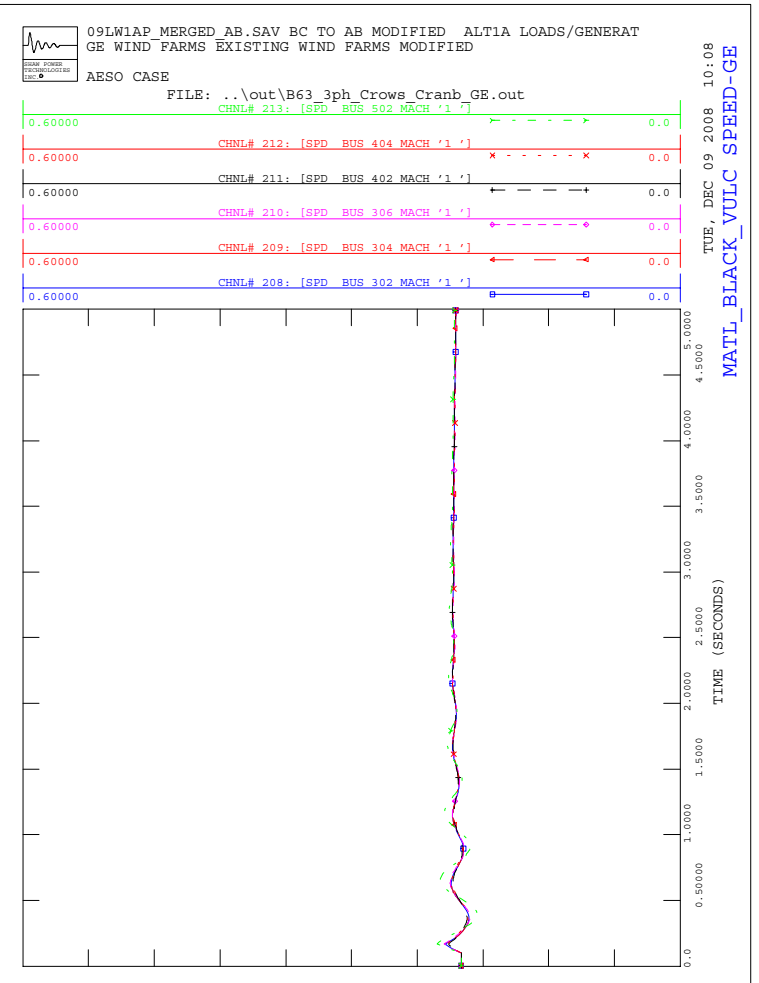
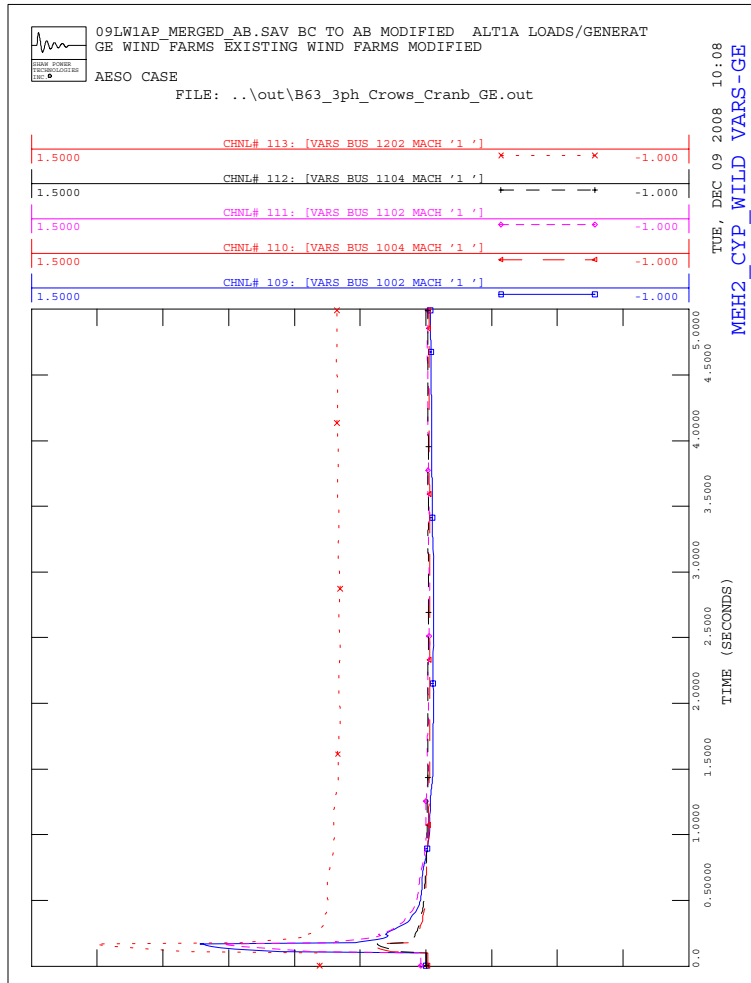
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
GE WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE
FILE: ..\out\B61_3ph_Langd_Genes_GE.out

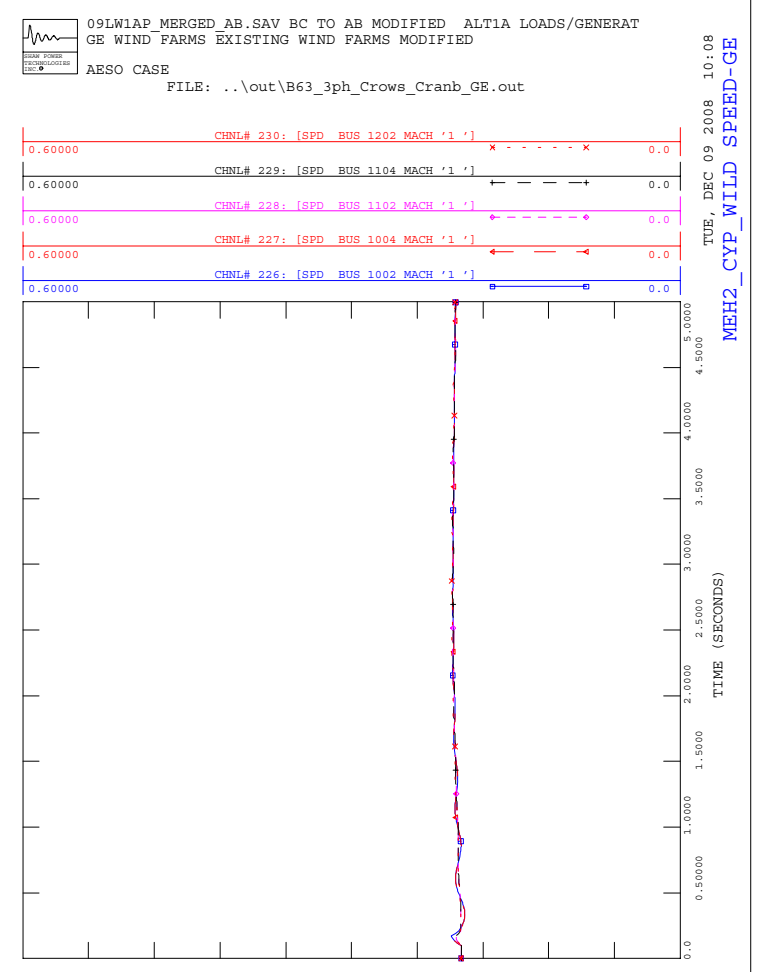
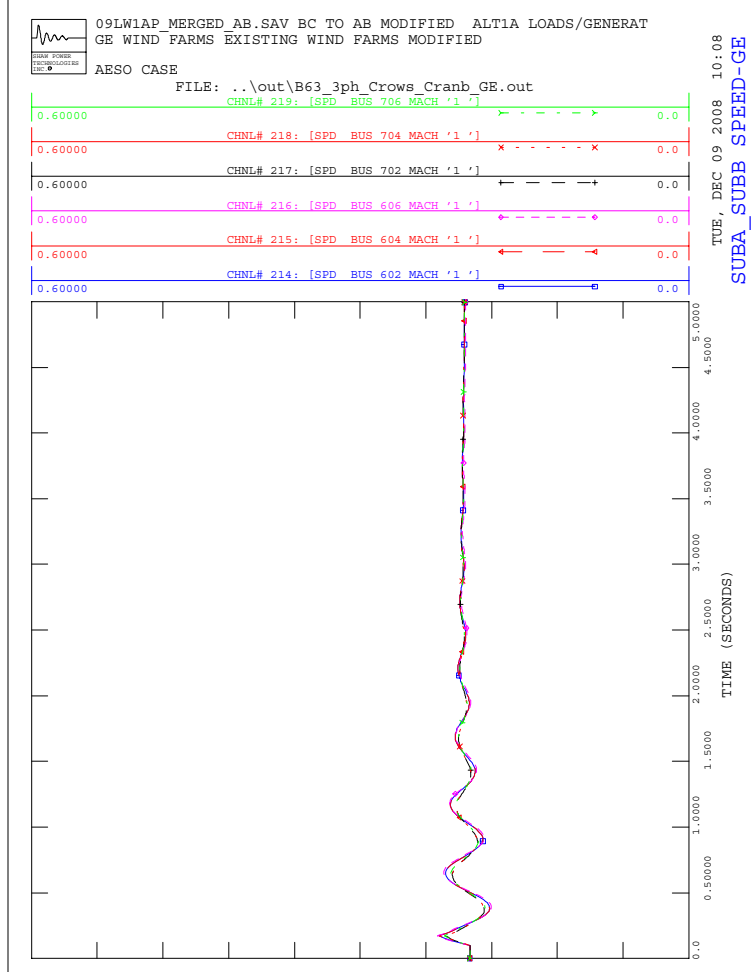
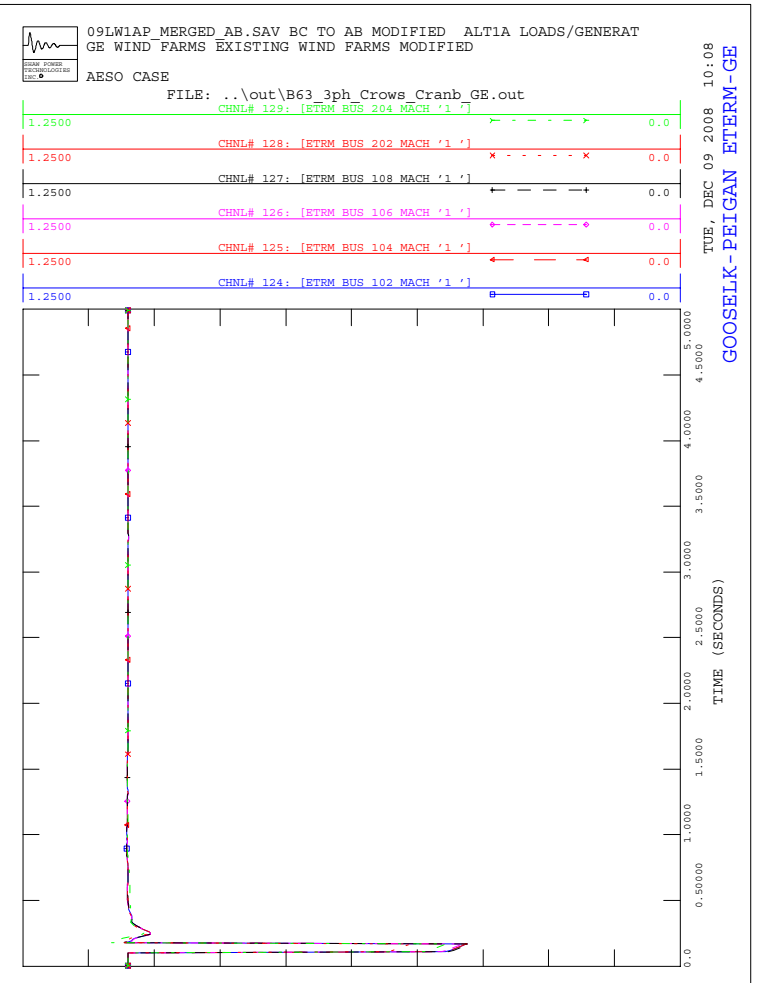
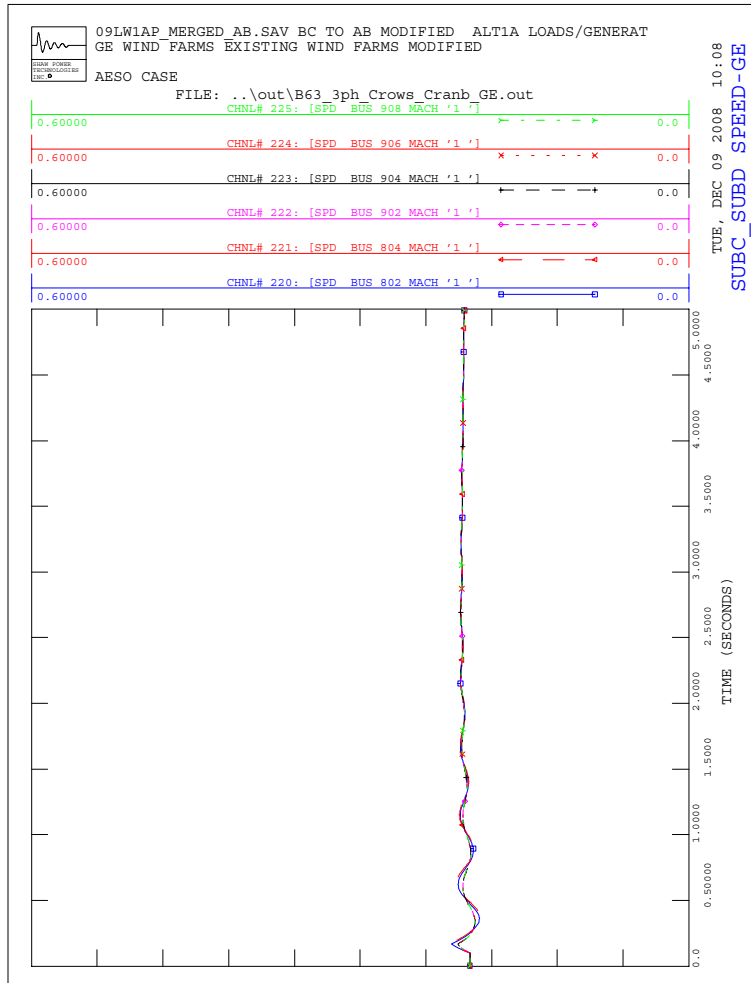
WED, NOV 12 2008 14:35
LANGDON_FRQ-GE

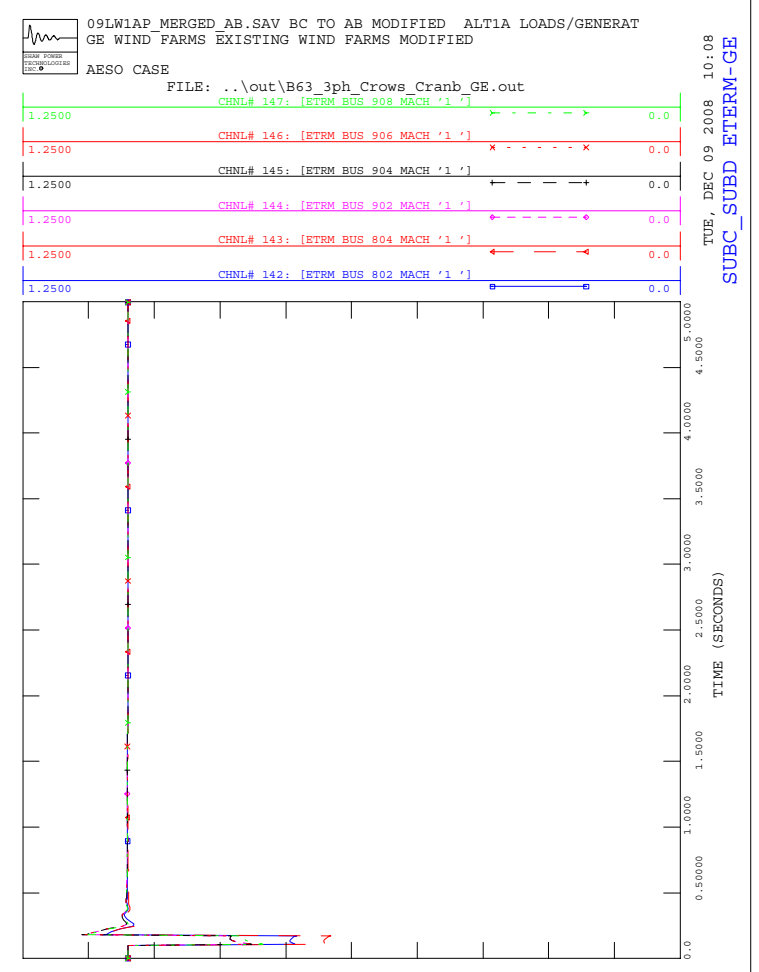
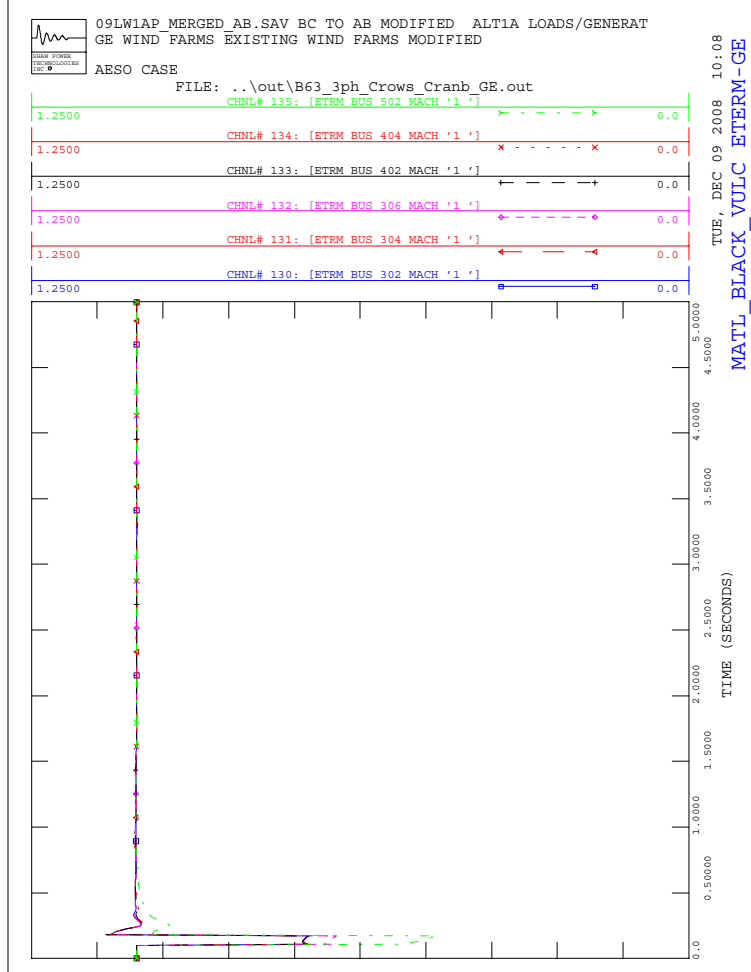
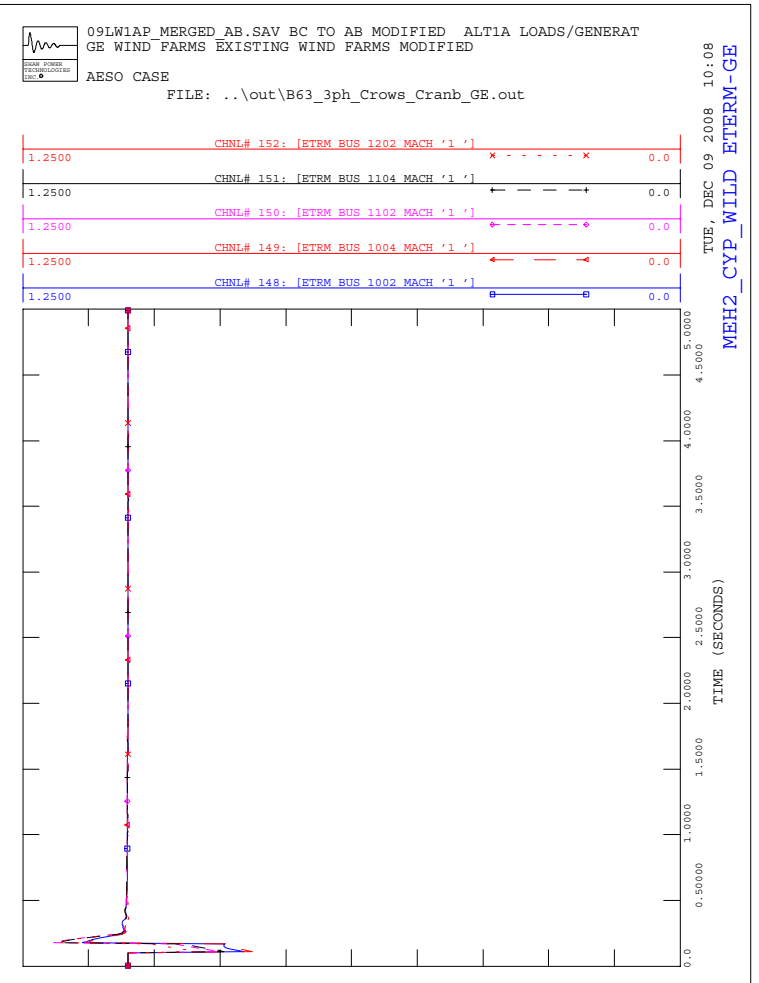
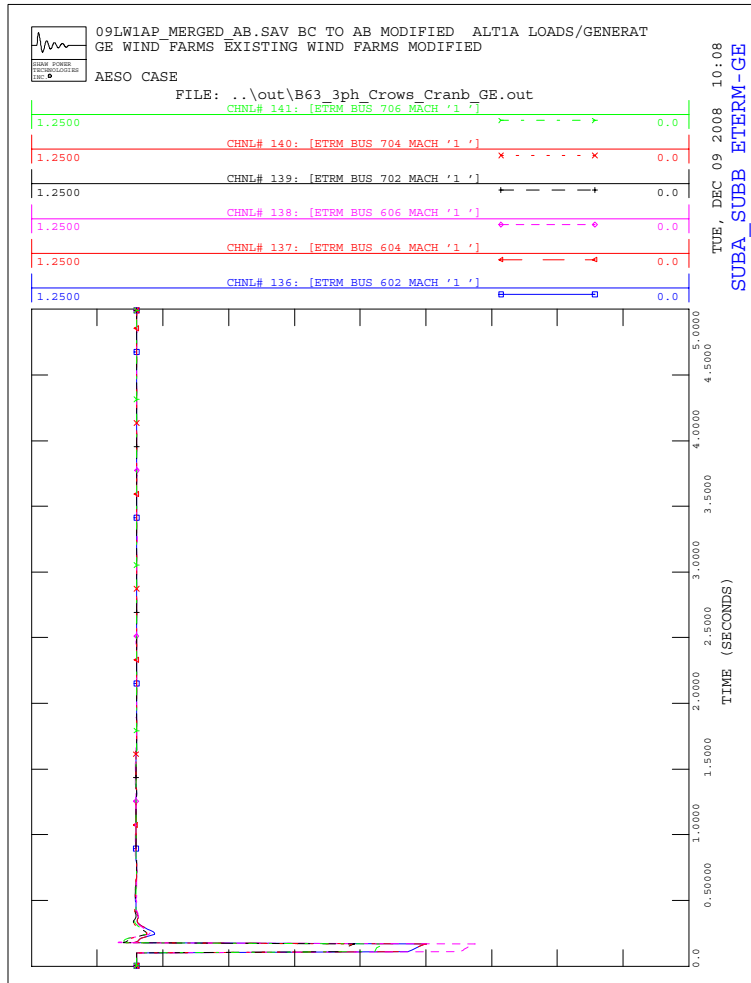


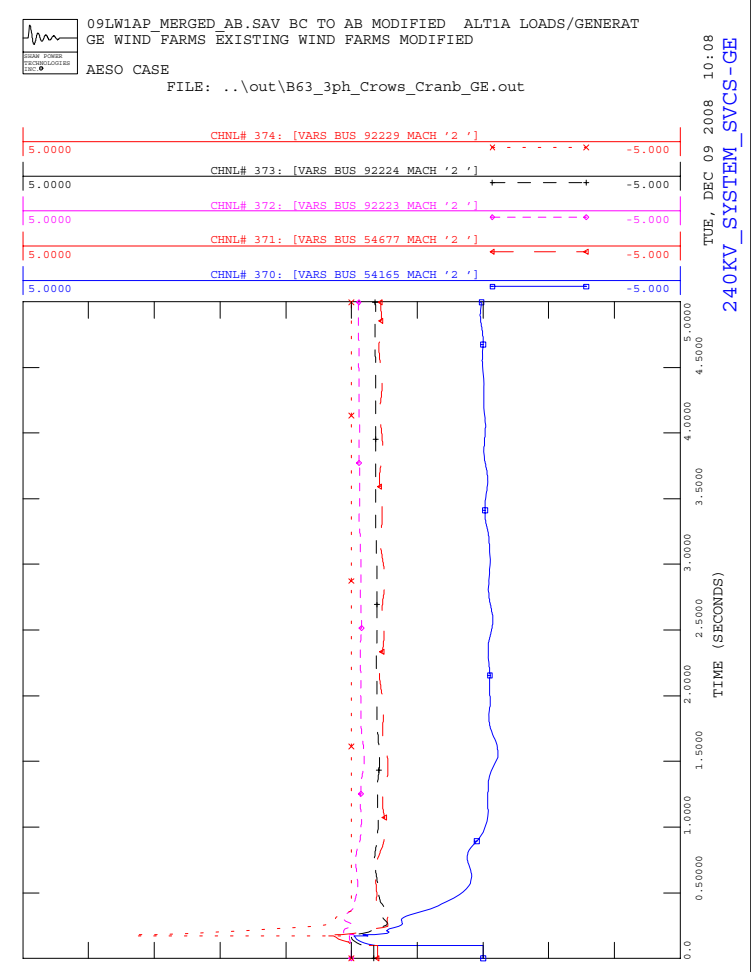
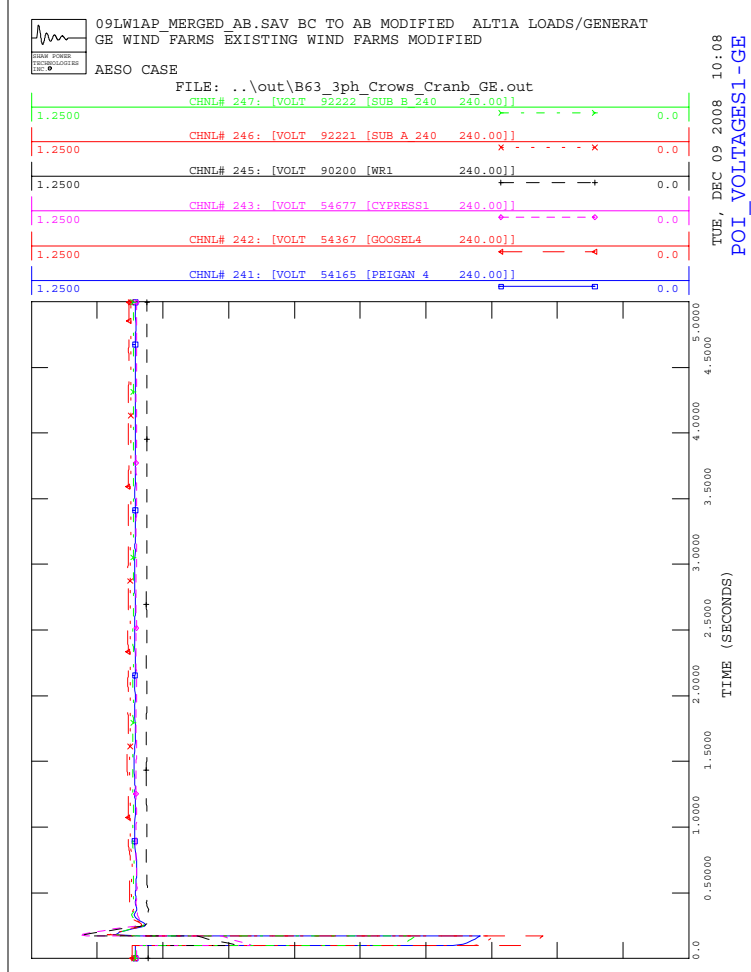
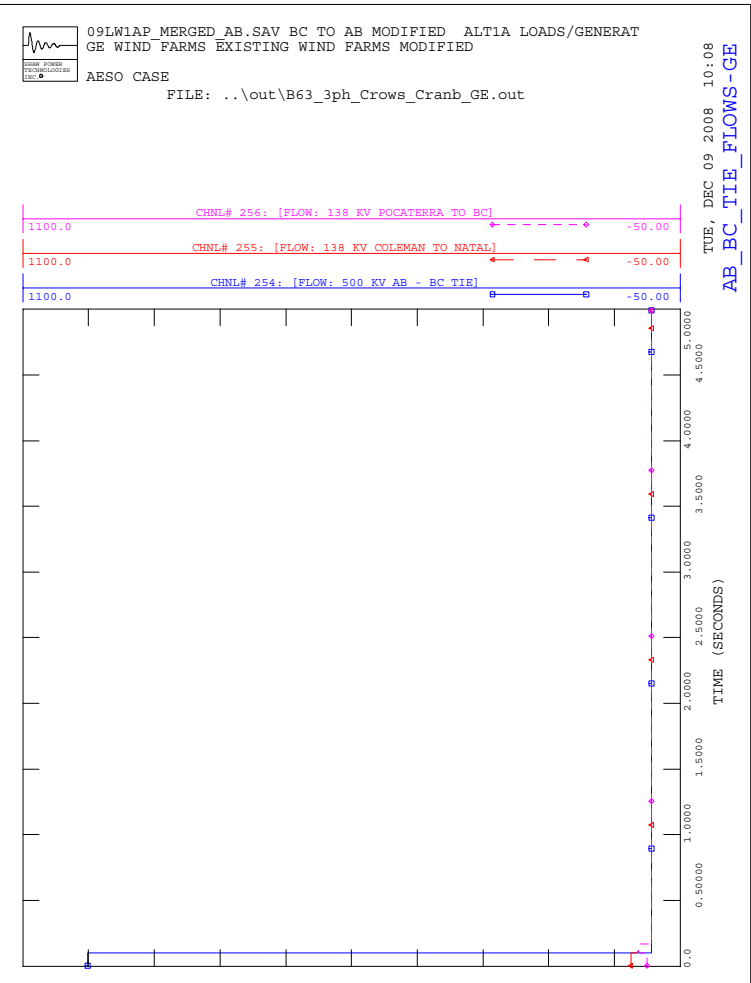
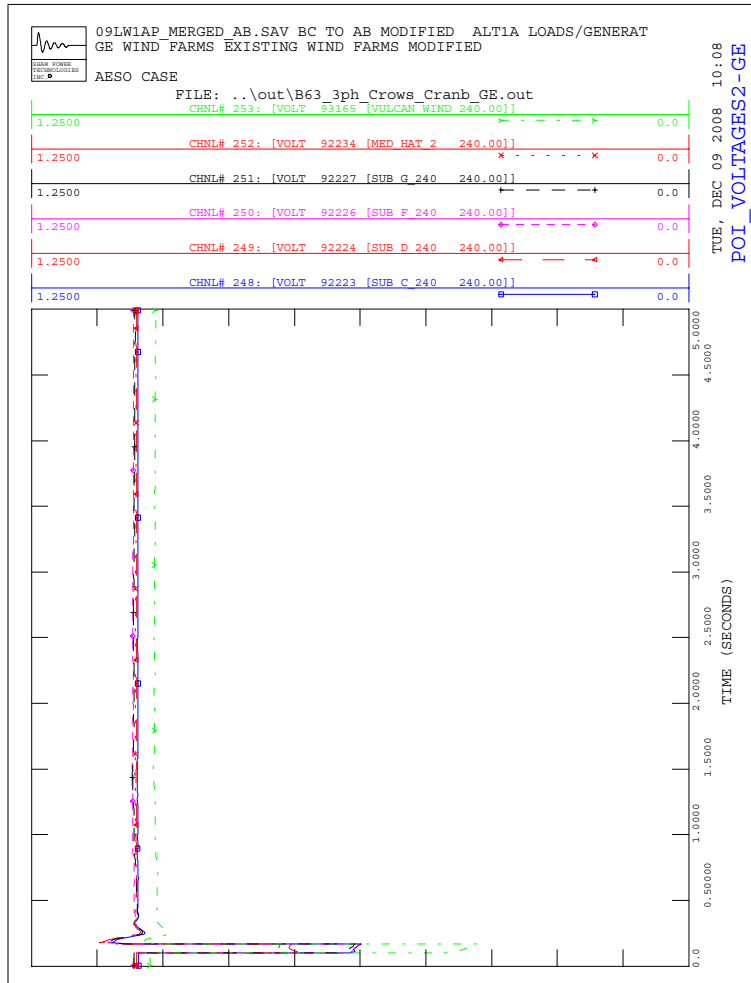








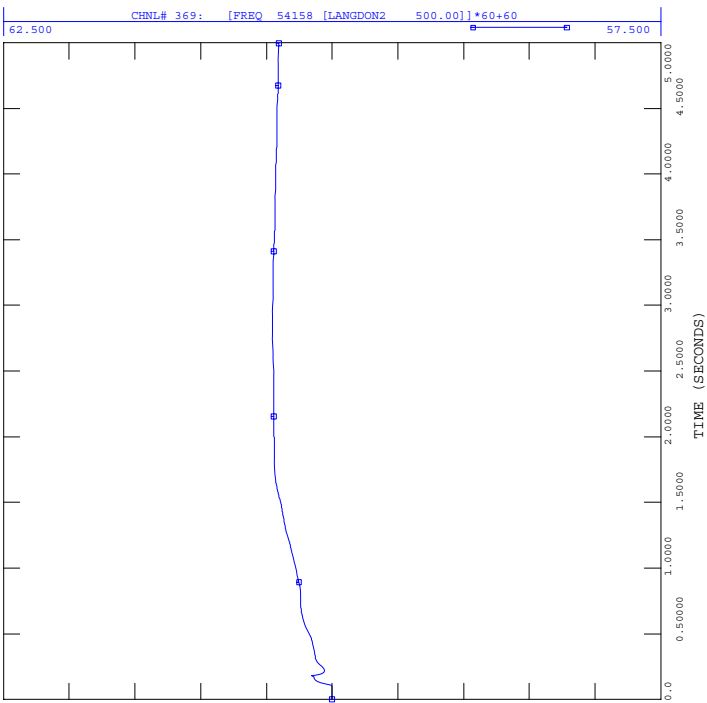


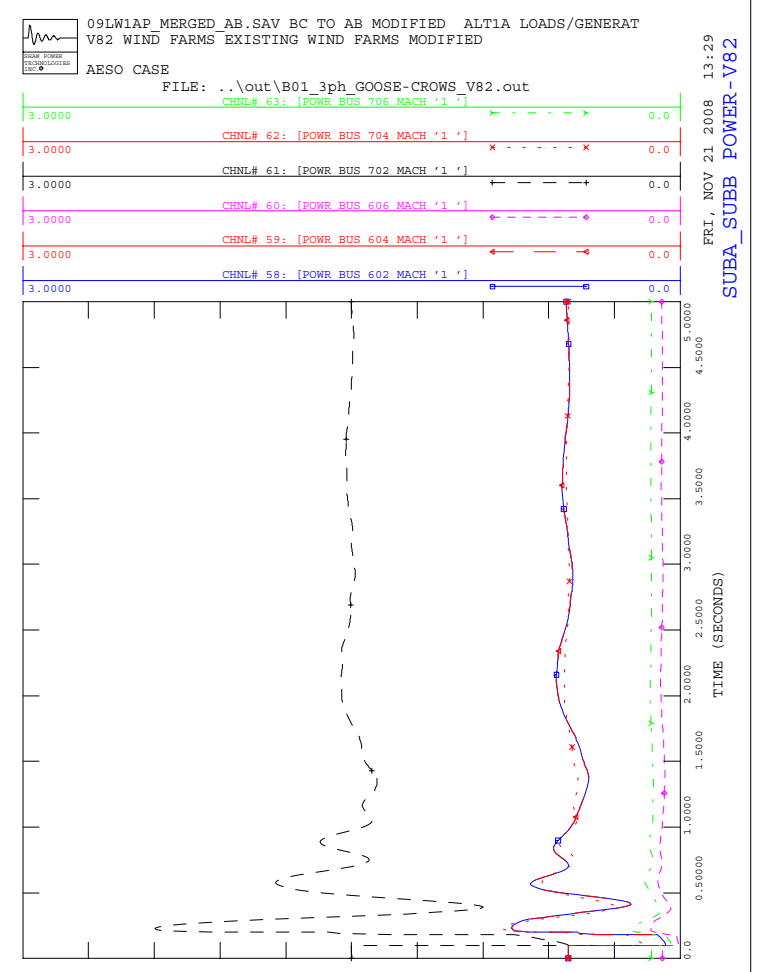
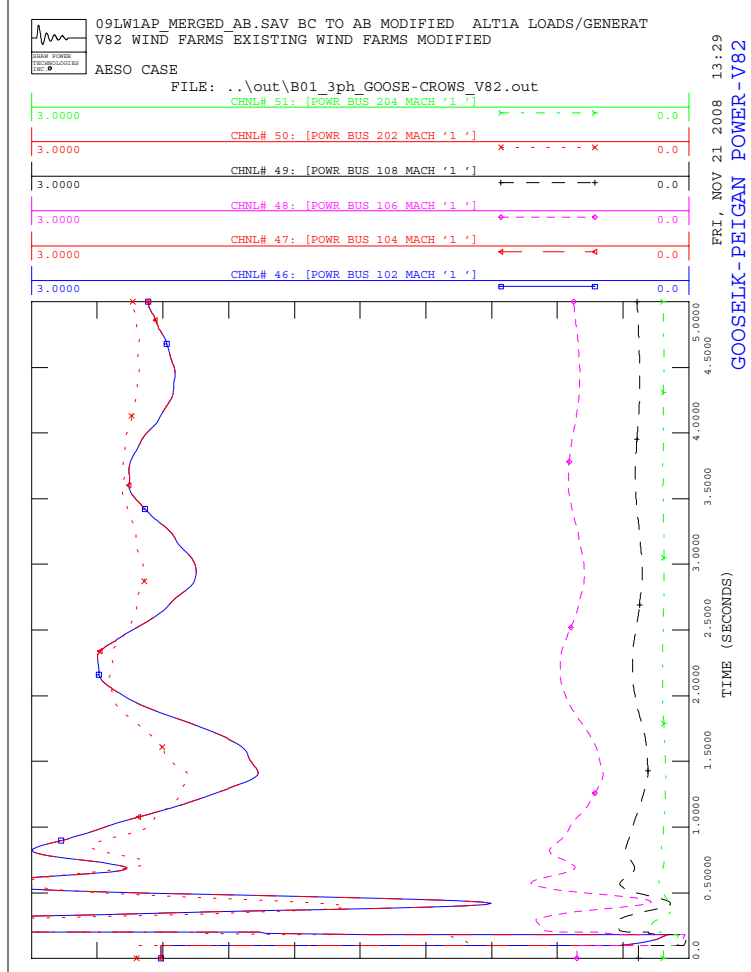
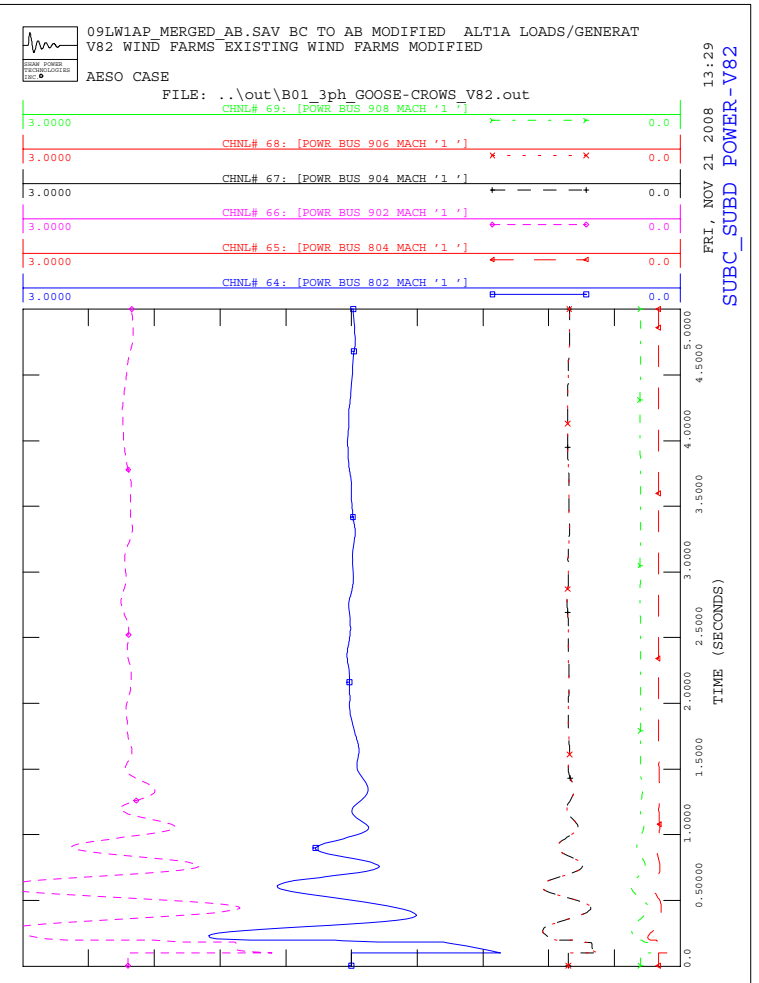
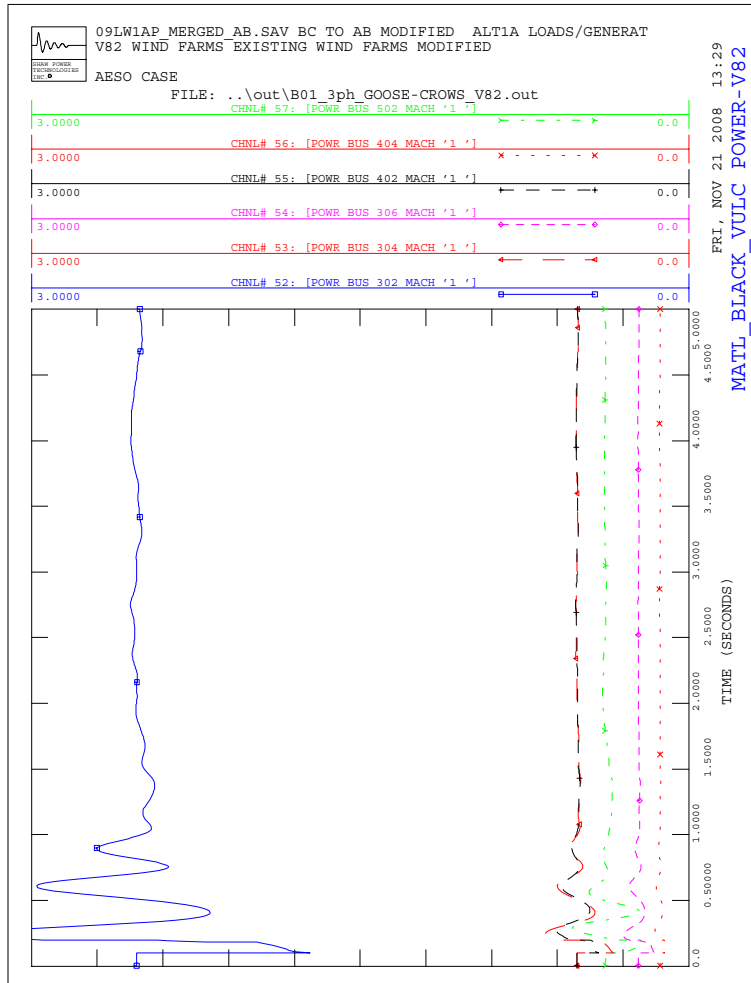


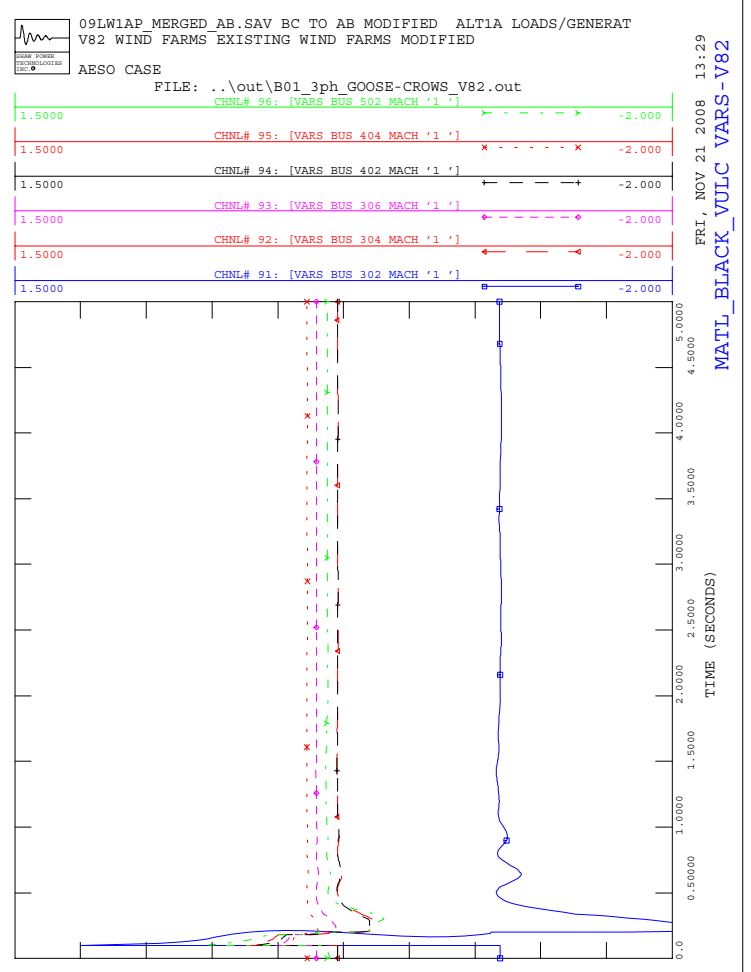
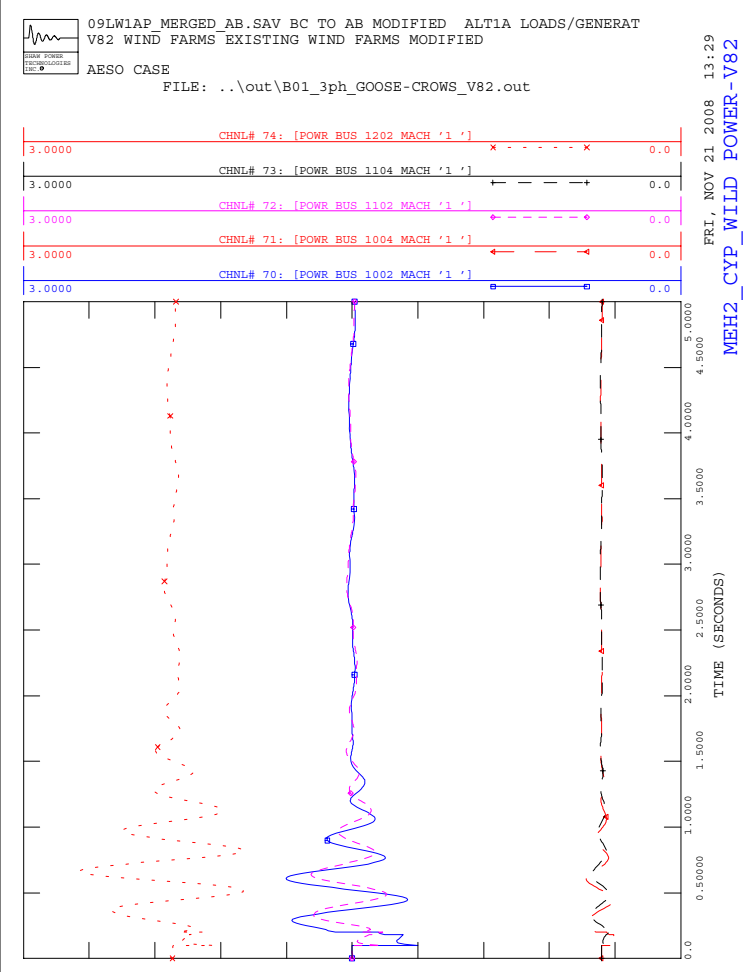
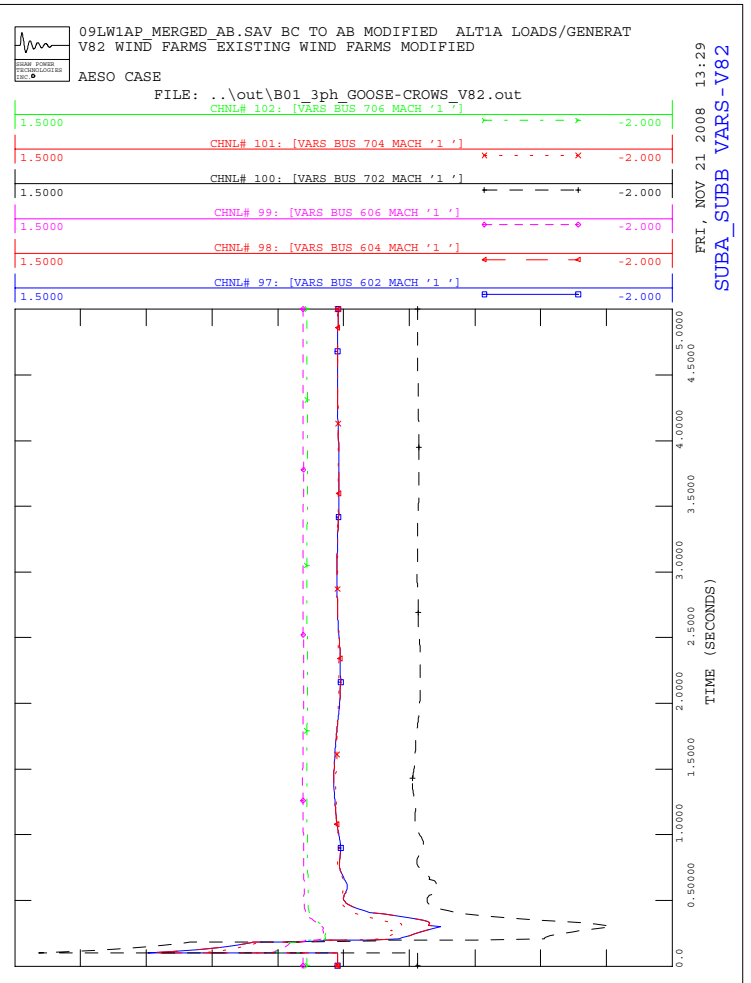
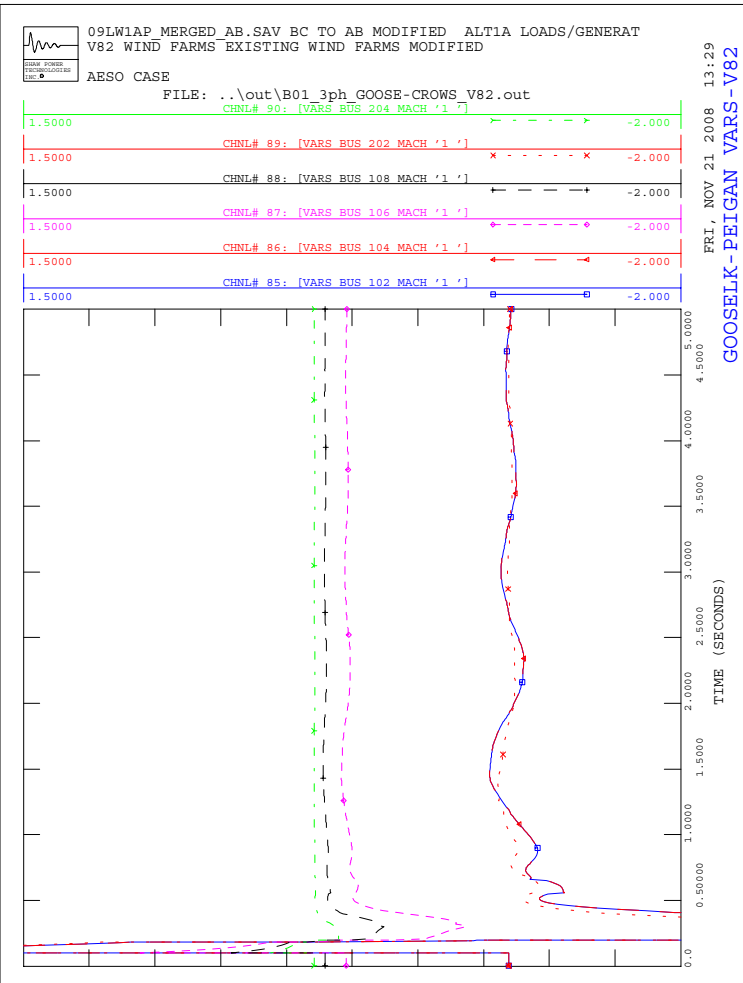


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
GE WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE
FILE: ..\out\B63_3ph_Crows_Cranb_GE.out

TUE, DEC 09 2008 10:08
LANGDON_FRQ-GE

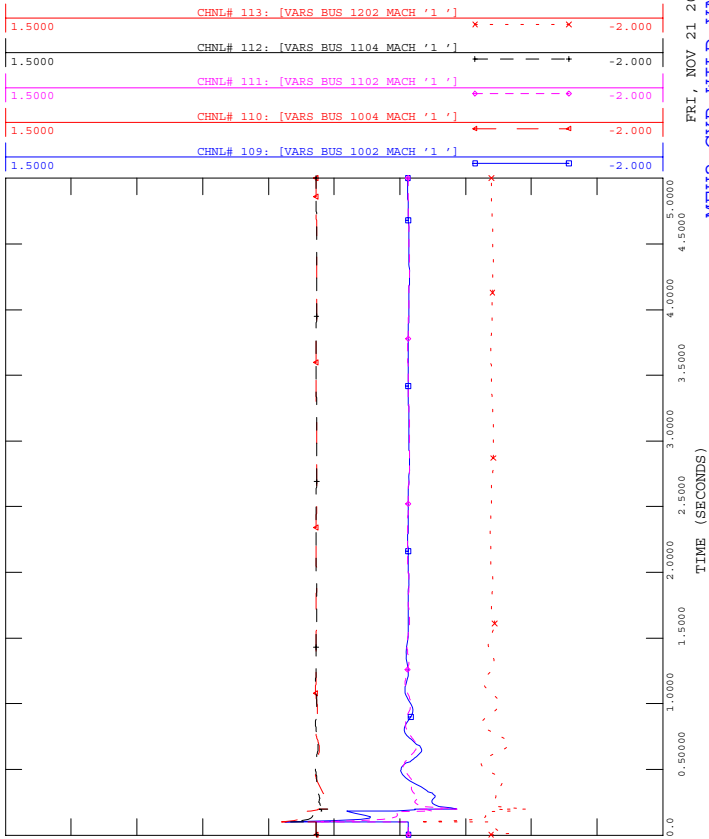






09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

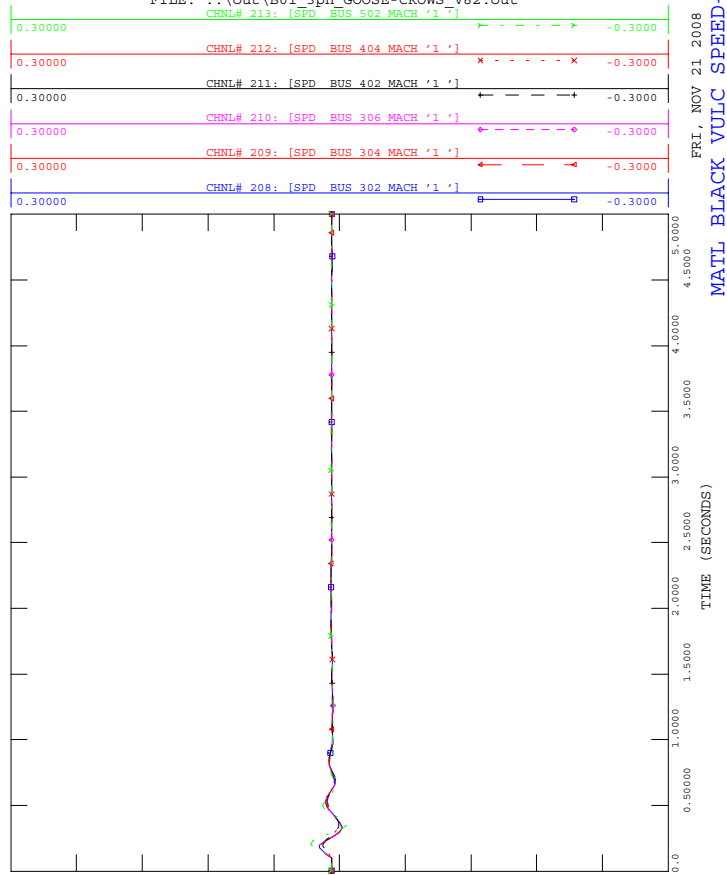
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FRI, NOV 21 2008 13:29

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

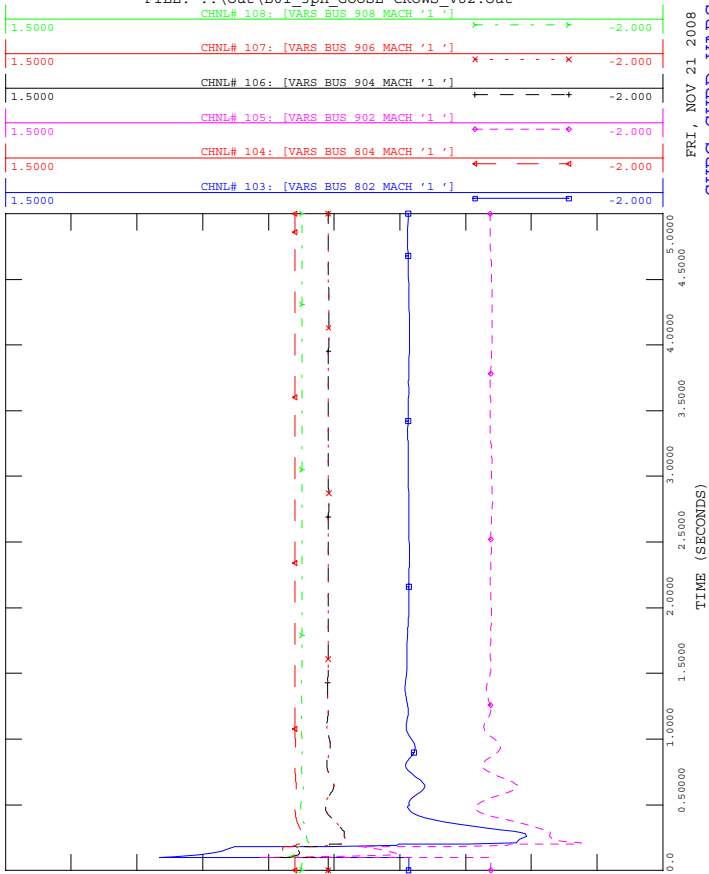
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FRI, NOV 21 2008 13:29

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

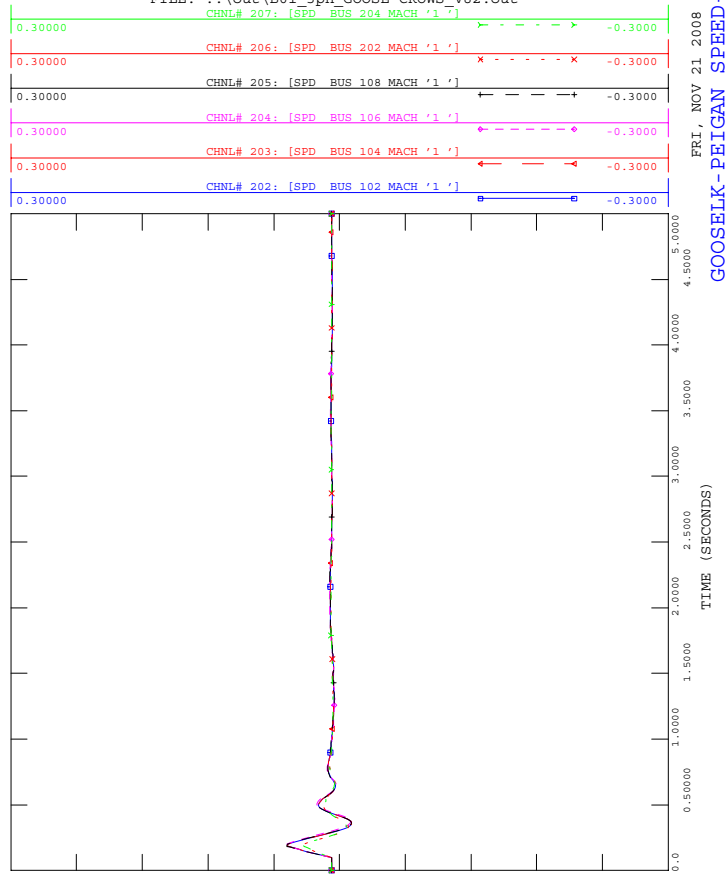
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FRI, NOV 21 2008 13:29

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 AESO CASE

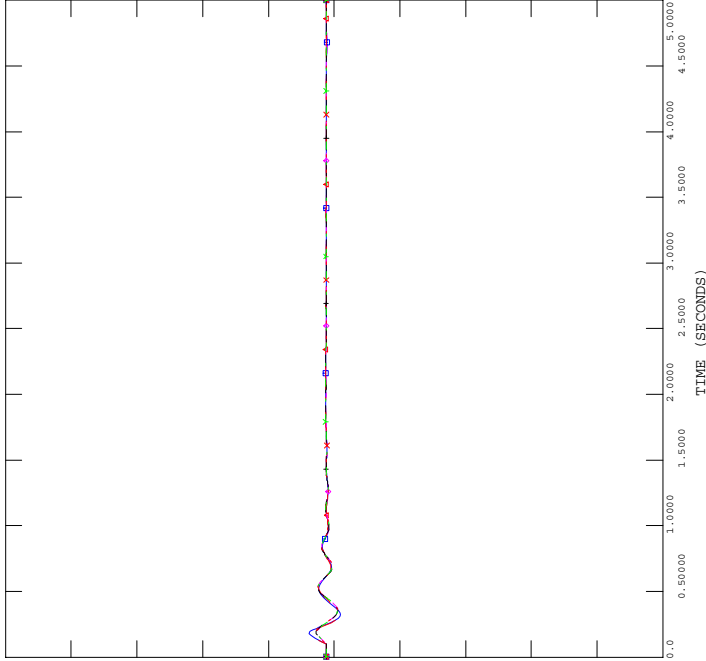
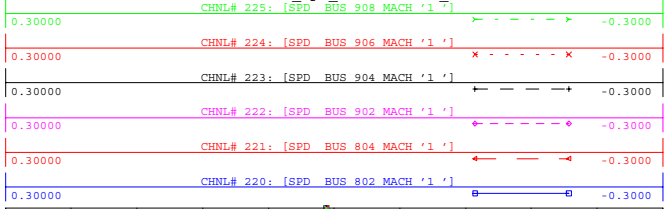
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FRI, NOV 21 2008 13:29

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
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 AESO CASE

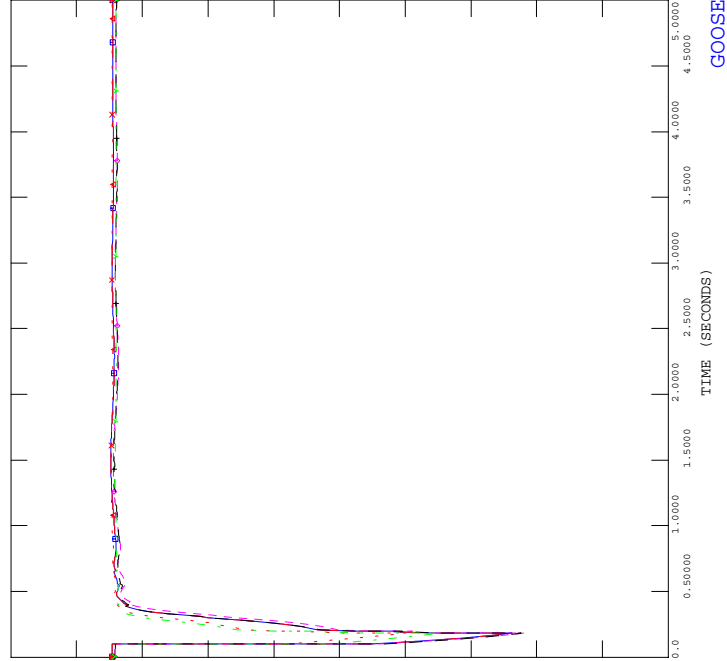
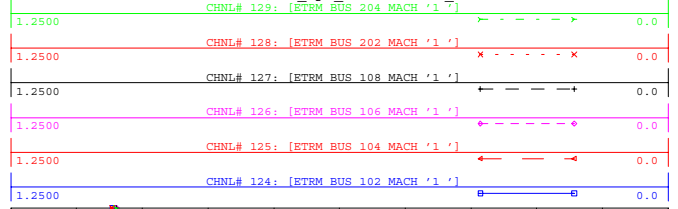
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FRI, NOV 21 2008 13:29
 SUBC_SPEED-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

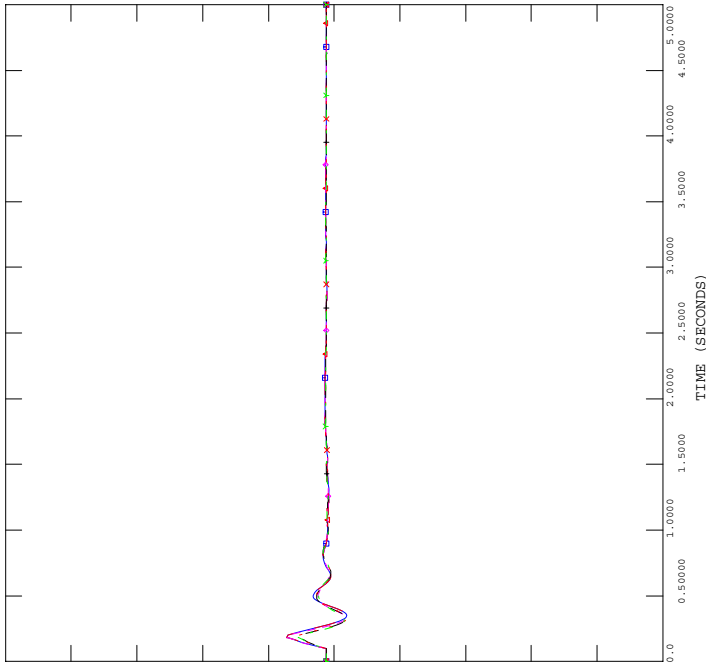
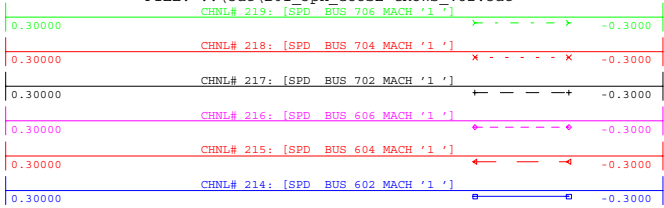
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FRI, NOV 21 2008 13:29
 GOSELK-PEIGAN ETERM-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

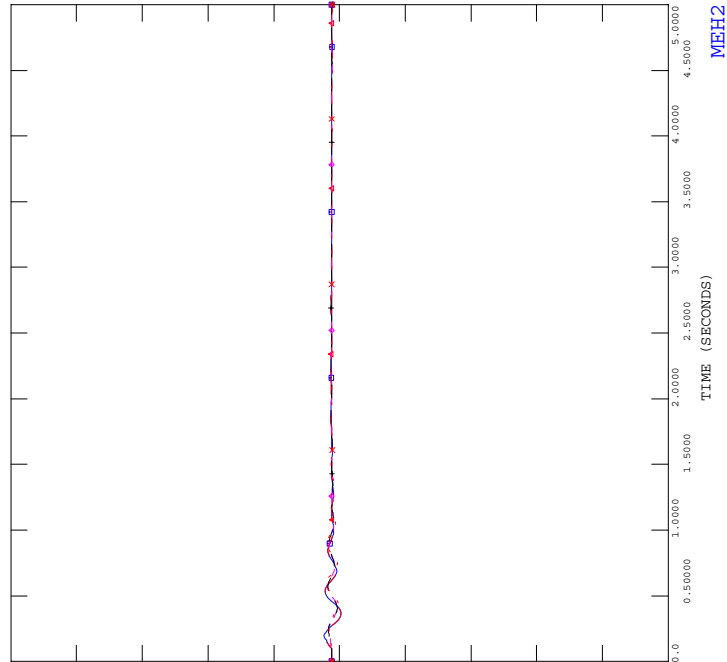
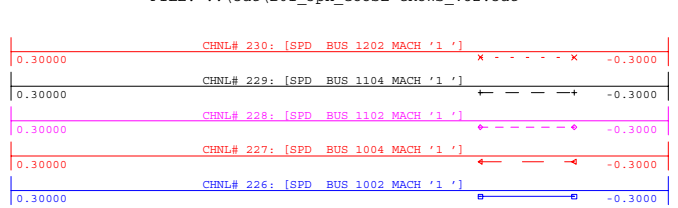
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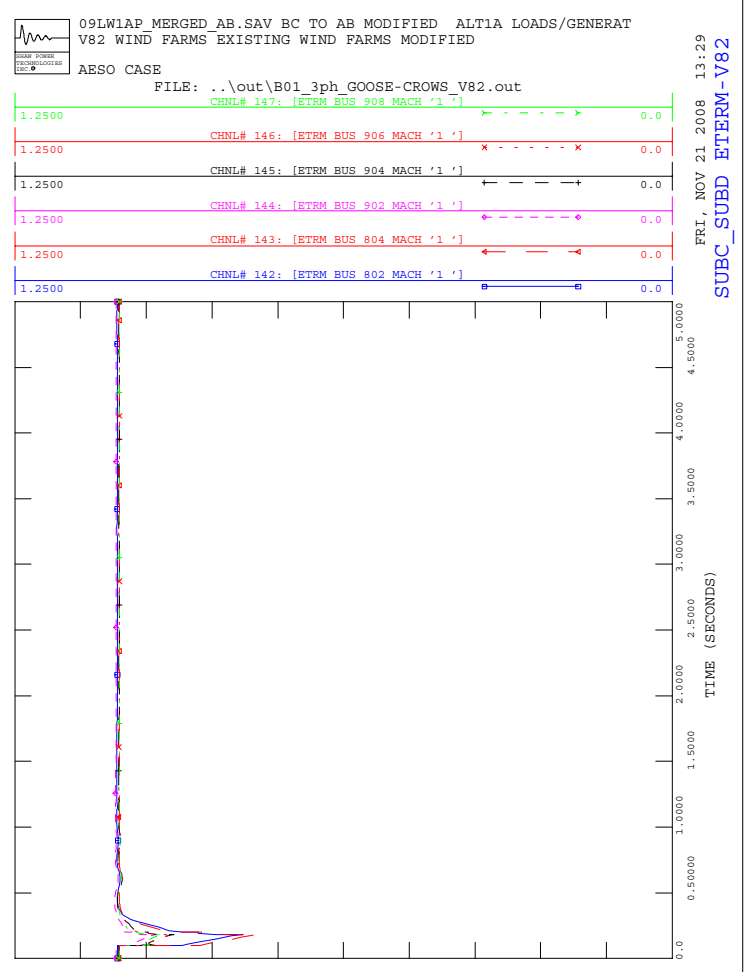
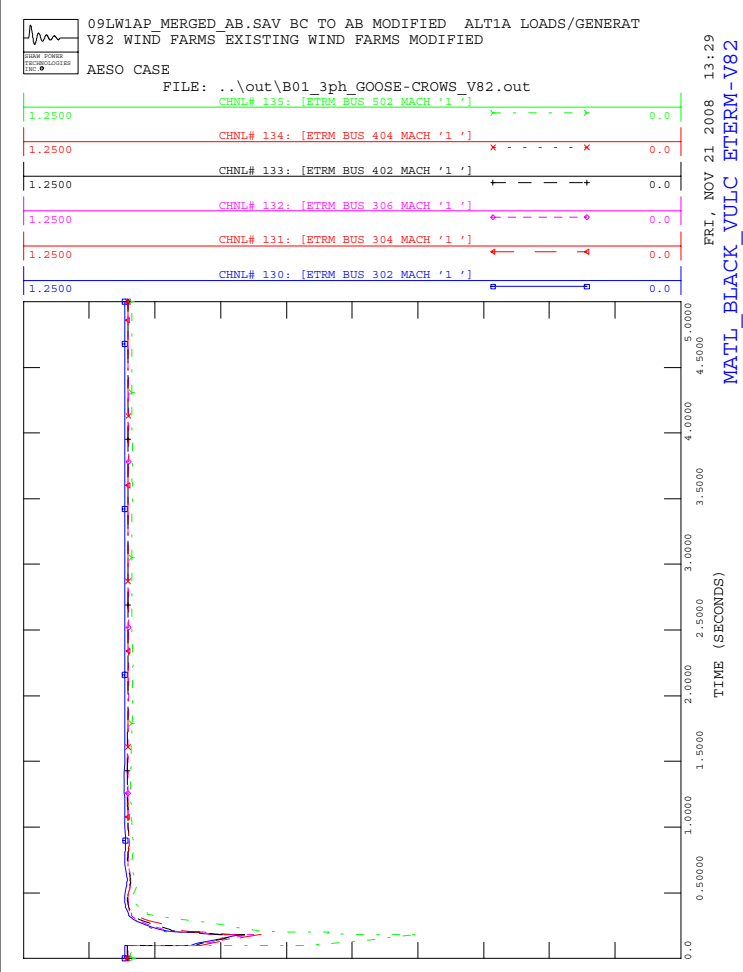
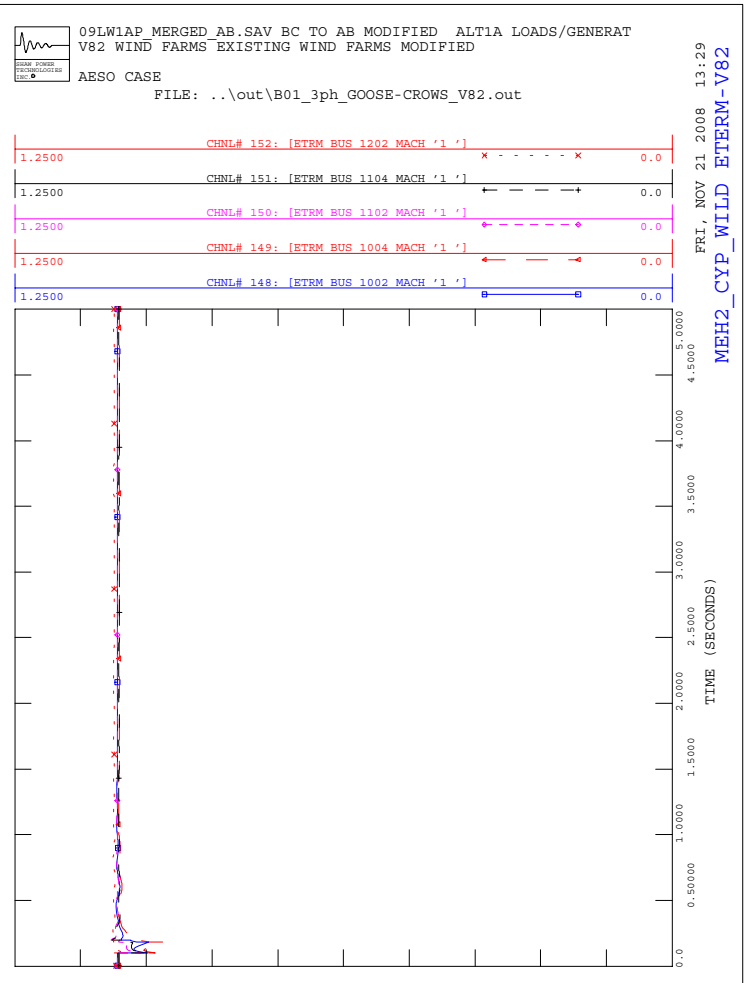
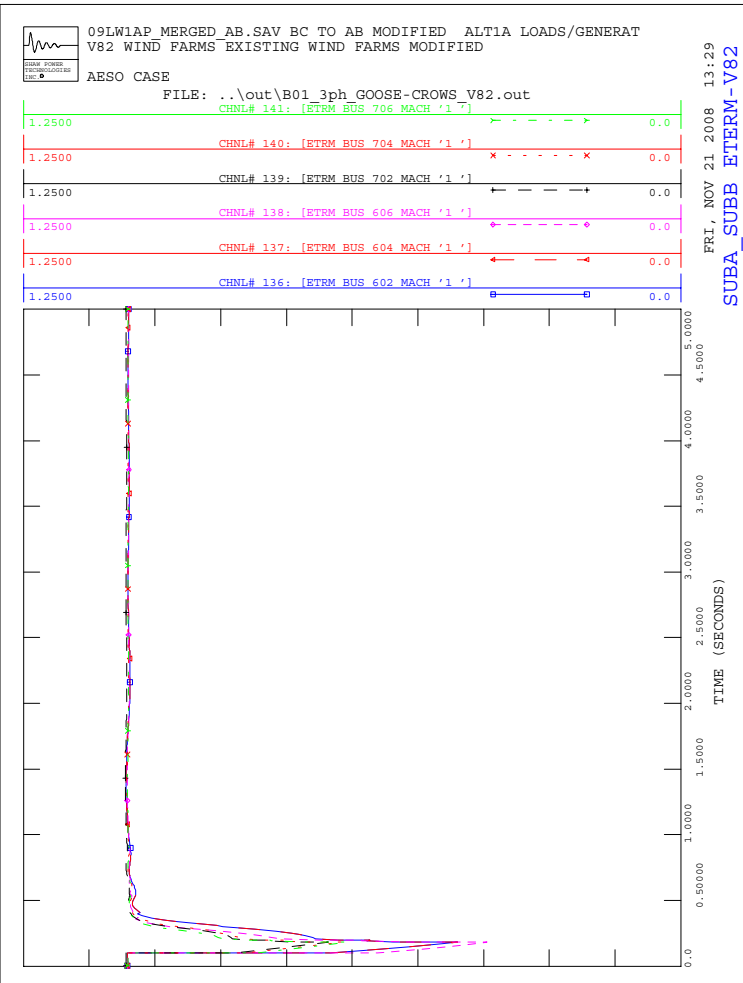
FRI, NOV 21 2008 13:29
 SUBA_SPEED-V82

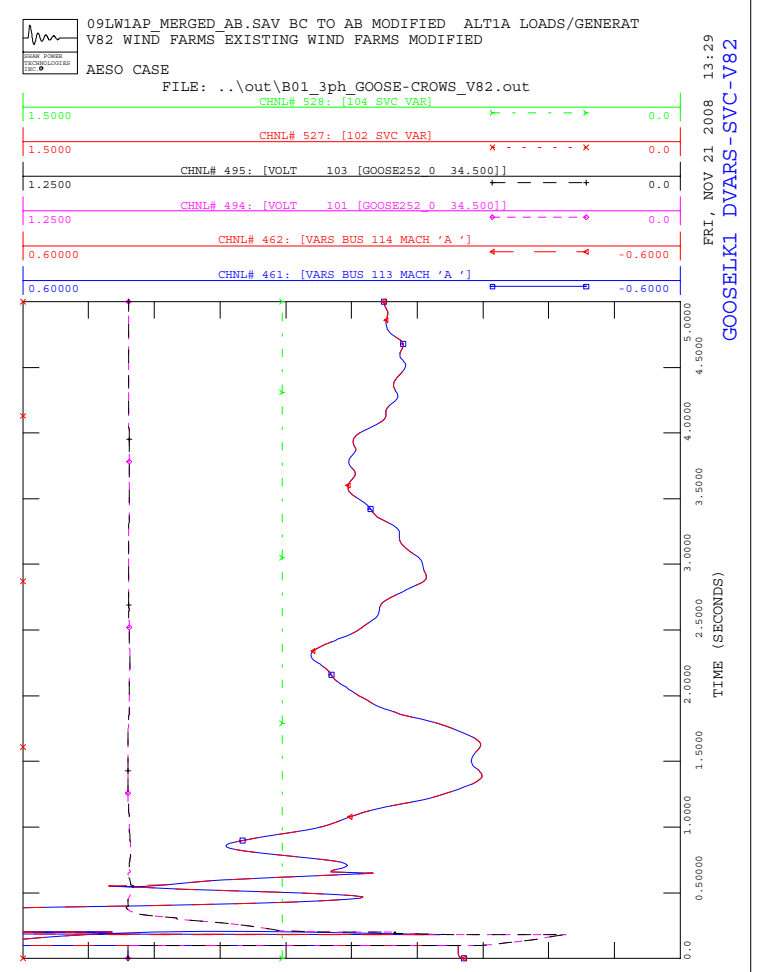
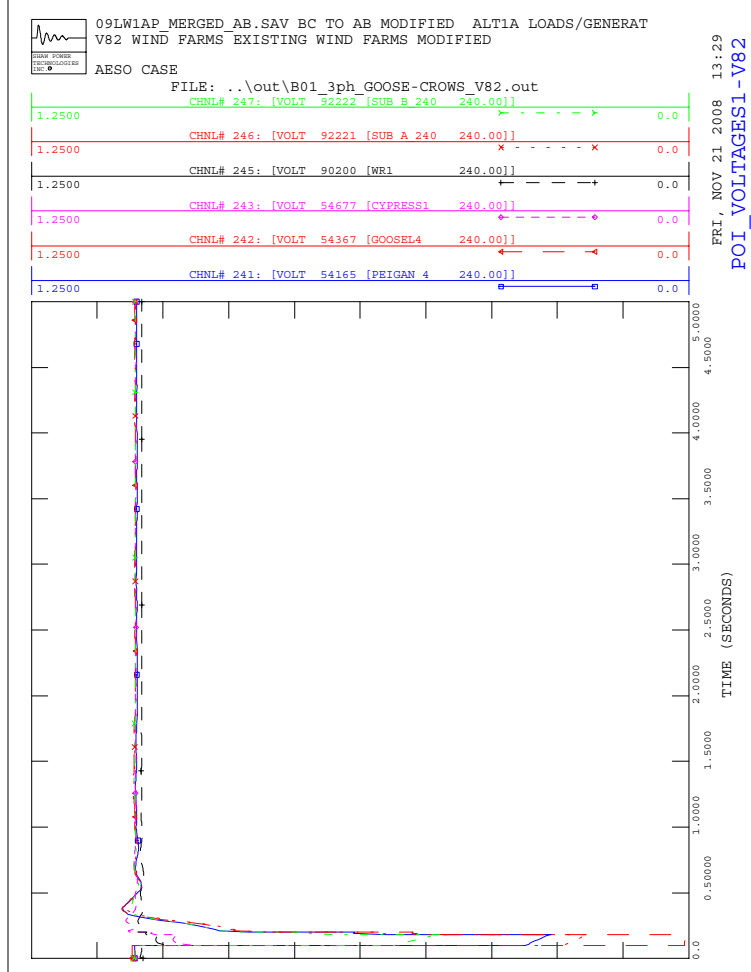
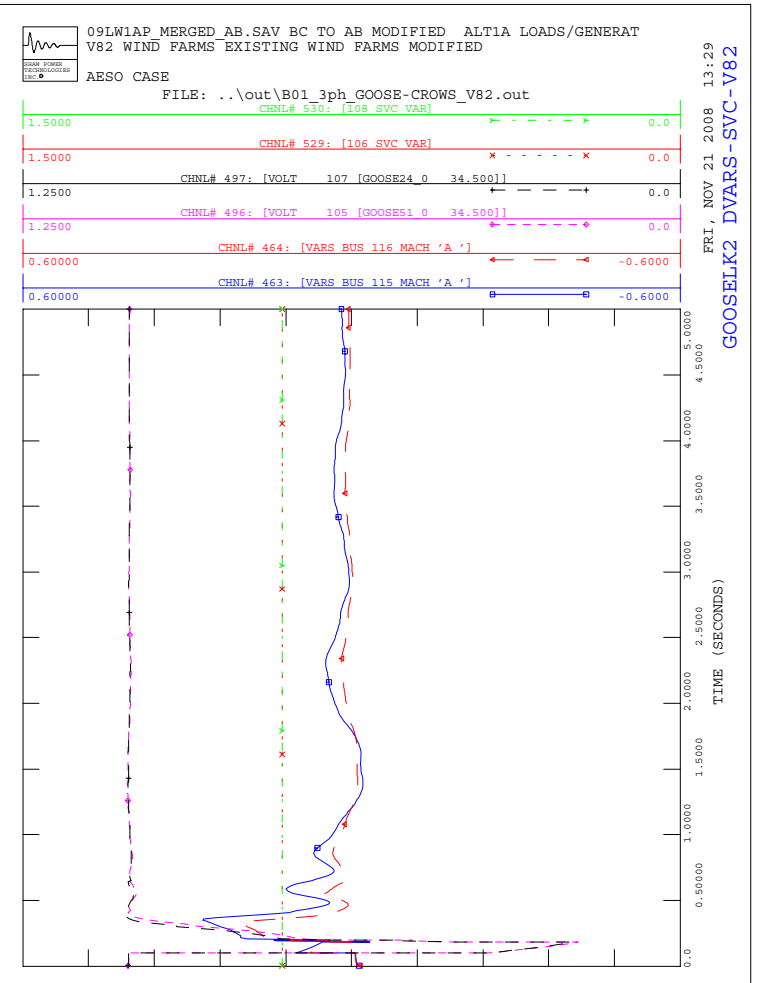
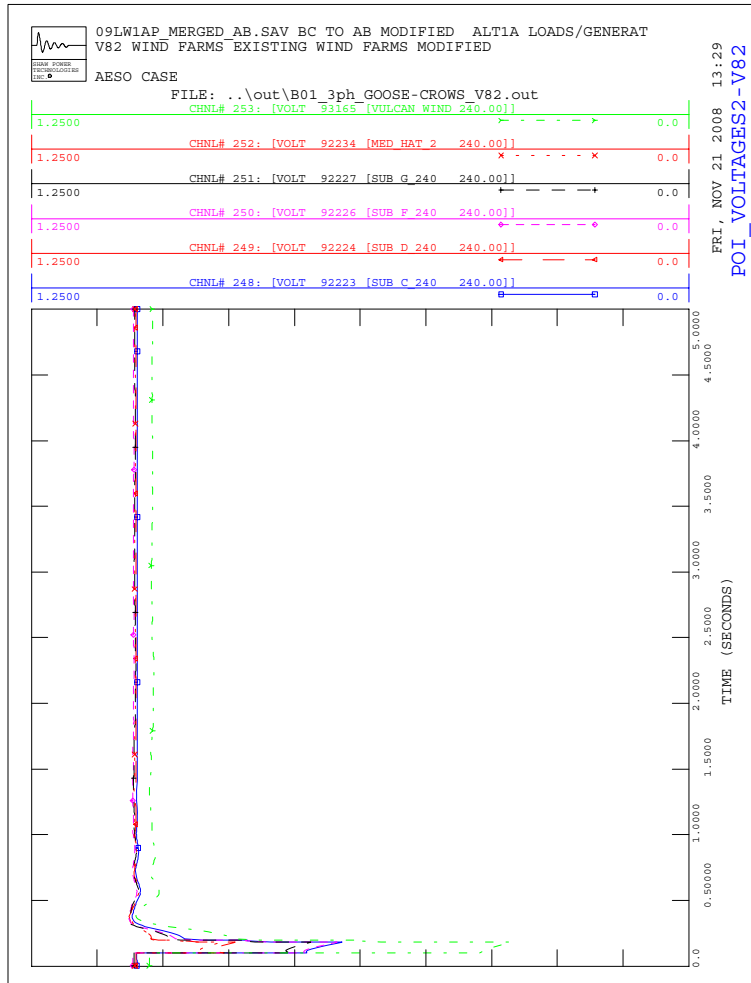
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

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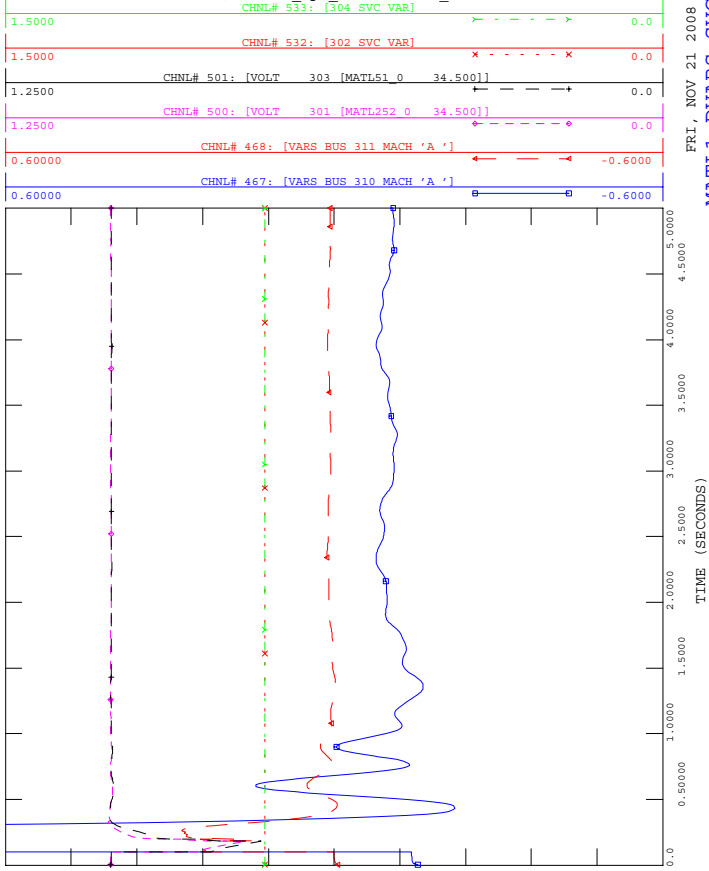
FRI, NOV 21 2008 13:29
 MEH2_CYP_WILD_SPEED-V82





09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

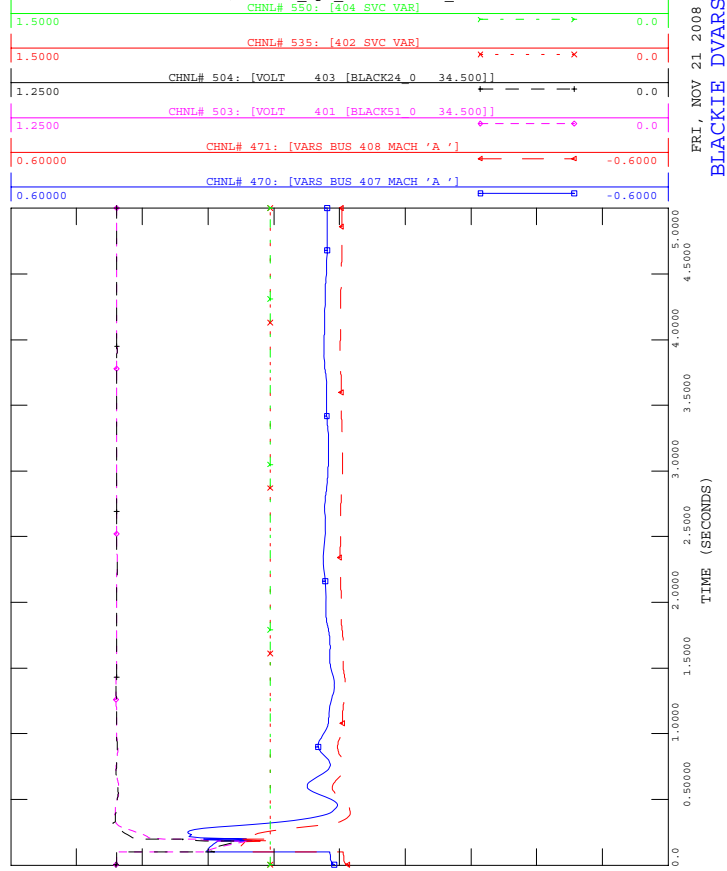
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FRI, NOV 21 2008 13:29
 MATL1 DVARS-SVC-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

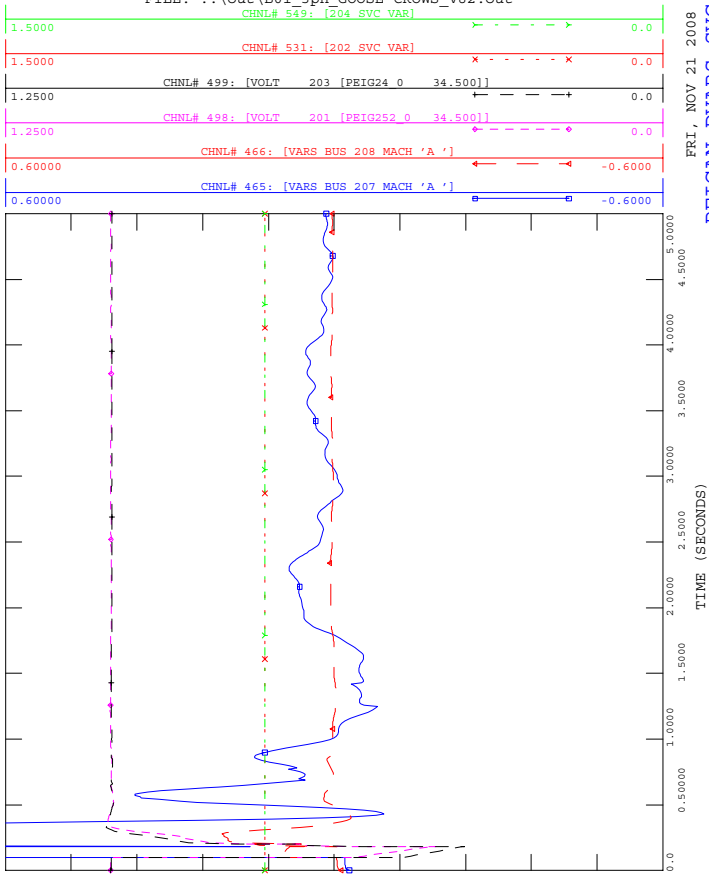
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FRI, NOV 21 2008 13:29
 BLACKIE DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

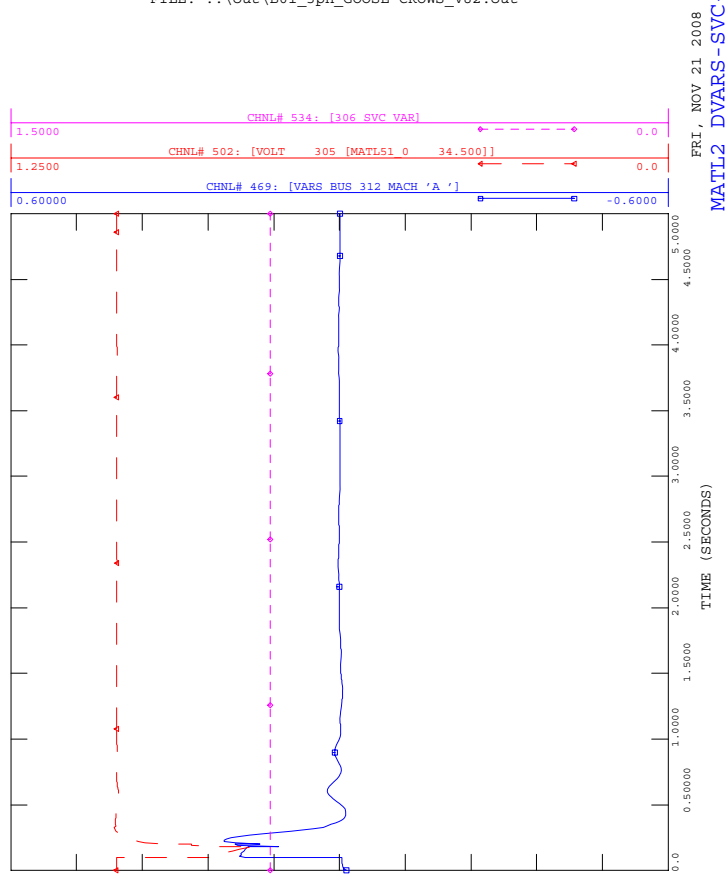
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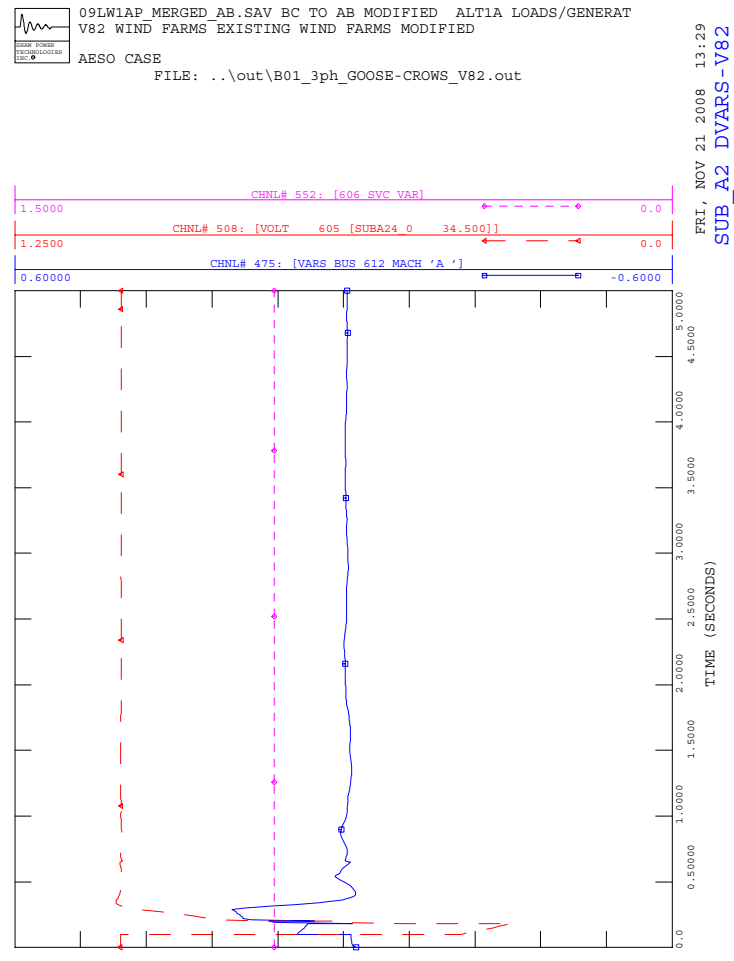
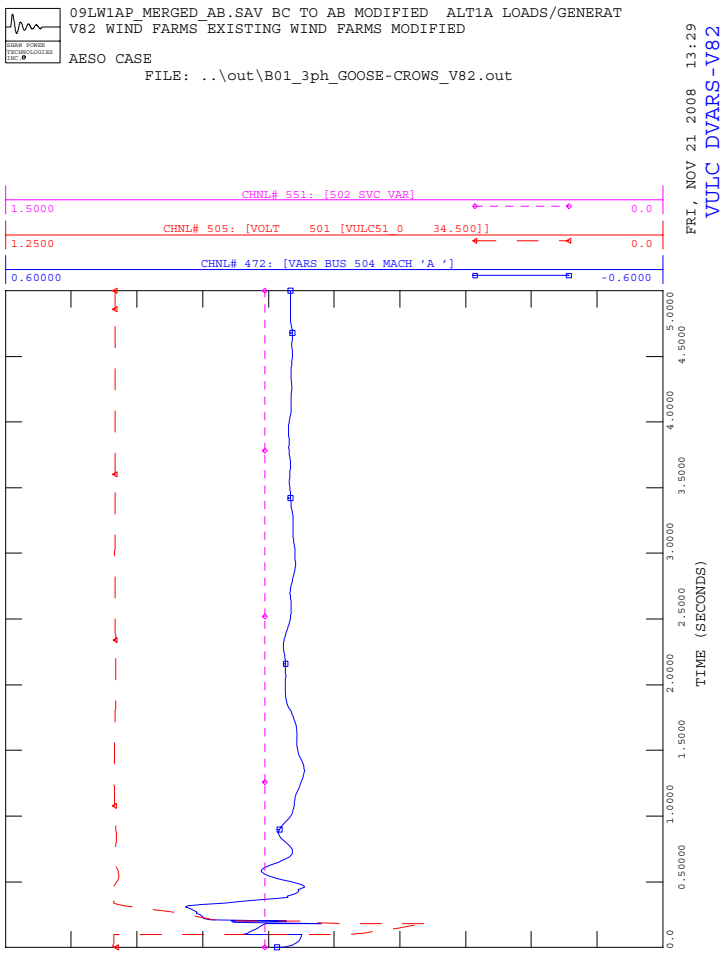
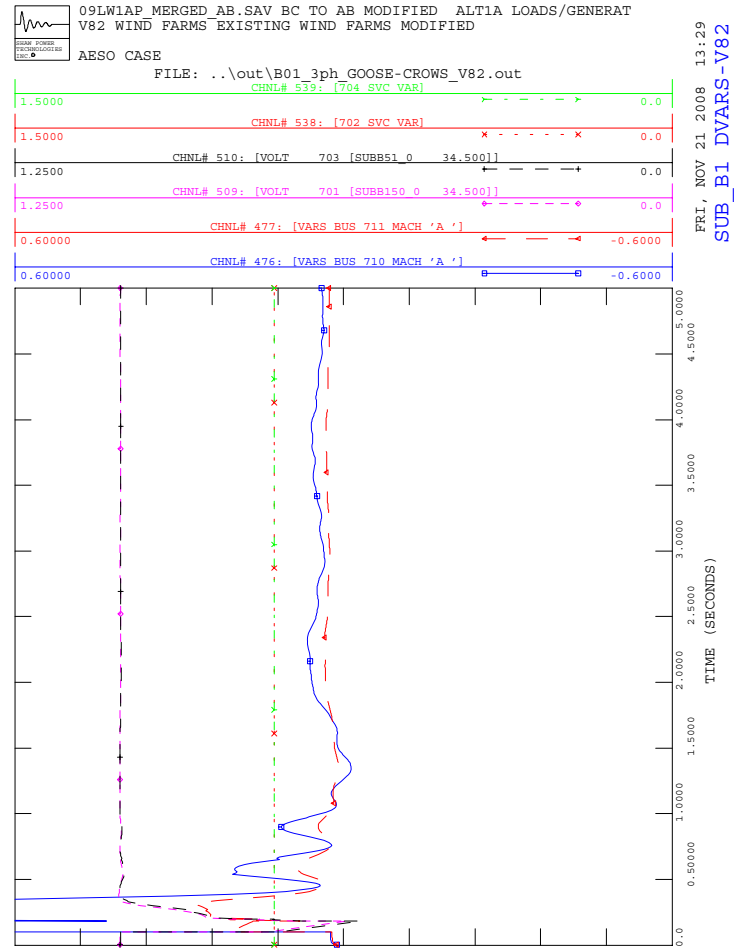
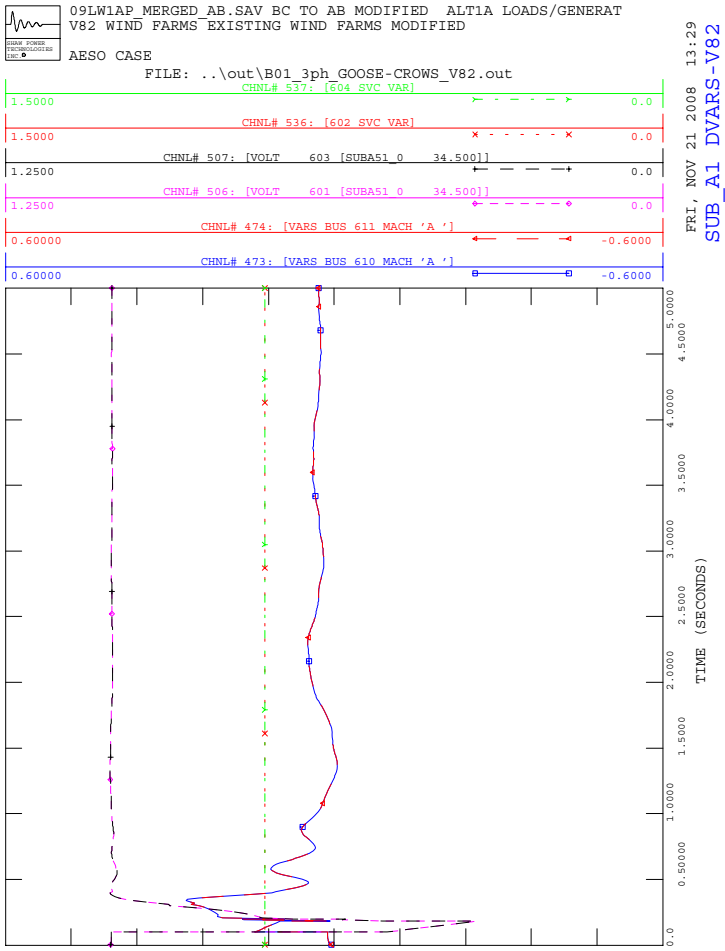
FRI, NOV 21 2008 13:29
 PEIGAN DVARS-SVC-V82

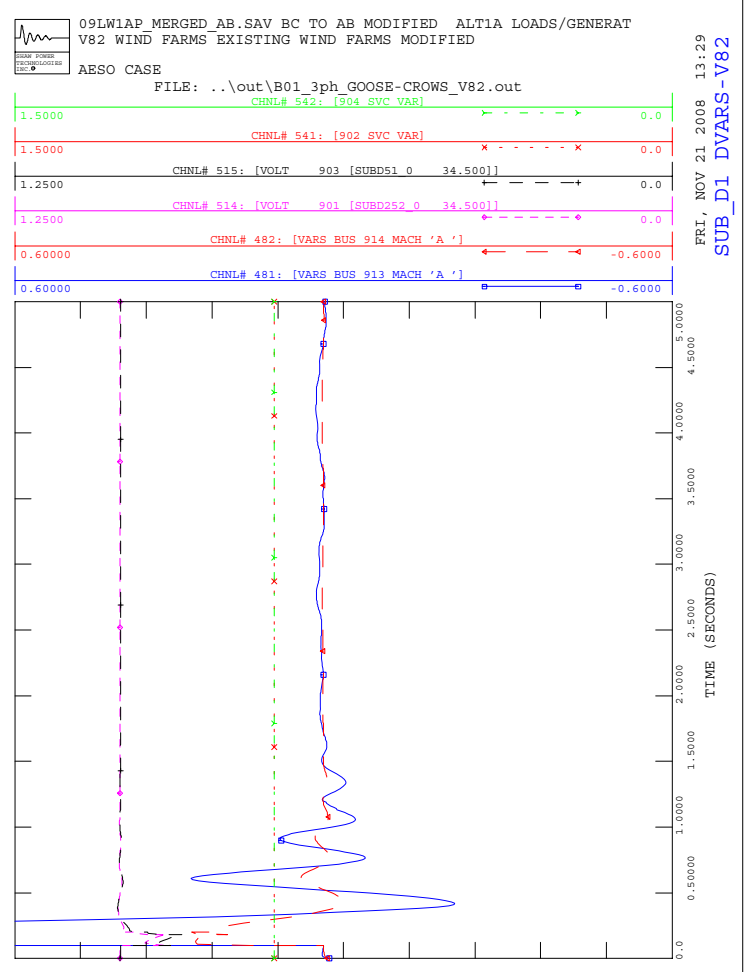
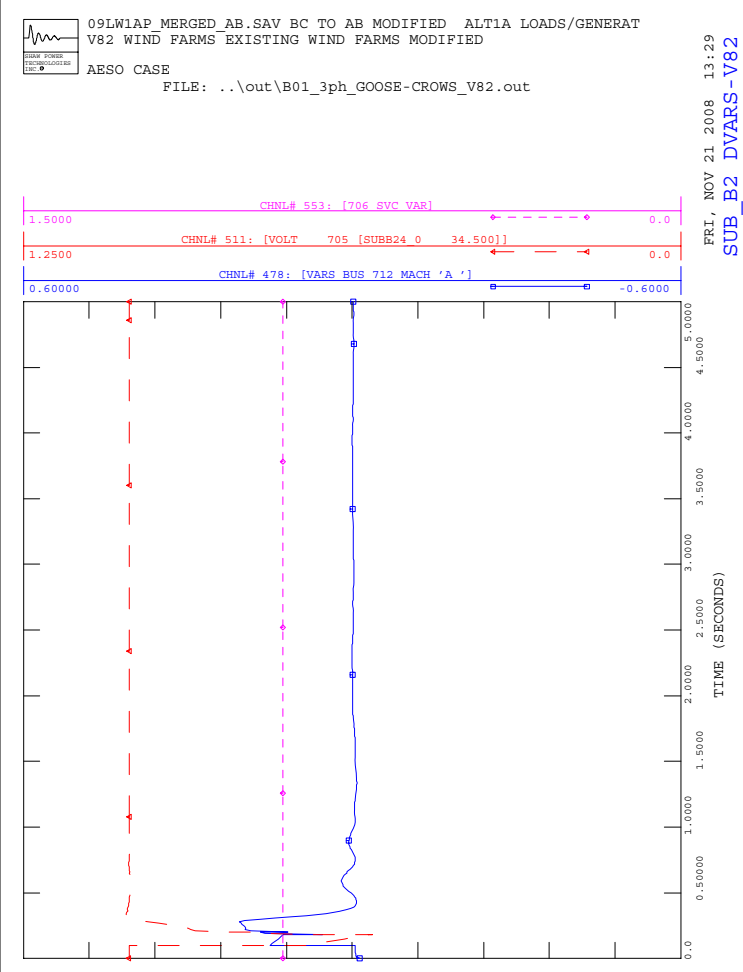
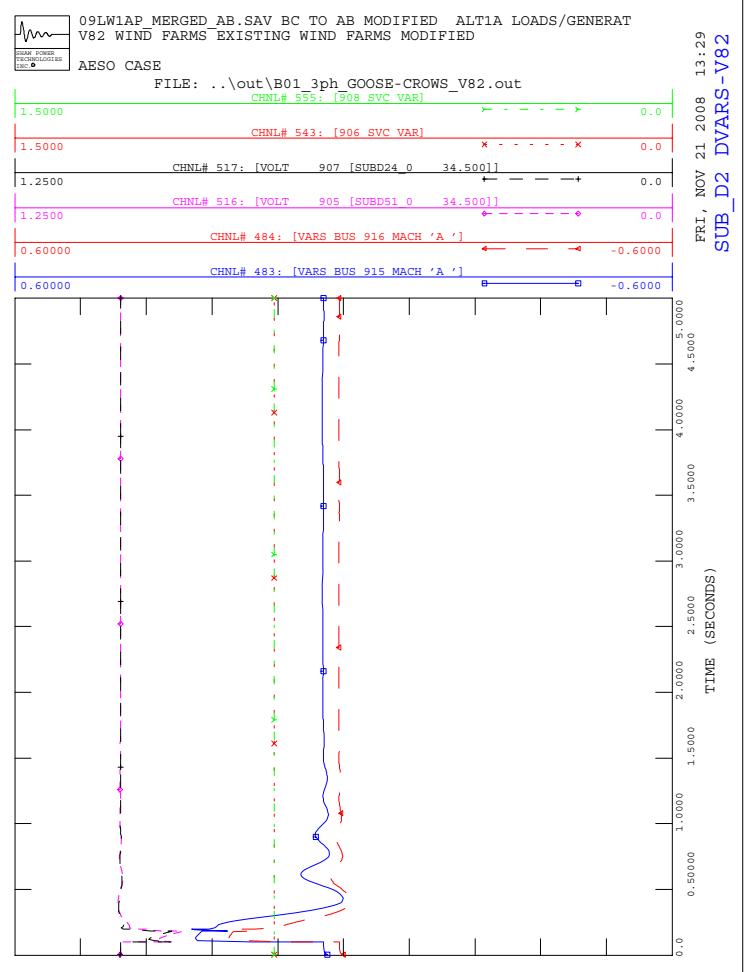
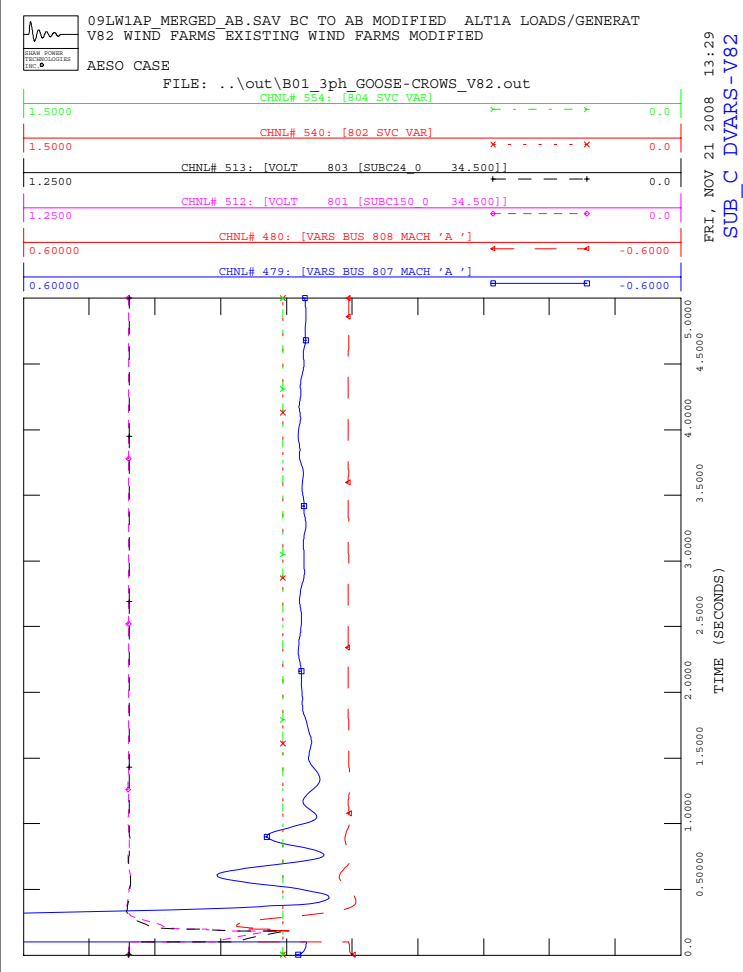
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

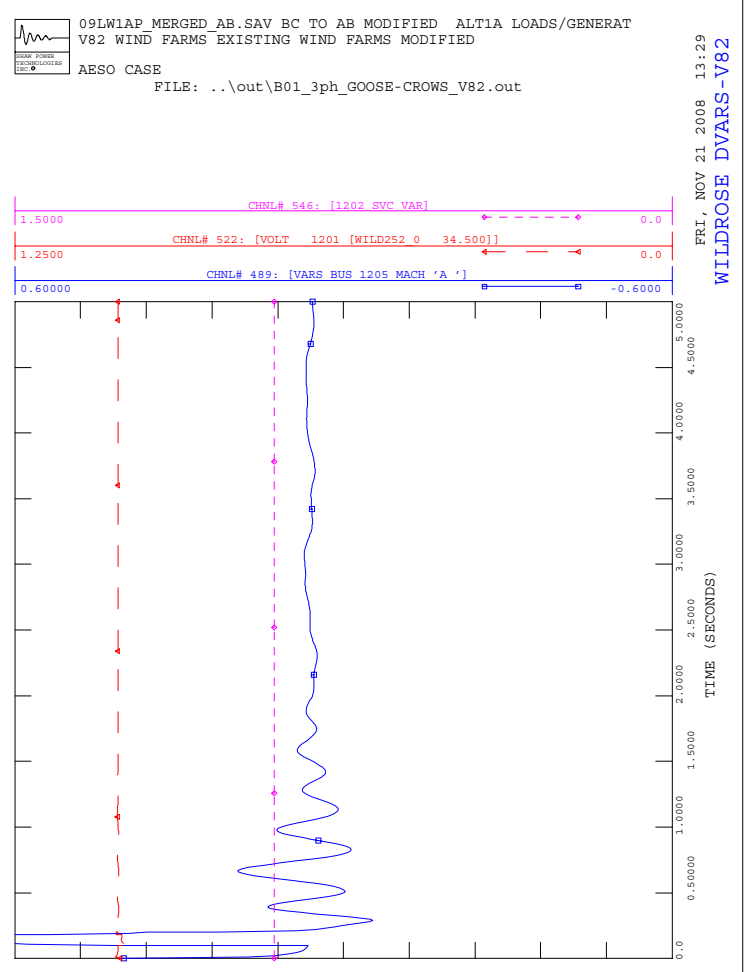
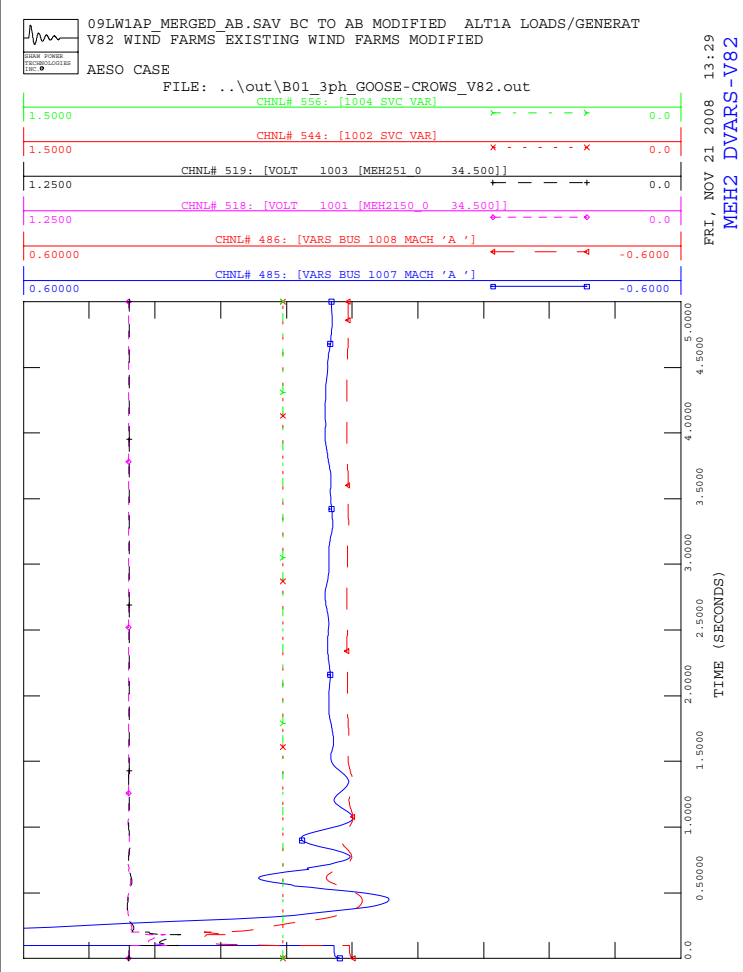
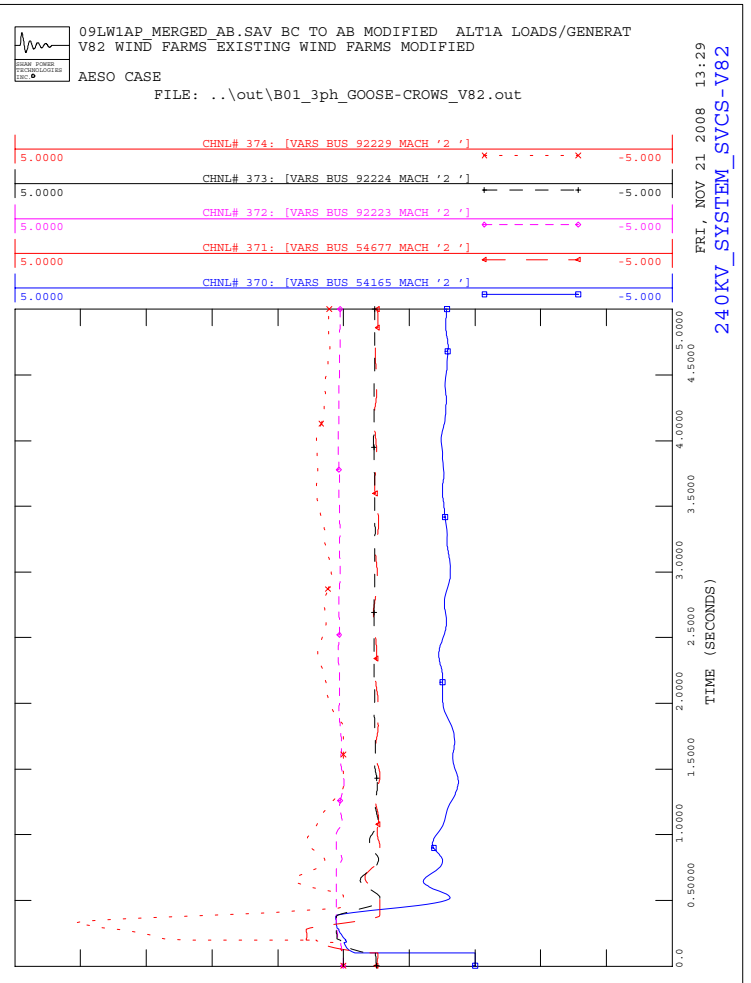
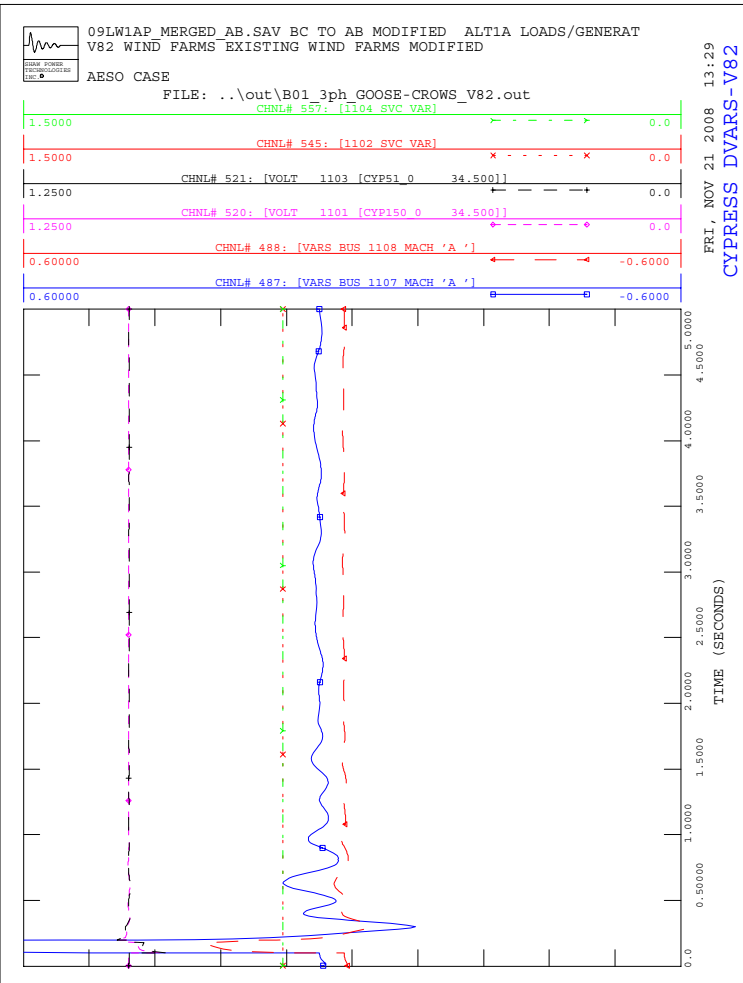
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 MATL2 DVARS-SVC-V82



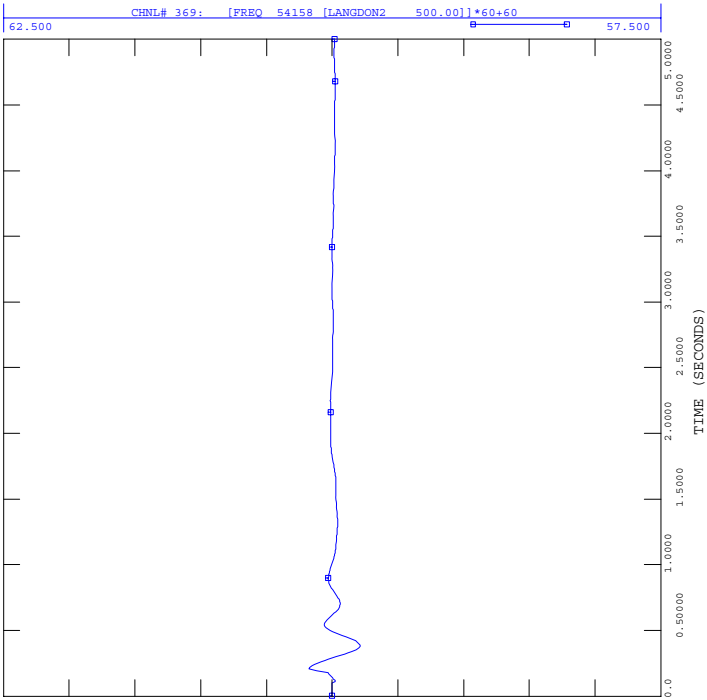






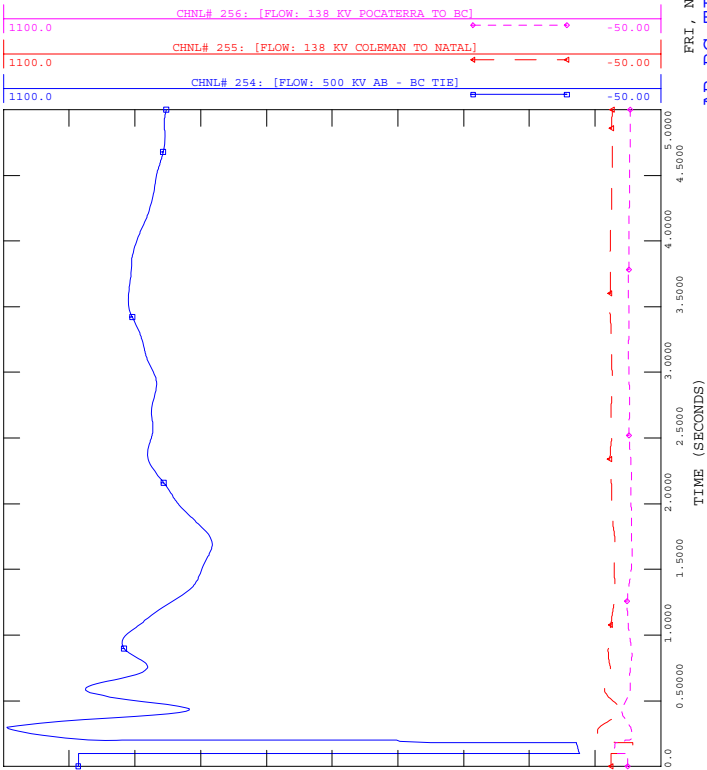
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B01_3ph_GOOSE-CROWS_V82.out

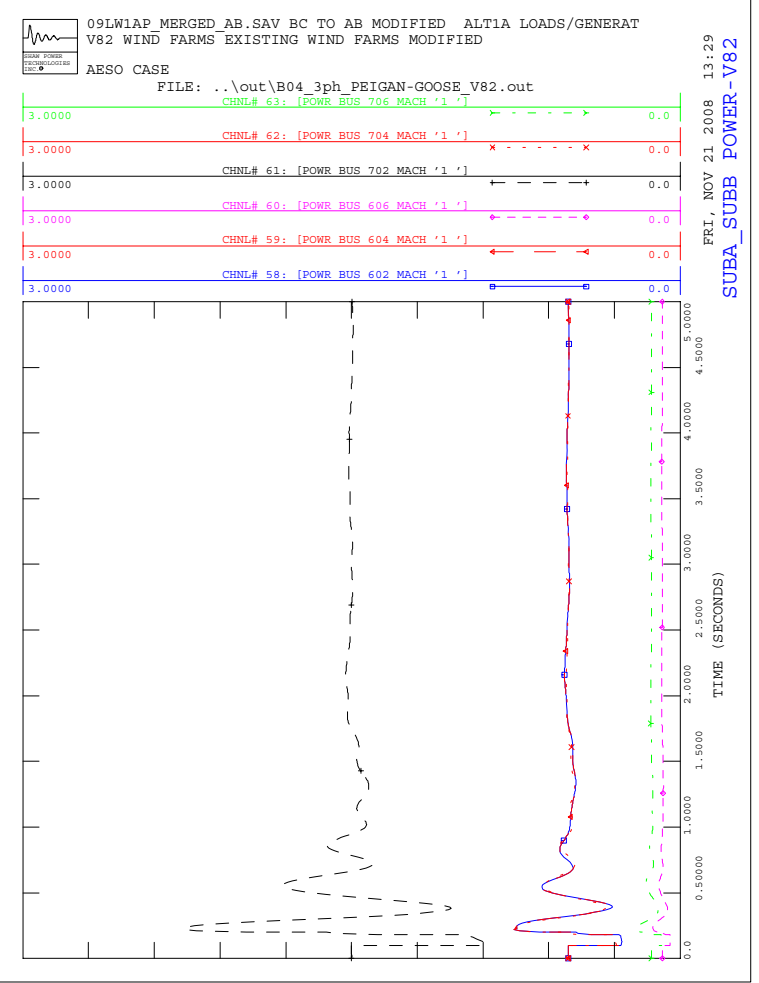
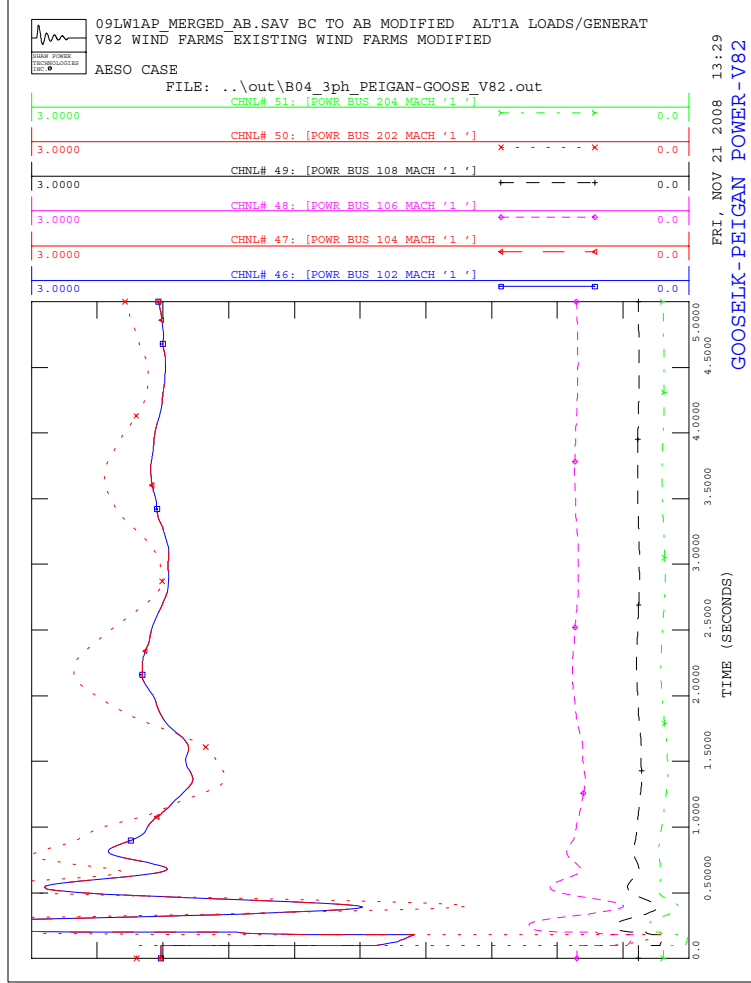
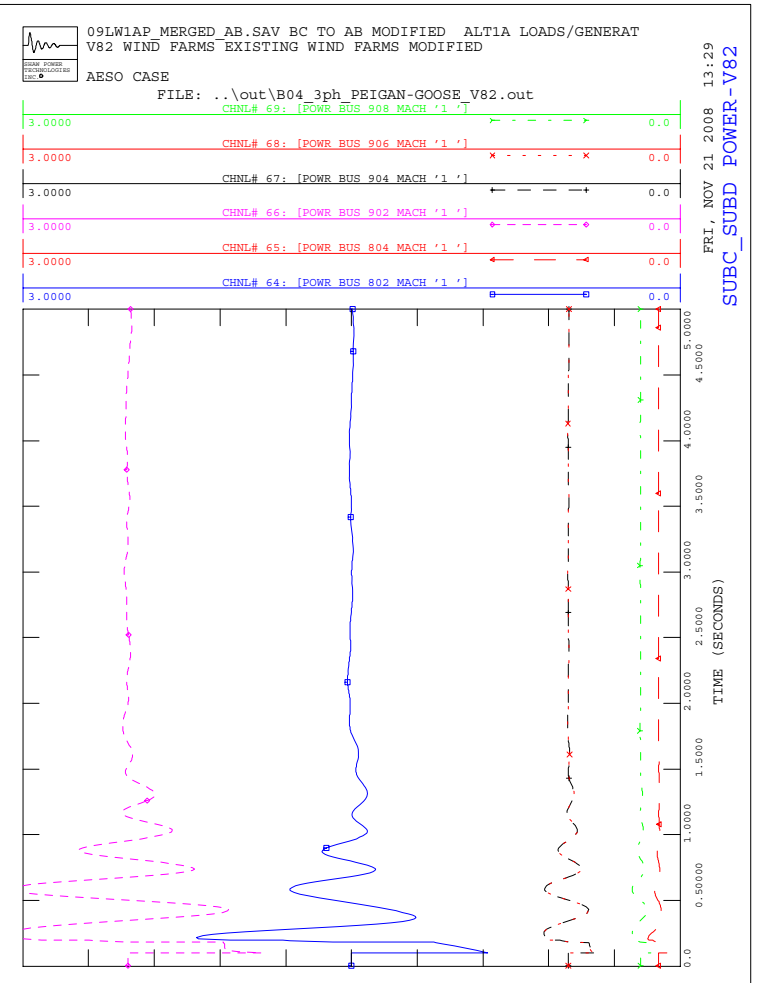
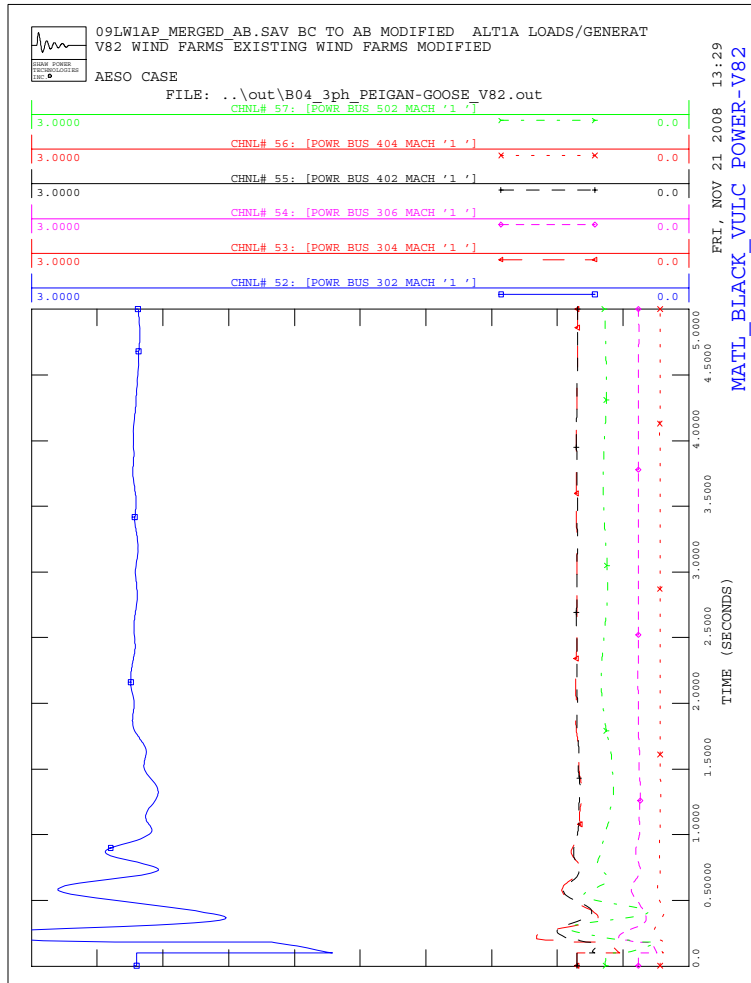
FRI, NOV 21 2008 13:29
LANGDON_FRQ-V82

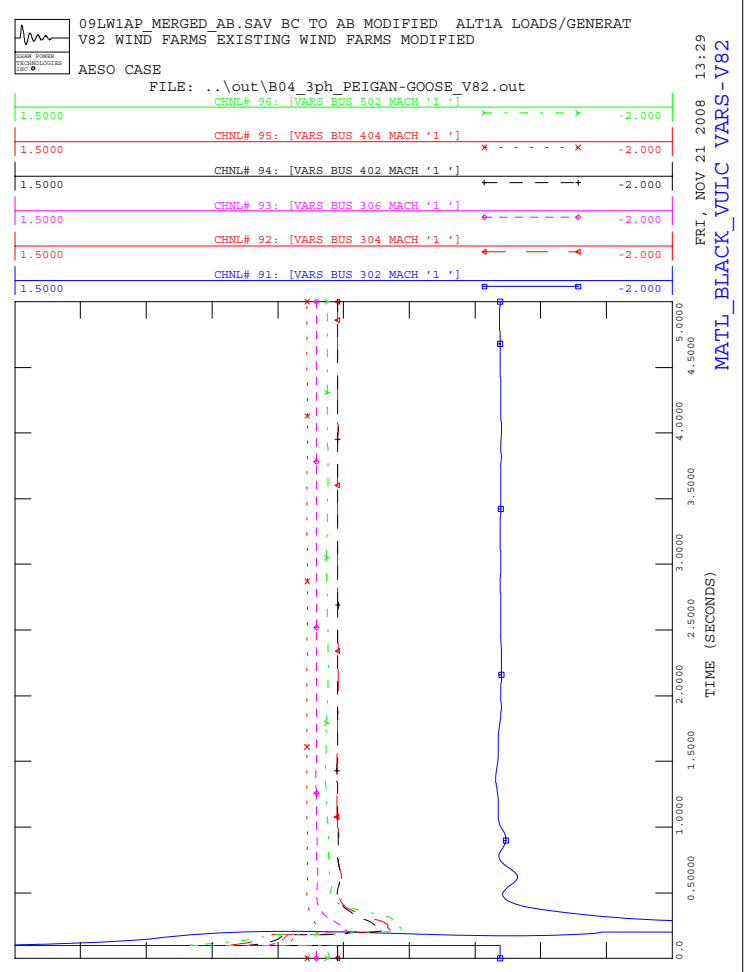
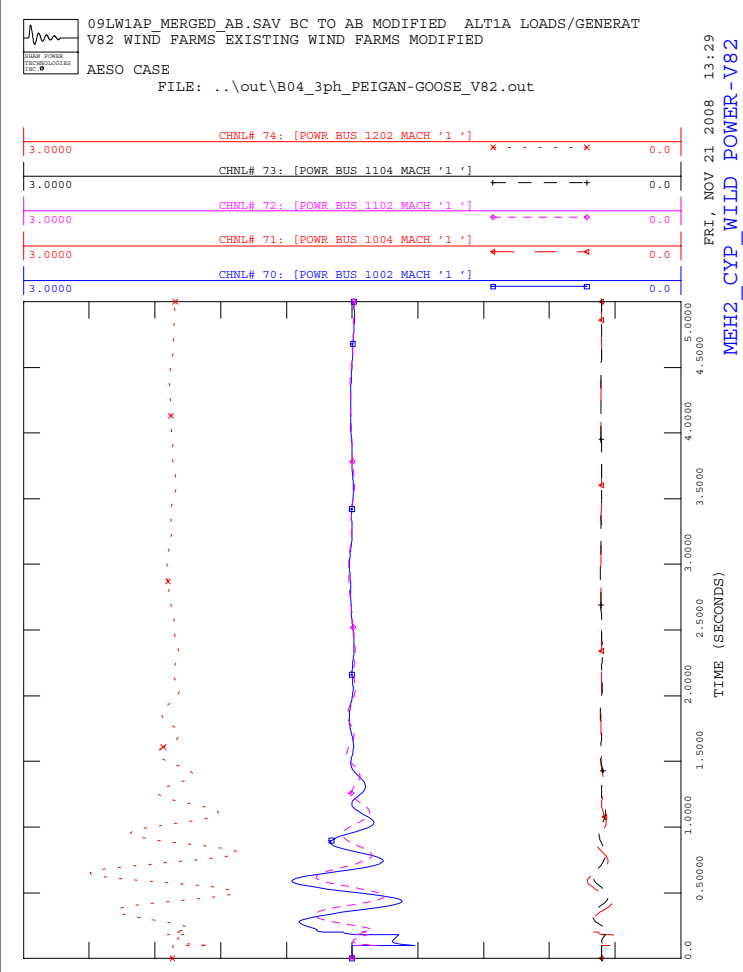
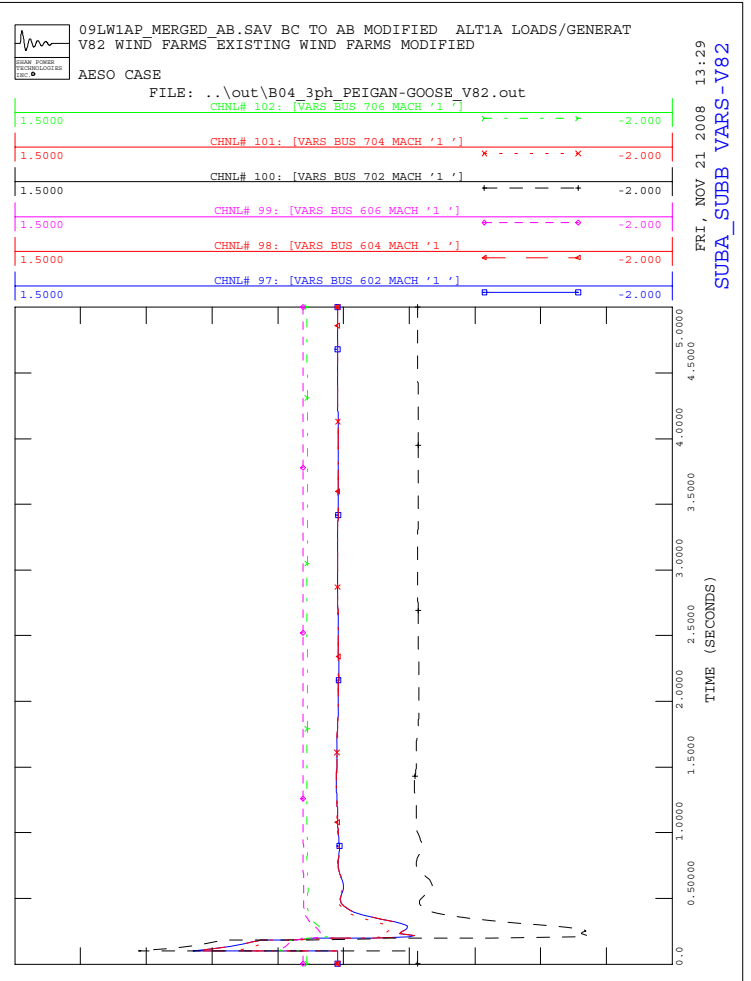
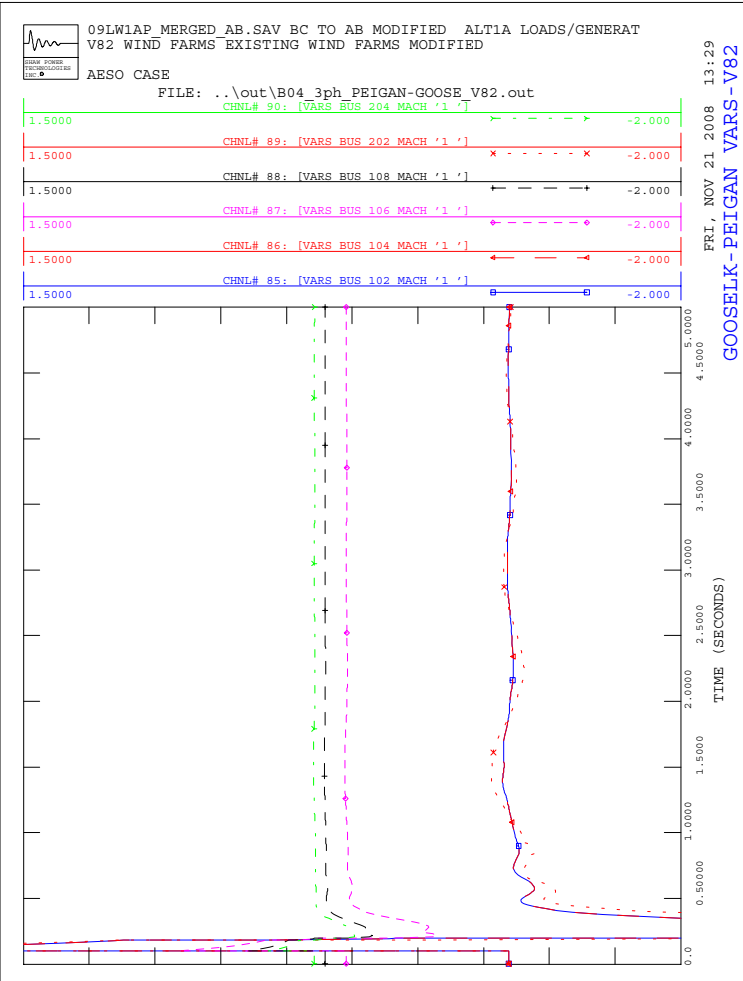


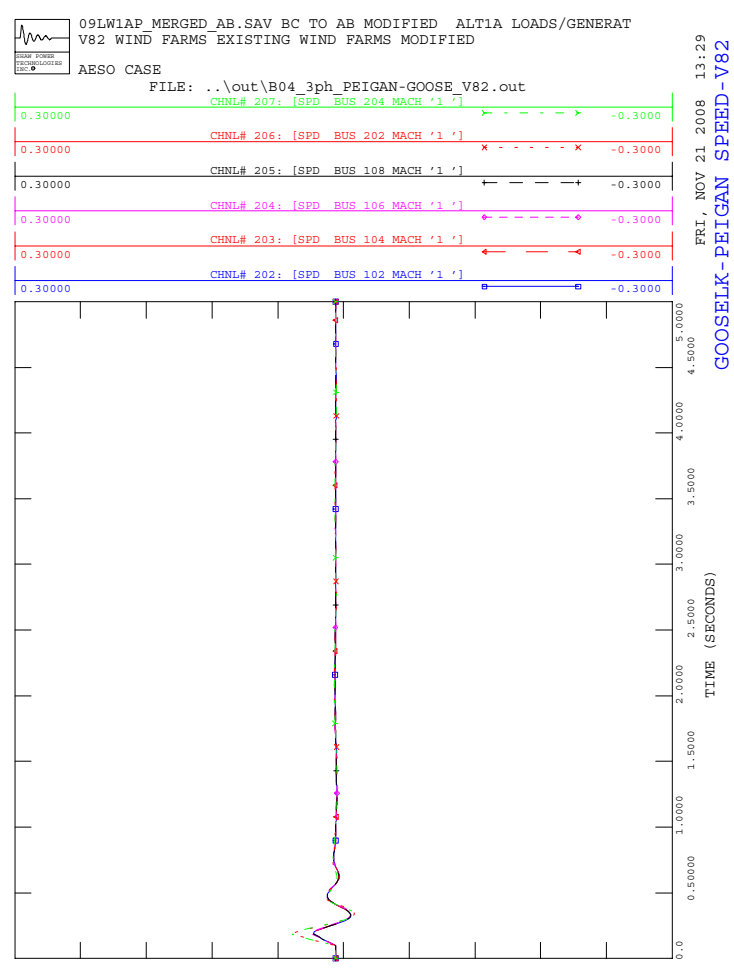
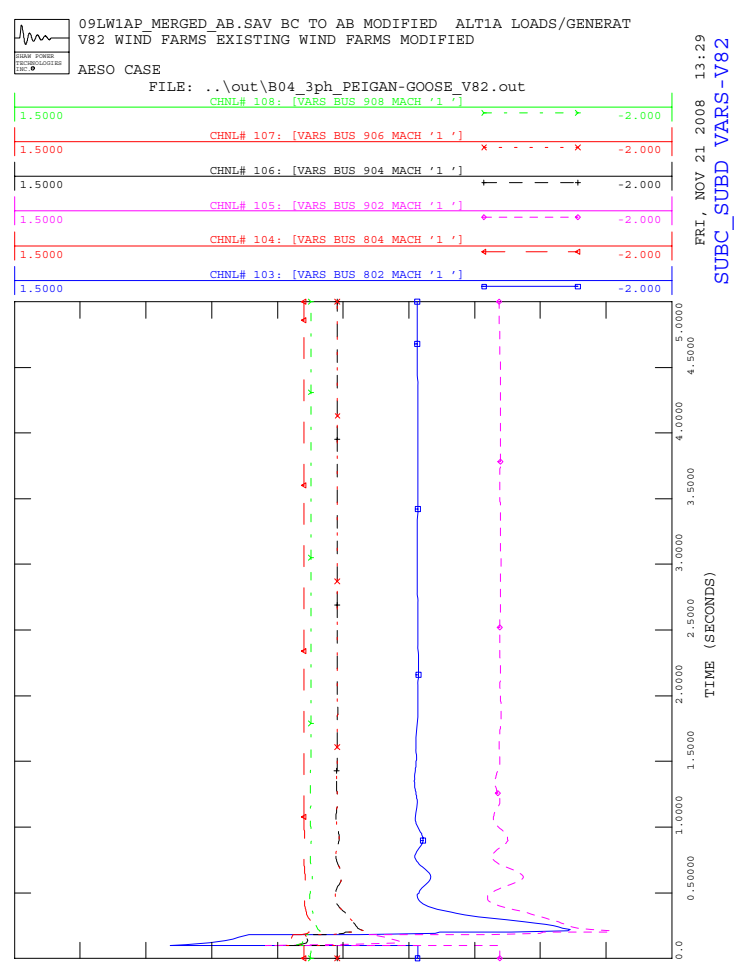
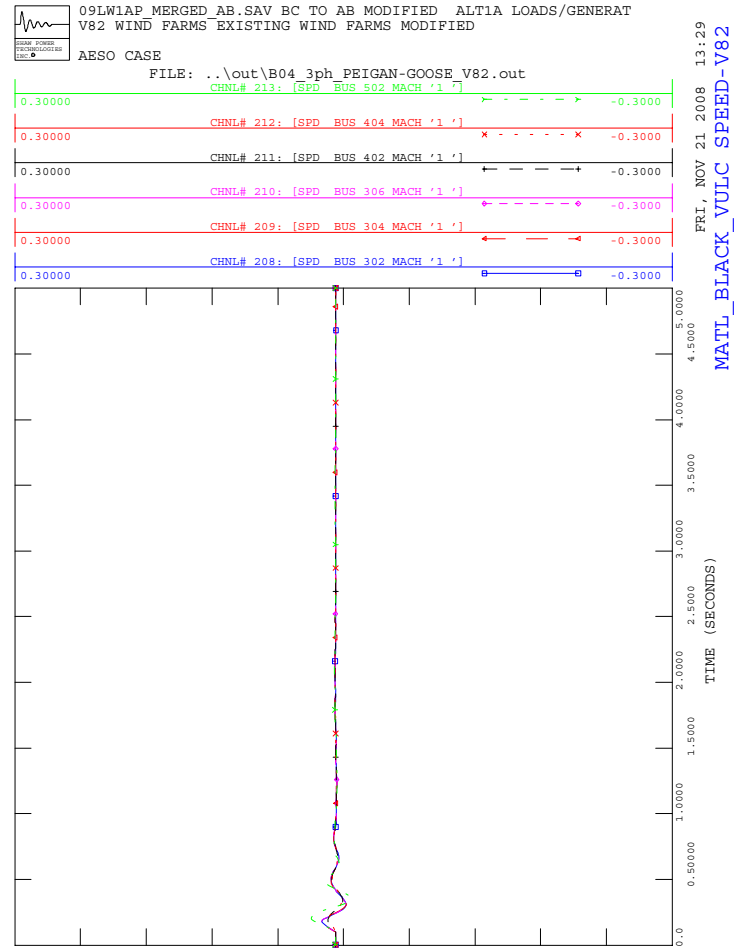
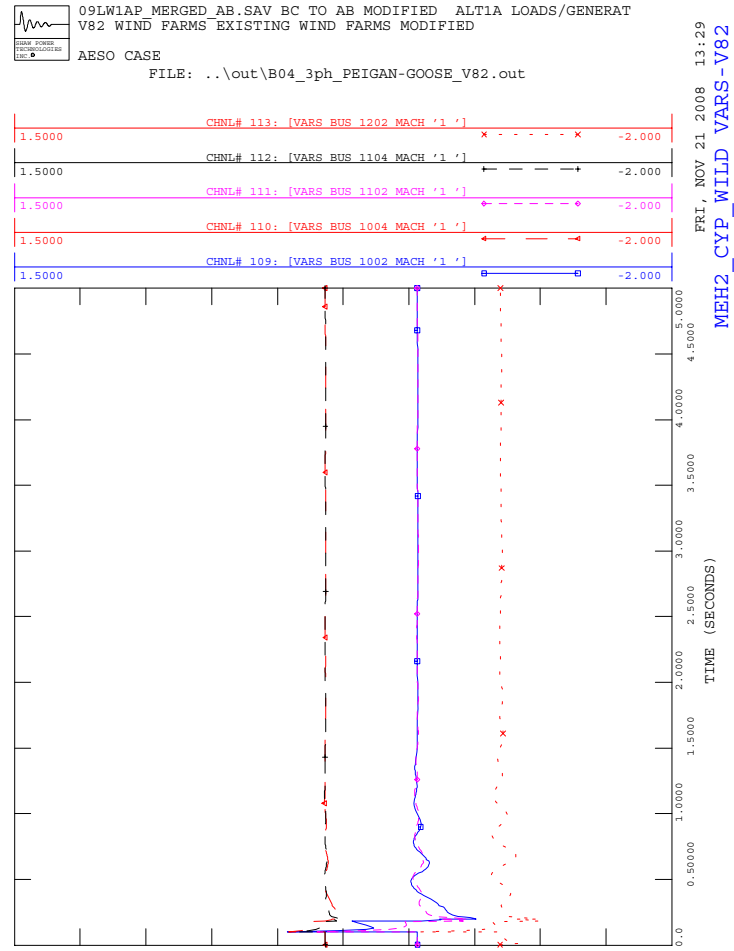
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B01_3ph_GOOSE-CROWS_V82.out

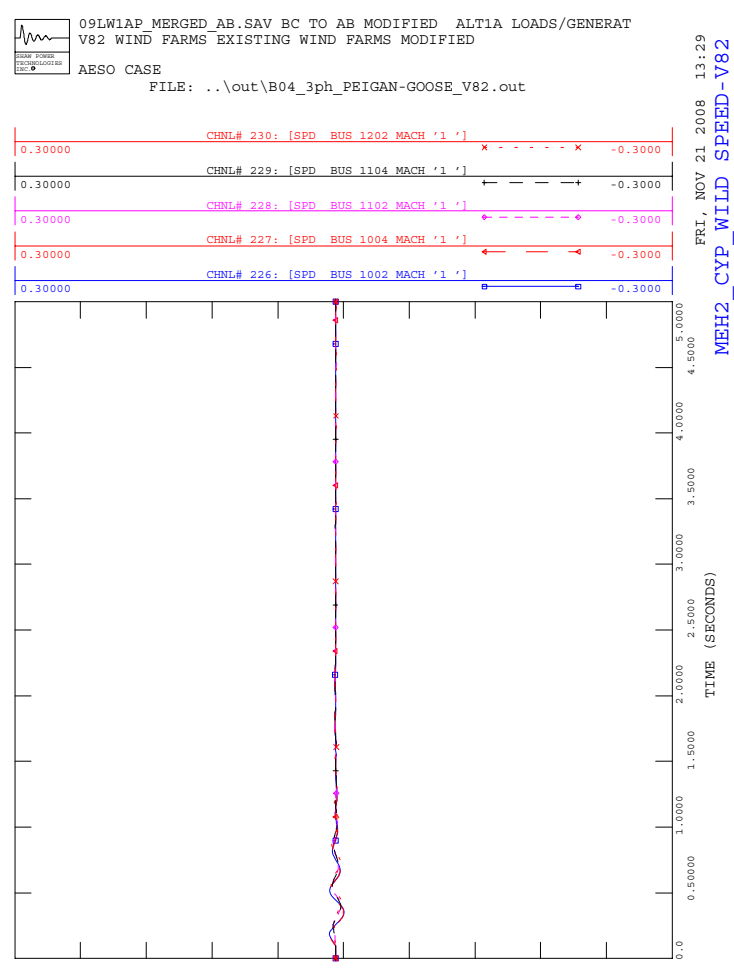
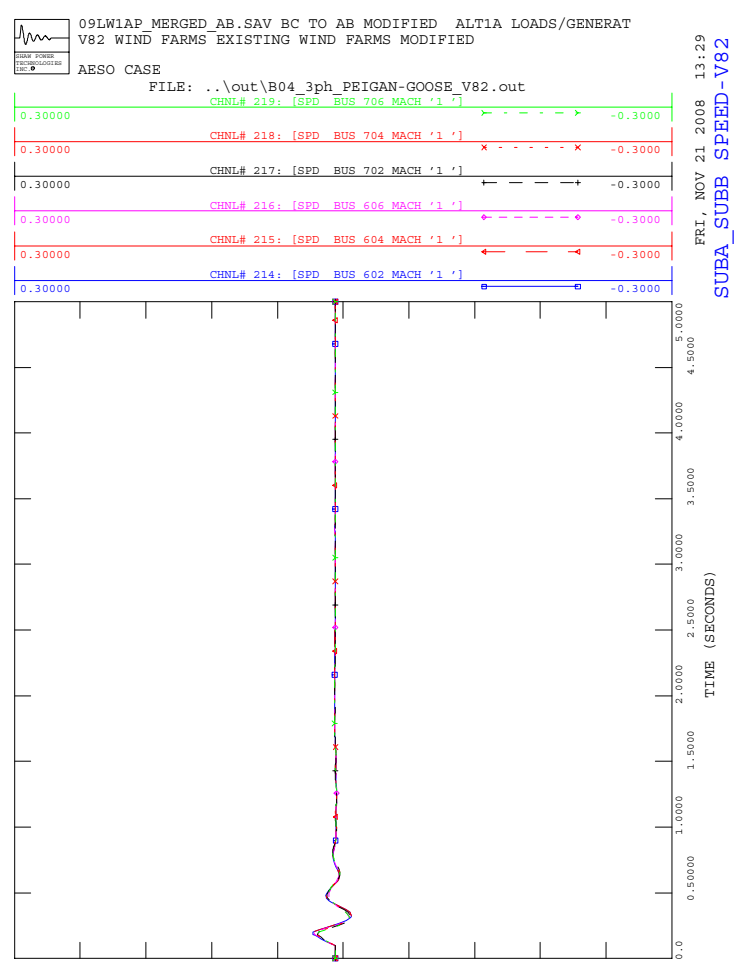
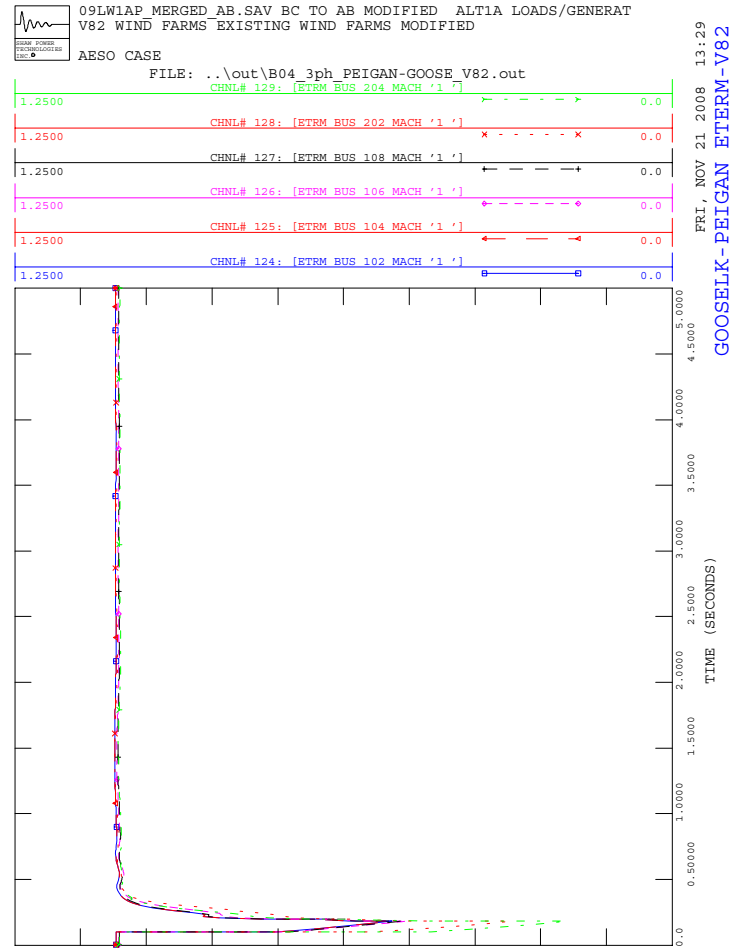
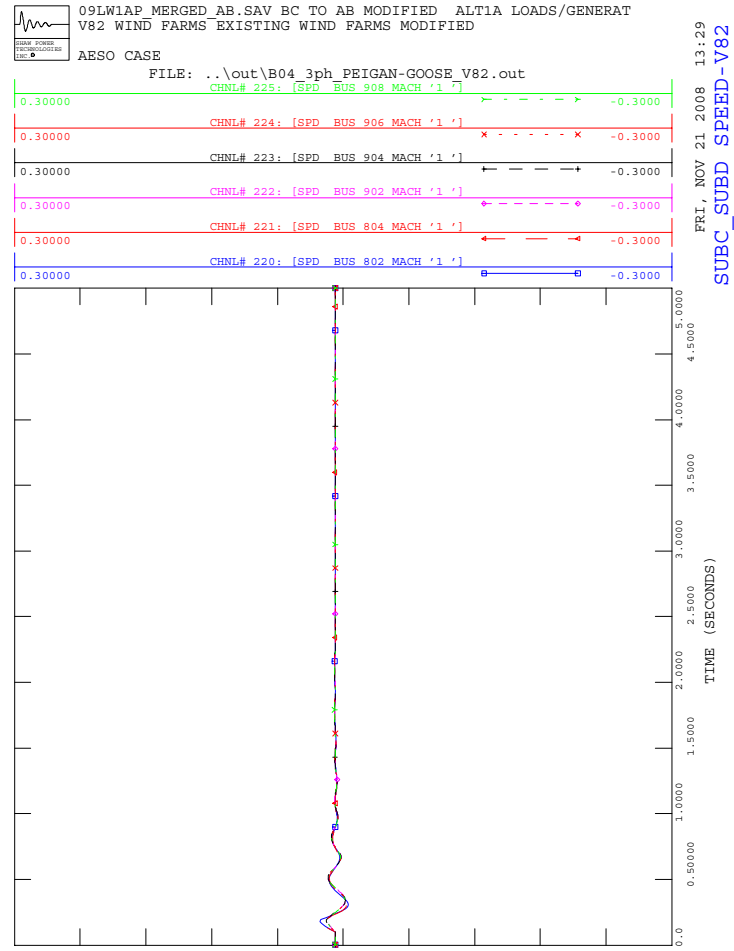
FRI, NOV 21 2008 13:29
AB_BC_TIE_FLOWS-V82

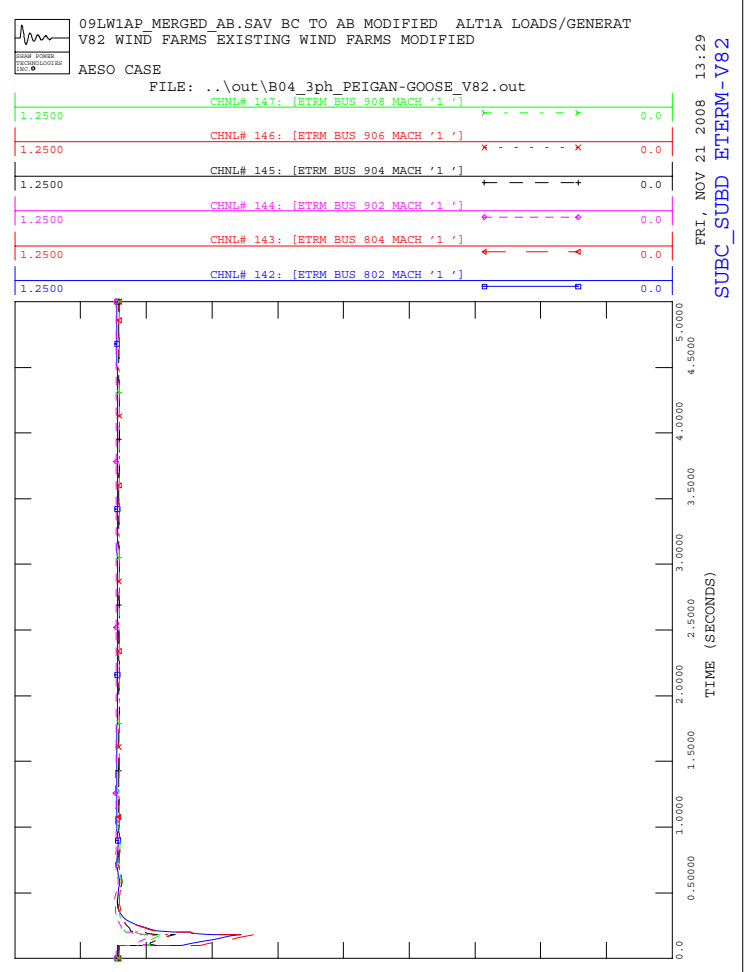
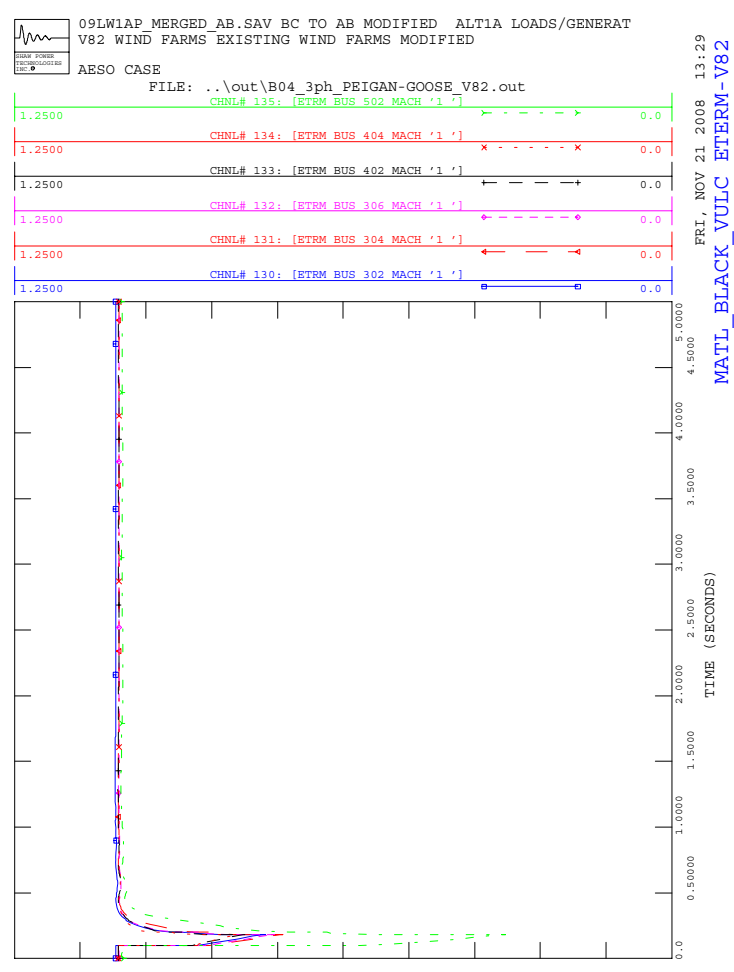
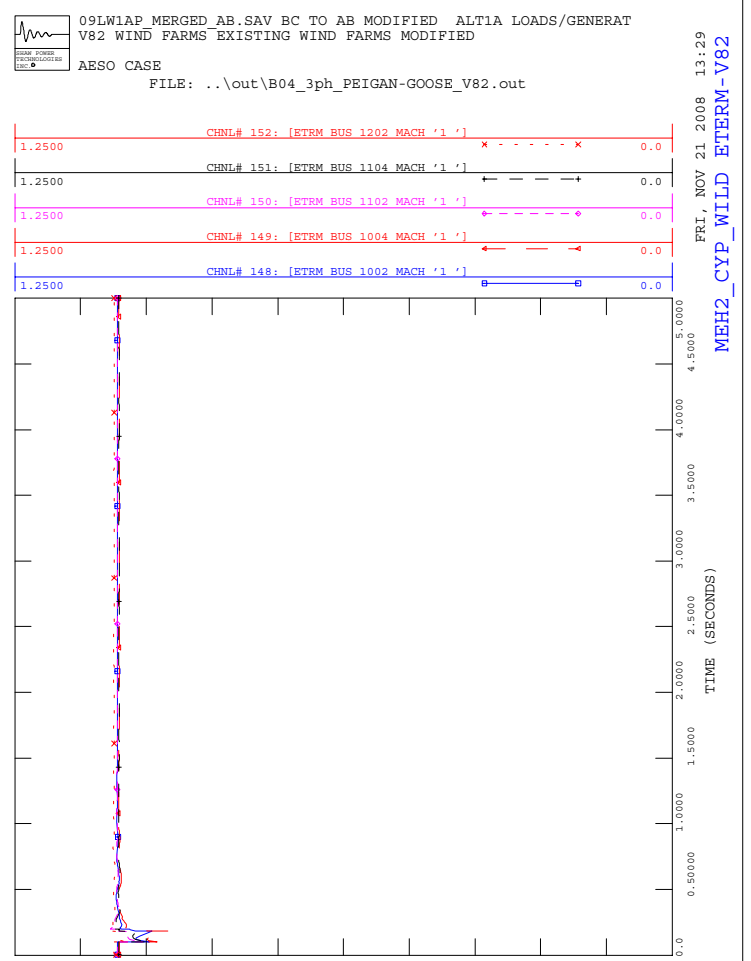
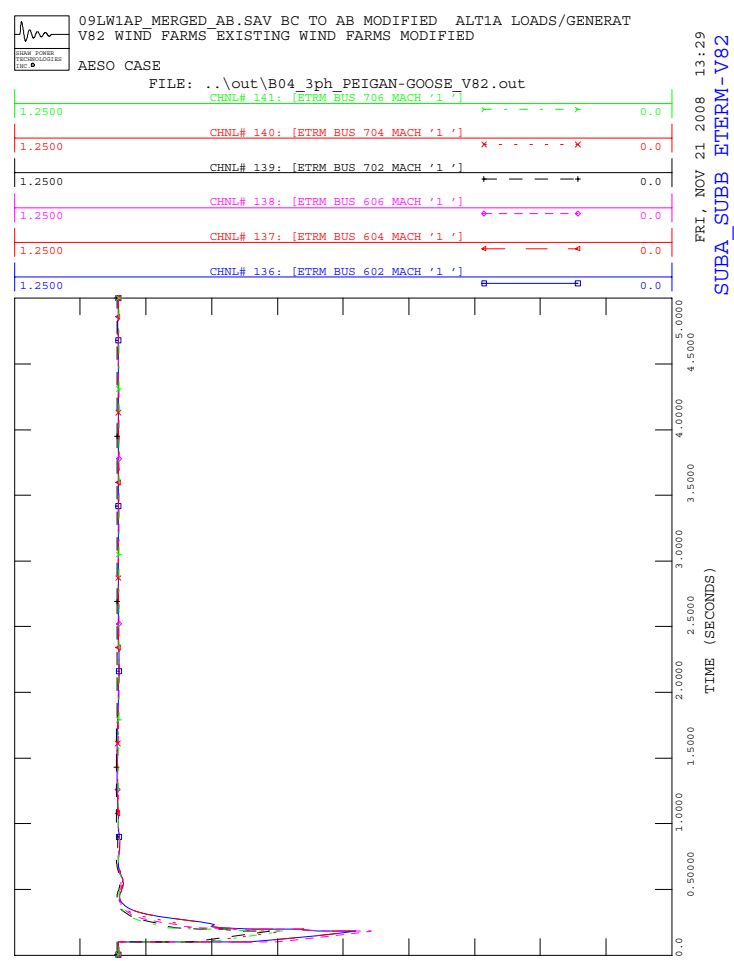


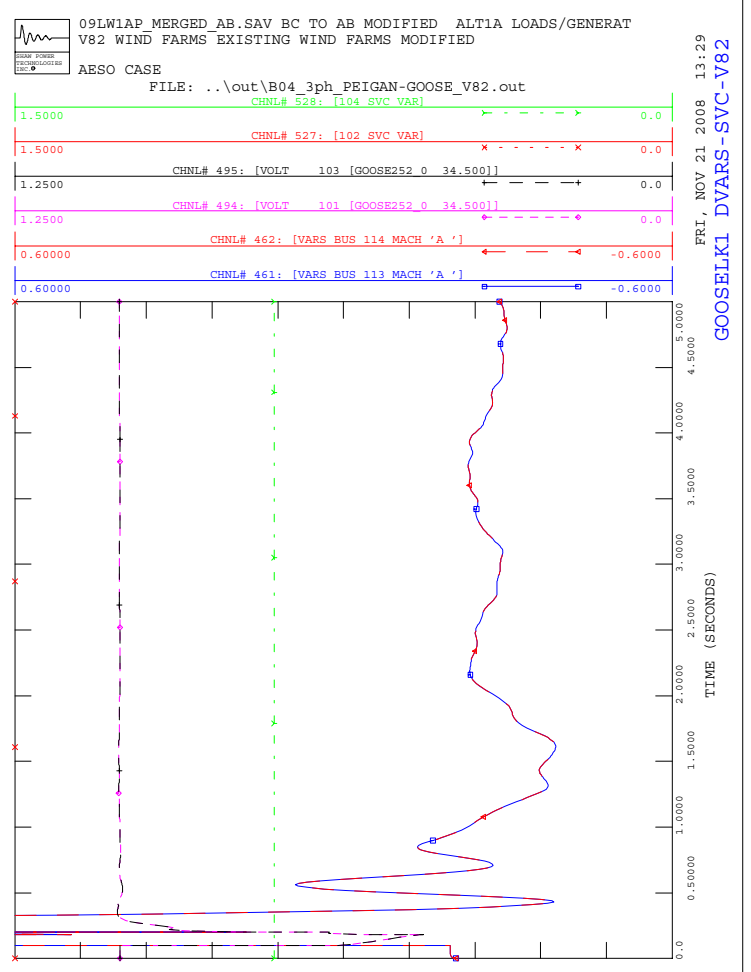
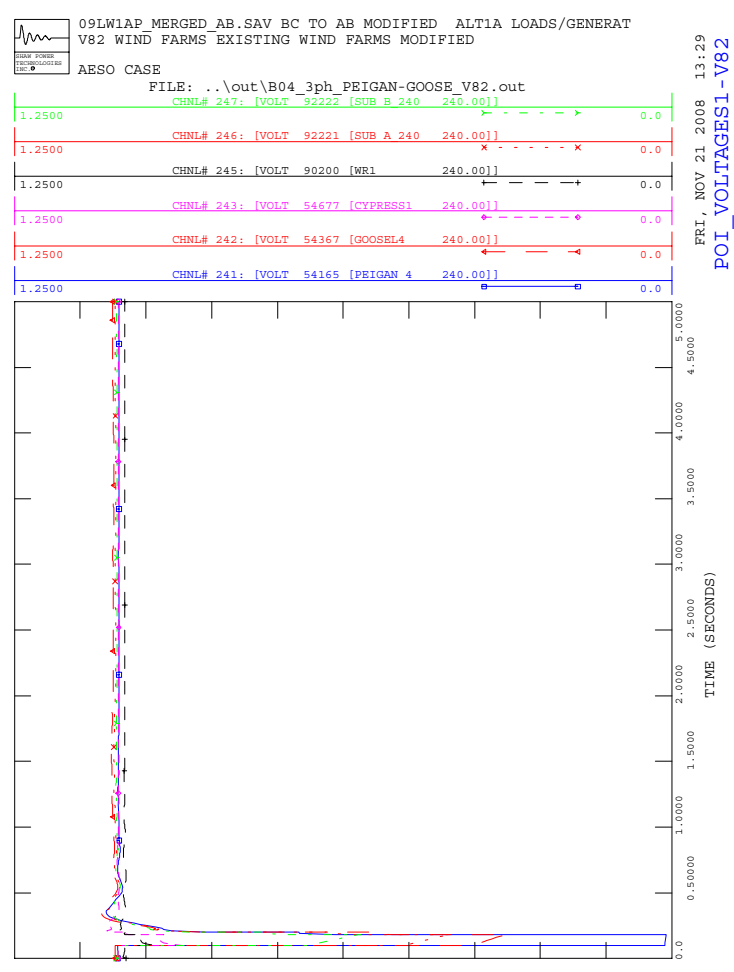
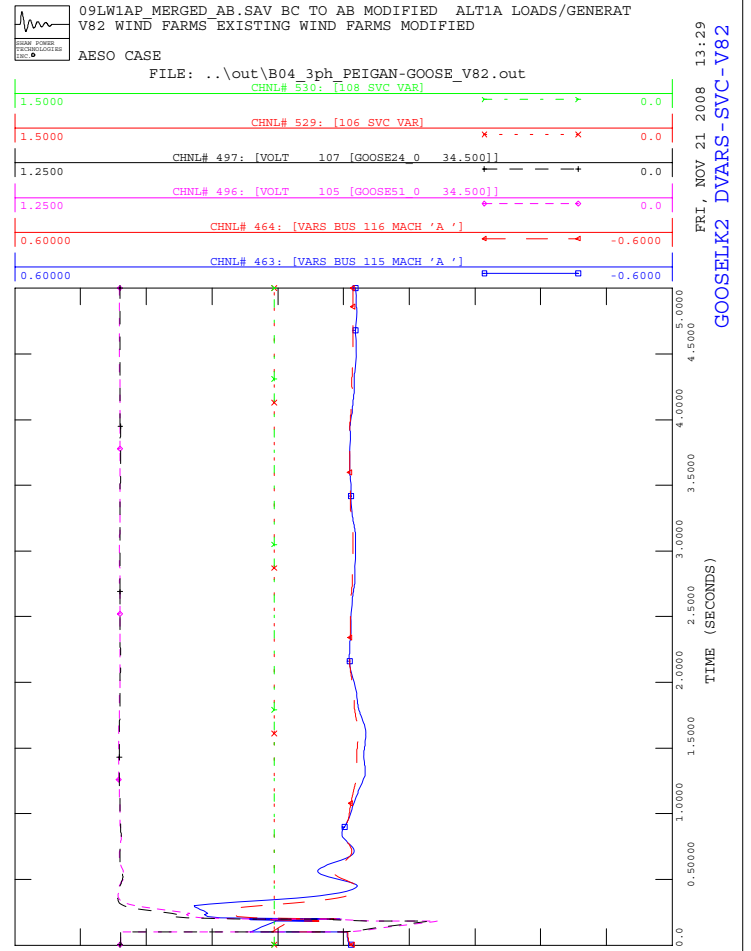
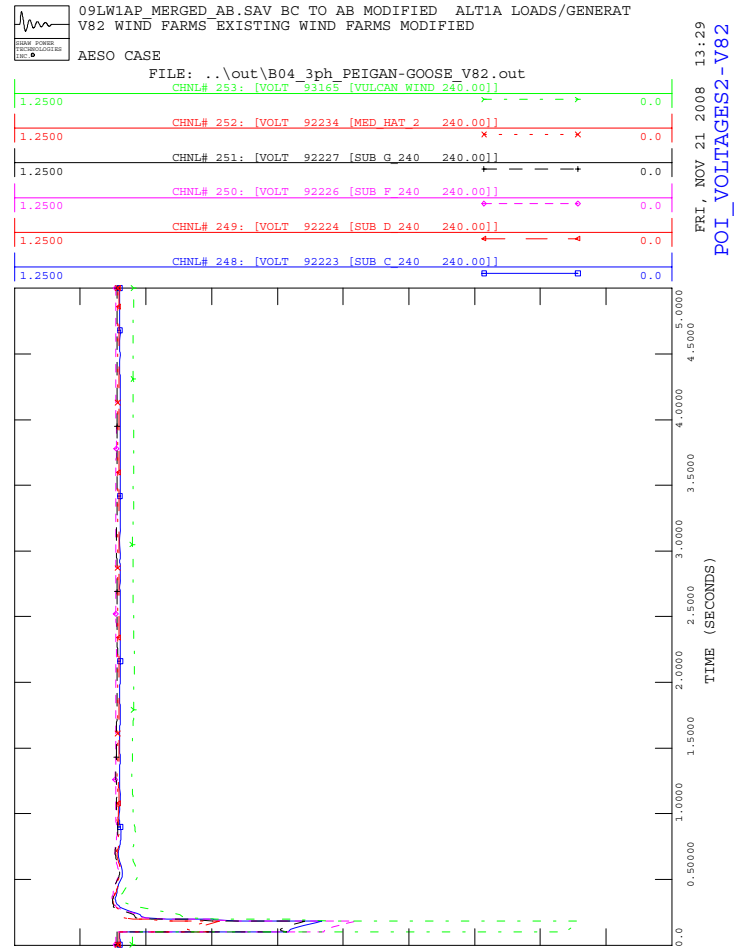


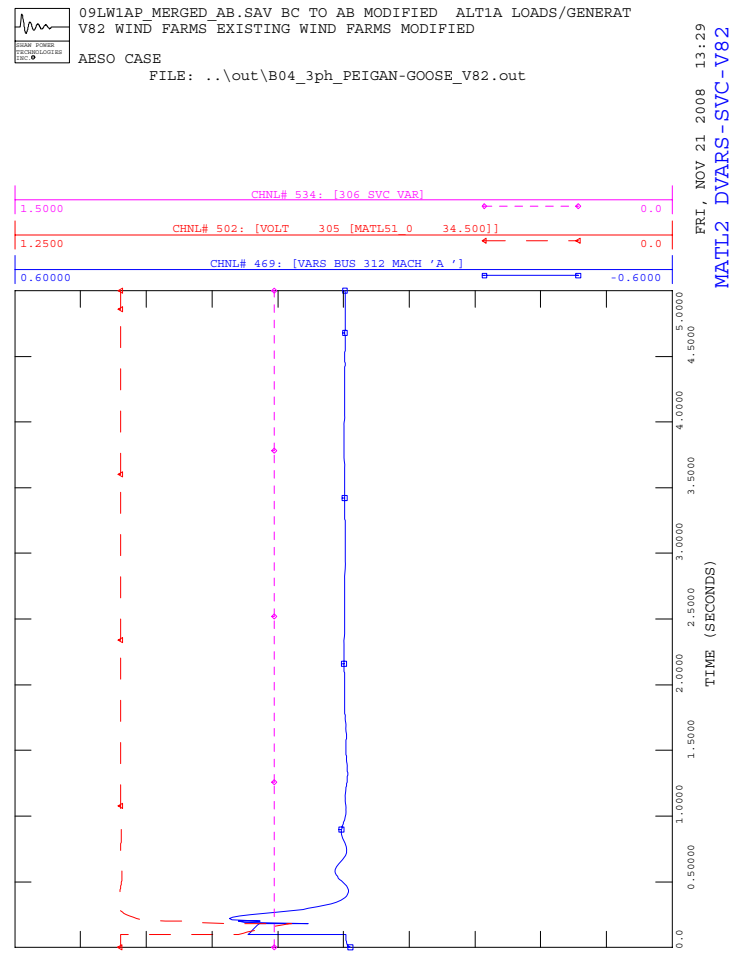
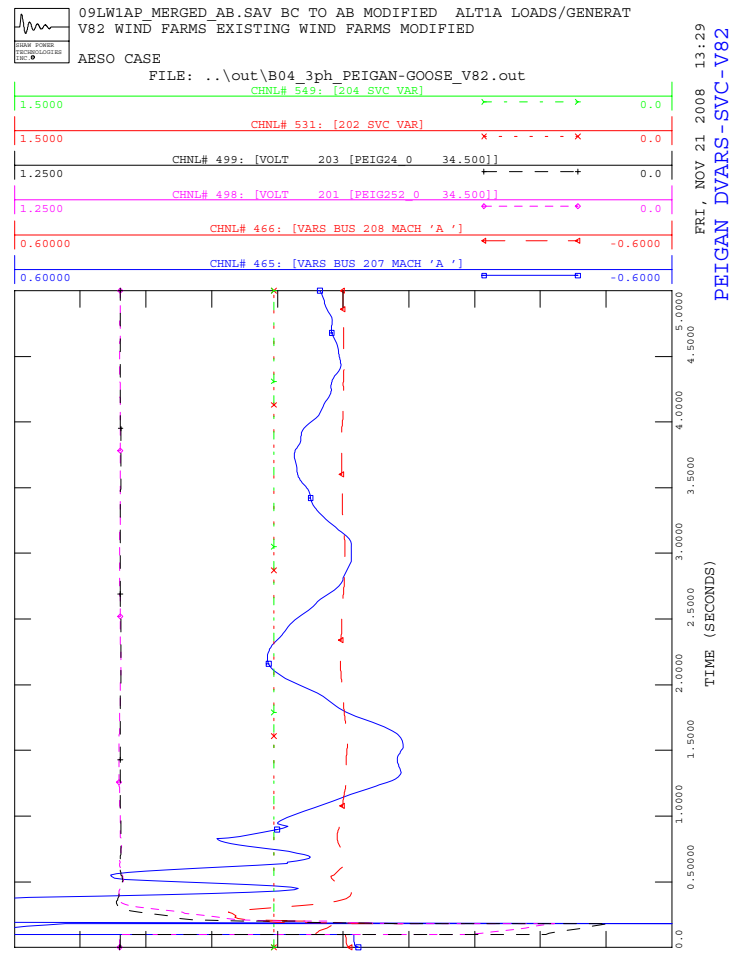
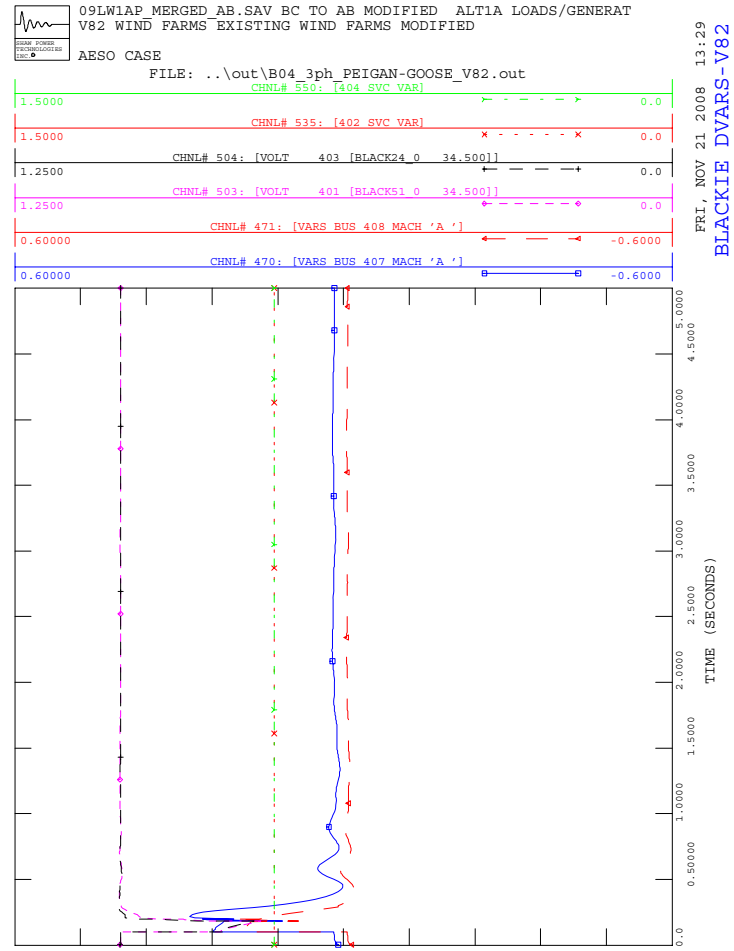
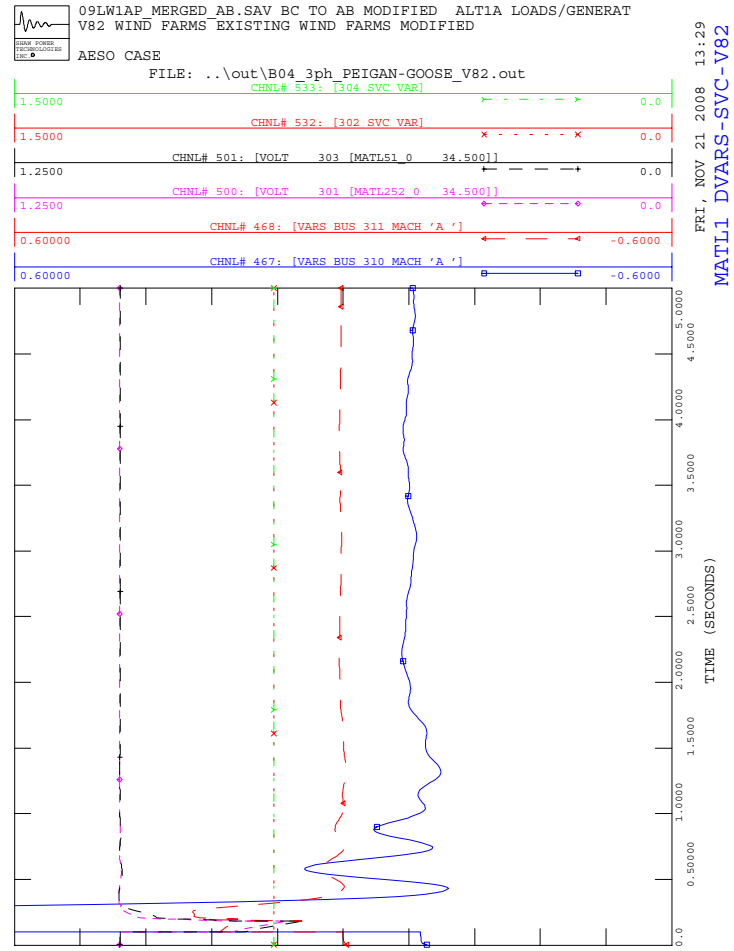


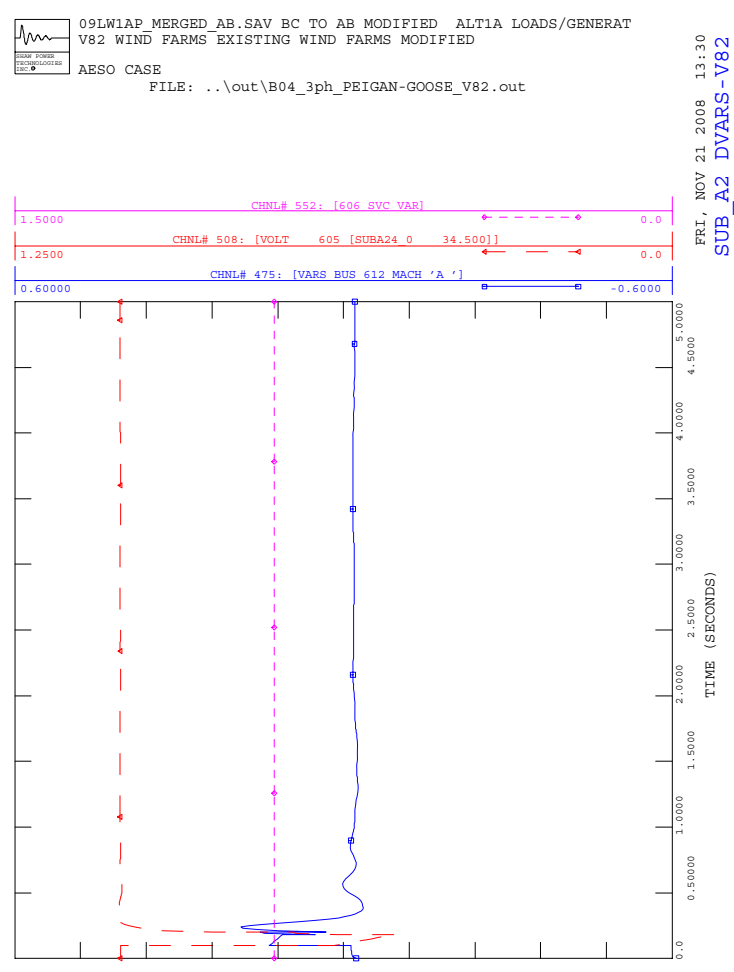
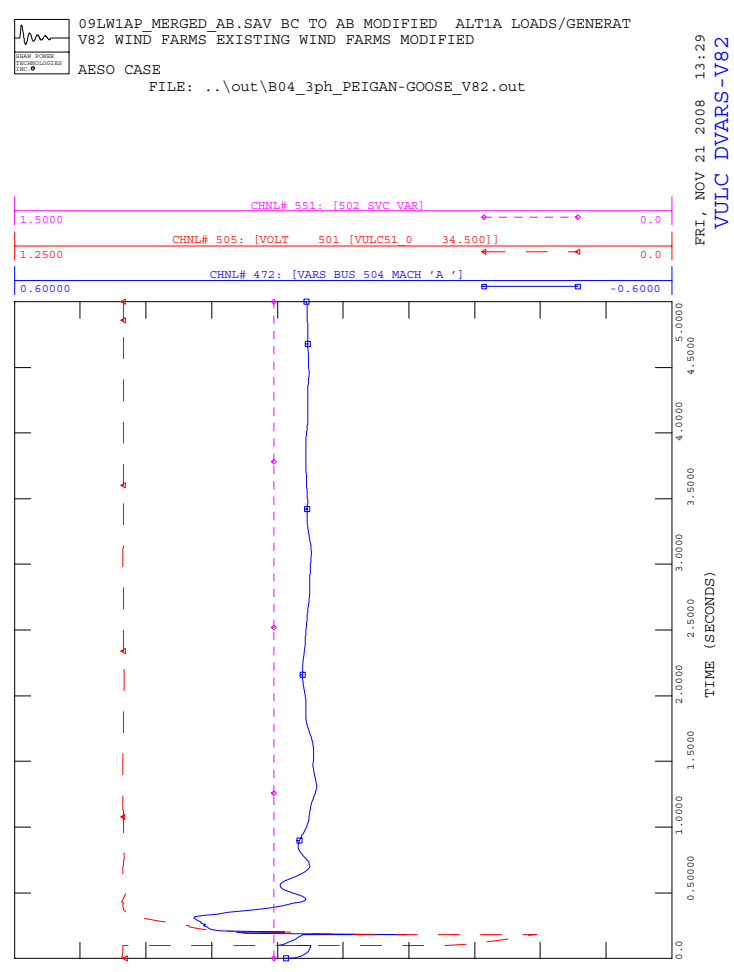
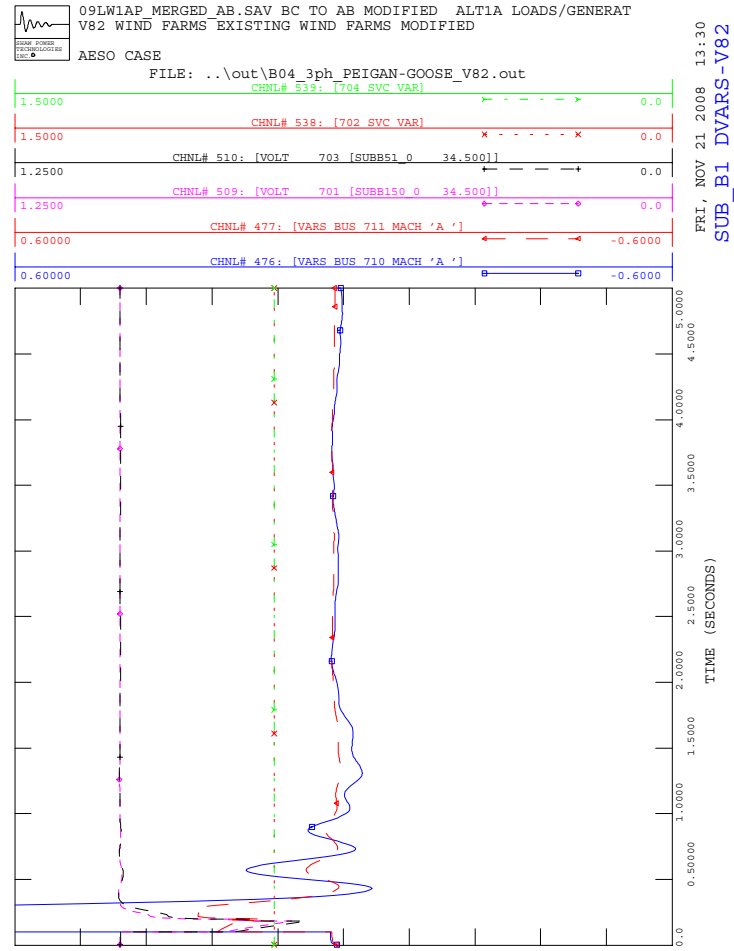
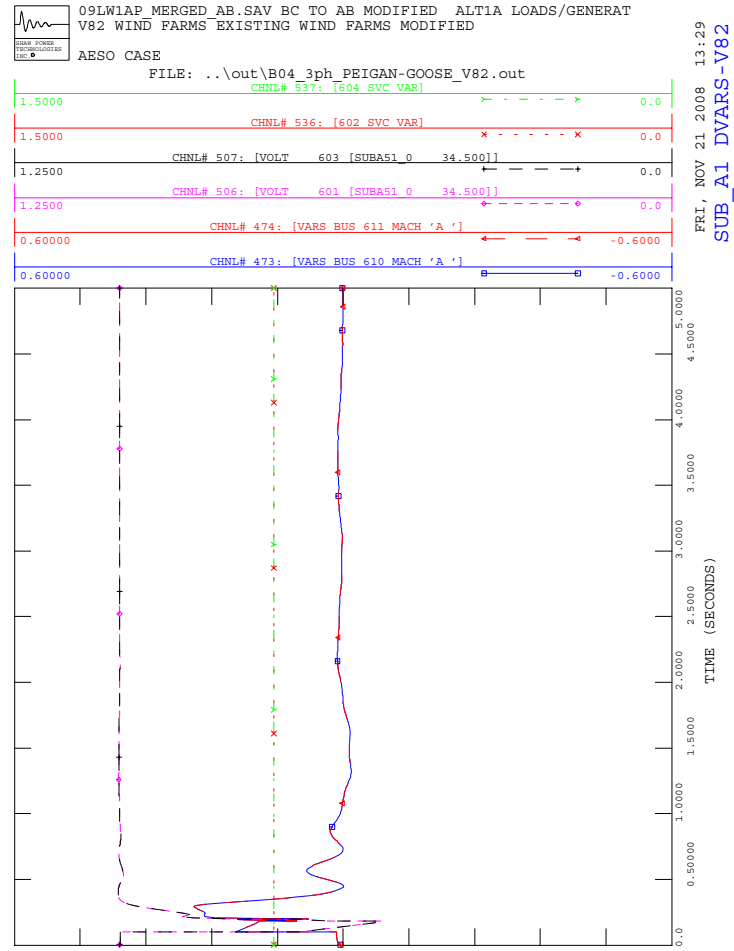


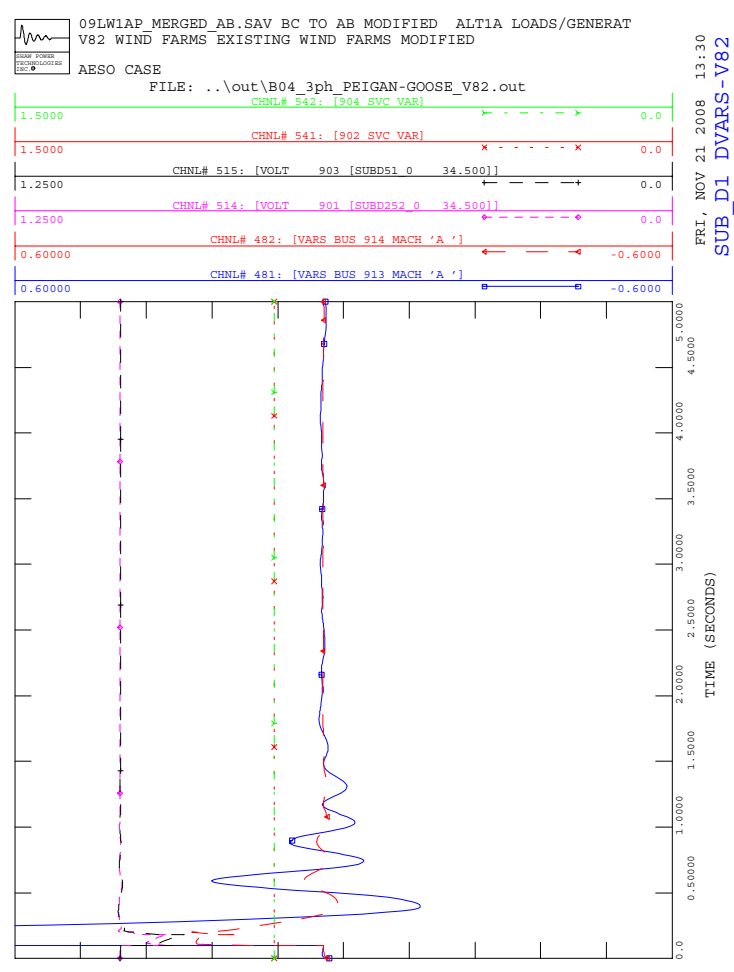
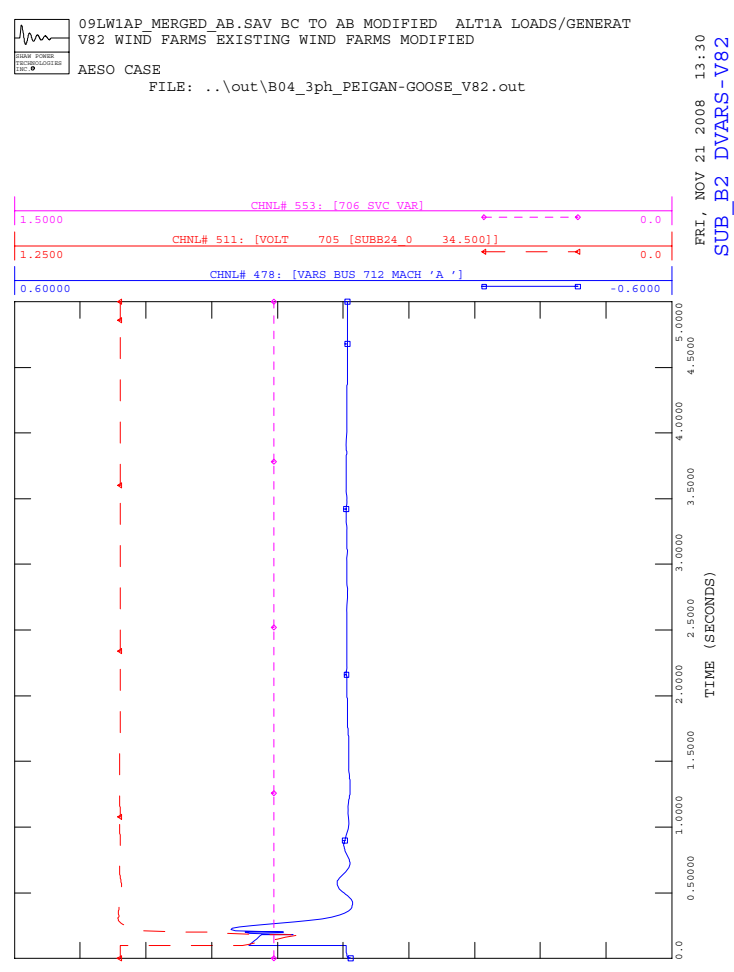
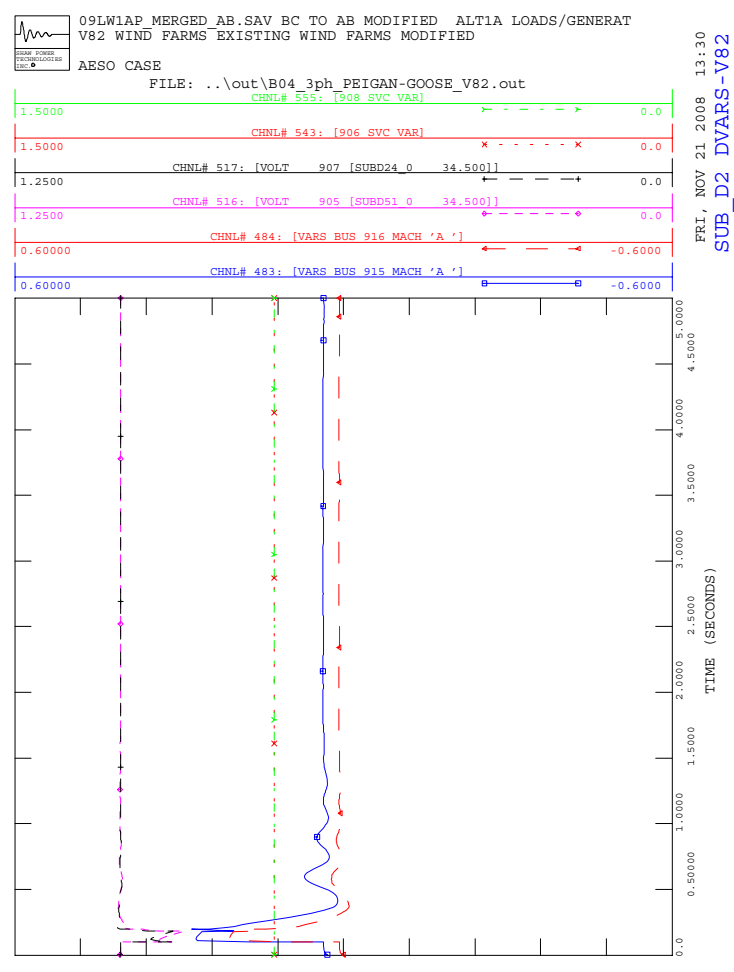
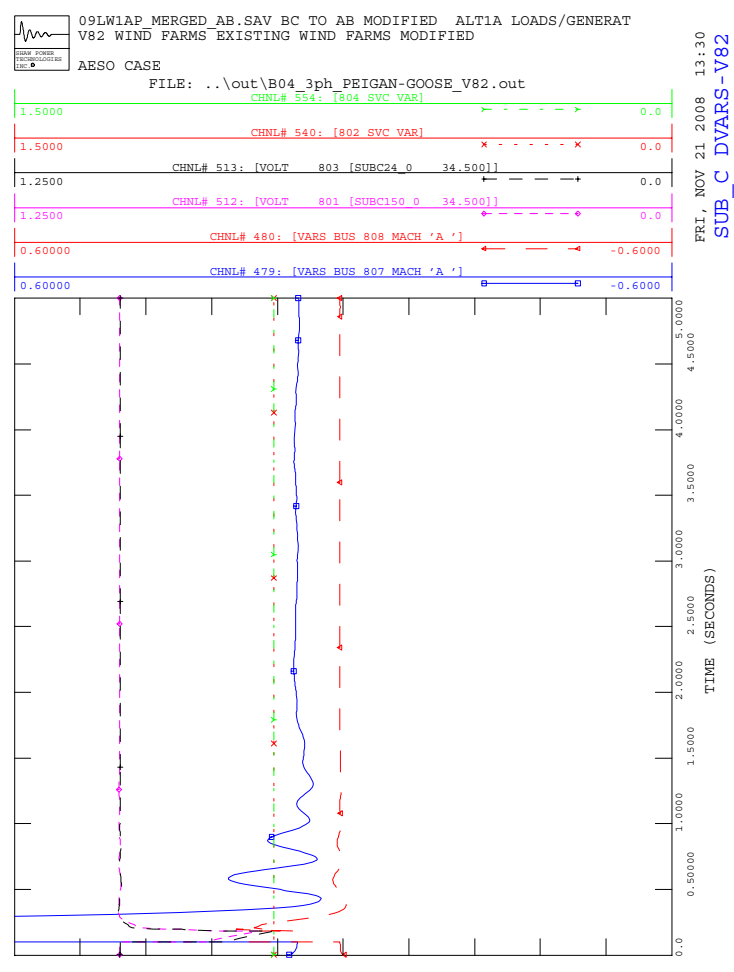


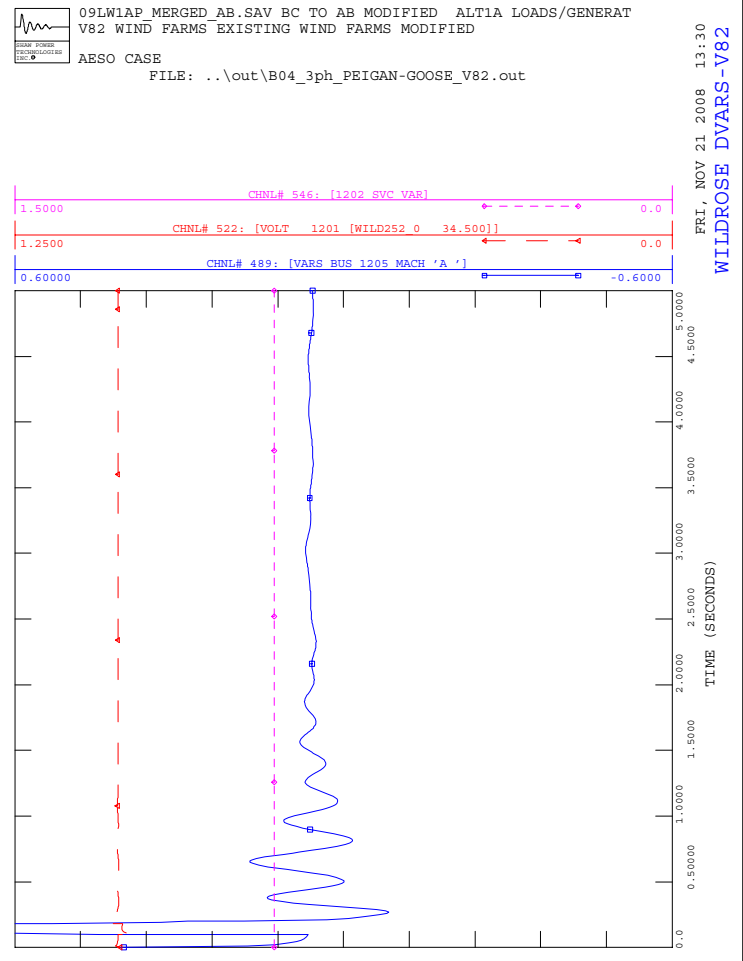
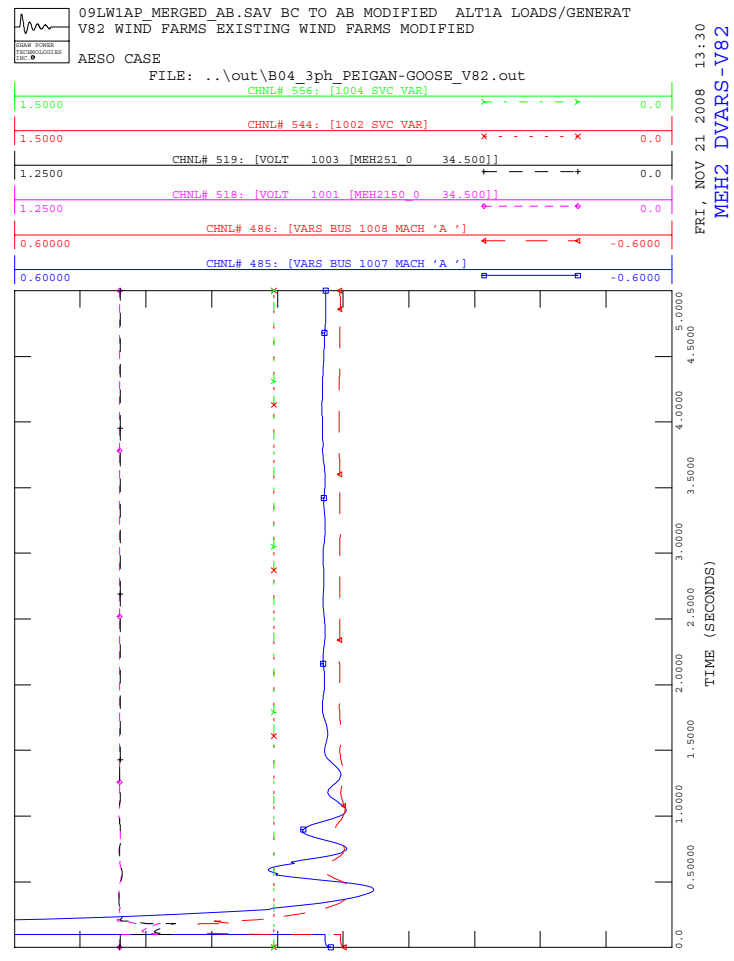
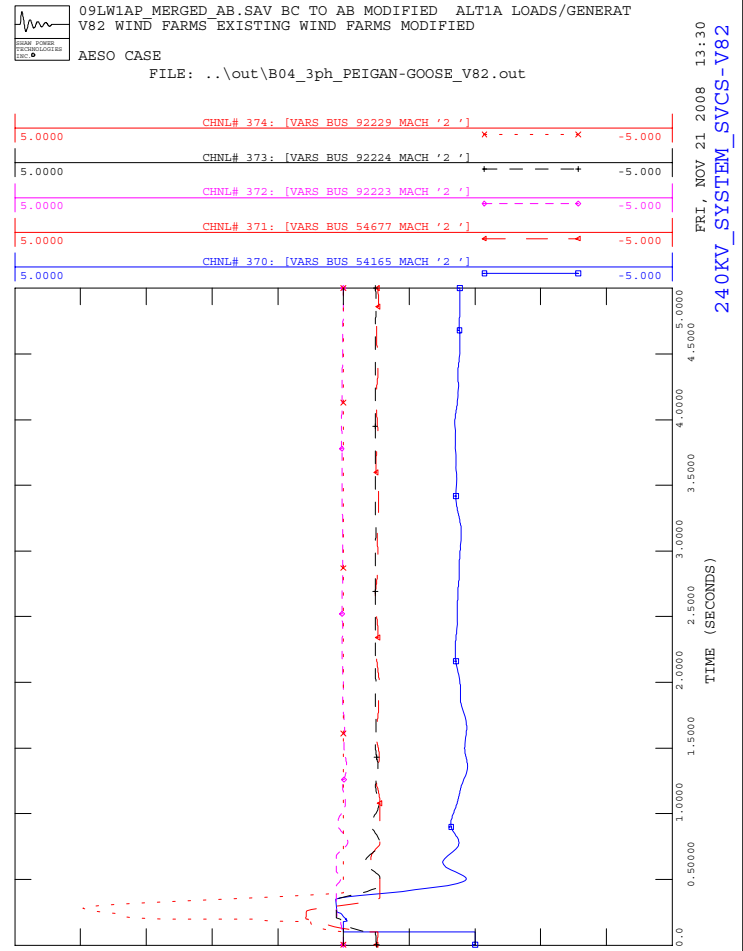
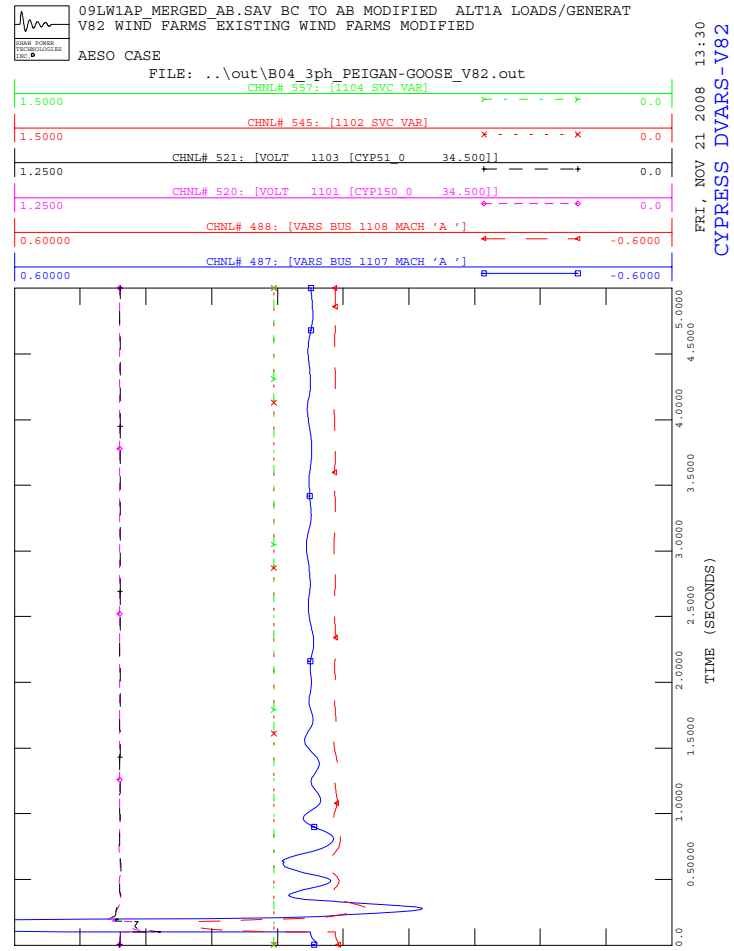








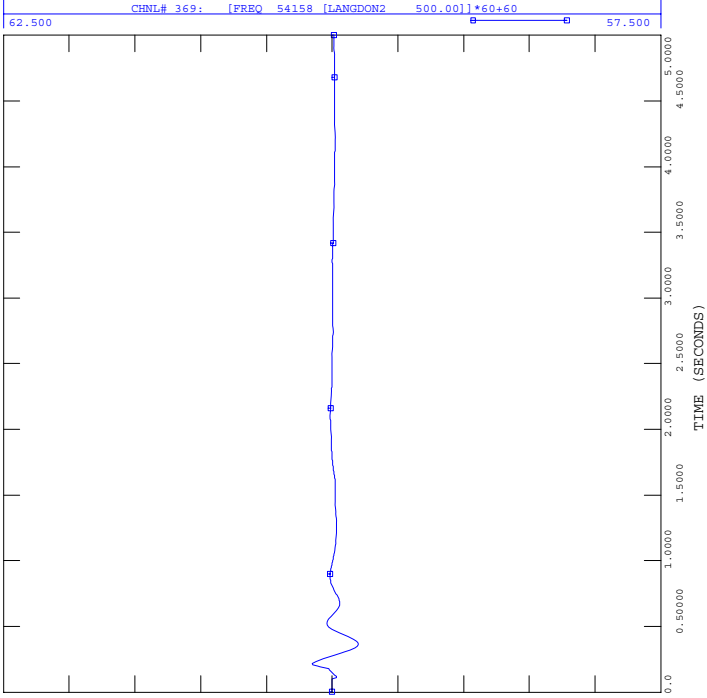






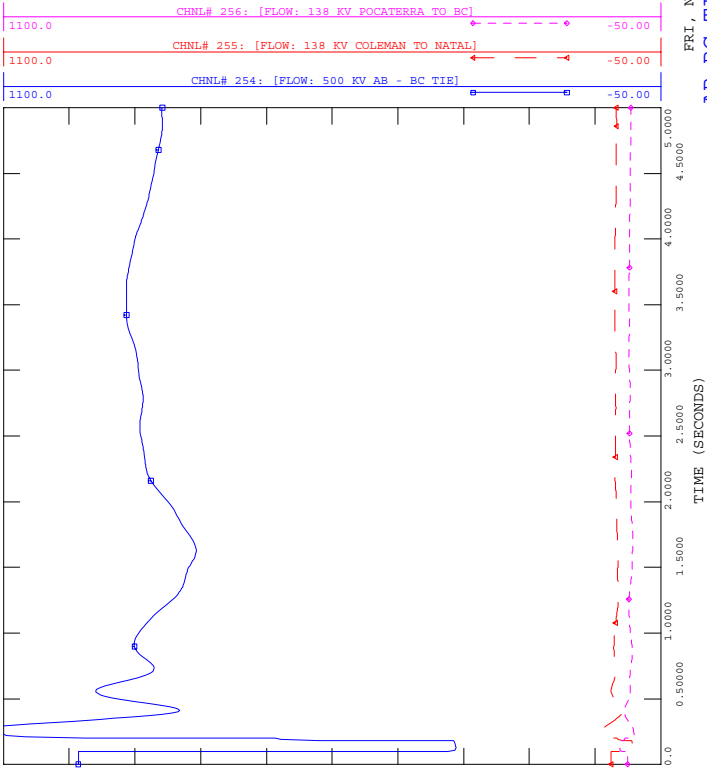
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B04_3ph_PEIGAN-GOOSE_V82.out

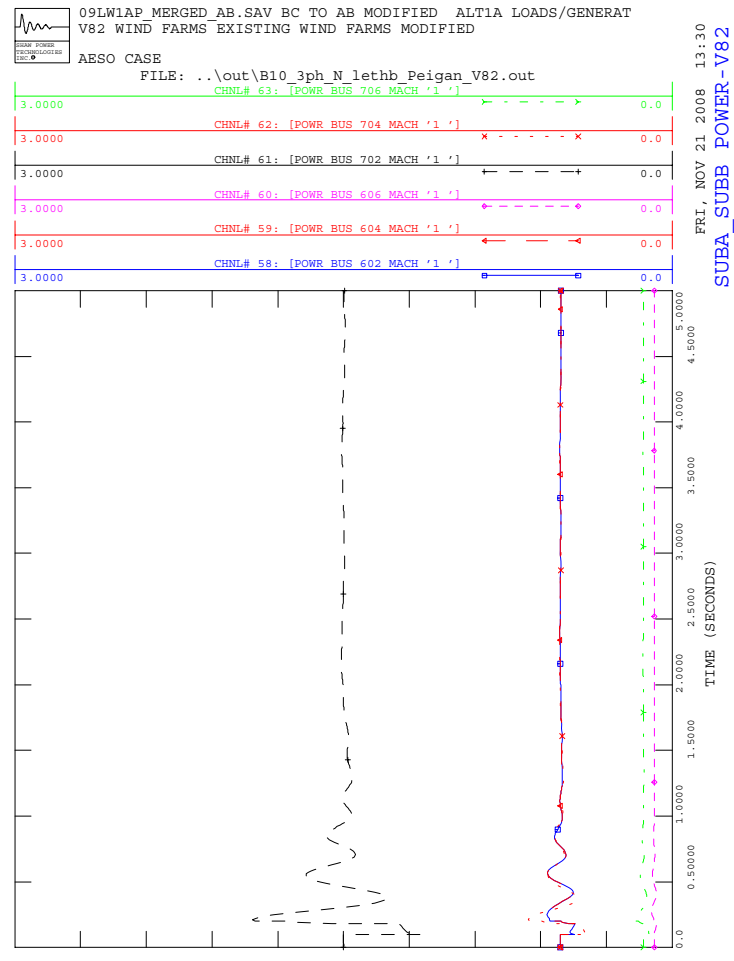
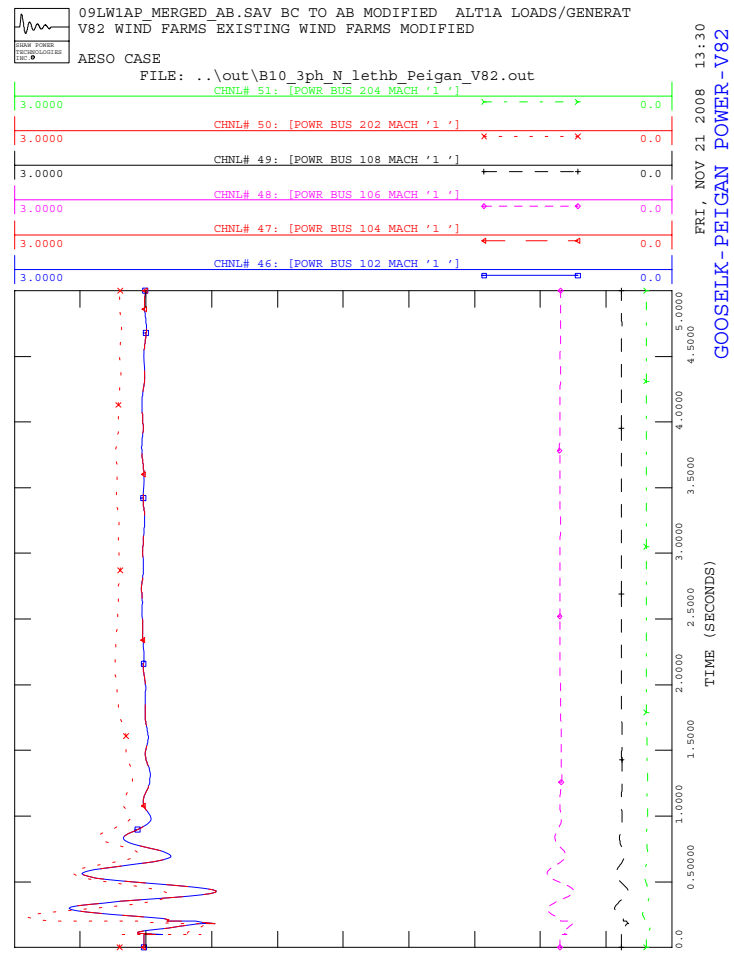
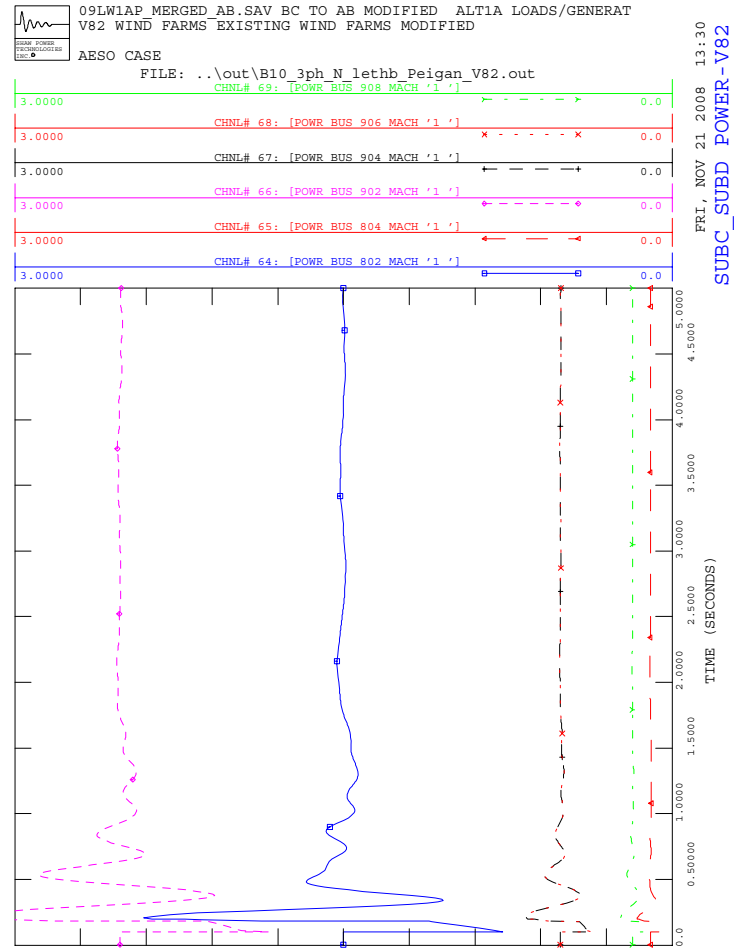
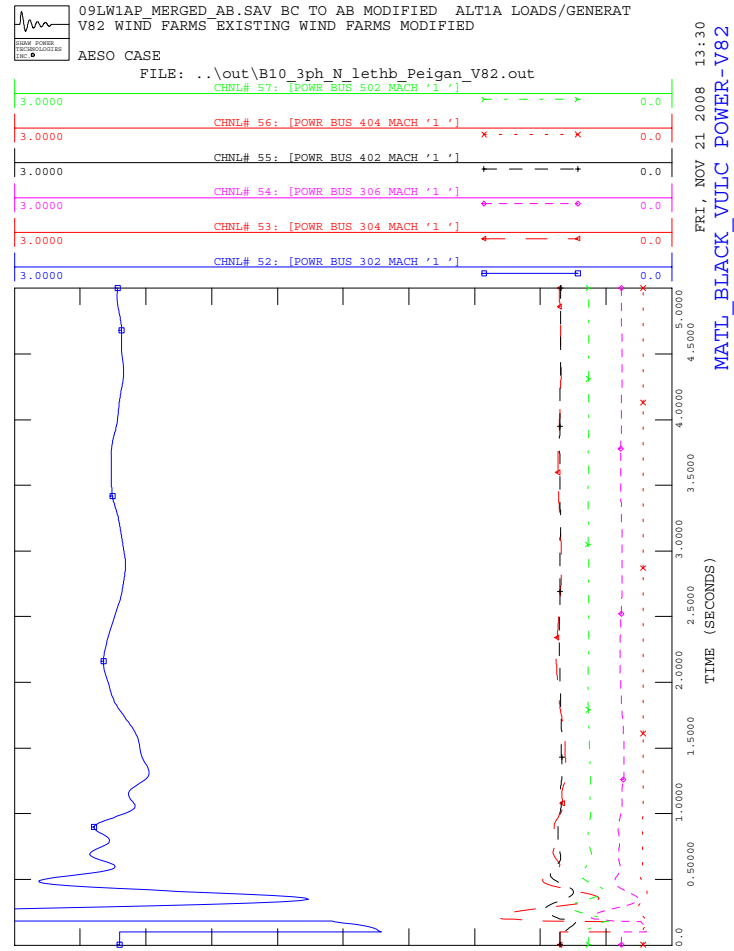
FRI, NOV 21 2008 13:30
LANGDON_FRQ - V82

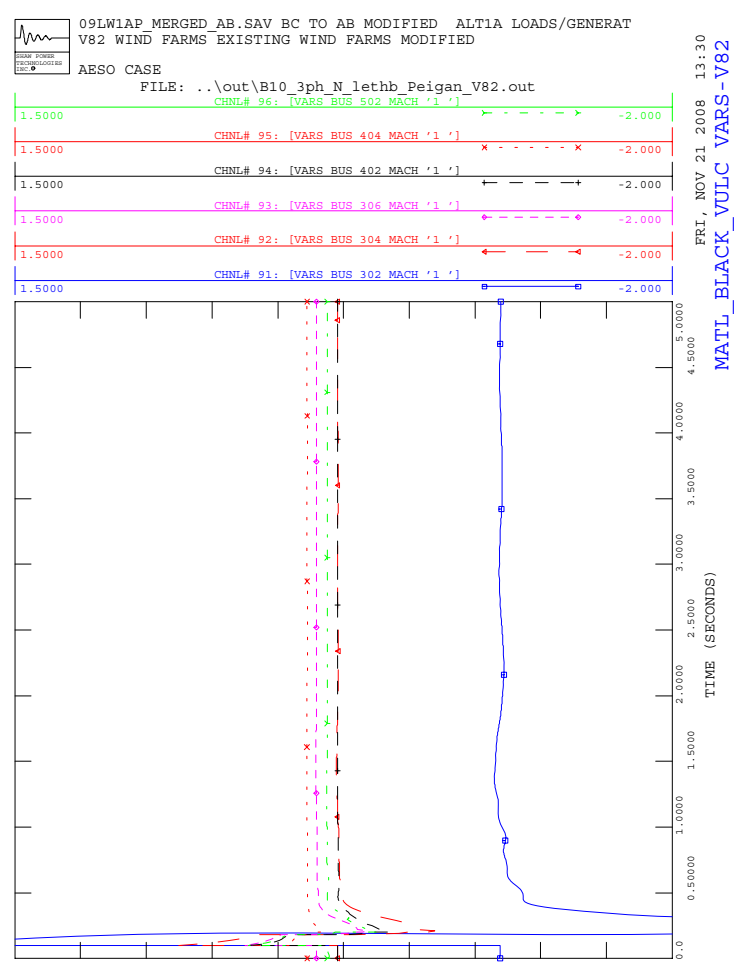
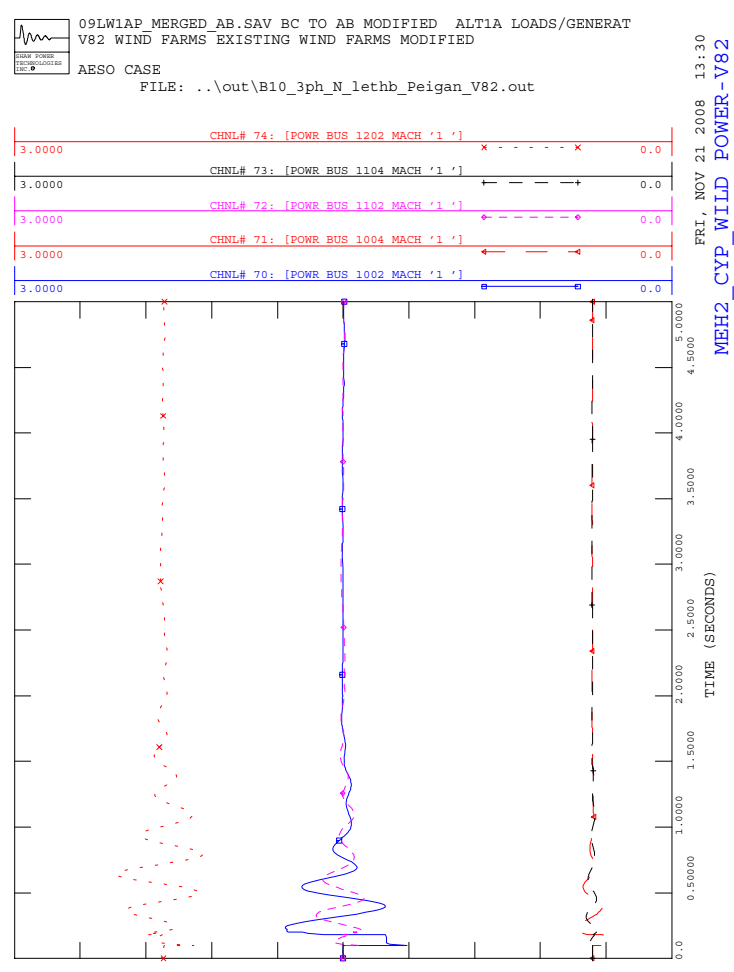
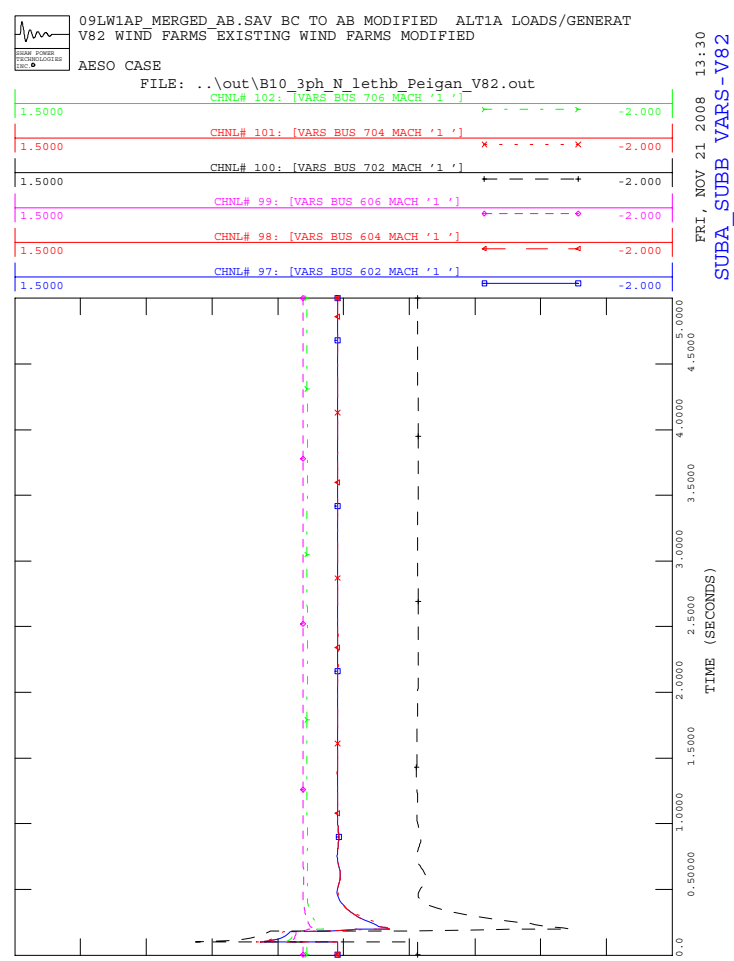
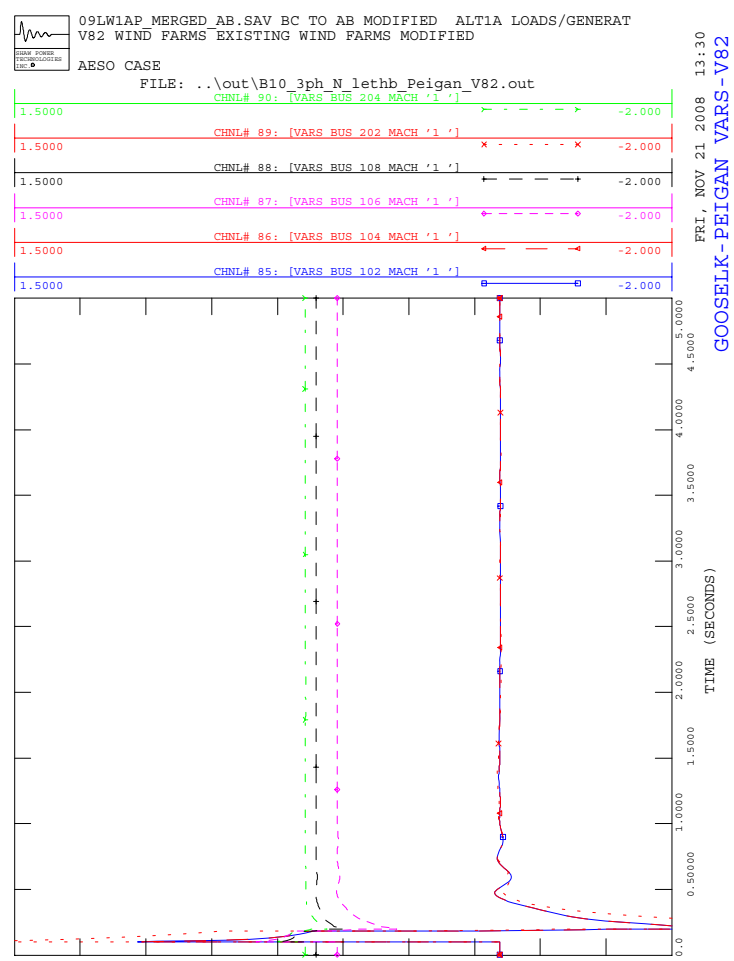


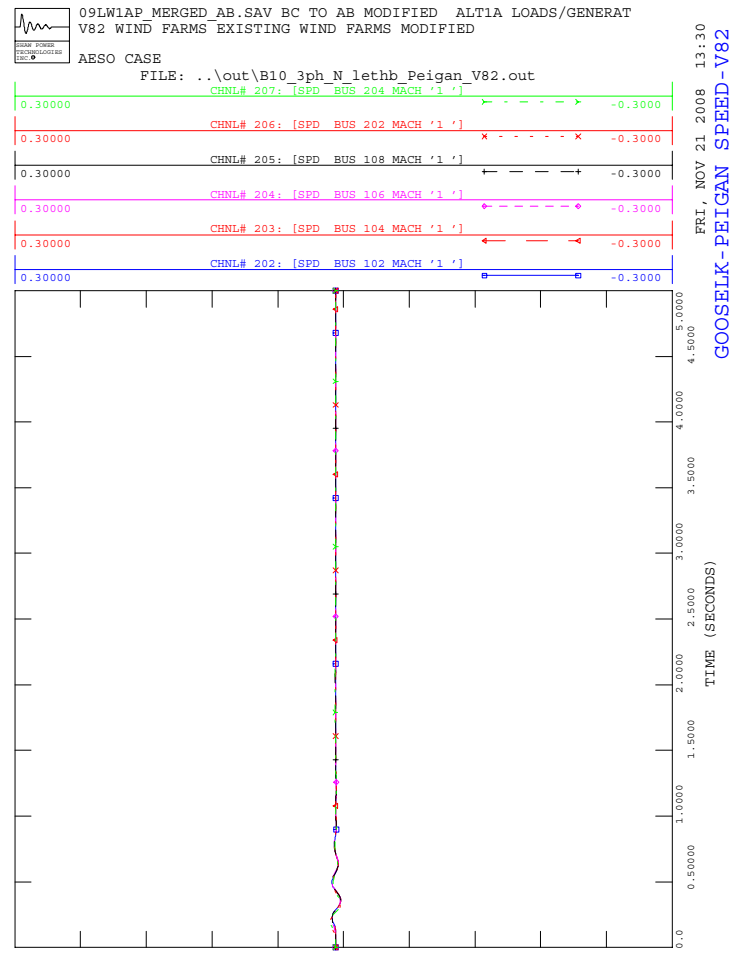
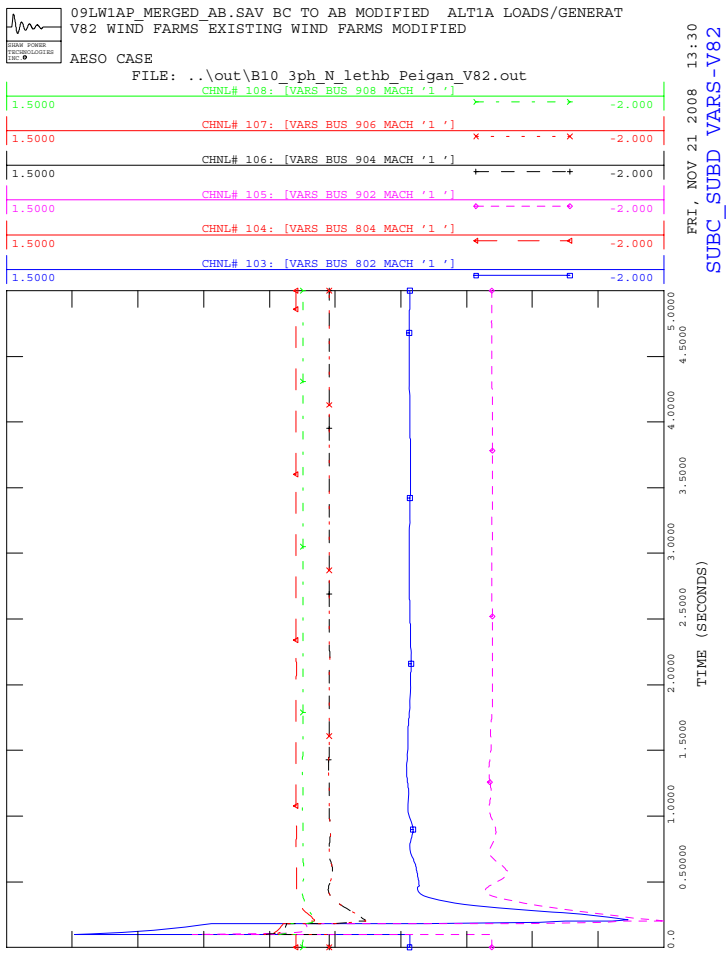
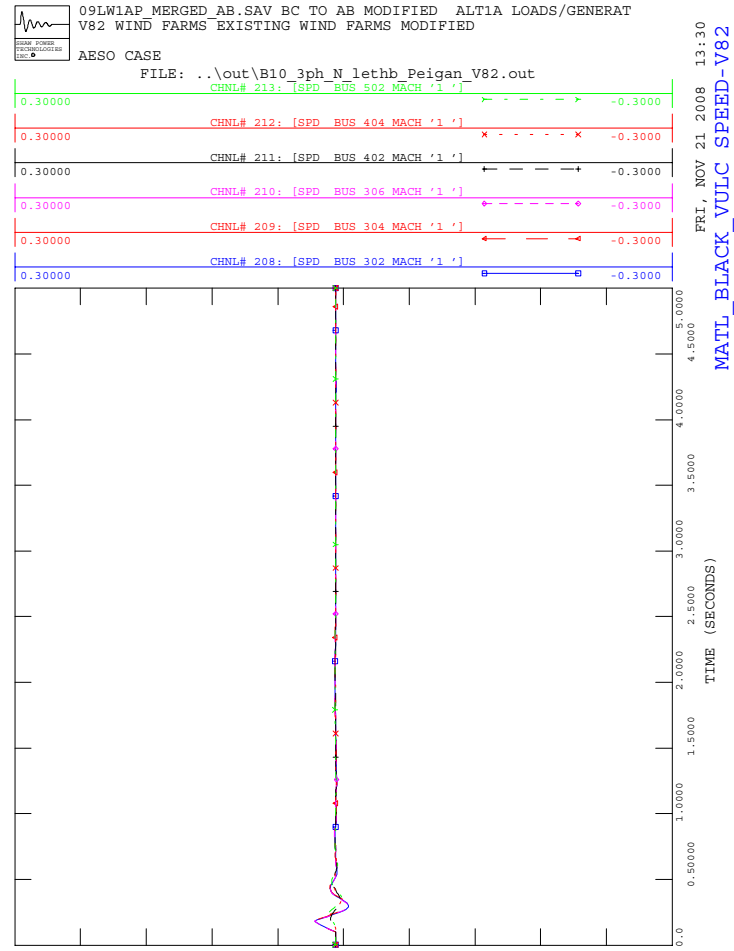
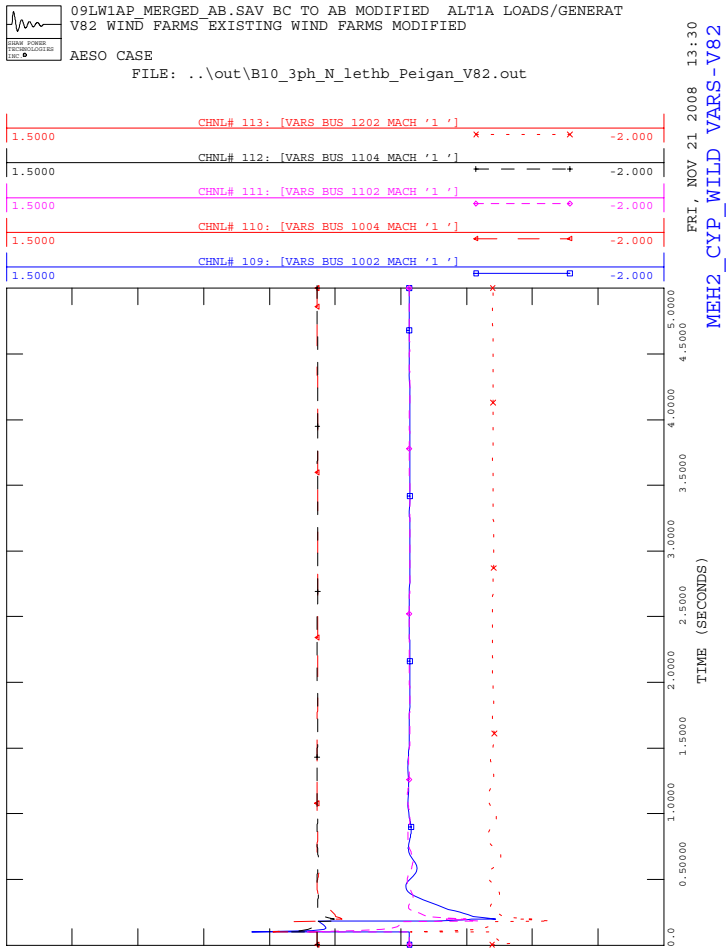
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B04_3ph_PEIGAN-GOOSE_V82.out

FRI, NOV 21 2008 13:30
AB_BC_TIE_FLOWS - V82



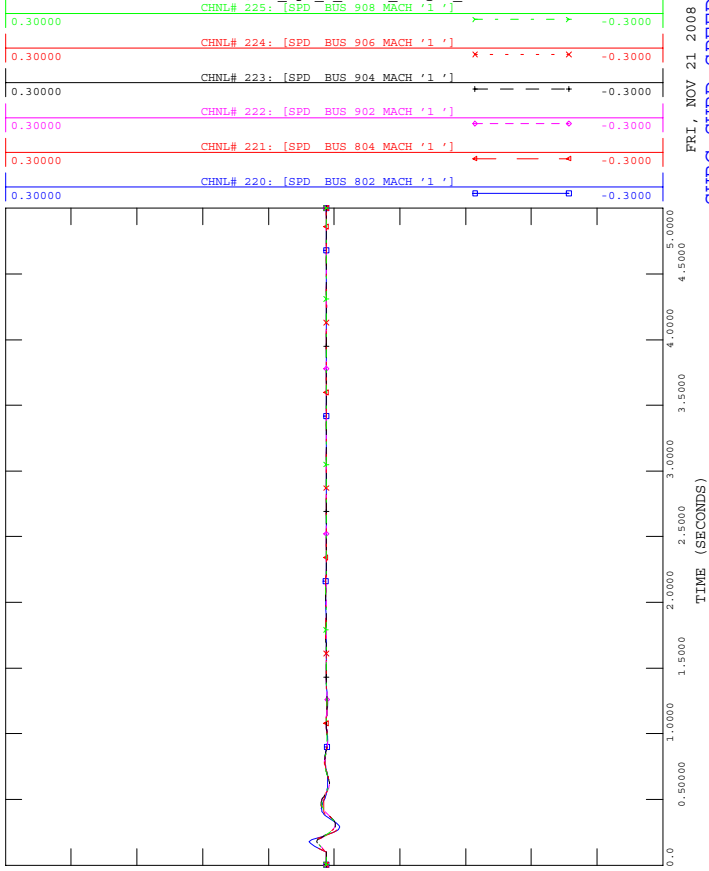






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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

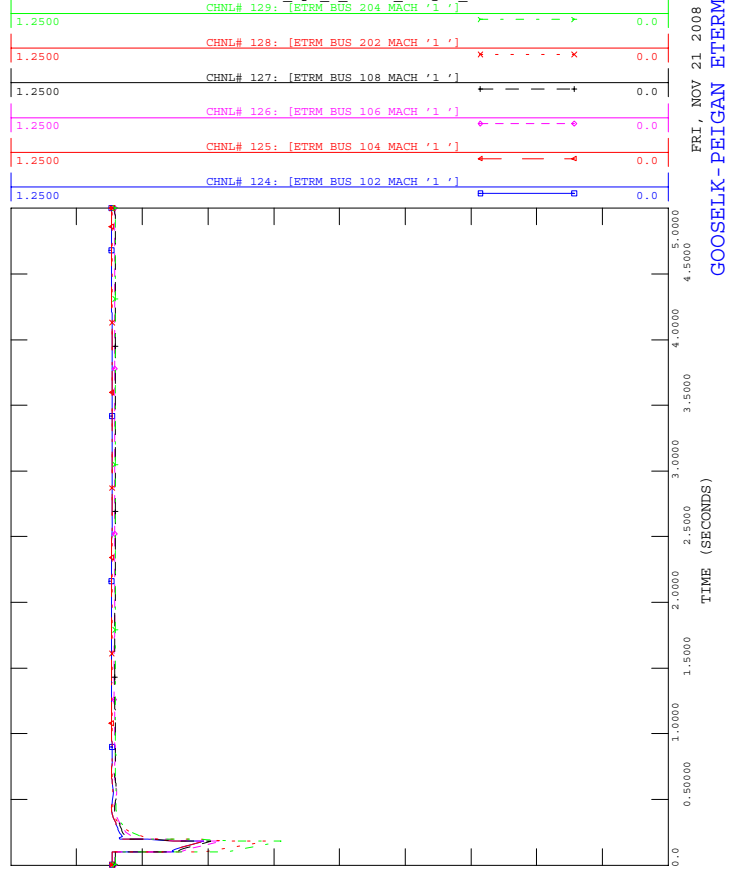
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FRI, NOV 21 2008 13:30
SUBC_SUBD SPEED-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

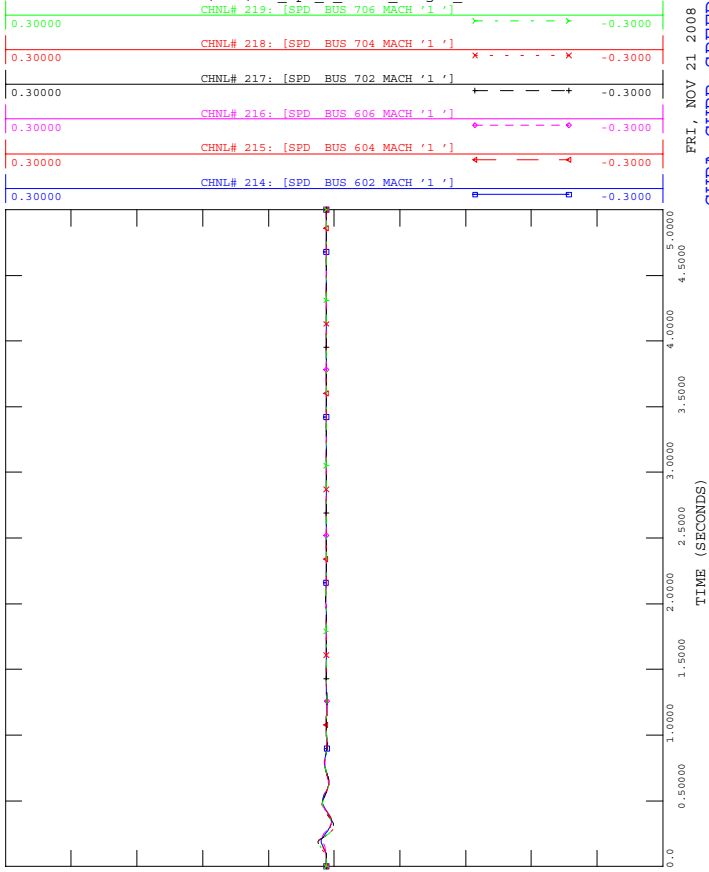
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FRI, NOV 21 2008 13:30
GOOSELK-PEIGAN ETERM-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

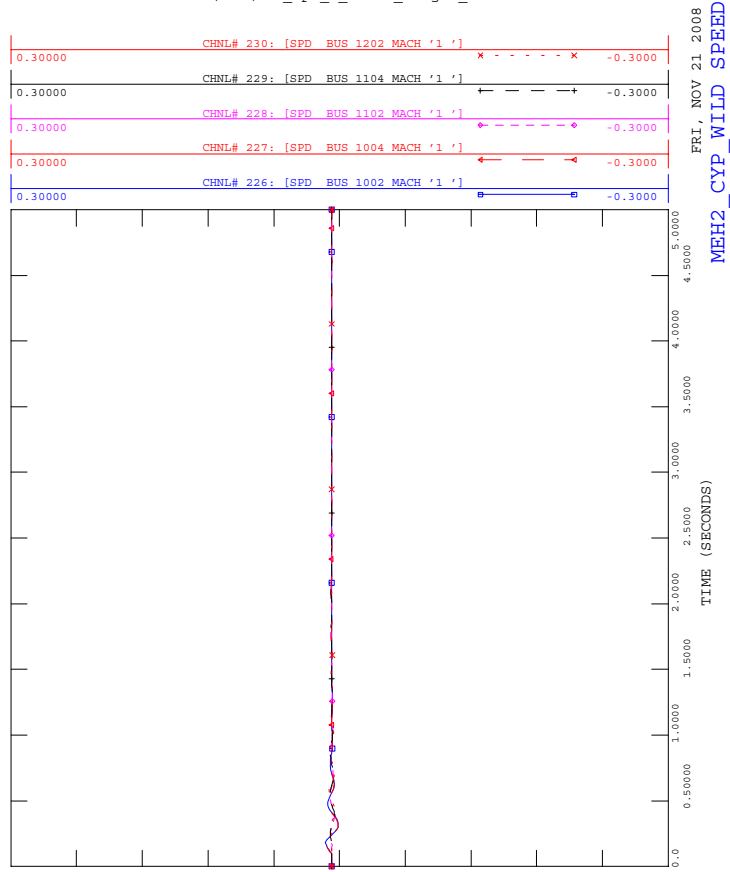
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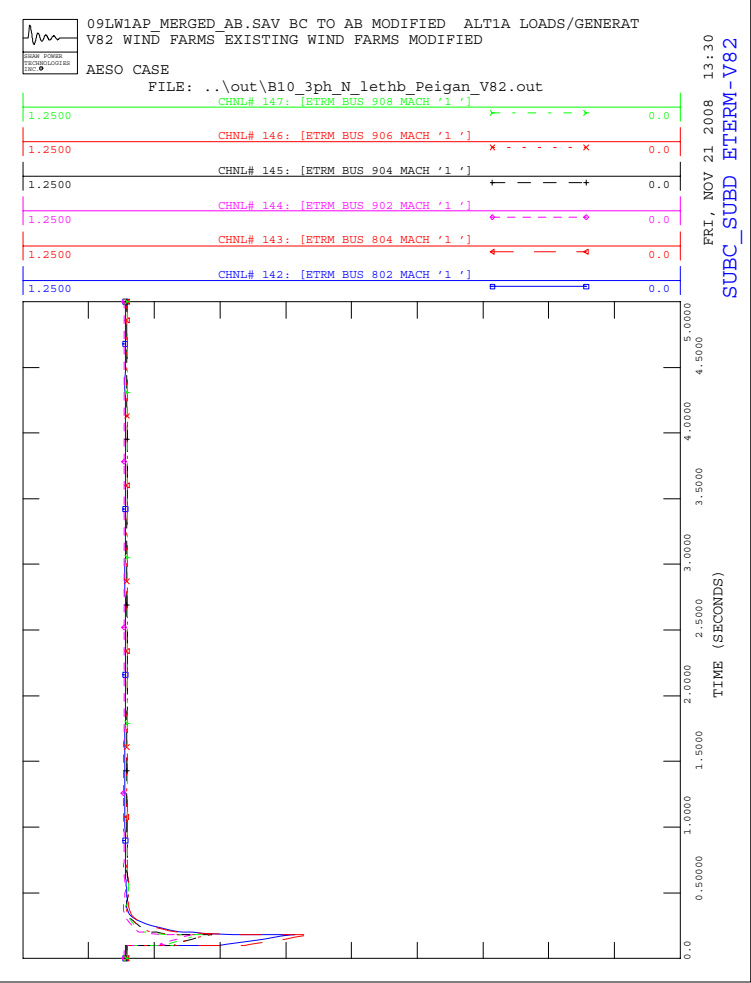
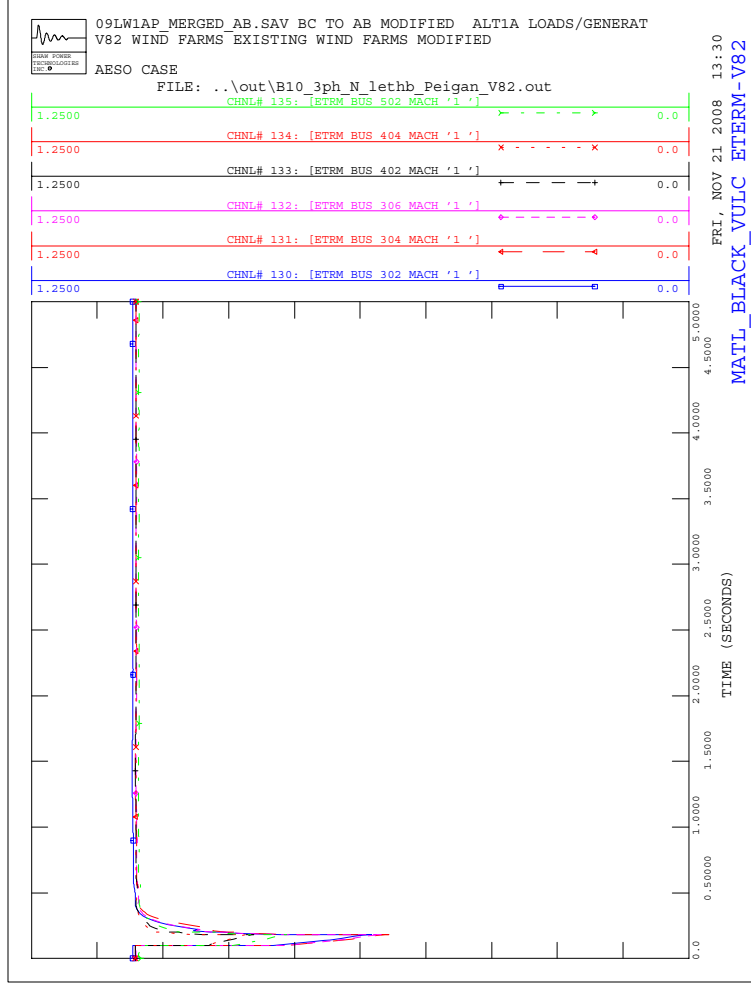
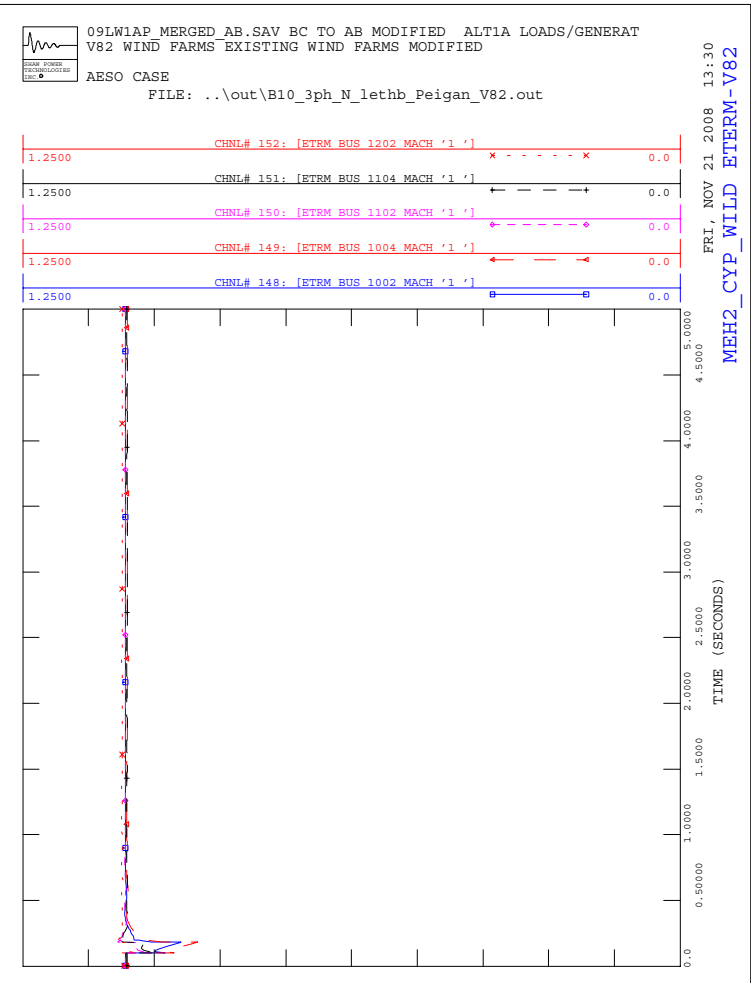
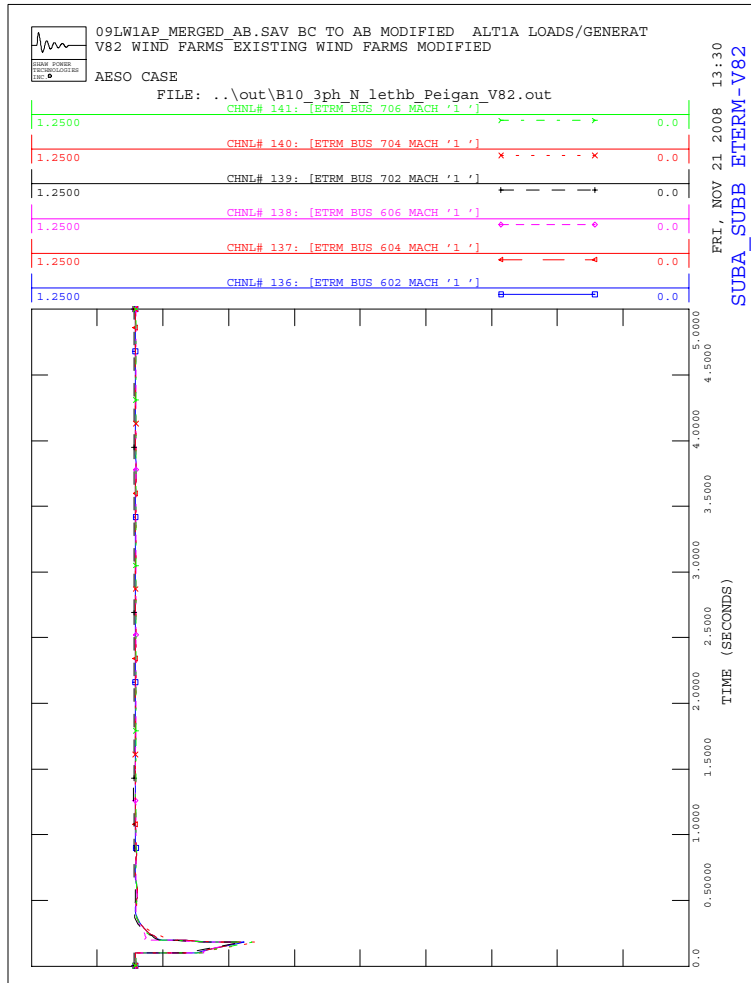
FRI, NOV 21 2008 13:30
SUBA_SUBD SPEED-V82

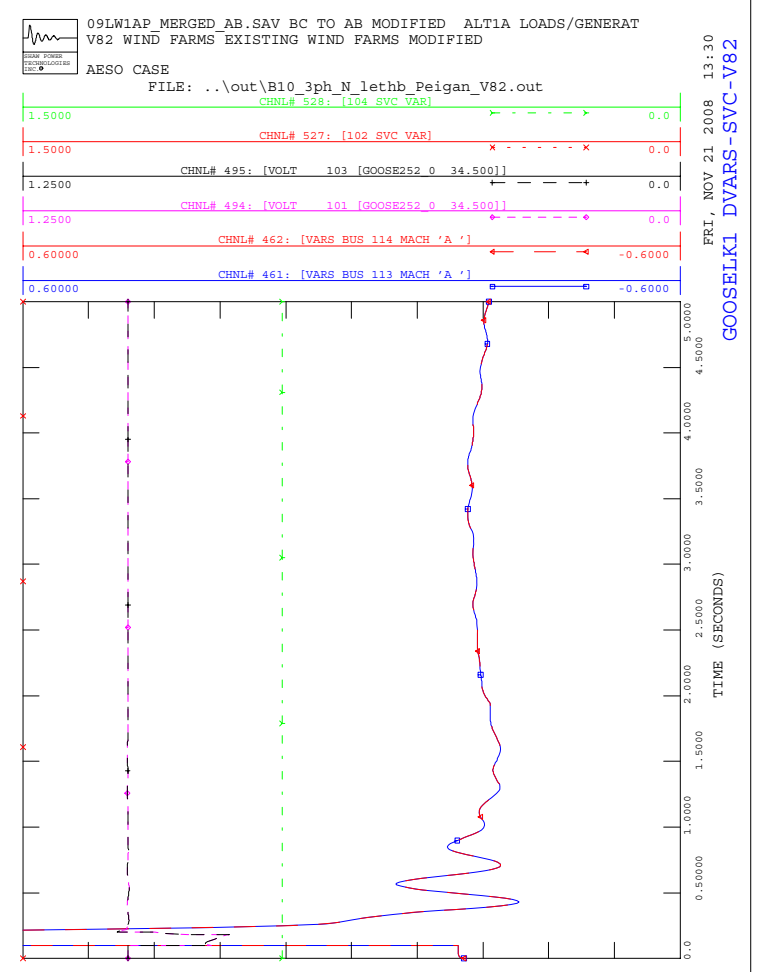
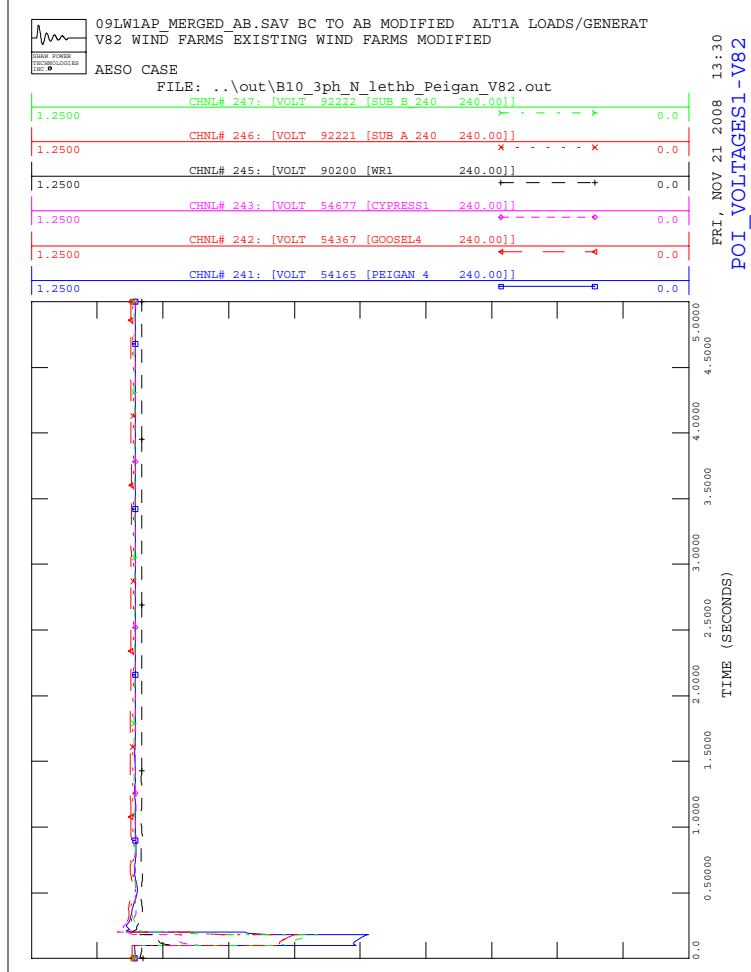
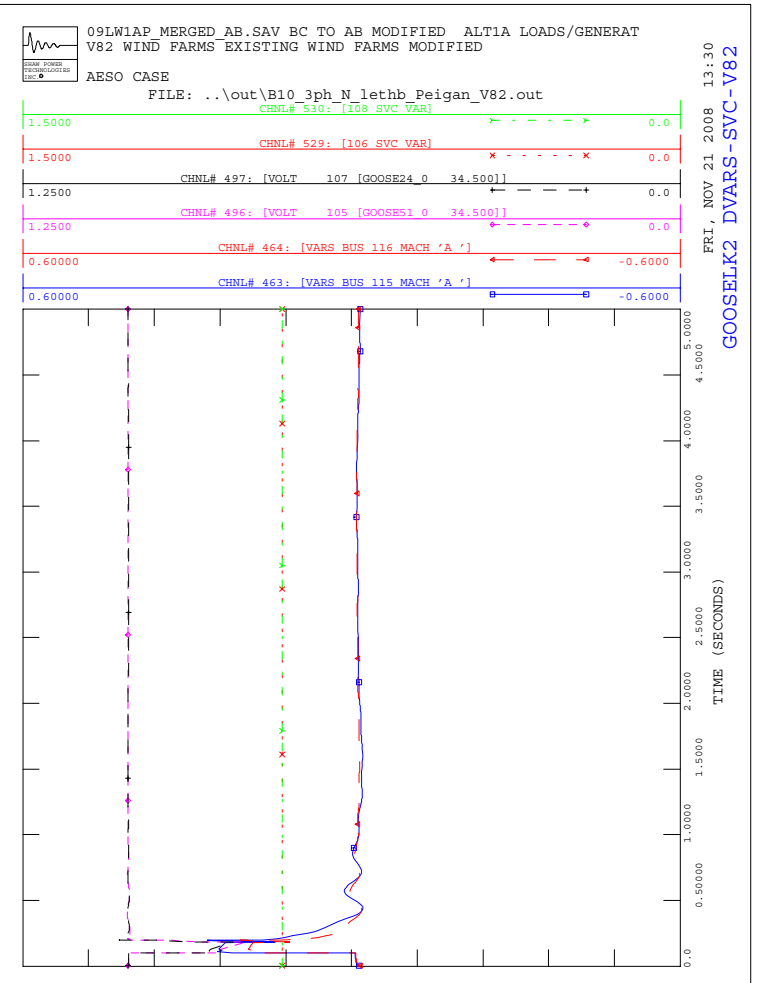
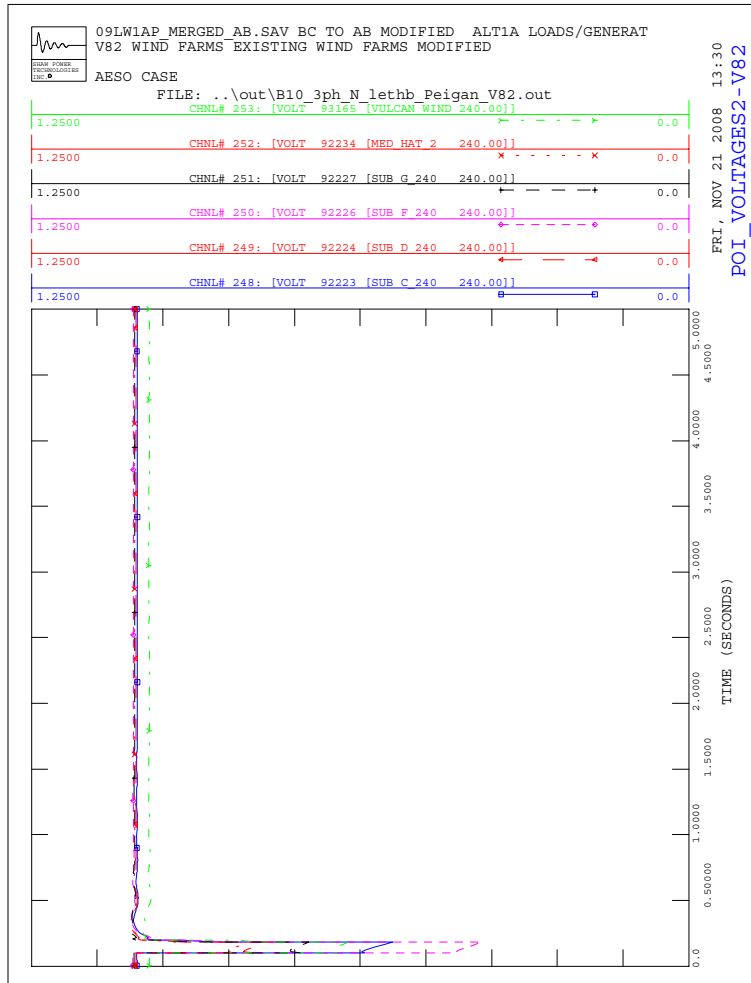
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

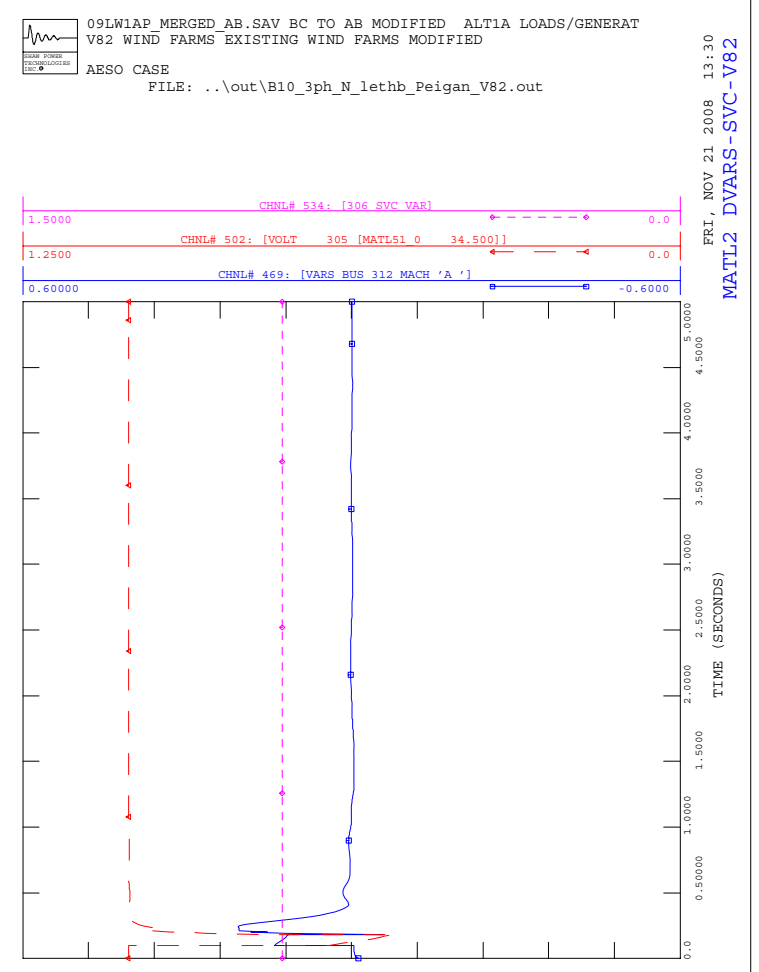
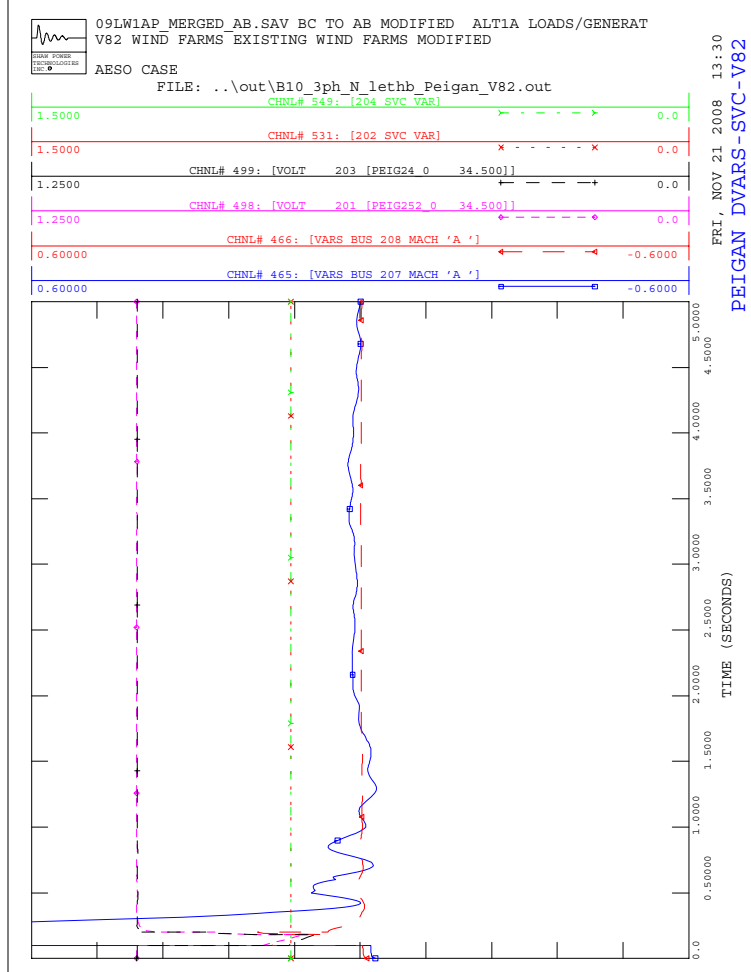
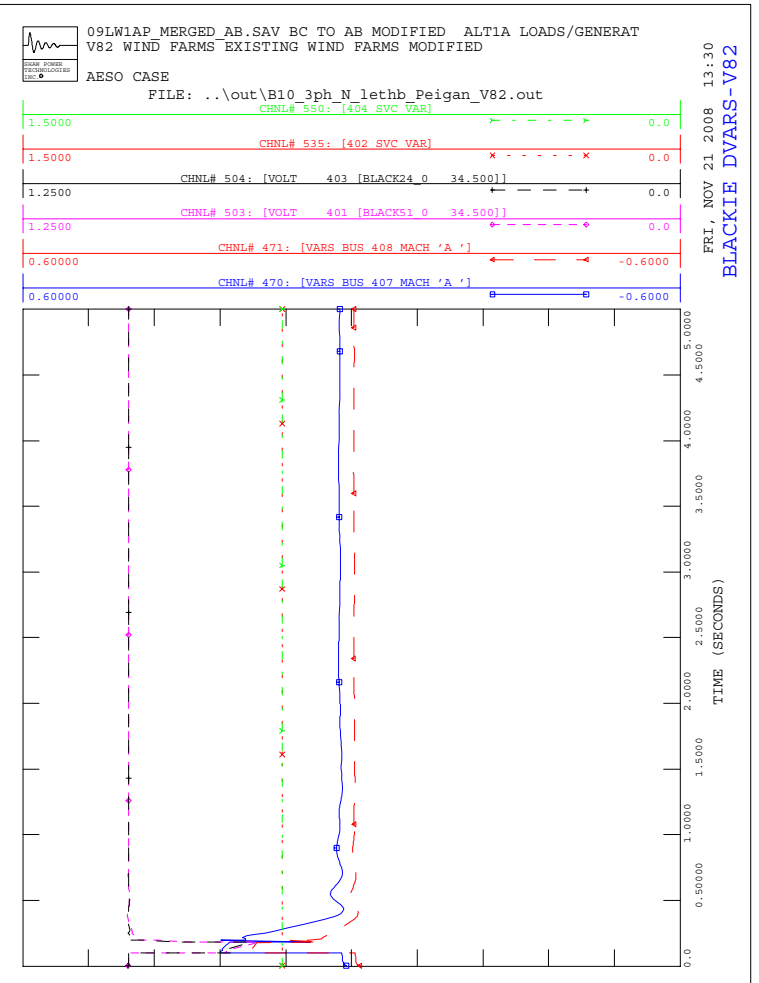
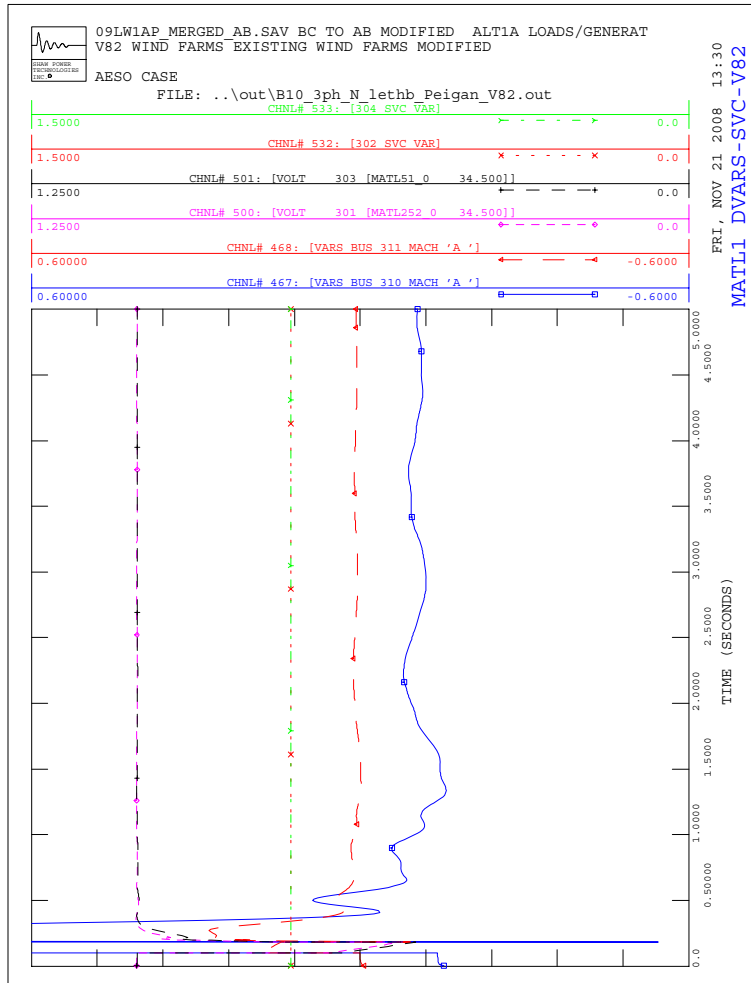
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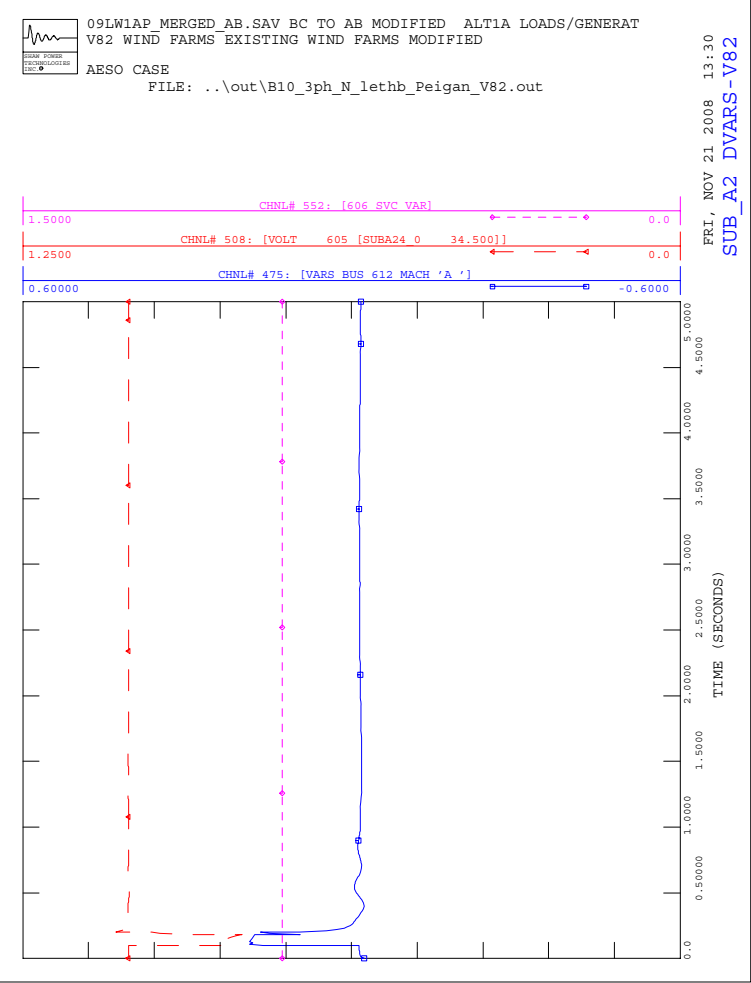
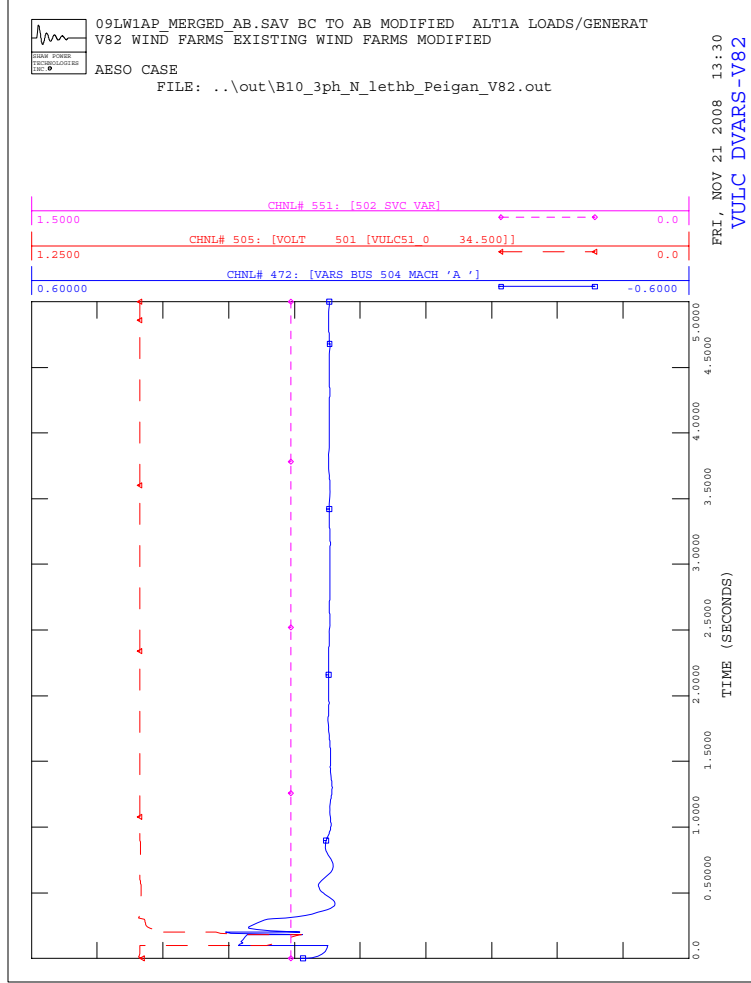
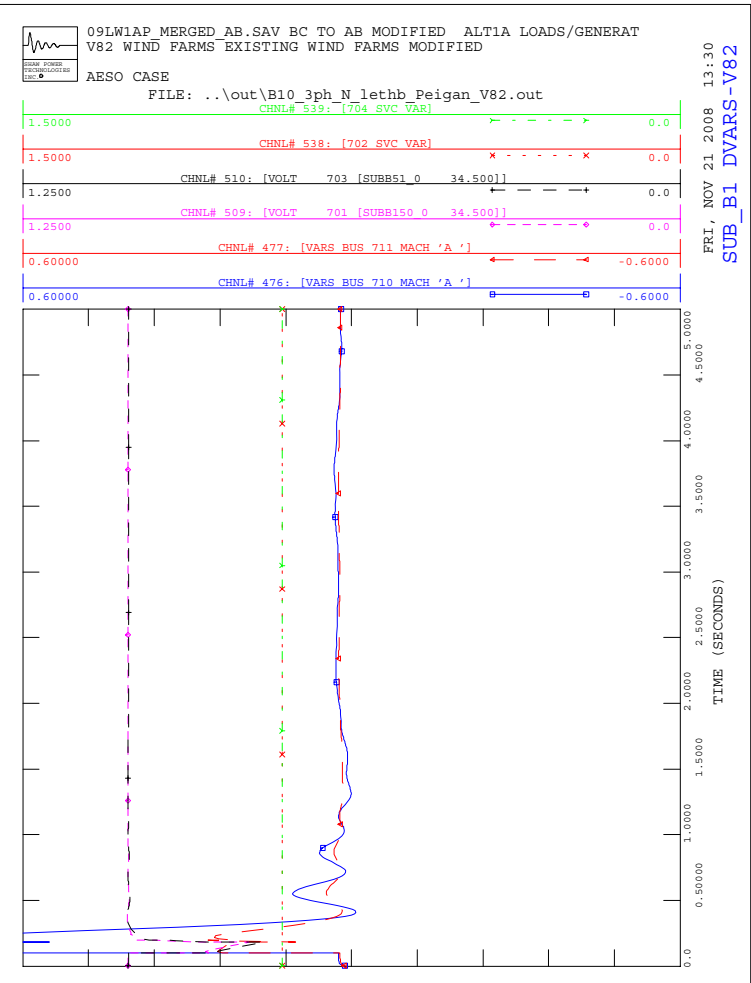
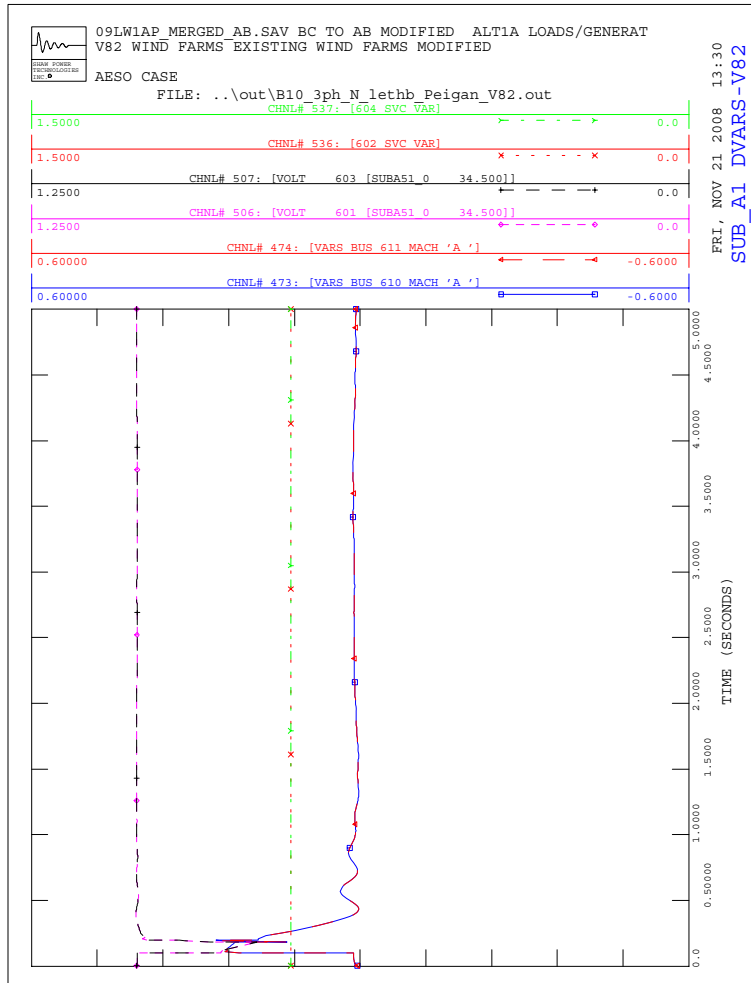


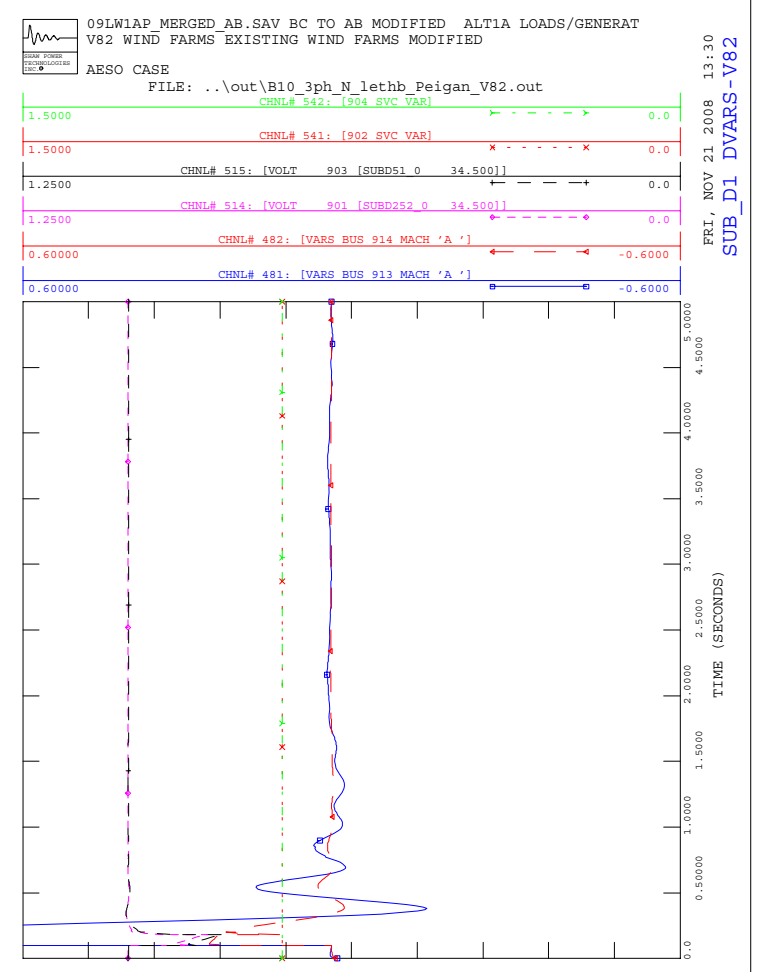
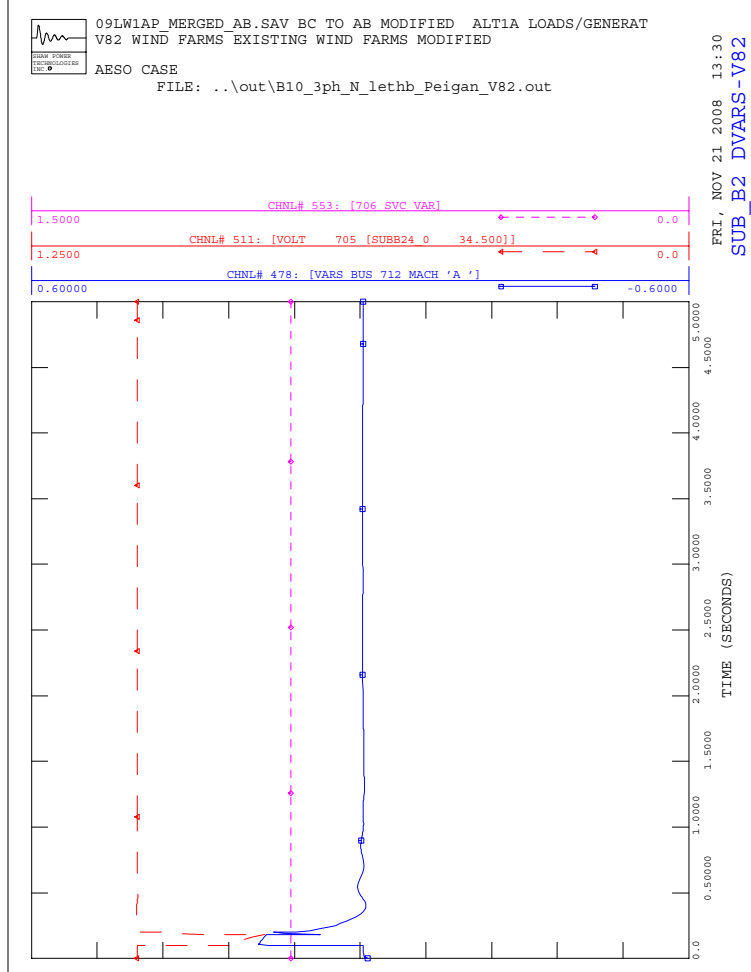
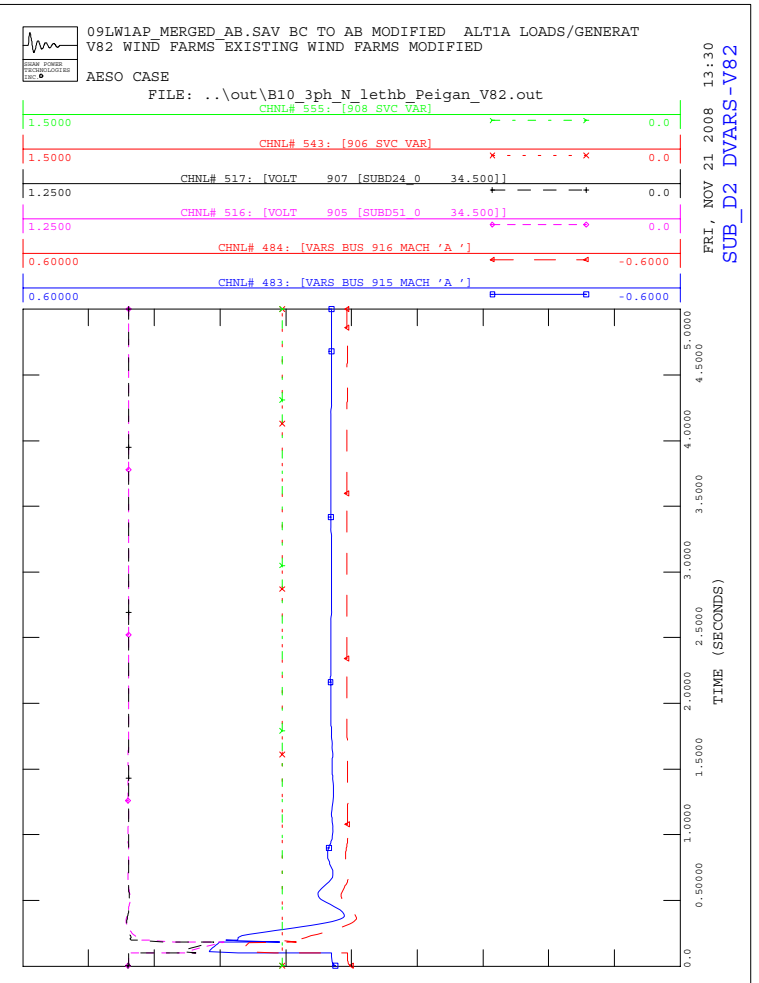
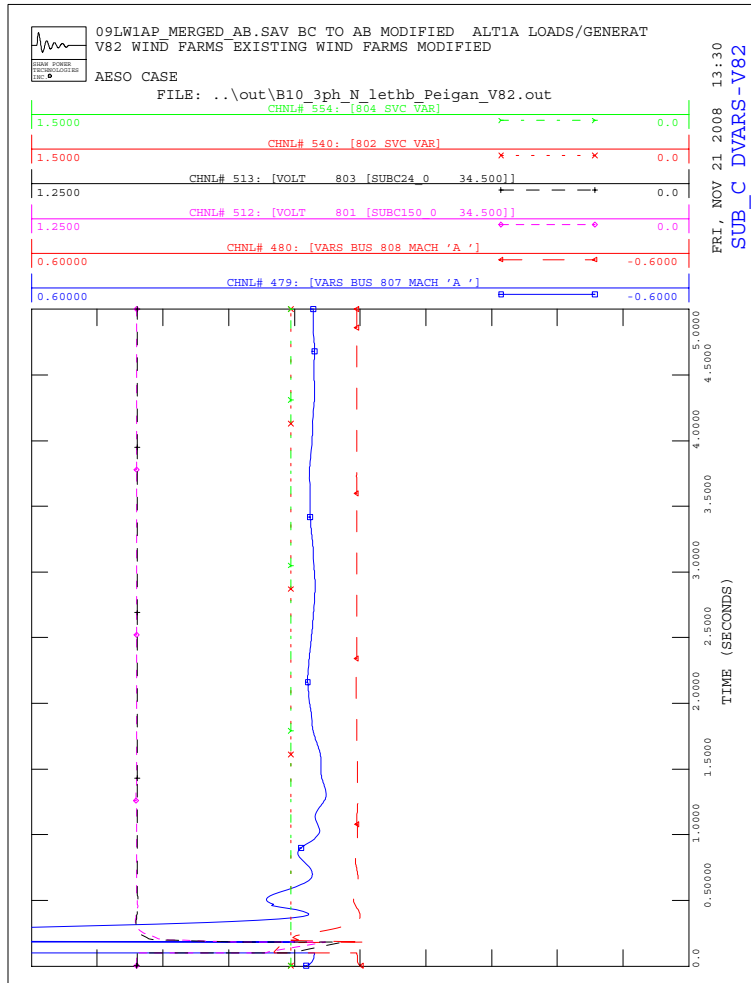
FRI, NOV 21 2008 13:30
MEH2_CYP_WILD SPEED-V82

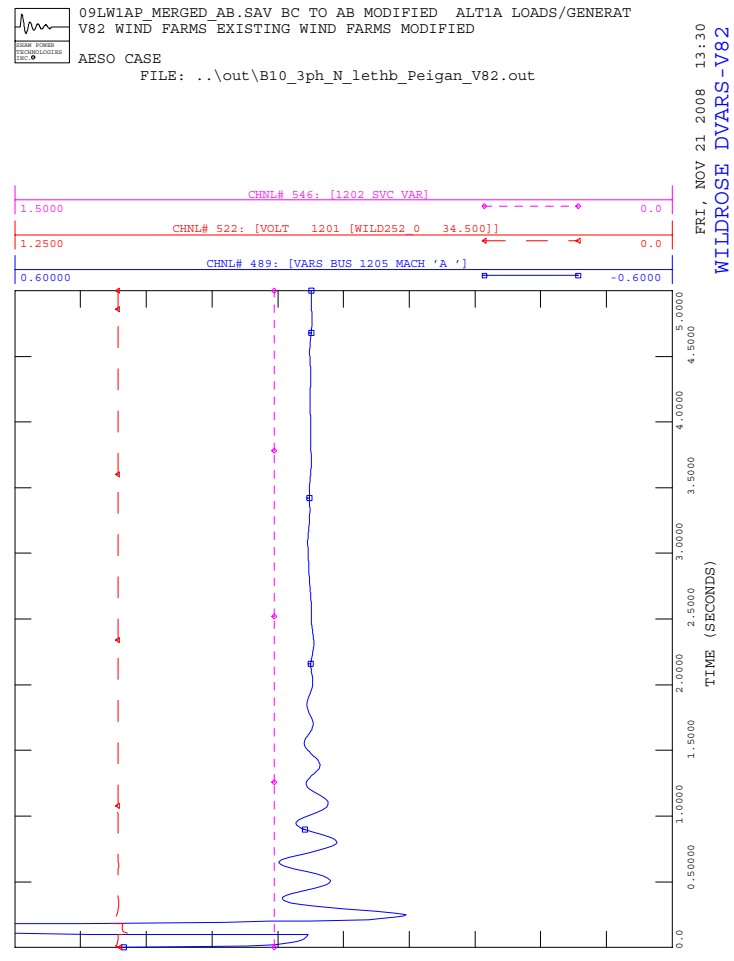
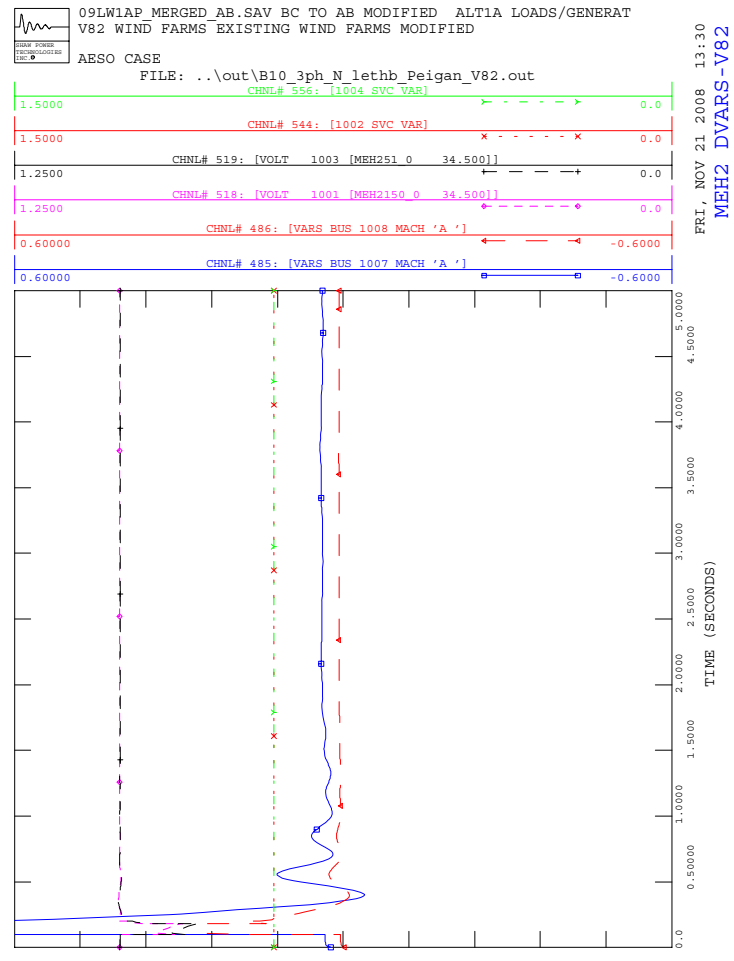
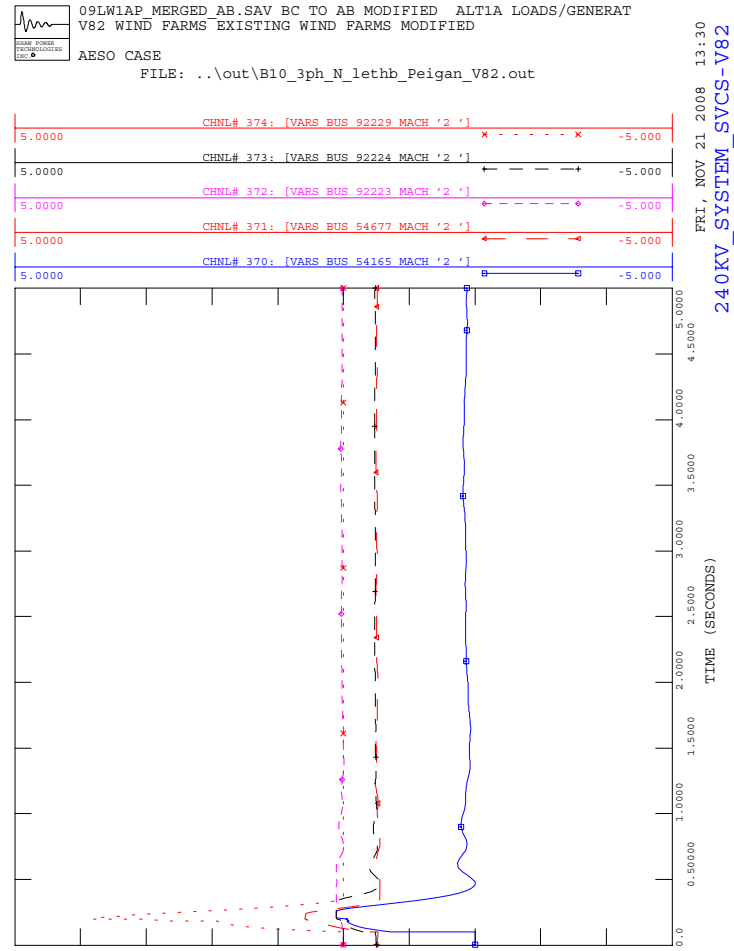
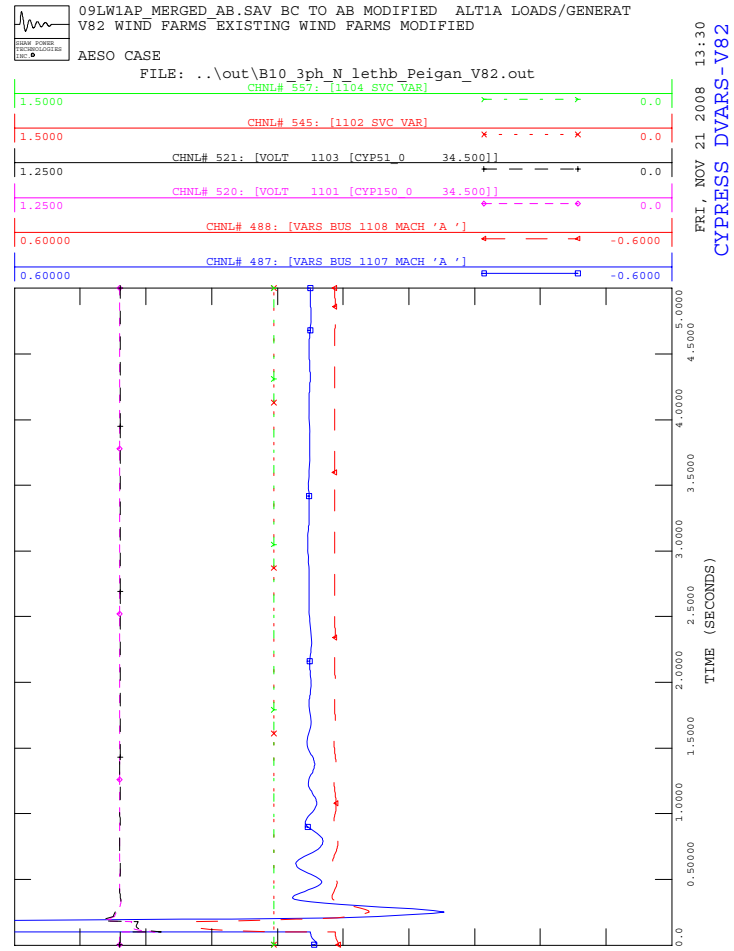












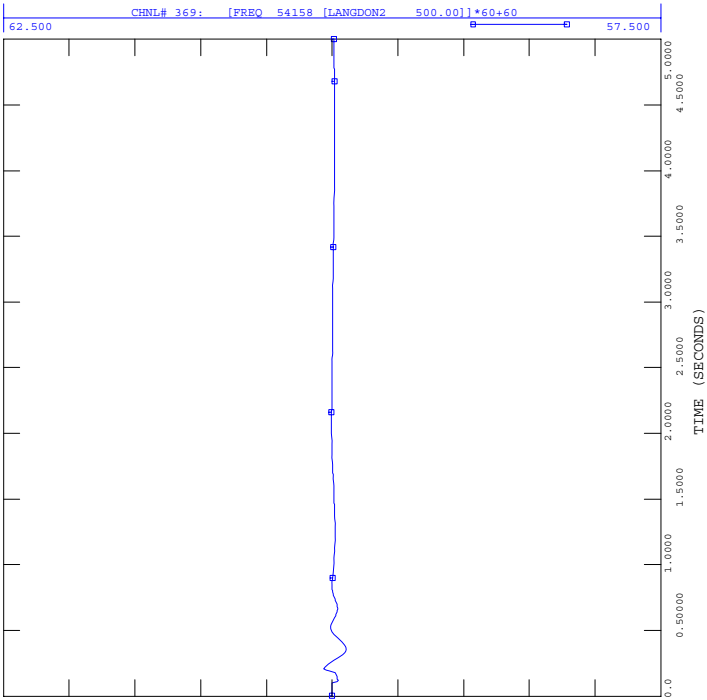


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B10_3ph_N_lethb_Peigan_V82.out

FRI, NOV 21 2008 13:30
LANGDON_FRQ-V82

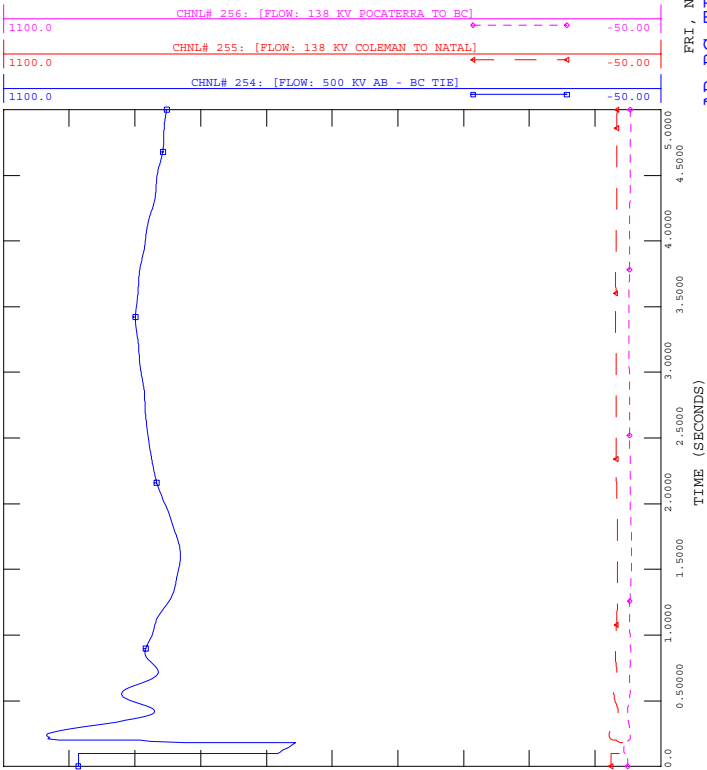


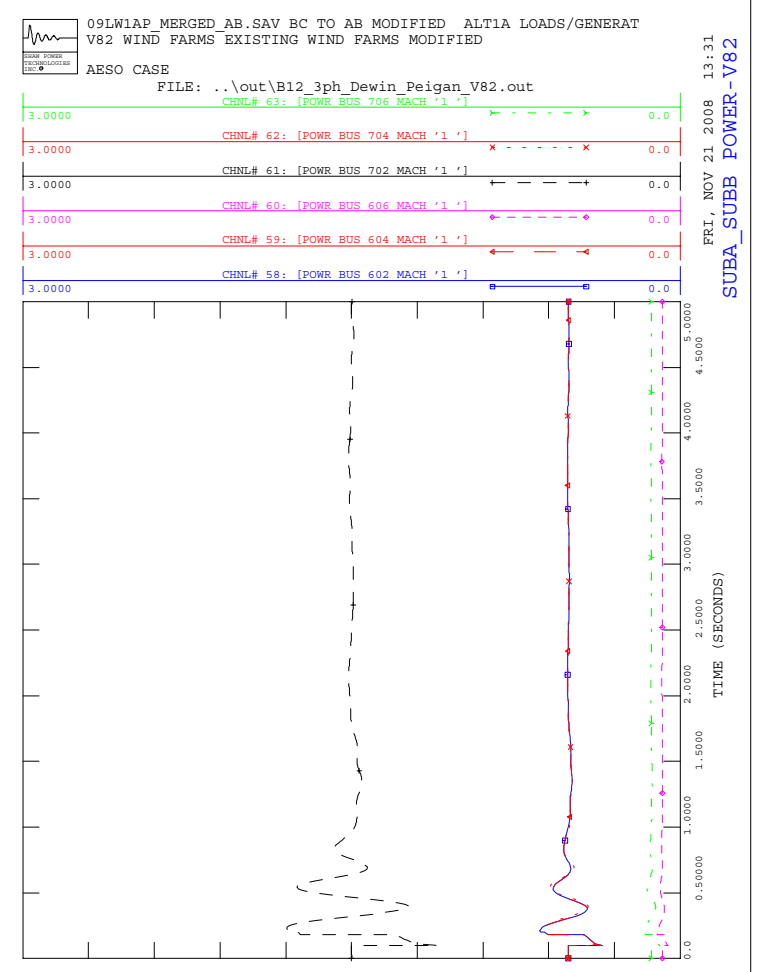
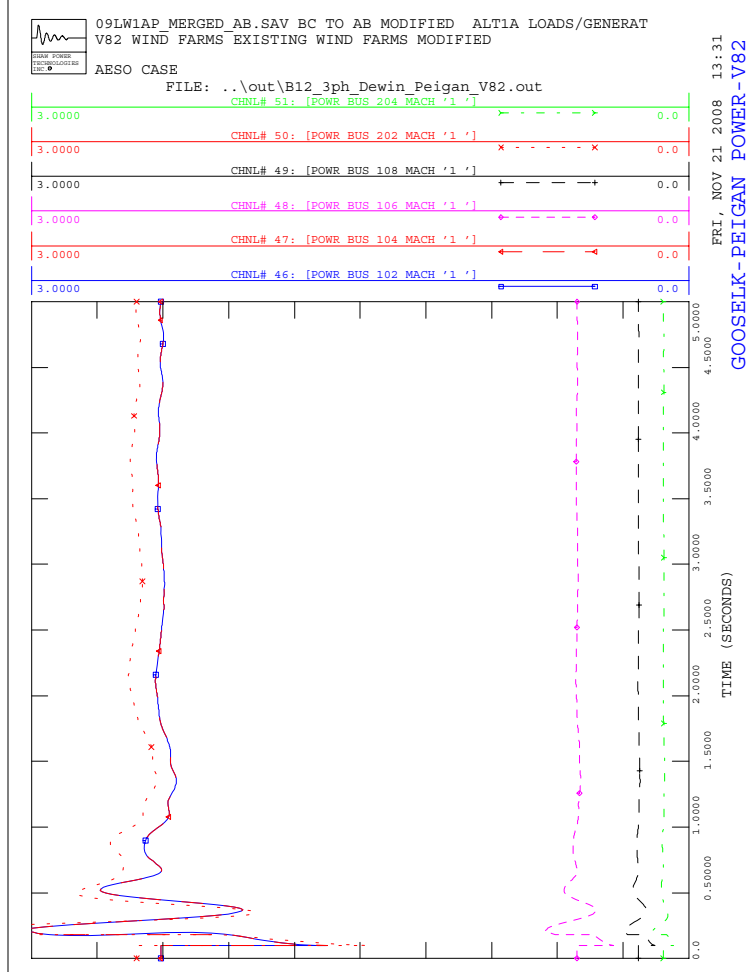
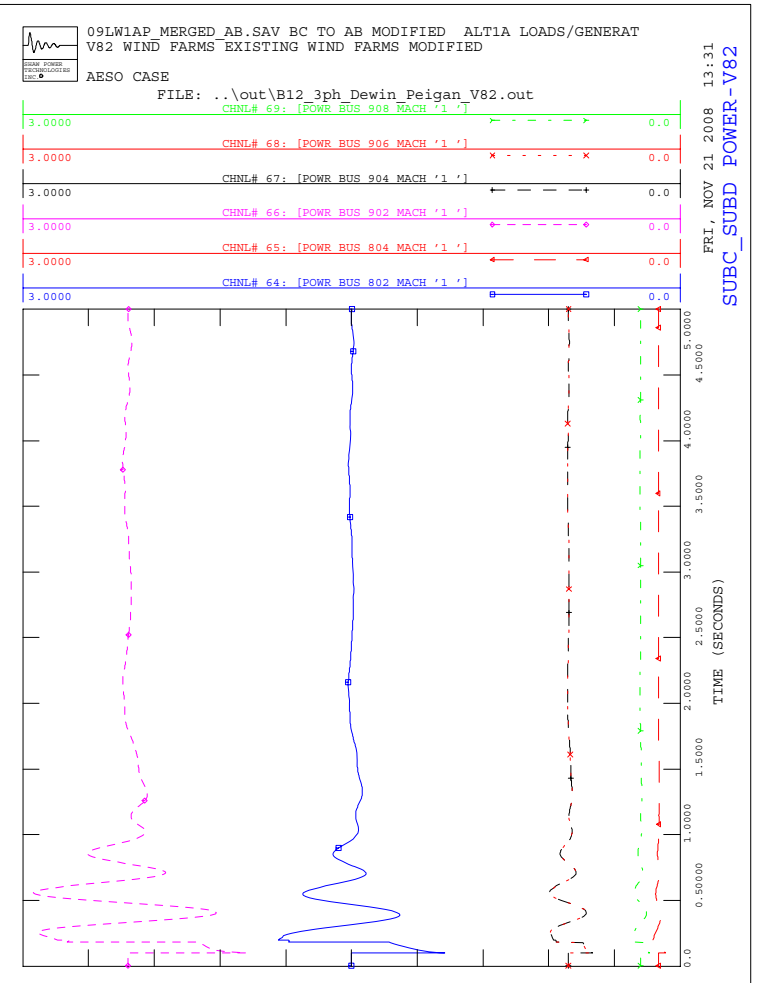
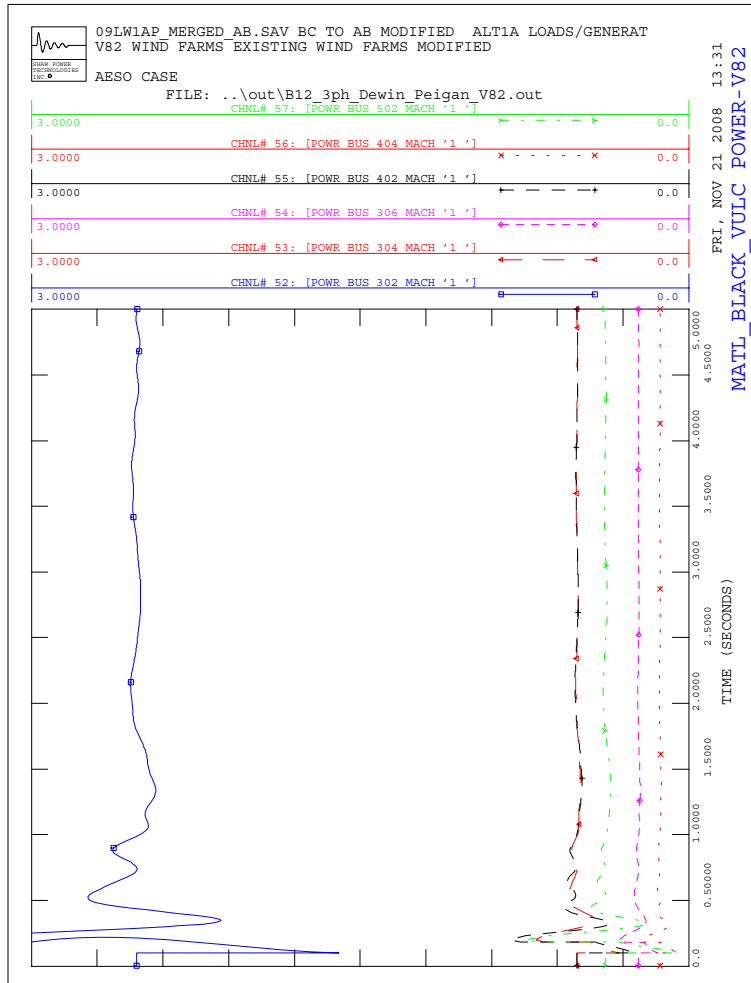
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

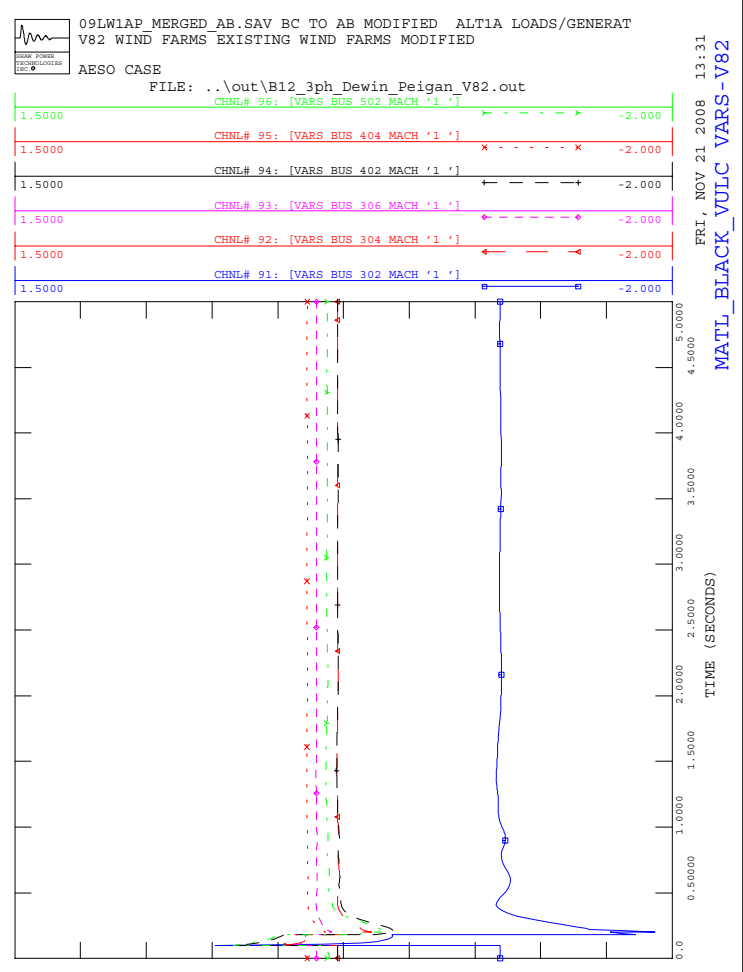
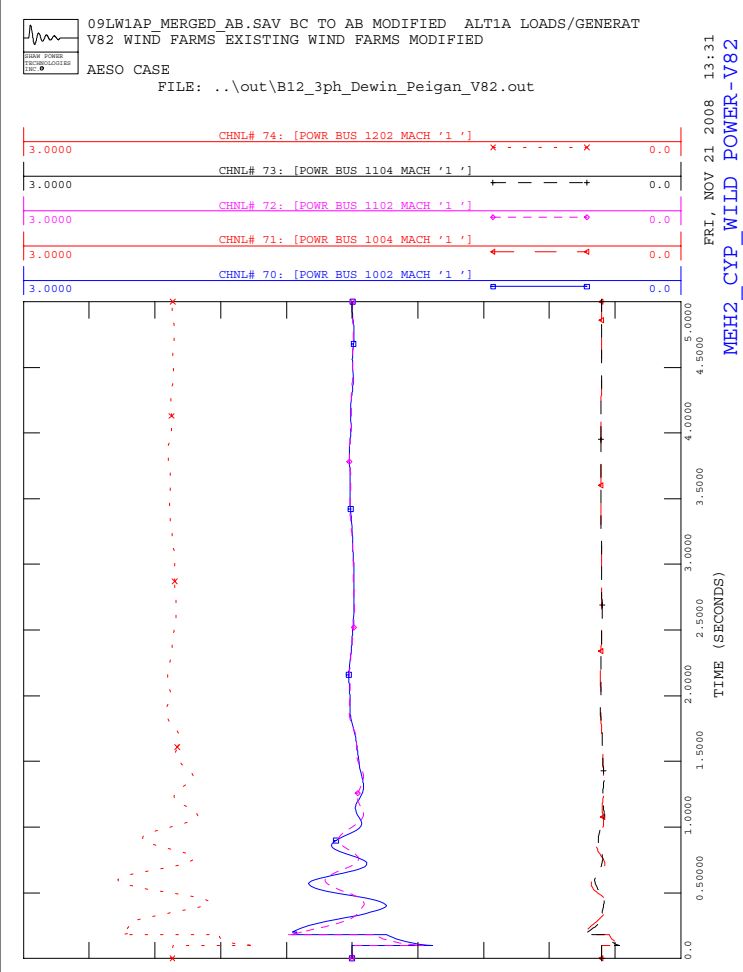
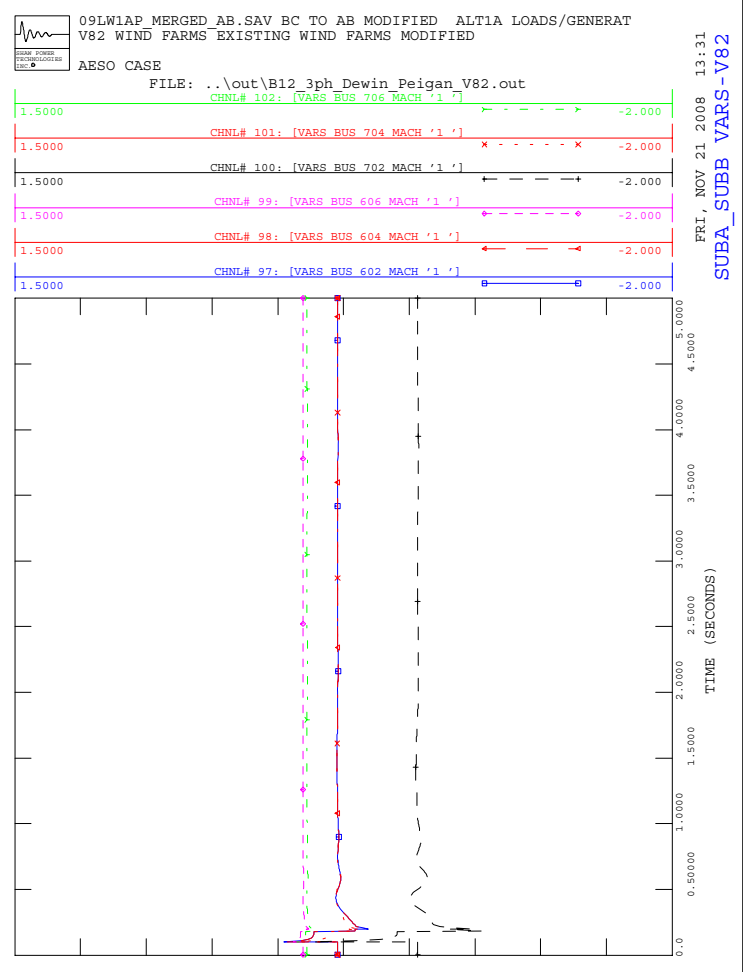
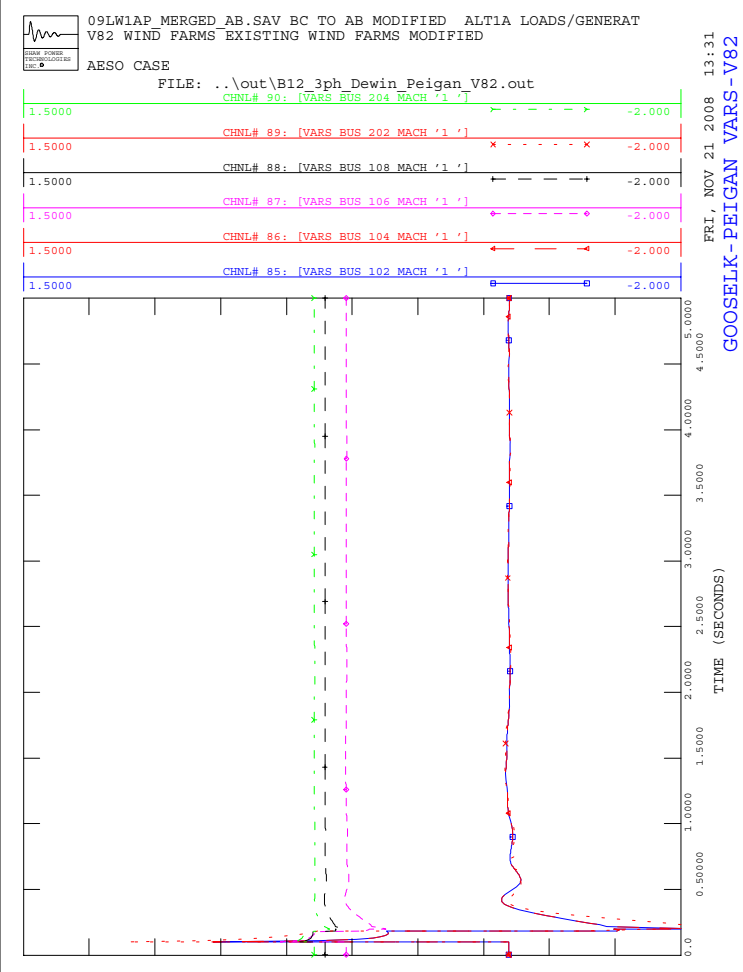
ABSO CASE

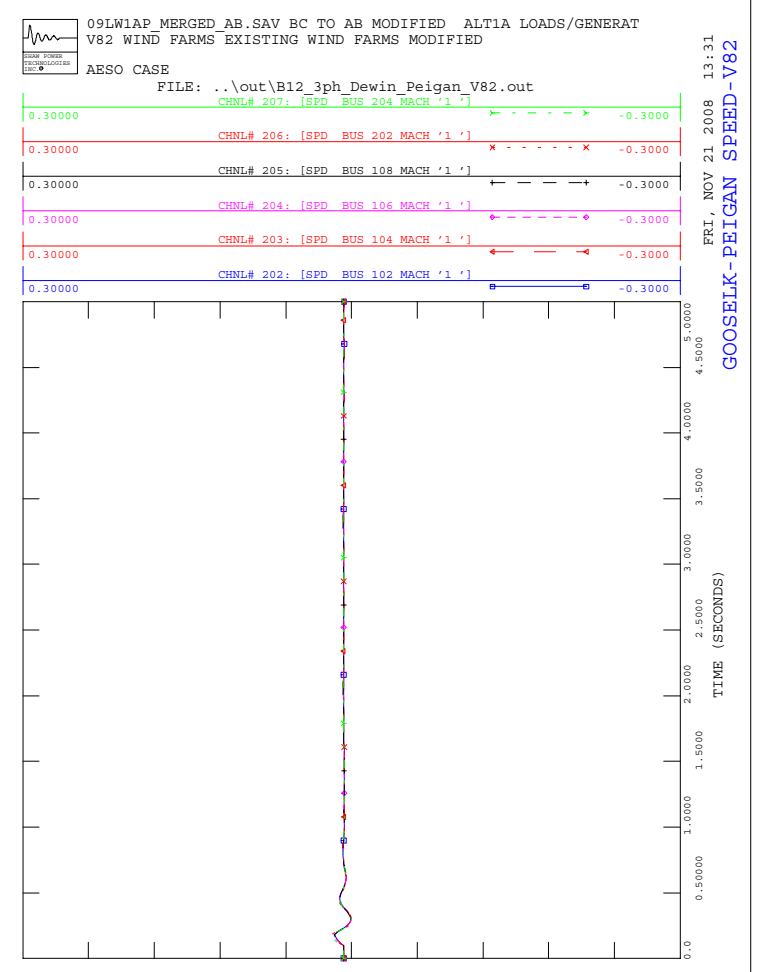
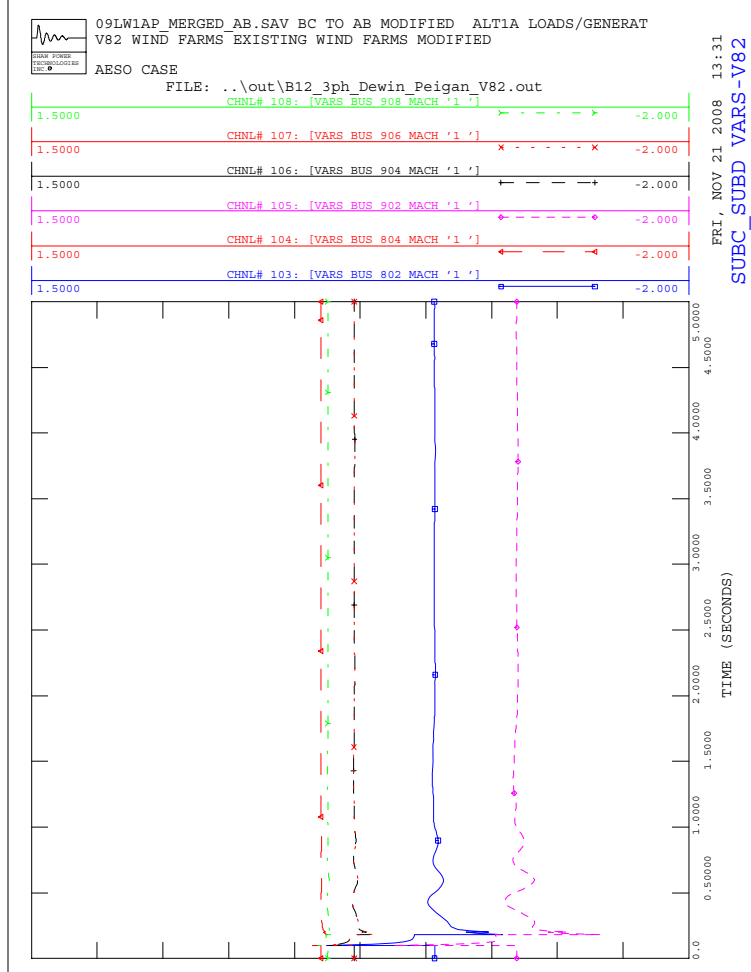
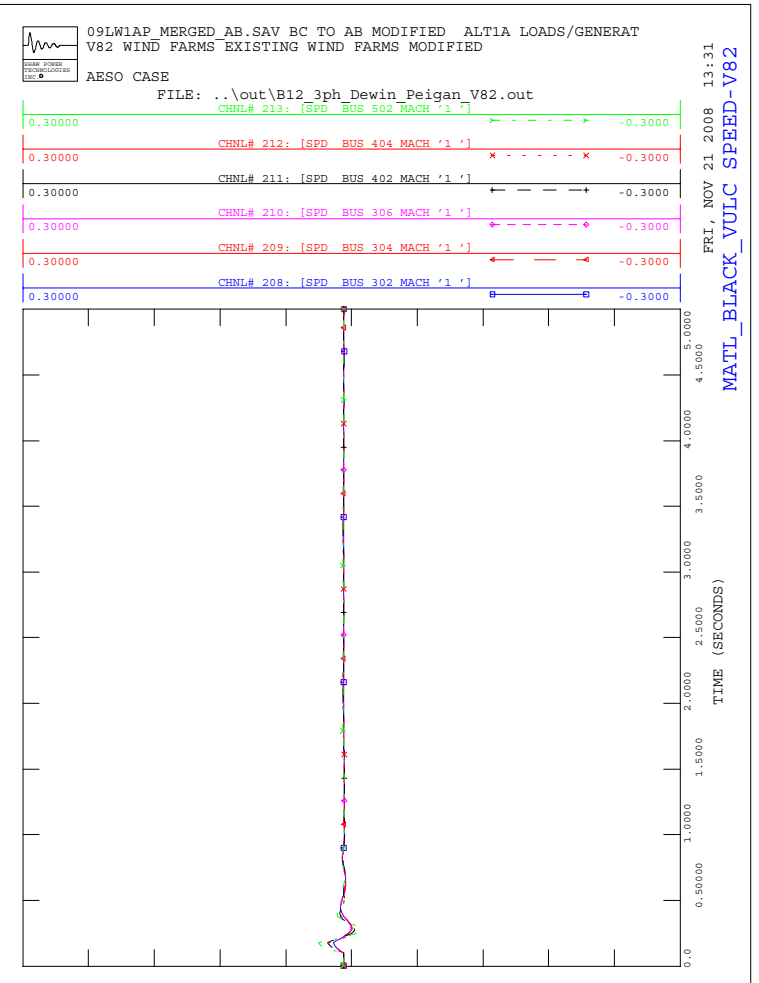
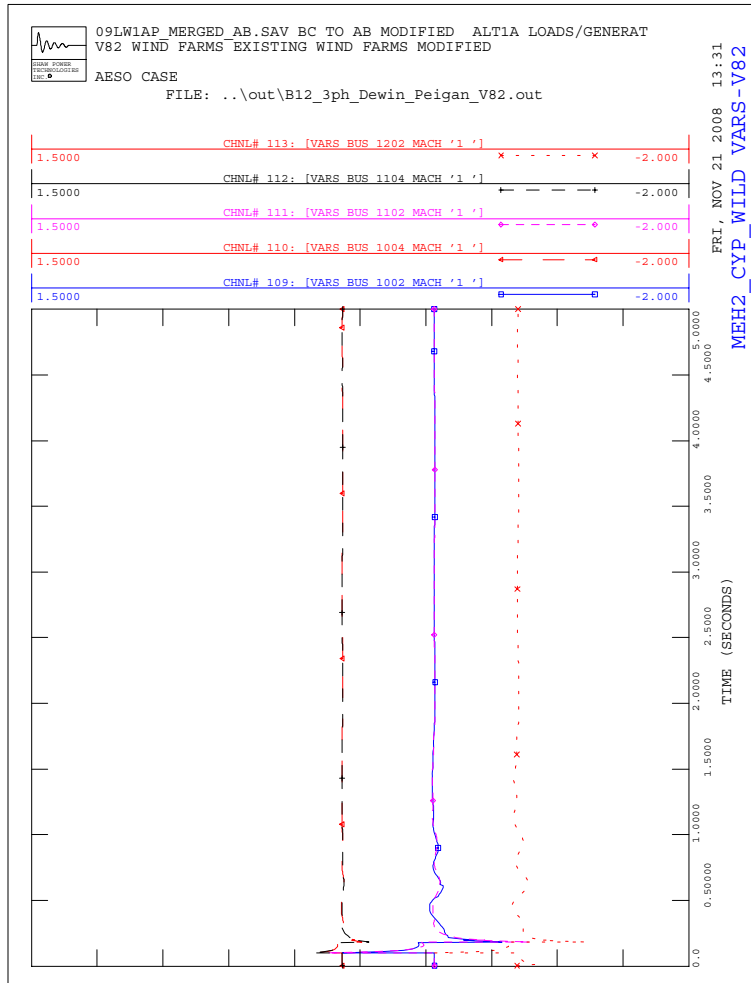
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FRI, NOV 21 2008 13:30
AB_BC_TIE_FLOWS-V82



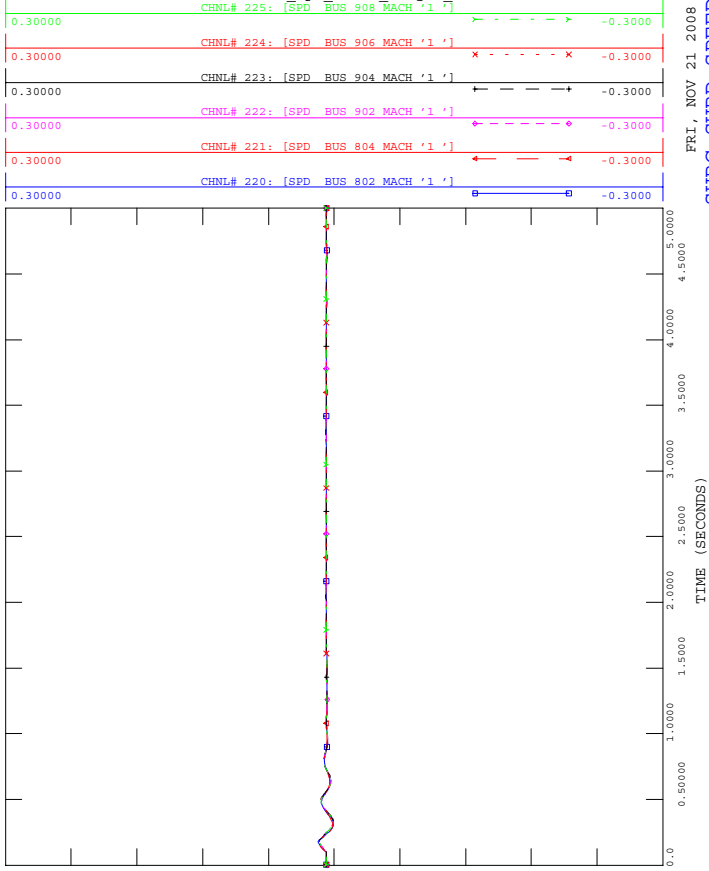






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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

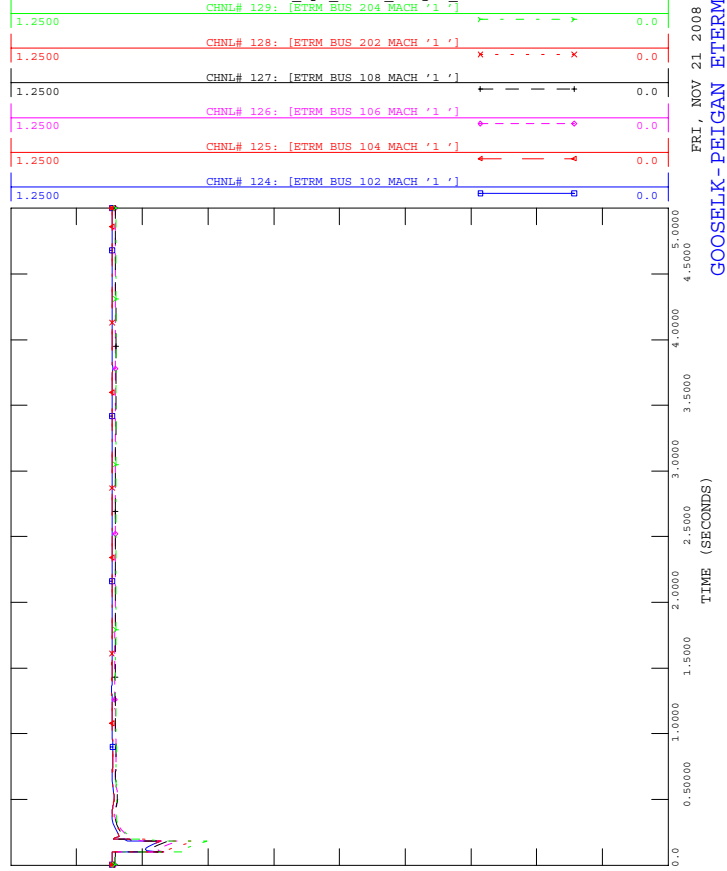
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FRI, NOV 21 2008 13:31
SUBC_SUBD SPEED-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

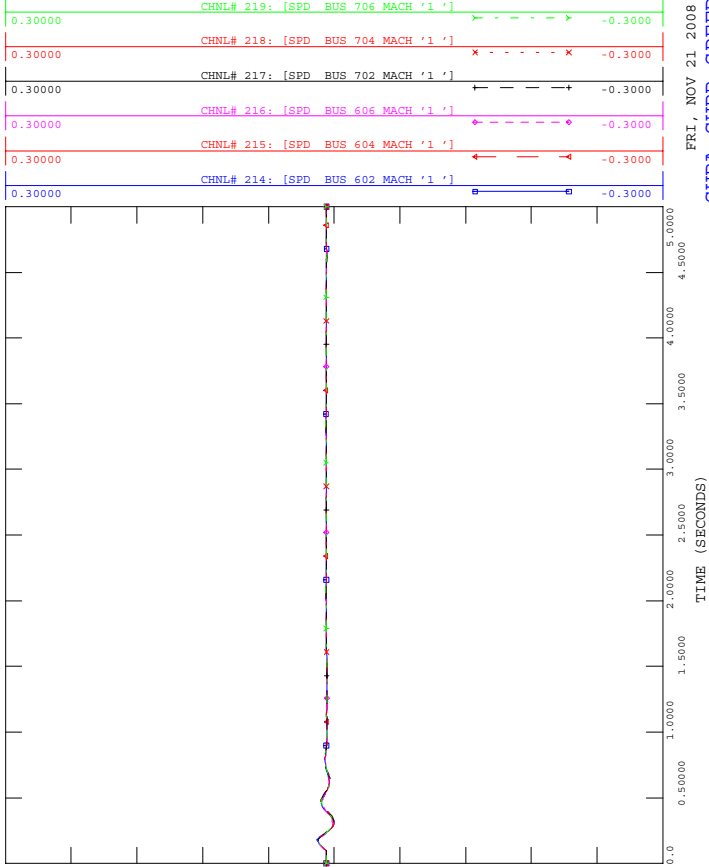
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FRI, NOV 21 2008 13:31
GOOSELK-PEIGAN ETERM-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

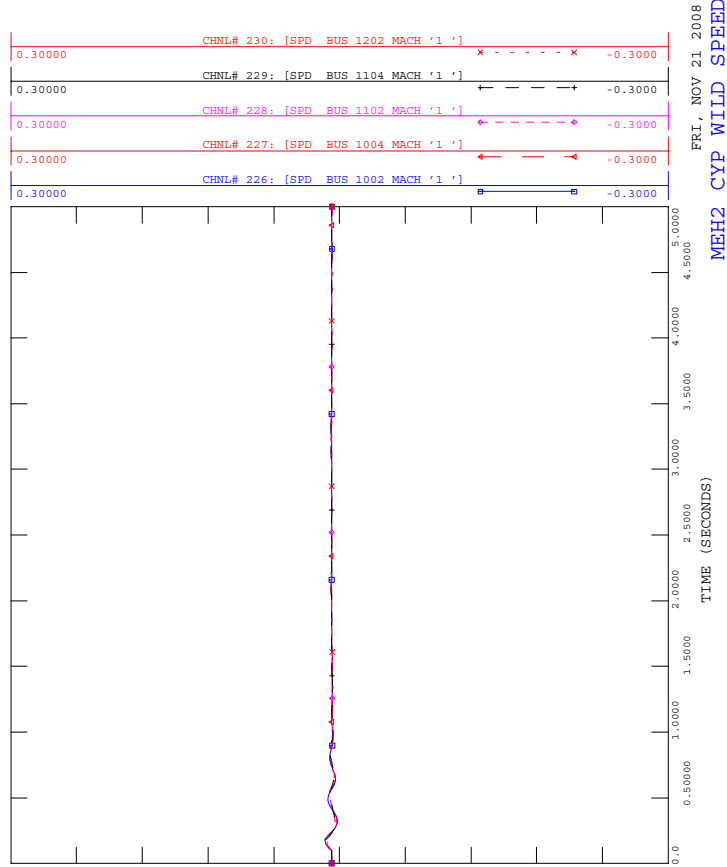
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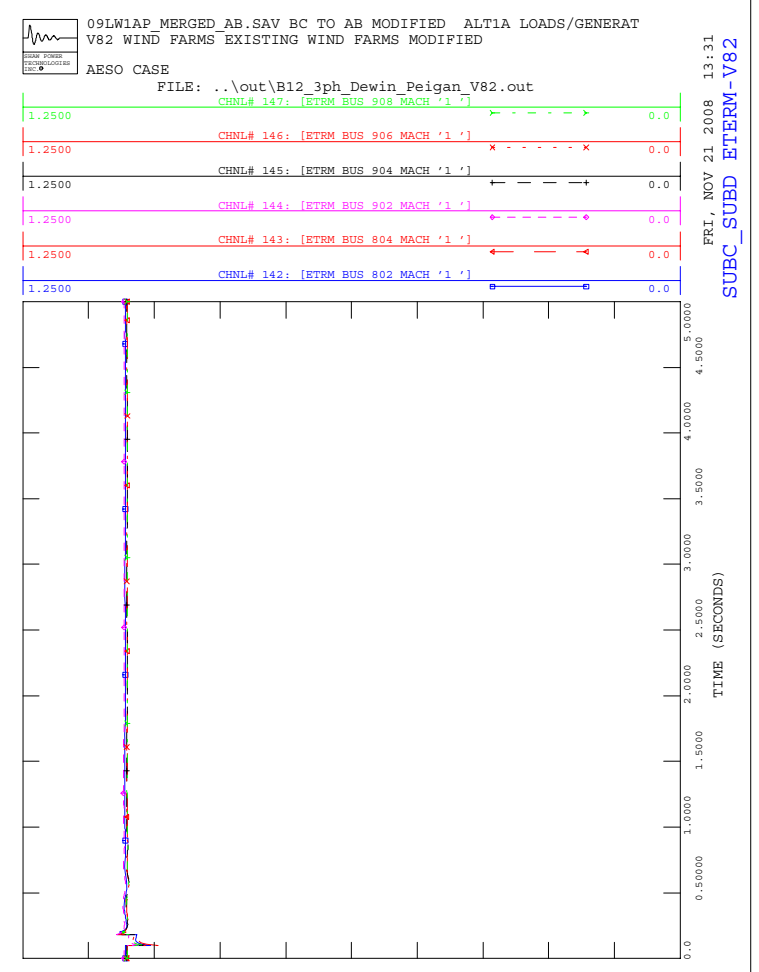
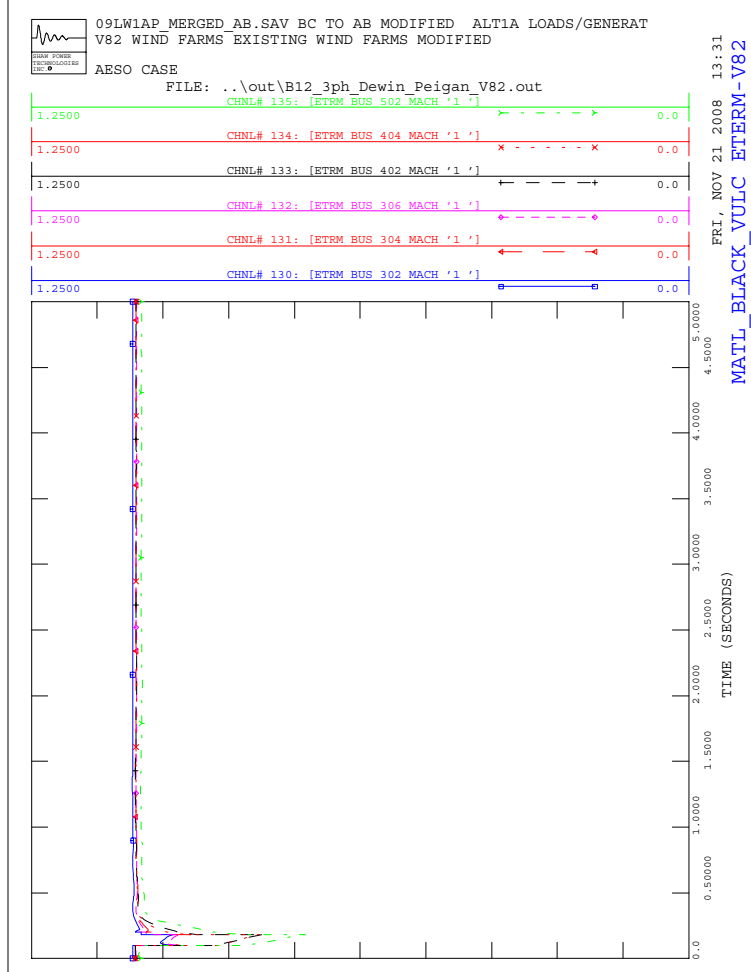
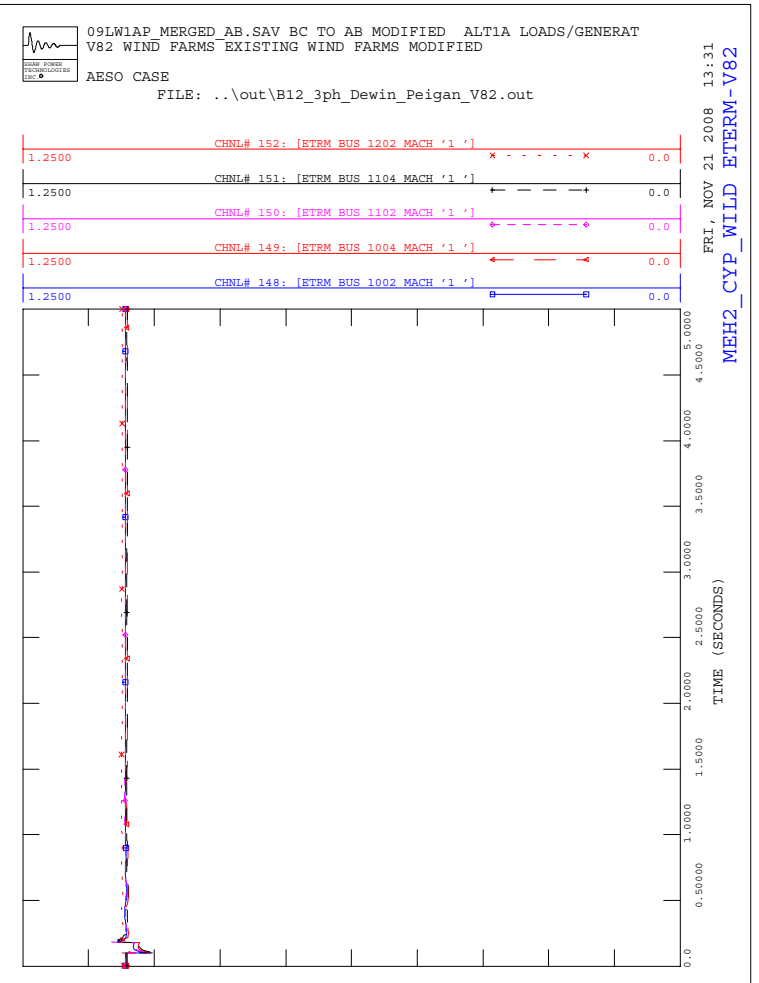
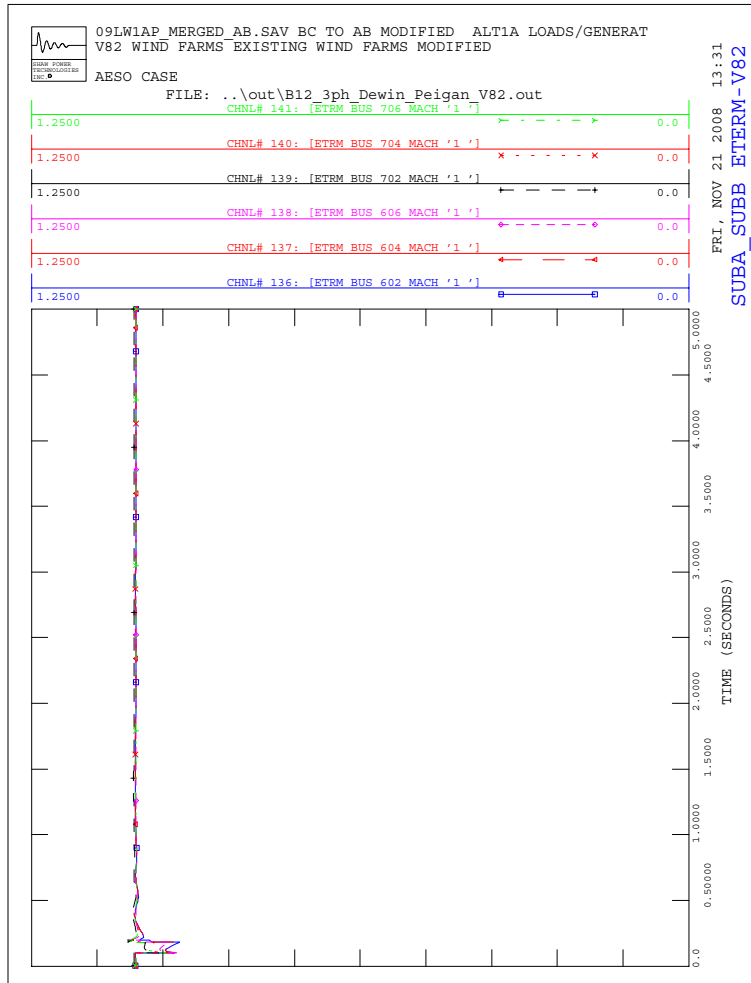
FRI, NOV 21 2008 13:31
SUBA_SUBD SPEED-V82

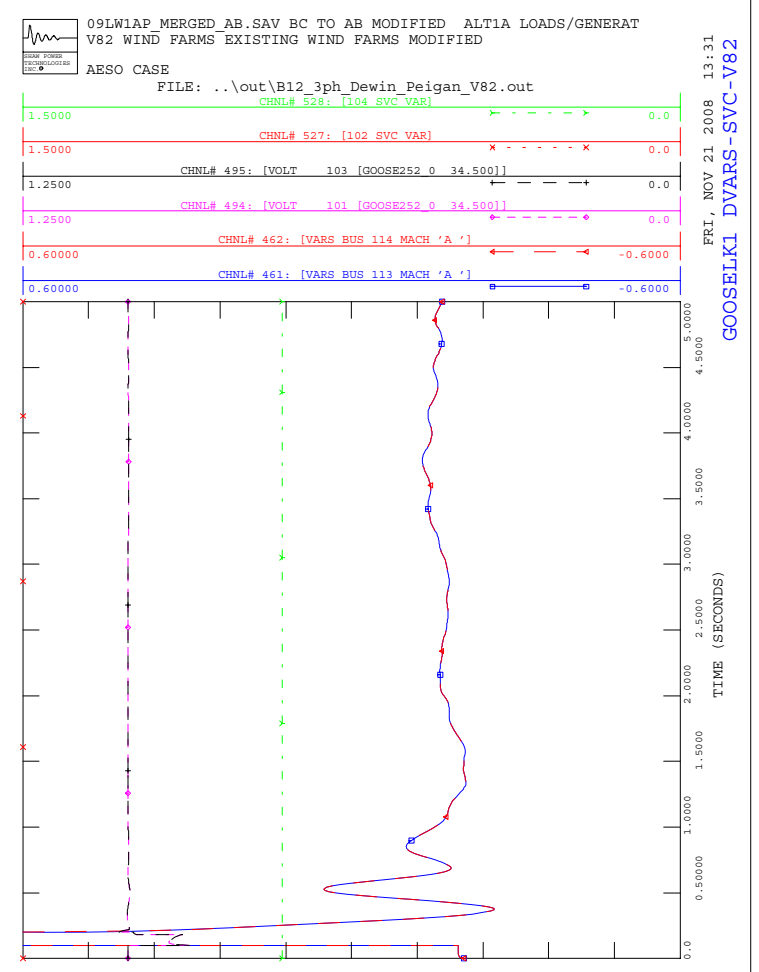
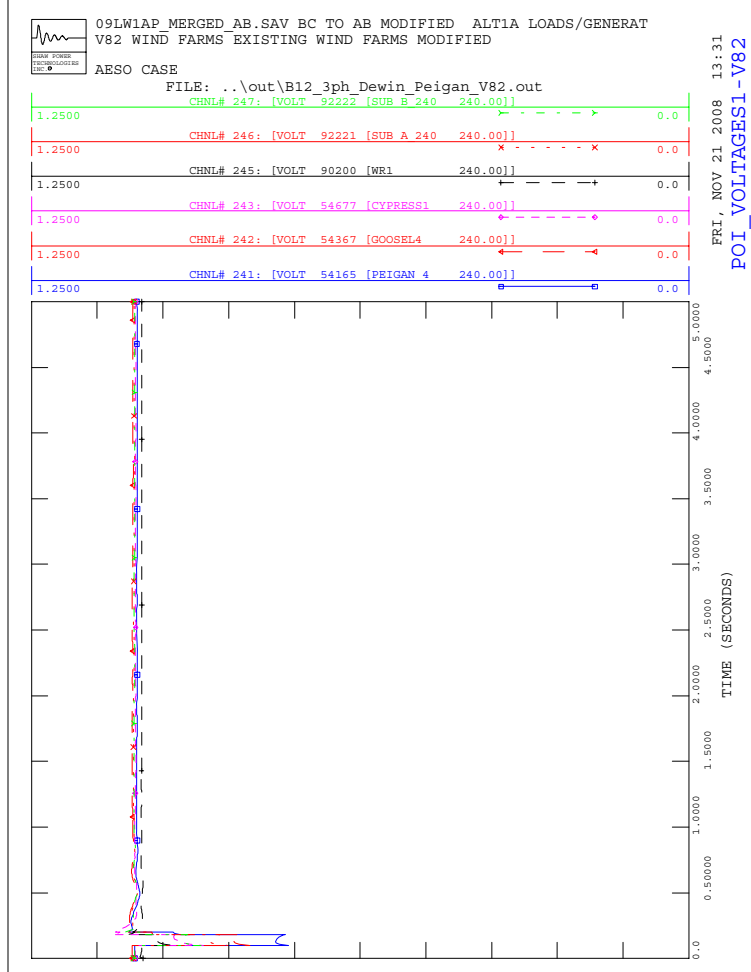
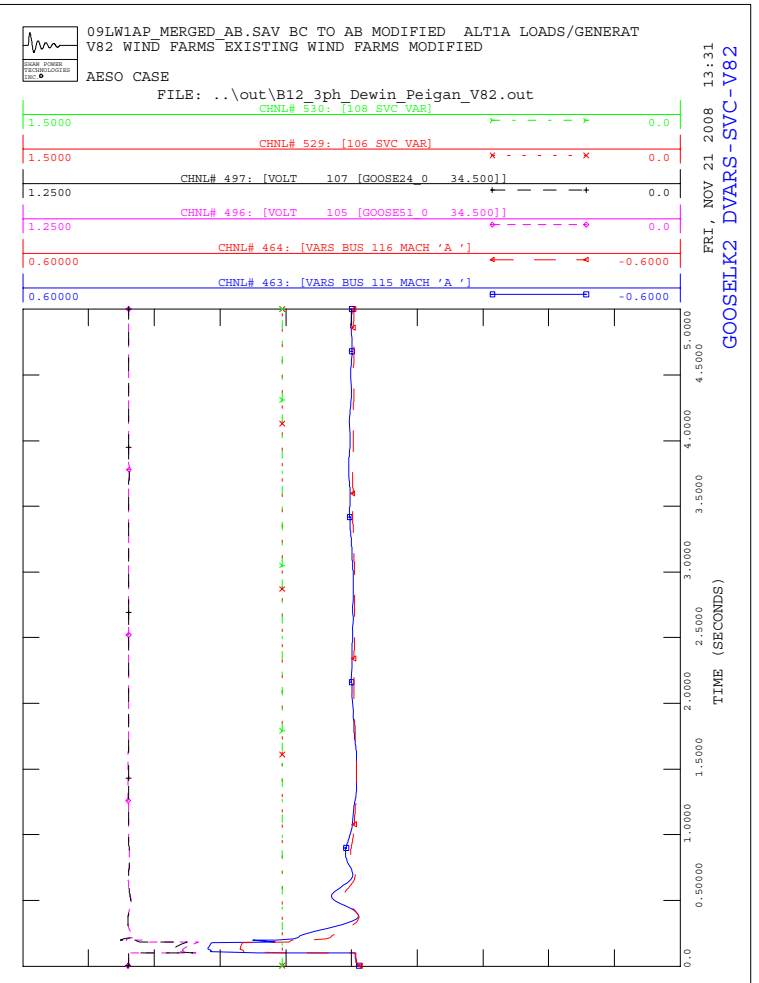
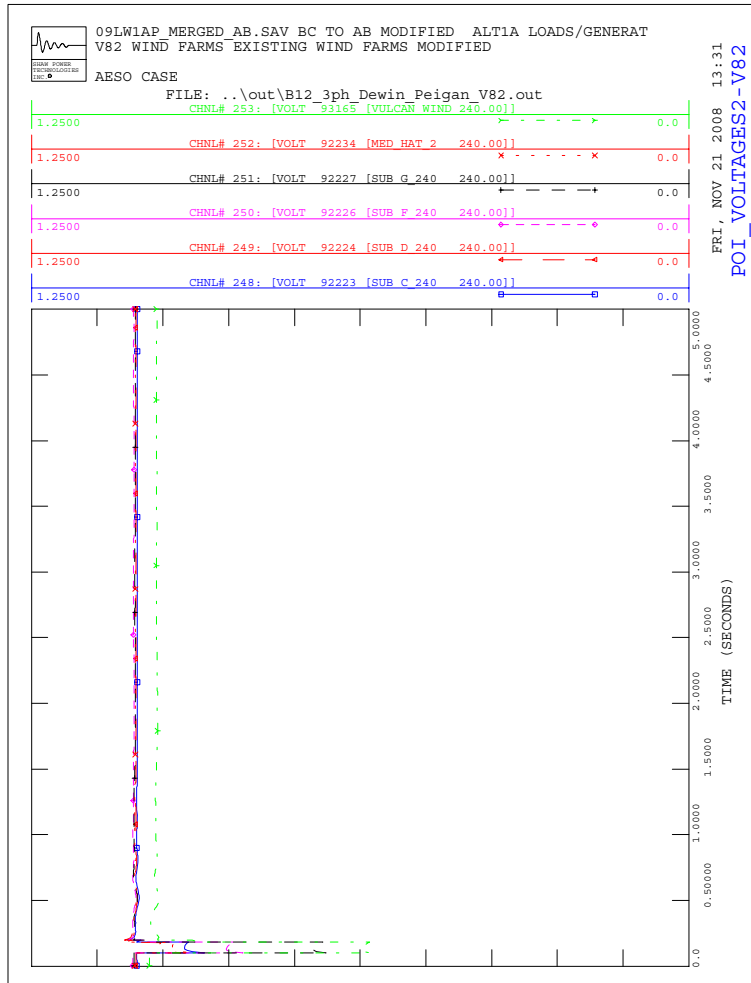
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

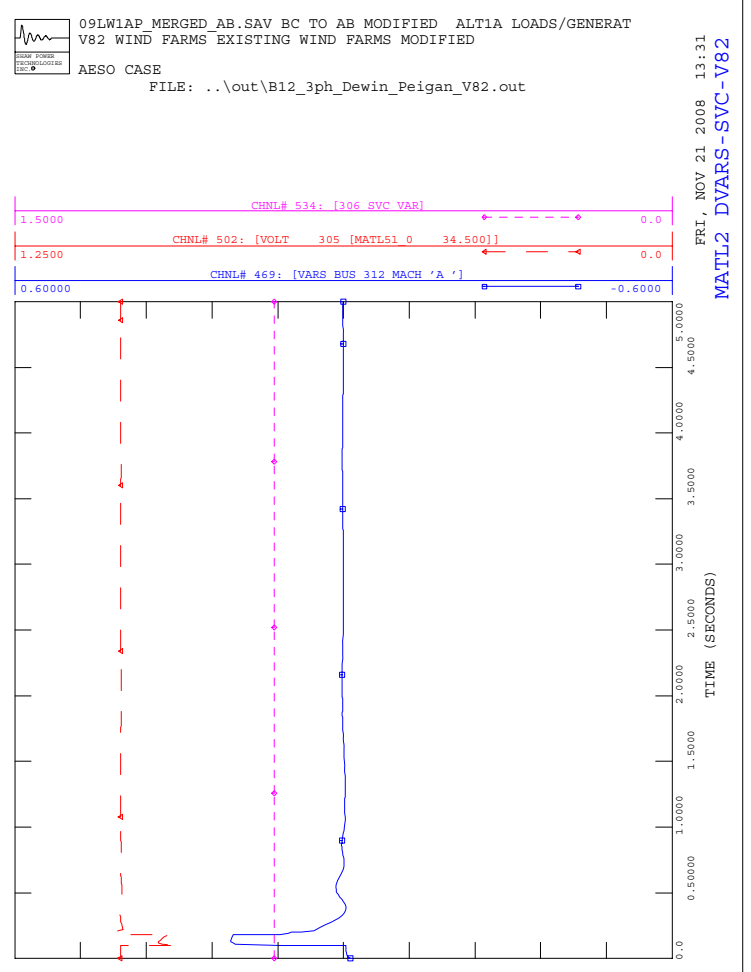
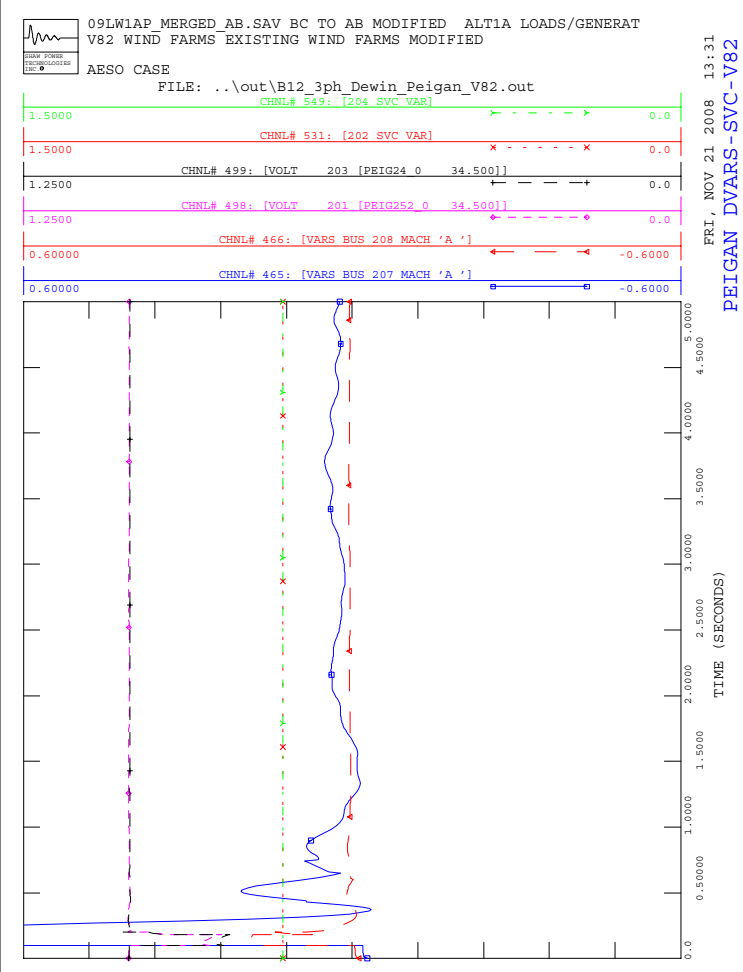
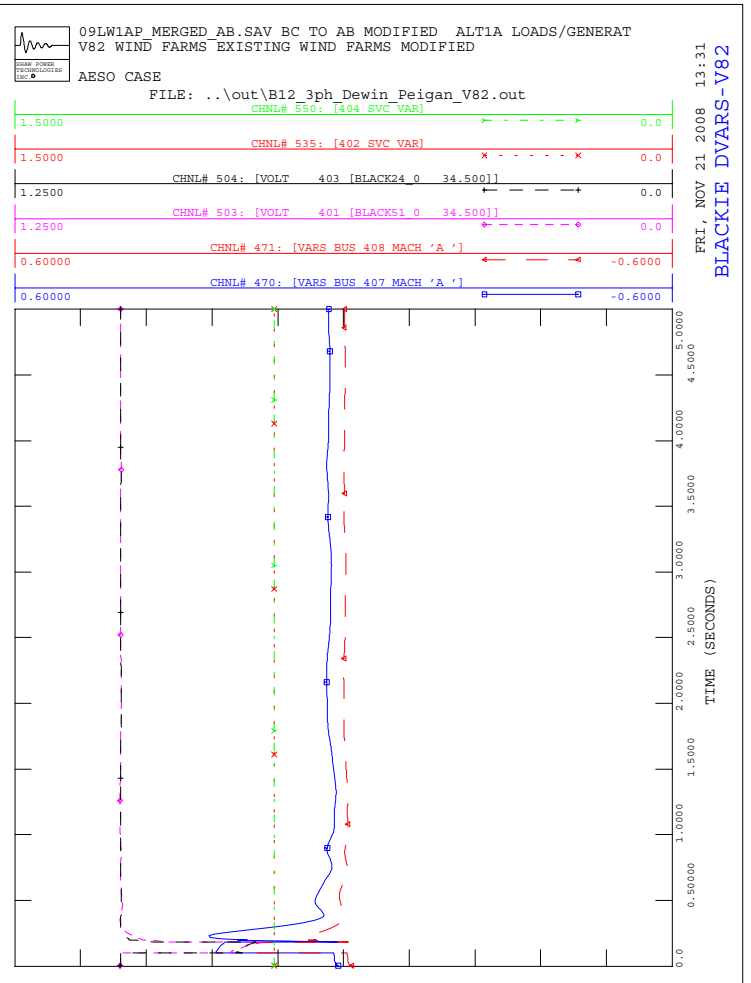
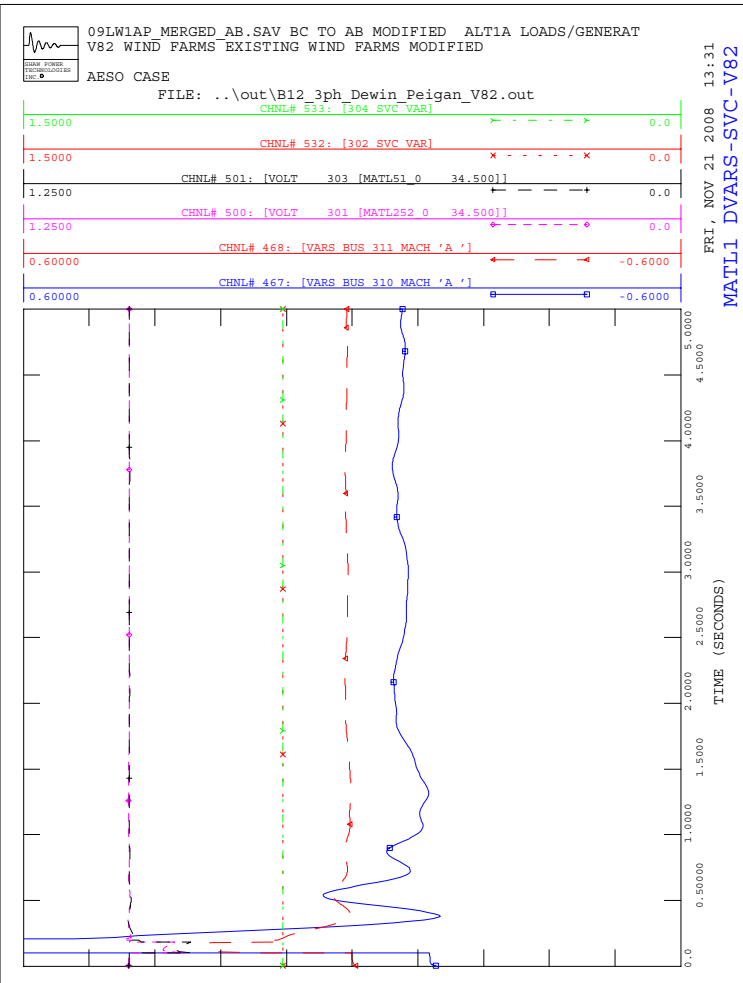
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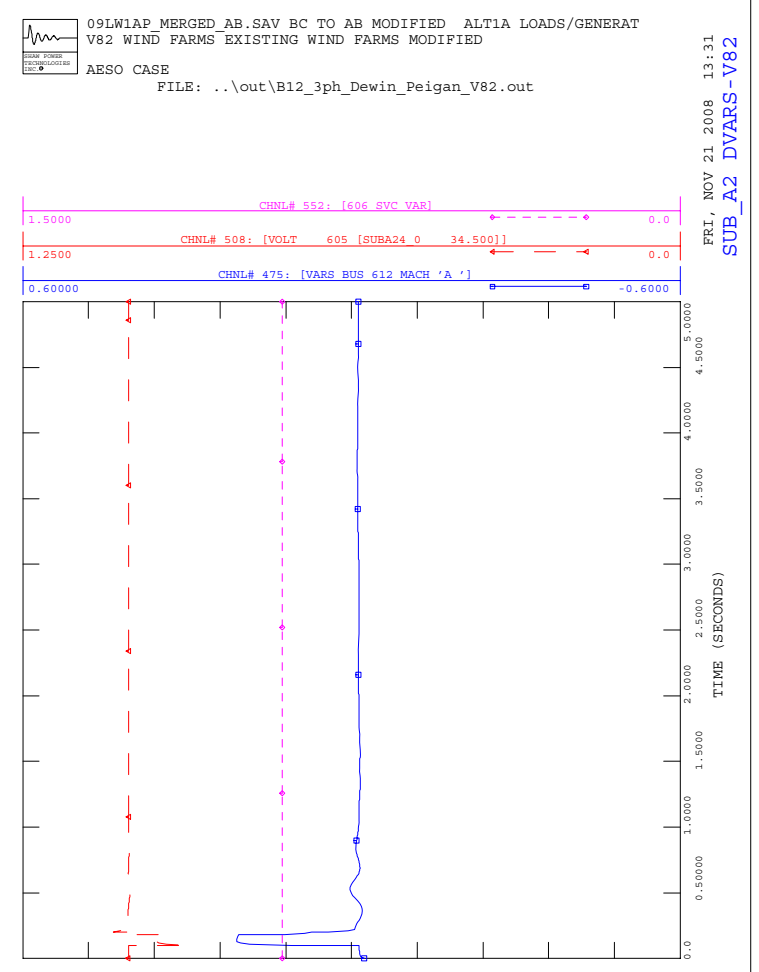
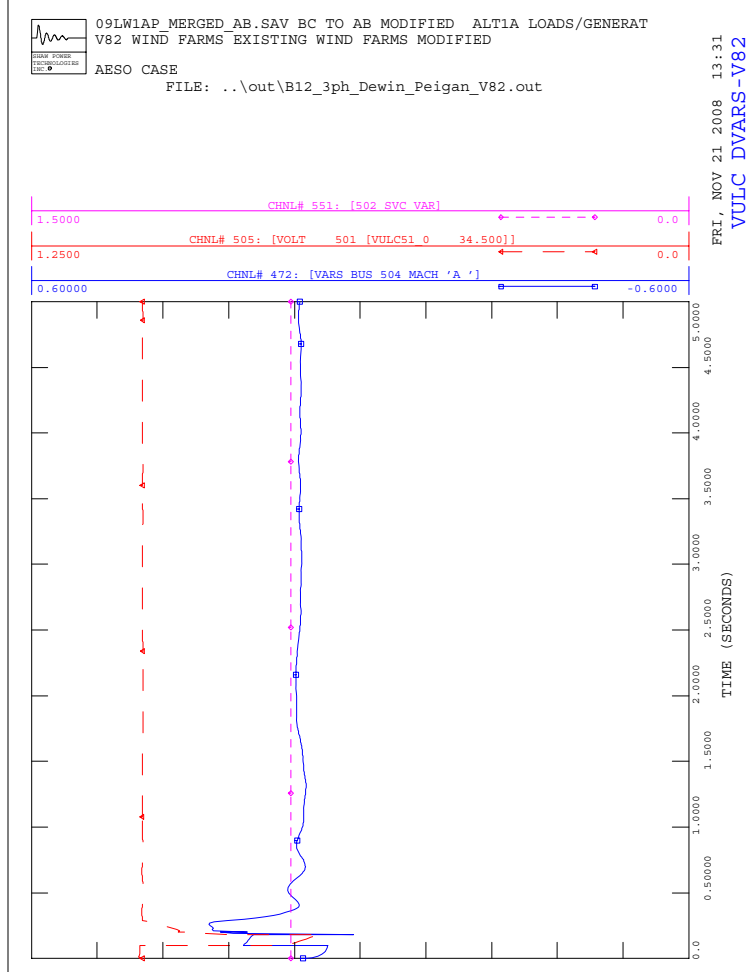
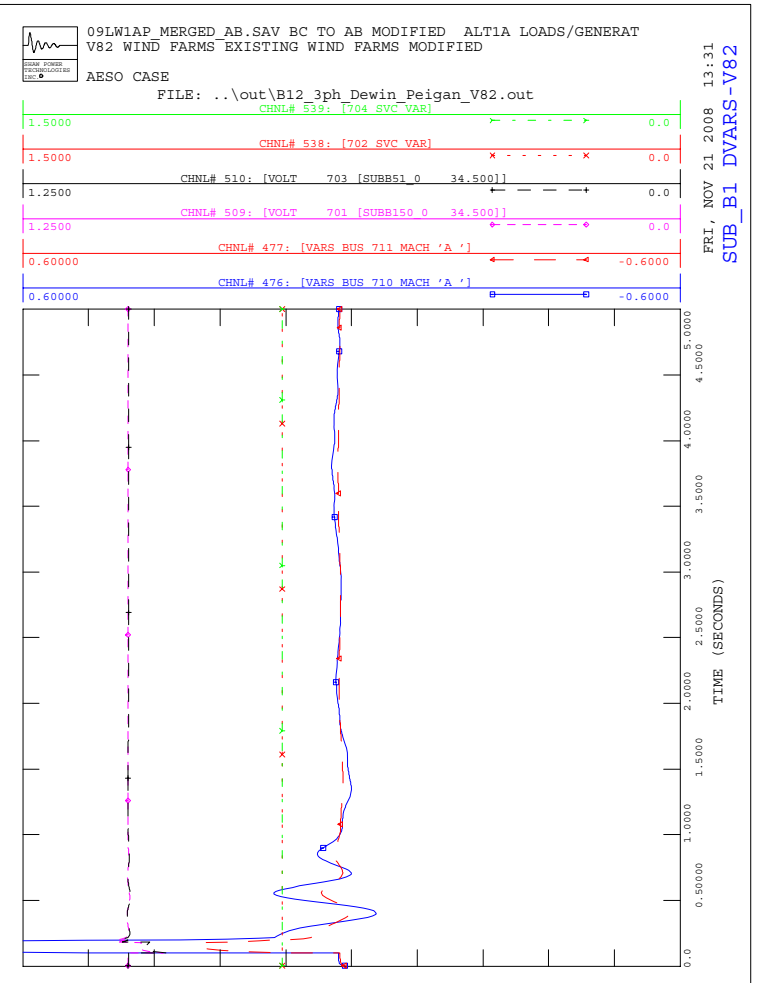
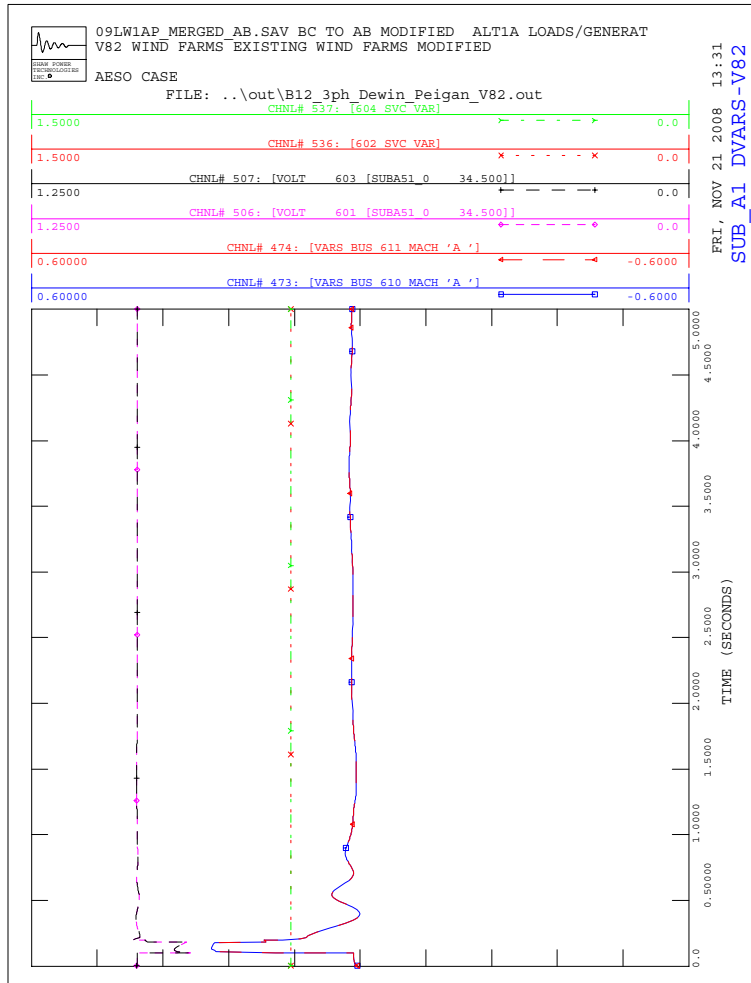


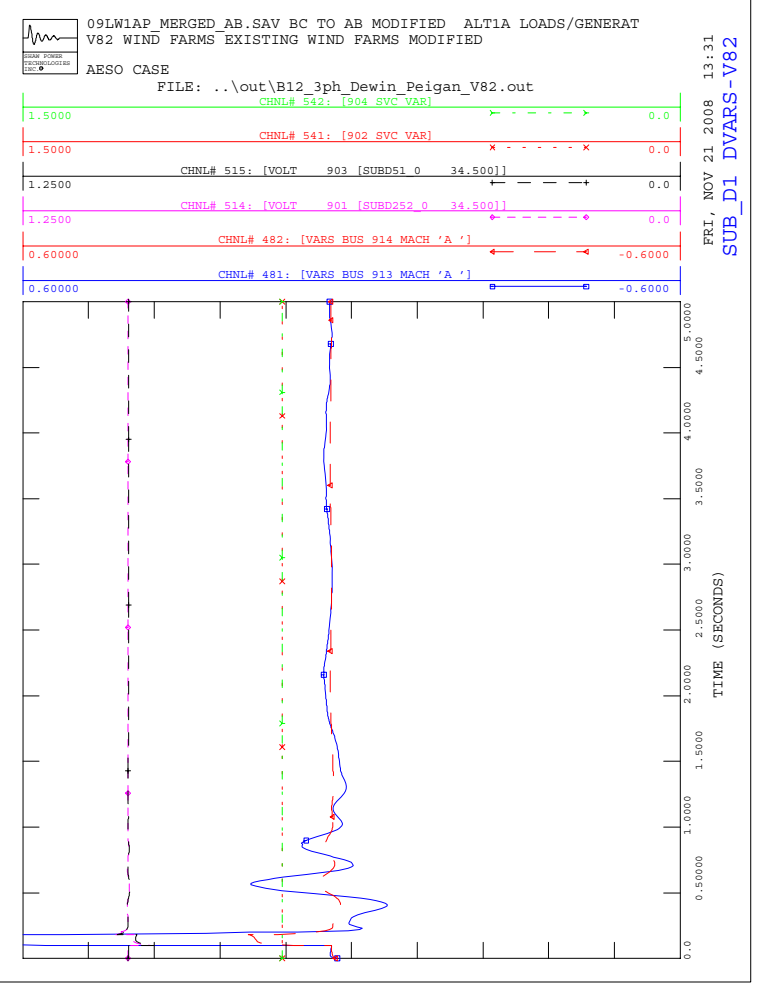
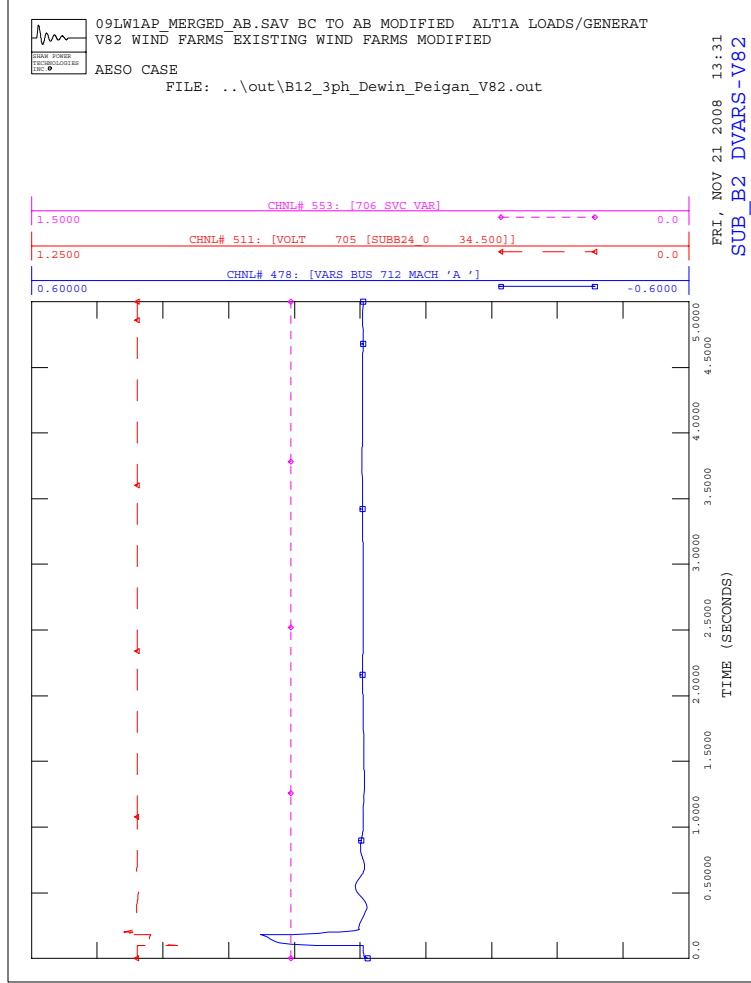
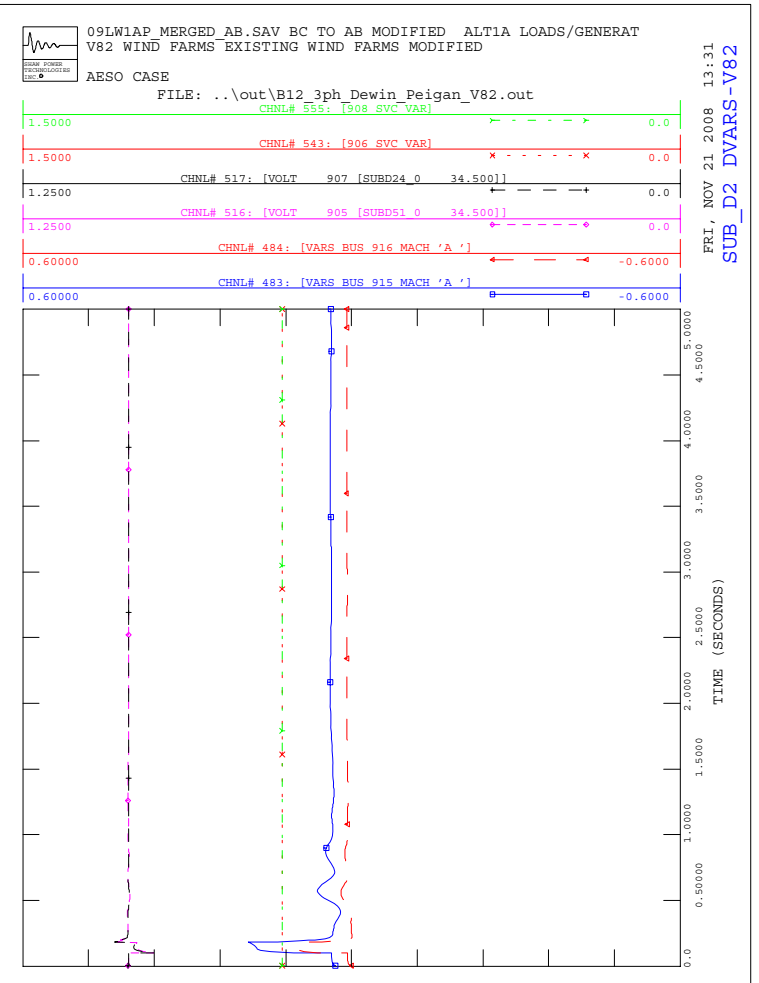
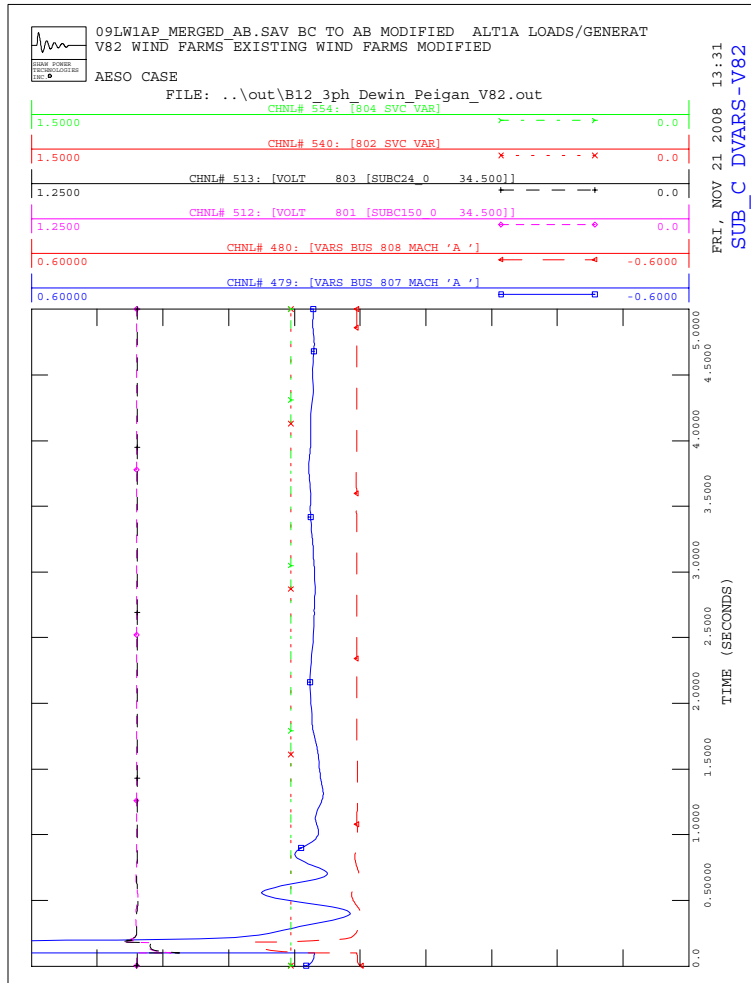
FRI, NOV 21 2008 13:31
MEH2_CYP_WILD SPEED-V82

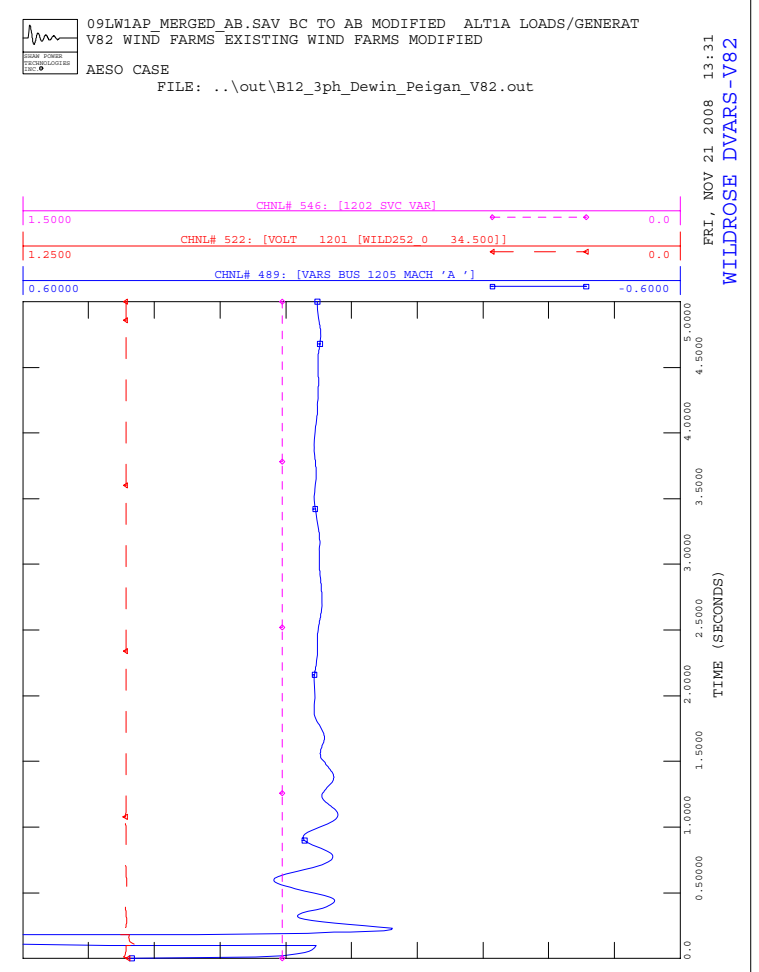
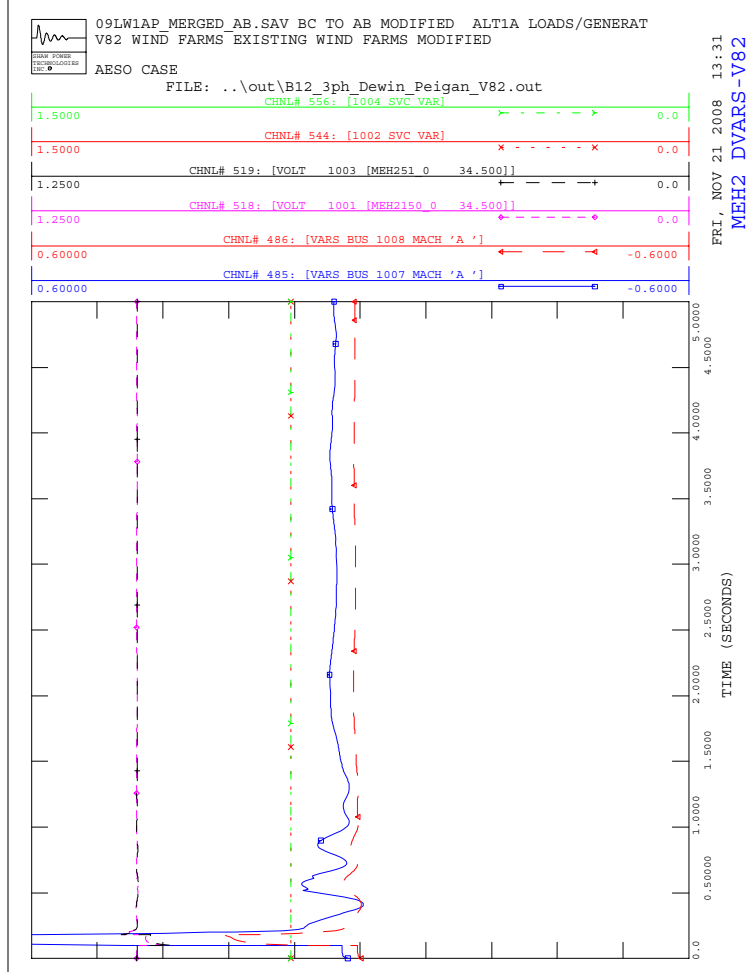
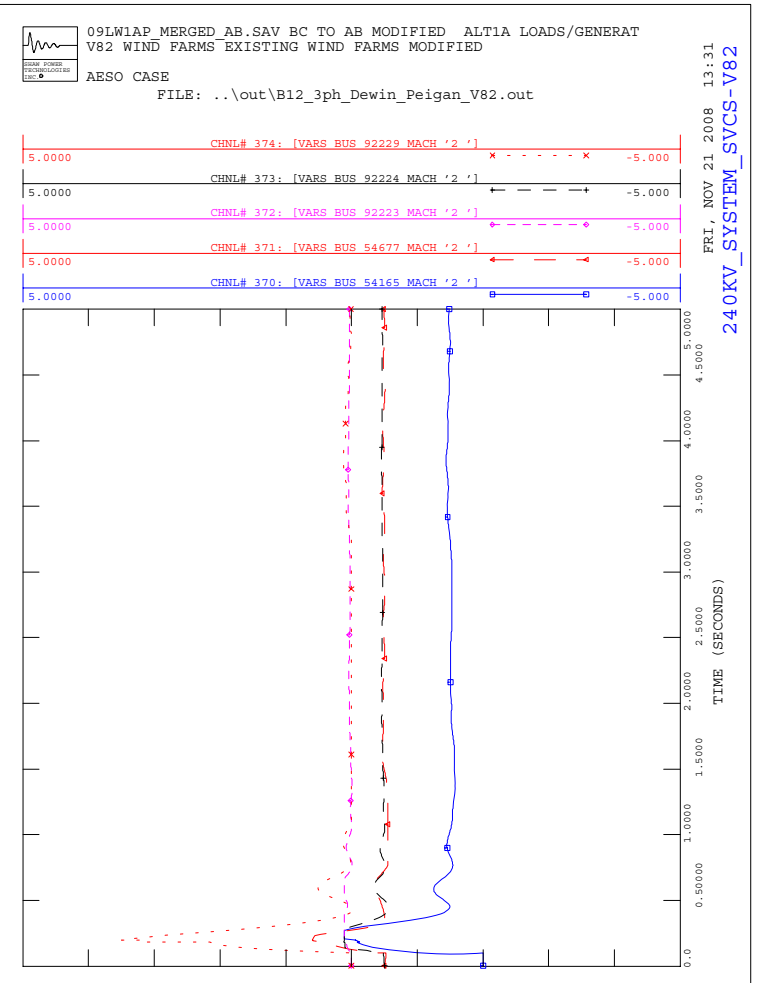
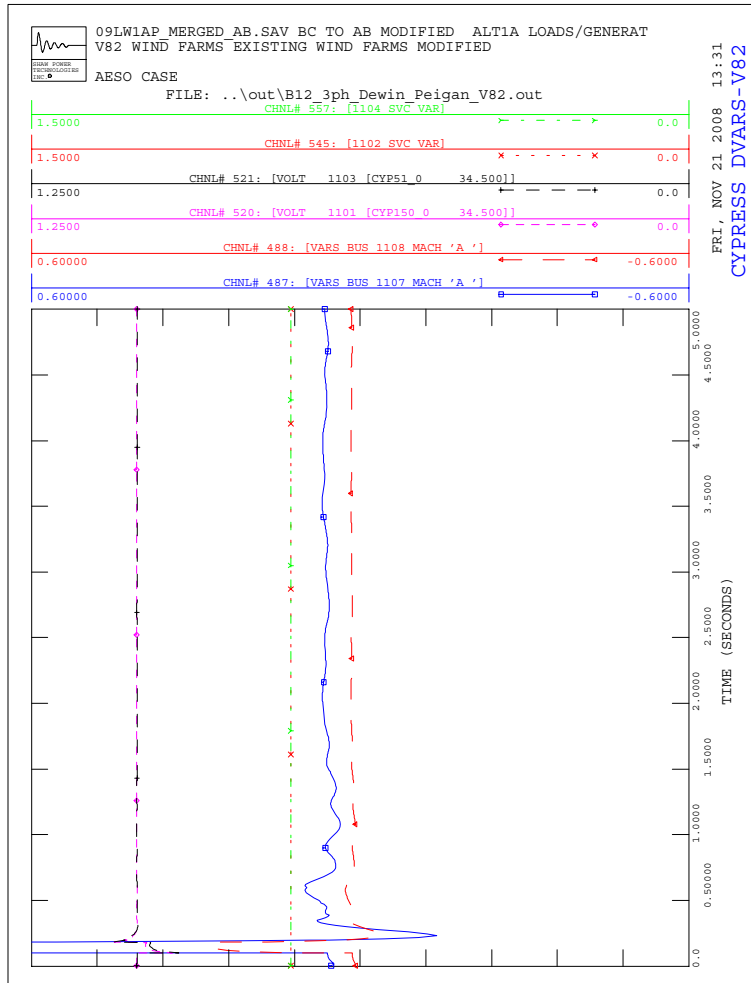








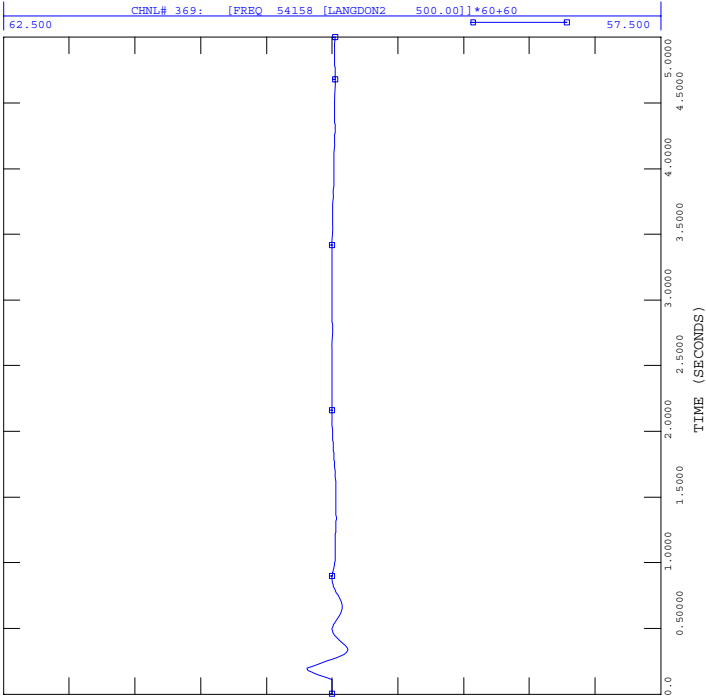






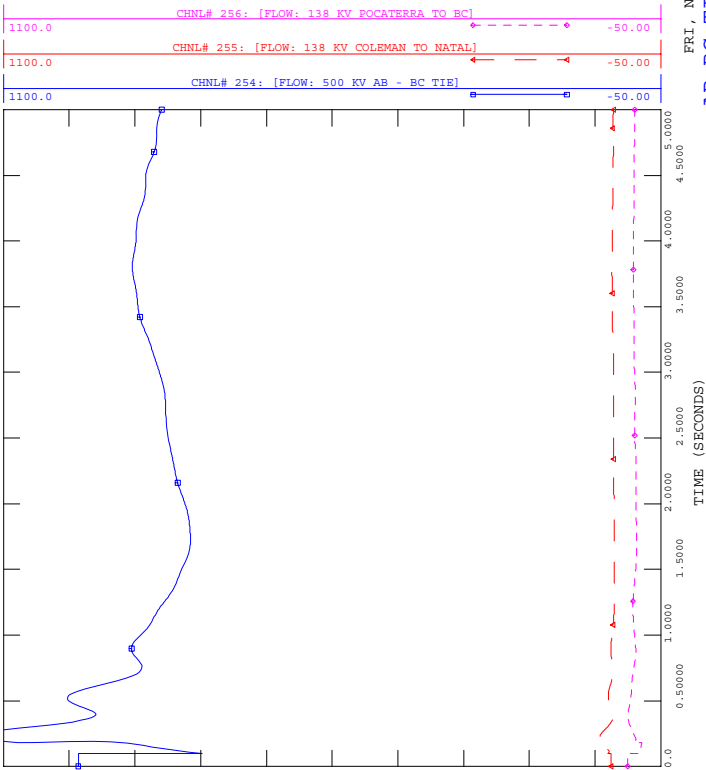
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B12_3ph_Dewin_Peigan_V82.out

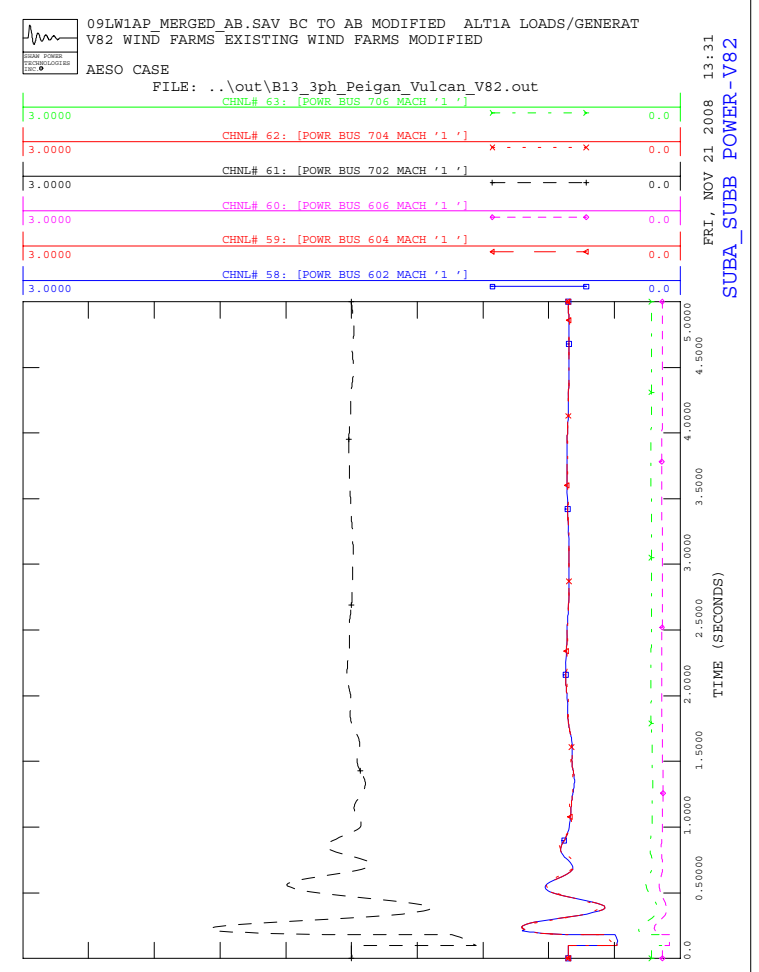
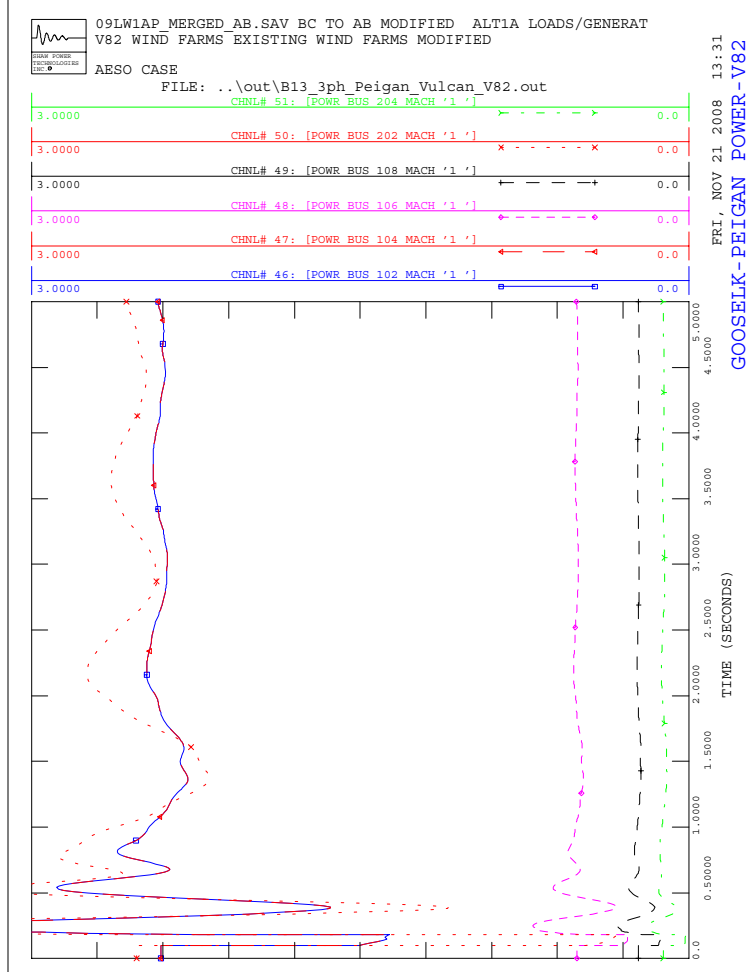
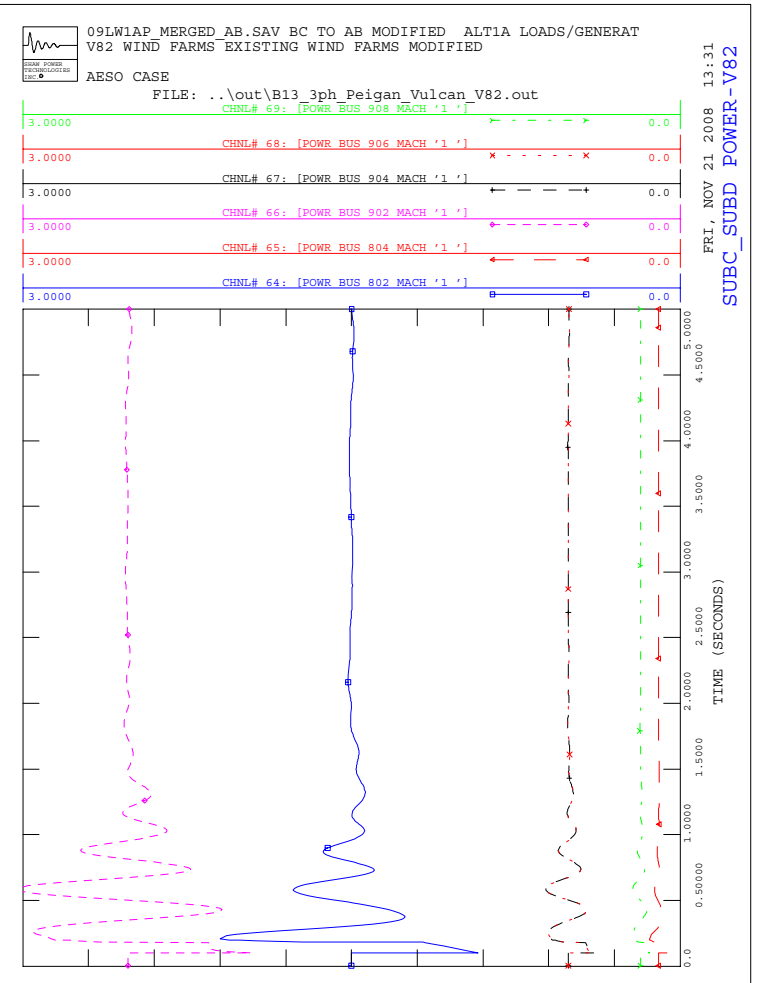
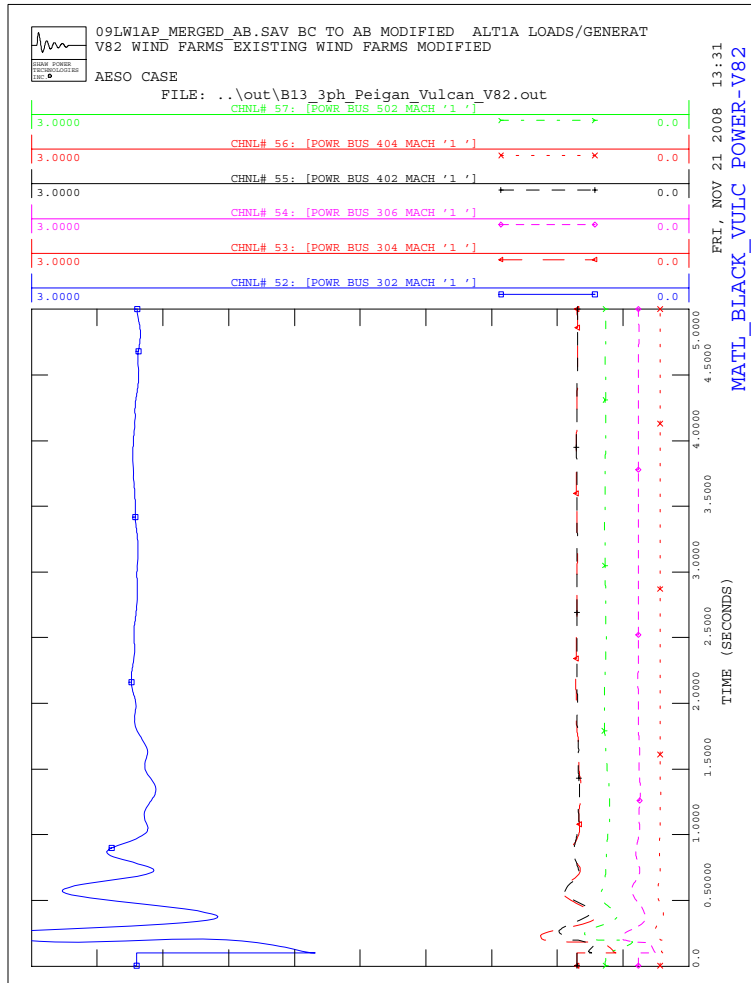
FRI, NOV 21 2008 13:31
LANGDON_FRQ-V82

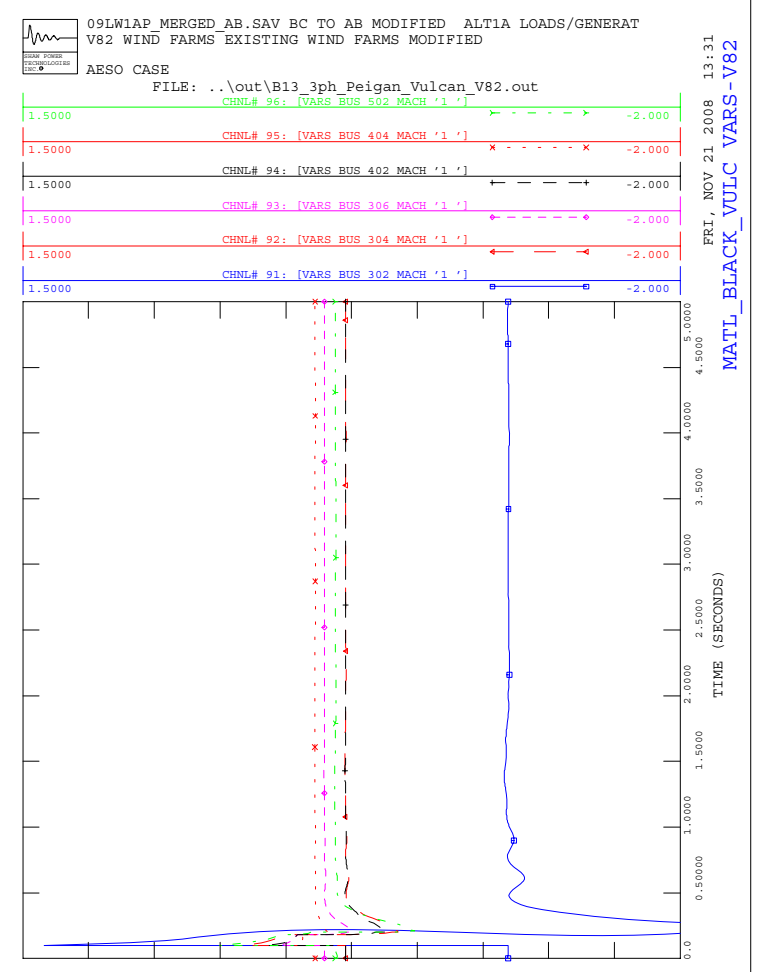
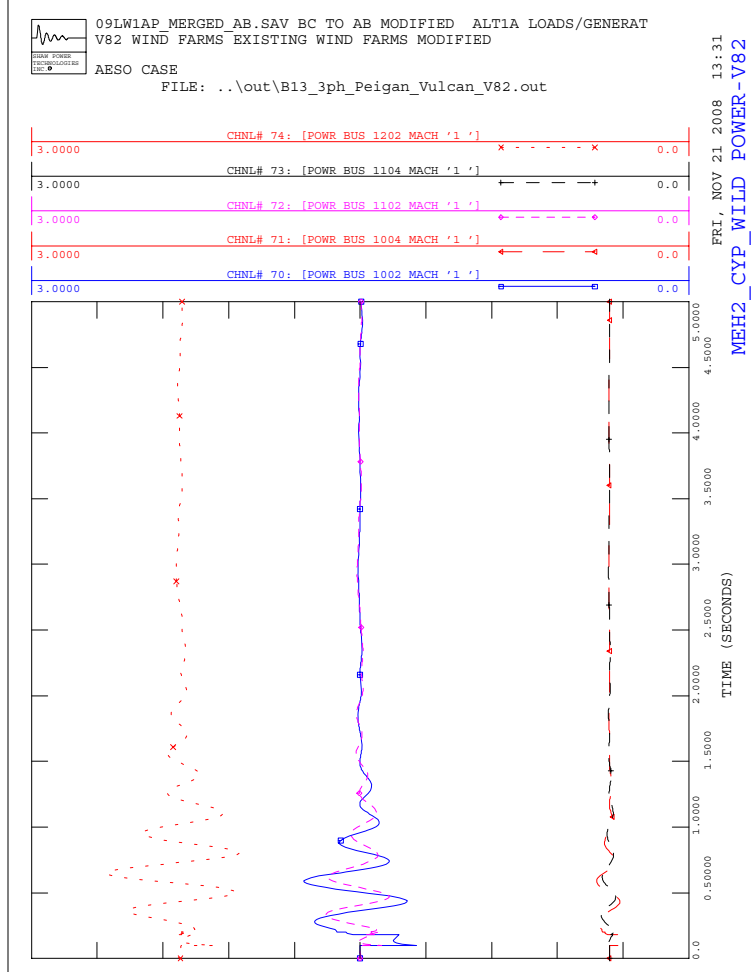
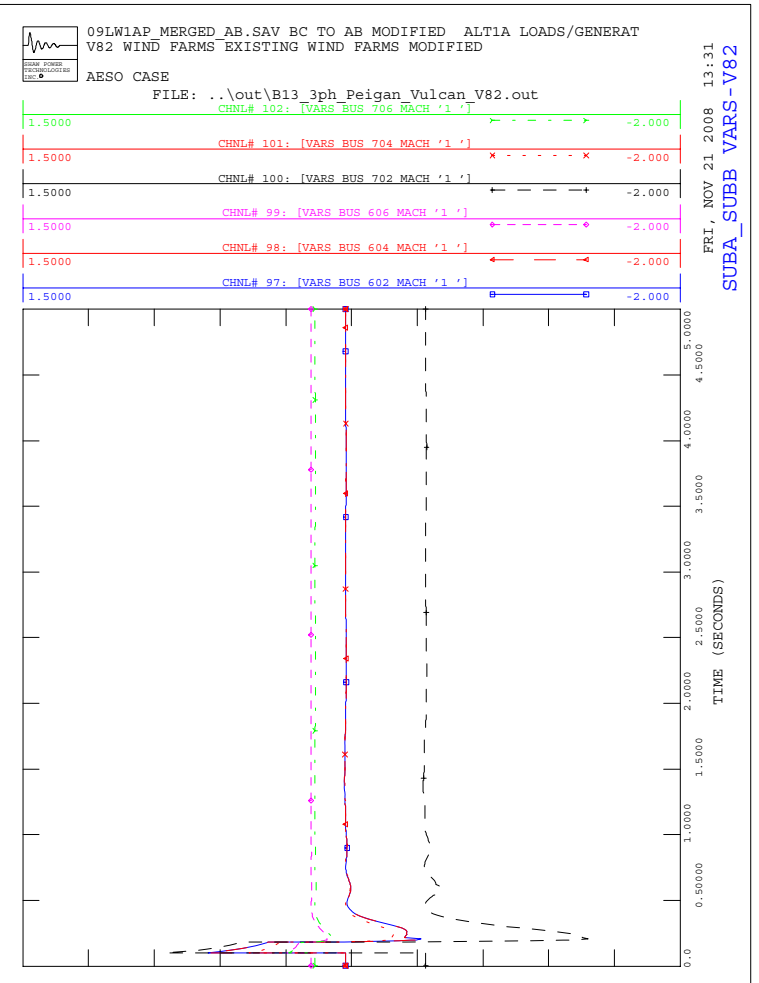
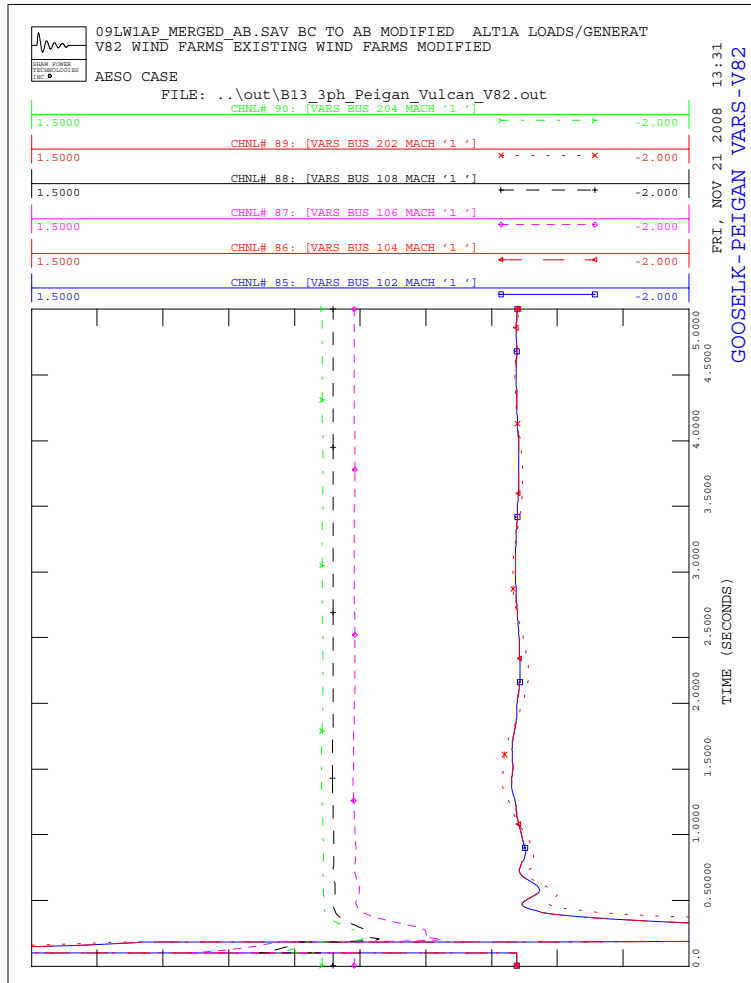


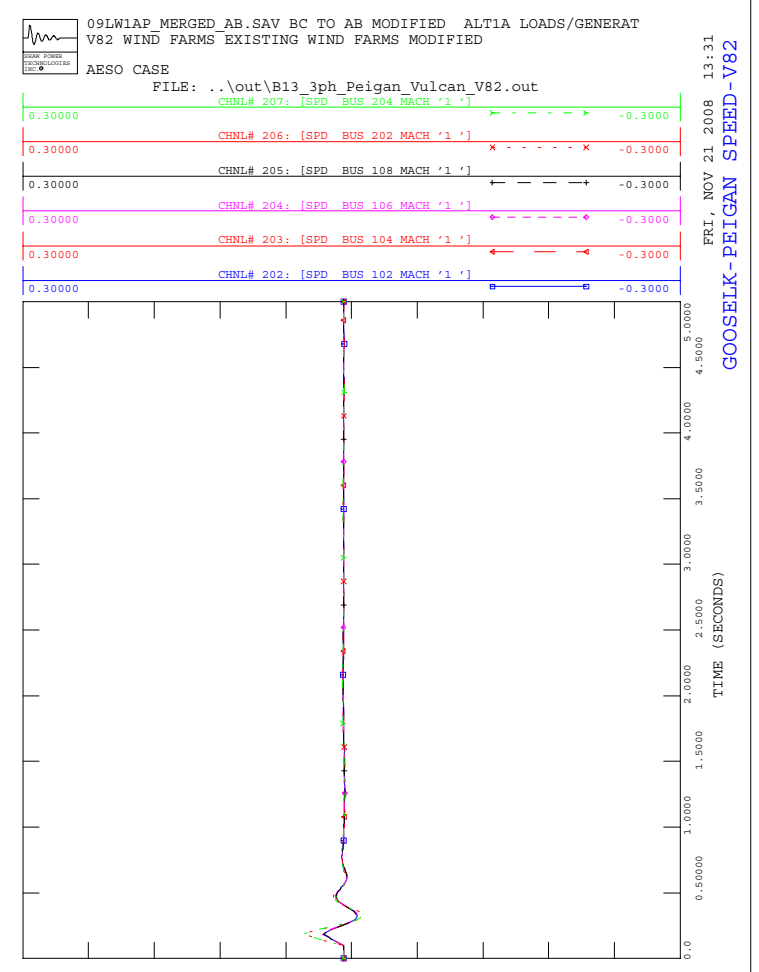
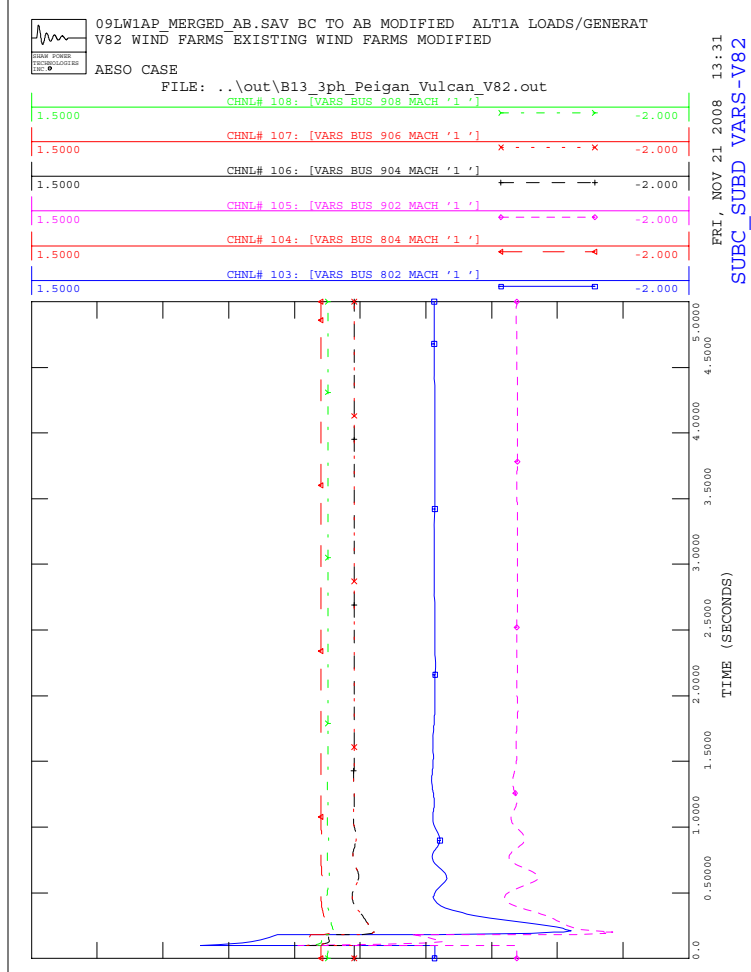
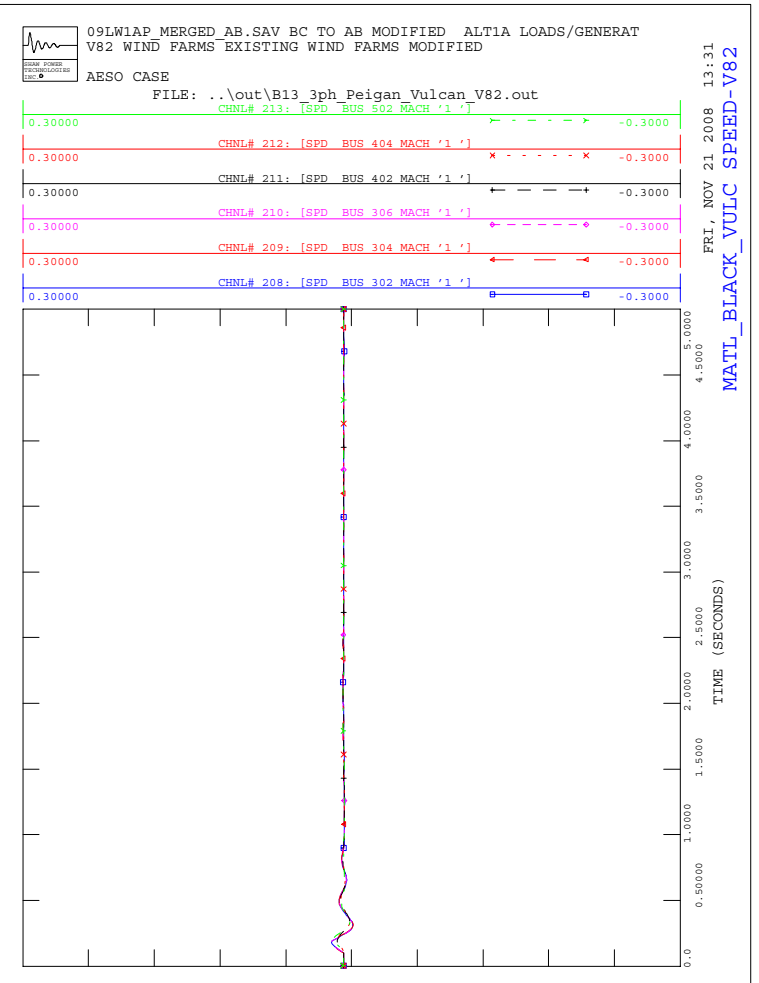
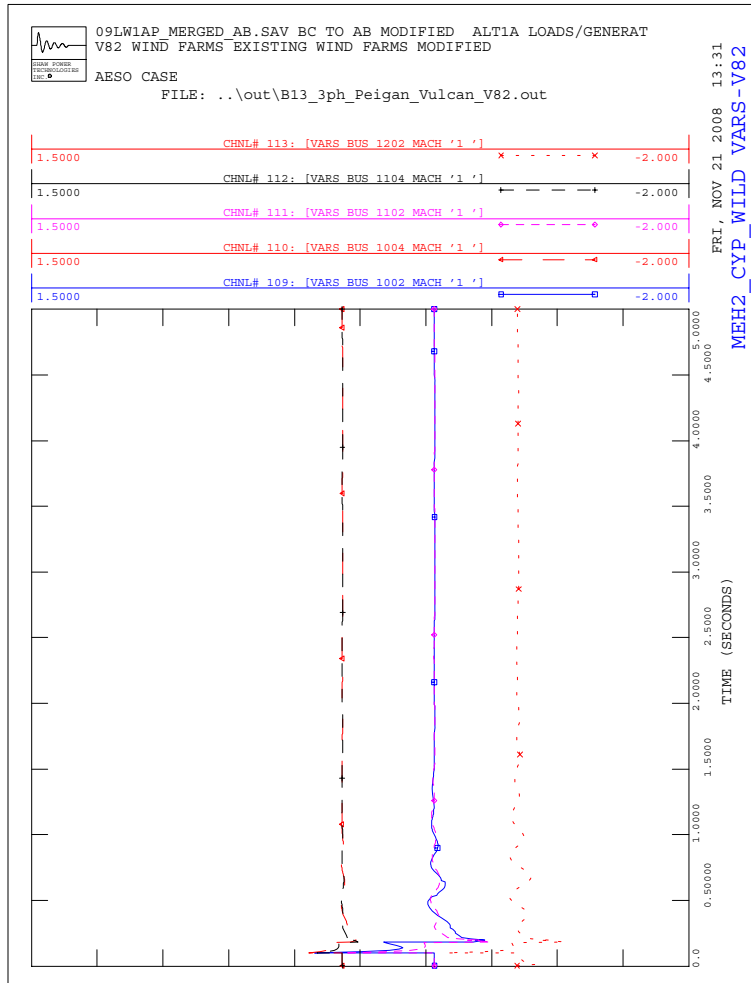
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
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FRI, NOV 21 2008 13:31
AB_BC_TIE_FLOWS-V82



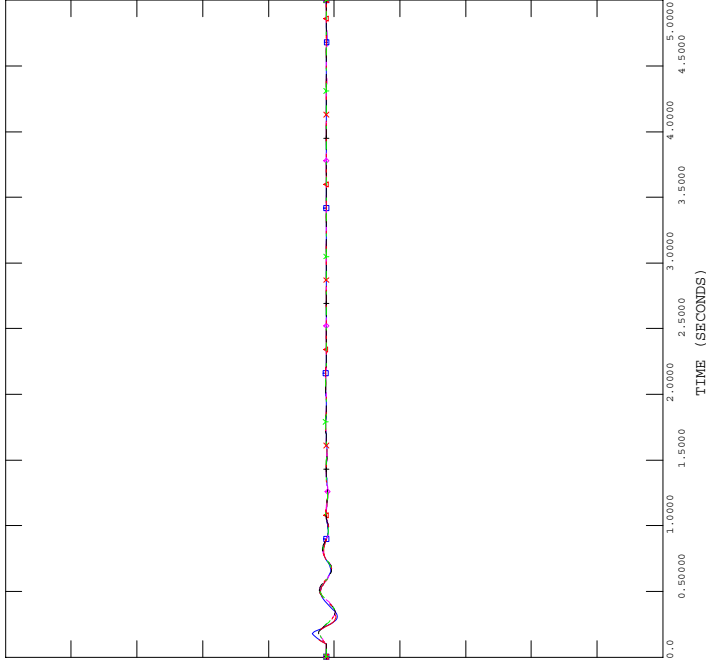
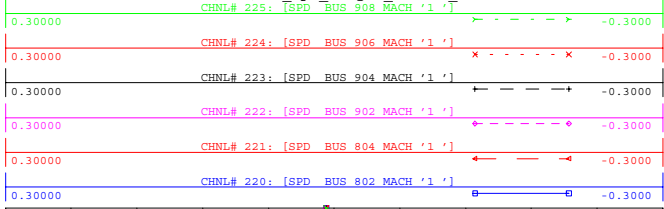






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 AESO CASE

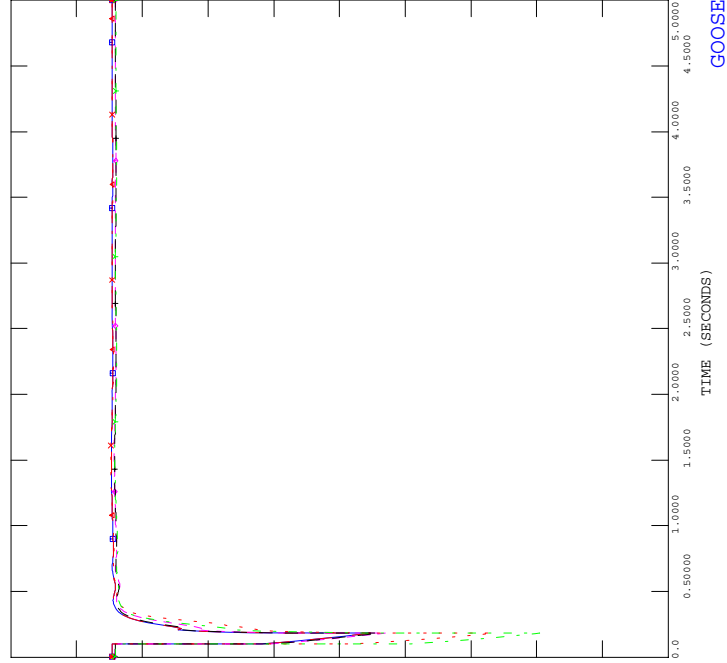
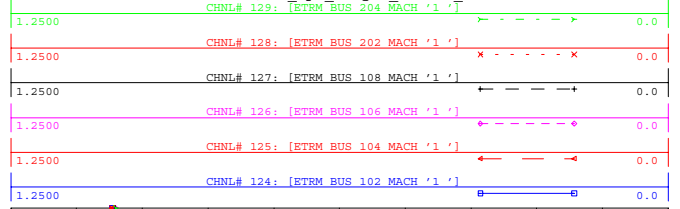
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FRI, NOV 21 2008 13:31
 SUBC_SPEED-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

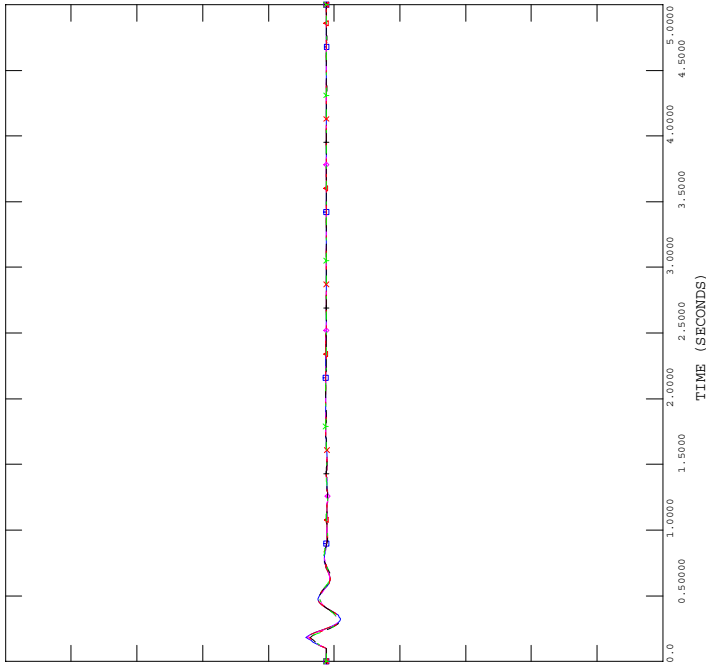
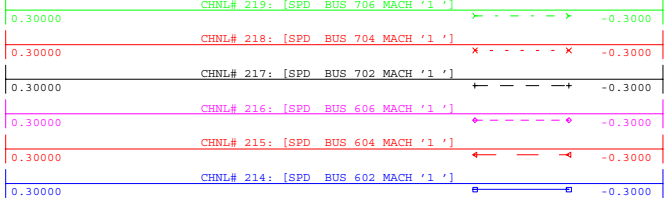
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 GOOSELK-PEIGAN ETERM-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

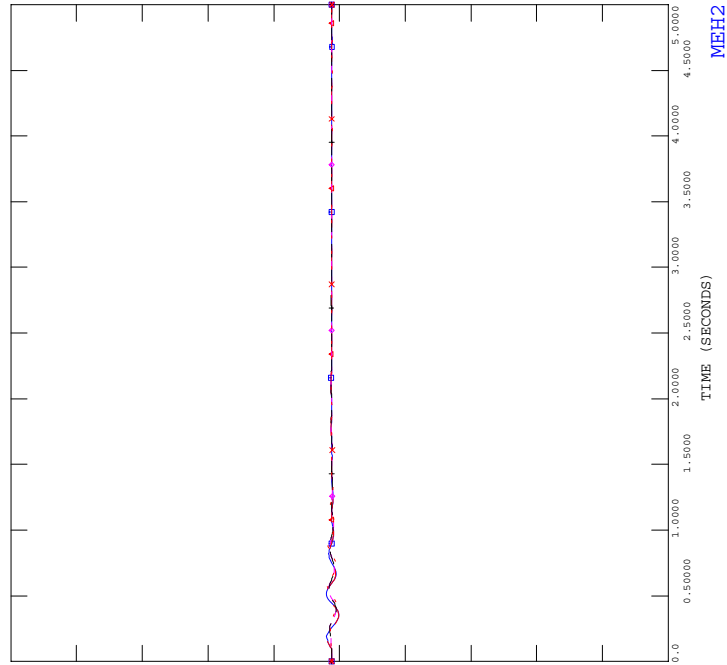
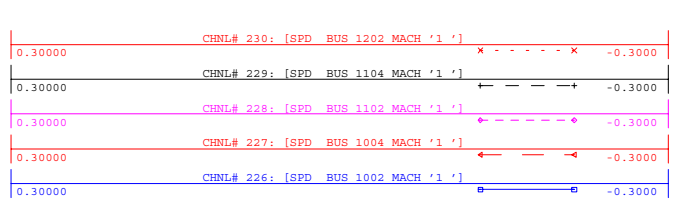
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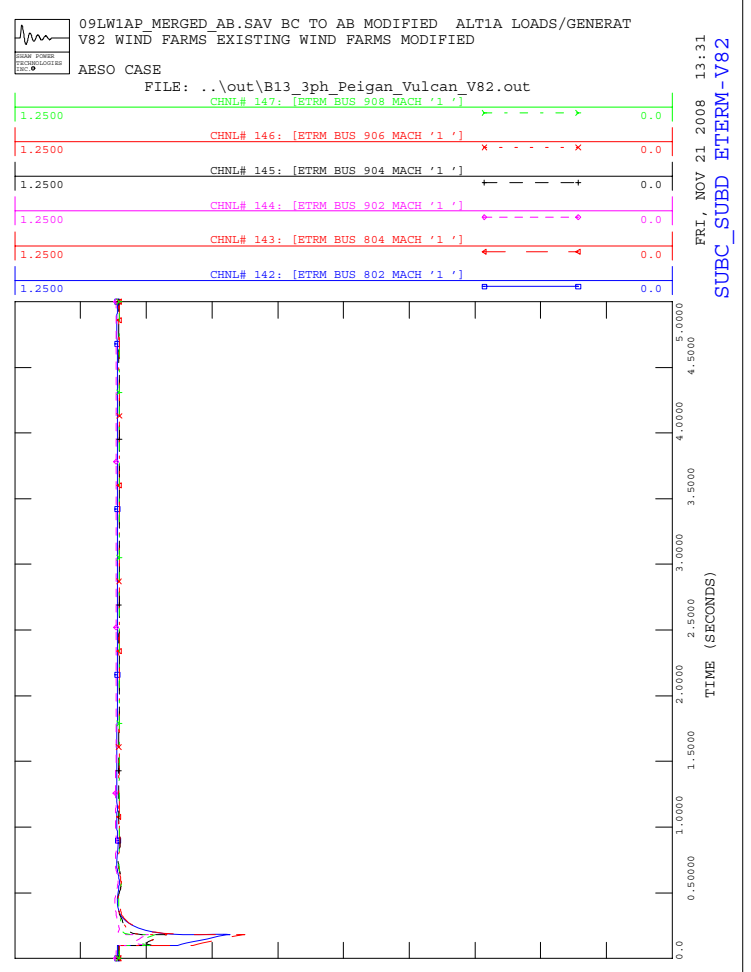
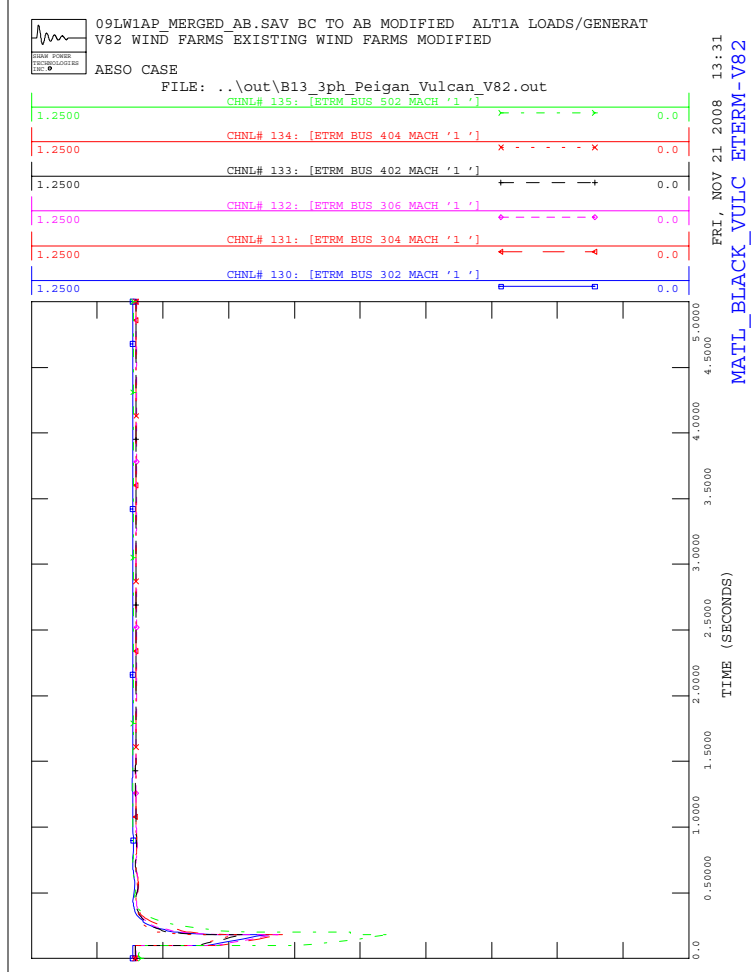
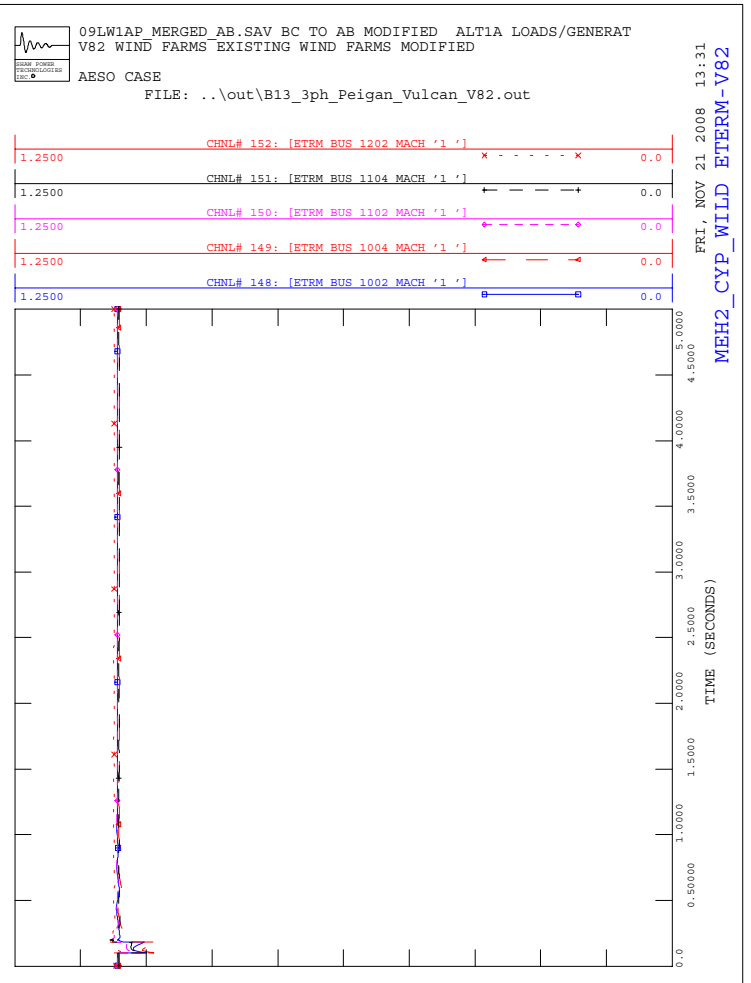
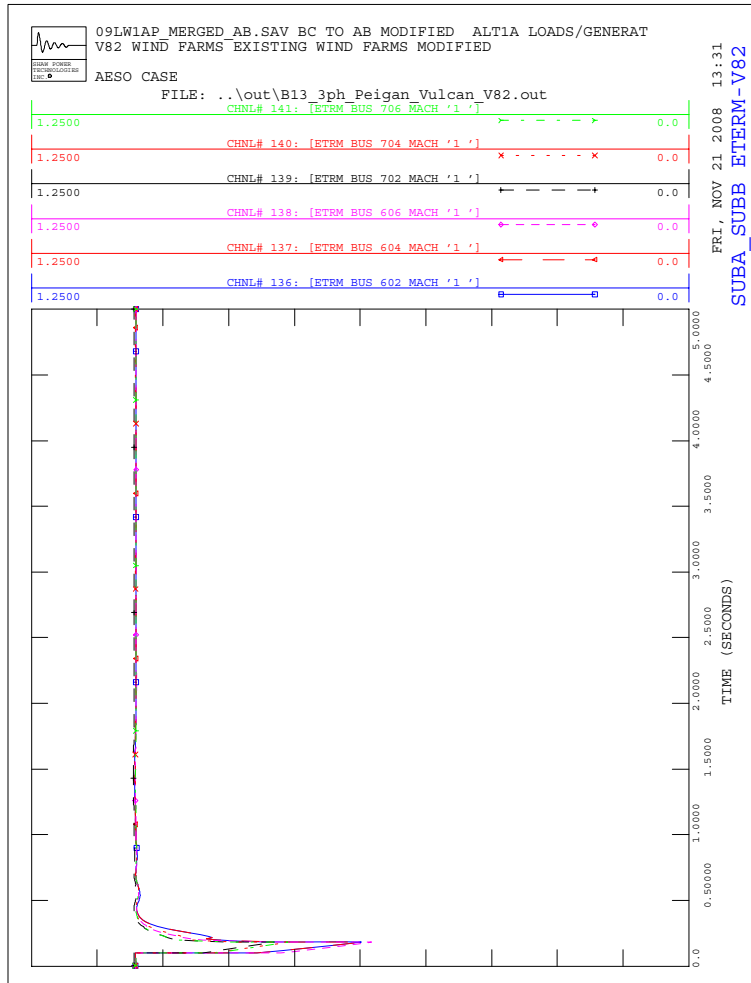
FRI, NOV 21 2008 13:31
 SUBA_SPEED-V82

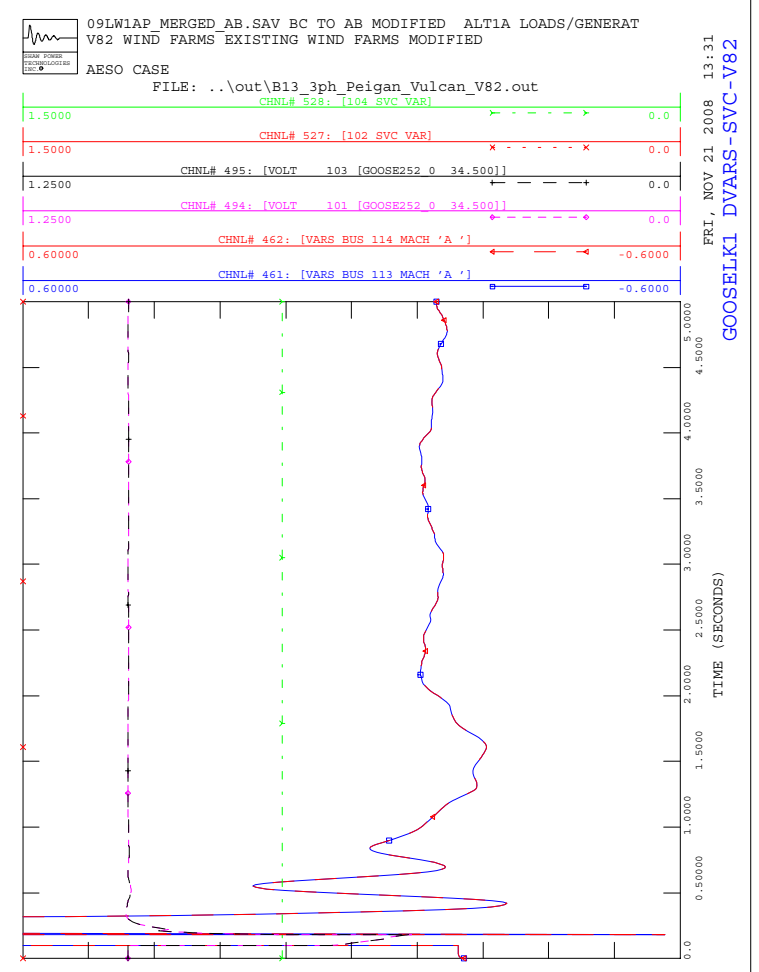
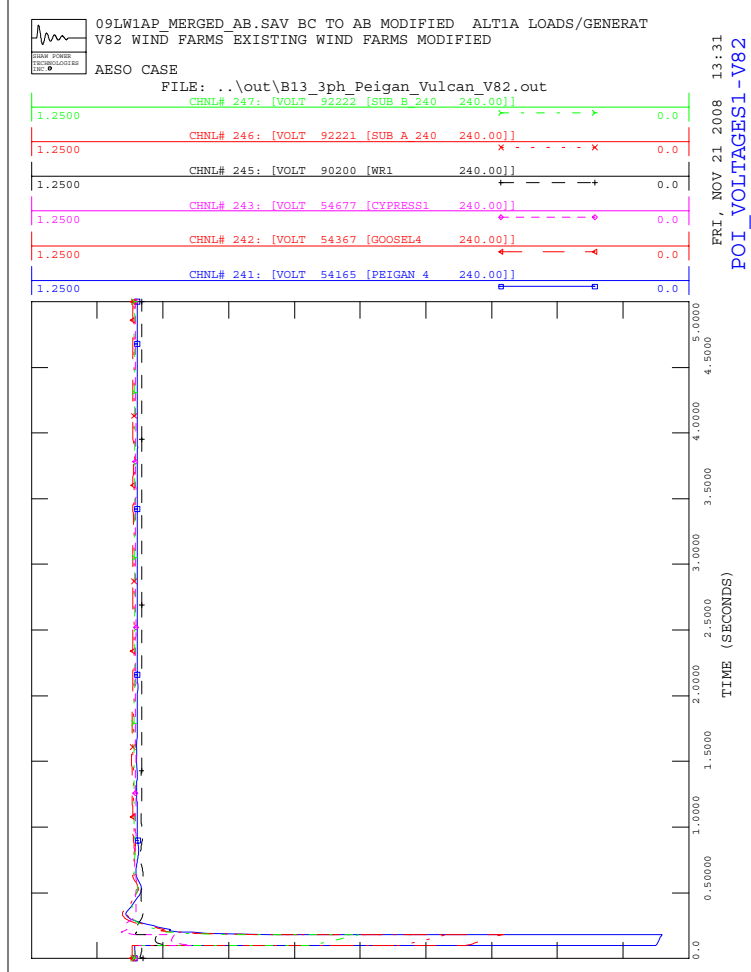
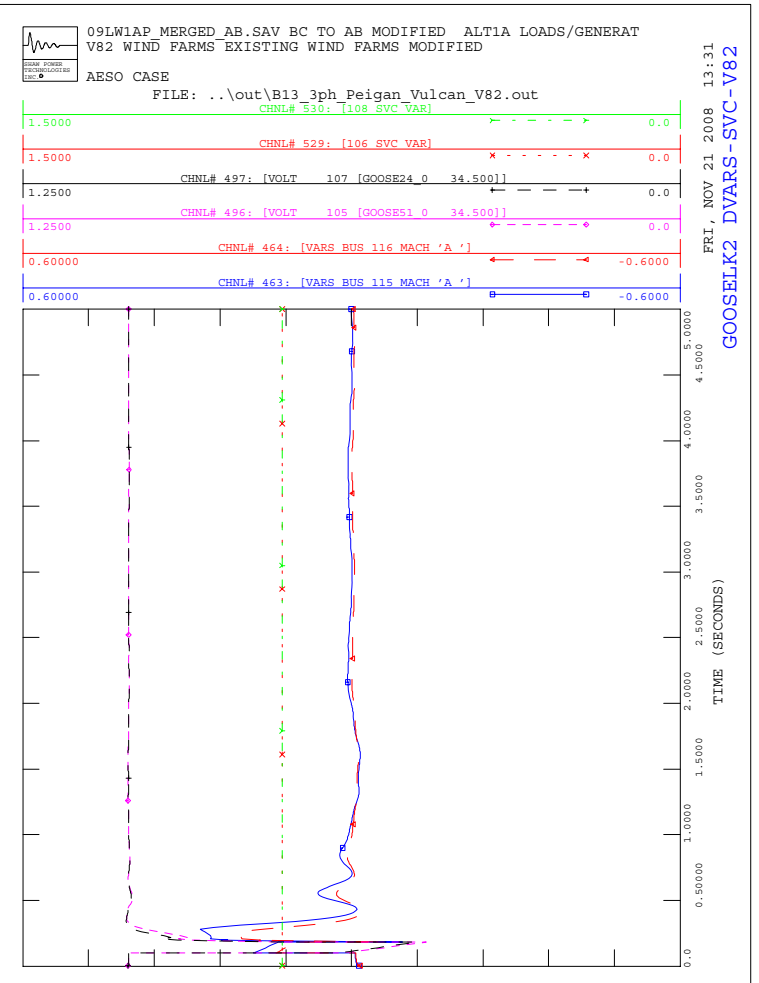
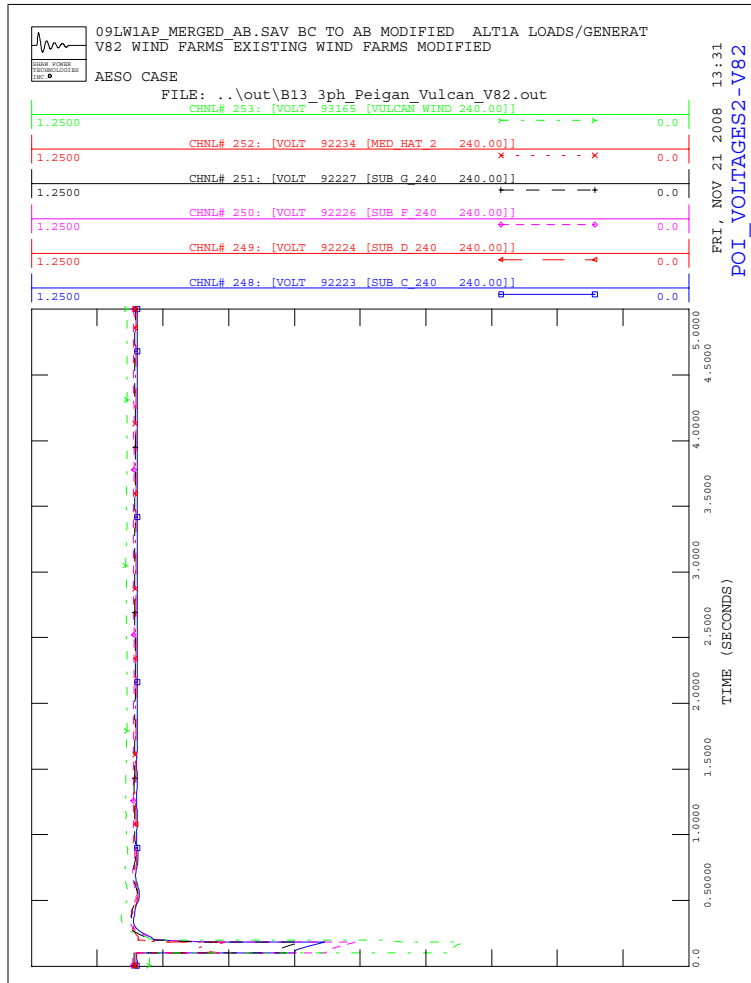
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

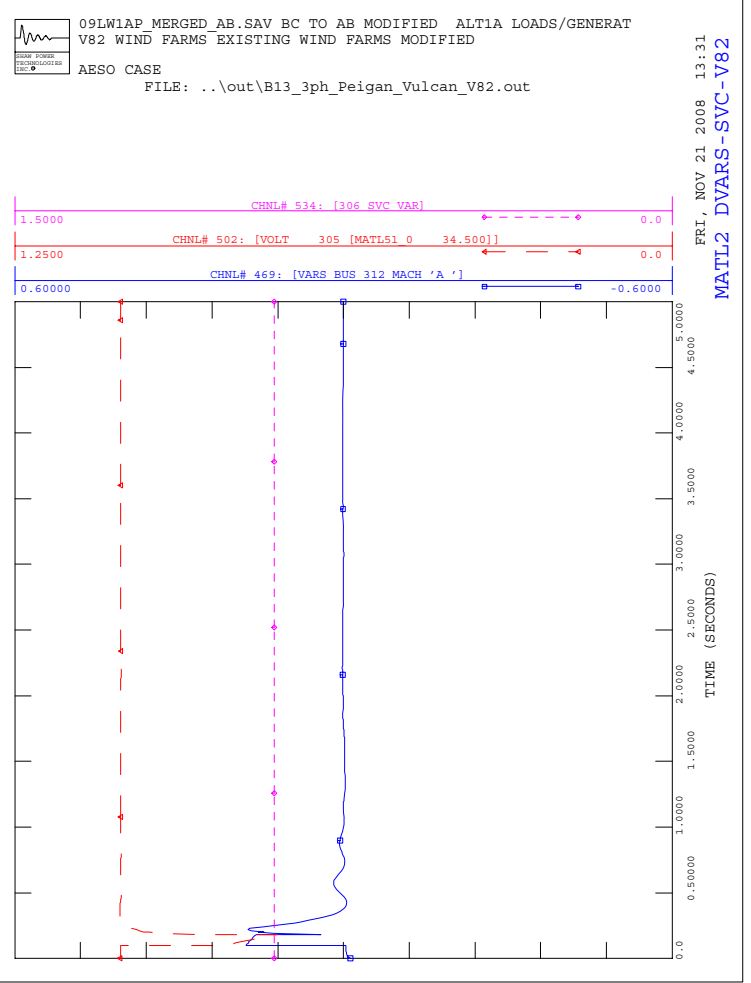
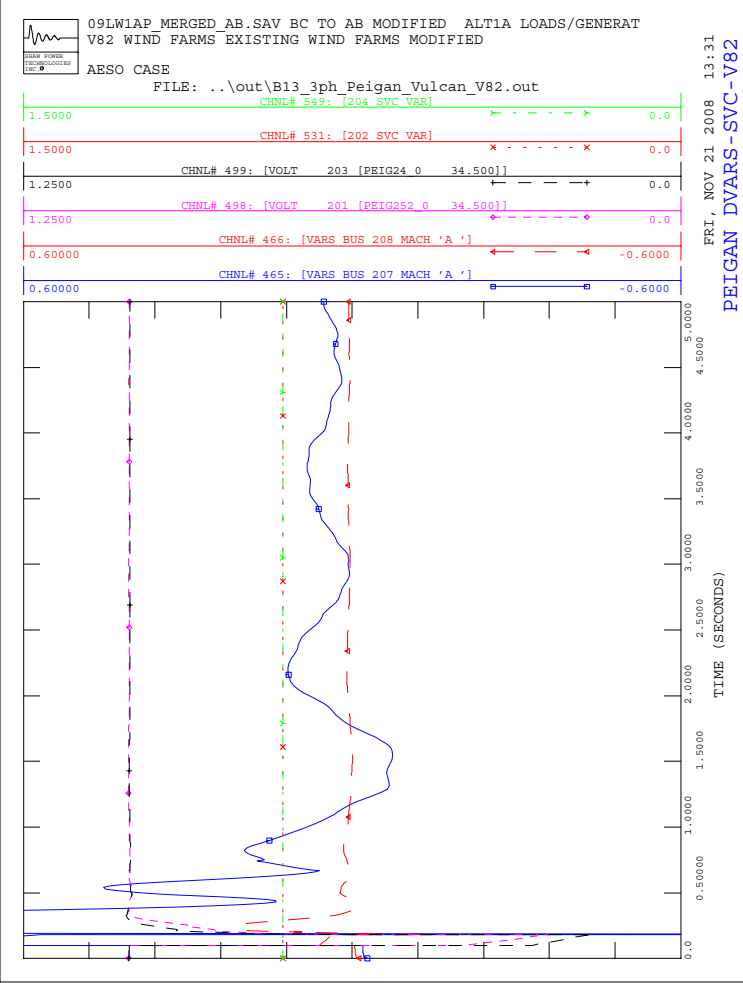
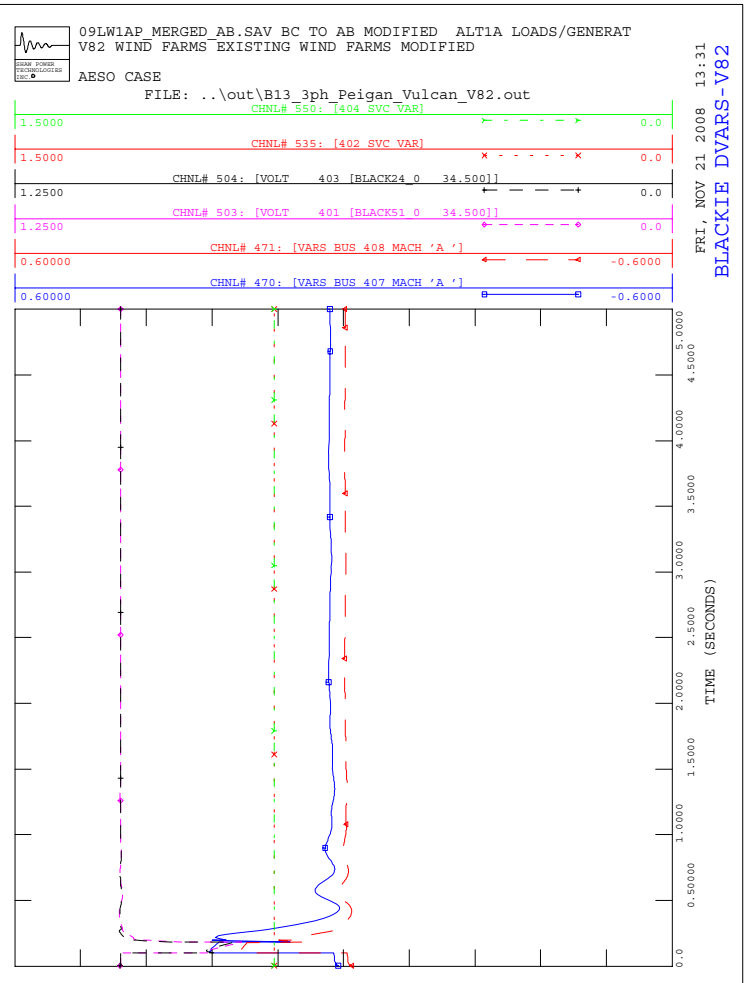
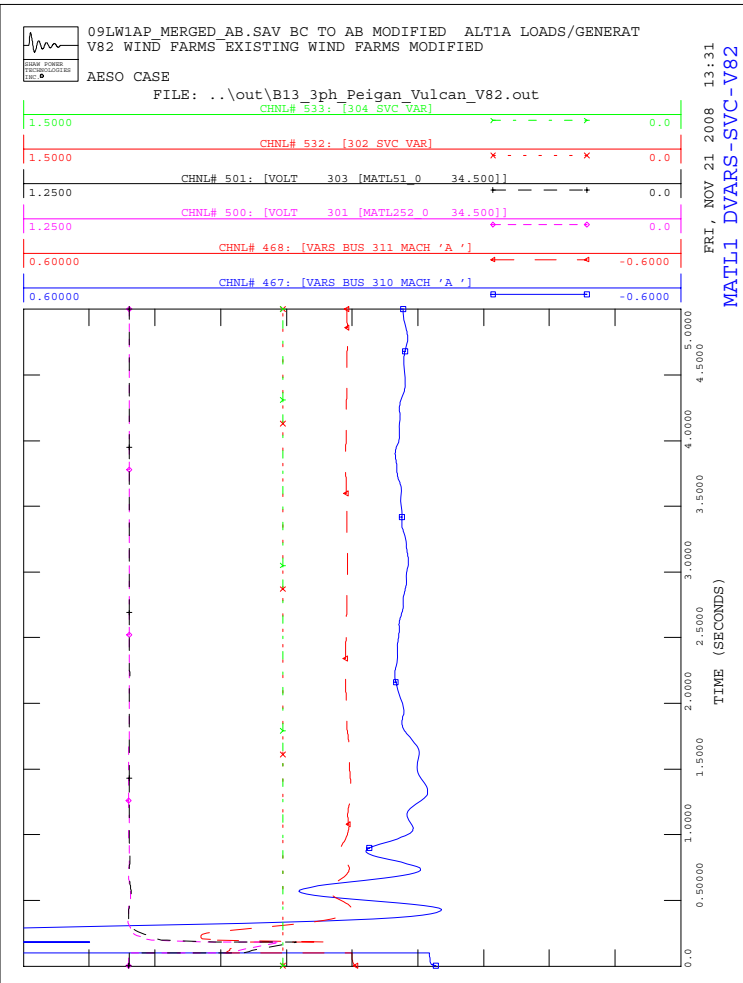
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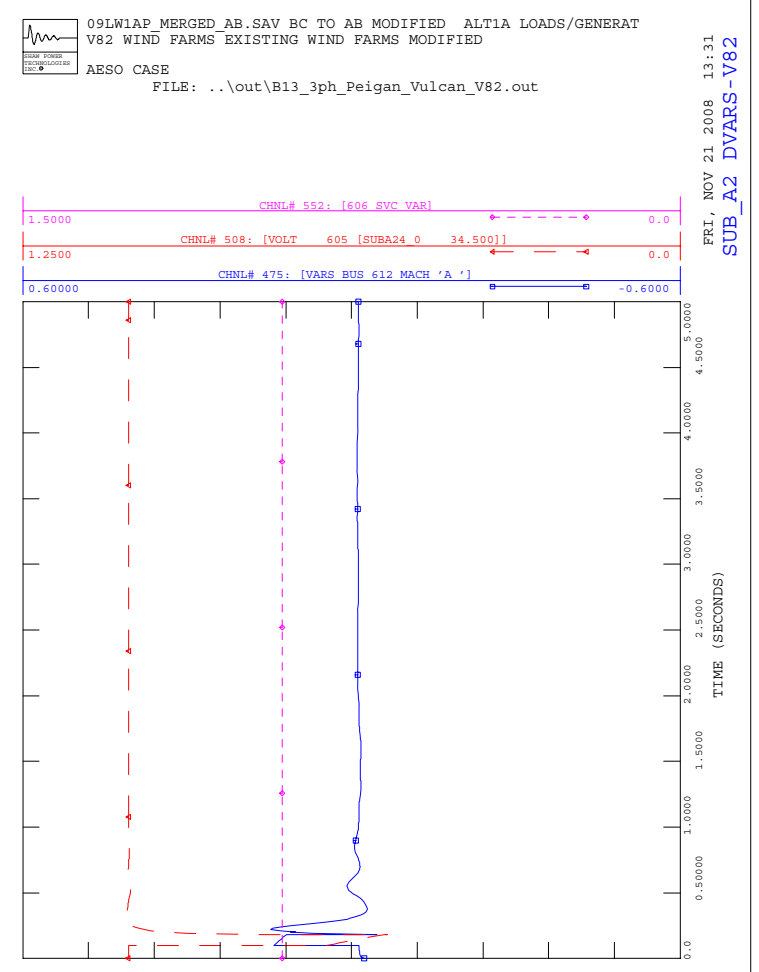
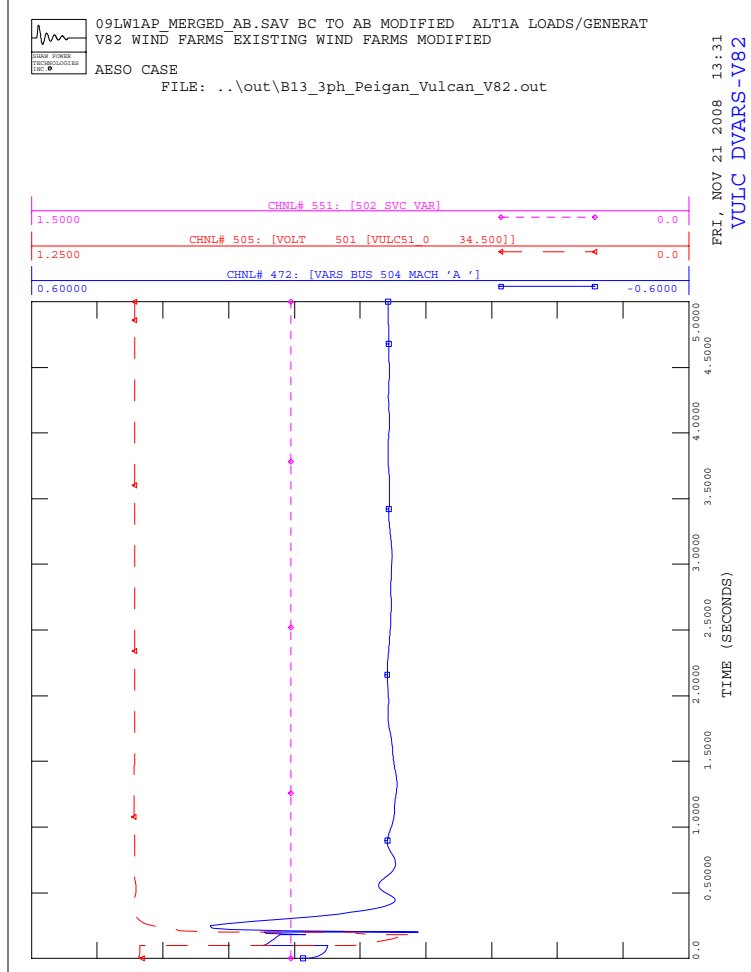
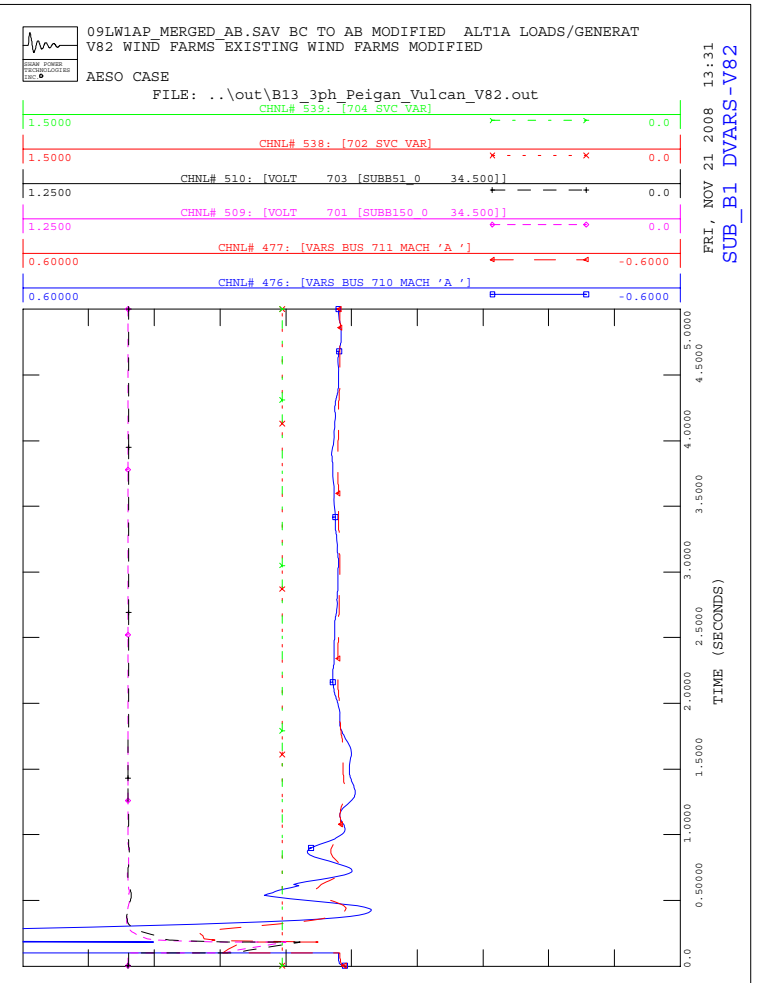
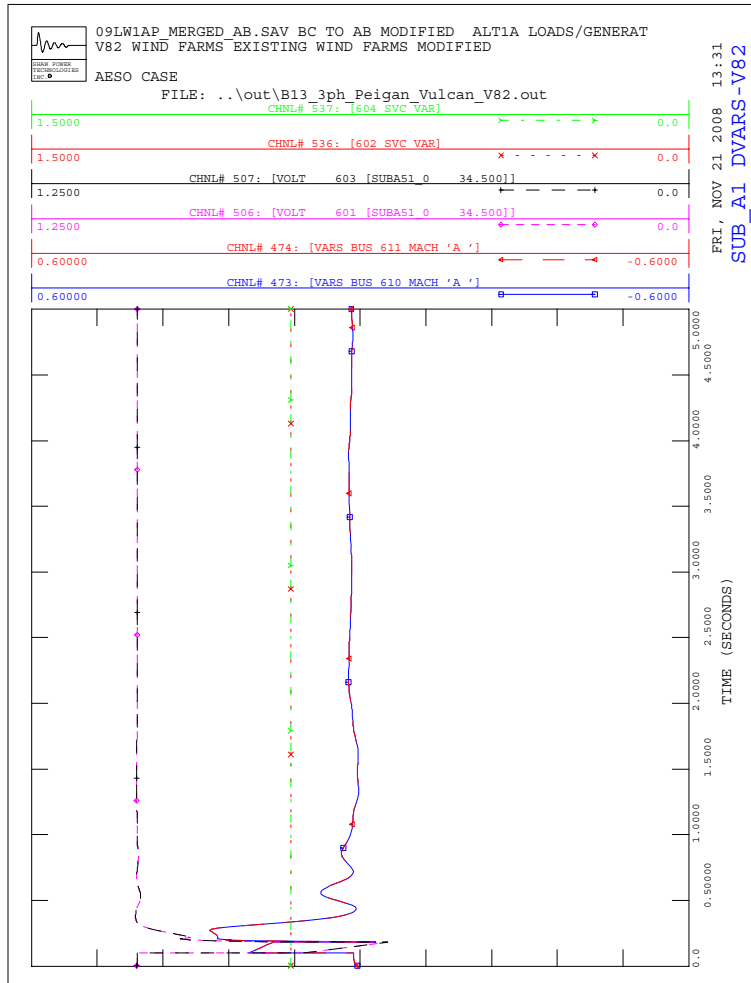


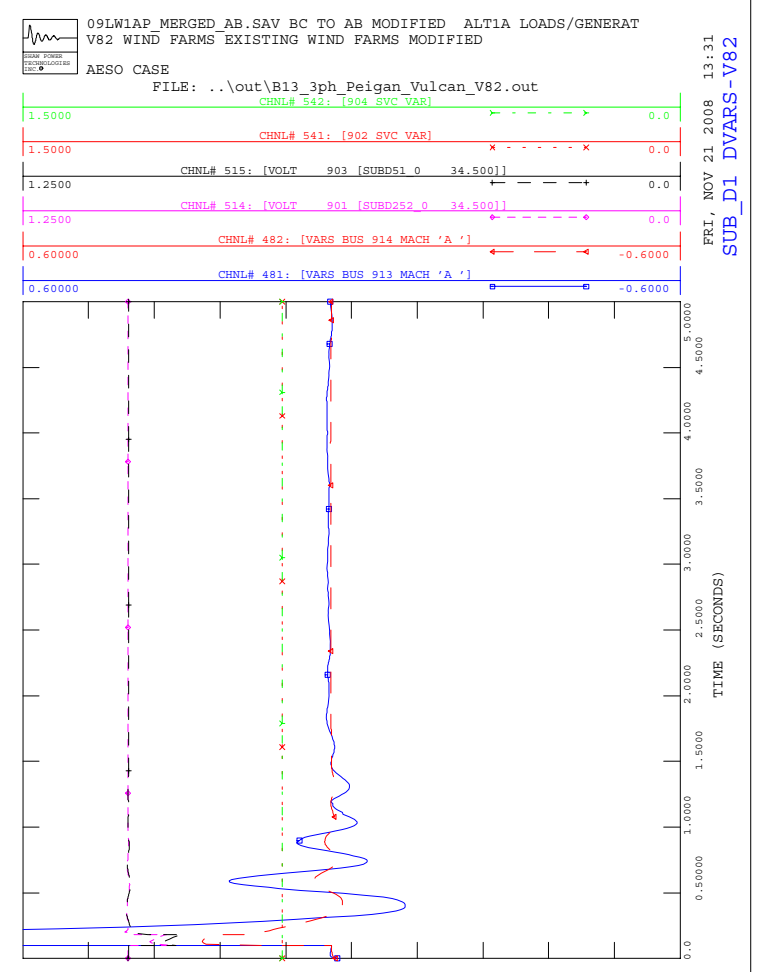
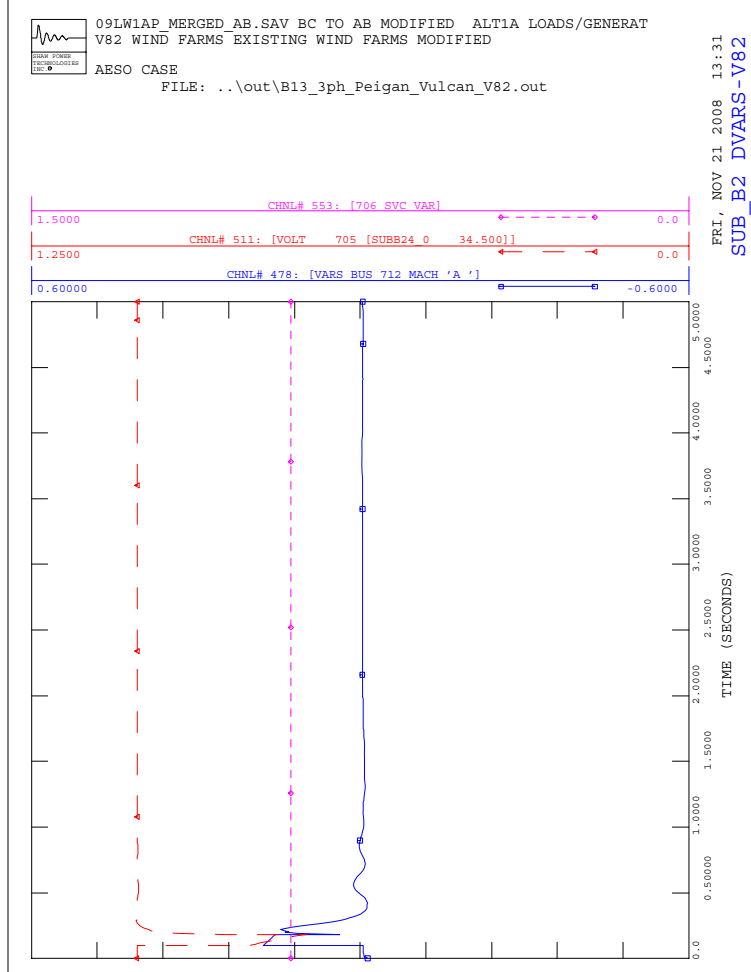
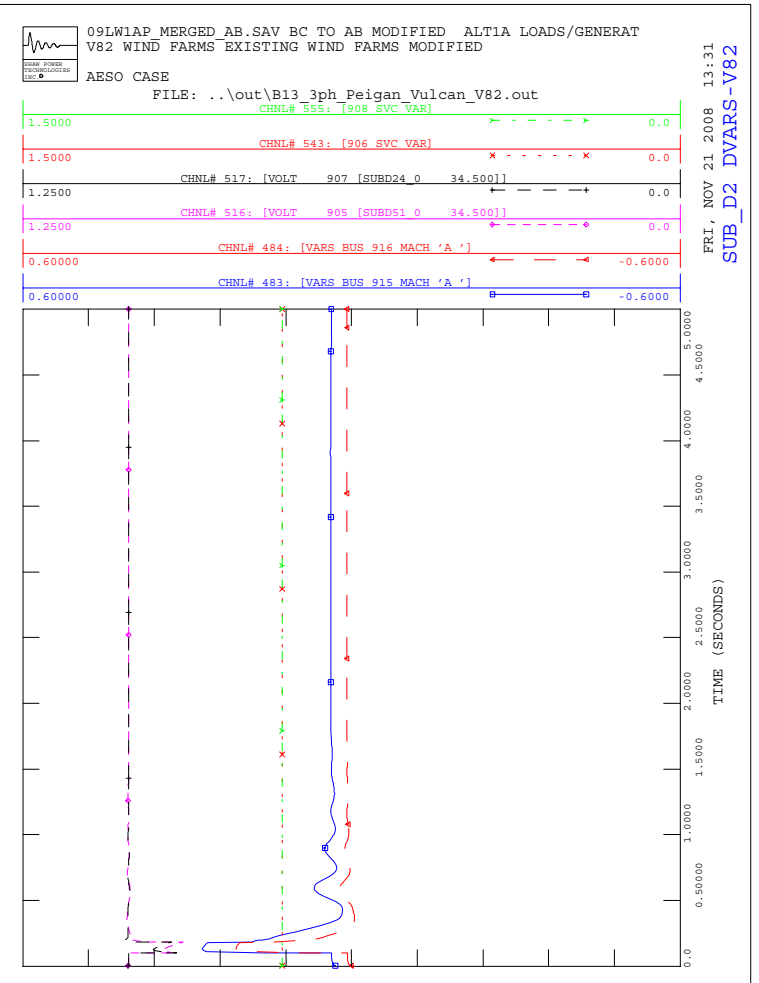
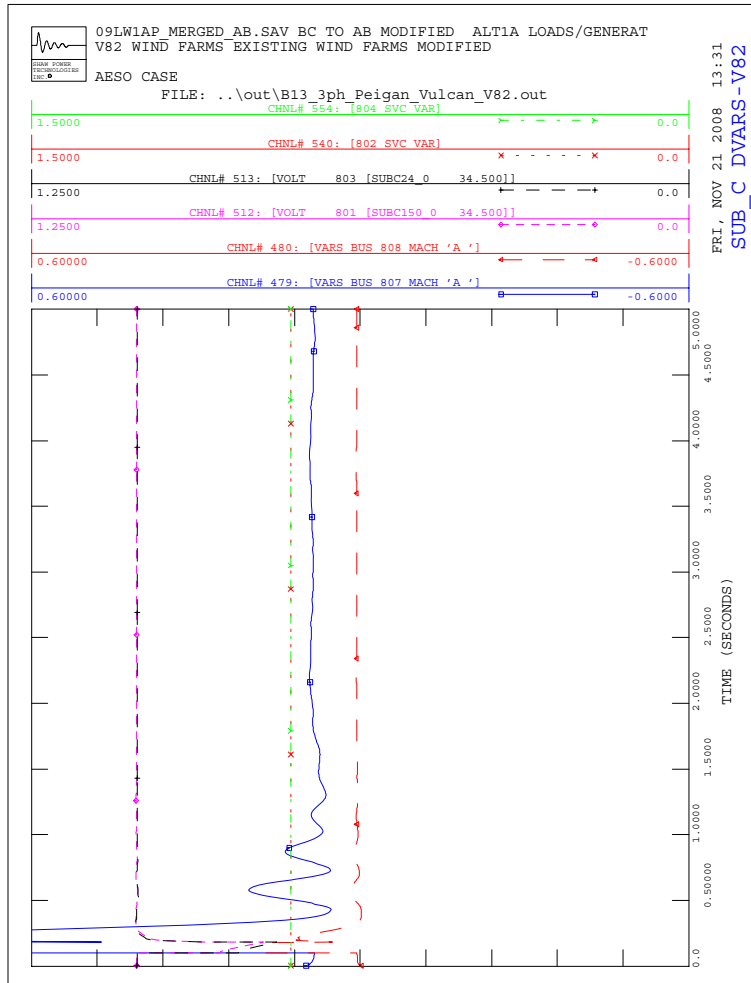
FRI, NOV 21 2008 13:31
 MEH2_CYP_WILD_SPEED-V82

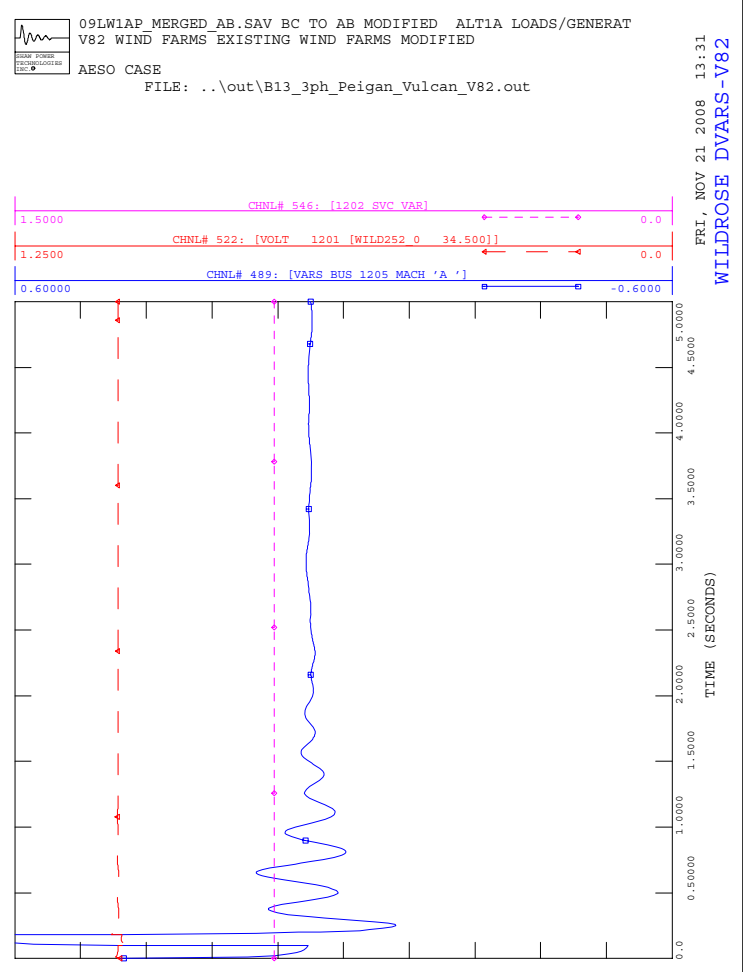
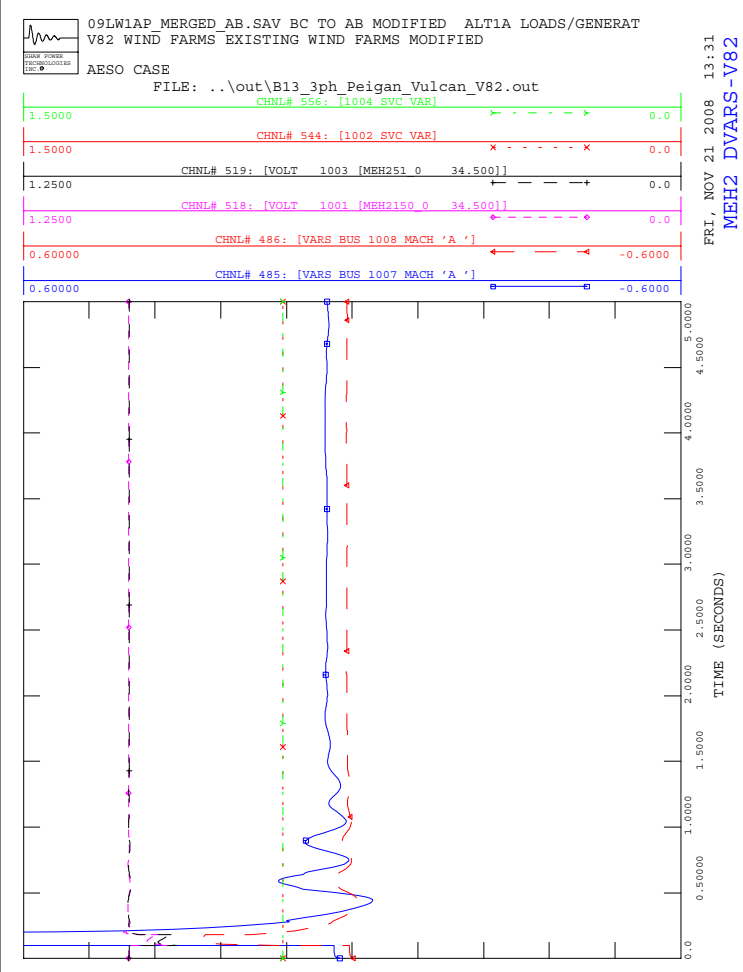
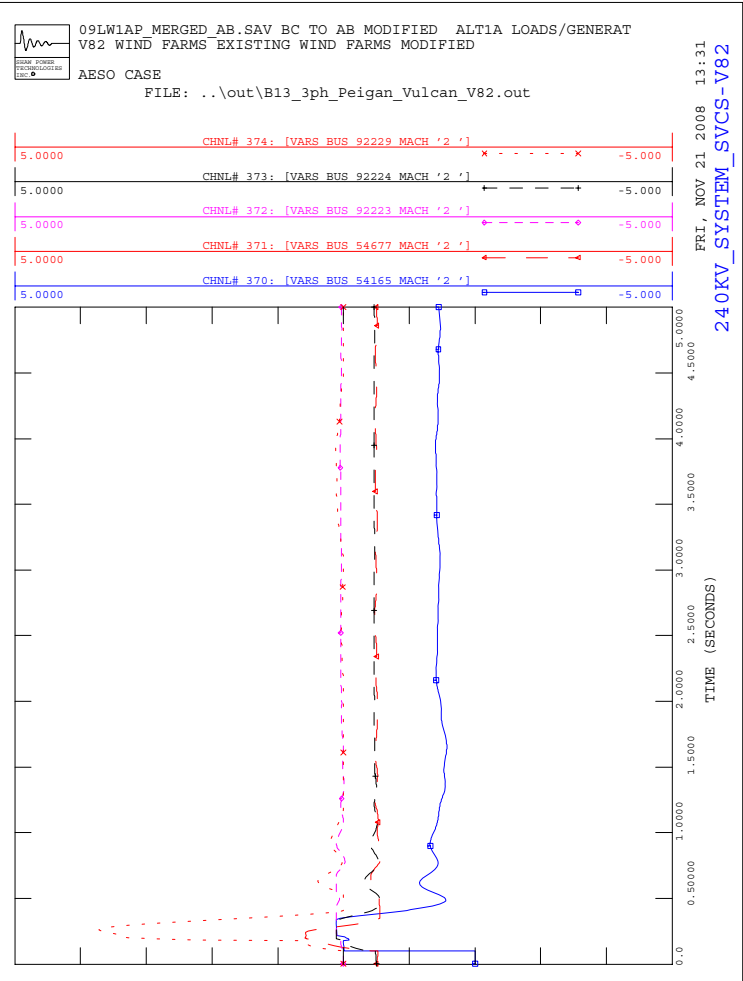
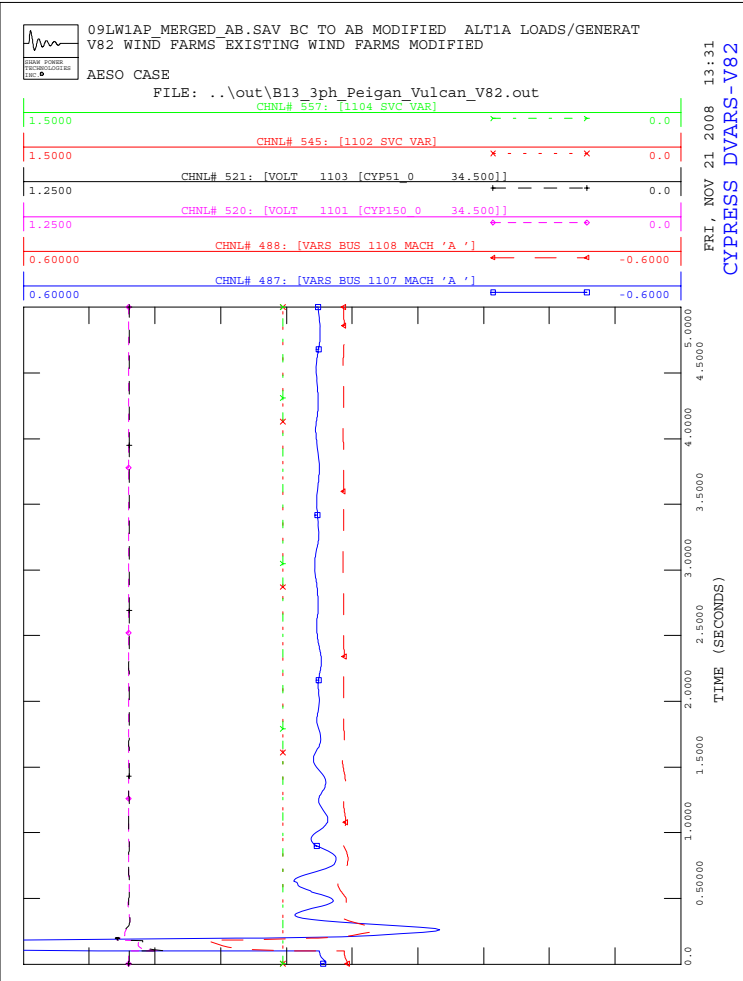








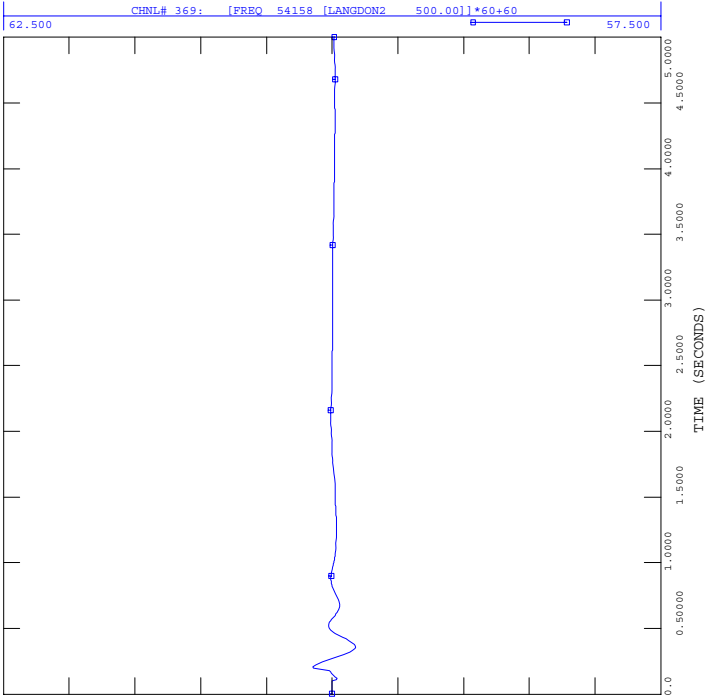






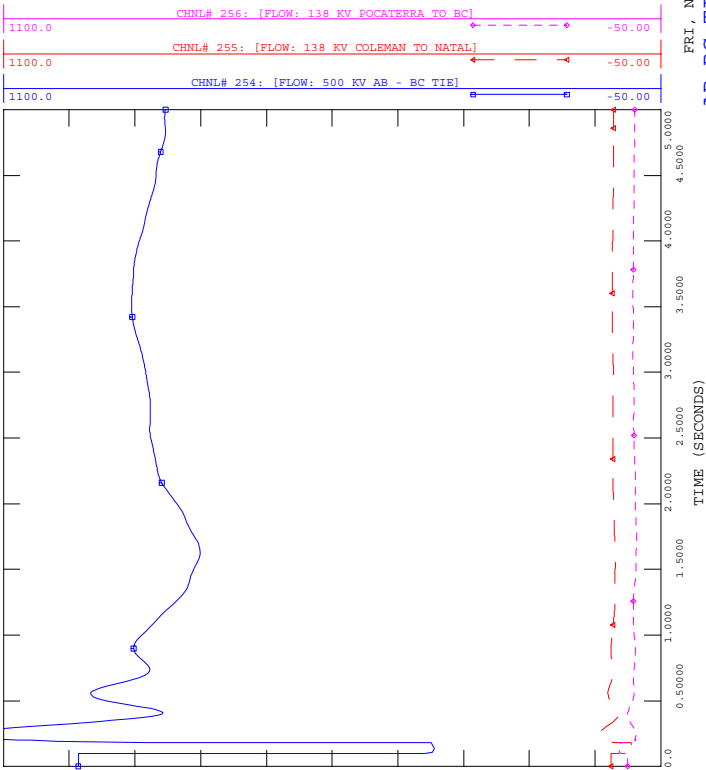
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B13_3ph_Peigan_Vulcan_V82.out

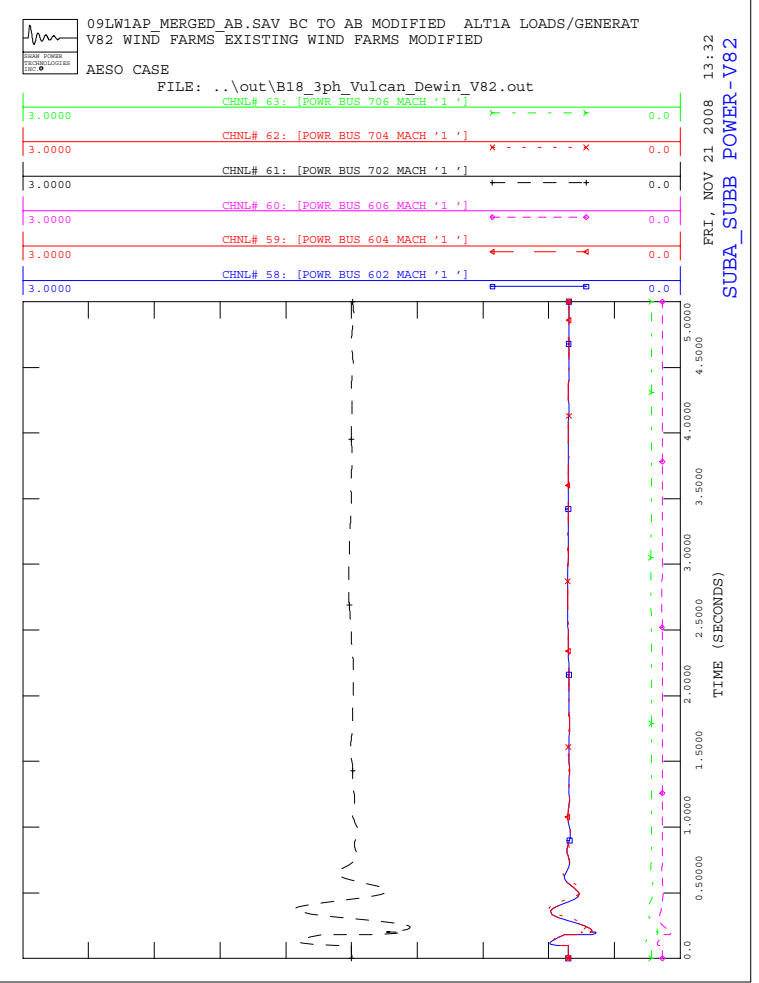
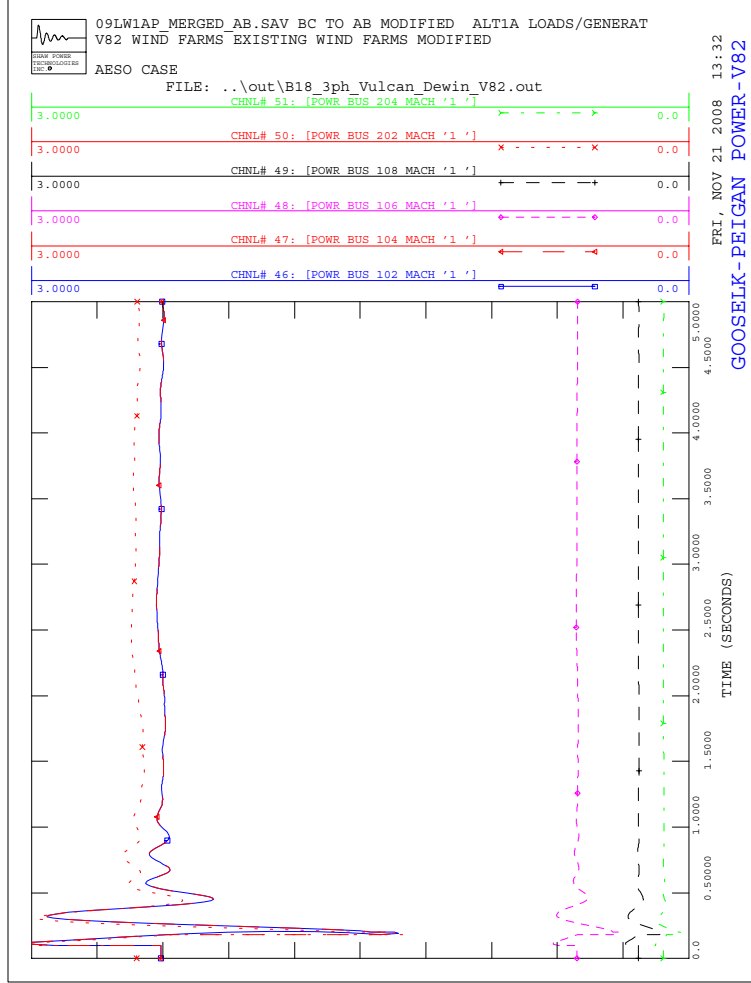
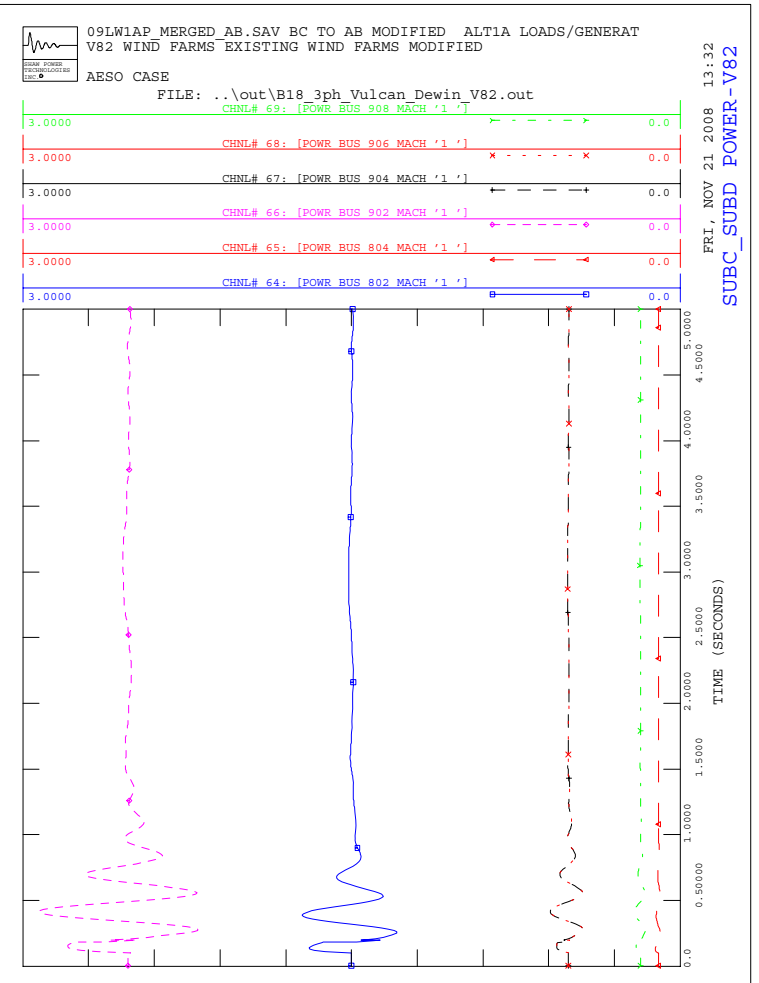
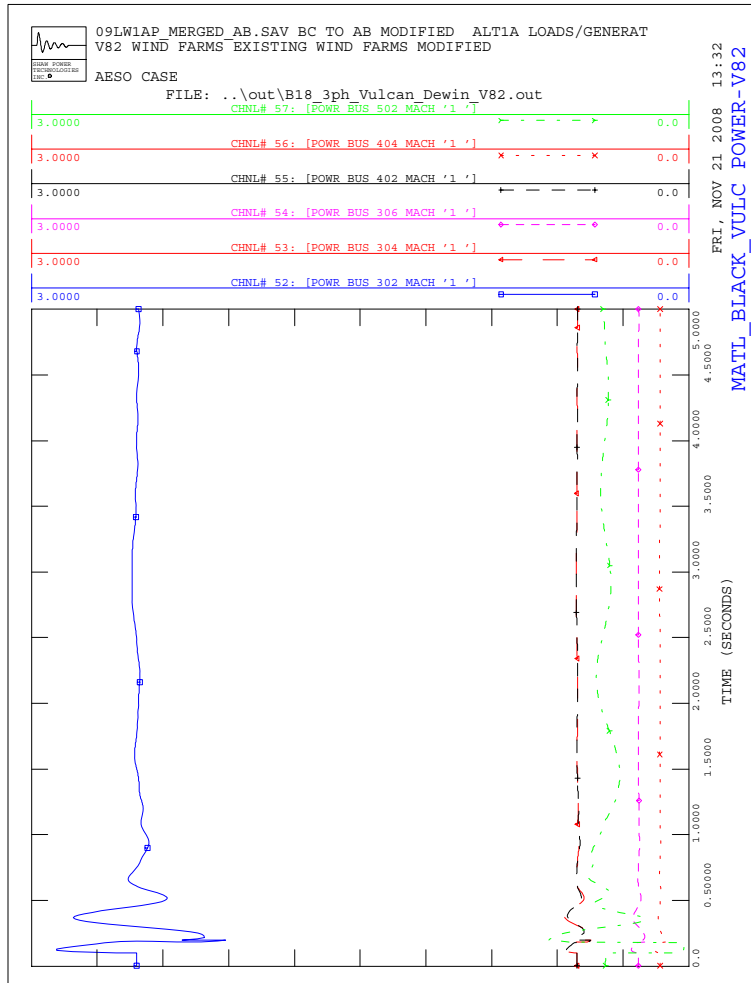
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LANGDON_FRQ-V82

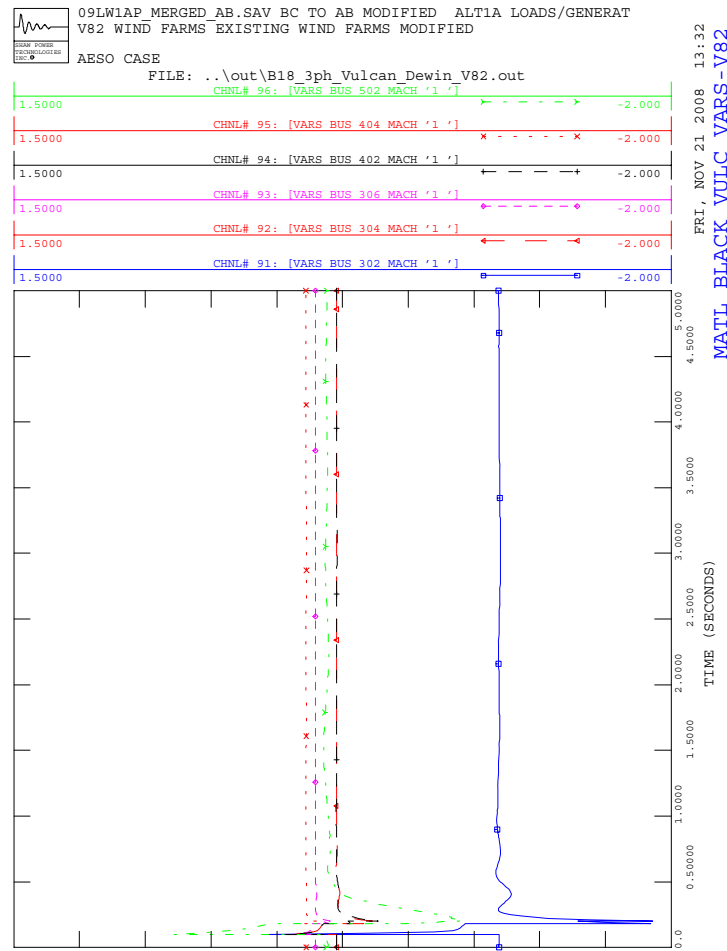
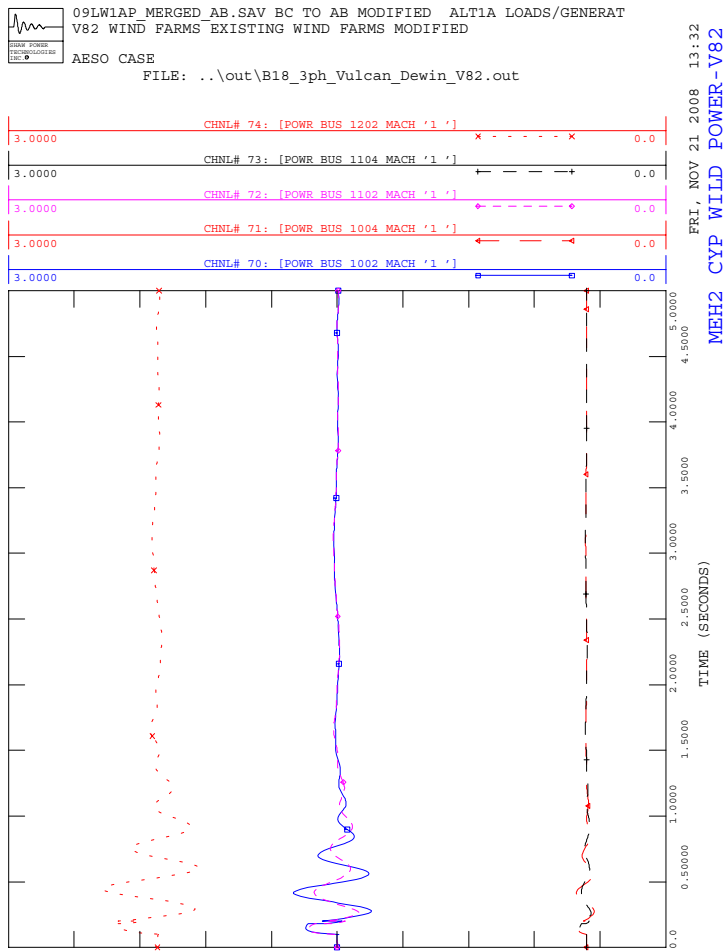
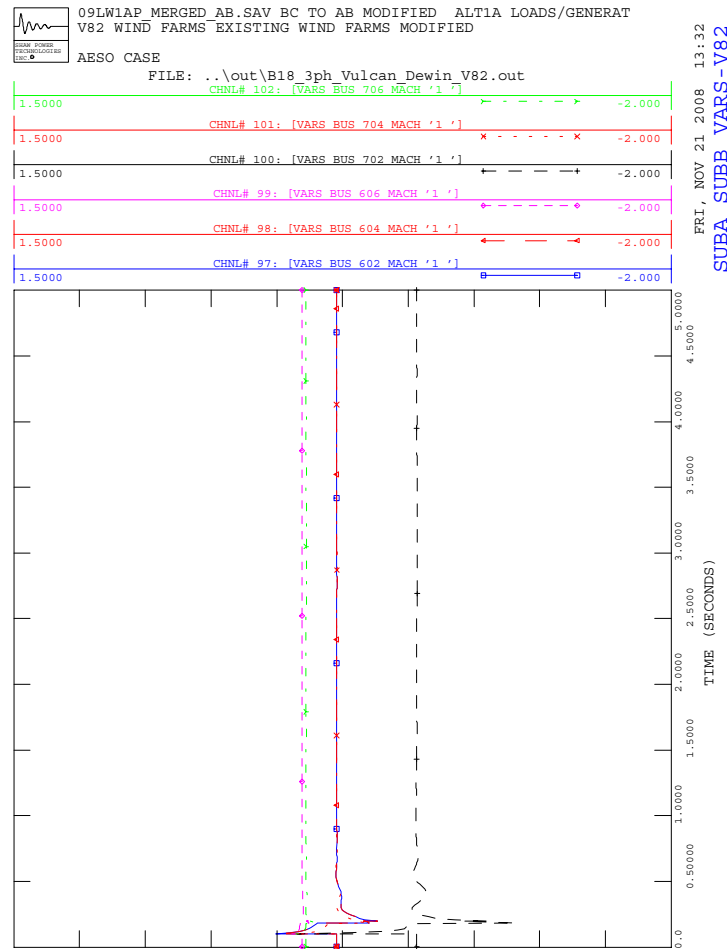
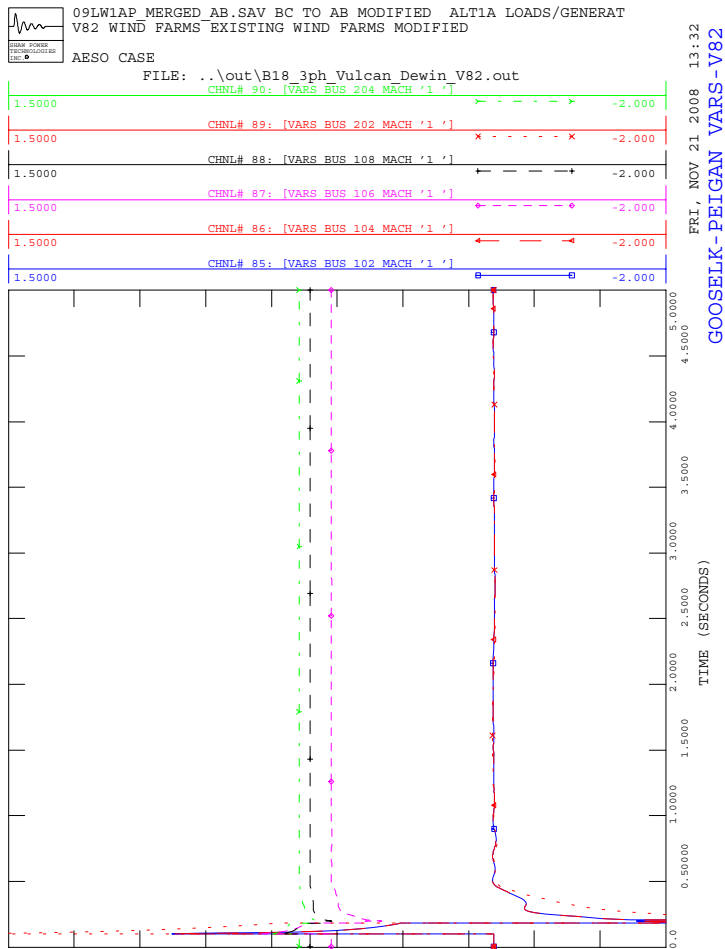


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
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AB_BC_TIE_FLOWS-V82

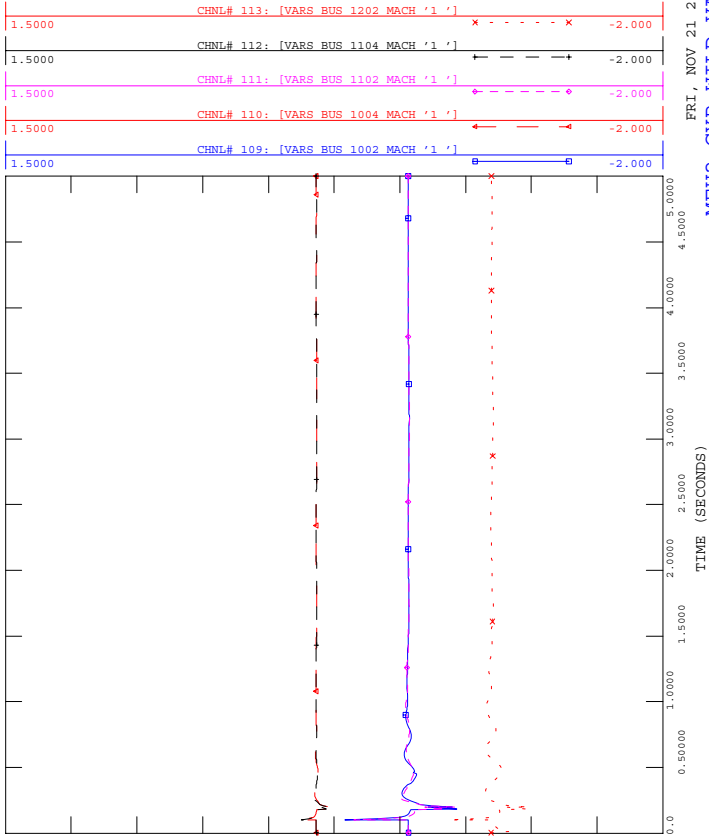






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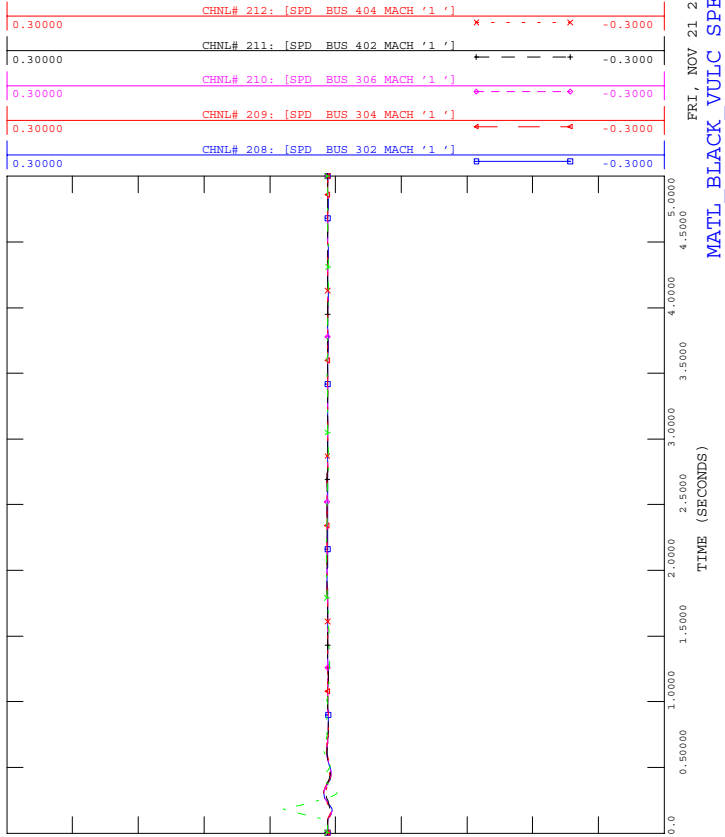
AEBSO CASE
FILE: ..\out\B18_3ph_Vulcan_Dewin_V82.out



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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

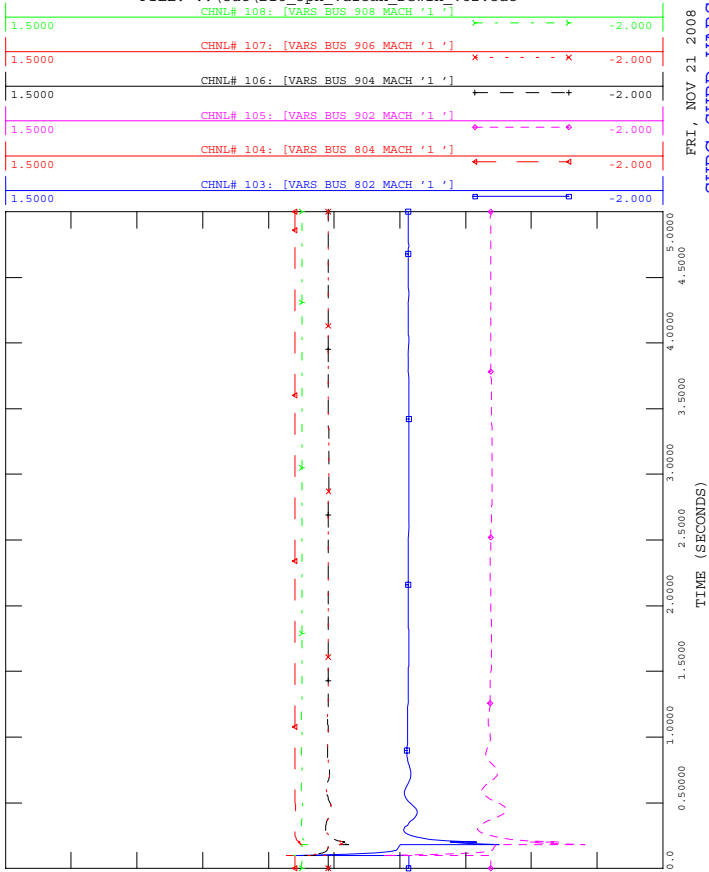
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

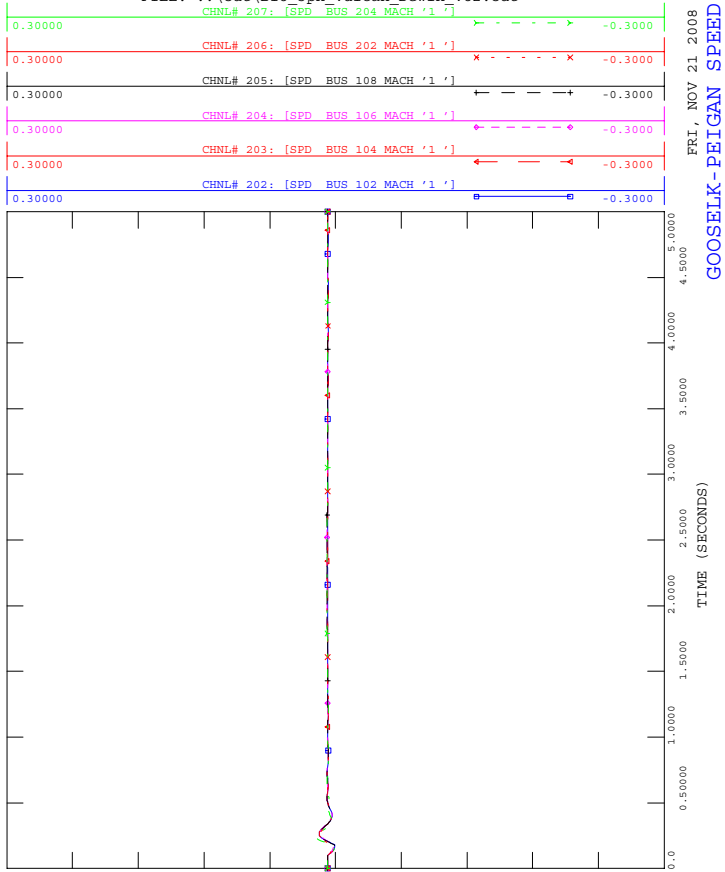
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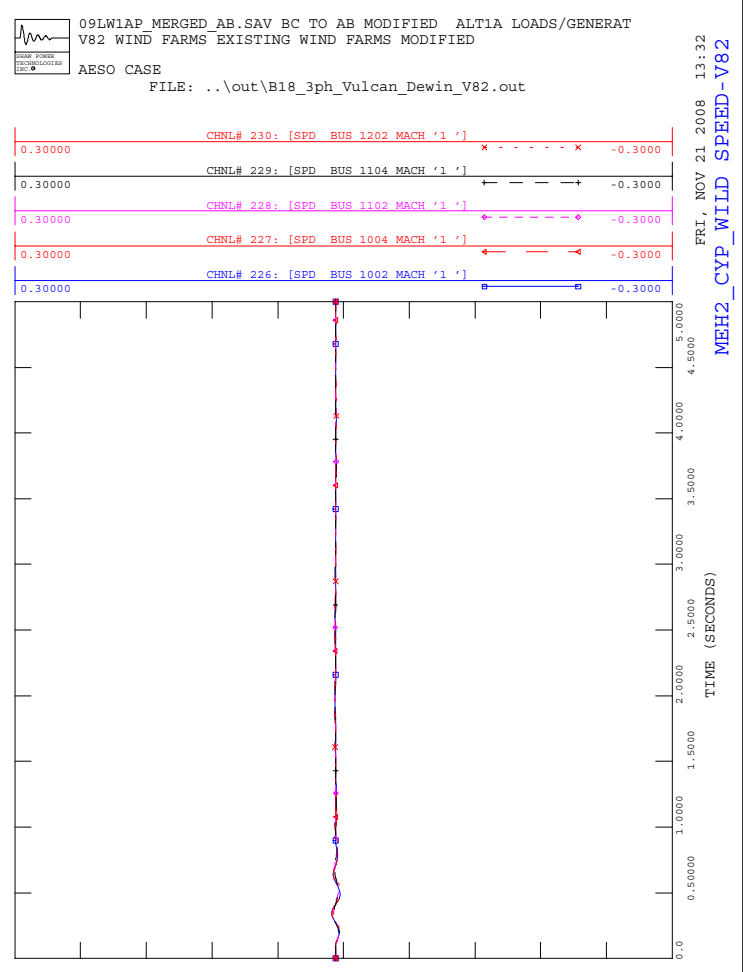
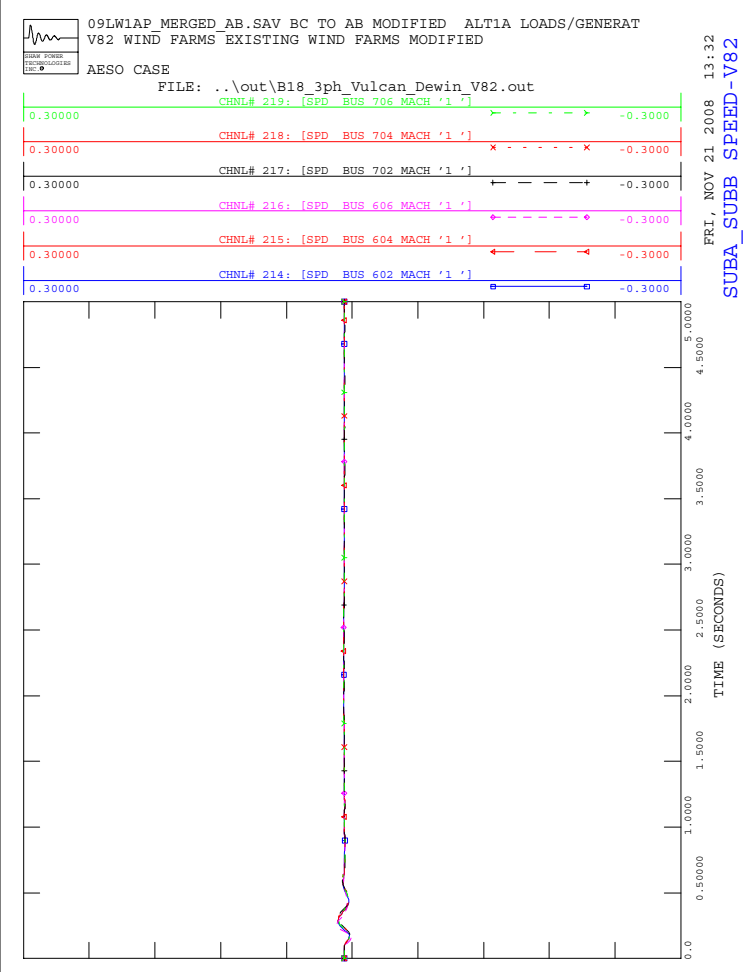
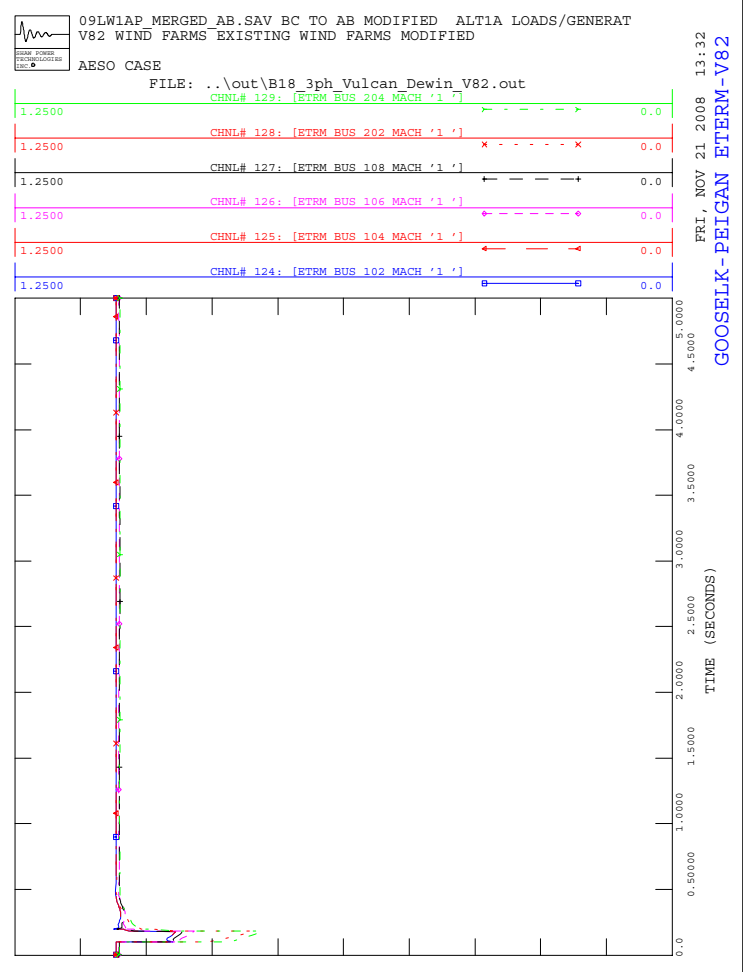
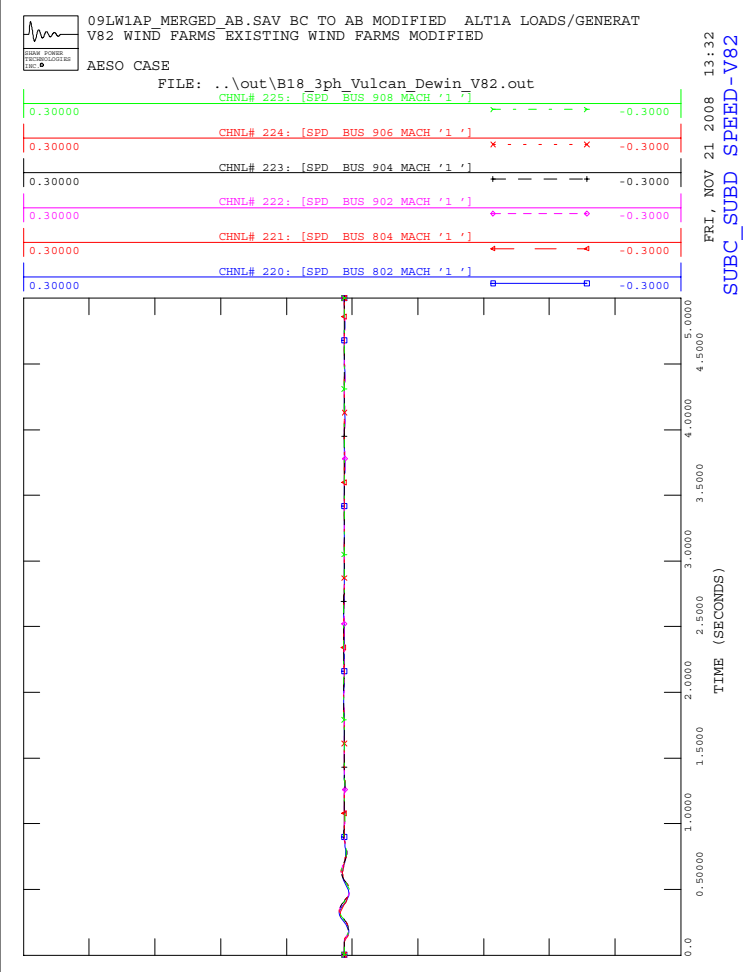
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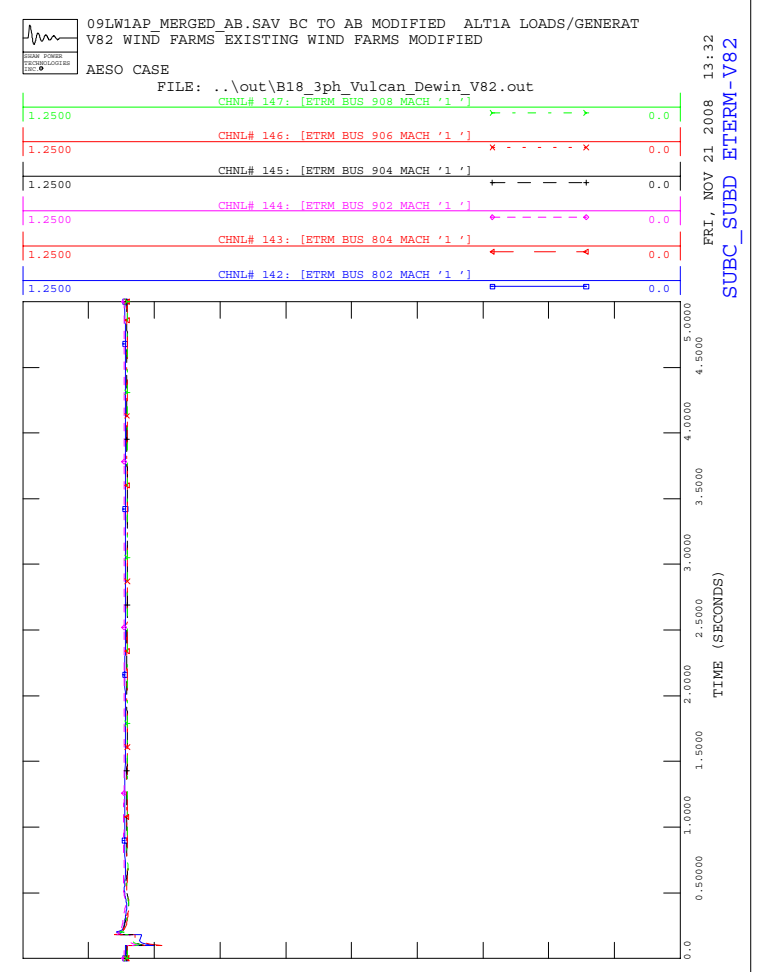
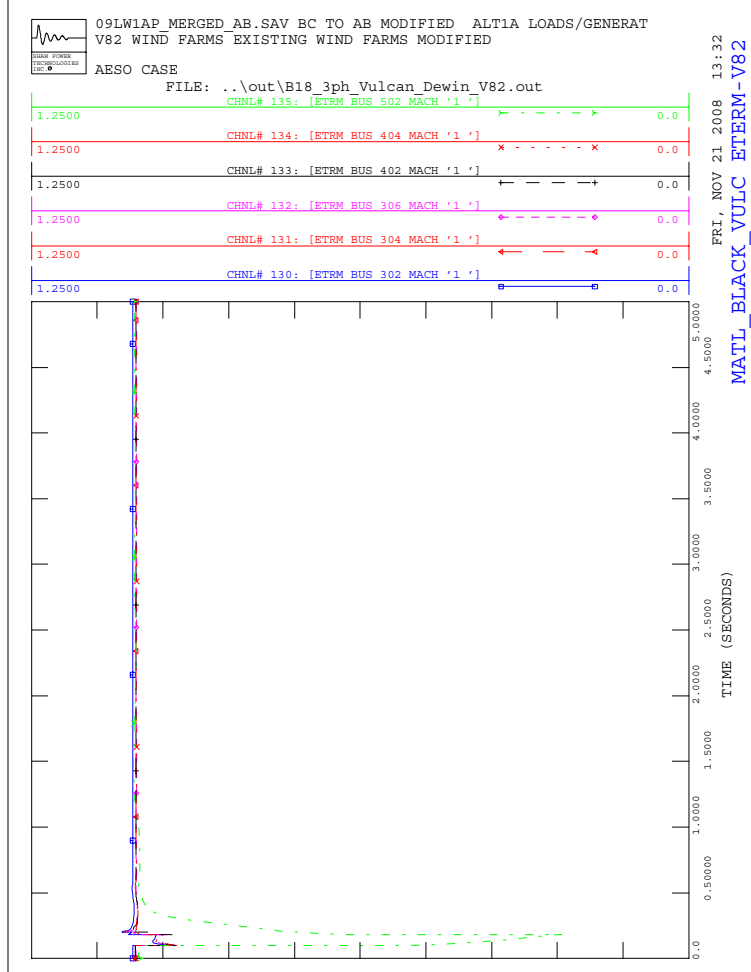
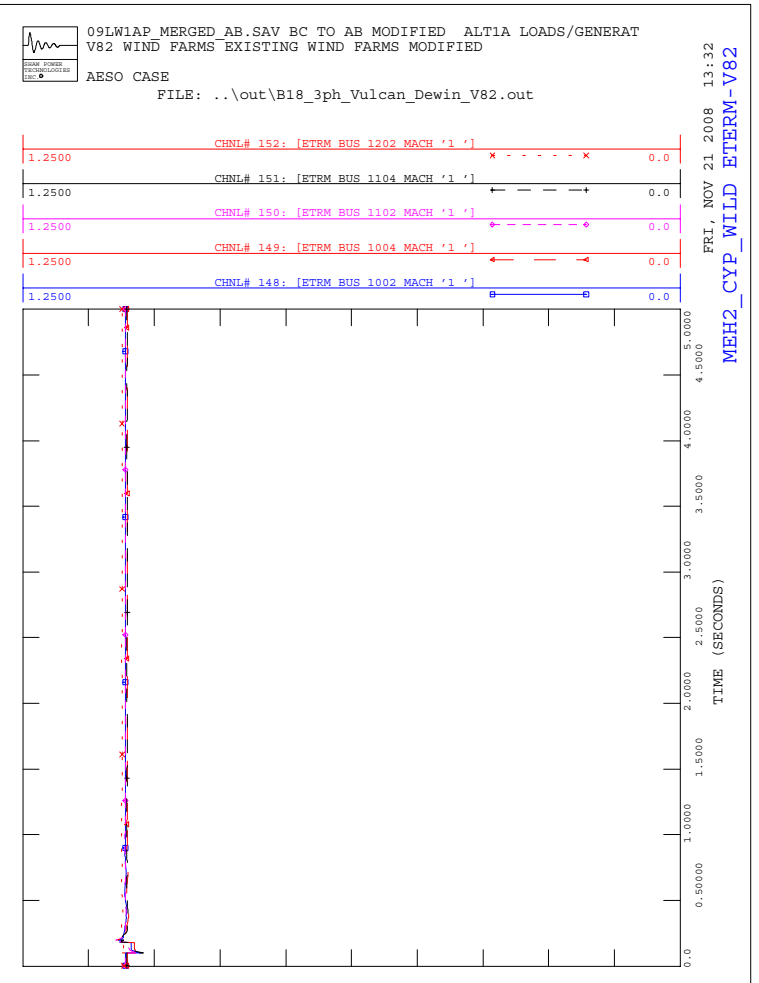
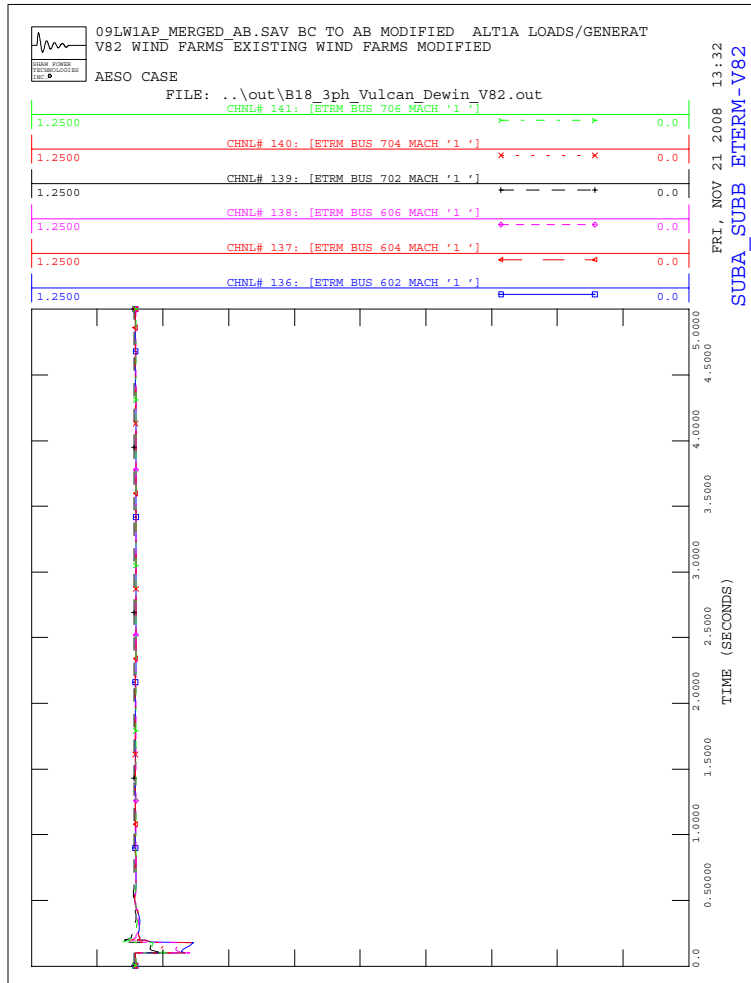
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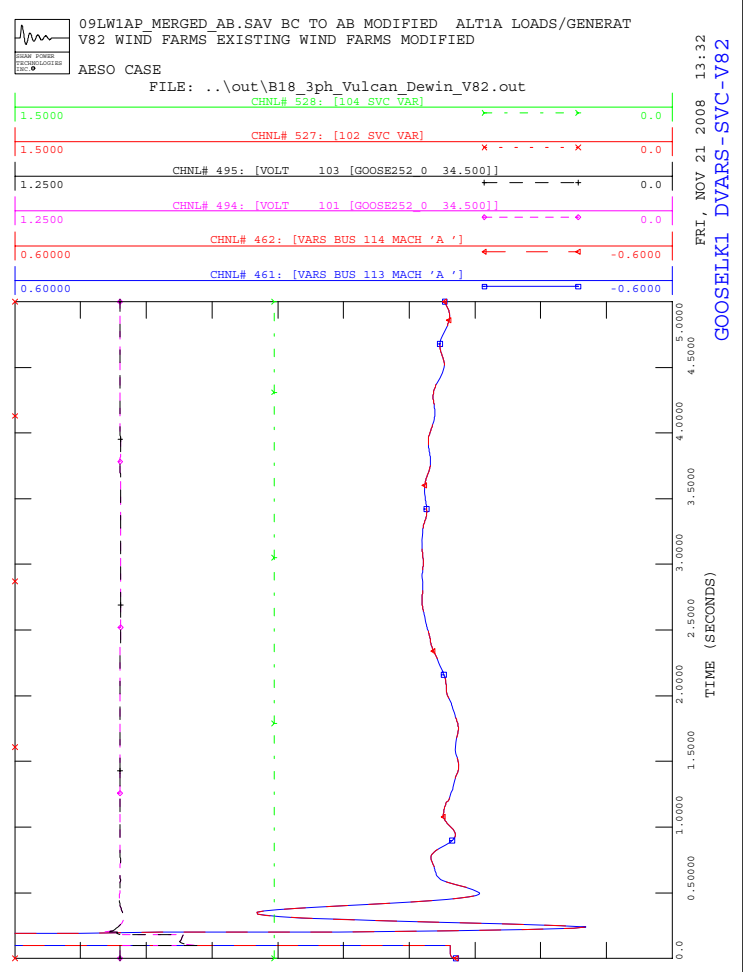
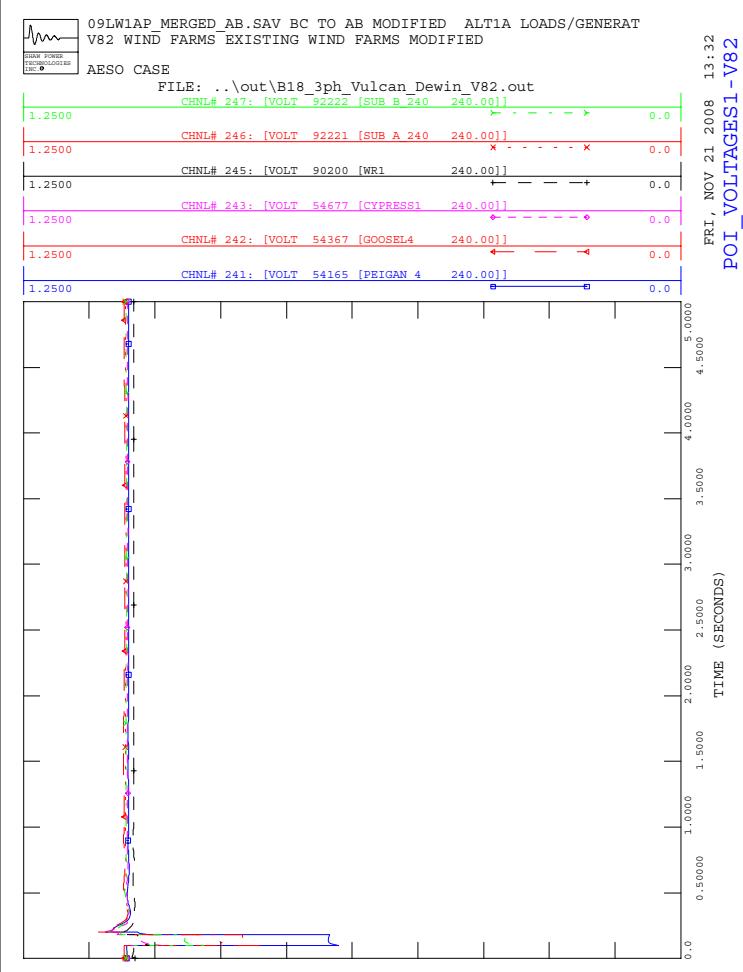
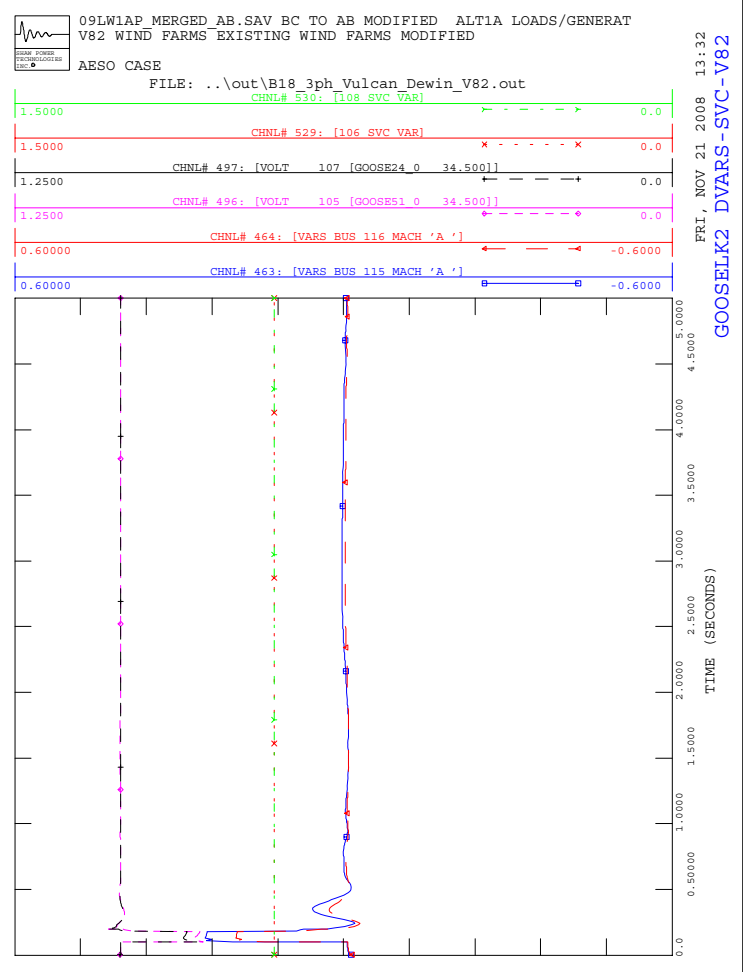
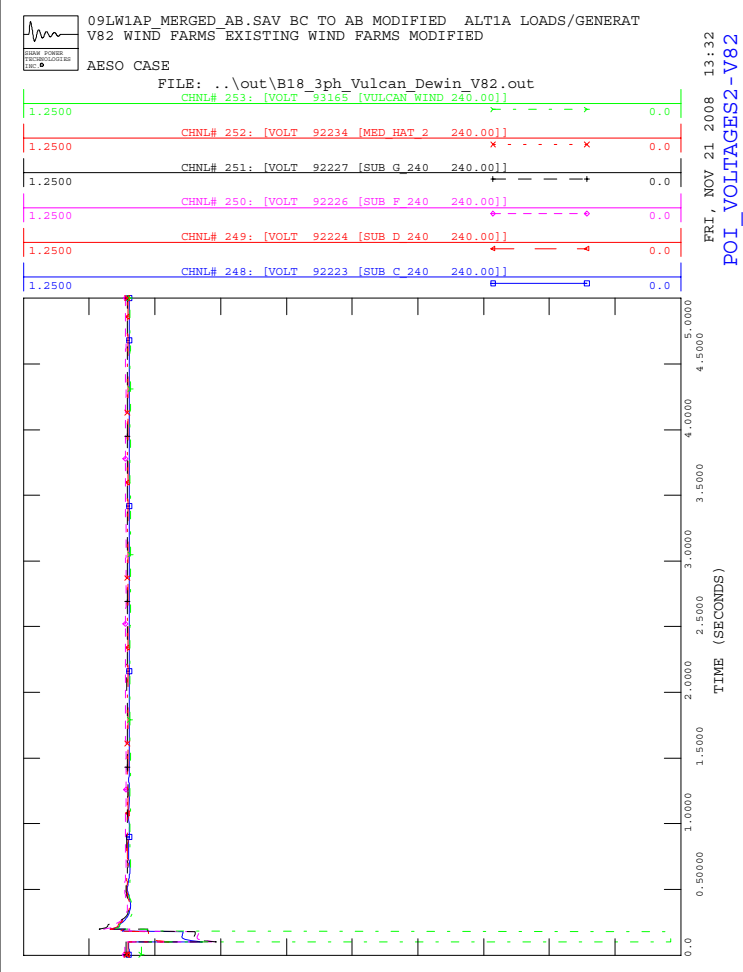
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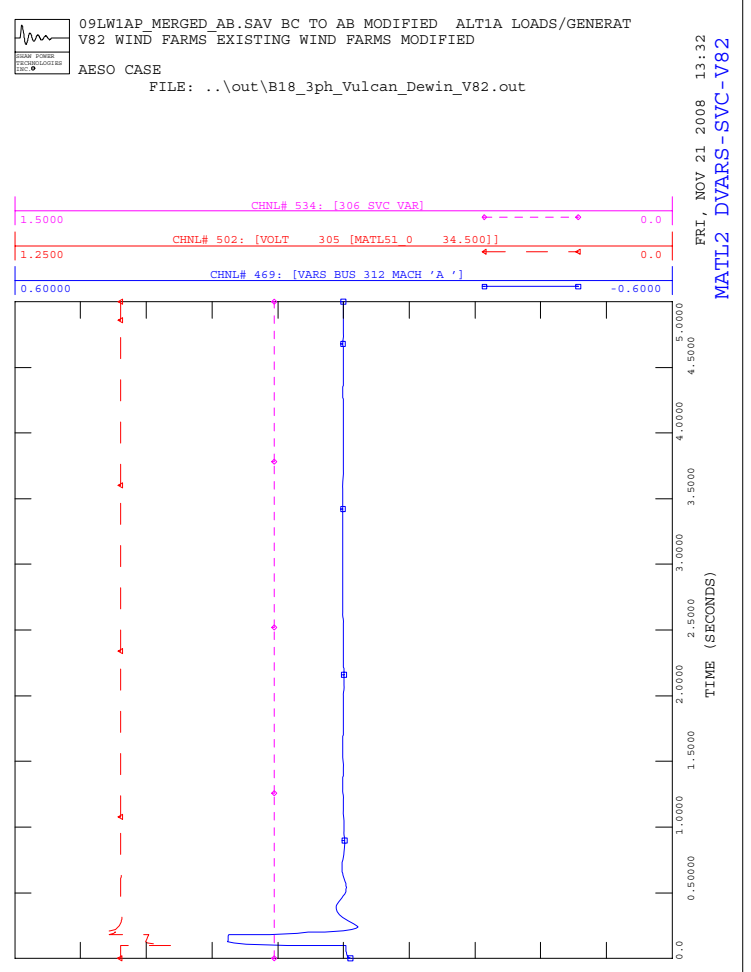
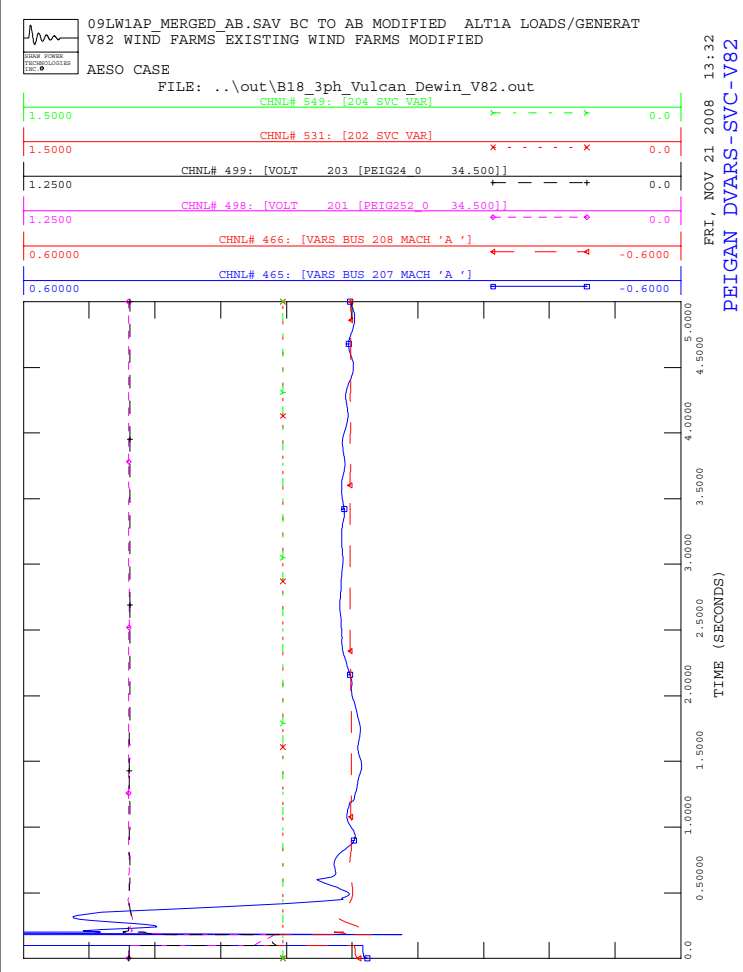
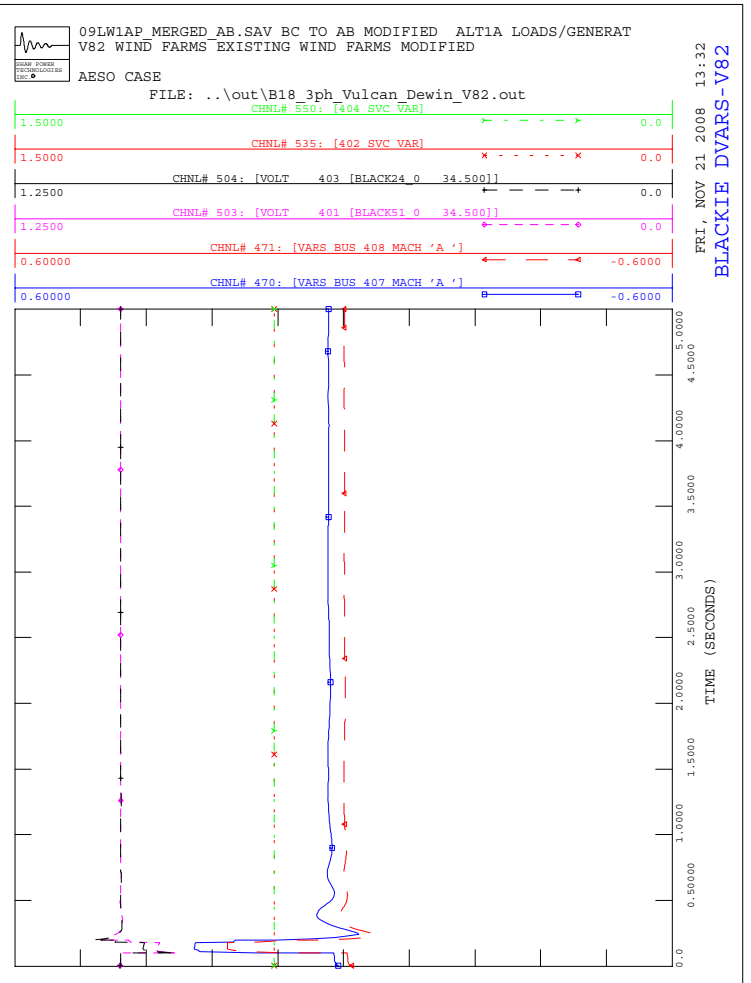
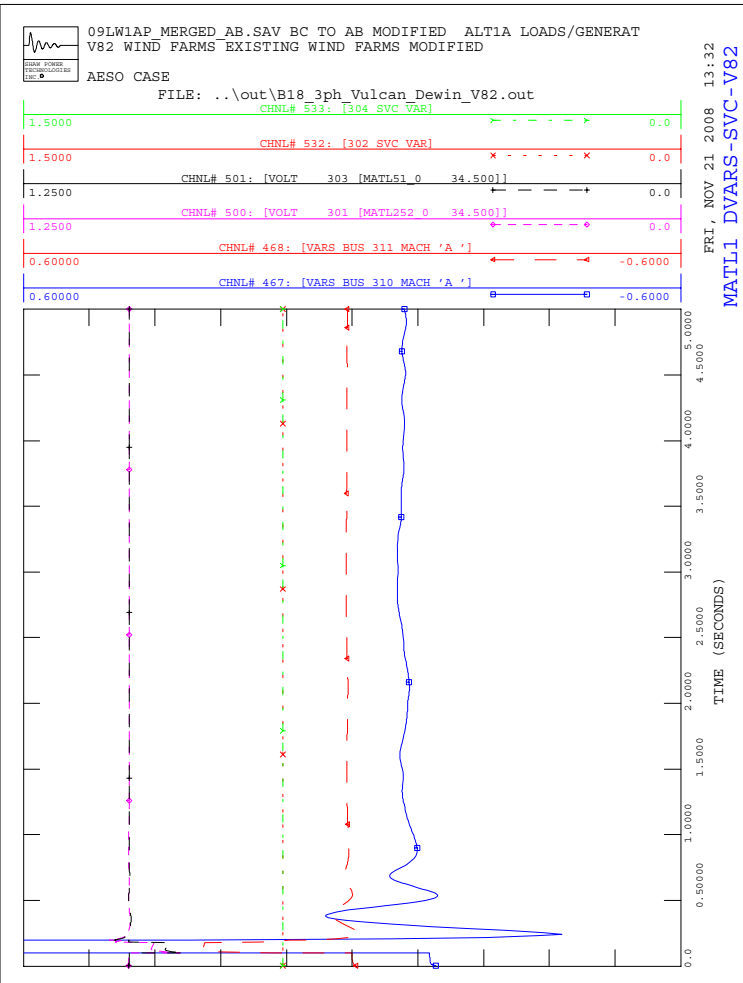


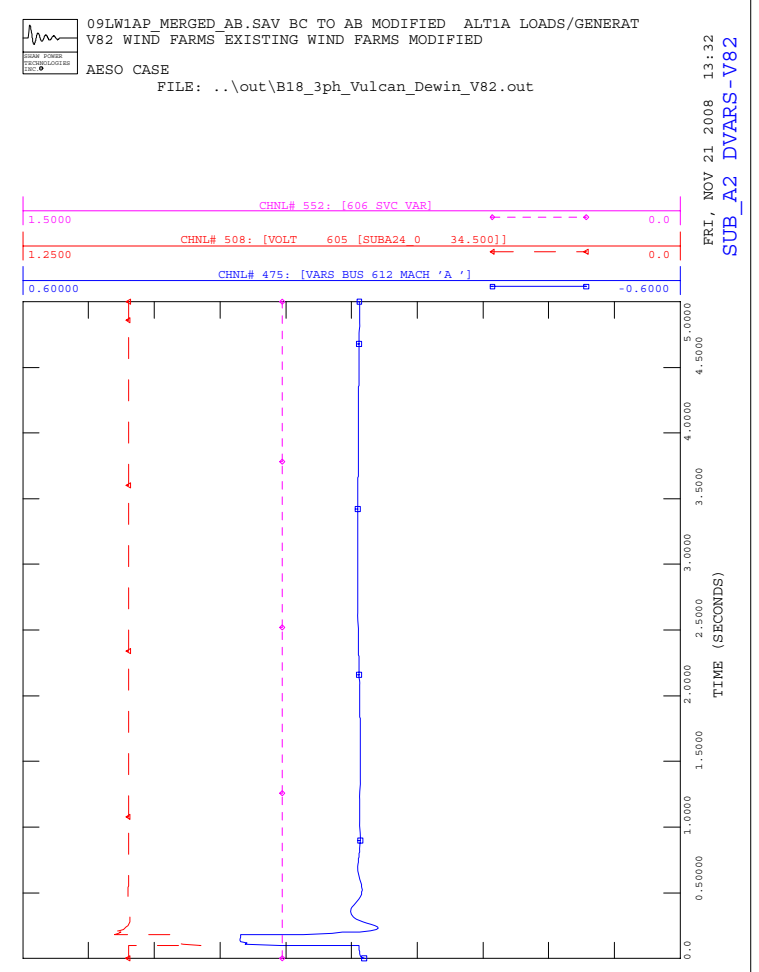
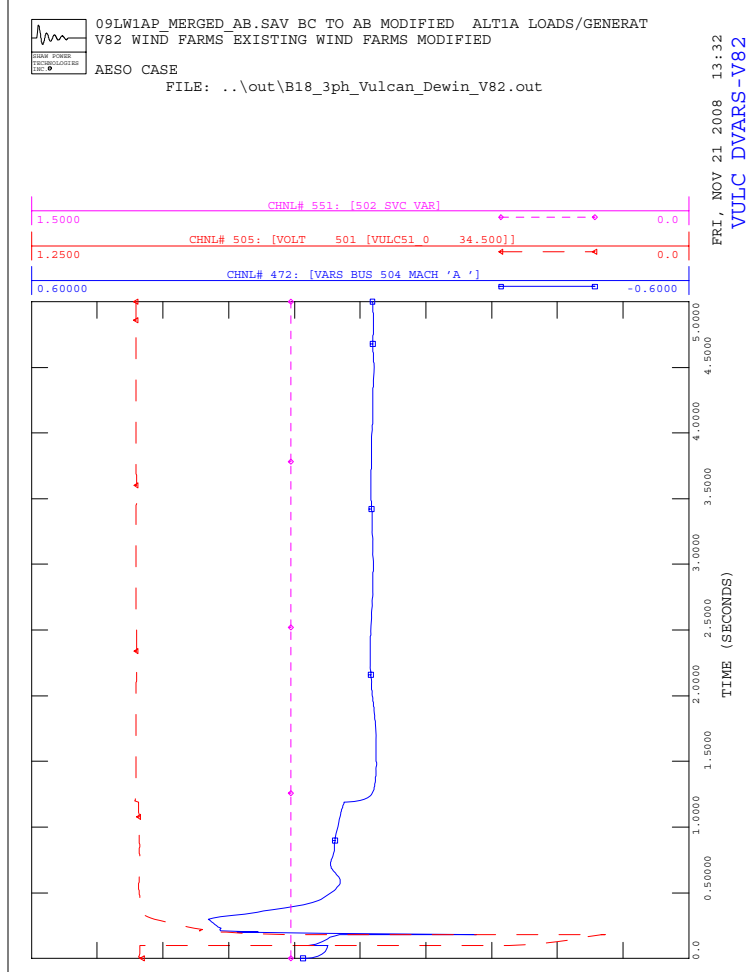
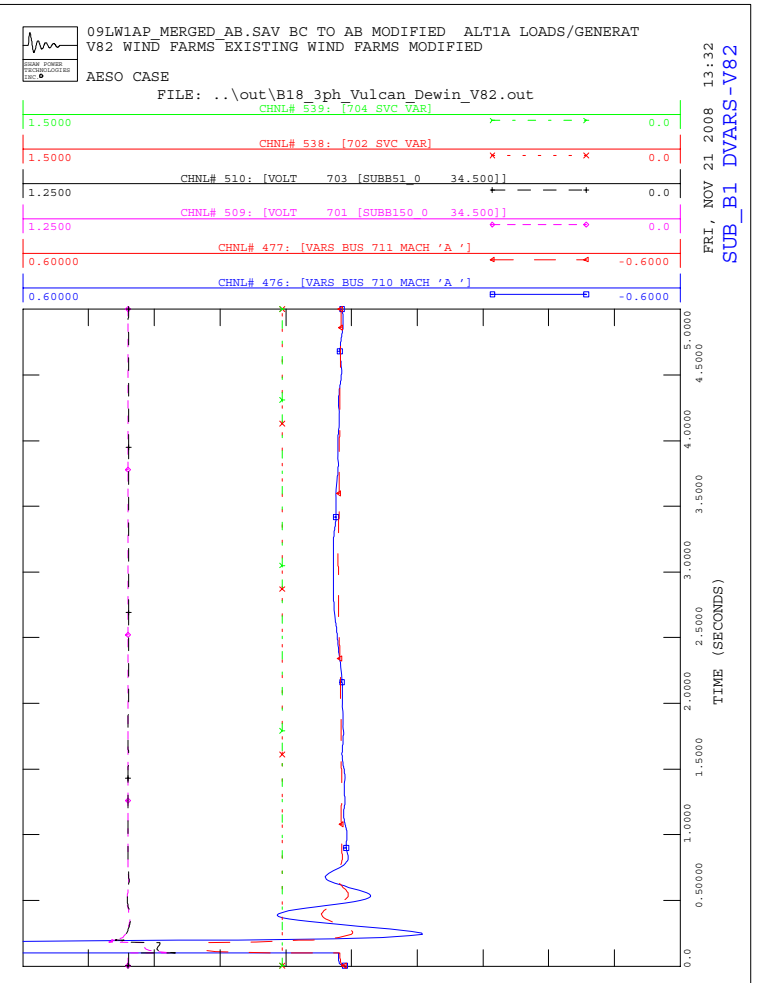
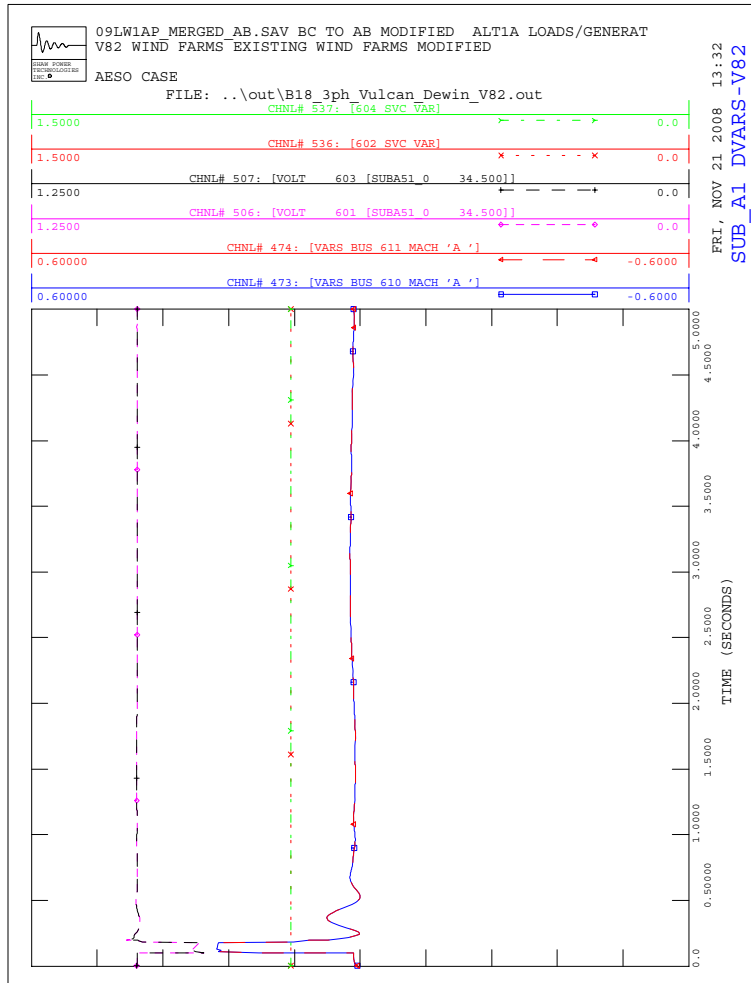
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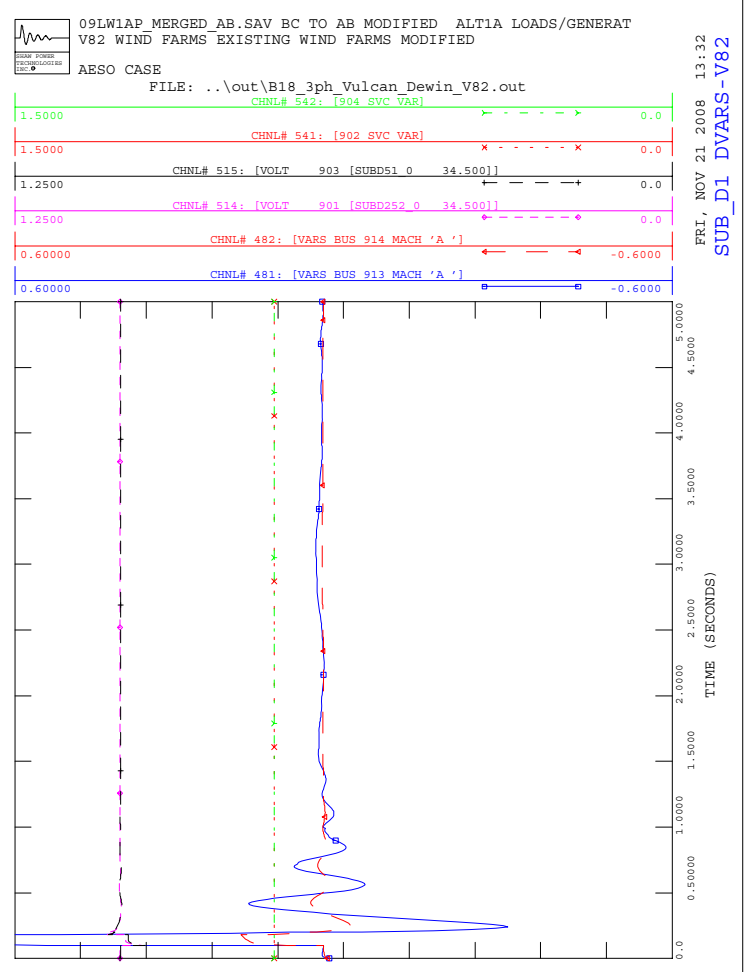
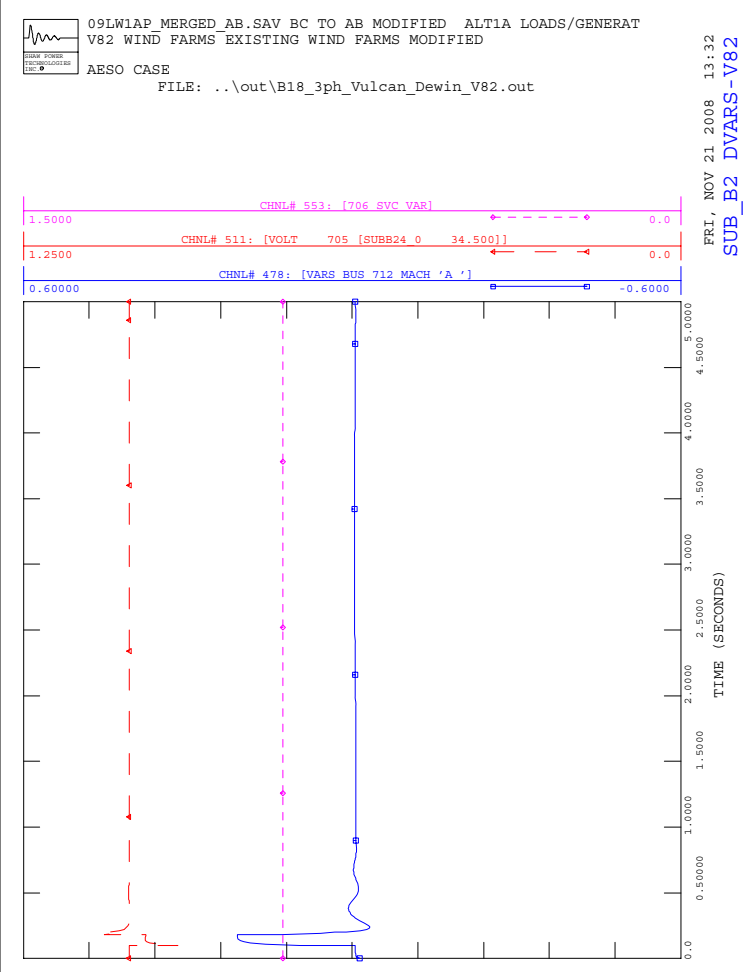
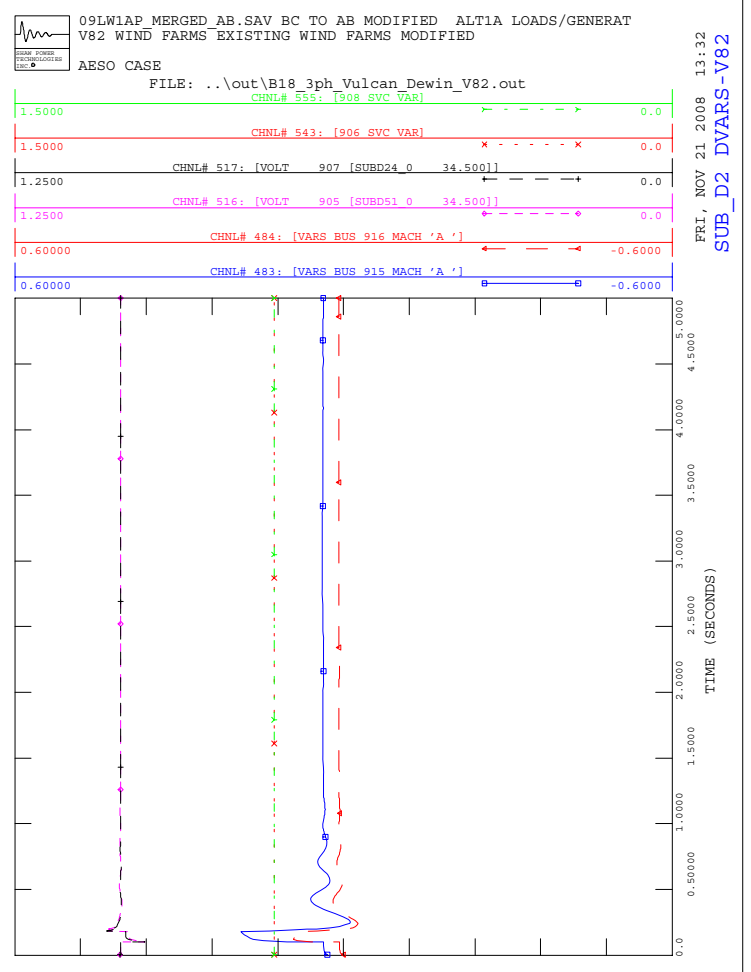
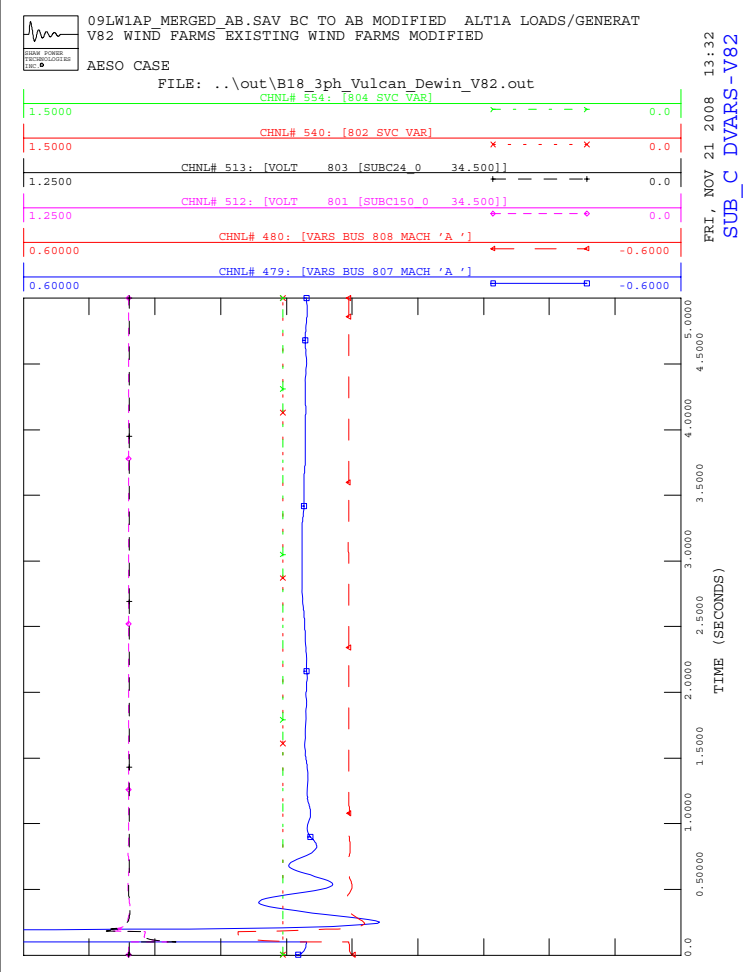


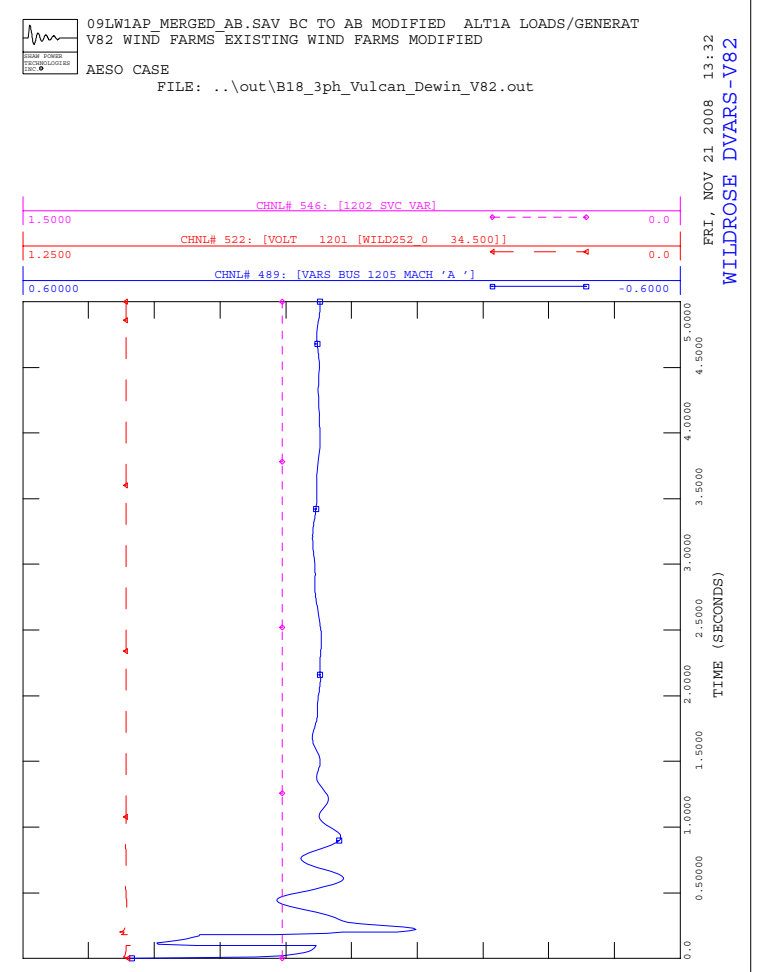
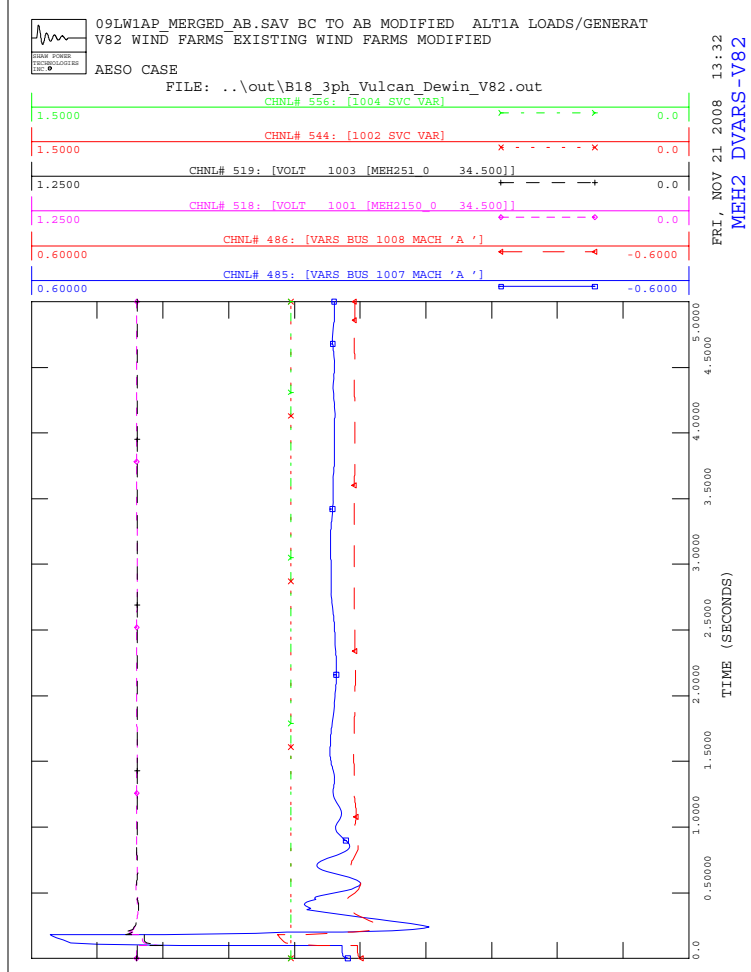
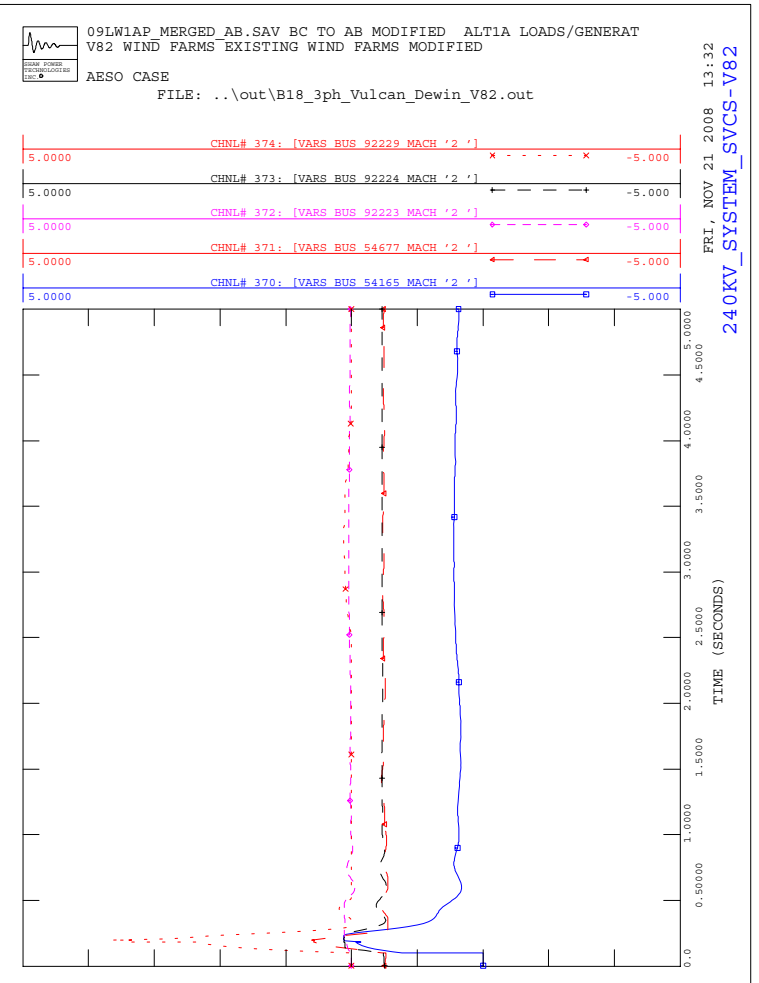
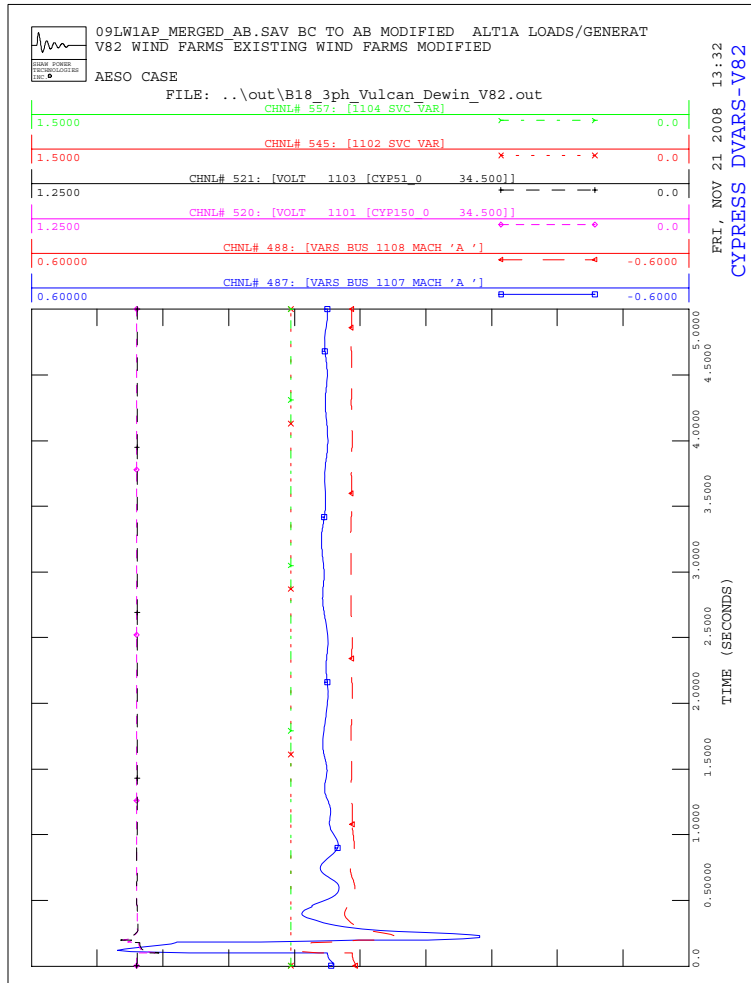








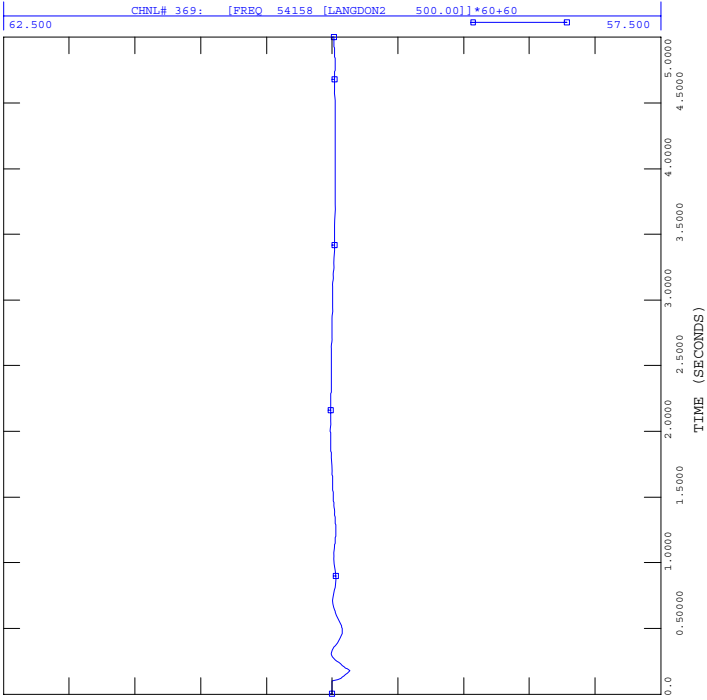






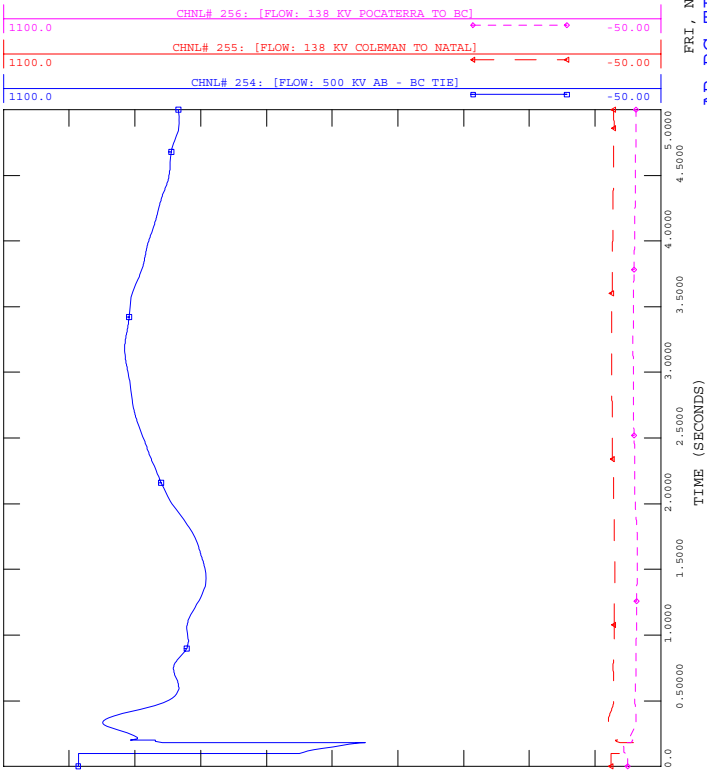
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B18_3ph_Vulcan_Dewin_V82.out

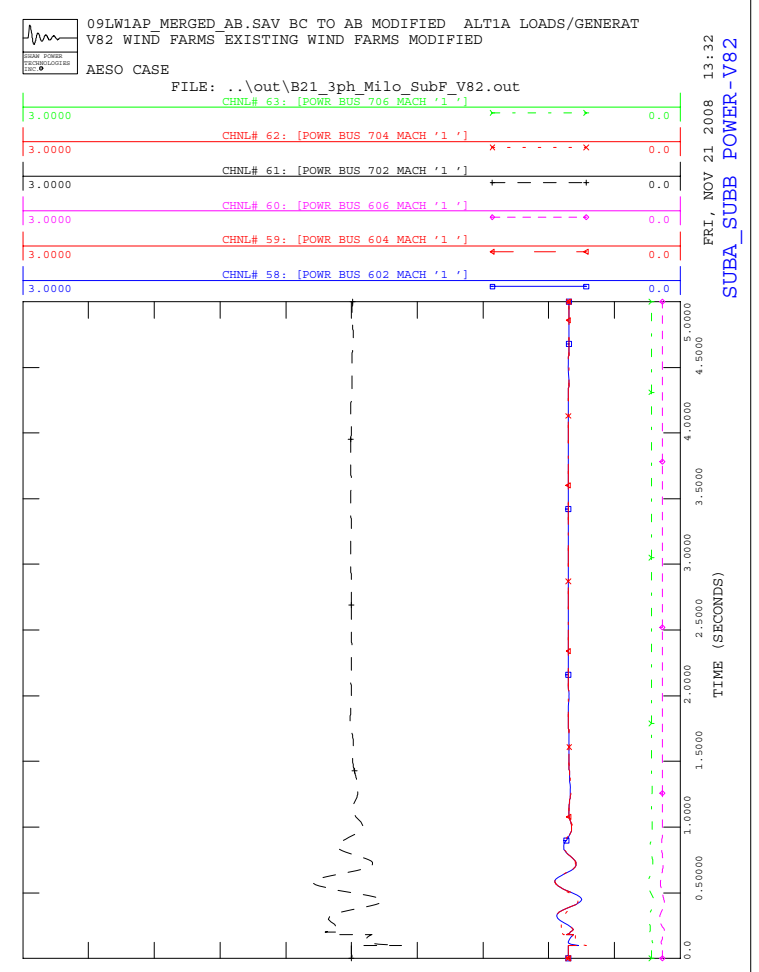
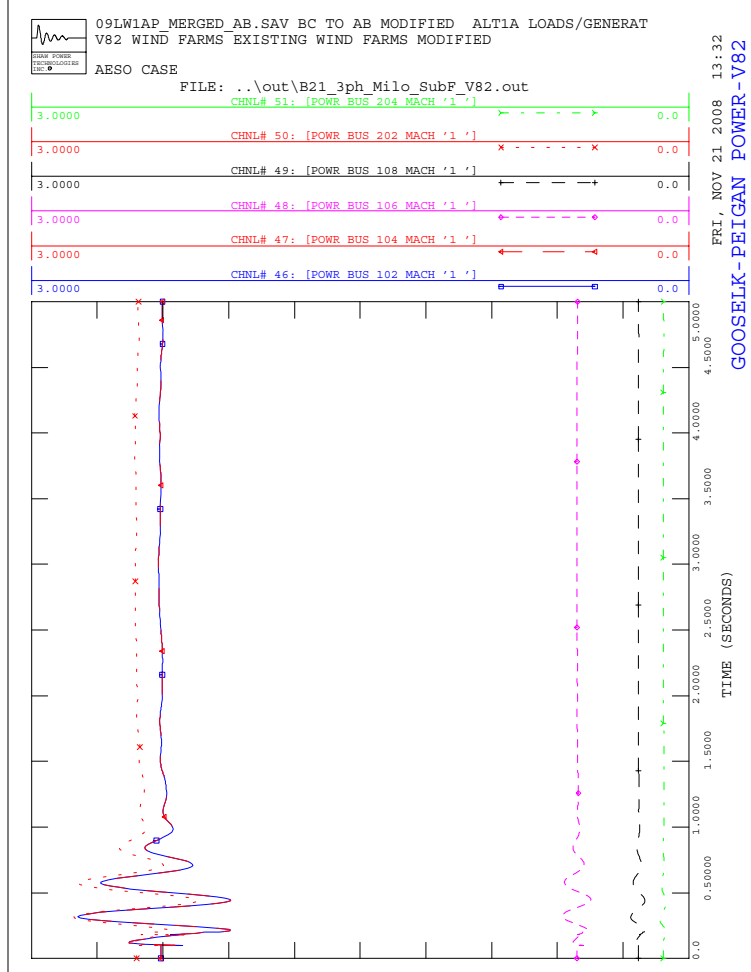
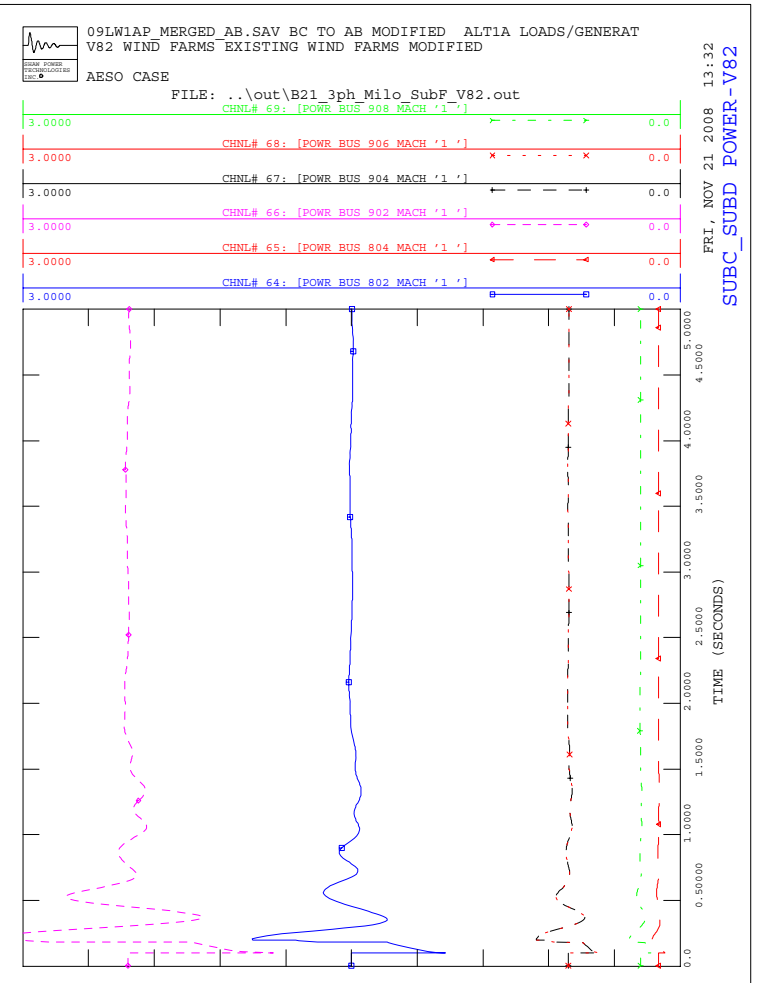
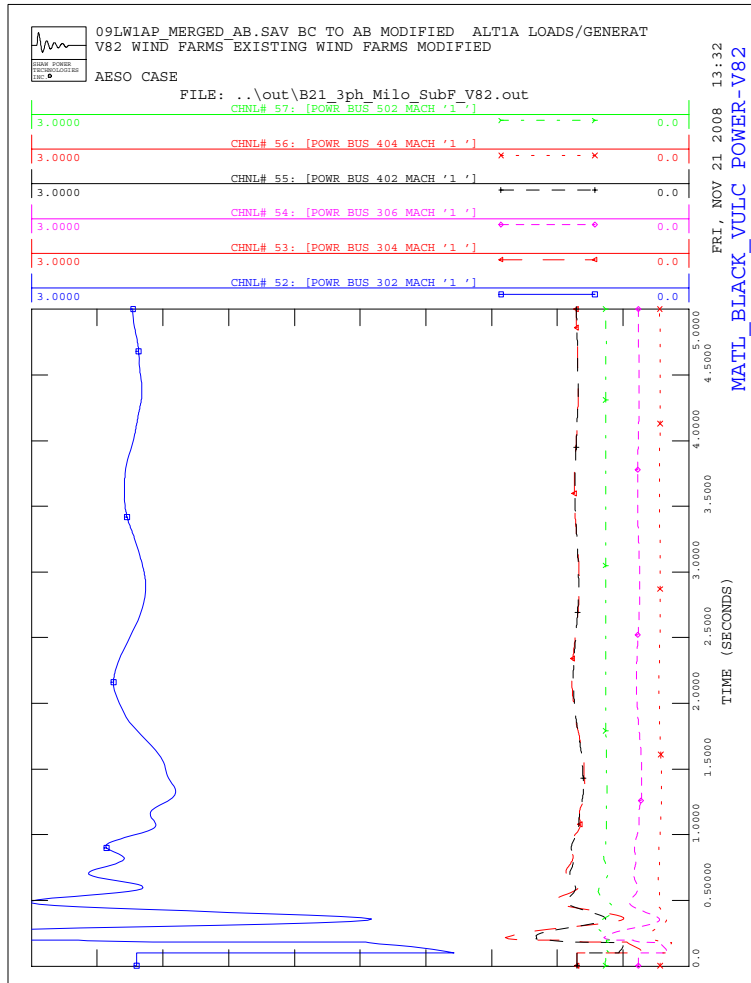
FRI, NOV 21 2008 13:32
LANGDON_FRQ-V82

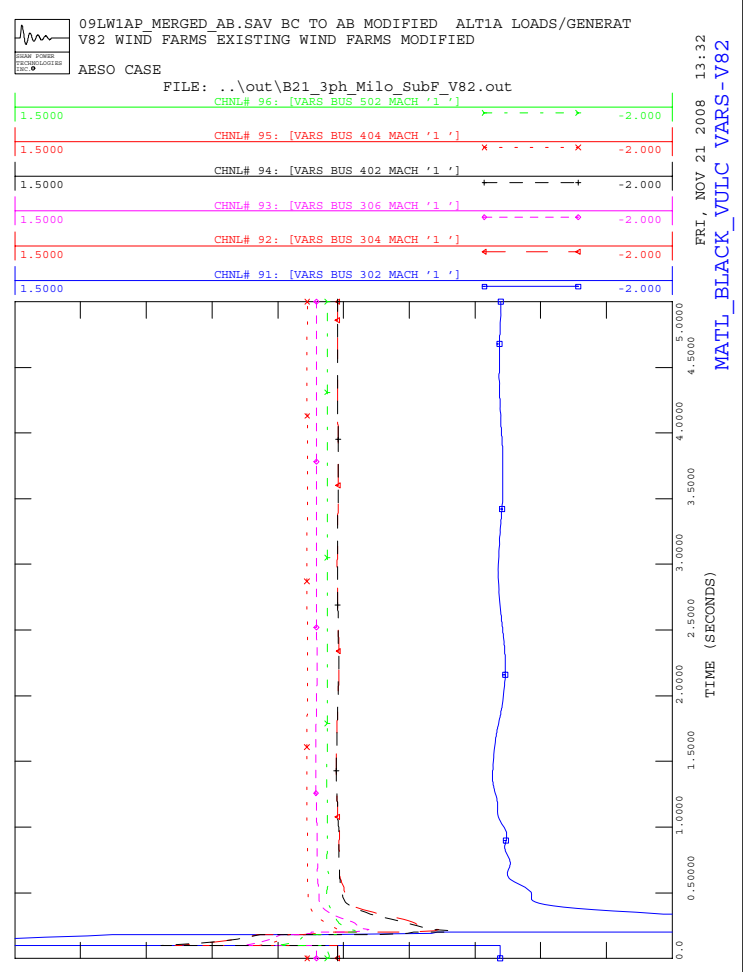
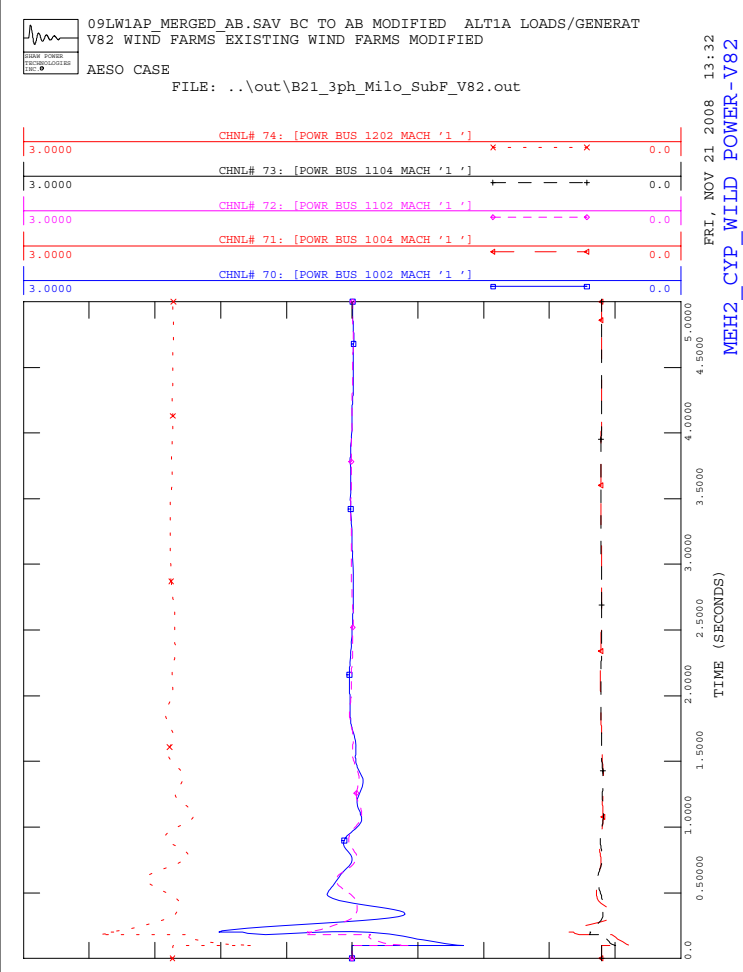
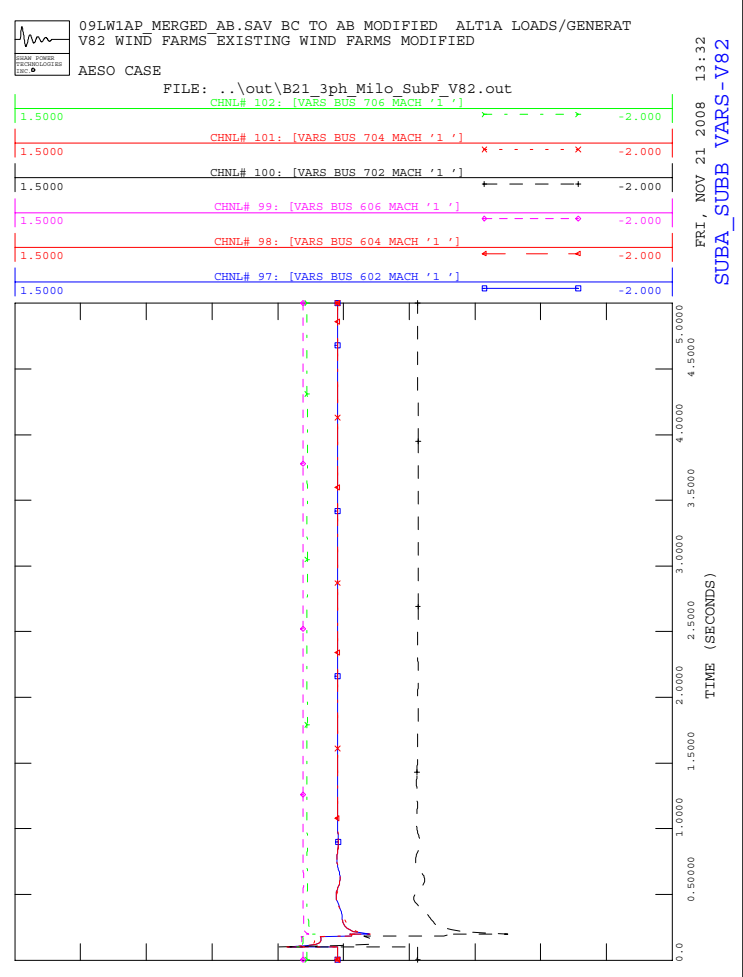
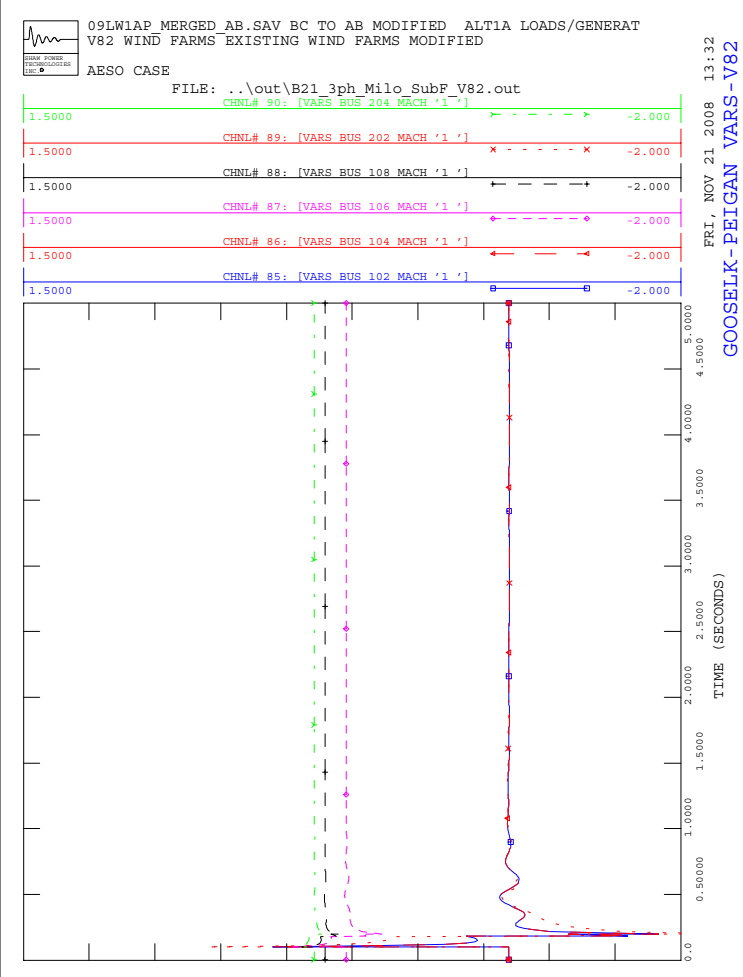


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B18_3ph_Vulcan_Dewin_V82.out

FRI, NOV 21 2008 13:32
AB_BC_TIE_FLOWS-V82

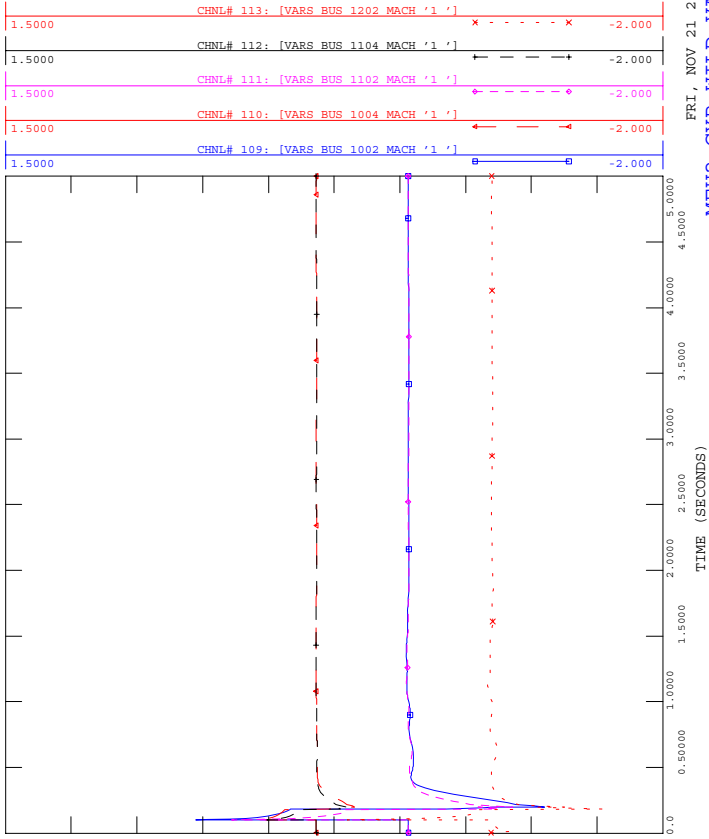






09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

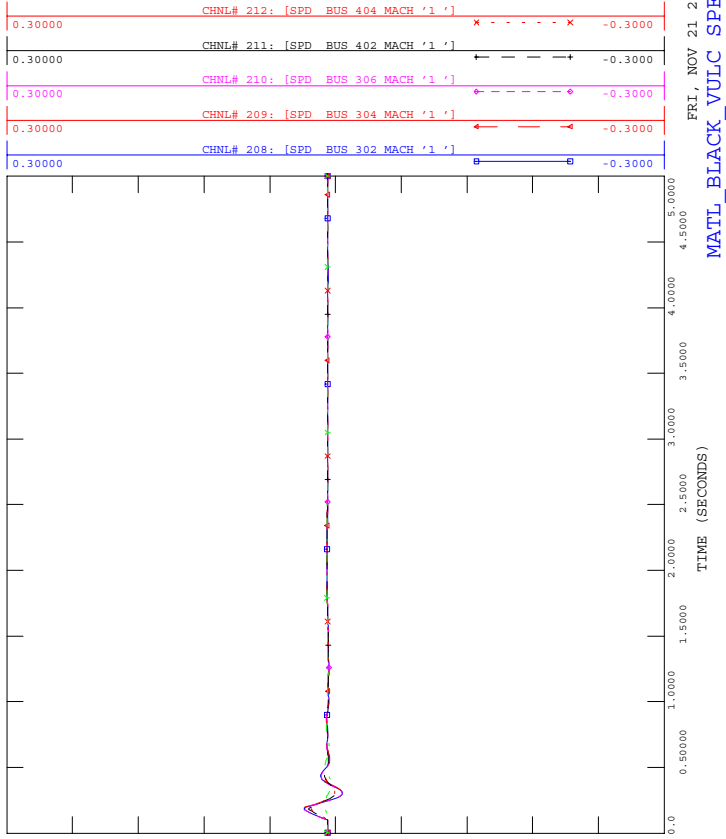
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FRI, NOV 21 2008 13:32
MEH2_CYP_WILD_VARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

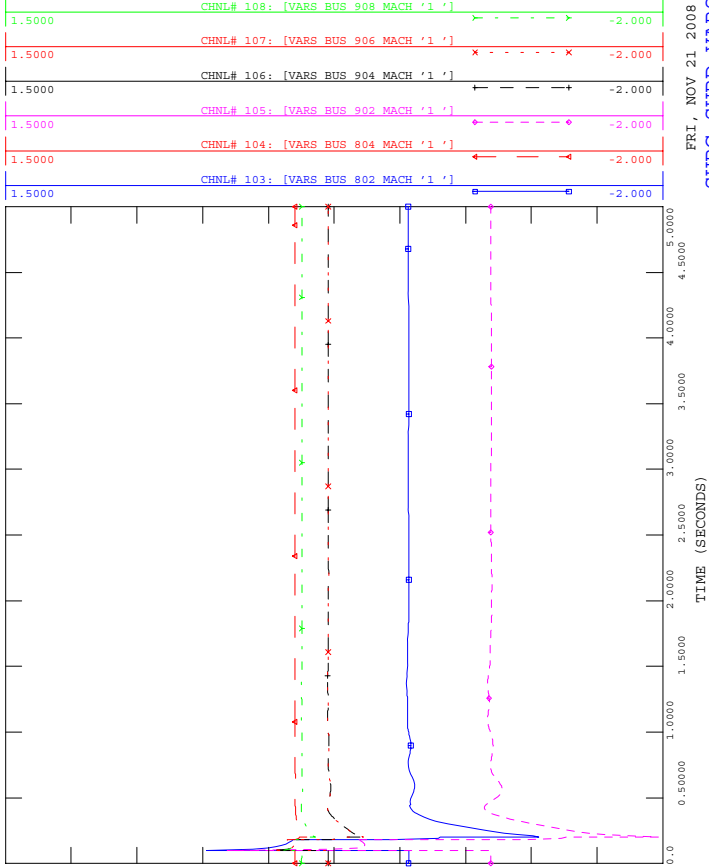
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FRI, NOV 21 2008 13:32
MAIL_BLACK_VULC_SPEED-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

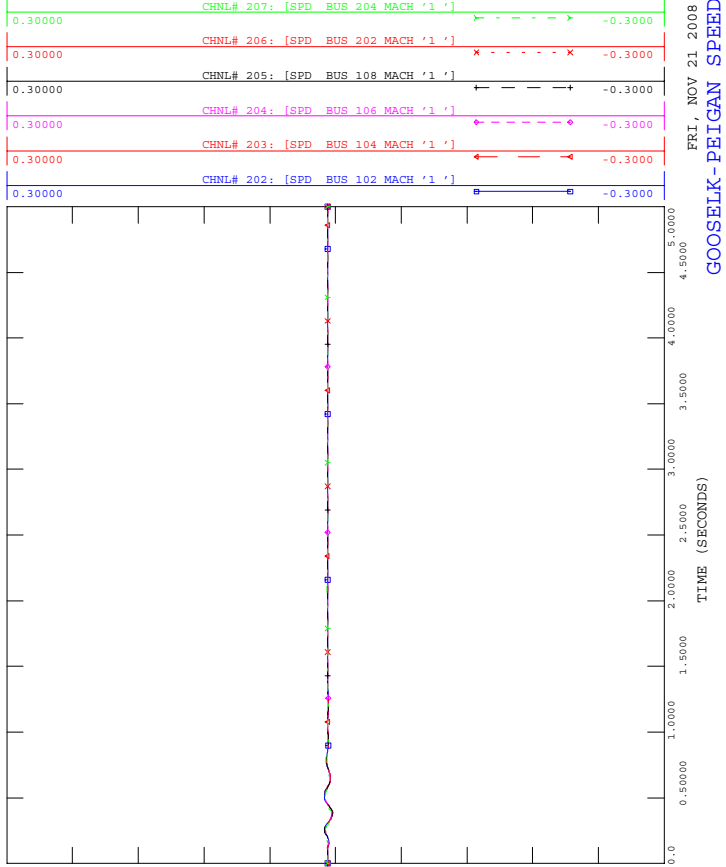
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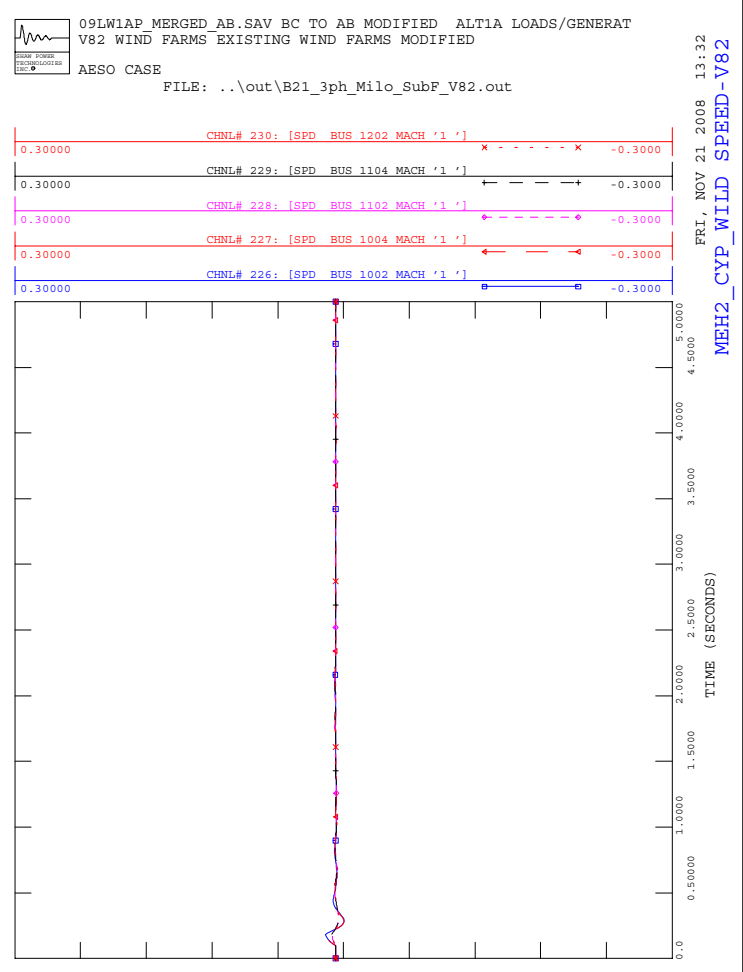
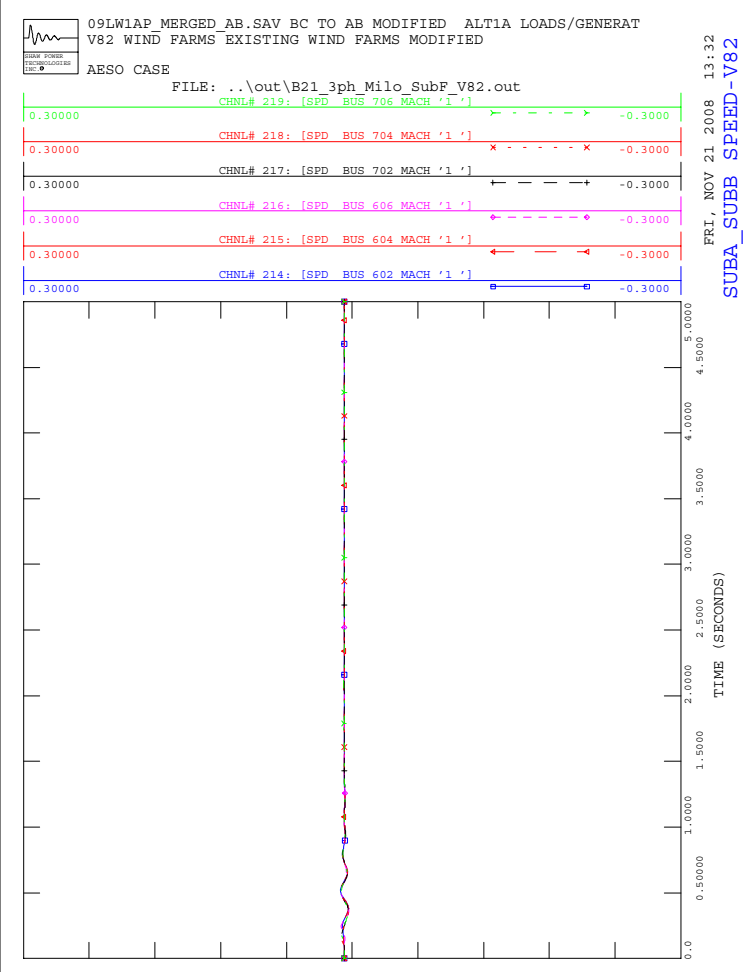
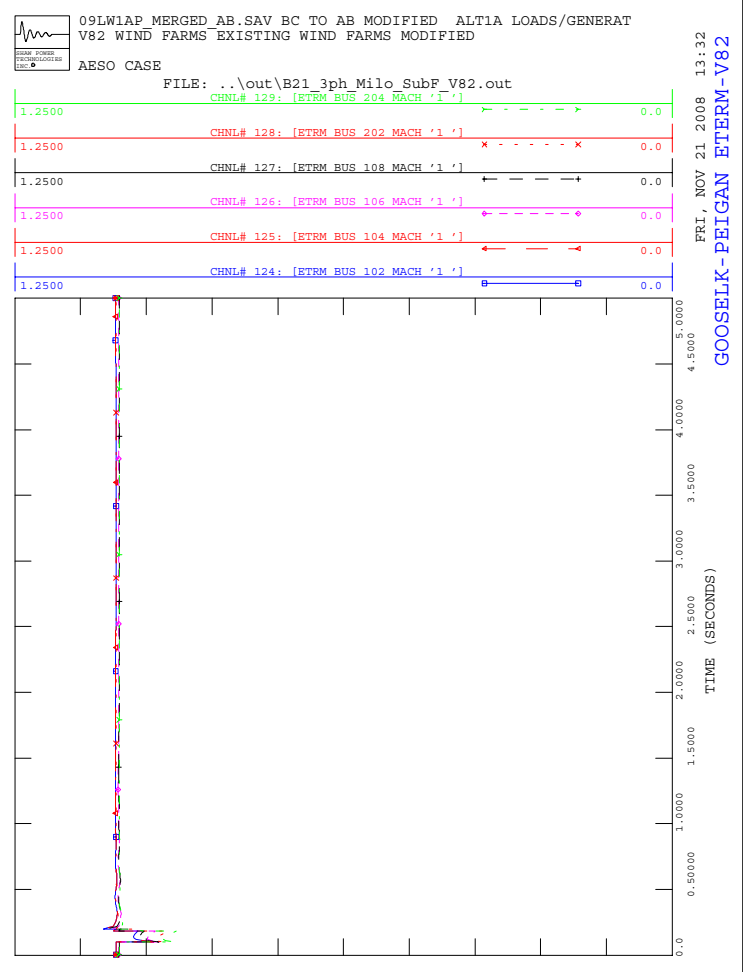
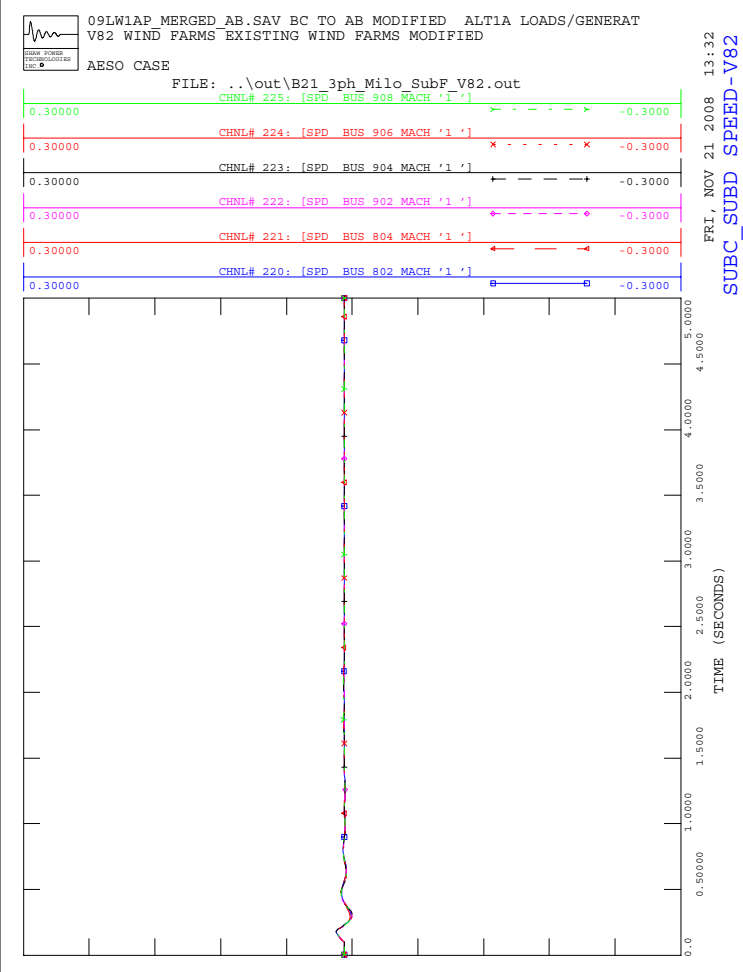
FRI, NOV 21 2008 13:32
SUBC_SUBD_VARS-V82

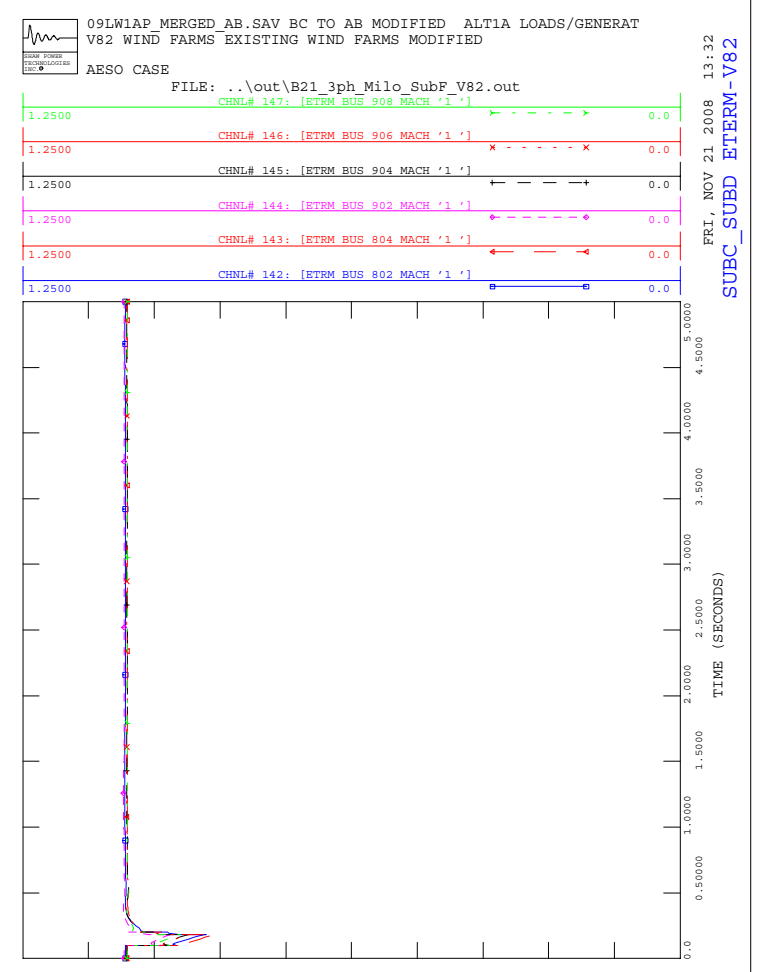
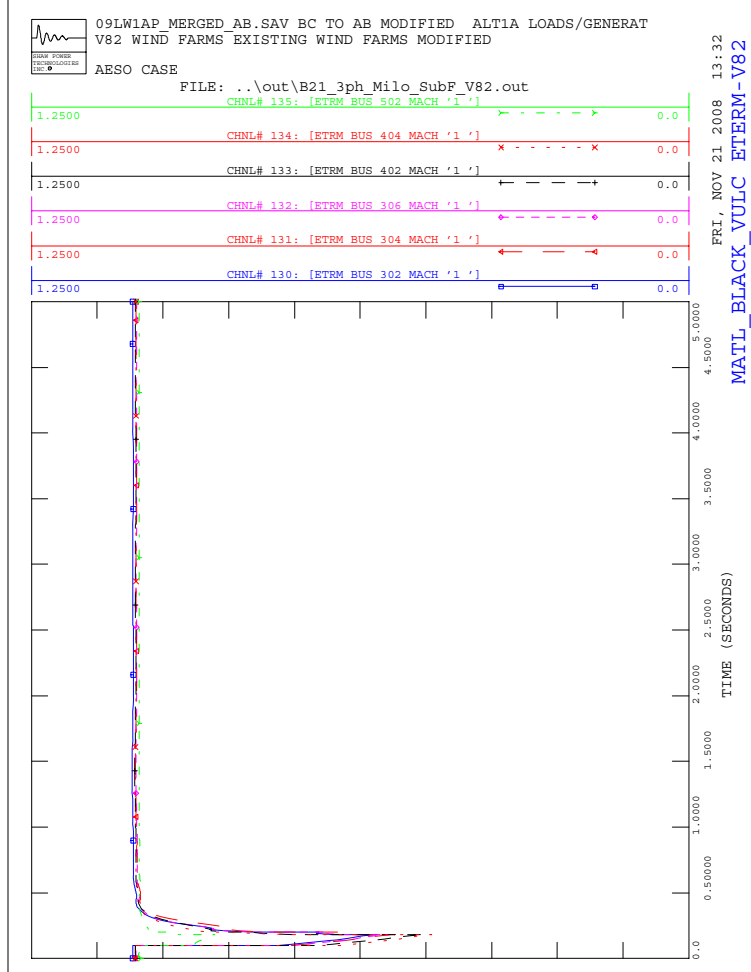
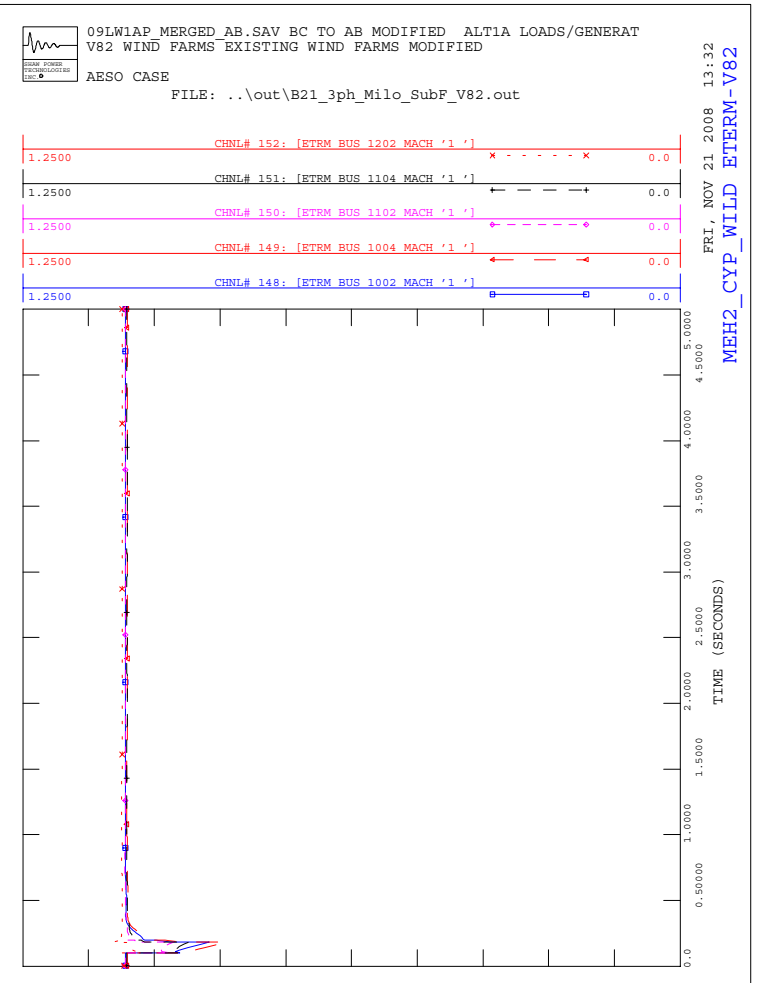
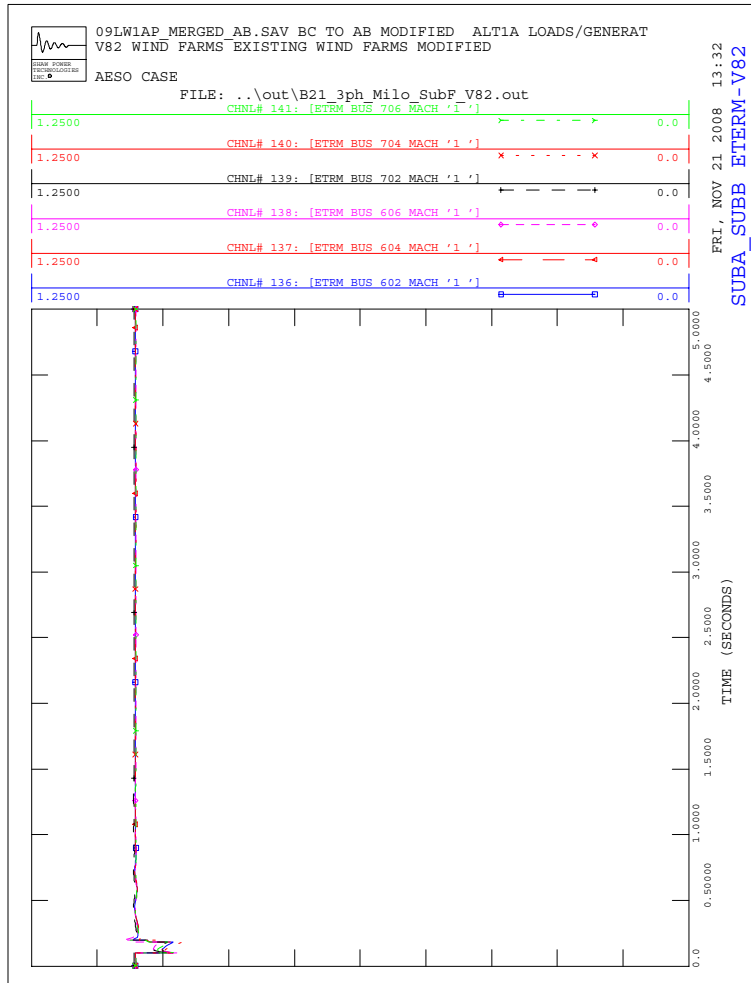
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

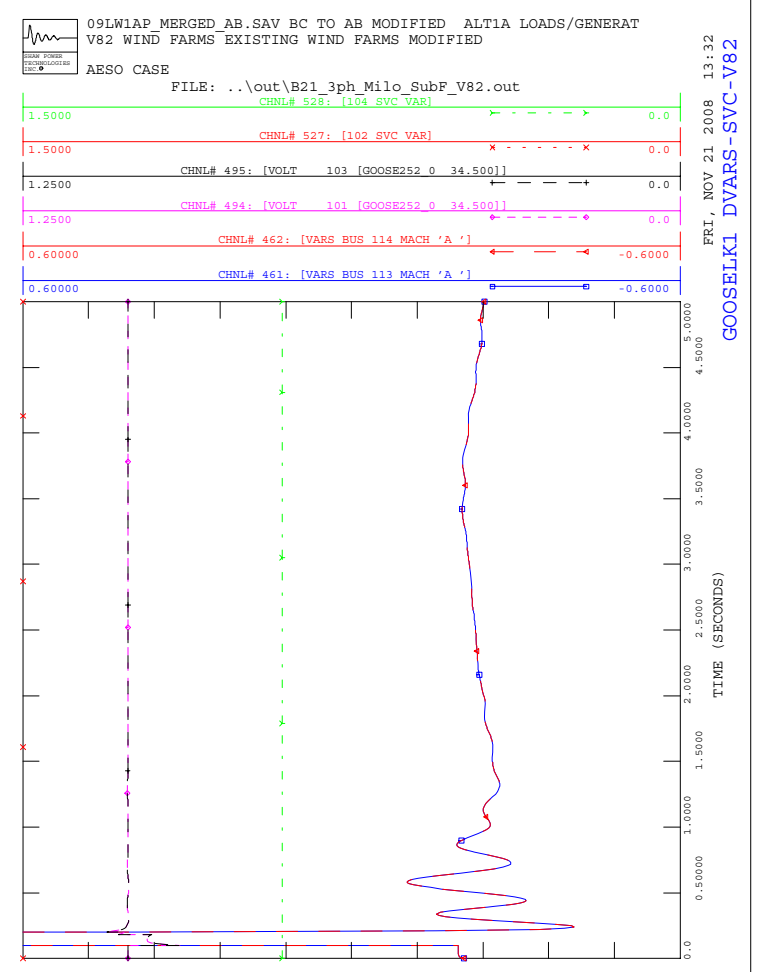
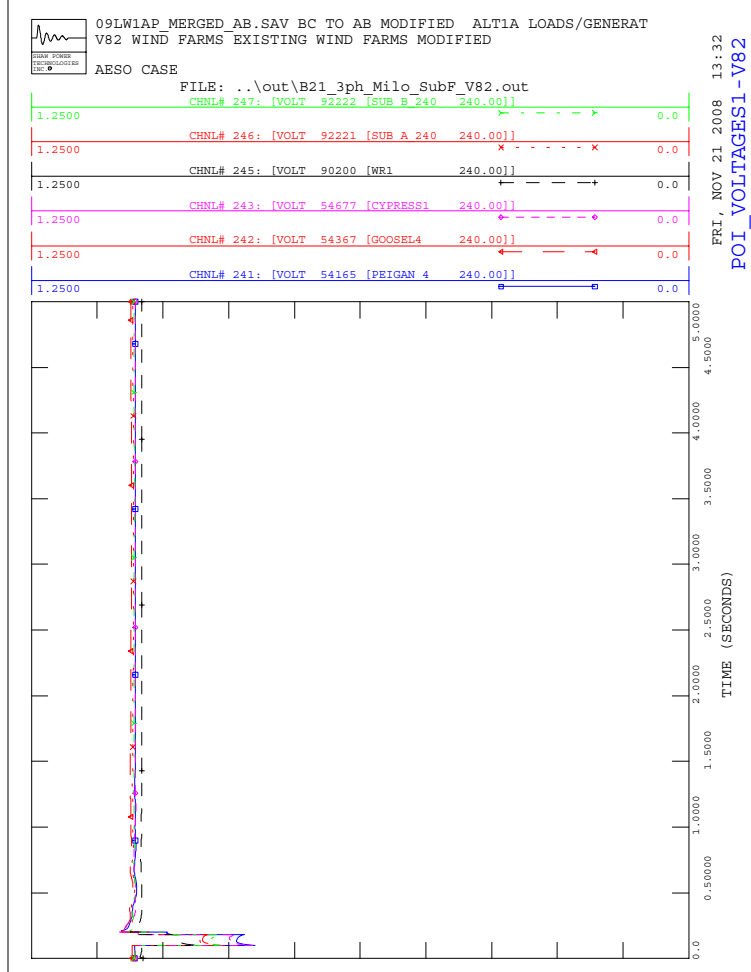
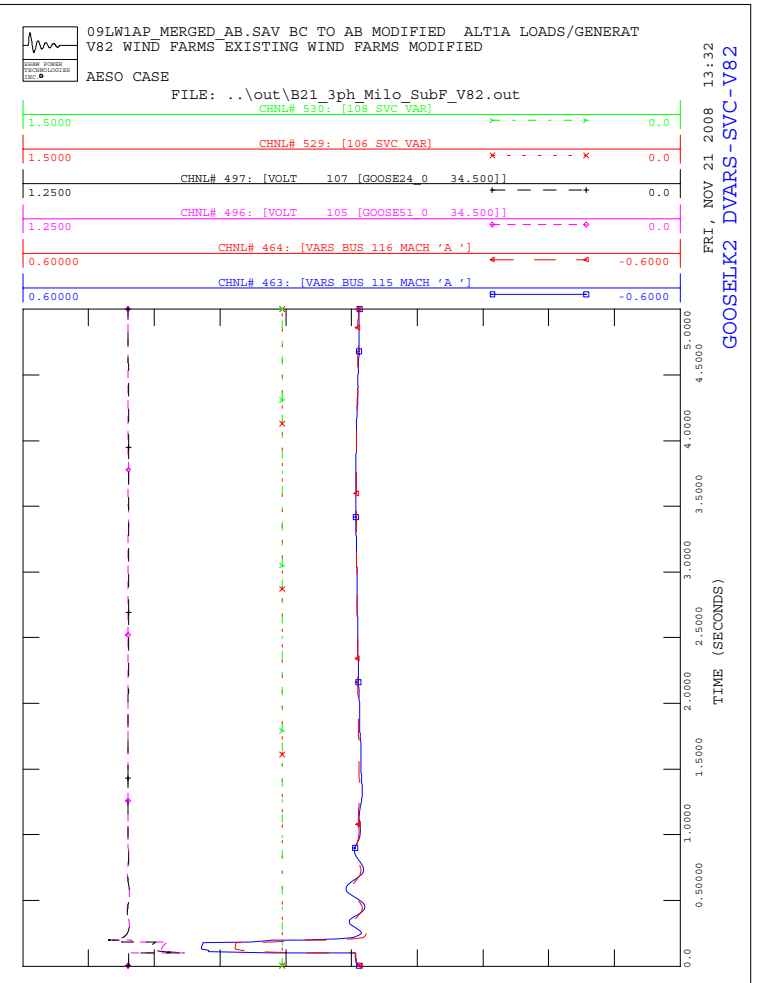
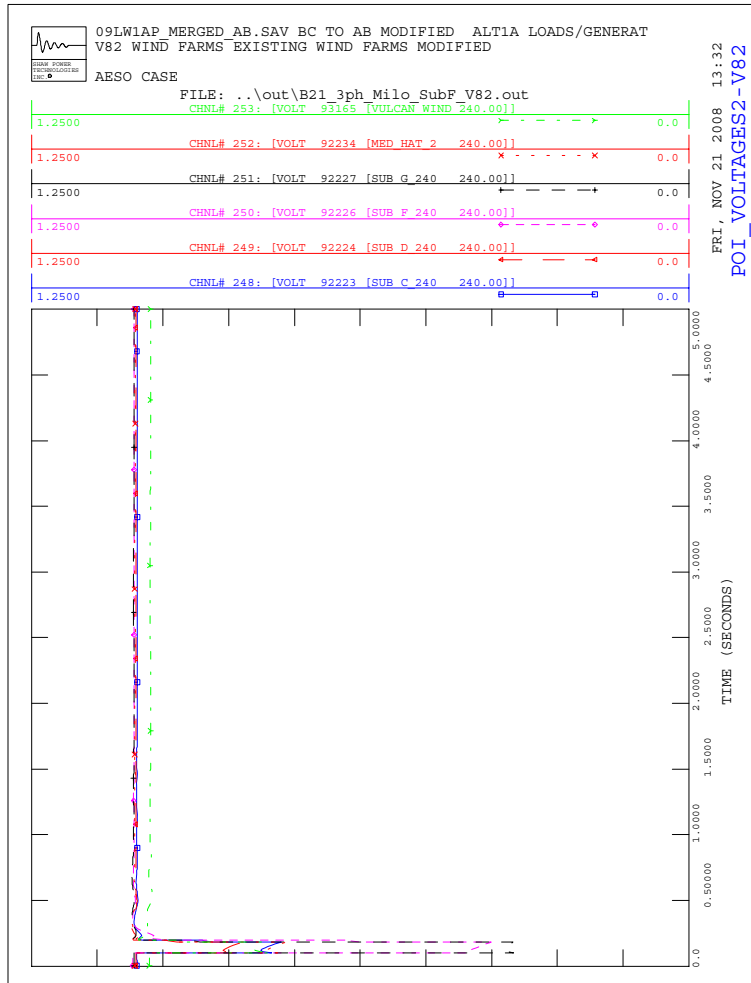
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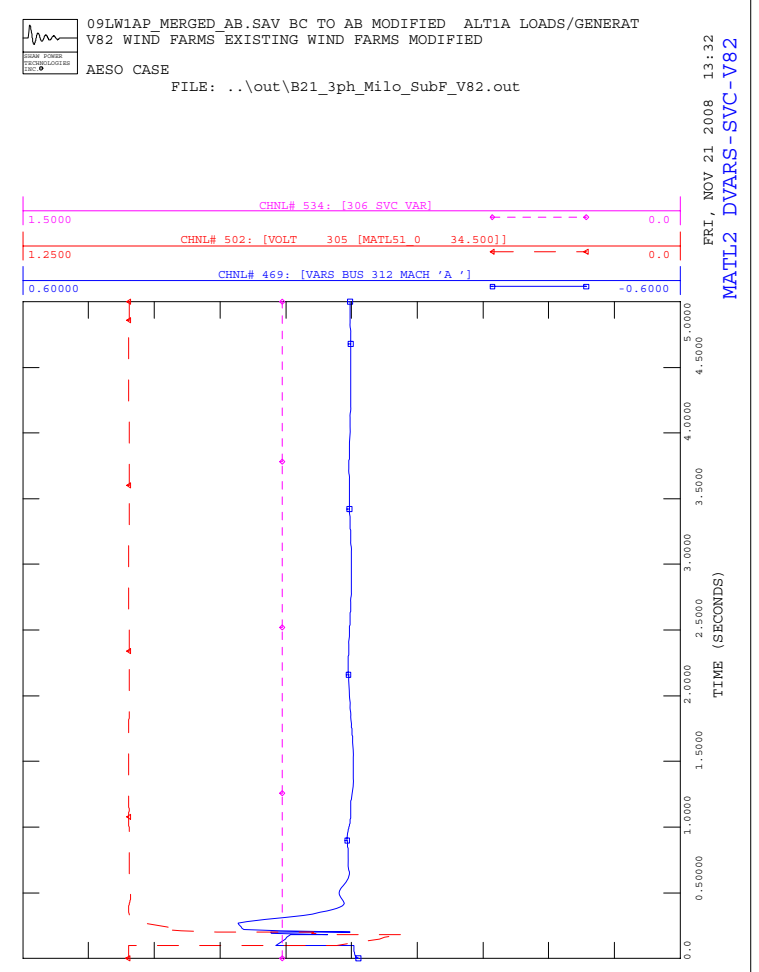
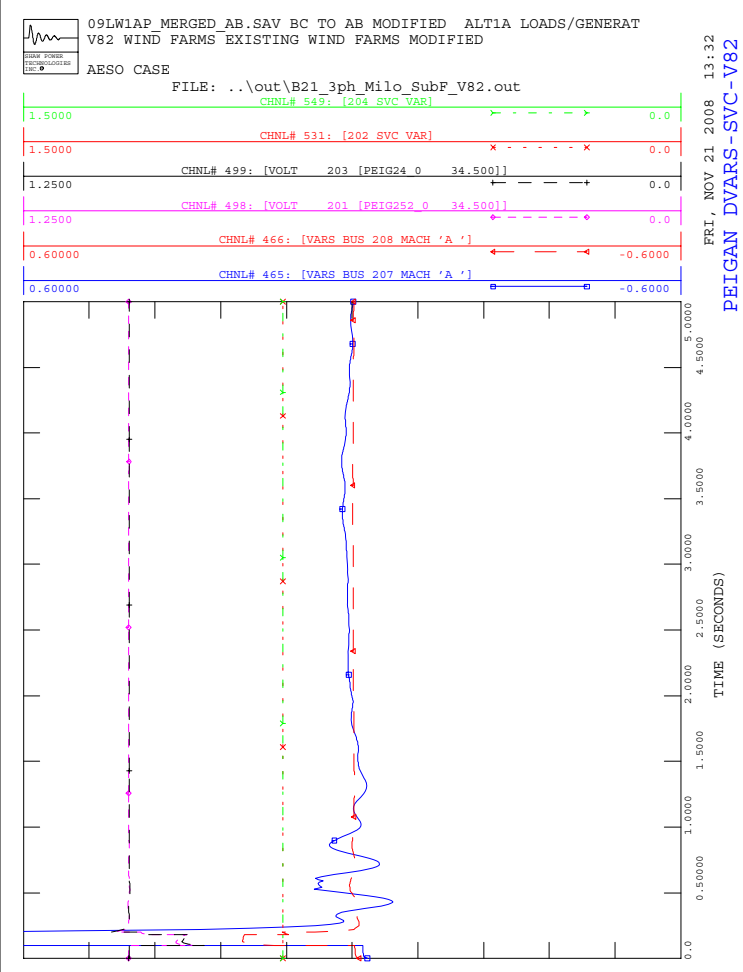
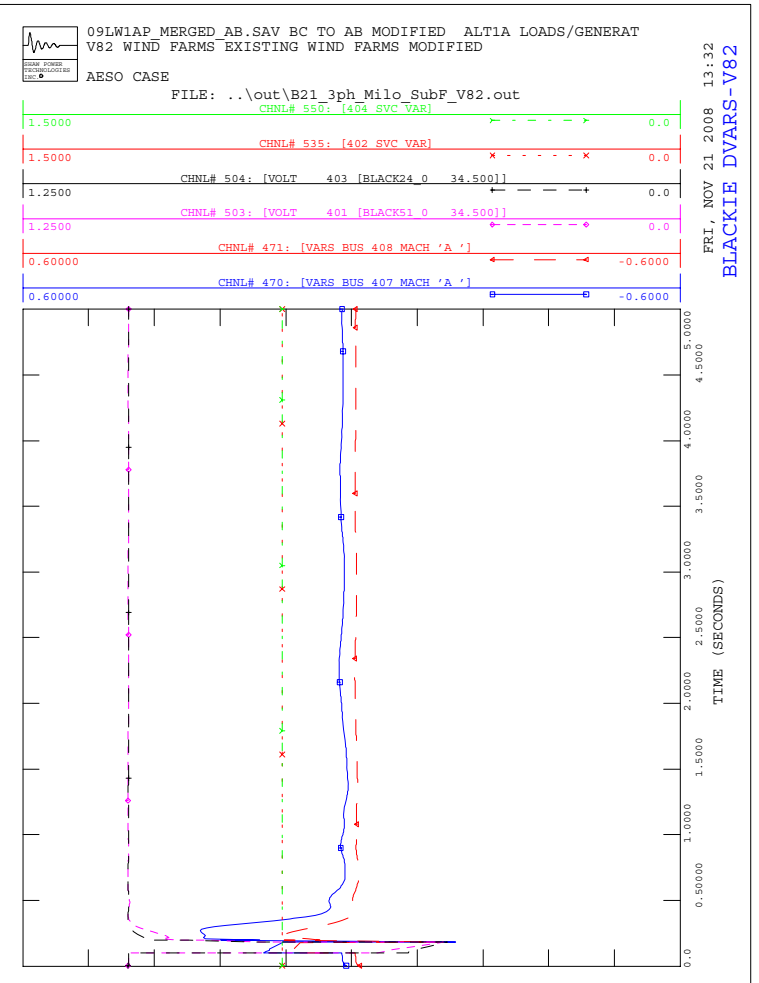
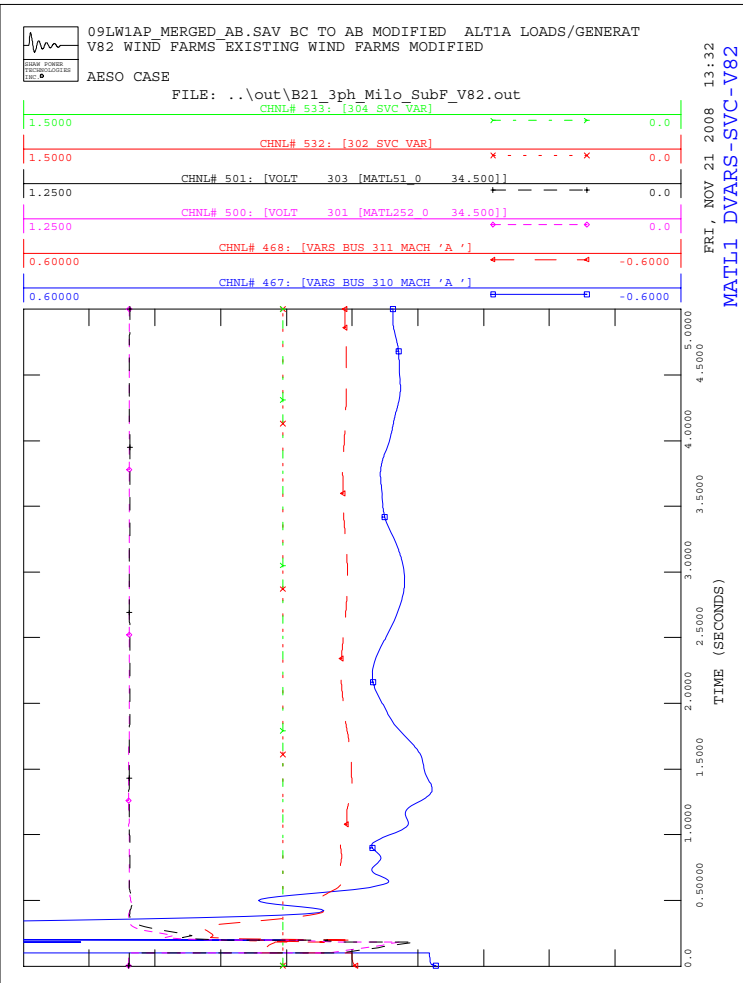


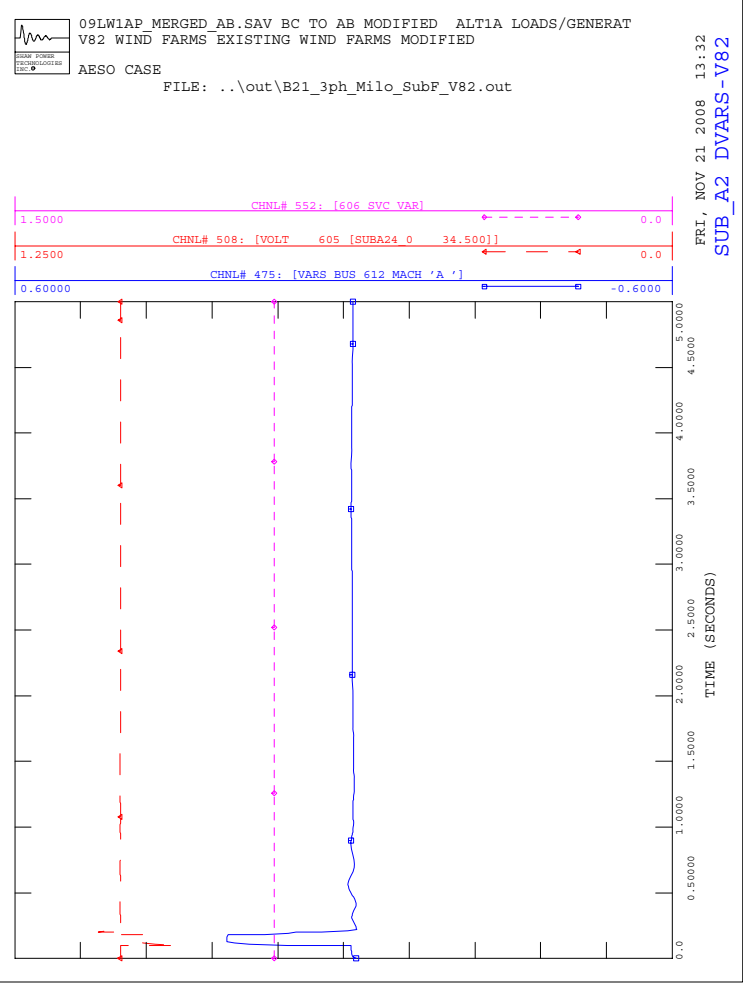
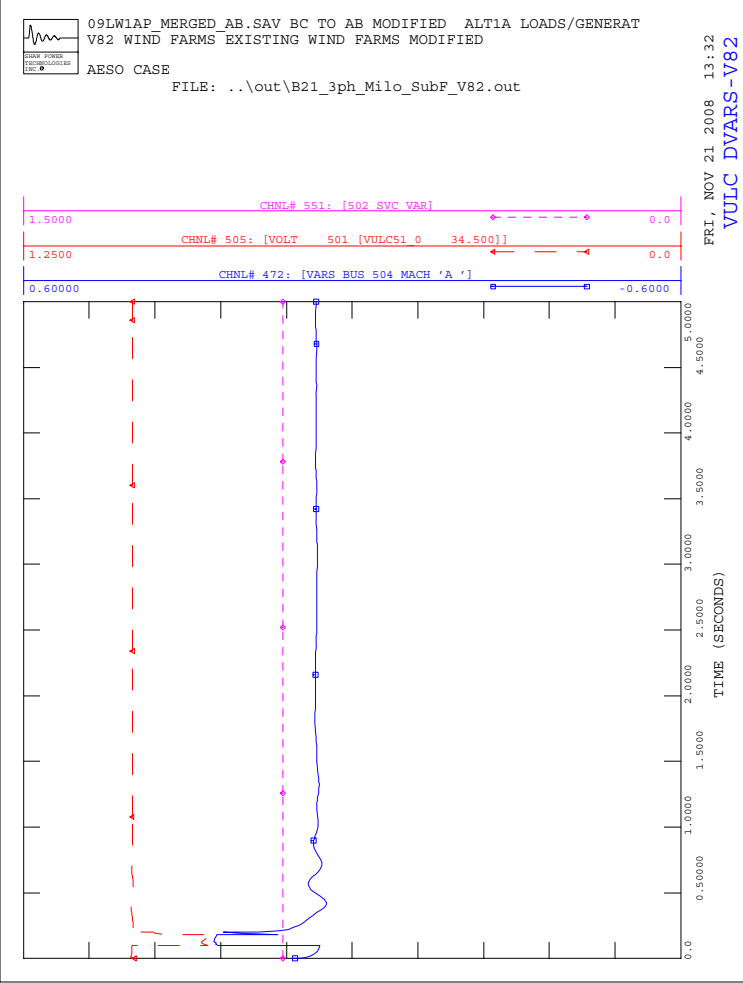
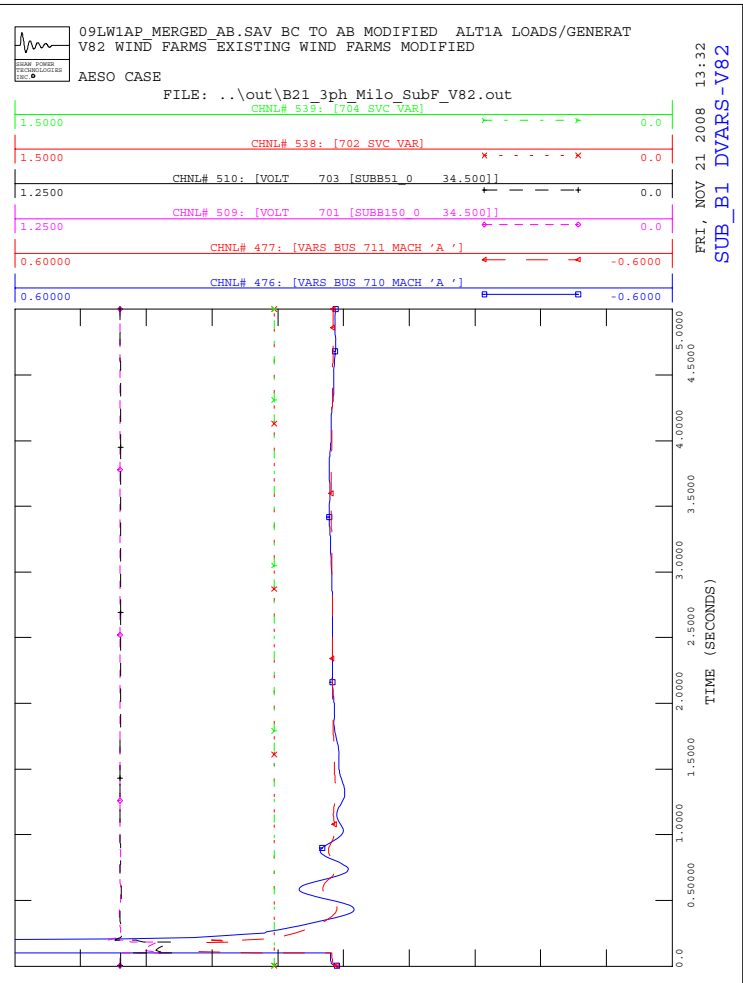
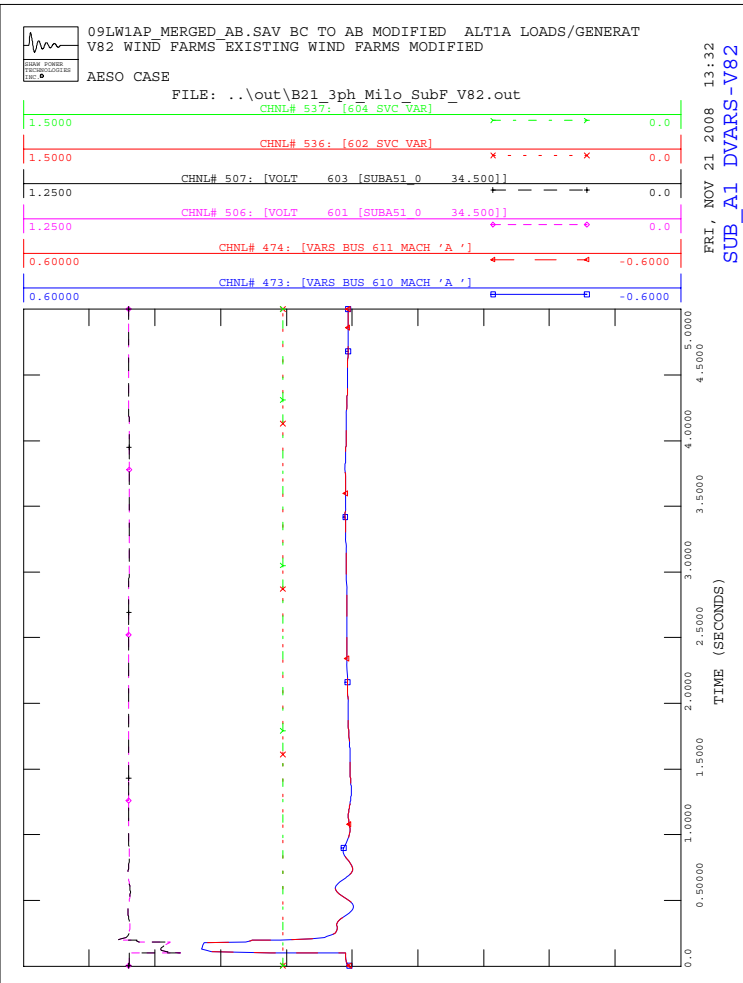
FRI, NOV 21 2008 13:32
GOOSELK-PEIGAN_SPEED-V82

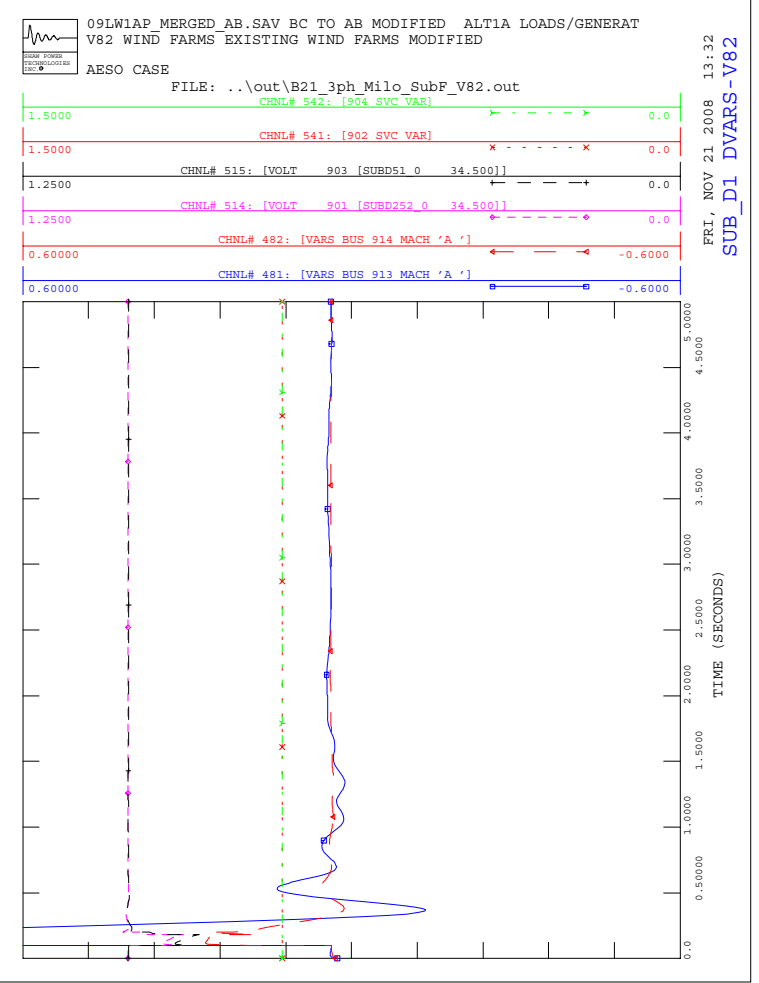
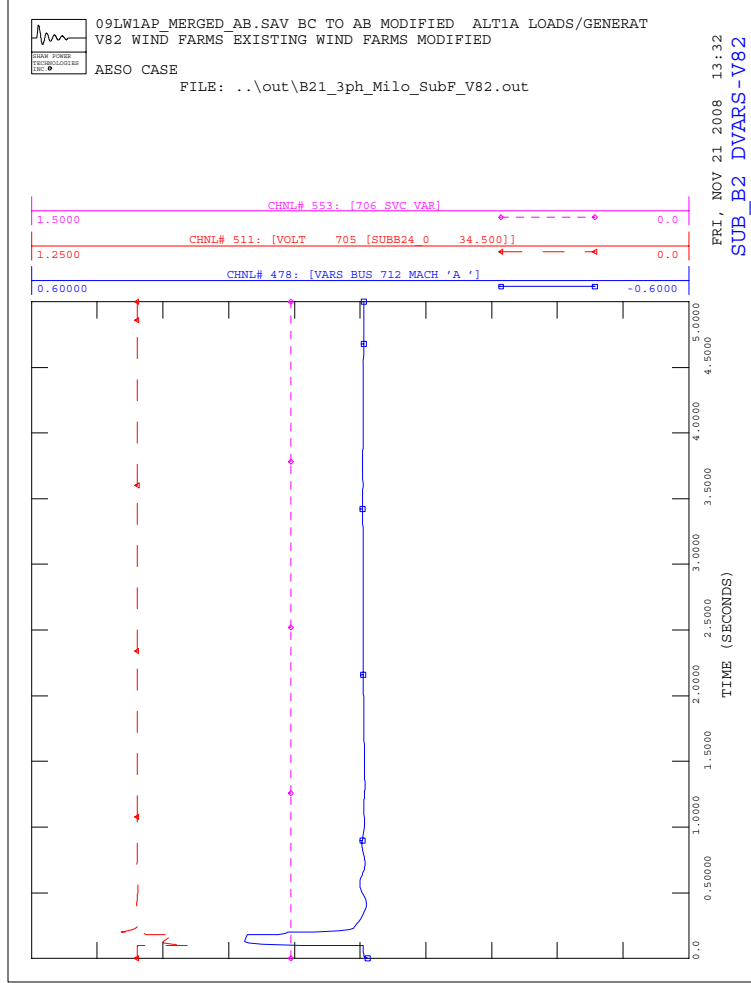
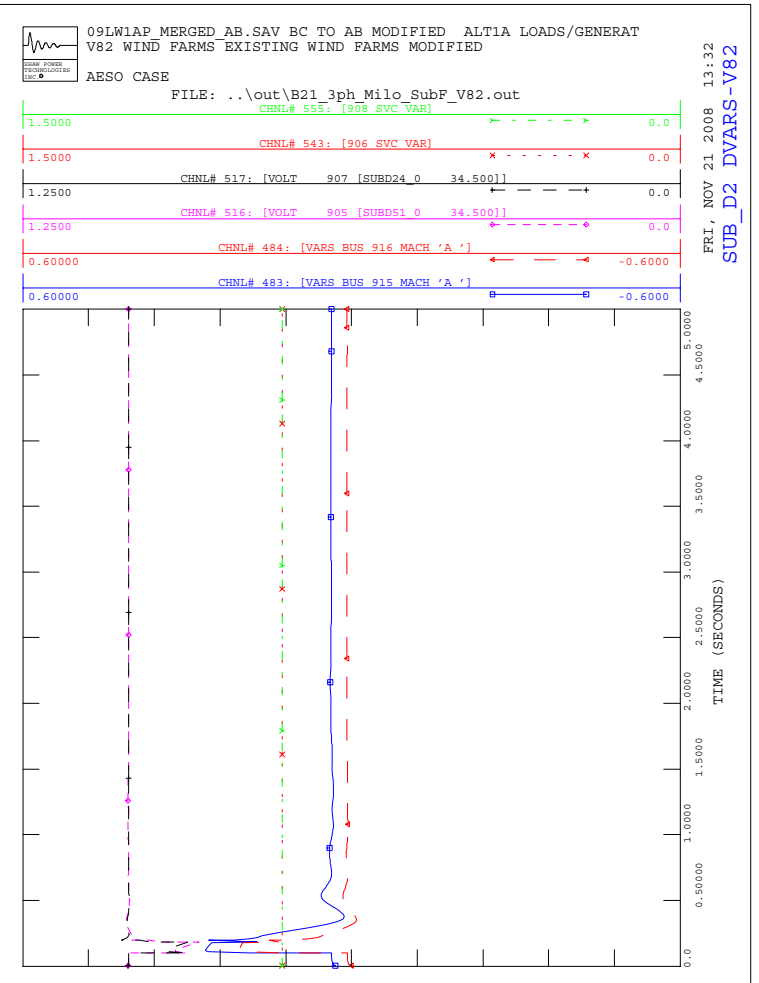
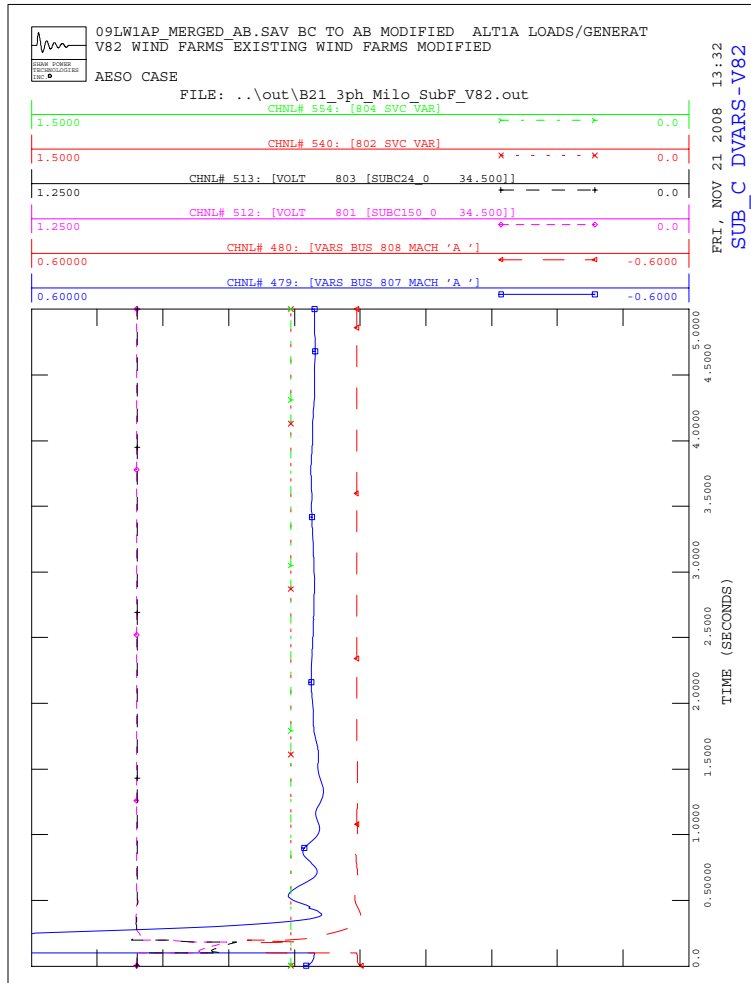


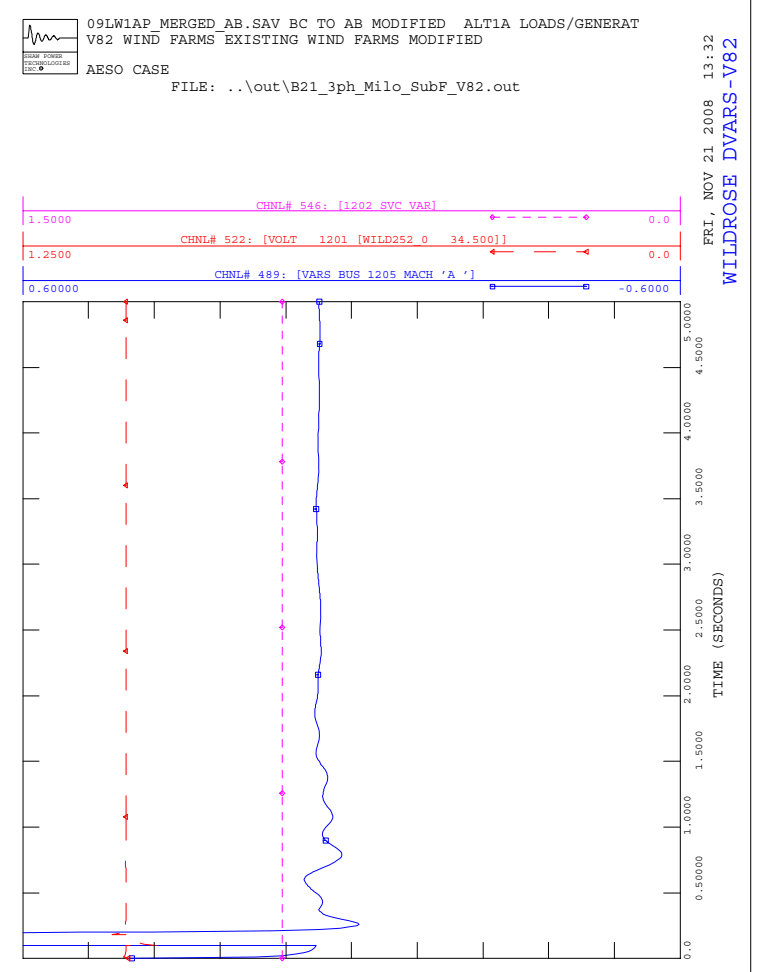
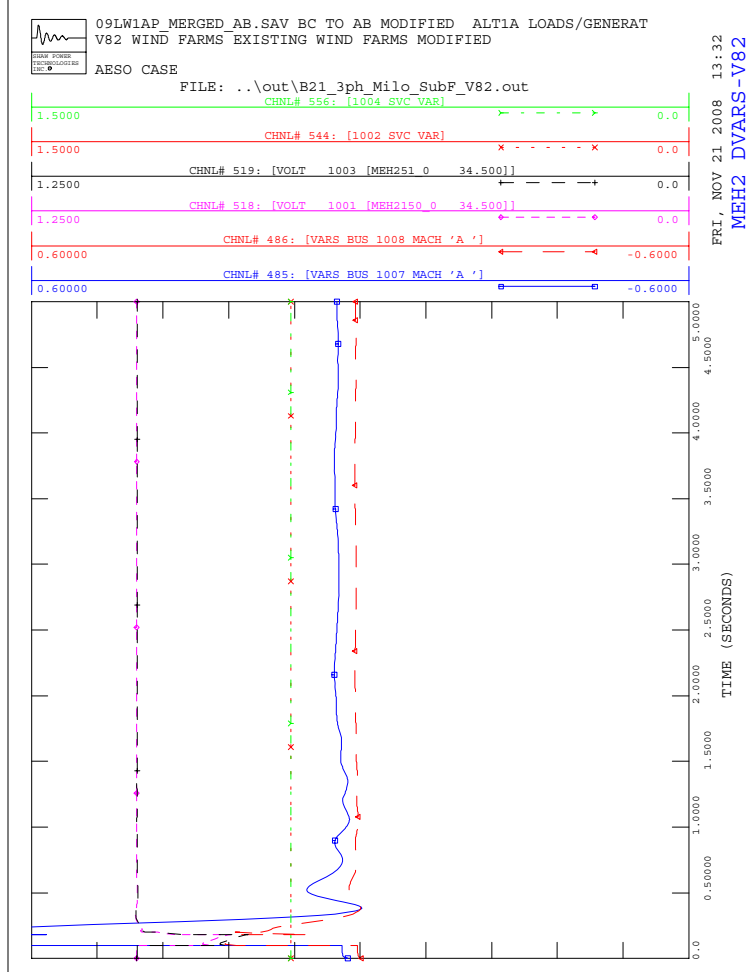
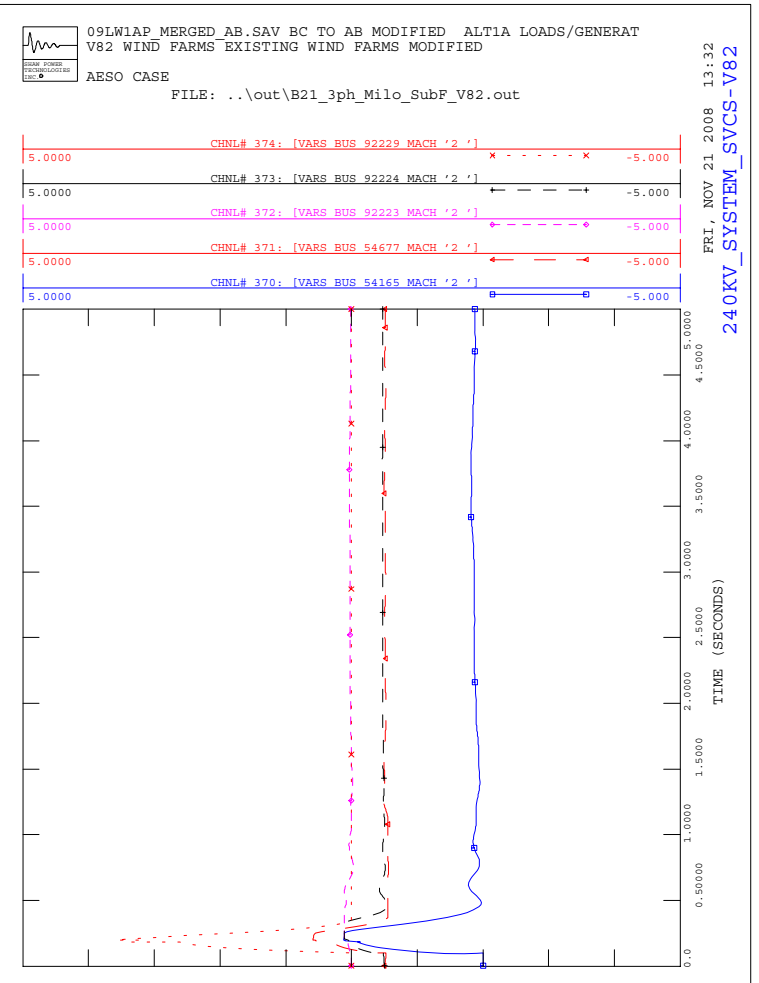
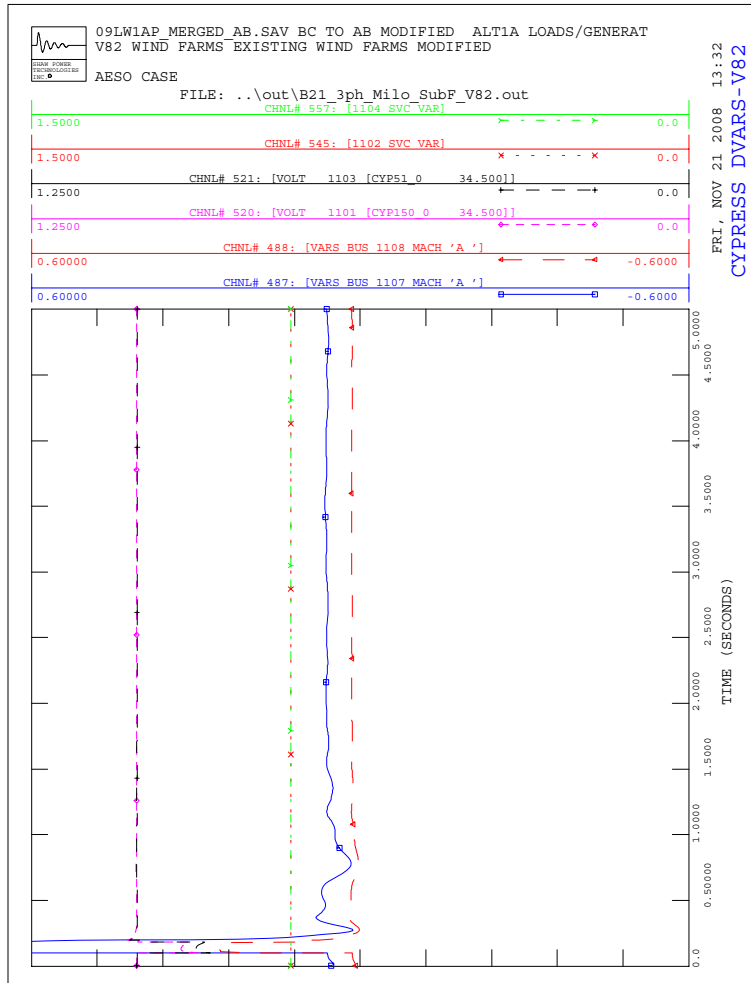












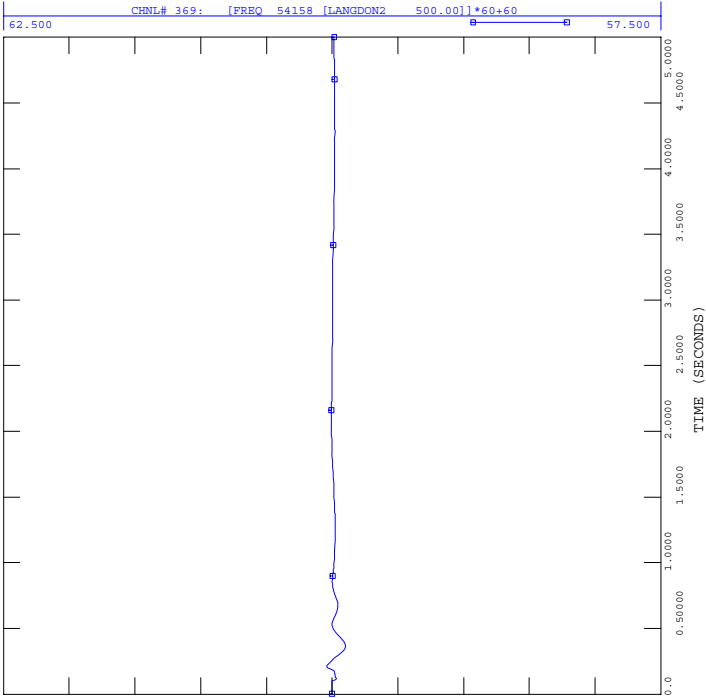


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B21_3ph_Milo_SubF_V82.out

FRI, NOV 21 2008 13:32
LANGDON_FRQ-V82

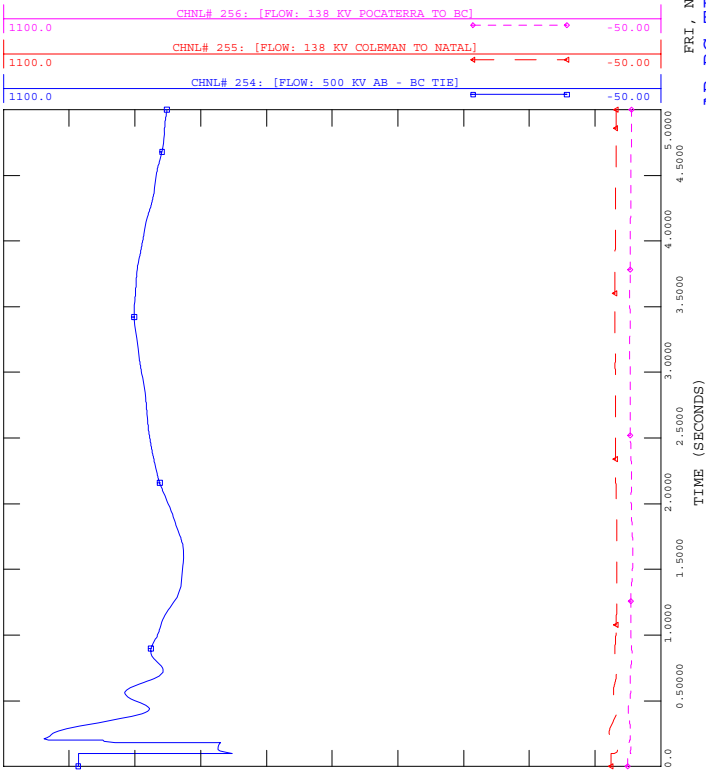


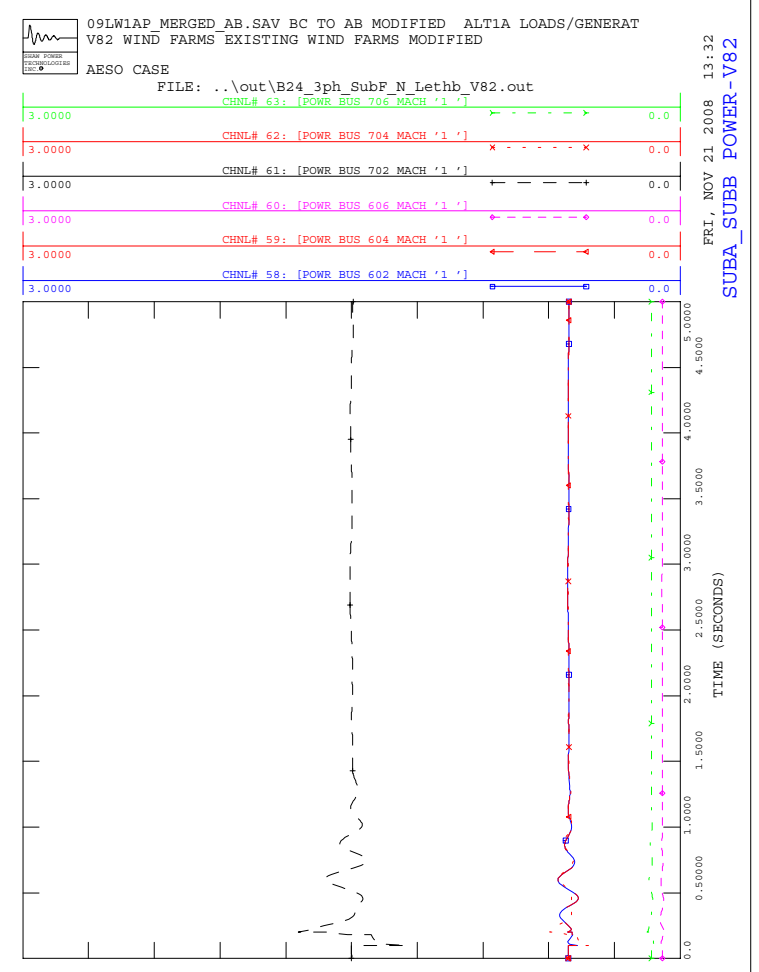
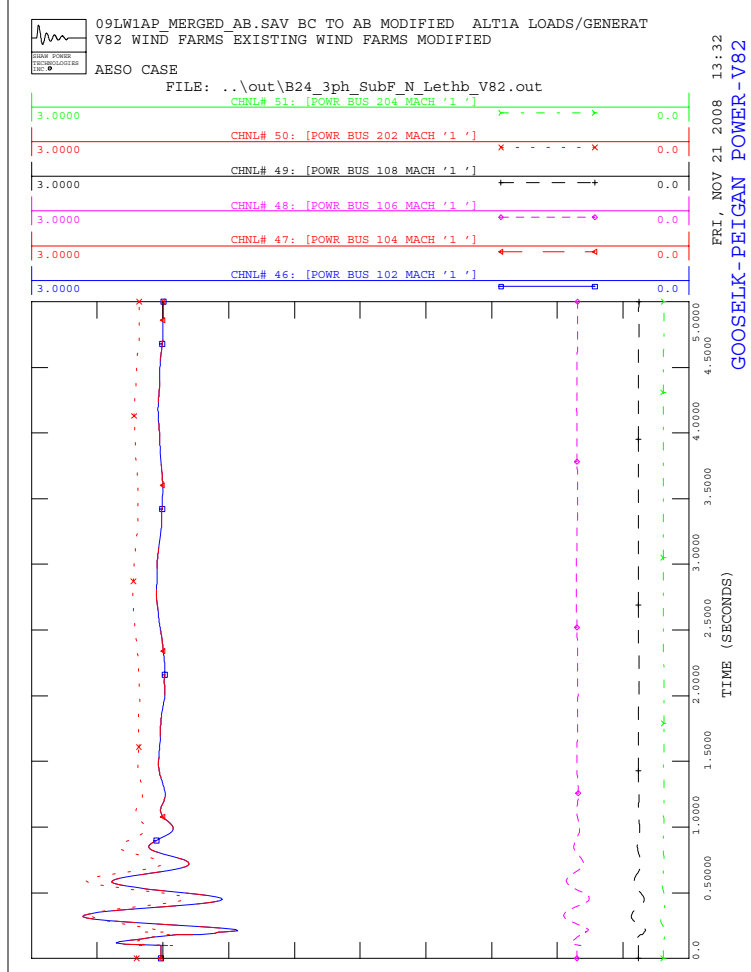
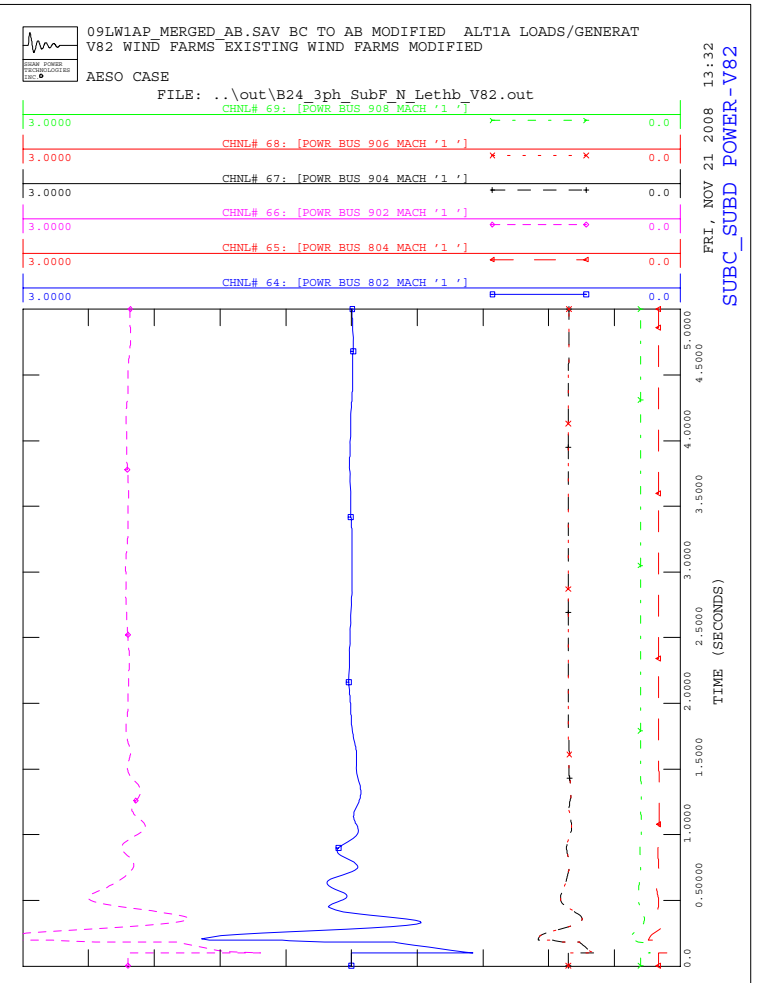
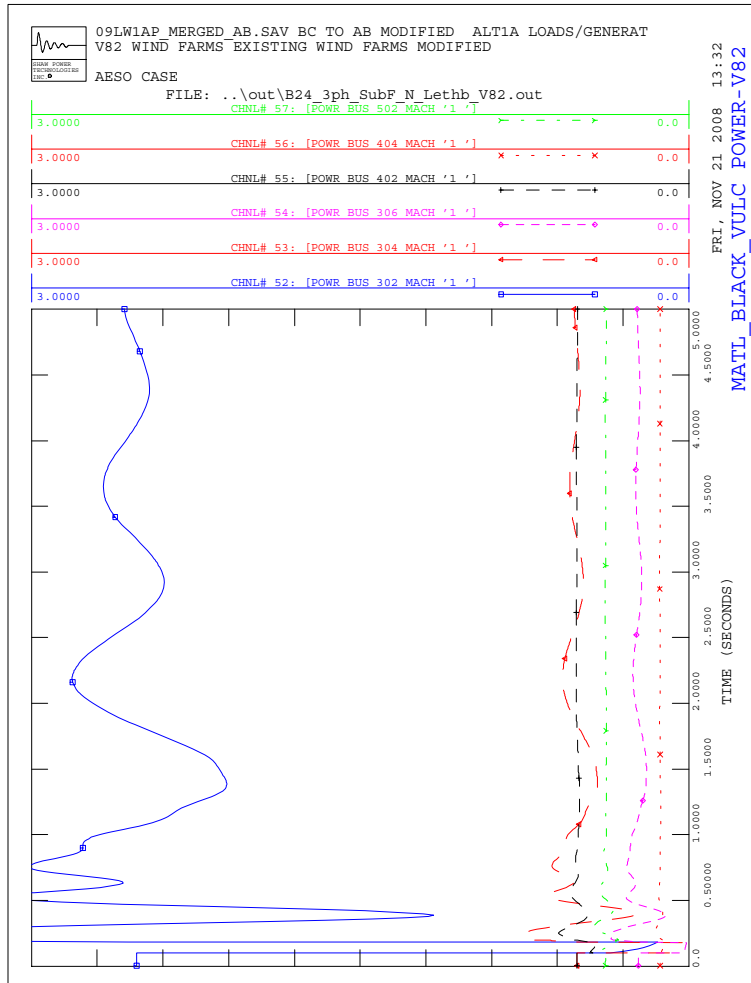
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

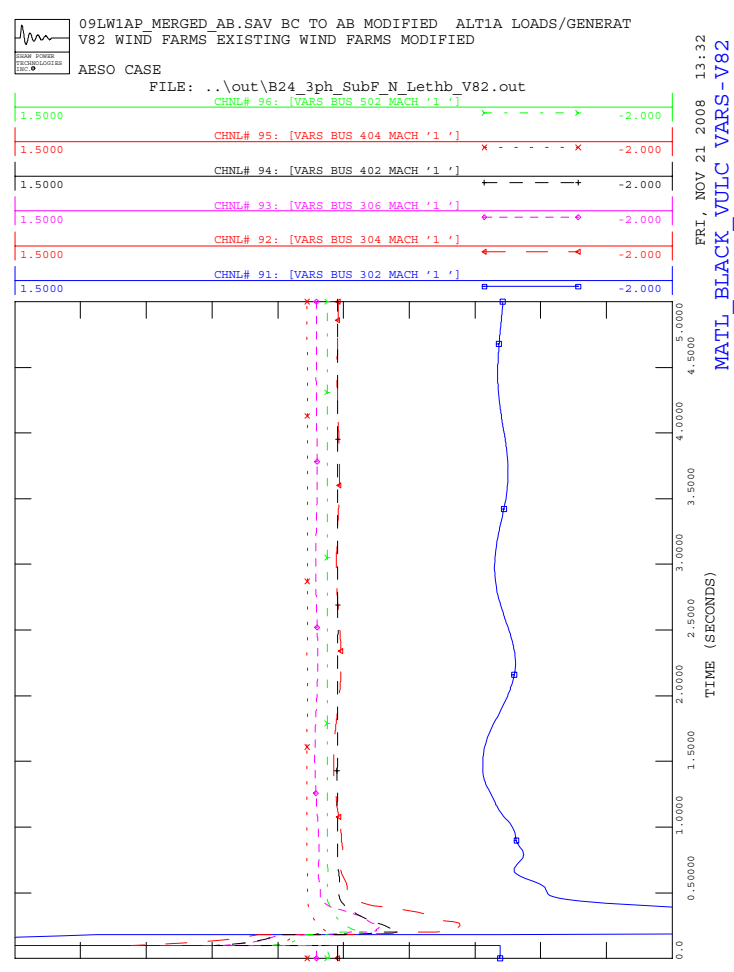
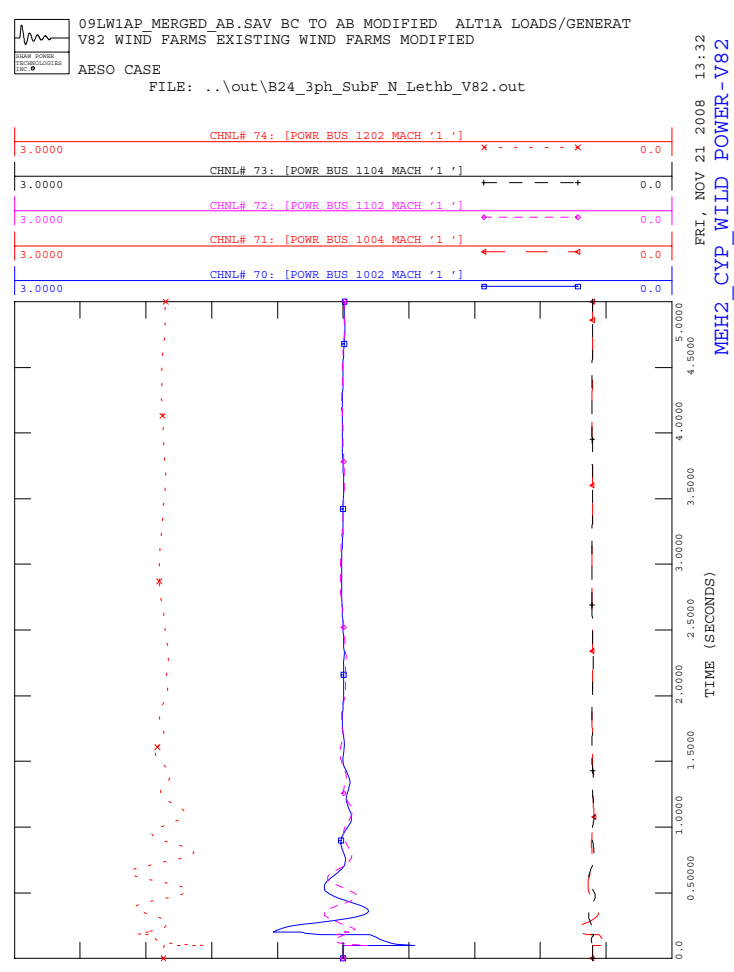
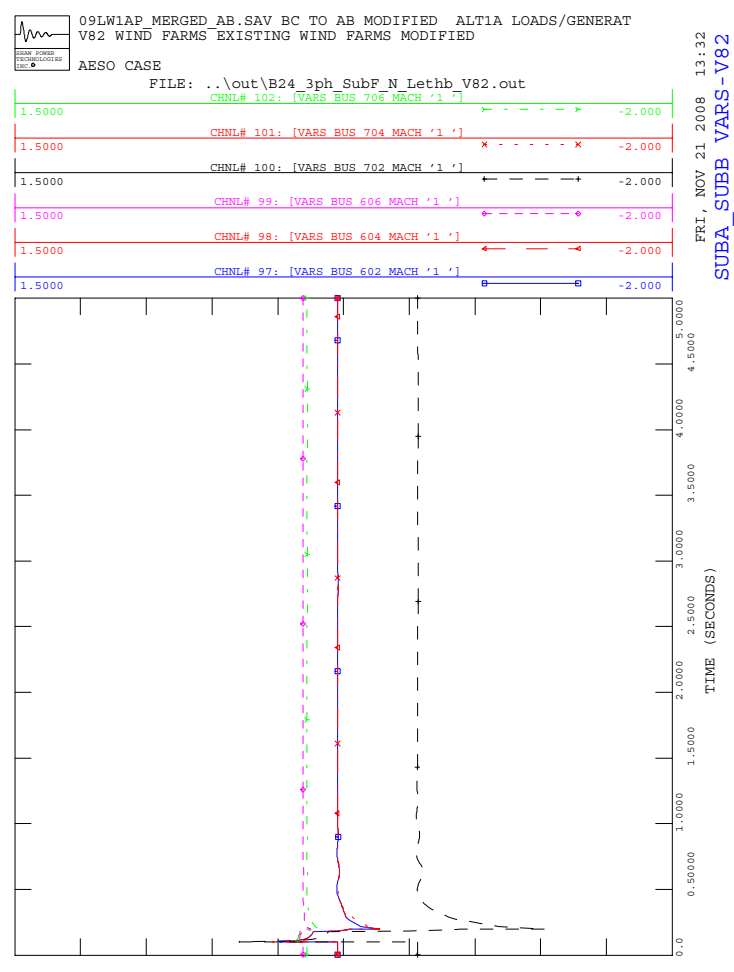
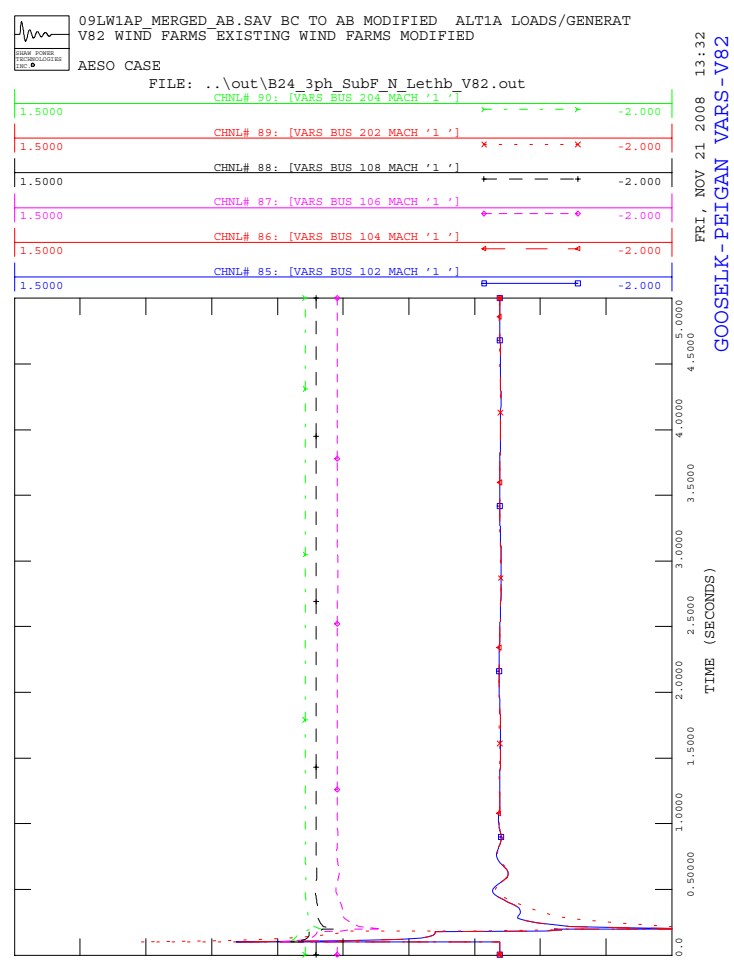
ABSO CASE

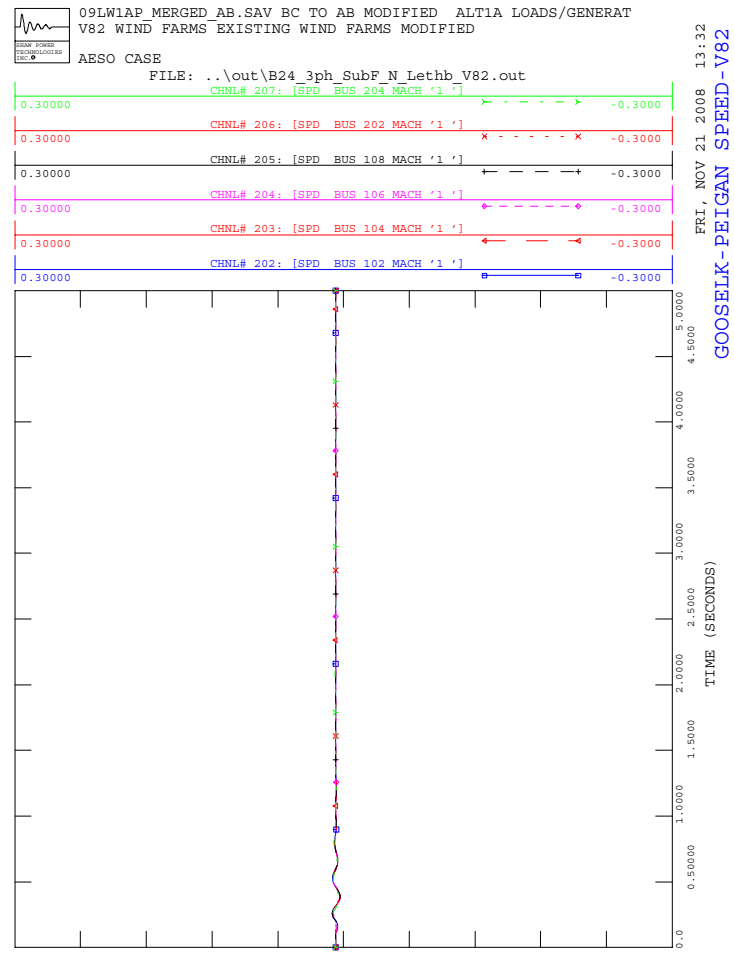
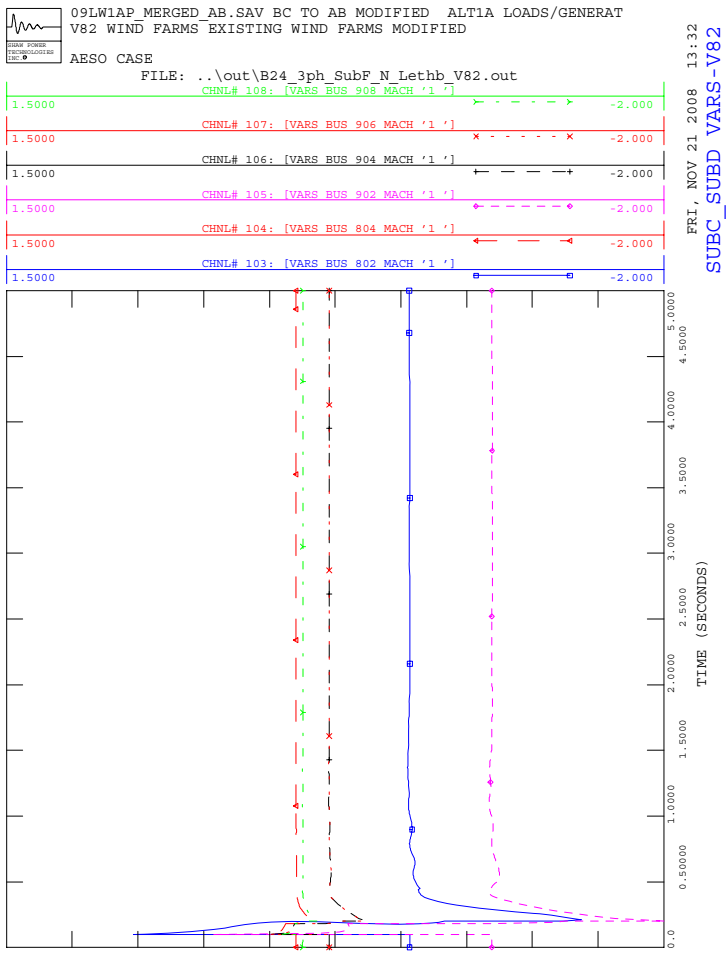
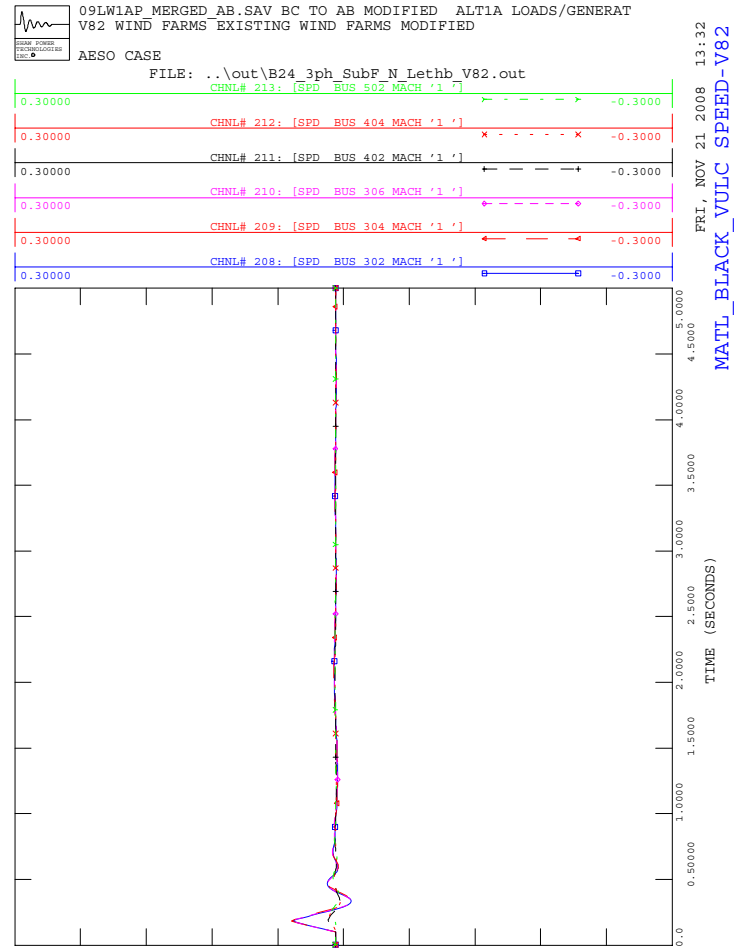
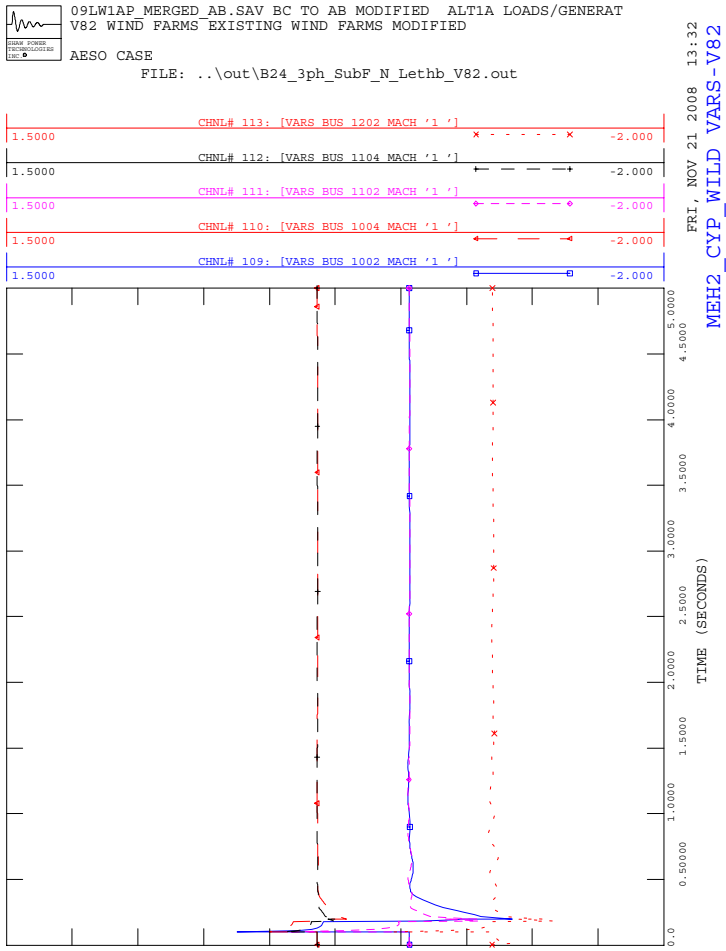
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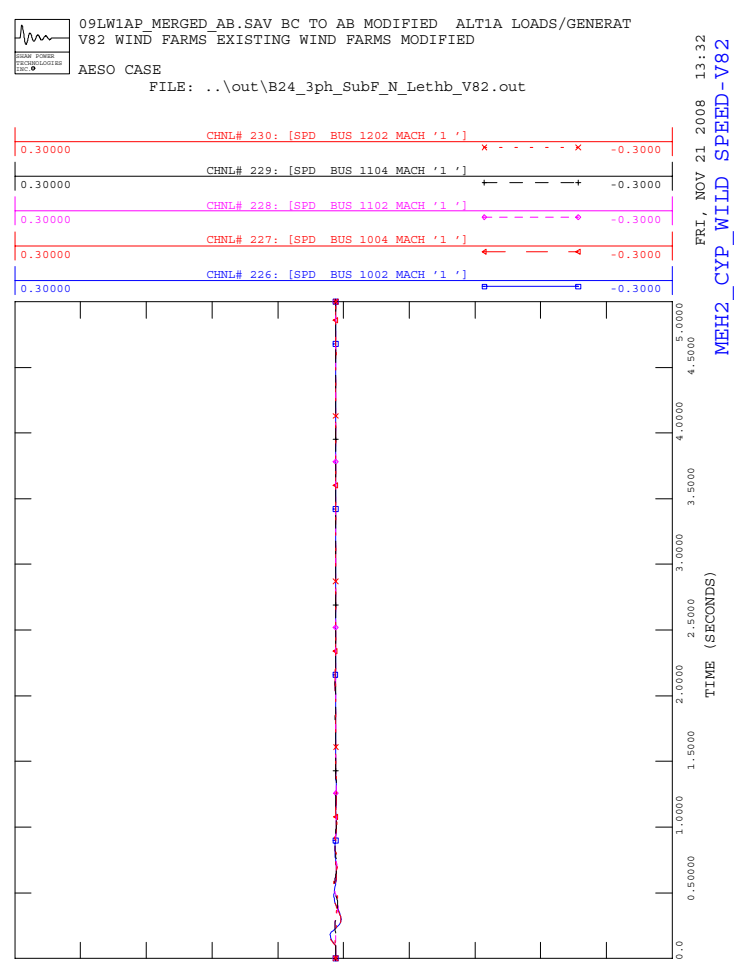
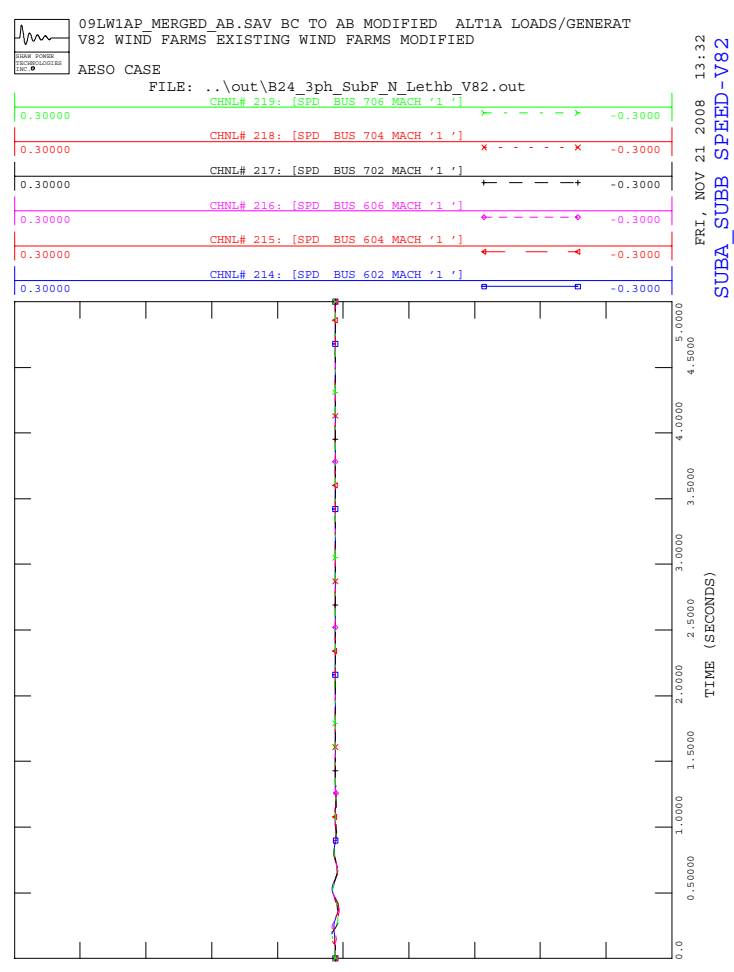
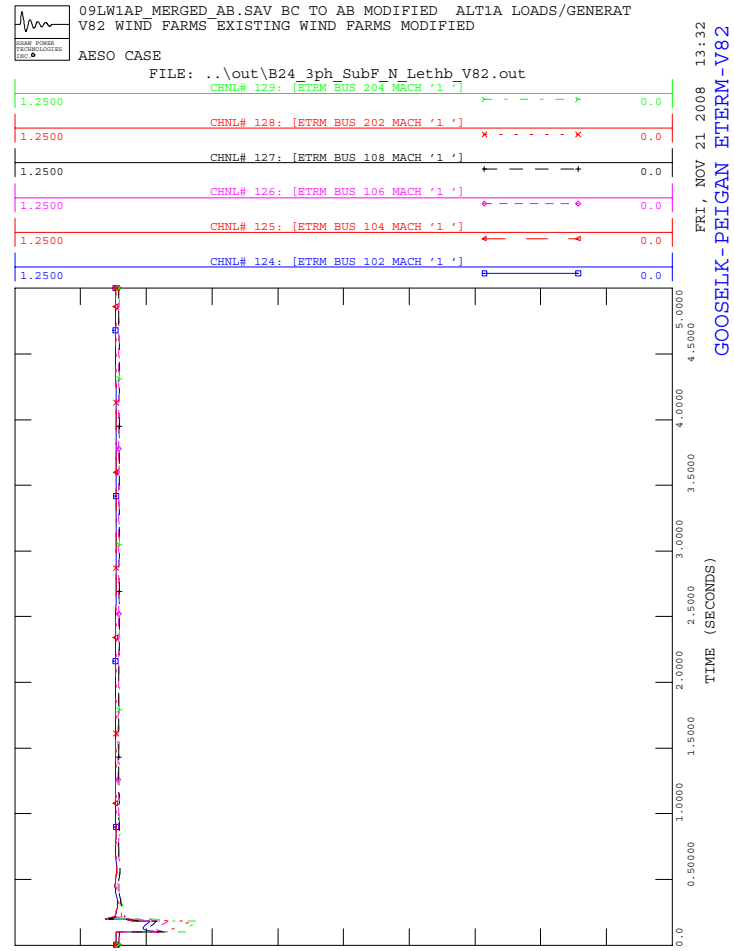
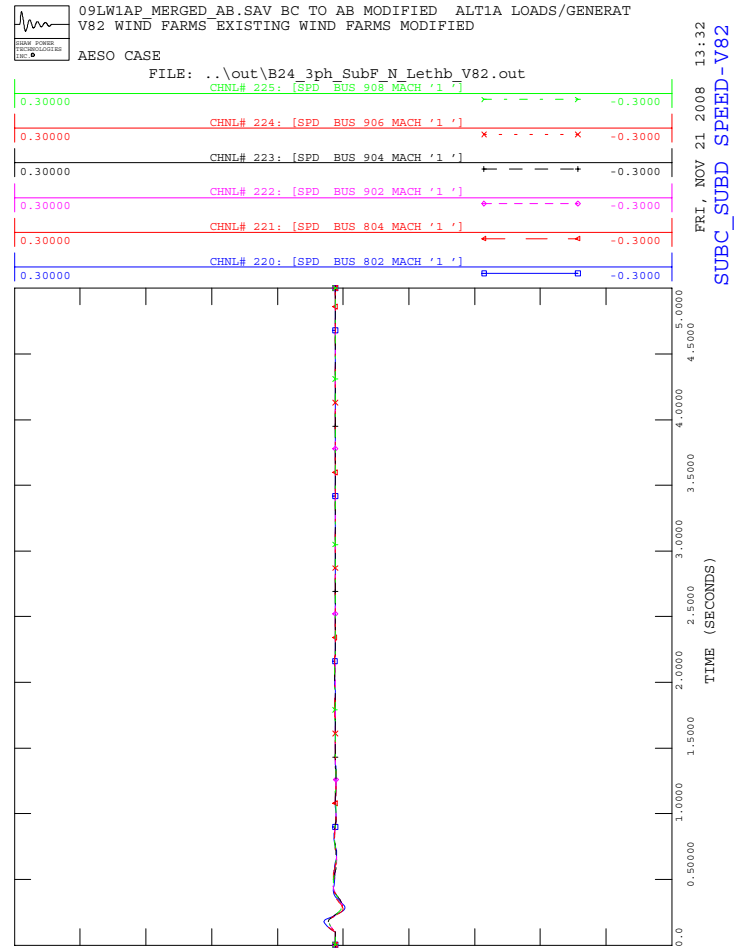
FRI, NOV 21 2008 13:32
AB_BC_TIE_FLOWS-V82

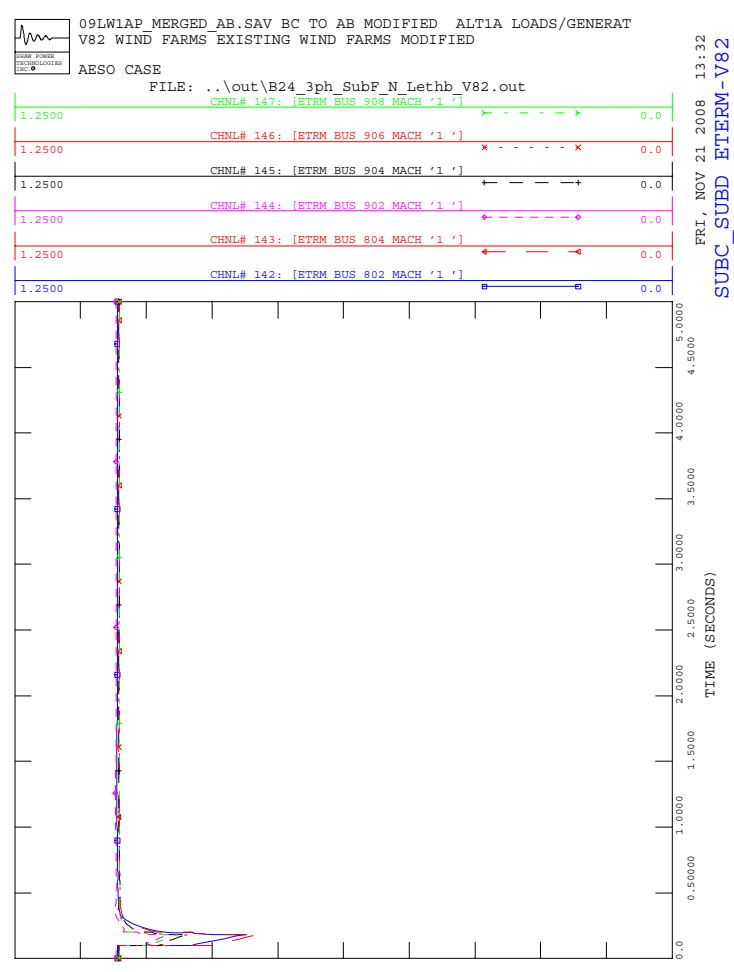
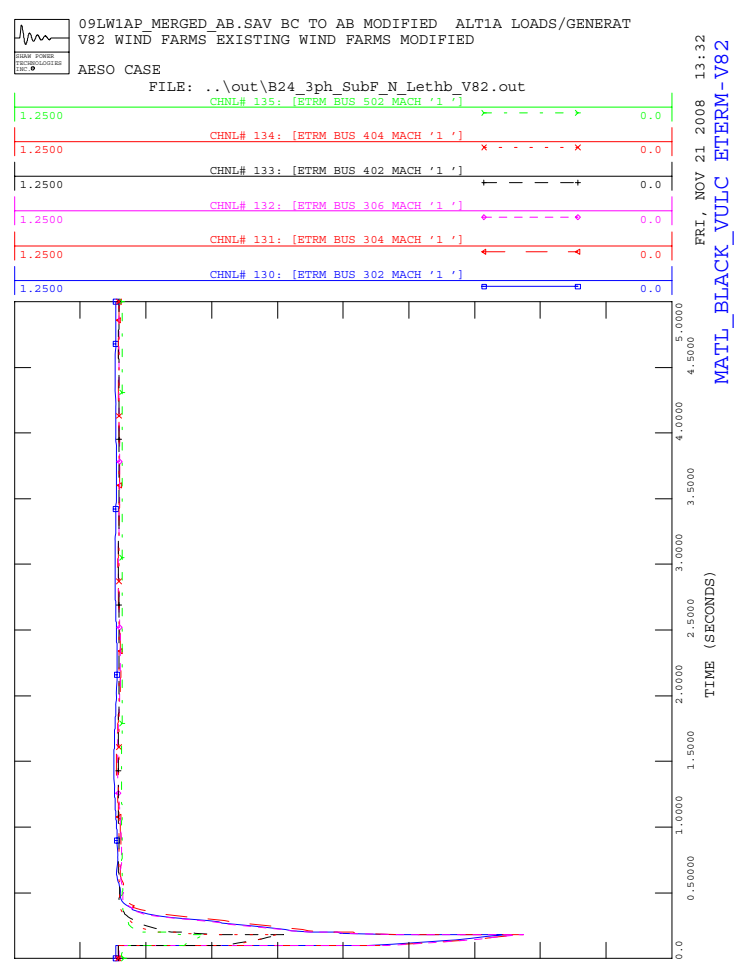
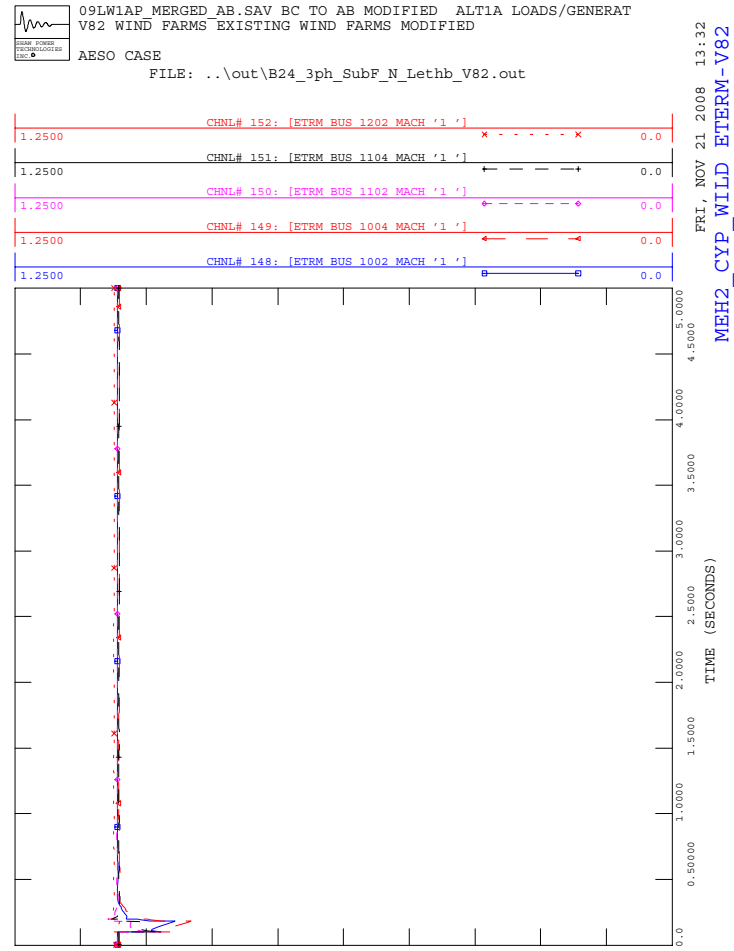
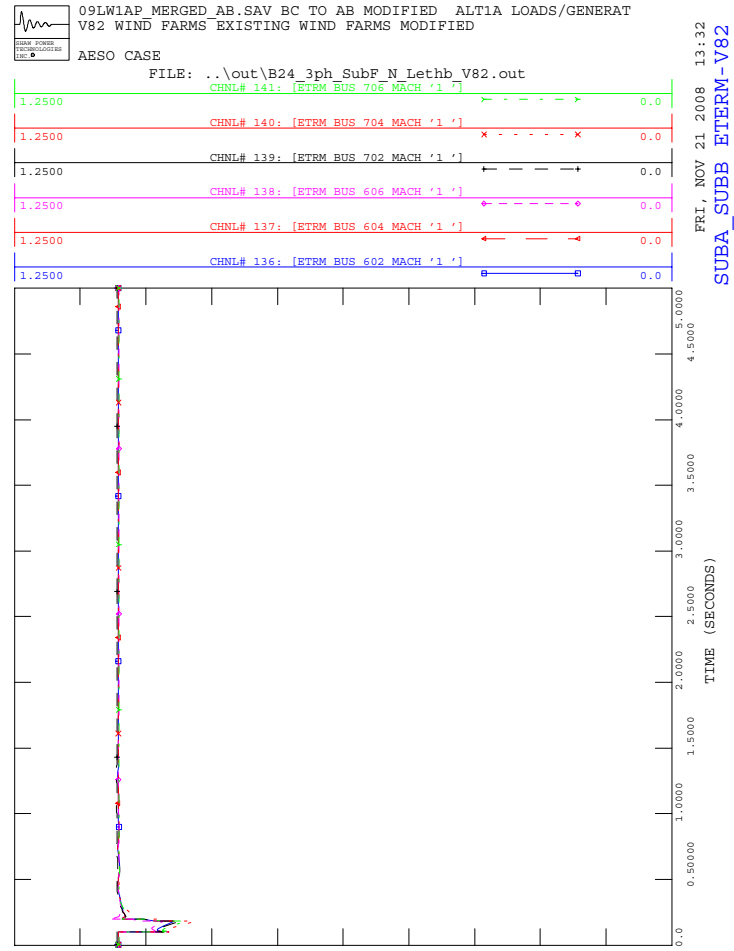


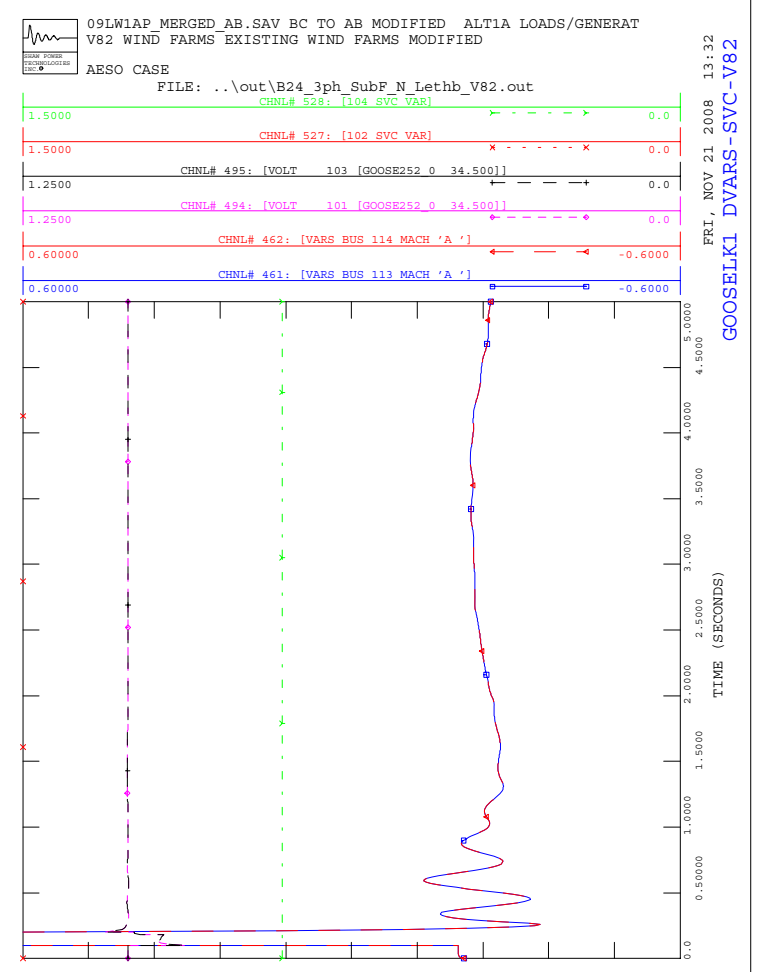
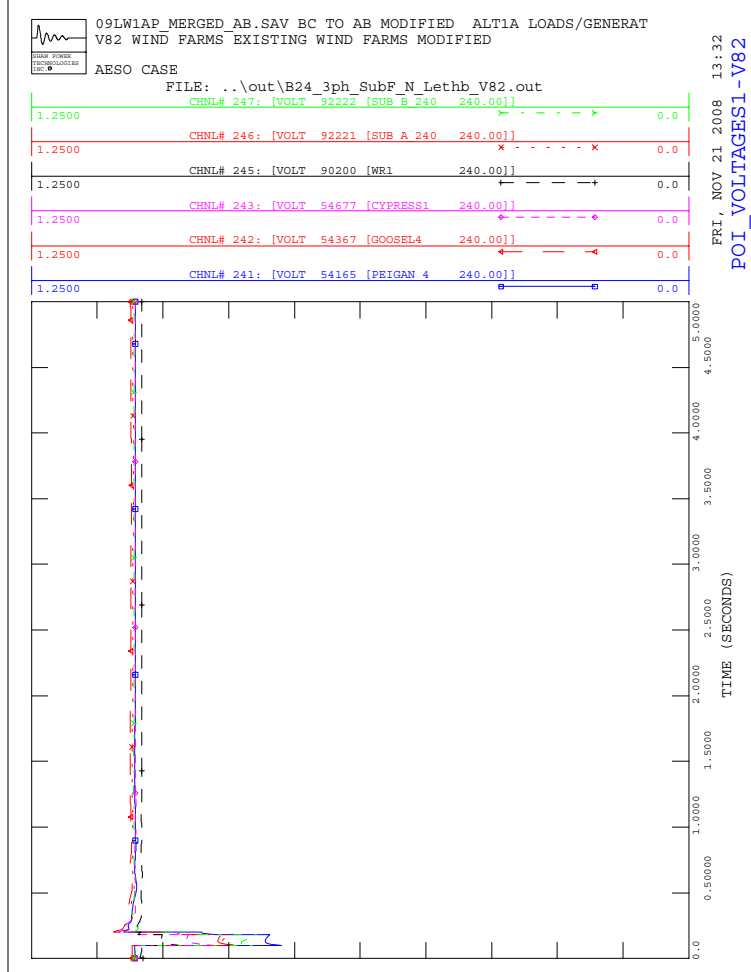
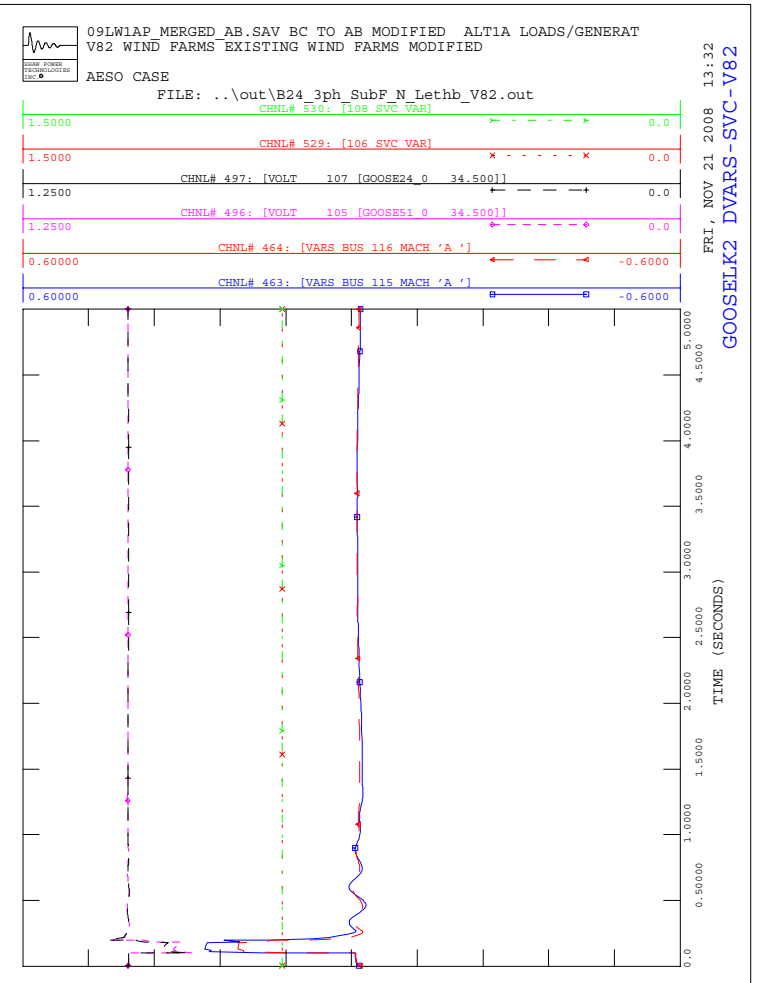
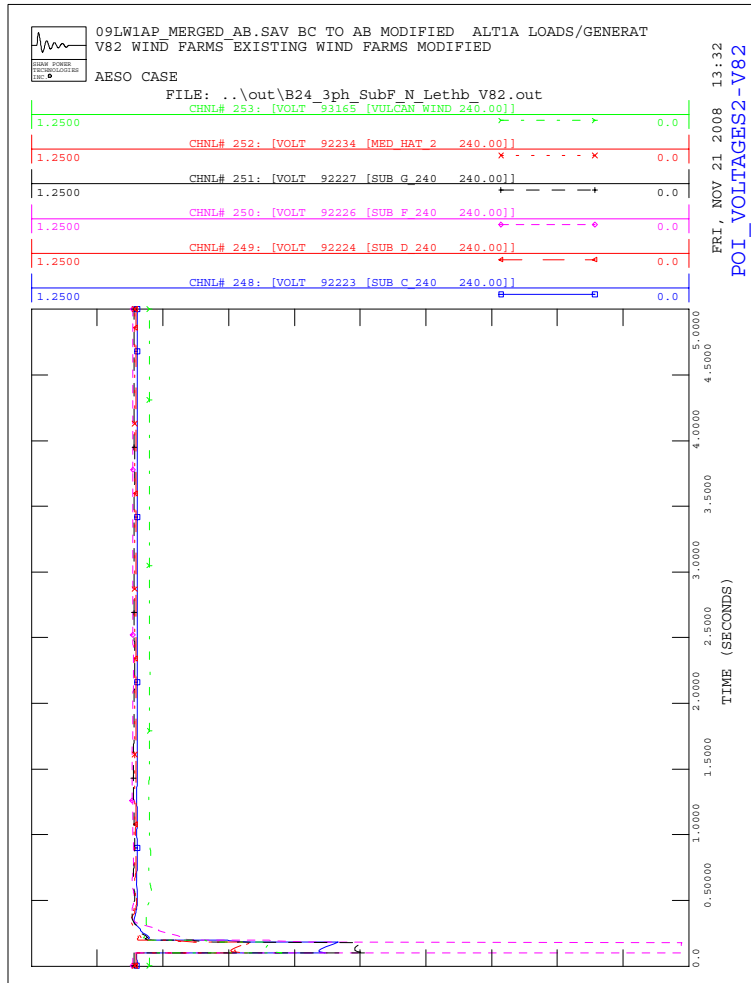


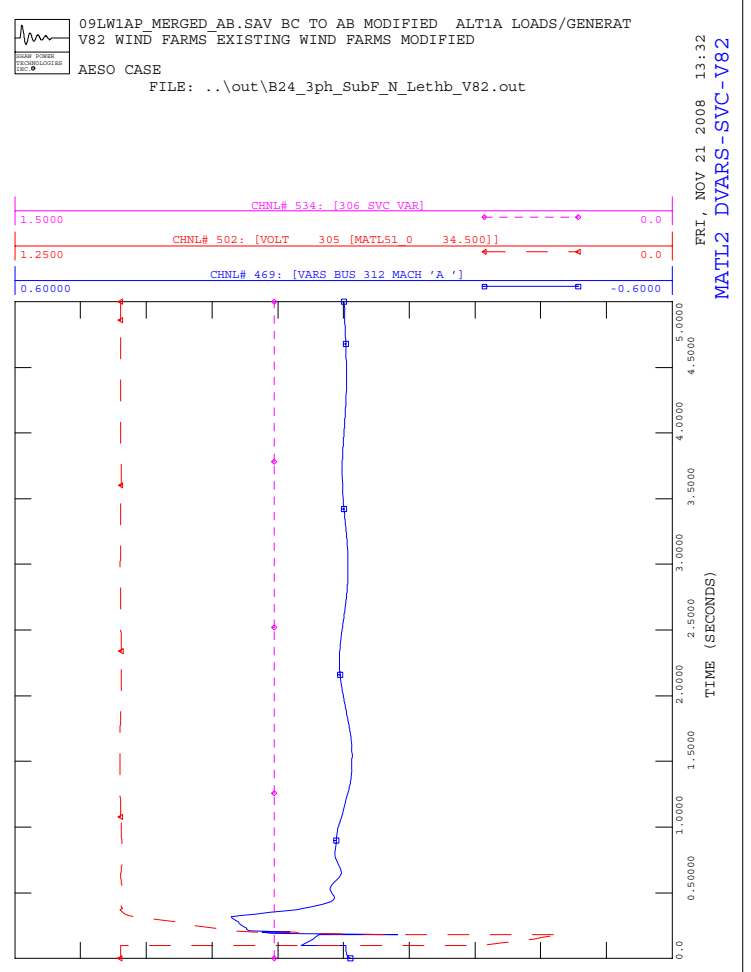
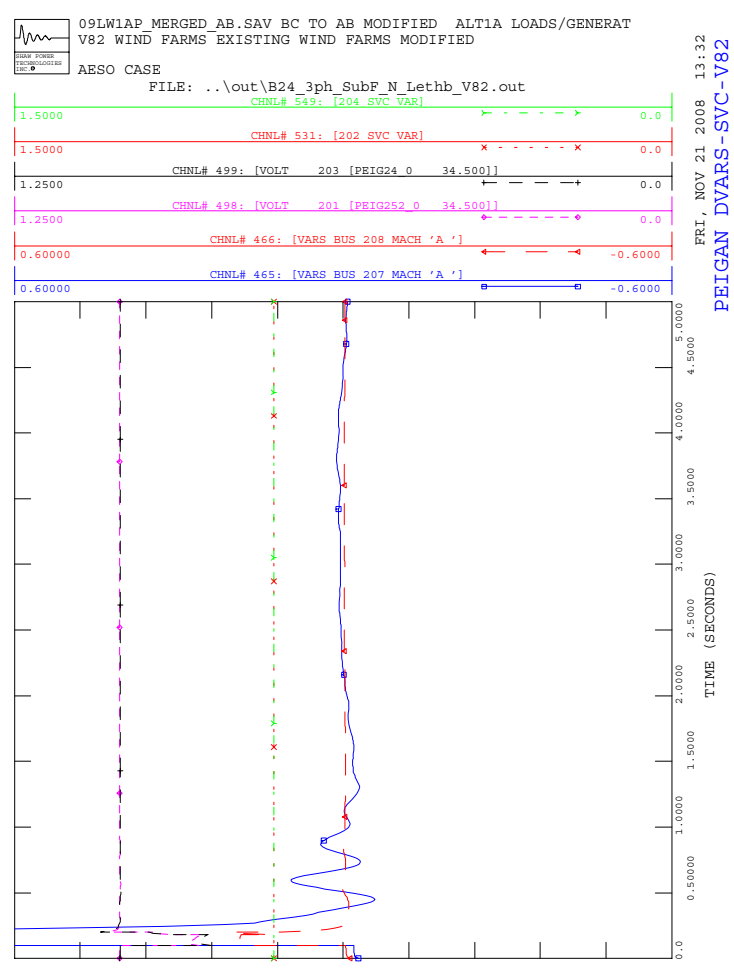
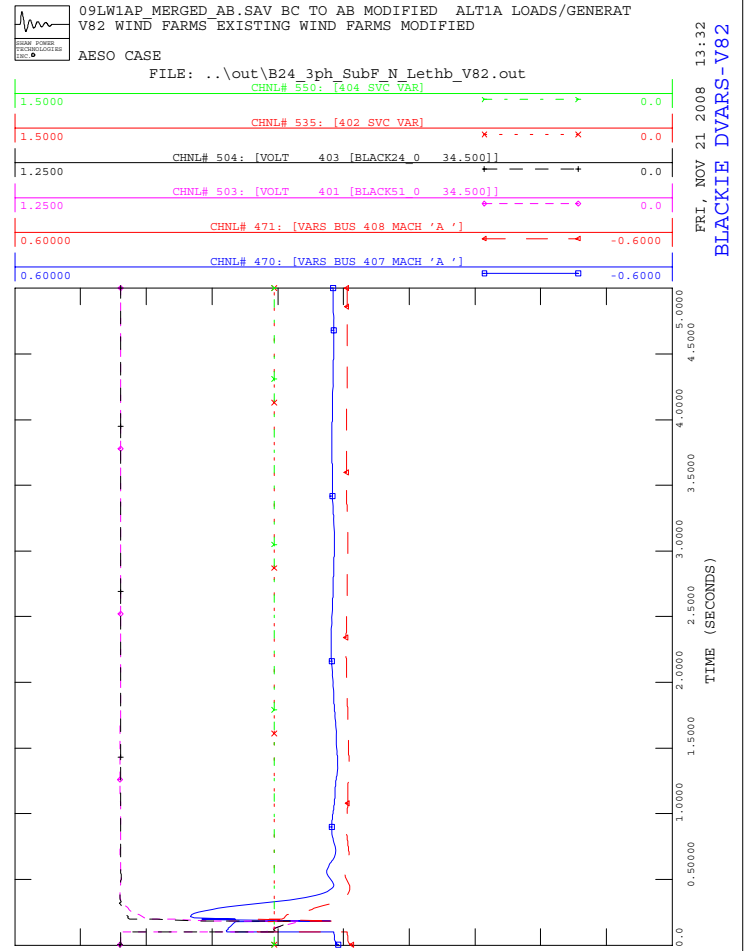
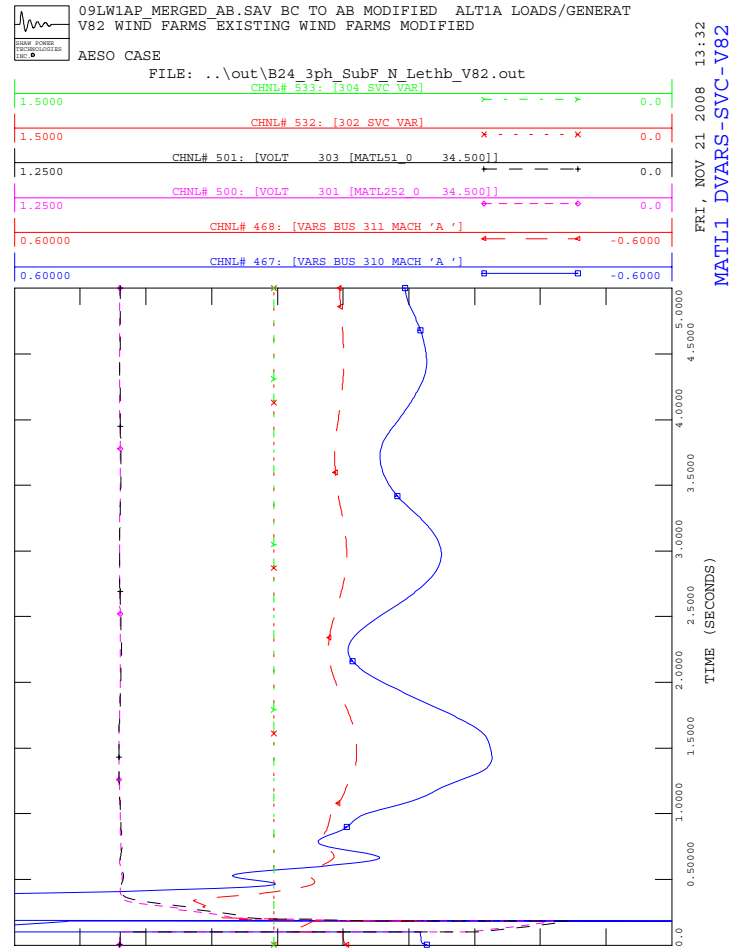


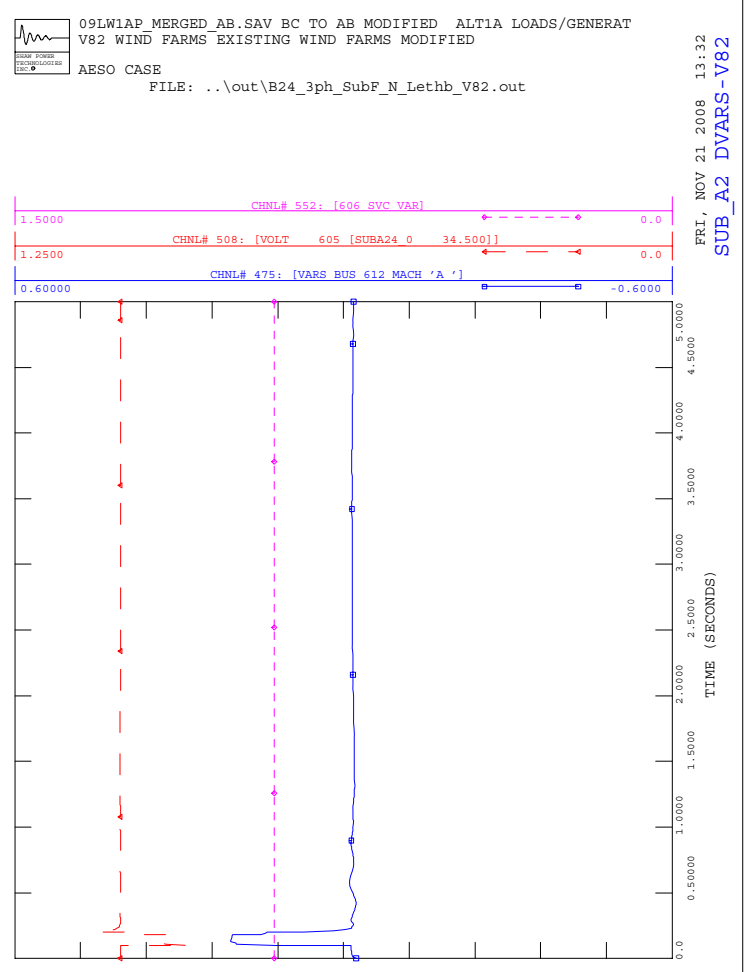
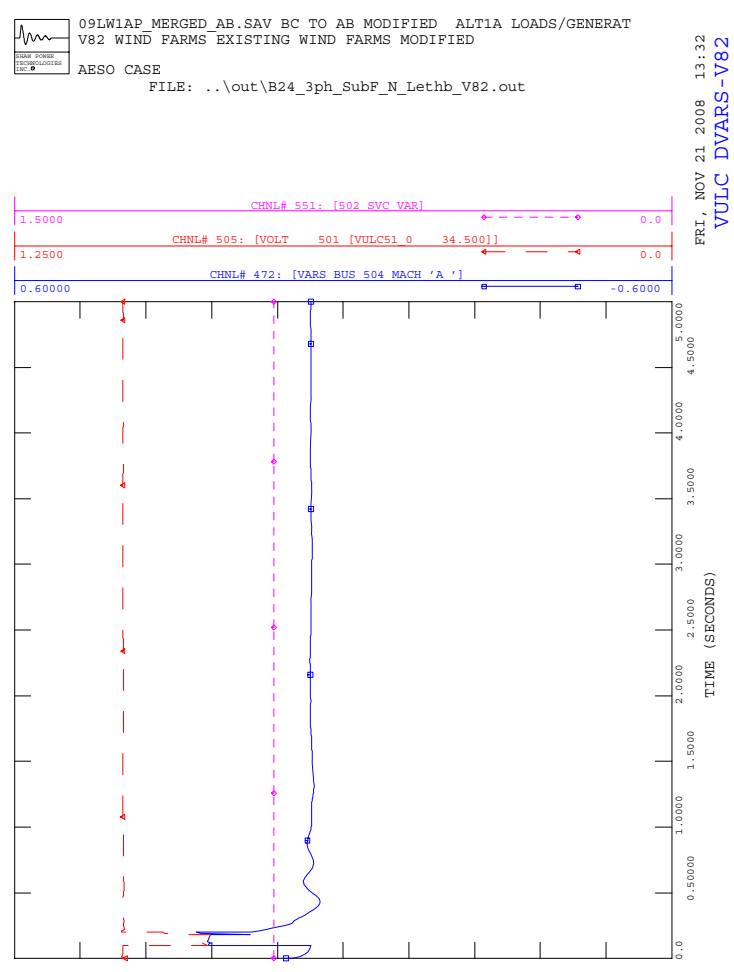
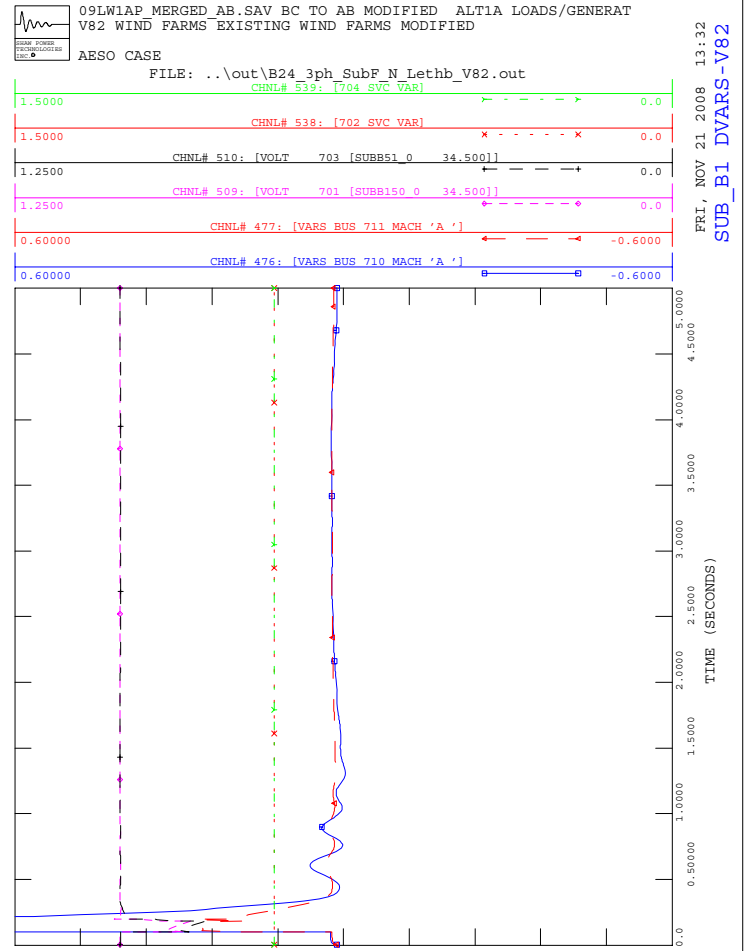
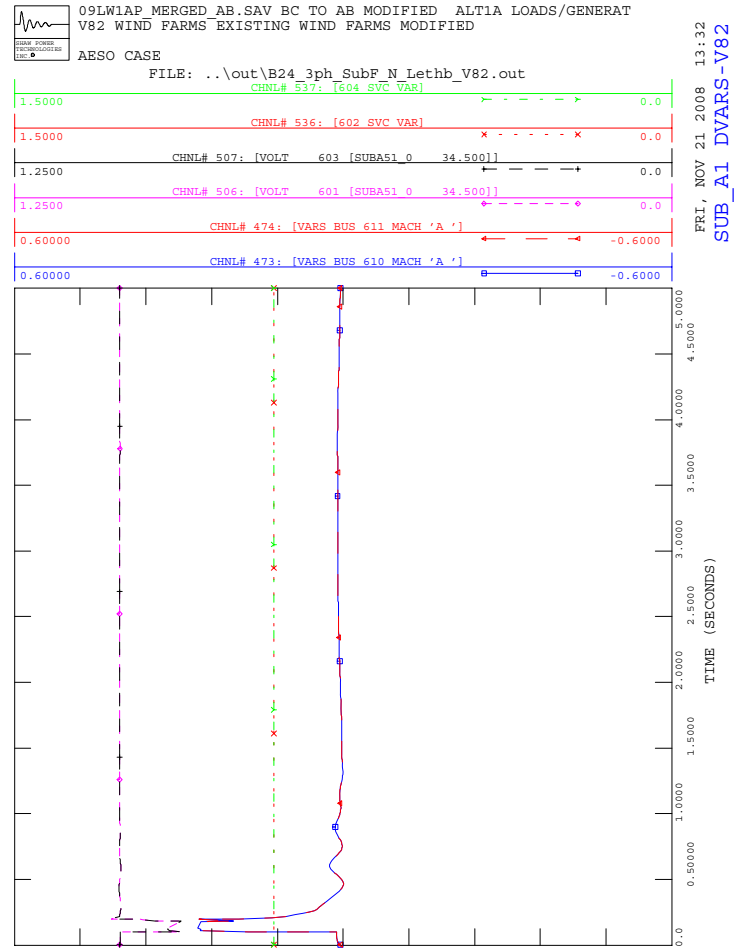


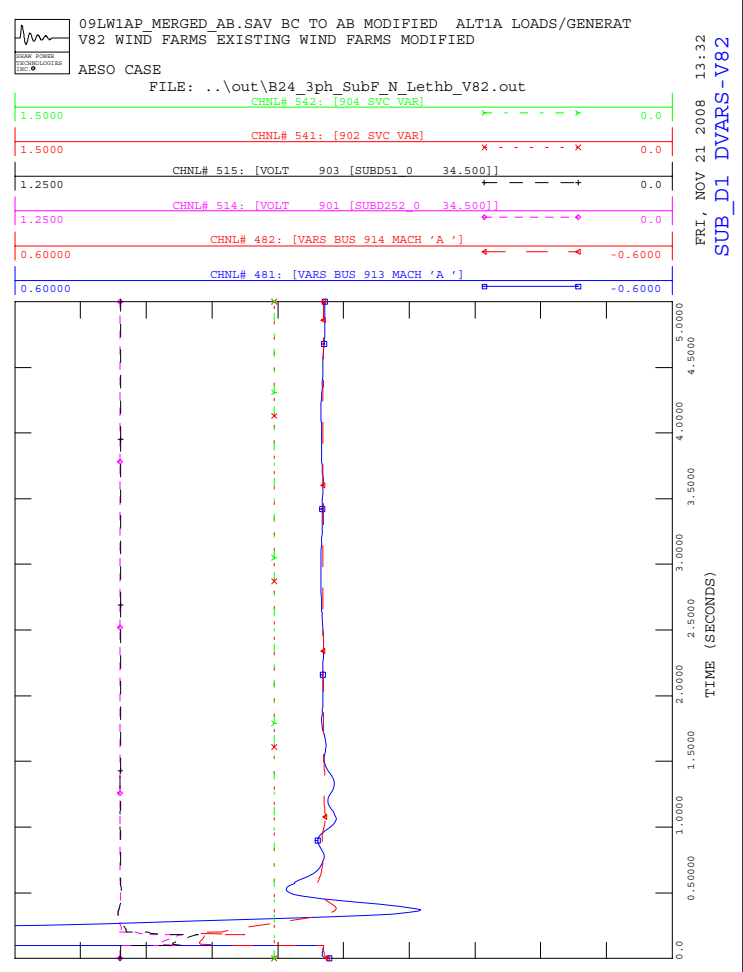
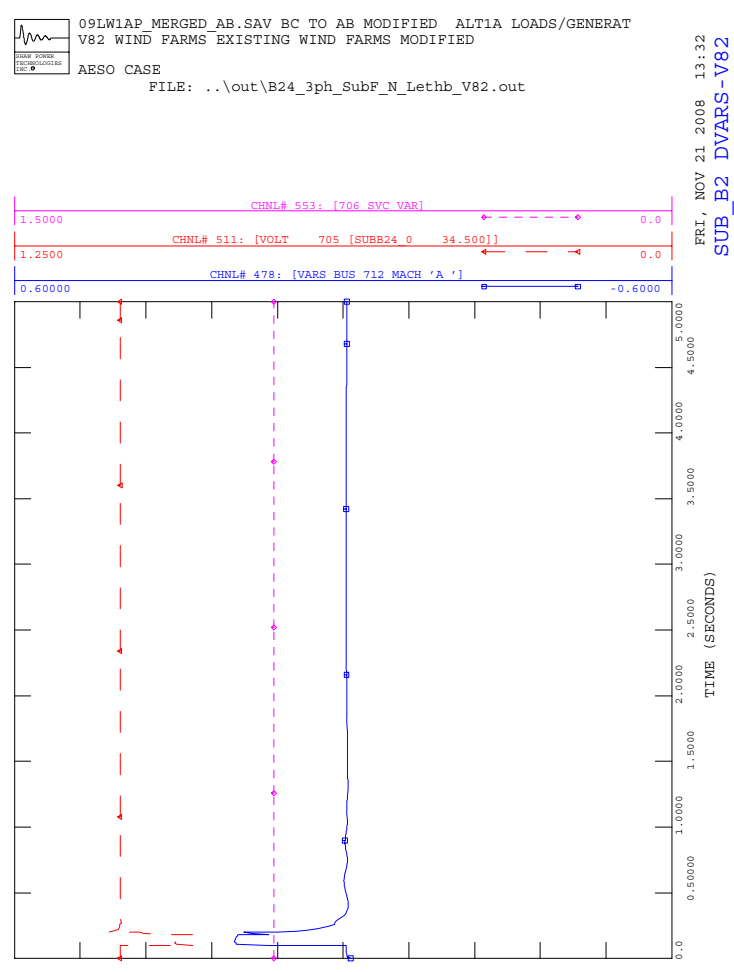
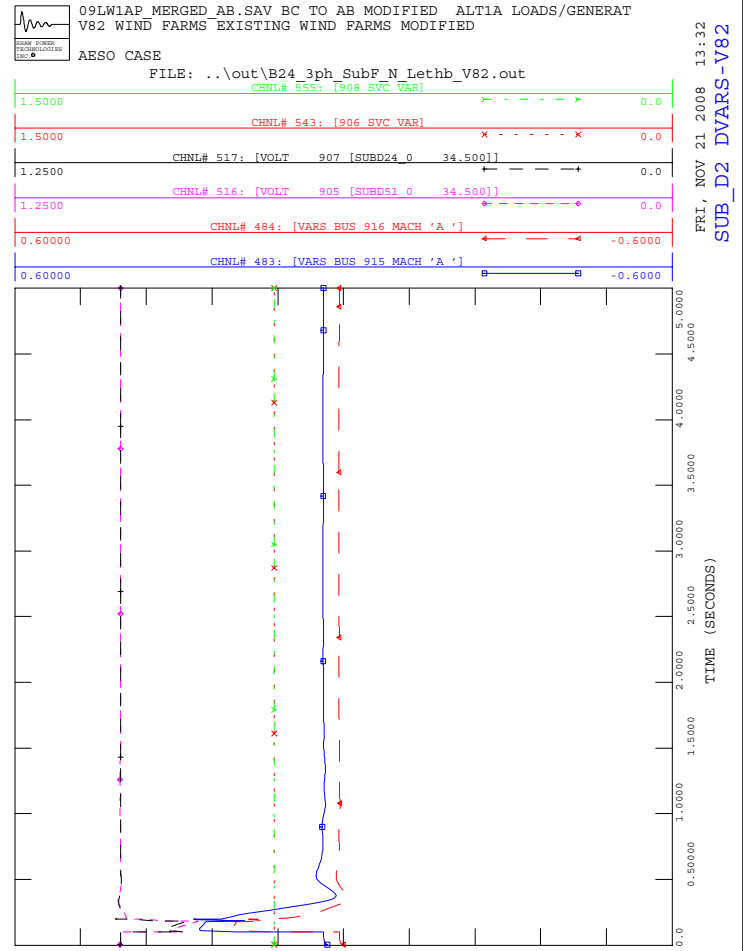
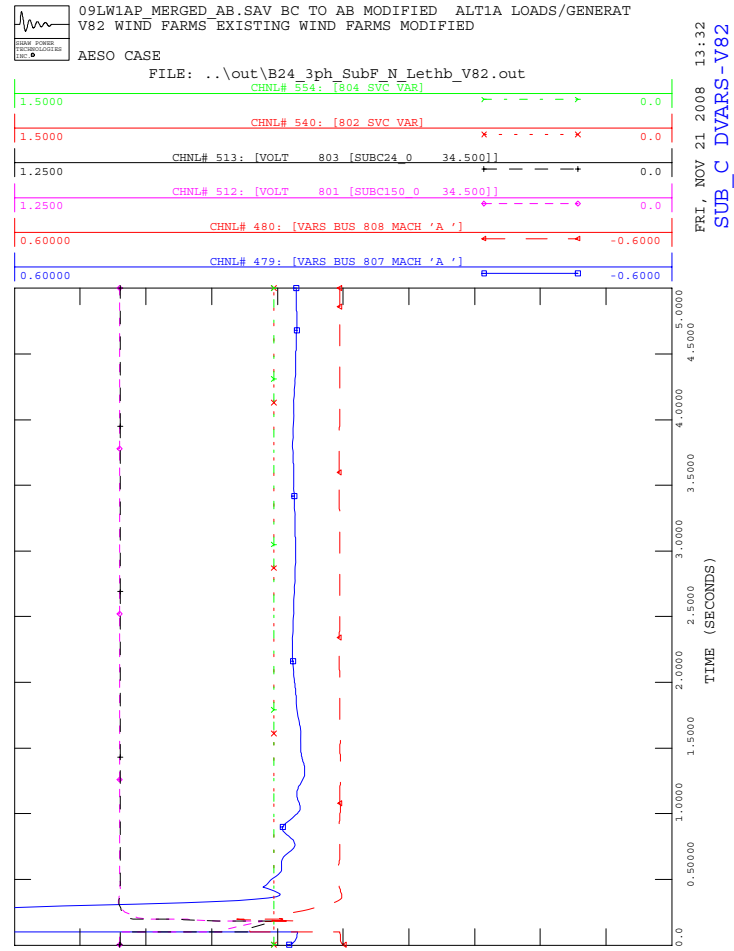


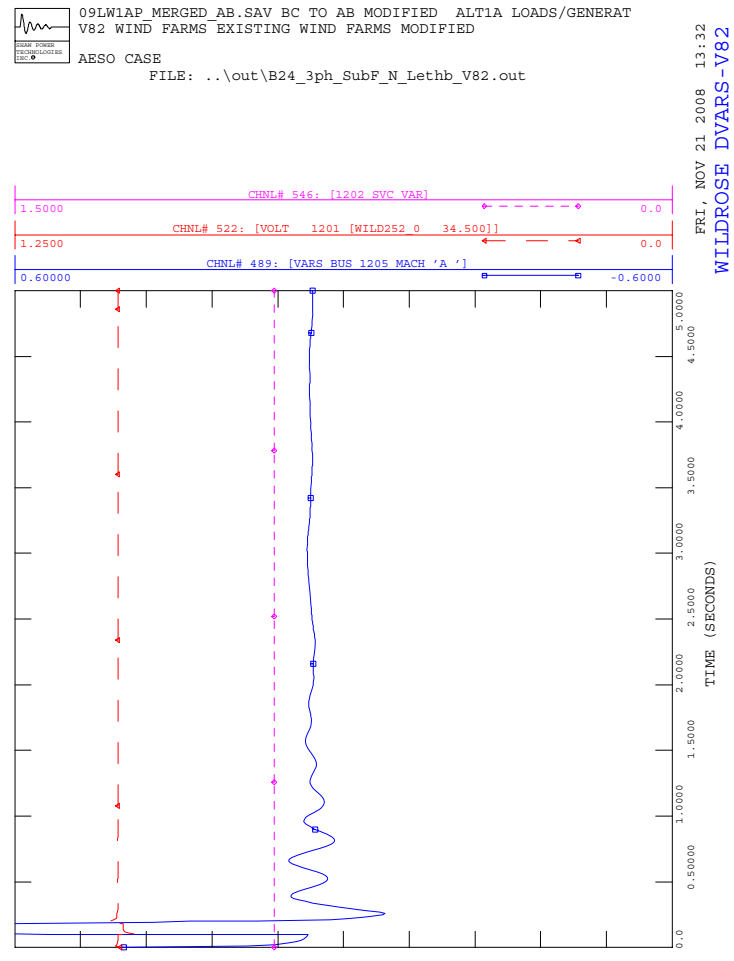
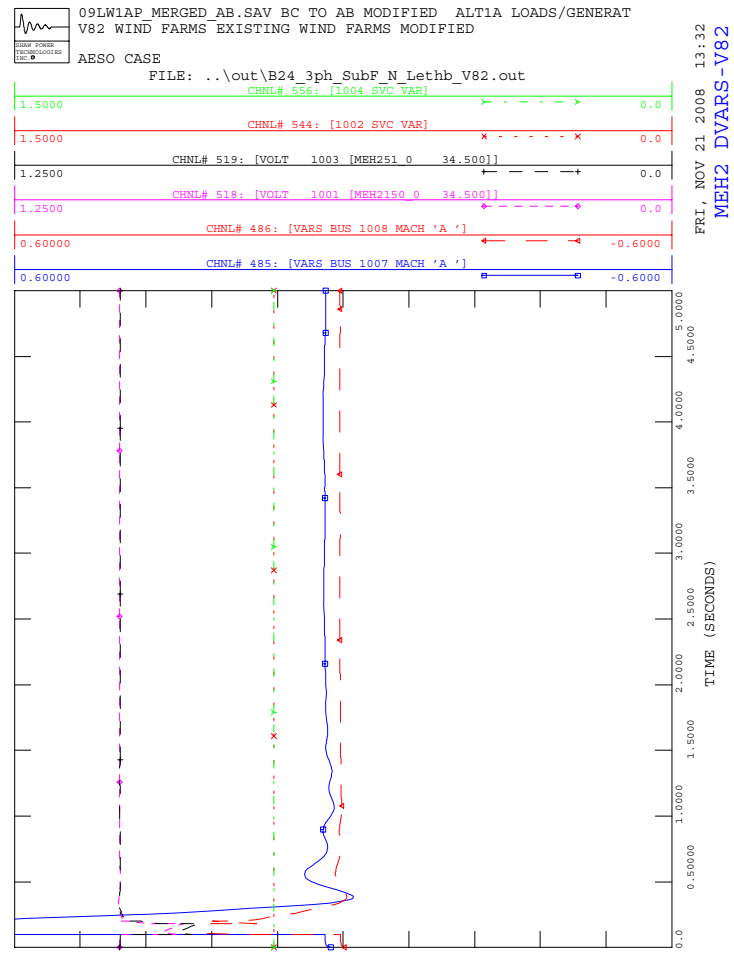
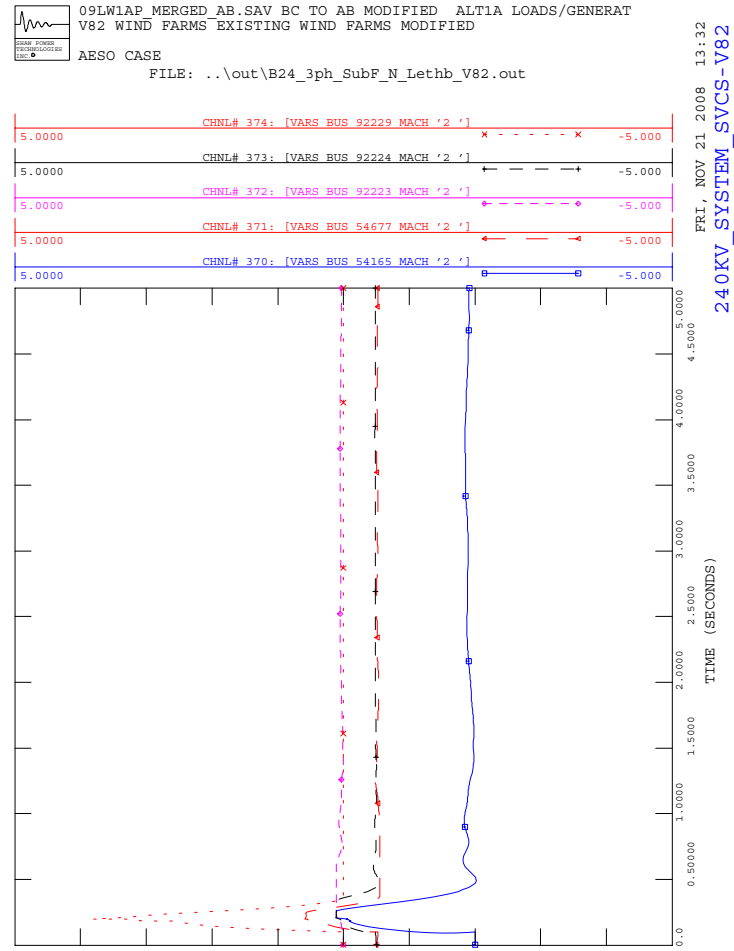
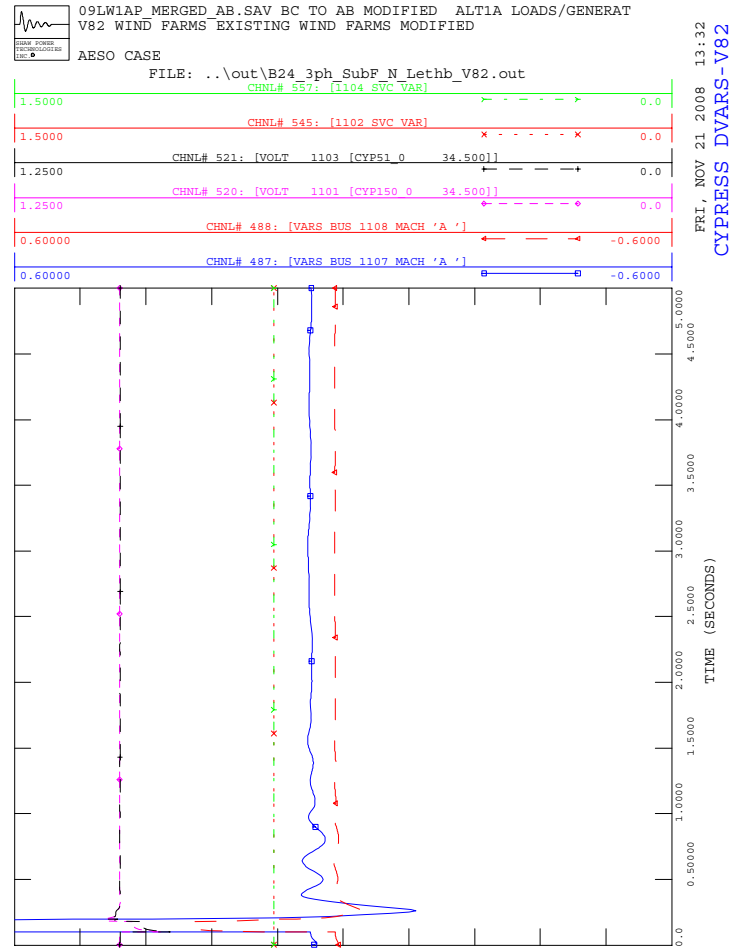








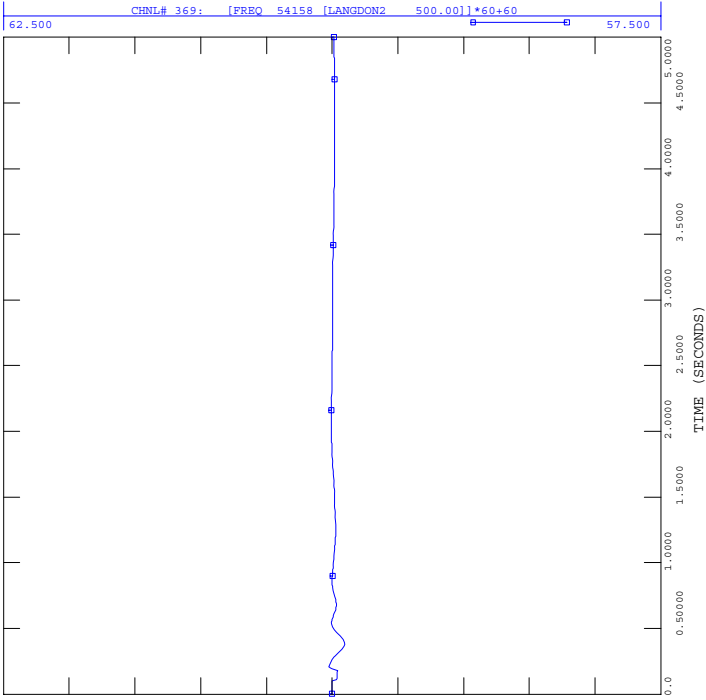






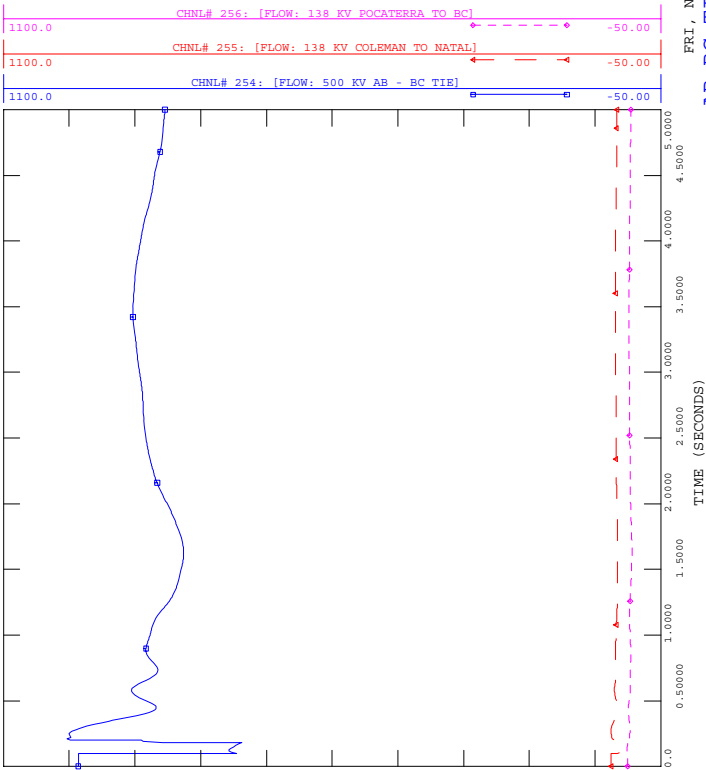
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B24_3ph_SubF_N_Lethb_V82.out

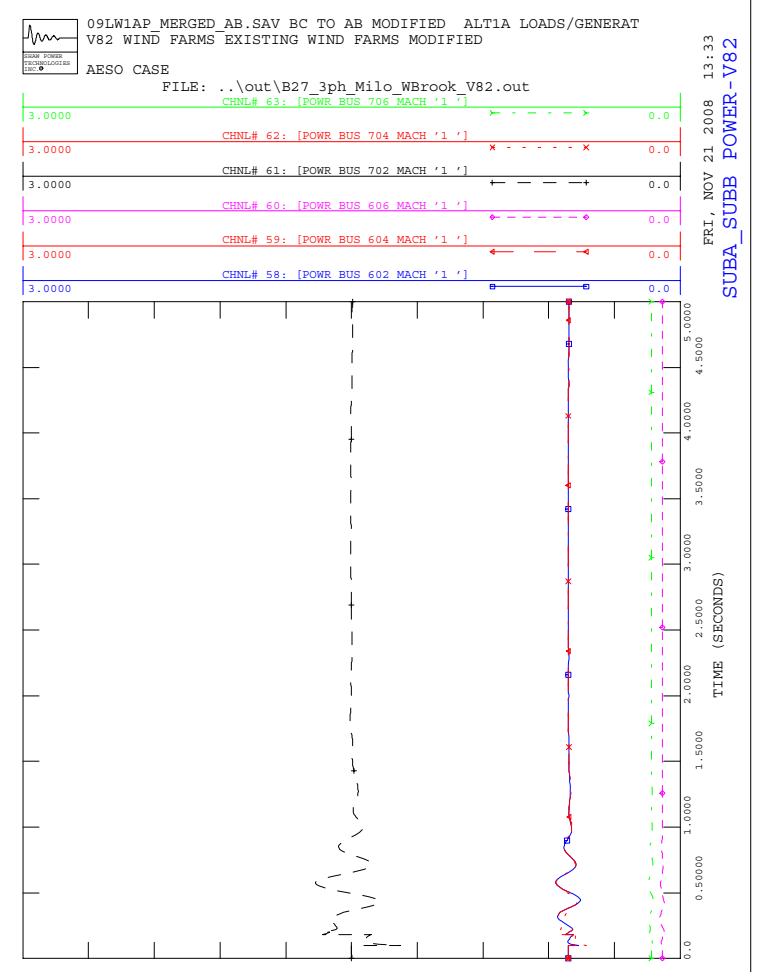
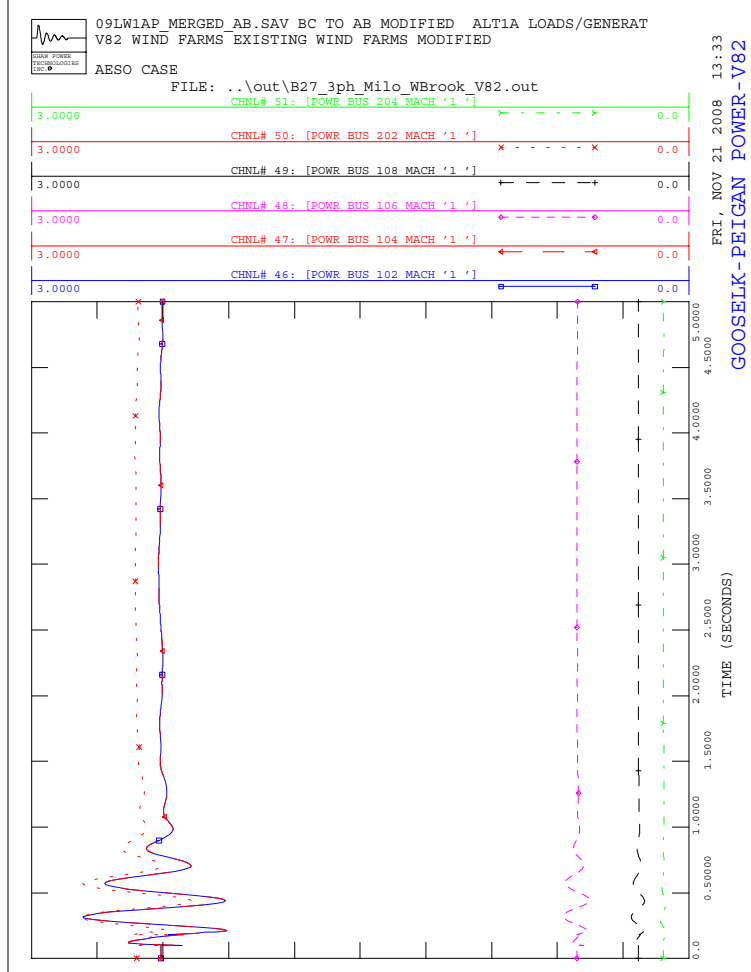
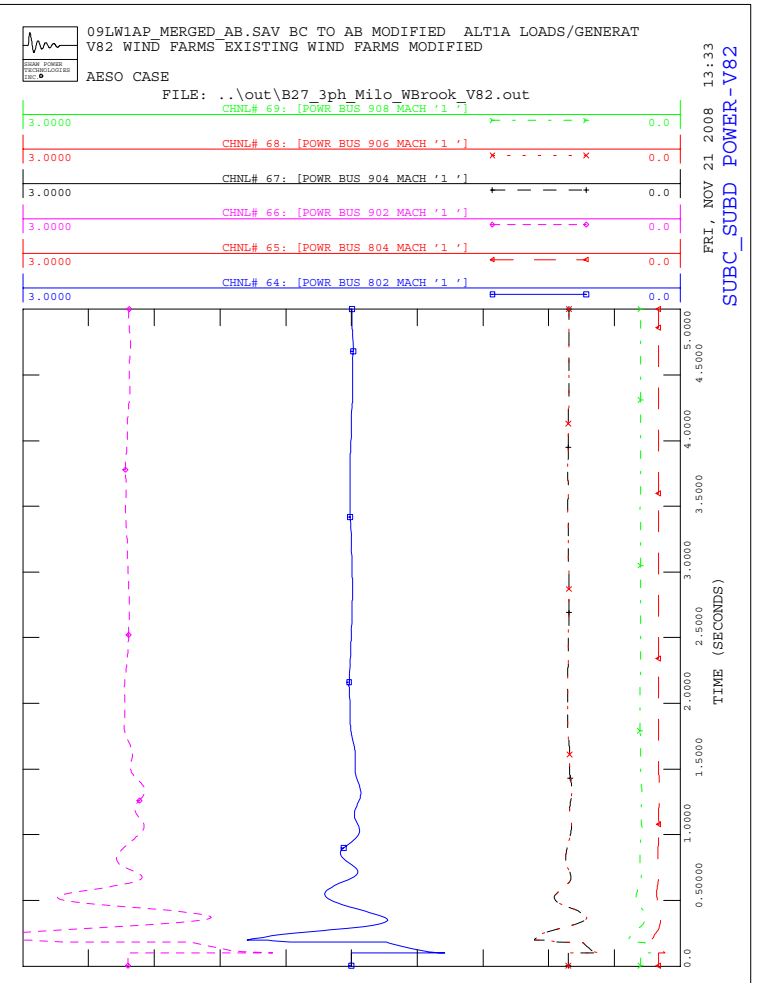
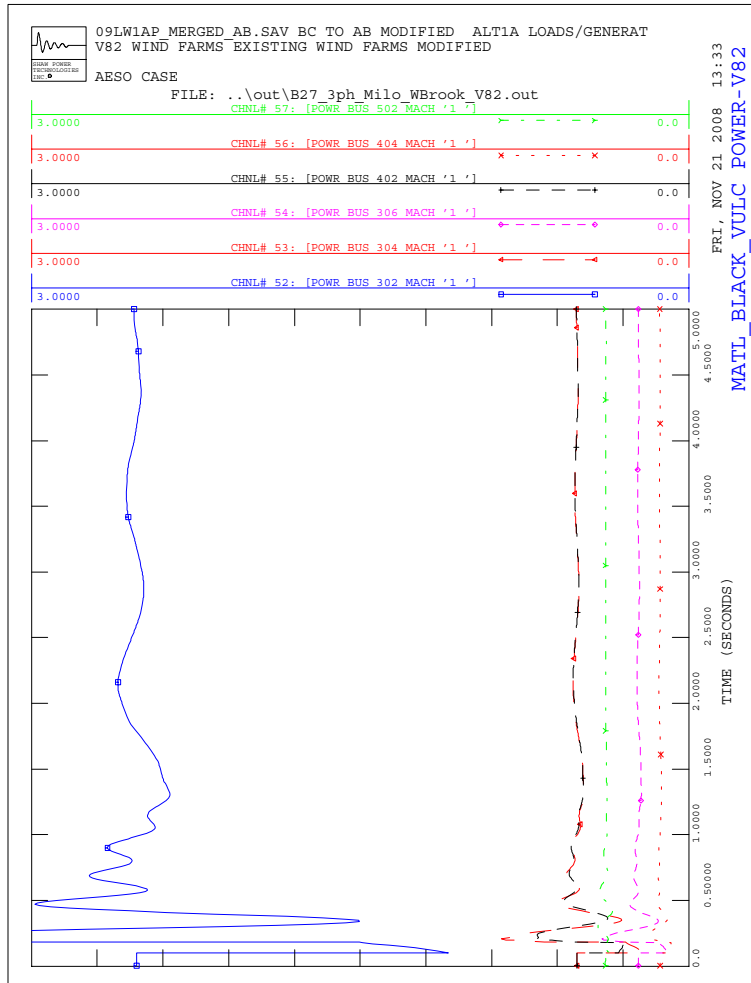
FRI, NOV 21 2008 13:32
LANGDON_FRQ-V82

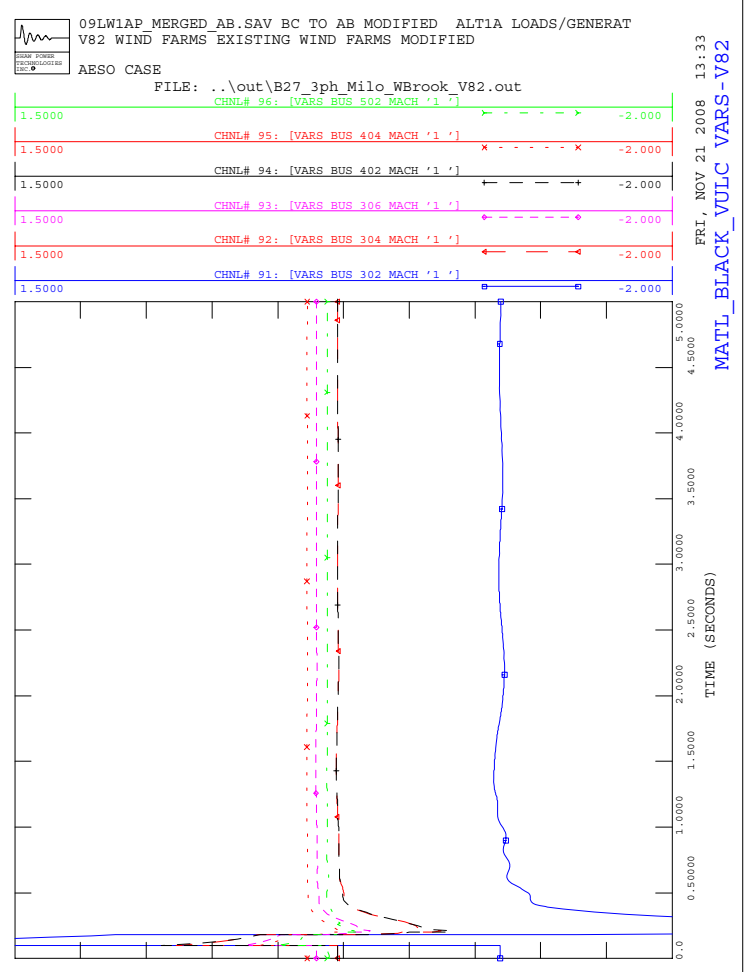
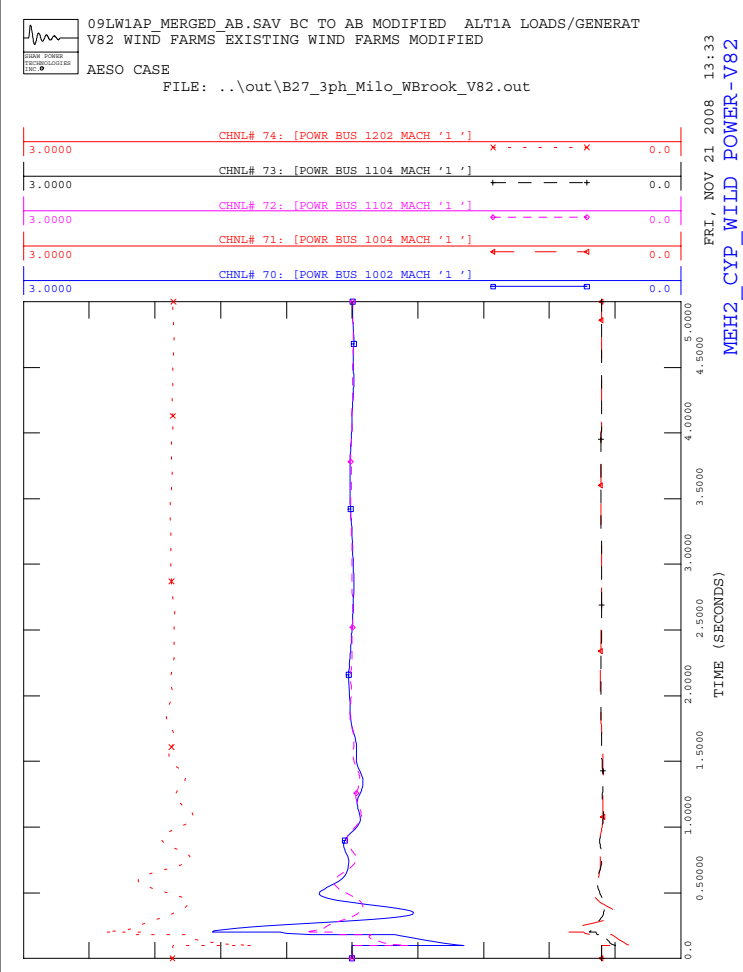
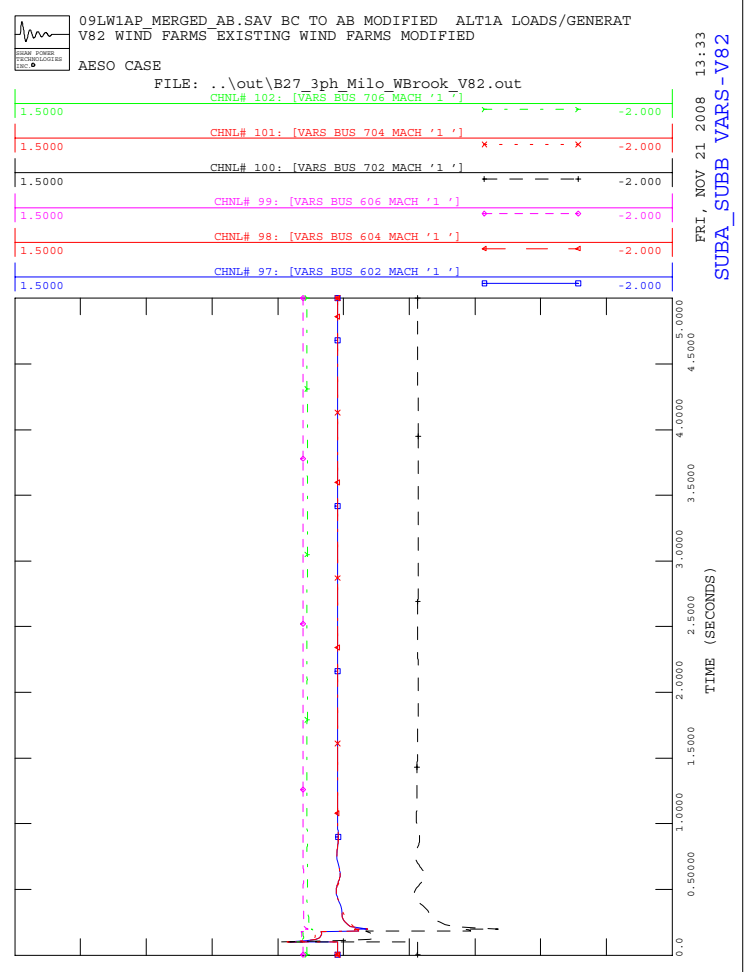
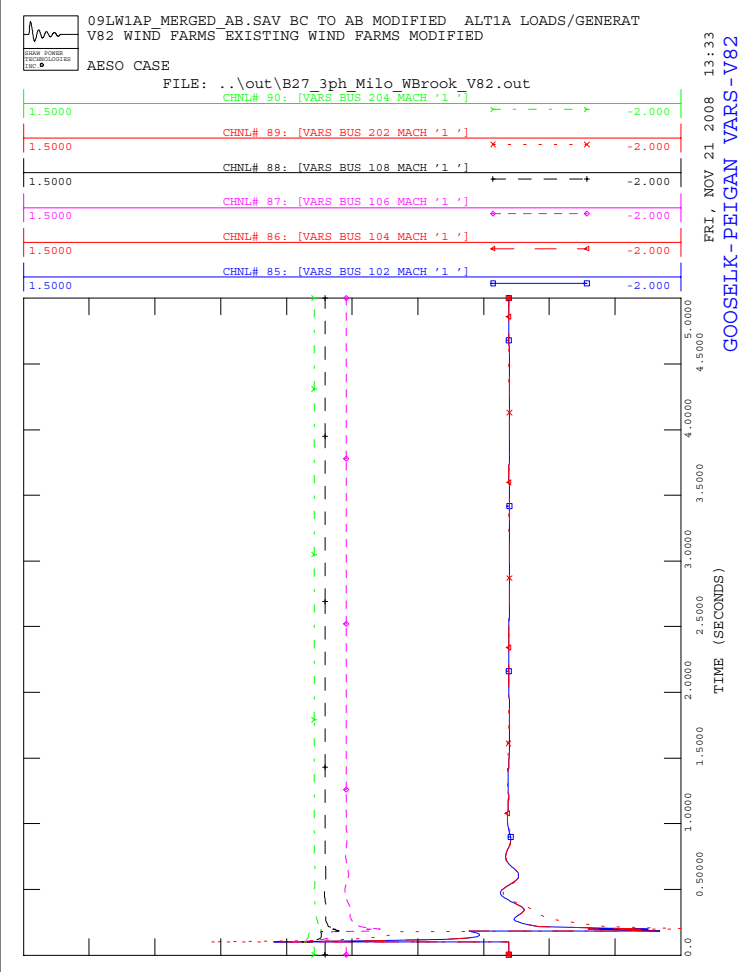


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B24_3ph_SubF_N_Lethb_V82.out

FRI, NOV 21 2008 13:32
AB_BC_TIE_FLOWS-V82

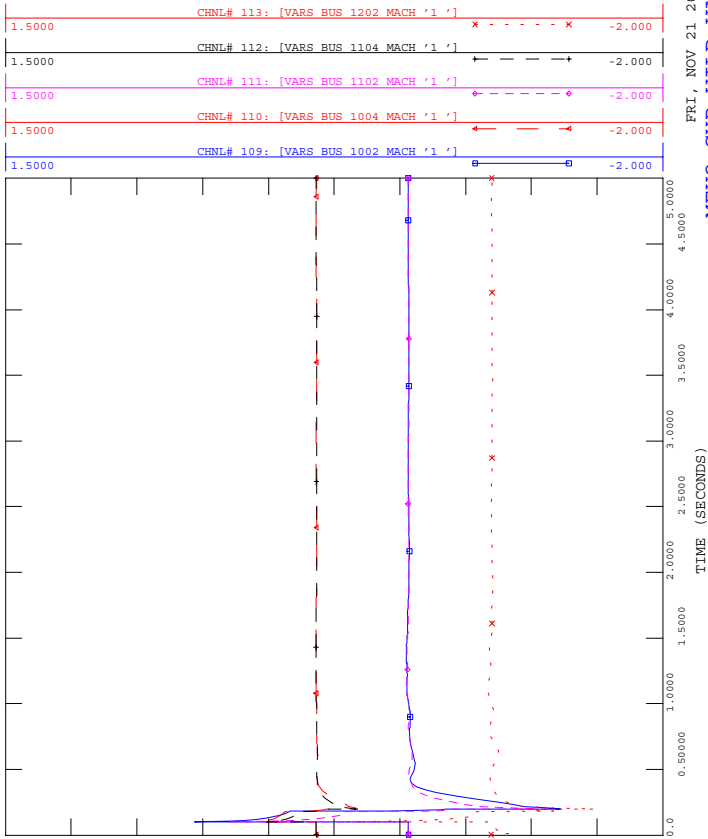






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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

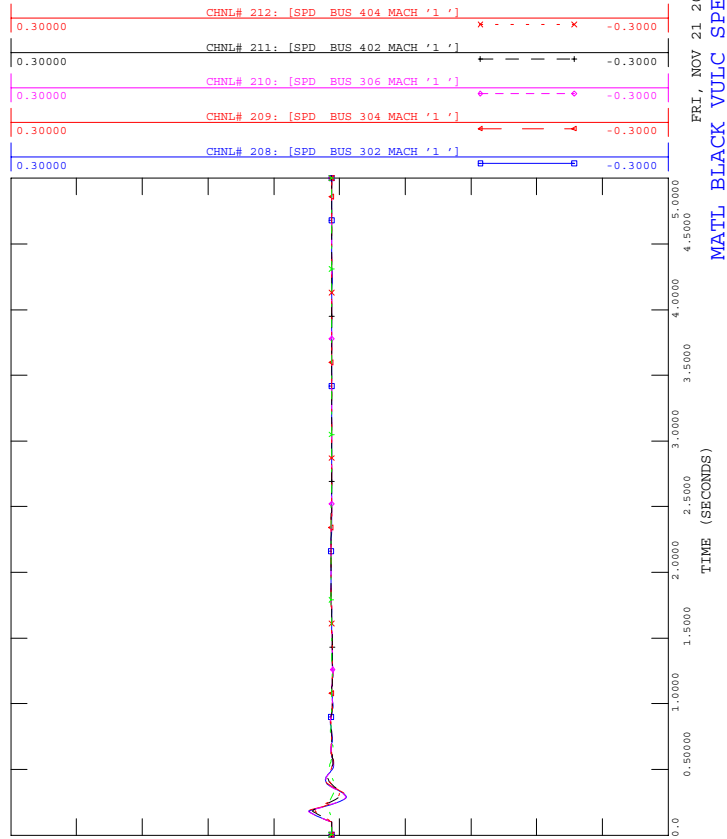
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FRI, NOV 21 2008 13:33

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

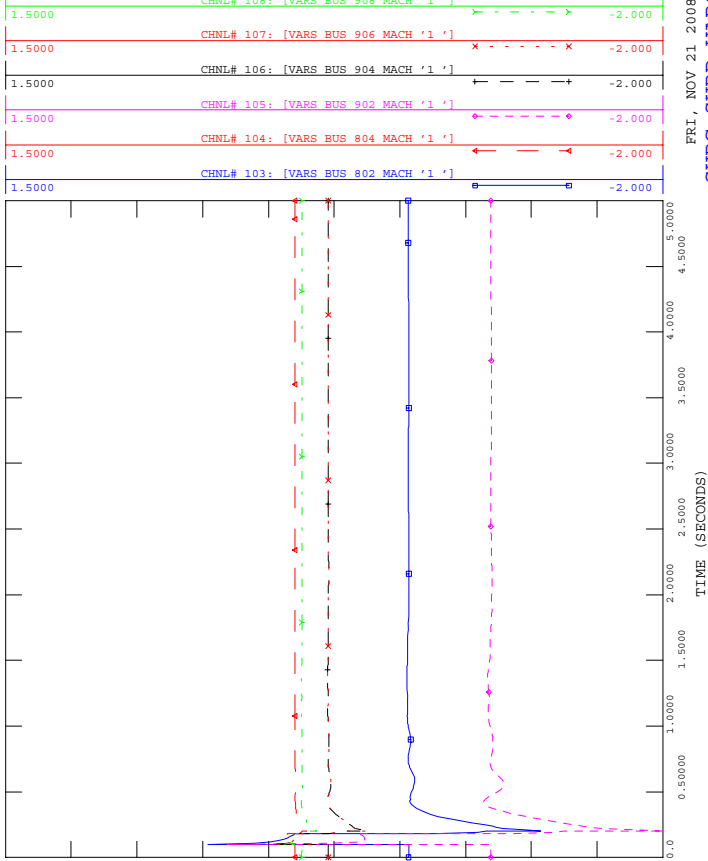
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FRI, NOV 21 2008 13:33

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

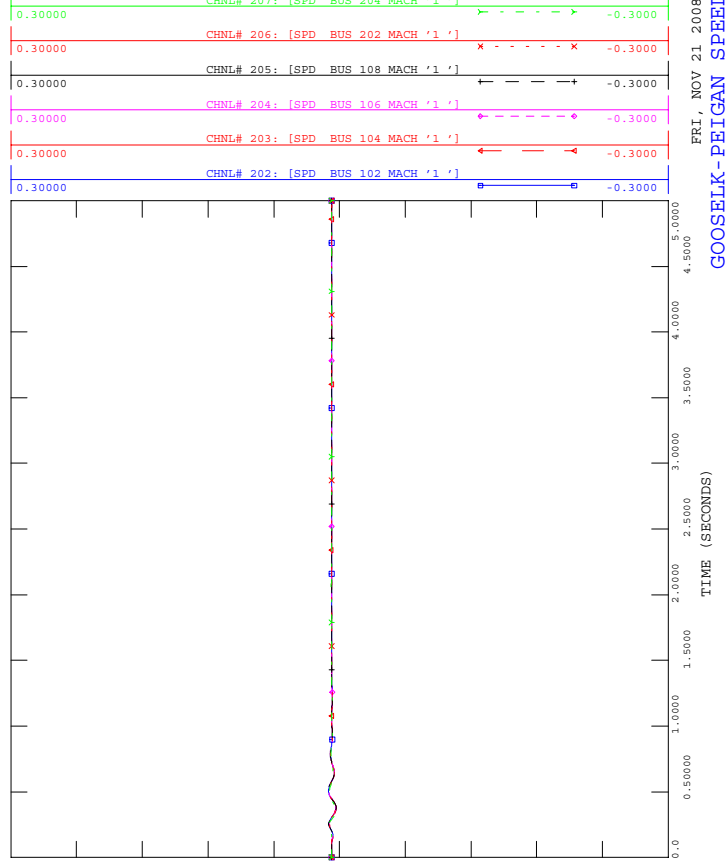
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FRI, NOV 21 2008 13:33

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

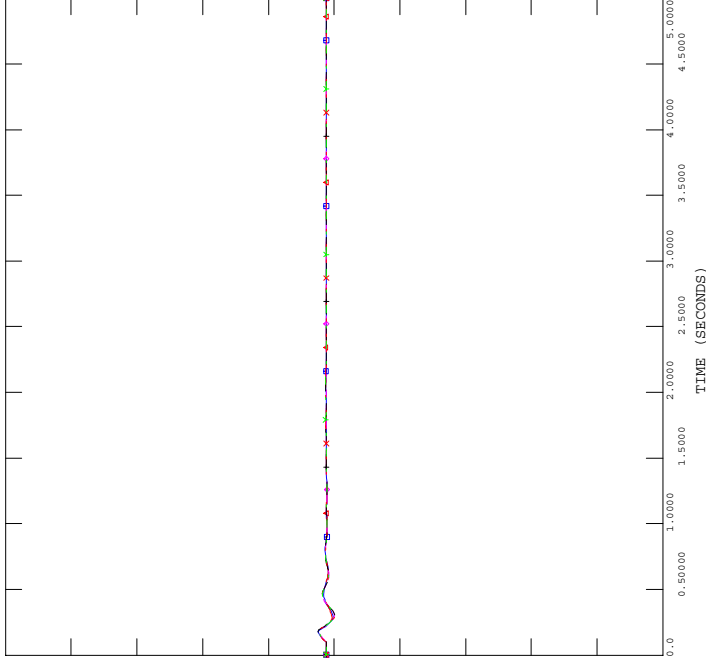
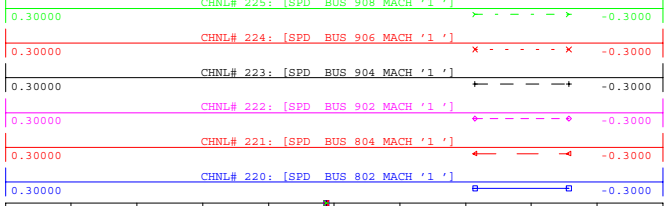
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FRI, NOV 21 2008 13:33

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

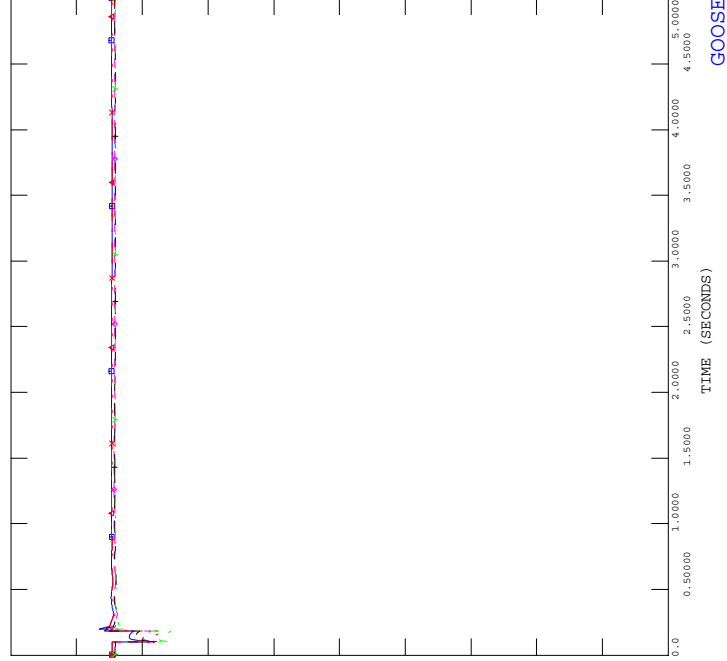
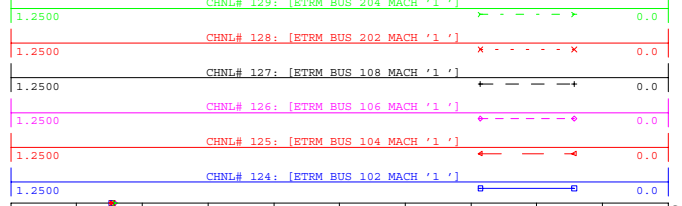
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FRI, NOV 21 2008 13:33
SUBC_SPEED-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

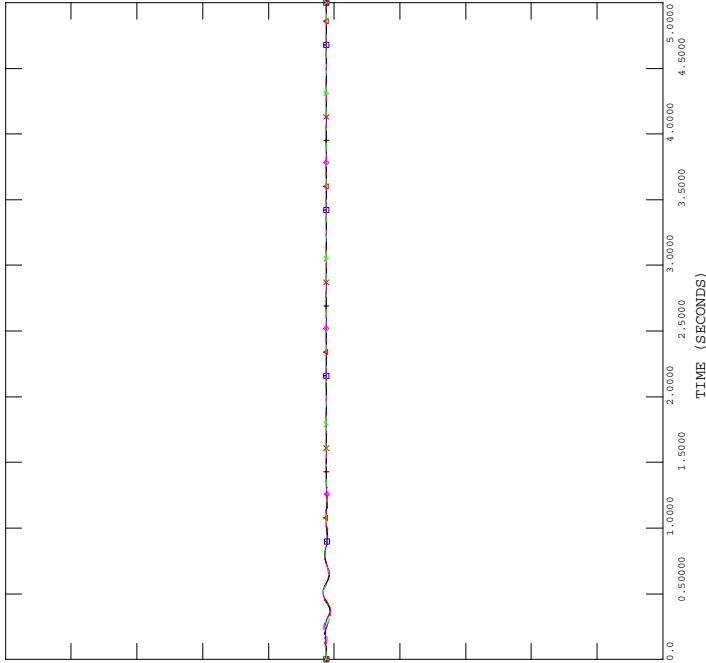
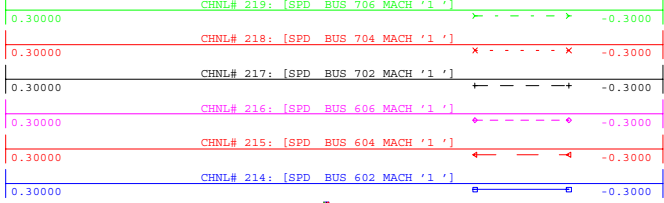
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FRI, NOV 21 2008 13:33
GOOSELK-PEIGAN ETERM-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

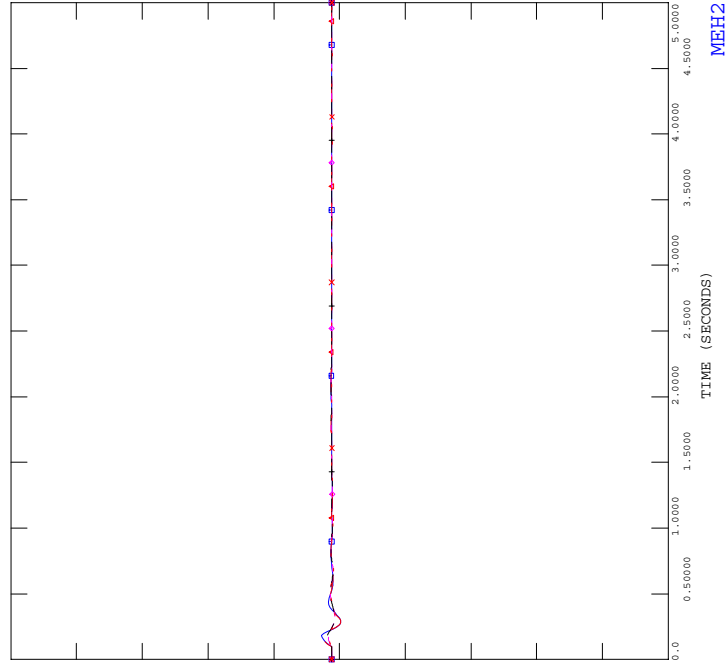
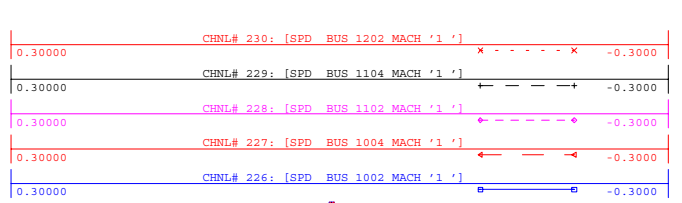
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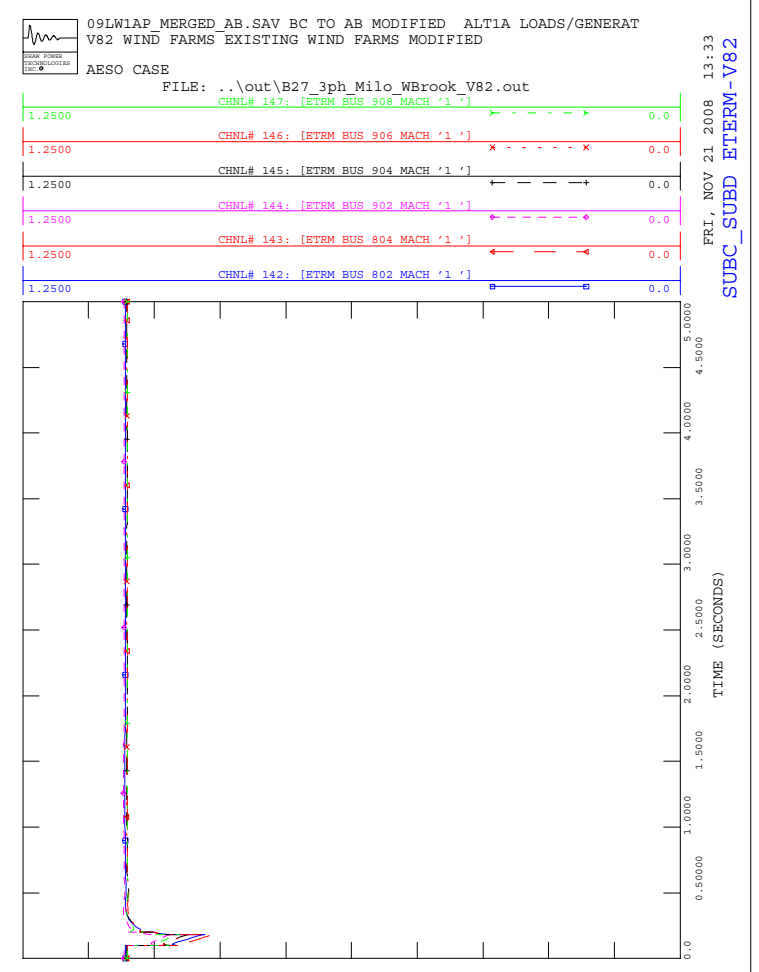
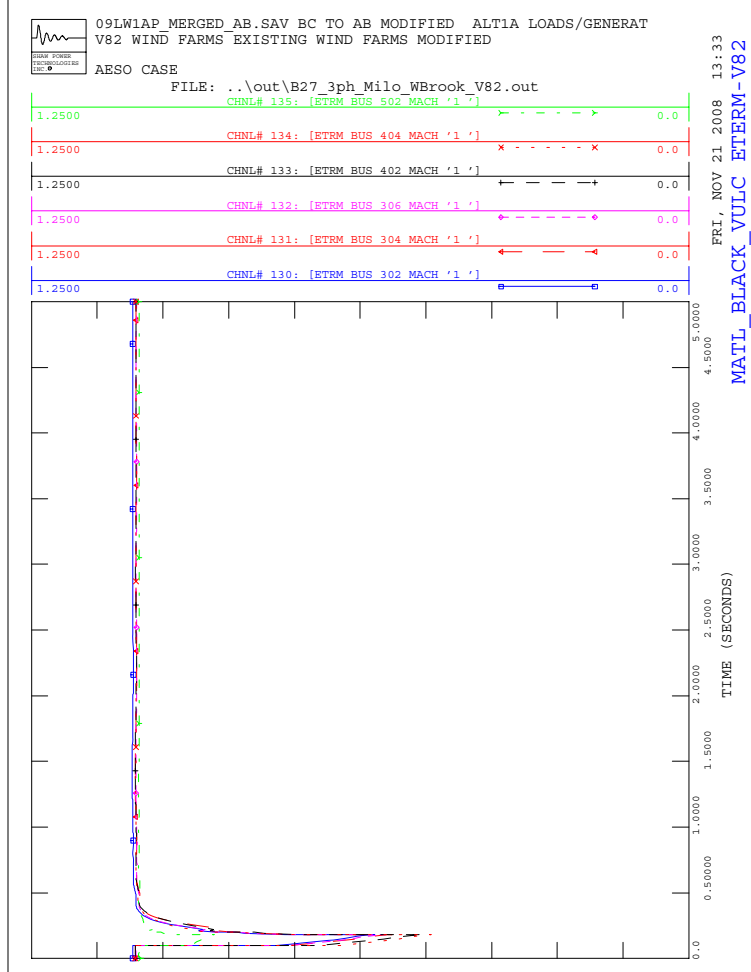
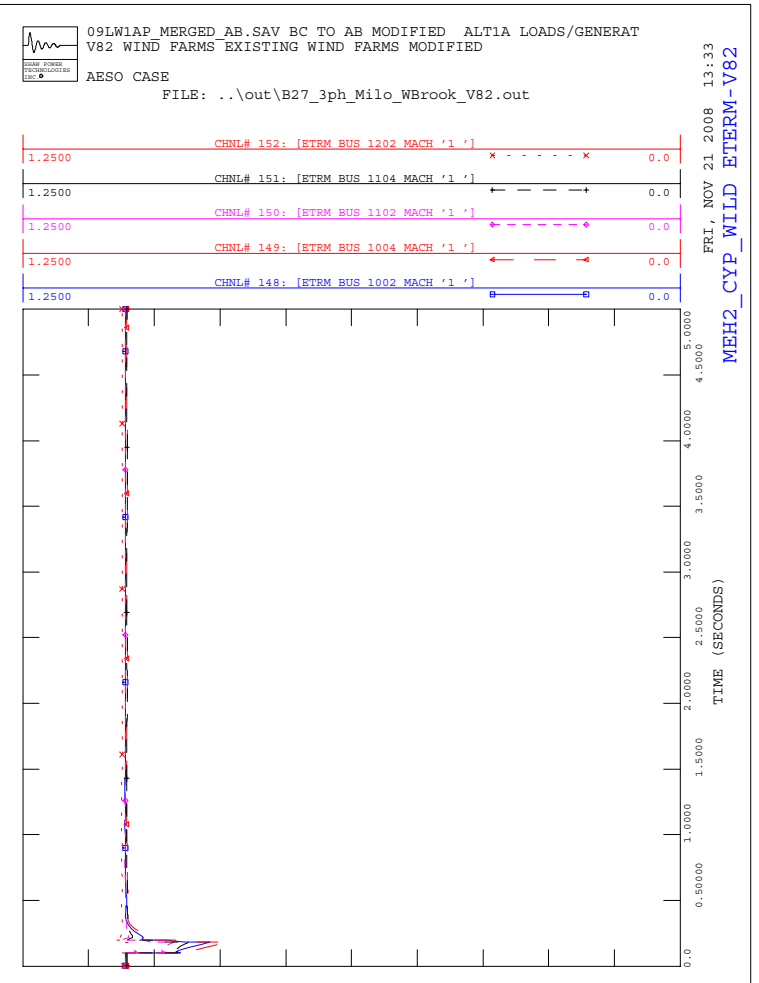
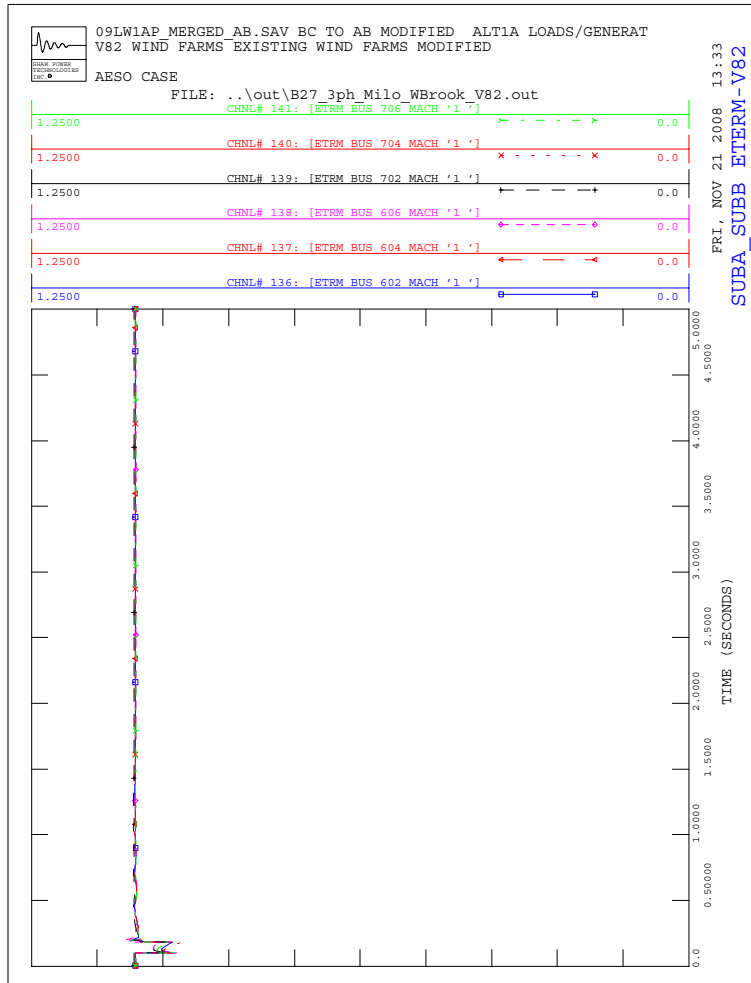
FRI, NOV 21 2008 13:33
SUBA_SPEED-V82

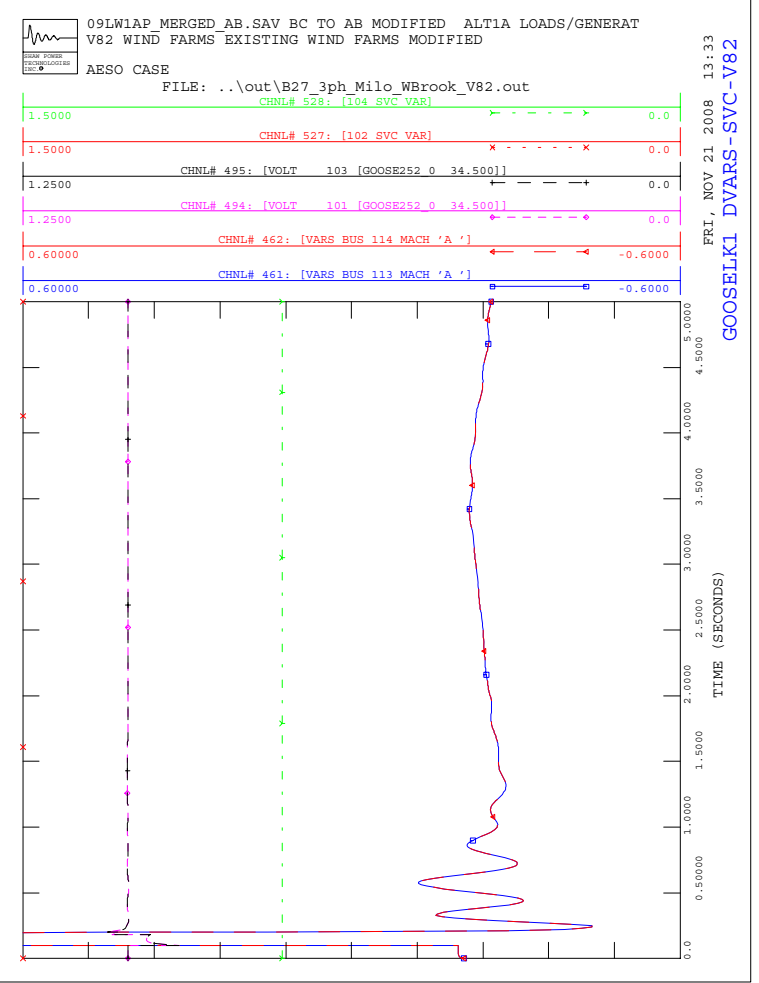
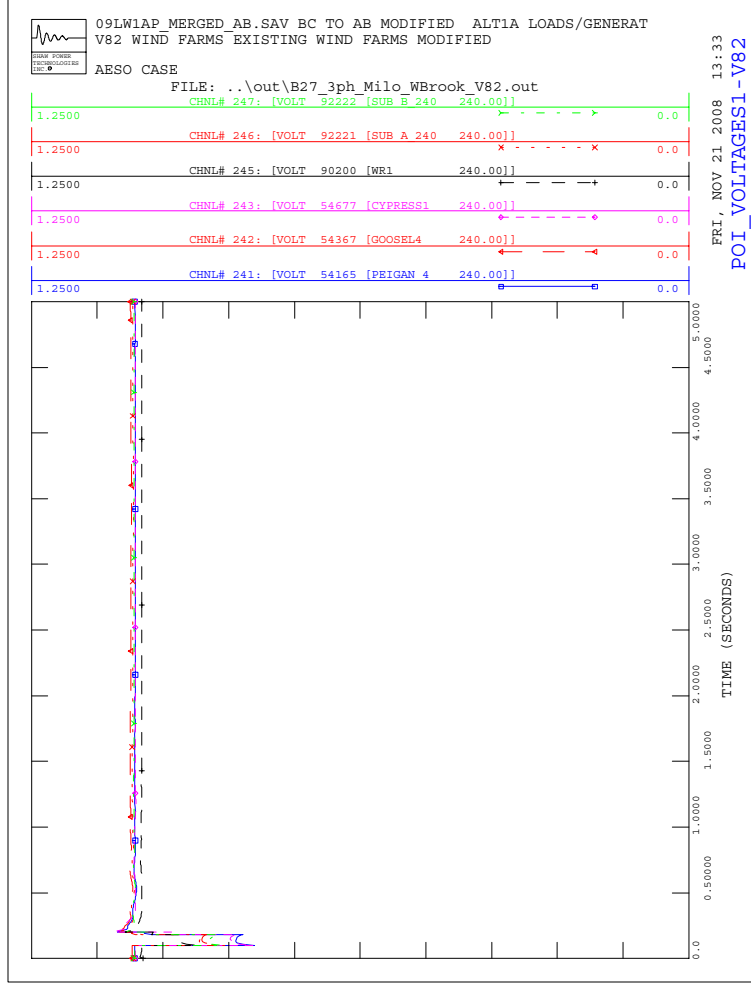
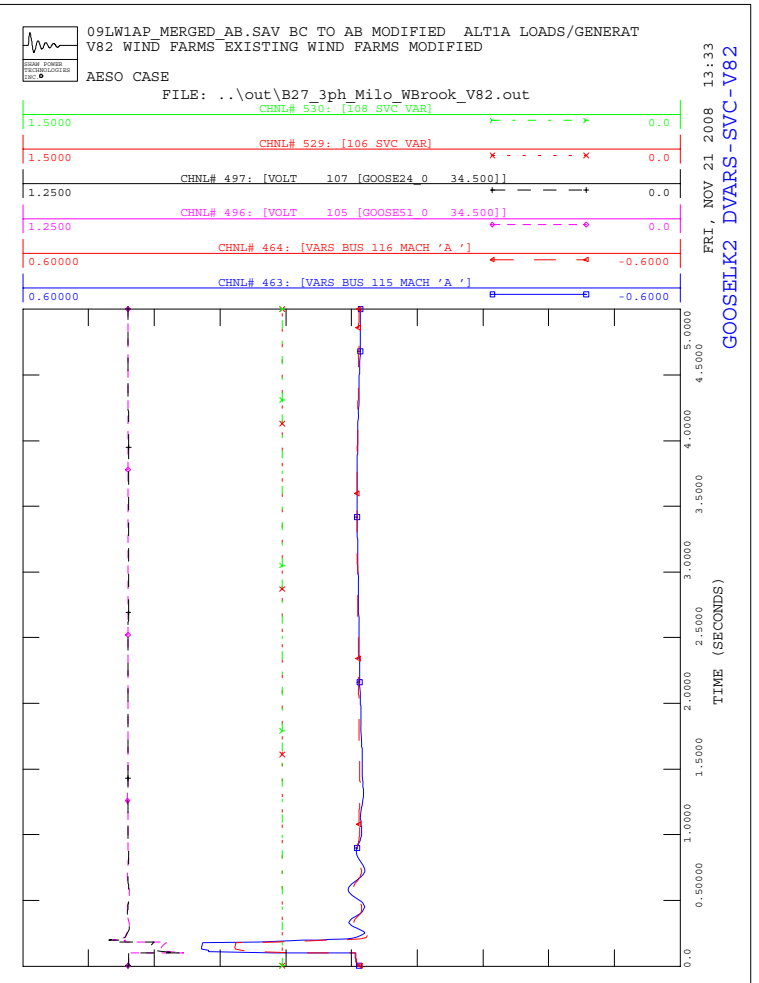
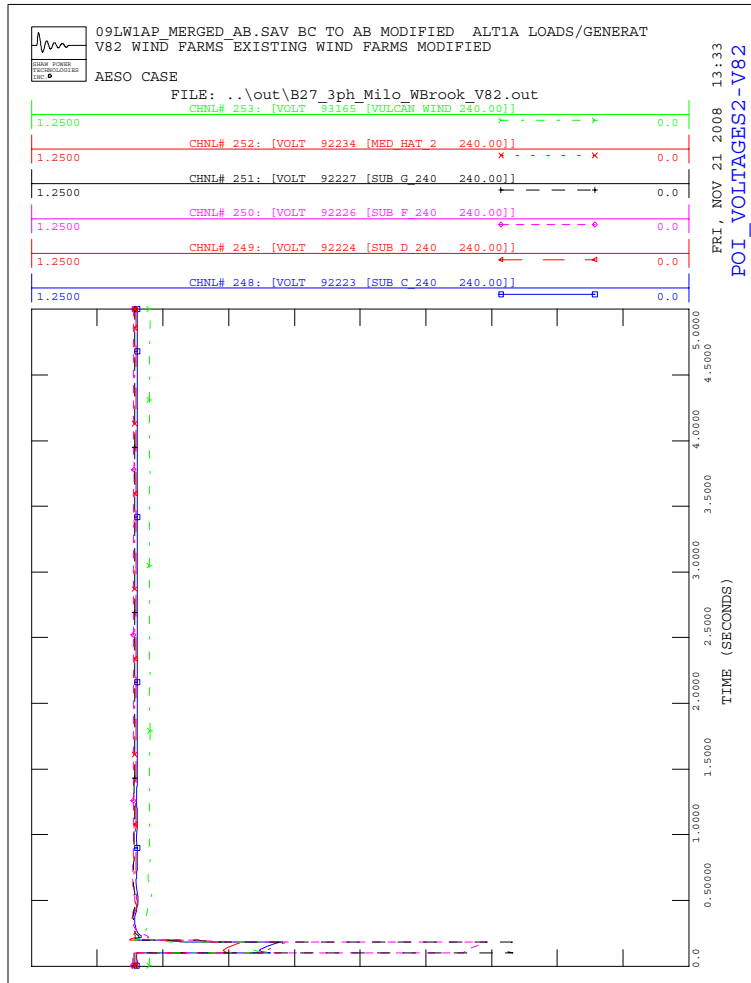
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\B27_3ph_Milo_WBrook_V82.out



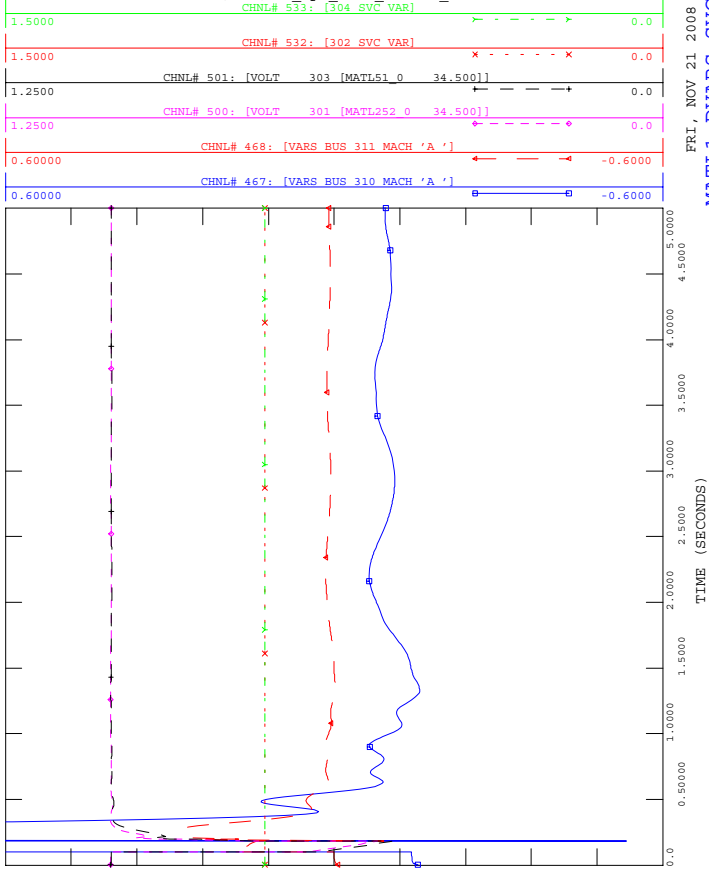
FRI, NOV 21 2008 13:33
MEH2_CYP_WILD_SPEED-V82





09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

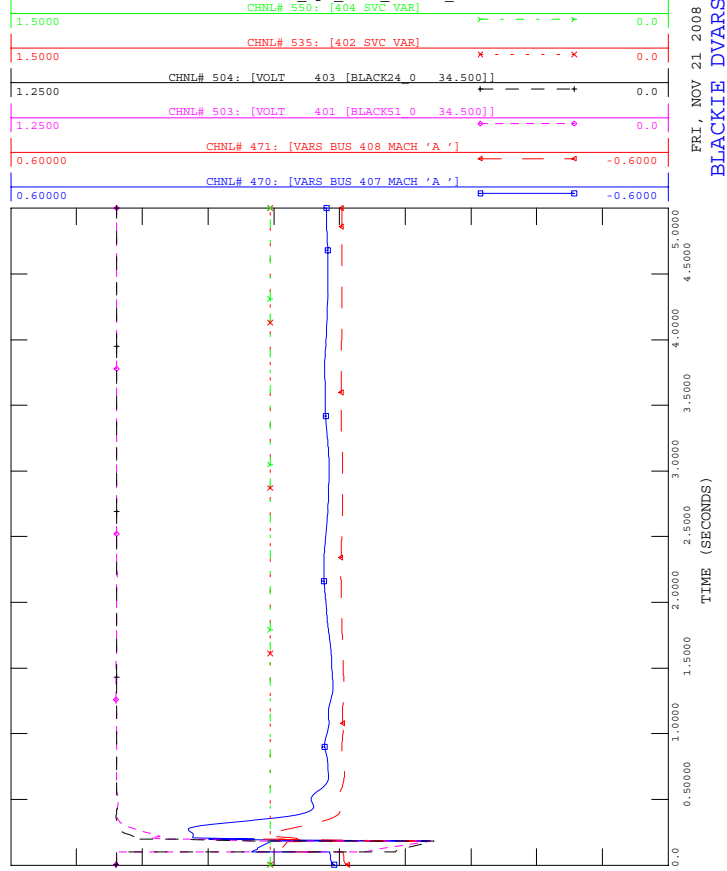
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FRI, NOV 21 2008 13:33
 MATL1 DVARS-SVC-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

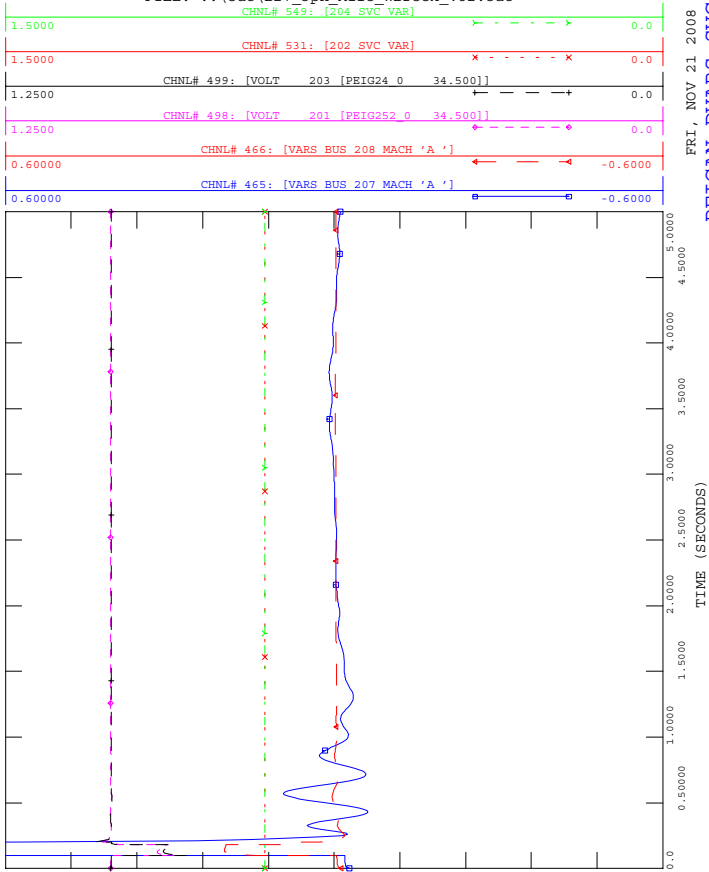
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FRI, NOV 21 2008 13:33
 BLACKIE DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

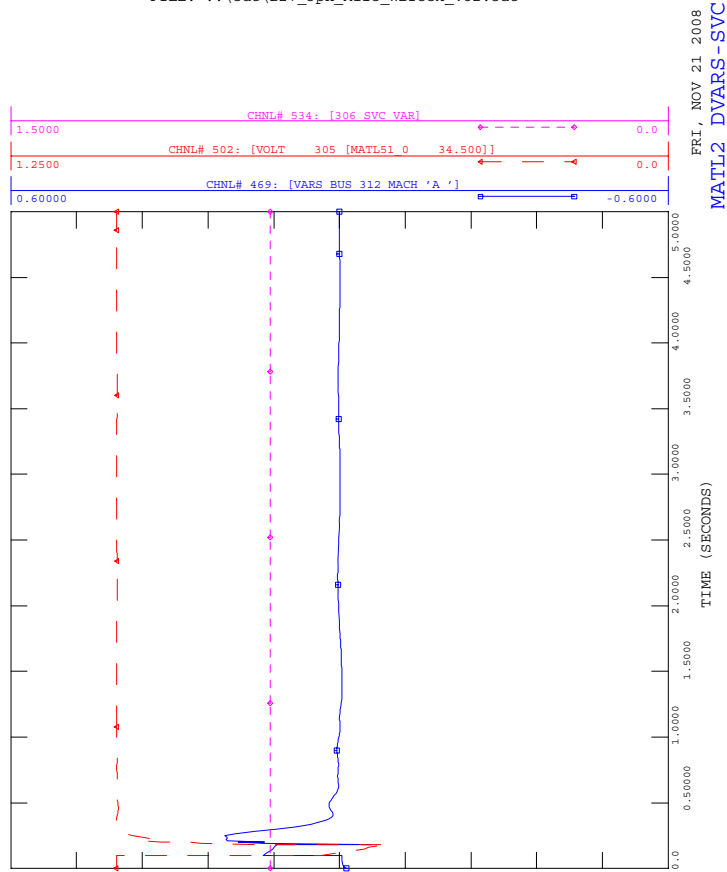
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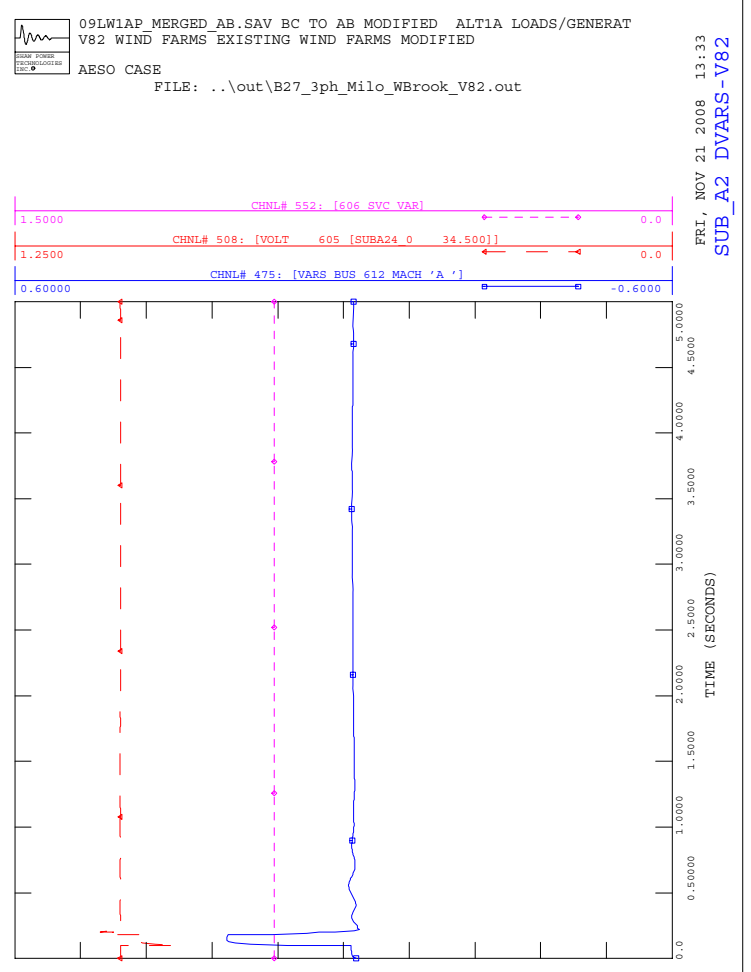
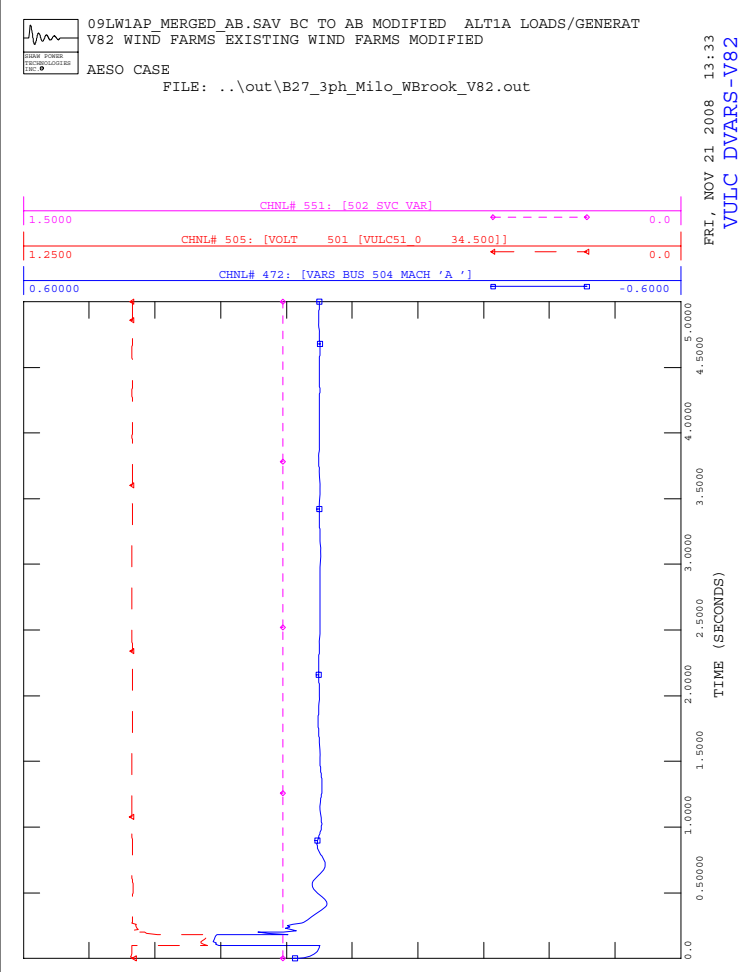
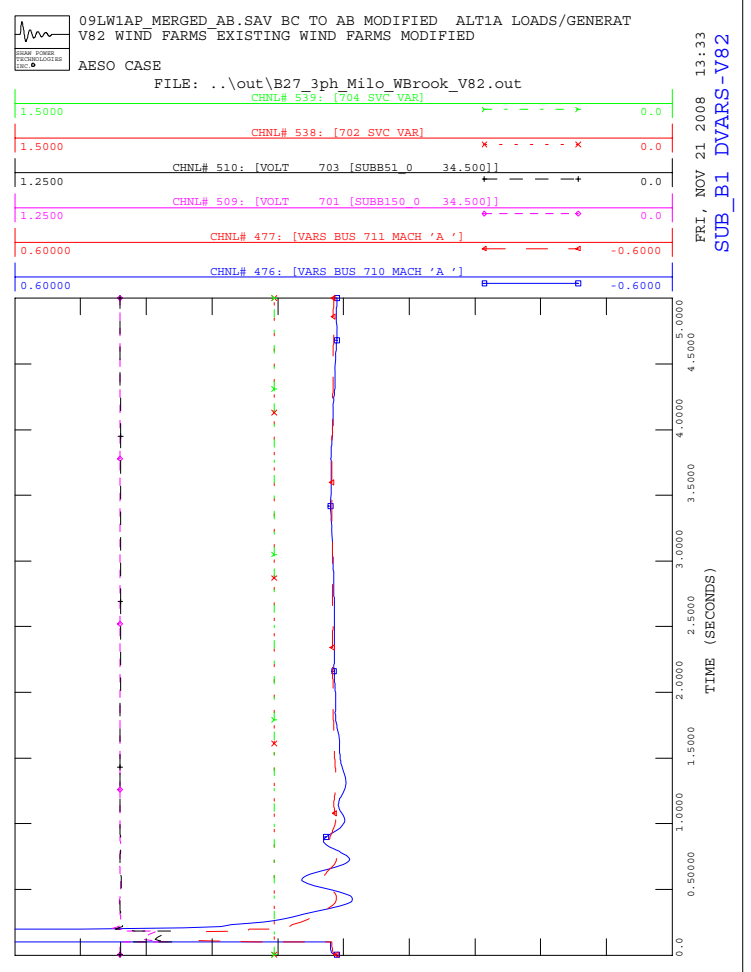
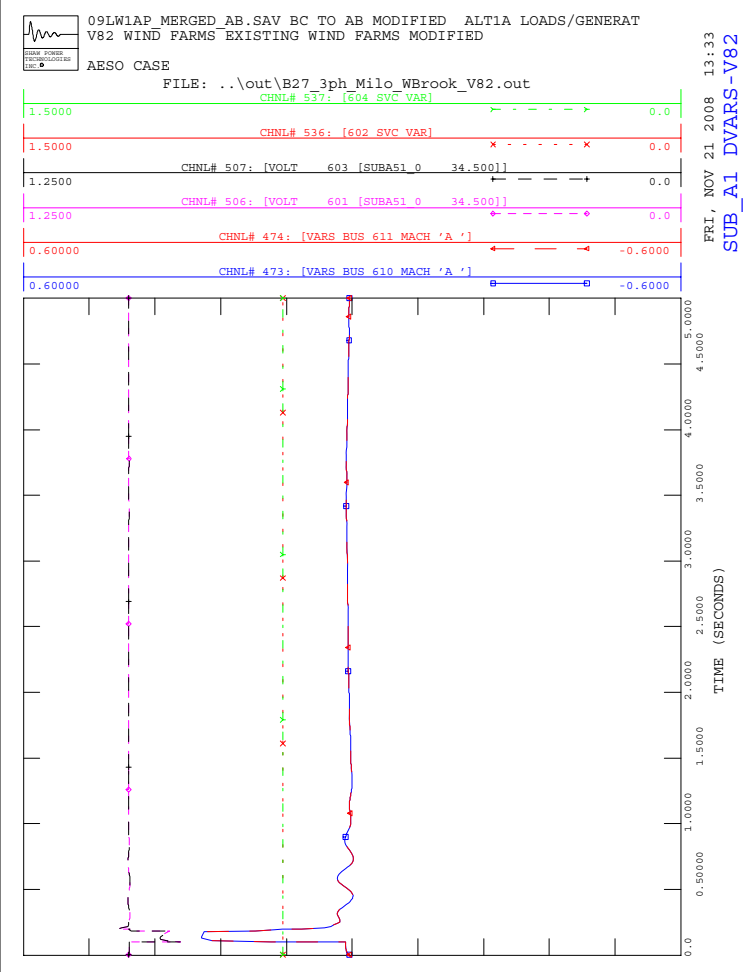
FRI, NOV 21 2008 13:33
 PEIGAN DVARS-SVC-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

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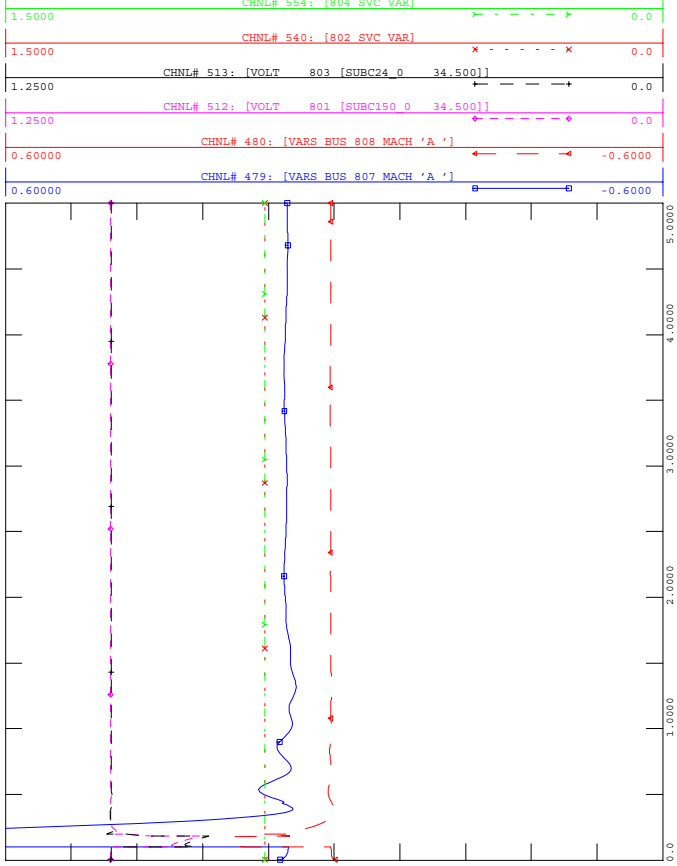


FRI, NOV 21 2008 13:33
 MATL2 DVARS-SVC-V82



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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

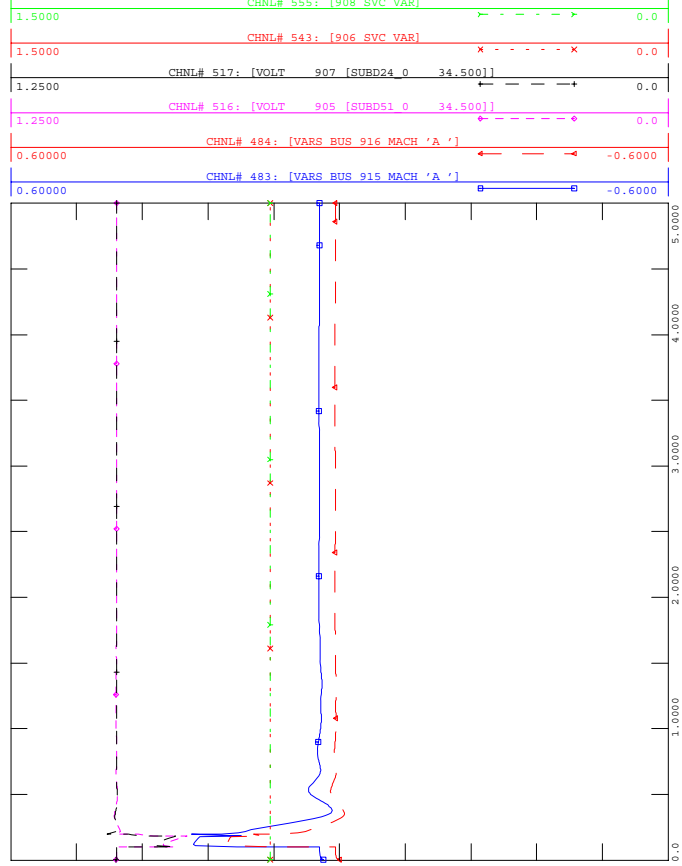
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FRI, NOV 21 2008 13:33
 SUB_C DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

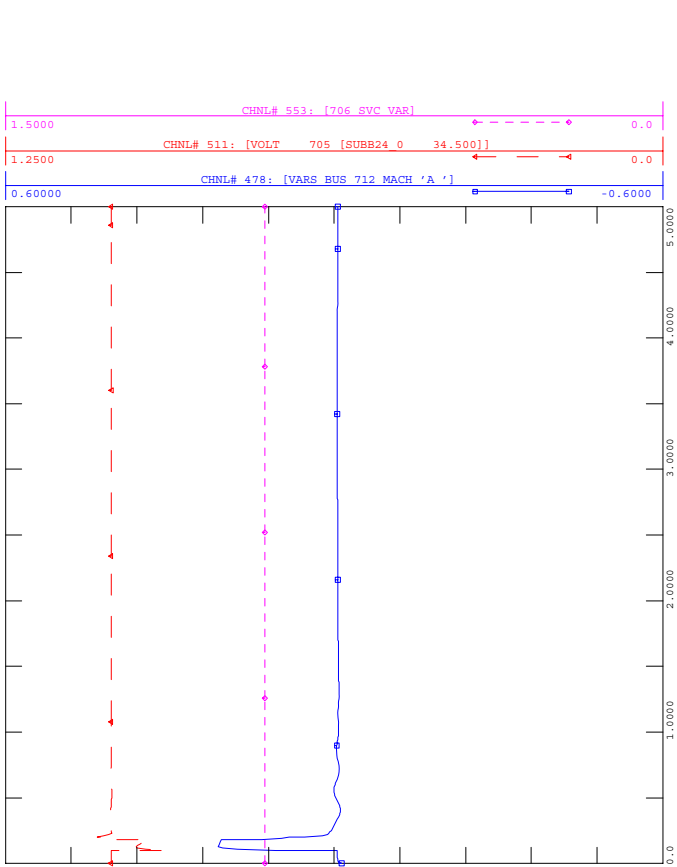
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FRI, NOV 21 2008 13:33
 SUB_D2 DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

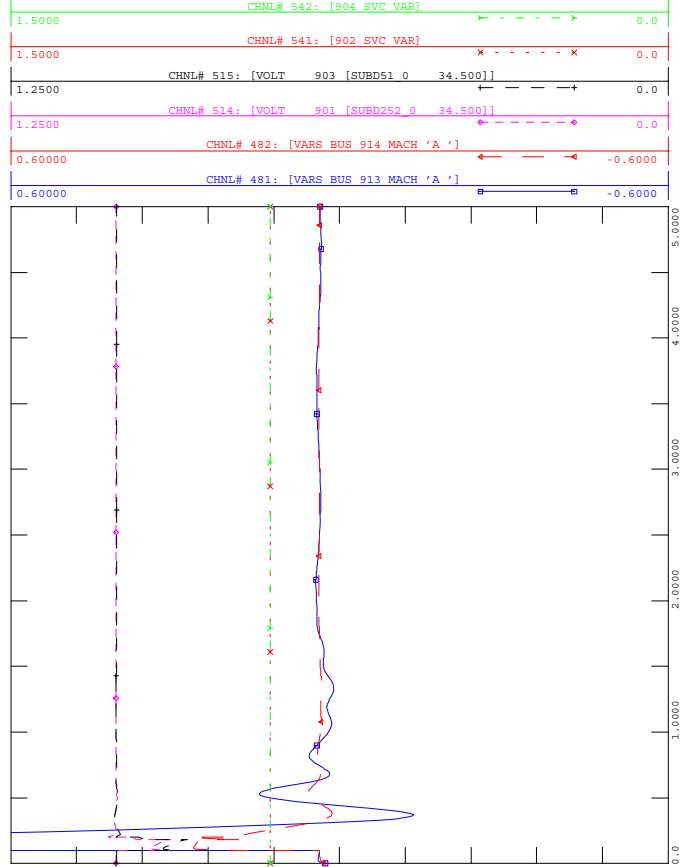
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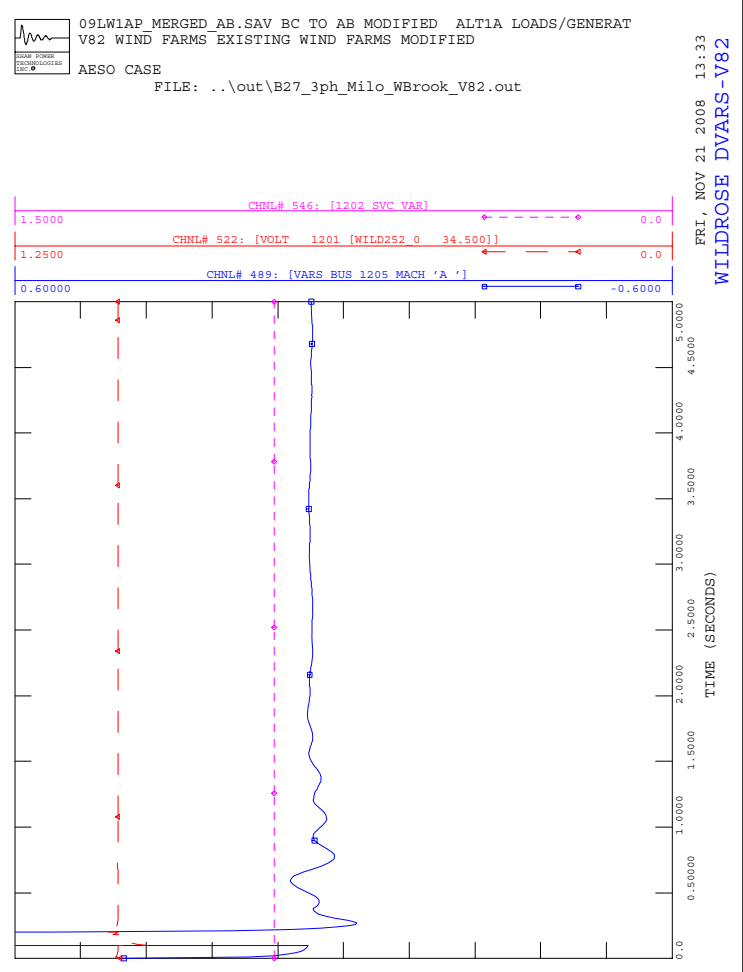
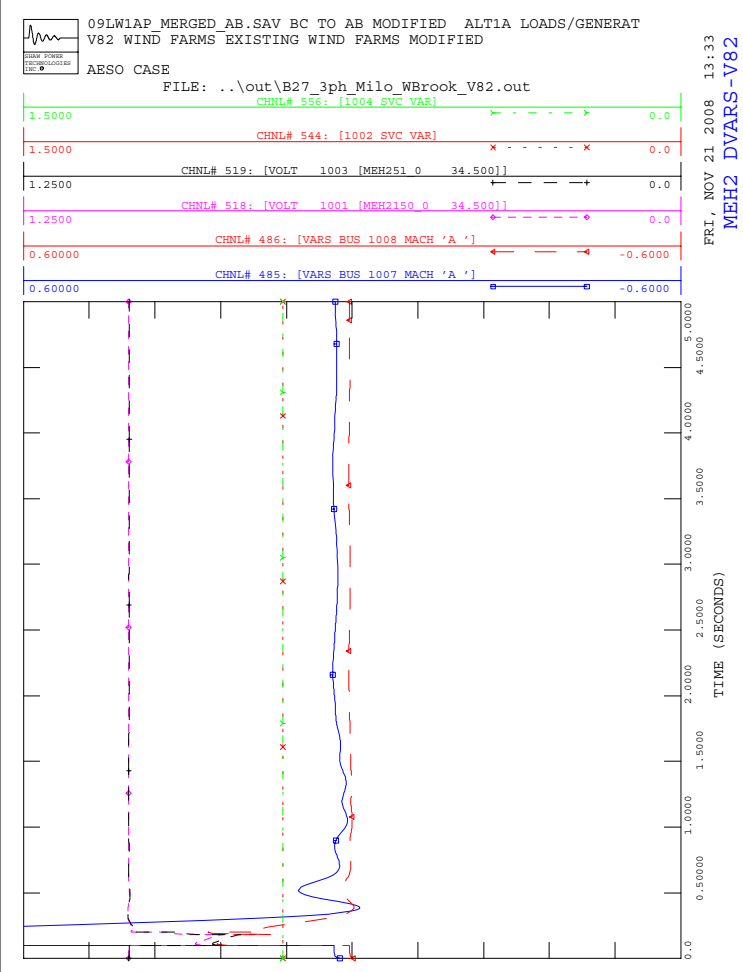
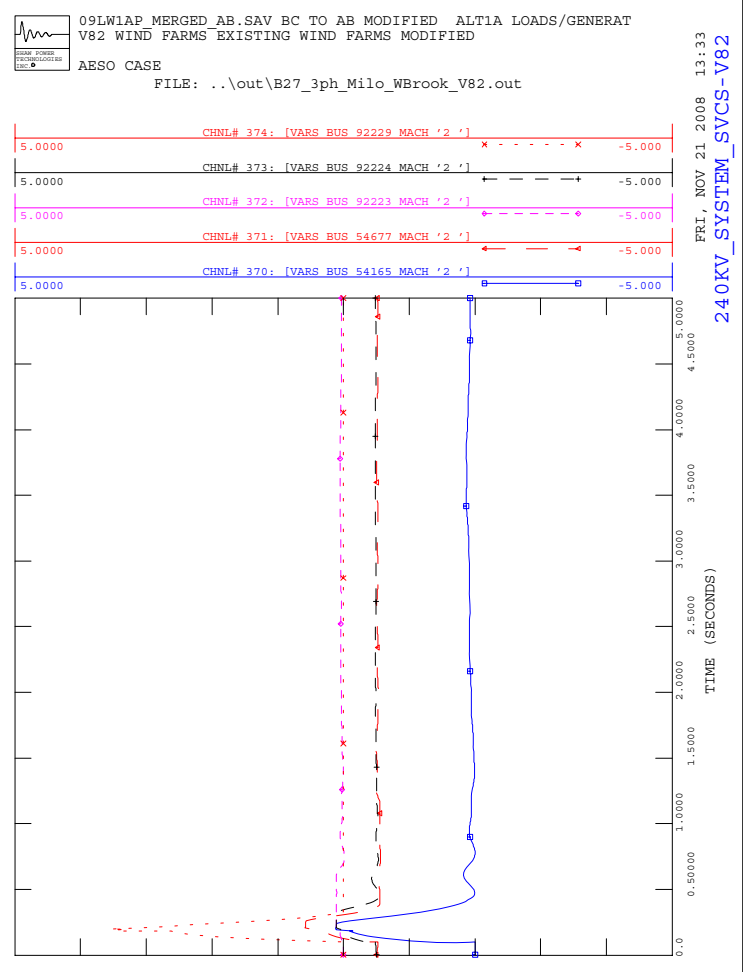
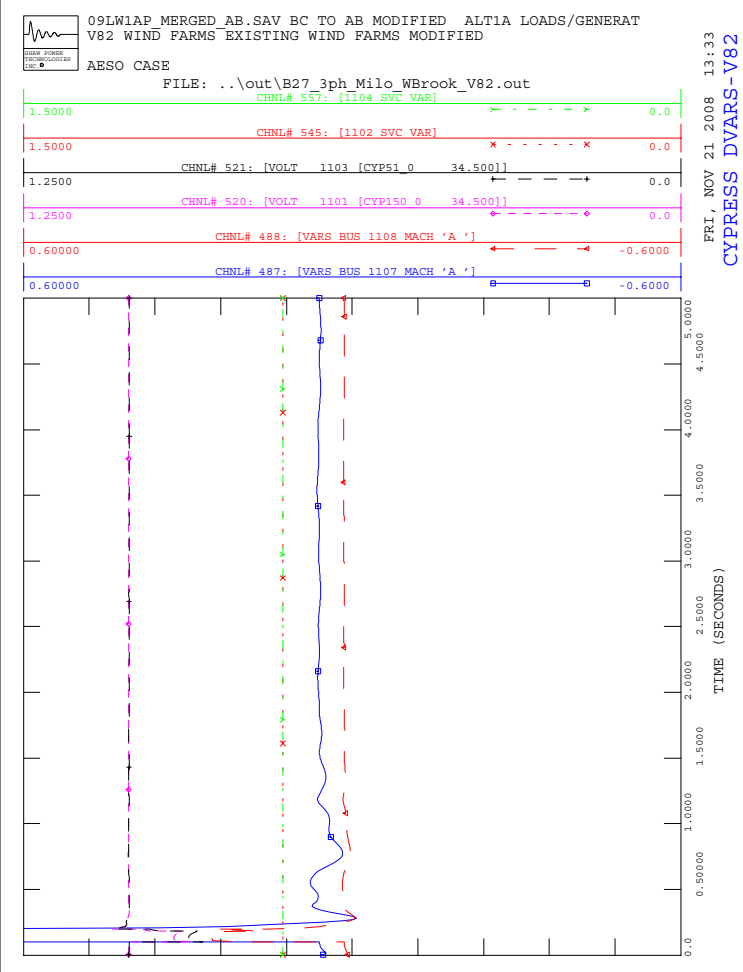
FRI, NOV 21 2008 13:33
 SUB_B2 DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

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FRI, NOV 21 2008 13:33
 SUB_D1 DVARS-V82



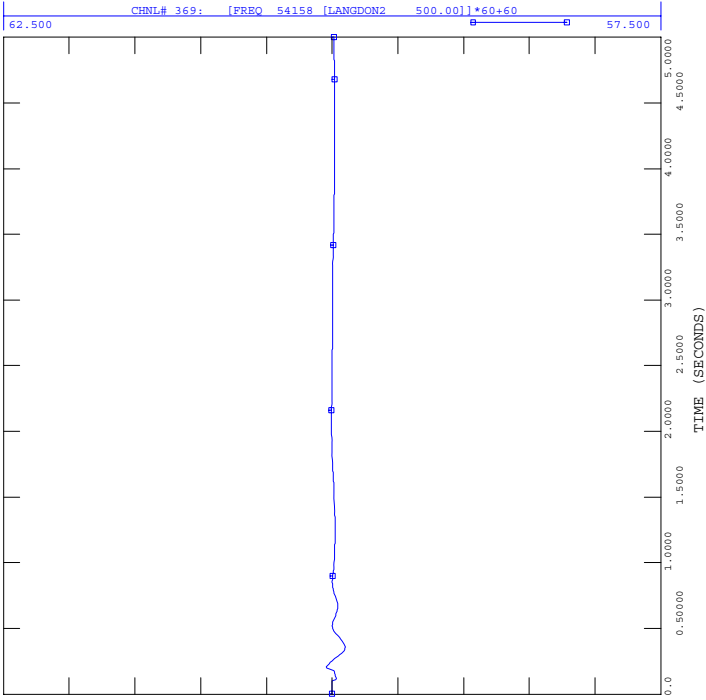


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B27_3ph_Milo_WBrook_V82.out

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LANGDON_FRQ-V82

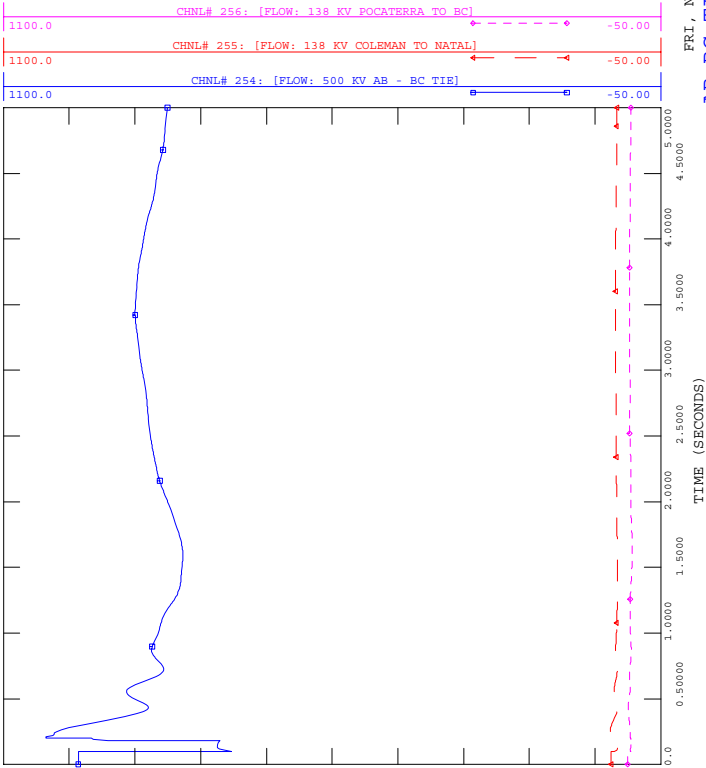


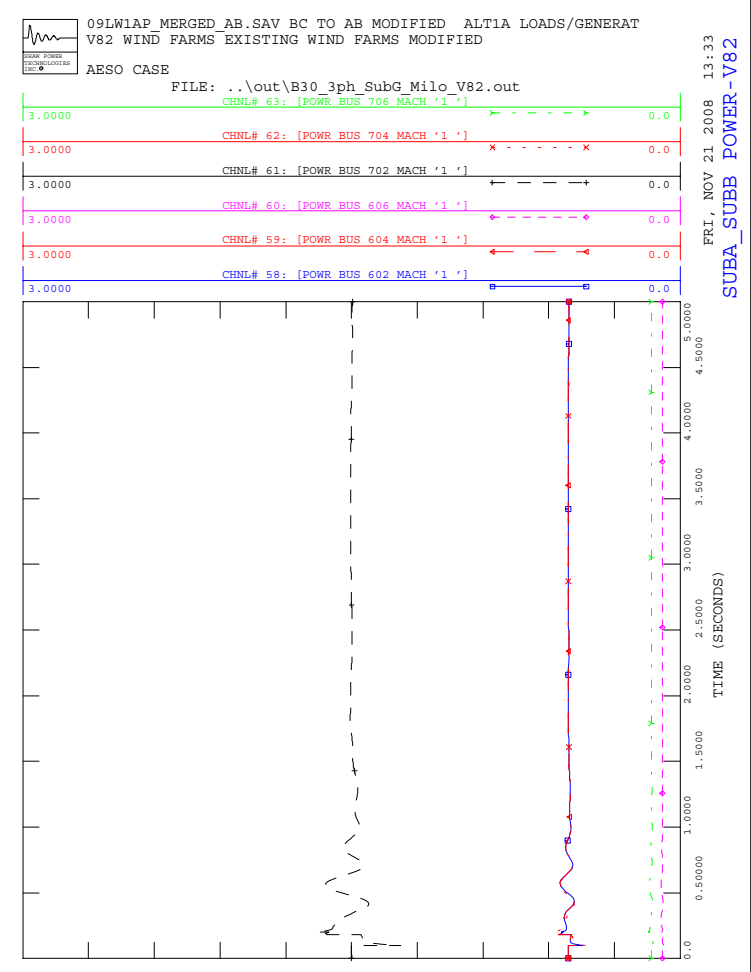
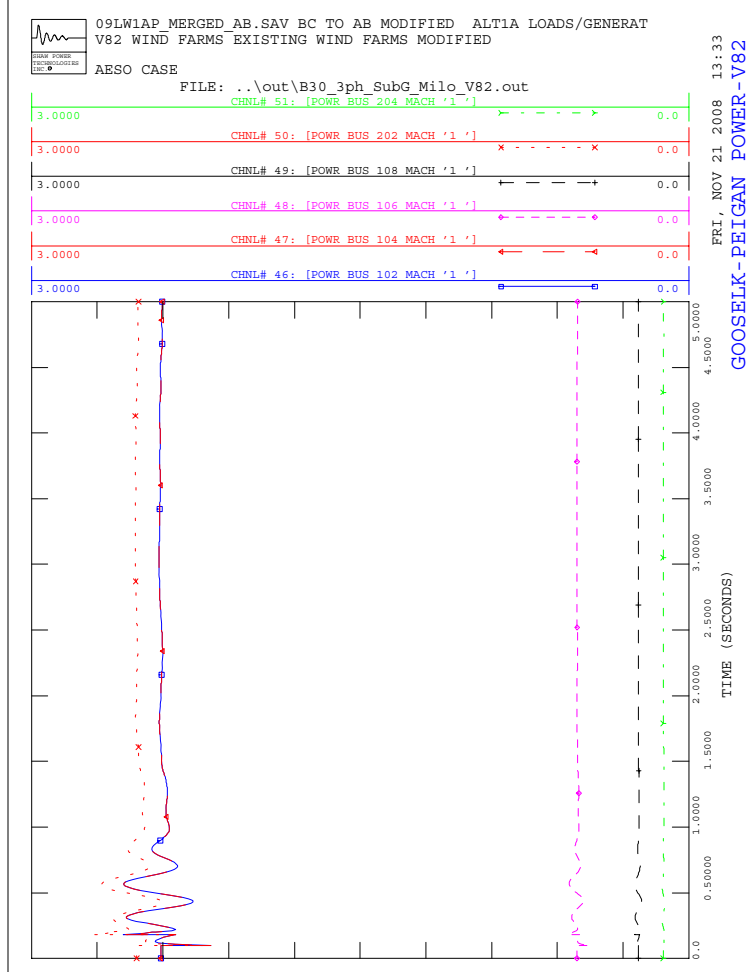
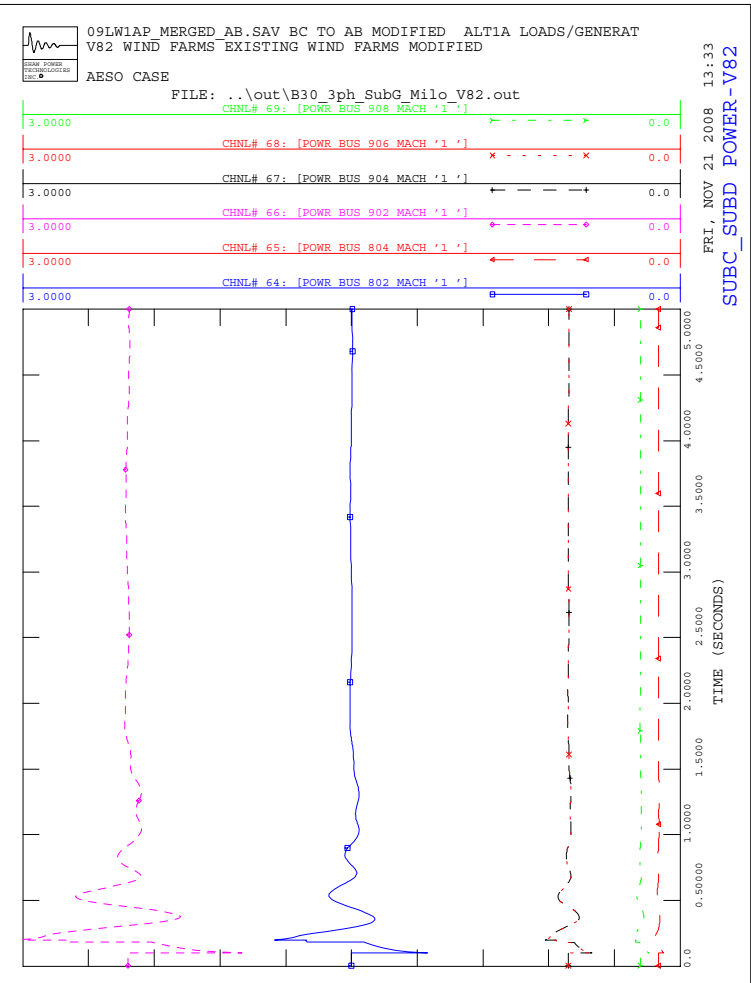
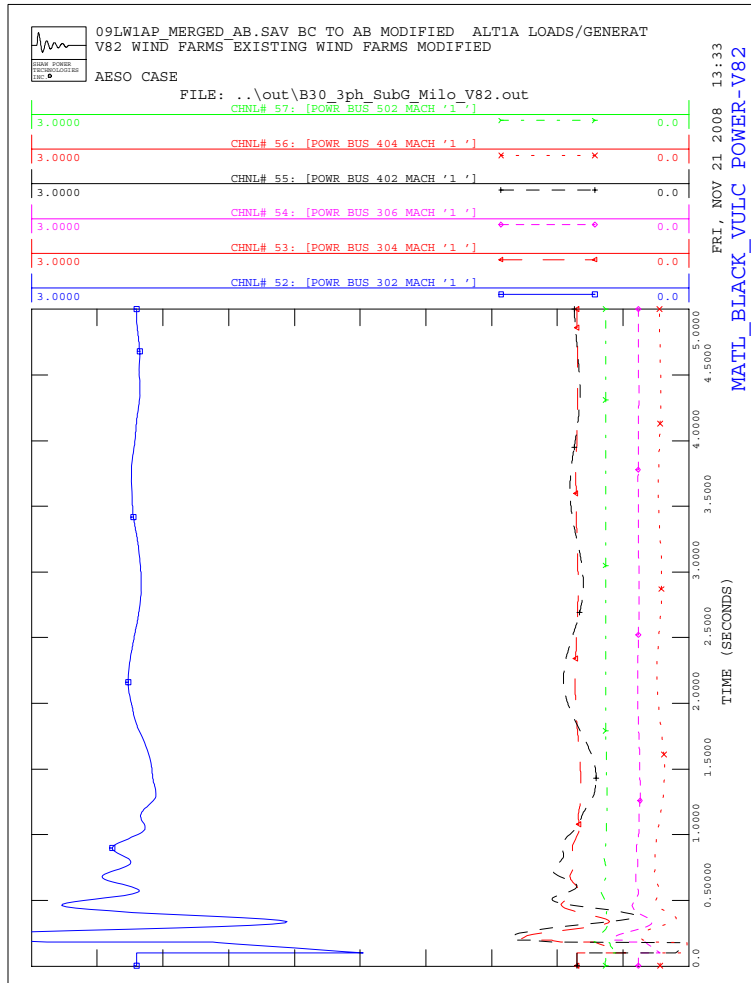
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

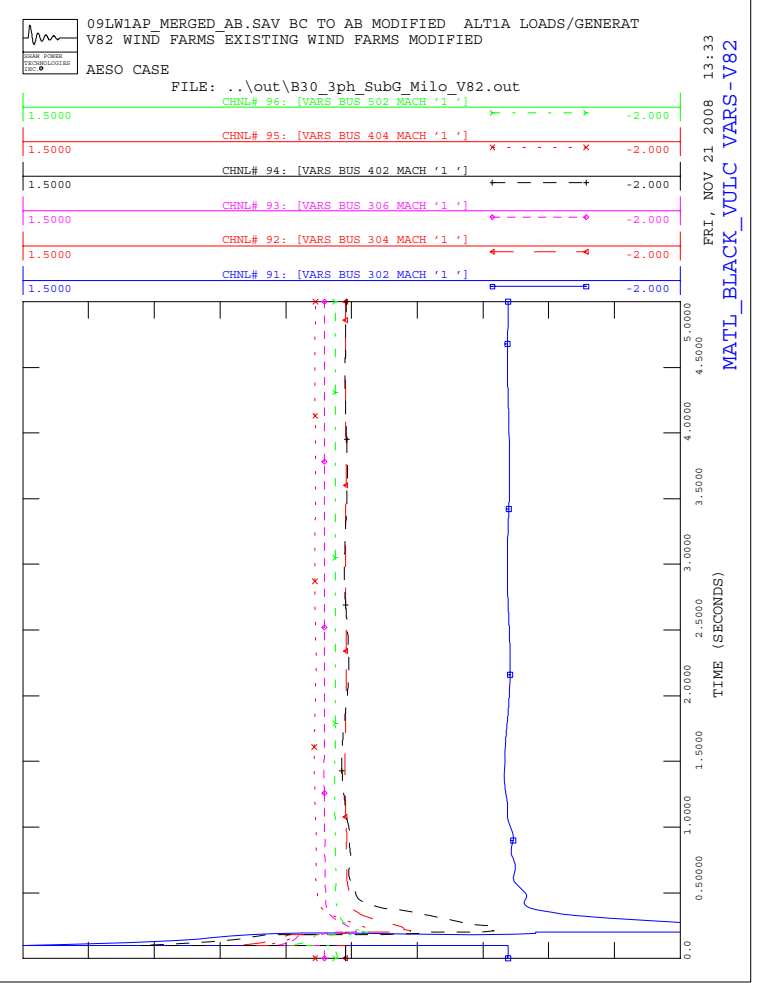
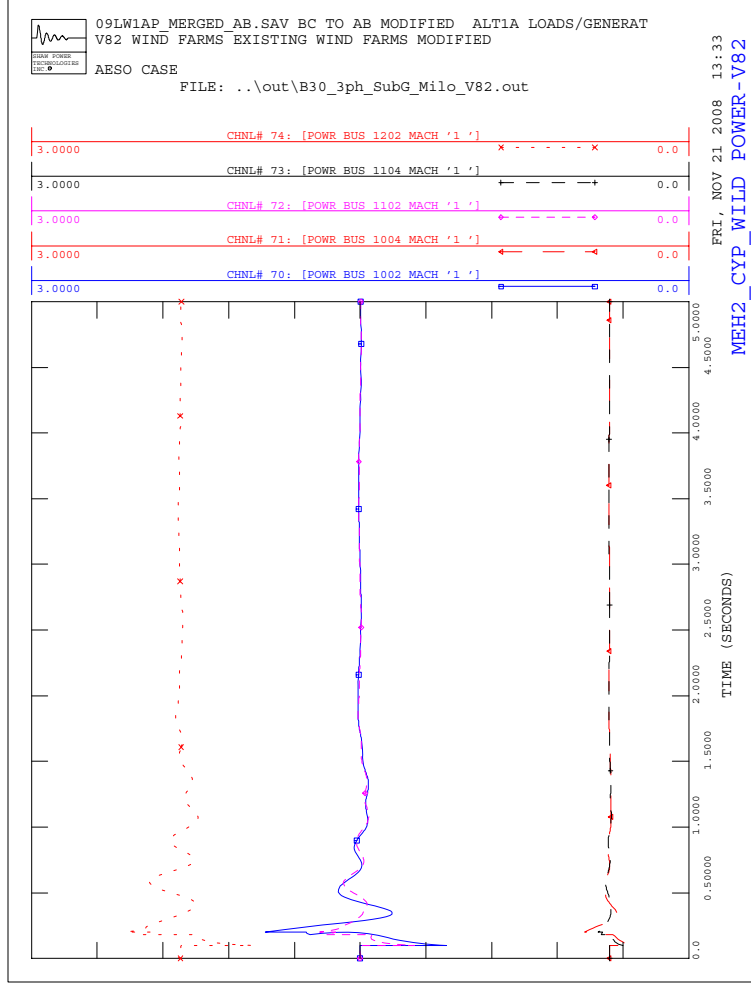
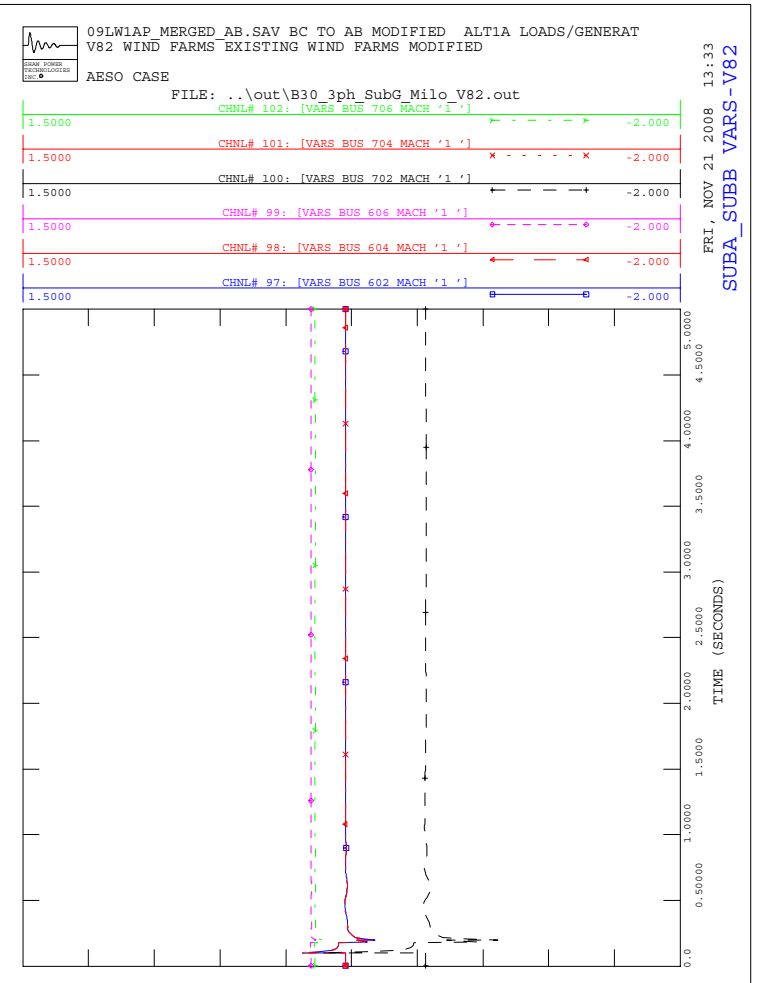
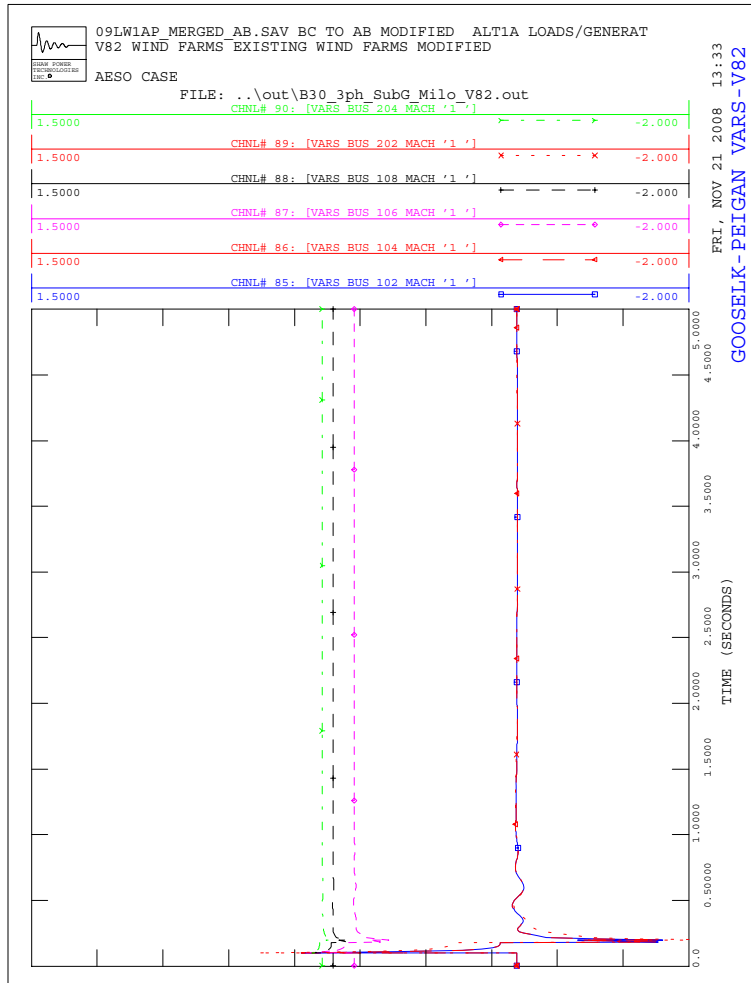
ABSO CASE

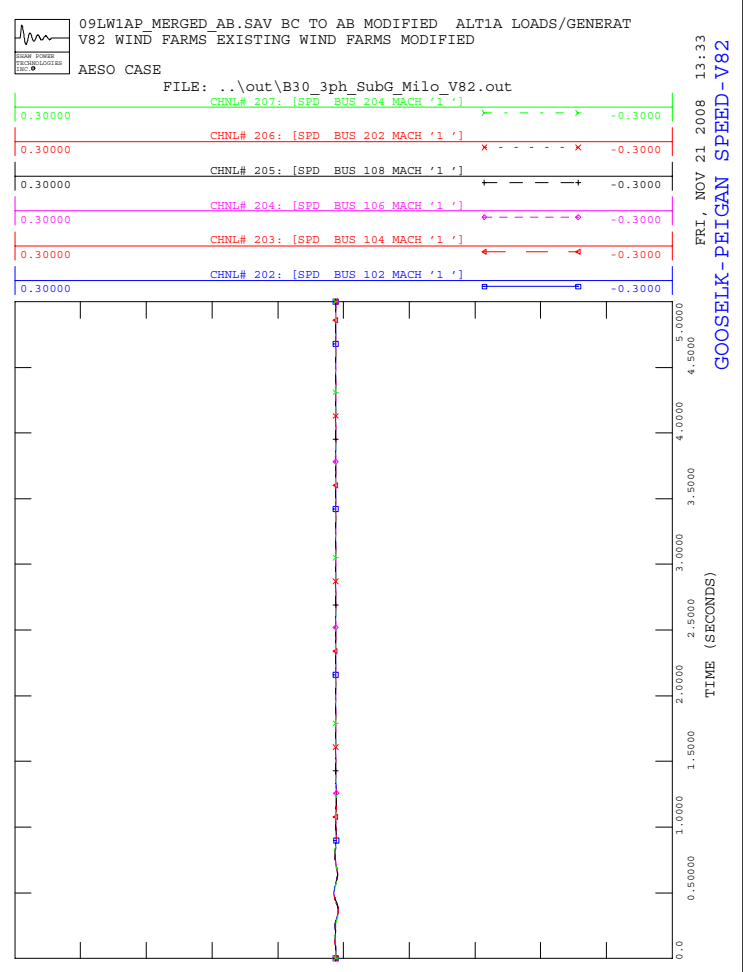
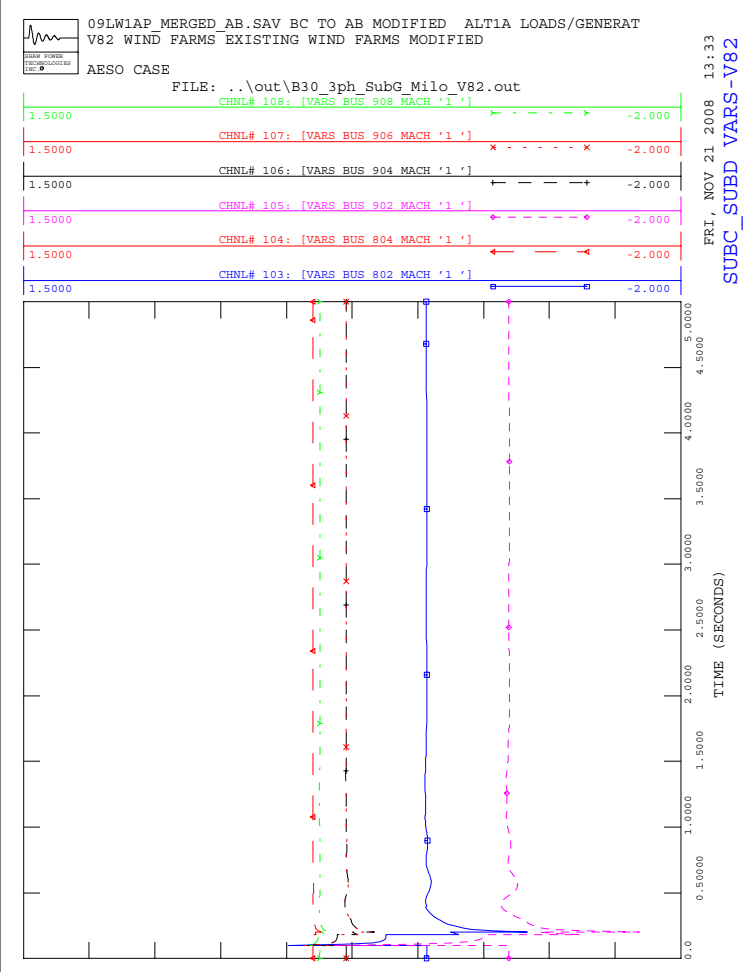
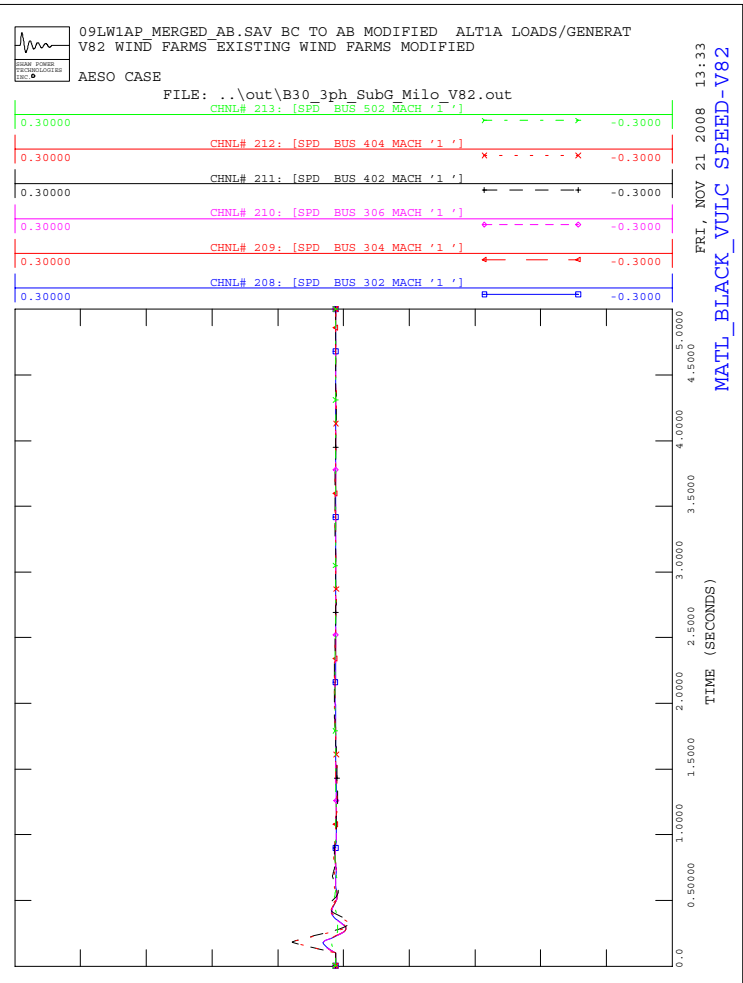
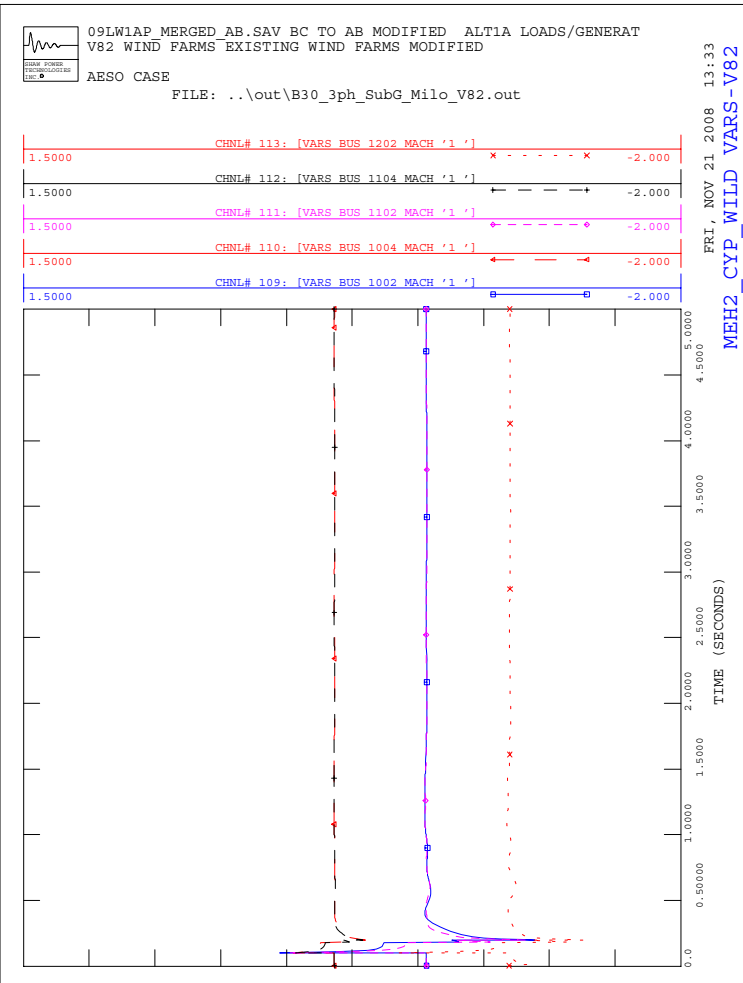
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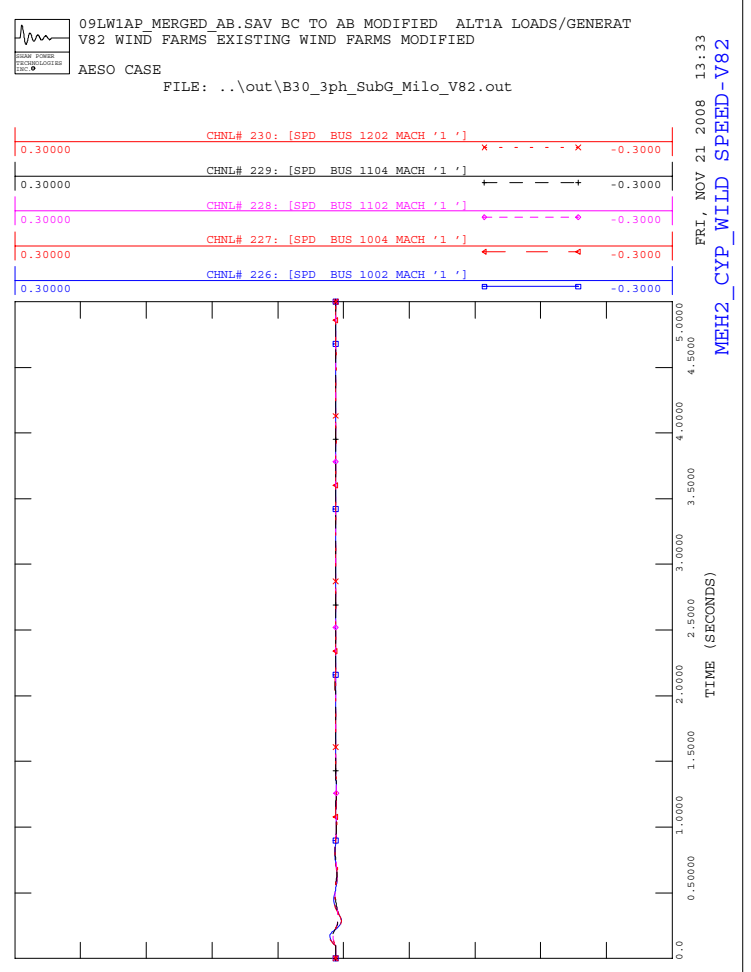
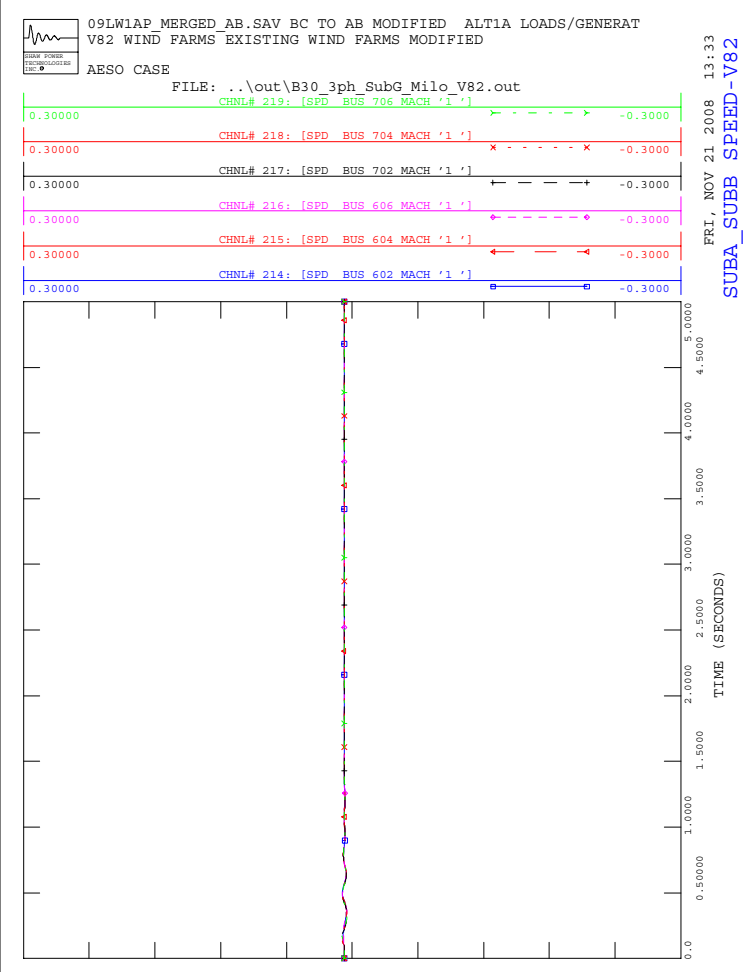
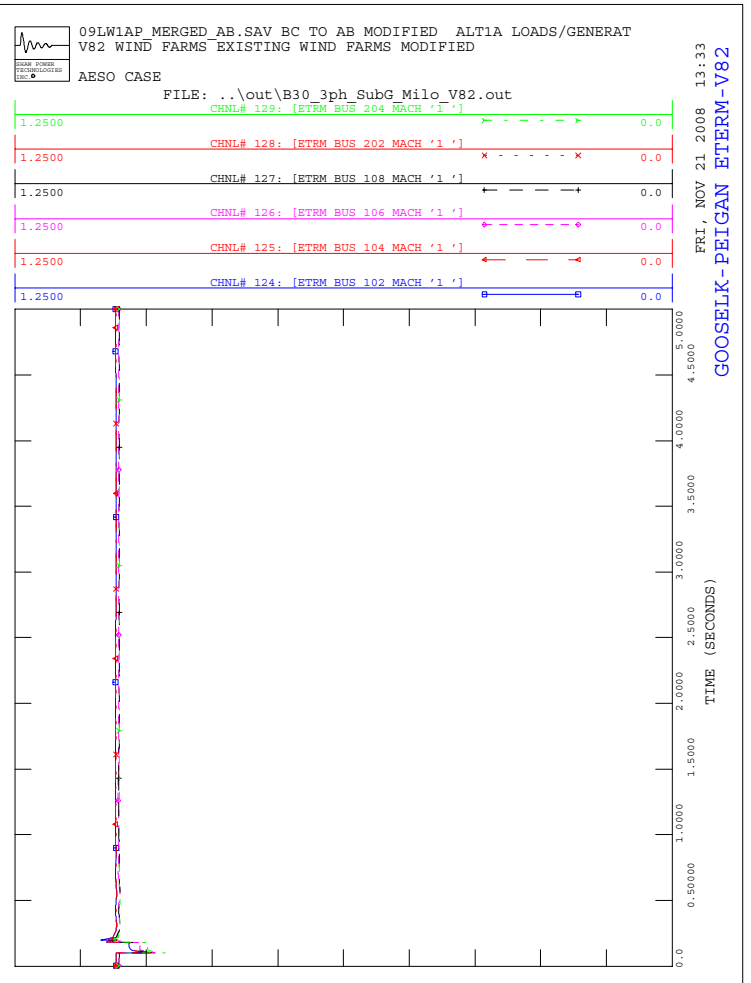
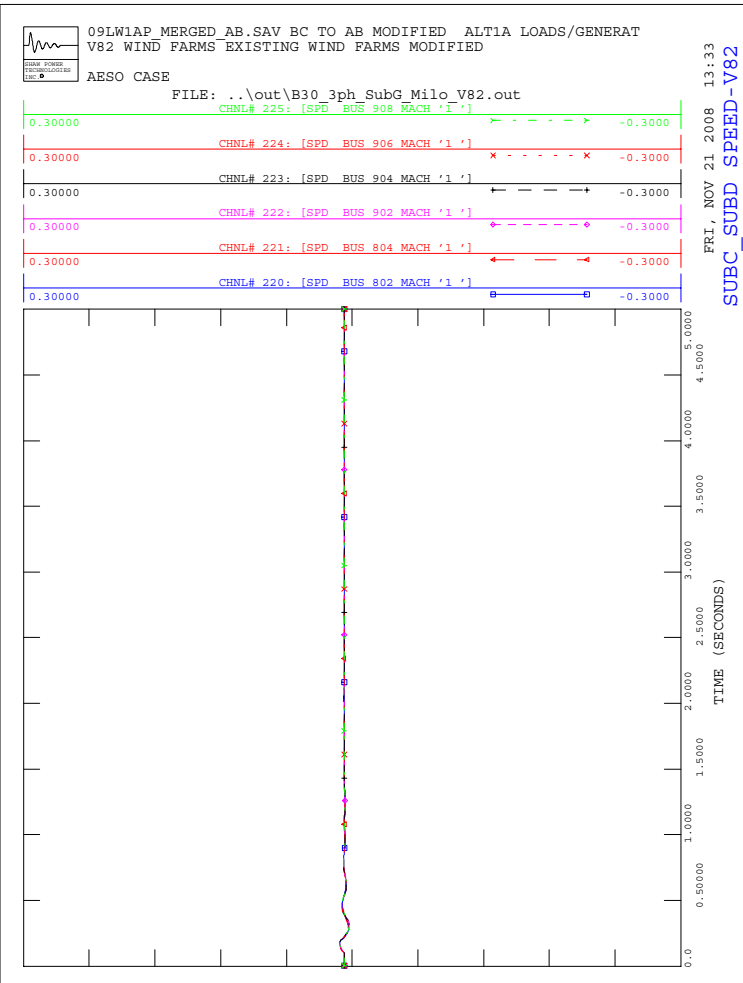
FRI, NOV 21 2008 13:33
AB_BC_TIE_FLOWS-V82

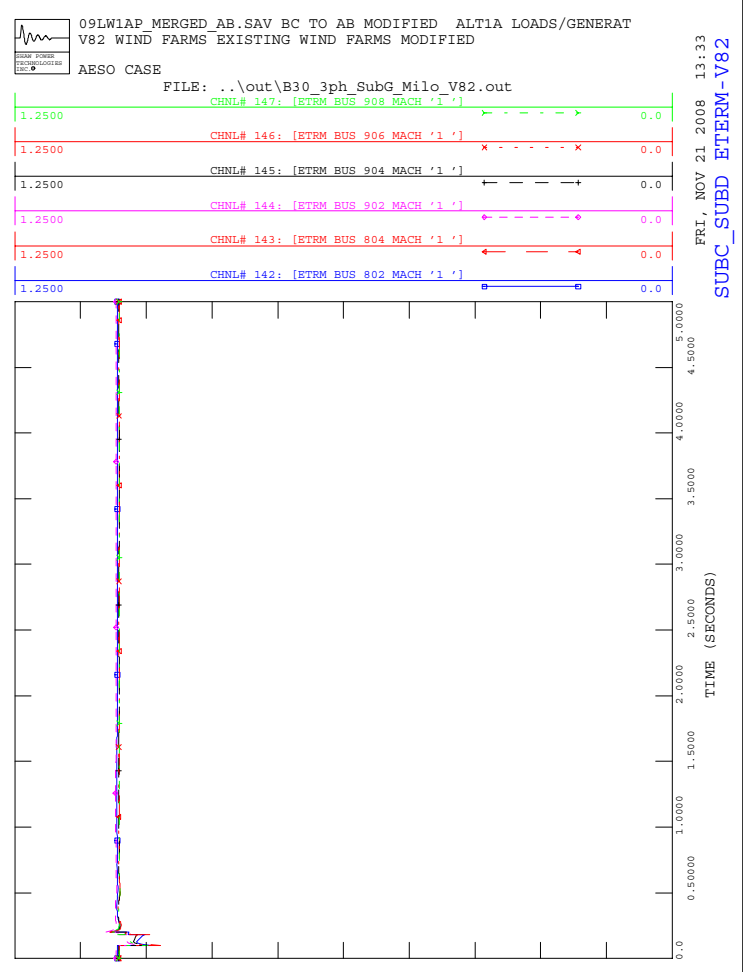
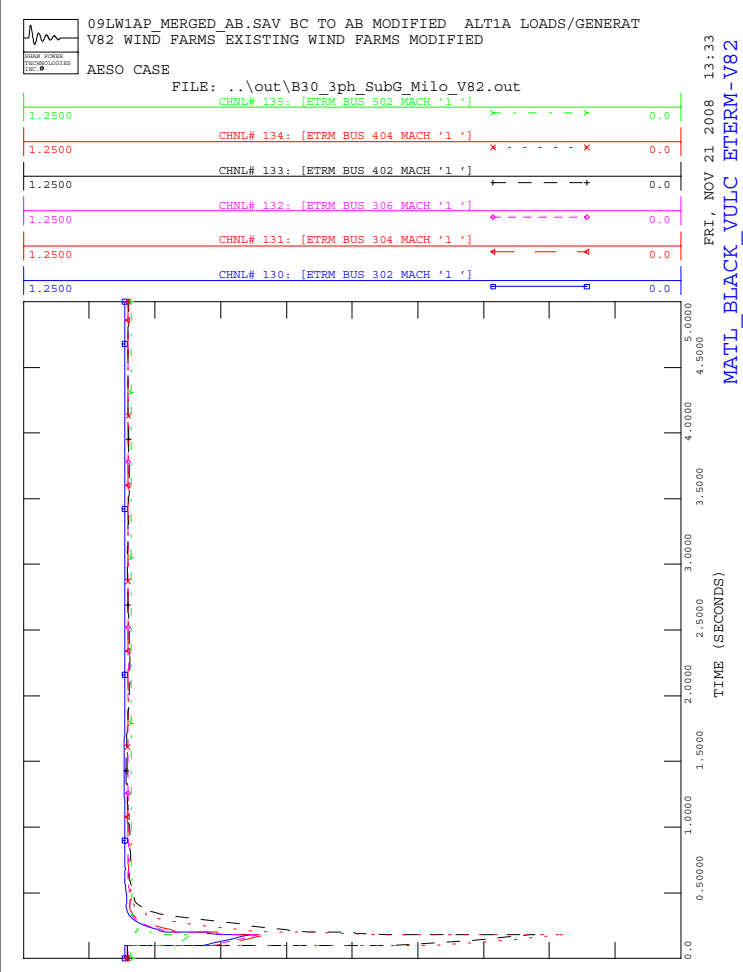
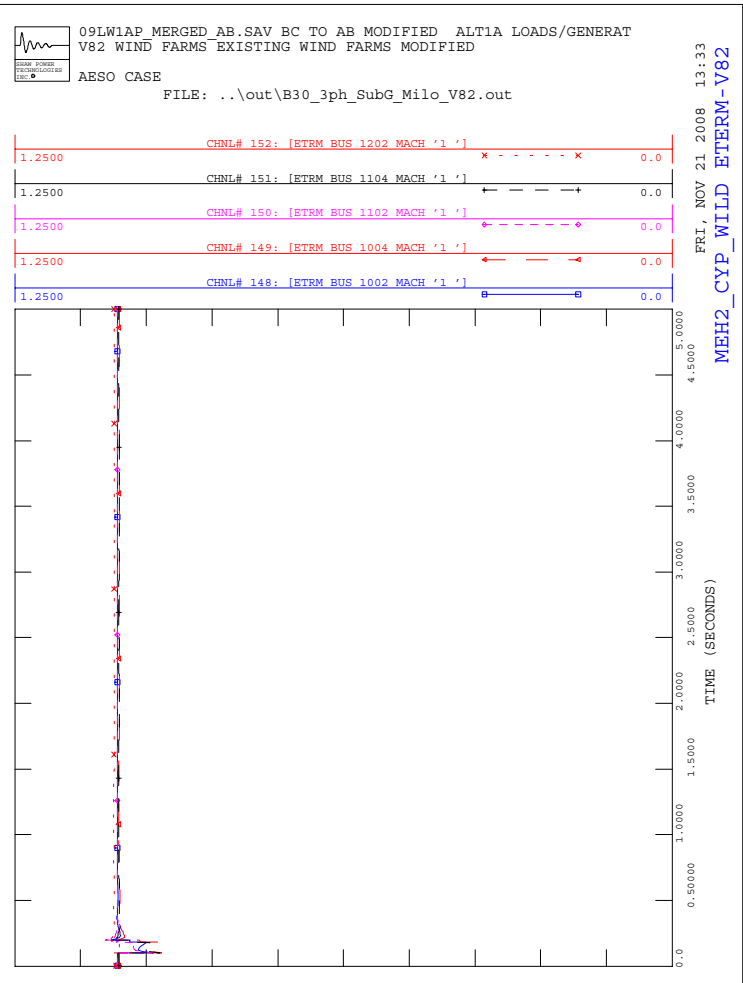
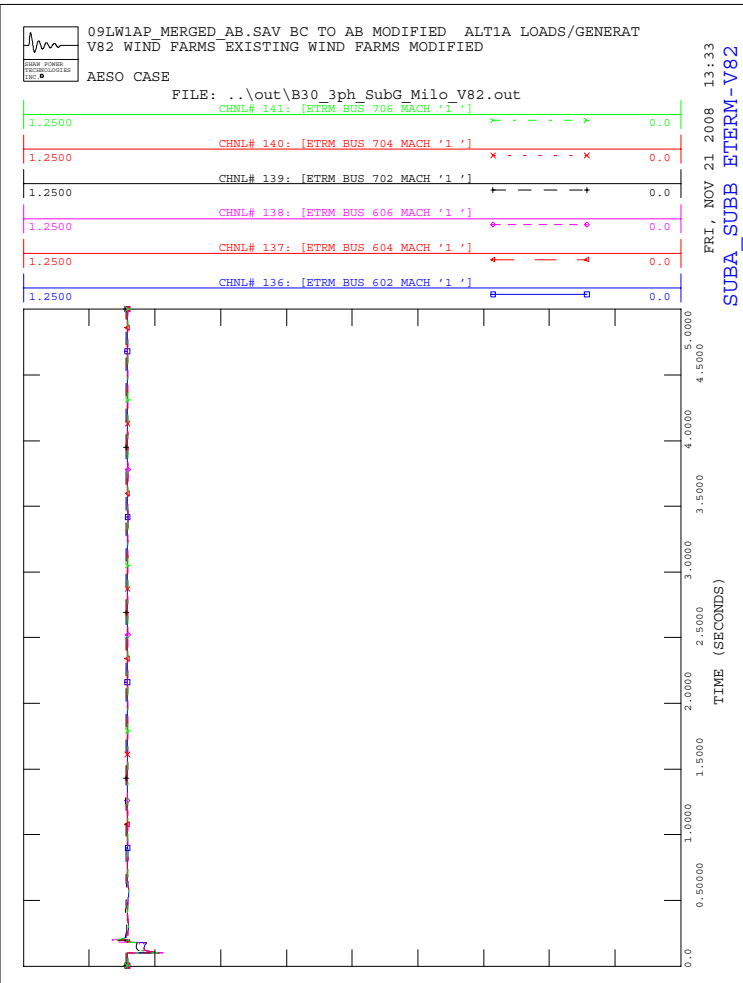


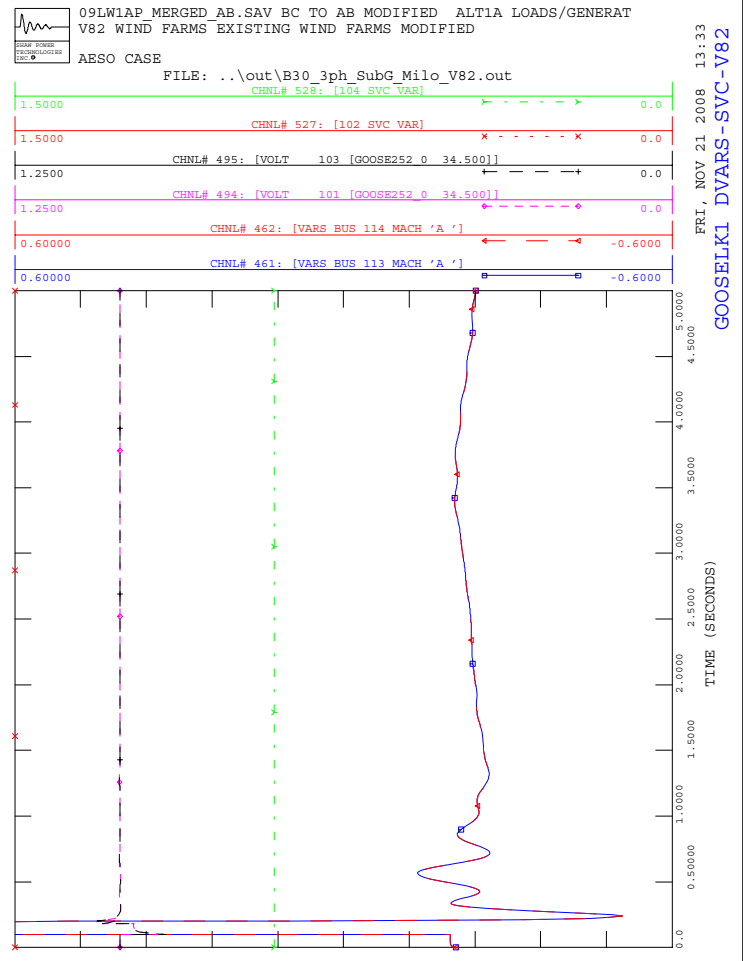
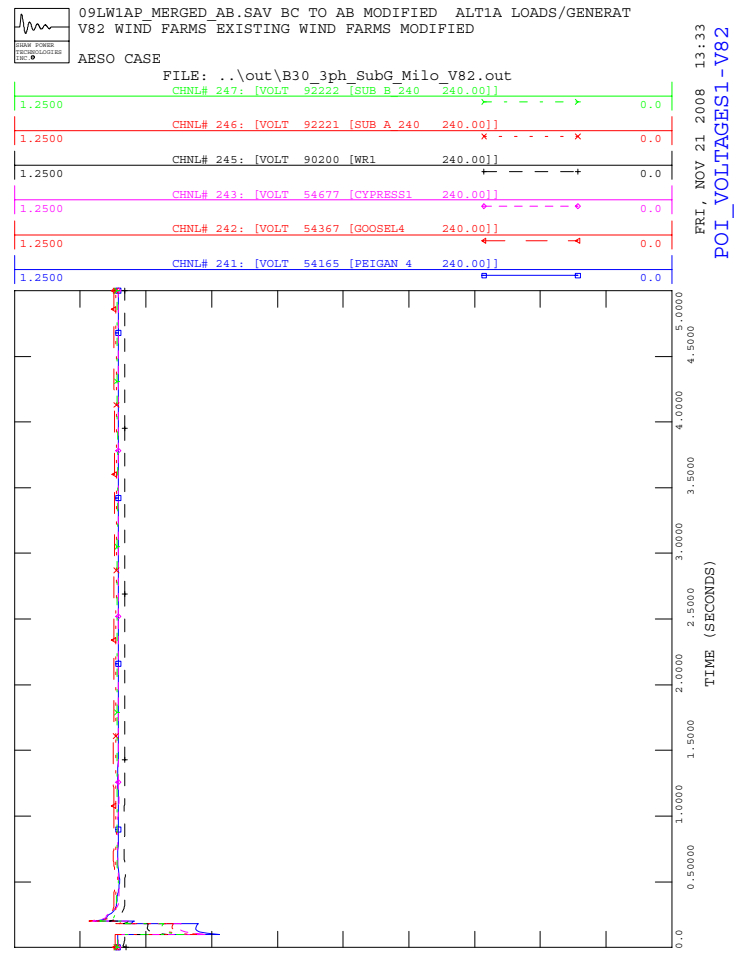
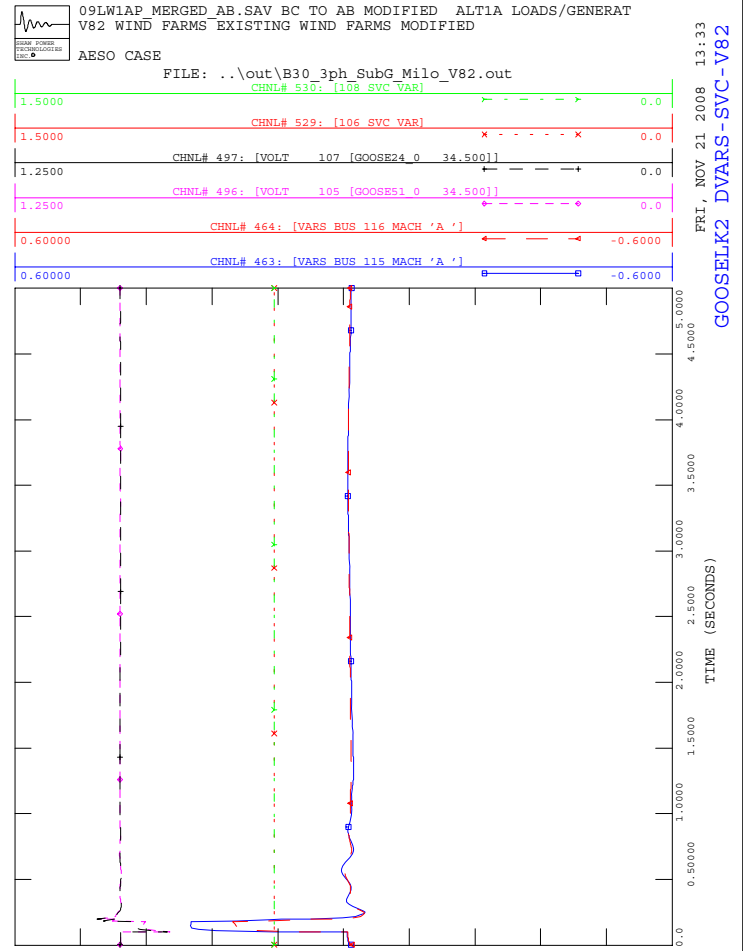
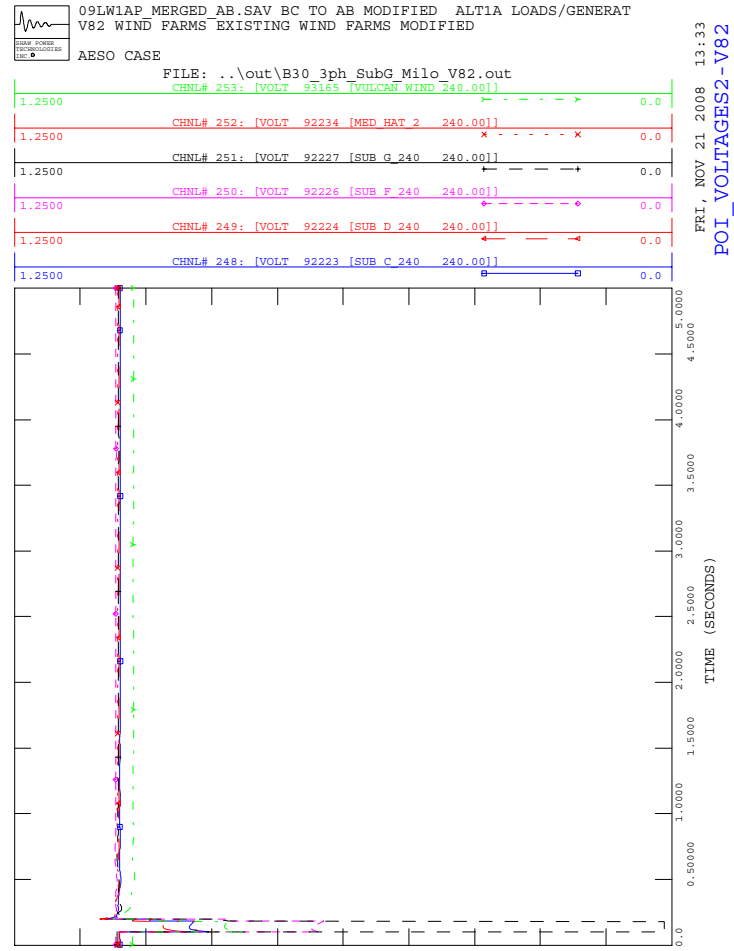


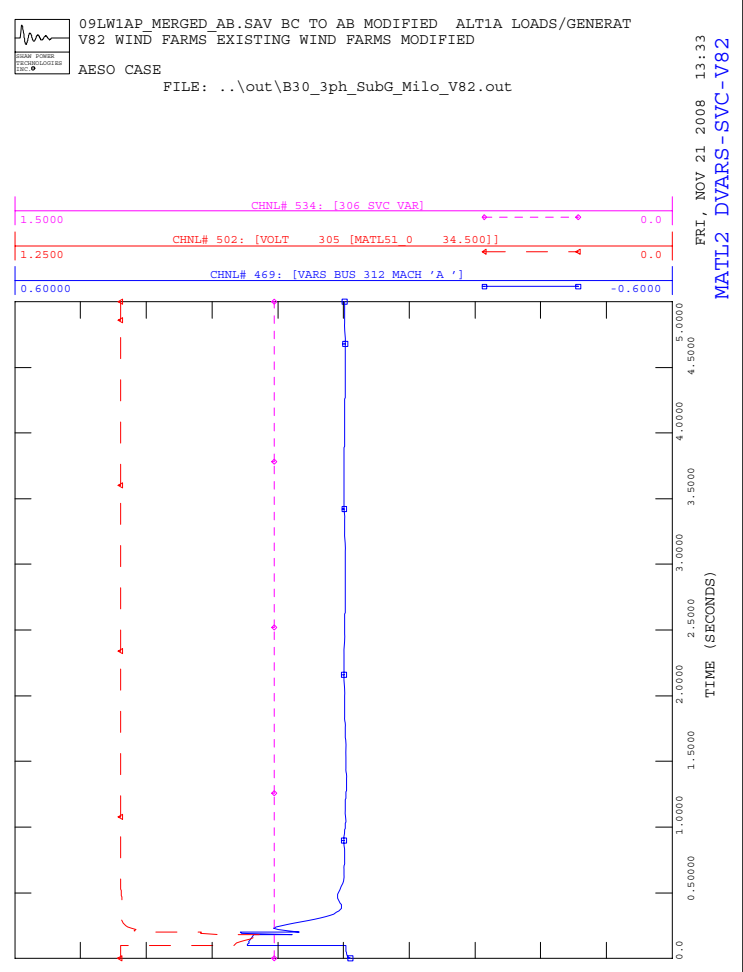
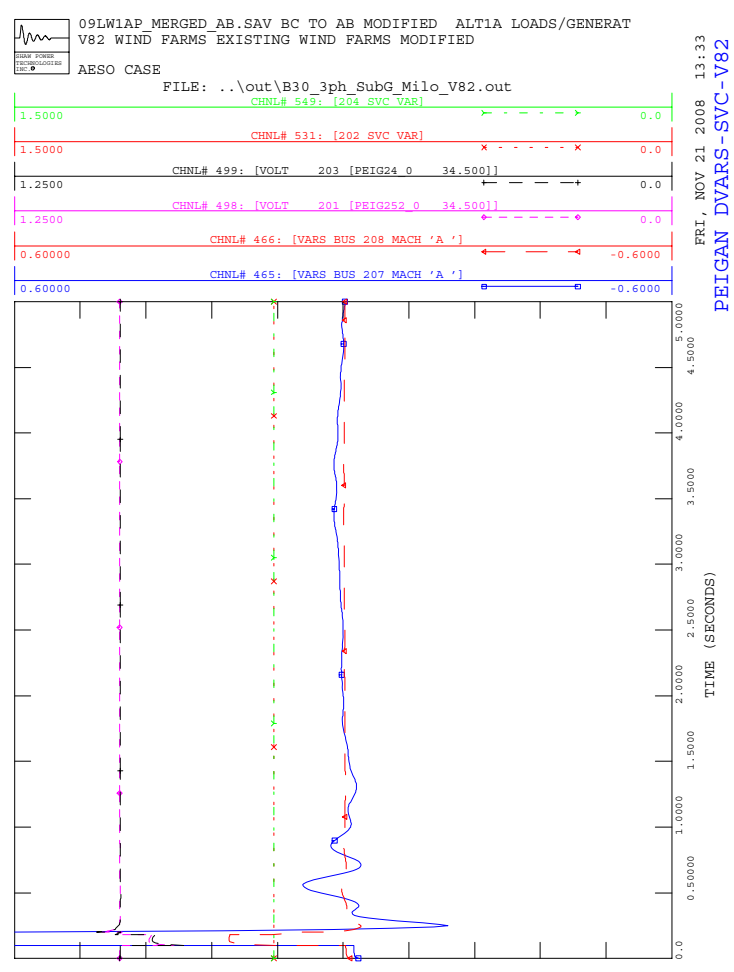
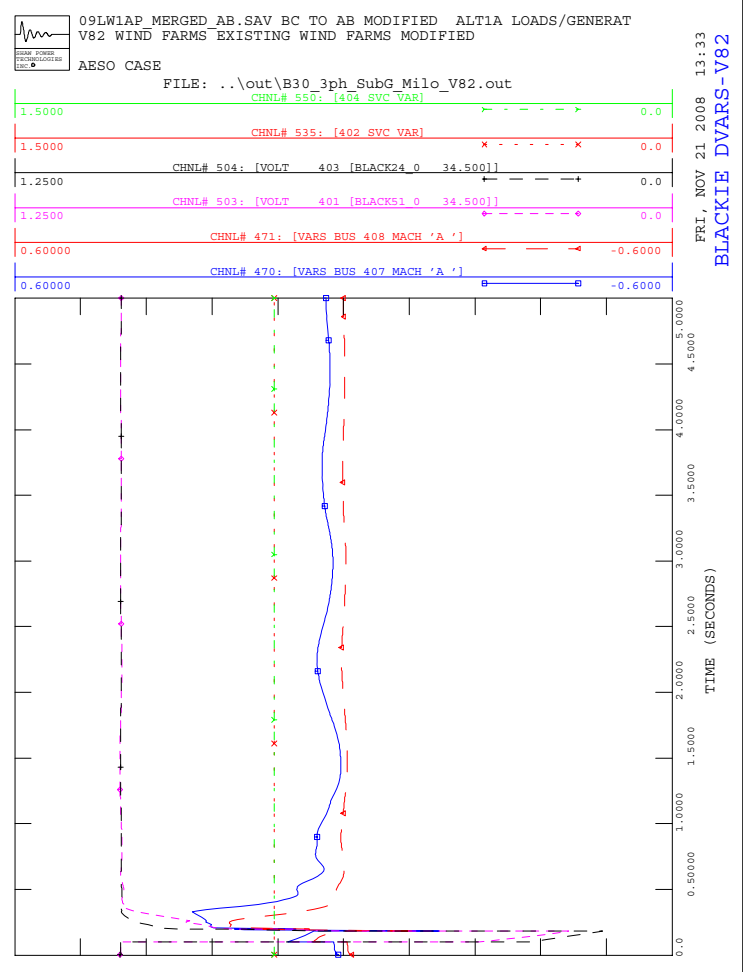
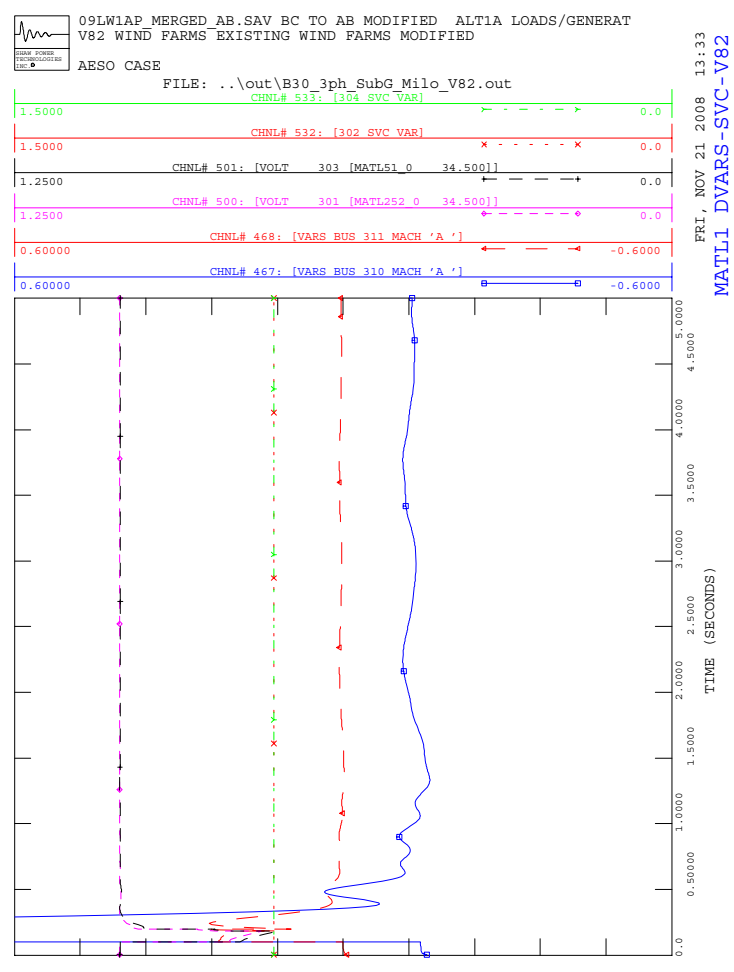


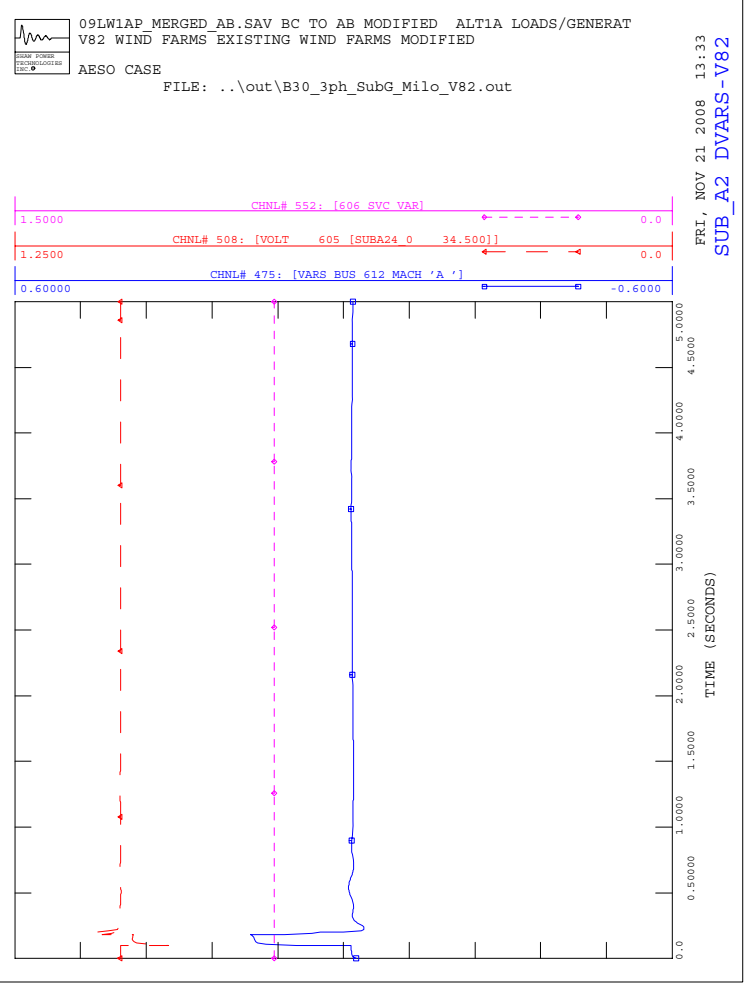
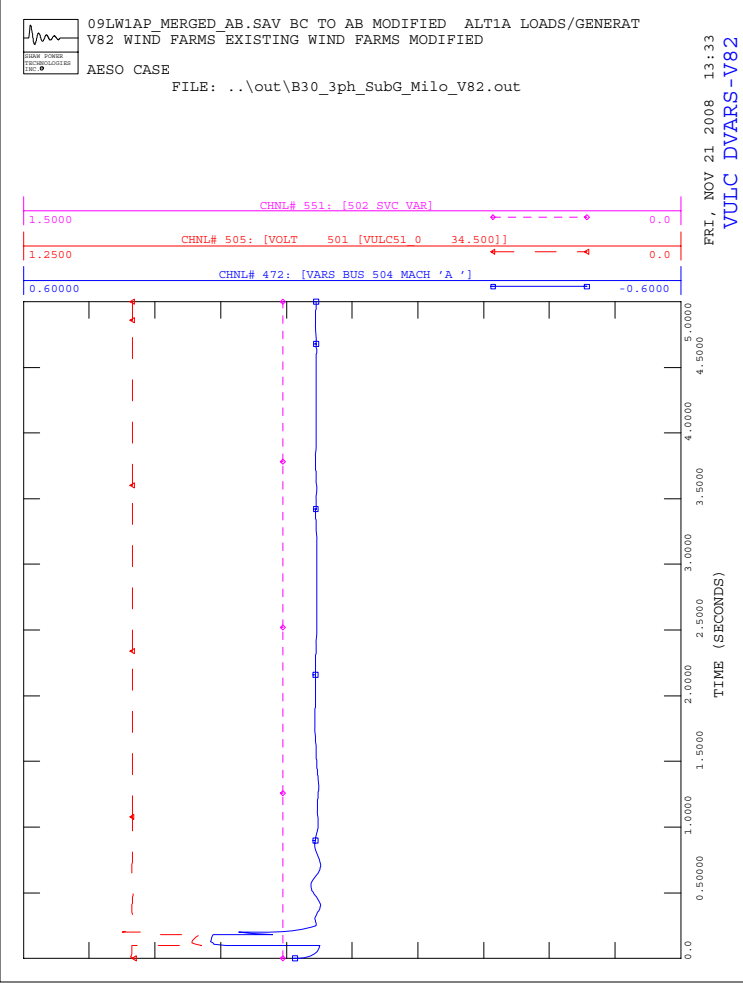
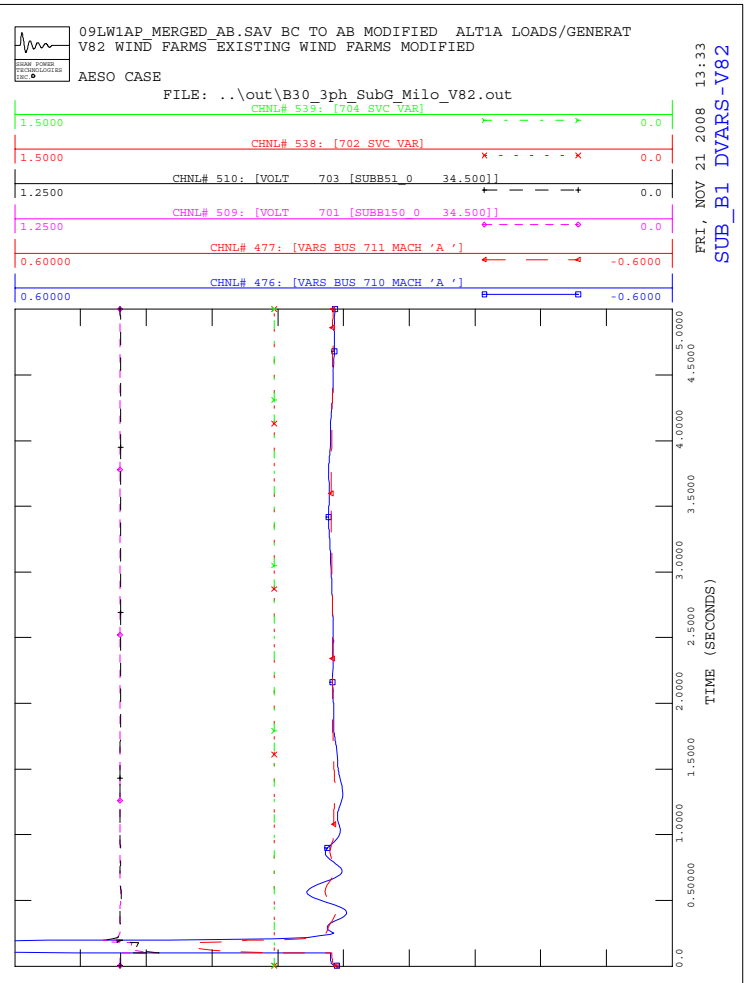
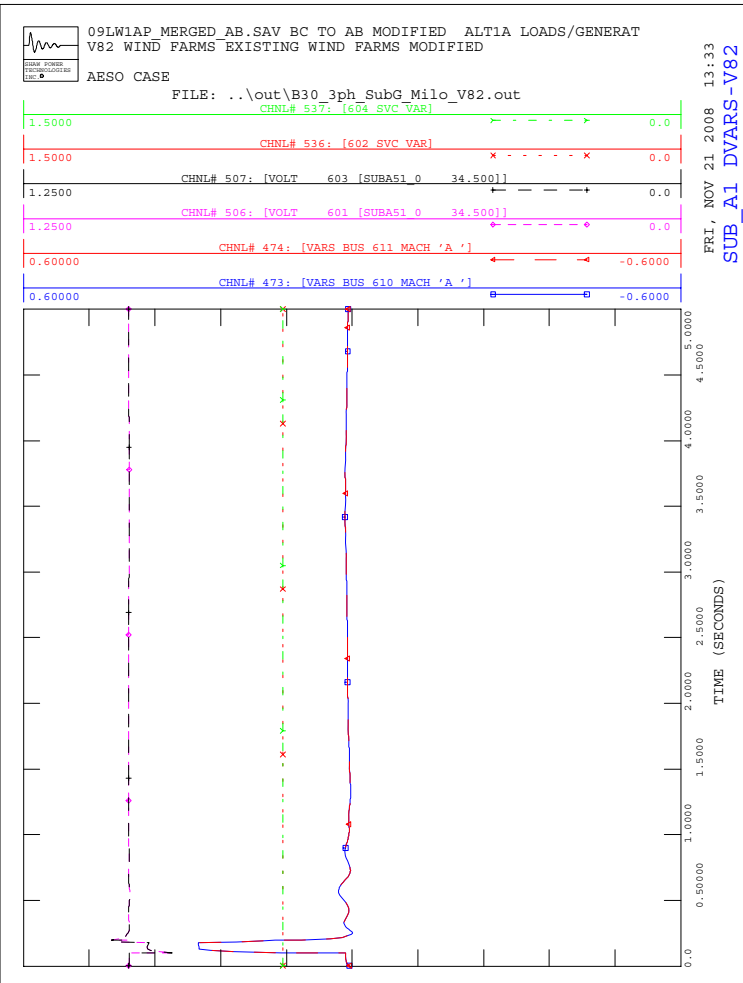


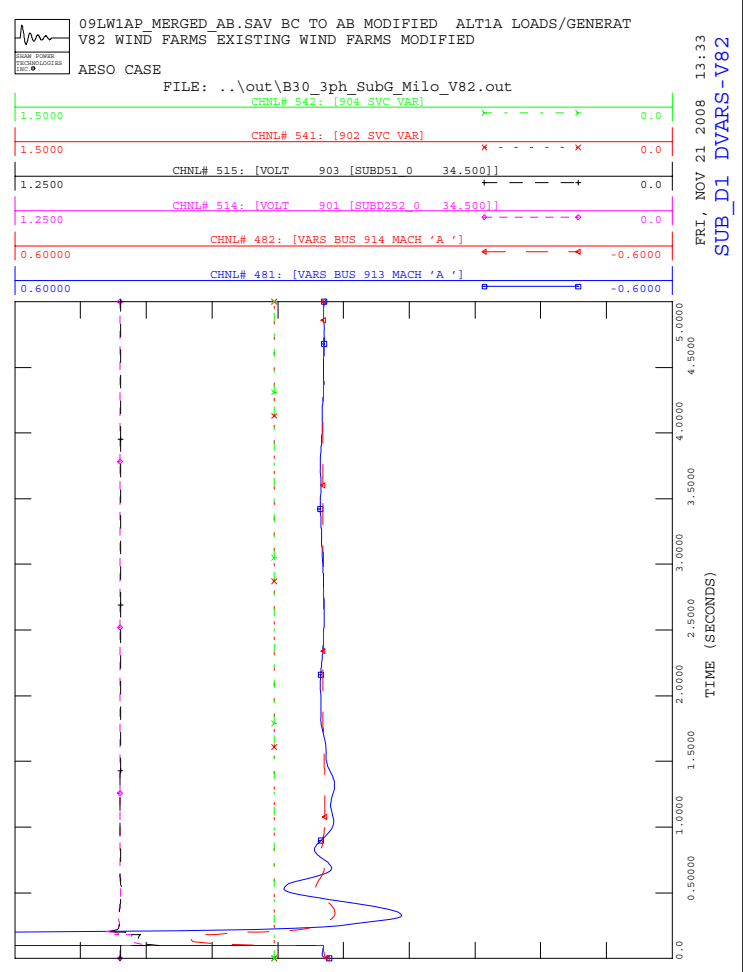
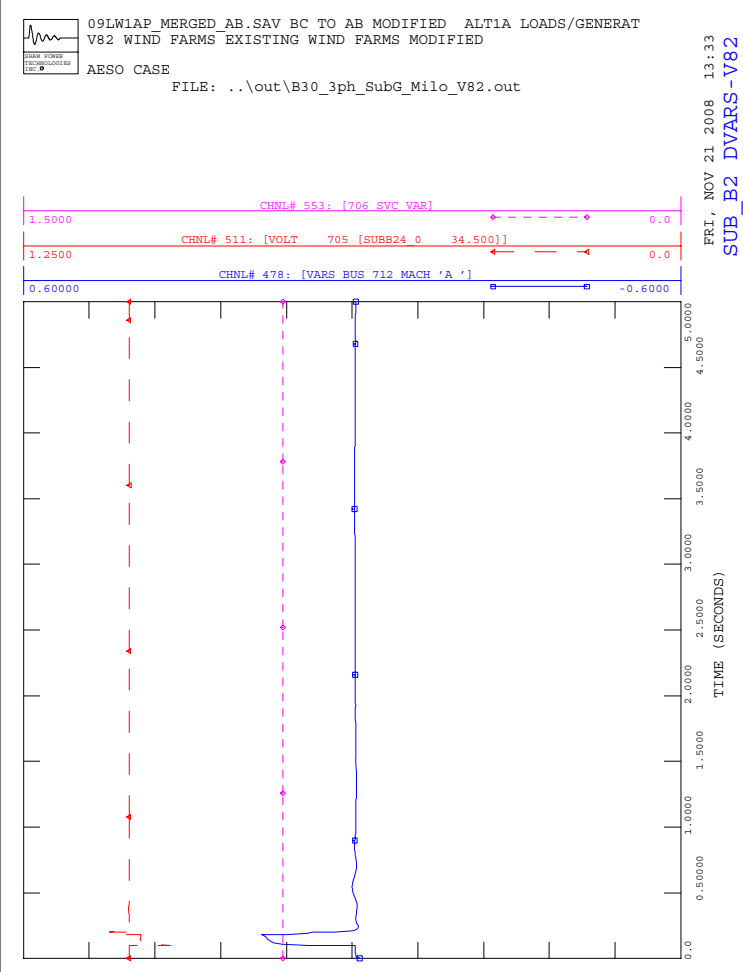
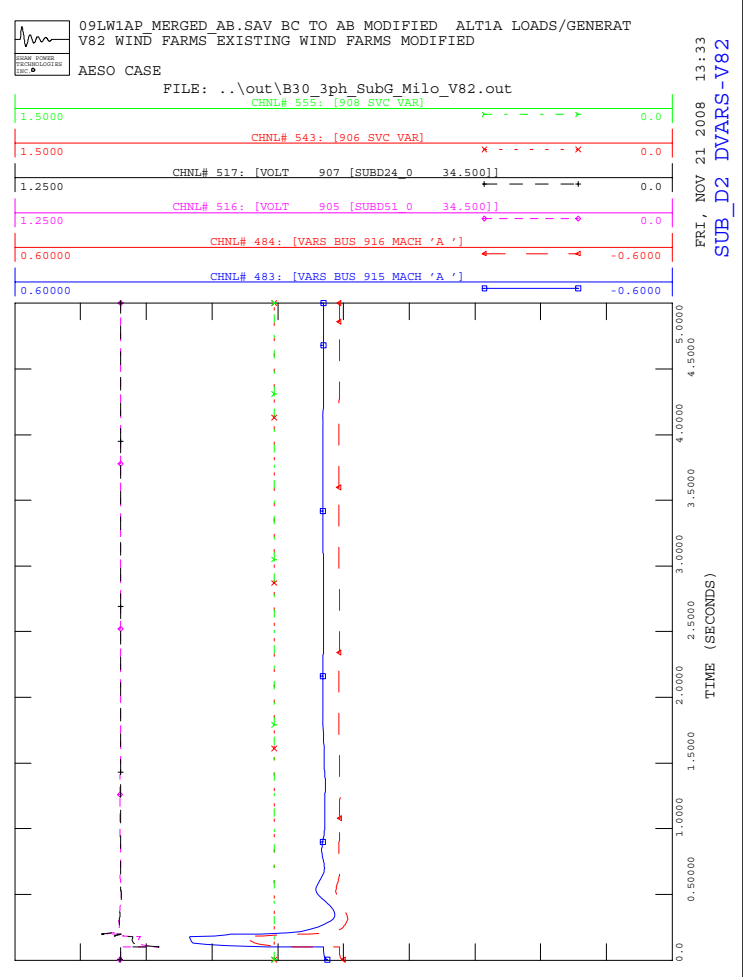
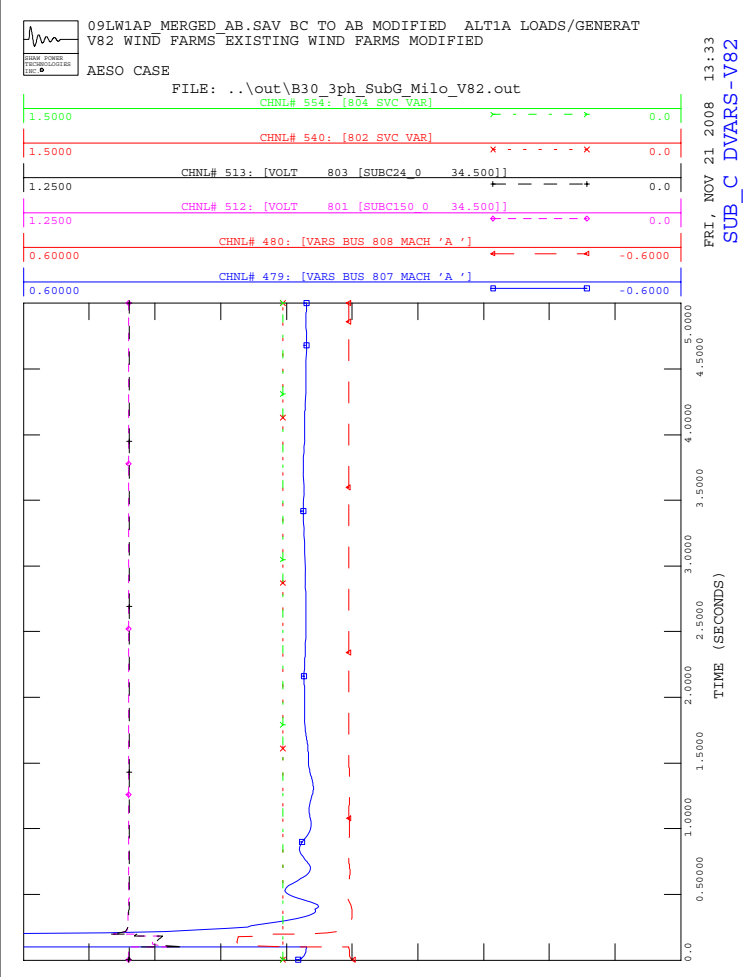


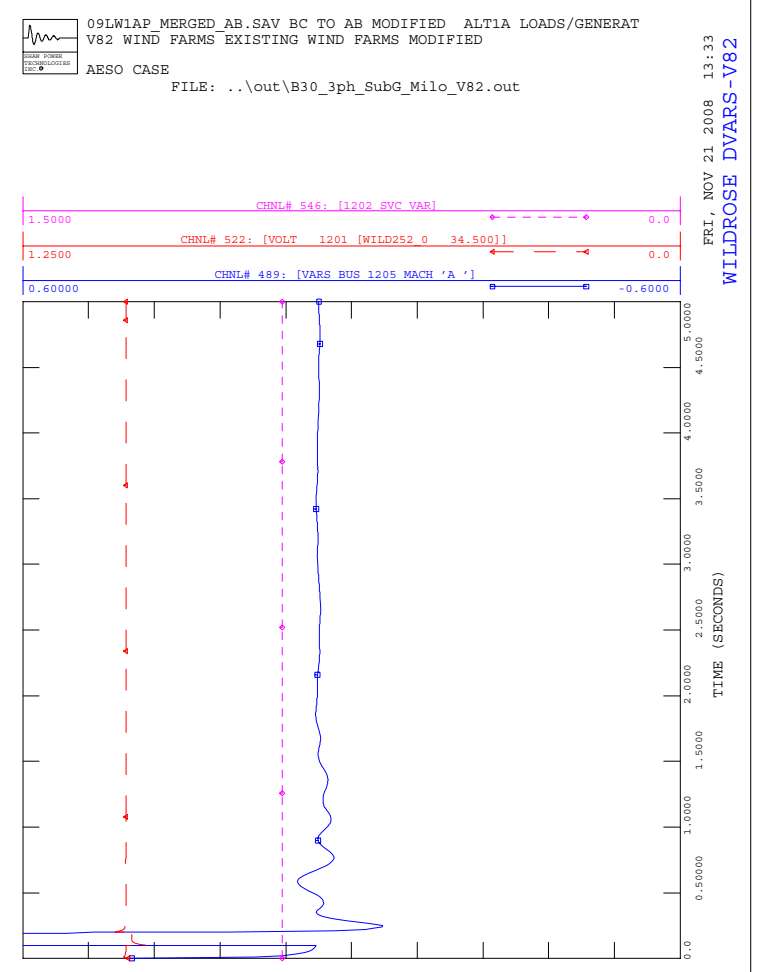
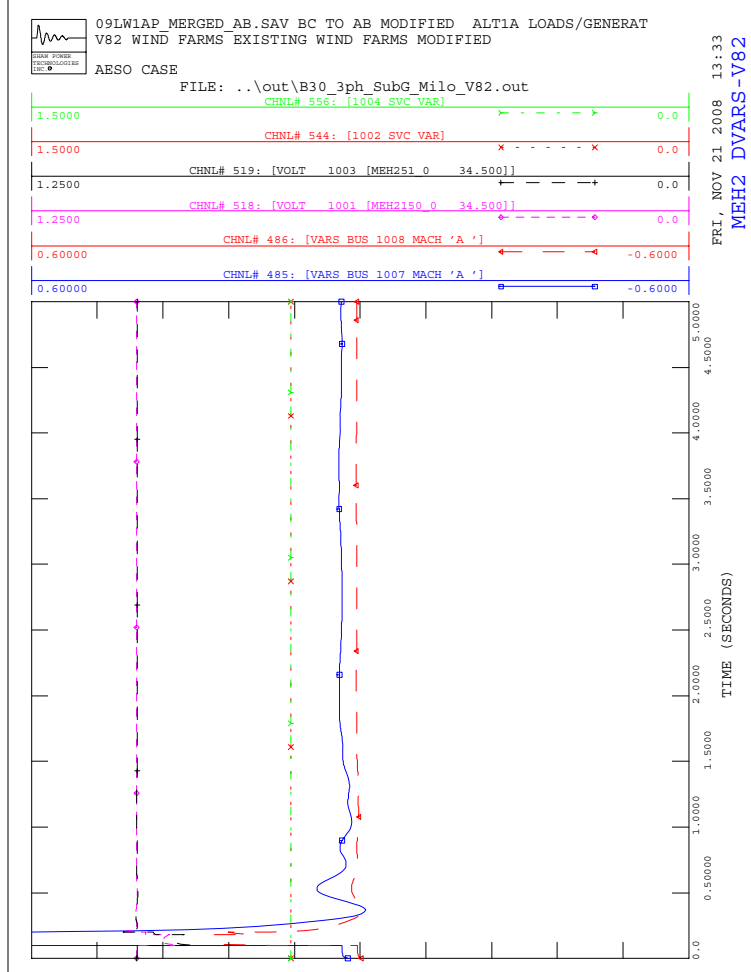
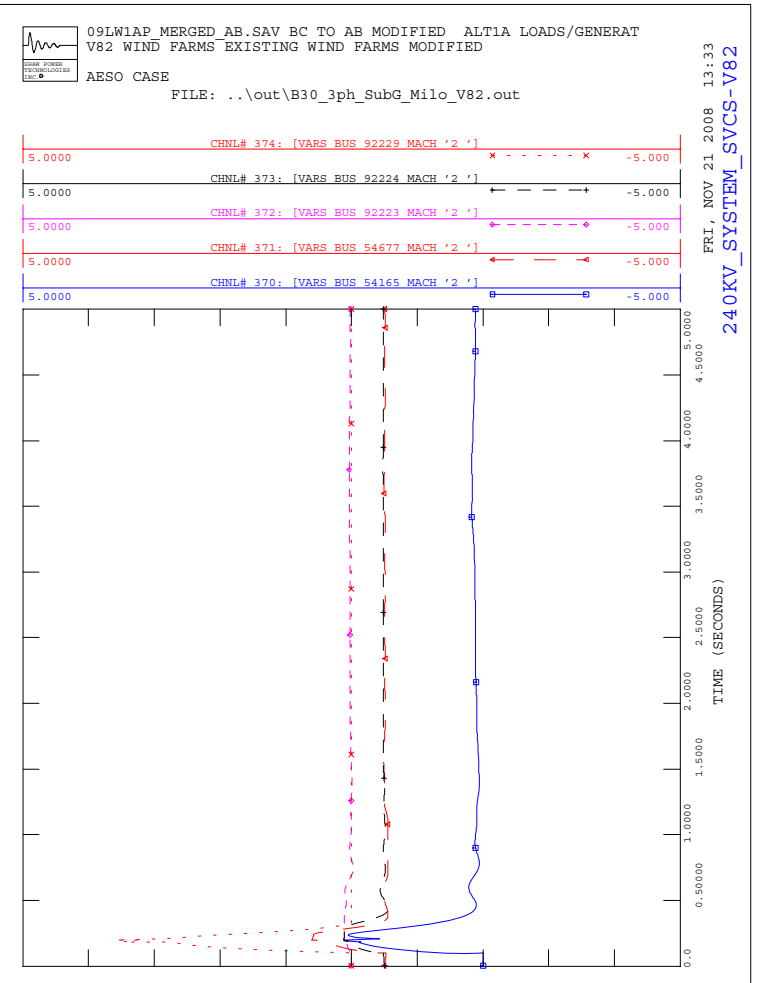
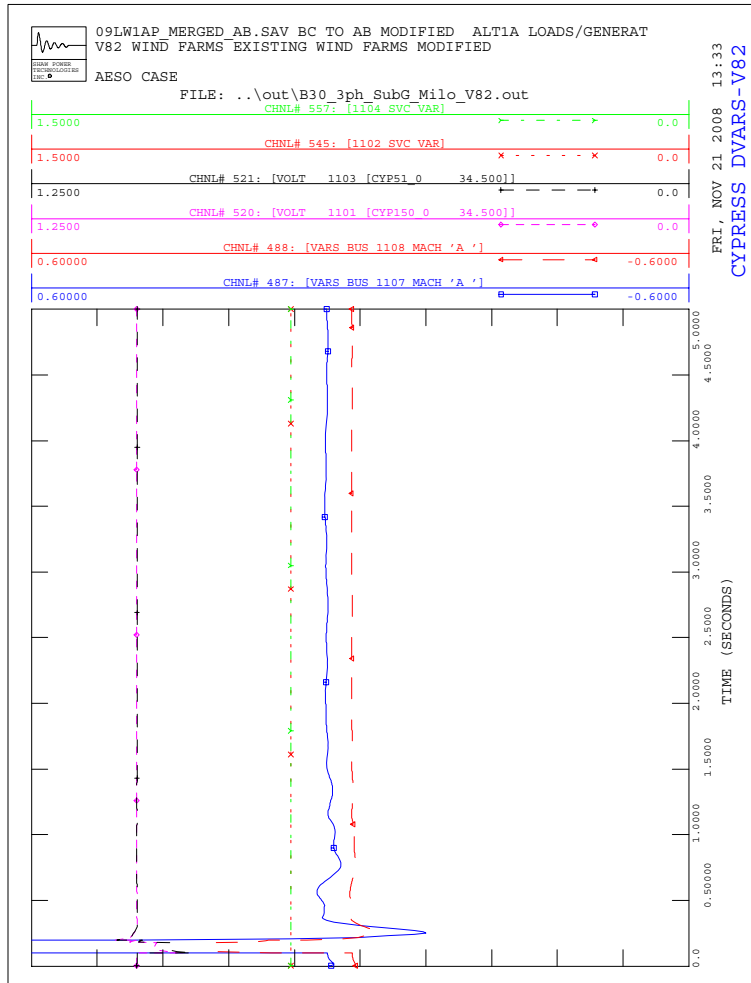












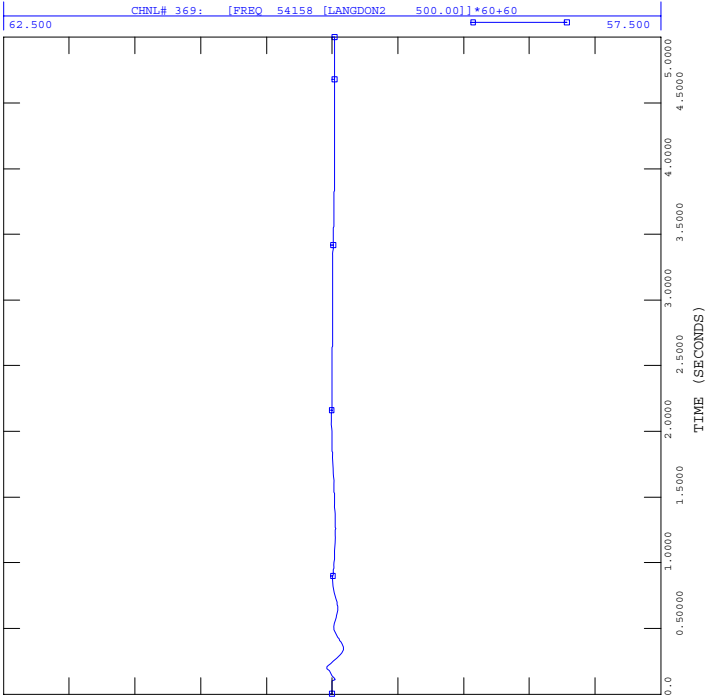


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B30_3ph_SubG_Milo_V82.out

FRI, NOV 21 2008 13:33
LANGDON_FRQ-V82

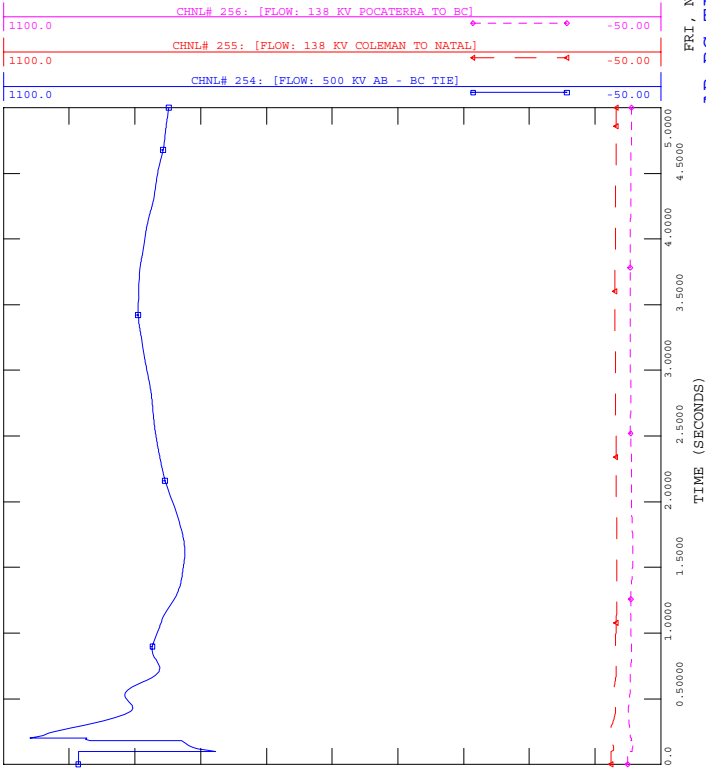


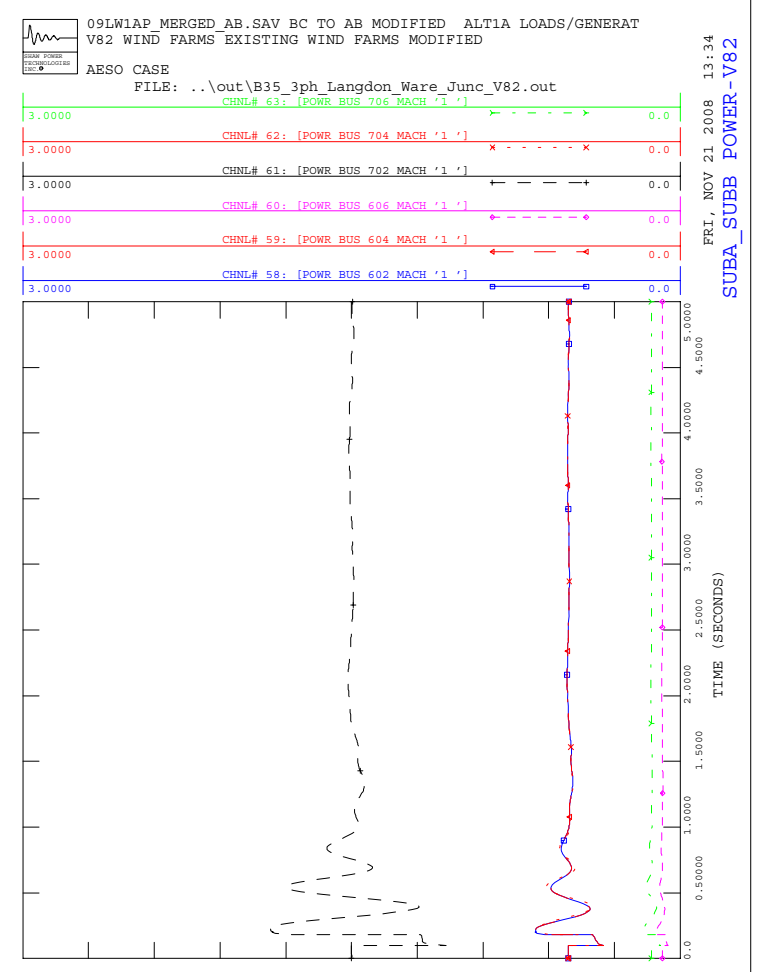
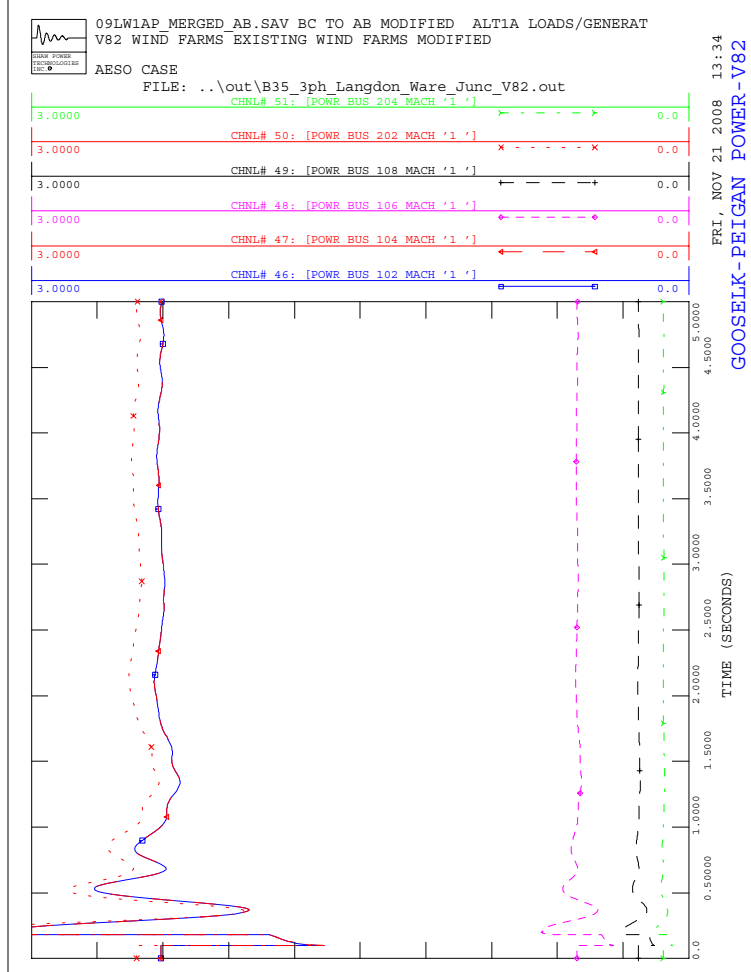
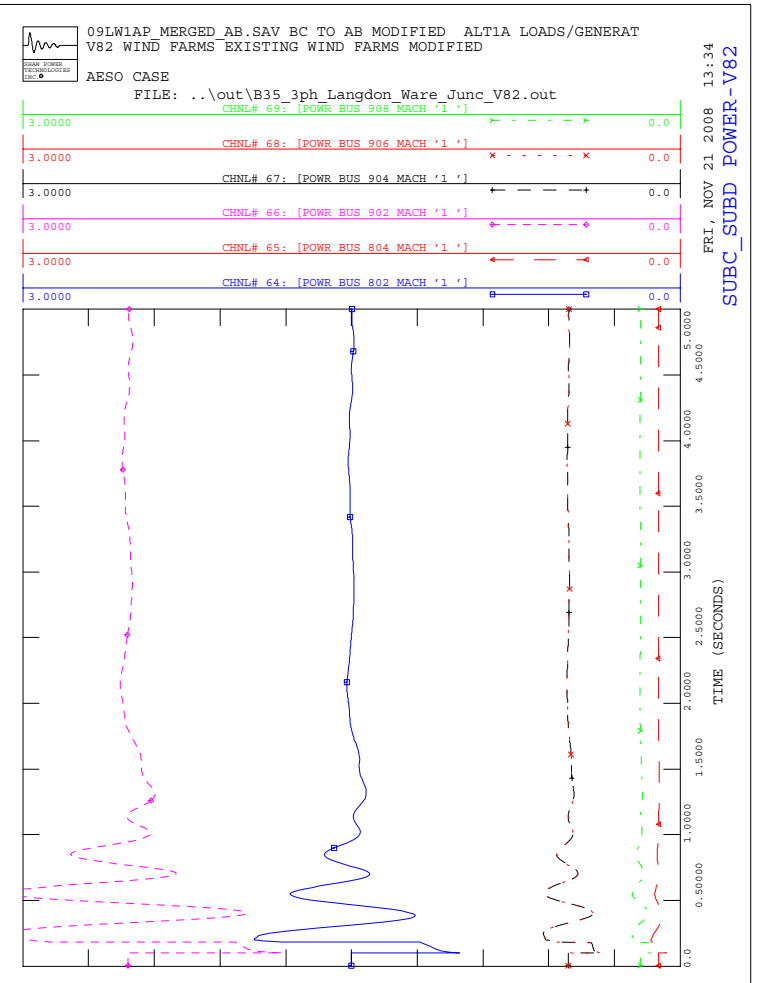
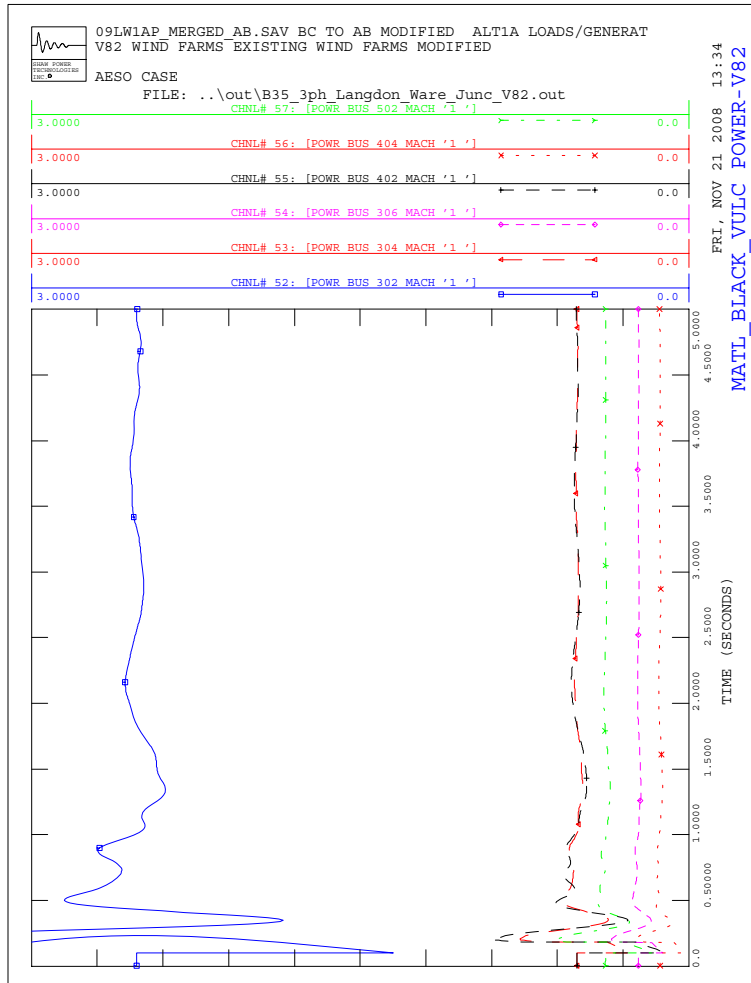
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

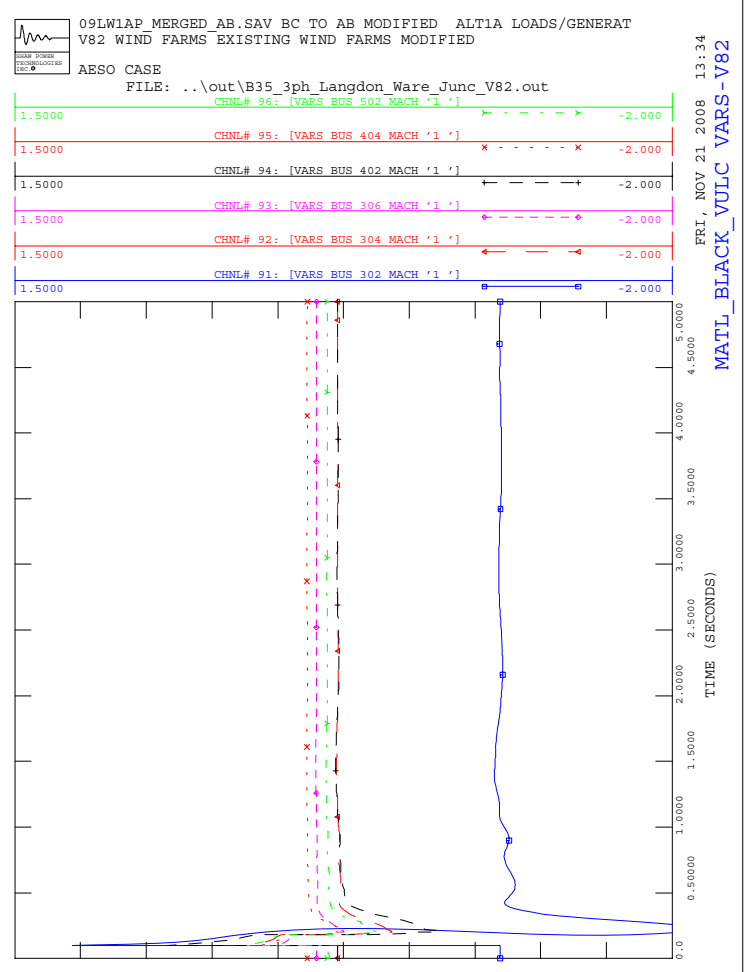
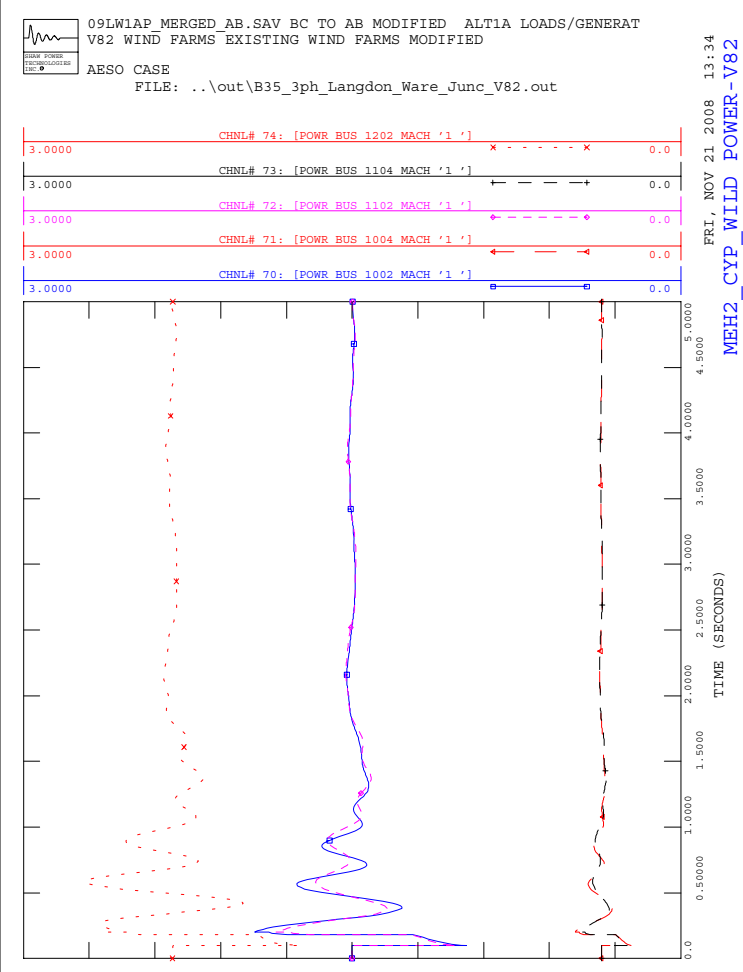
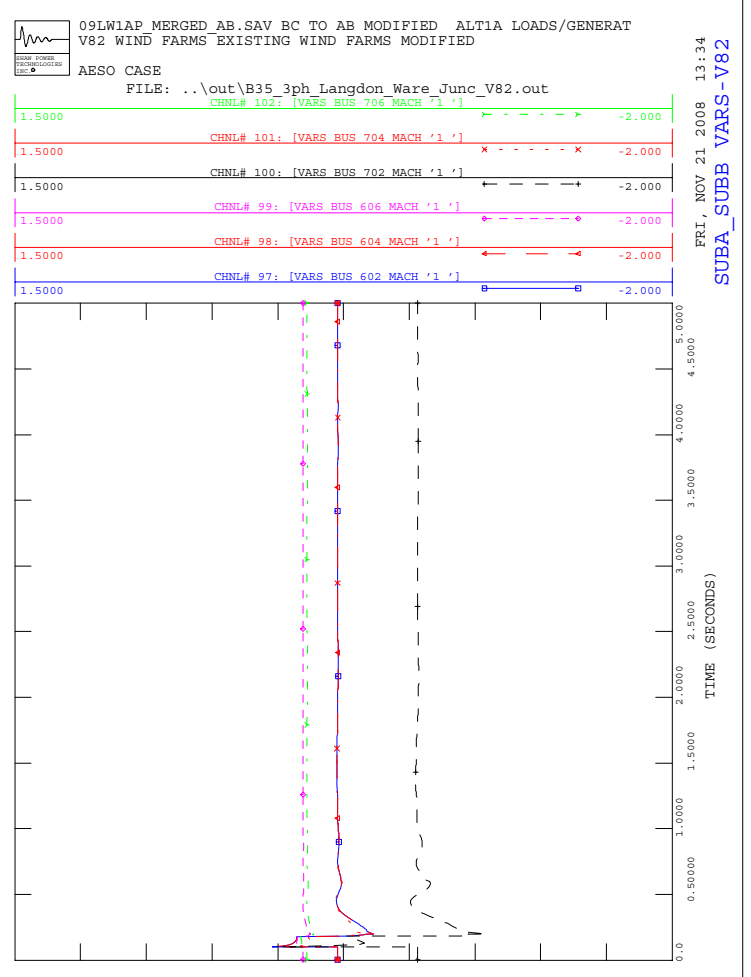
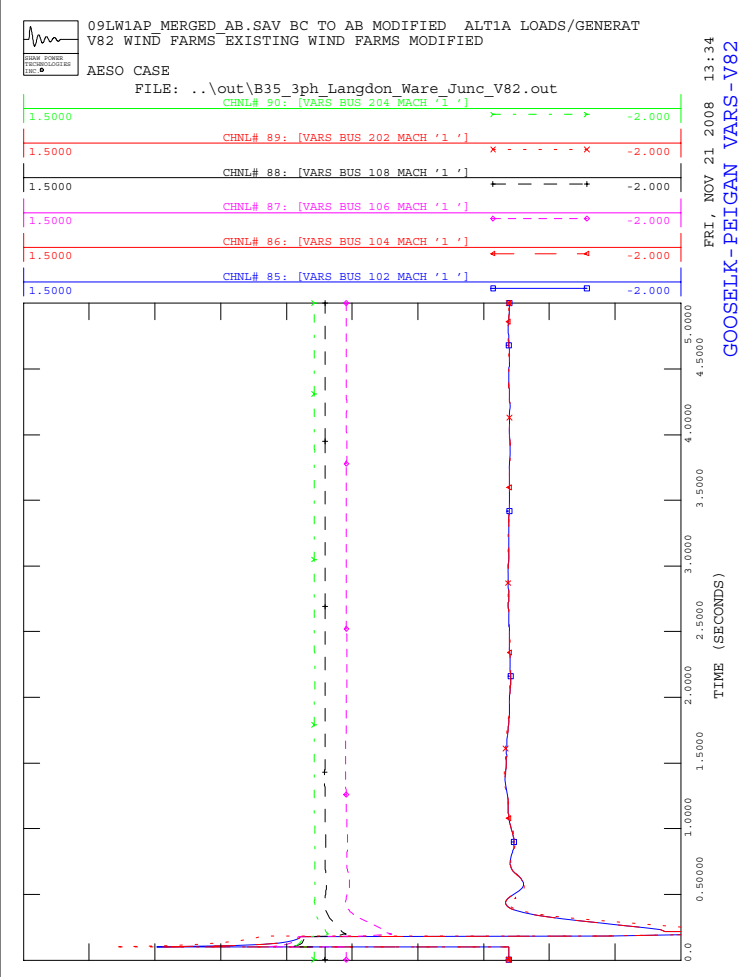
ABSO CASE

FILE: ..\out\B30_3ph_SubG_Milo_V82.out

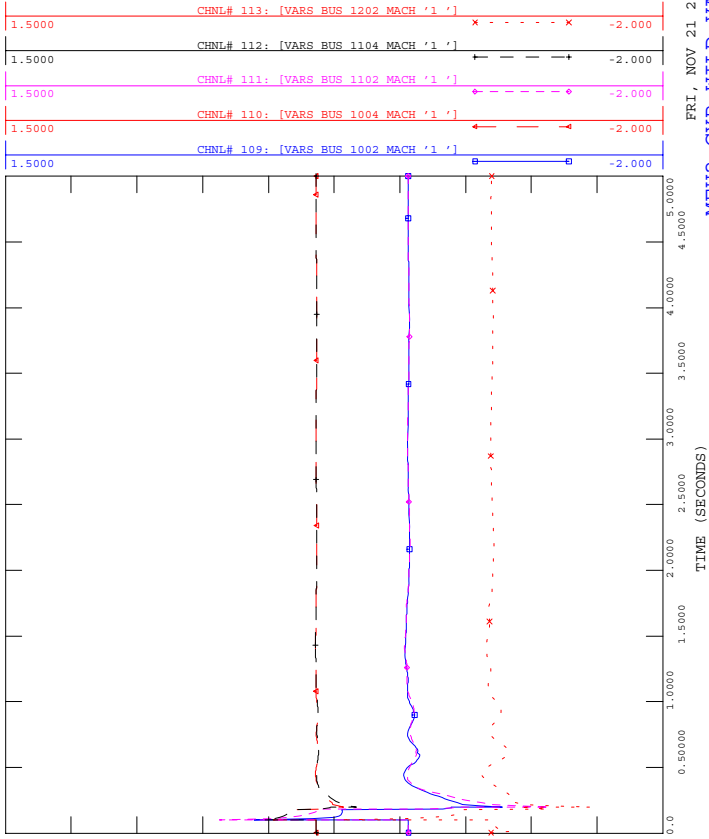
FRI, NOV 21 2008 13:33
AB_BC_TIE_FLOWS-V82





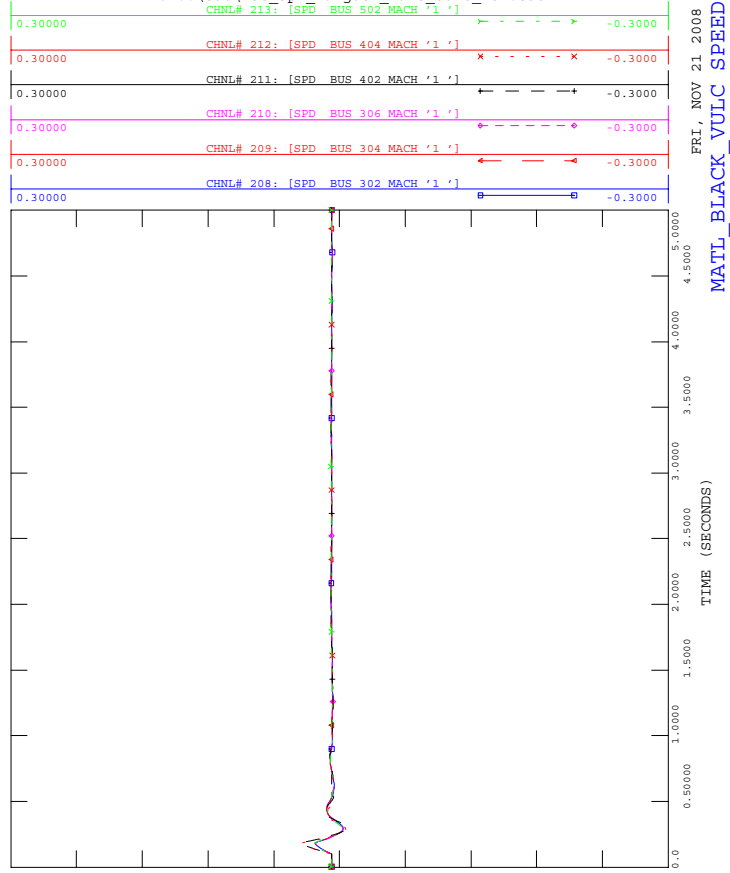


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
 FILE: ..\out\B35_3ph_Langdon_Ware_Junc_V82.out



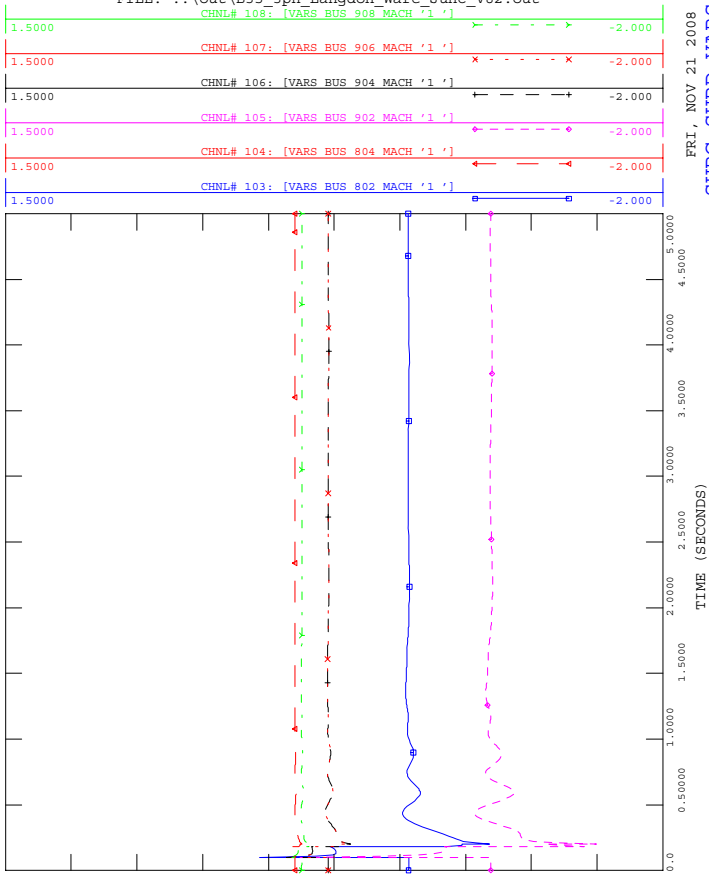
FRI, NOV 21 2008 13:34

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
 FILE: ..\out\B35_3ph_Langdon_Ware_Junc_V82.out



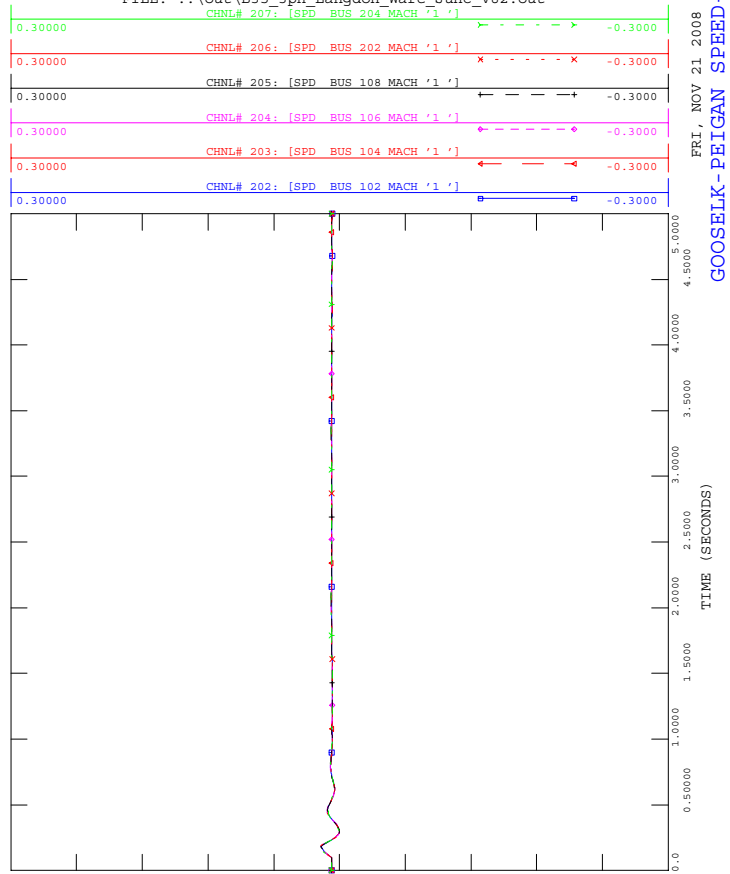
FRI, NOV 21 2008 13:34

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
 FILE: ..\out\B35_3ph_Langdon_Ware_Junc_V82.out

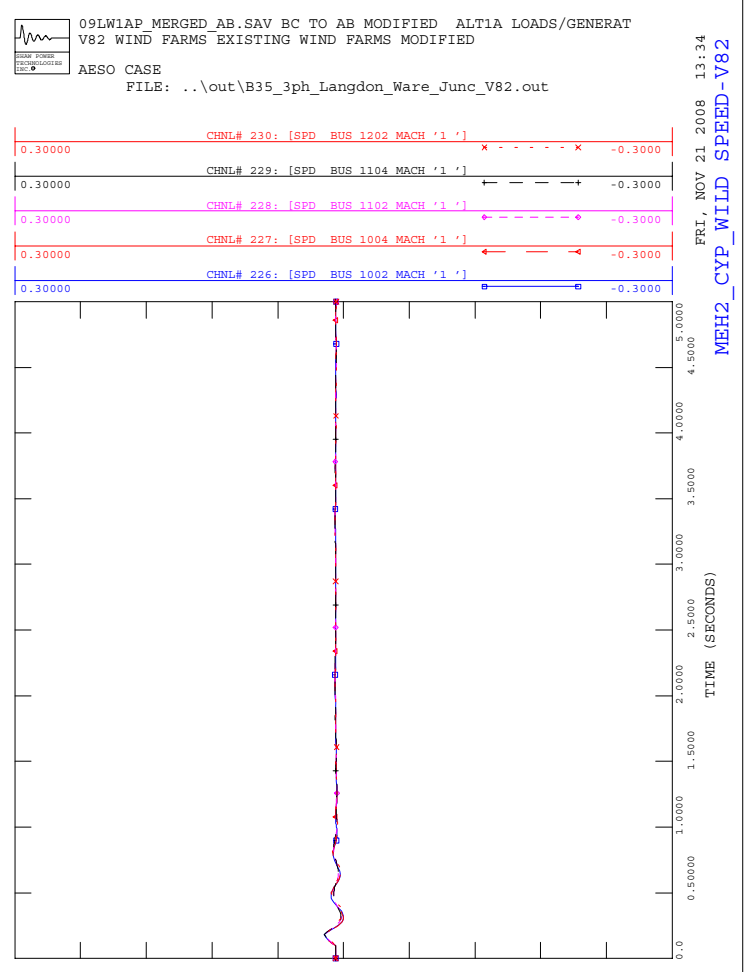
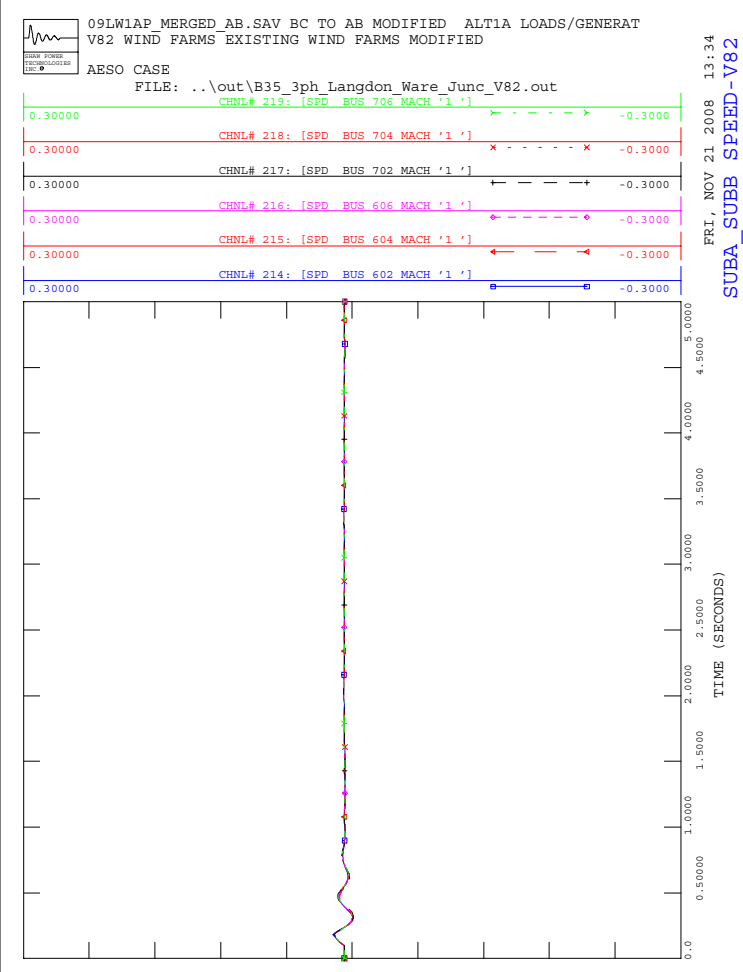
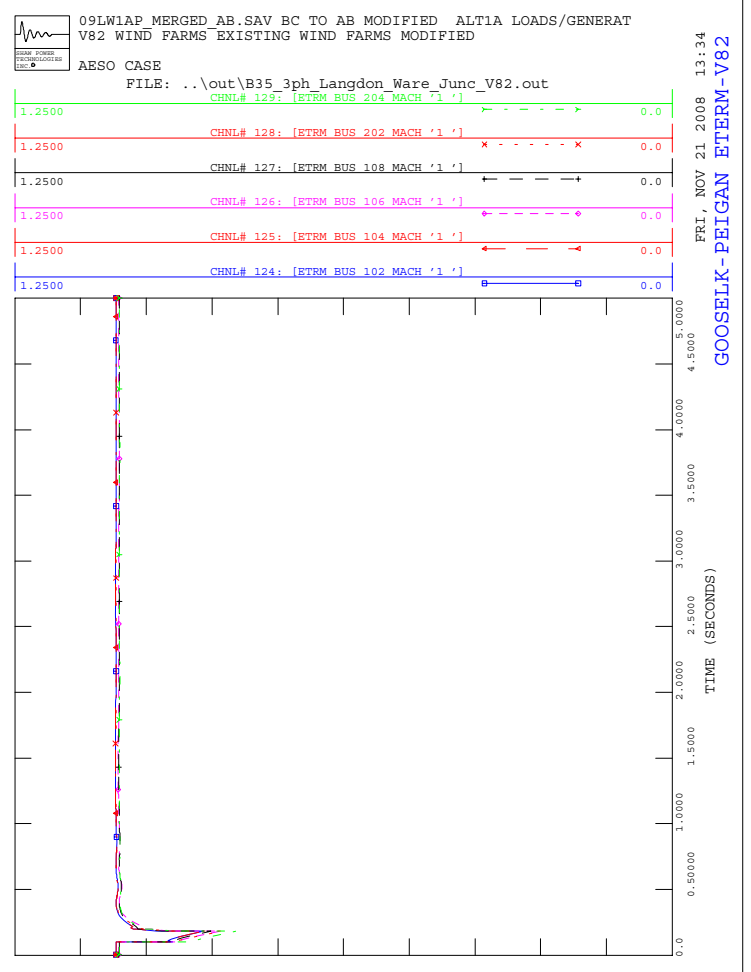
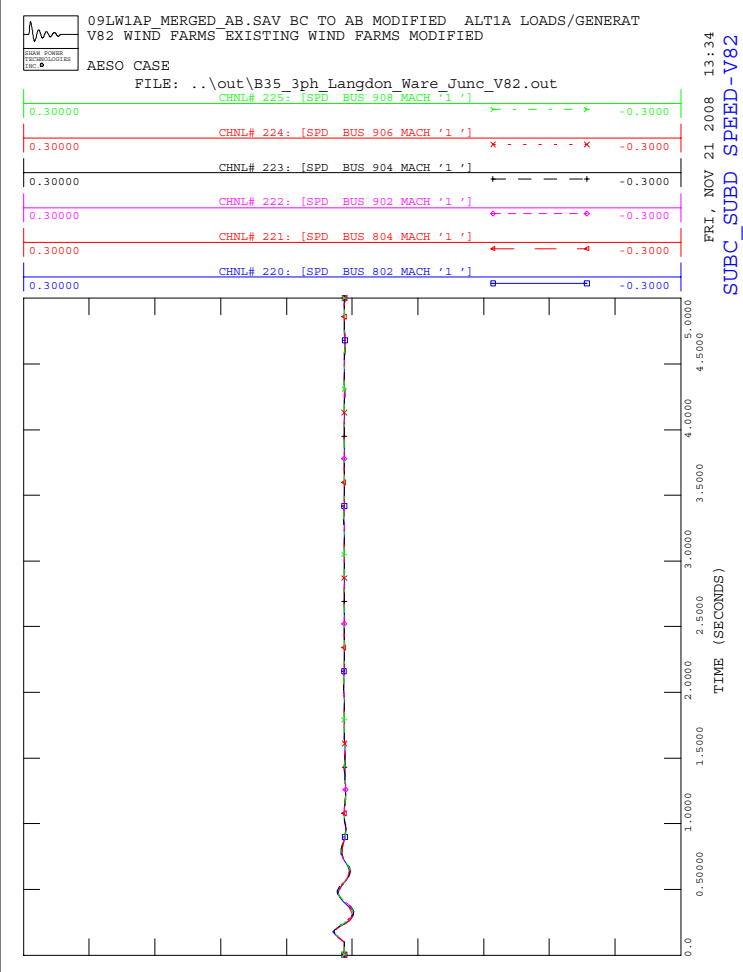


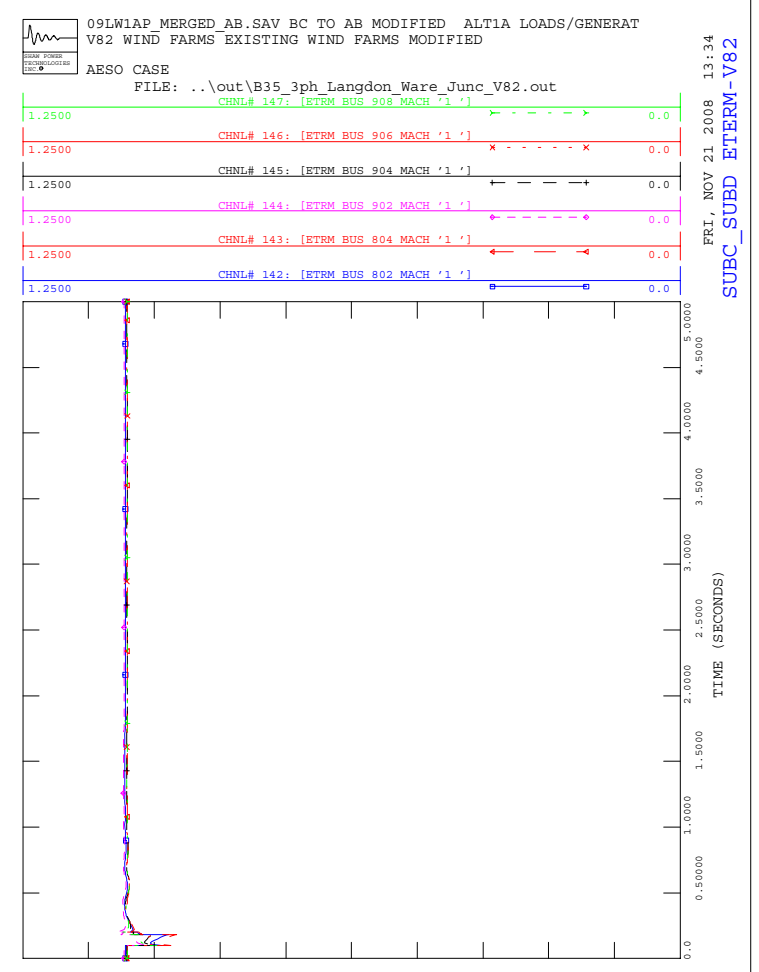
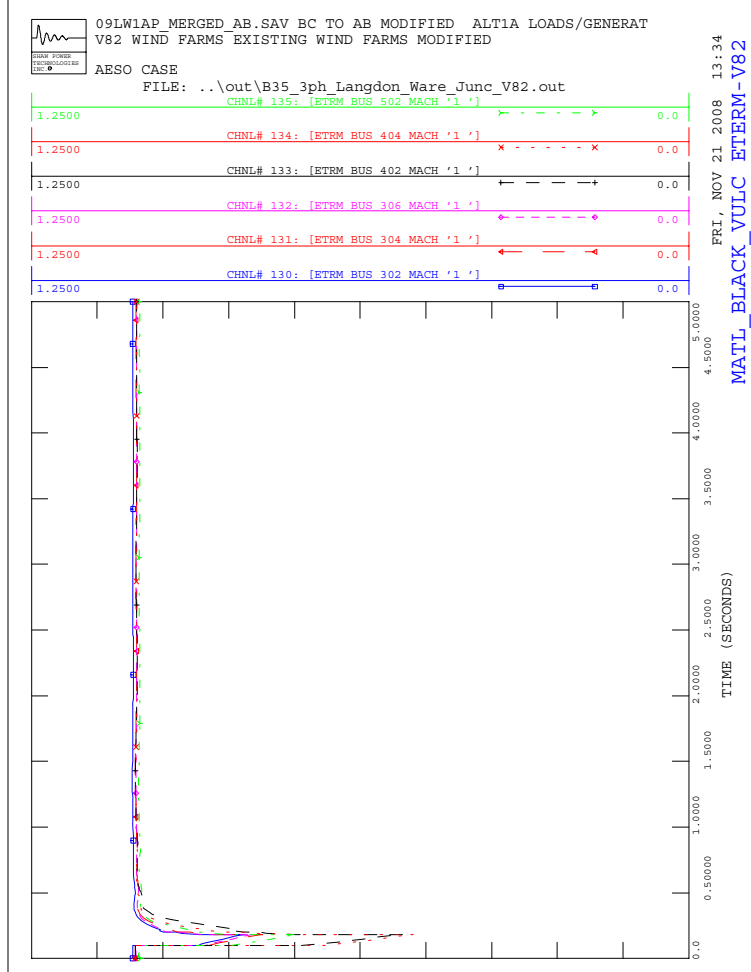
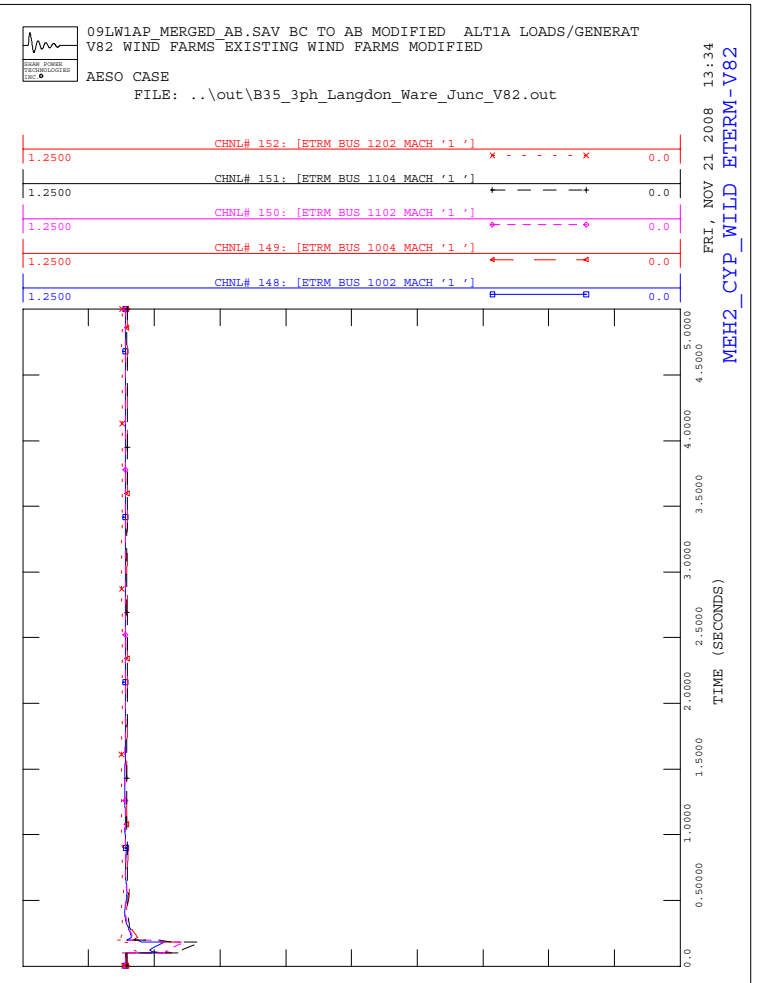
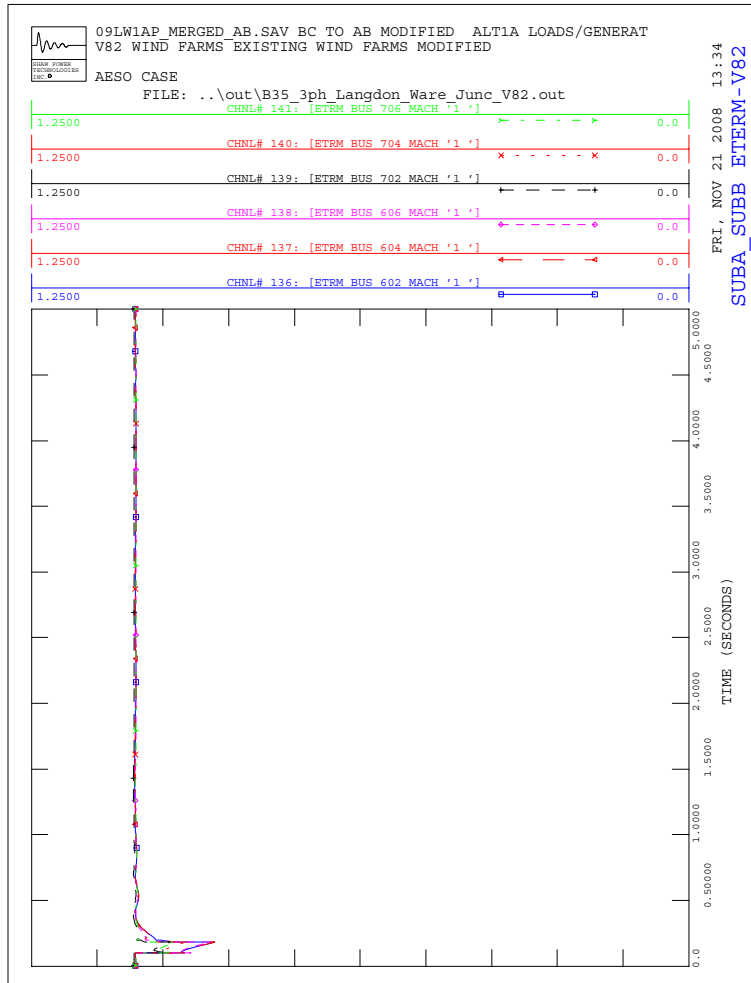
FRI, NOV 21 2008 13:34

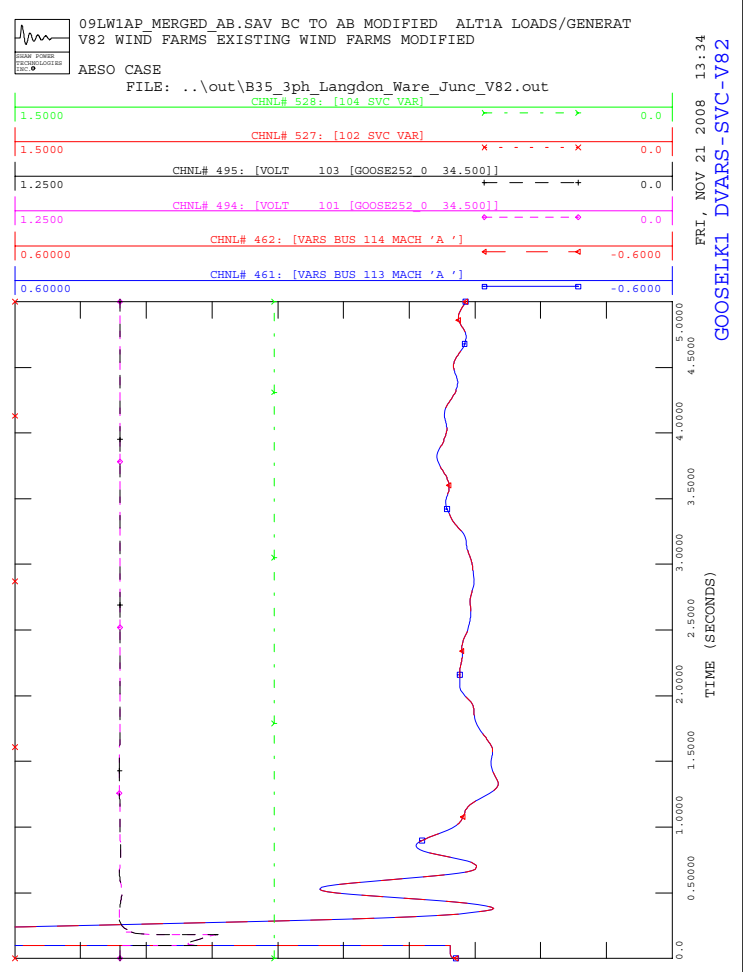
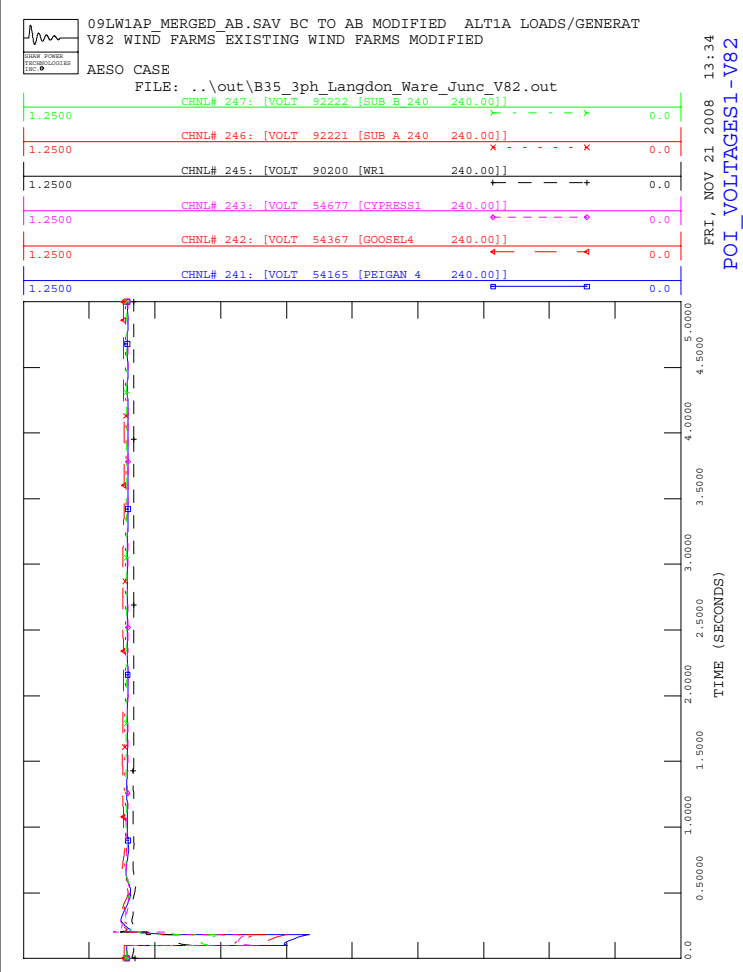
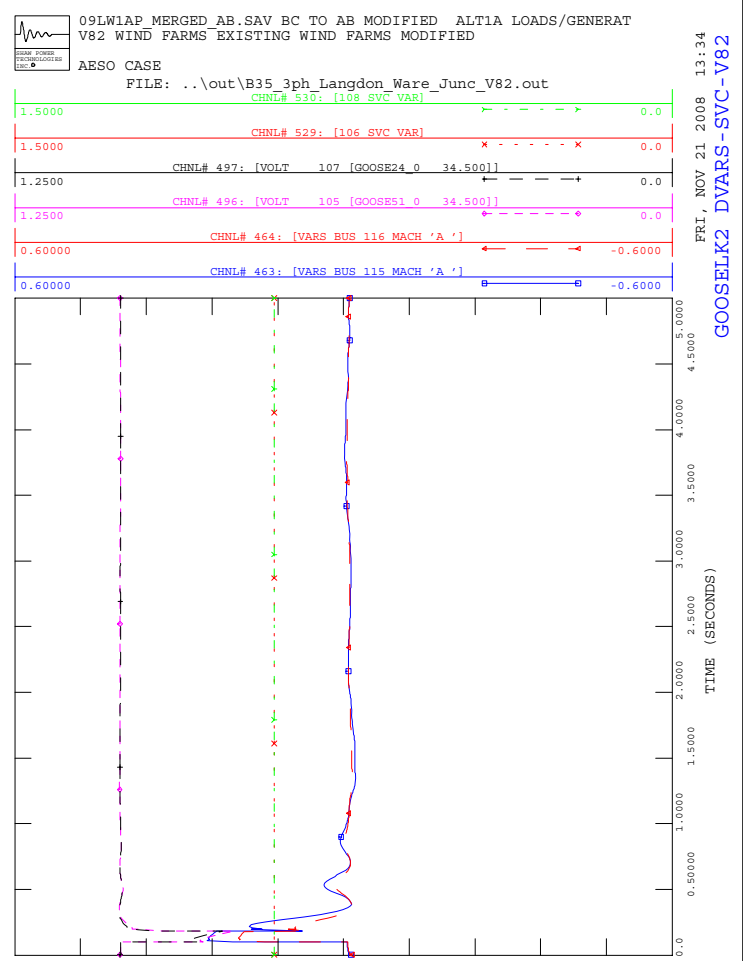
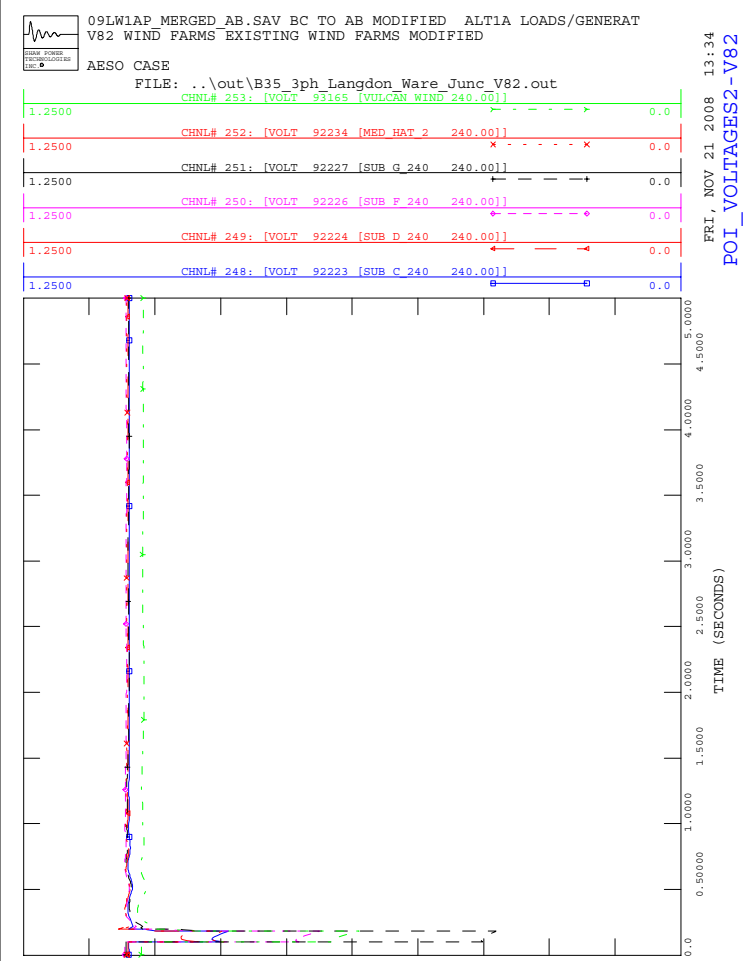
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
 FILE: ..\out\B35_3ph_Langdon_Ware_Junc_V82.out

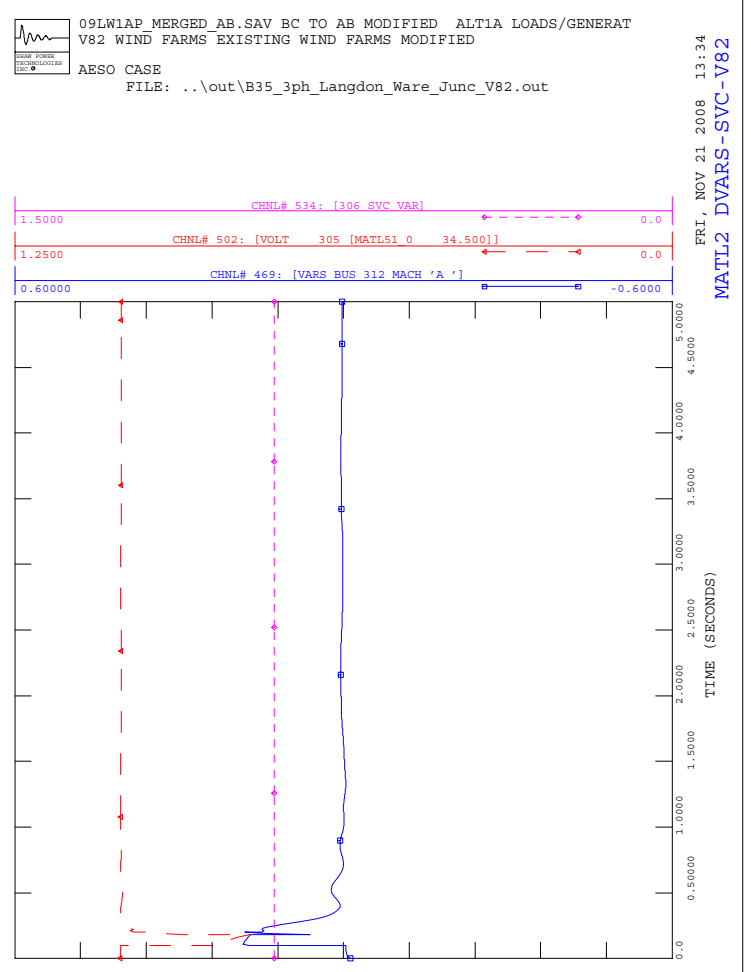
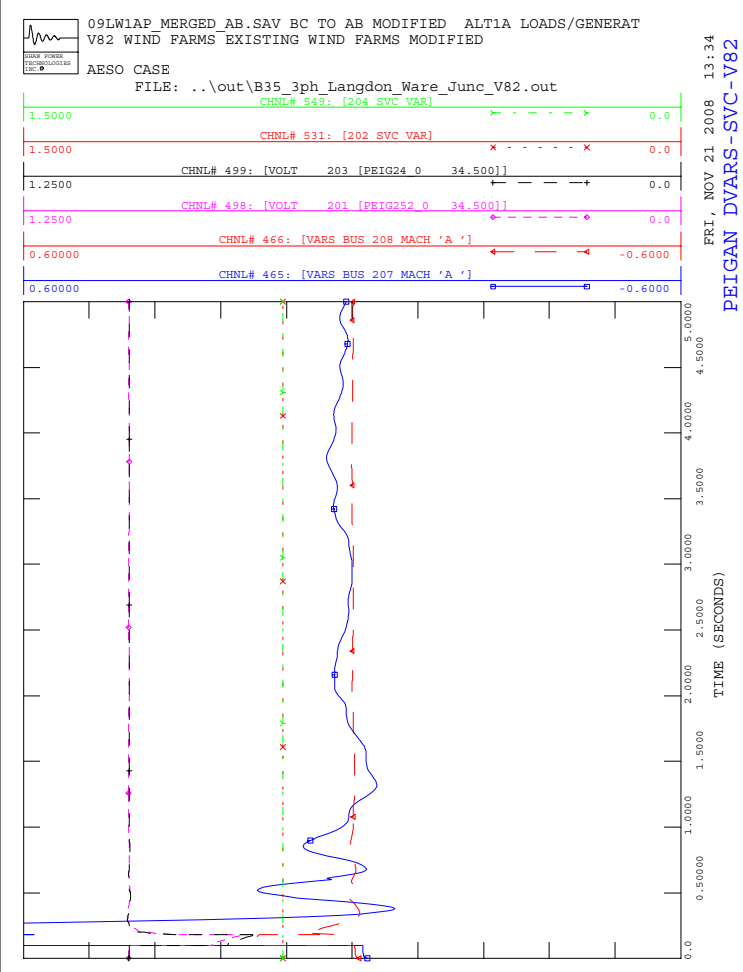
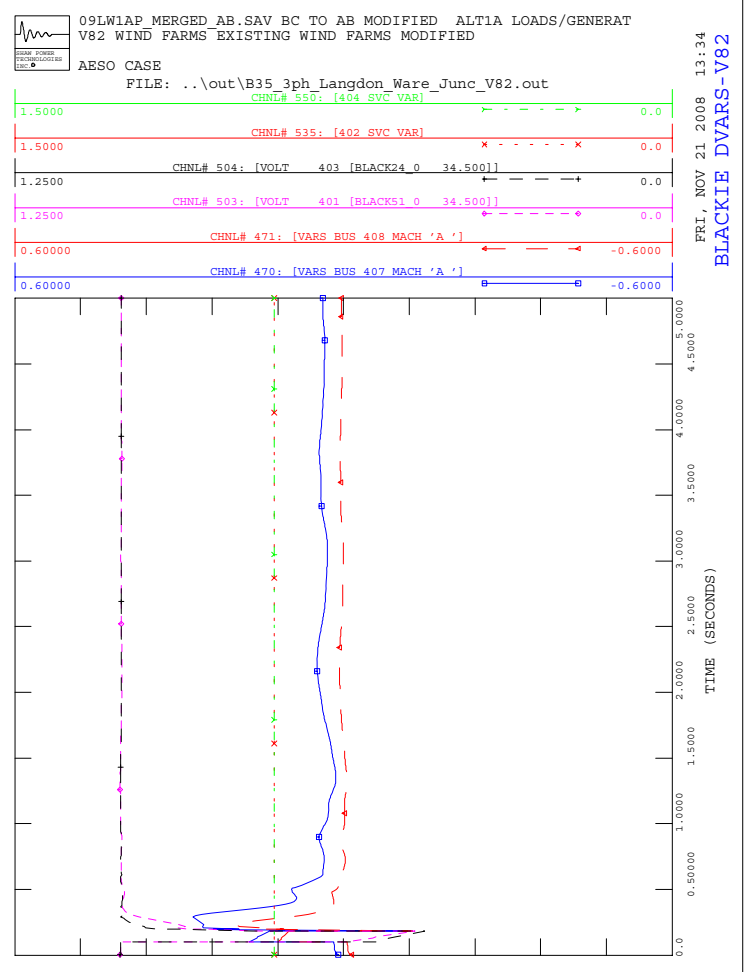
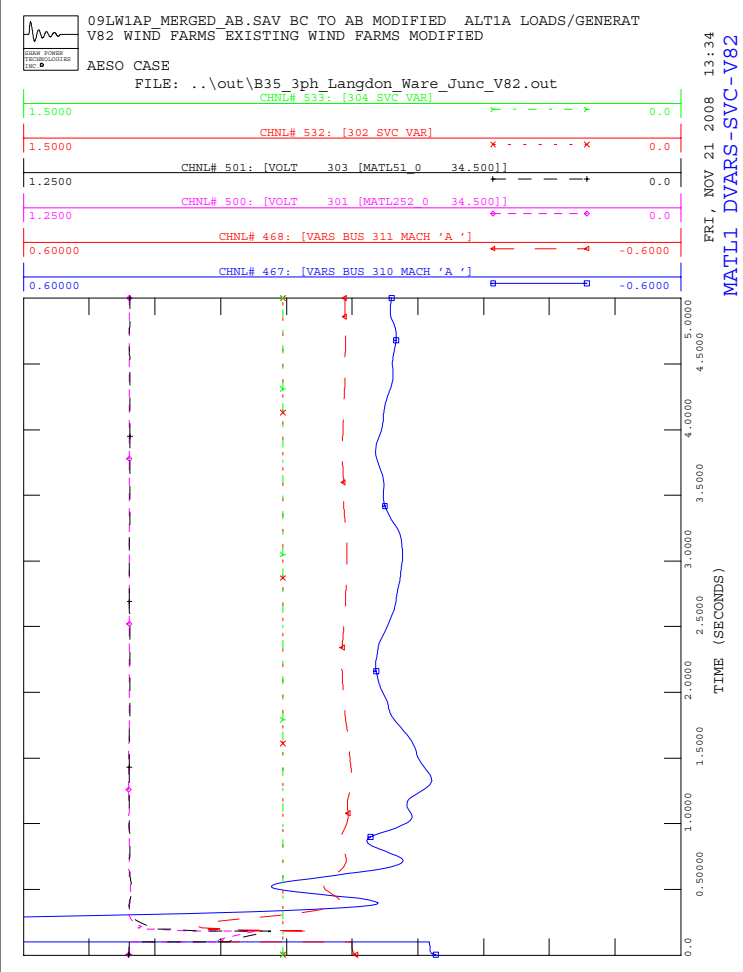


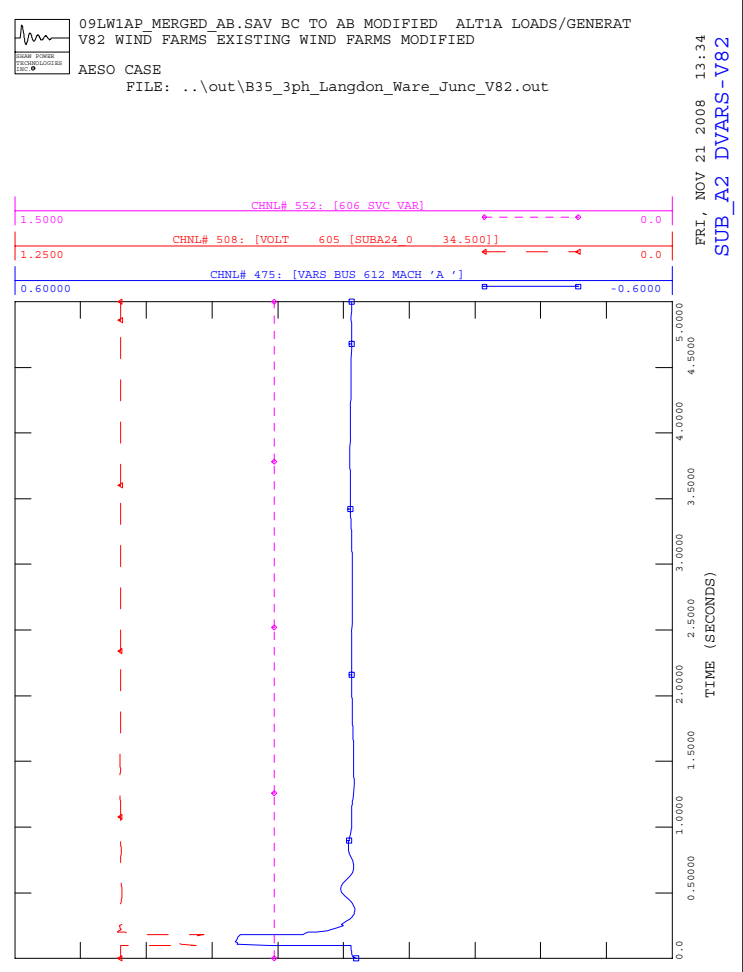
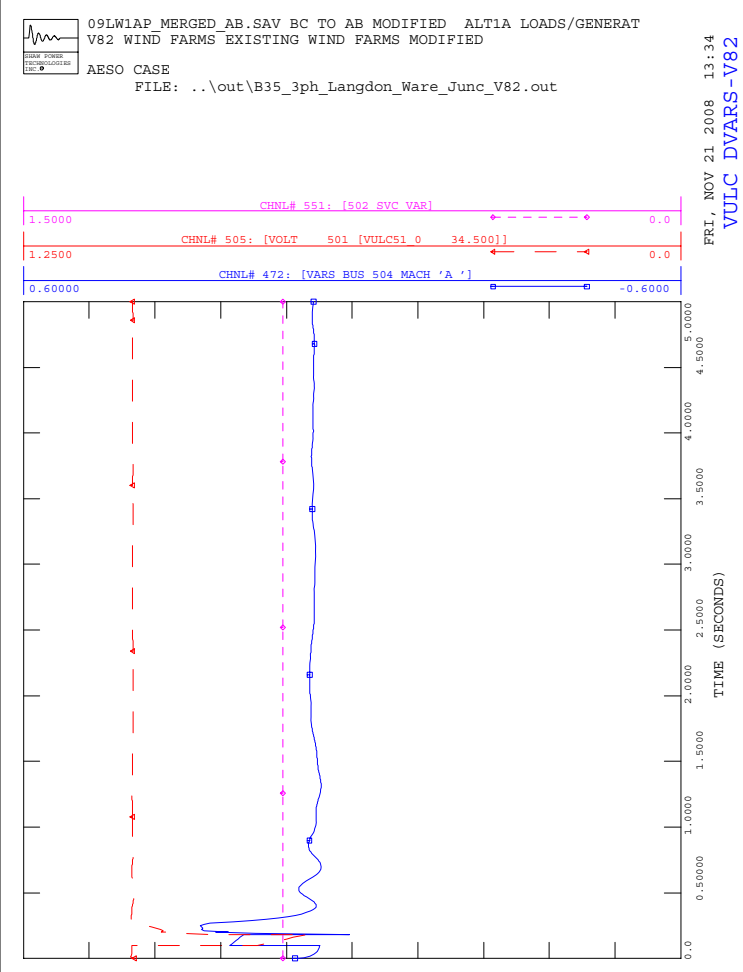
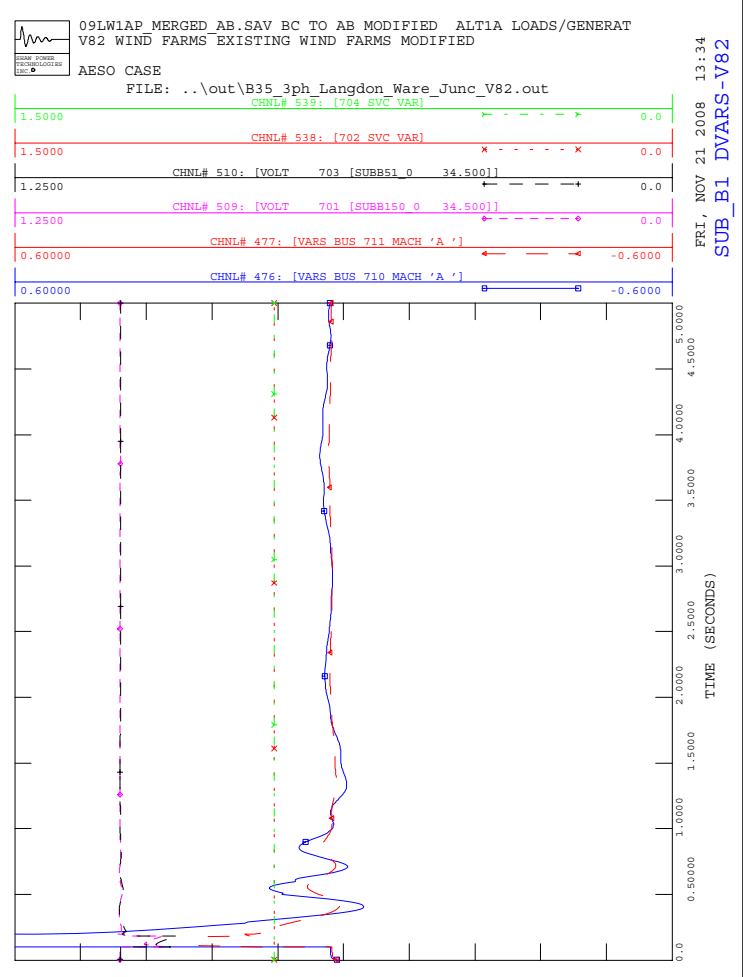
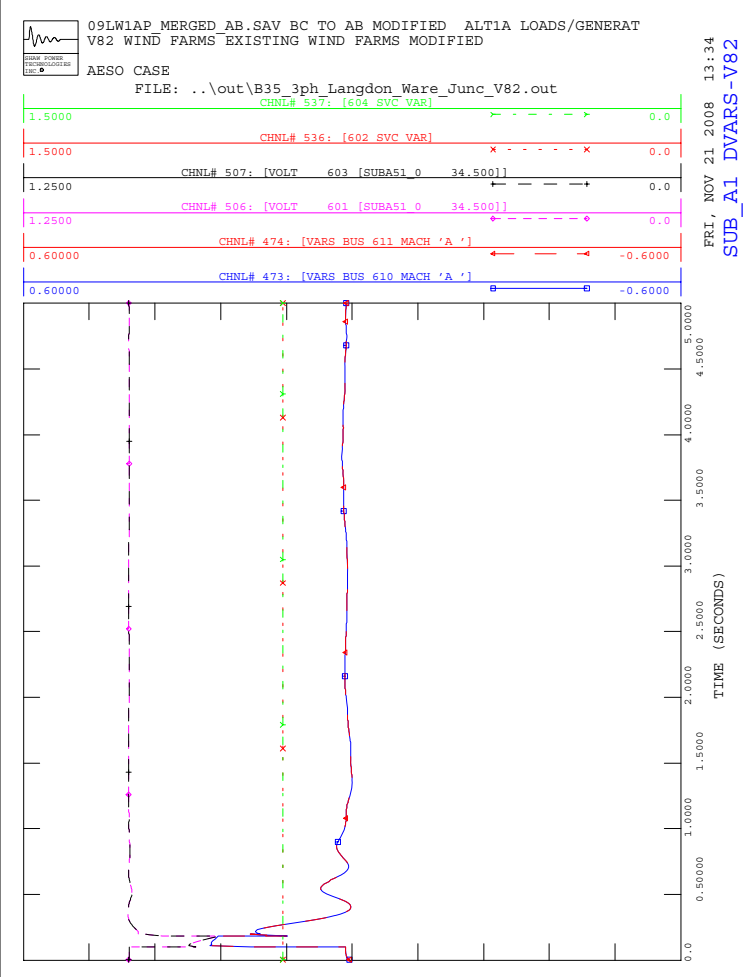
FRI, NOV 21 2008 13:34

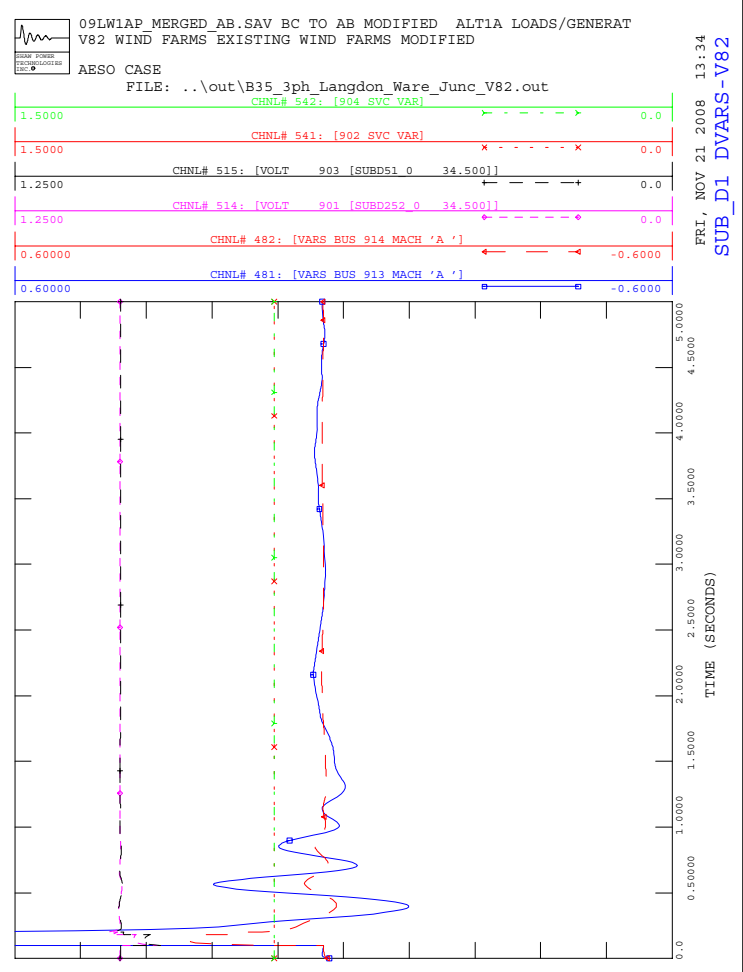
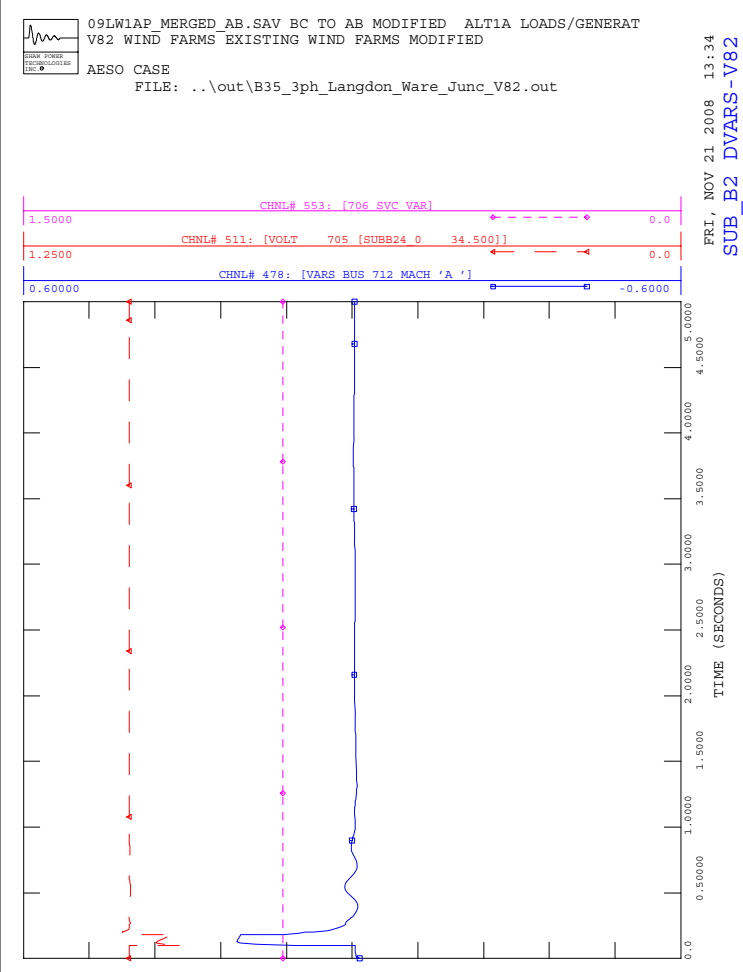
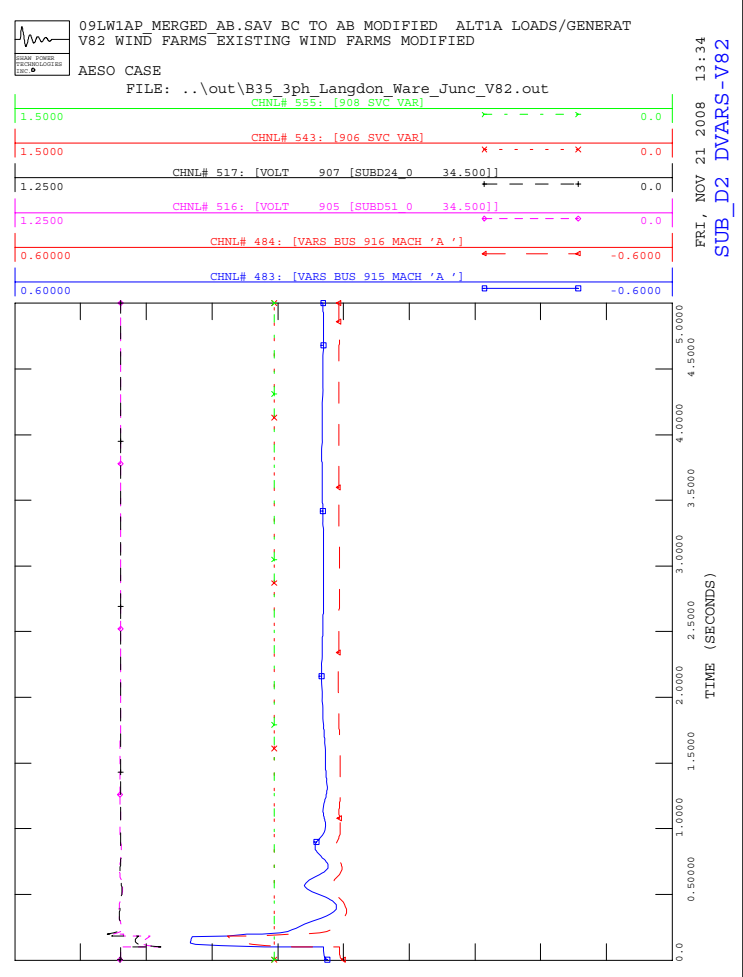
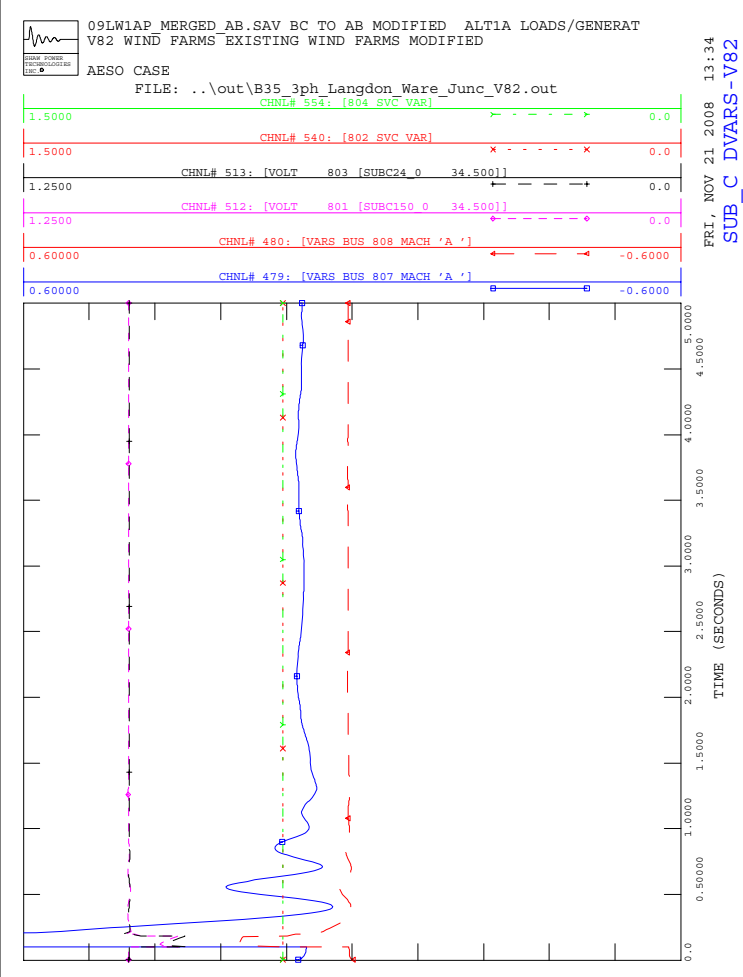


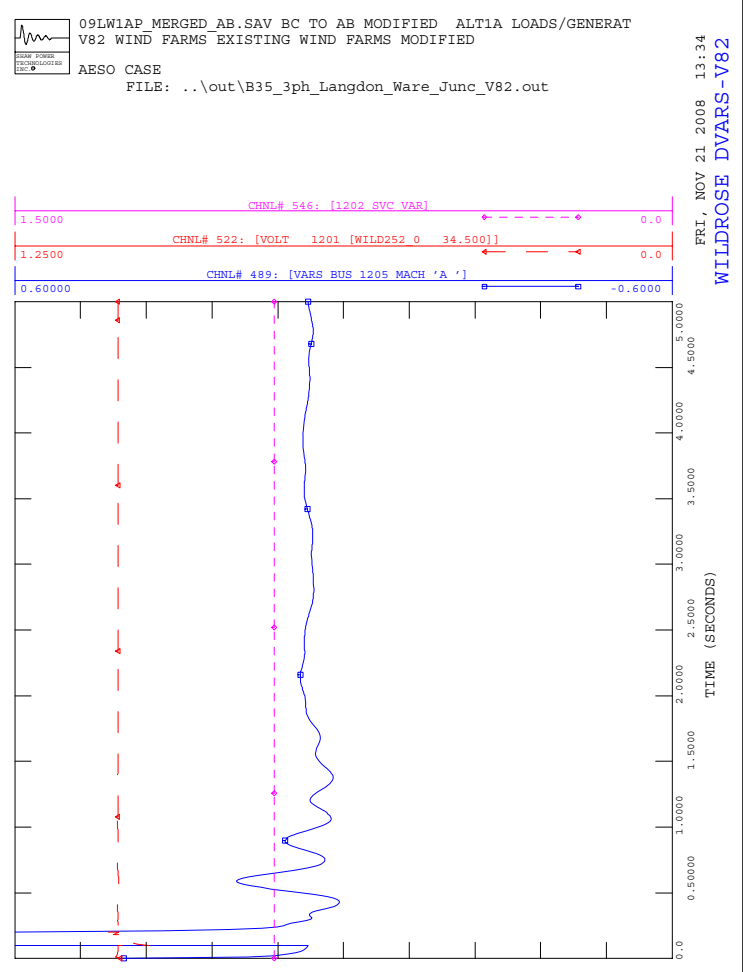
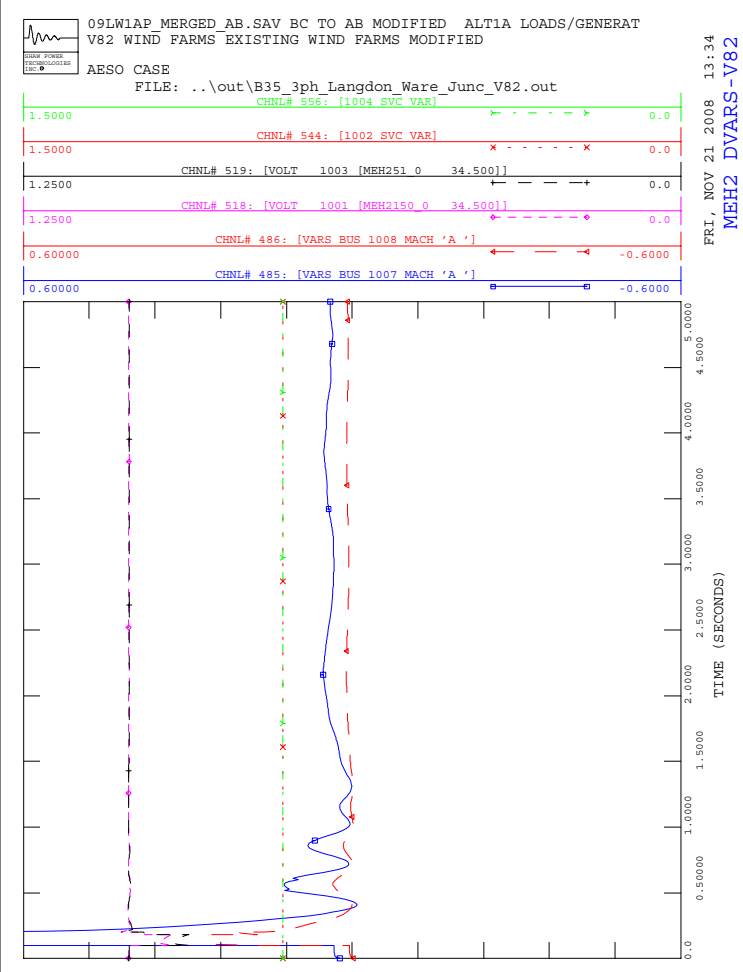
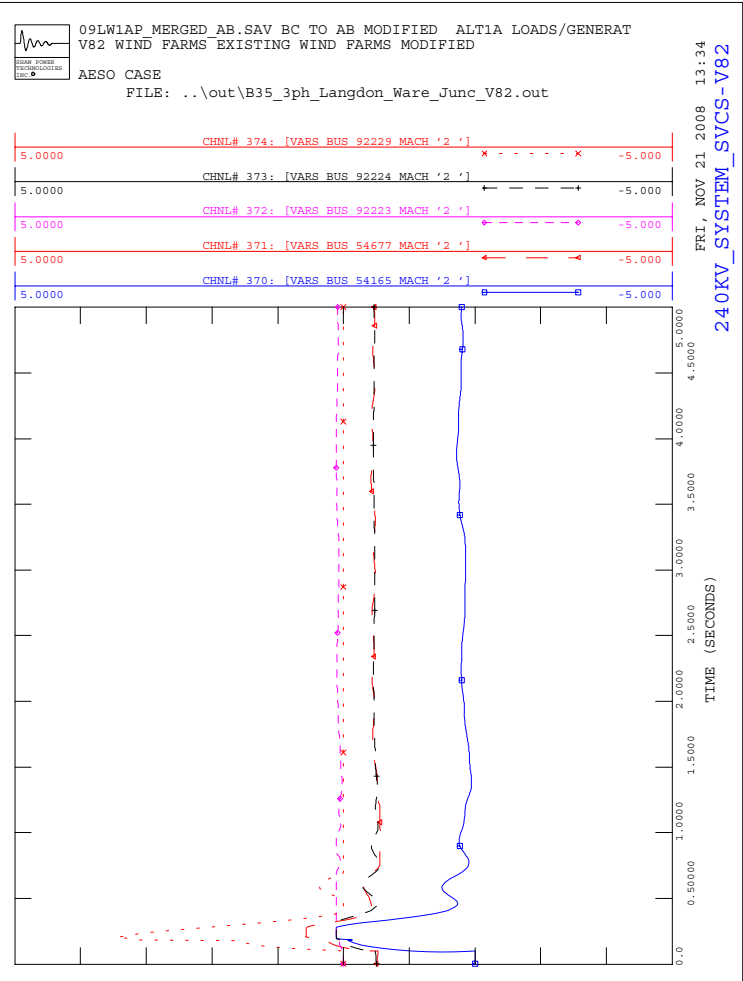
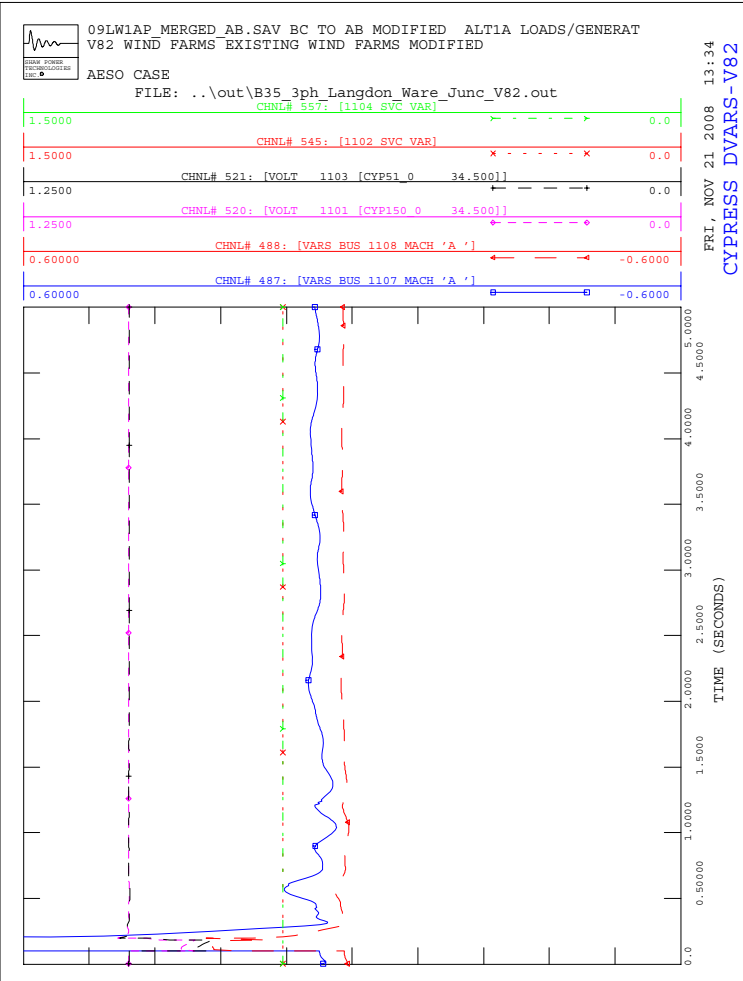












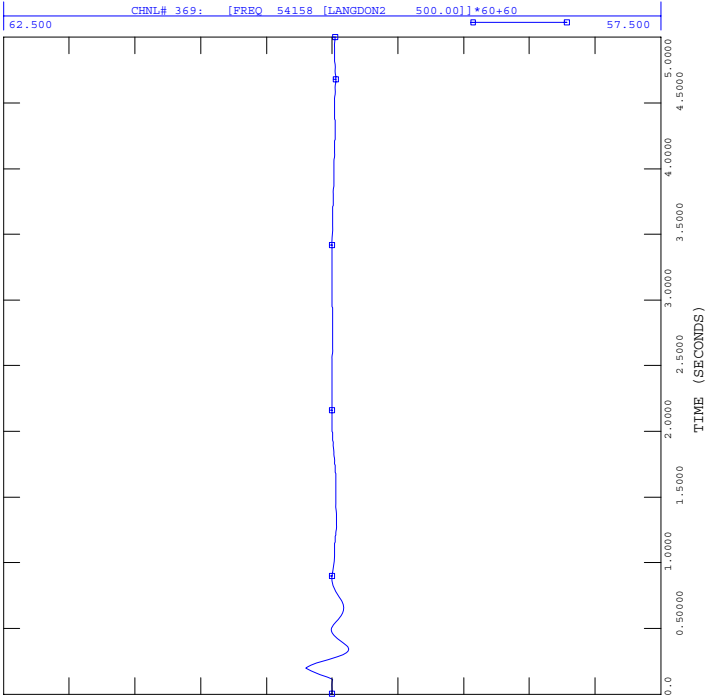


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B35_3ph_Langdon_Ware_Junc_V82.out

FRI, NOV 21 2008 13:34
LANGDON_FRQ-V82

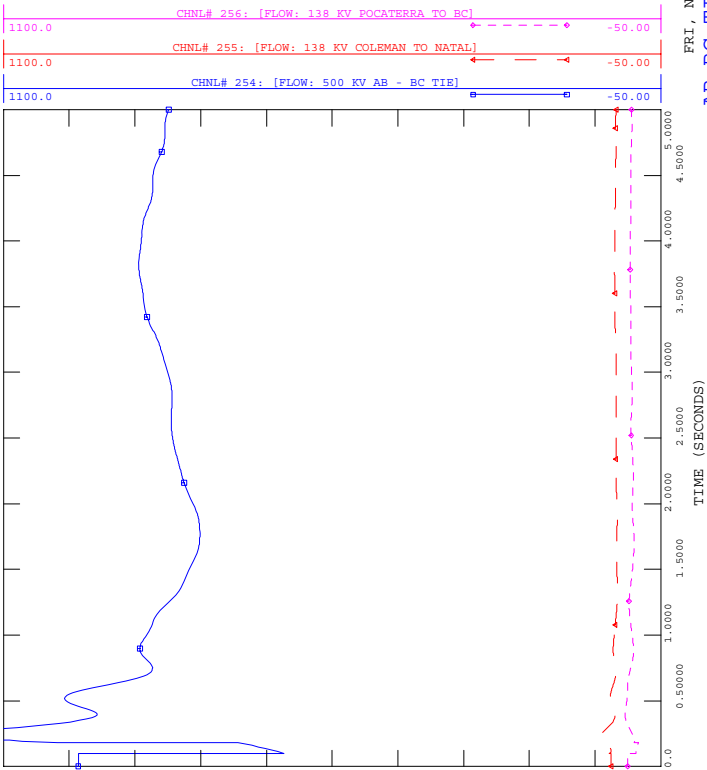


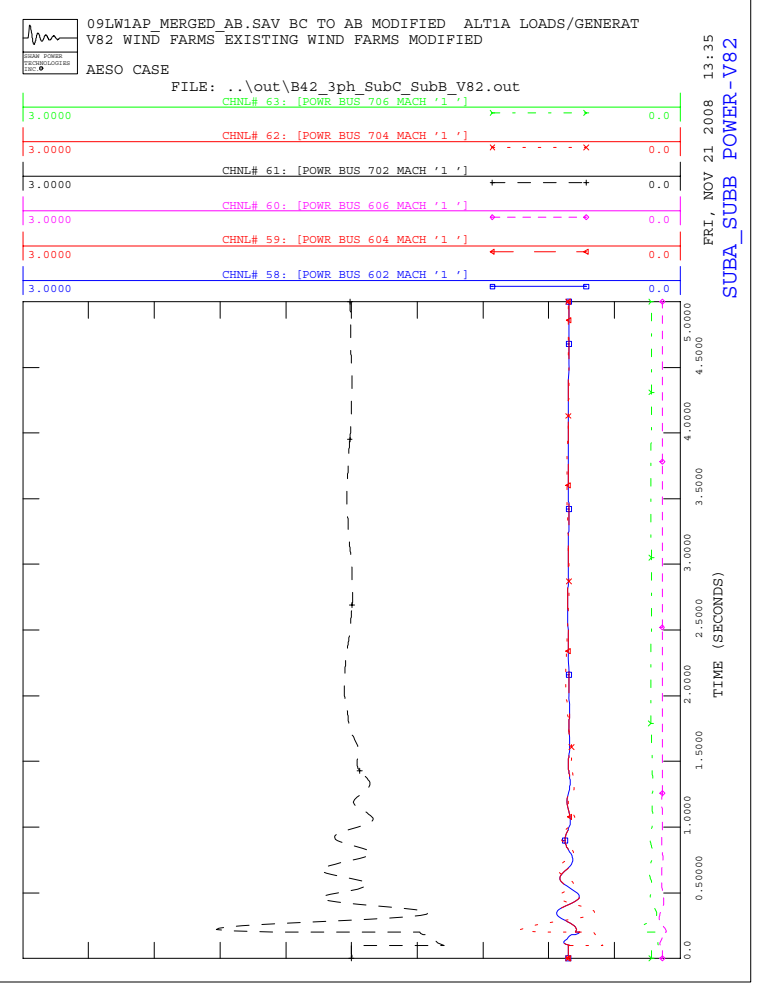
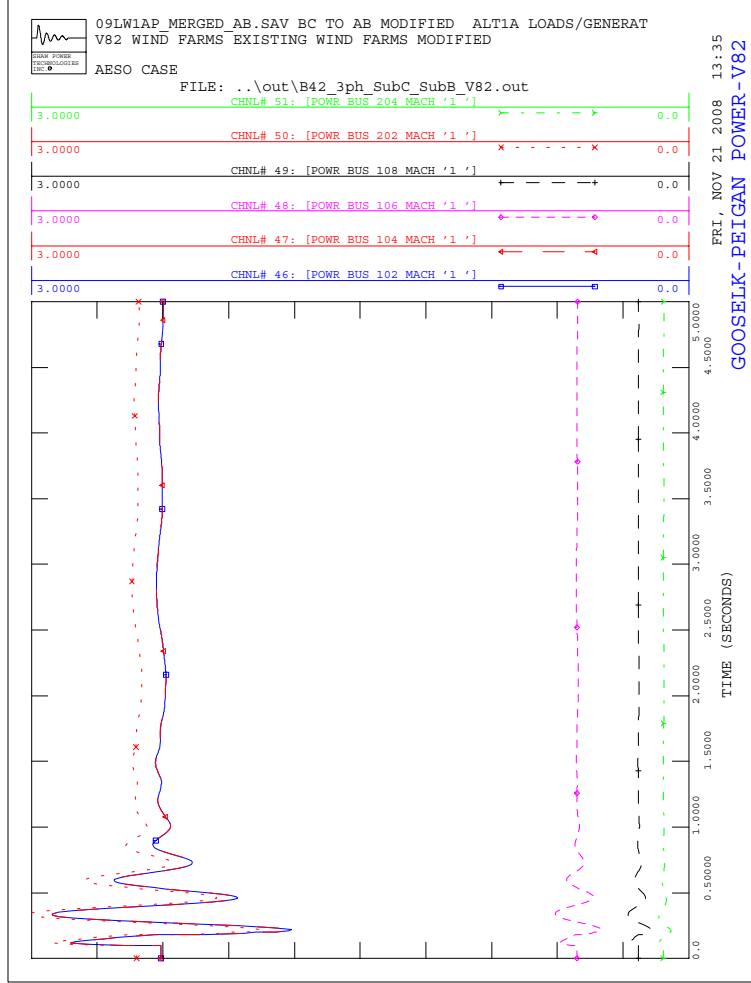
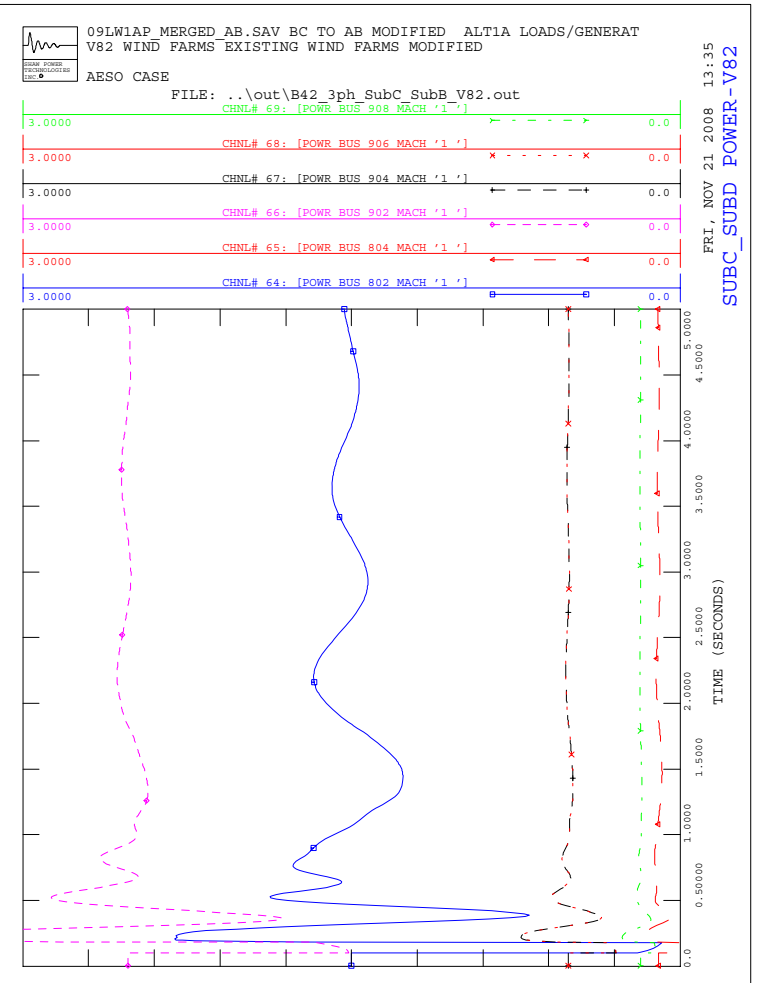
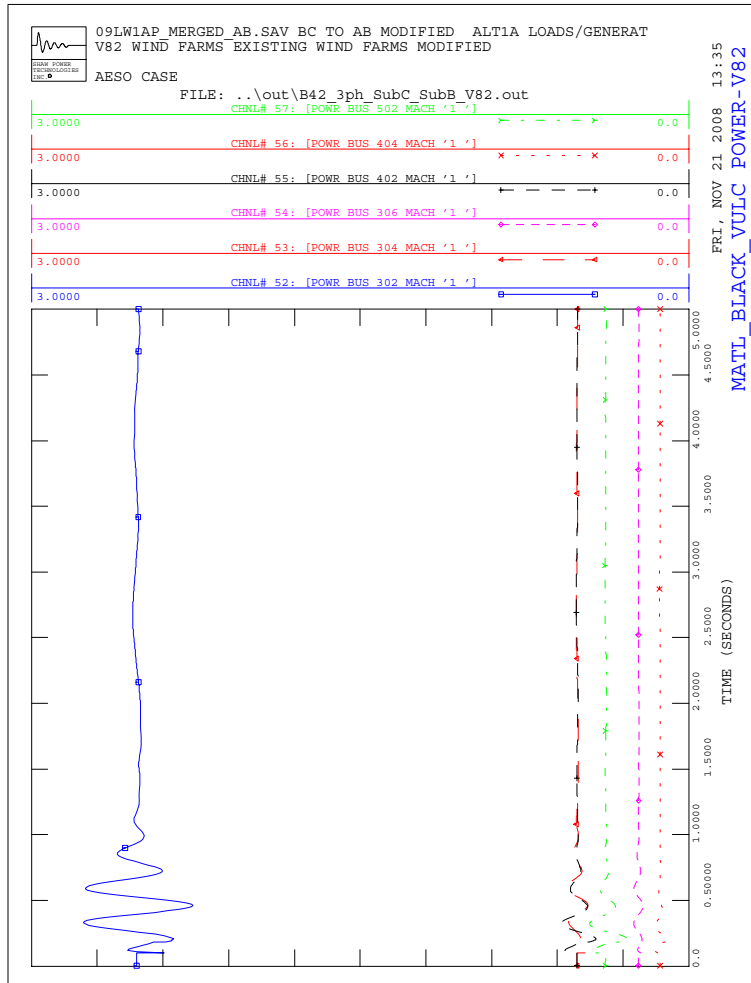
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

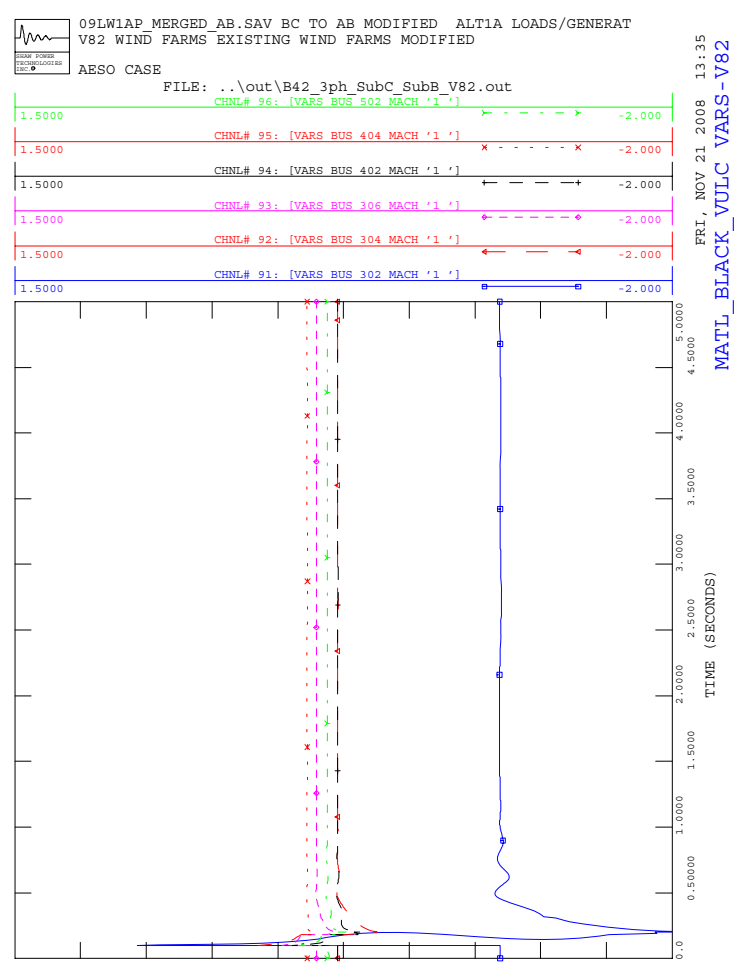
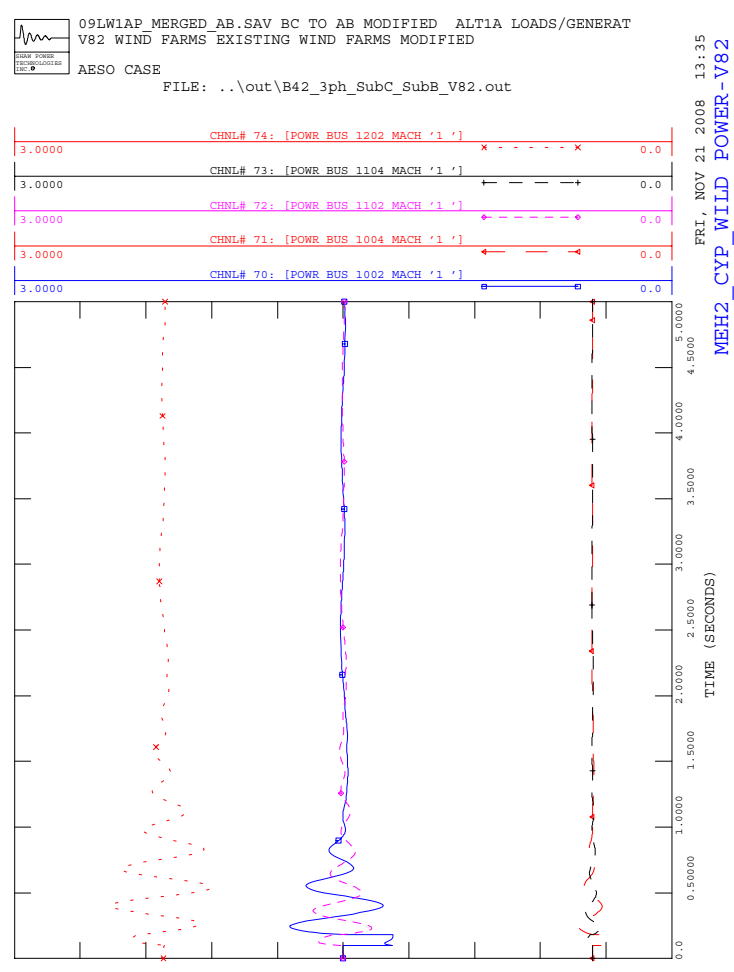
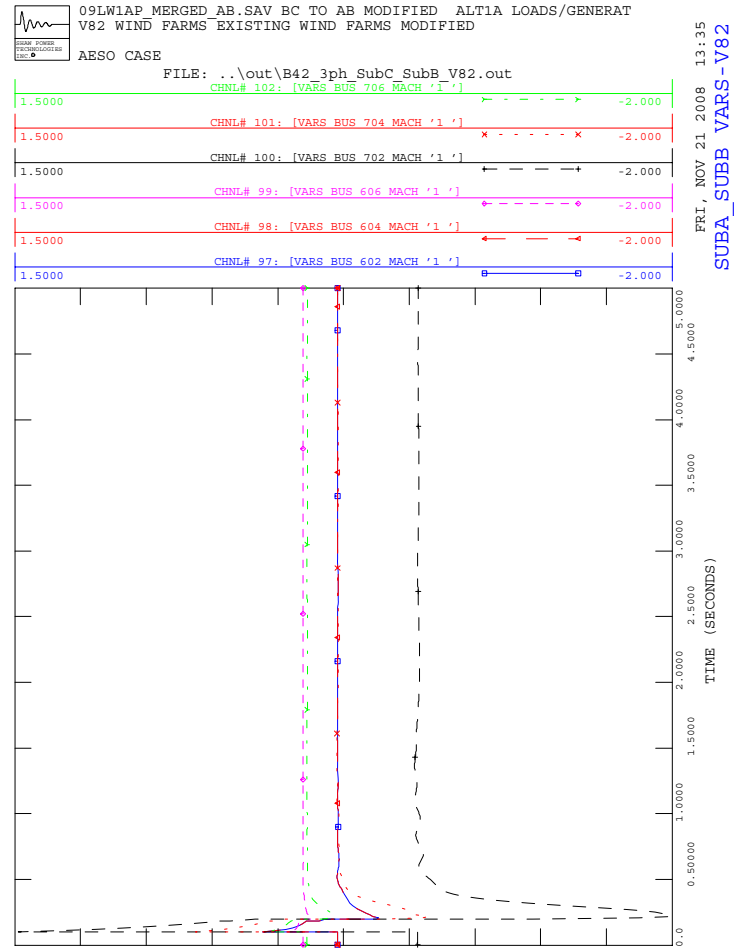
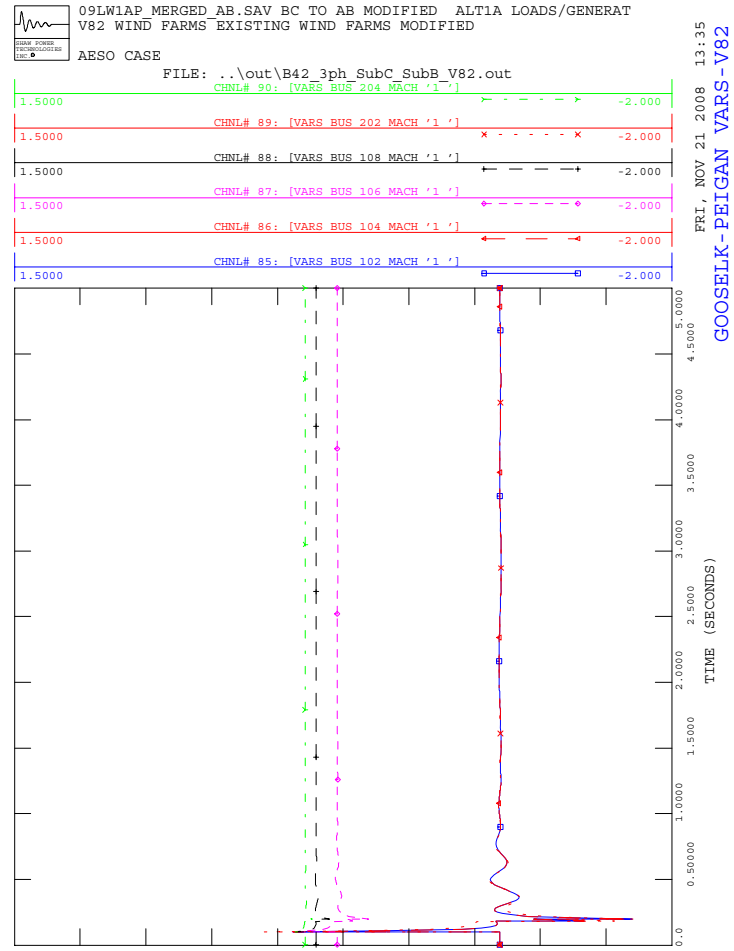
ABSO CASE

FILE: ..\out\B35_3ph_Langdon_Ware_Junc_V82.out

FRI, NOV 21 2008 13:34
AB_BC_TIE_FLOWS-V82

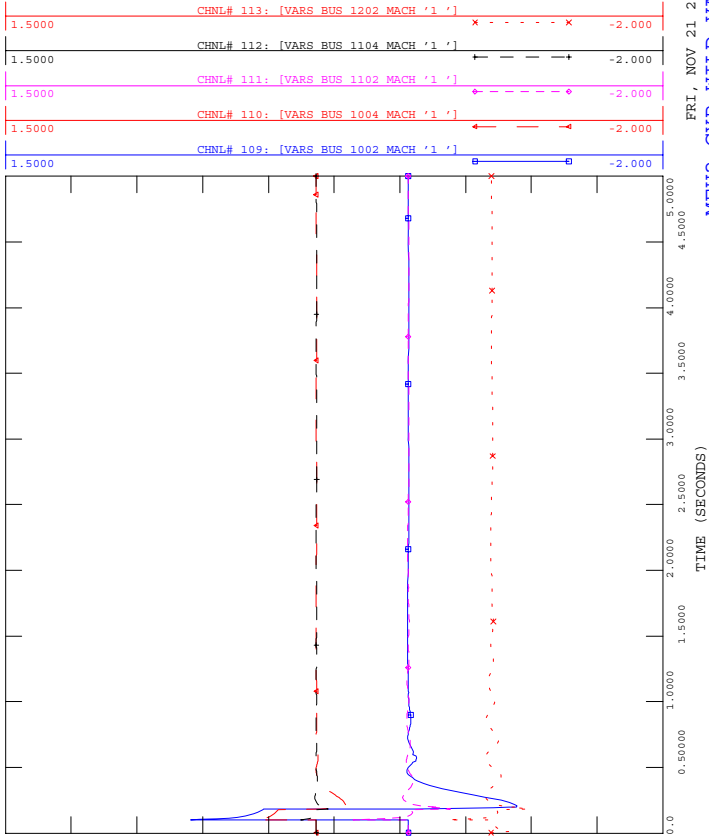






09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

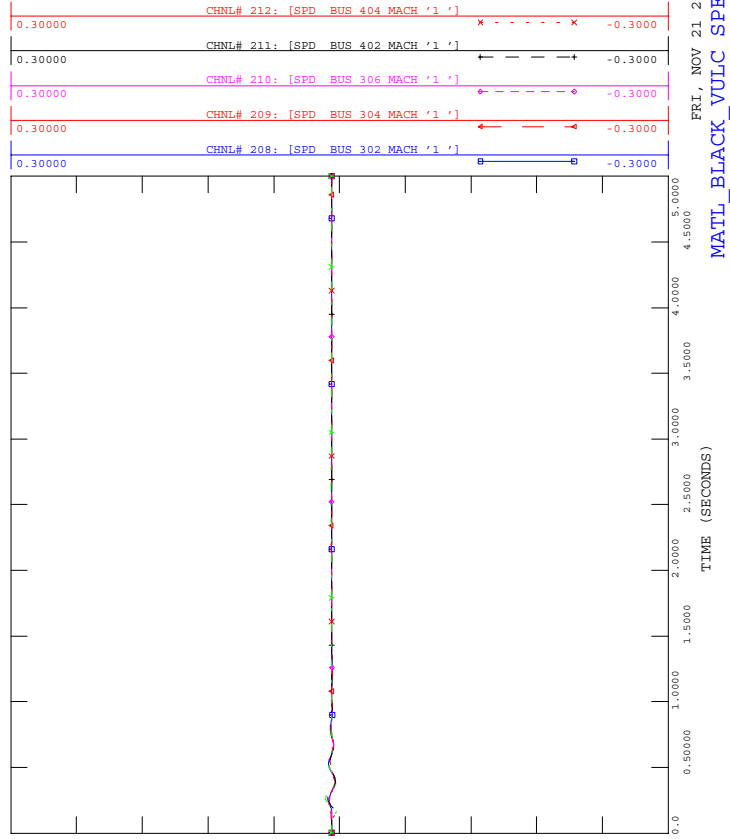
FILE: ..\out\B42_3ph_SubC_SubB_V82.out



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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

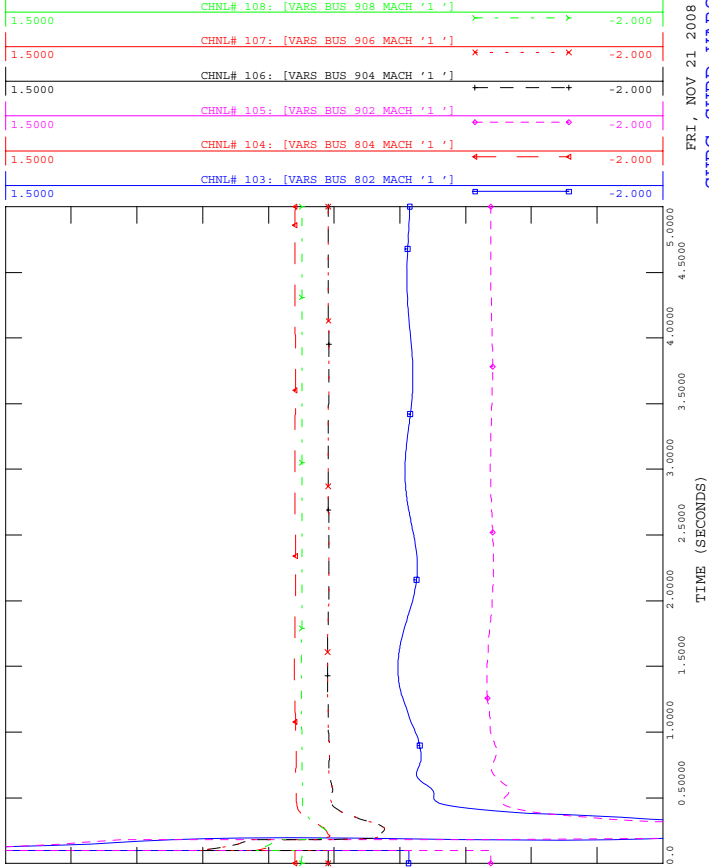
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FRI, NOV 21 2008 13:35

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

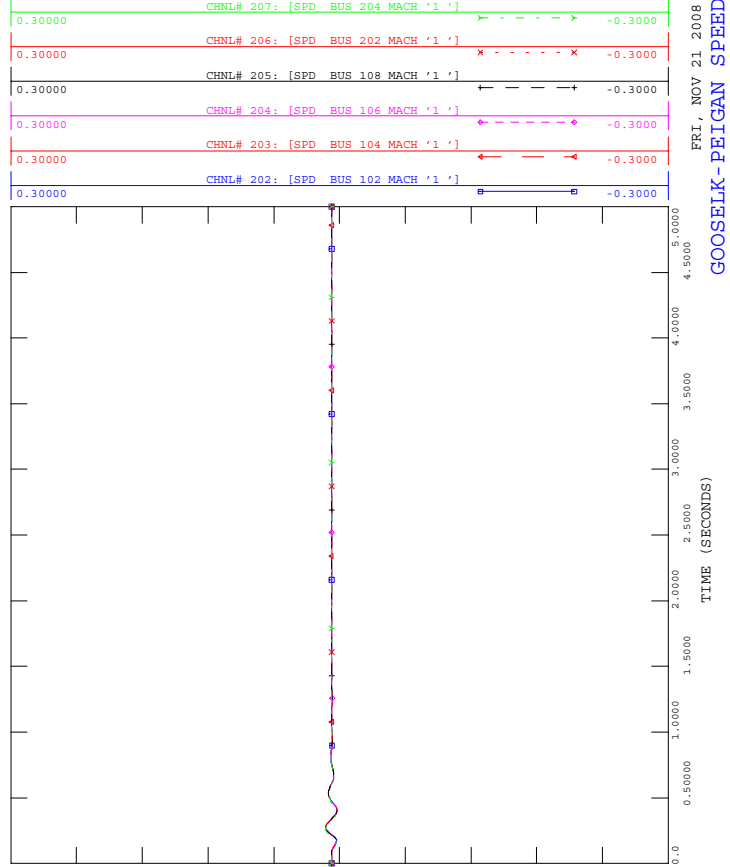
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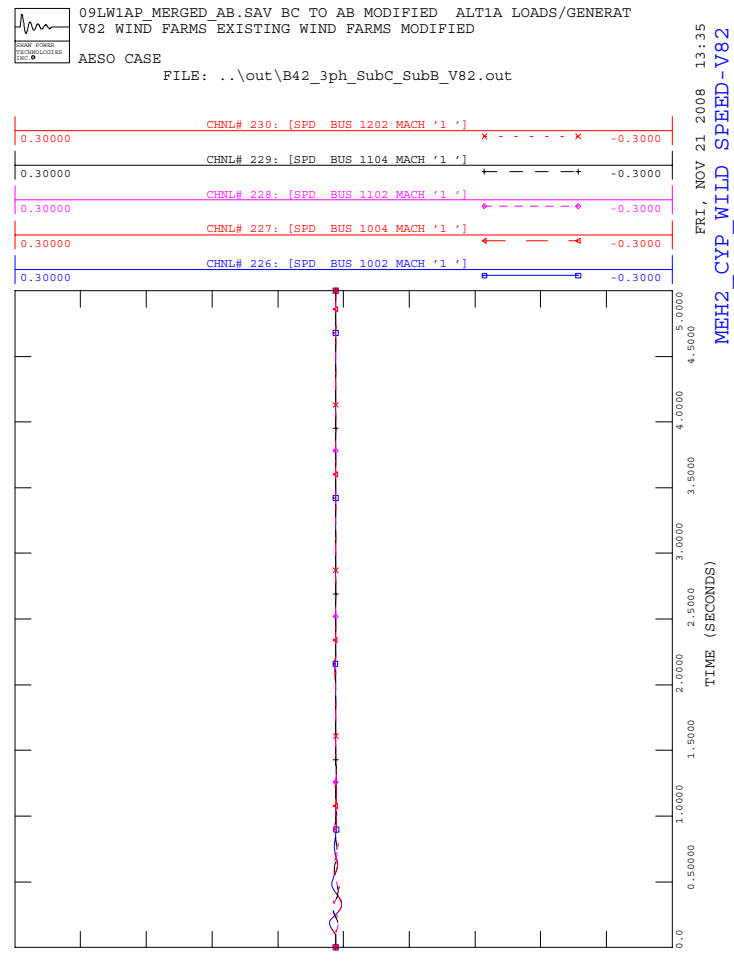
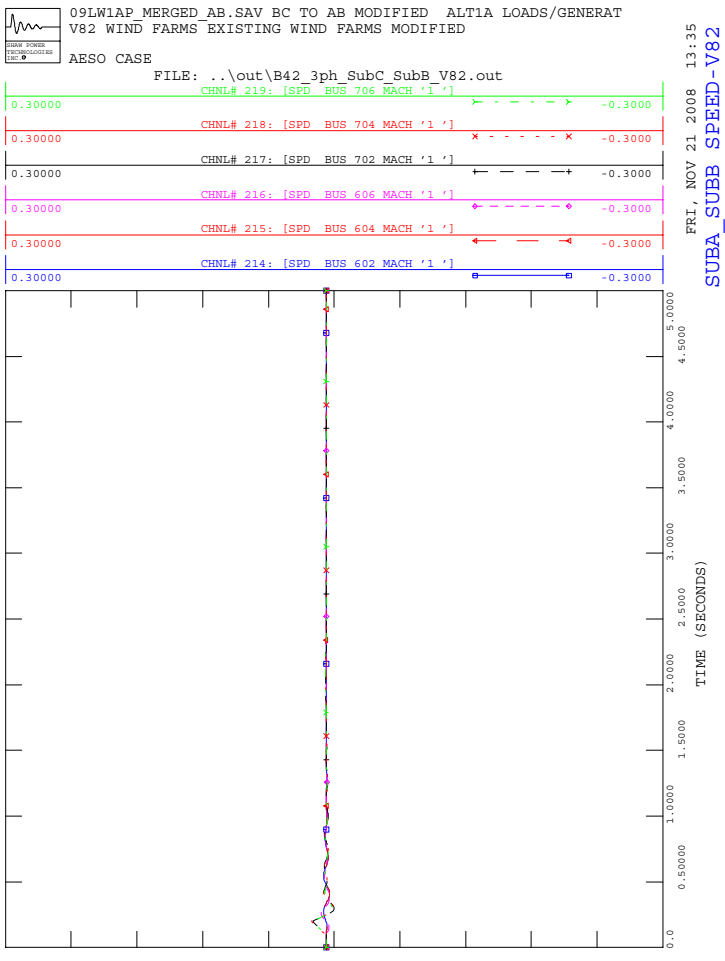
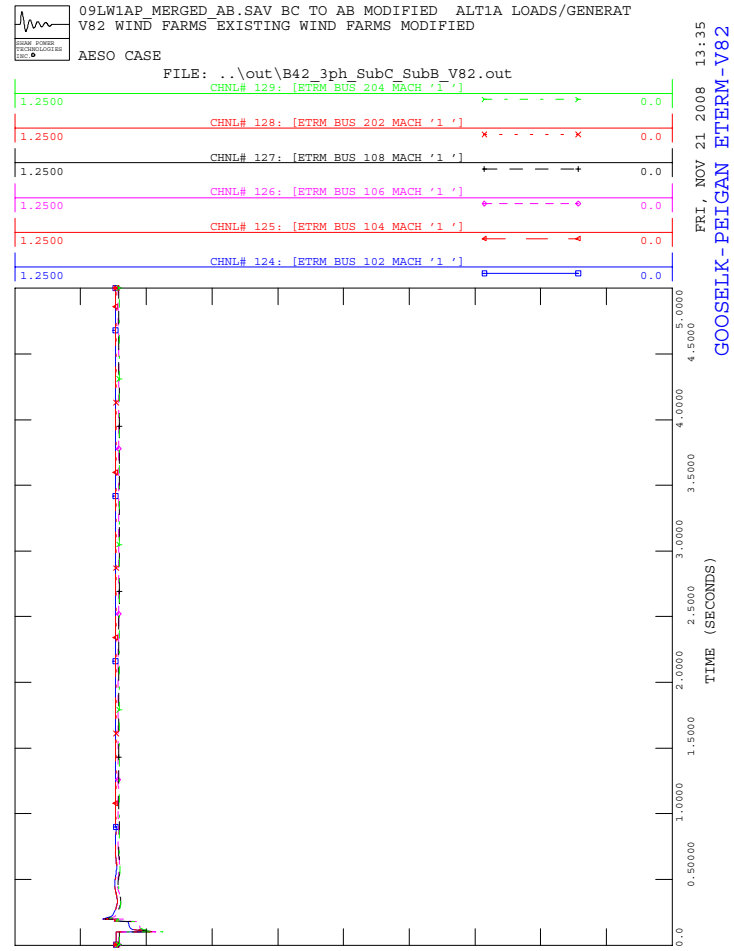
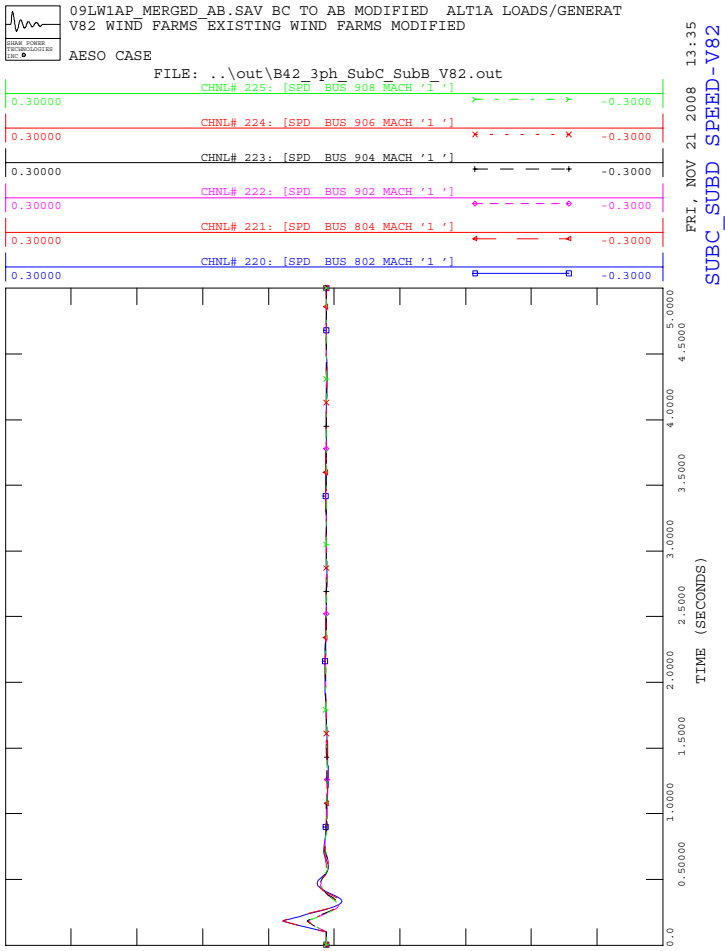
FRI, NOV 21 2008 13:35

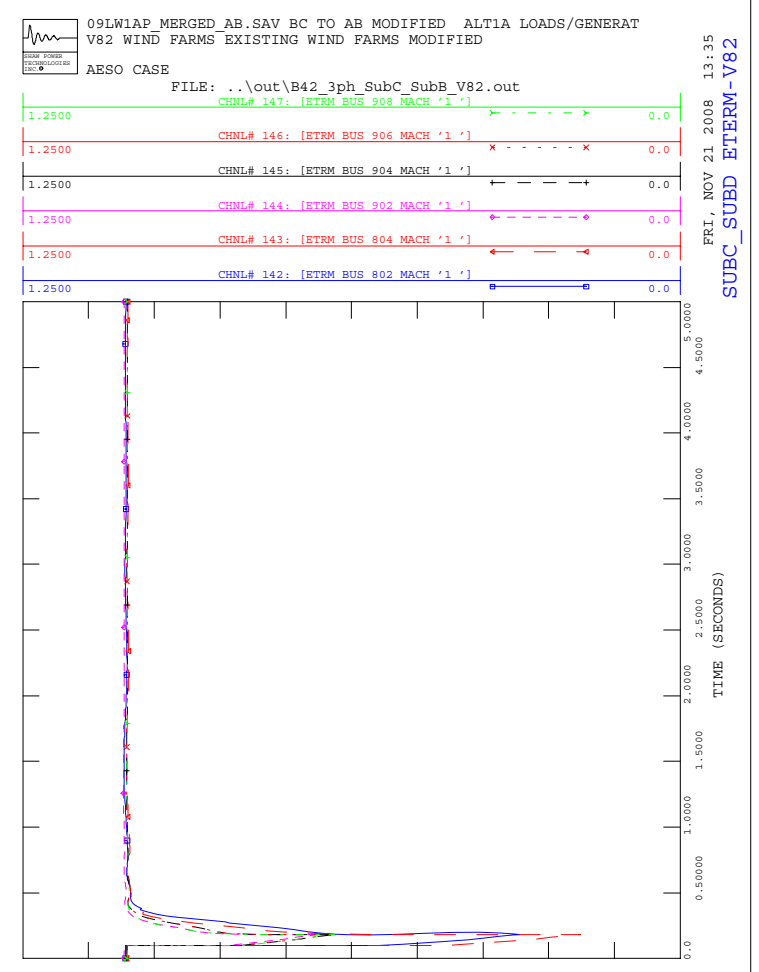
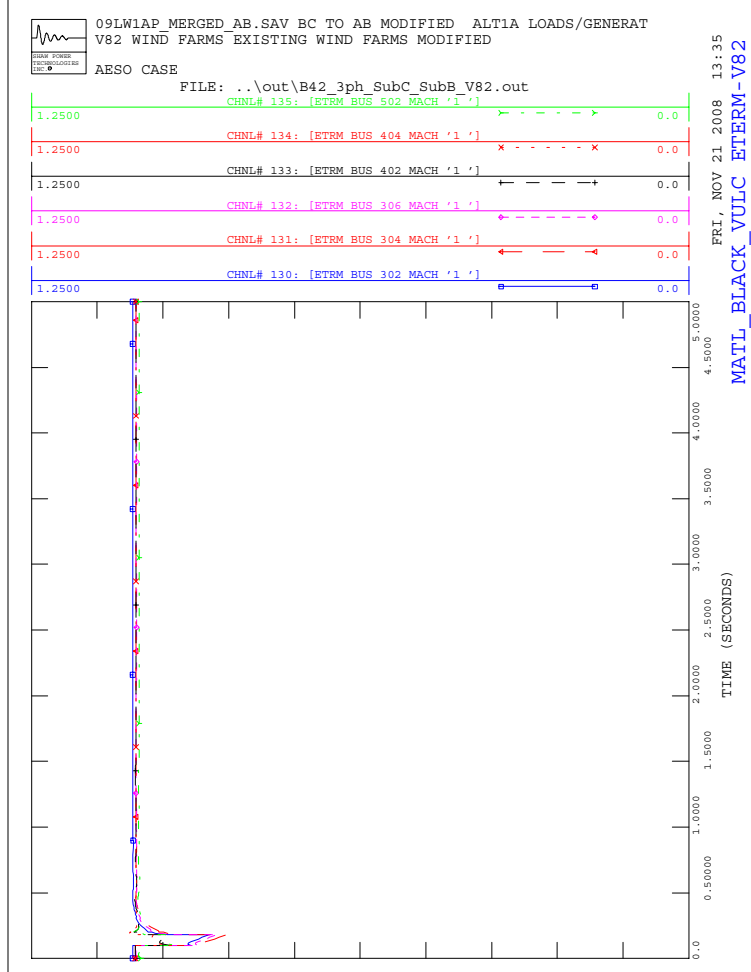
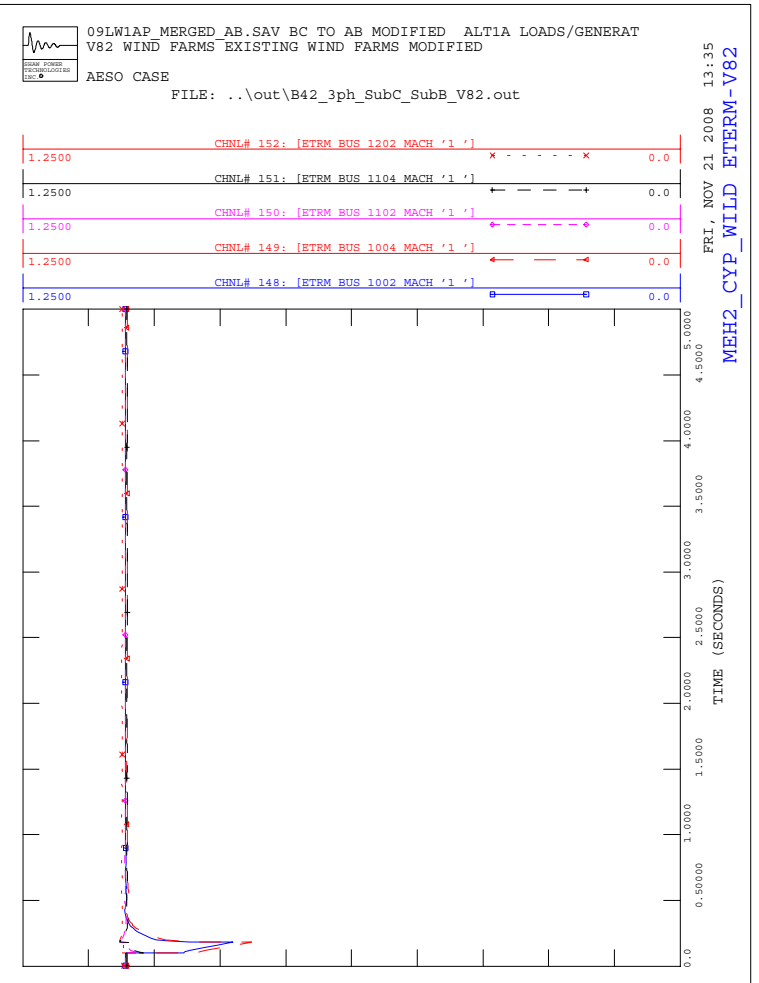
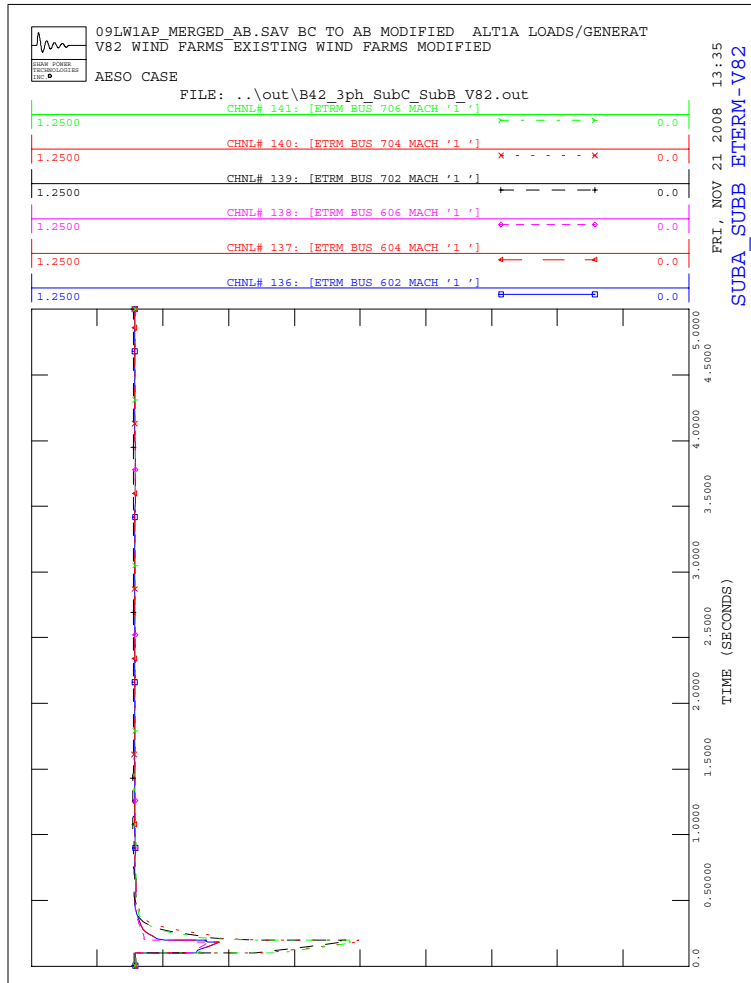
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

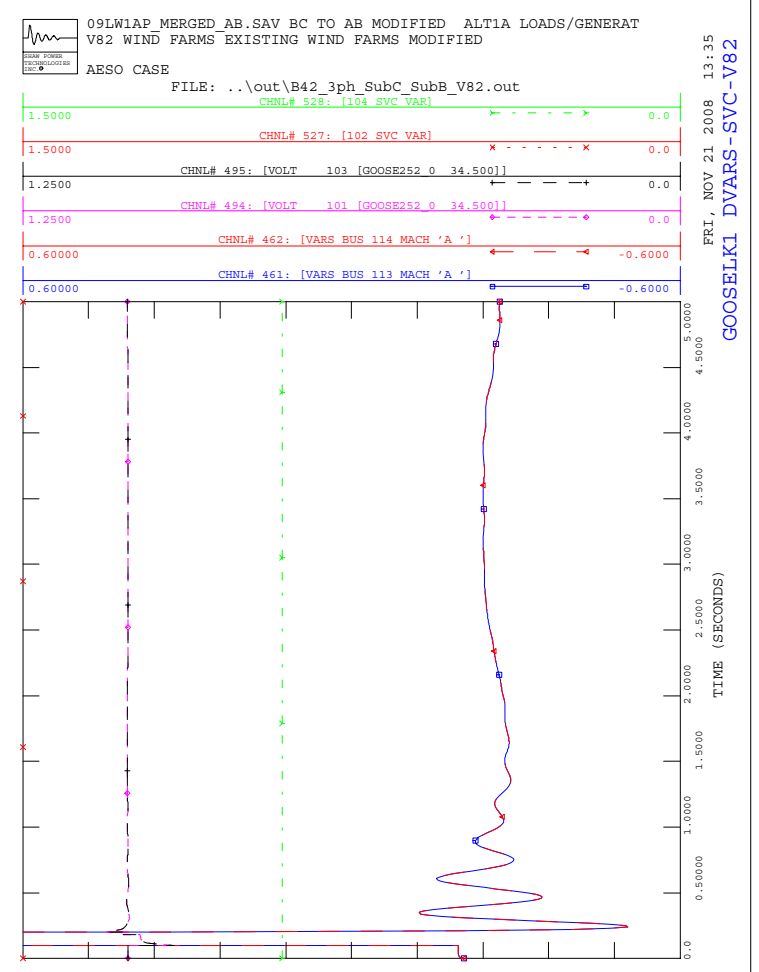
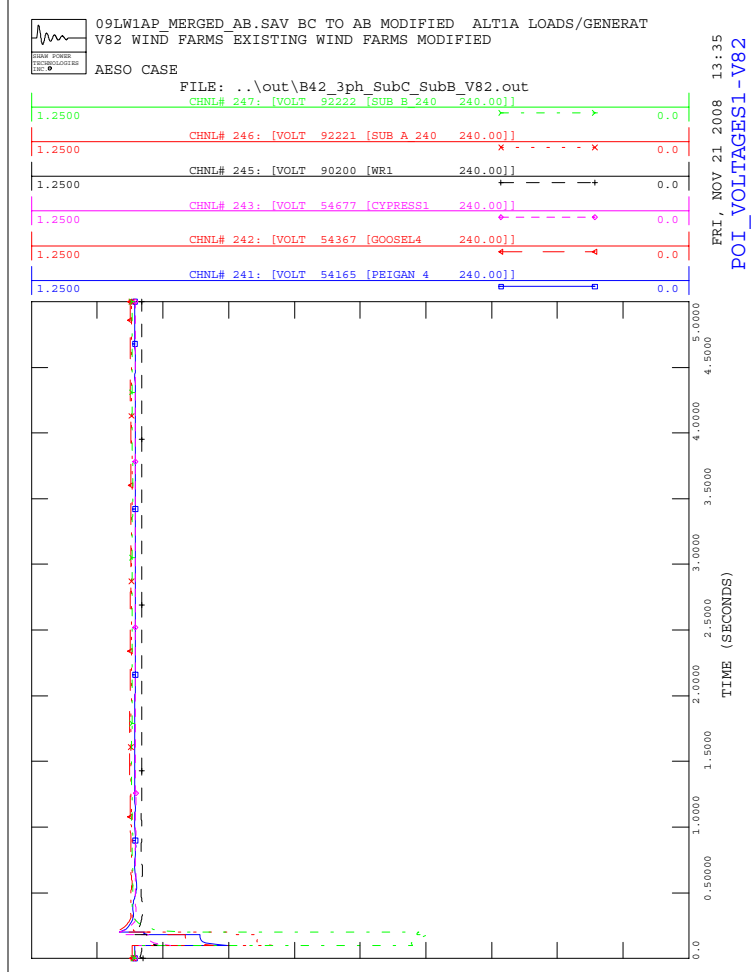
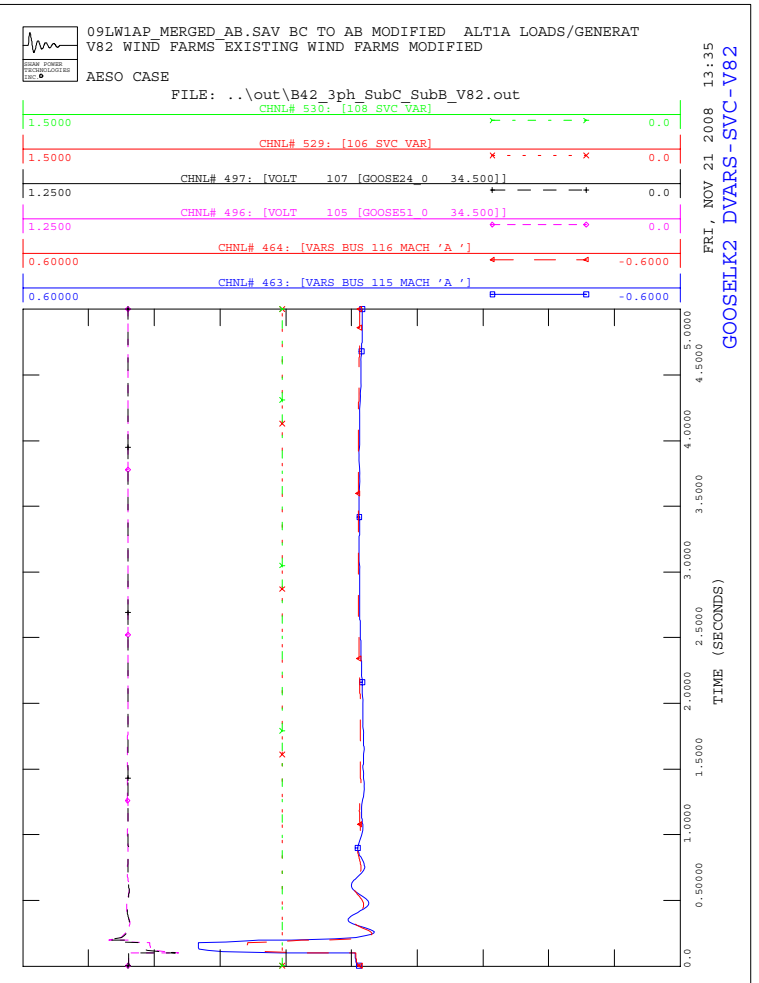
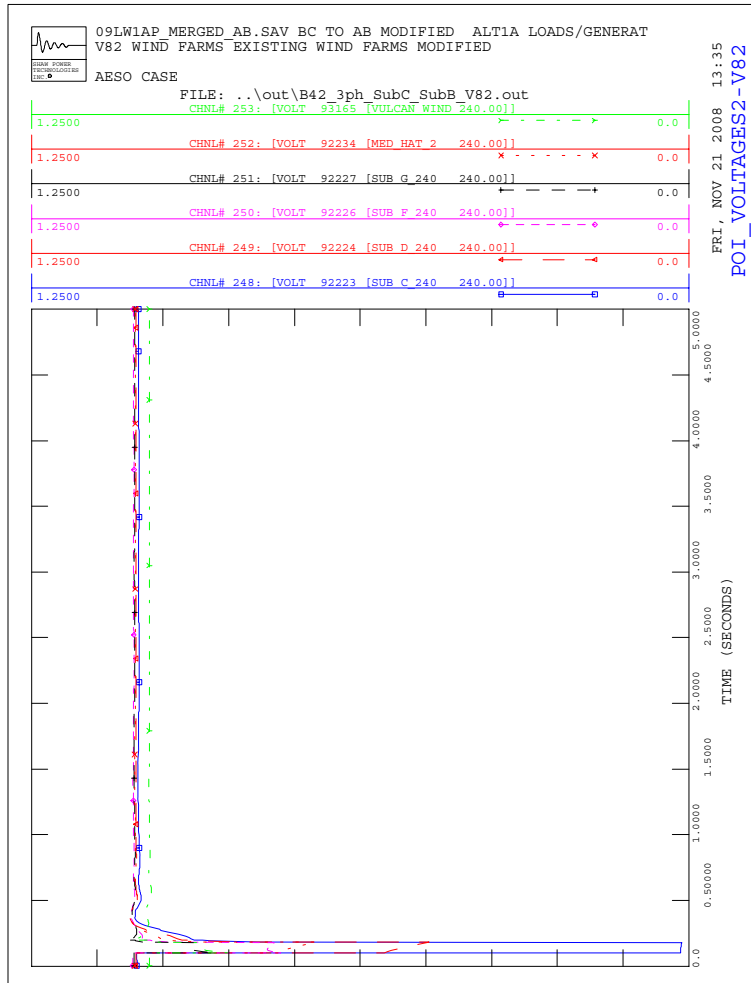
FILE: ..\out\B42_3ph_SubC_SubB_V82.out

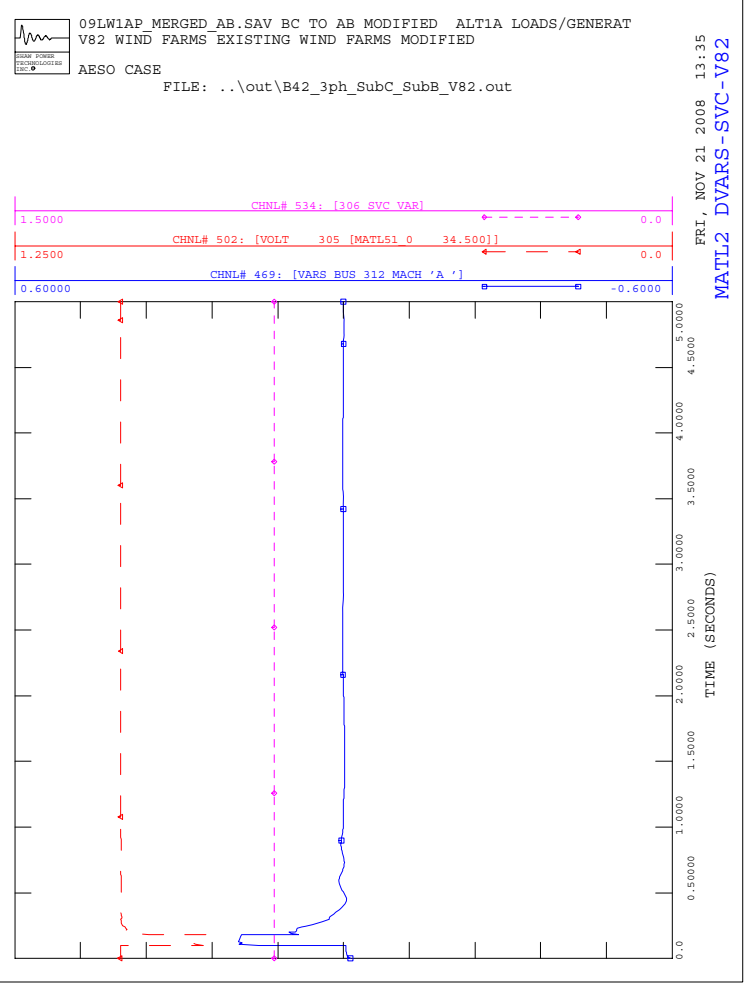
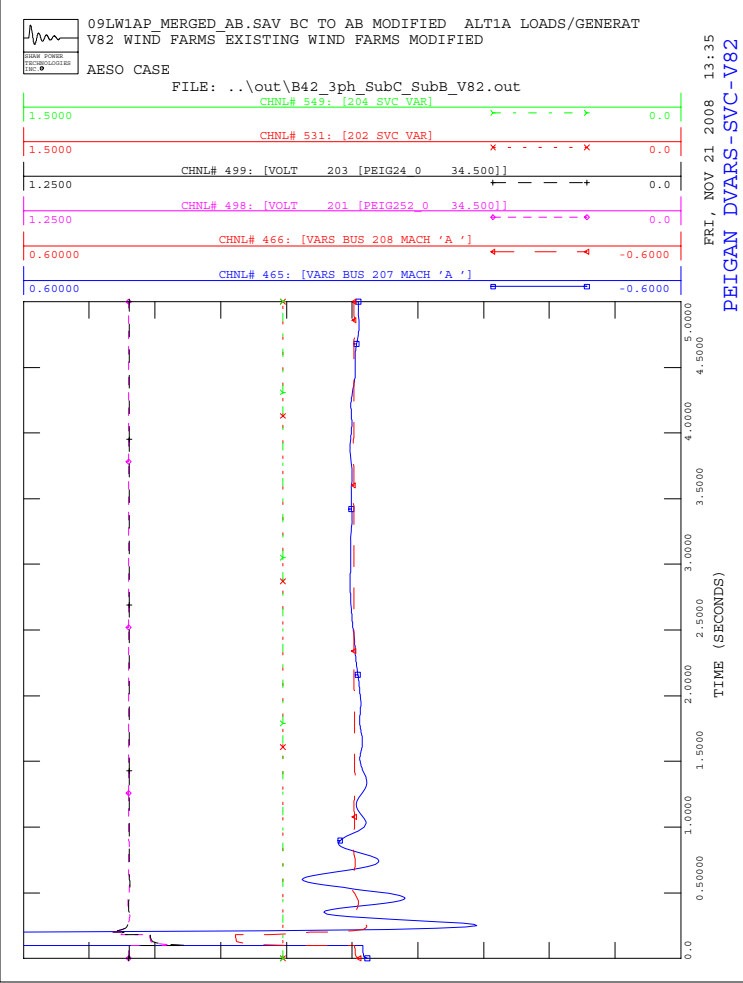
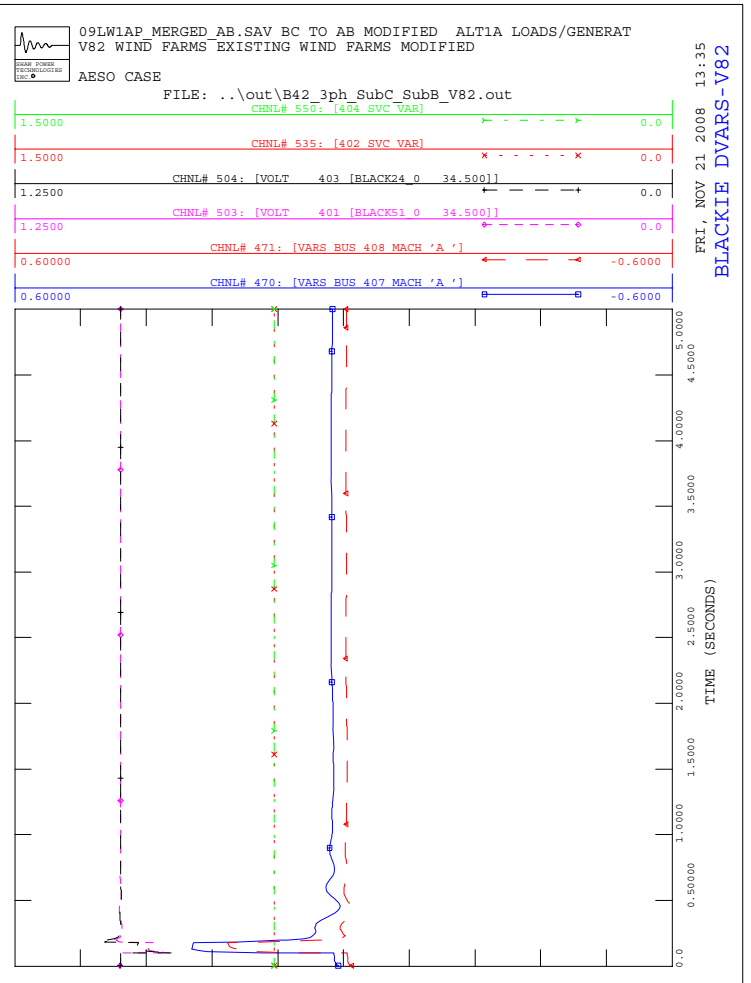
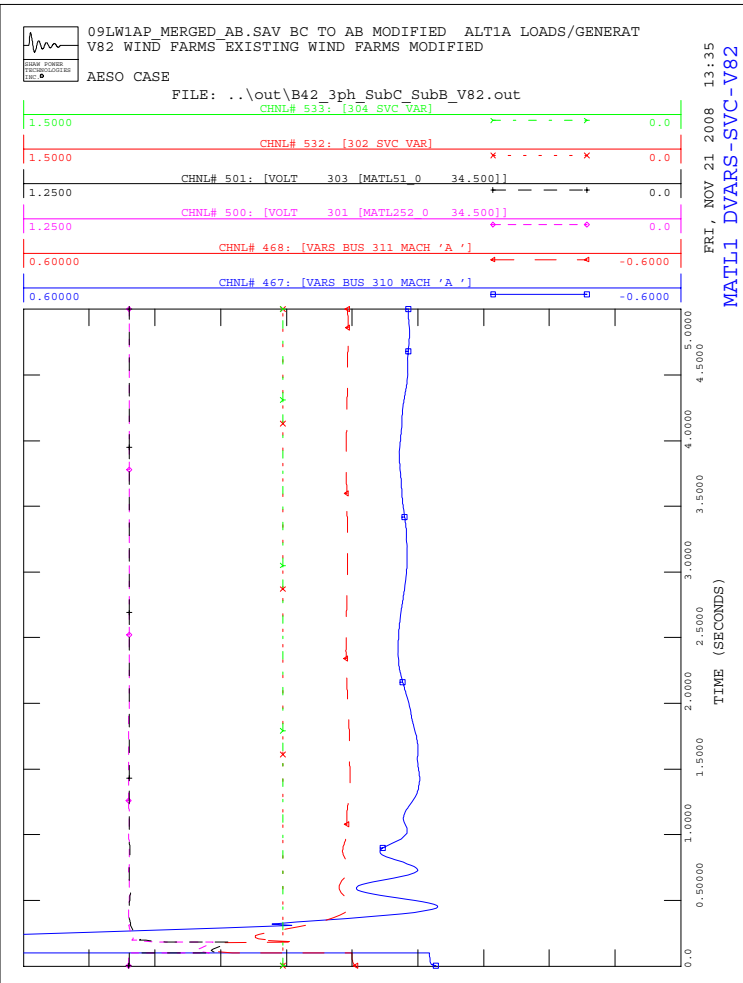


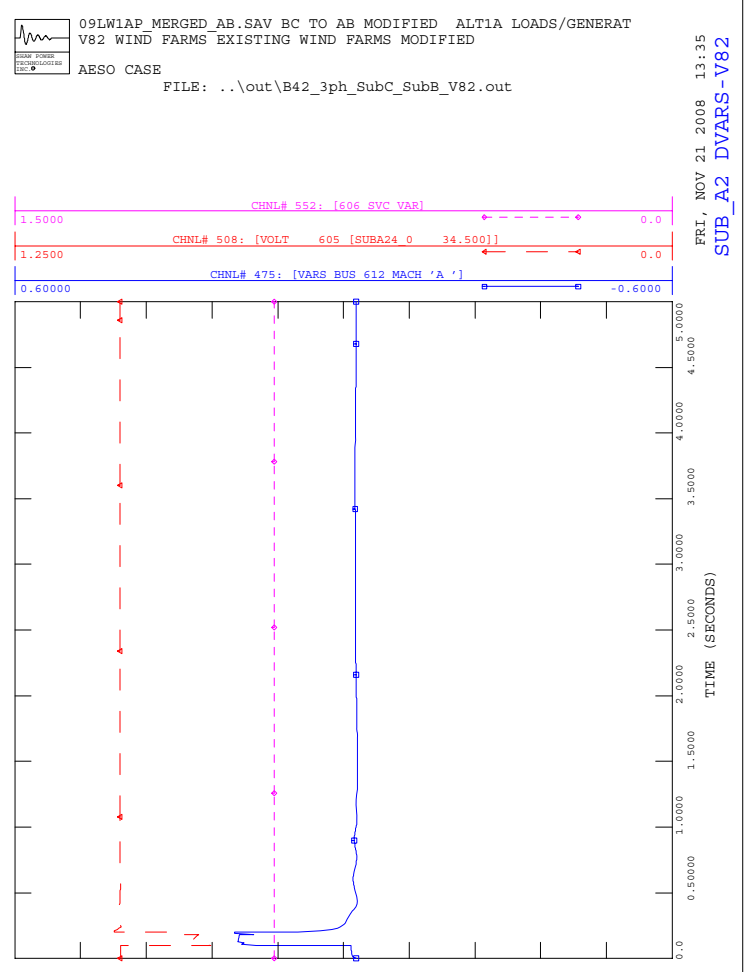
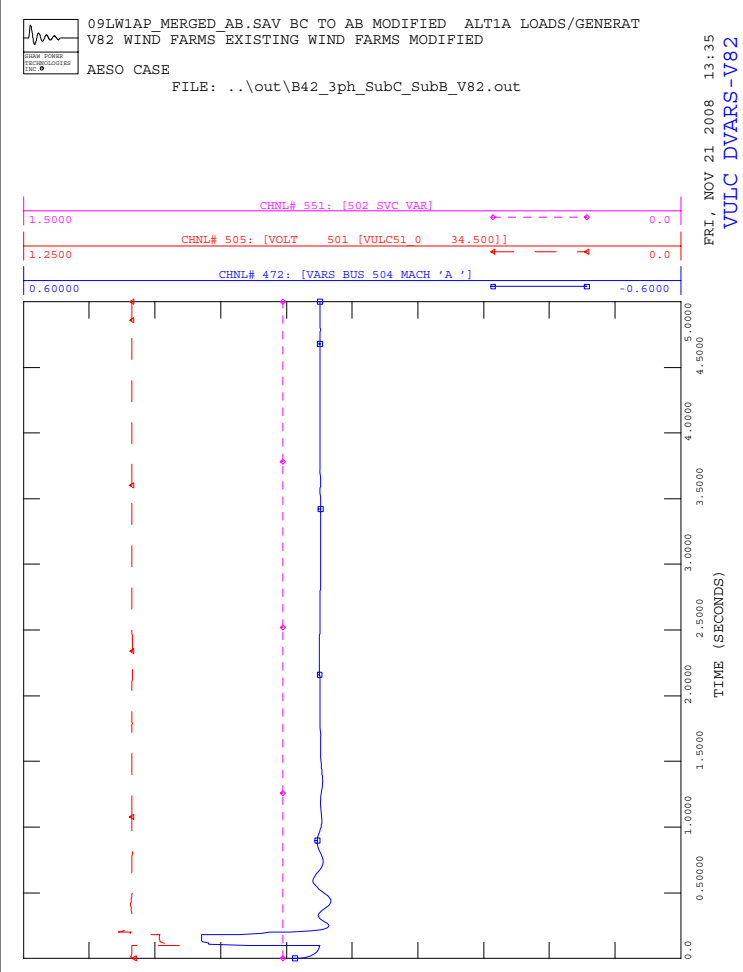
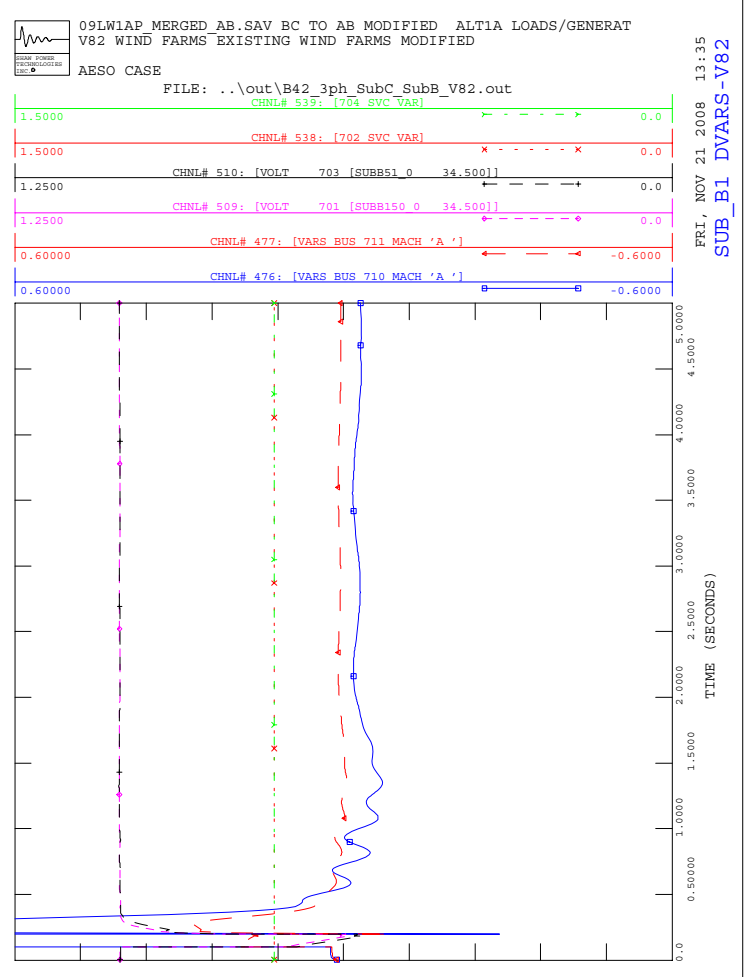
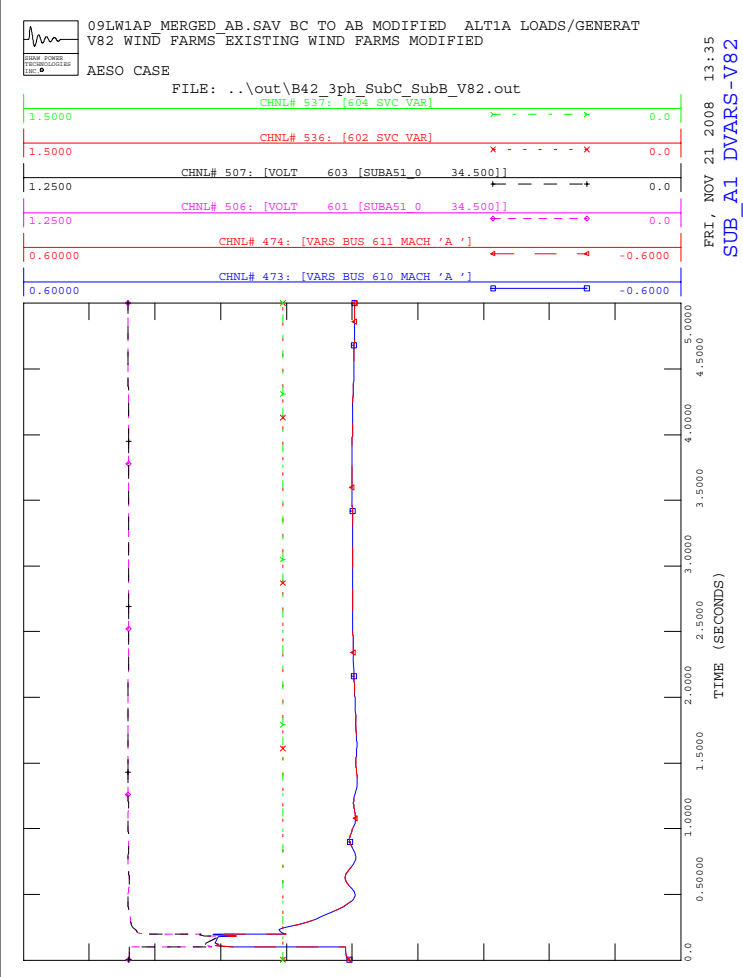
FRI, NOV 21 2008 13:35

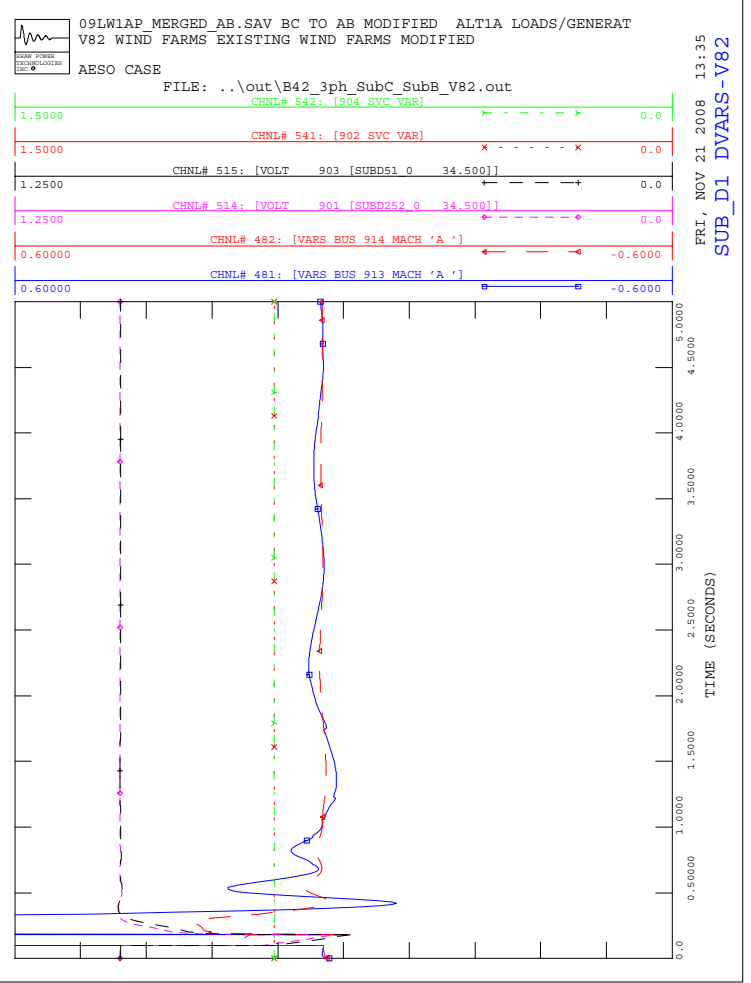
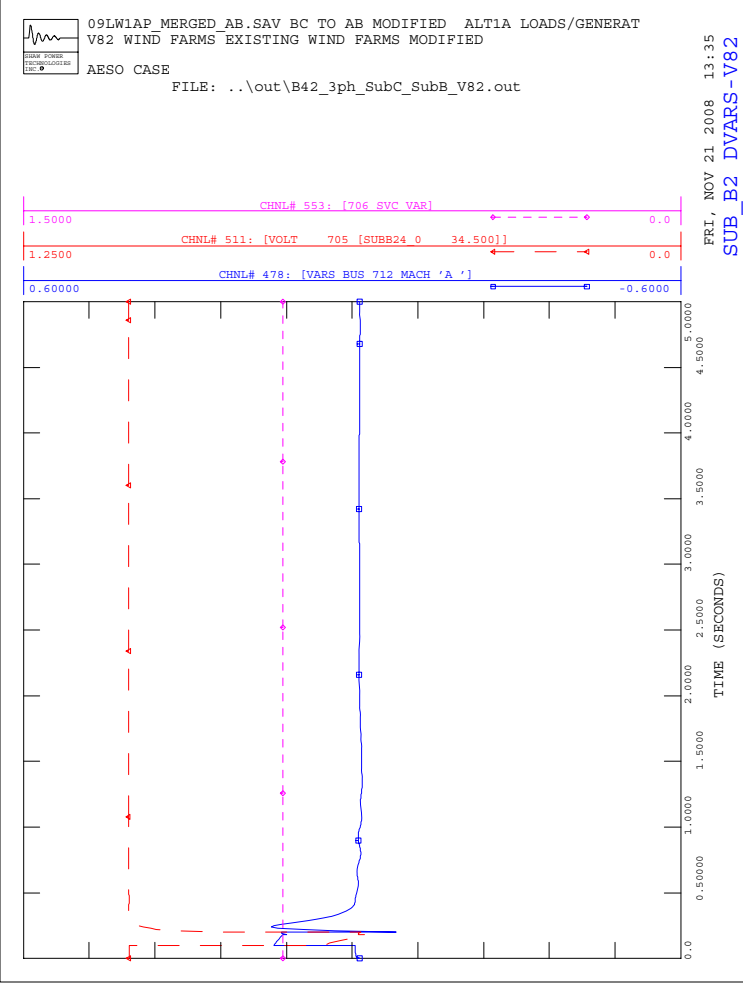
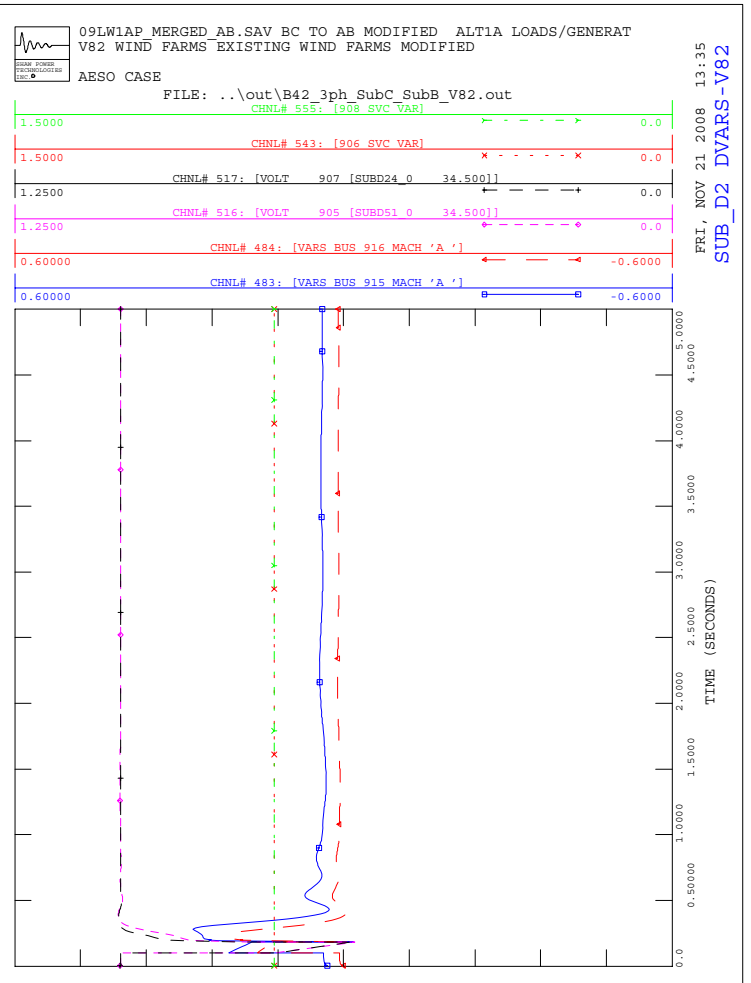
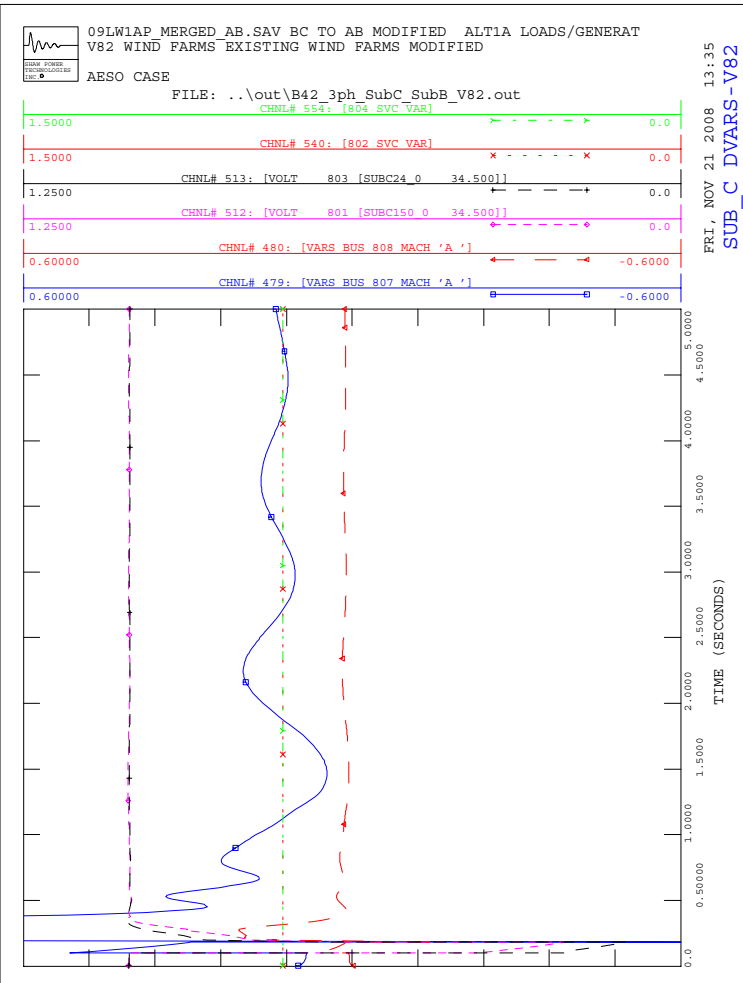


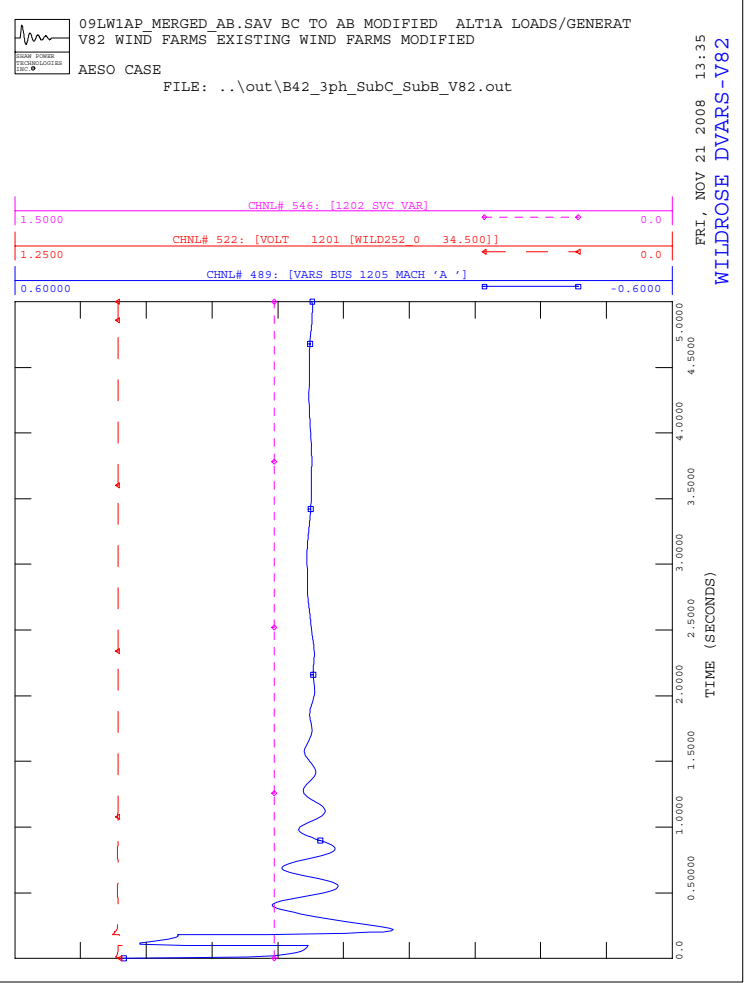
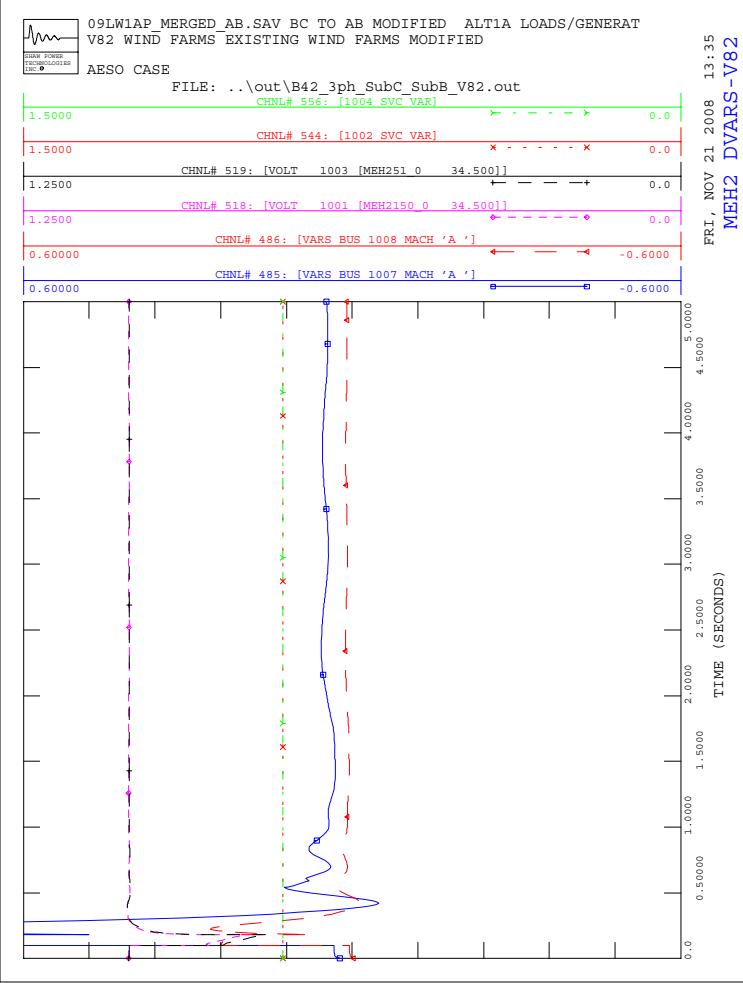
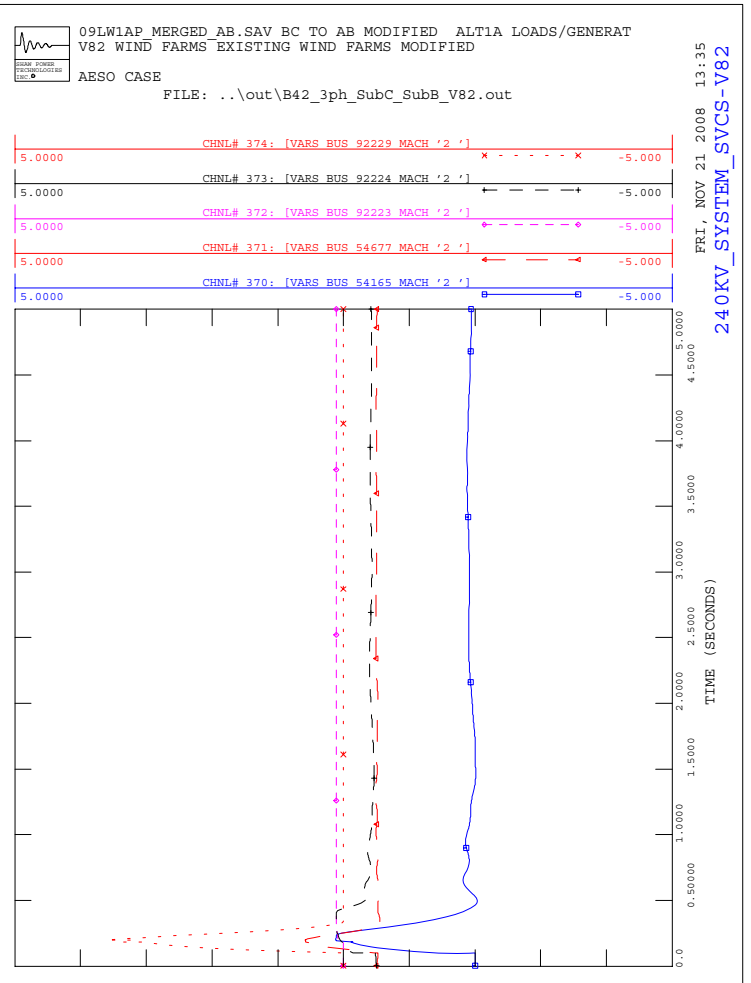
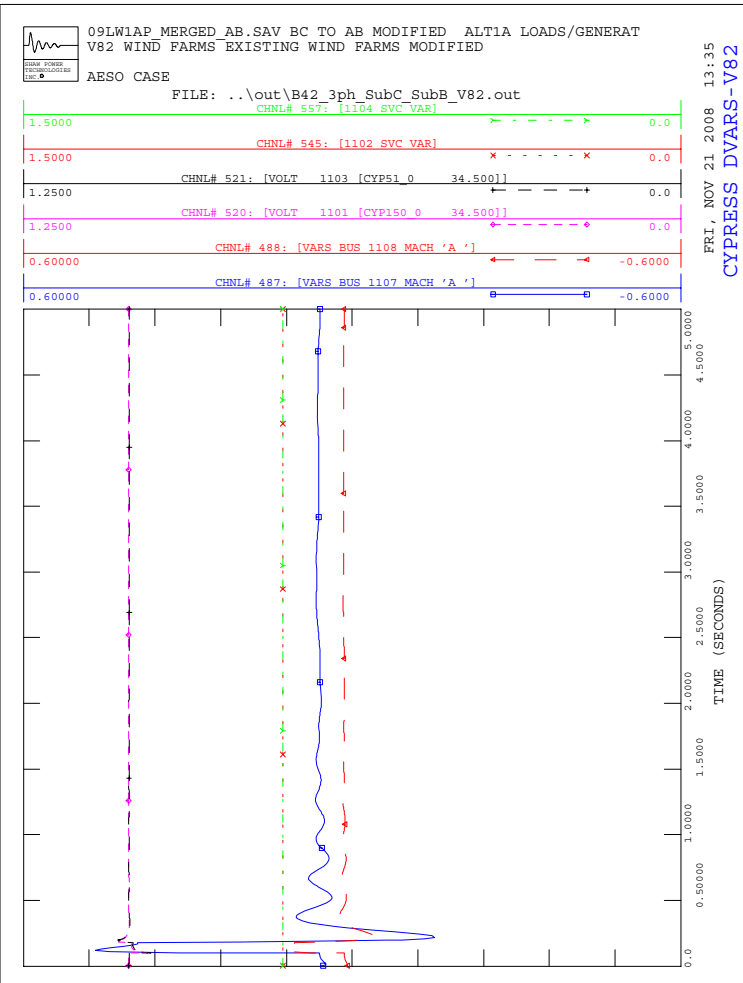












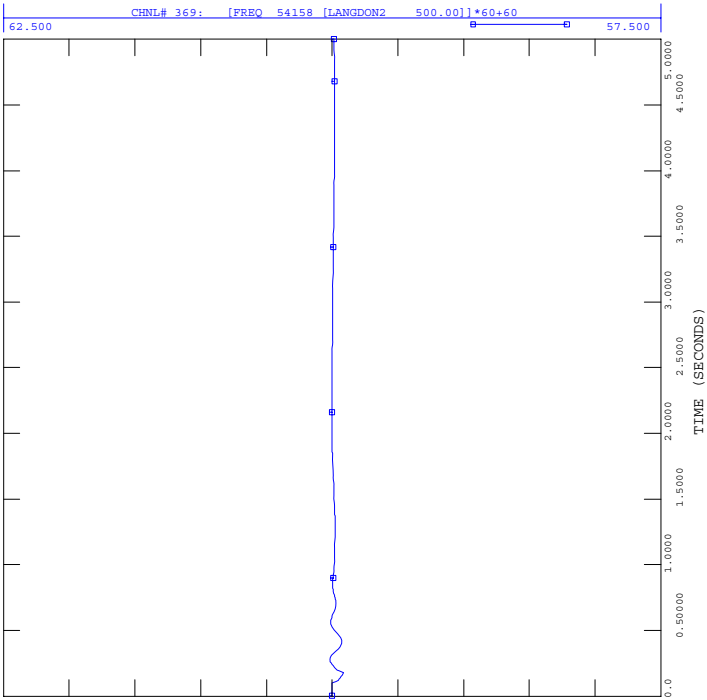


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B42_3ph_SubC_SubB_V82.out

FRI, NOV 21 2008 13:35
LANGDON_FRQ-V82

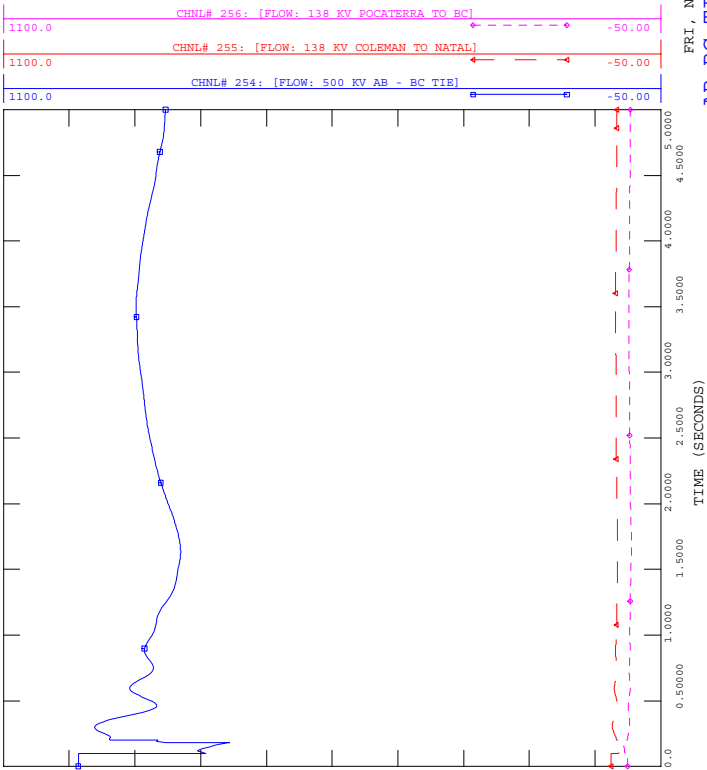


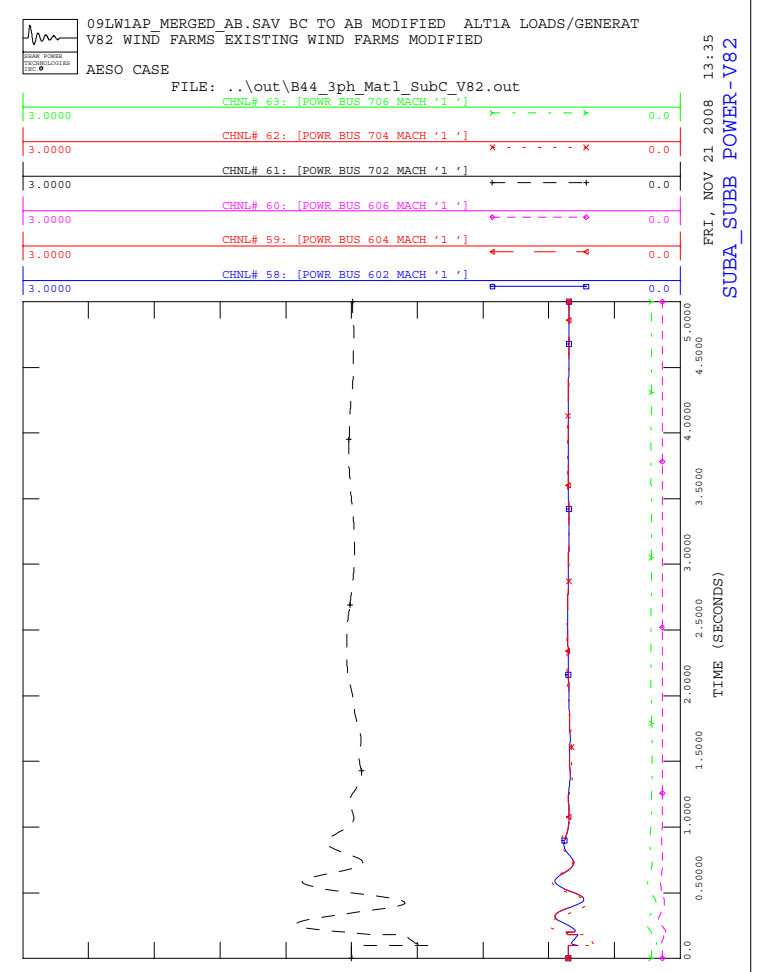
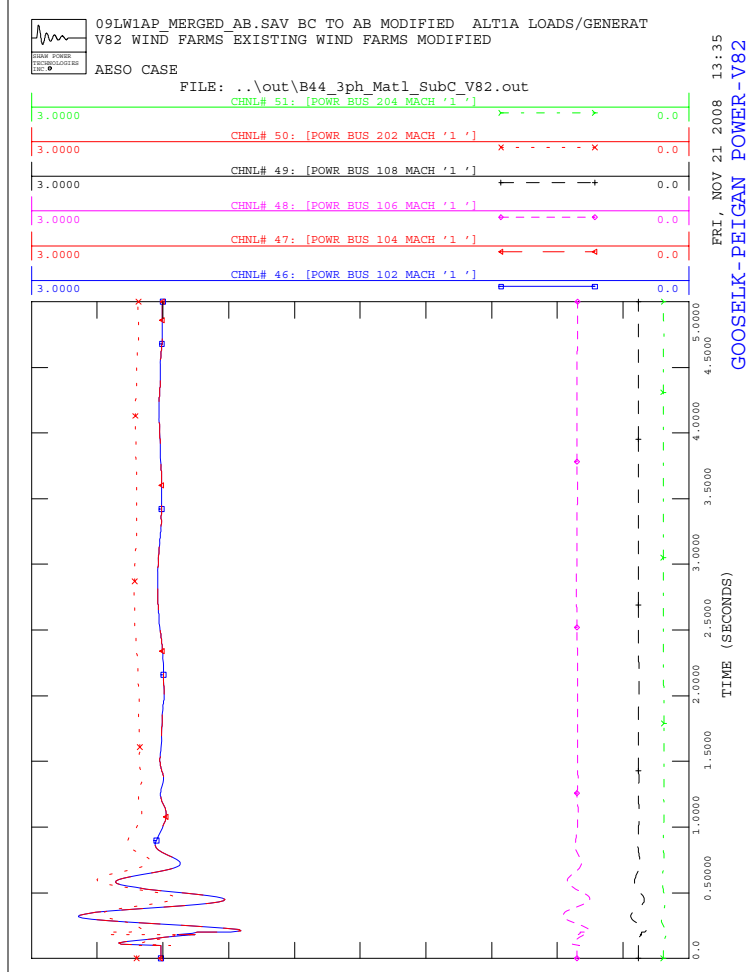
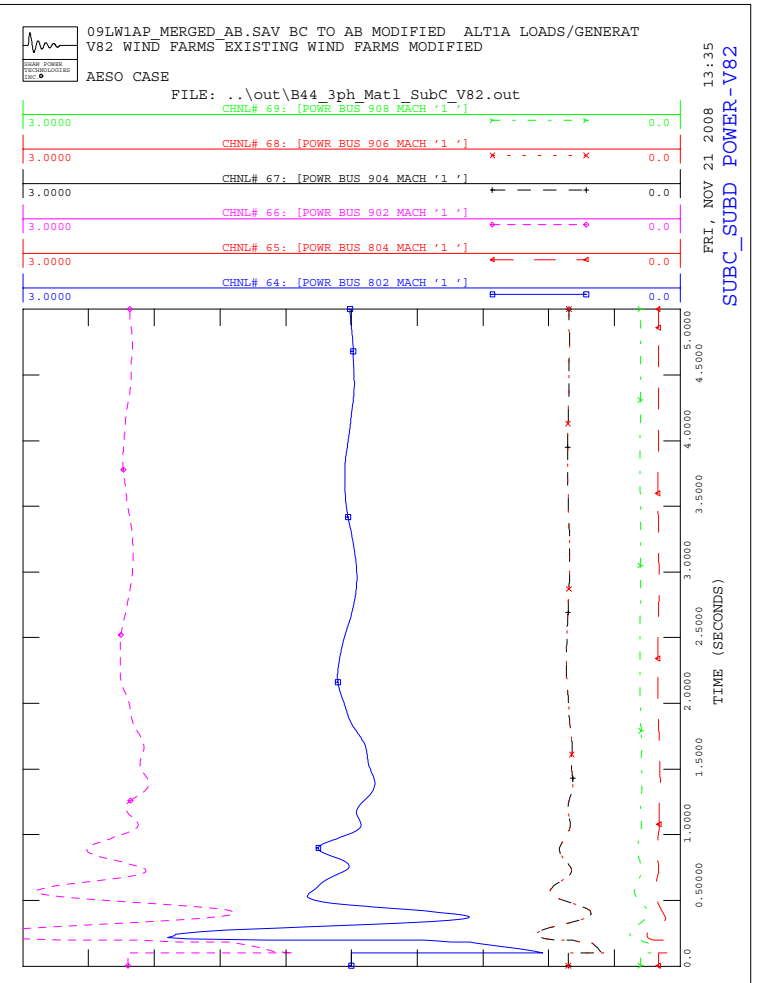
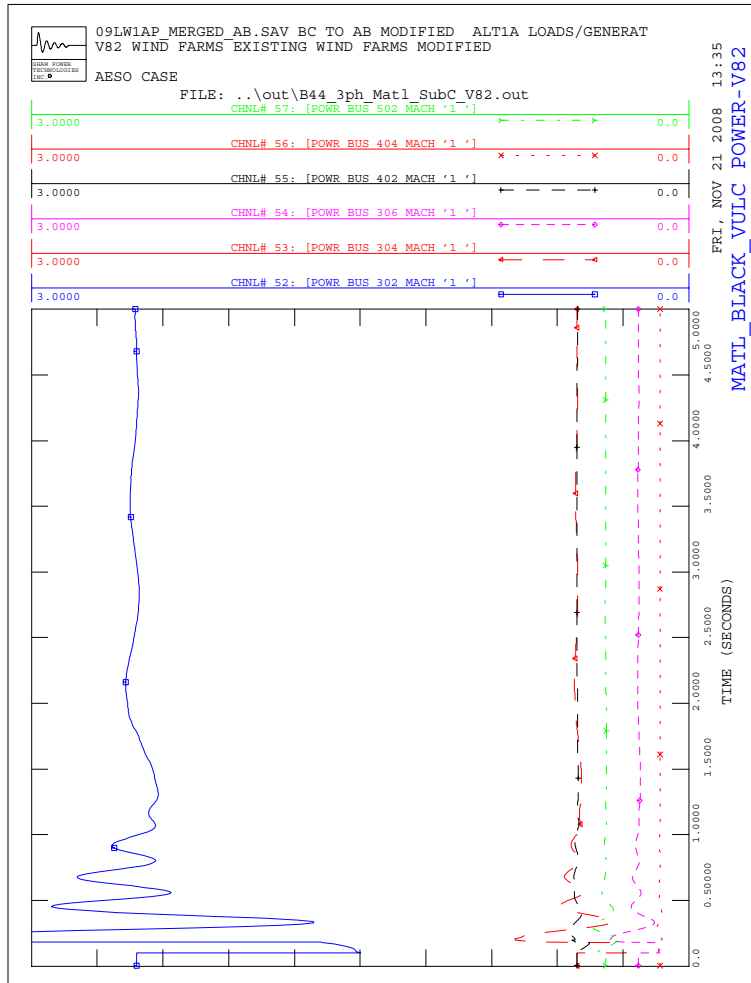
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

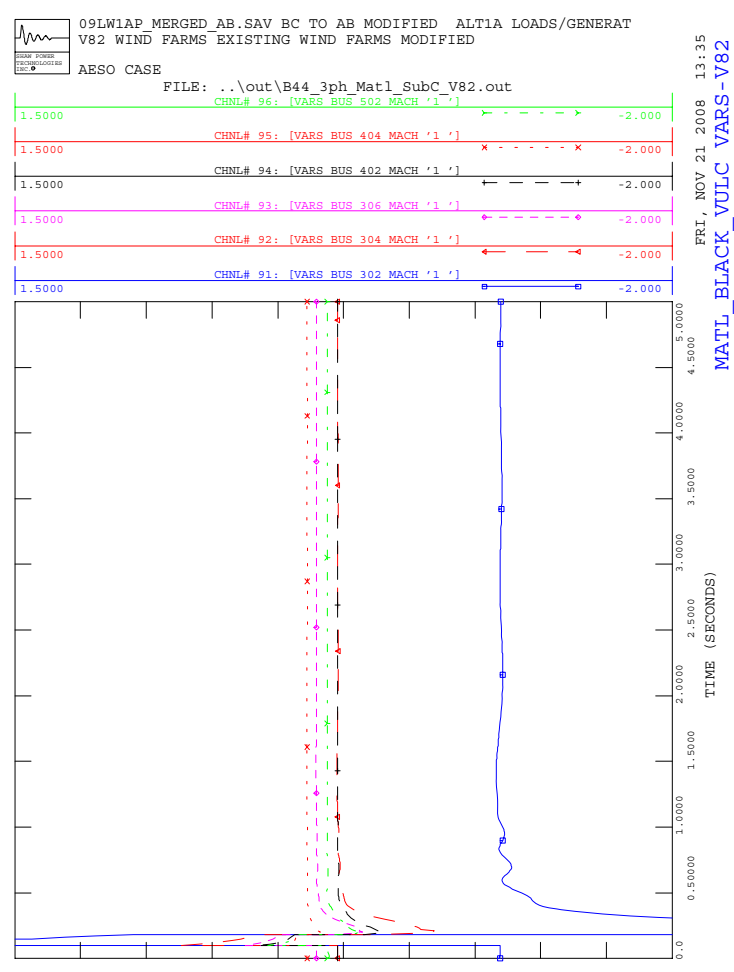
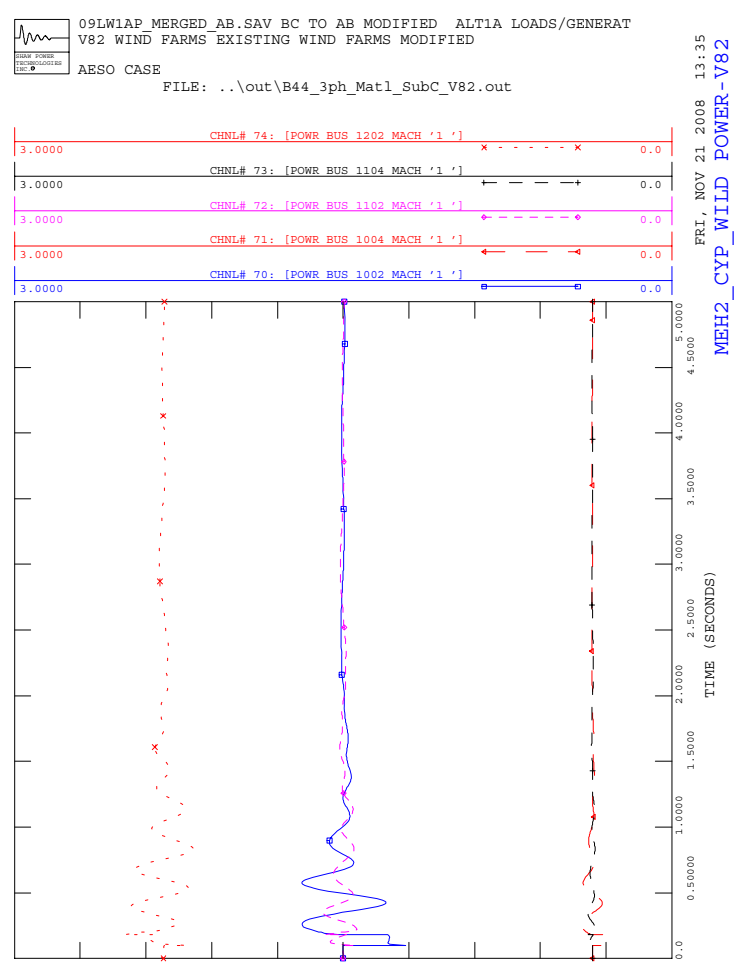
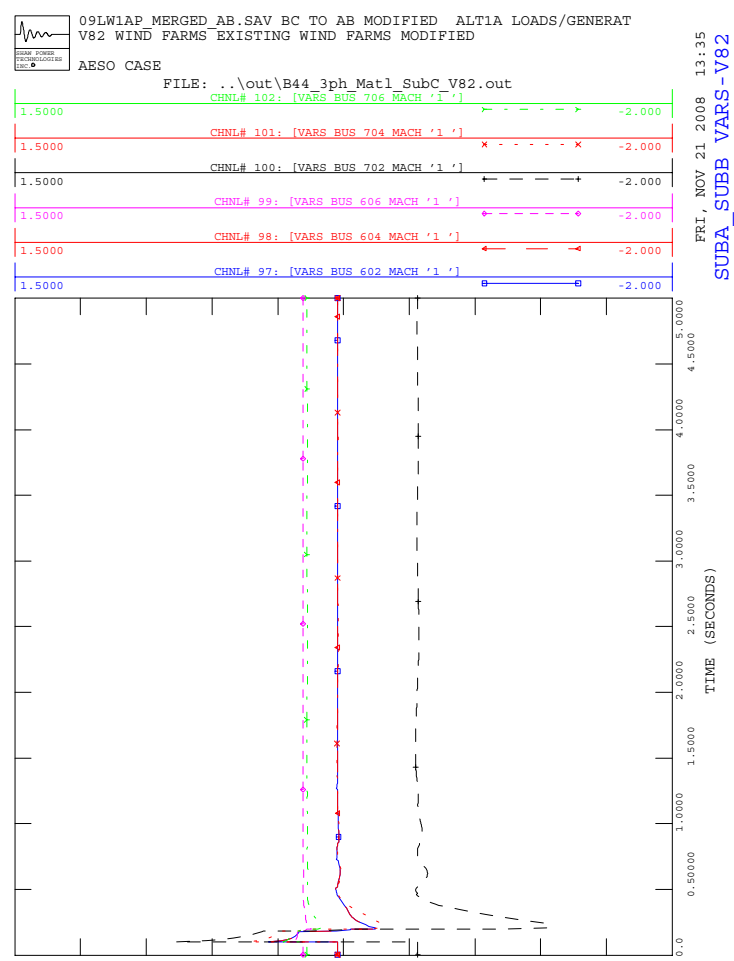
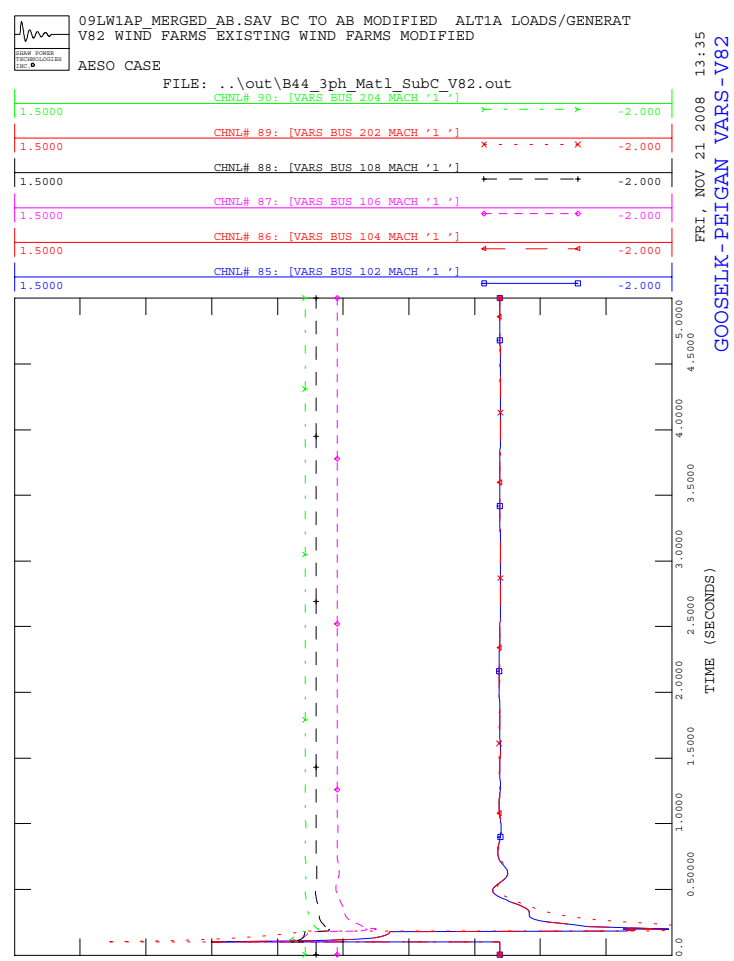
ABSO CASE

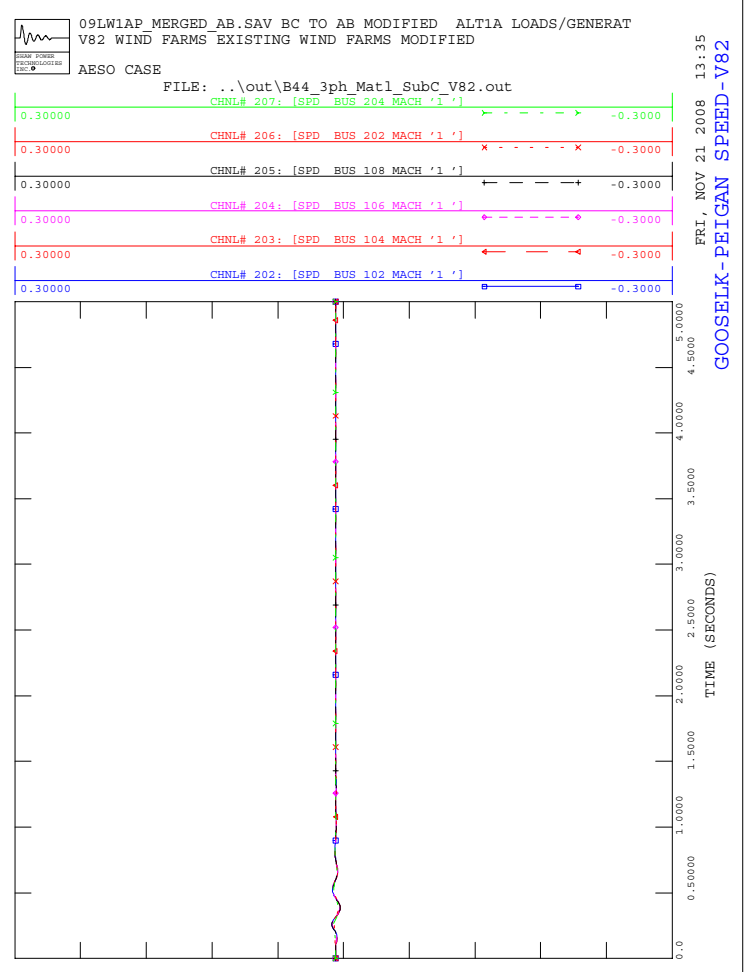
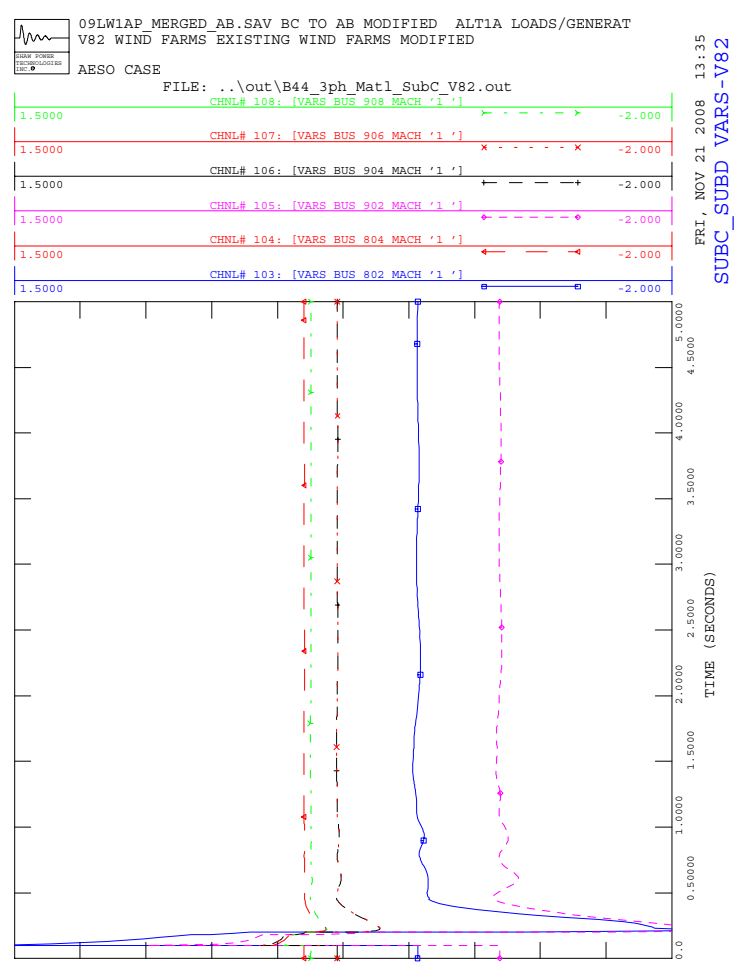
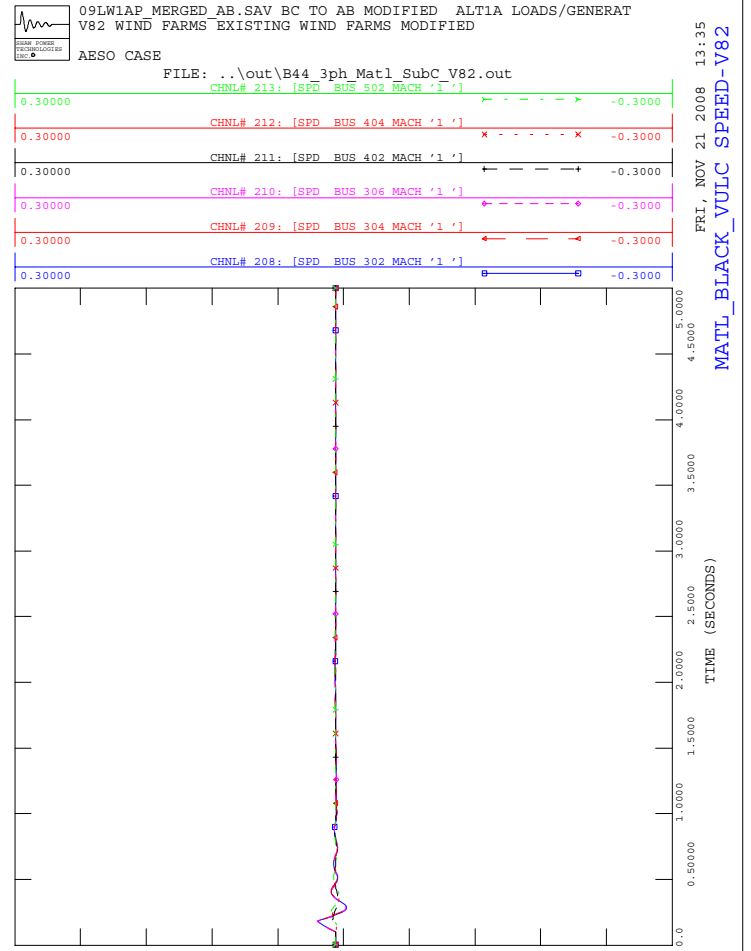
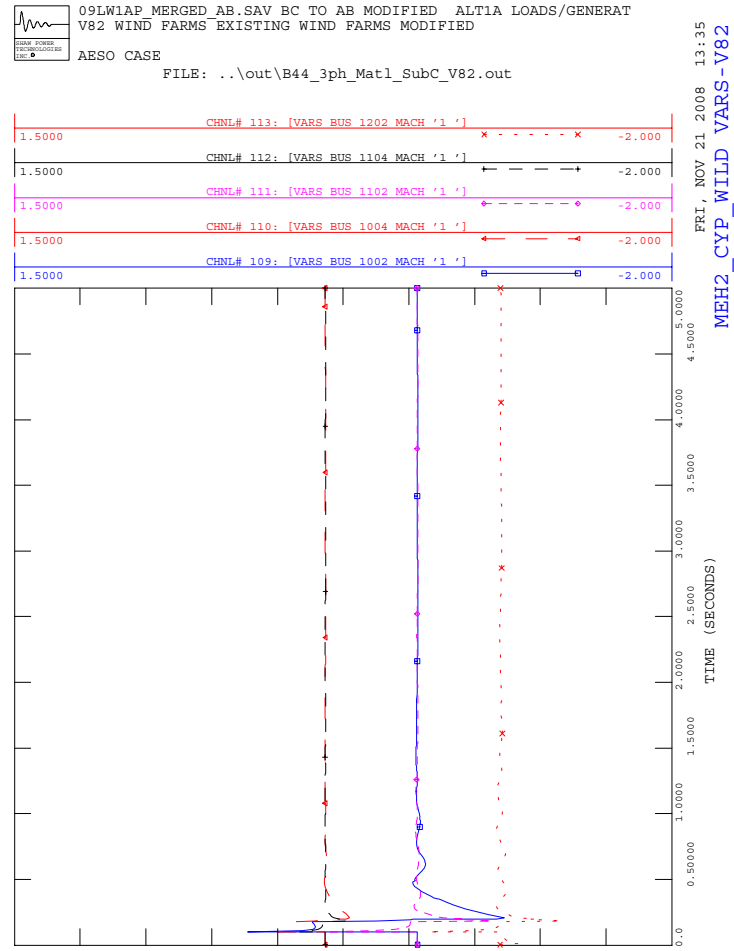
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FRI, NOV 21 2008 13:35
AB_BC_TIE_FLOWS-V82



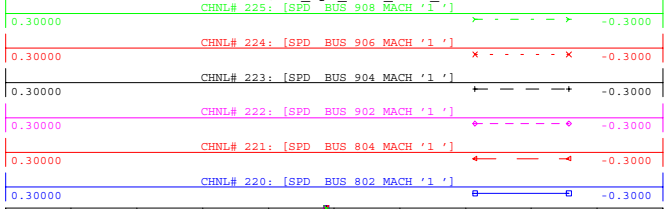




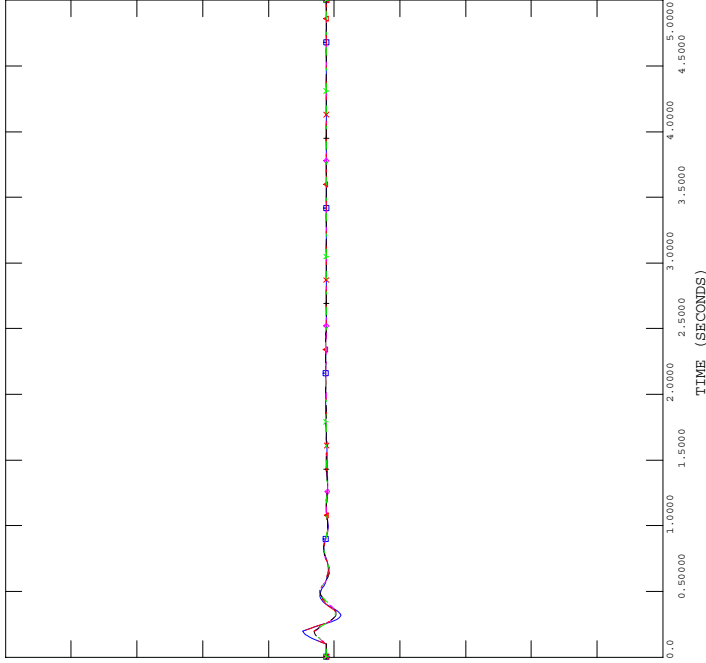


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\B44_3ph_Mat1_SubC_V82.out
 CHNL# 225: [SPD_BUS 908 MACH '1 ']

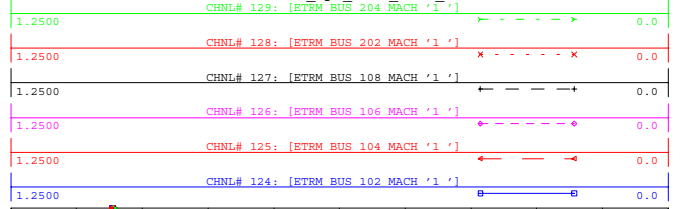


FRI, NOV 21 2008 13:35
 SUBC_SUBD SPEED -V82

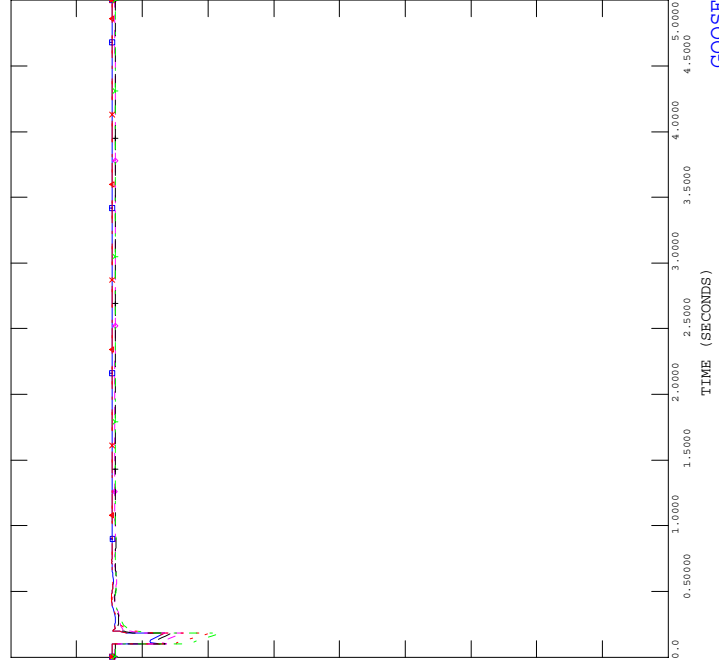


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\B44_3ph_Mat1_SubC_V82.out
 CHNL# 129: [ETRM_BUS 204 MACH '1 ']

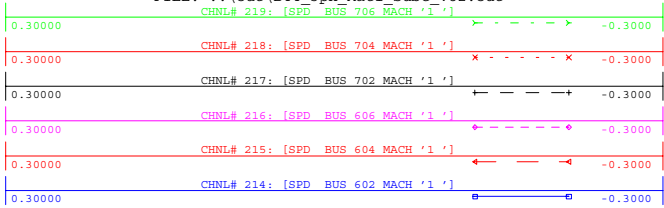


FRI, NOV 21 2008 13:35
 GOOSELK-PEIGAN ETERM -V82

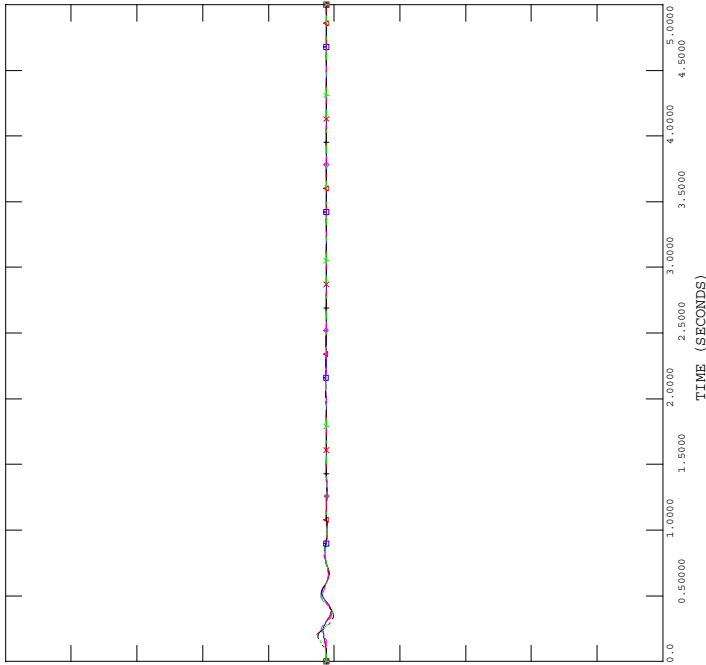


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\B44_3ph_Mat1_SubC_V82.out
 CHNL# 219: [SPD_BUS 706 MACH '1 ']

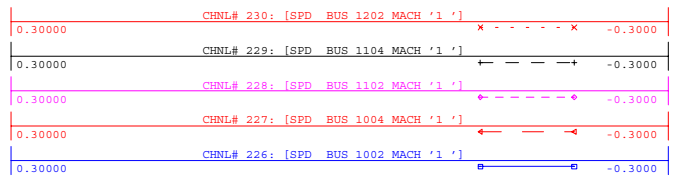


FRI, NOV 21 2008 13:35
 SUBA_SUBD SPEED -V82

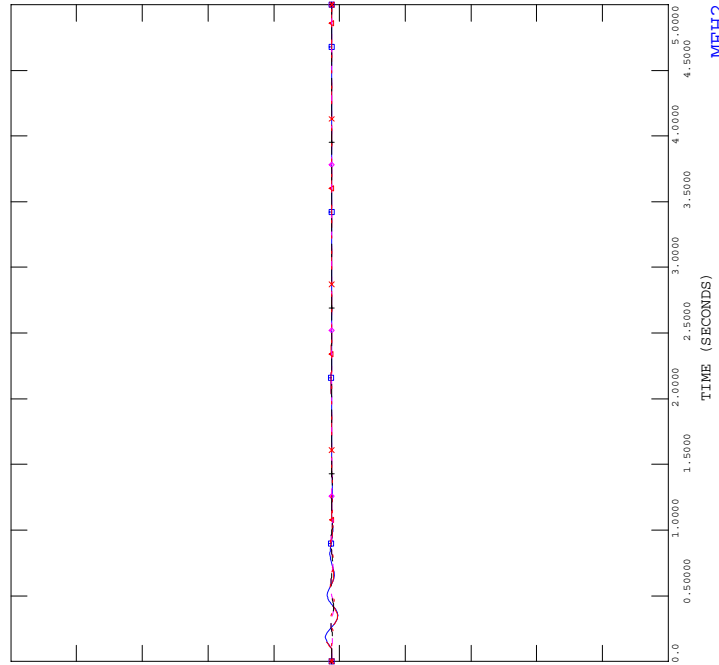


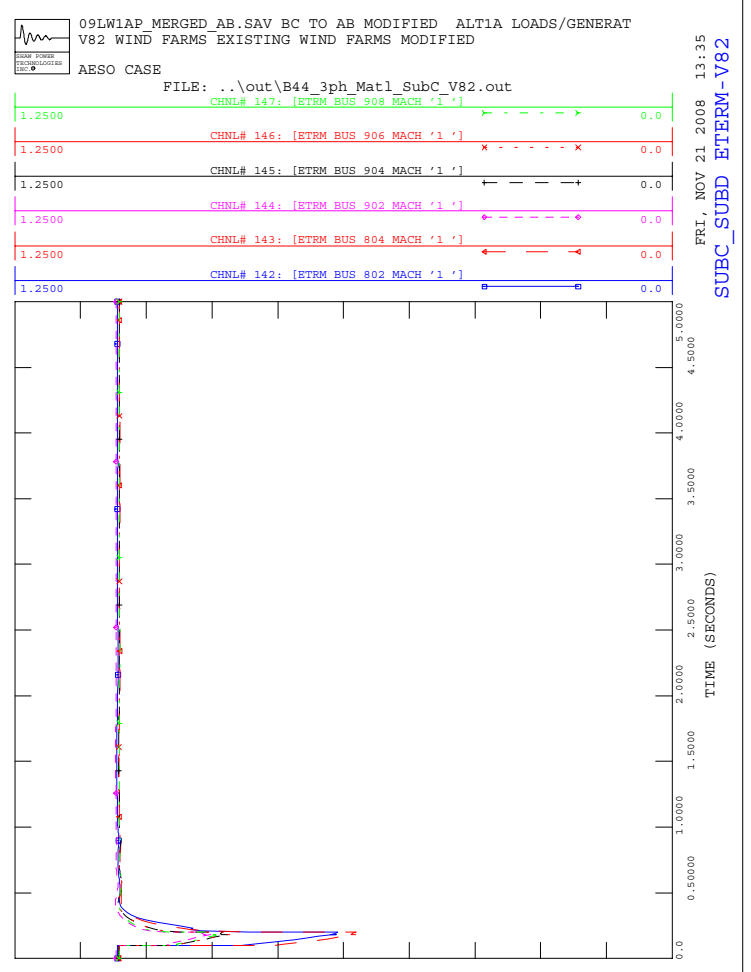
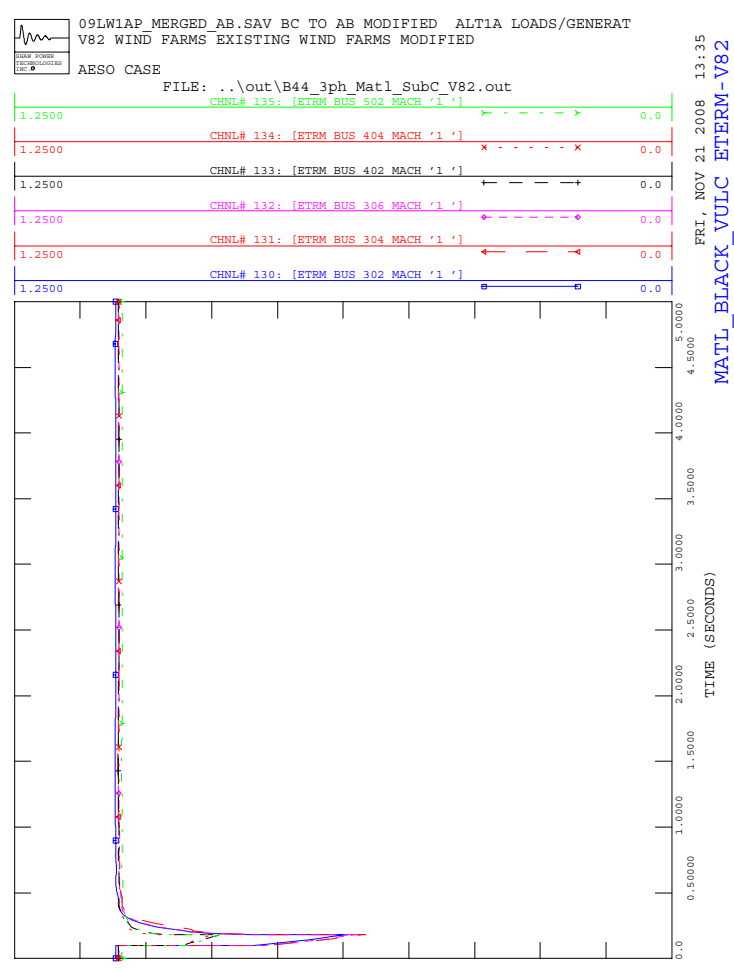
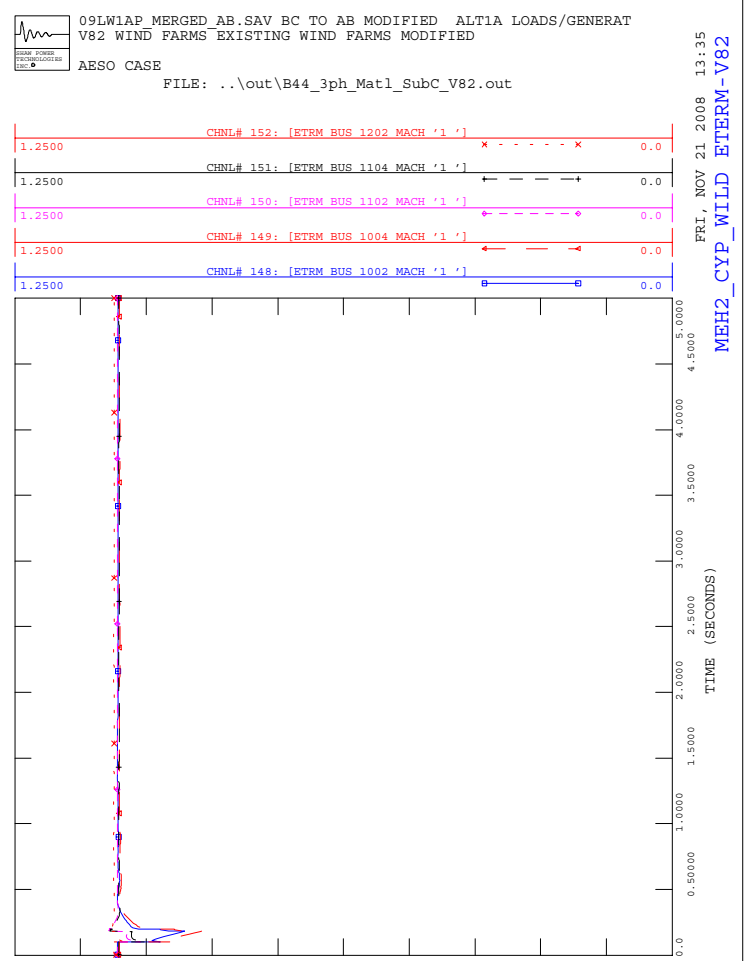
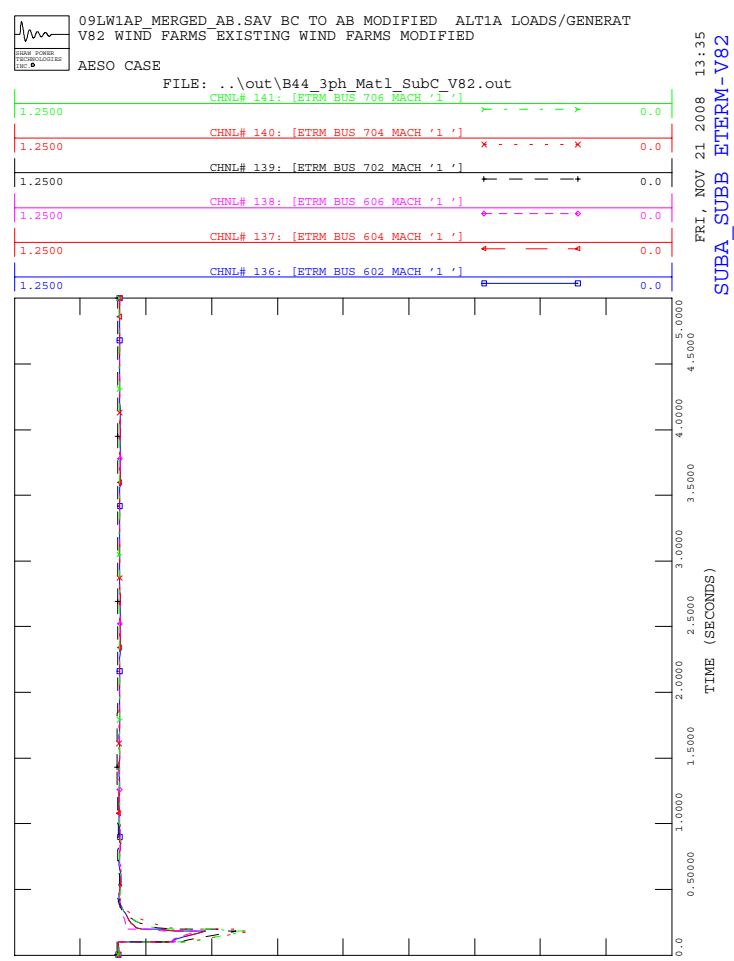
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

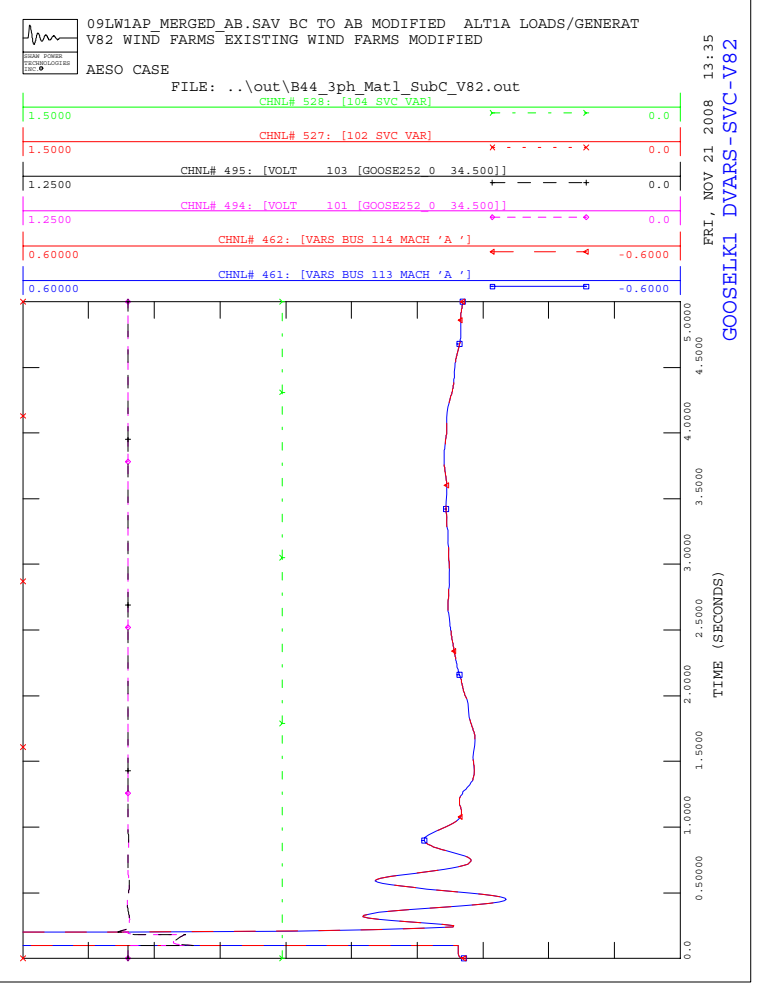
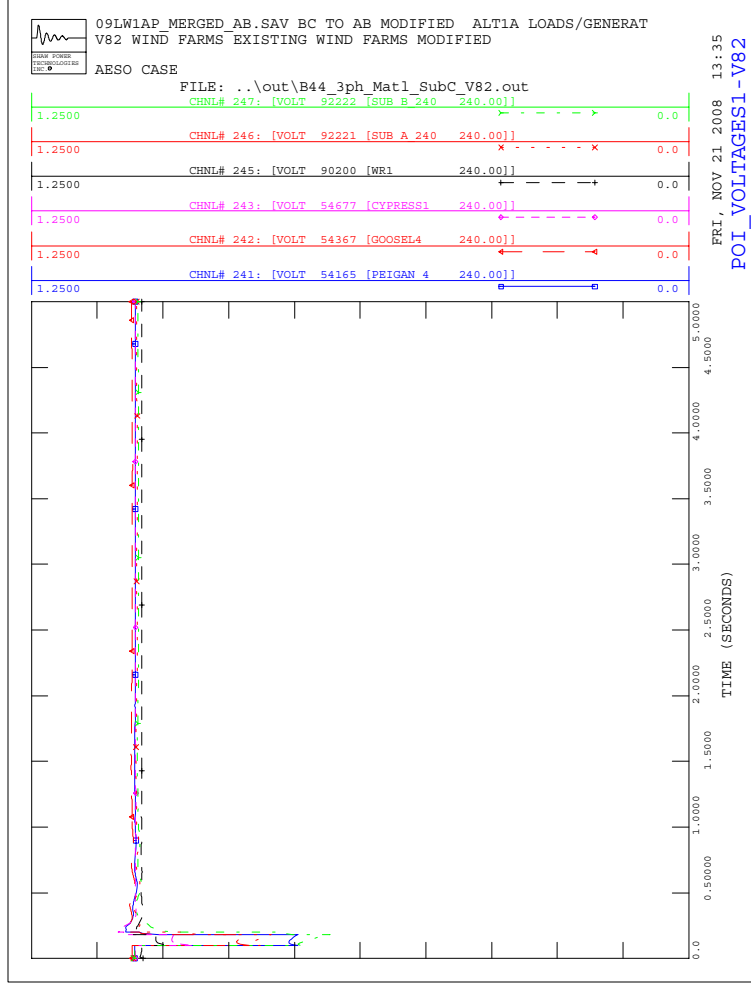
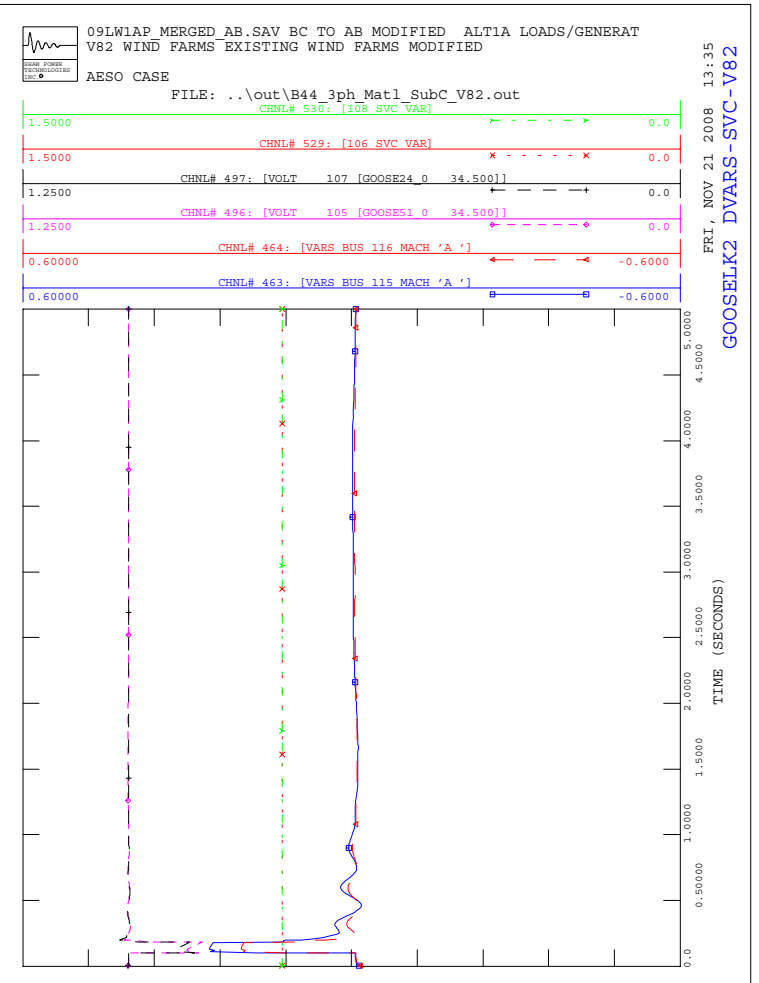
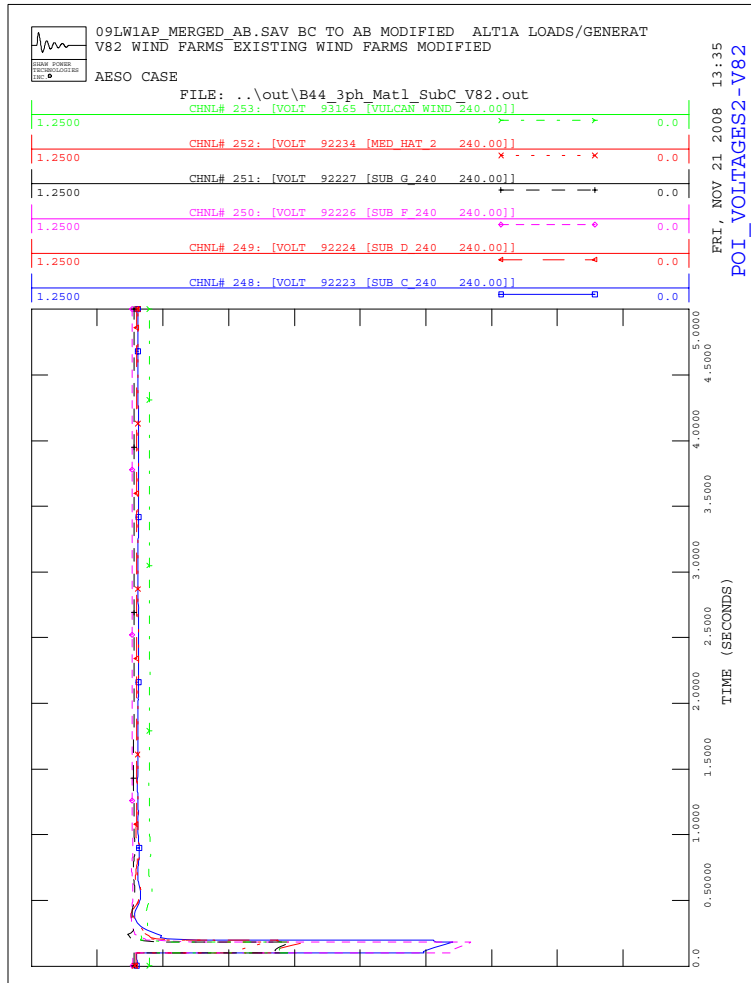
FILE: ..\out\B44_3ph_Mat1_SubC_V82.out

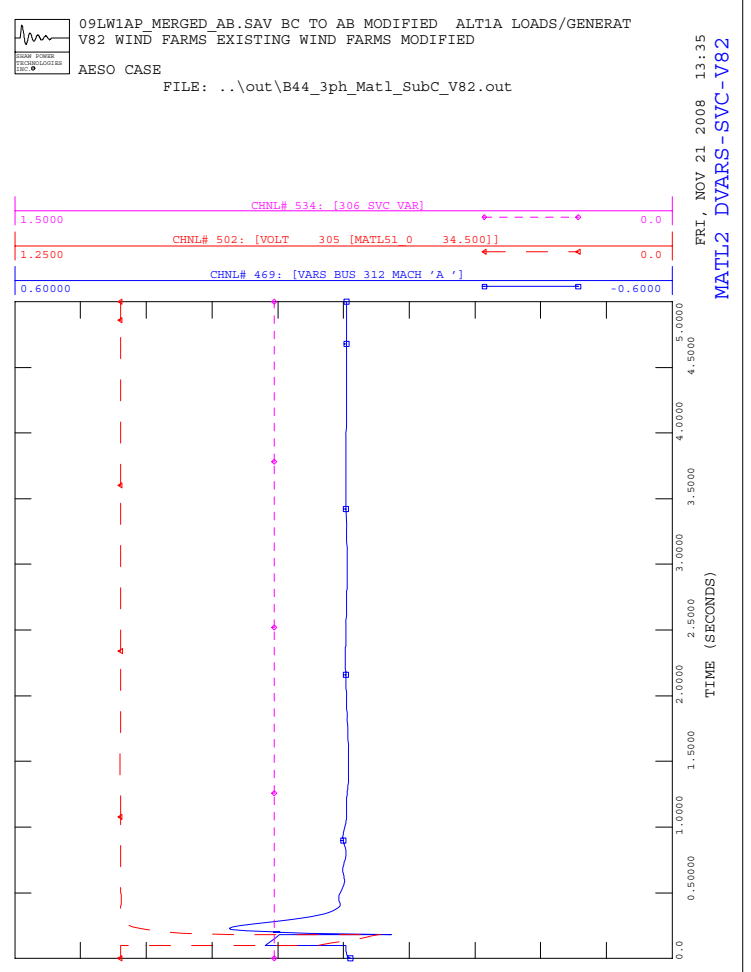
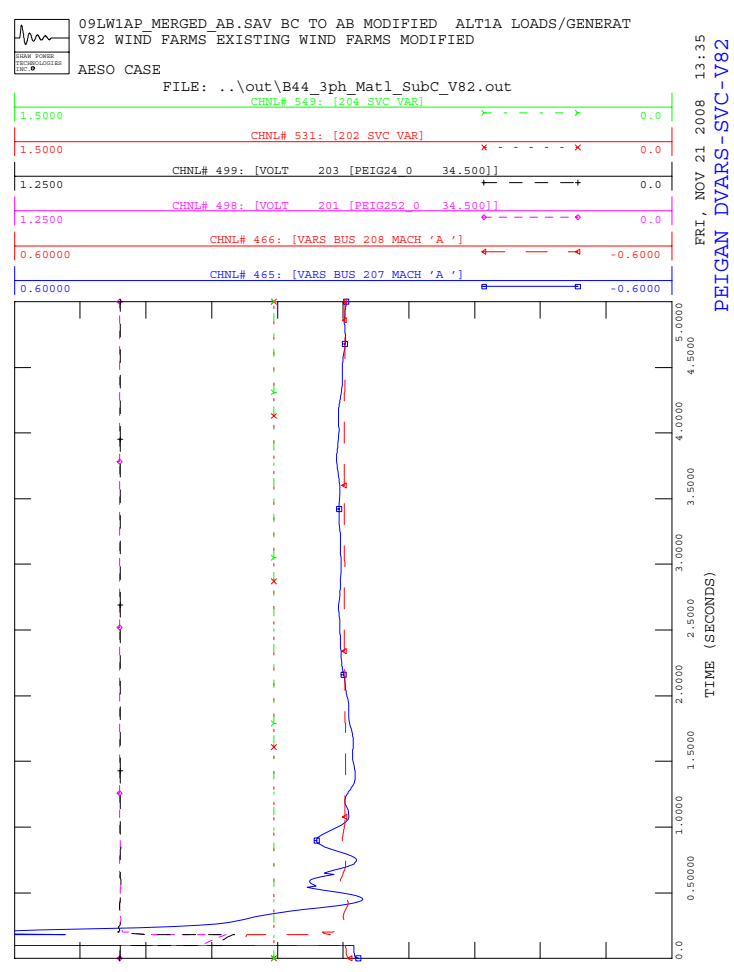
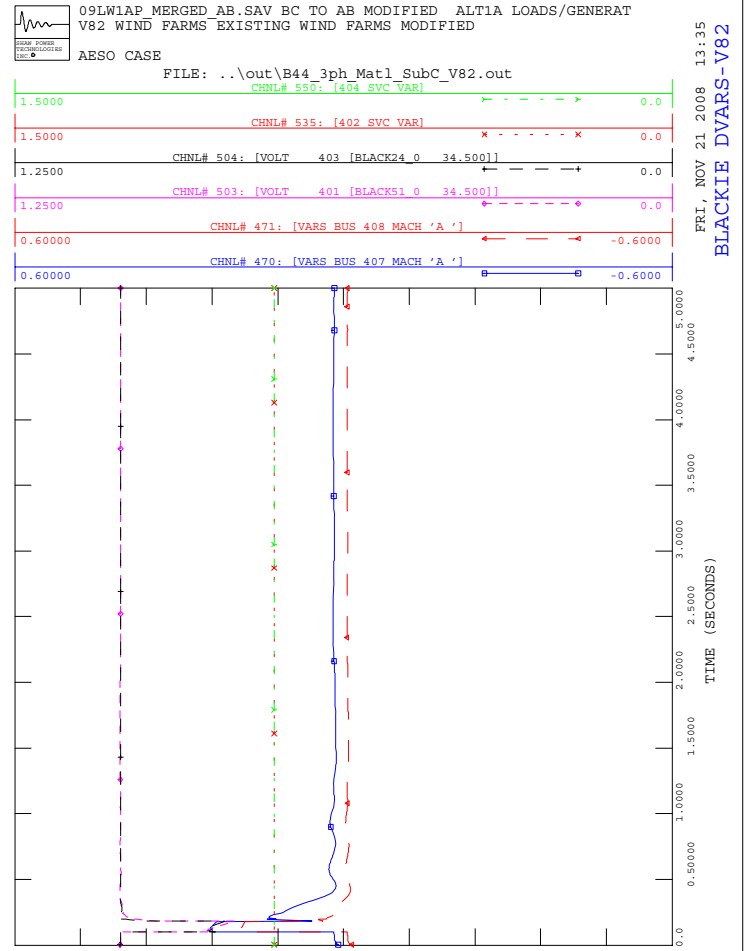
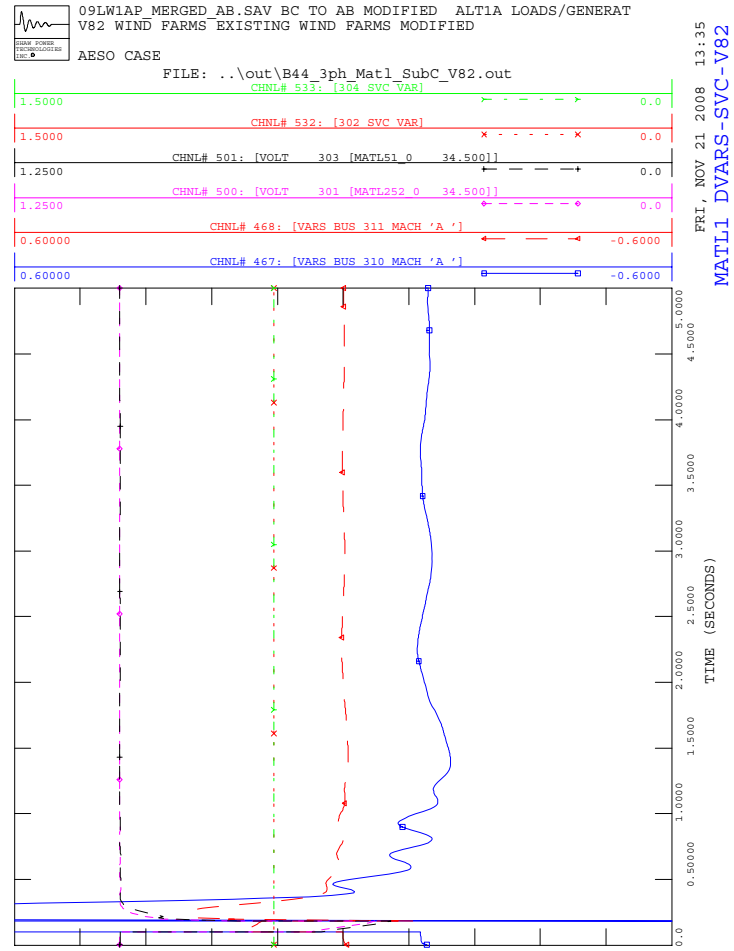


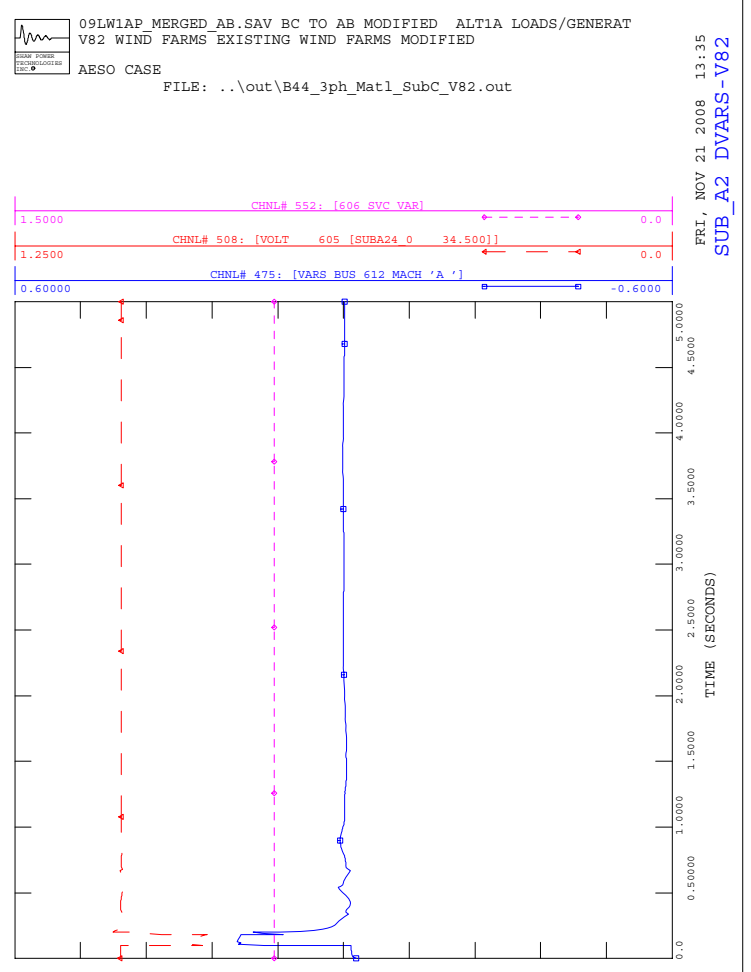
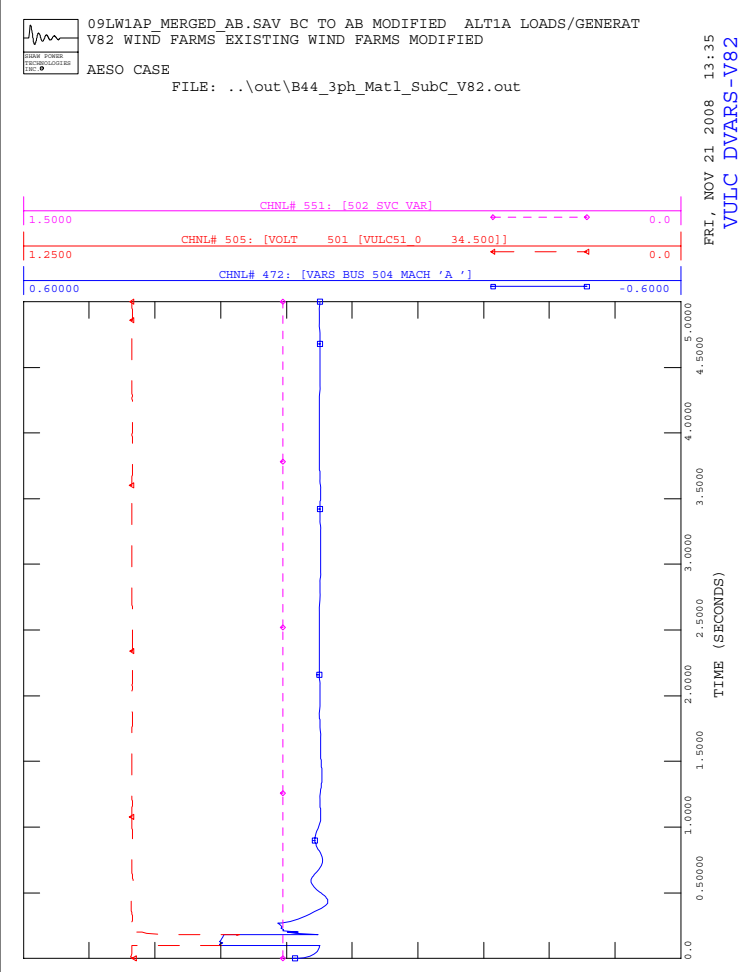
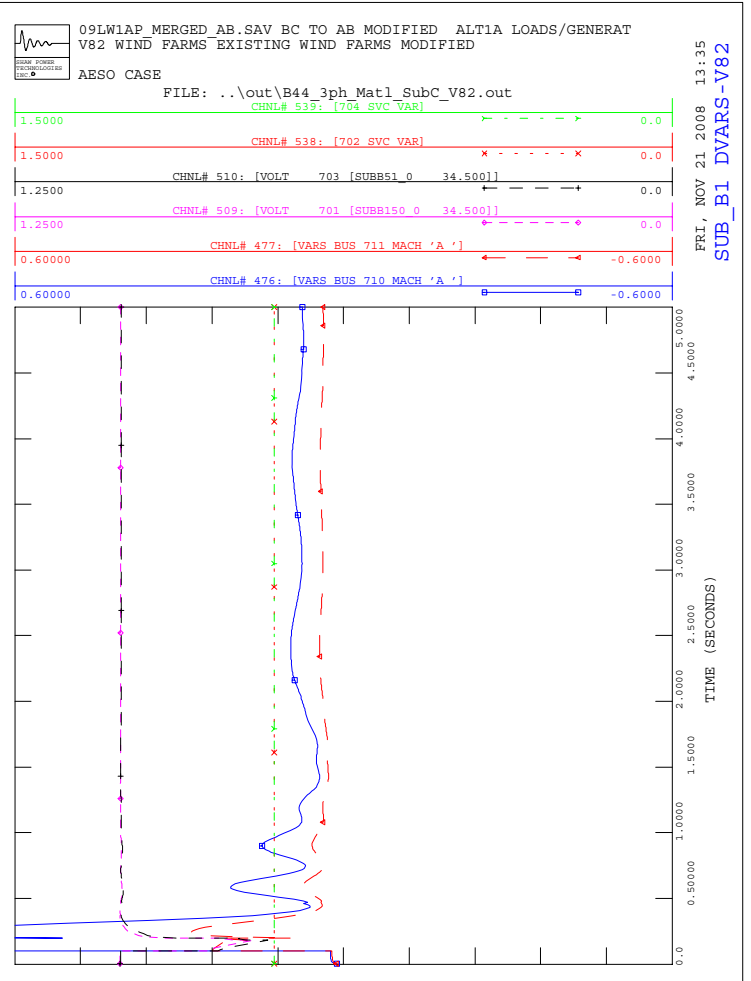
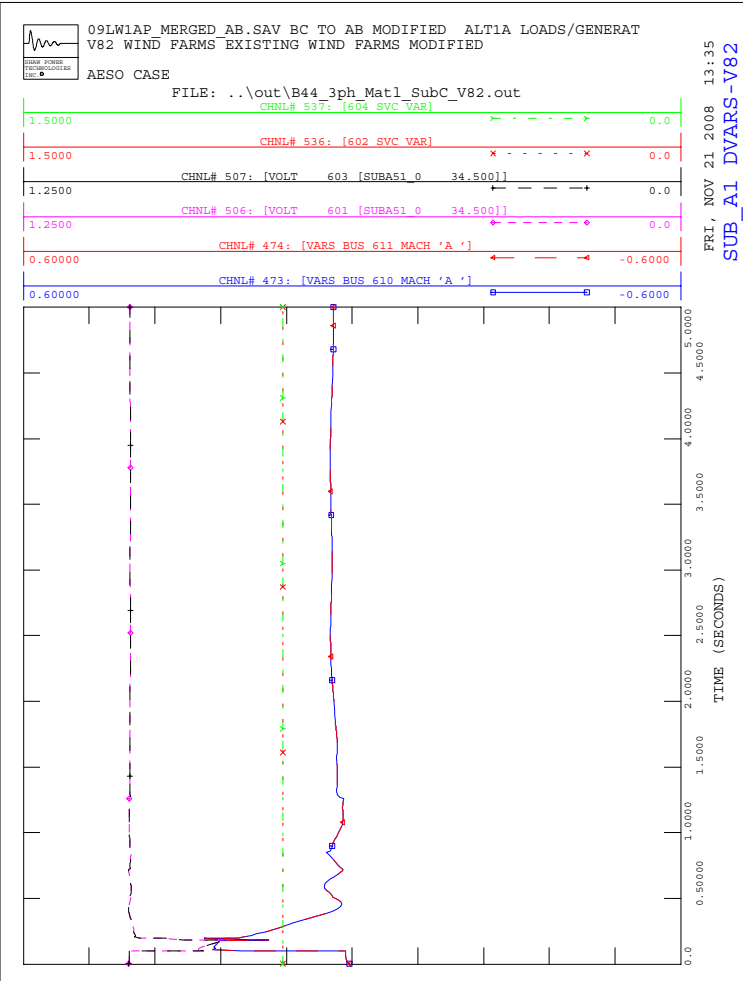
FRI, NOV 21 2008 13:35
 MEH2_CYP_WILD SPEED -V82

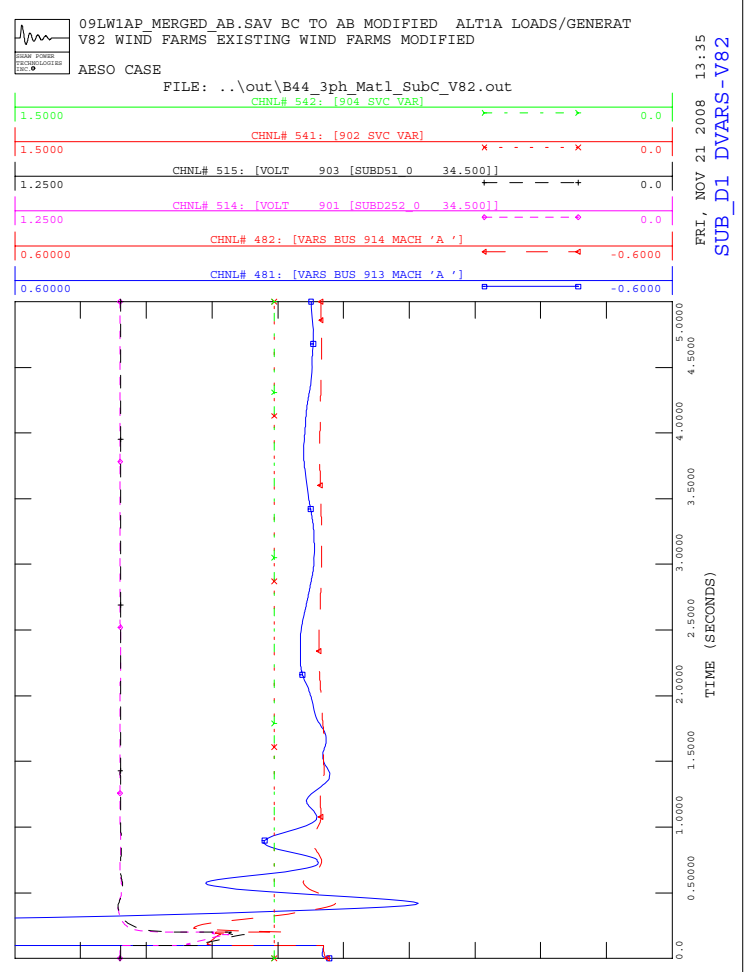
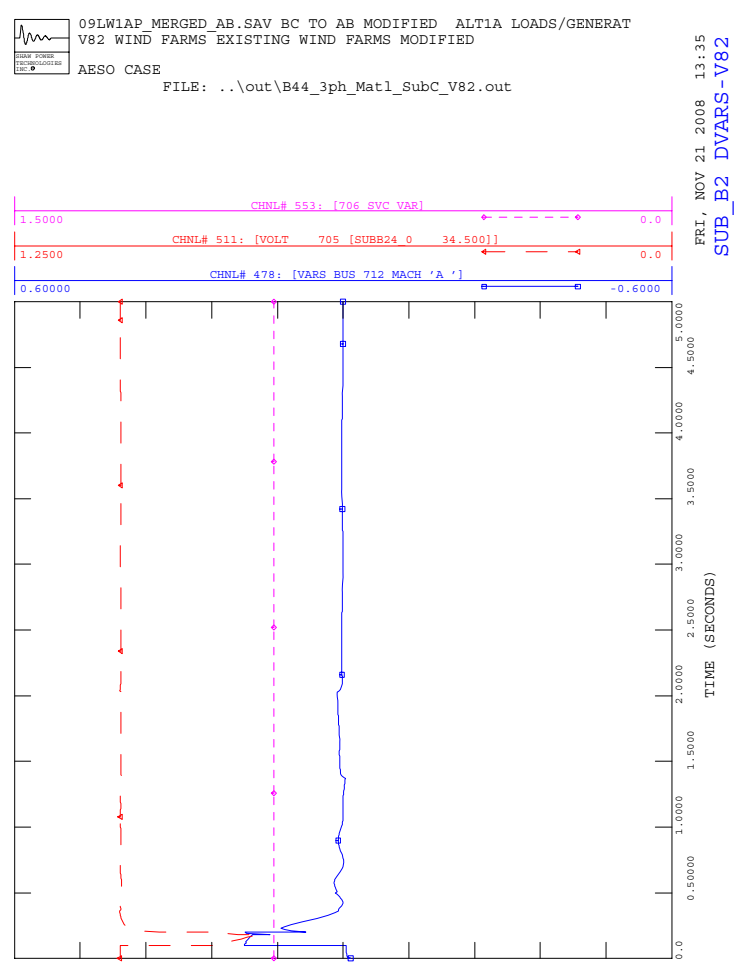
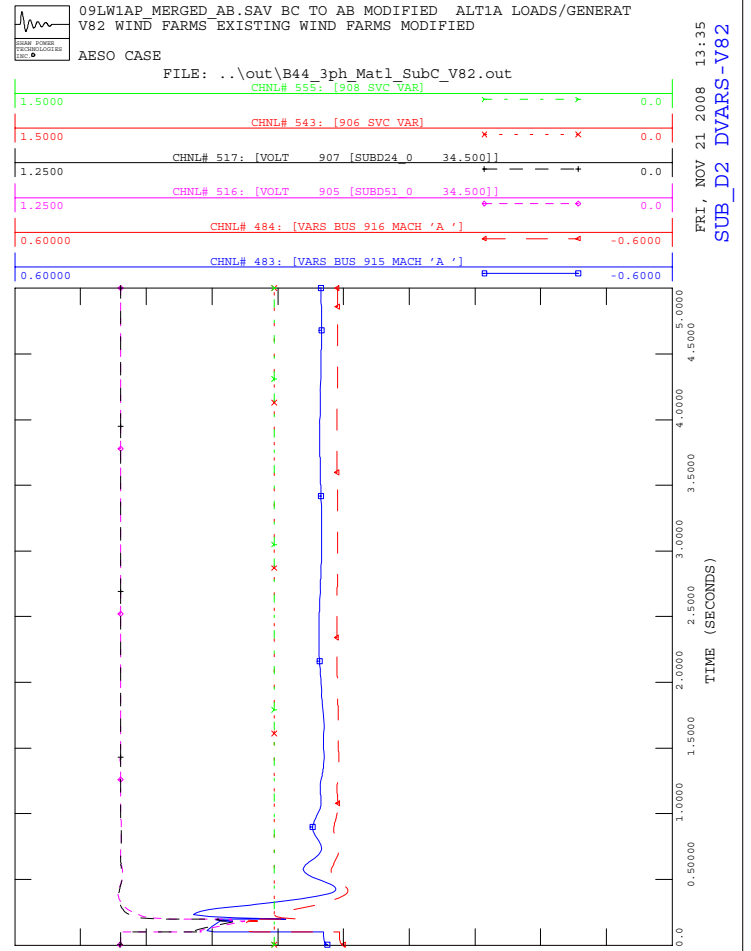
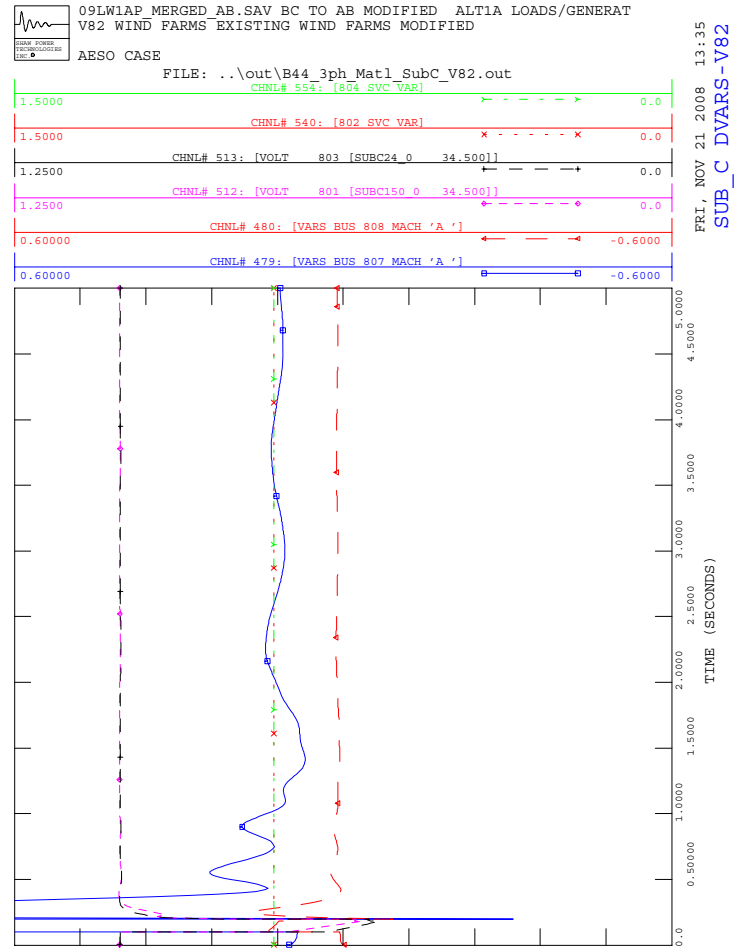


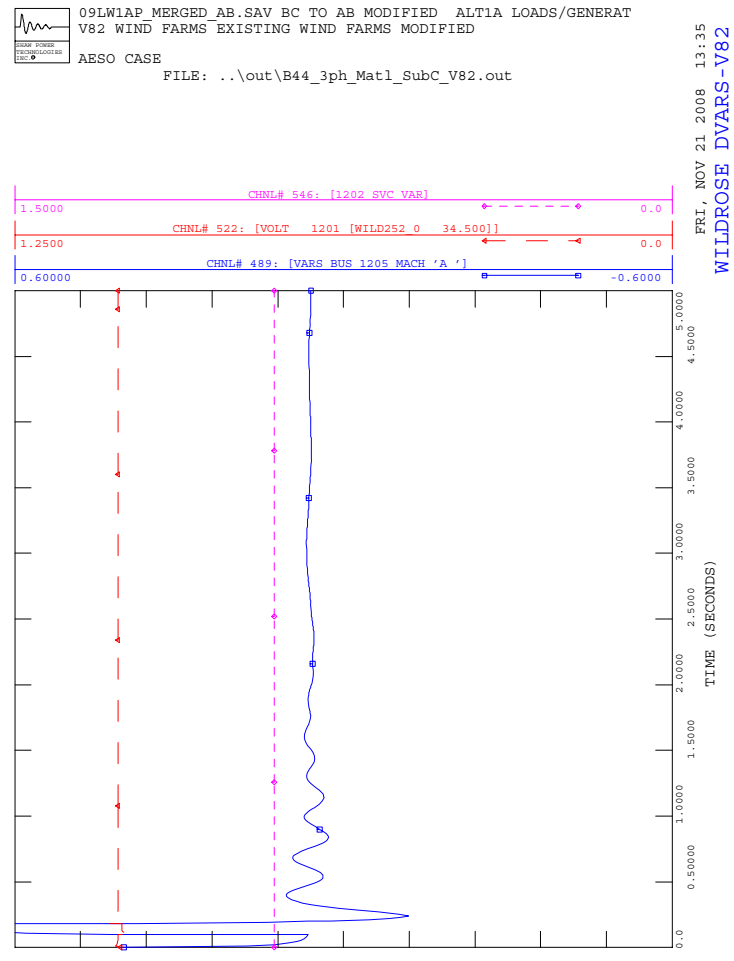
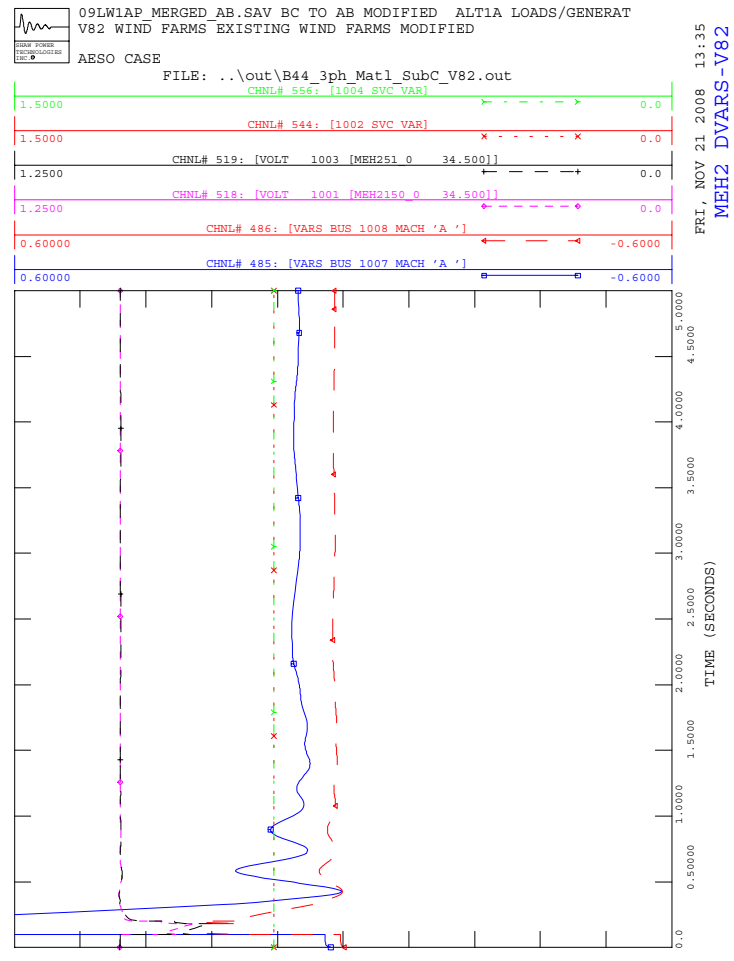
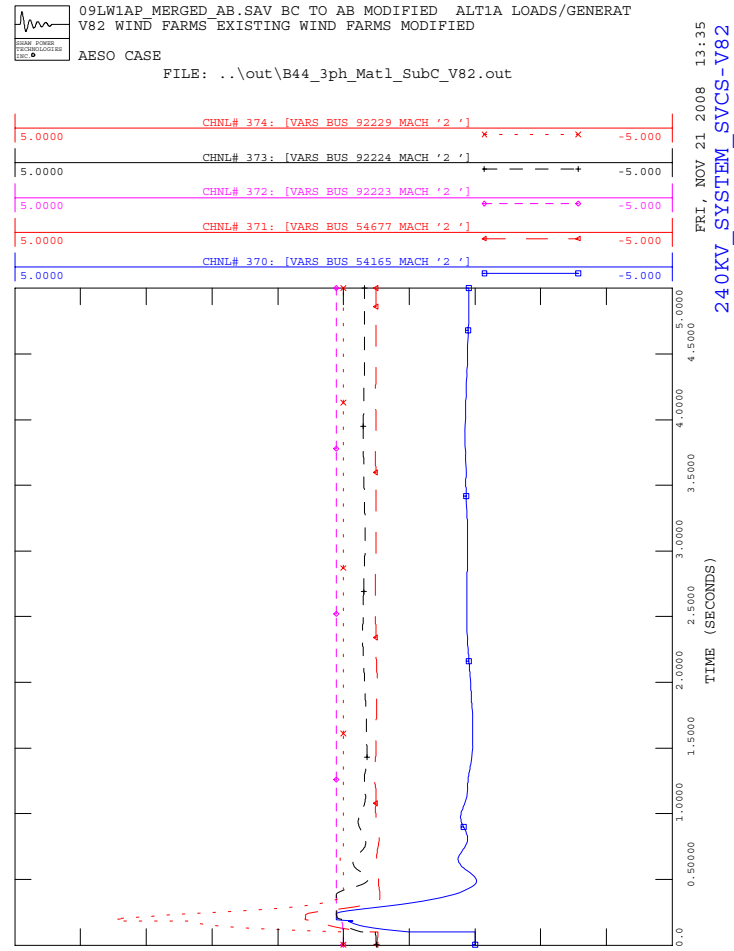
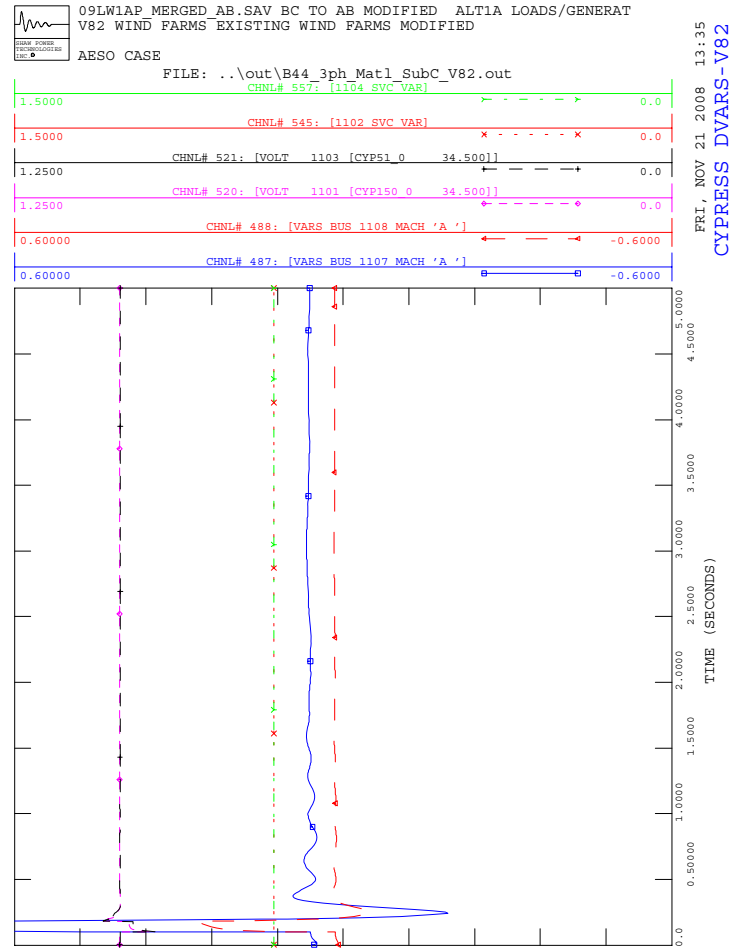












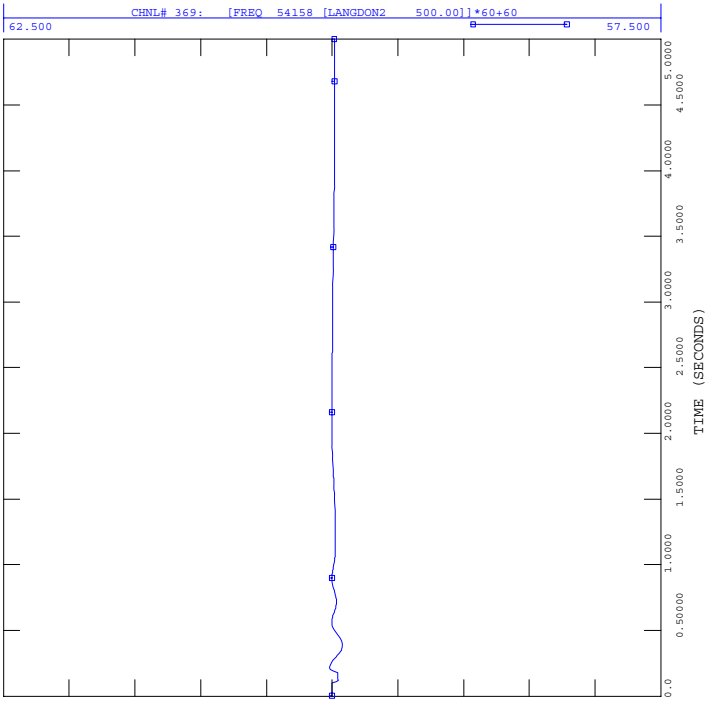


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B44_3ph_Mat1_SubC_V82.out

FRI, NOV 21 2008 13:35
LANGDON_FRQ-V82

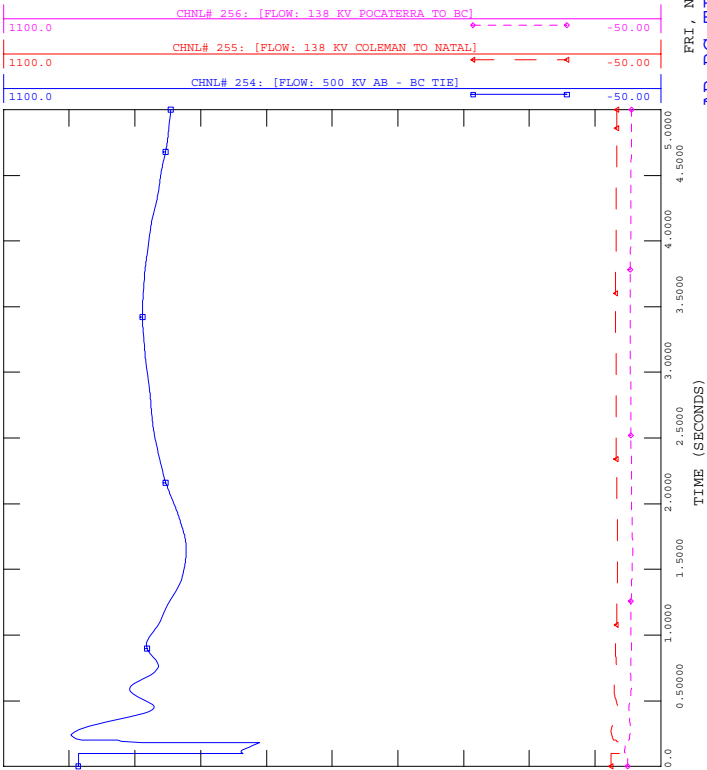


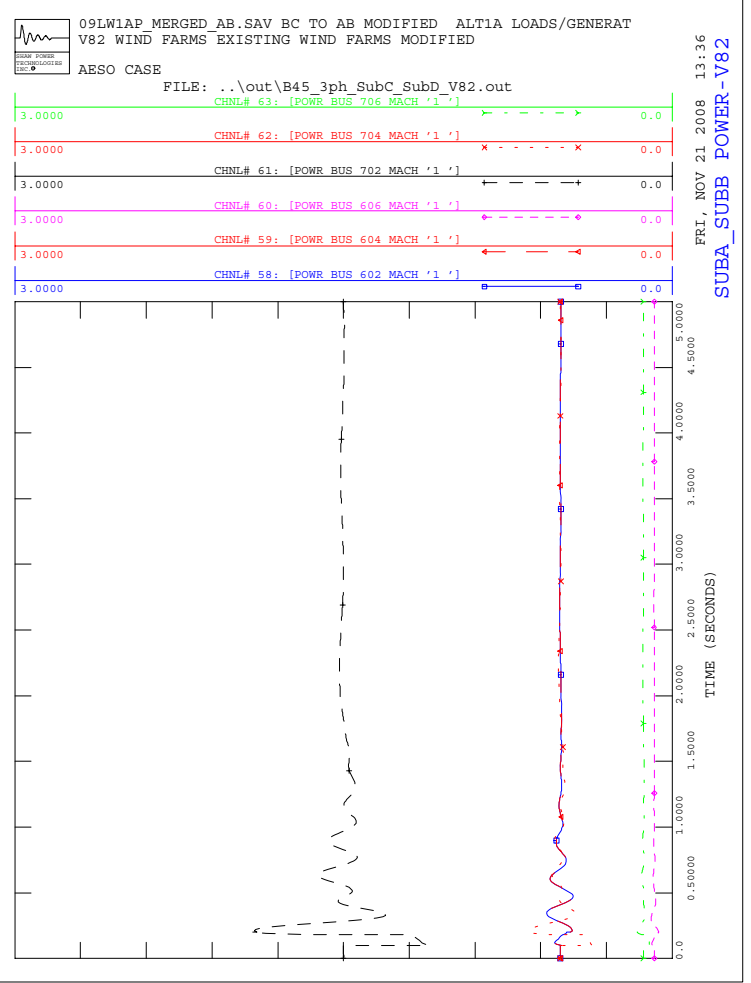
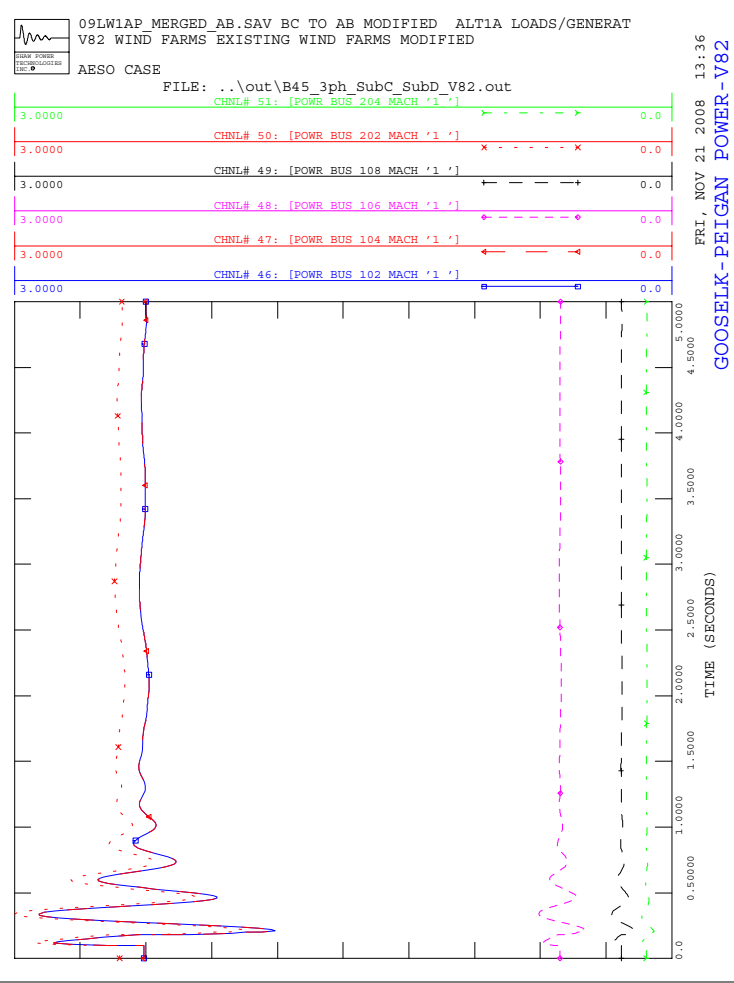
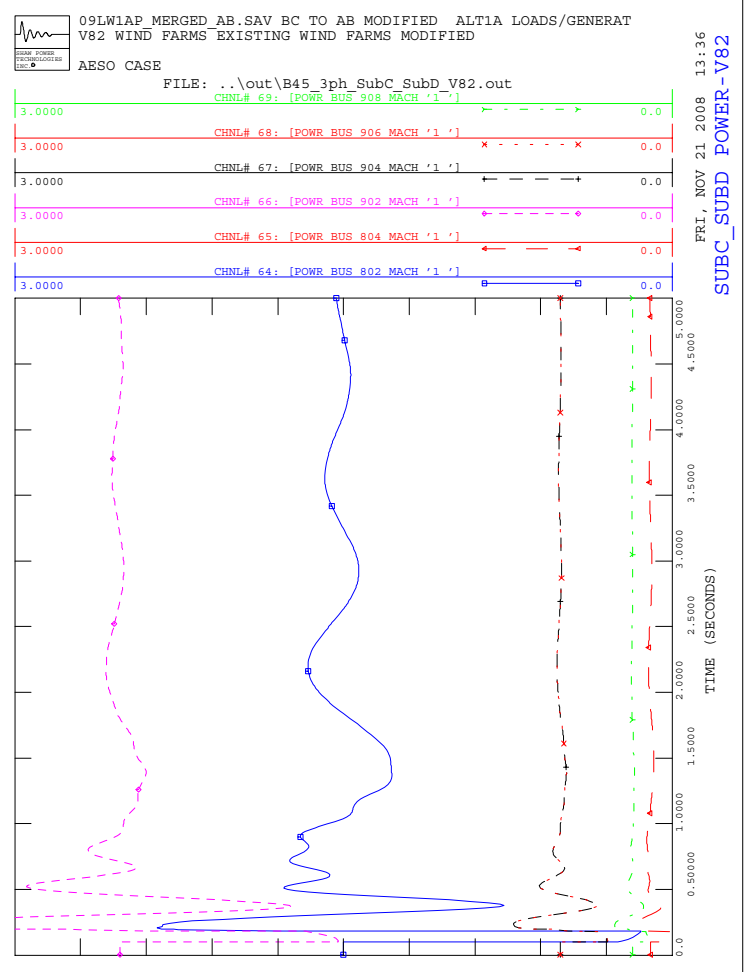
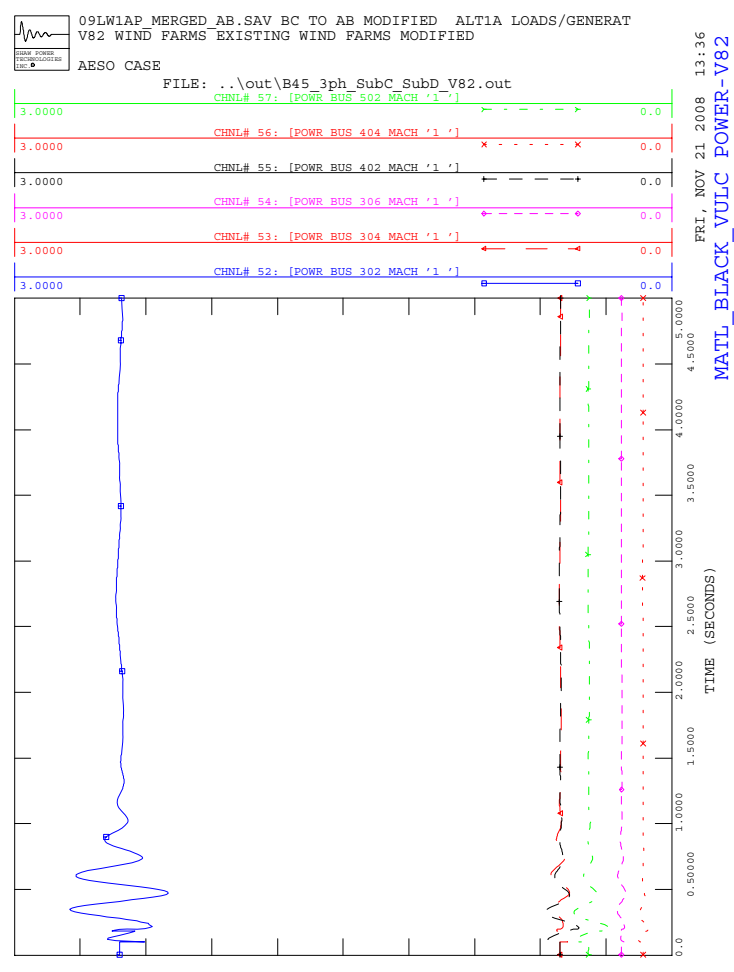
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

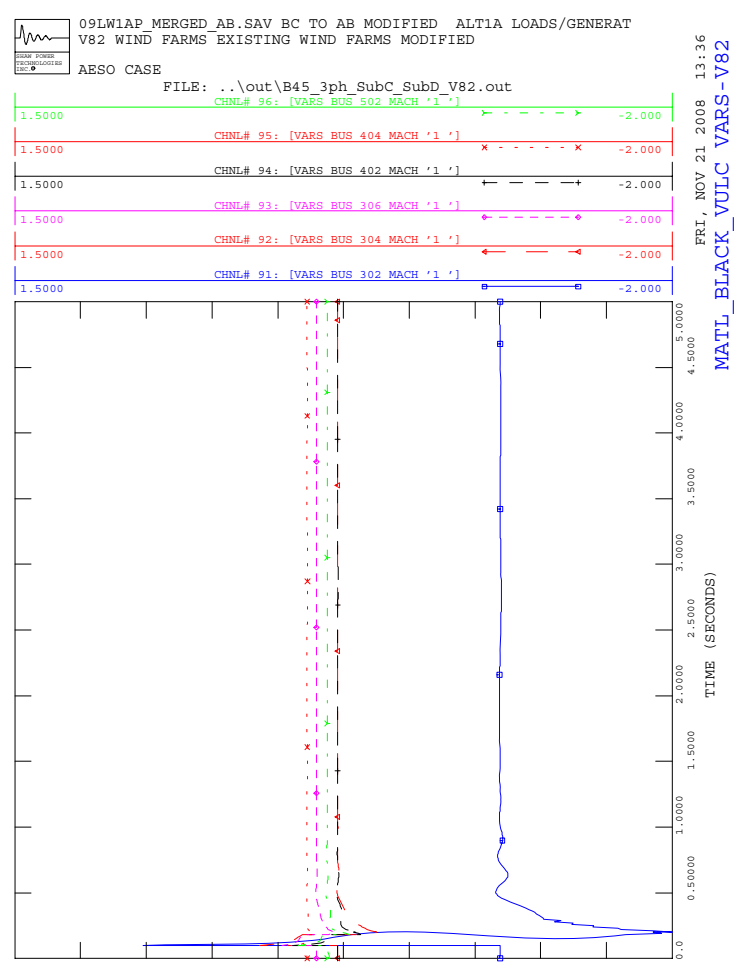
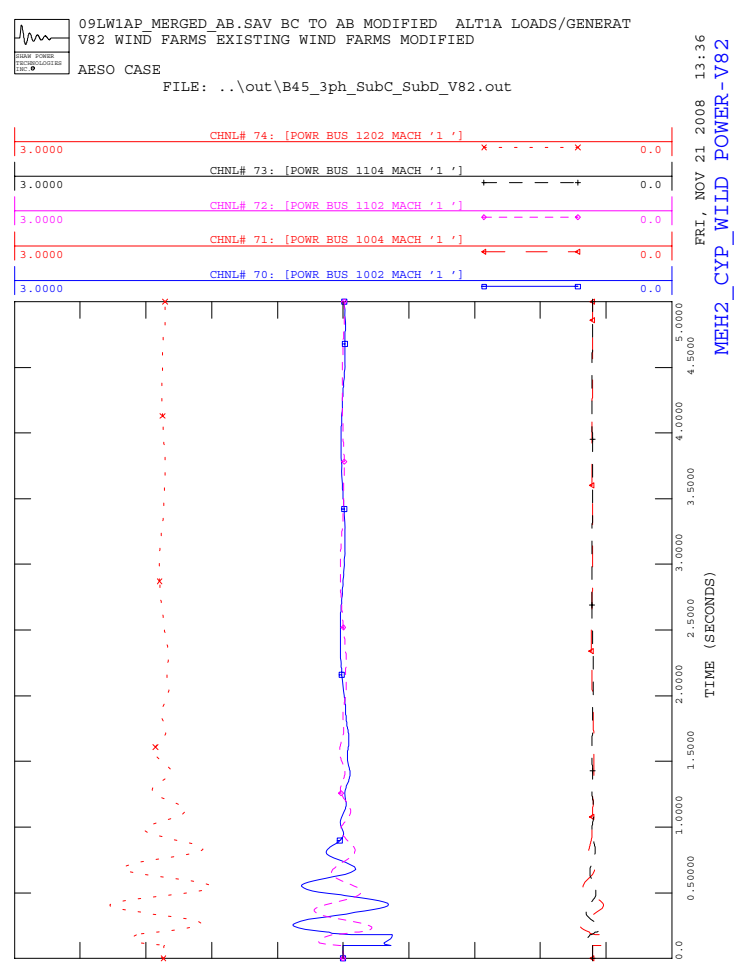
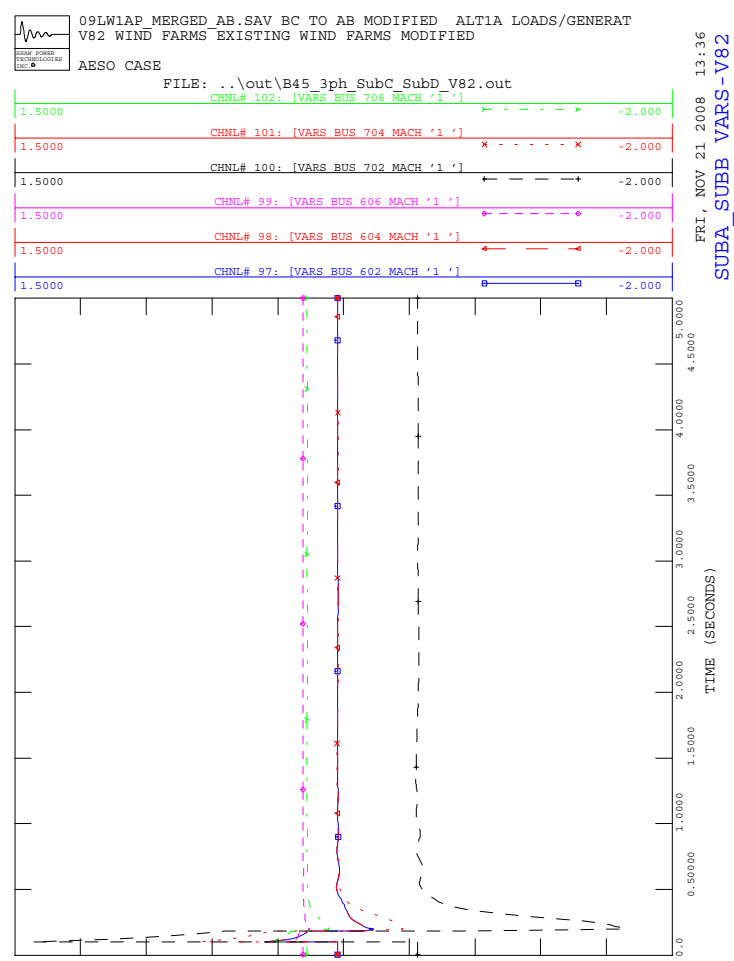
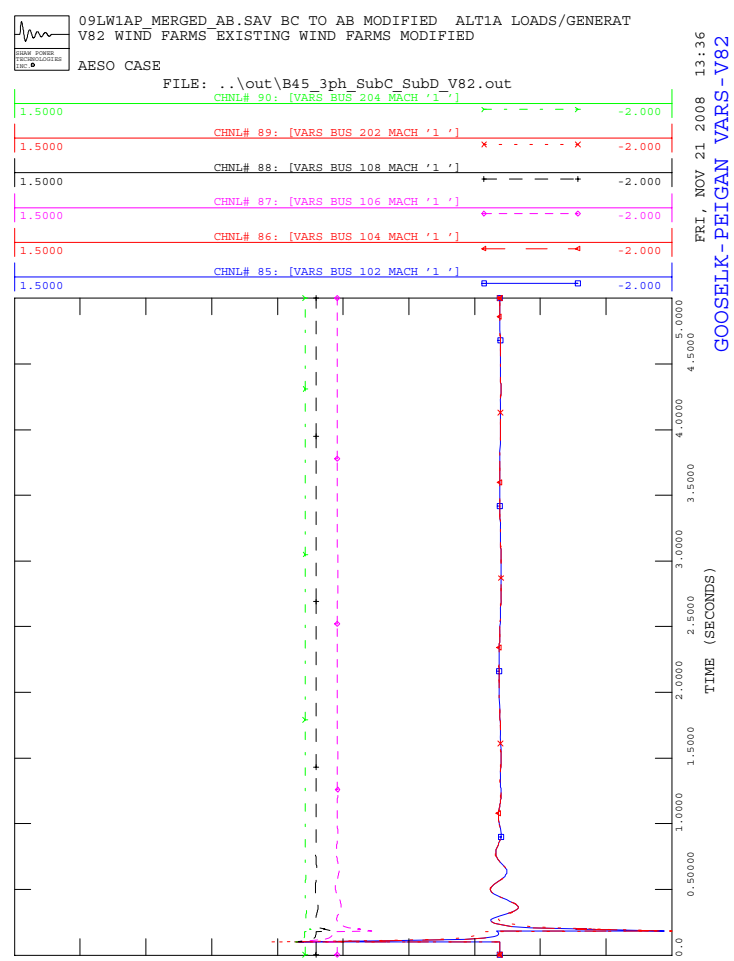
ABSO CASE

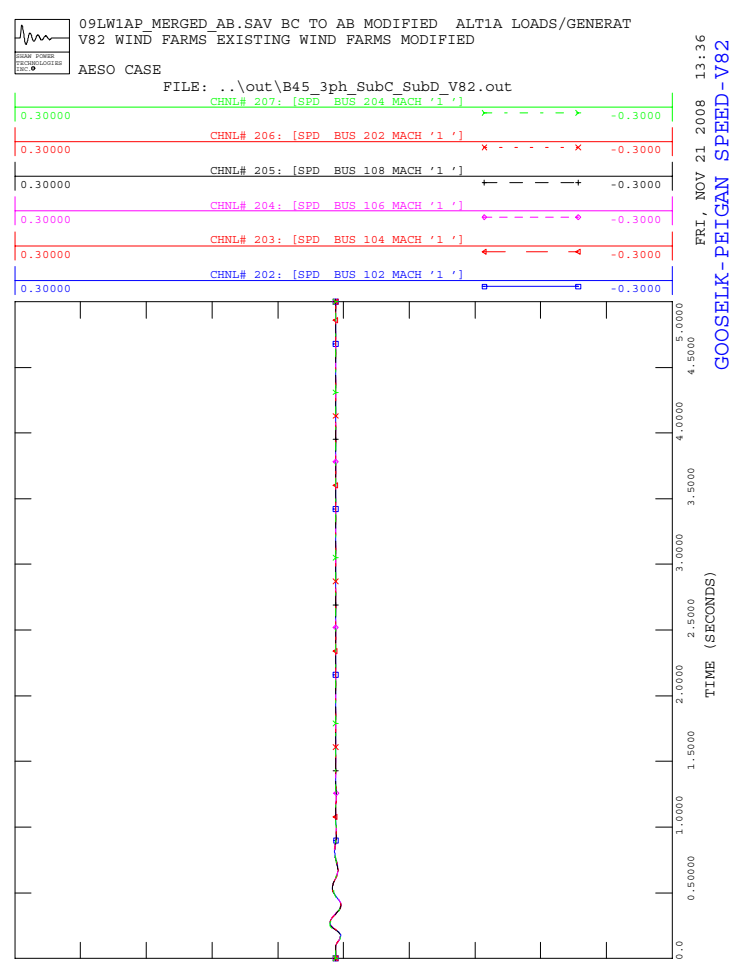
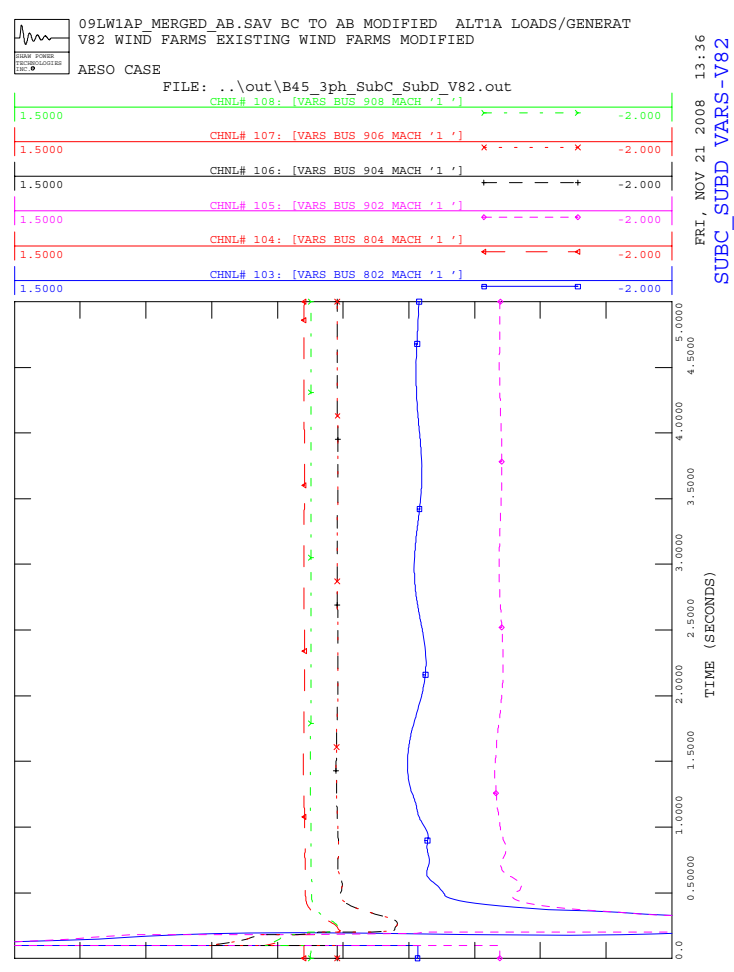
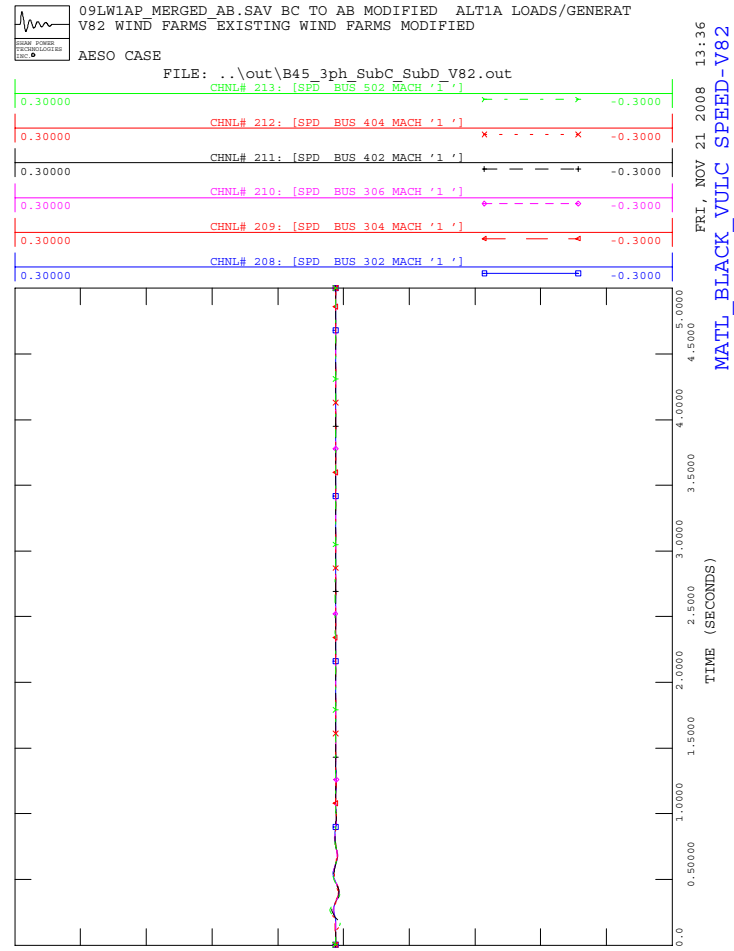
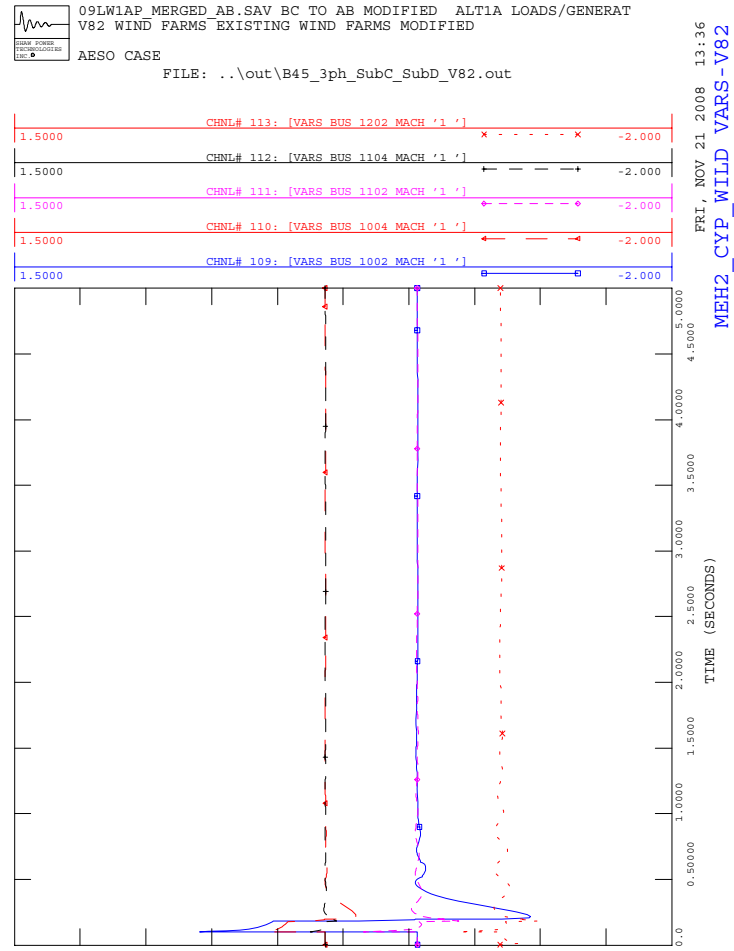
FILE: ..\out\B44_3ph_Mat1_SubC_V82.out

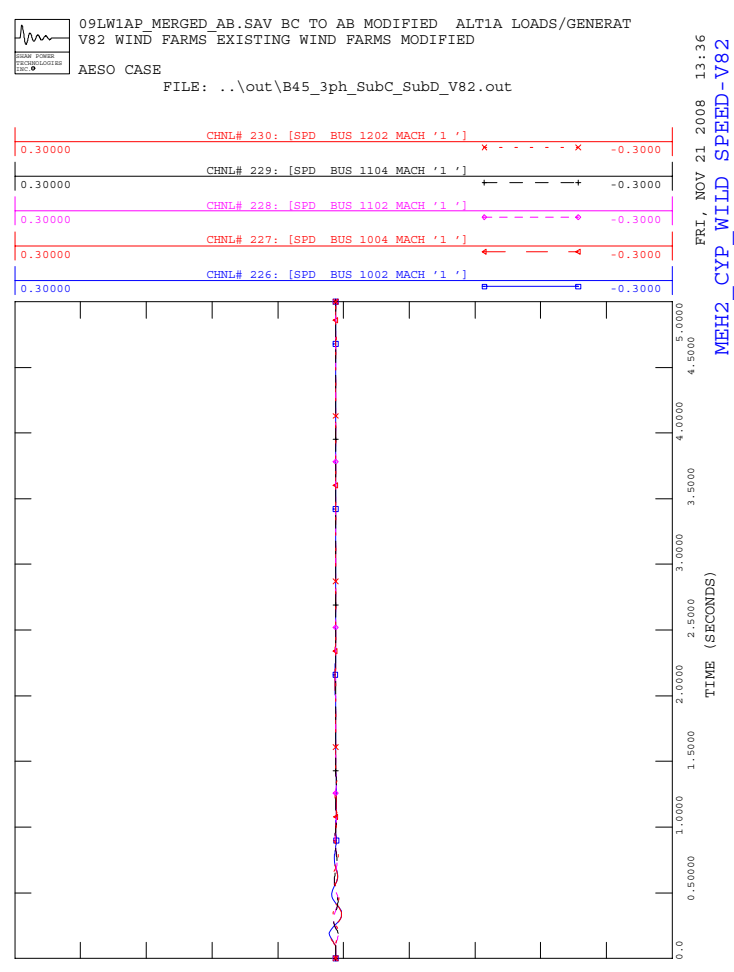
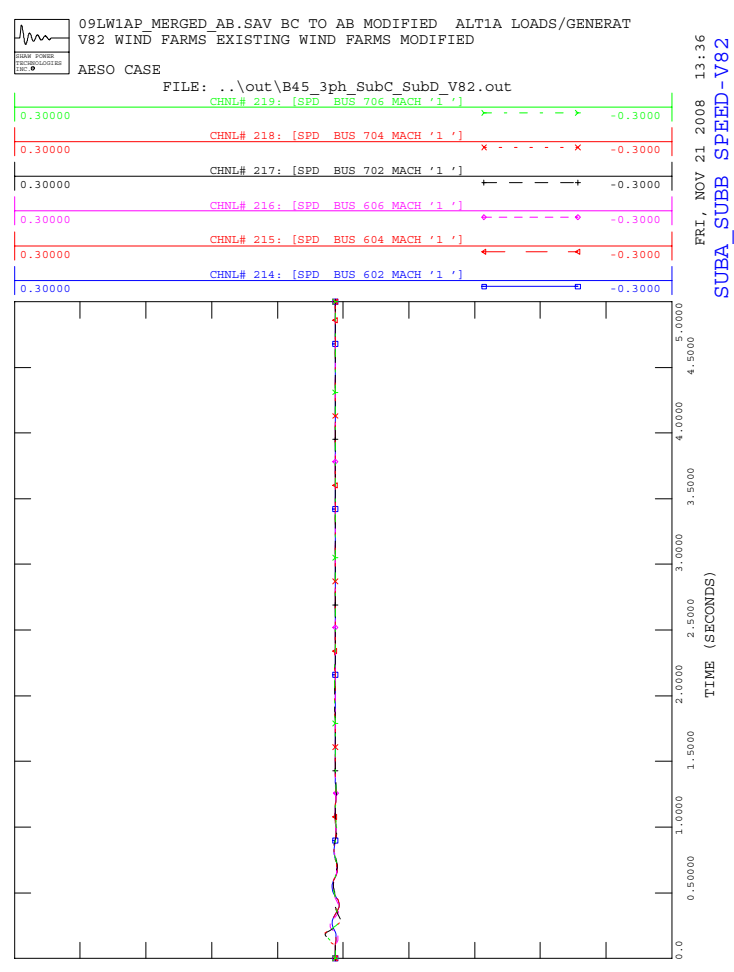
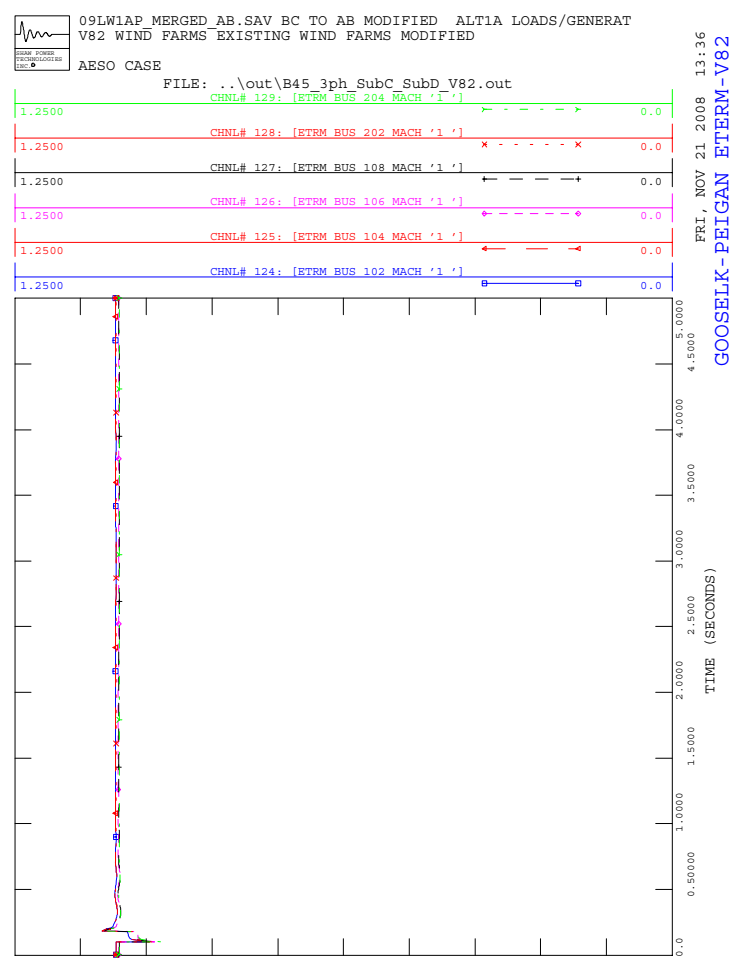
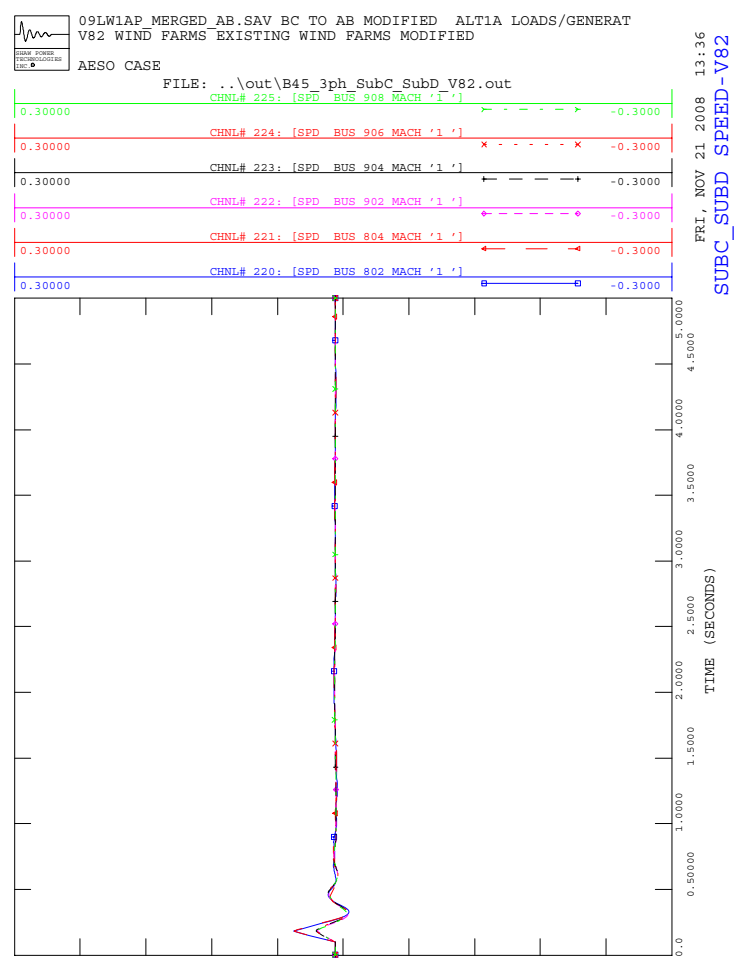
FRI, NOV 21 2008 13:35
AB_BC_TIE_FLOWS-V82

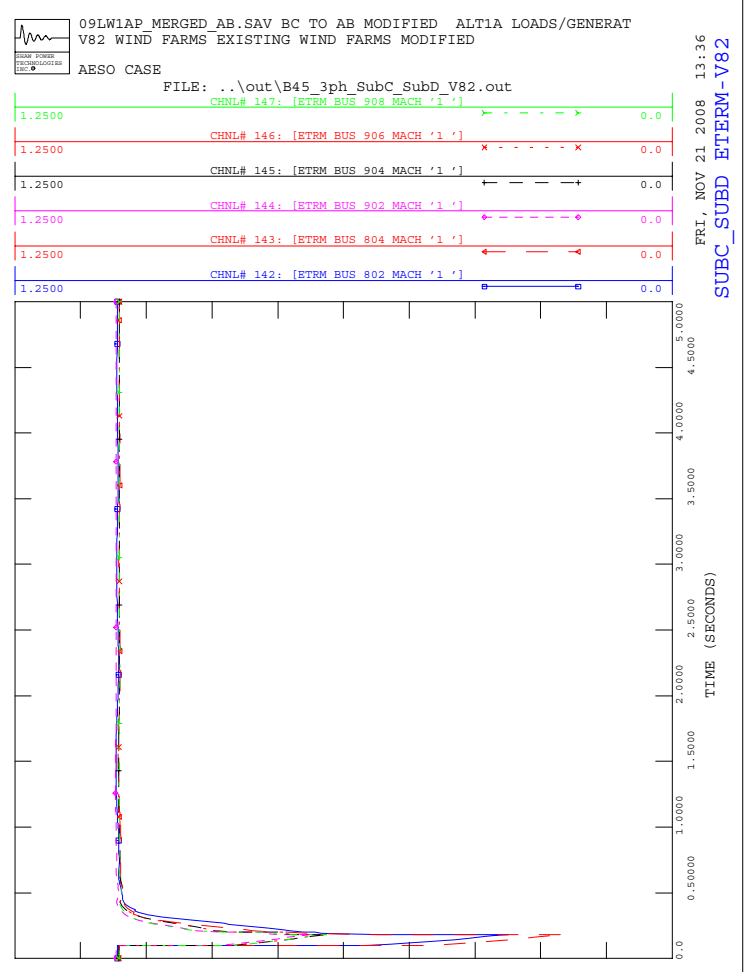
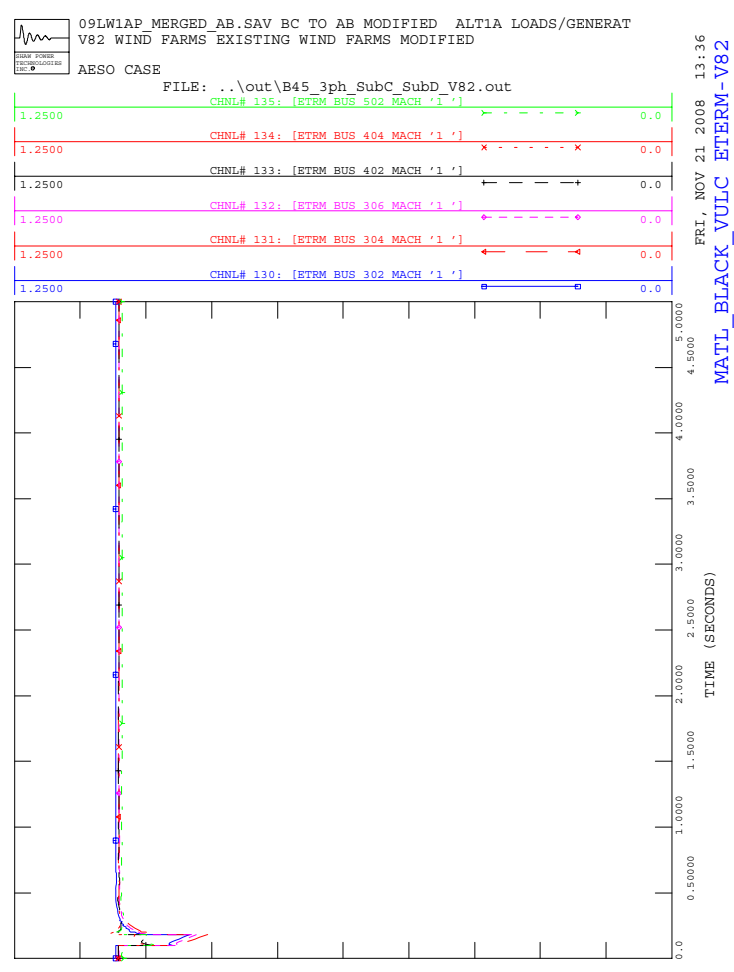
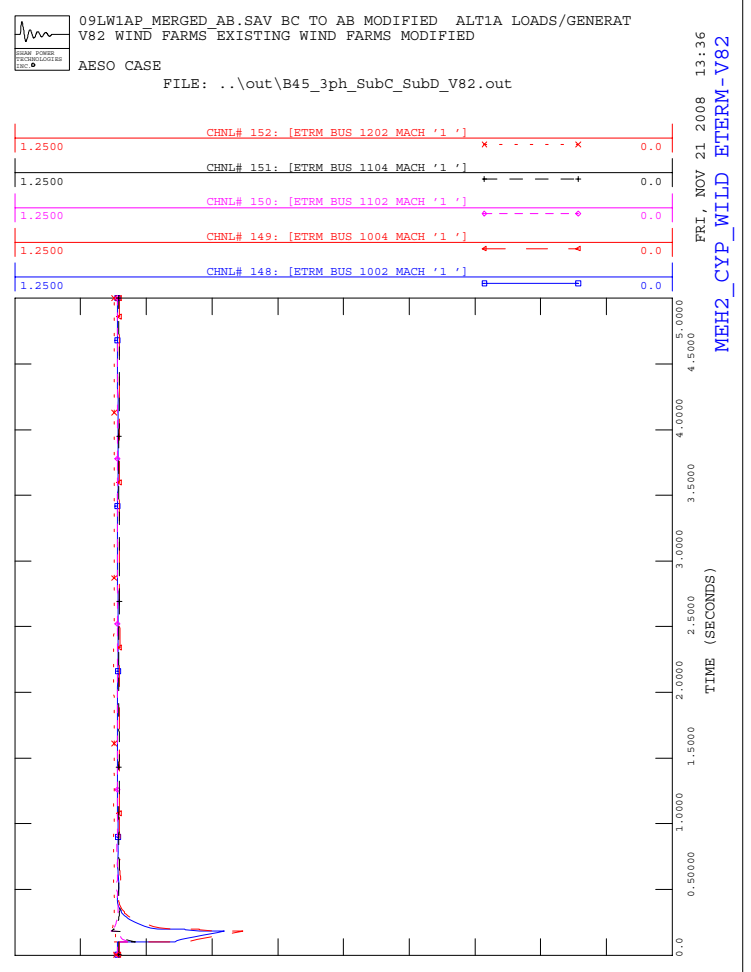
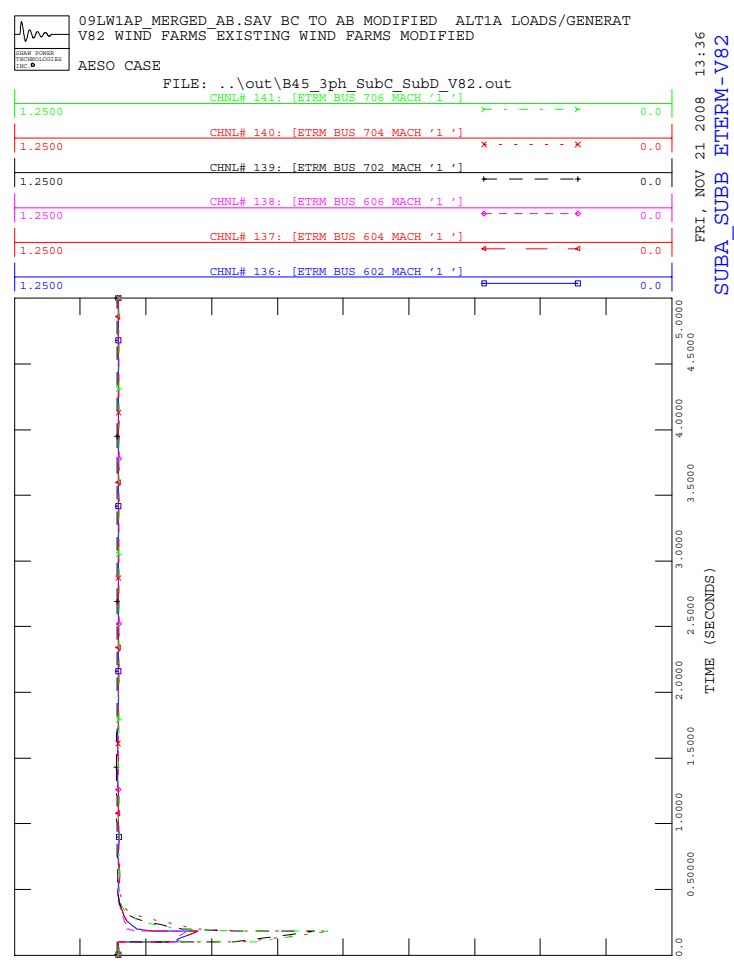


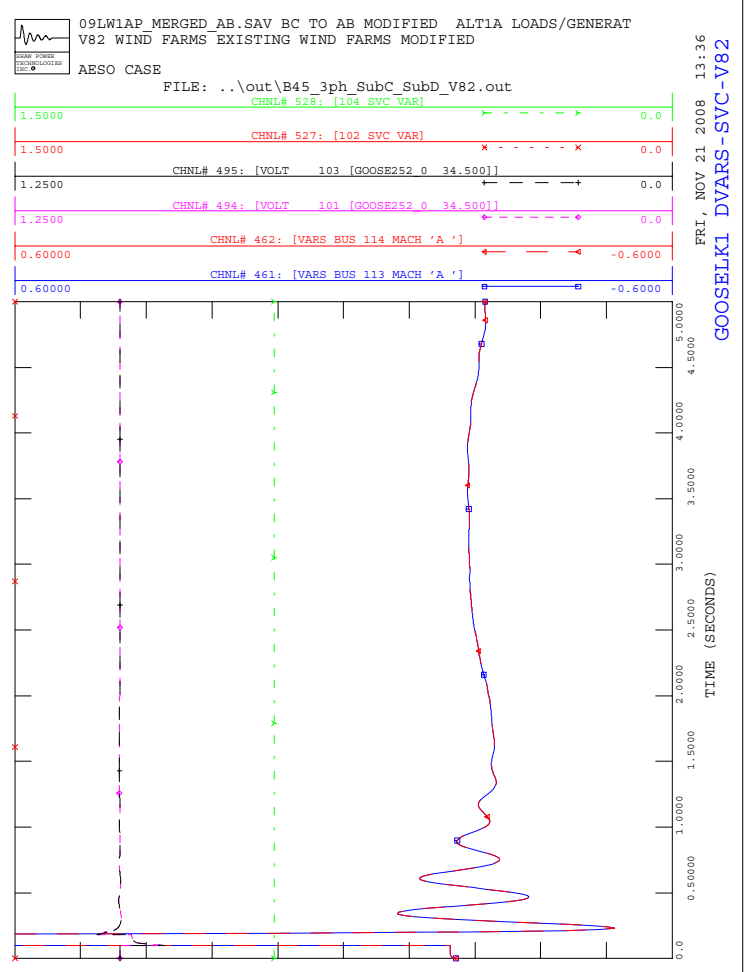
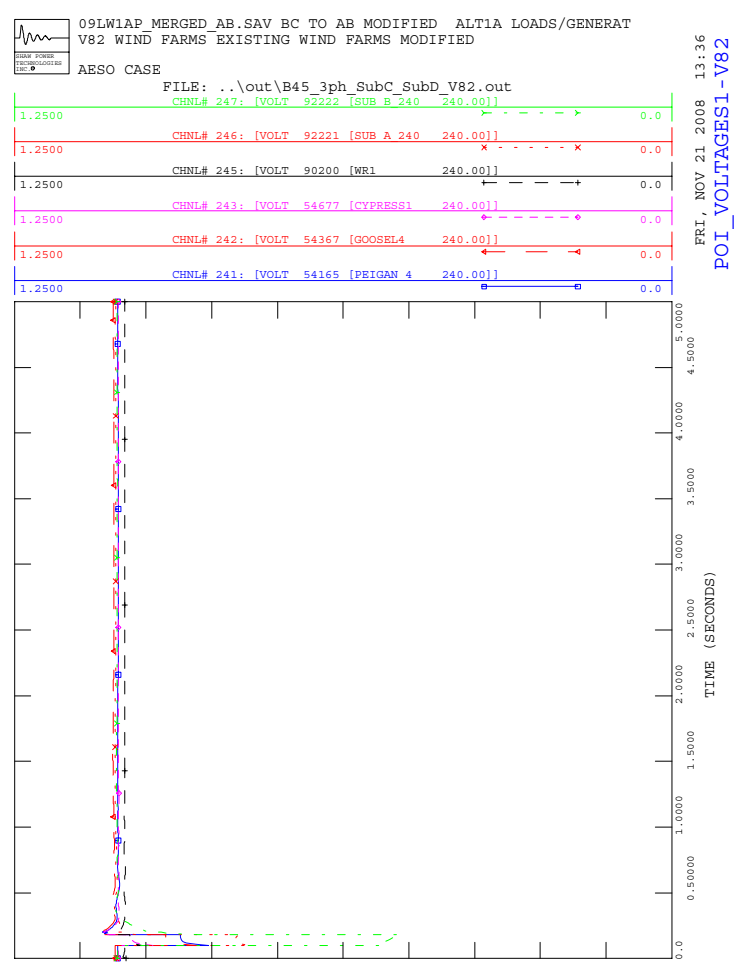
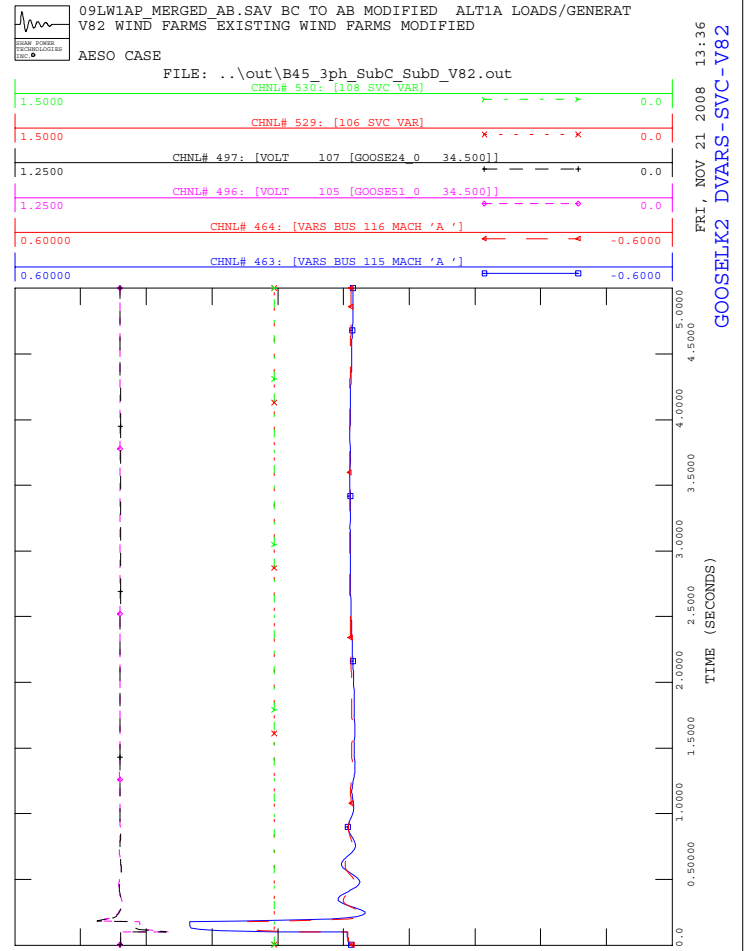
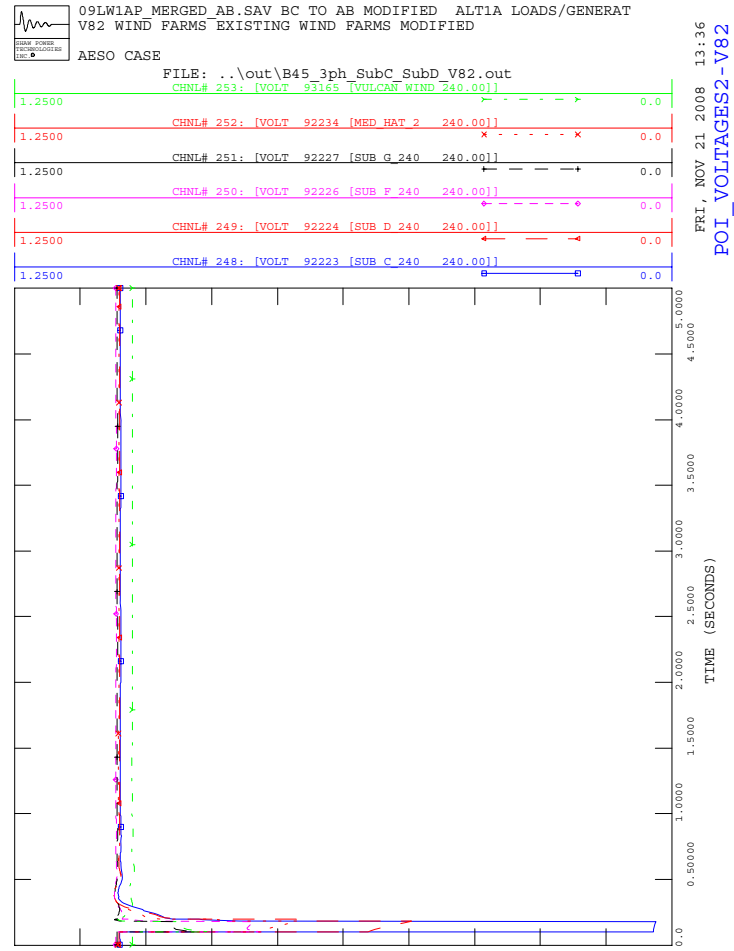


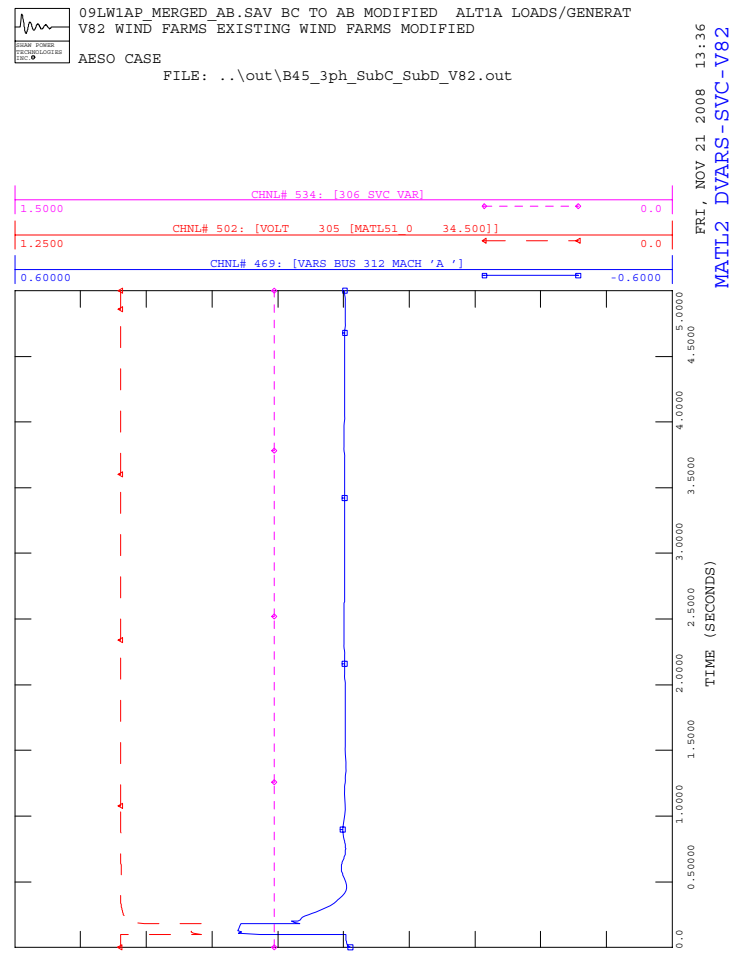
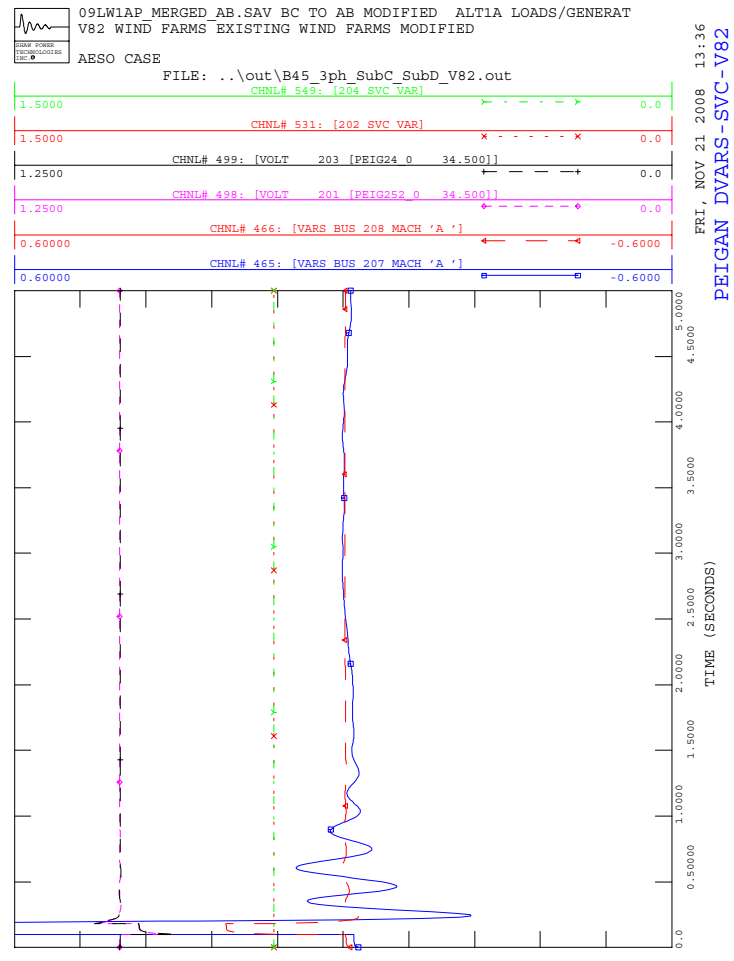
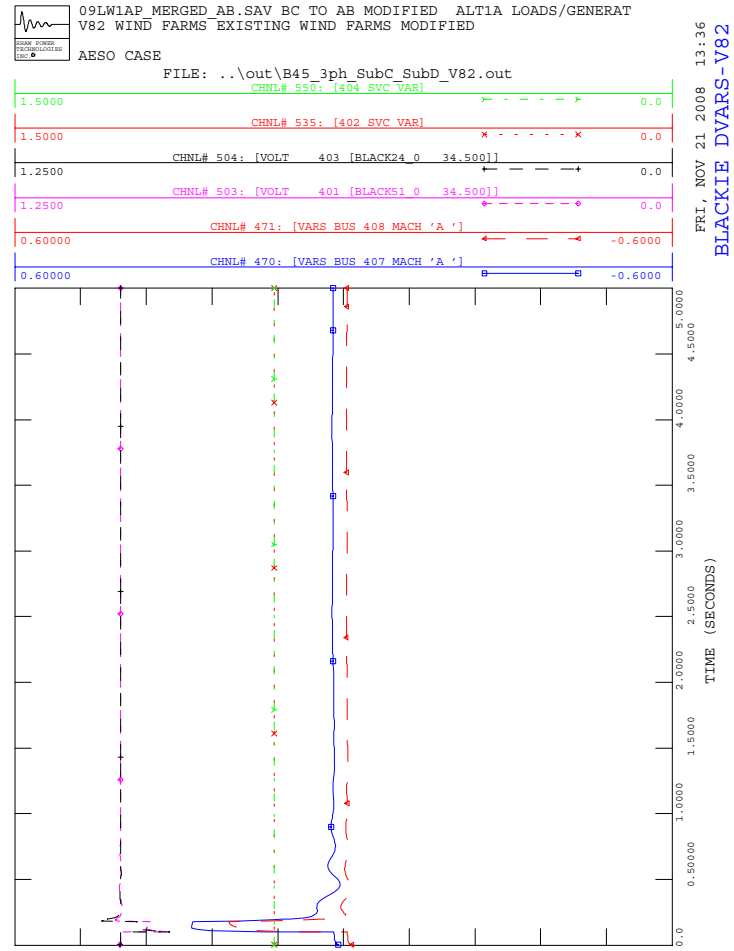
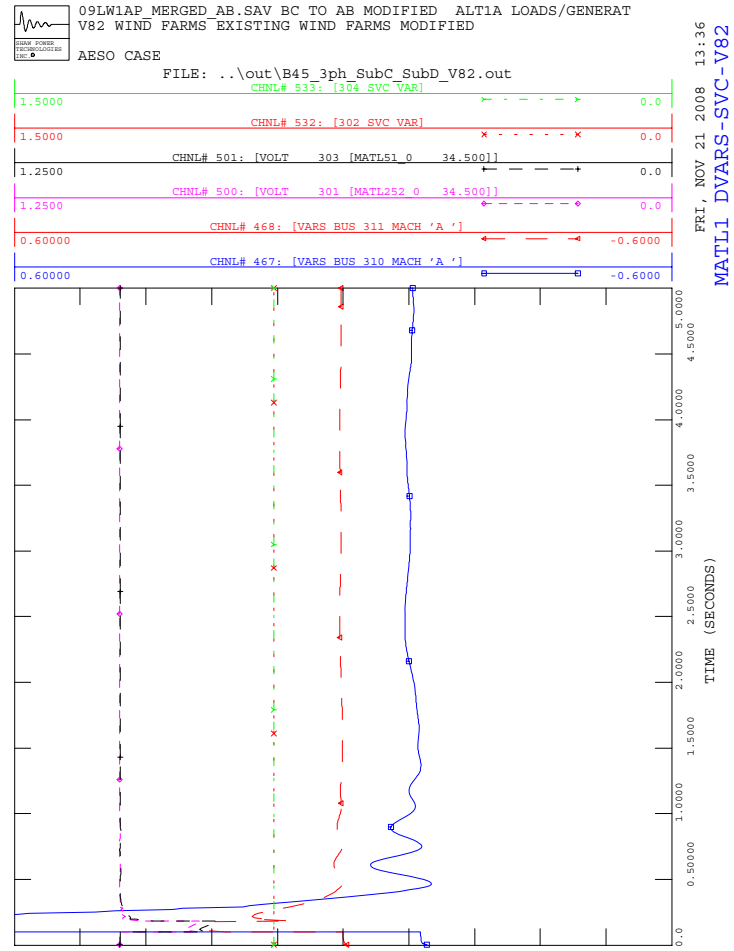


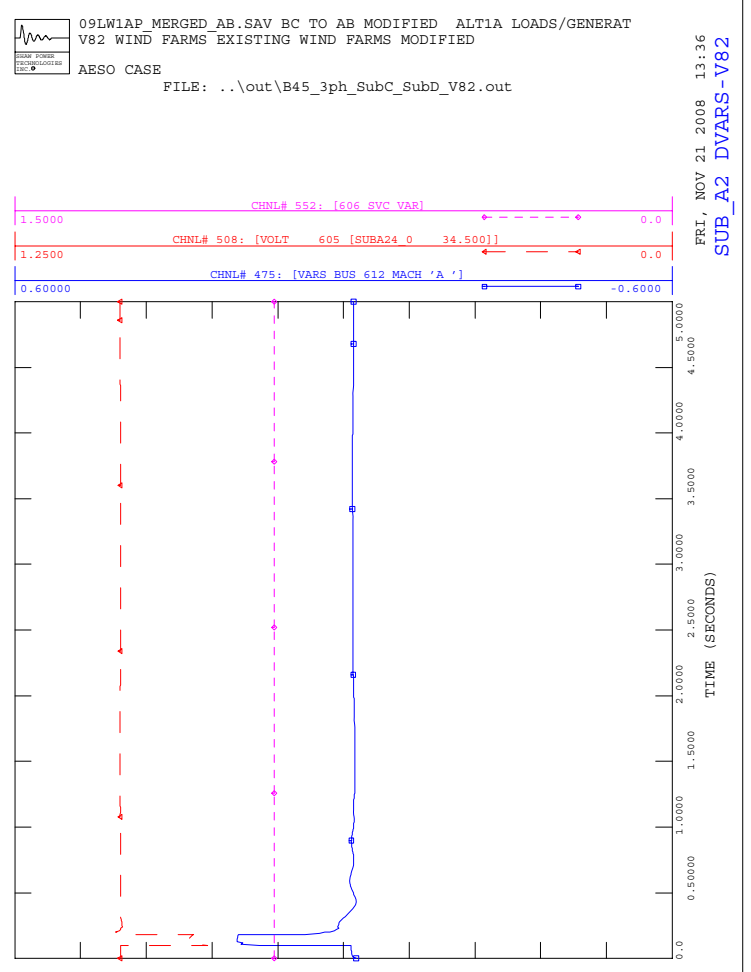
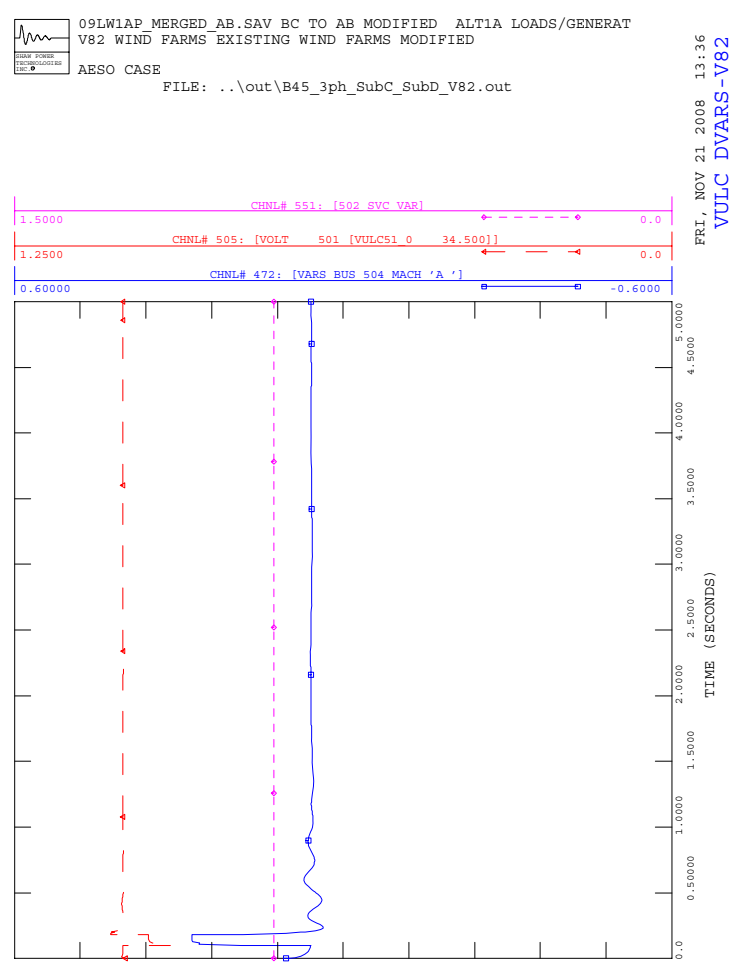
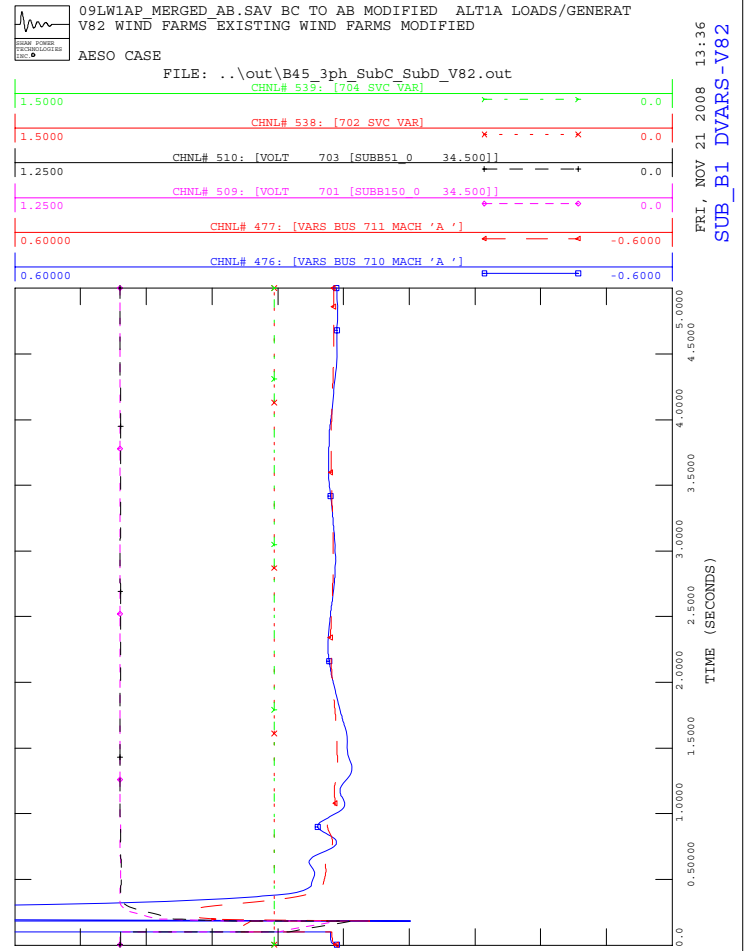
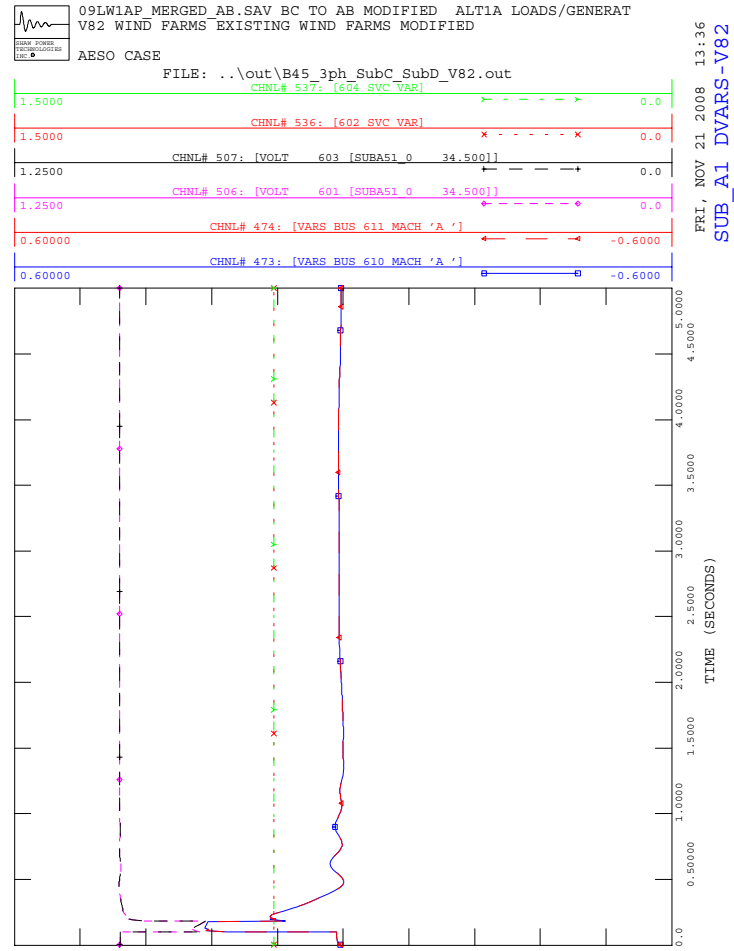


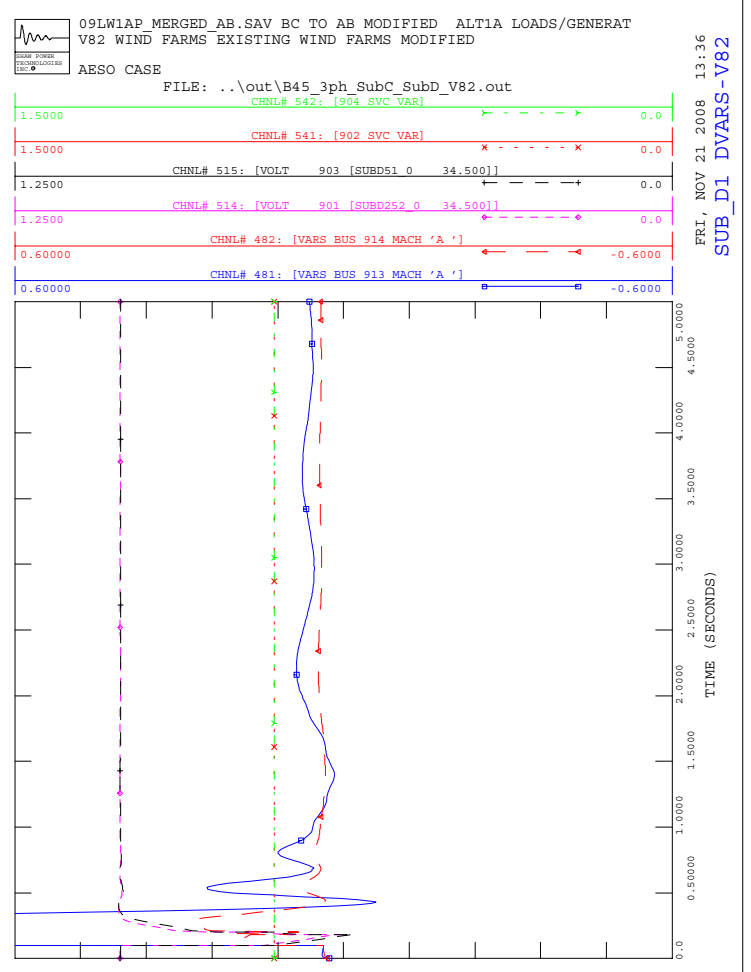
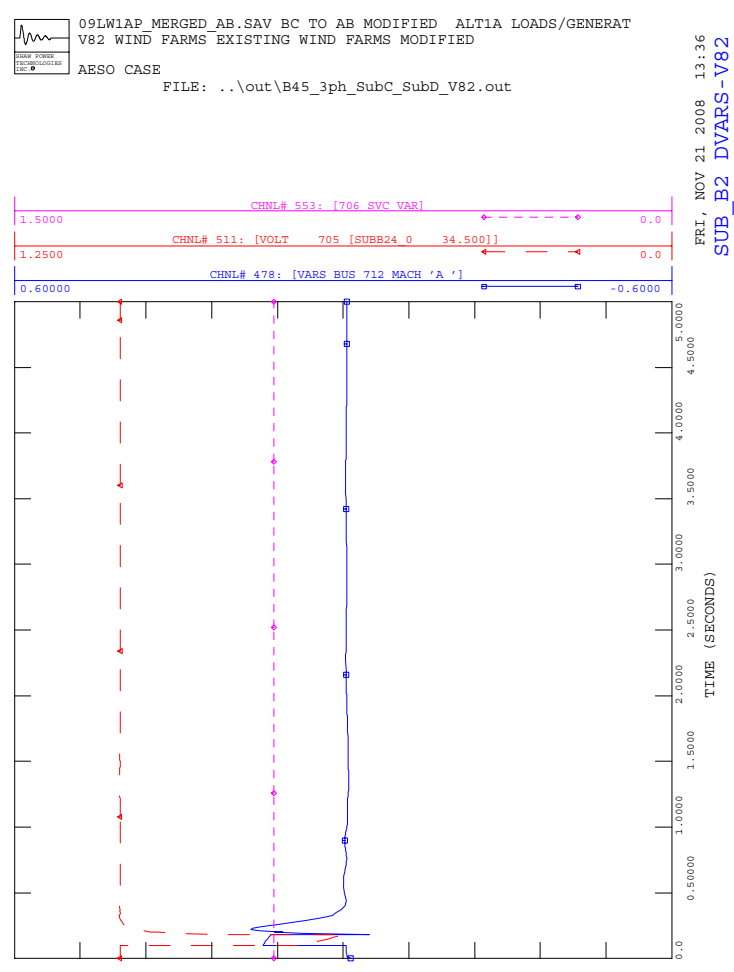
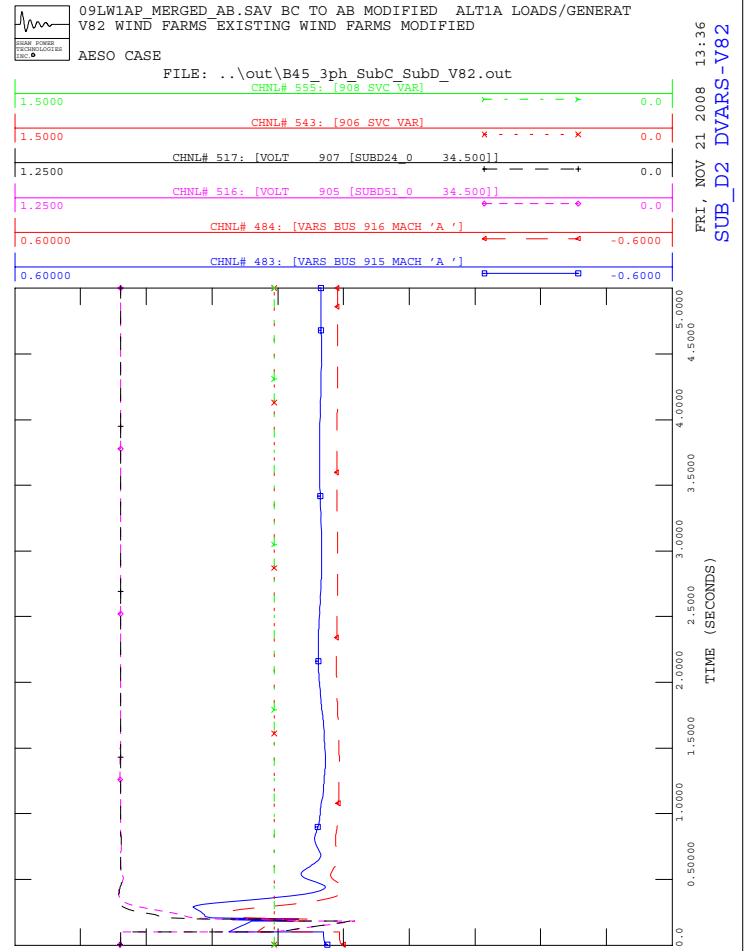
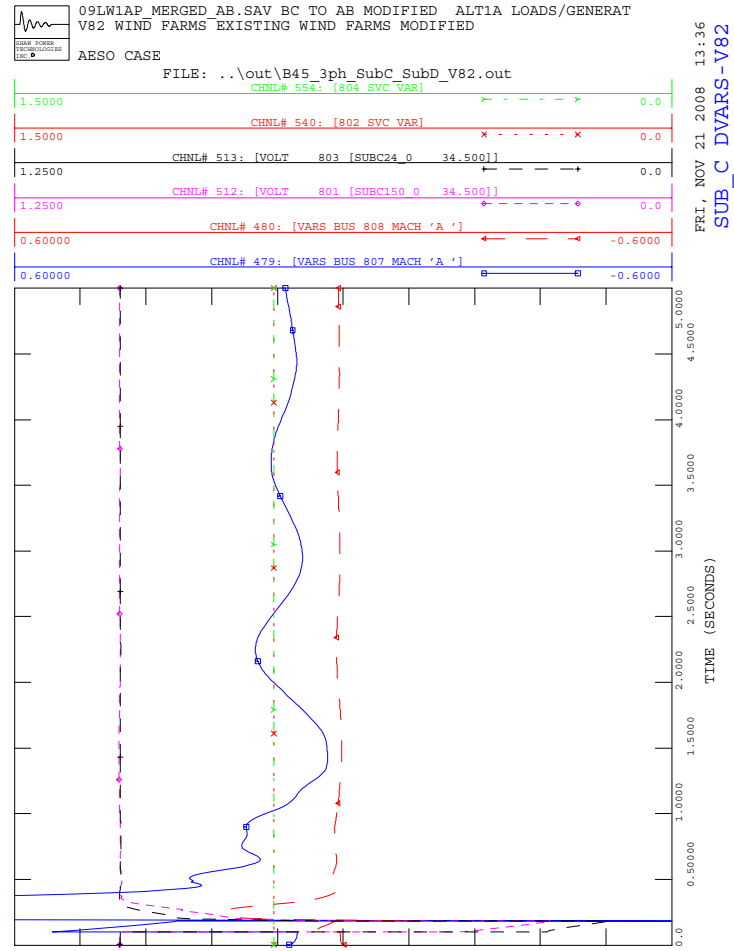


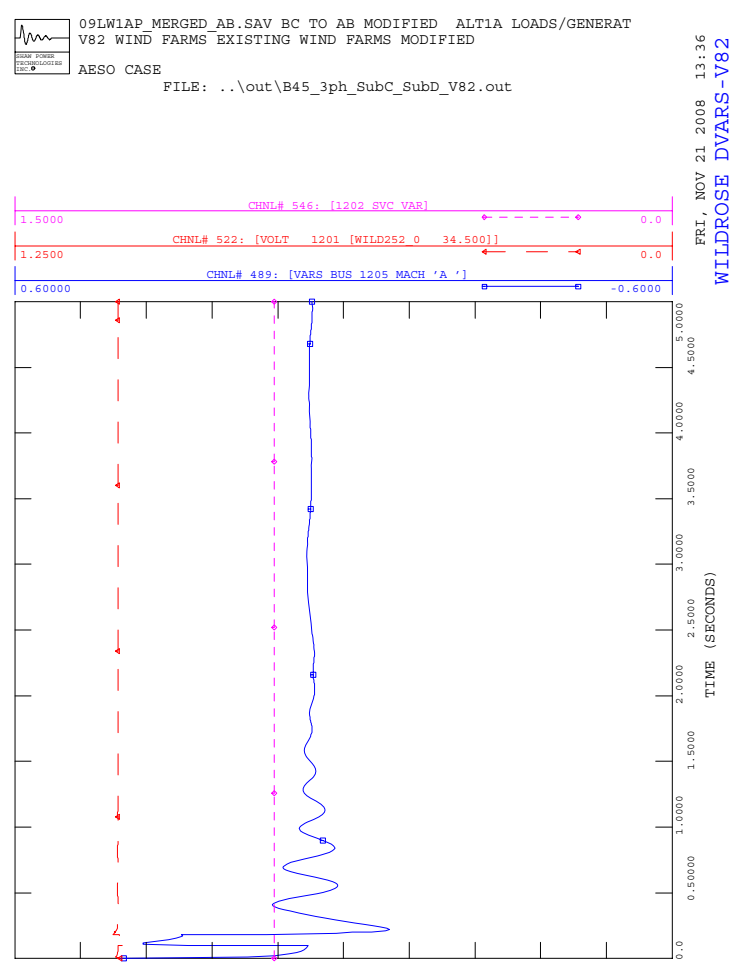
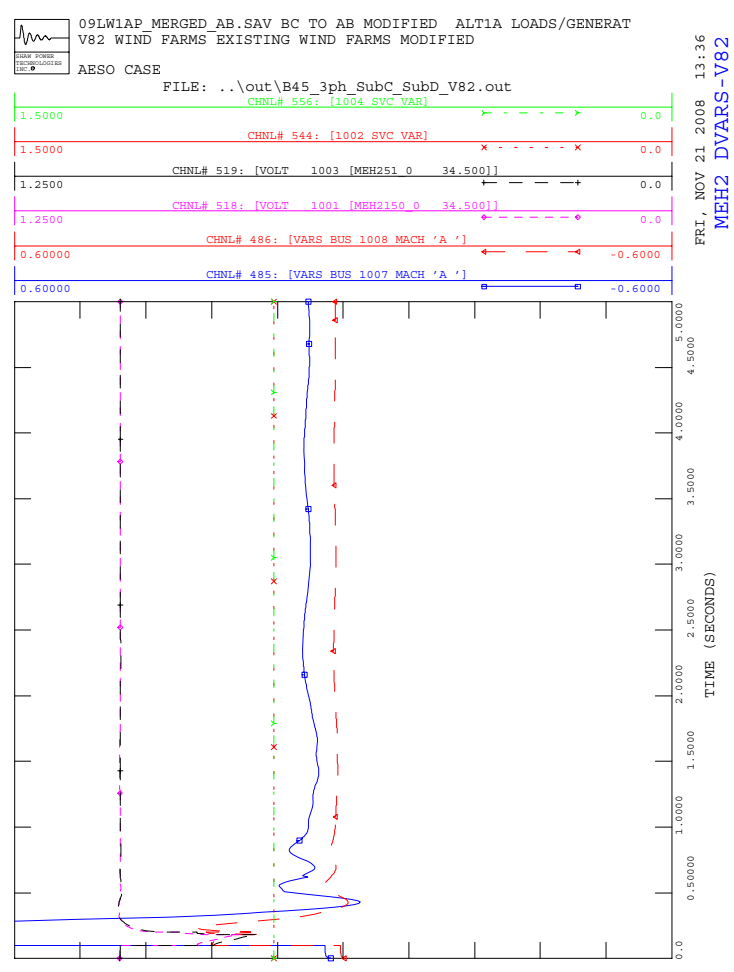
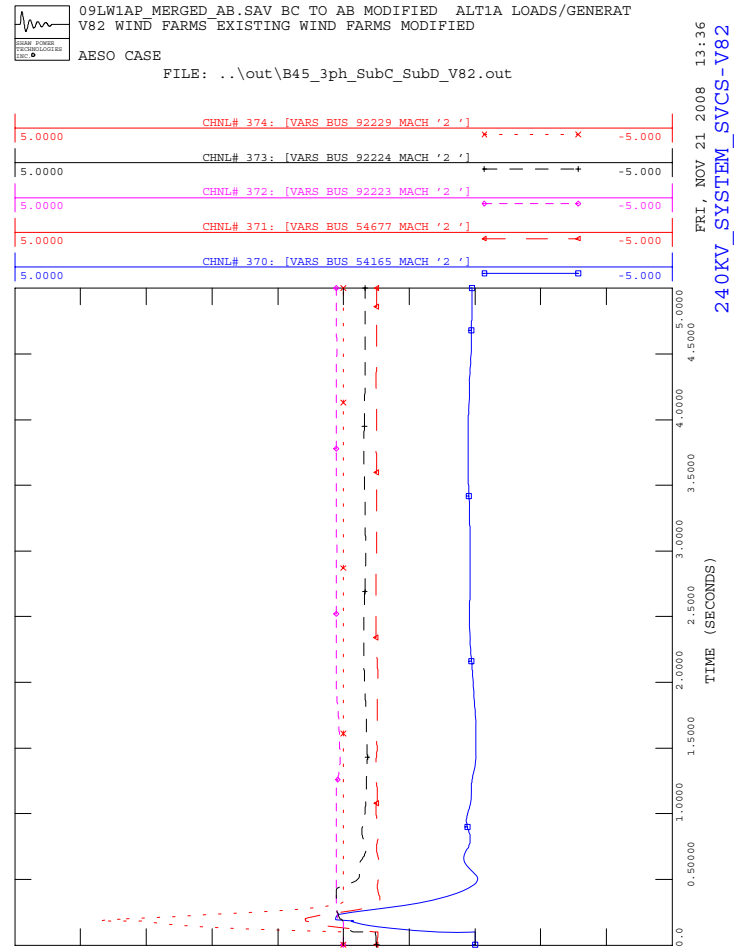
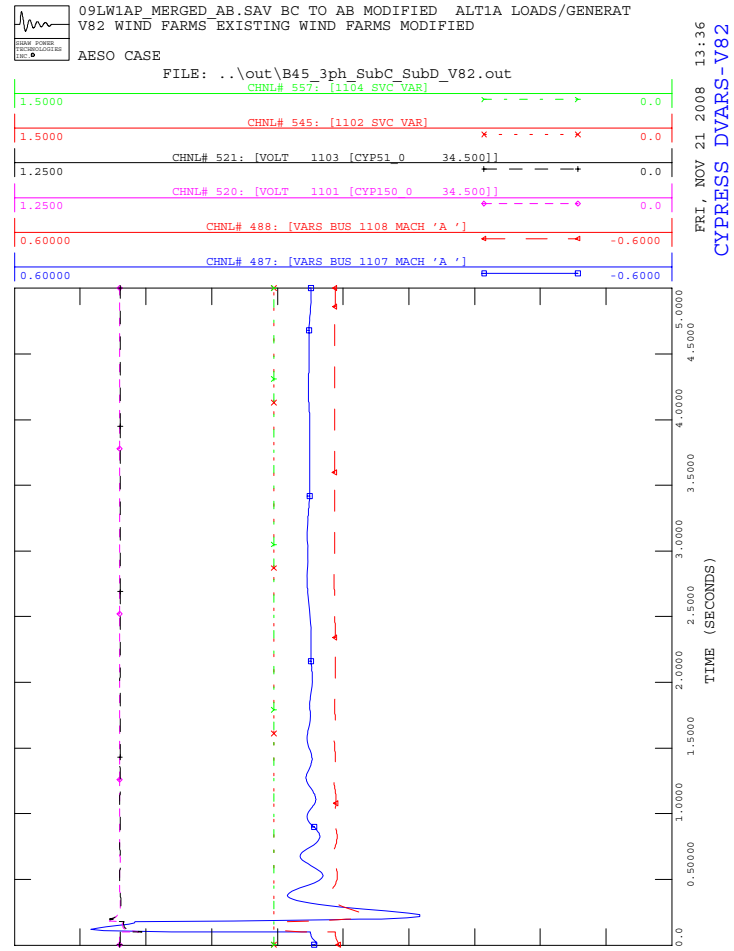












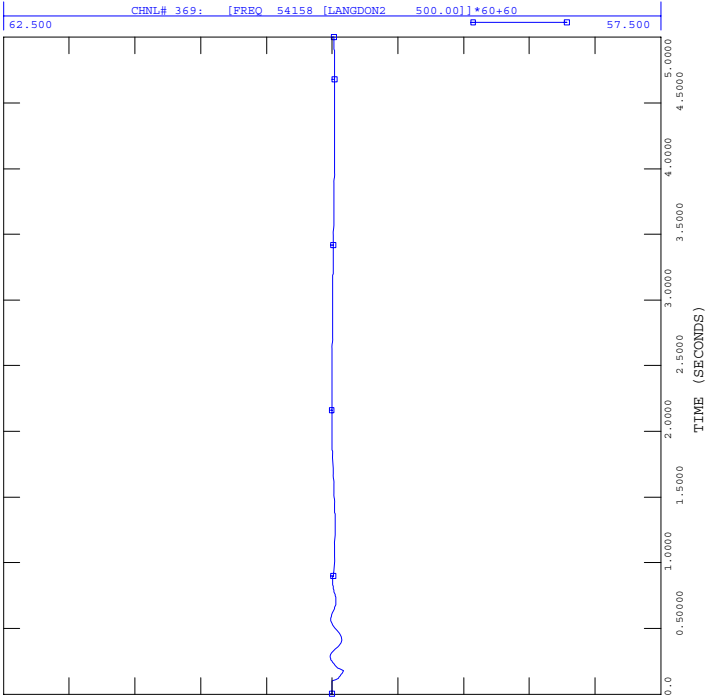


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B45_3ph_SubC_SubD_V82.out

FRI, NOV 21 2008 13:36
LANGDON_FRQ-V82

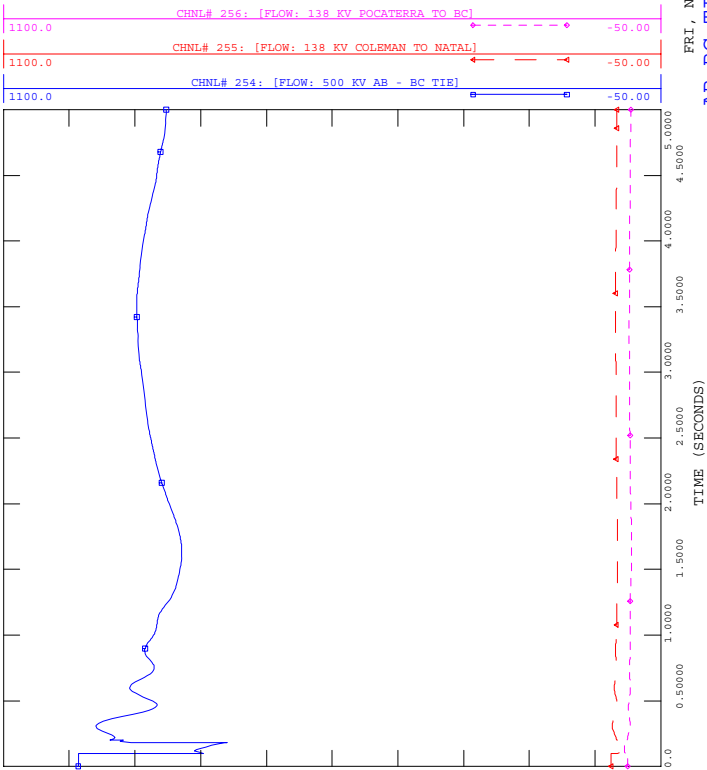


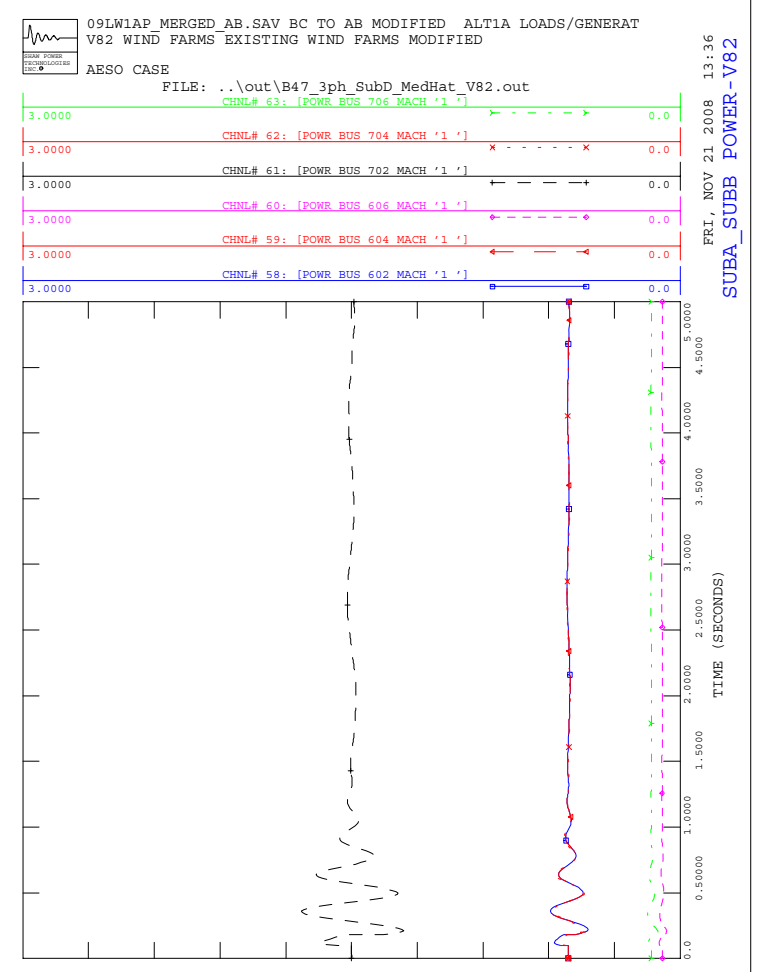
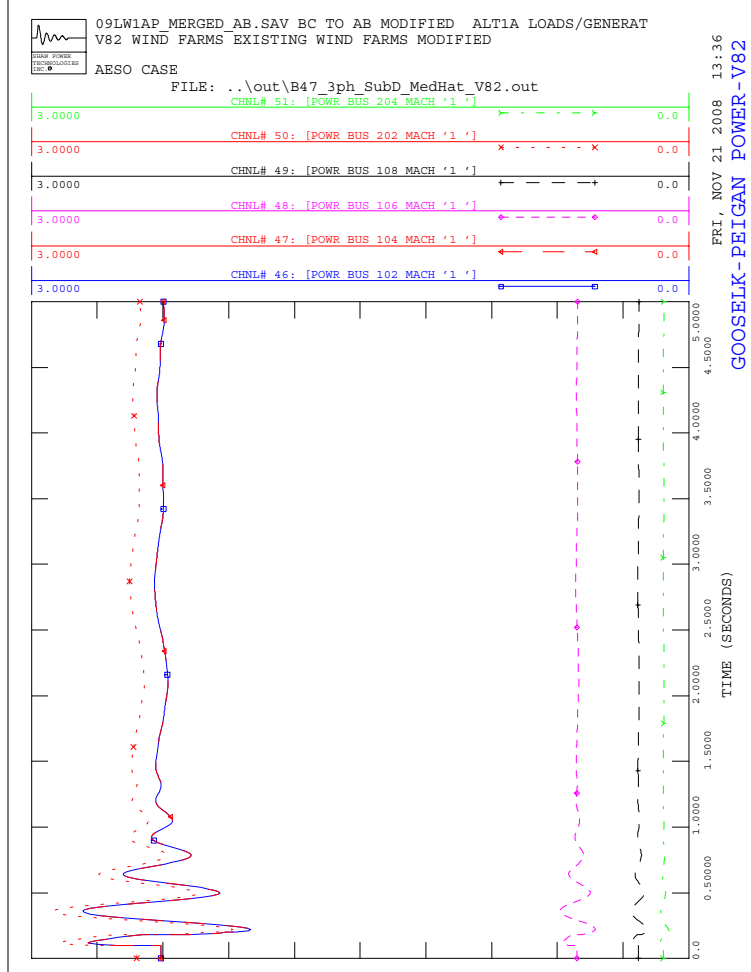
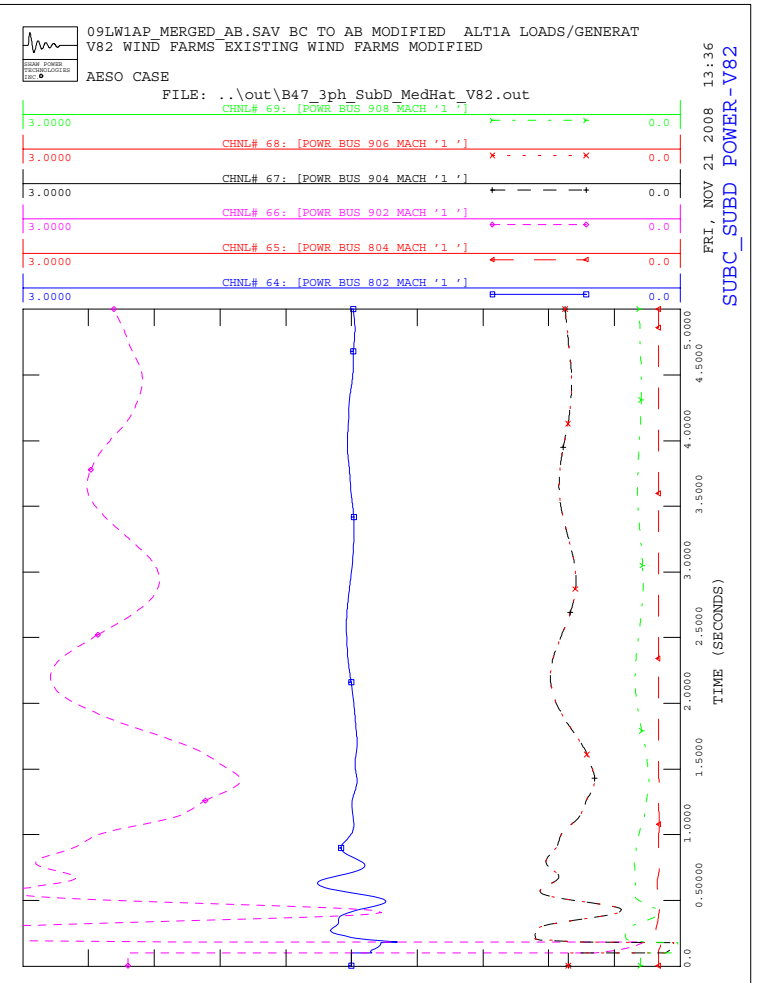
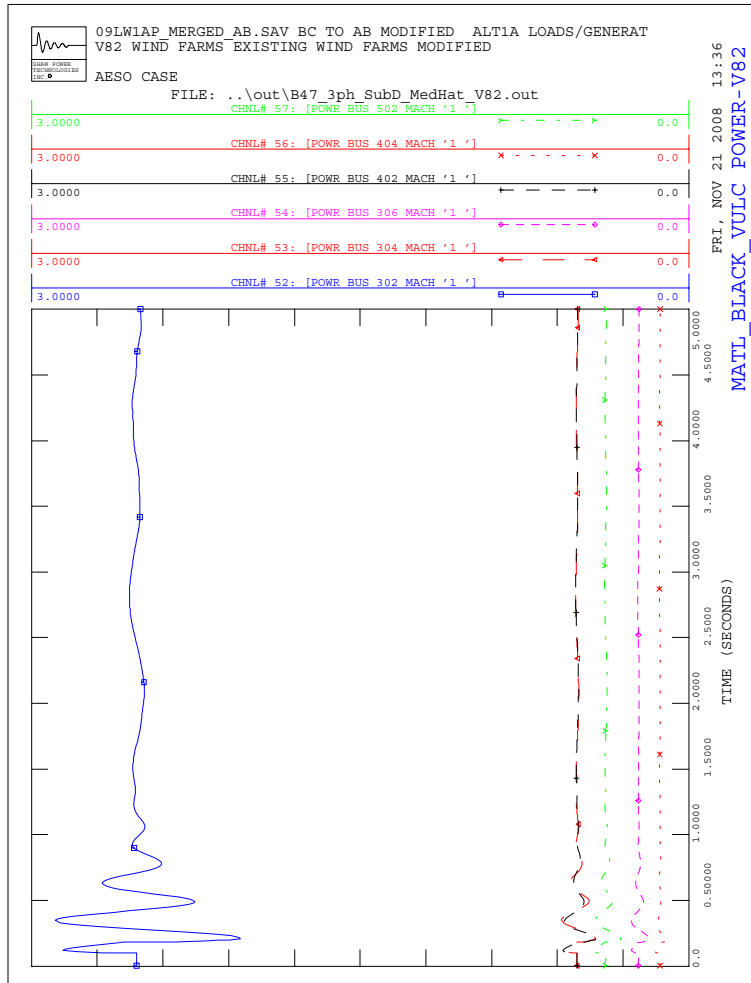
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

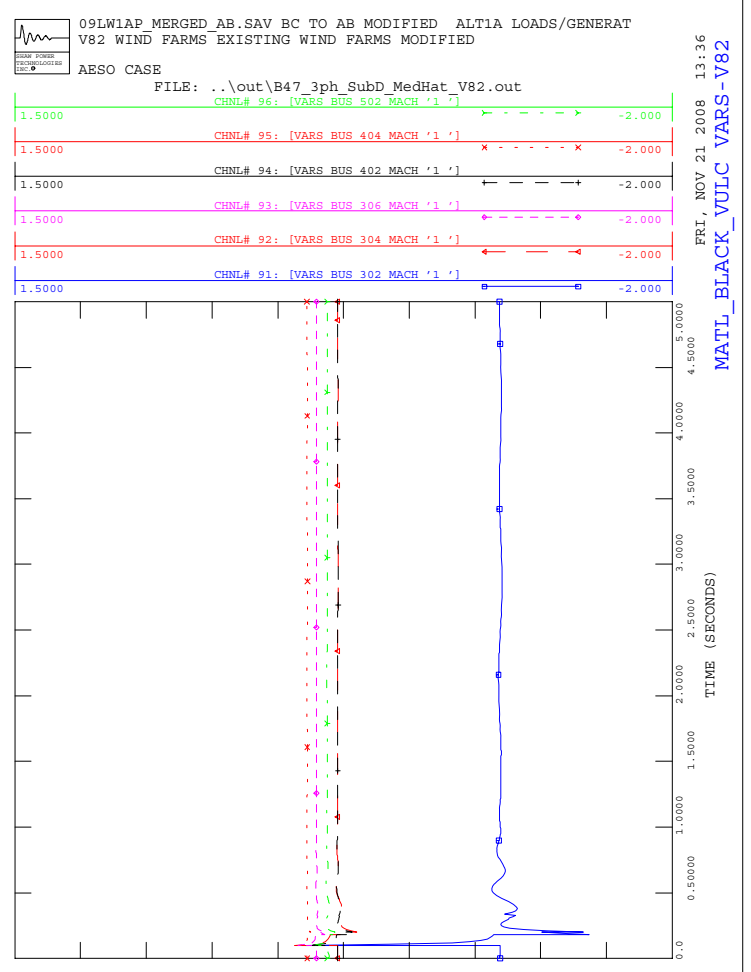
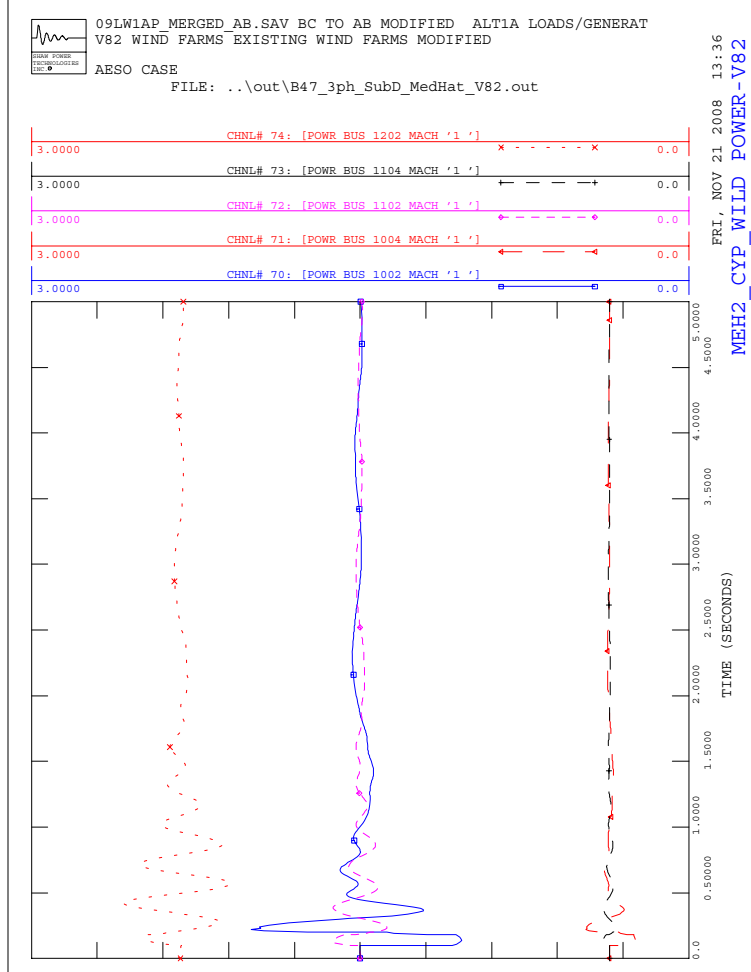
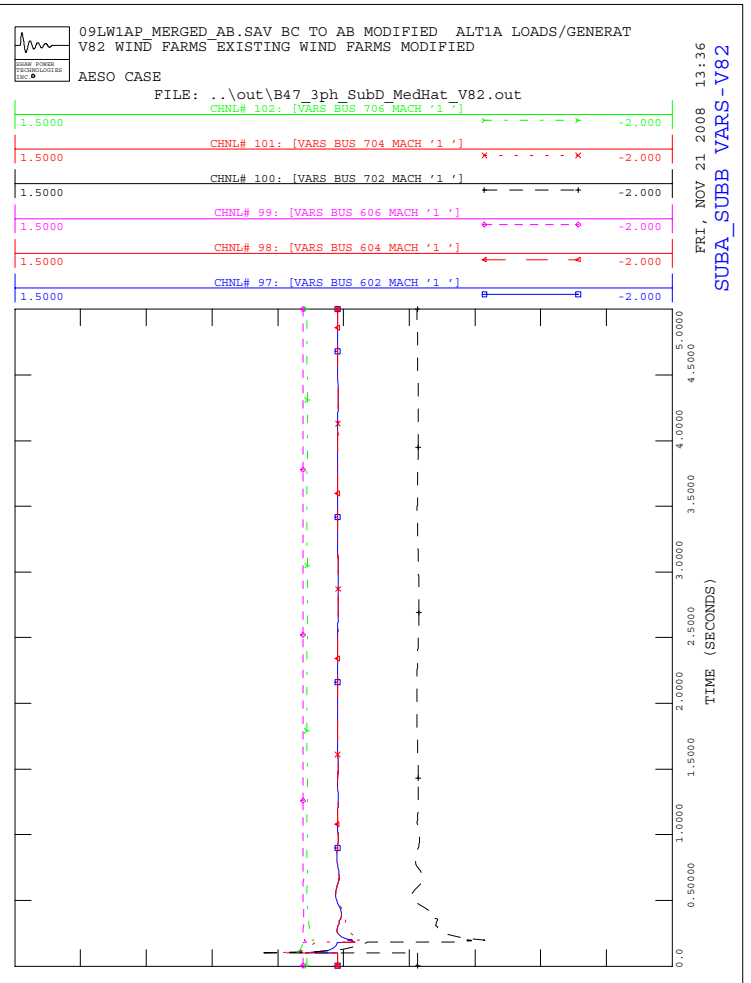
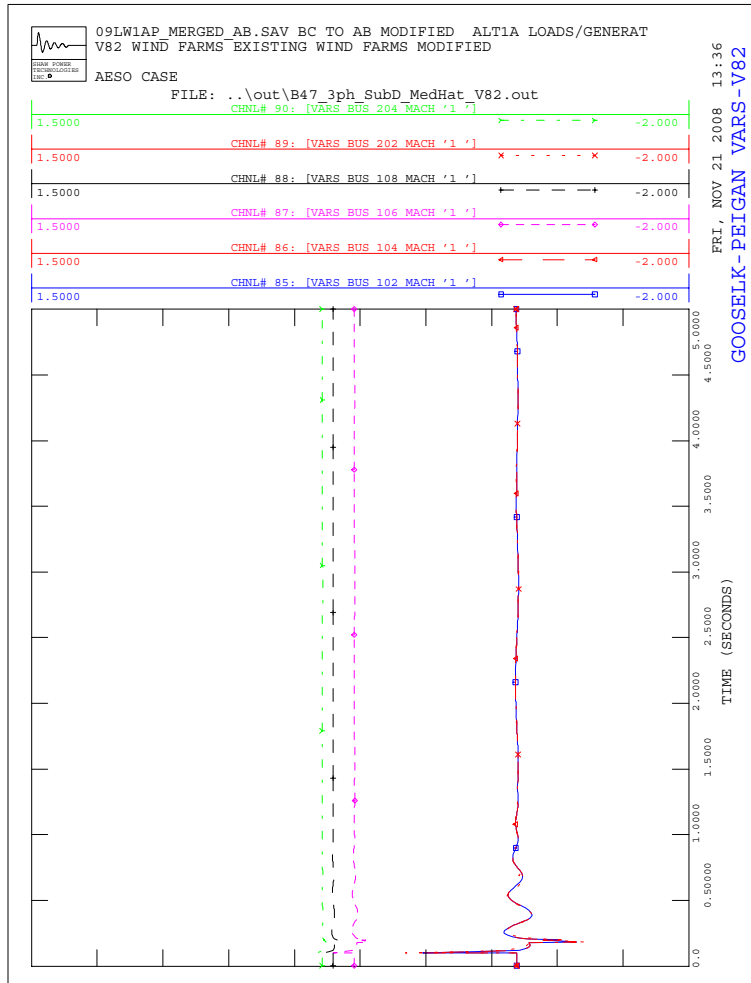
ABSO CASE

FILE: ..\out\B45_3ph_SubC_SubD_V82.out

FRI, NOV 21 2008 13:36
AB_BC_TIE_FLOWS-V82

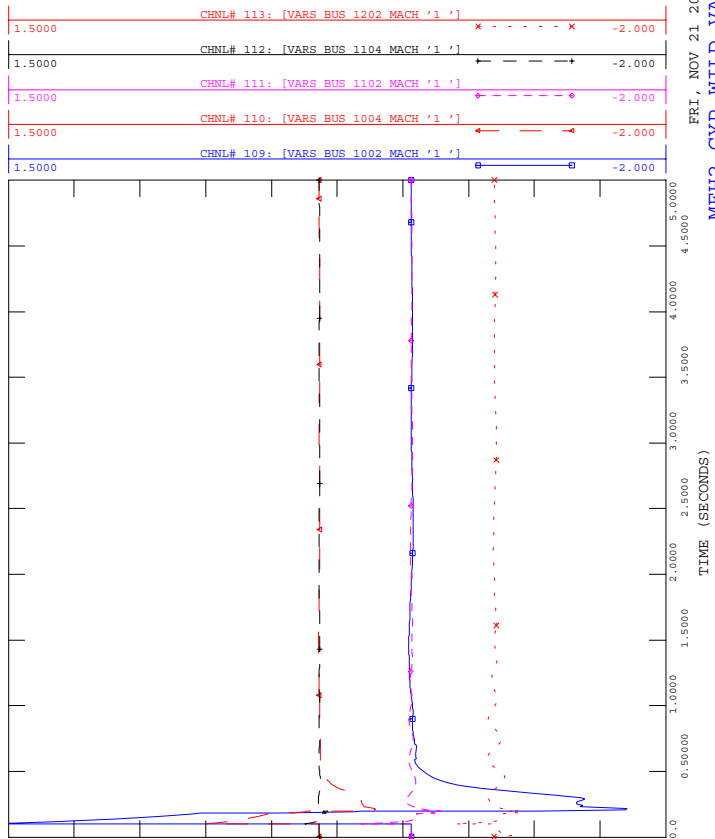






09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

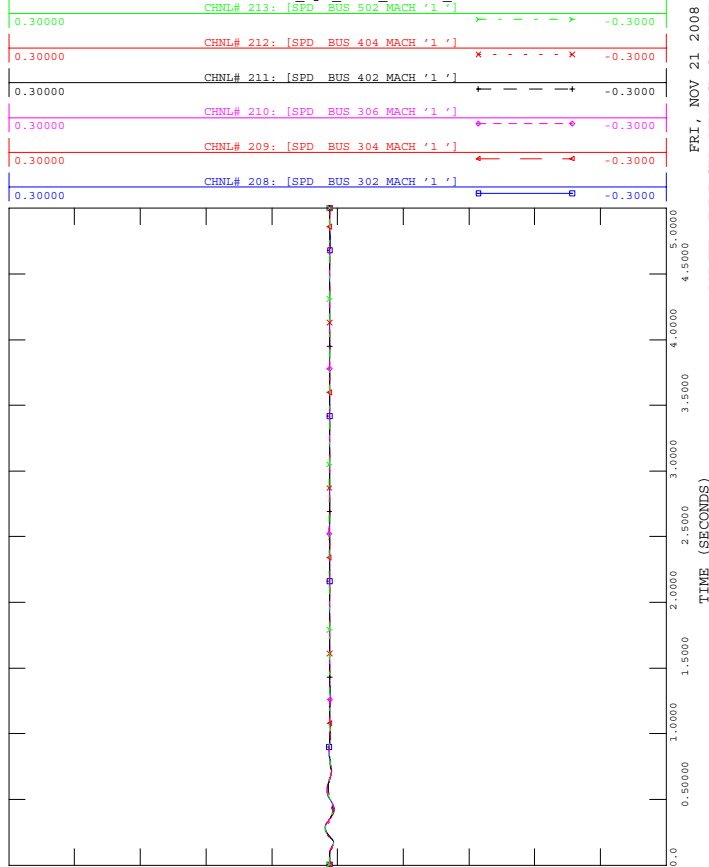
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FRI, NOV 21 2008 13:36

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

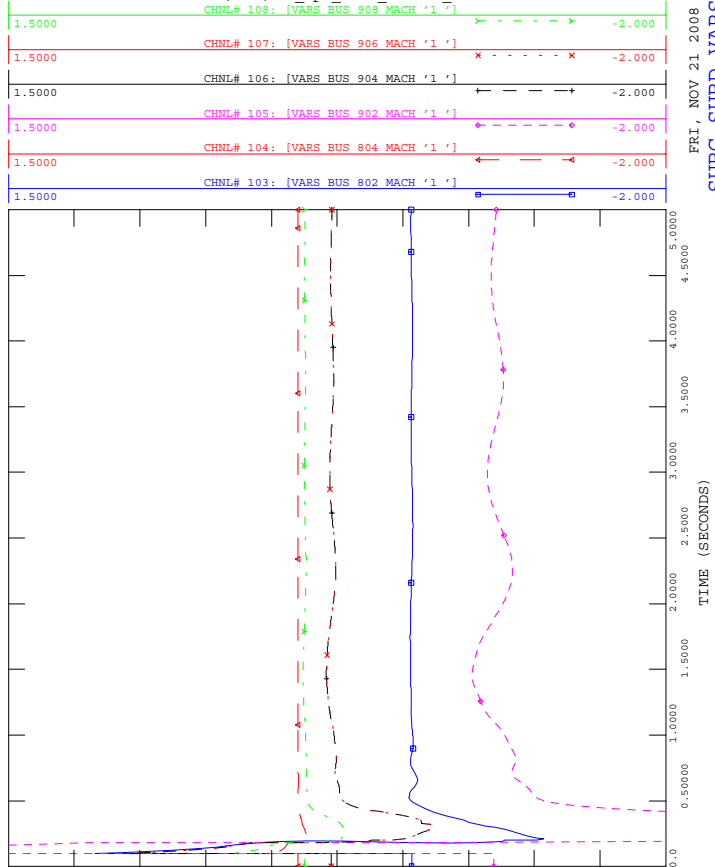
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FRI, NOV 21 2008 13:36

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

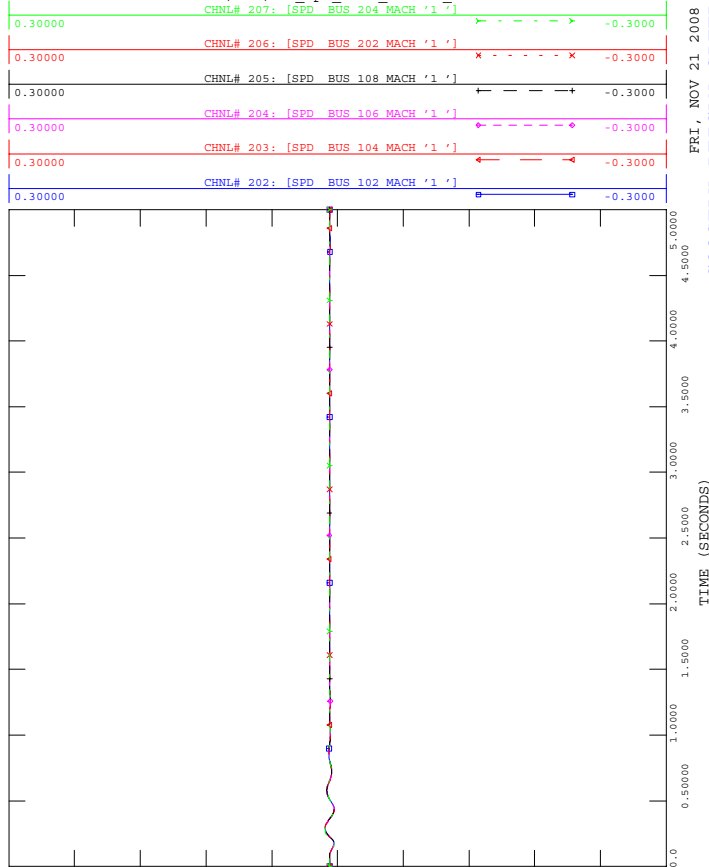
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FRI, NOV 21 2008 13:36

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

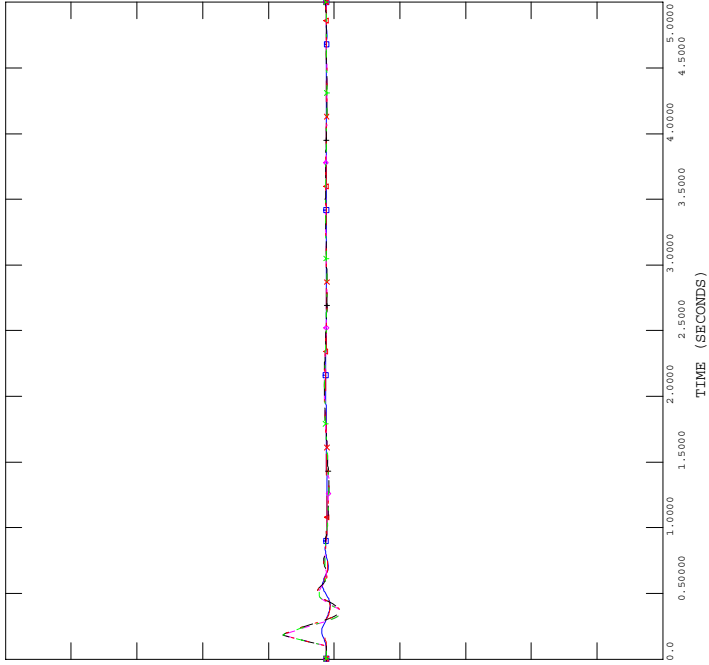
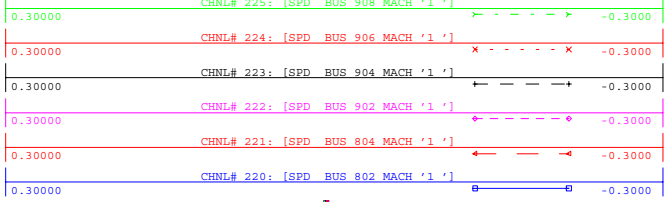
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FRI, NOV 21 2008 13:36

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

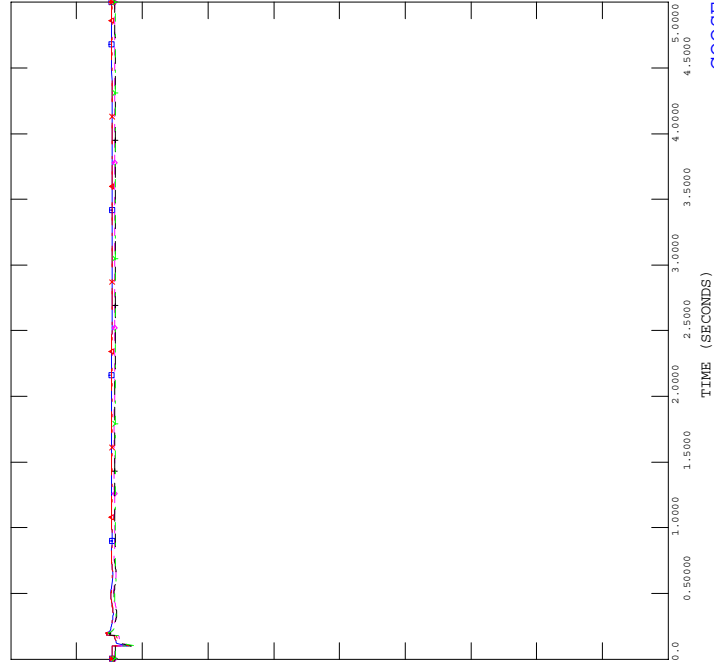
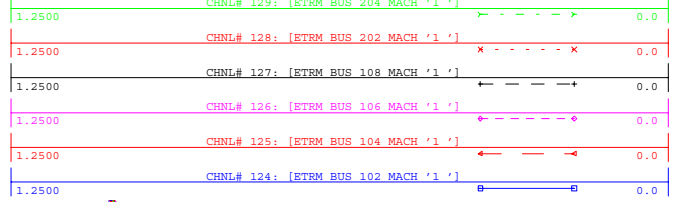
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FRI, NOV 21 2008 13:36
 SUBC_SUBD_SPEED-V82

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

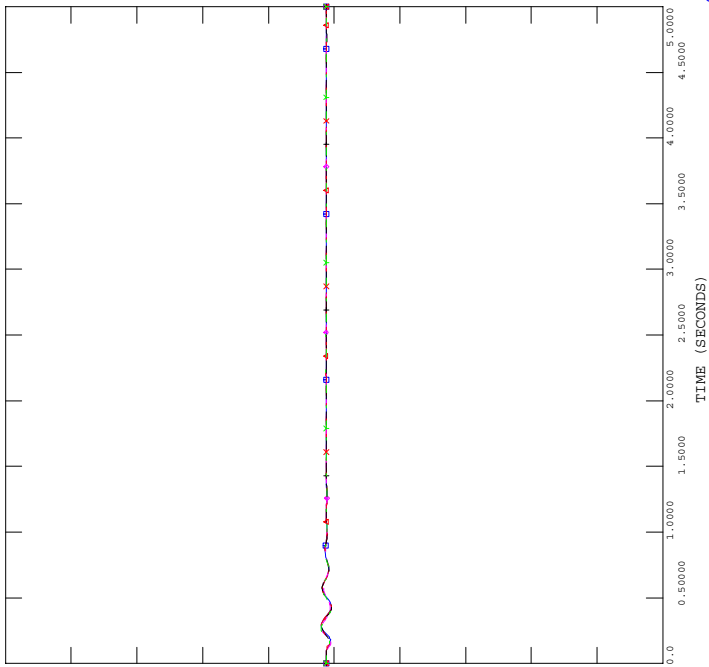
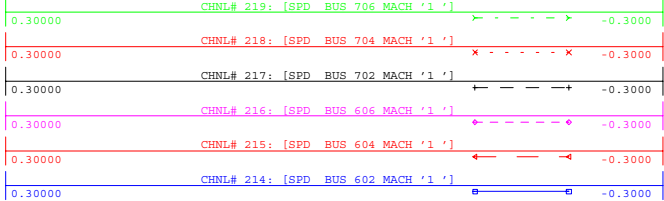
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FRI, NOV 21 2008 13:36
 GOOSELK-PEIGAN_ETERM-V82

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

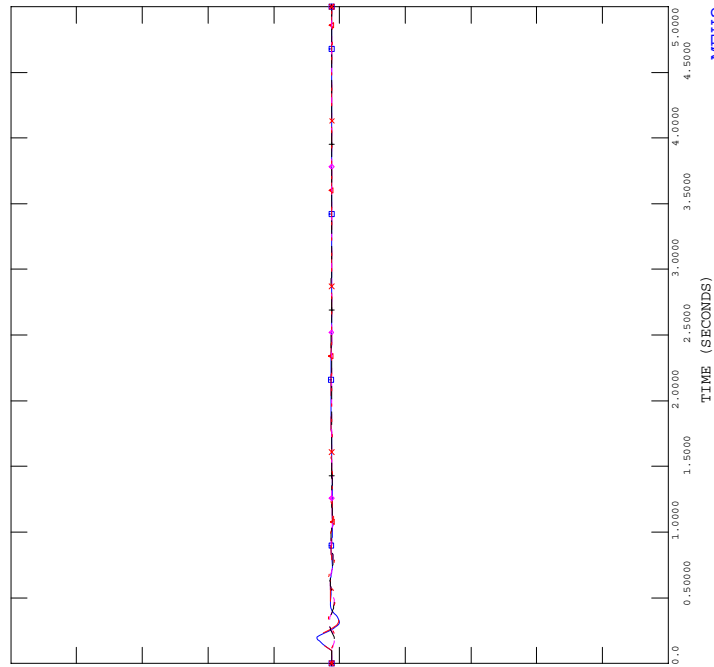
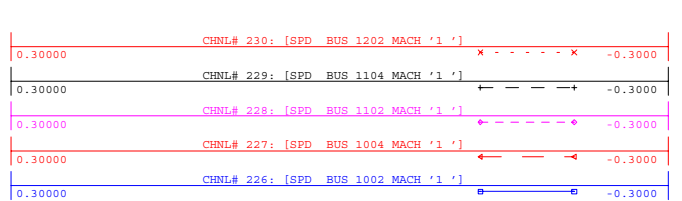
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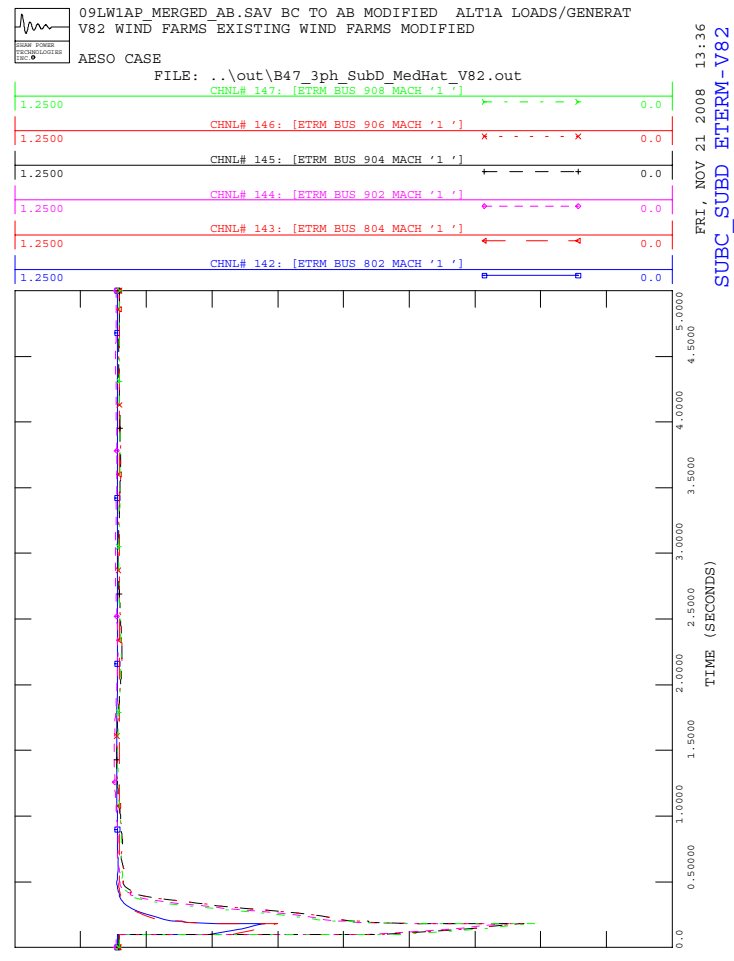
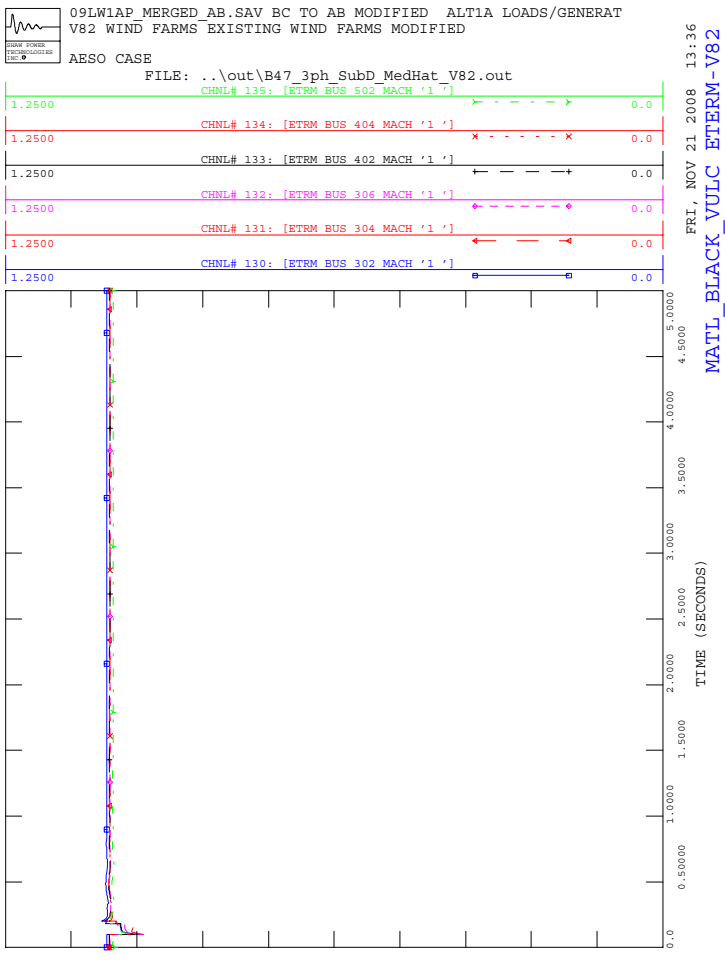
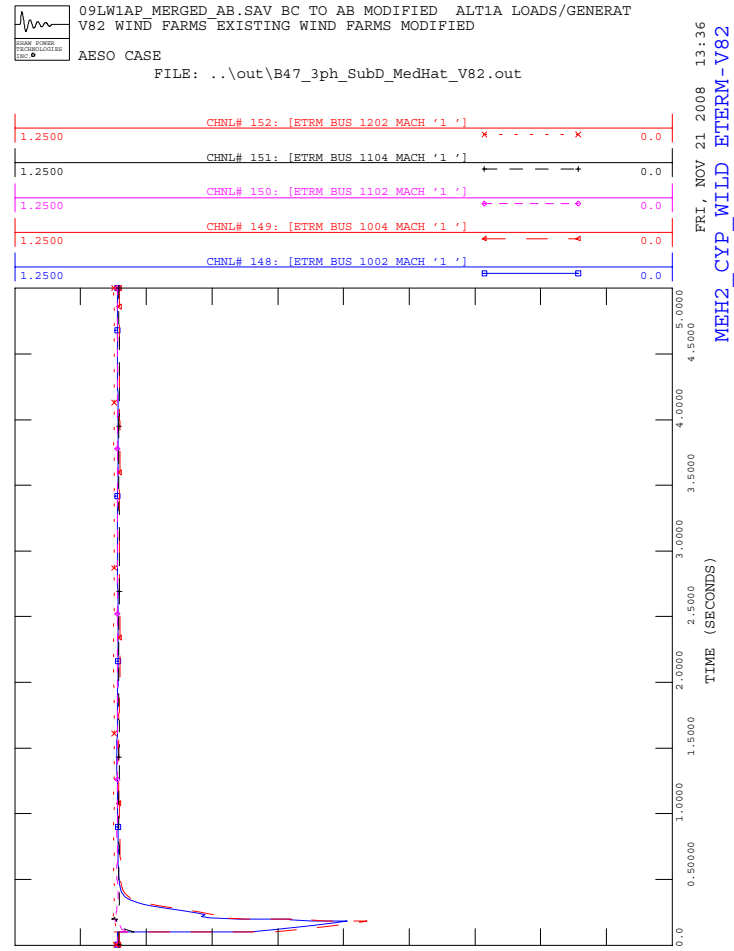
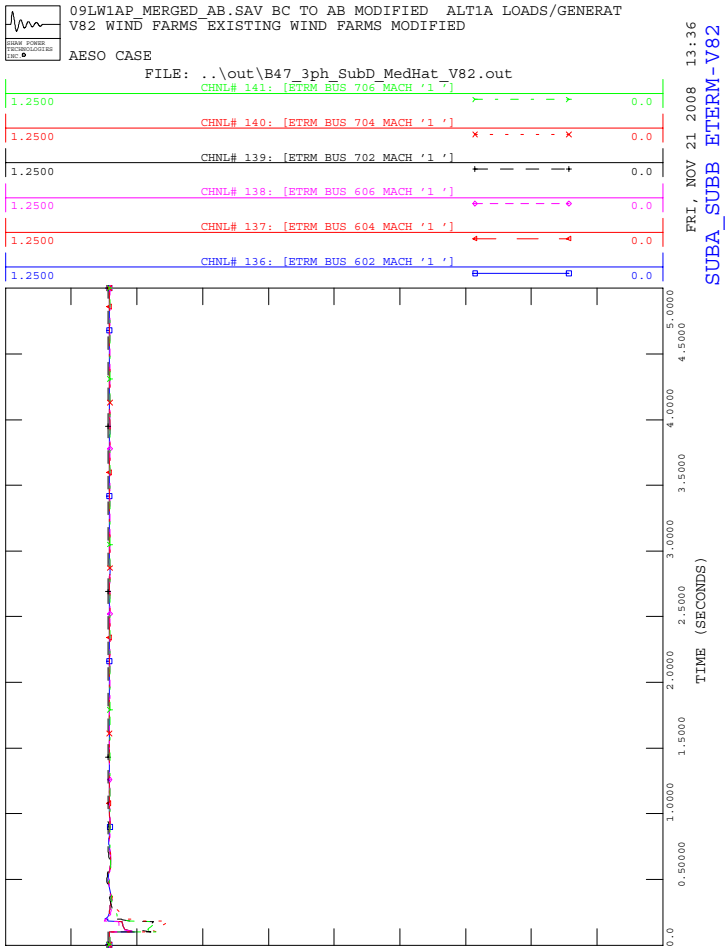
FRI, NOV 21 2008 13:36
 SUBA_SUBB_SPEED-V82

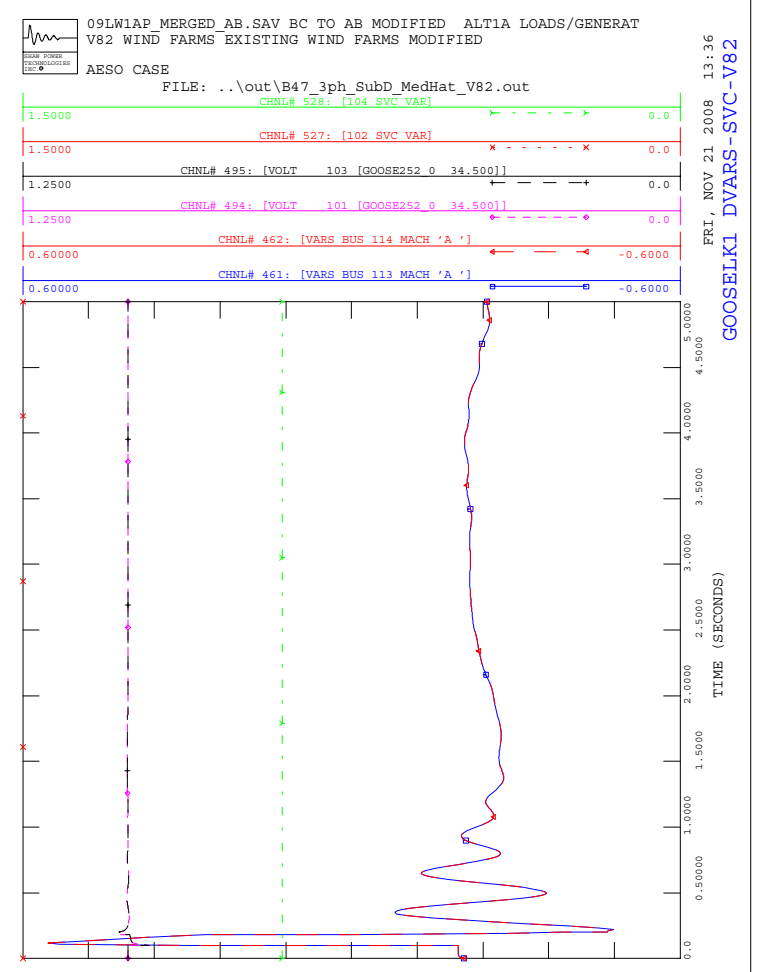
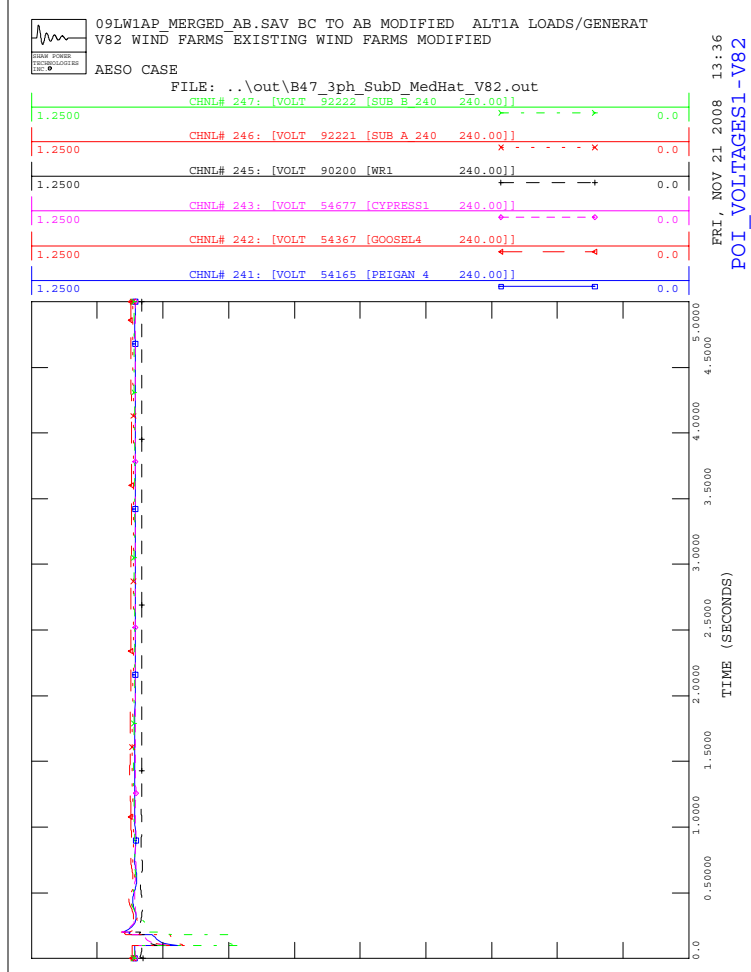
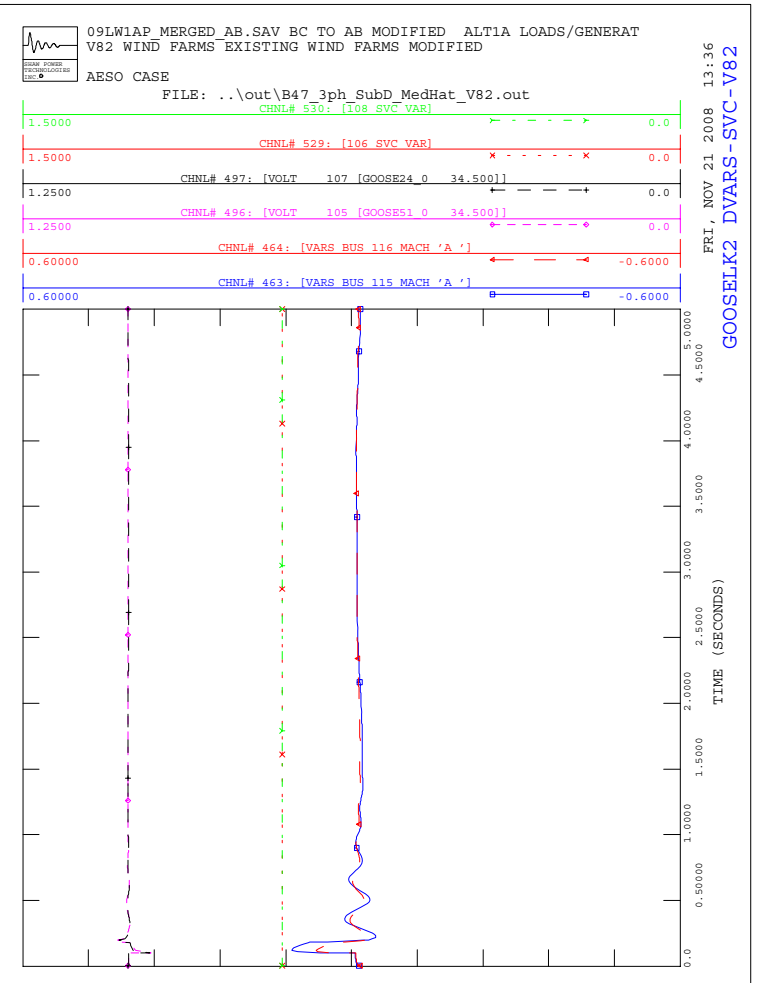
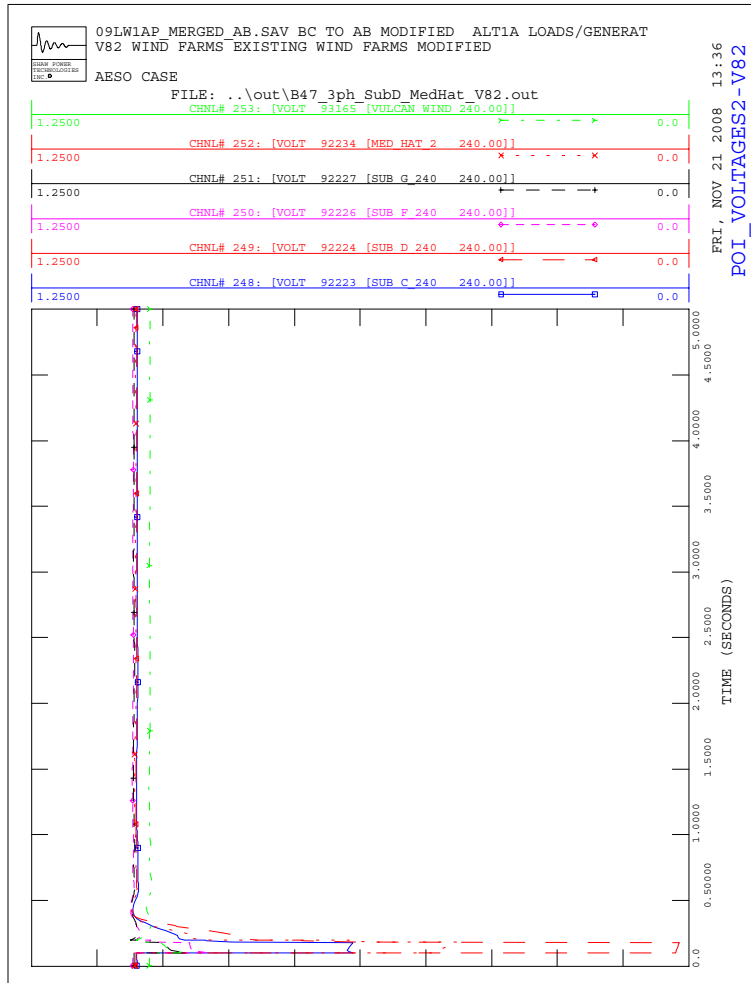
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

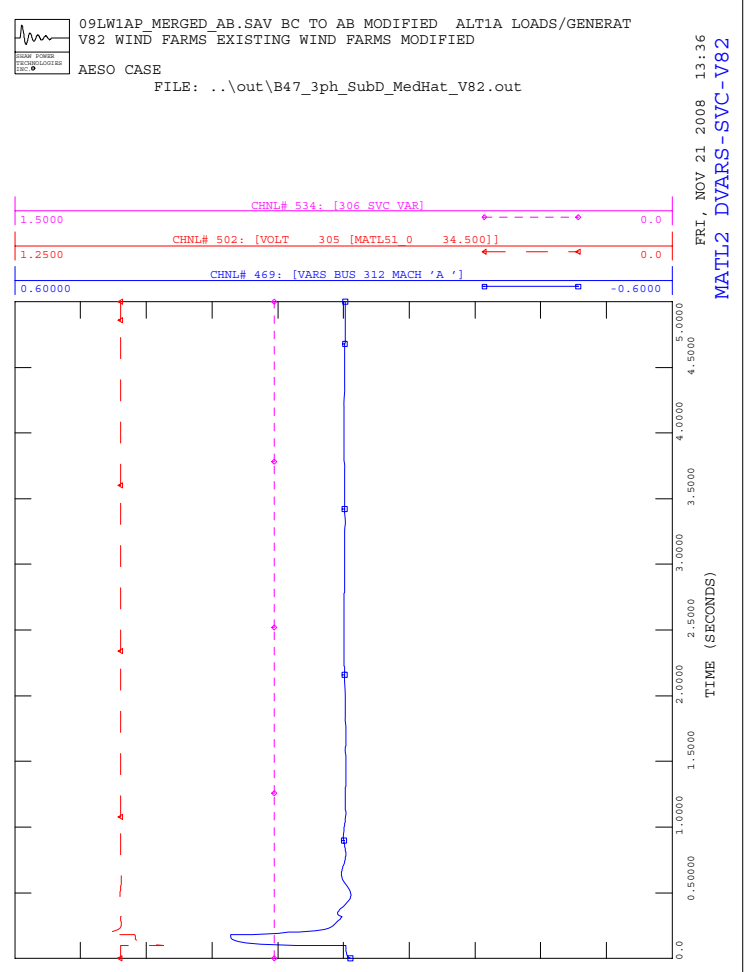
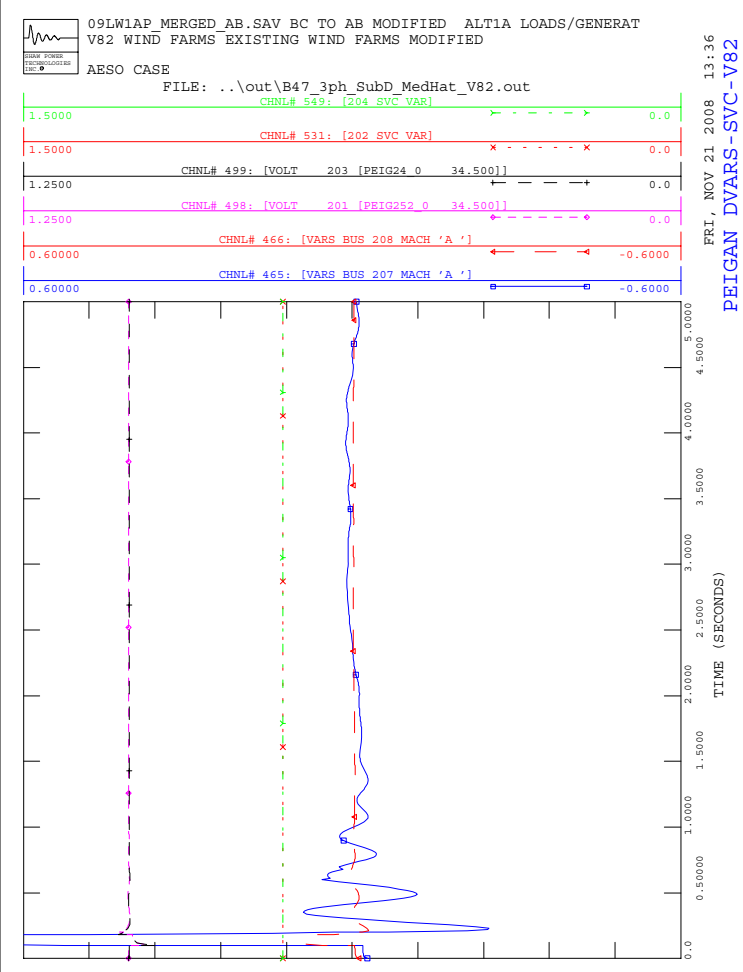
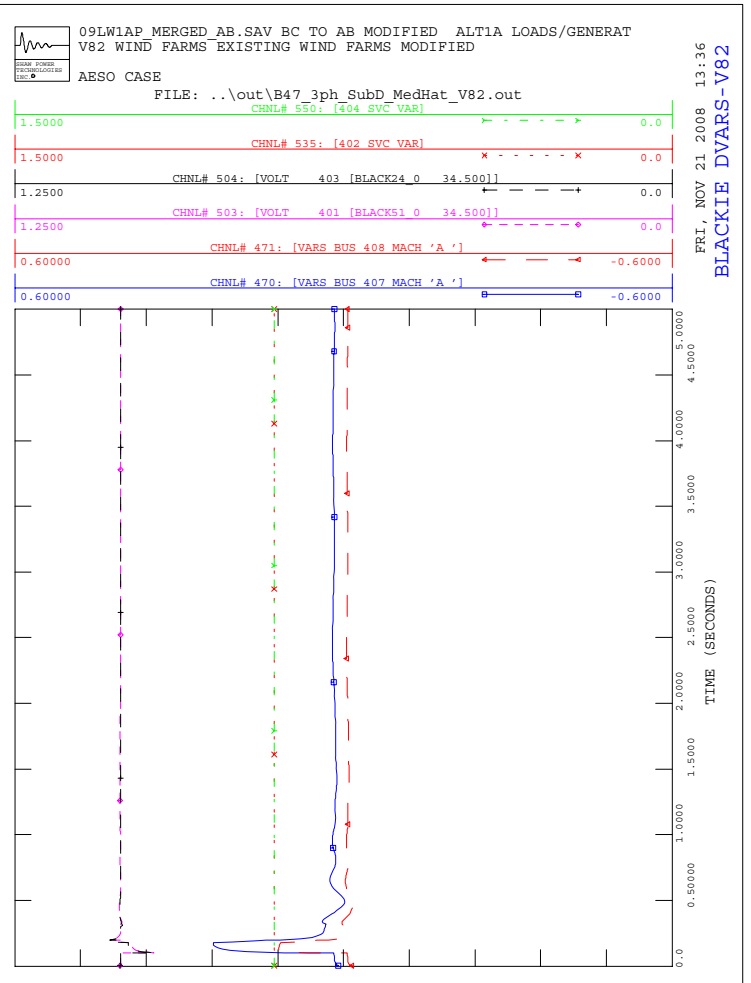
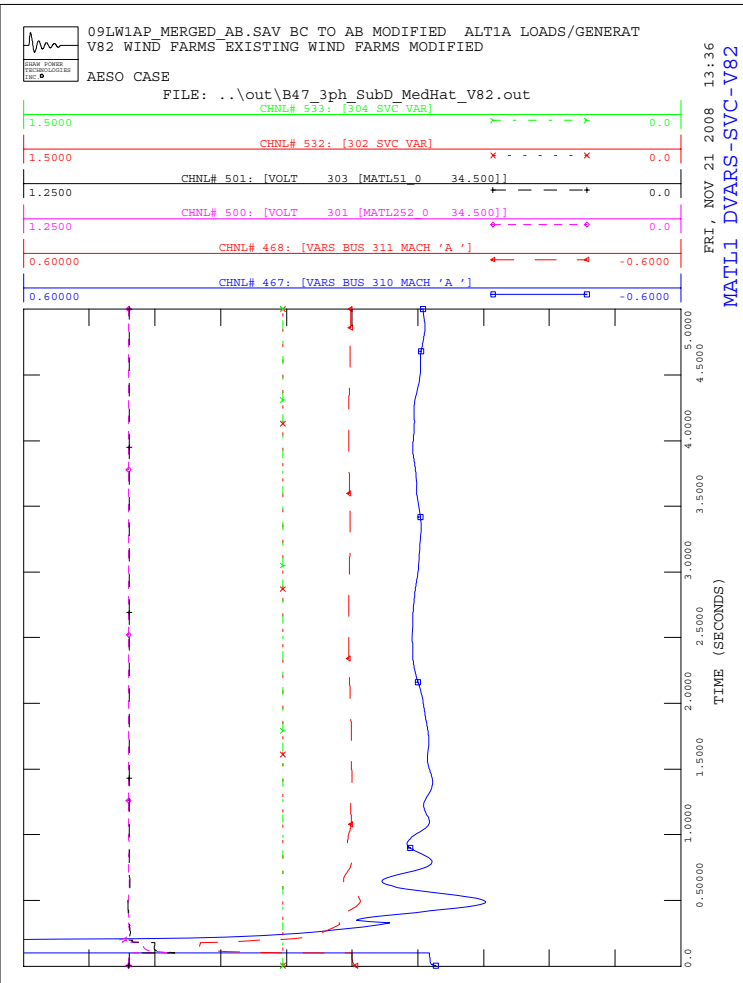
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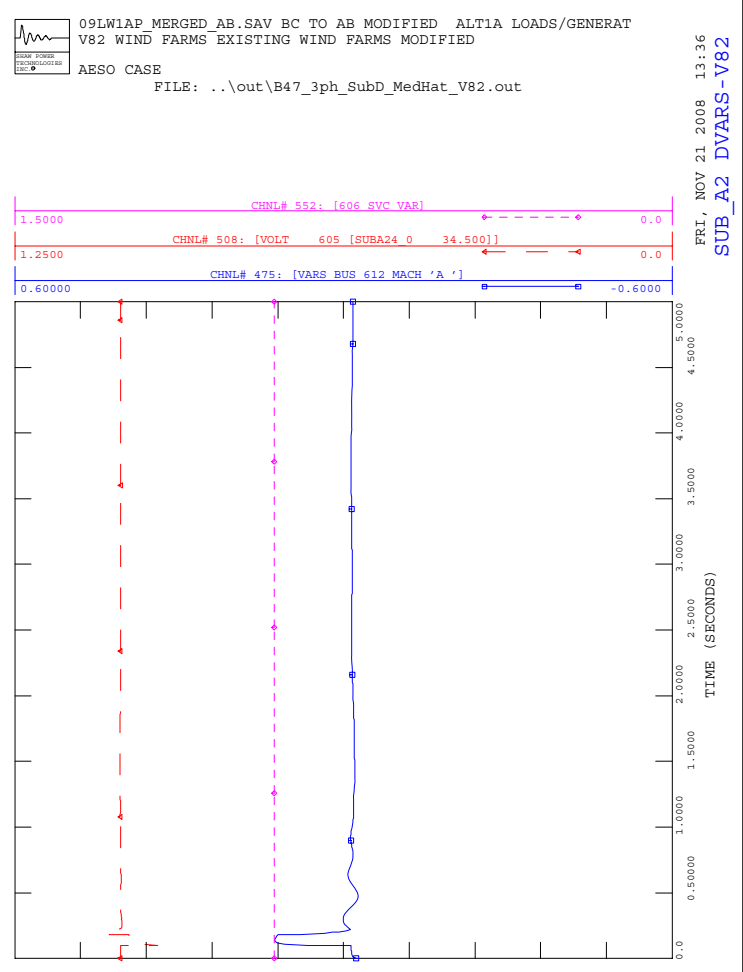
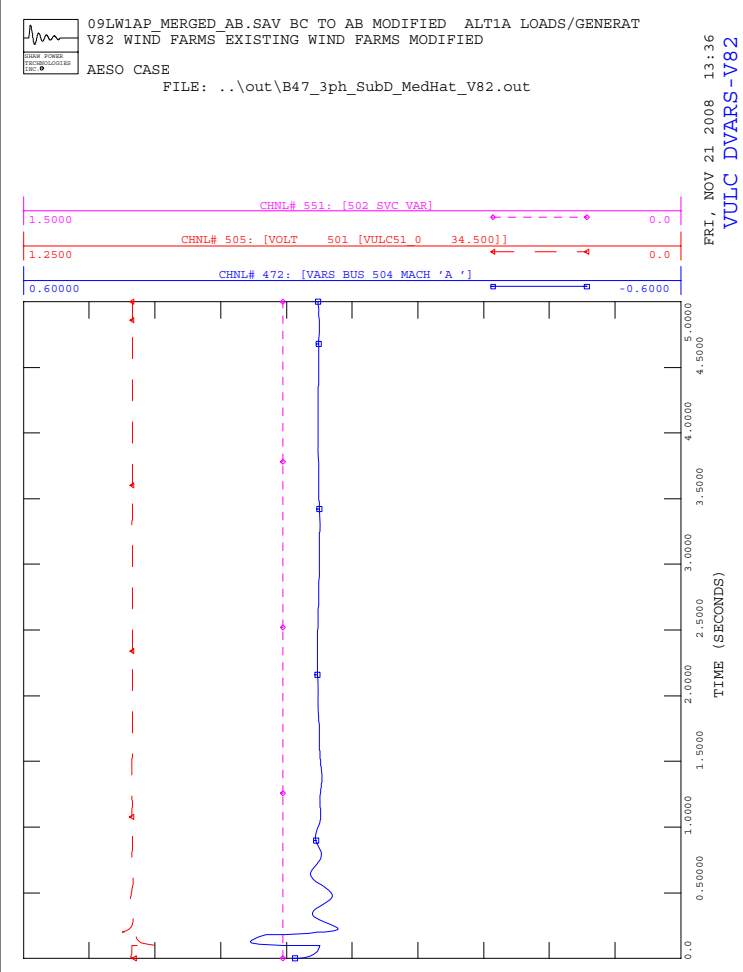
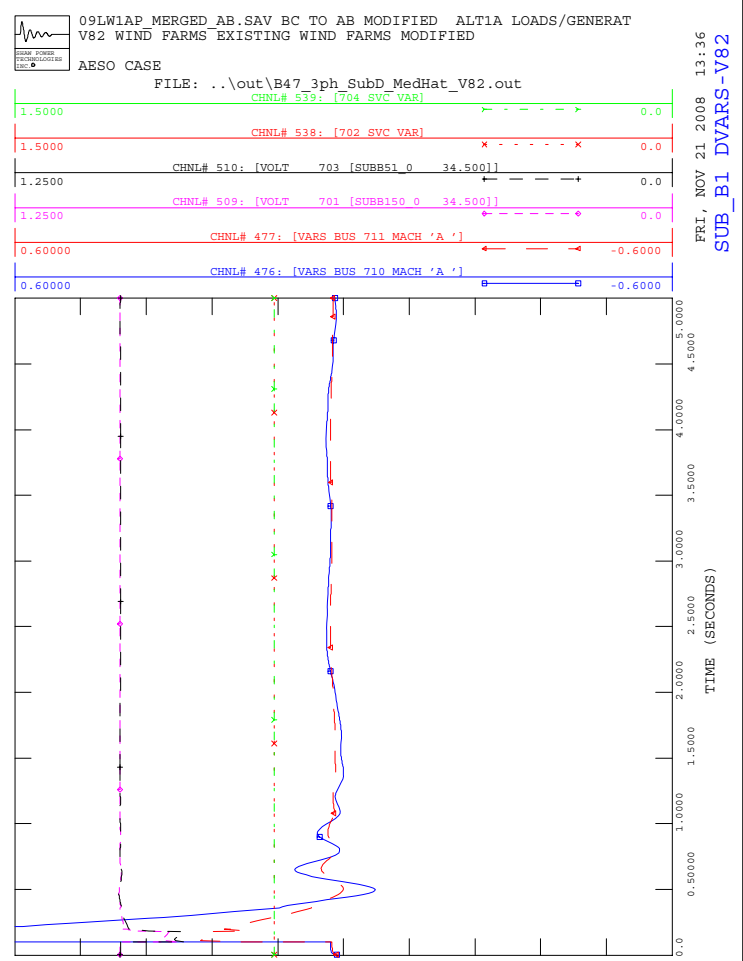
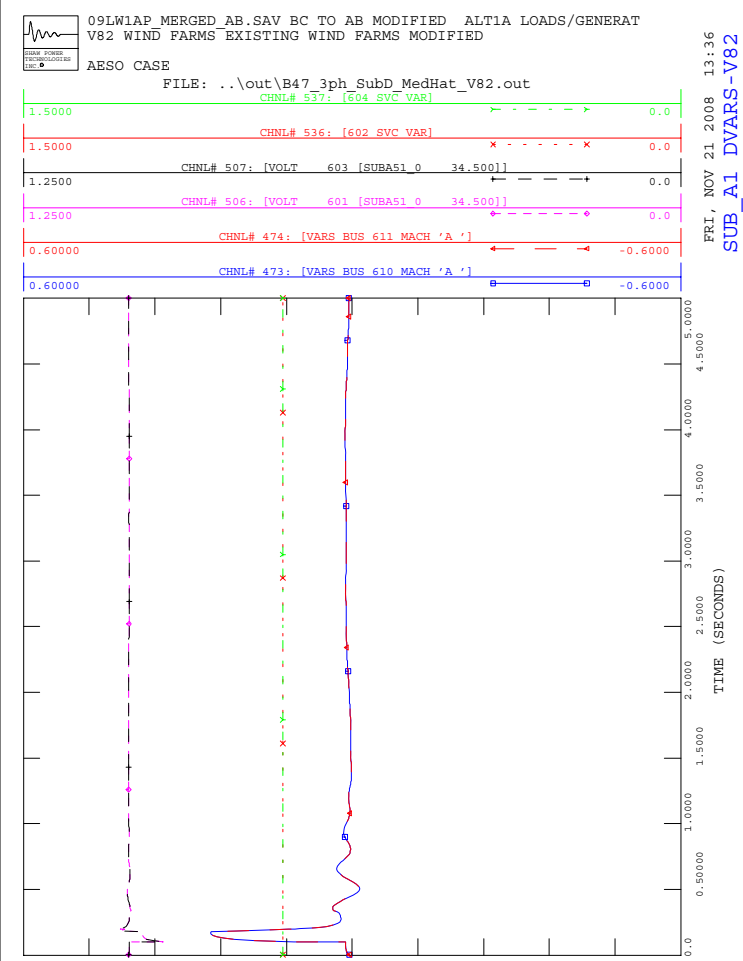


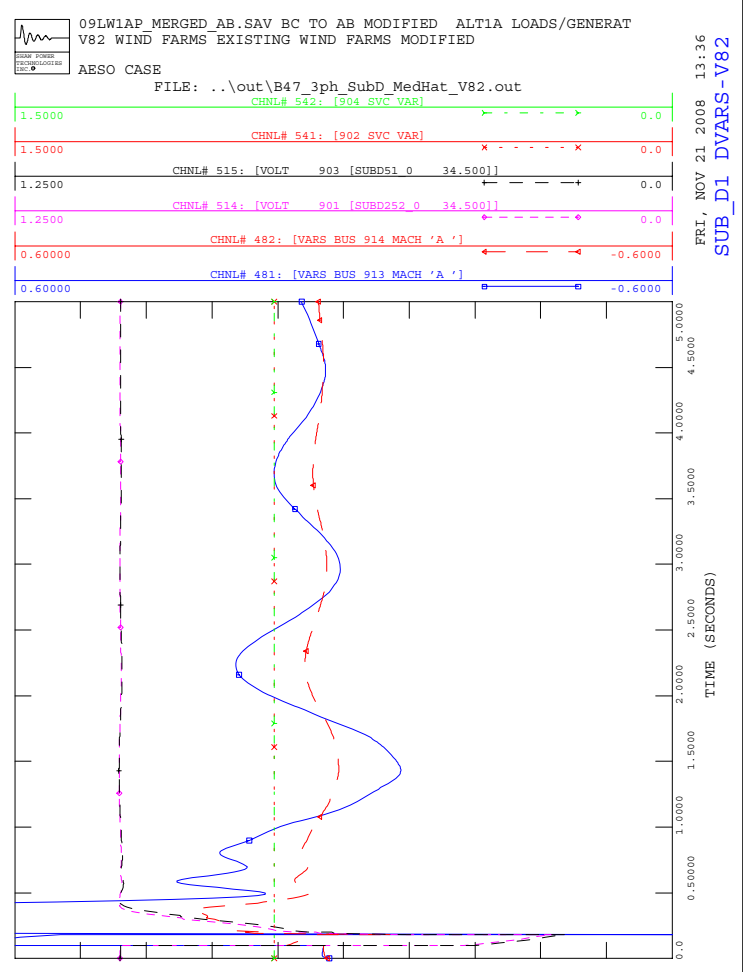
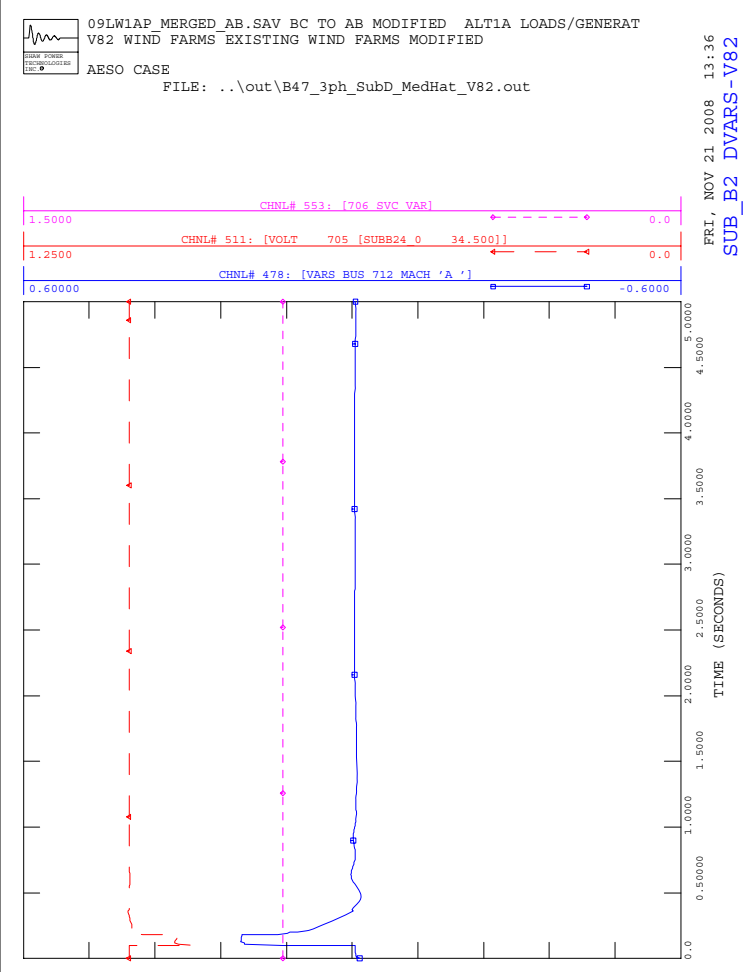
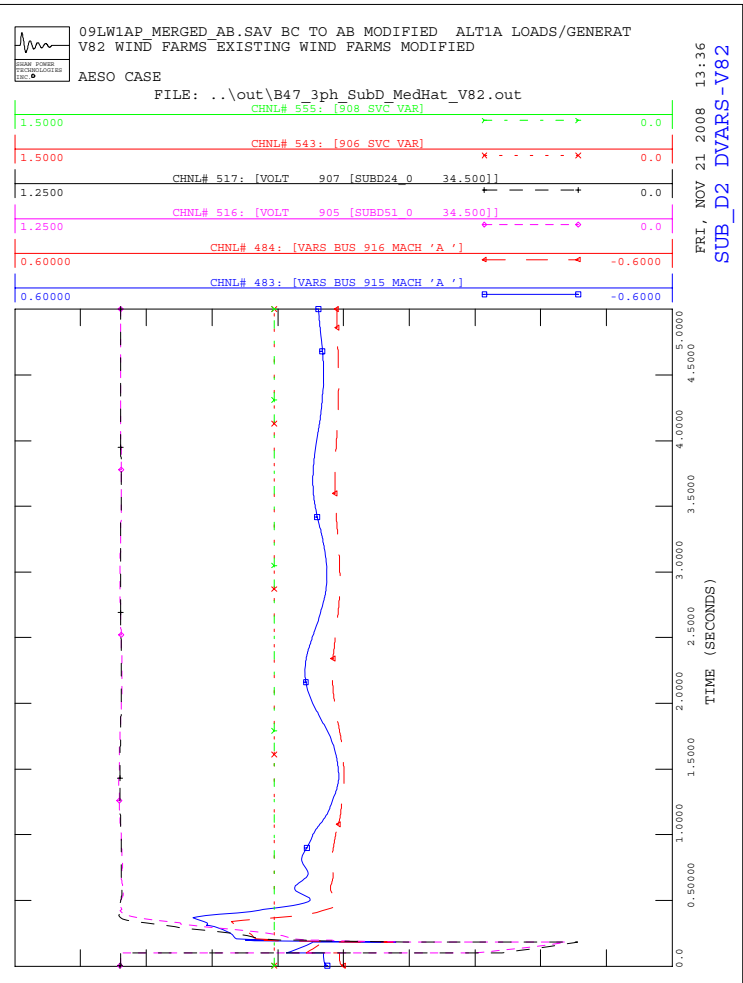
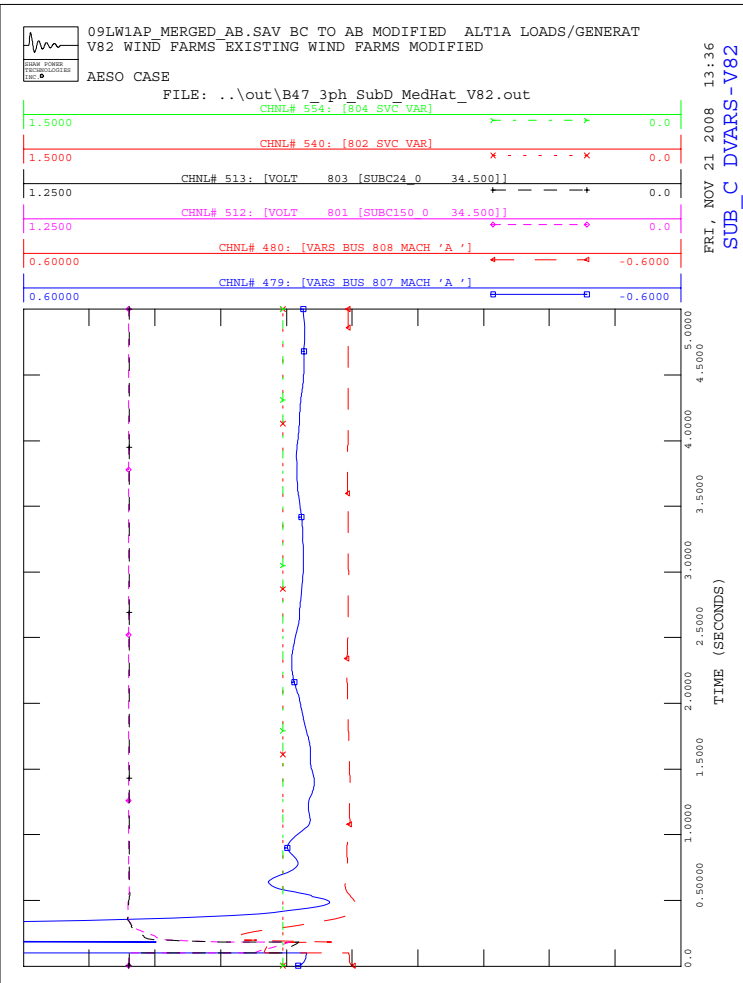
FRI, NOV 21 2008 13:36
 MEH2_CYP_WILD_SPEED-V82

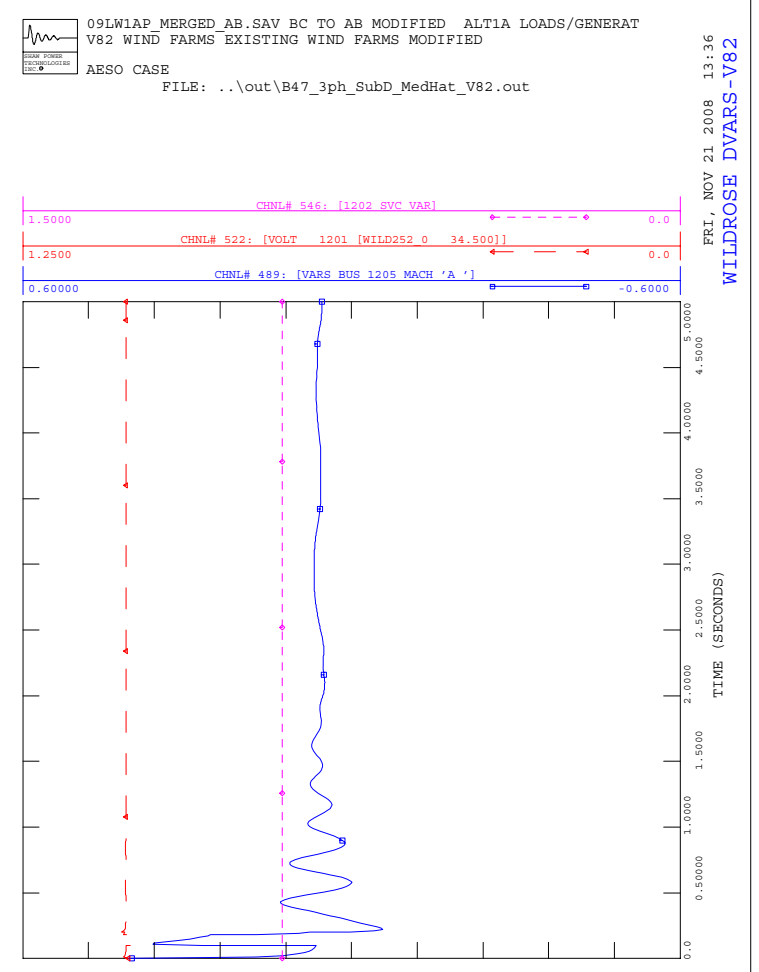
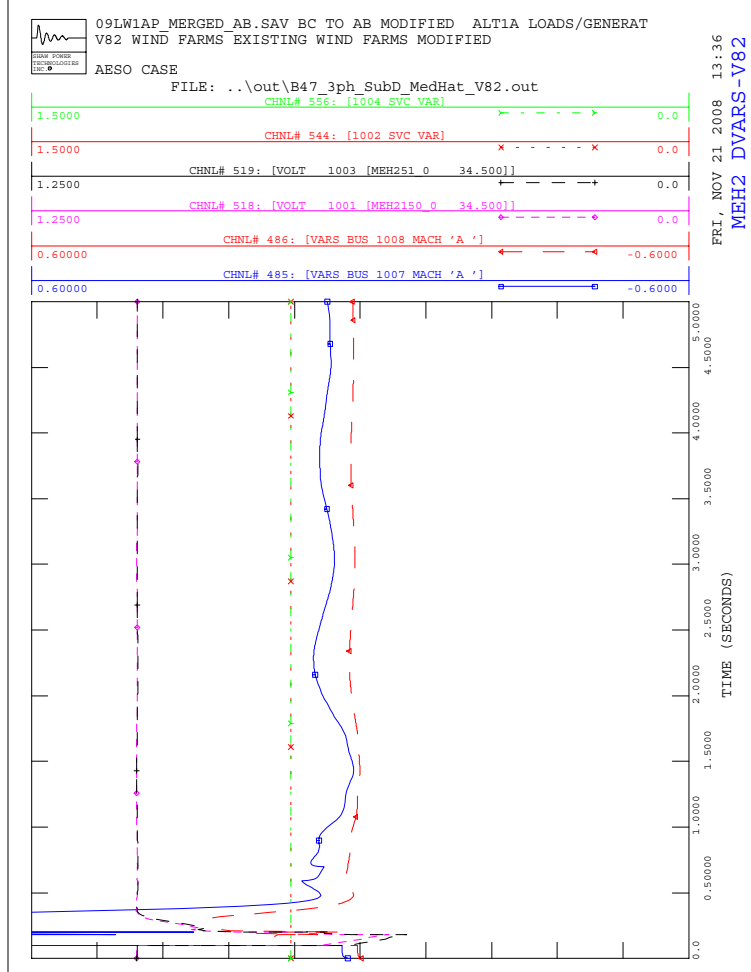
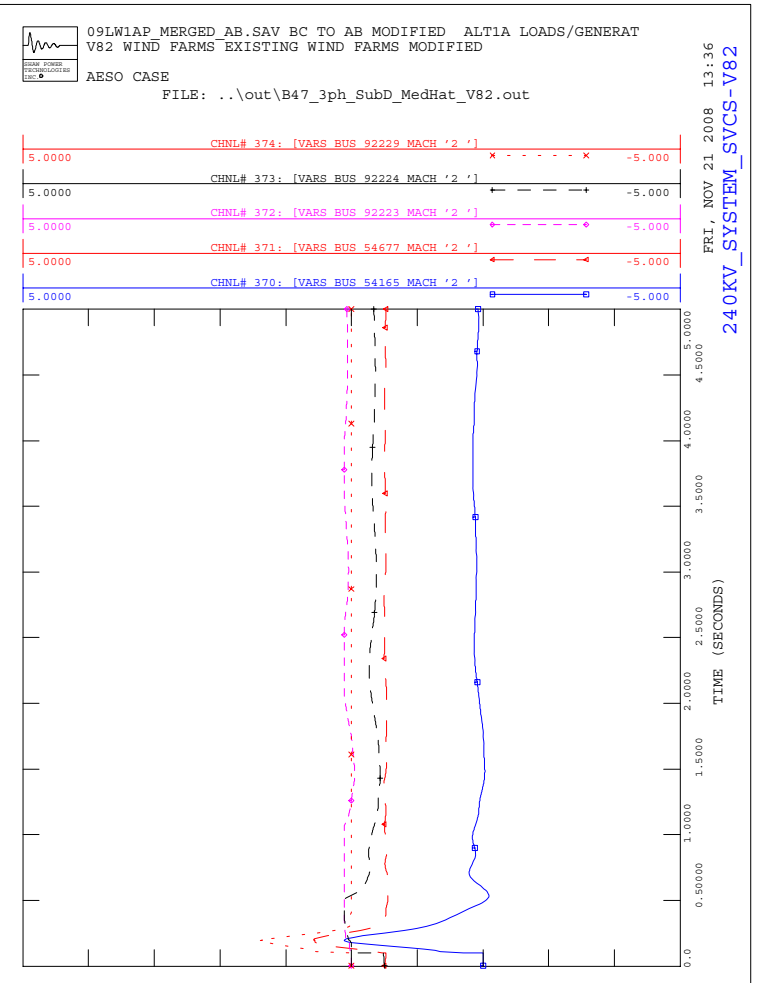
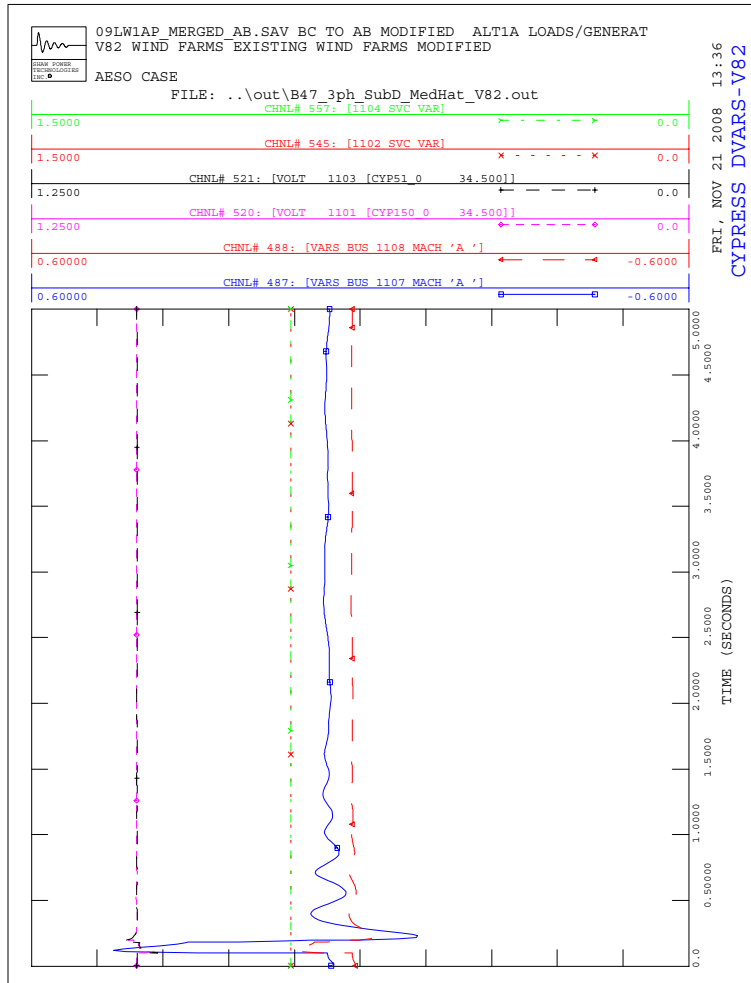












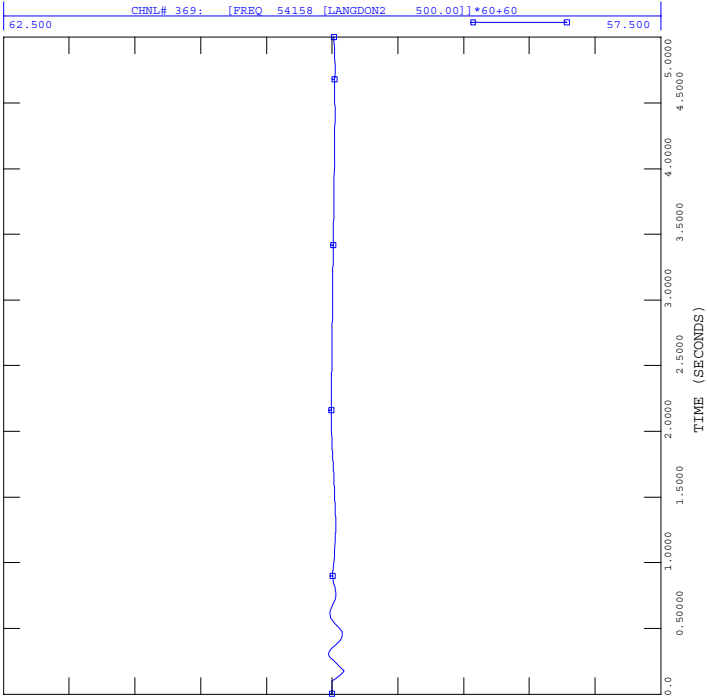


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B47_3ph_SubD_MedHat_V82.out

FRI, NOV 21 2008 13:36
LANGDON_FRQ-V82

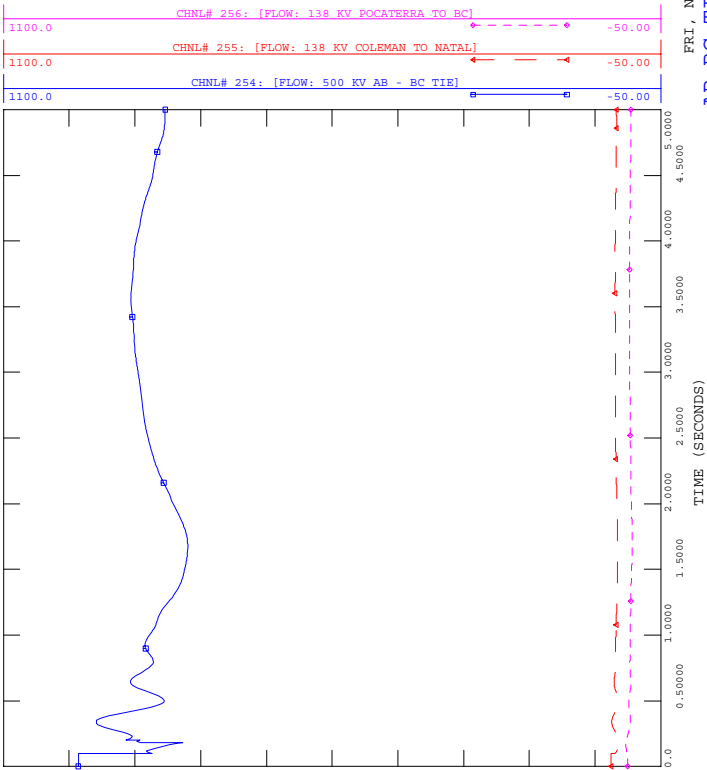


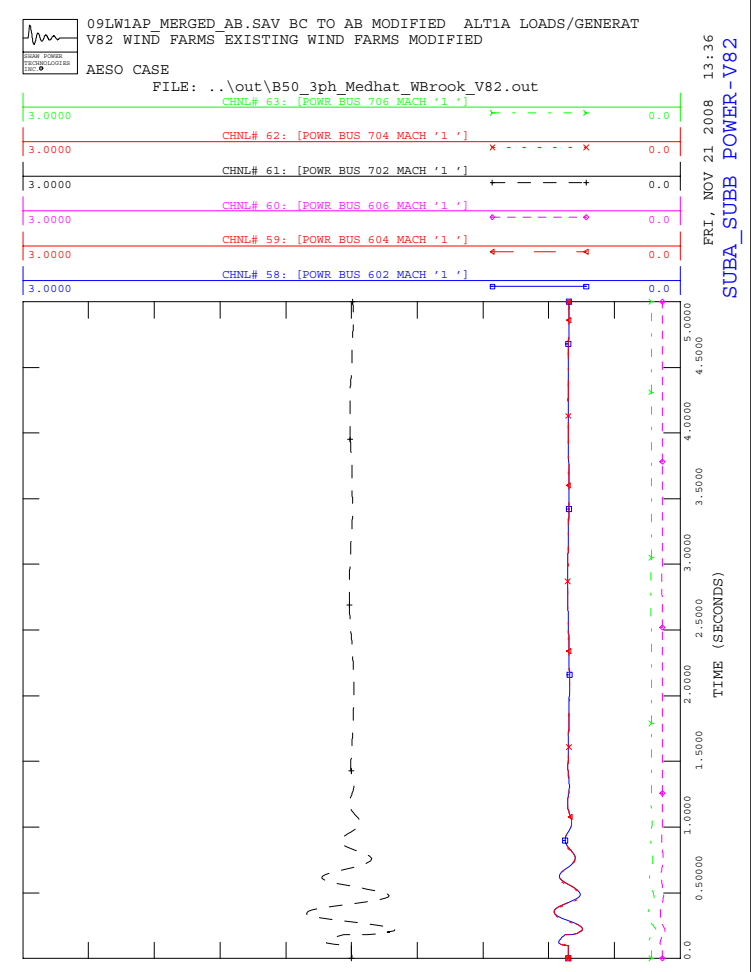
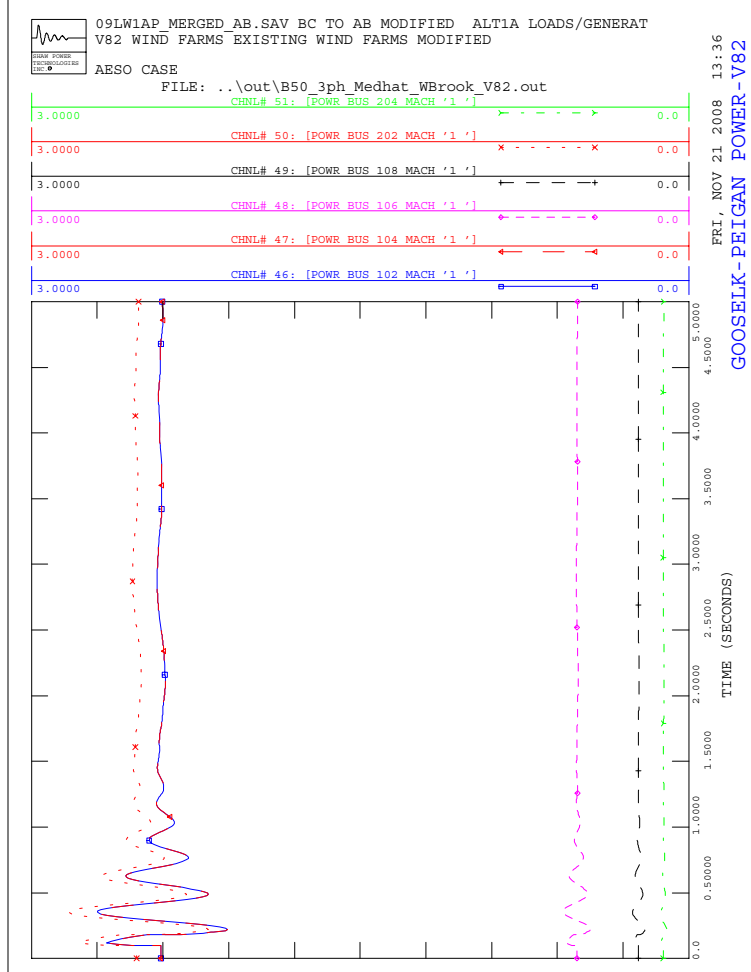
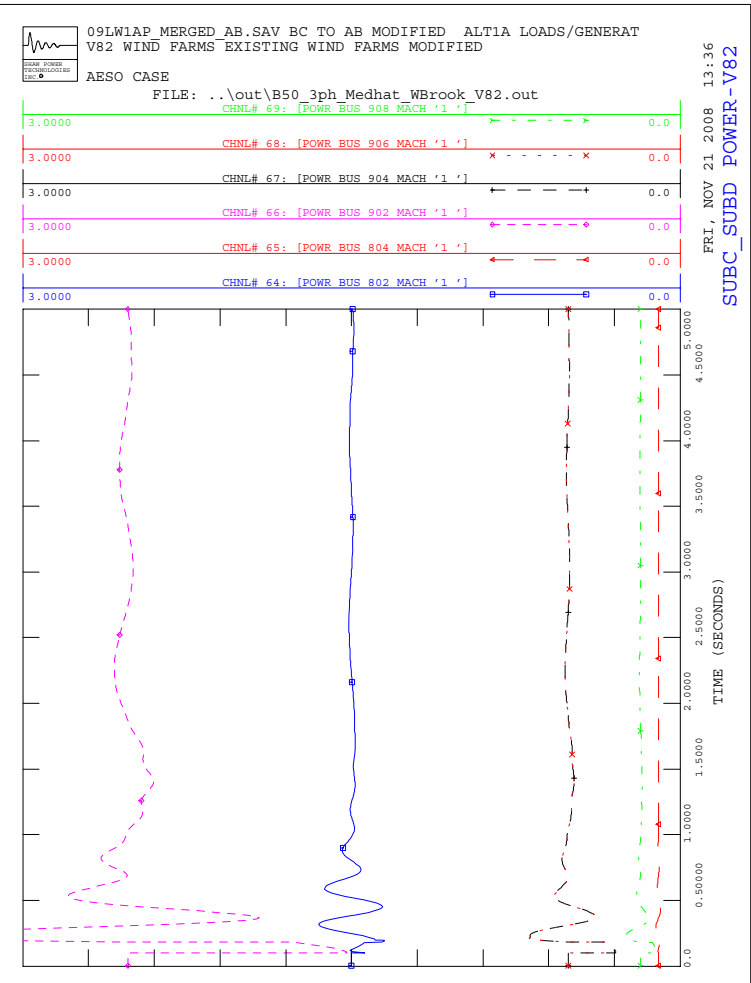
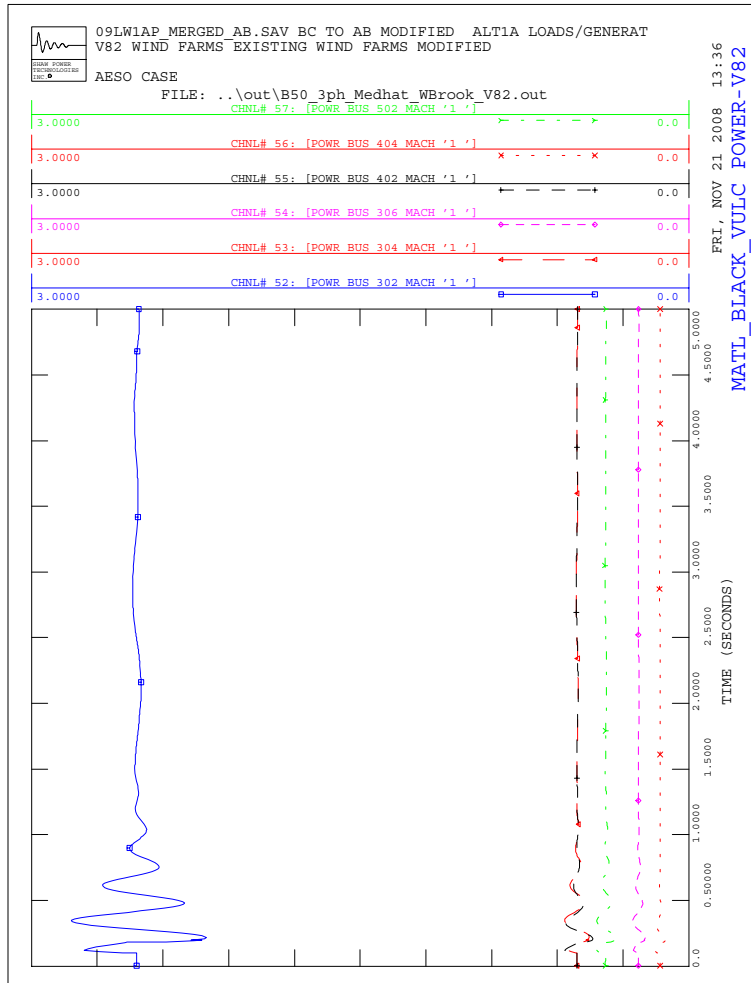
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

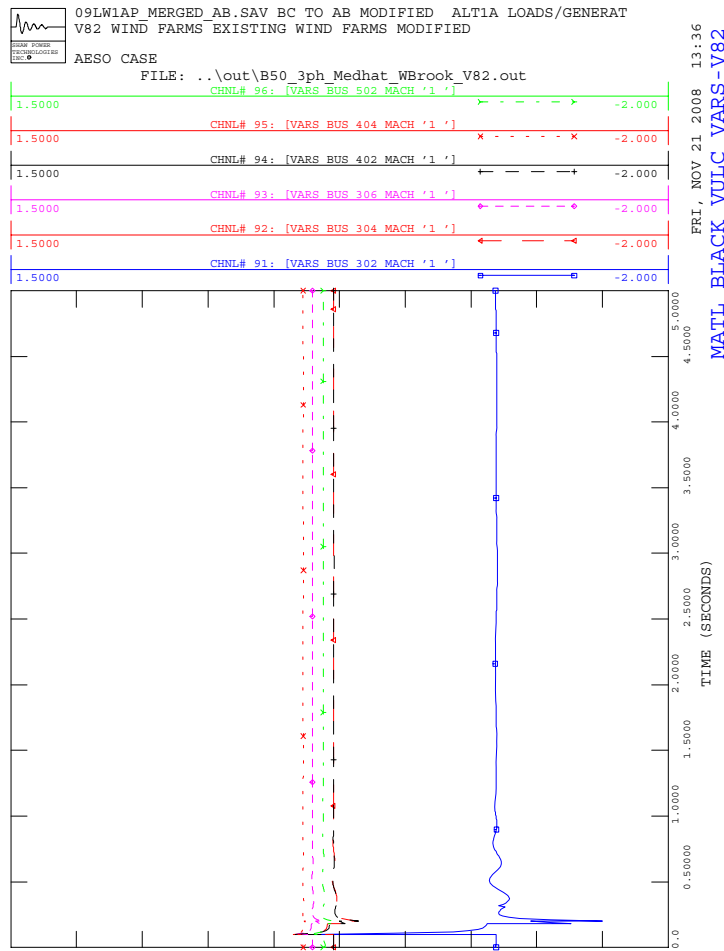
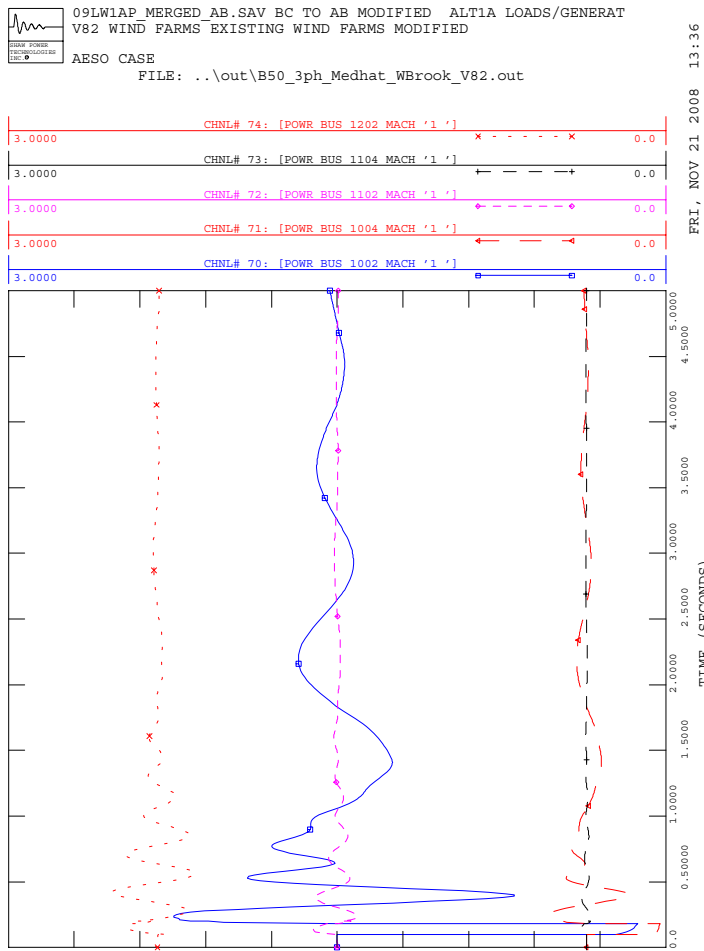
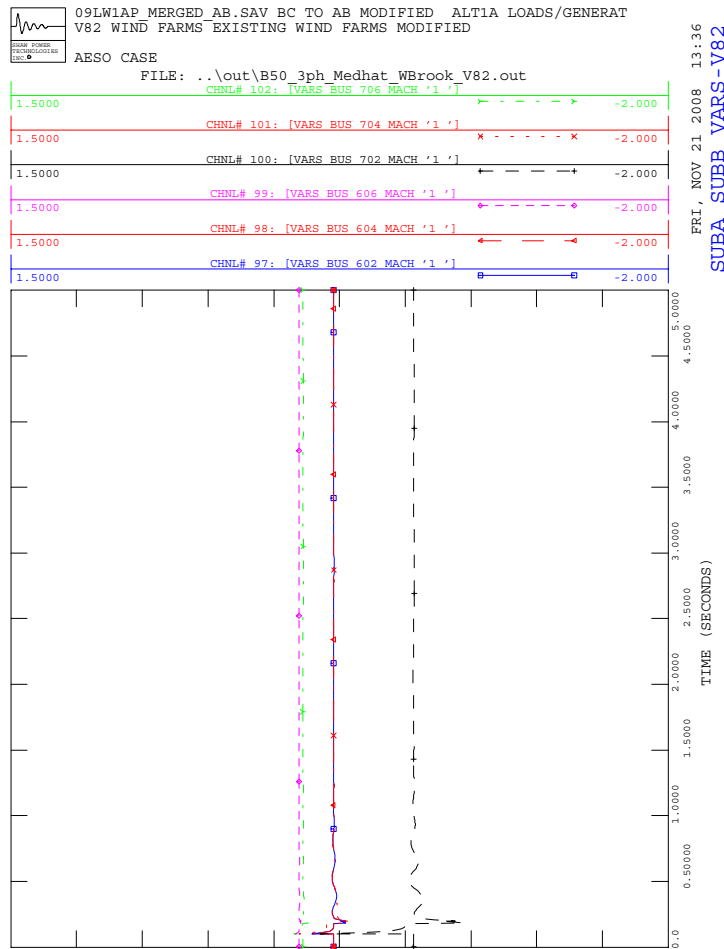
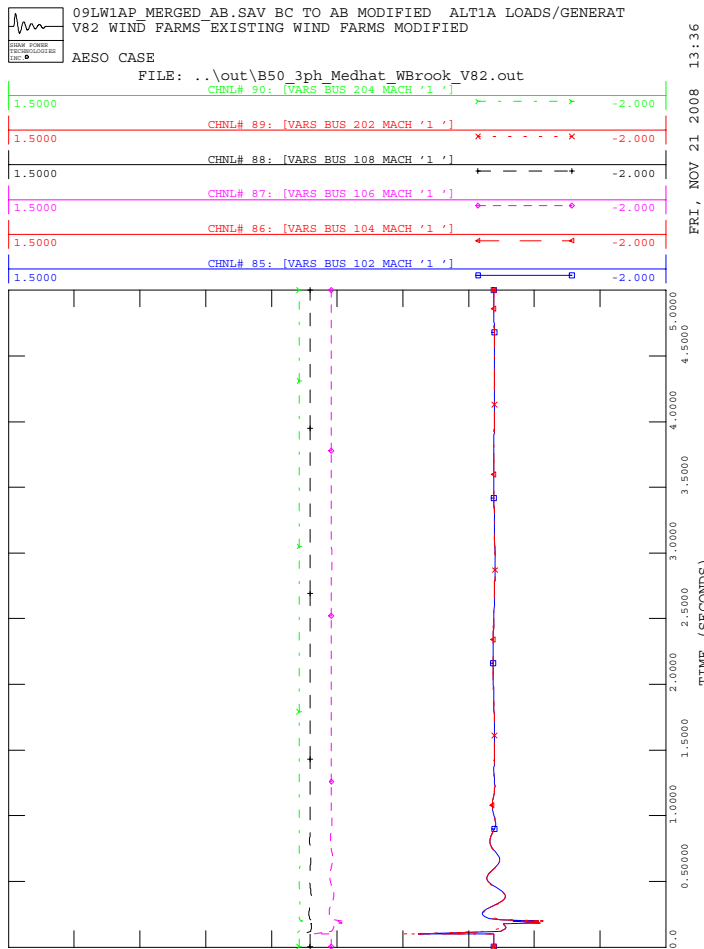
ABSO CASE

FILE: ..\out\B47_3ph_SubD_MedHat_V82.out

FRI, NOV 21 2008 13:36
AB_BC_TIE_FLOWS-V82

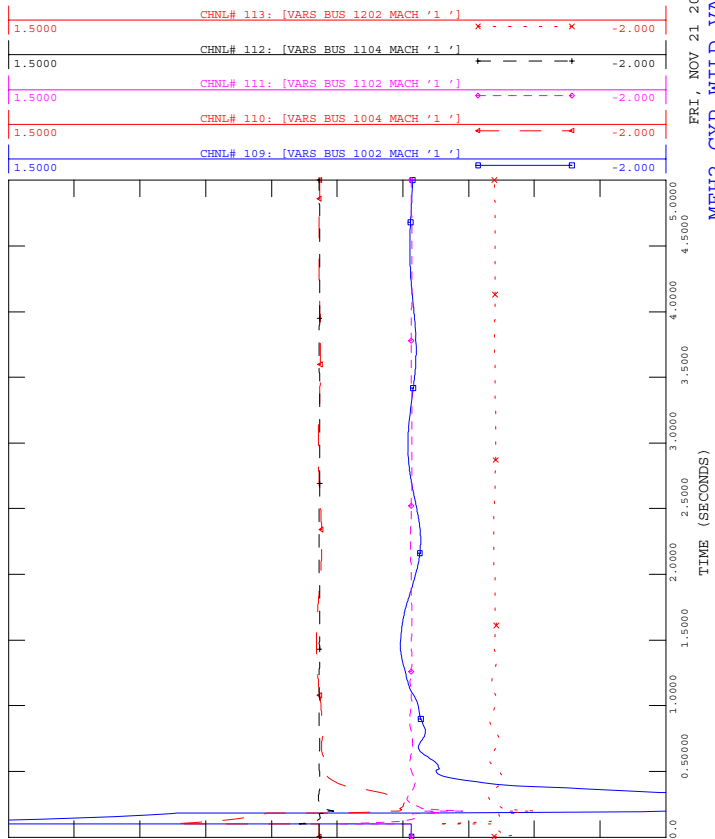






09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

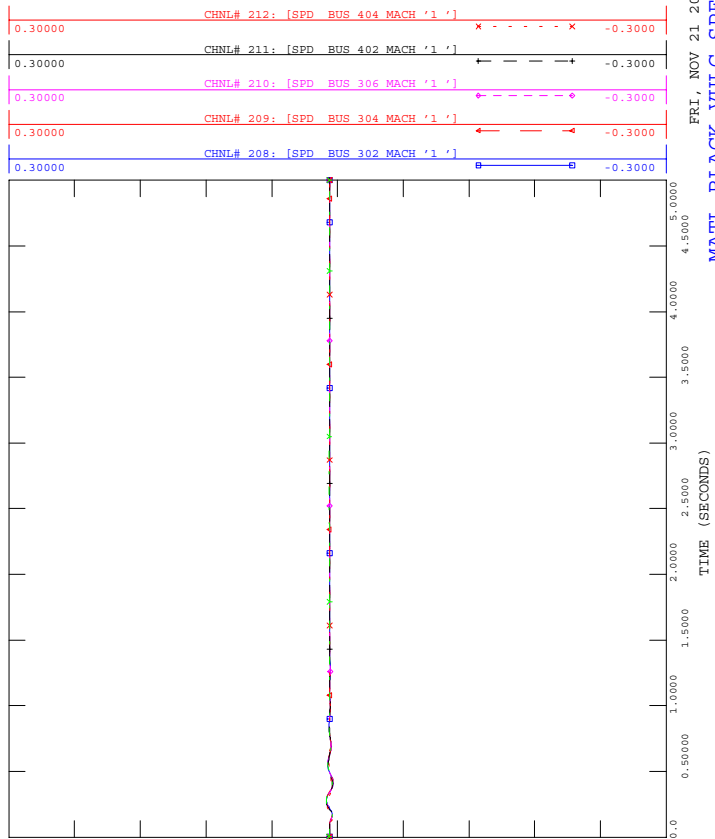
FILE: ..\out\B50_3ph_Medhat_WBrook_V82.out



FRI, NOV 21 2008 13:36

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

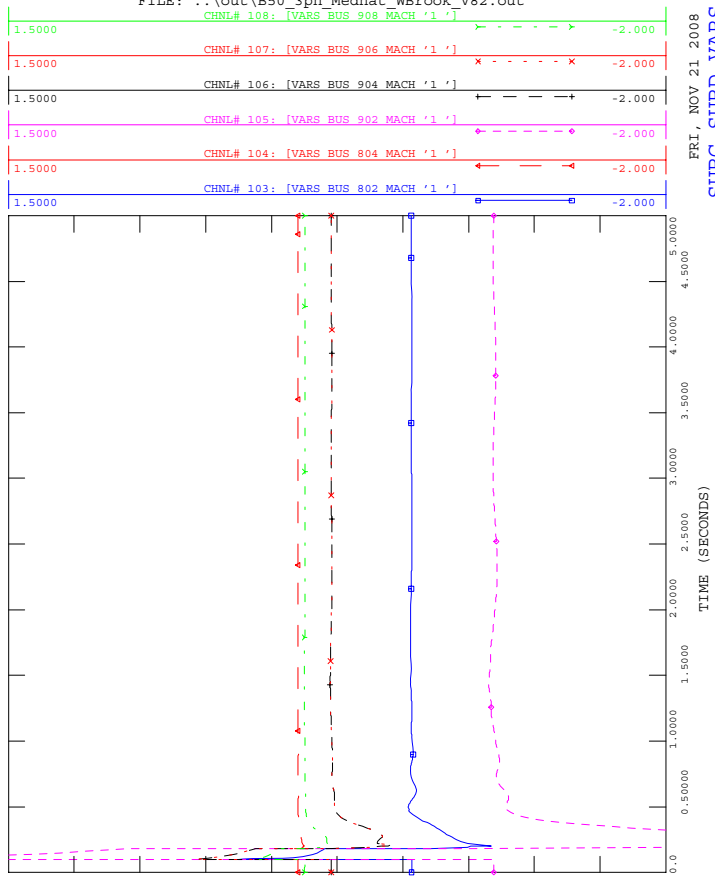
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FRI, NOV 21 2008 13:36

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

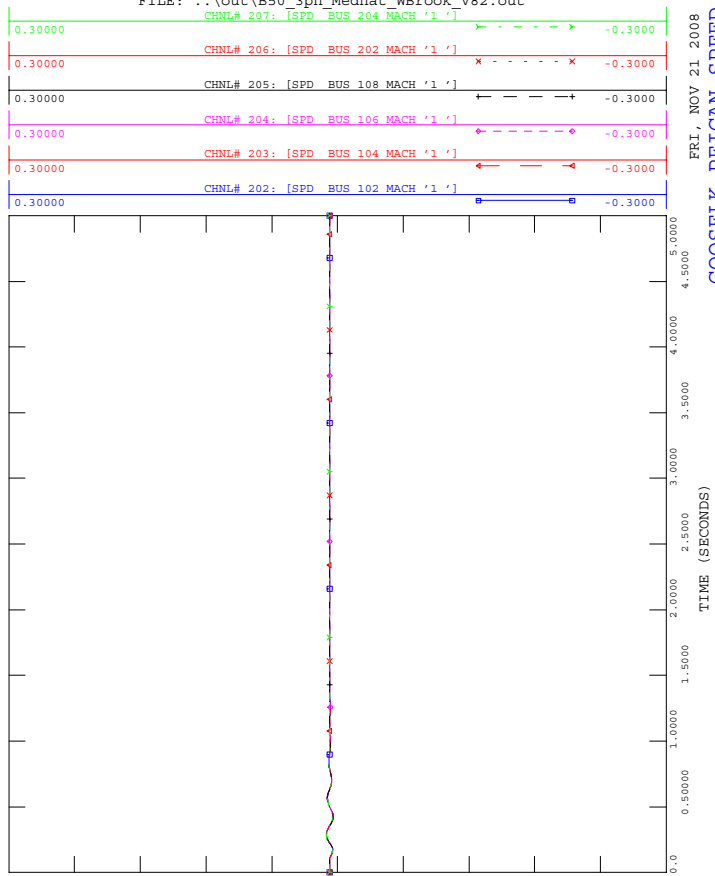
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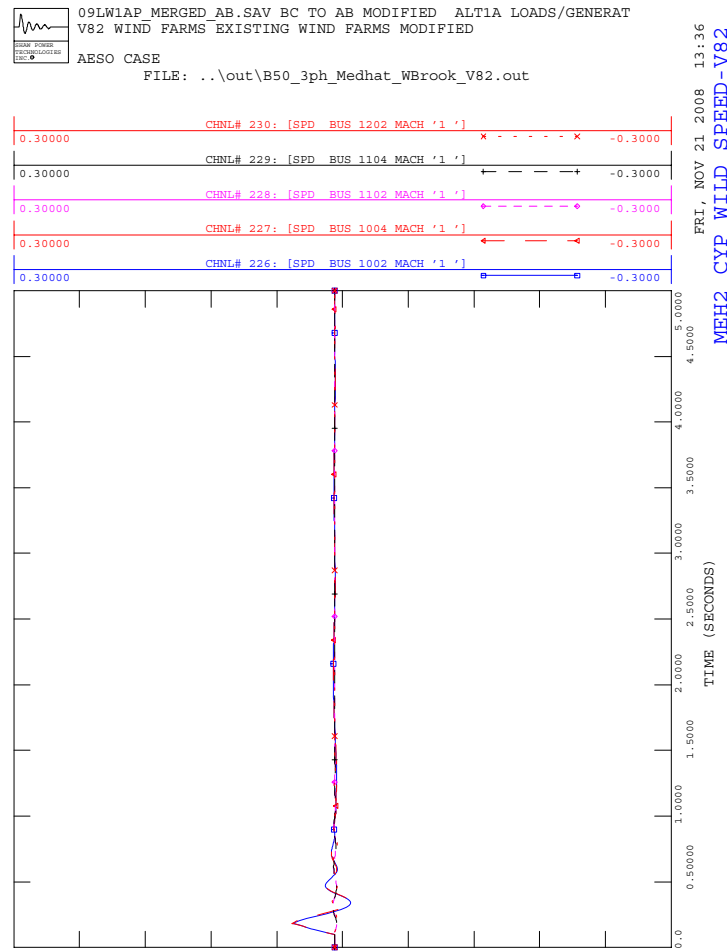
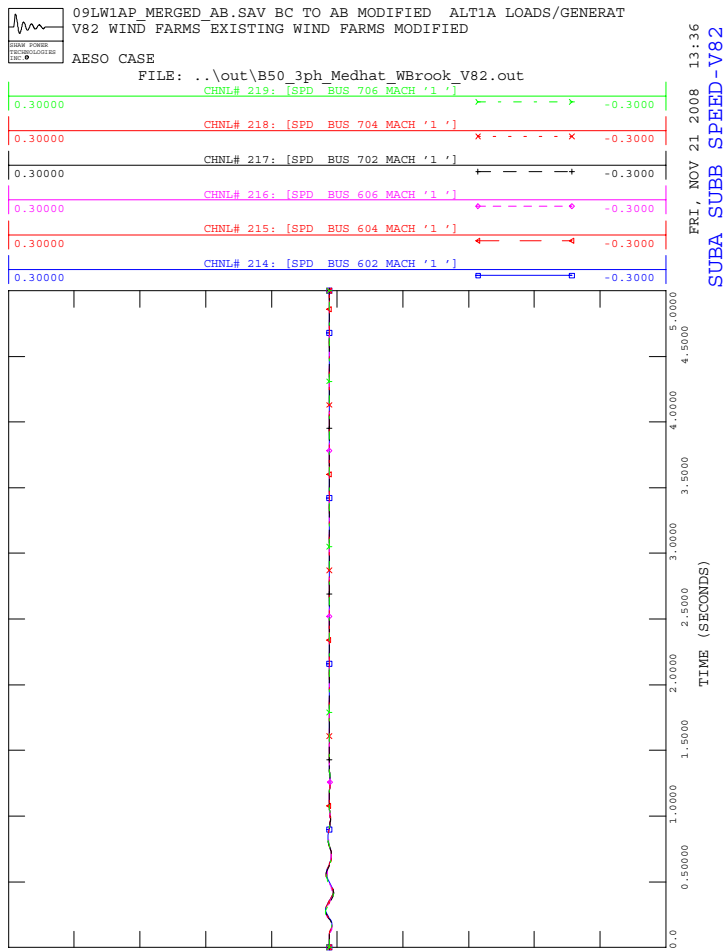
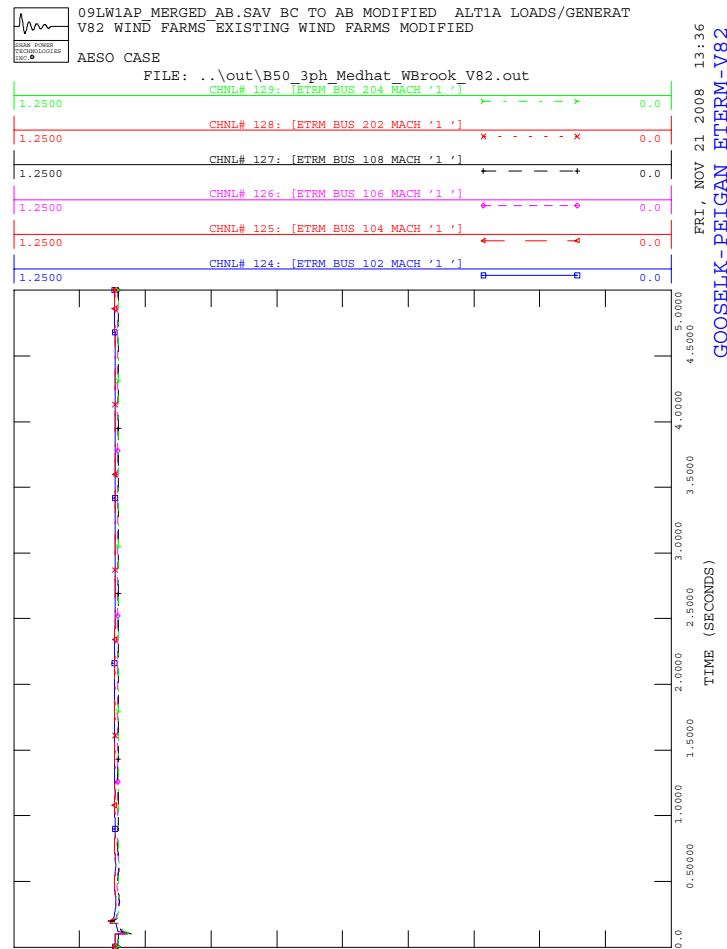
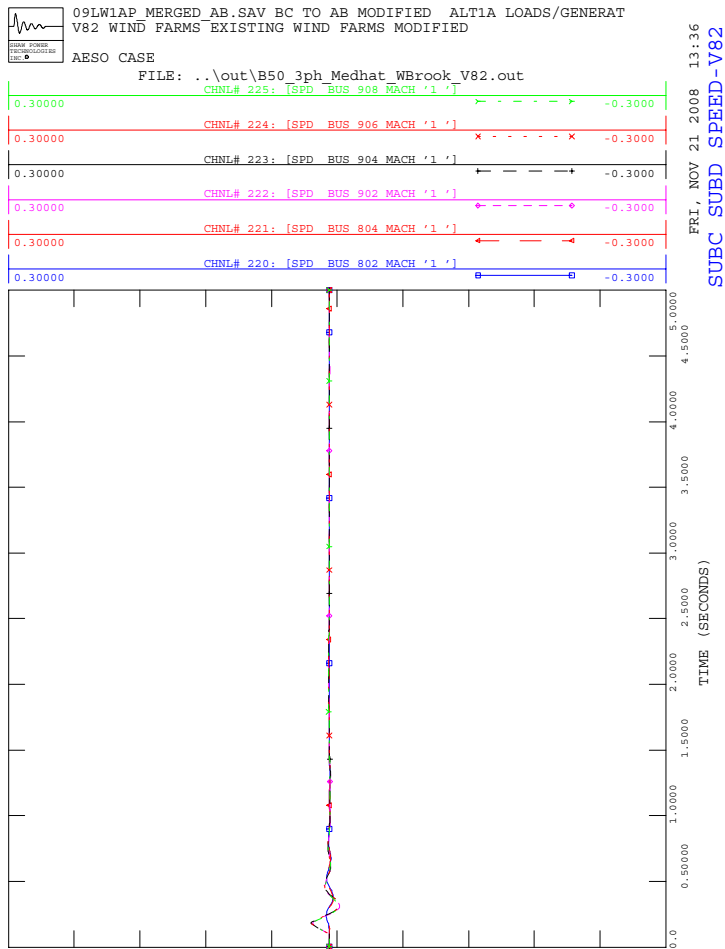
FRI, NOV 21 2008 13:36

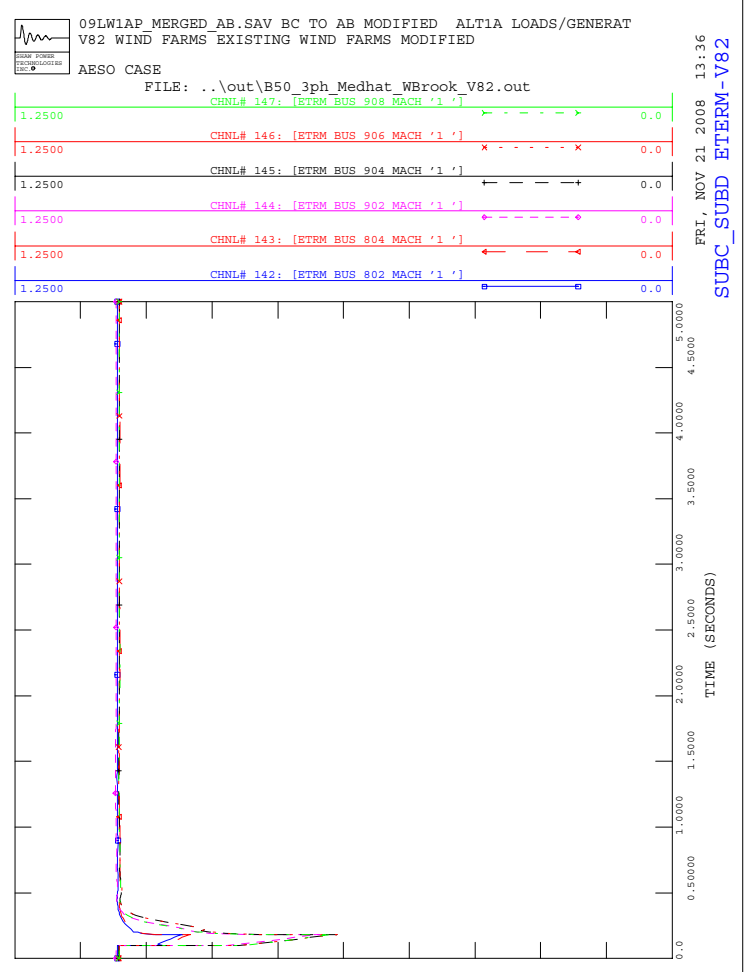
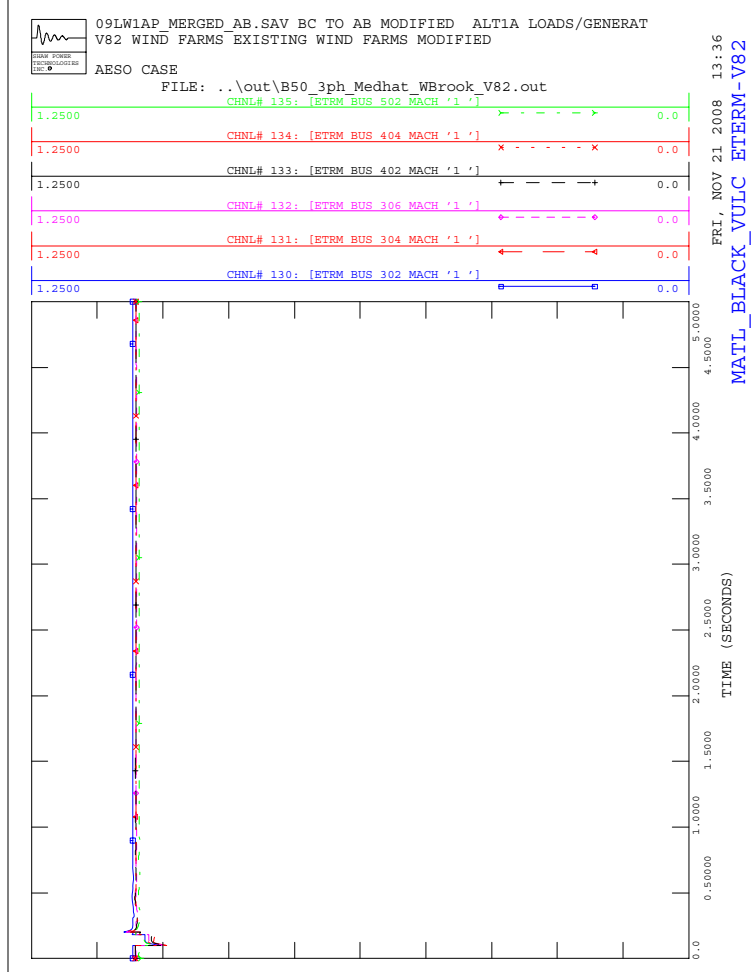
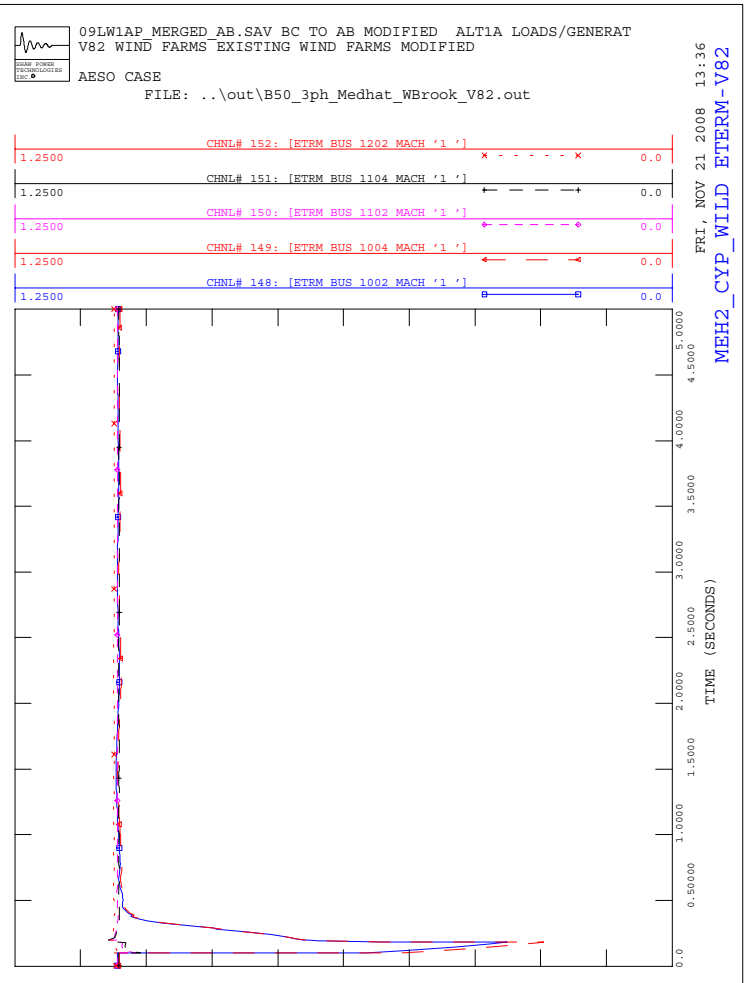
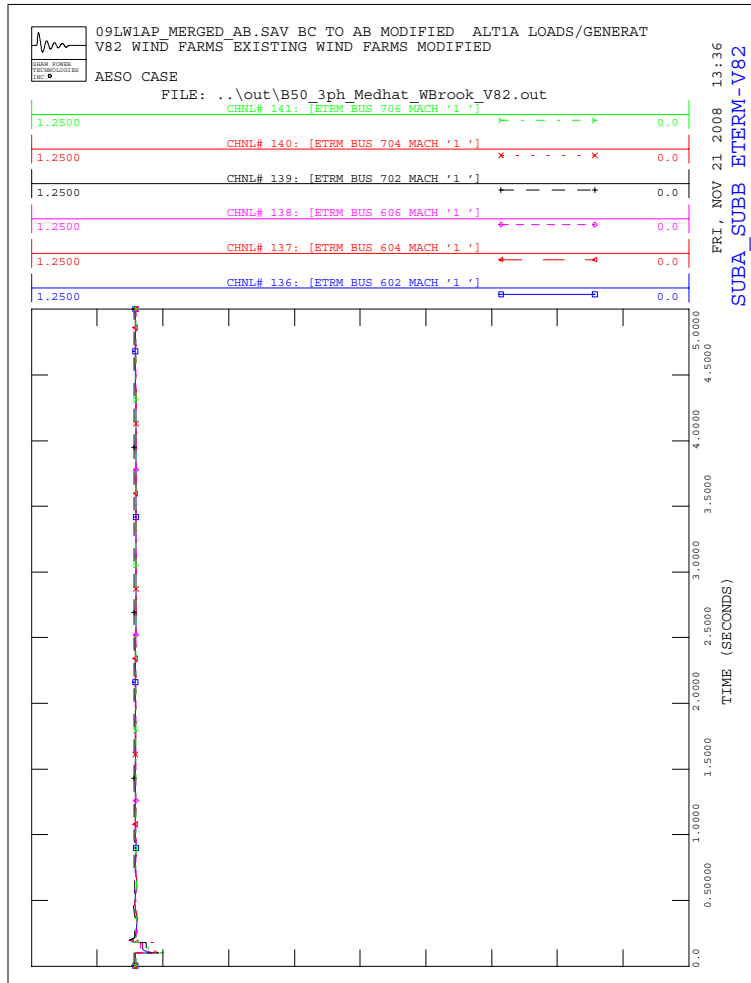
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

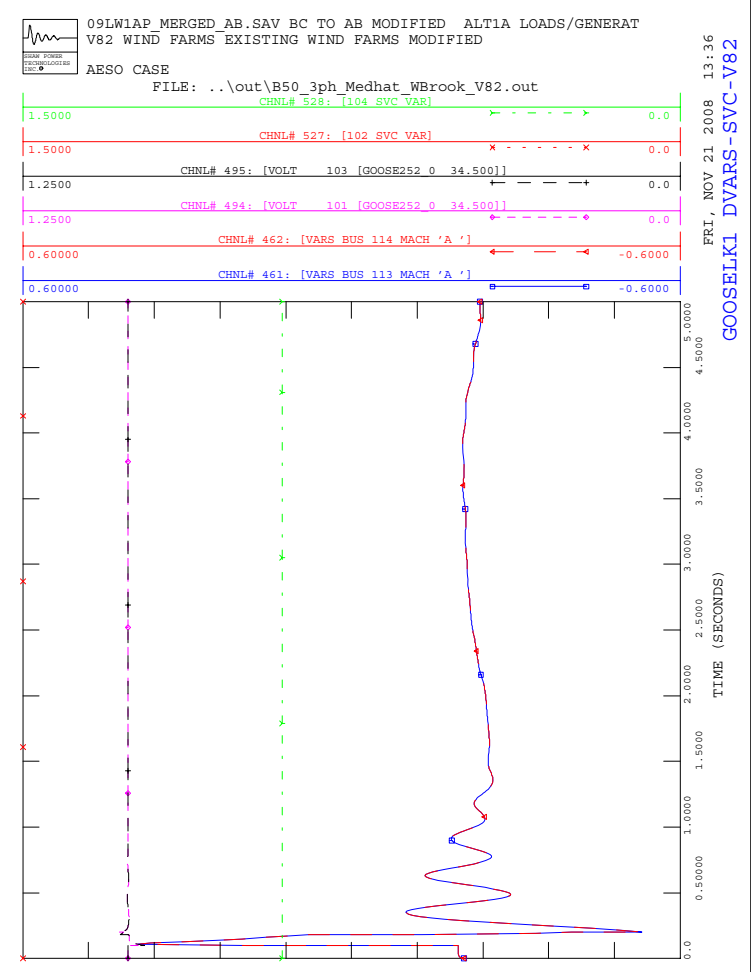
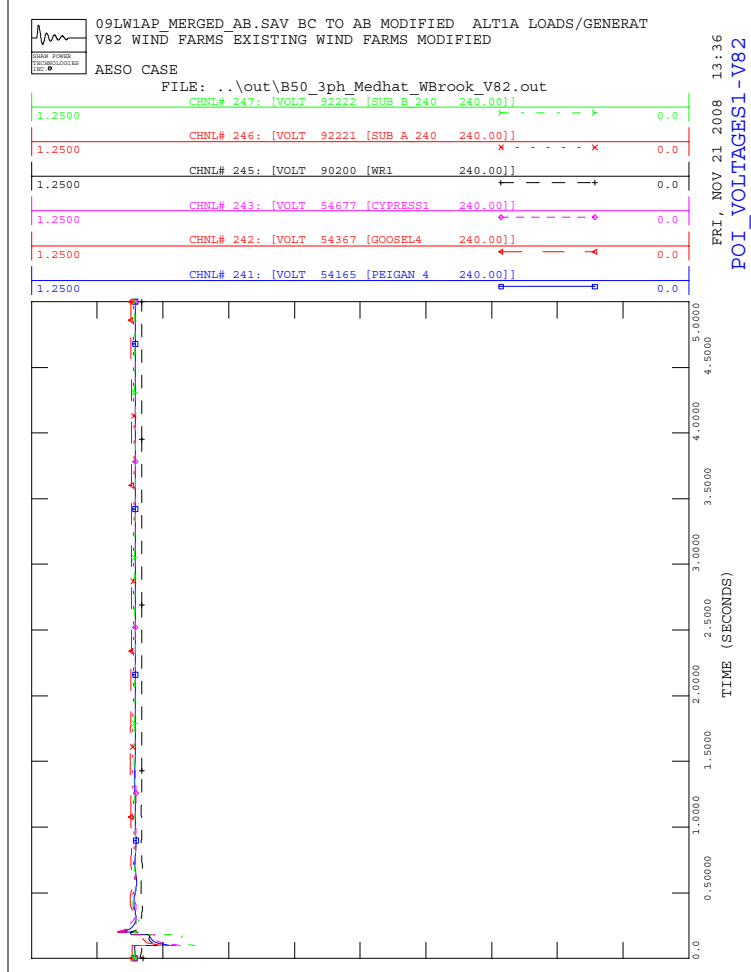
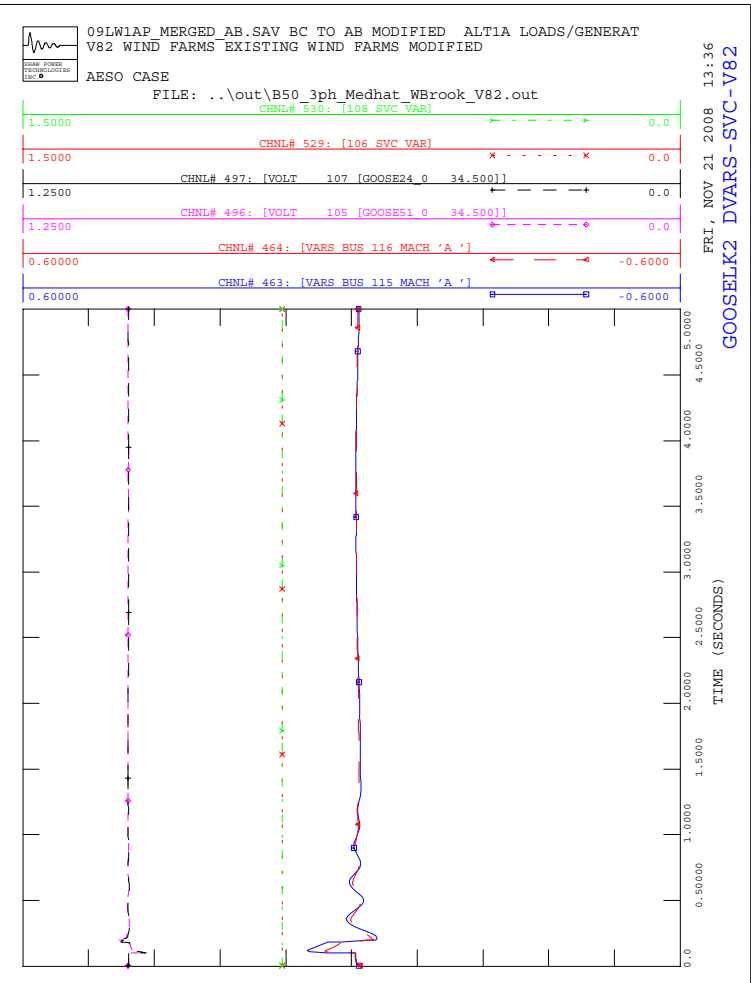
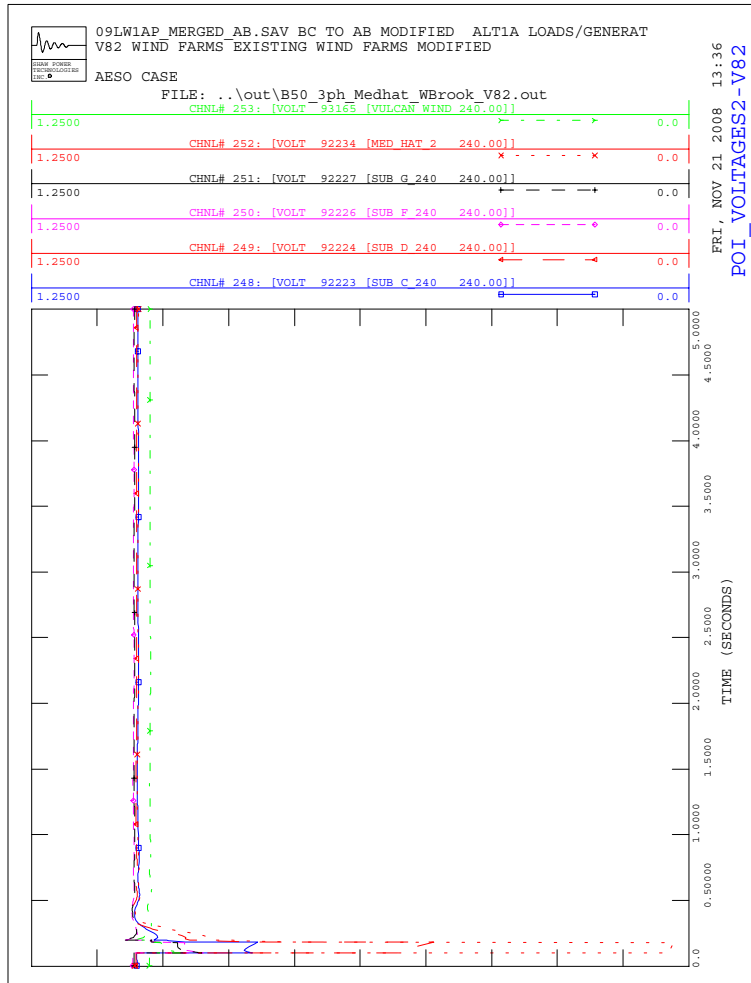
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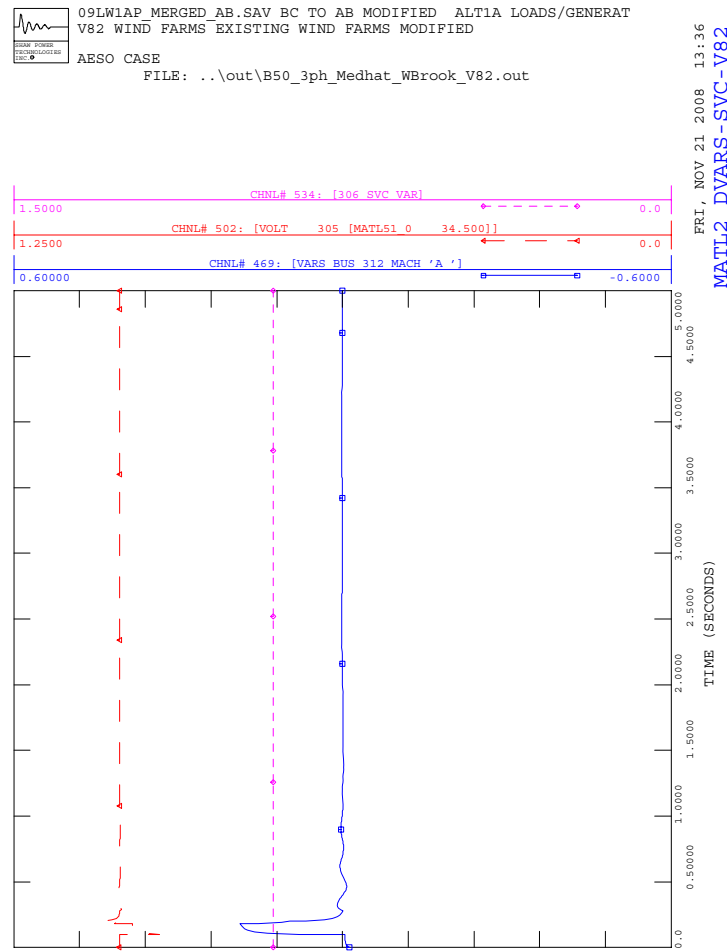
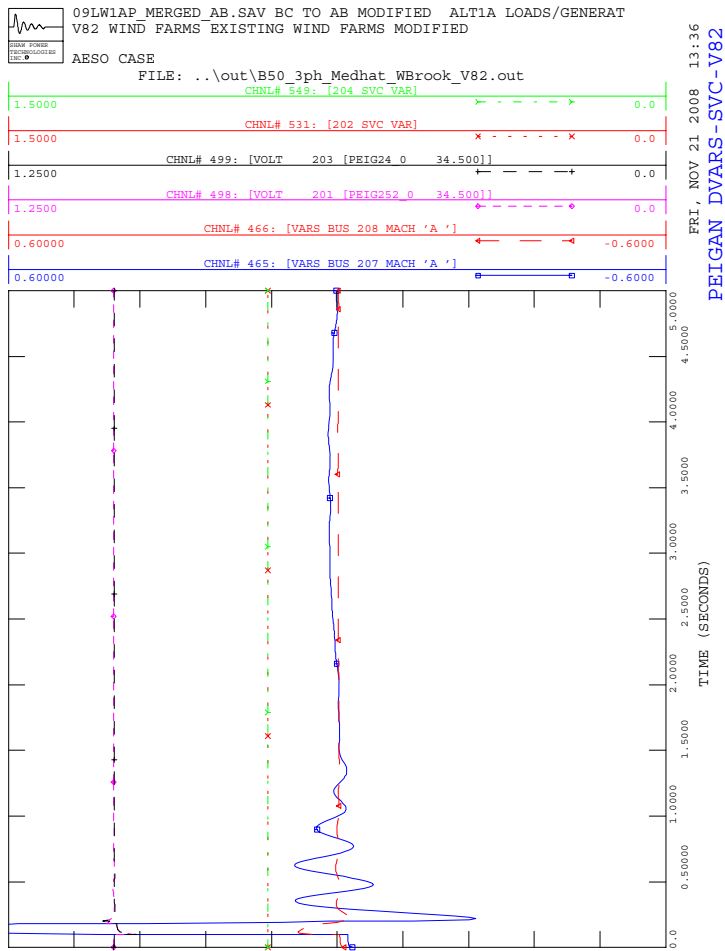
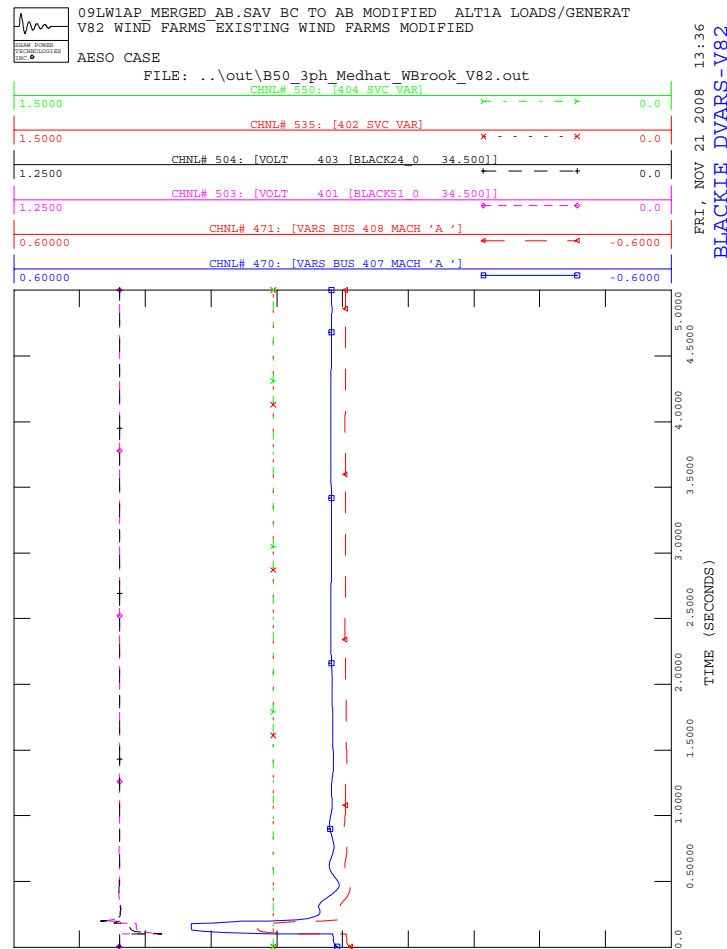
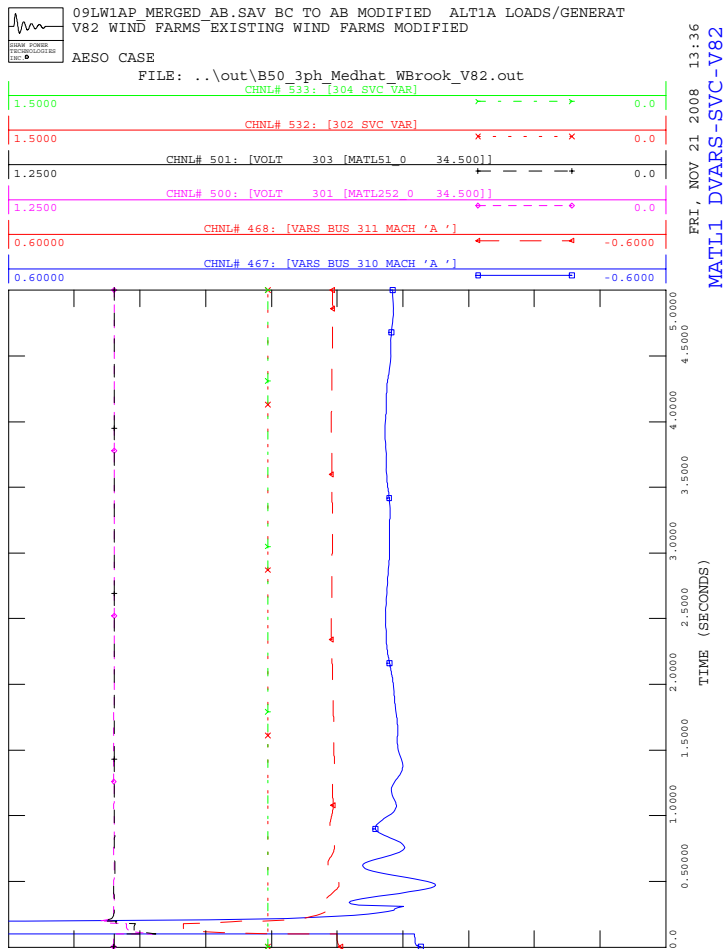


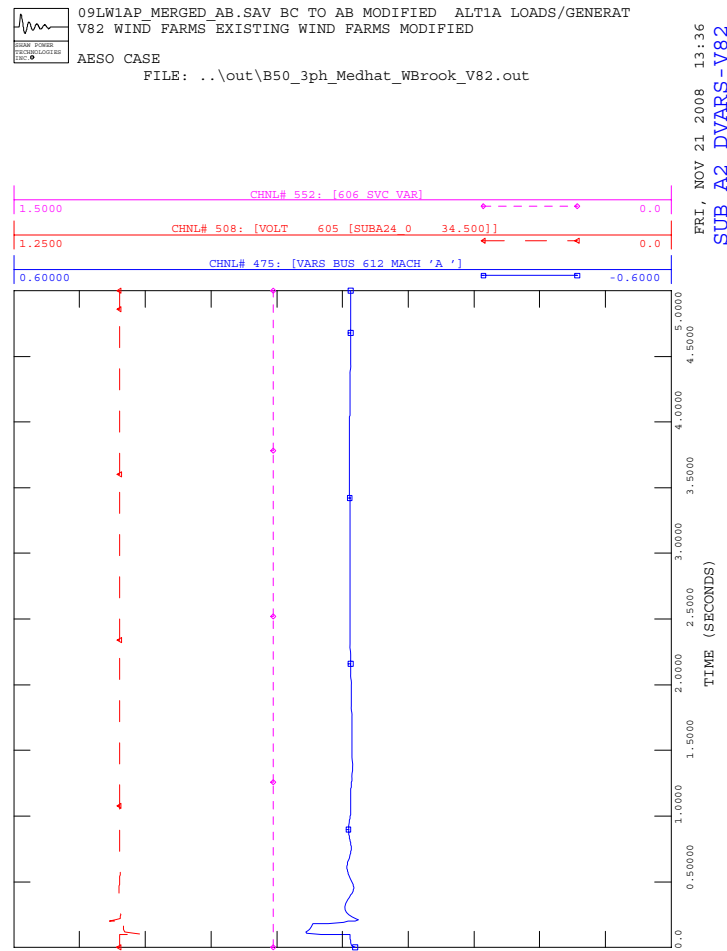
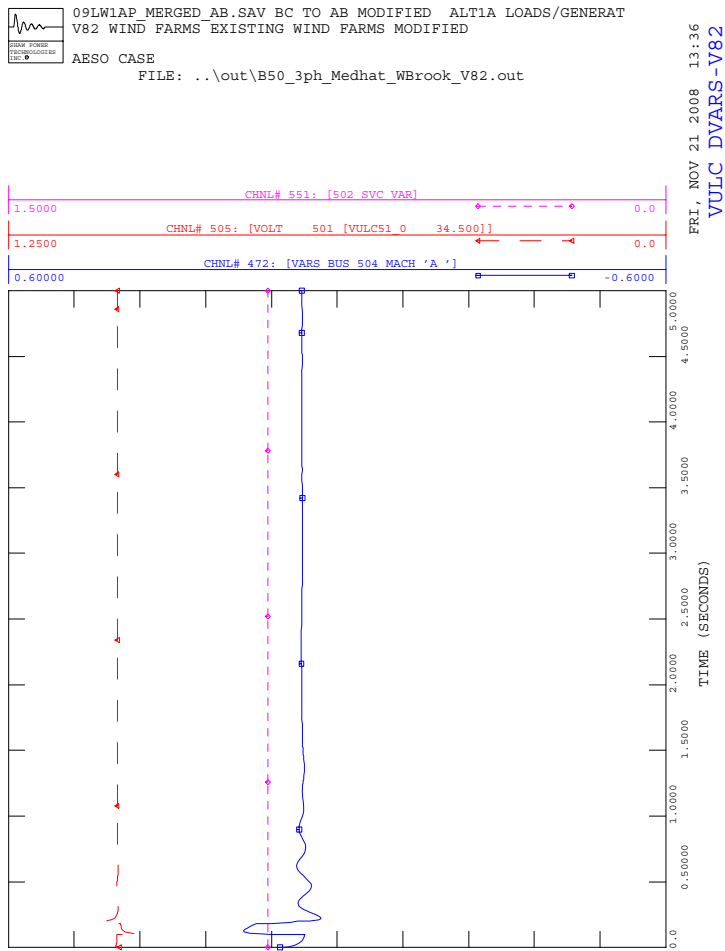
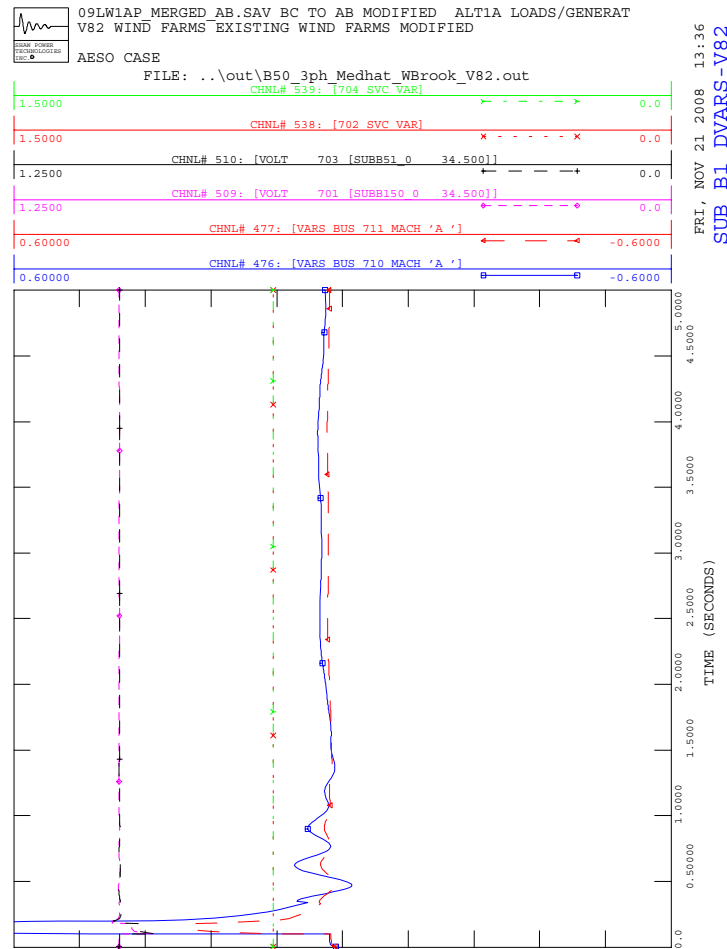
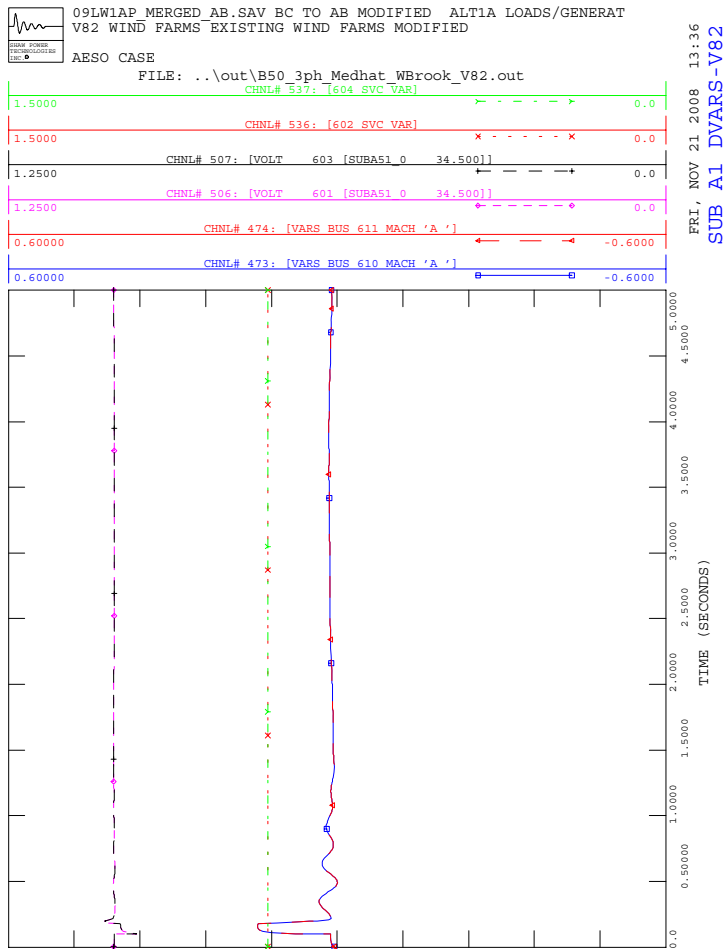
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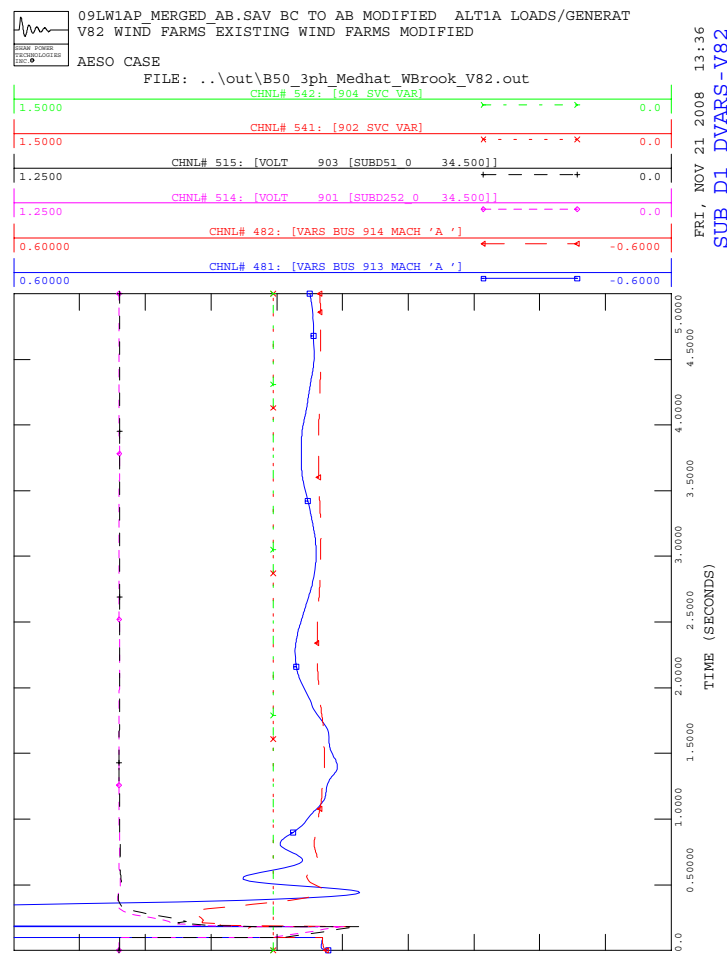
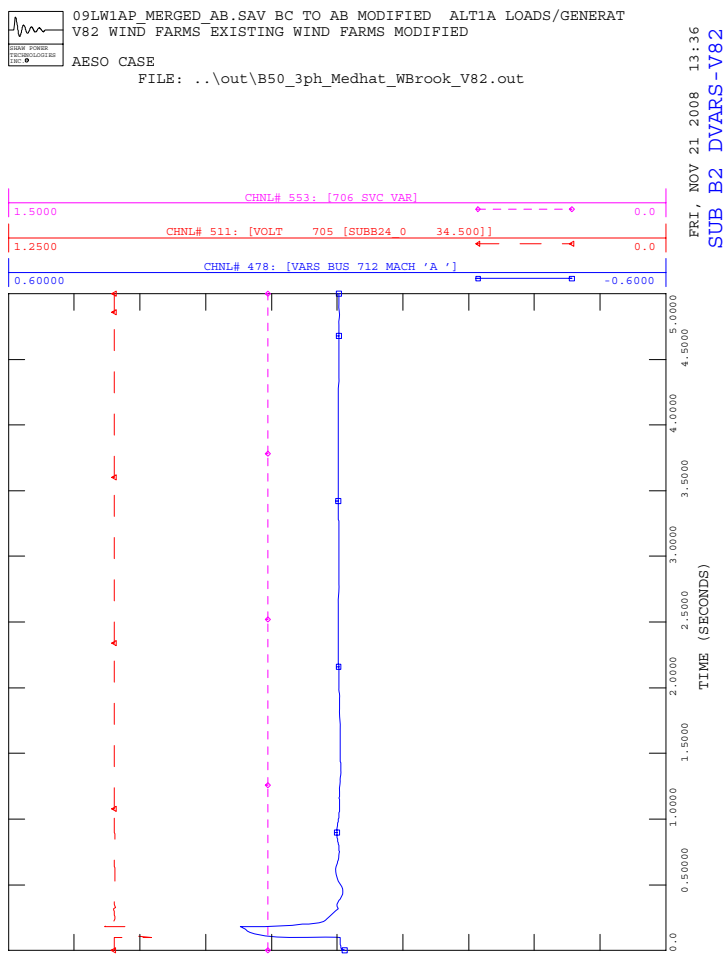
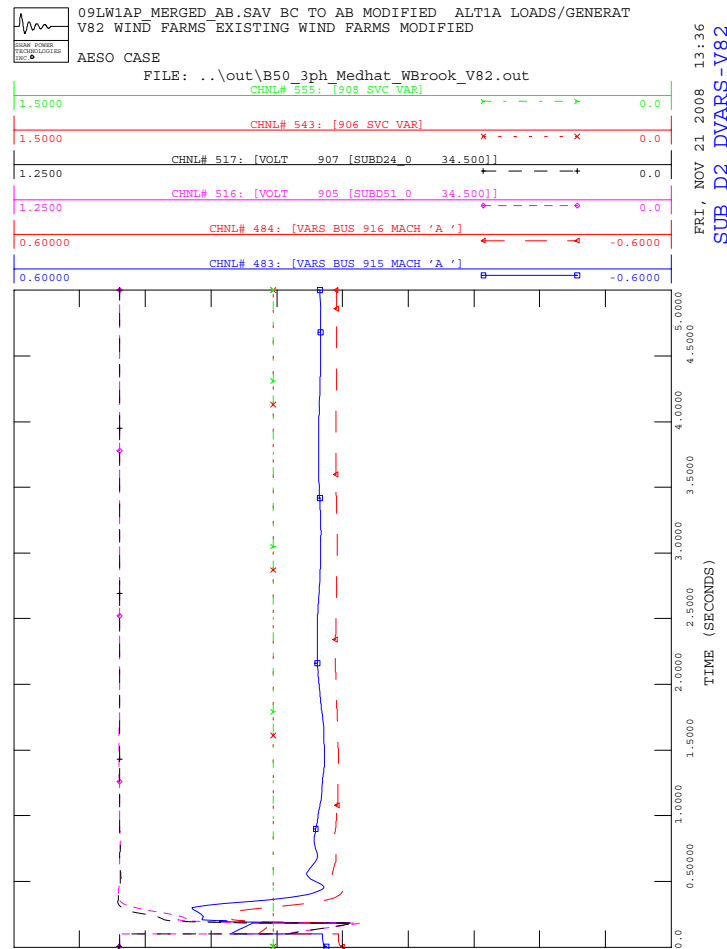
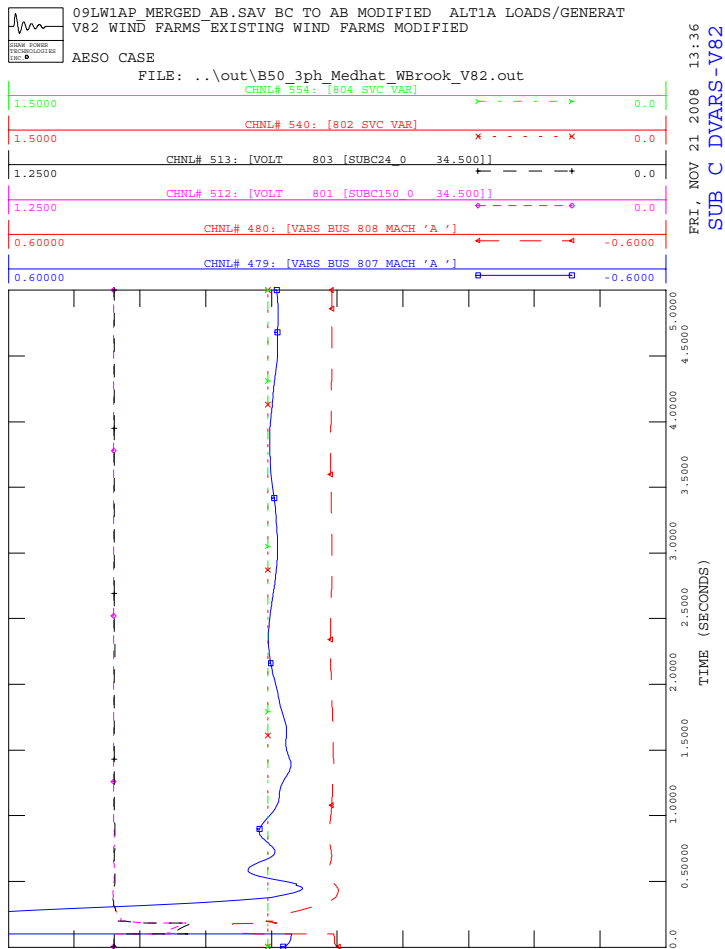


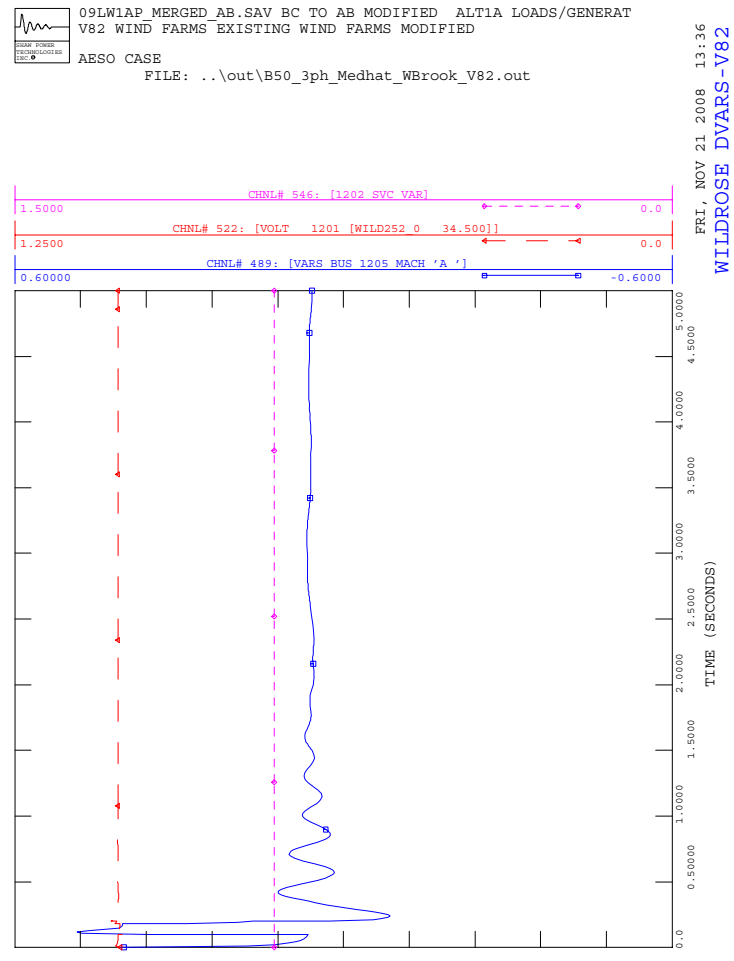
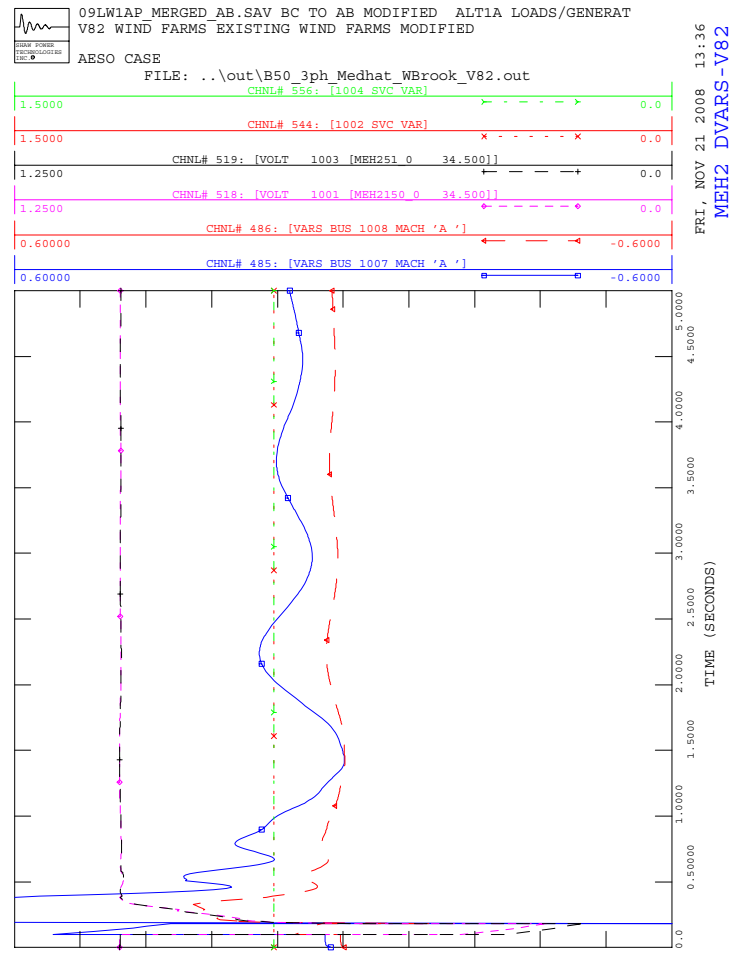
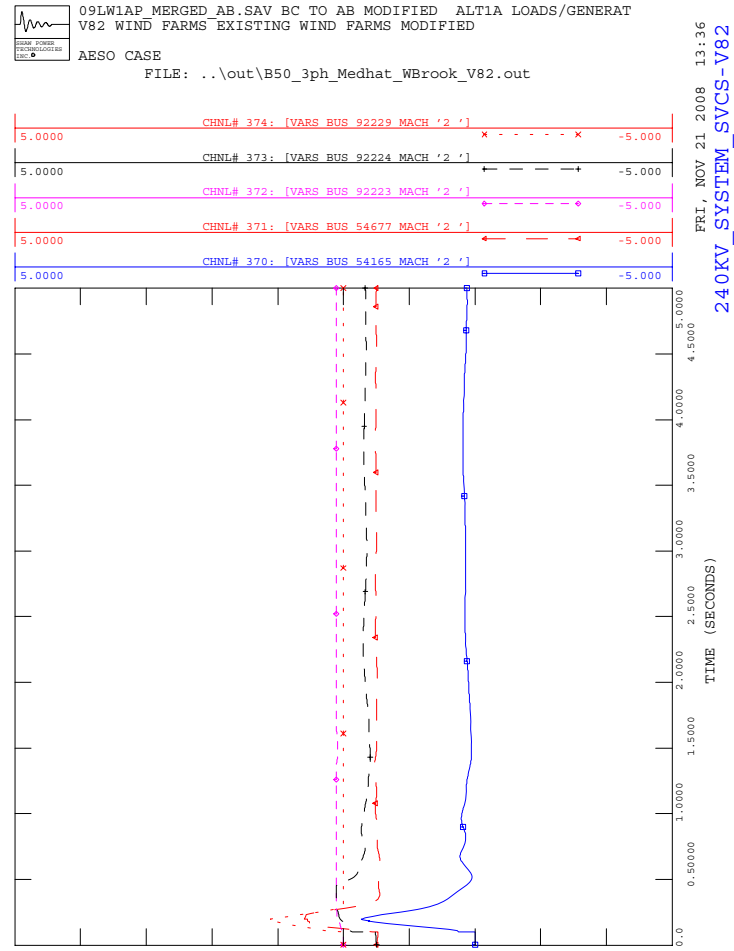
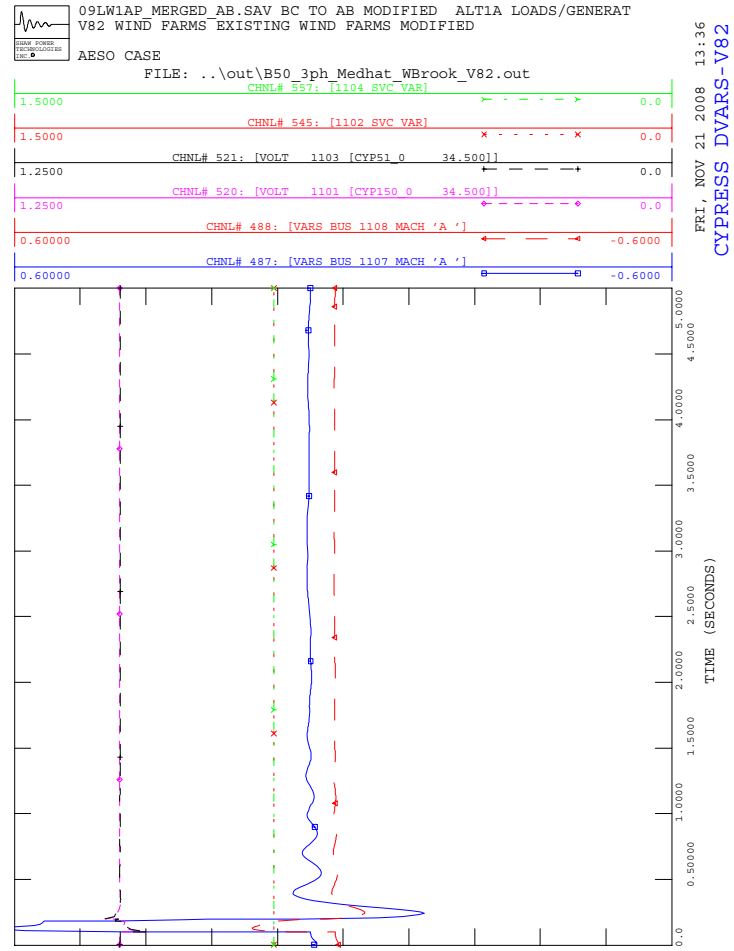








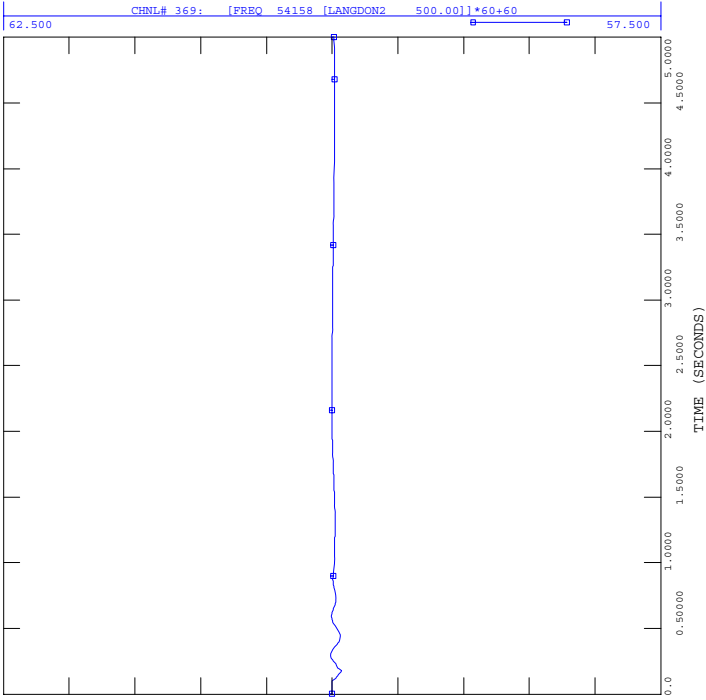






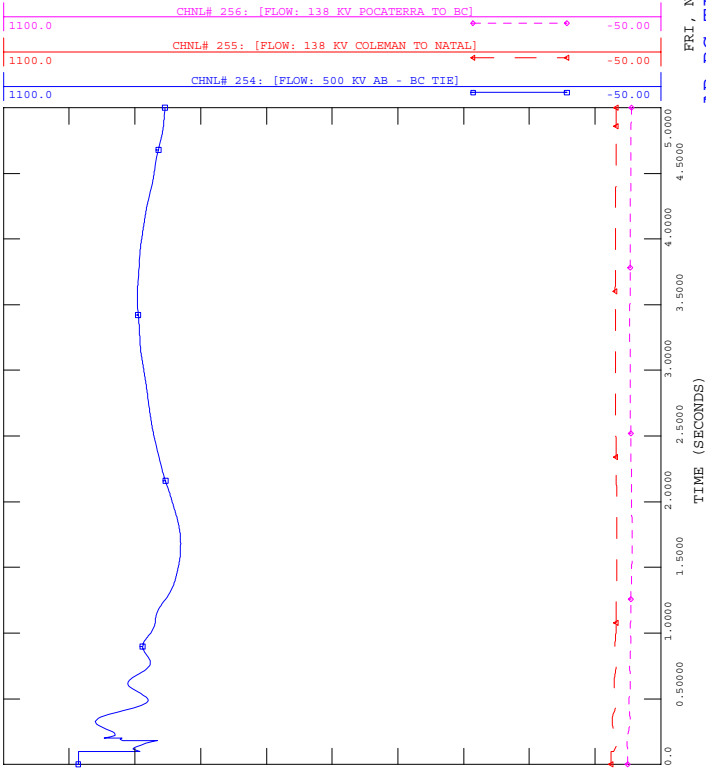
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B50_3ph_Medhat_WBrook_V82.out

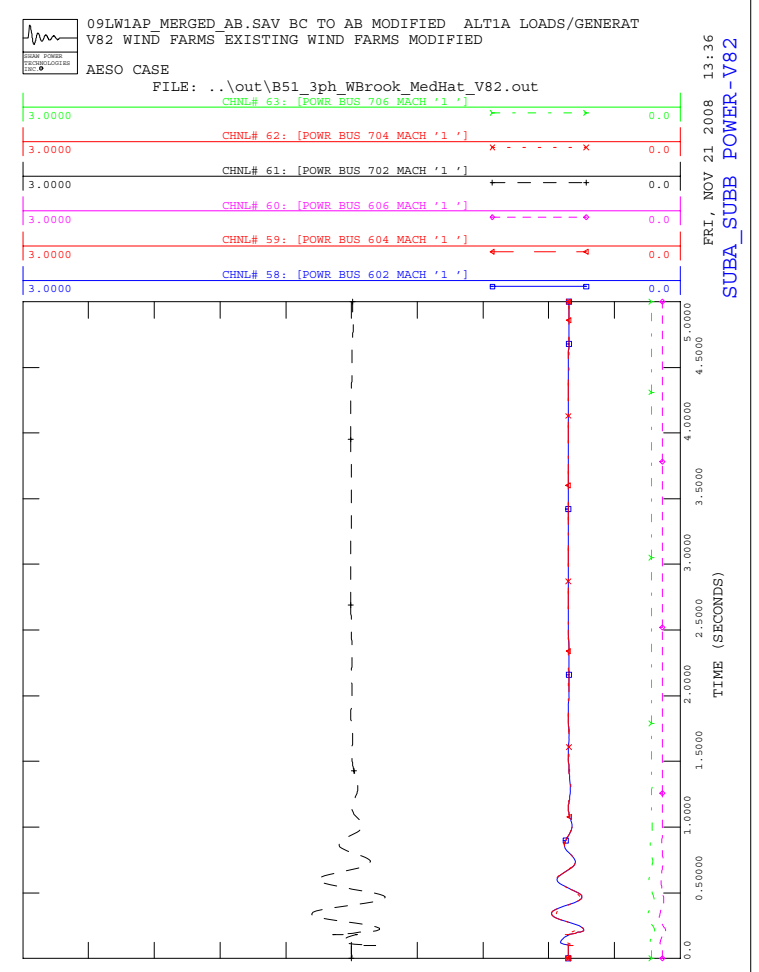
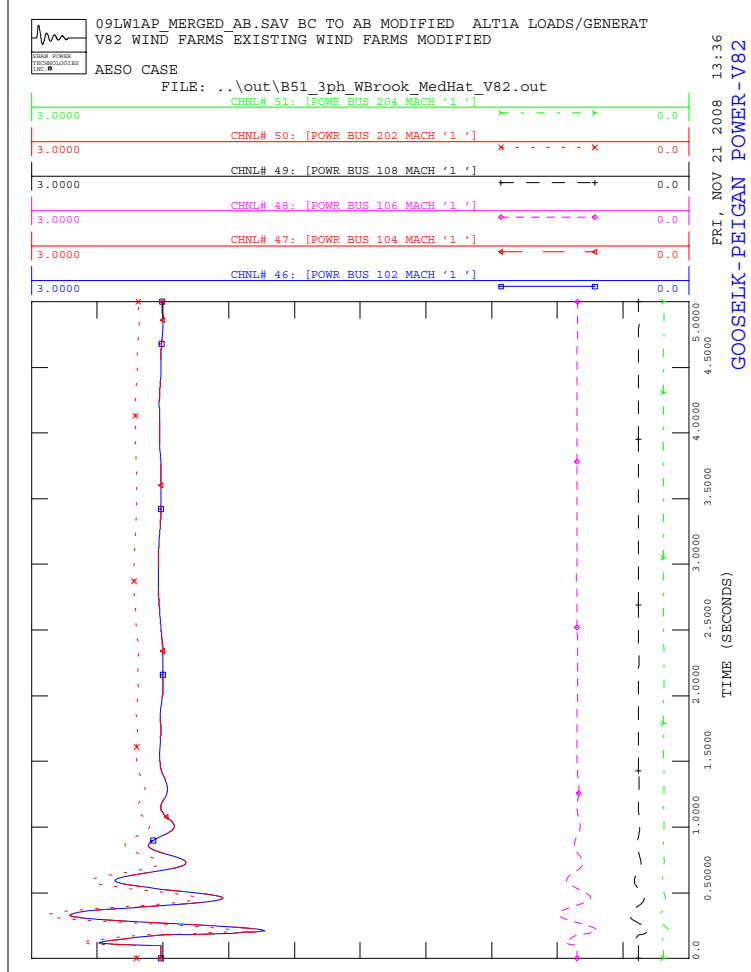
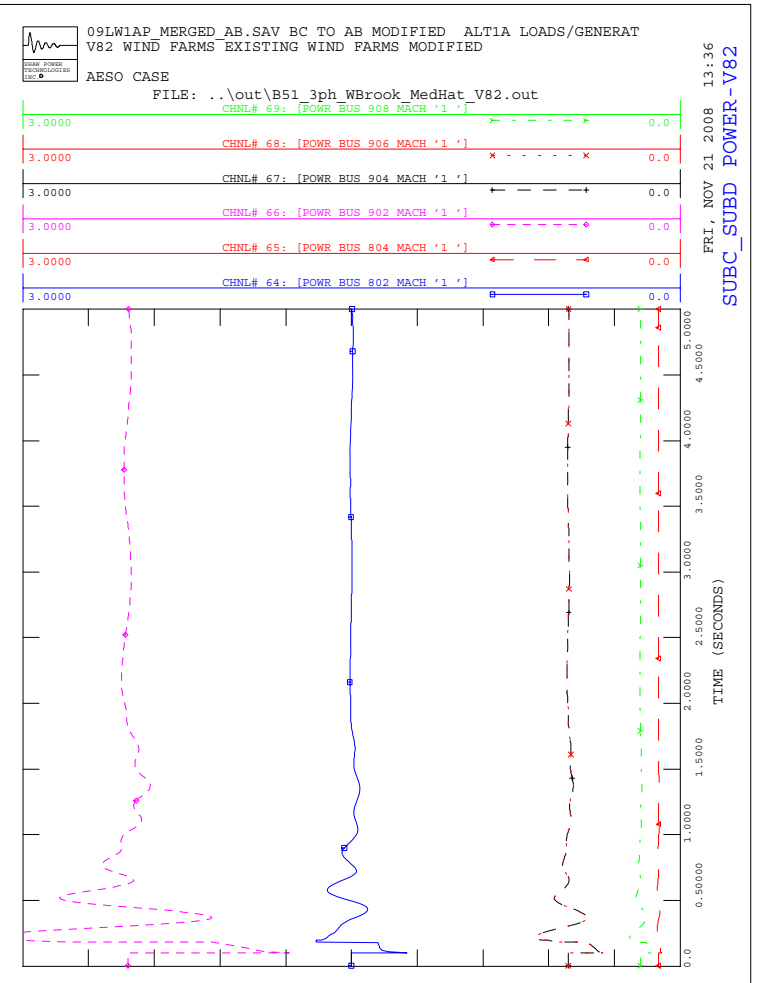
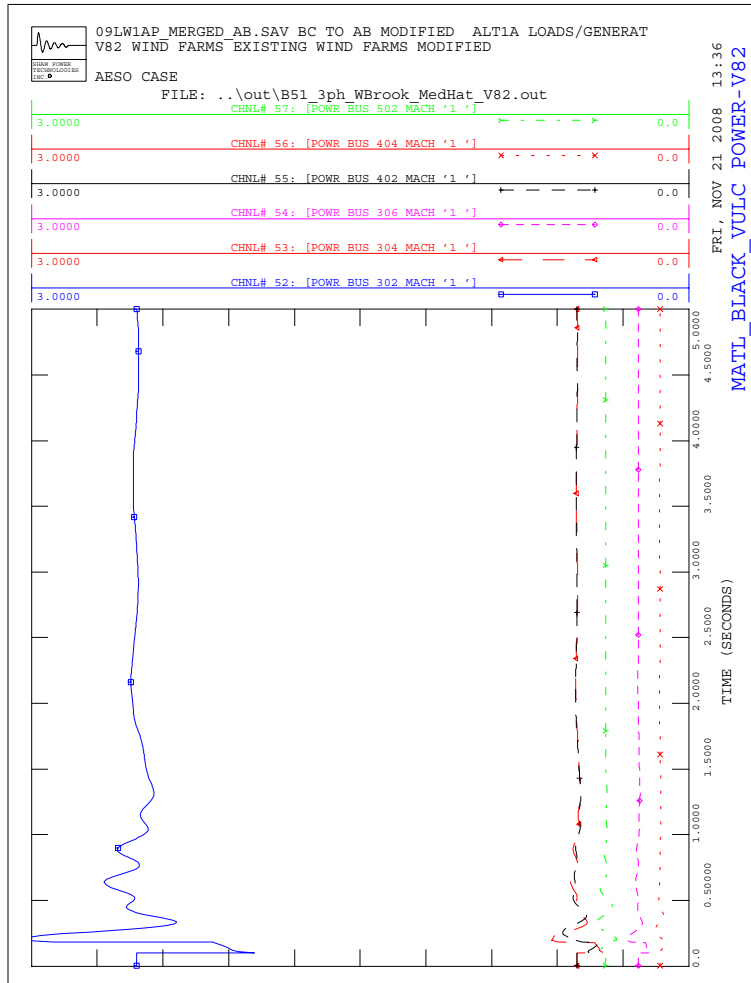
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LANGDON_FRQ-V82

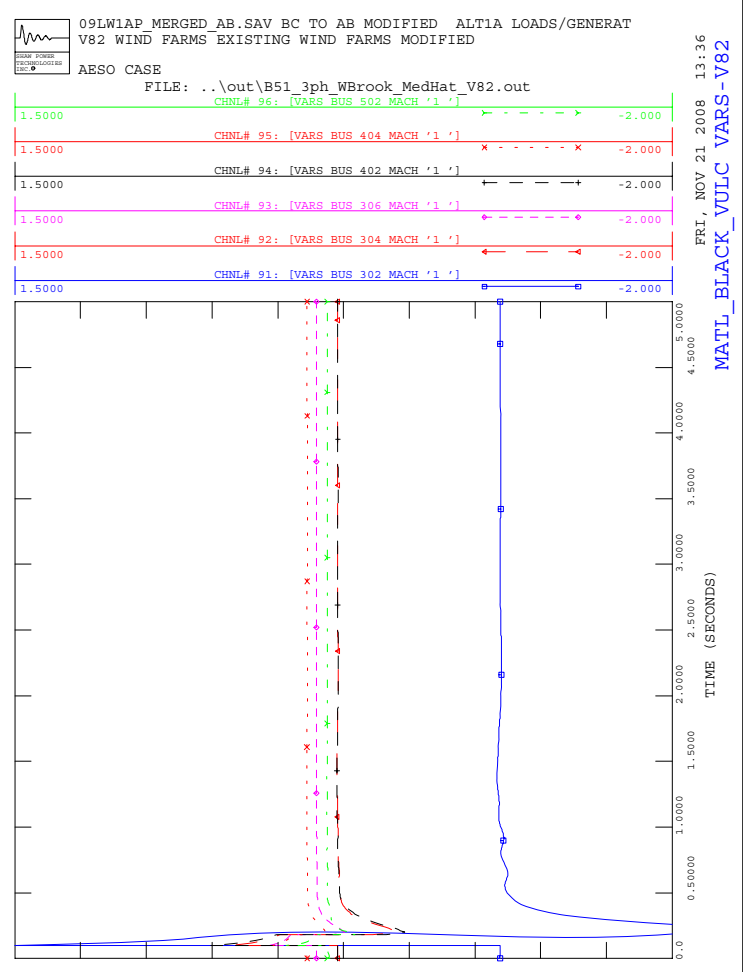
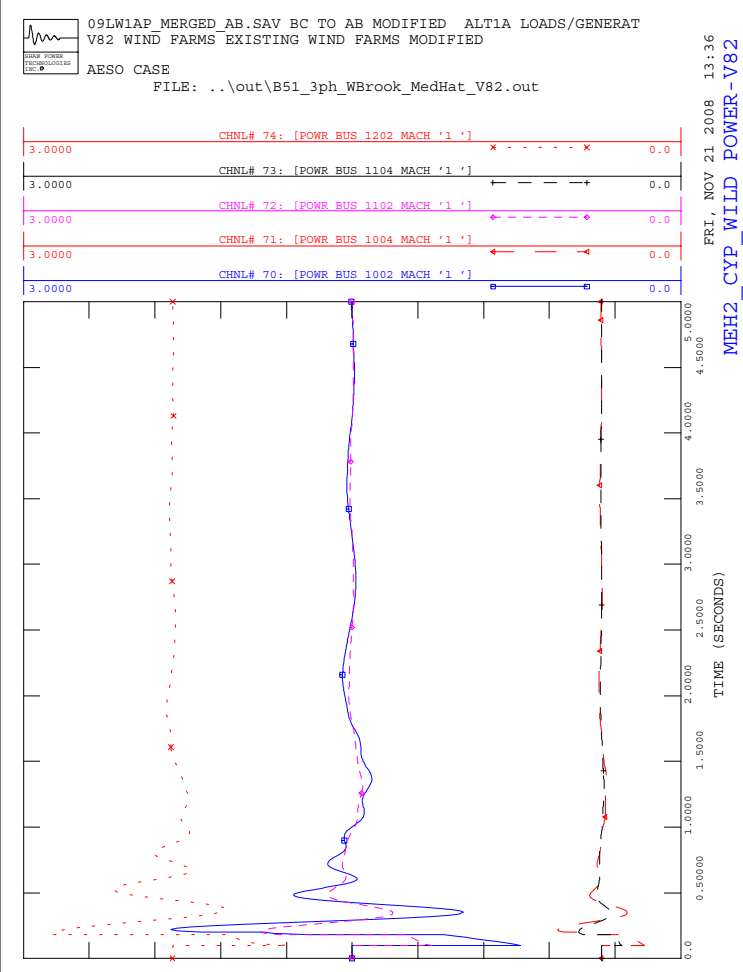
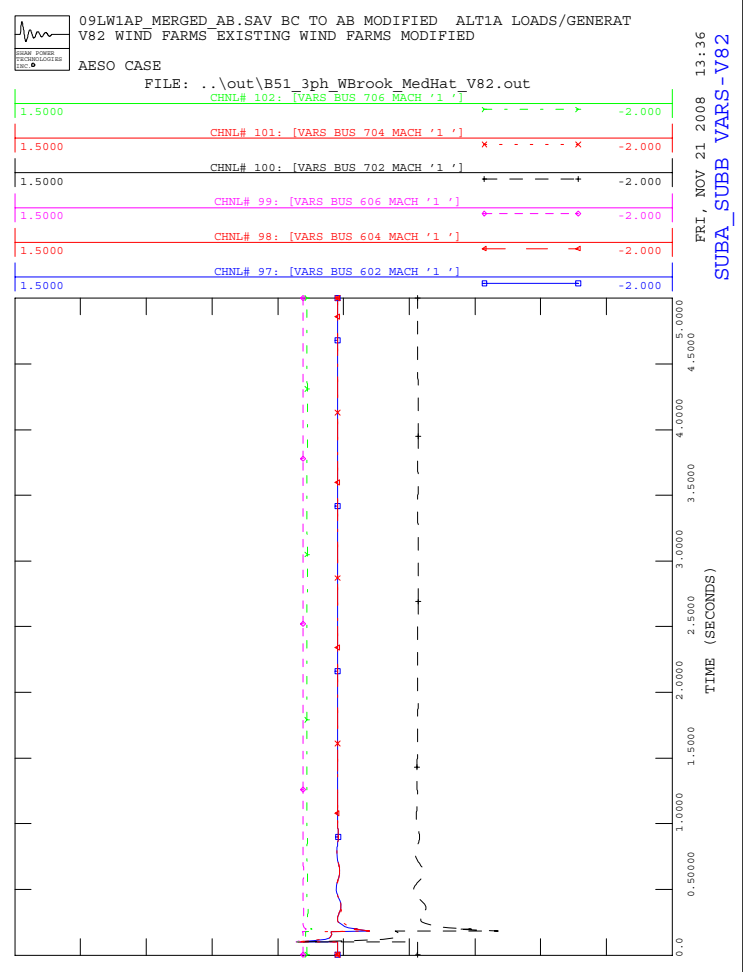
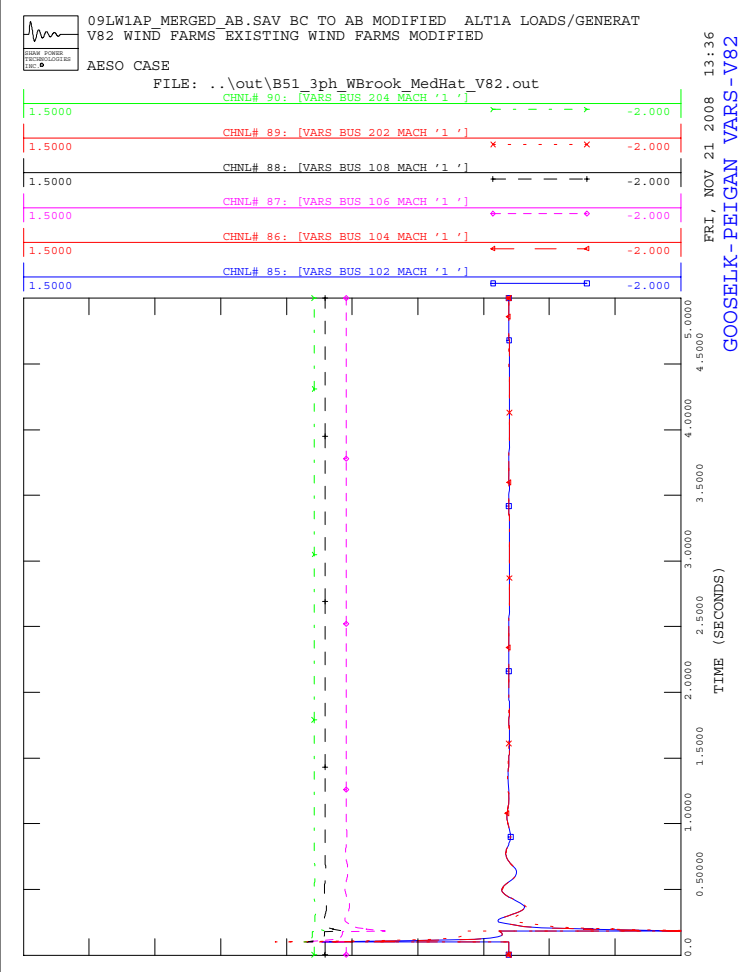


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B50_3ph_Medhat_WBrook_V82.out

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AB_BC_TIE_FLOWS-V82

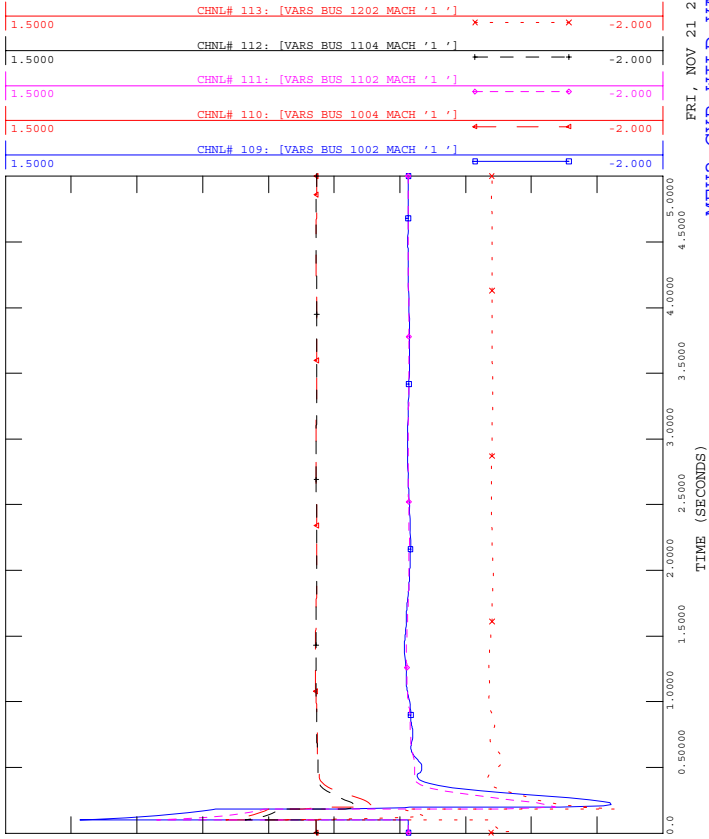






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AESO CASE

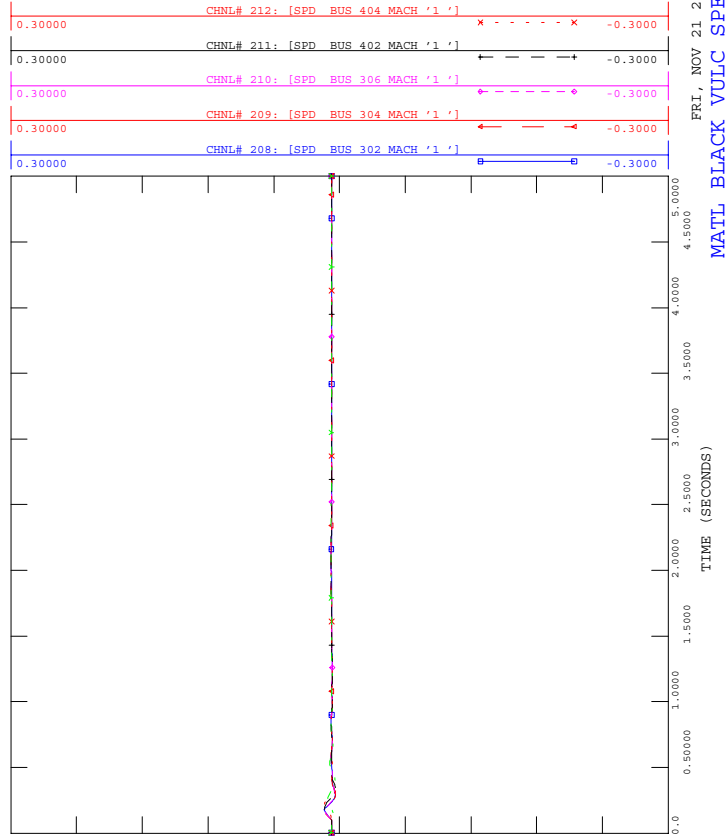
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AESO CASE

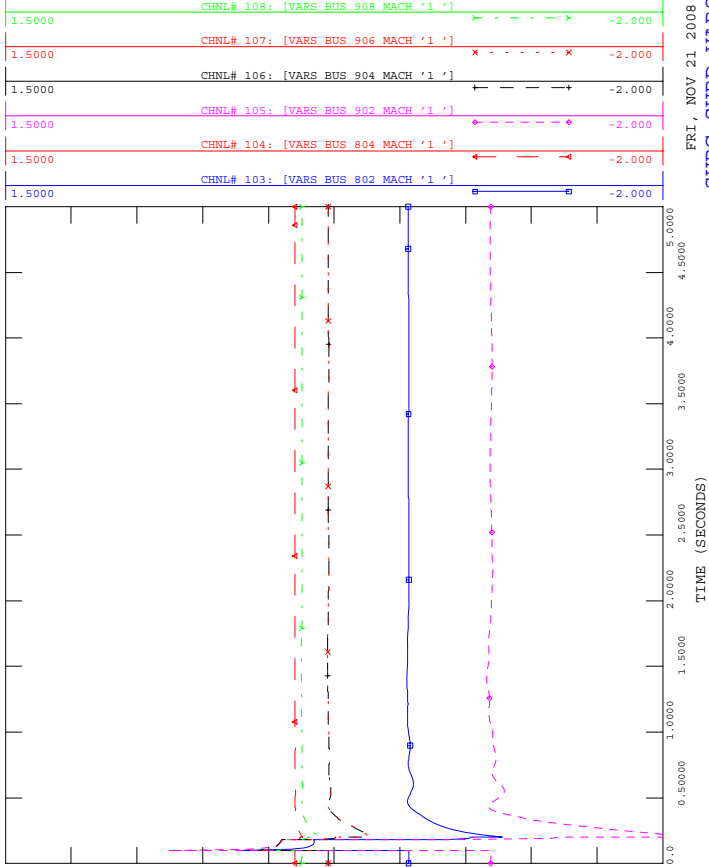
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AESO CASE

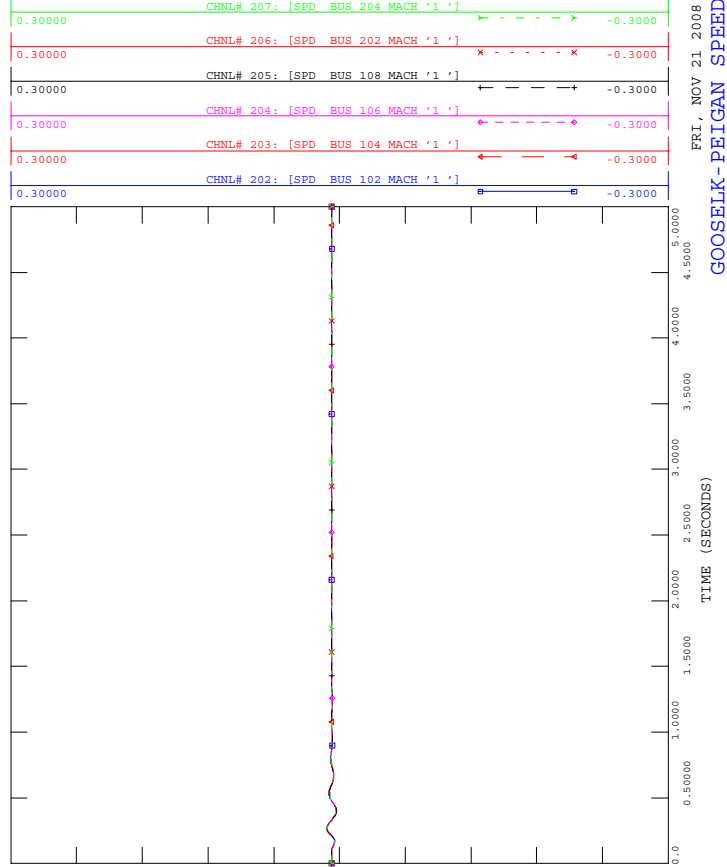
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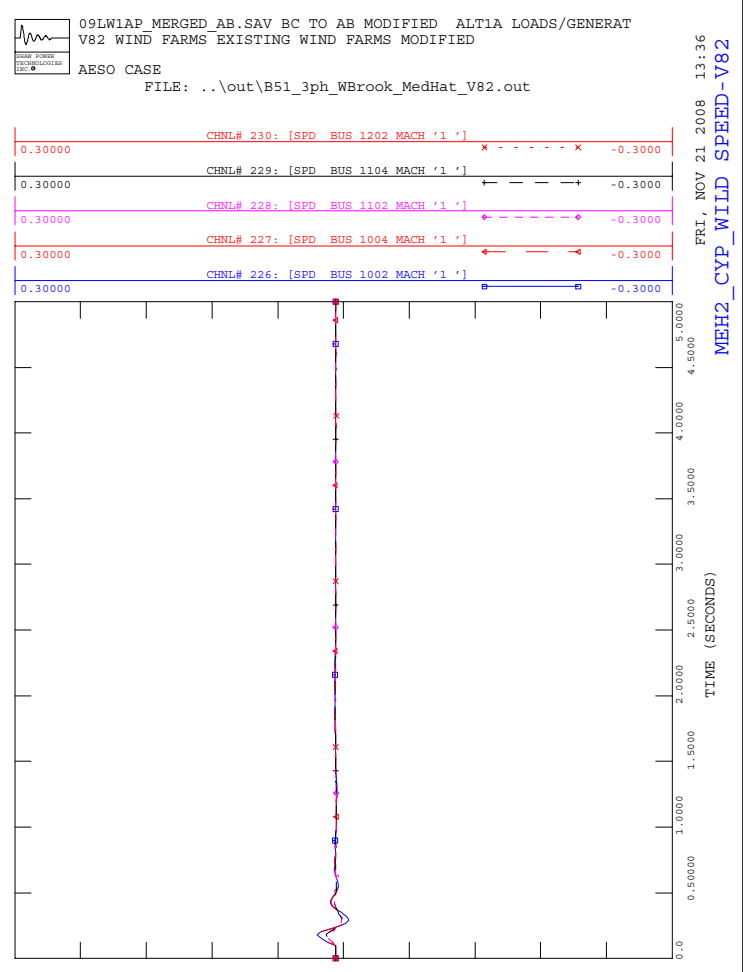
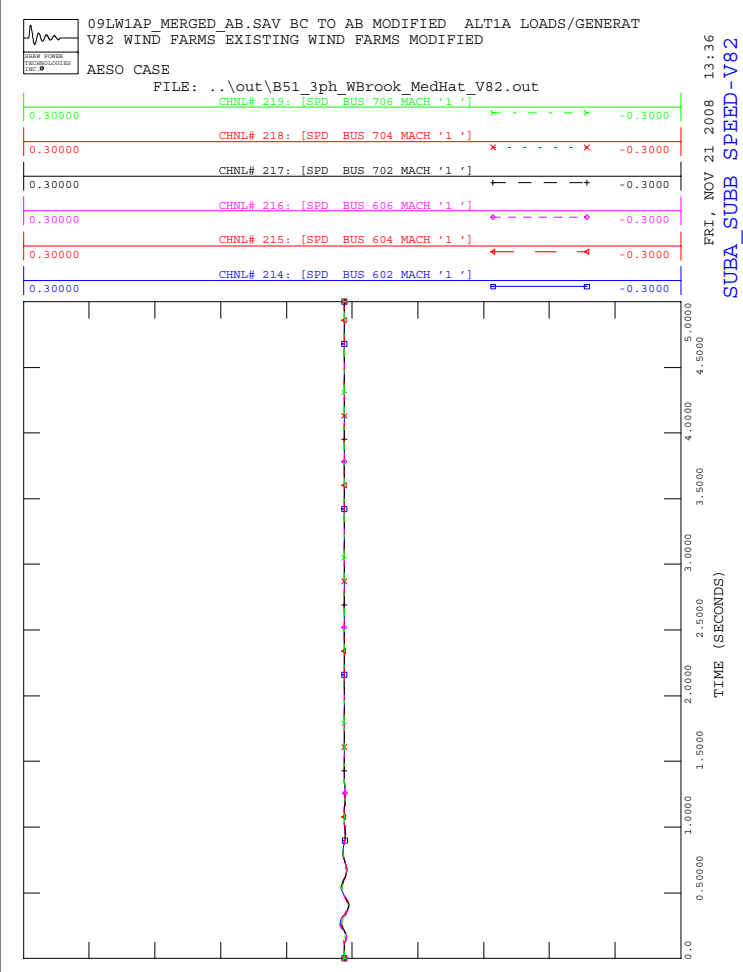
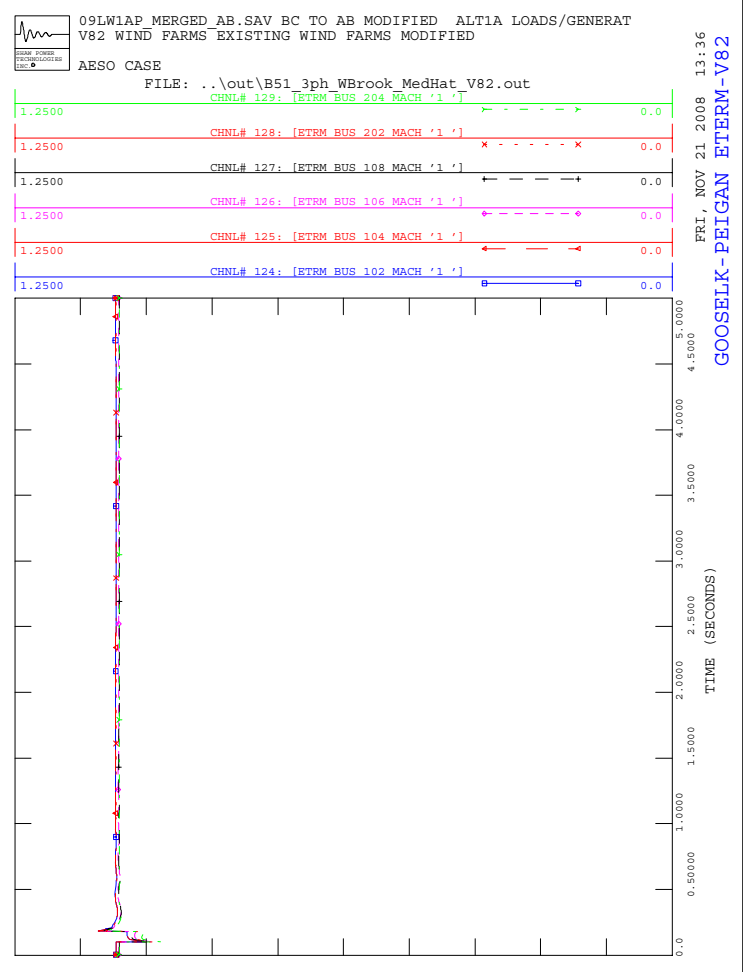
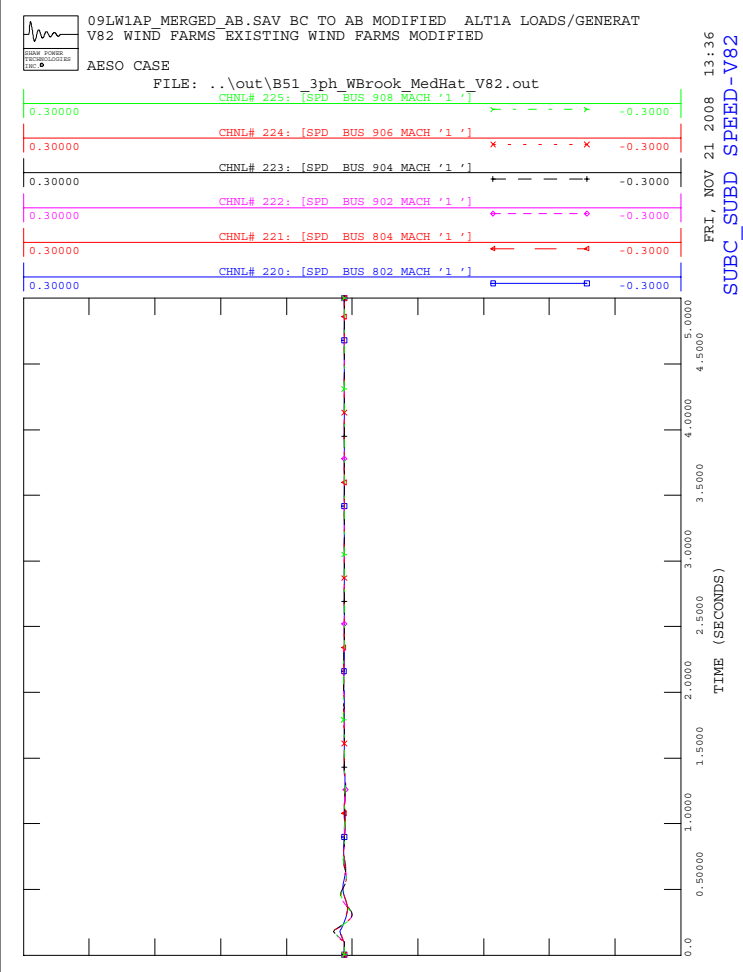
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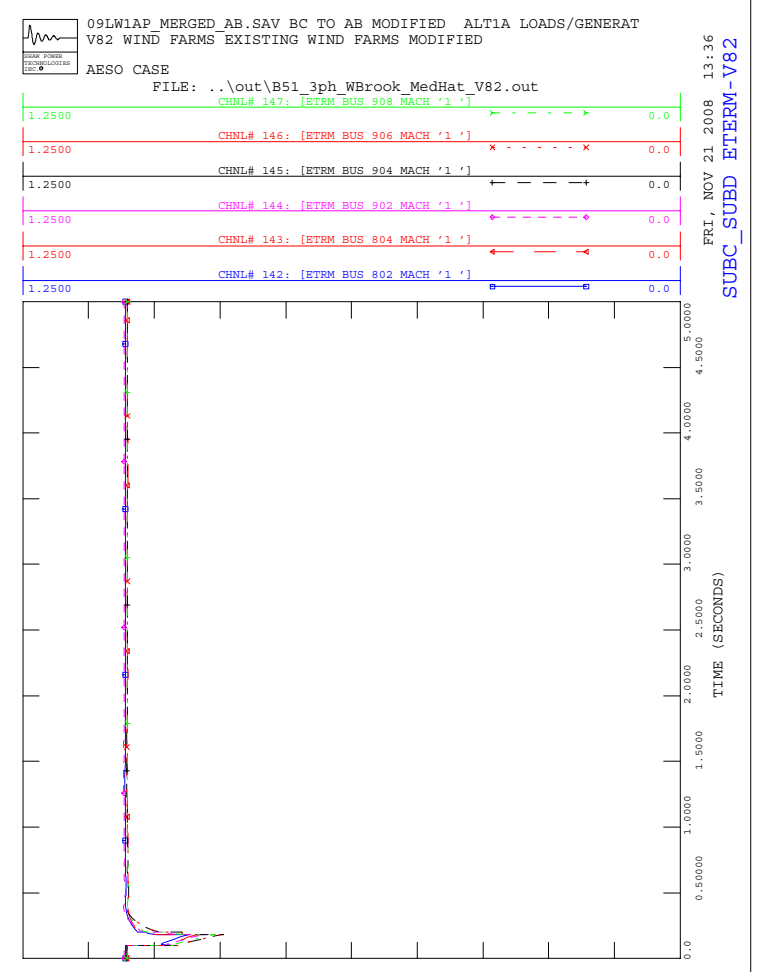
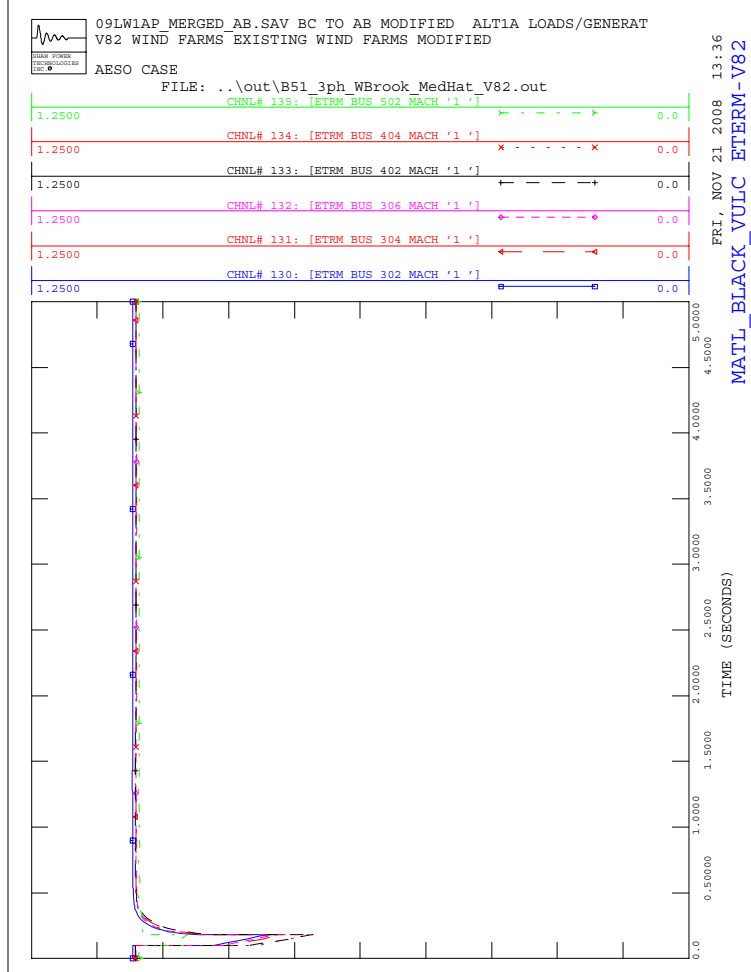
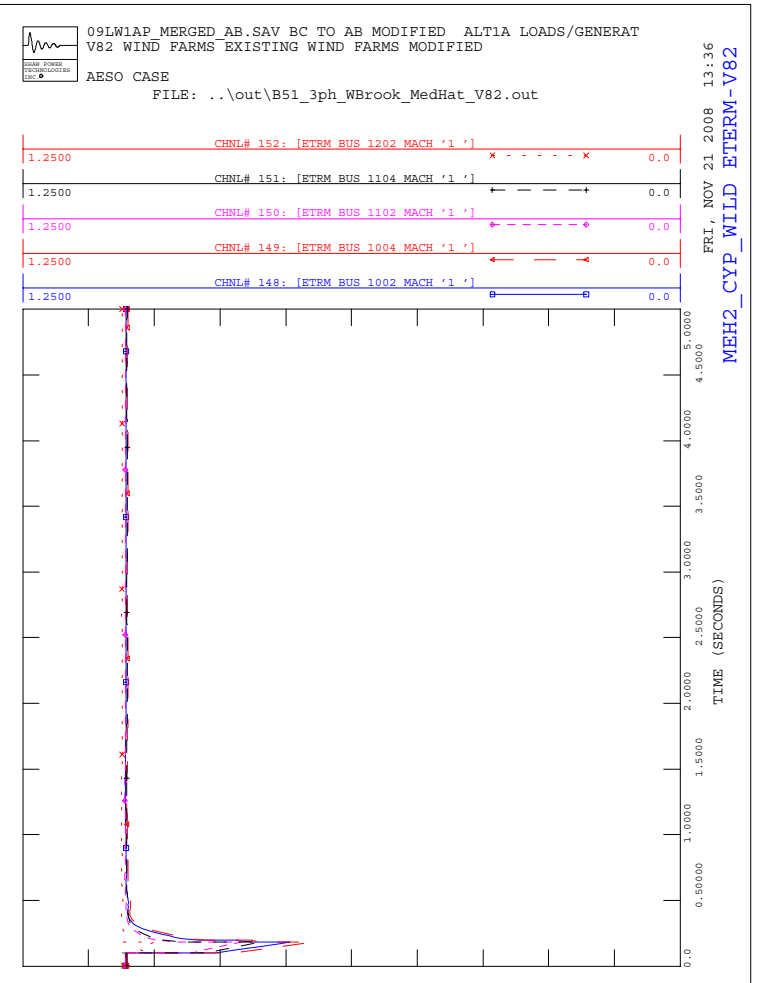
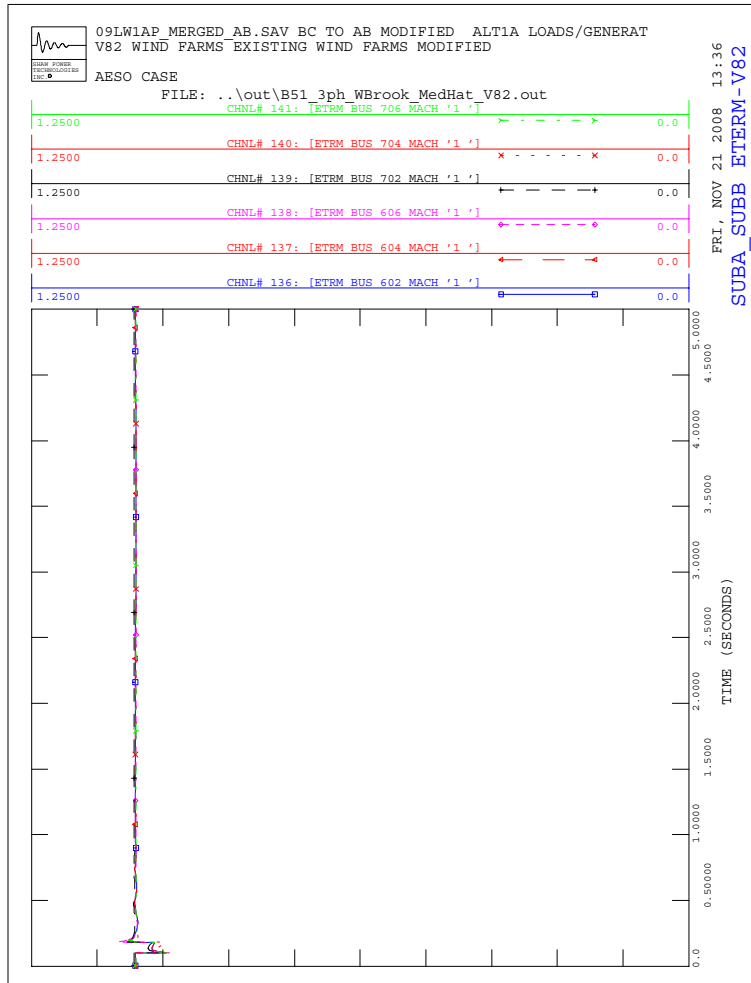
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

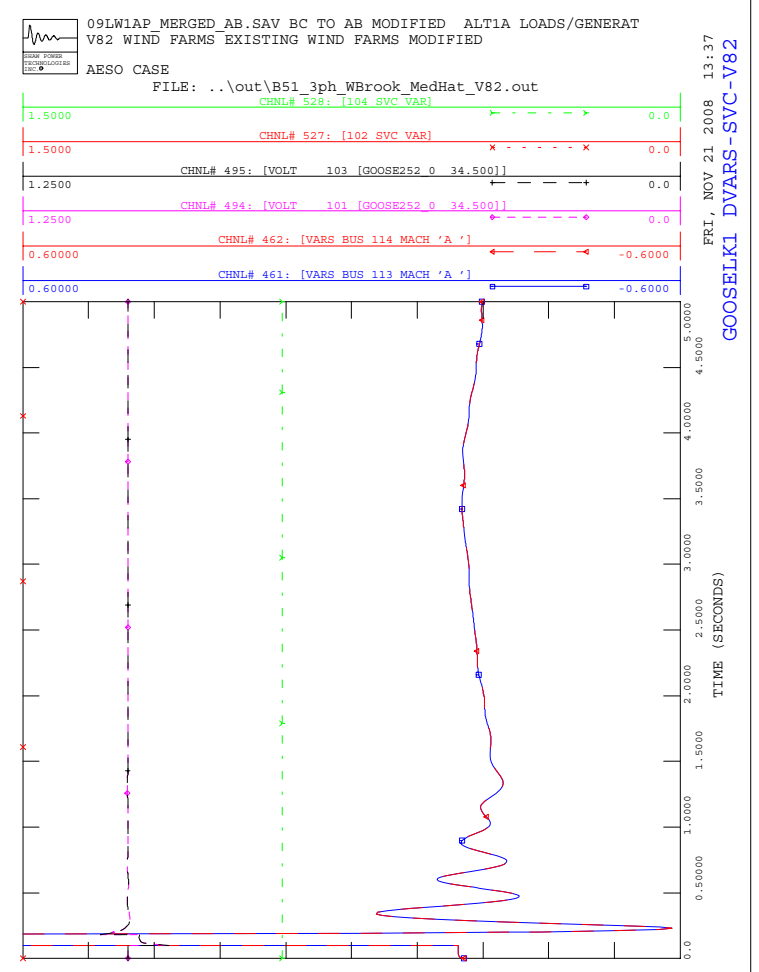
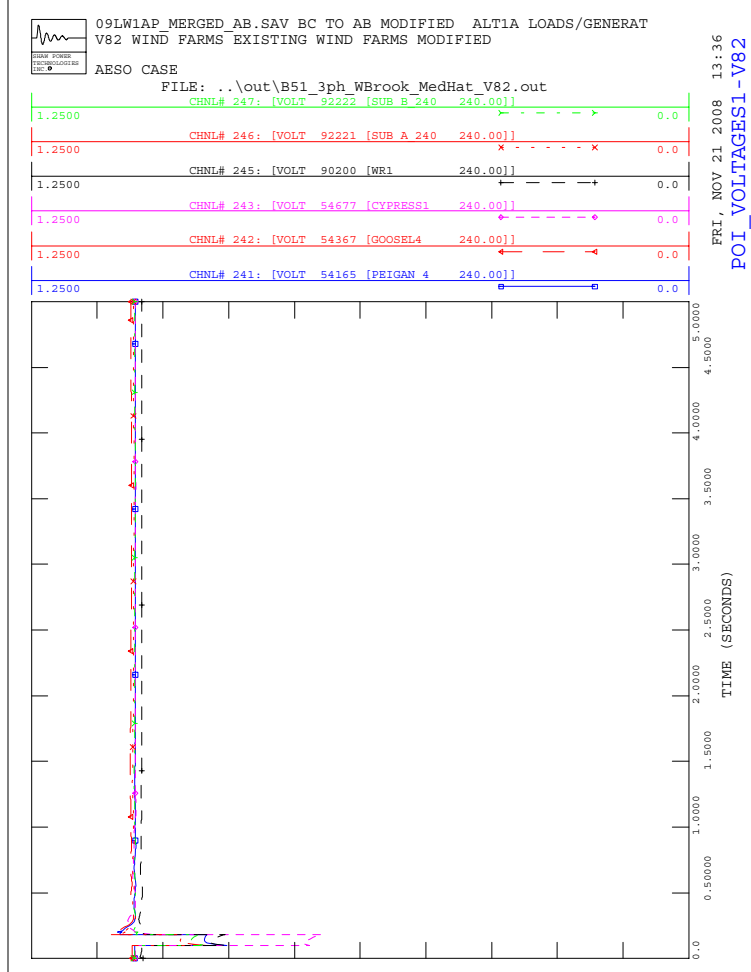
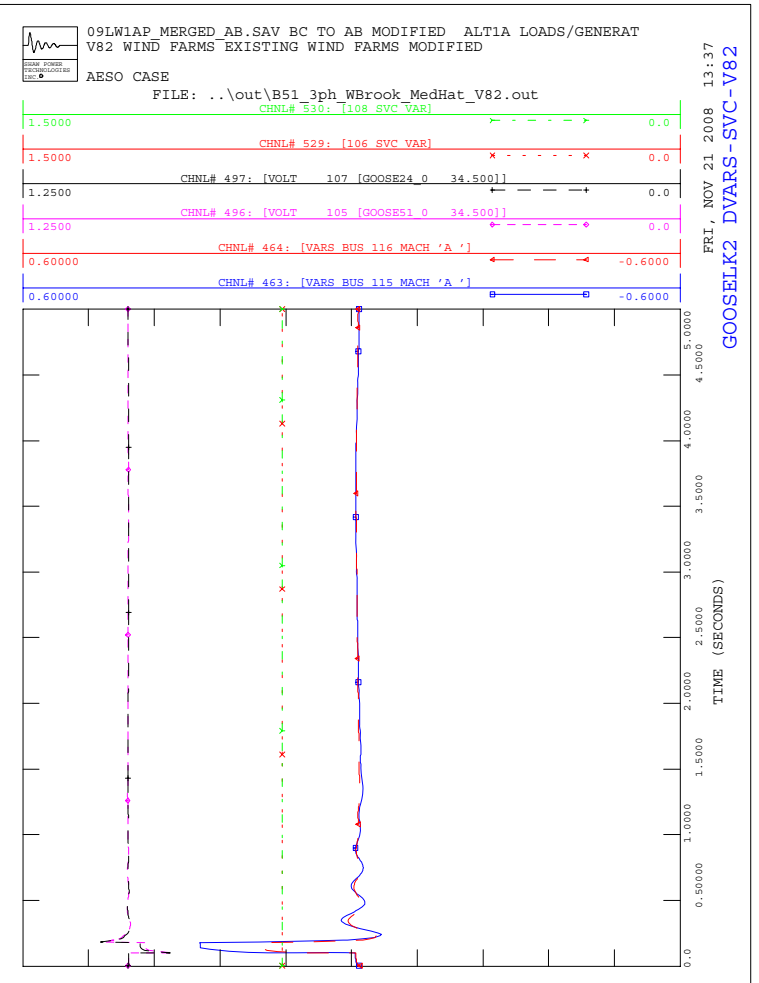
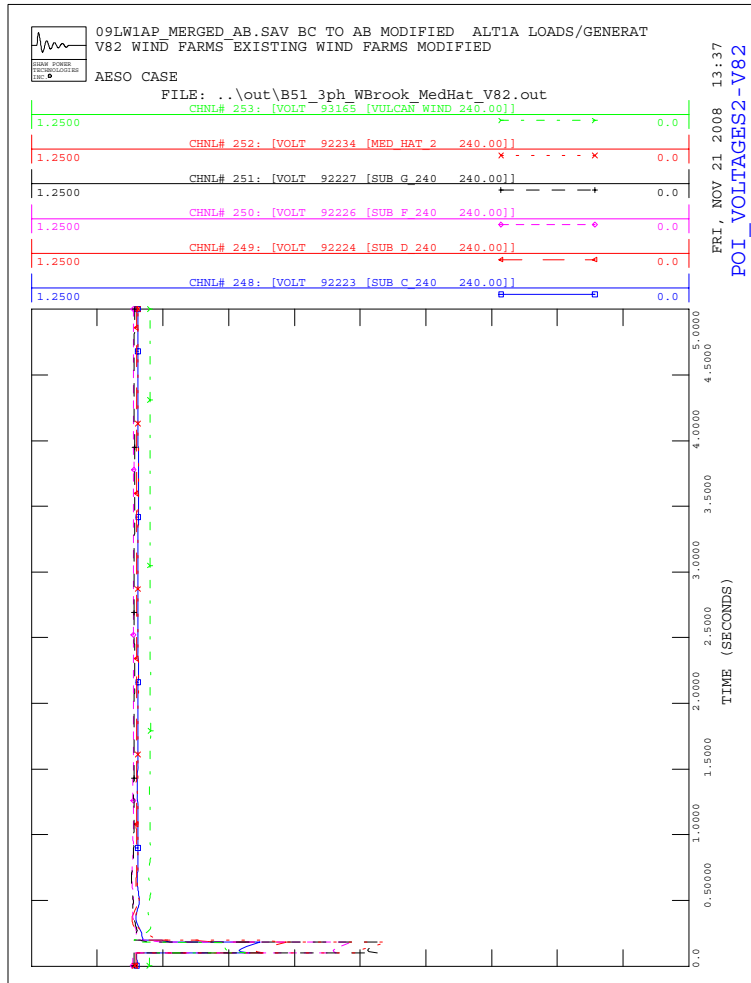
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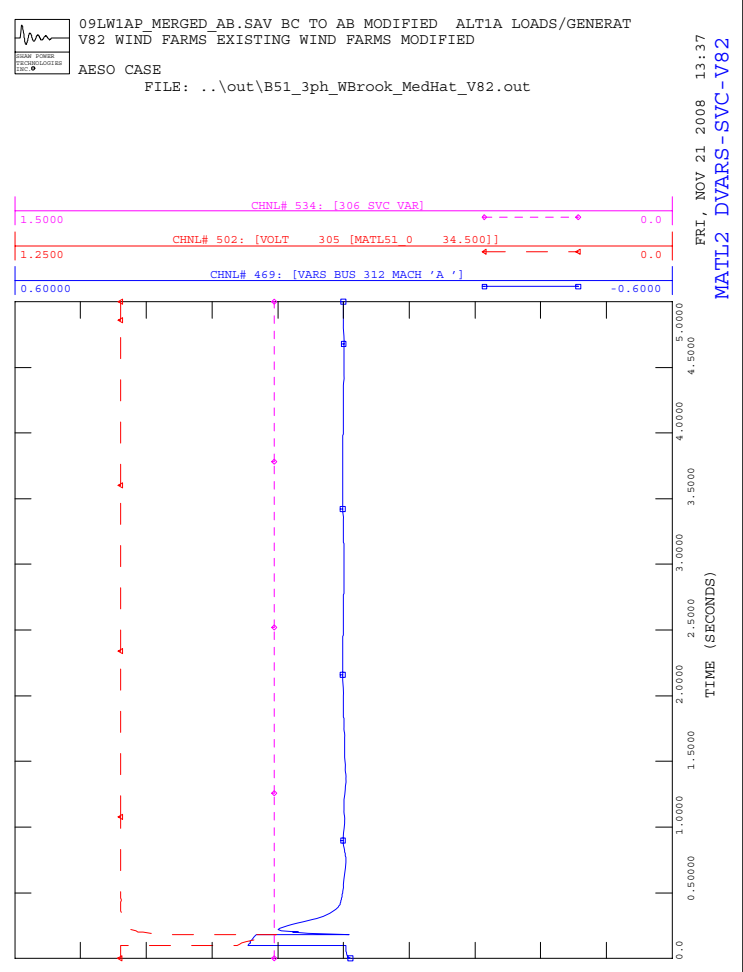
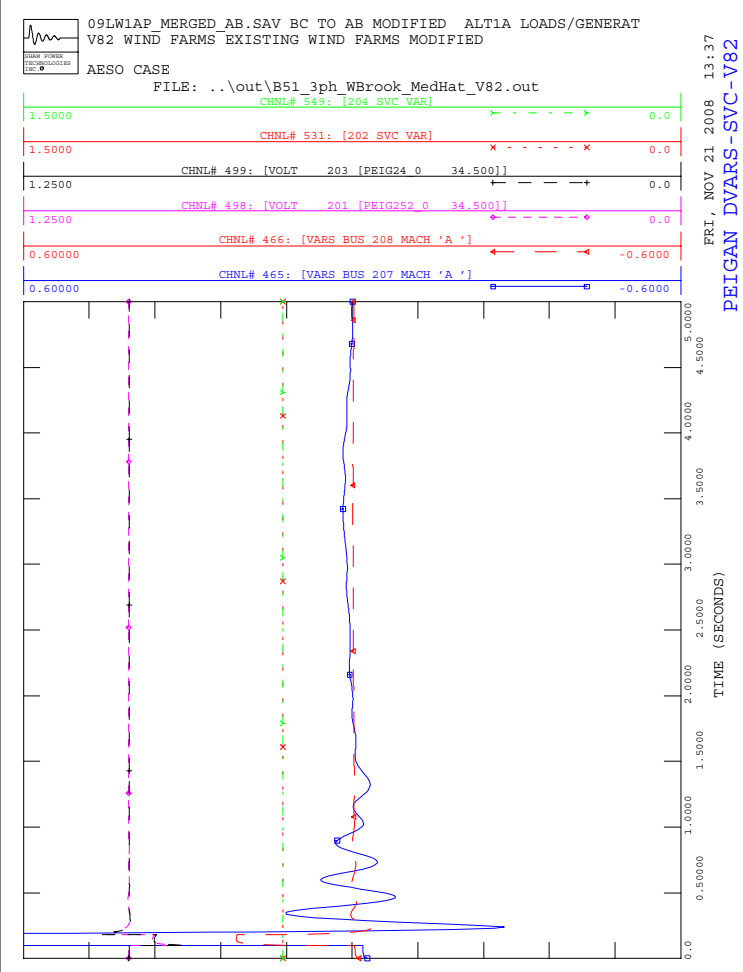
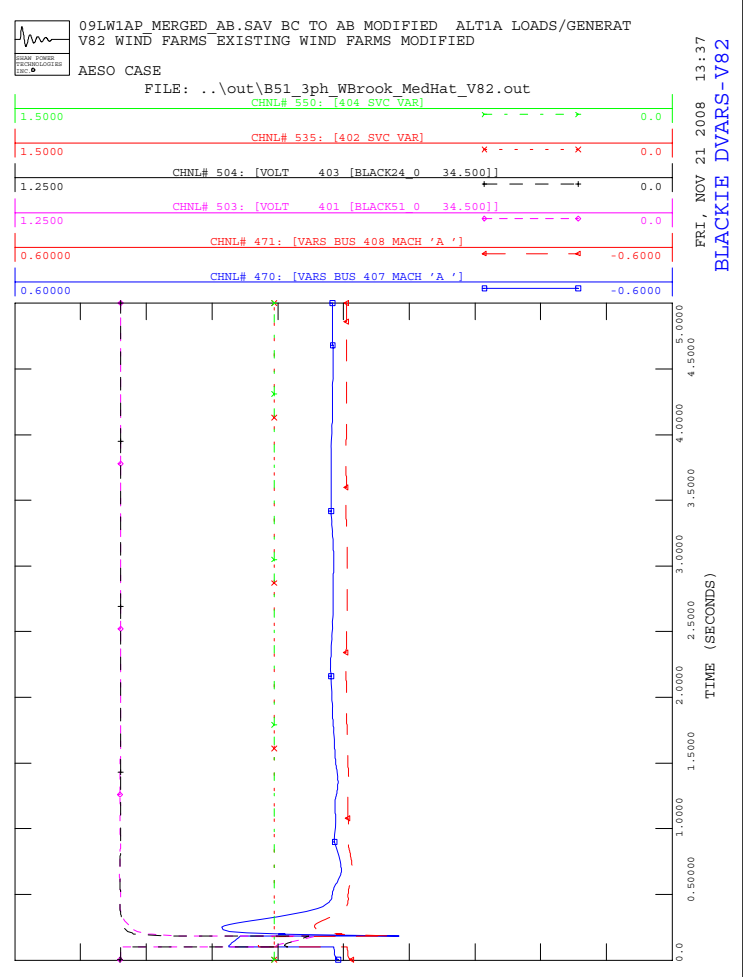
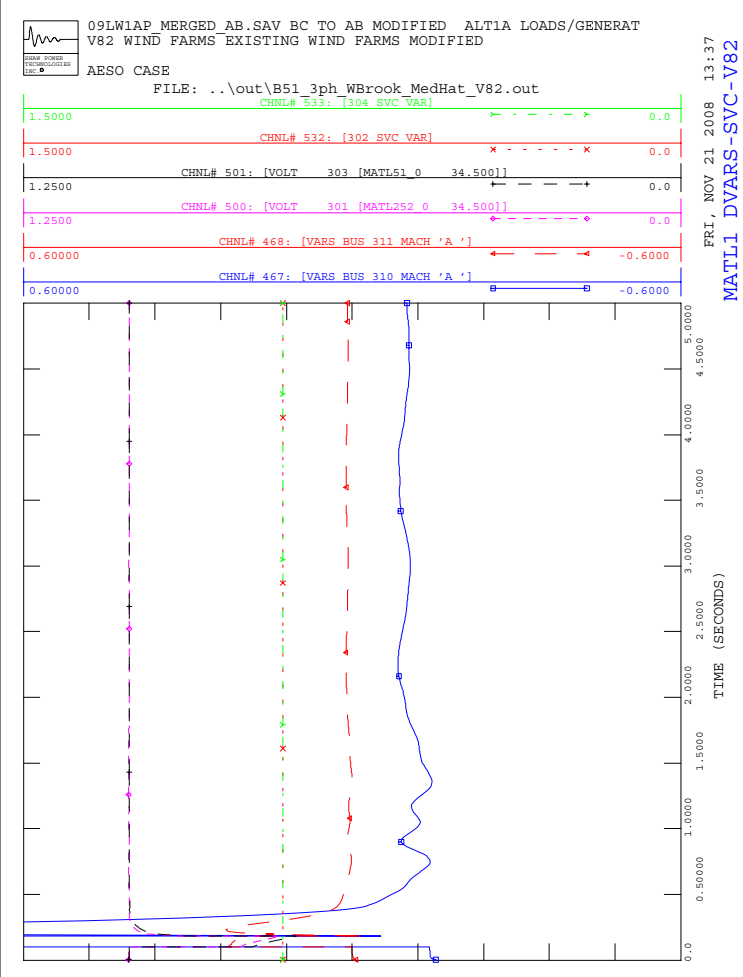


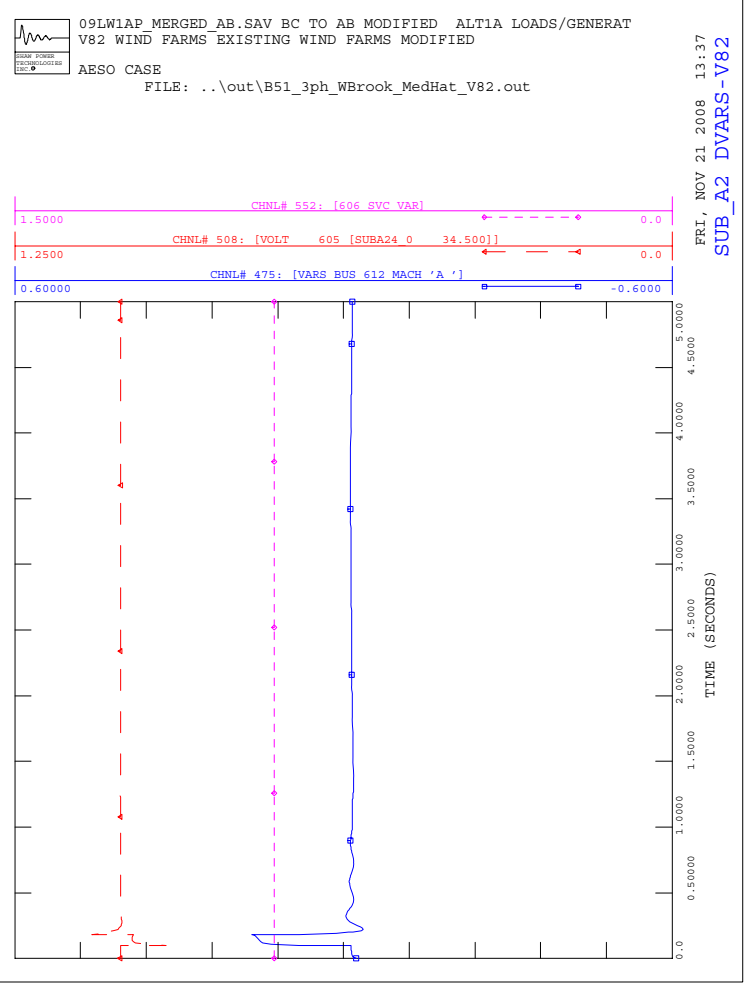
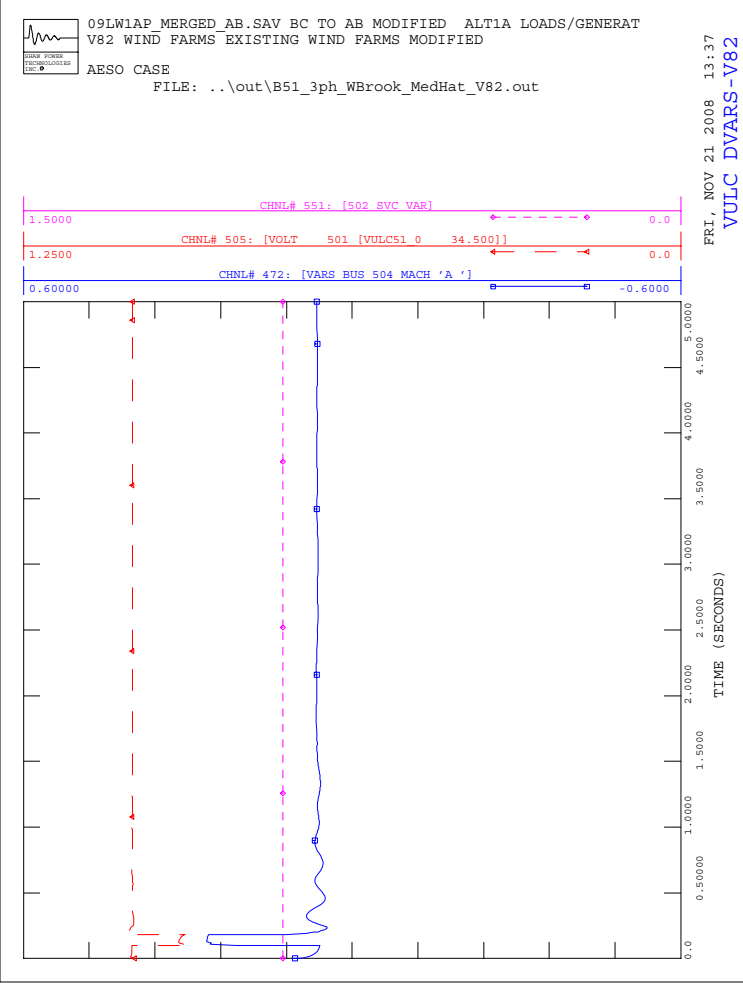
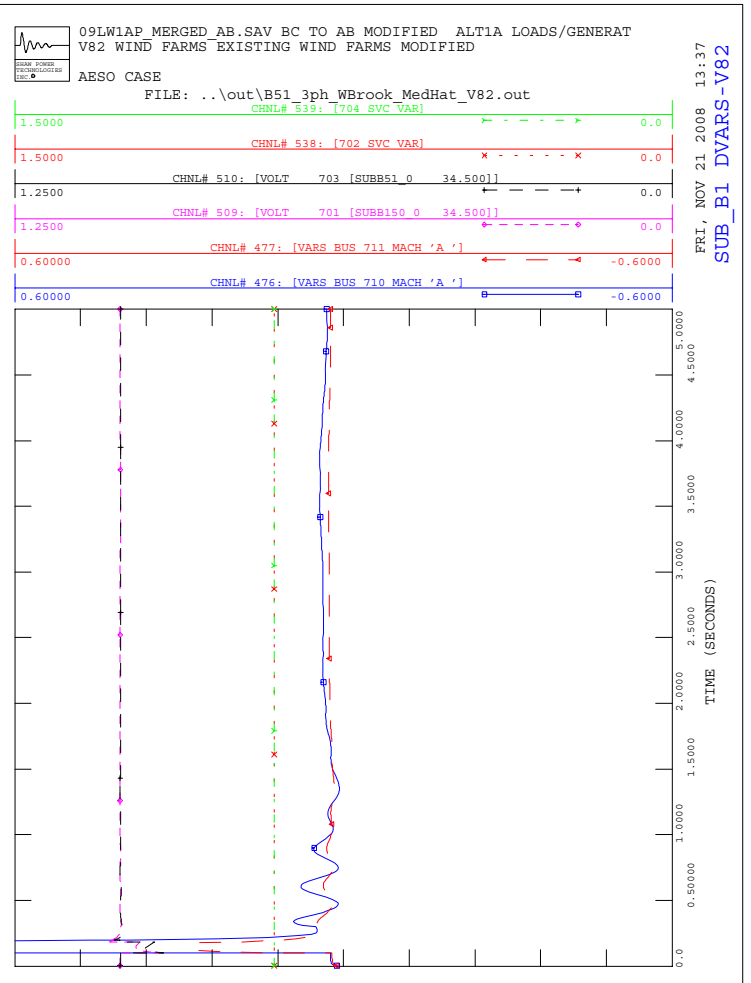
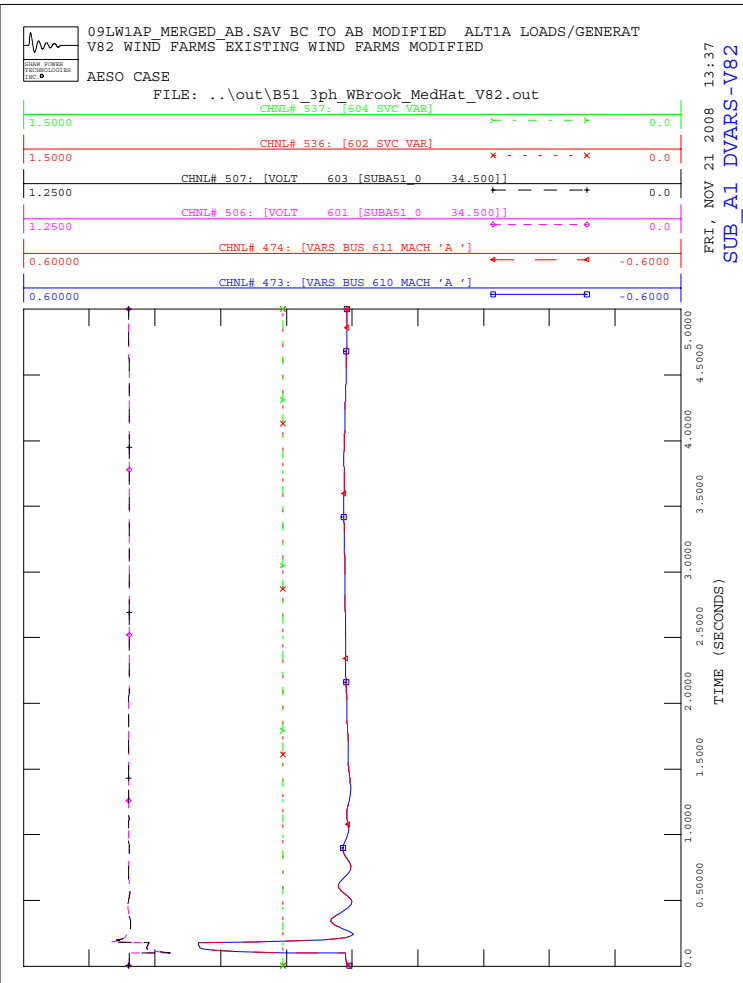
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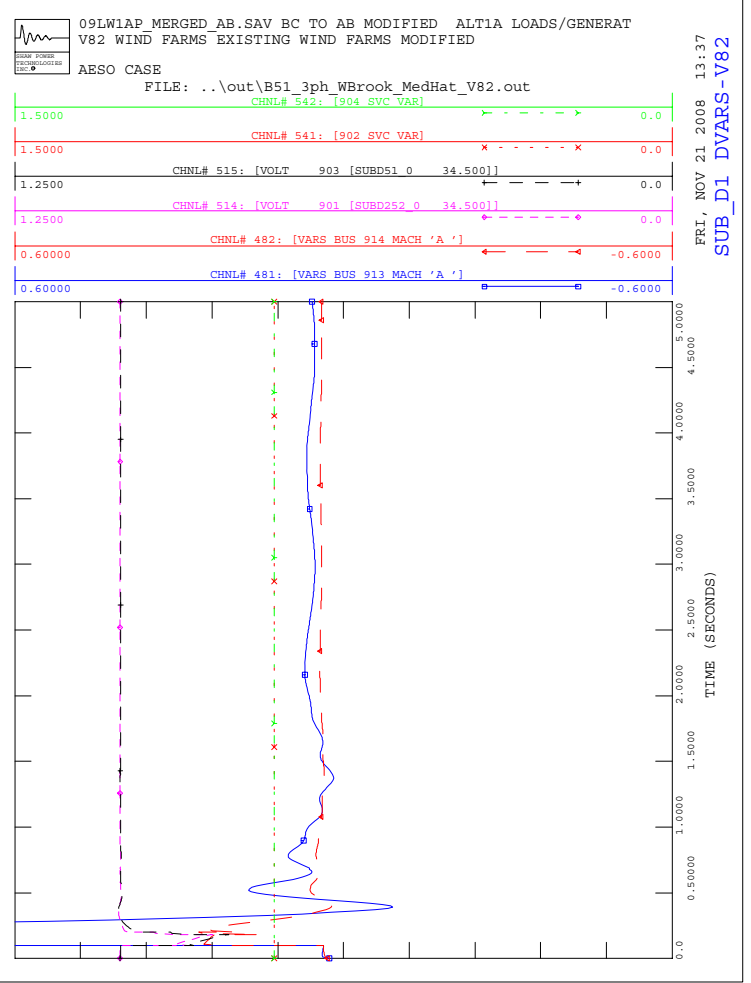
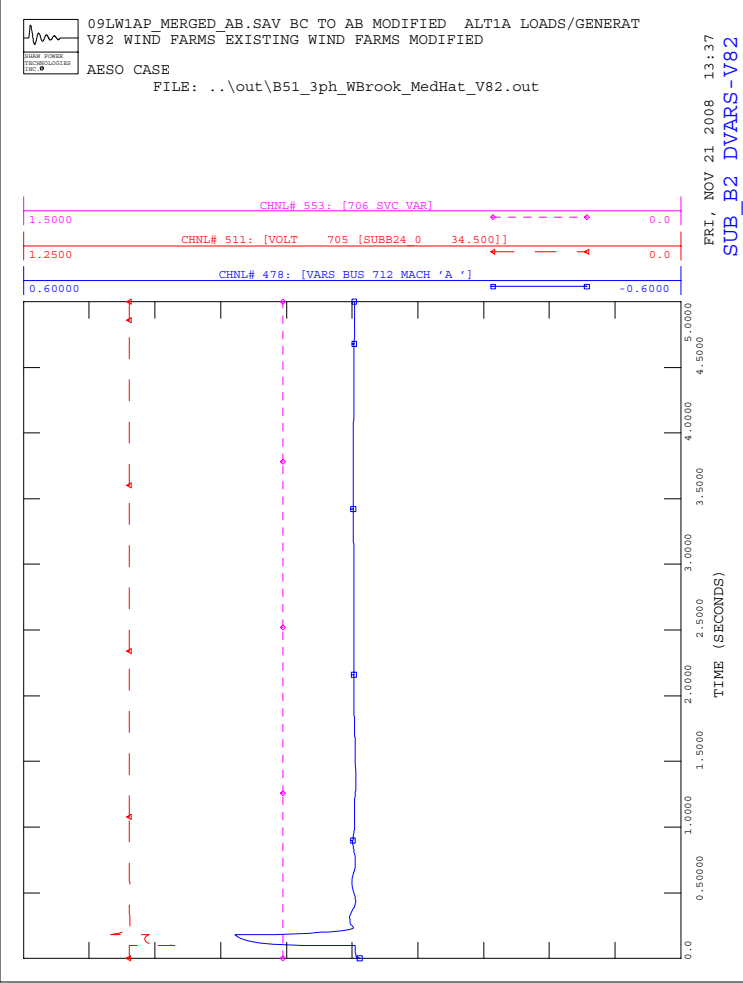
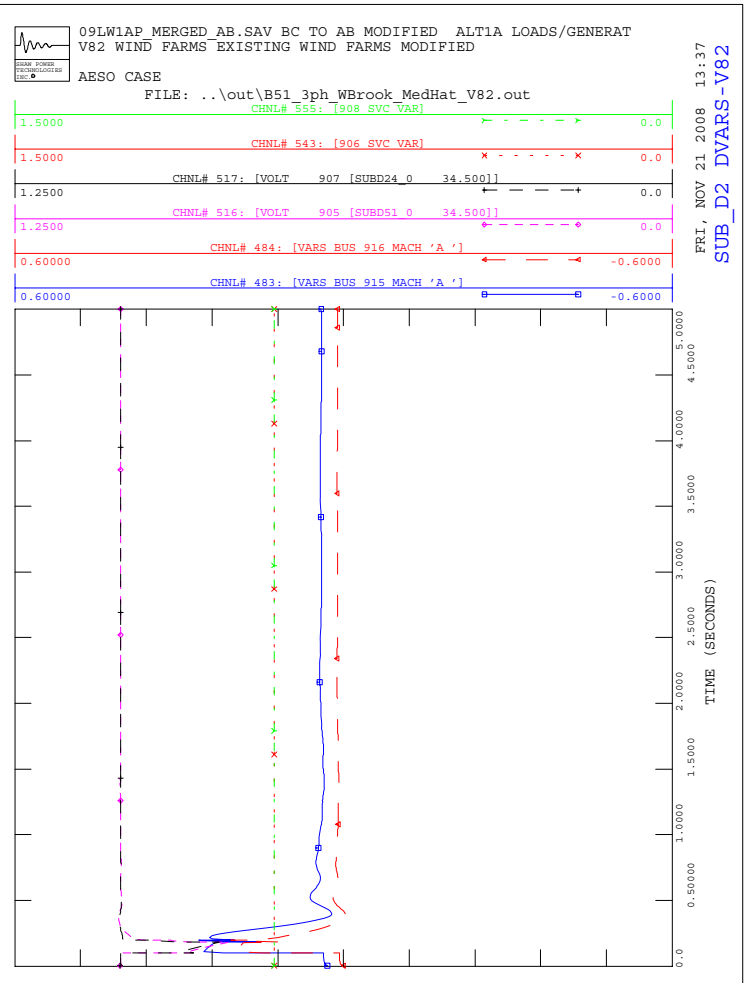
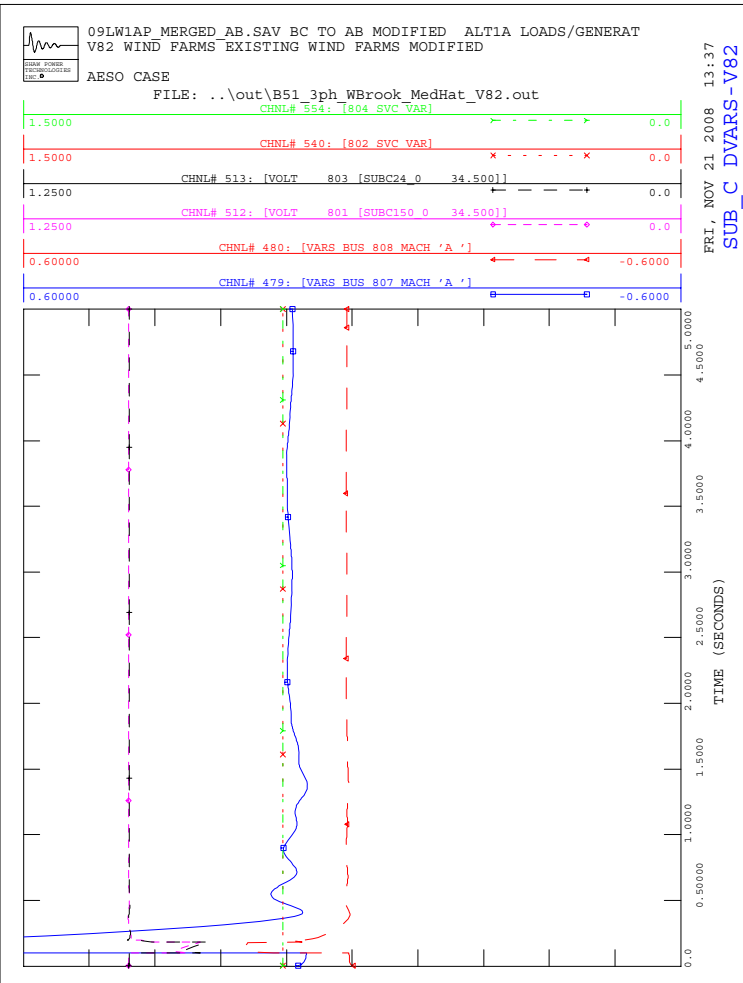


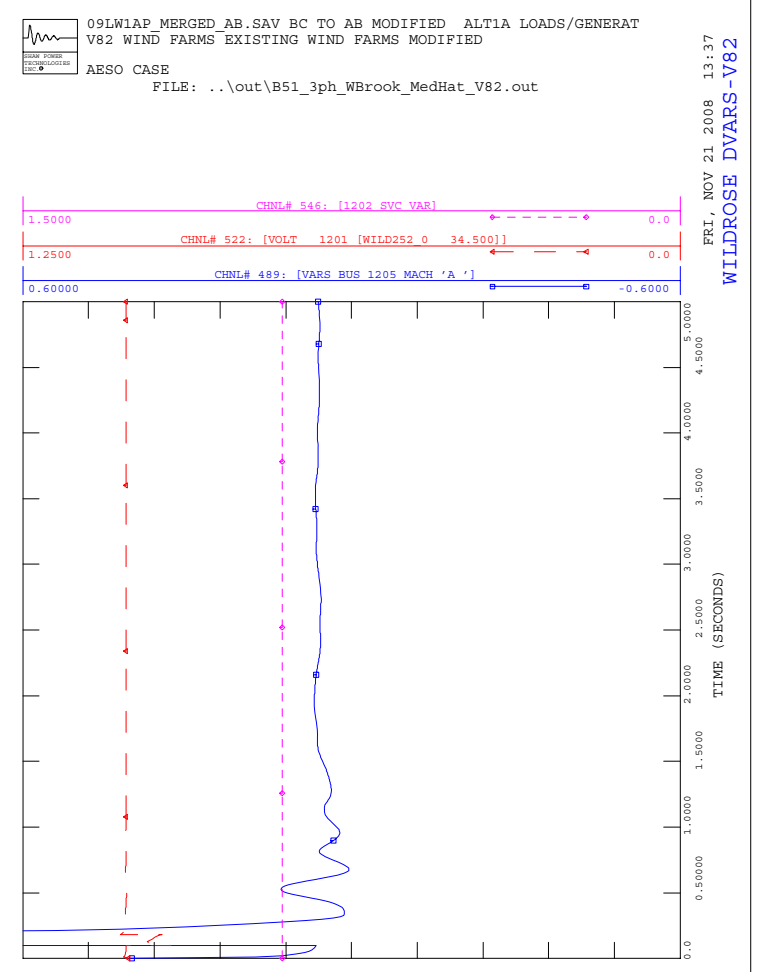
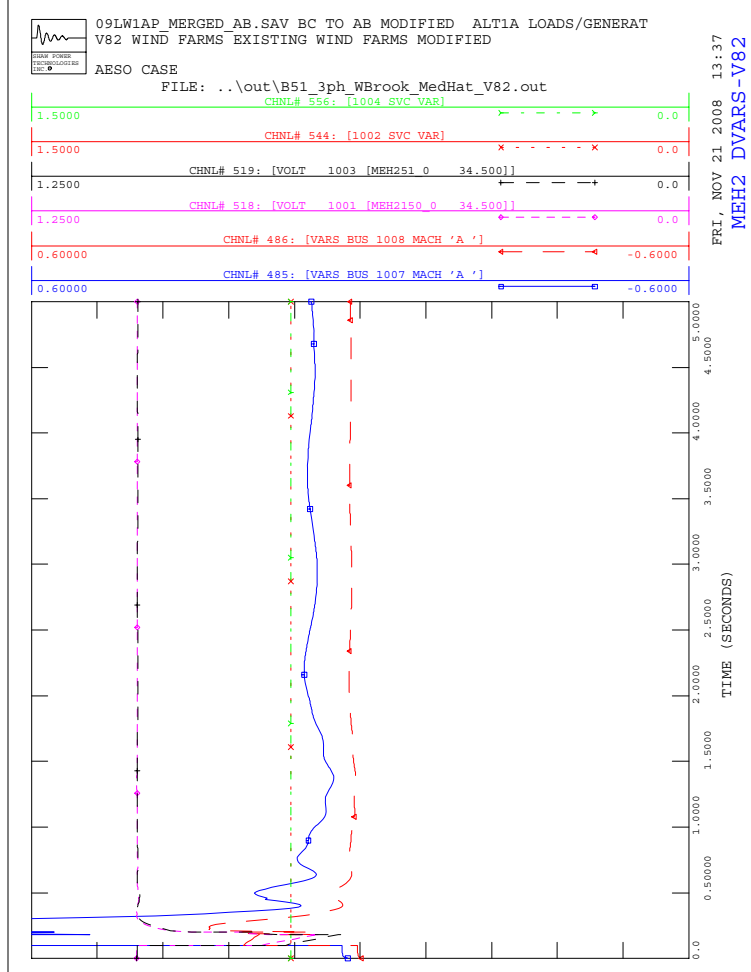
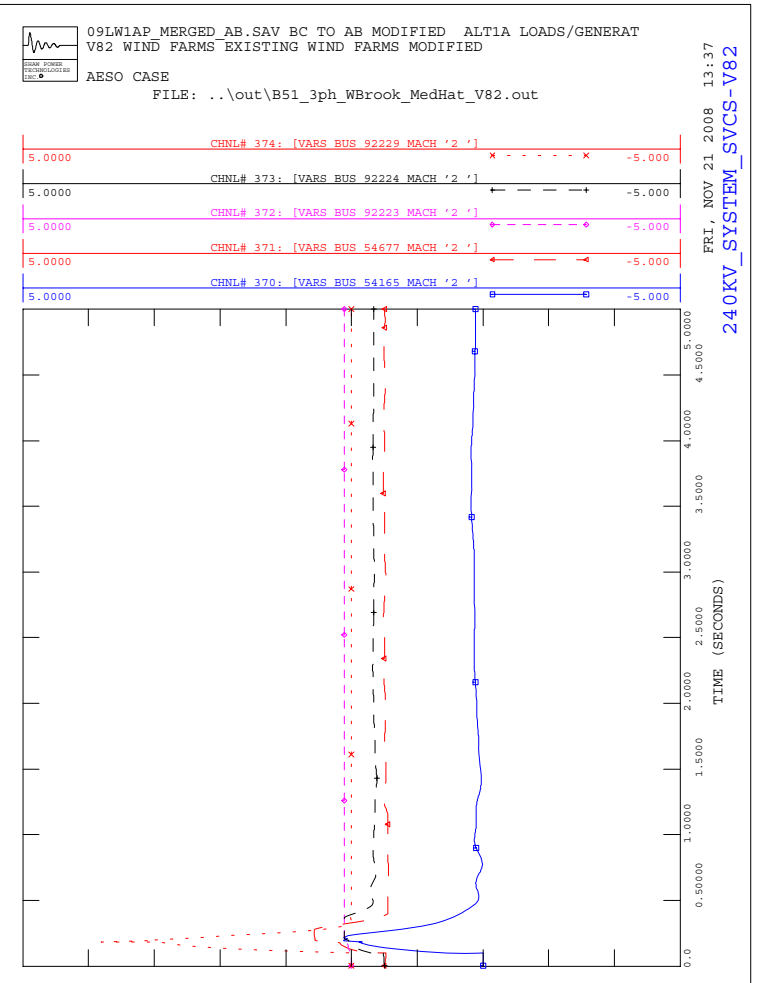
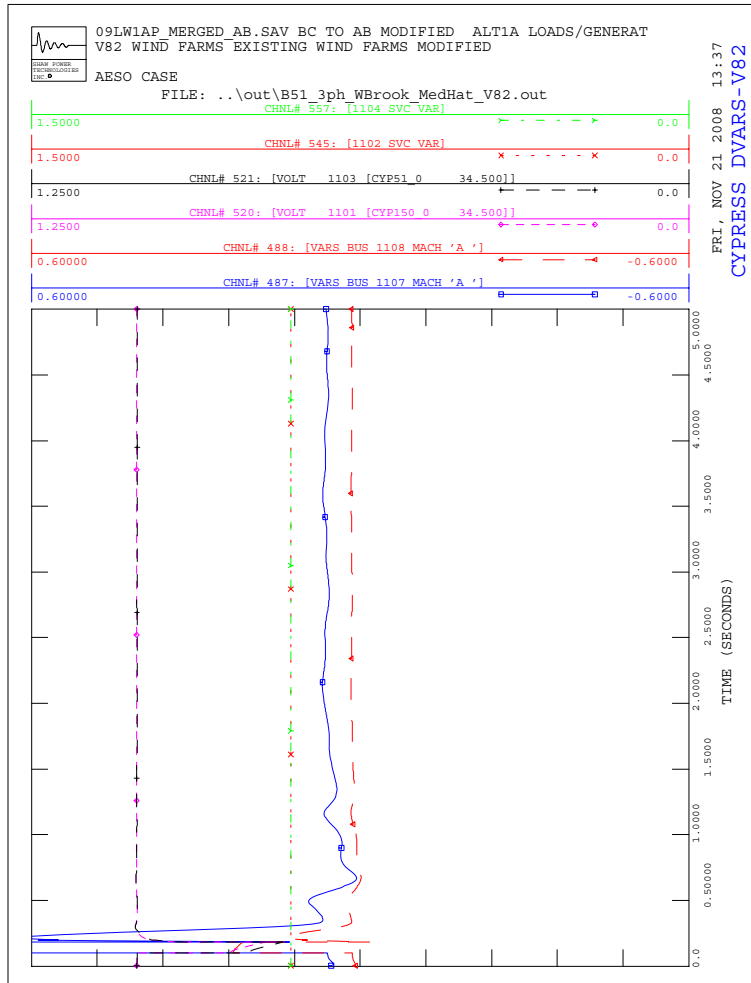








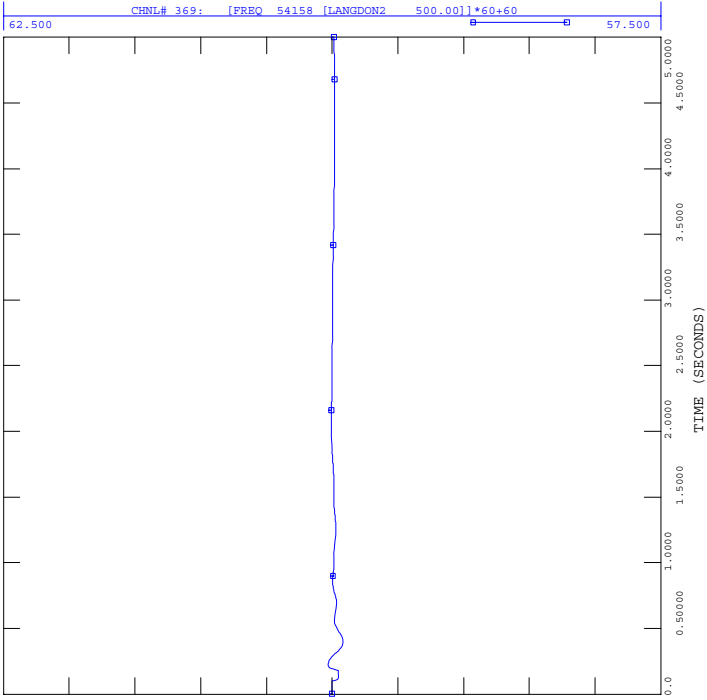






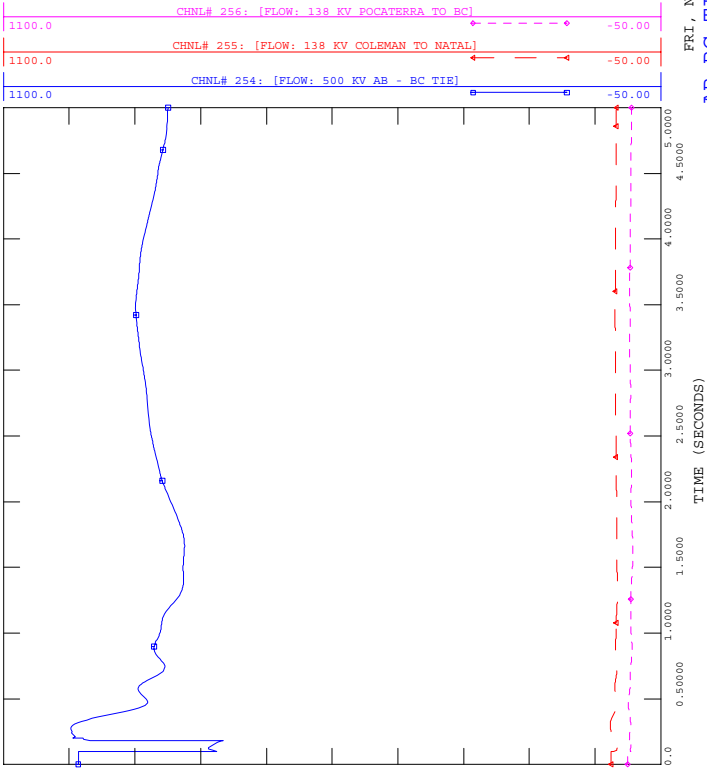
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B51_3ph_WBrook_MedHat_V82.out

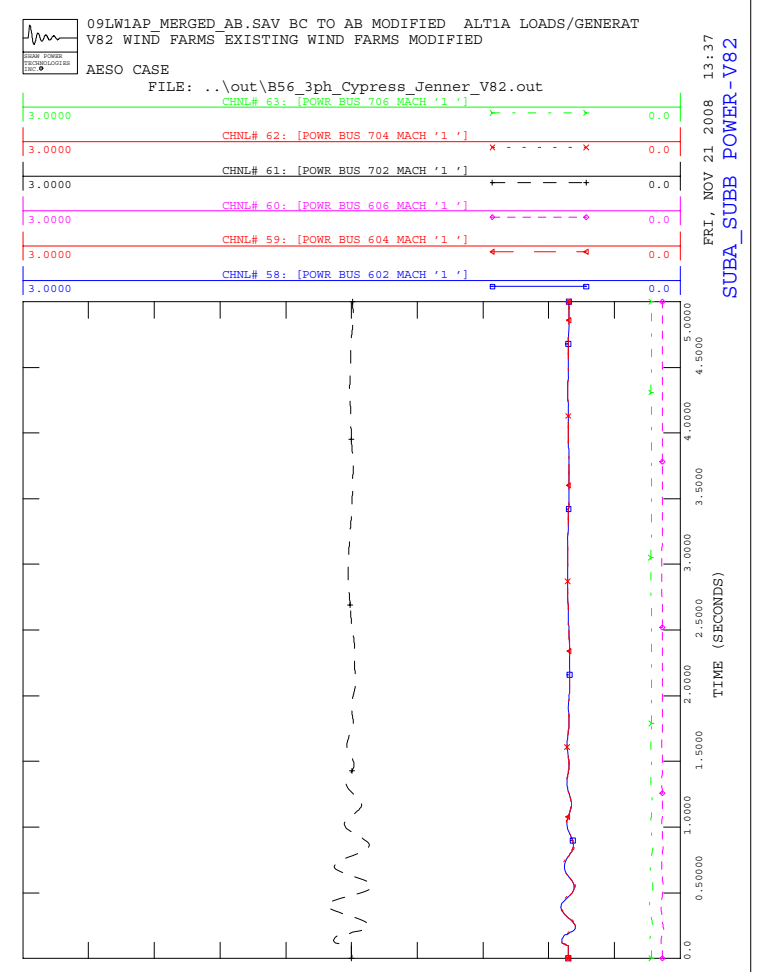
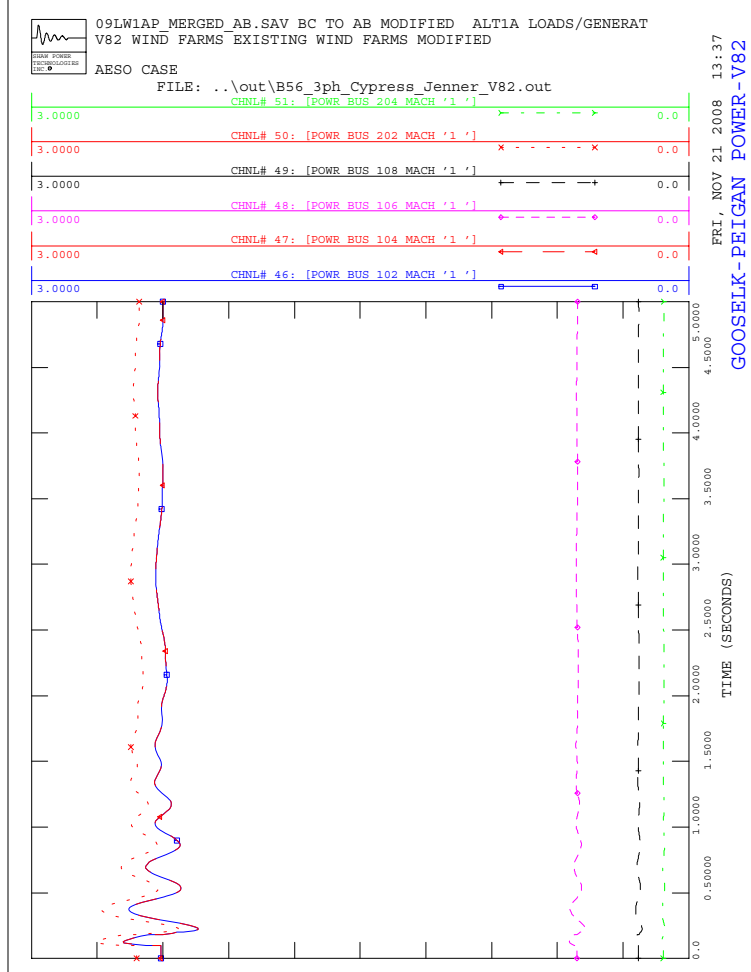
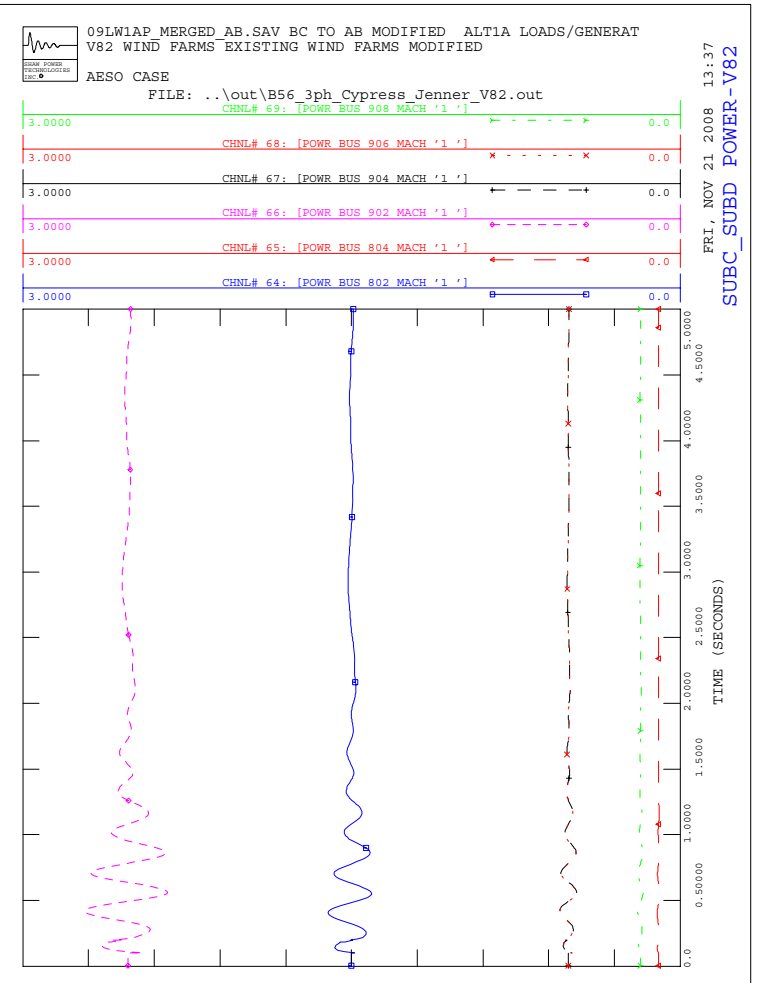
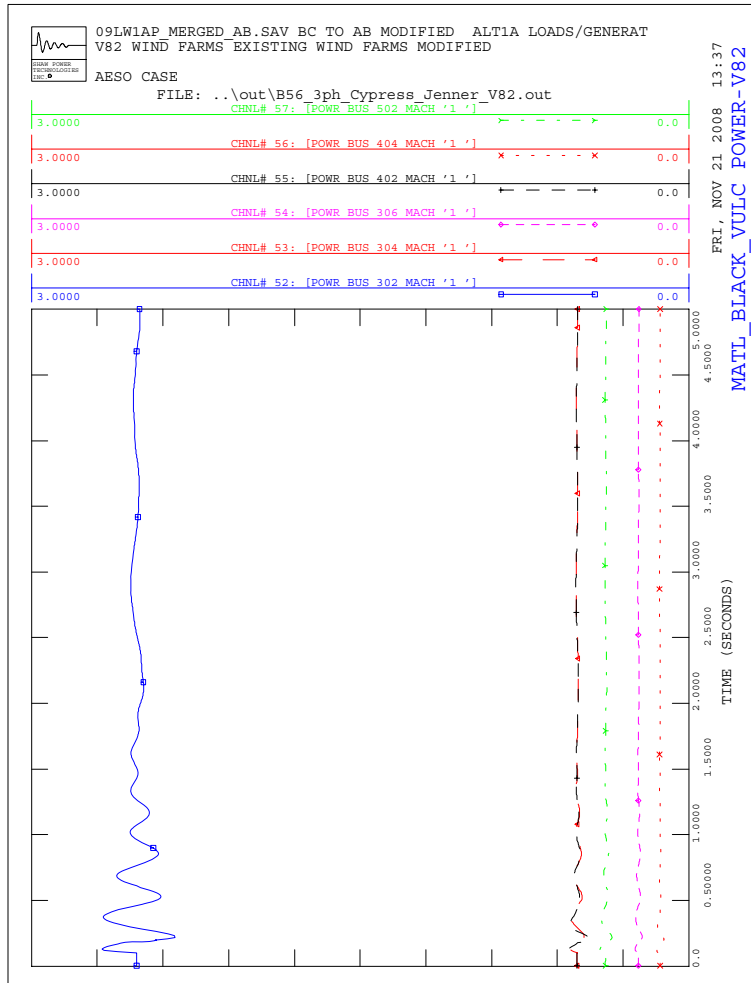
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LANGDON_FRQ-V82

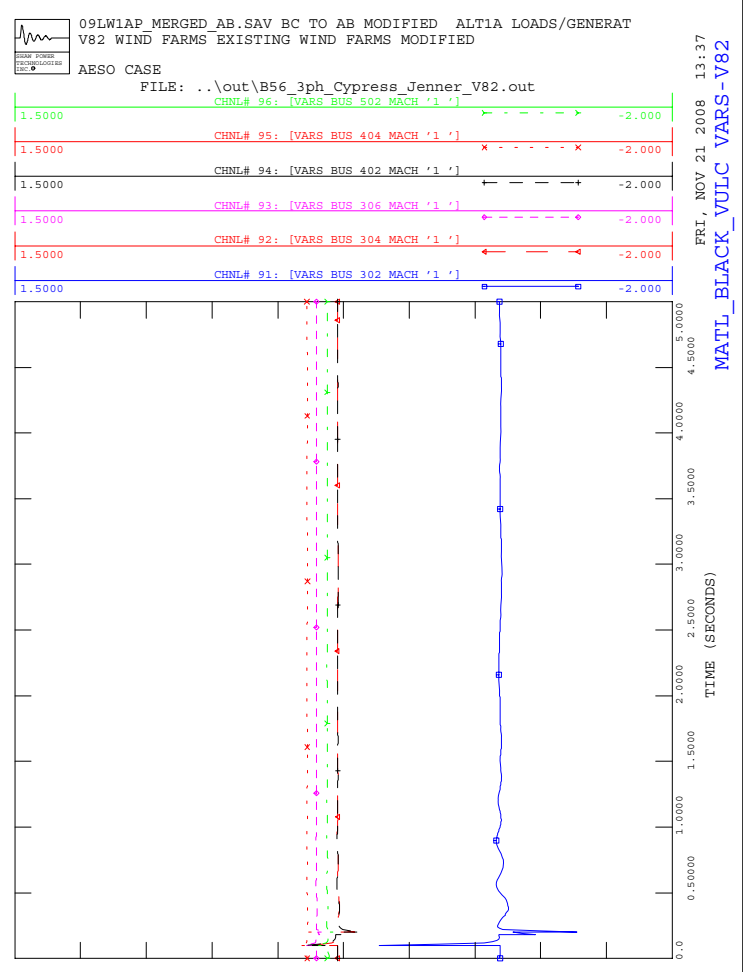
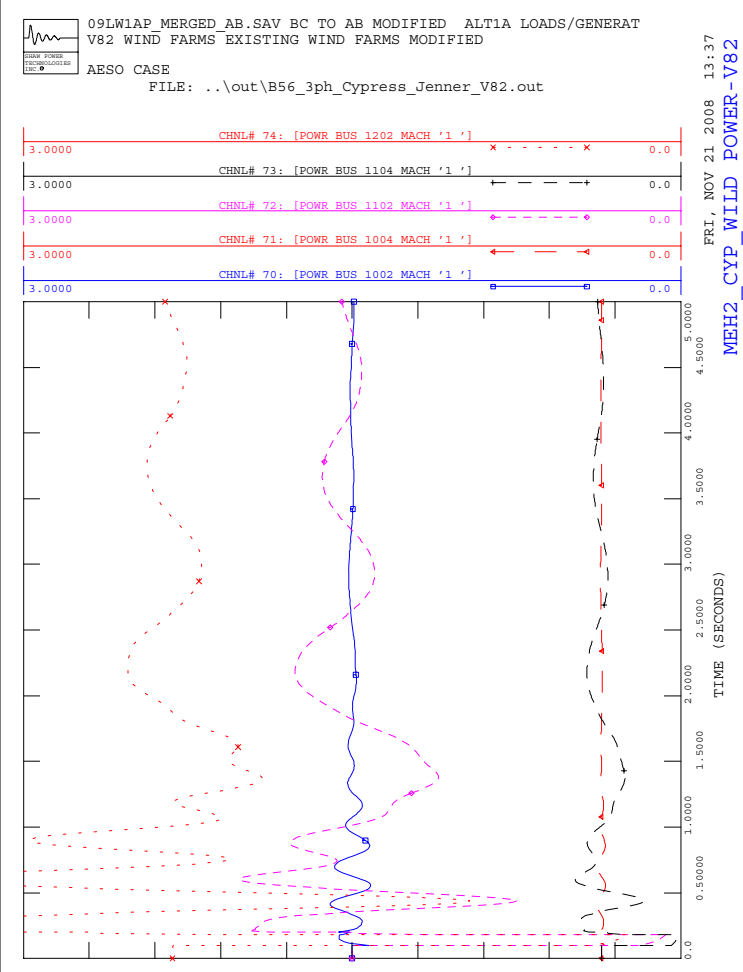
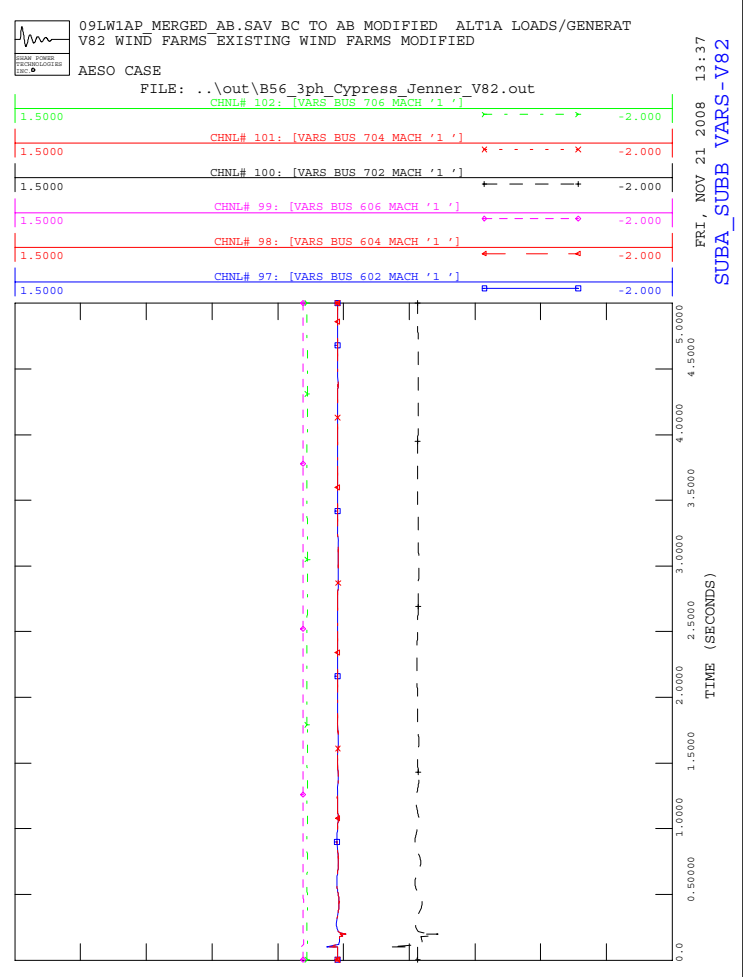
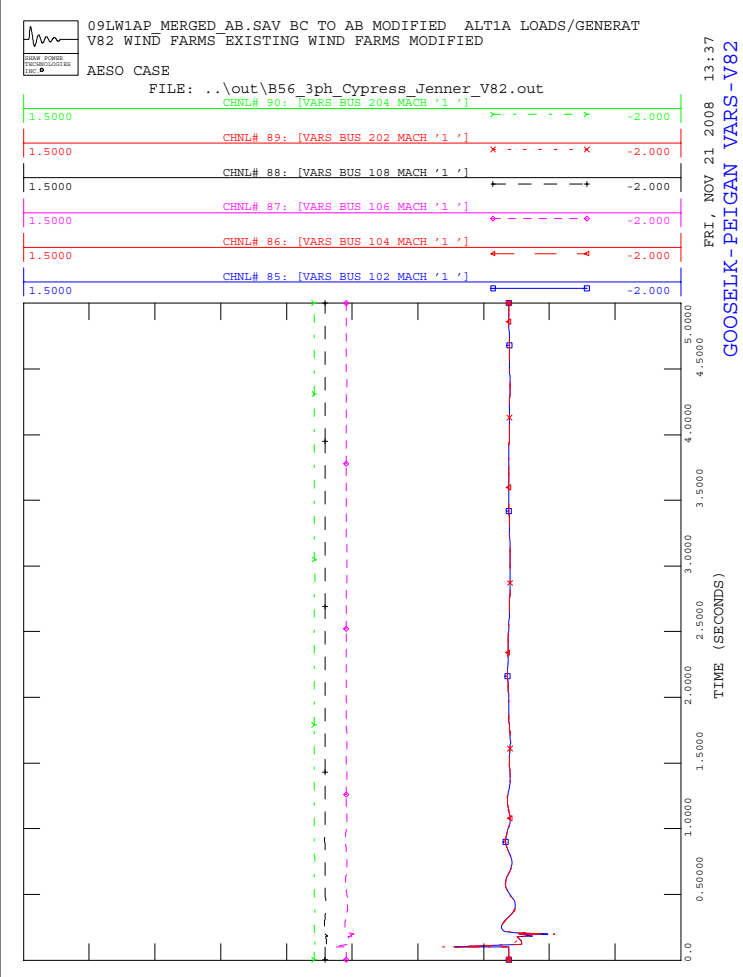


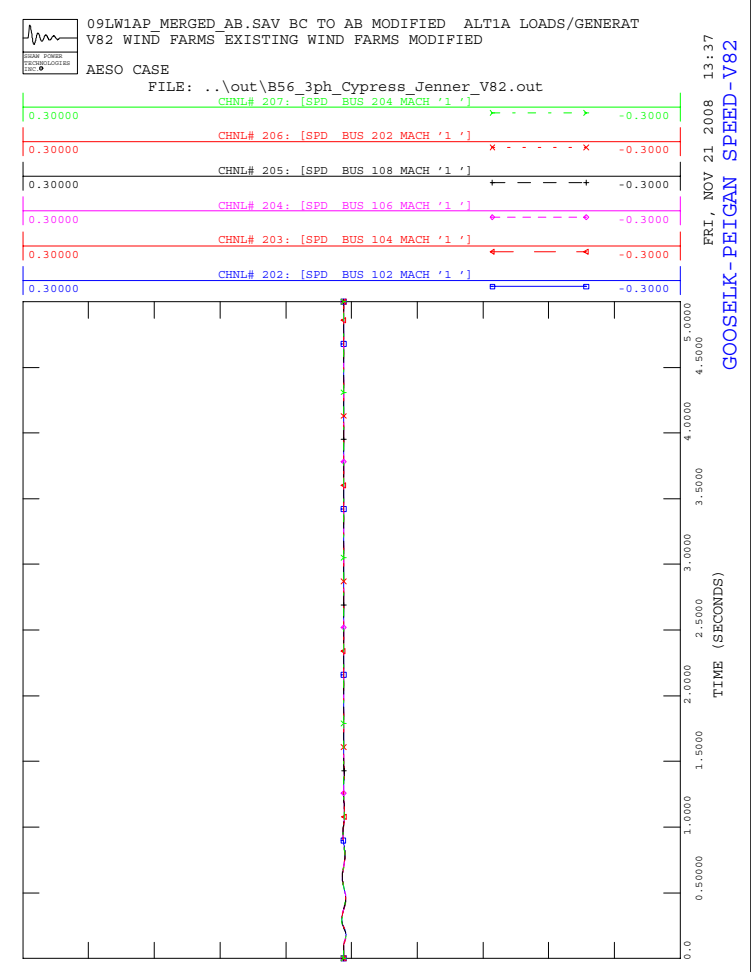
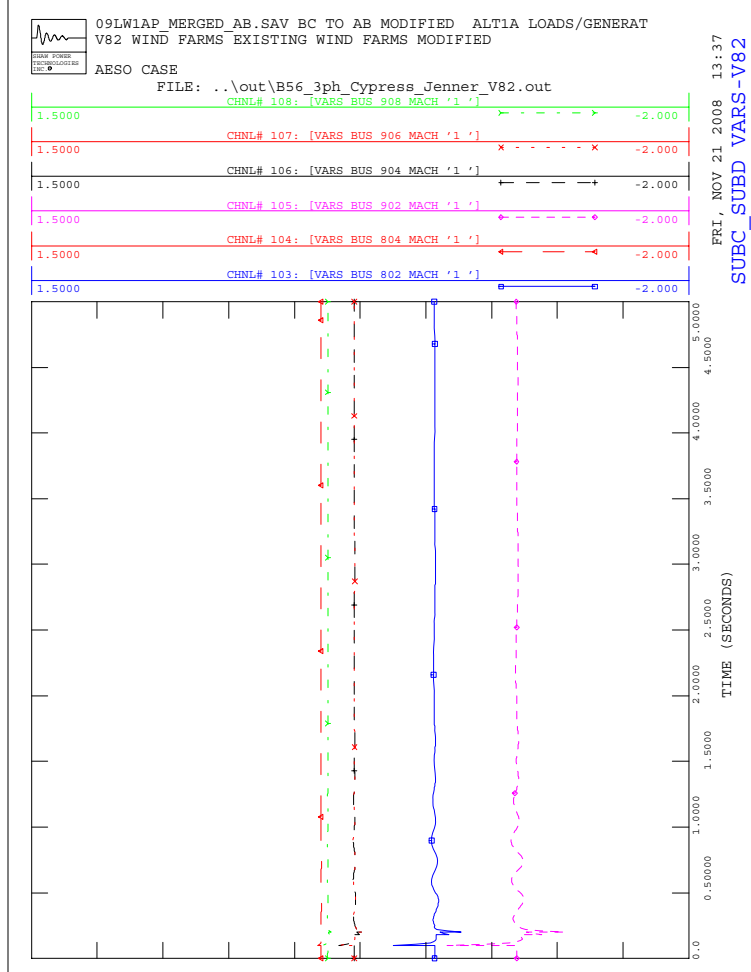
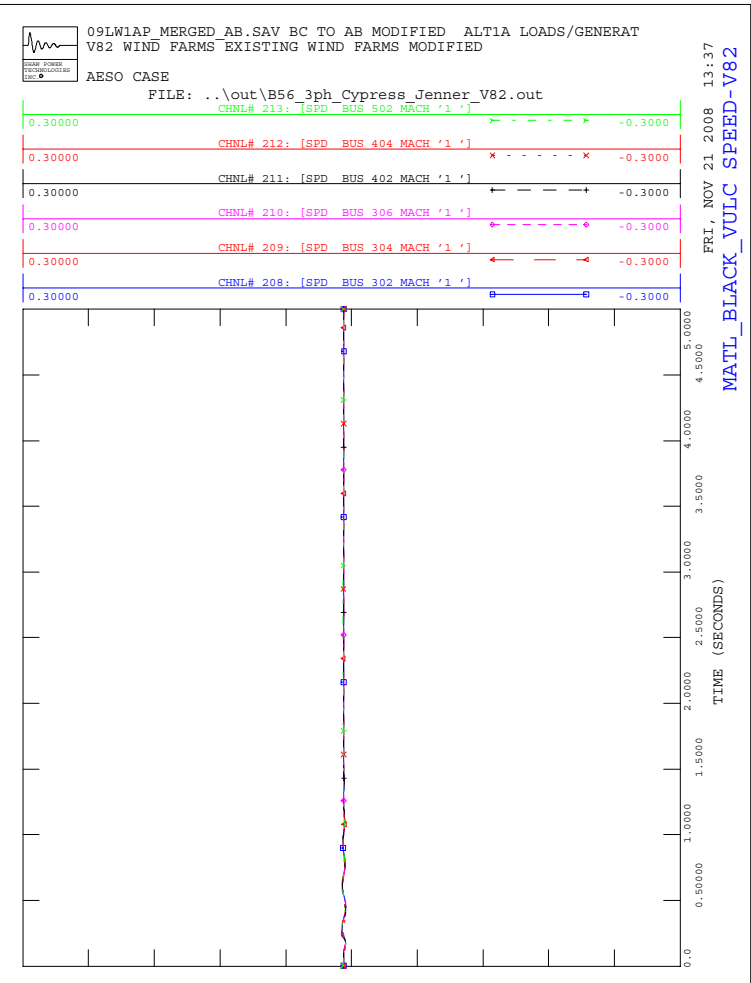
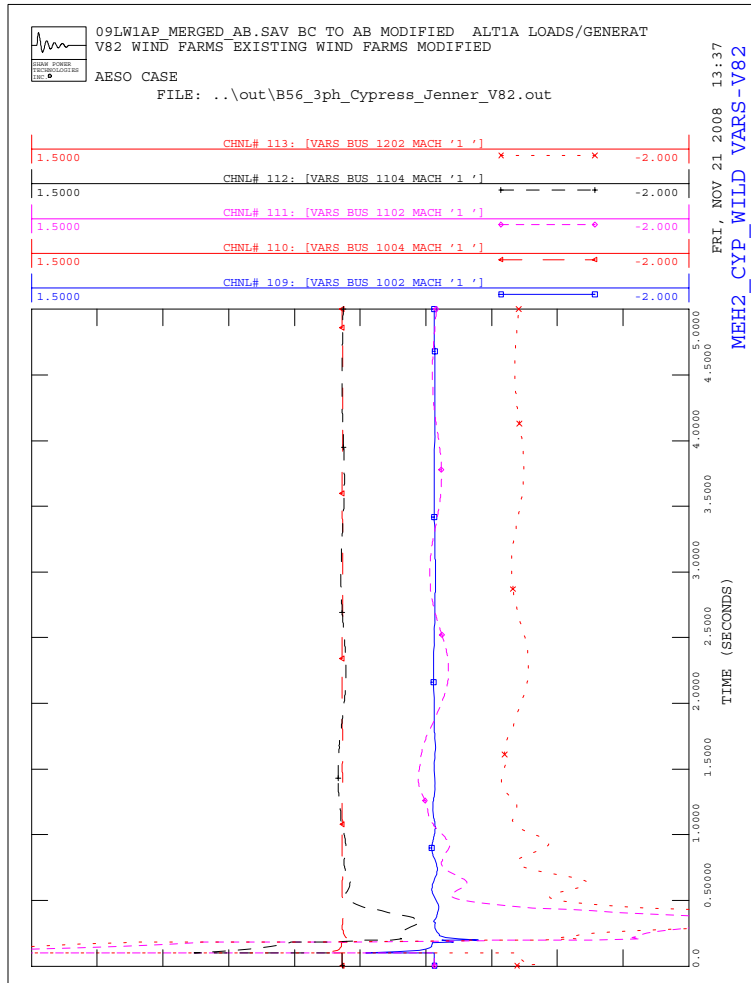
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B51_3ph_WBrook_MedHat_V82.out

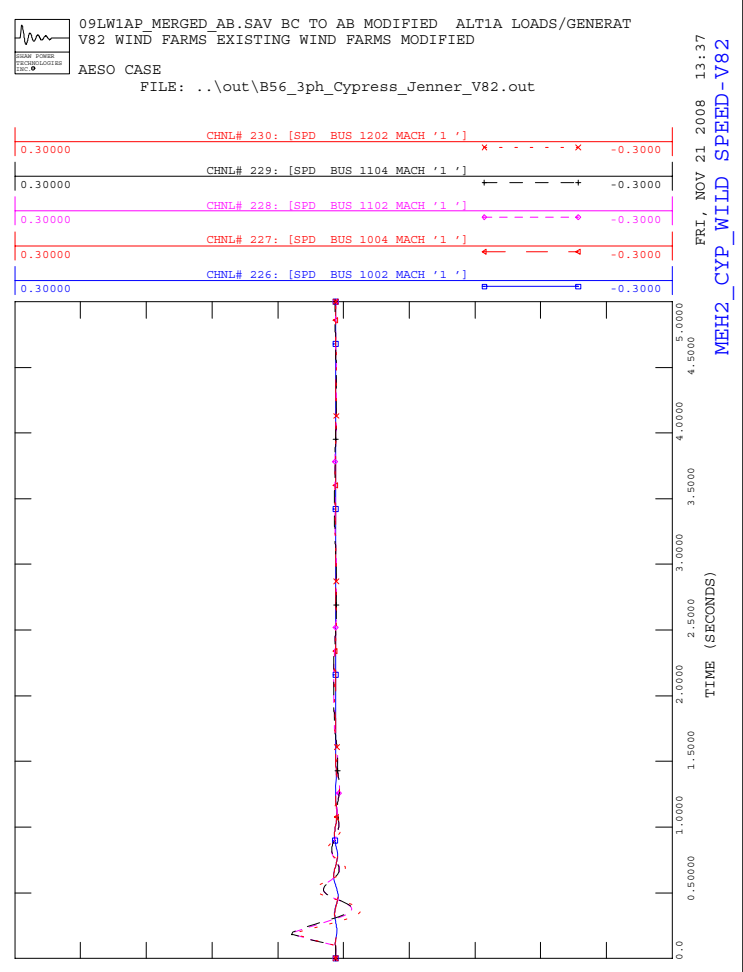
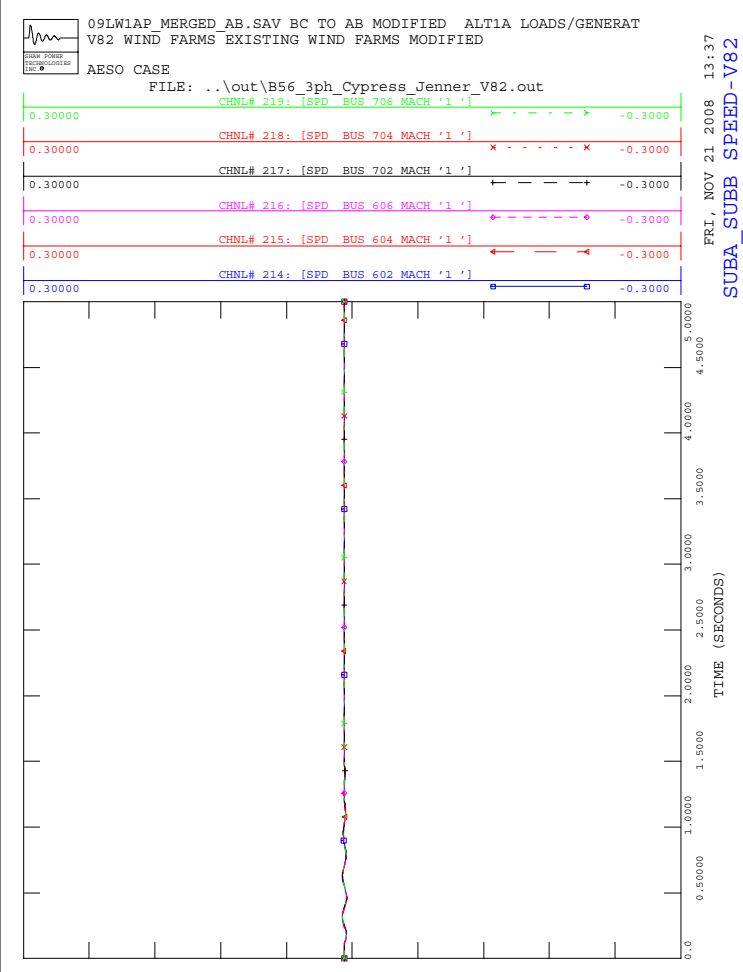
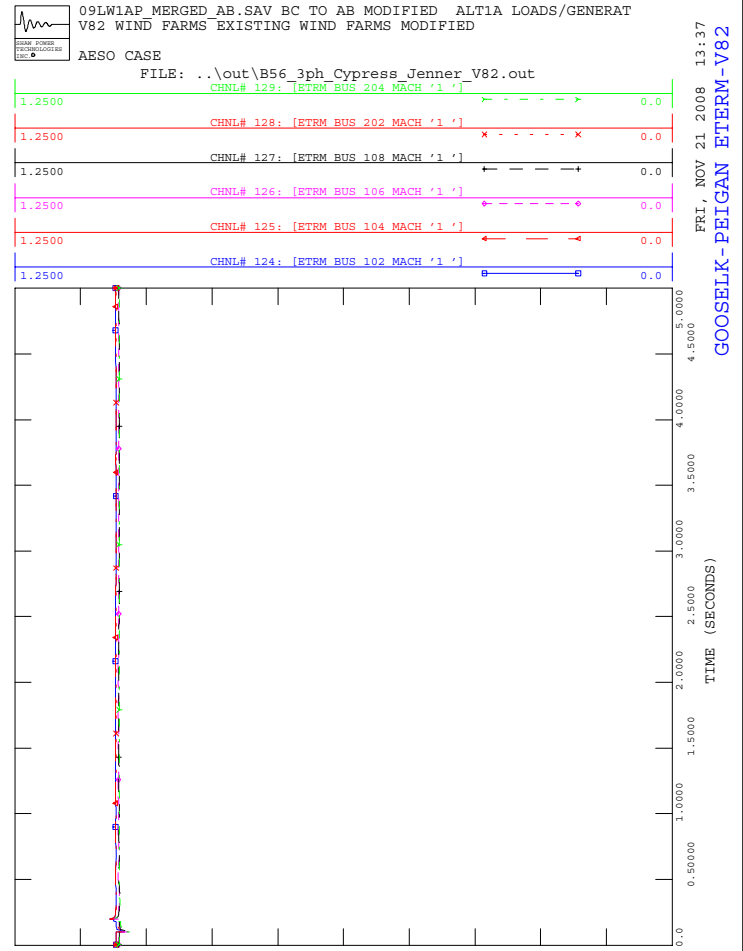
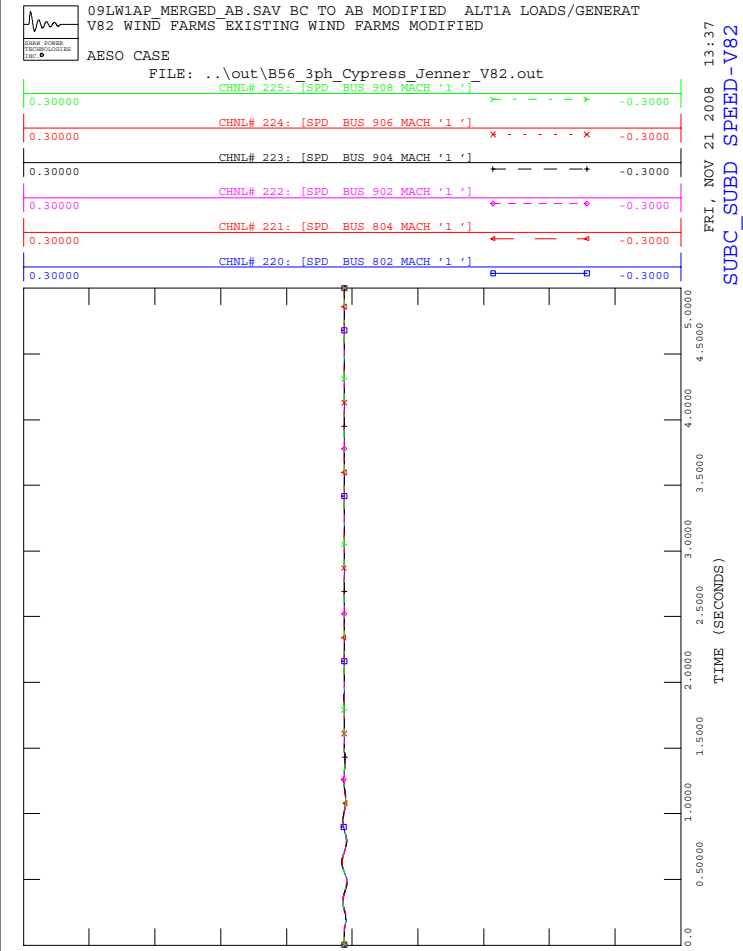
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AB_BC_TIE_FLOWS-V82

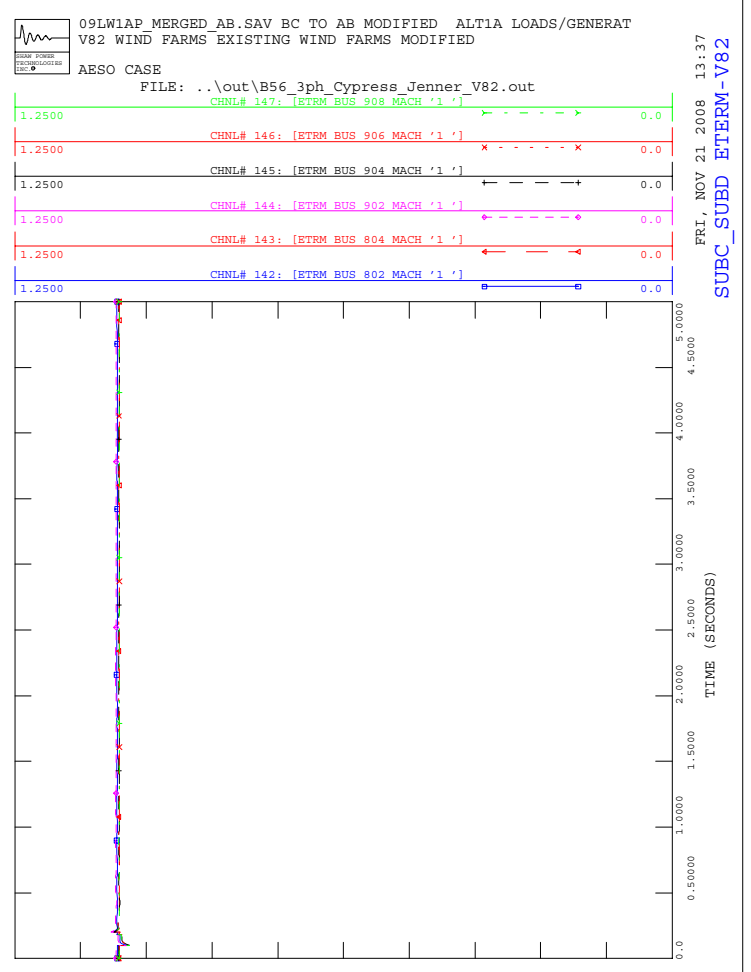
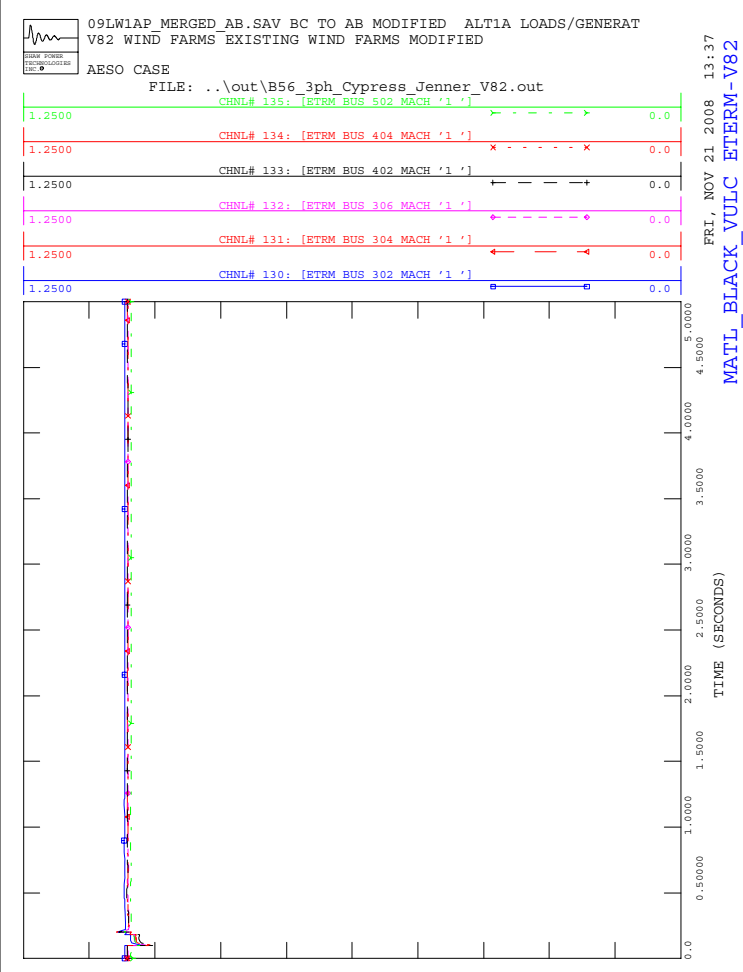
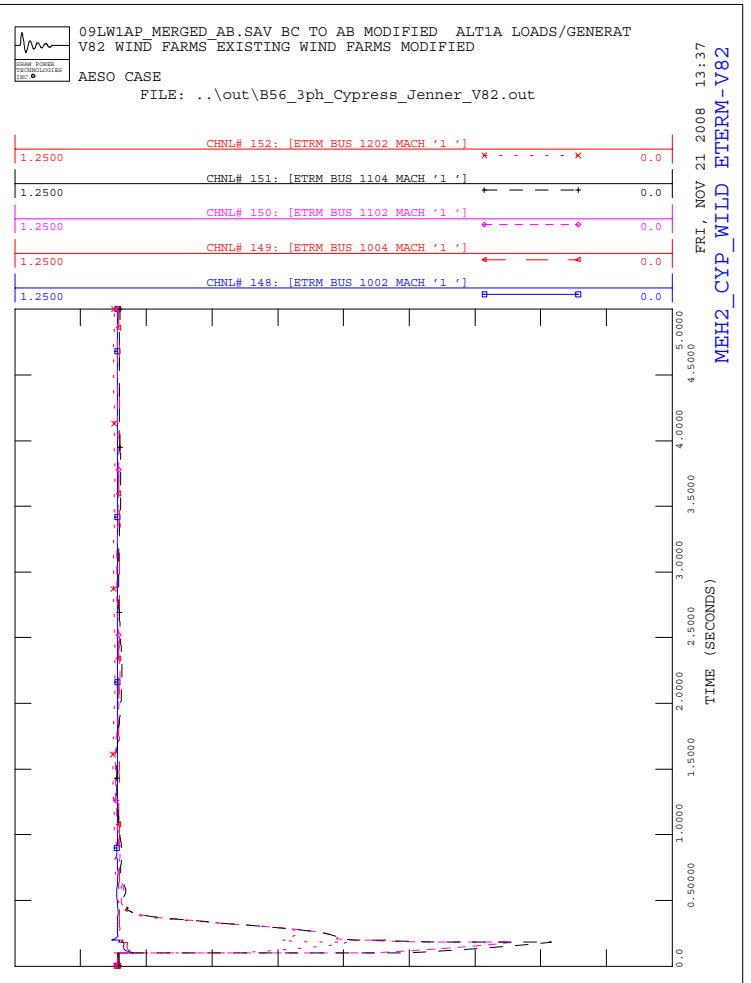
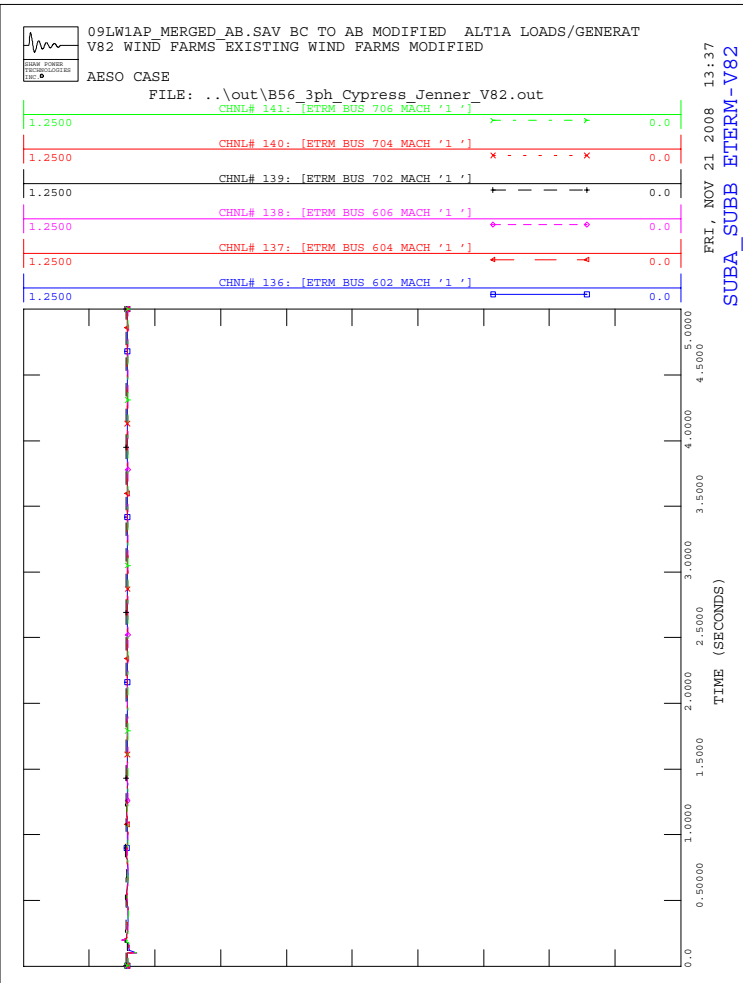


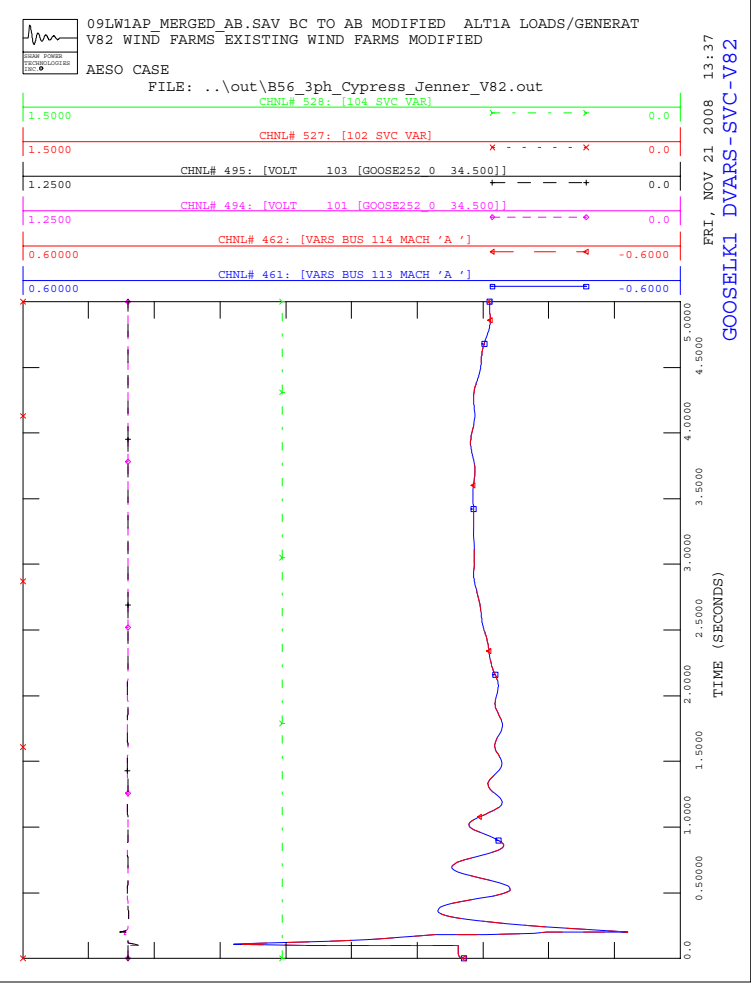
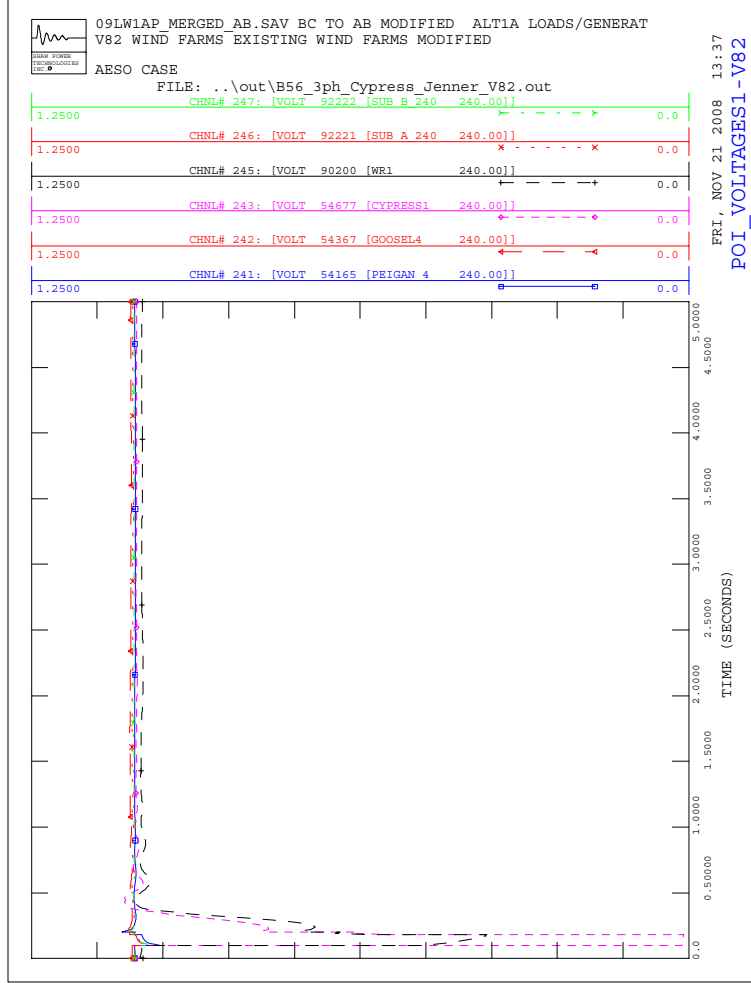
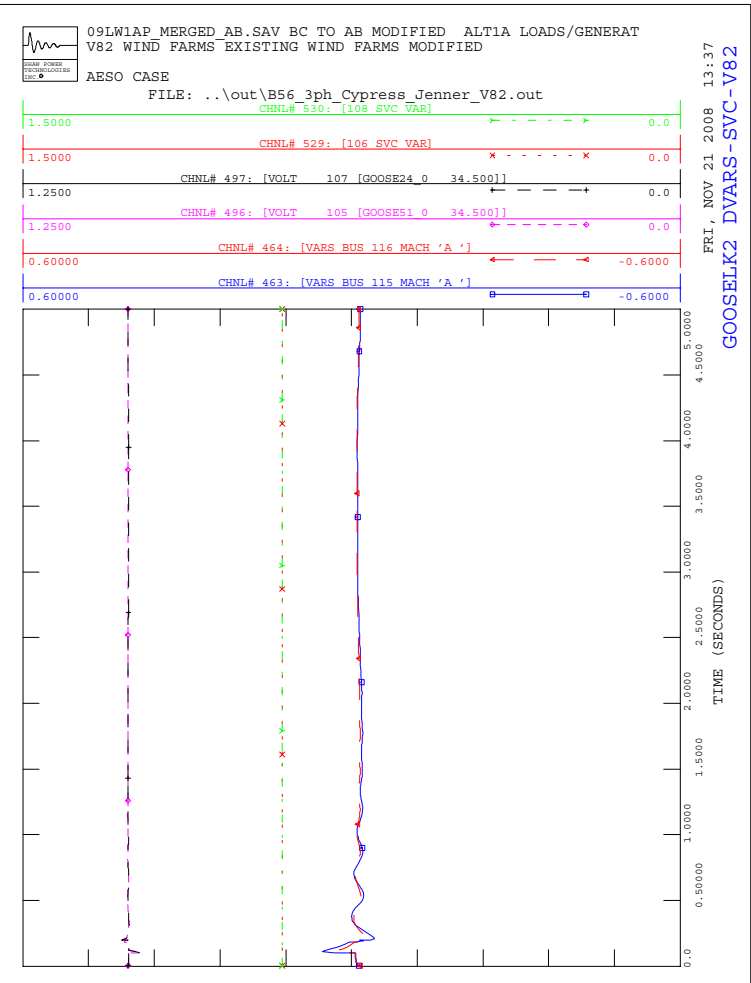
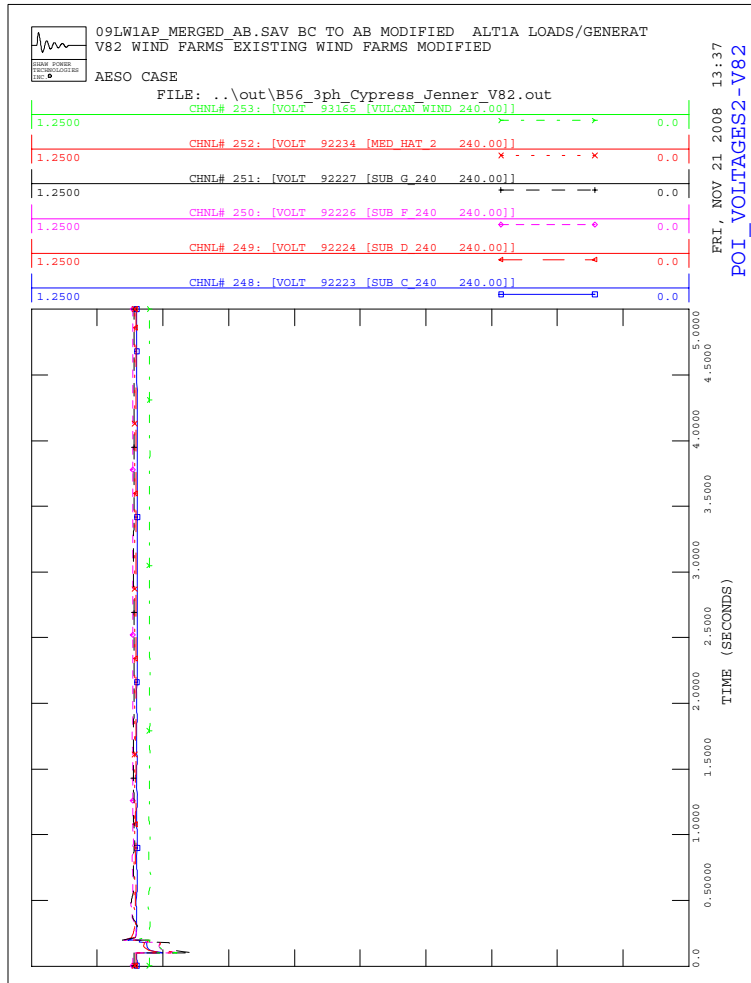


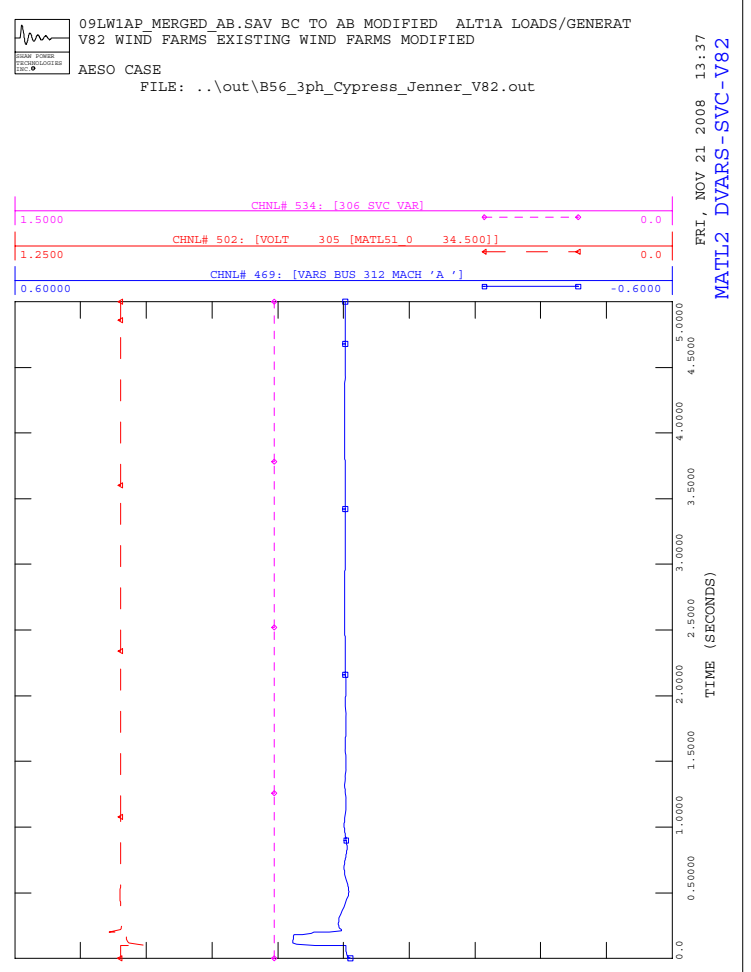
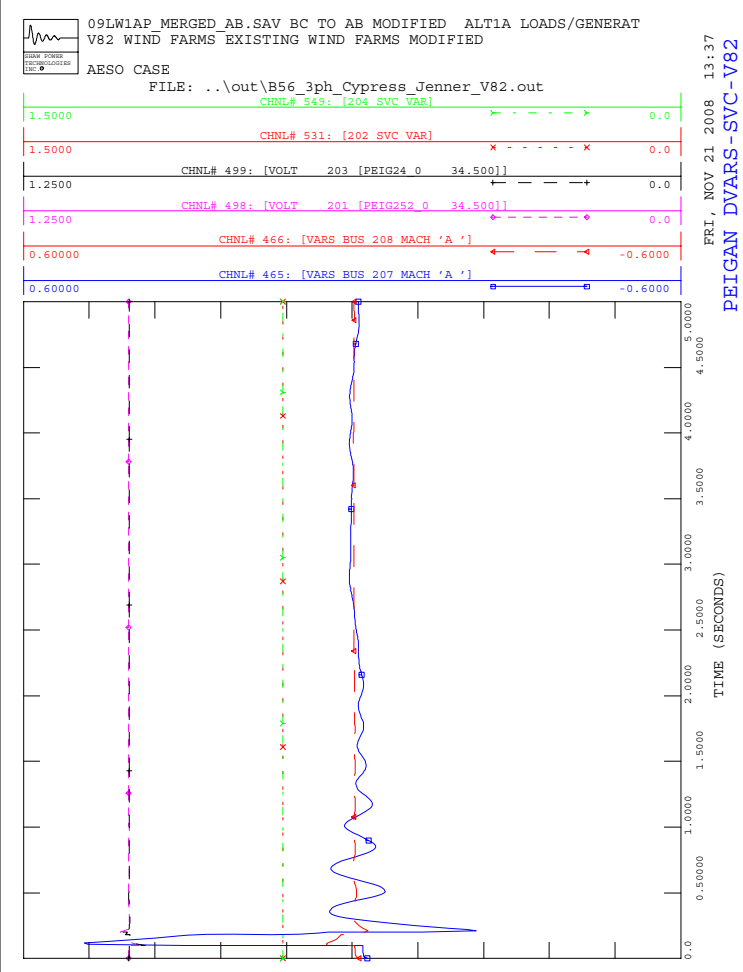
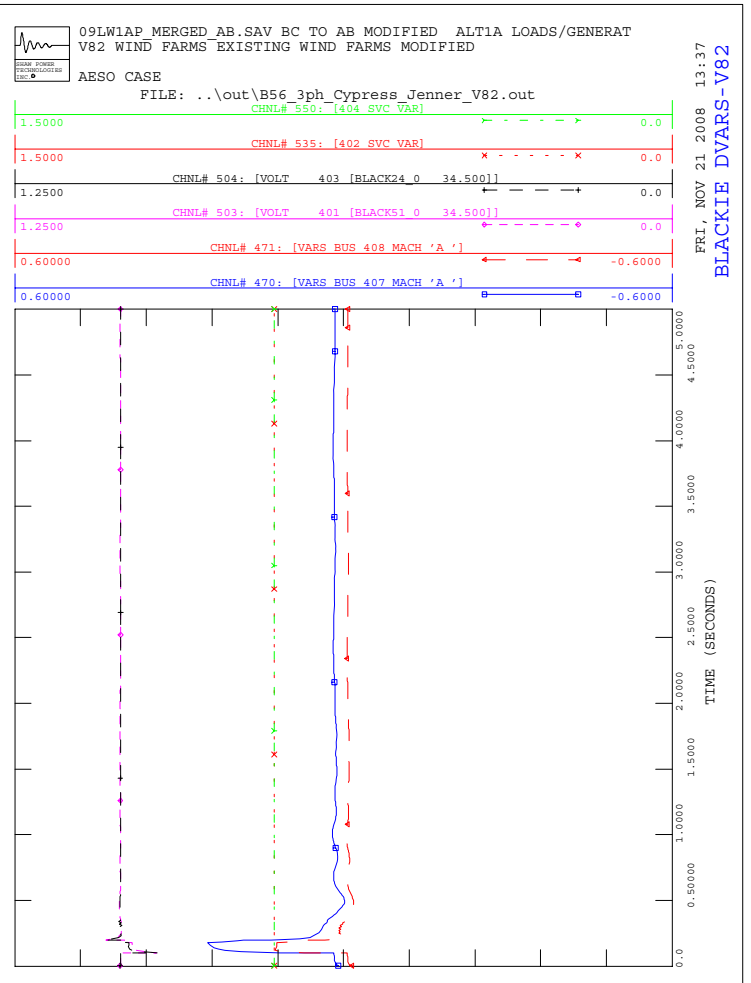
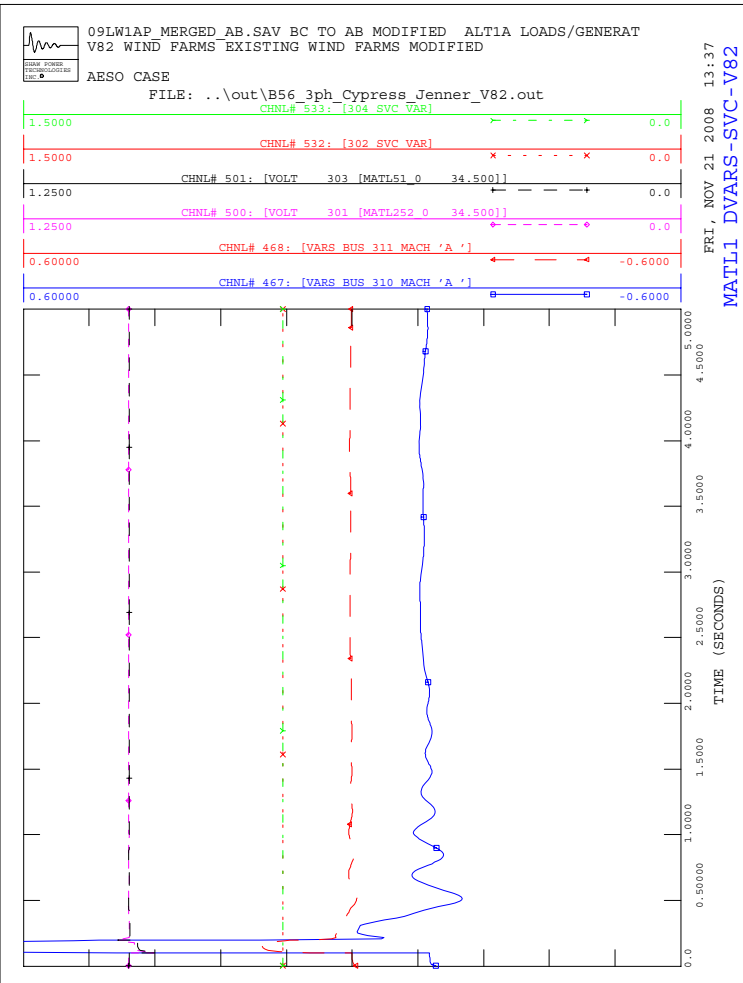


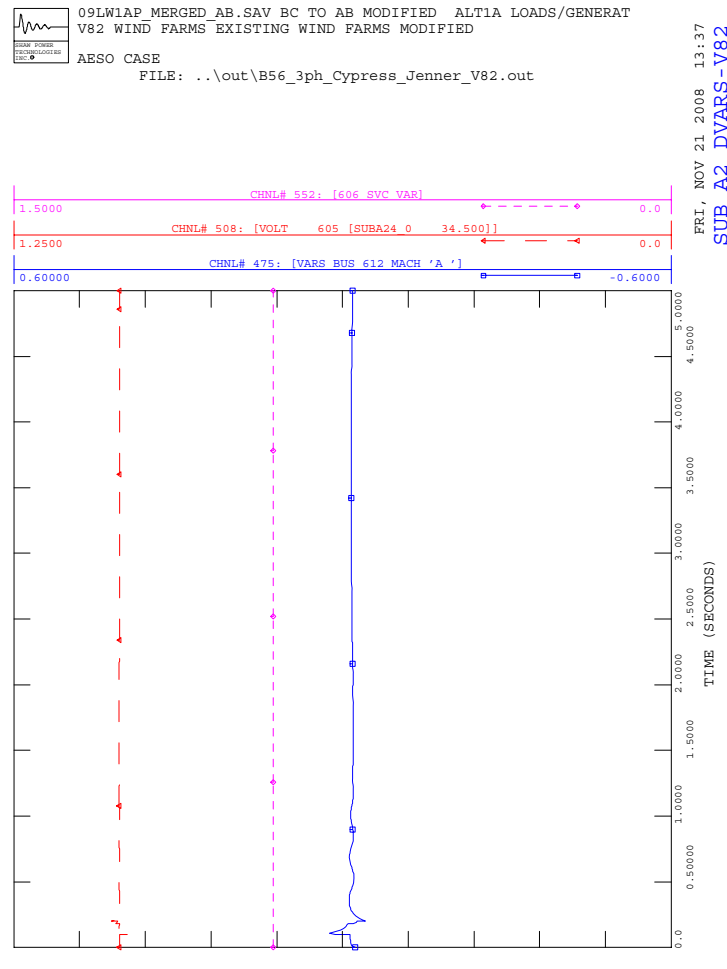
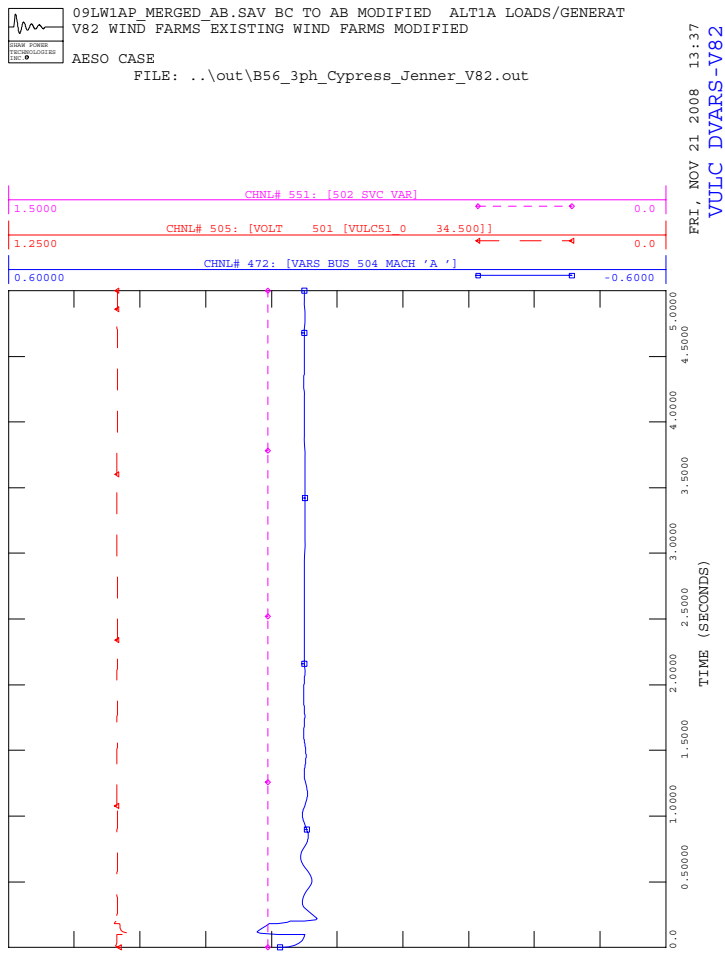
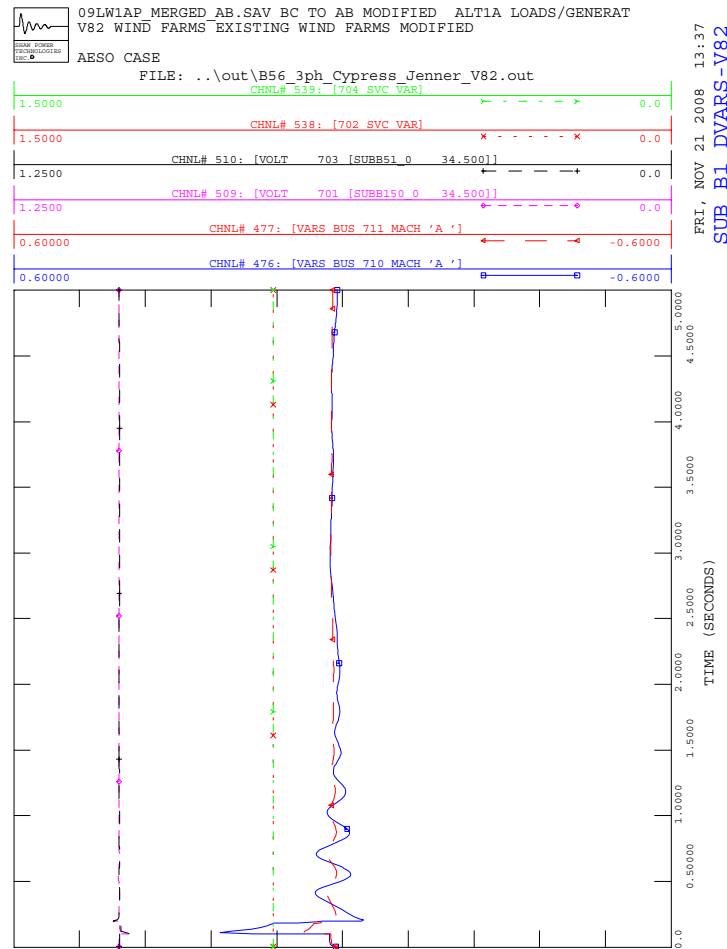
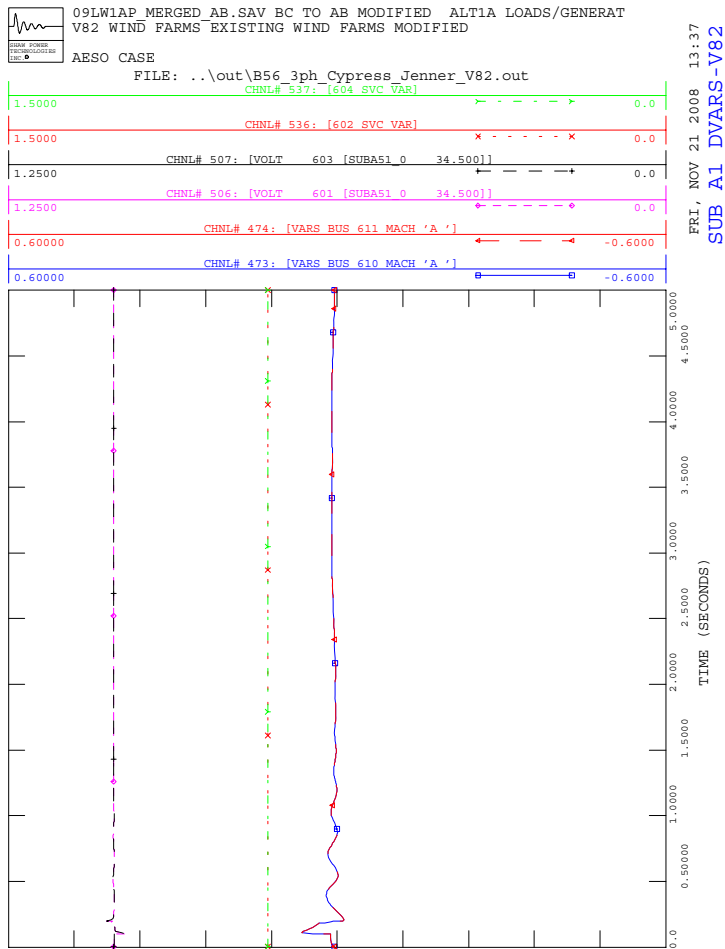


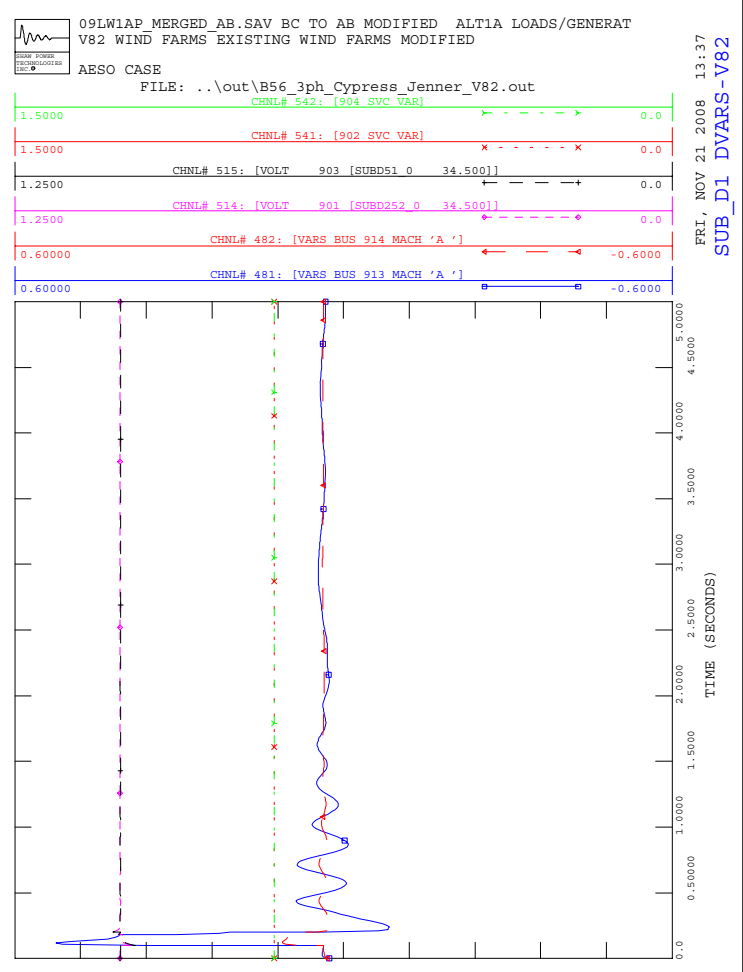
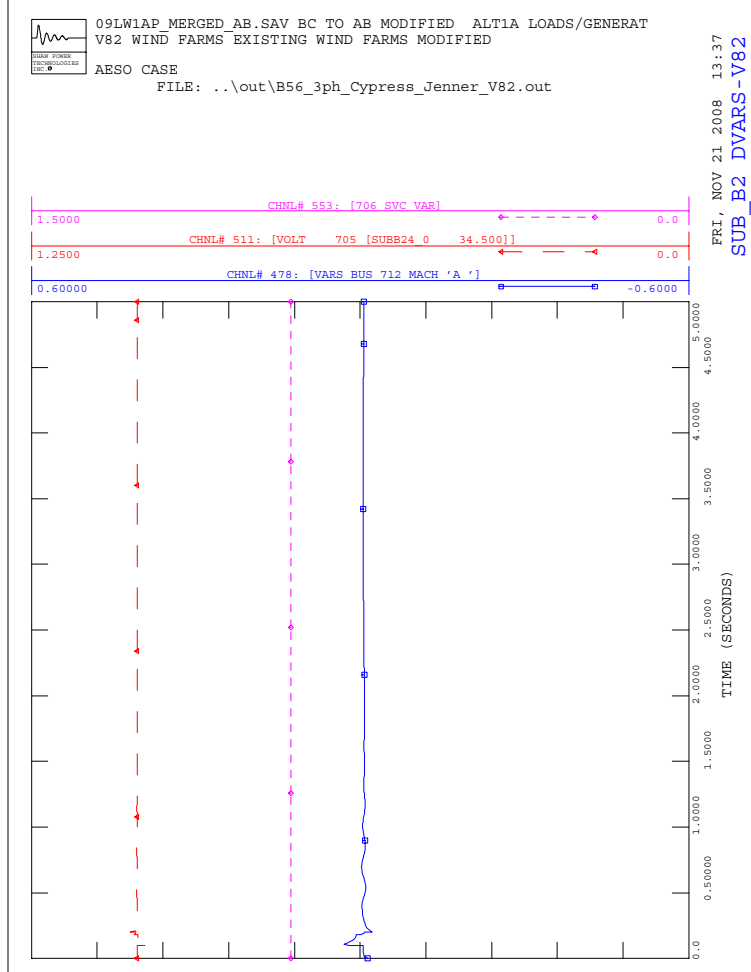
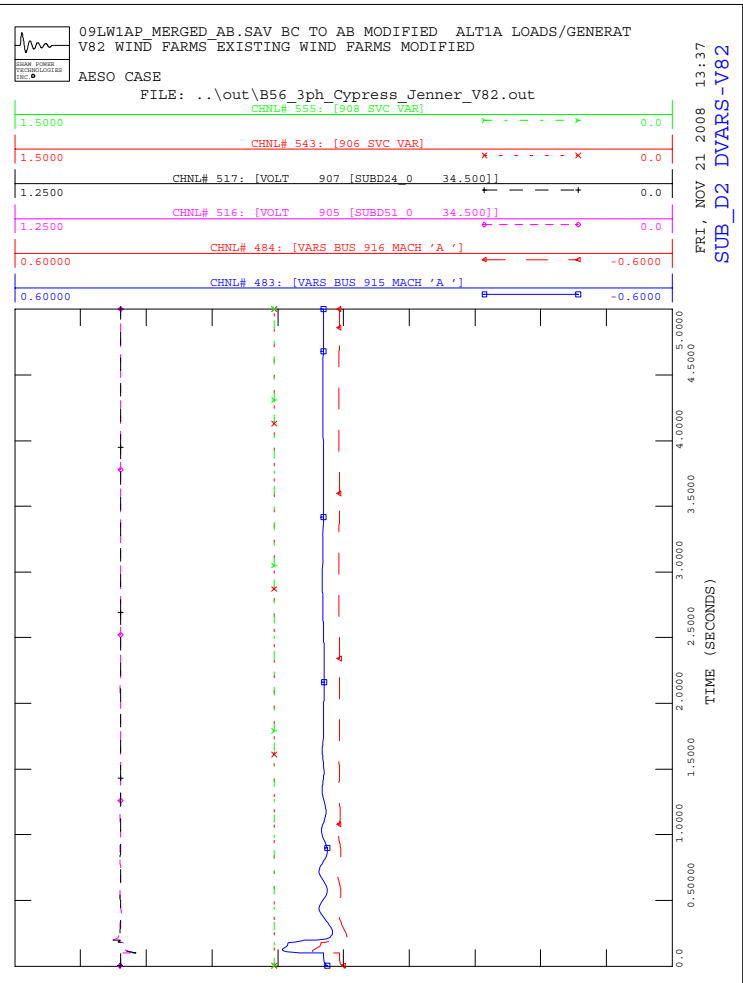
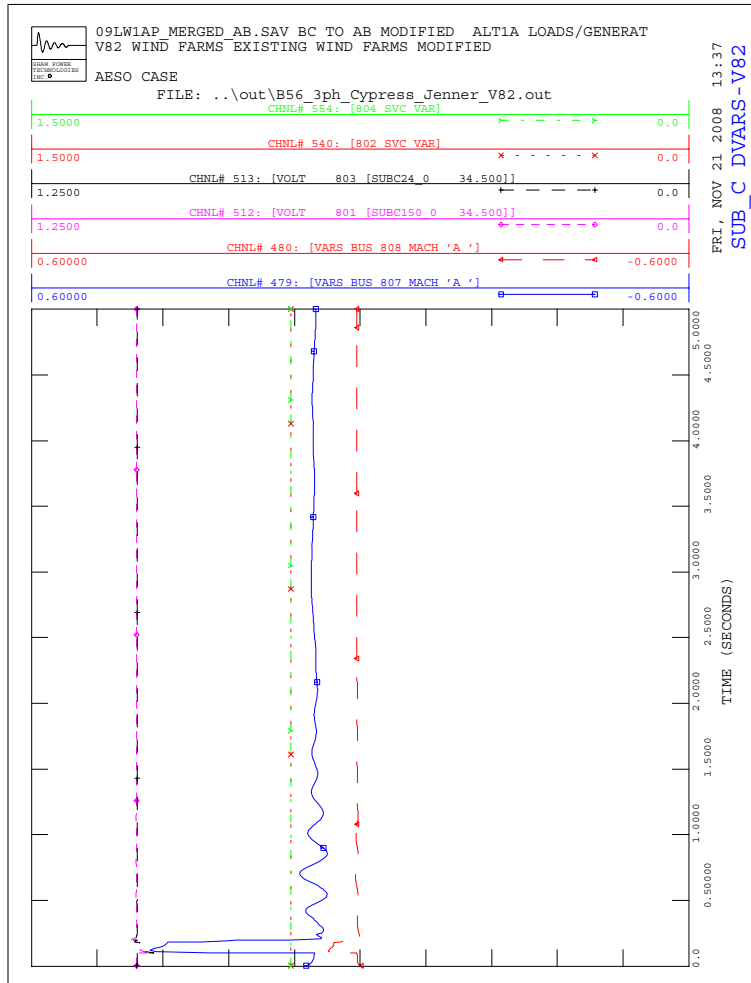


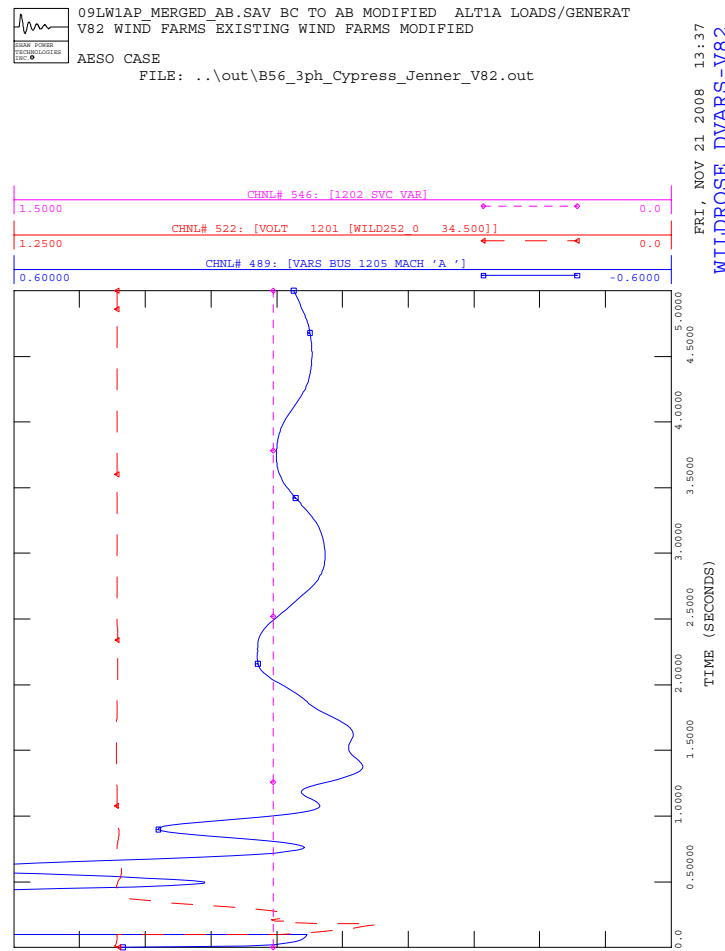
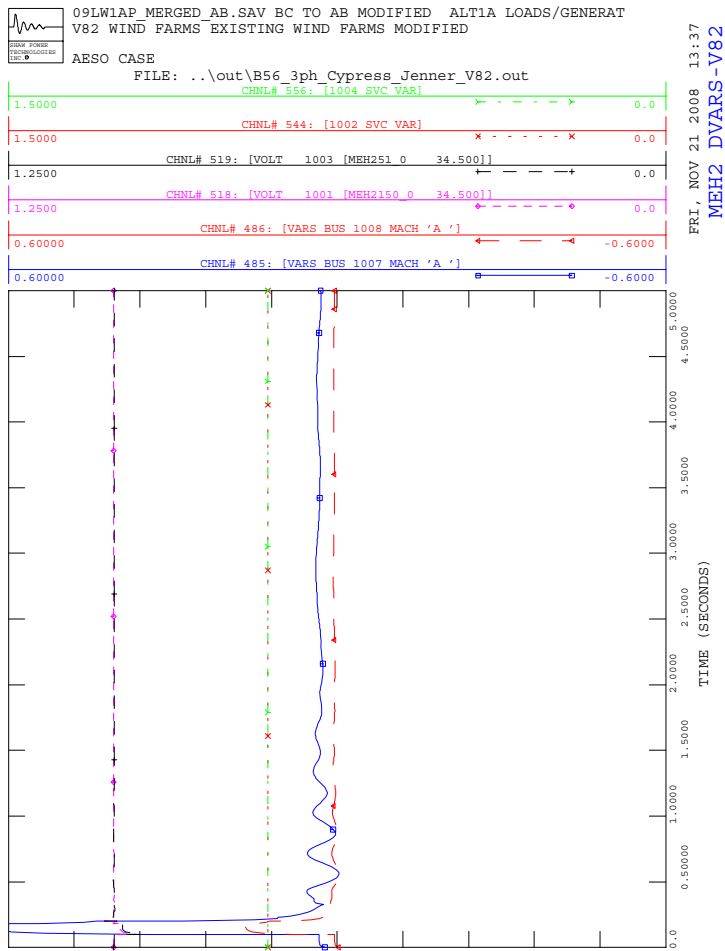
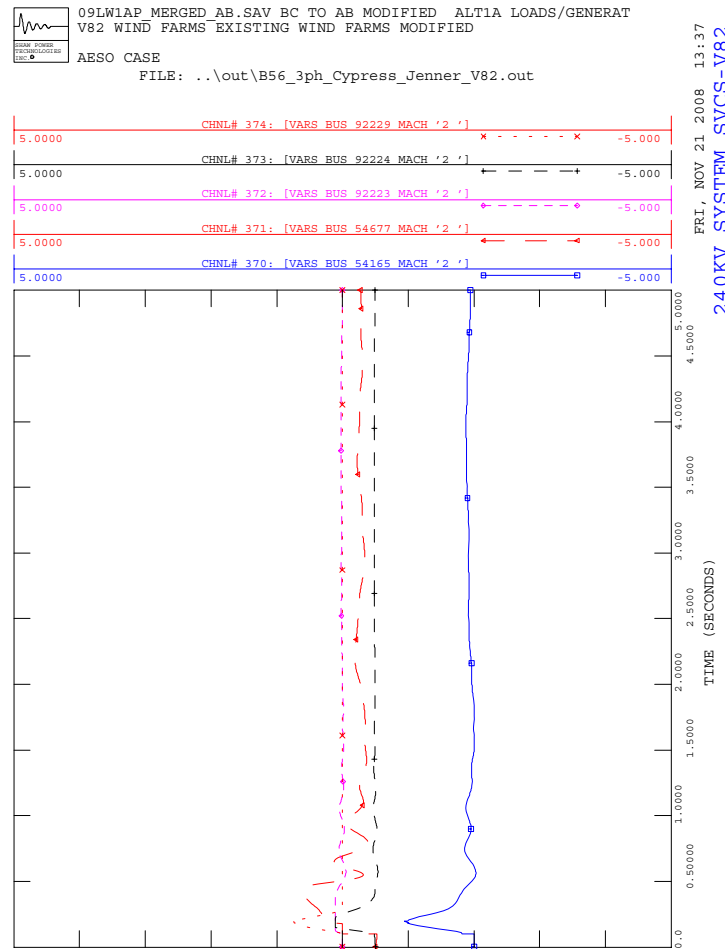
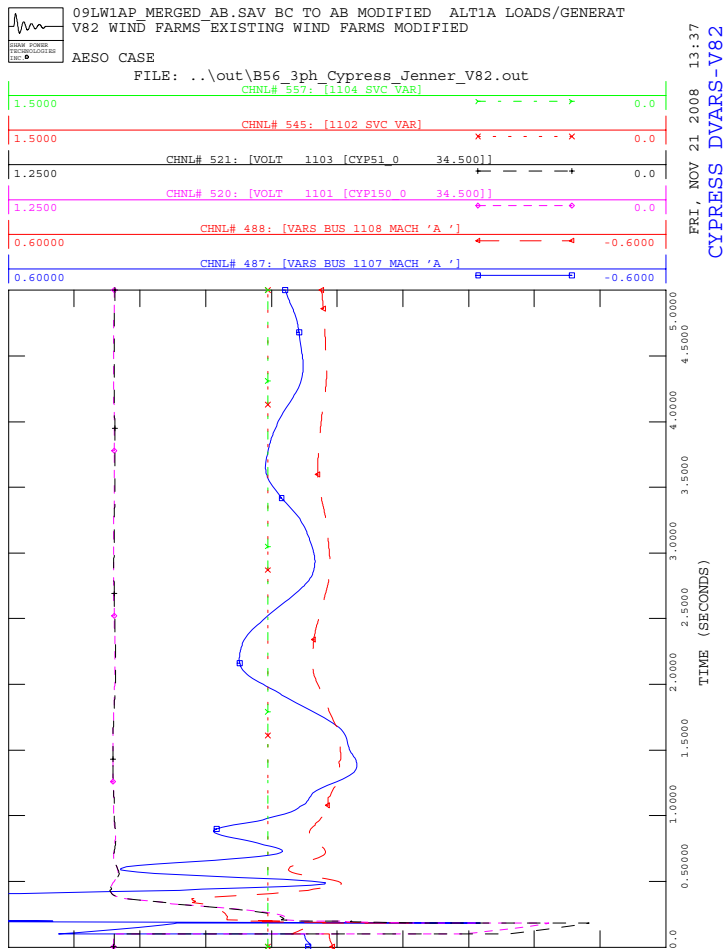








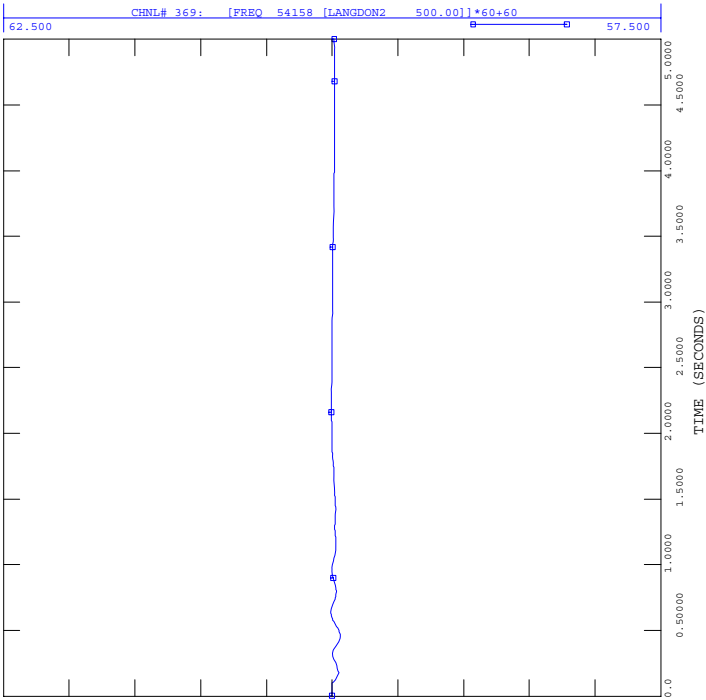






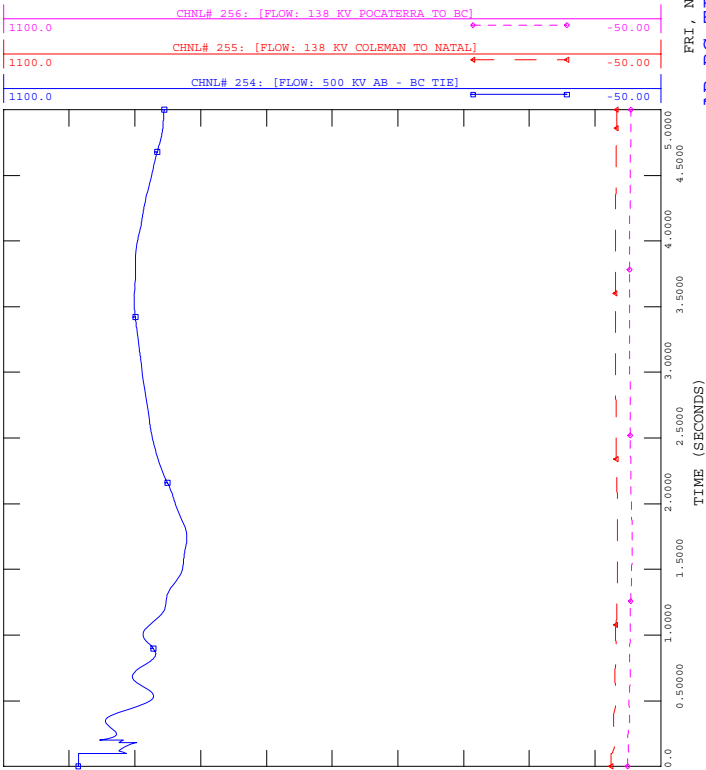
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B56_3ph_Cypress_Jenner_V82.out

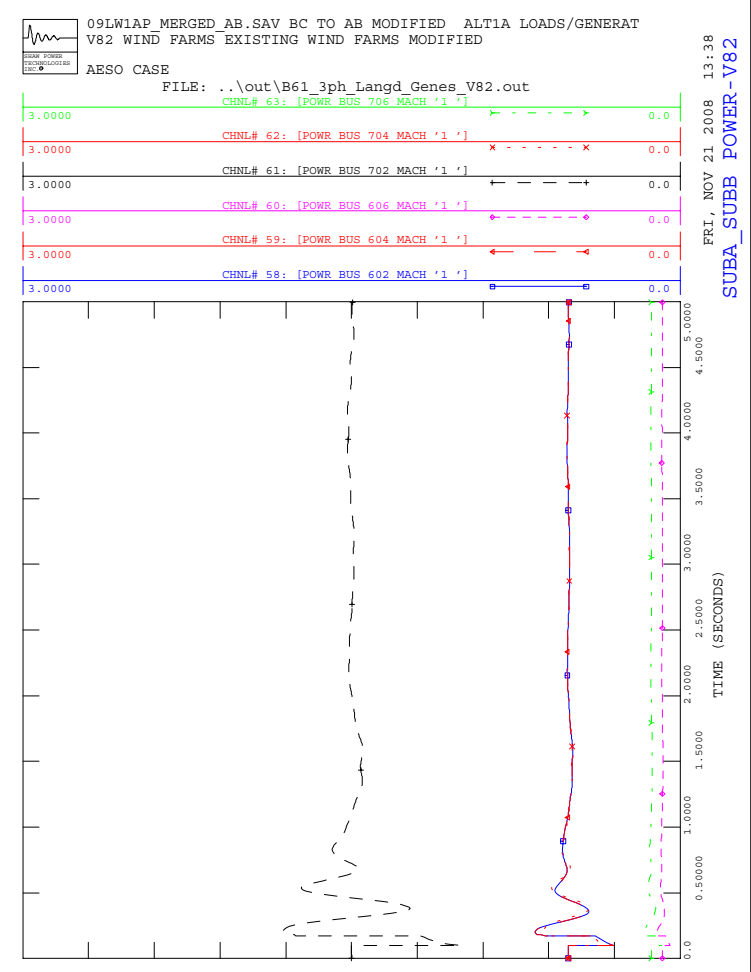
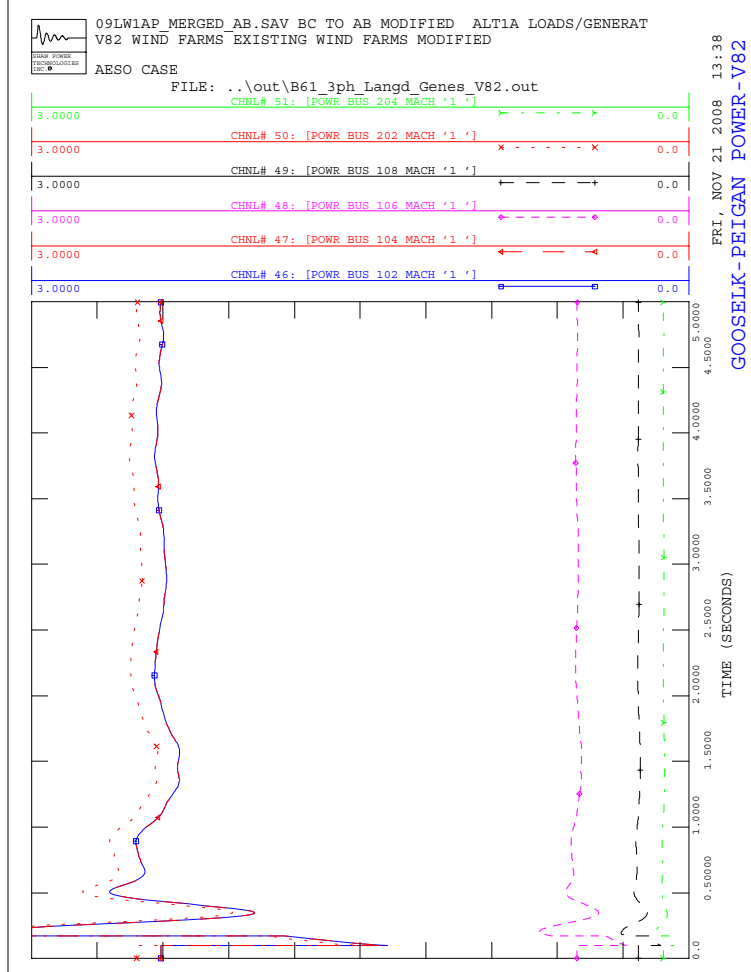
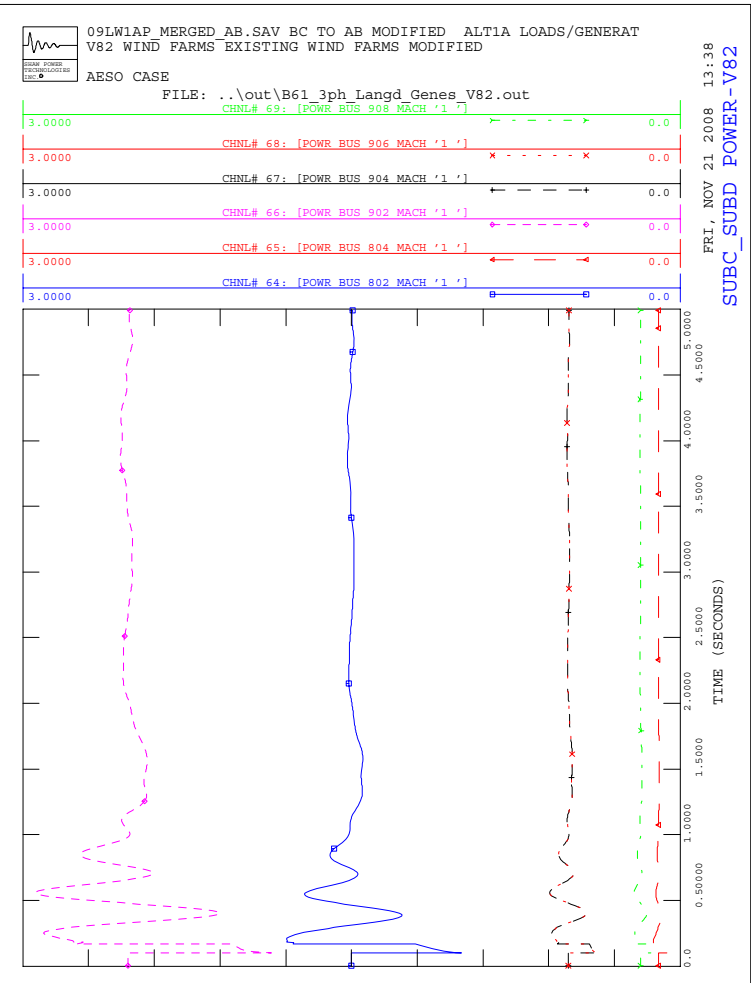
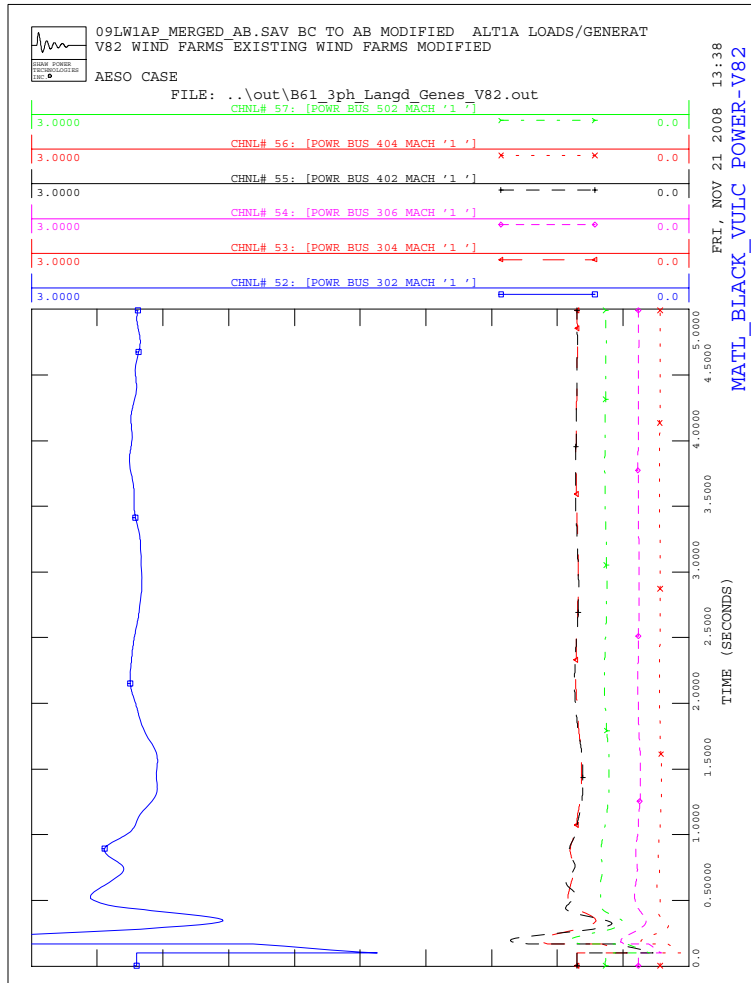
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LANGDON_FRQ-V82

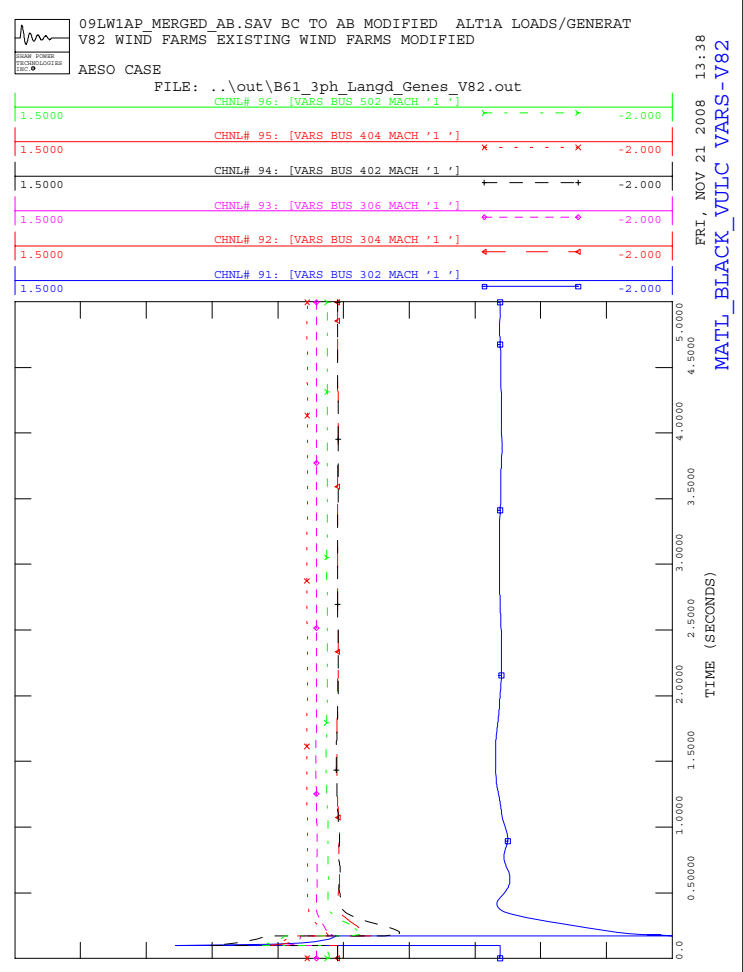
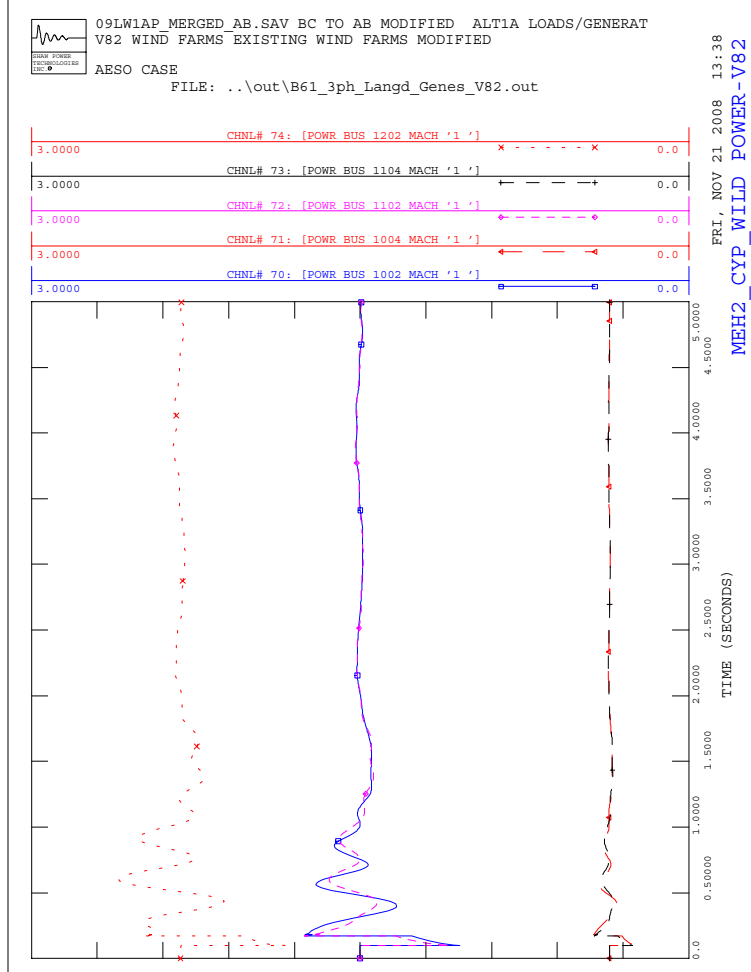
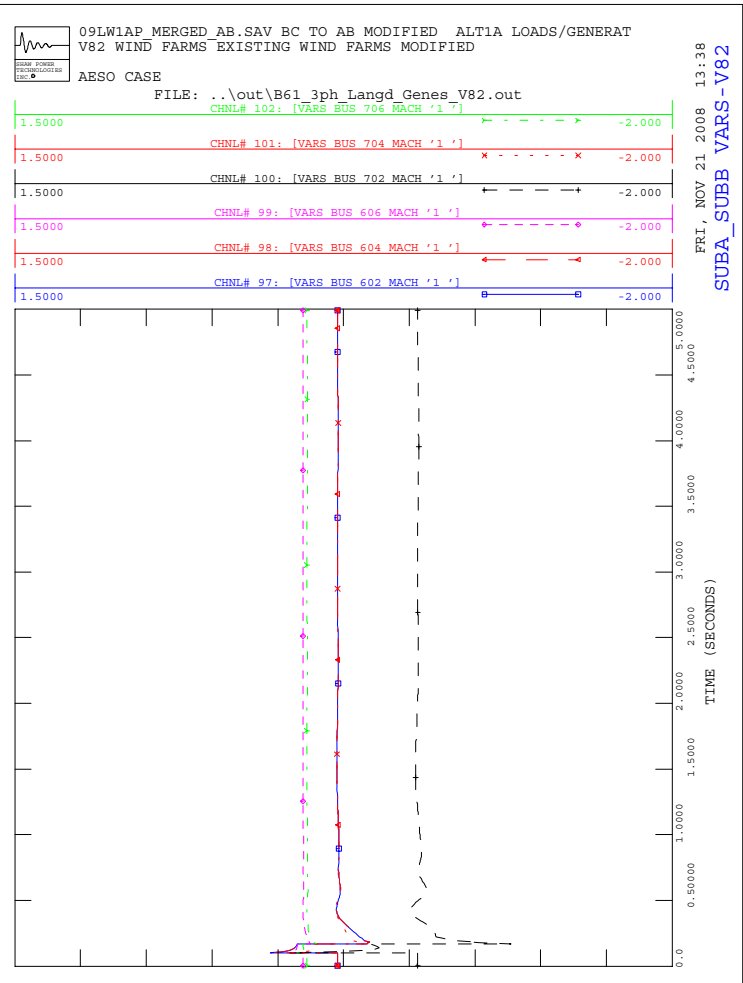
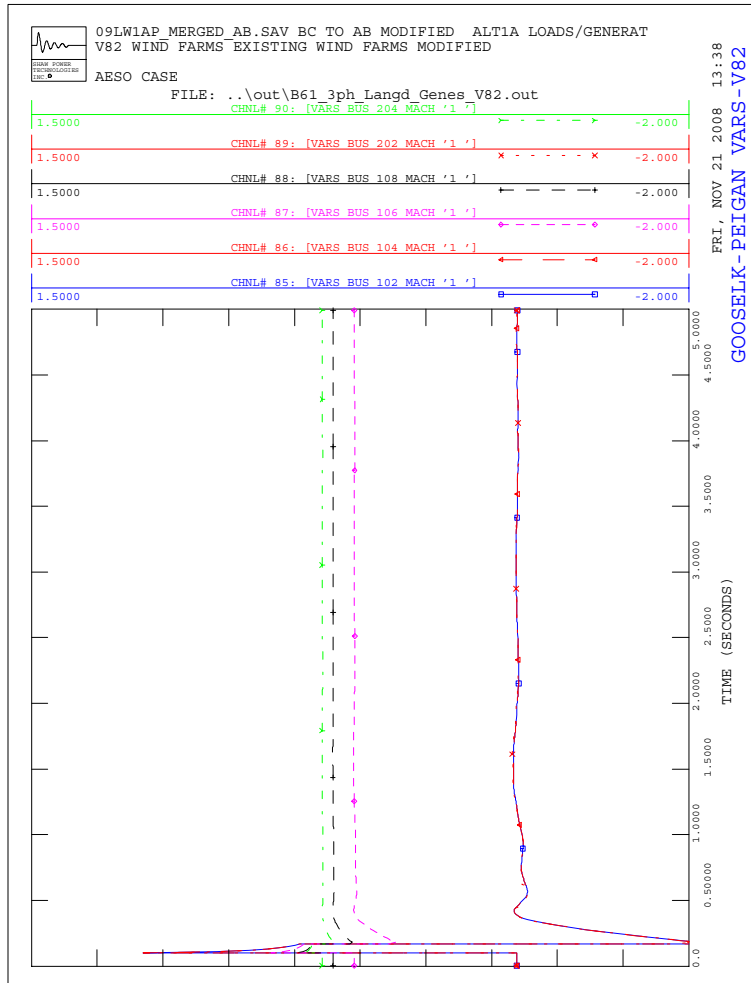


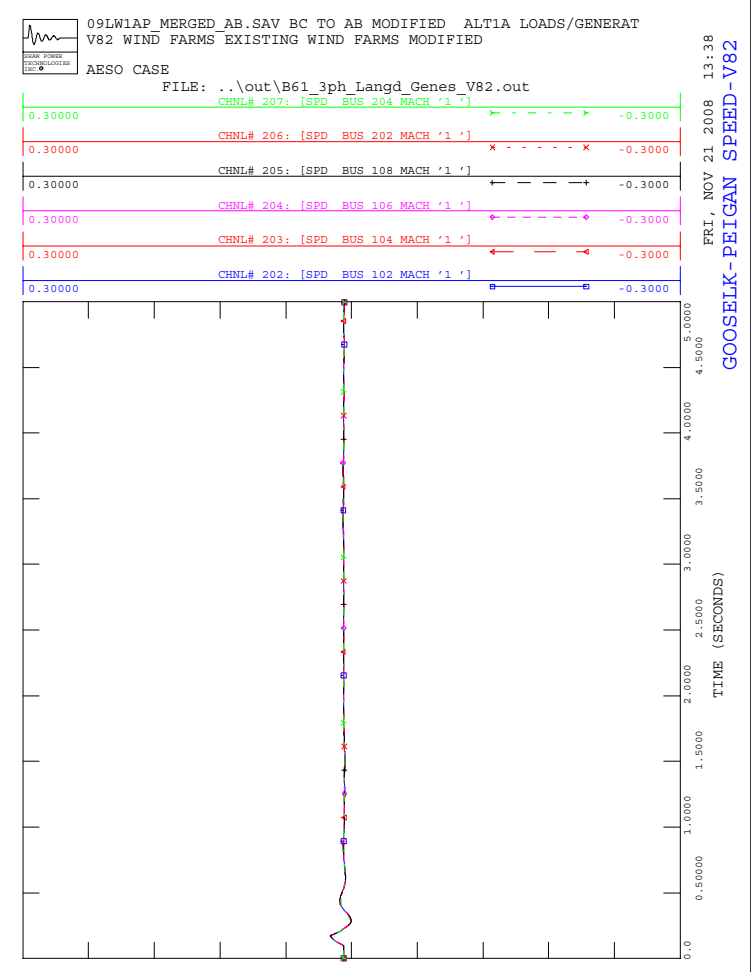
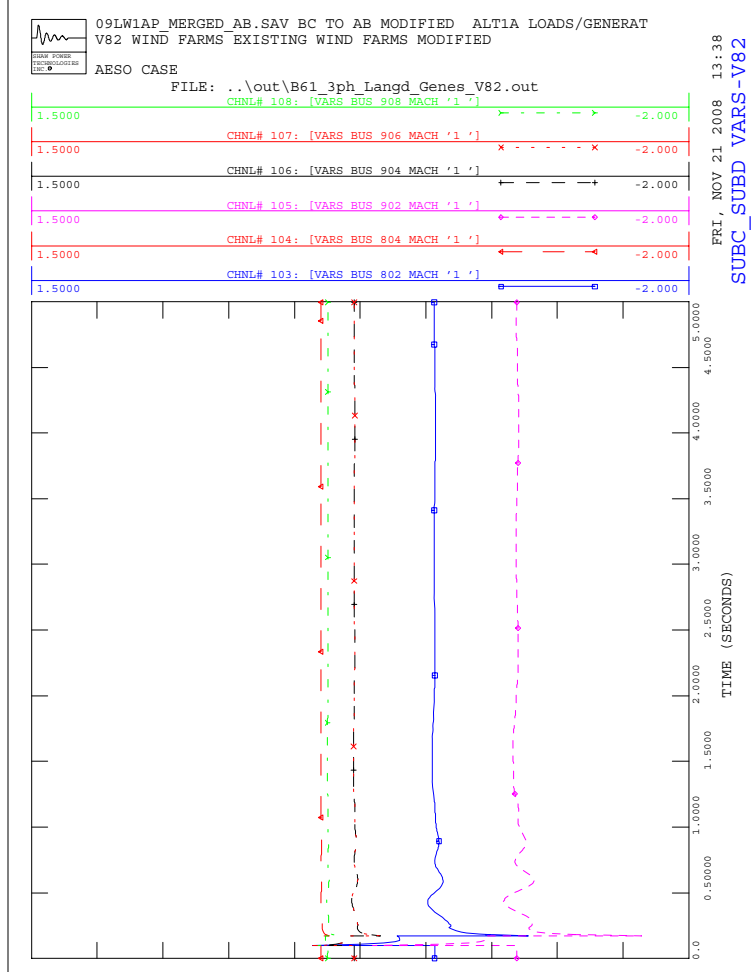
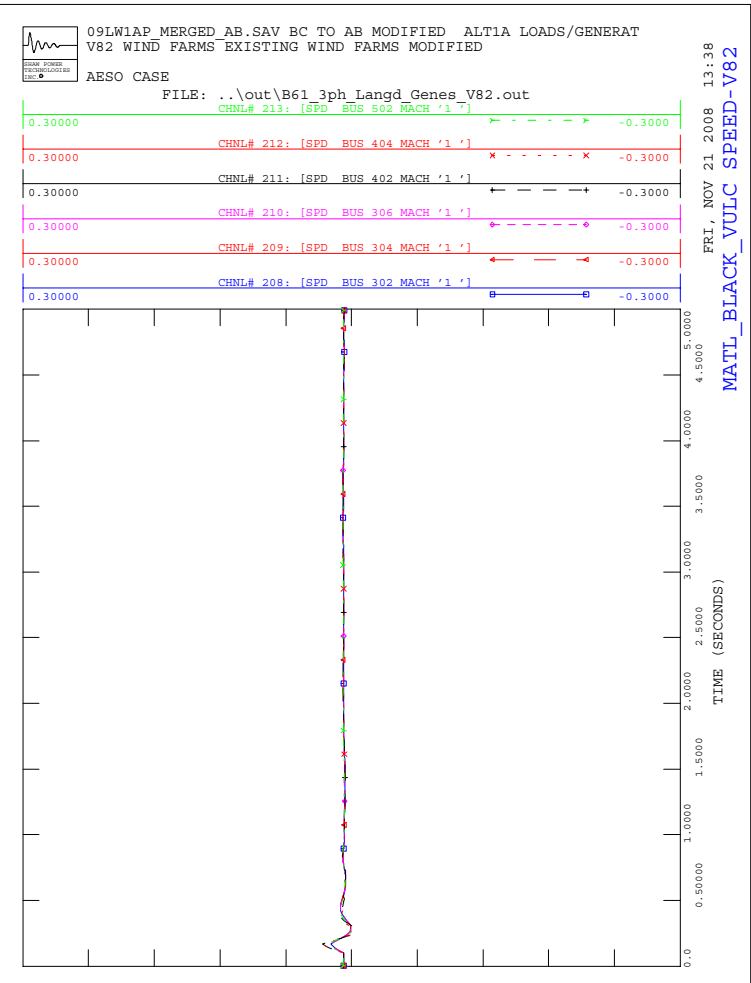
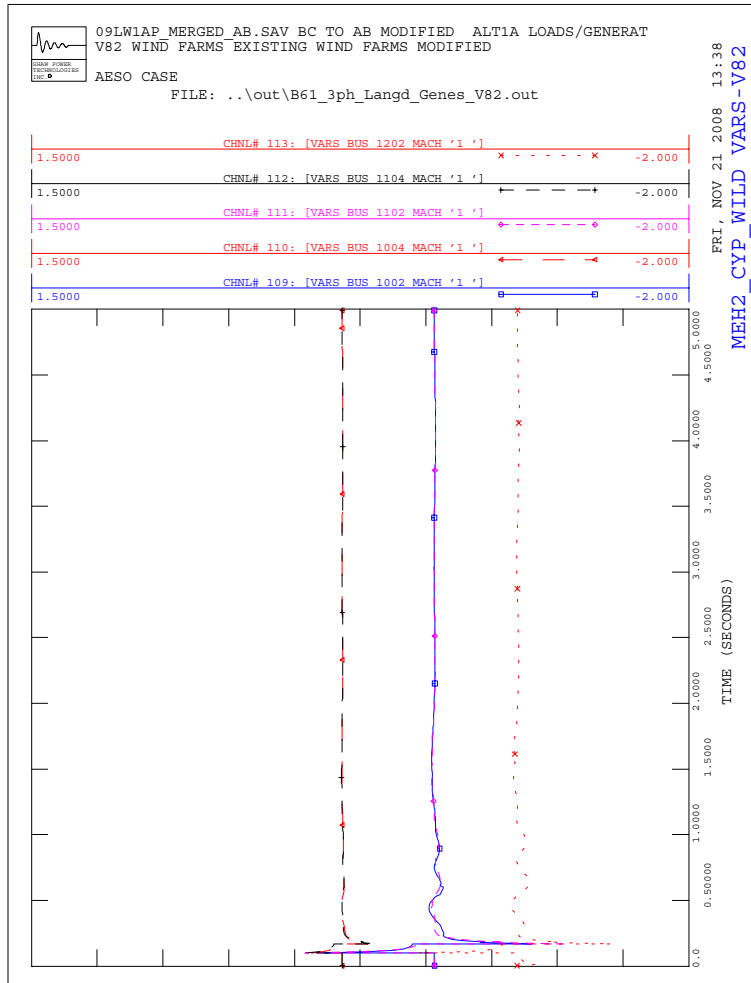
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\B56_3ph_Cypress_Jenner_V82.out

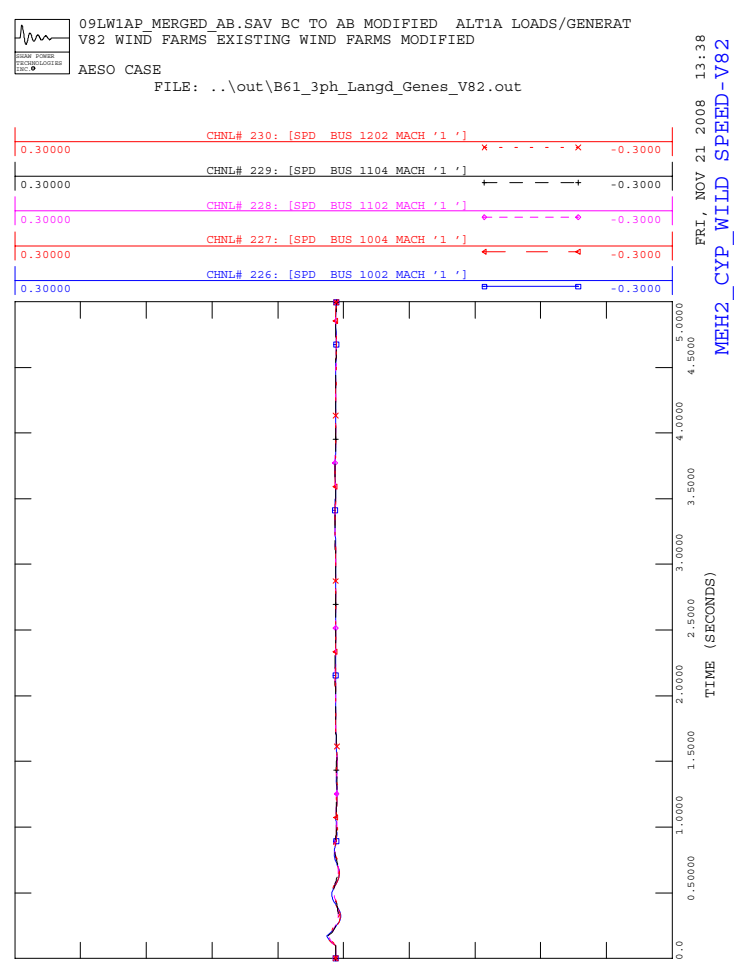
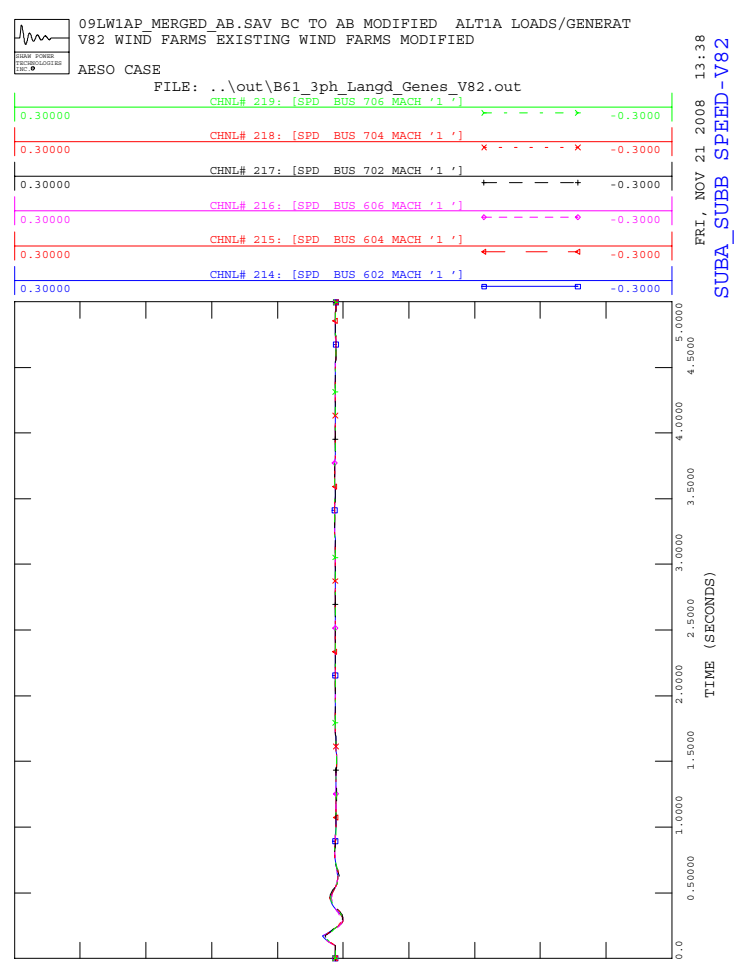
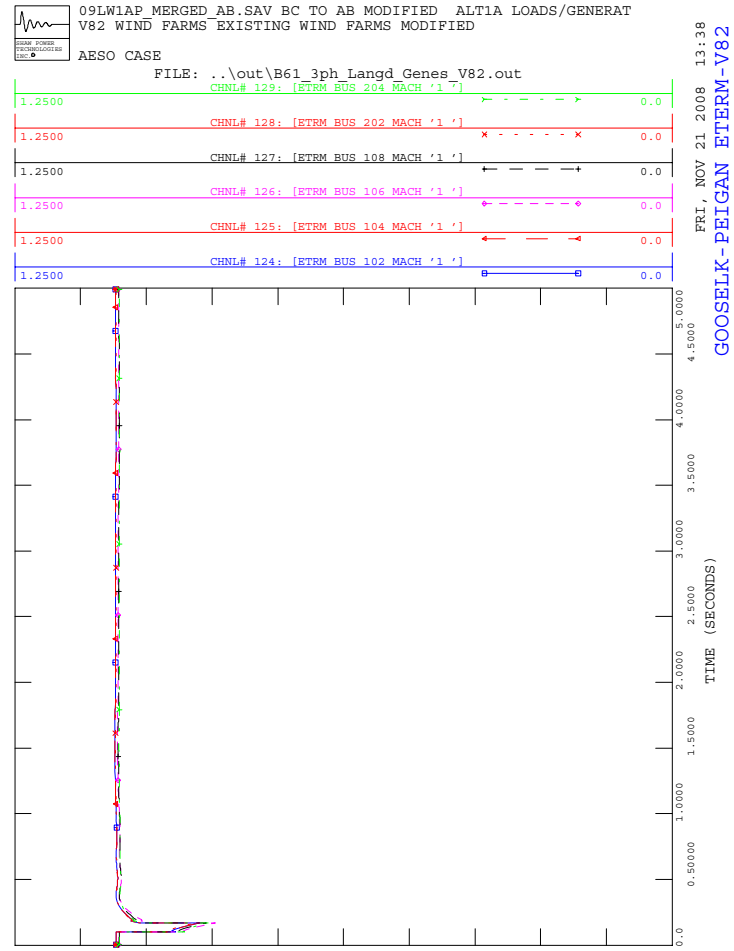
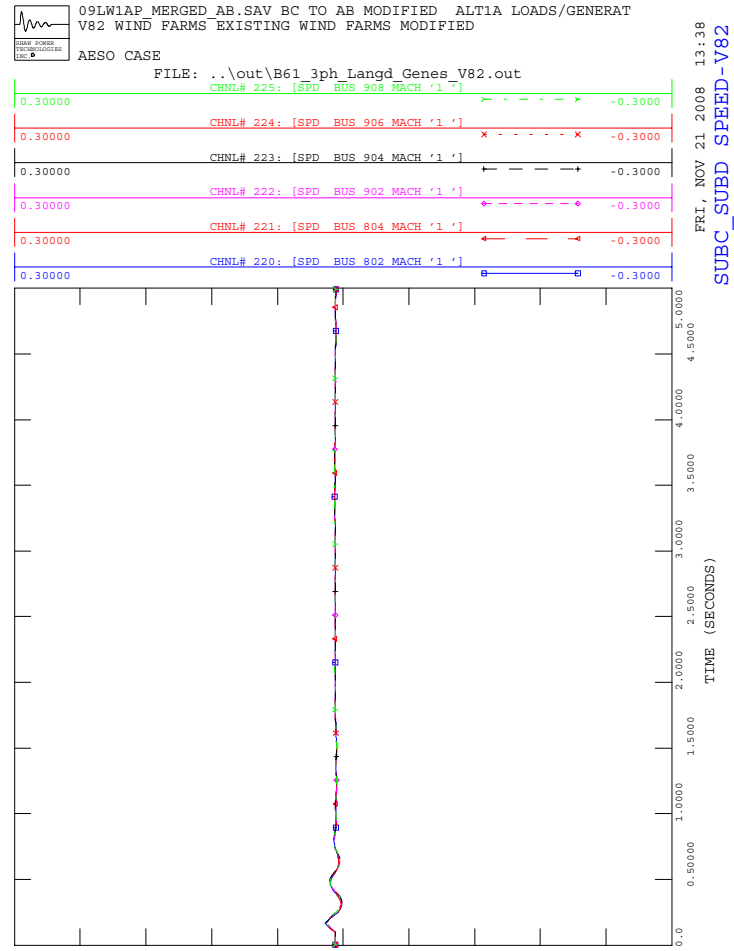
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AB_BC_TIE_FLOWS-V82

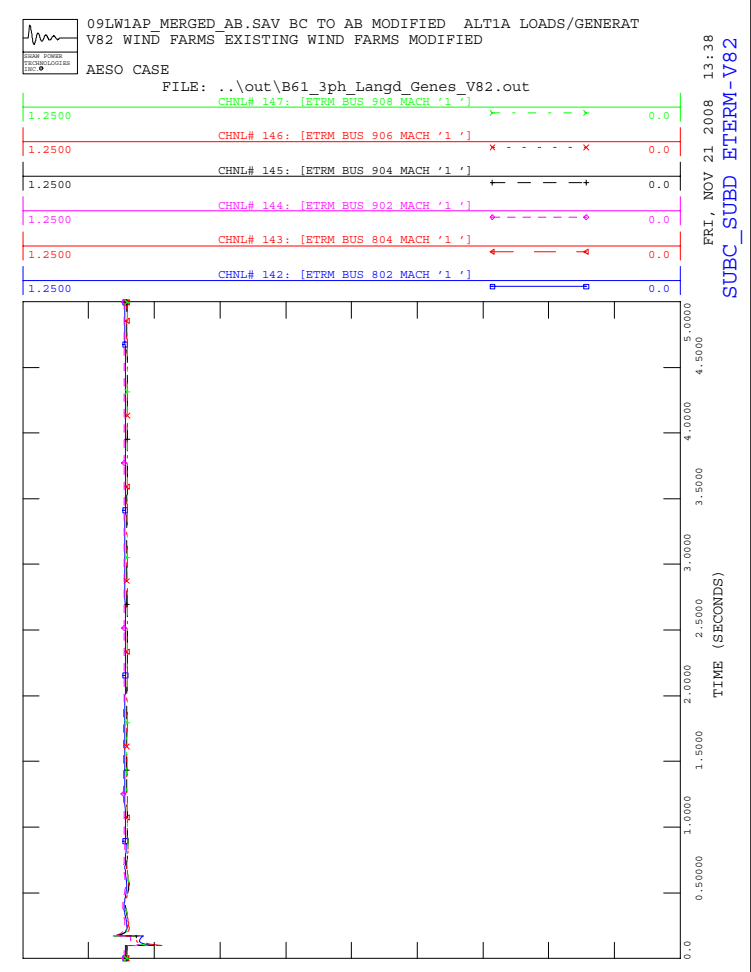
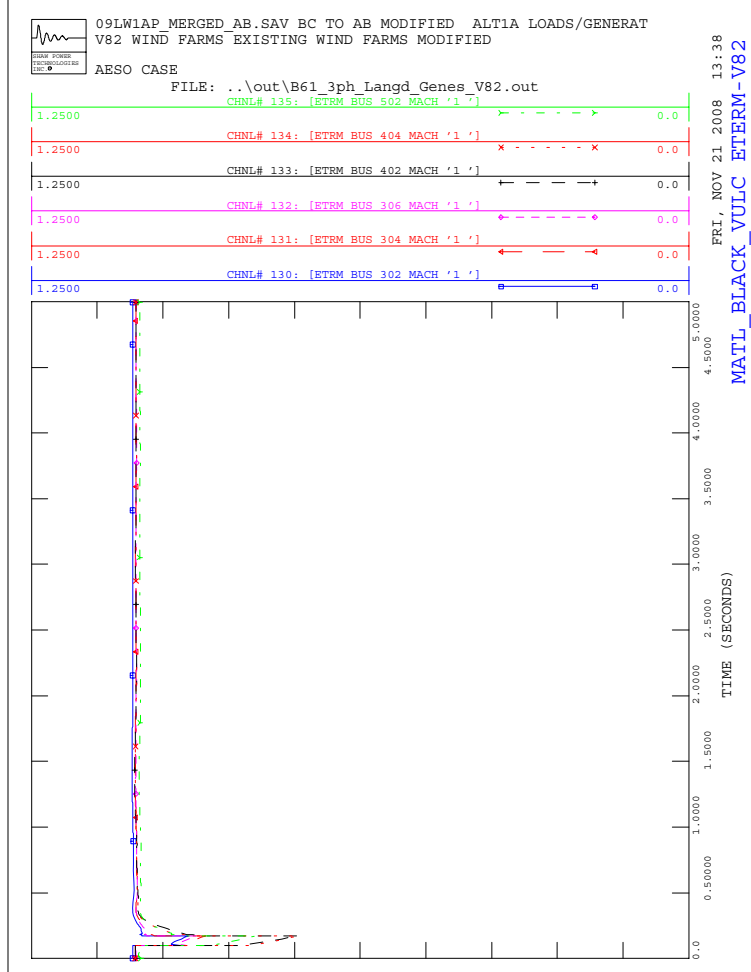
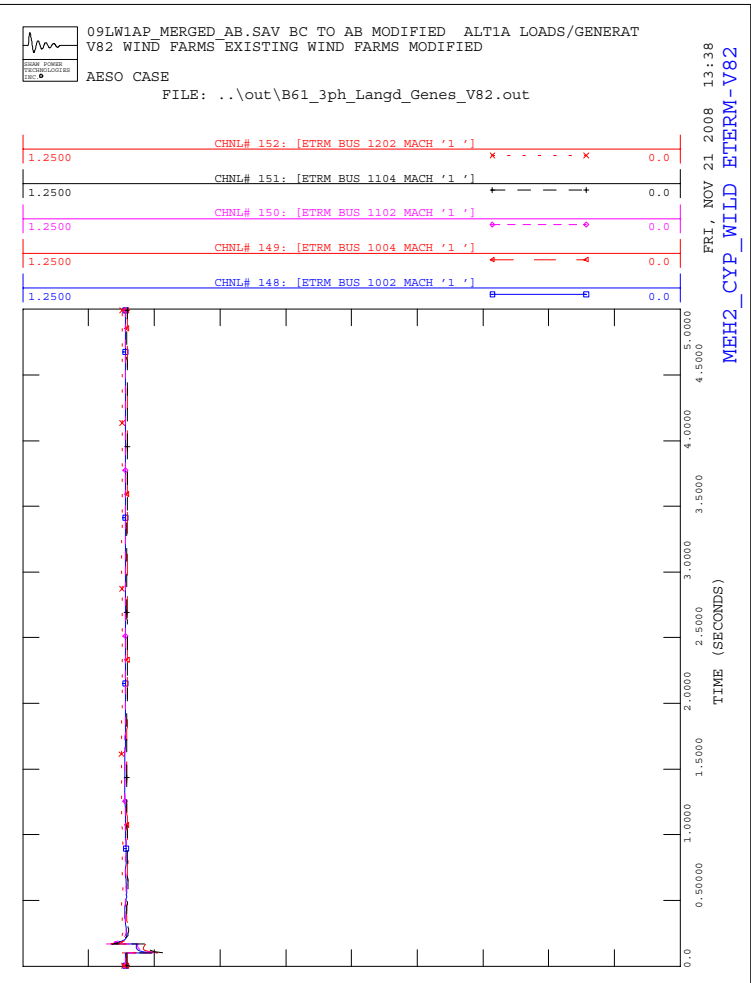
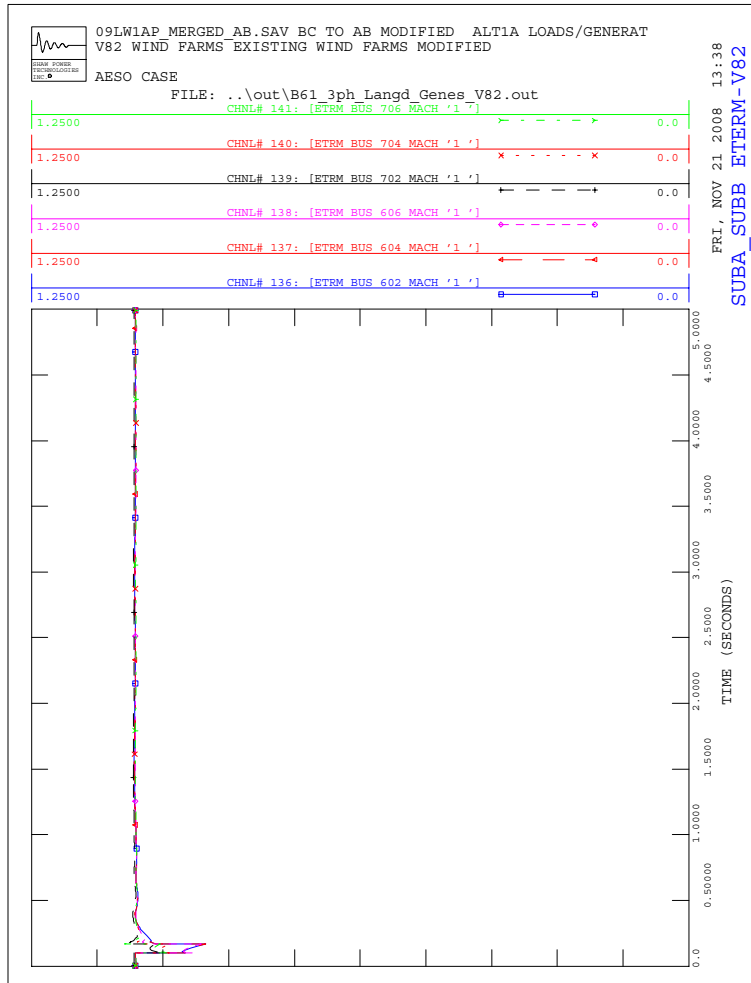


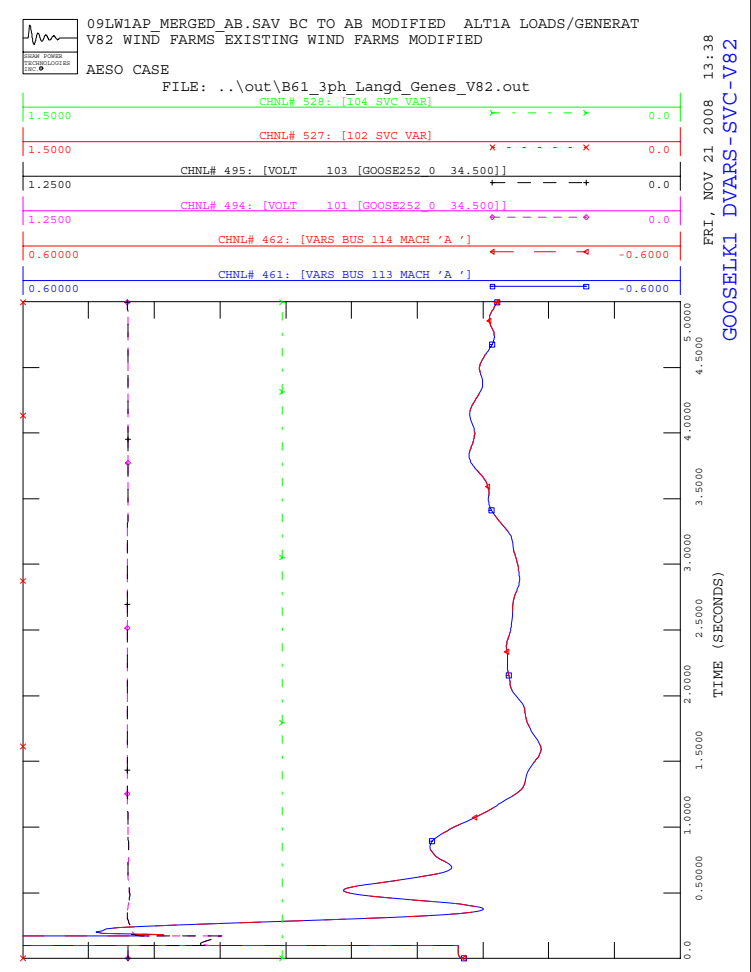
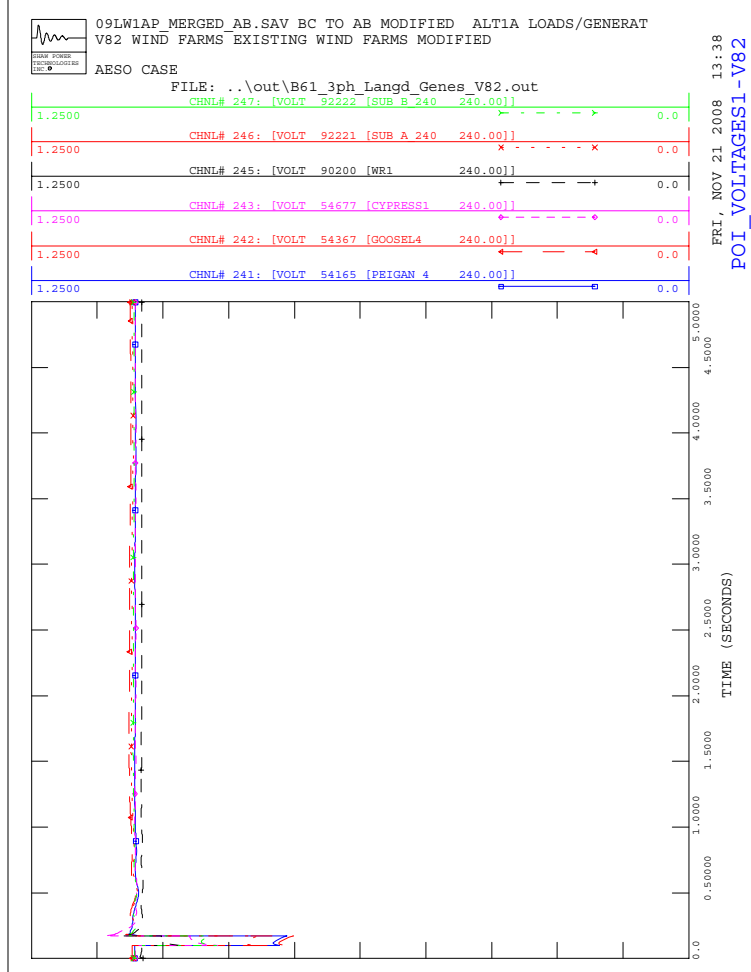
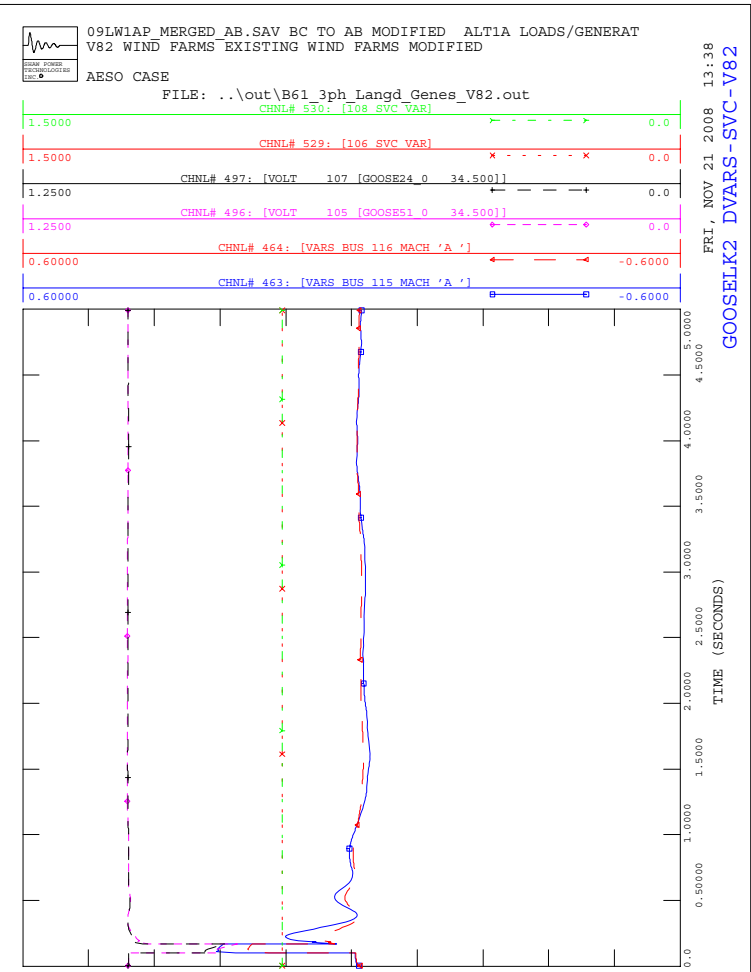
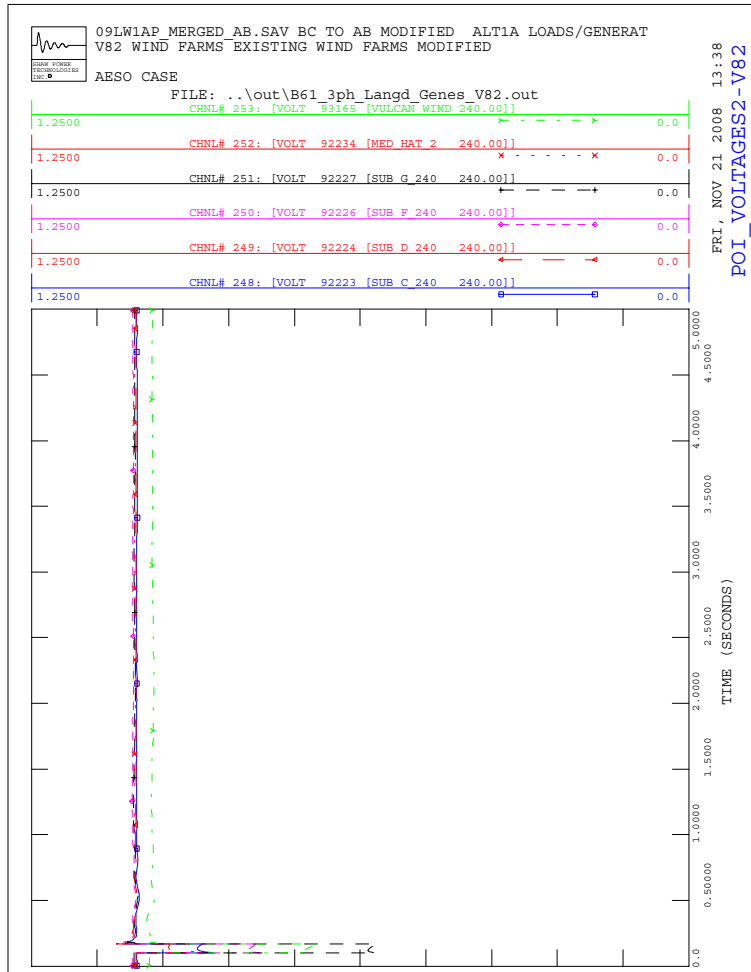


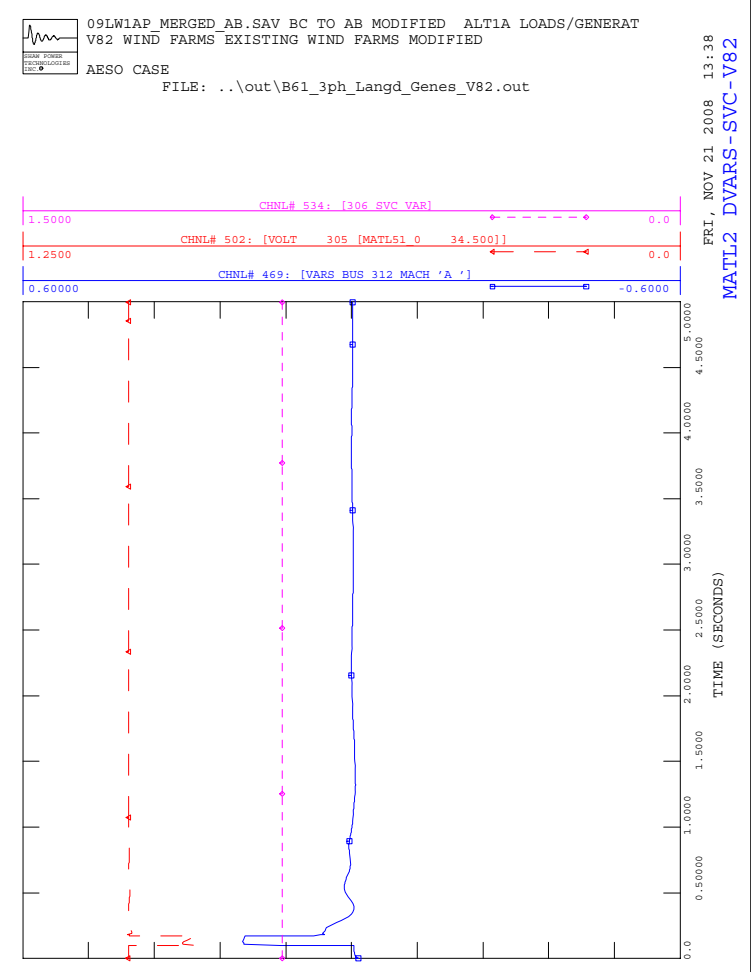
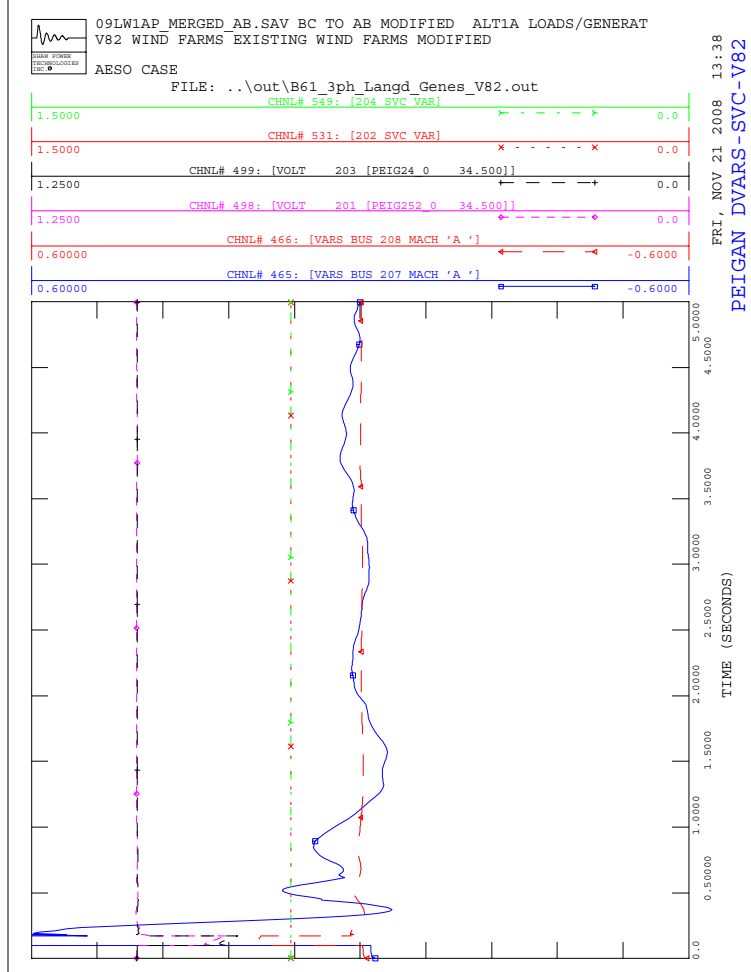
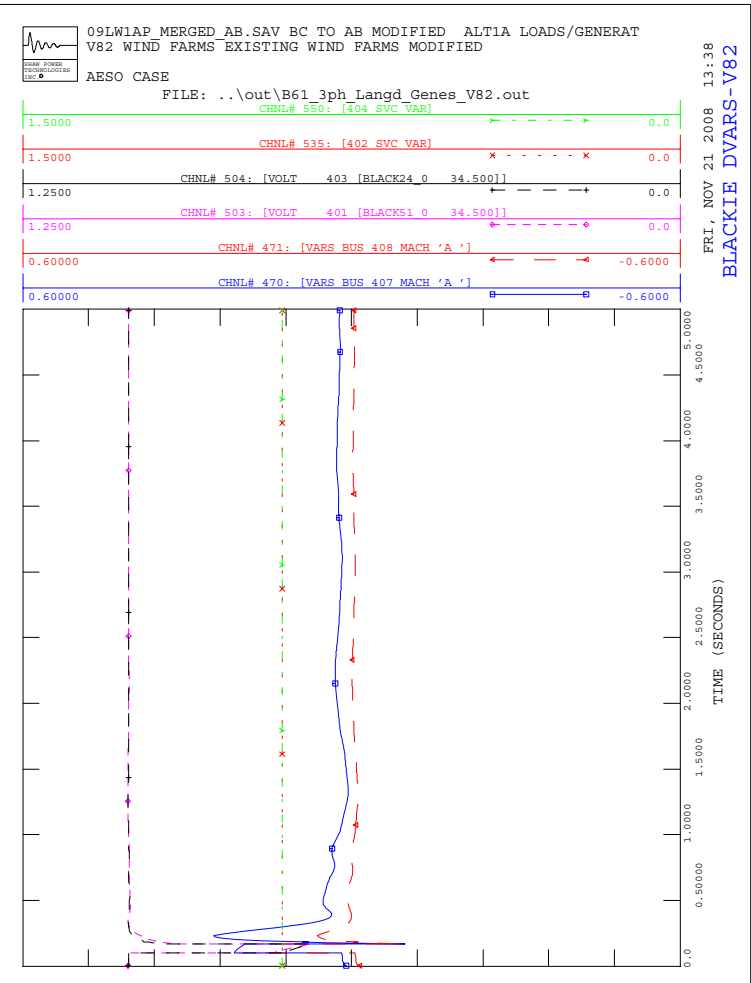
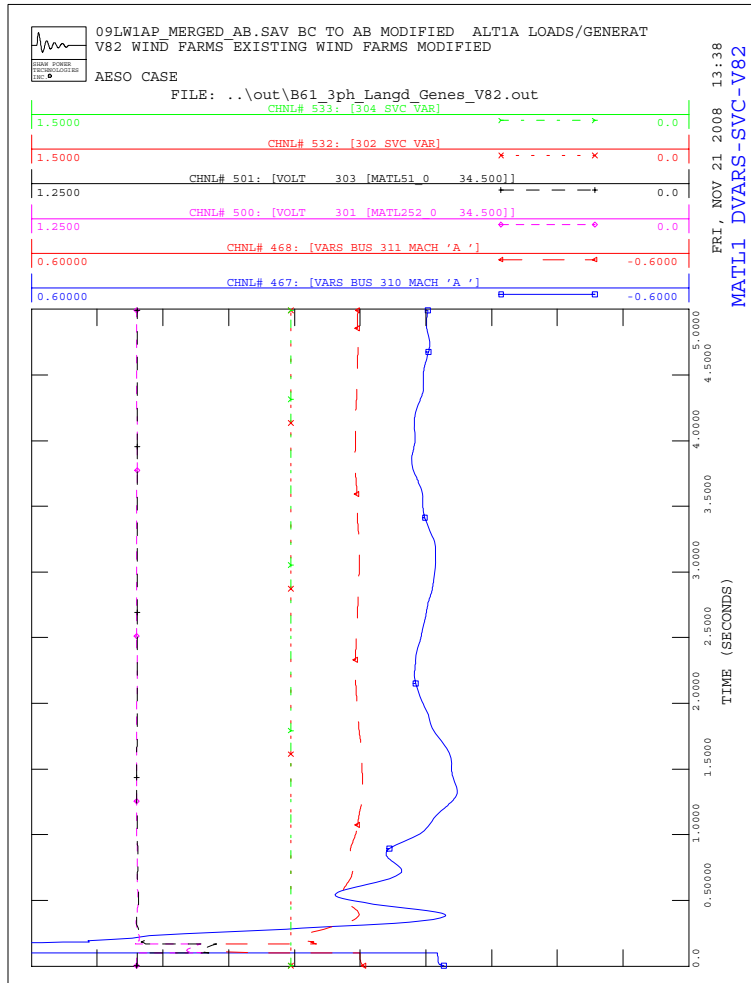


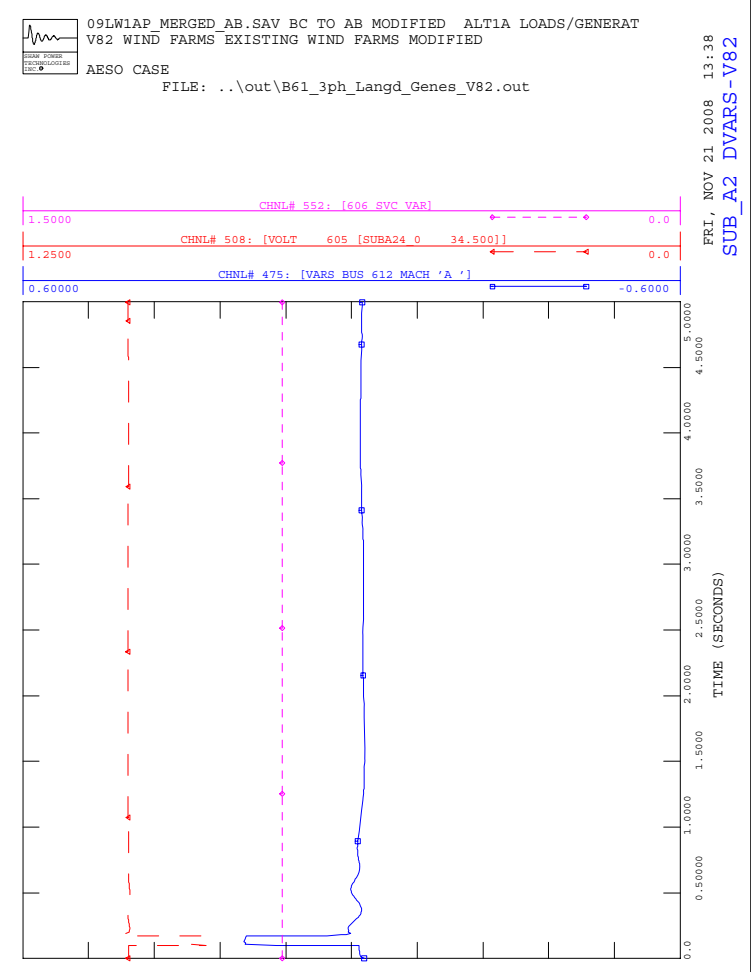
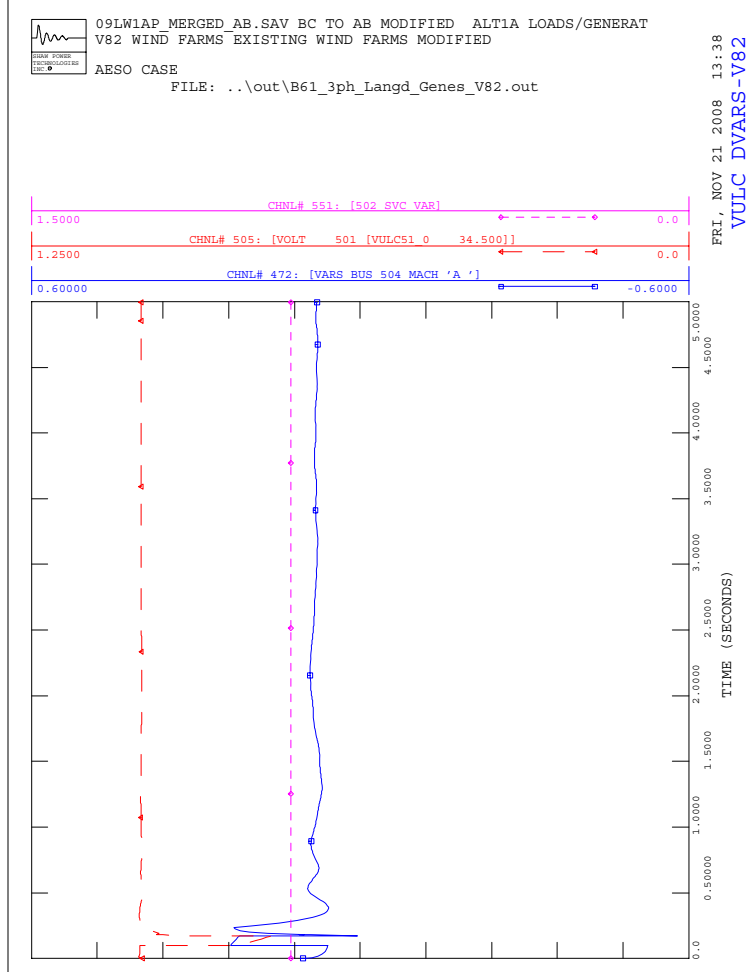
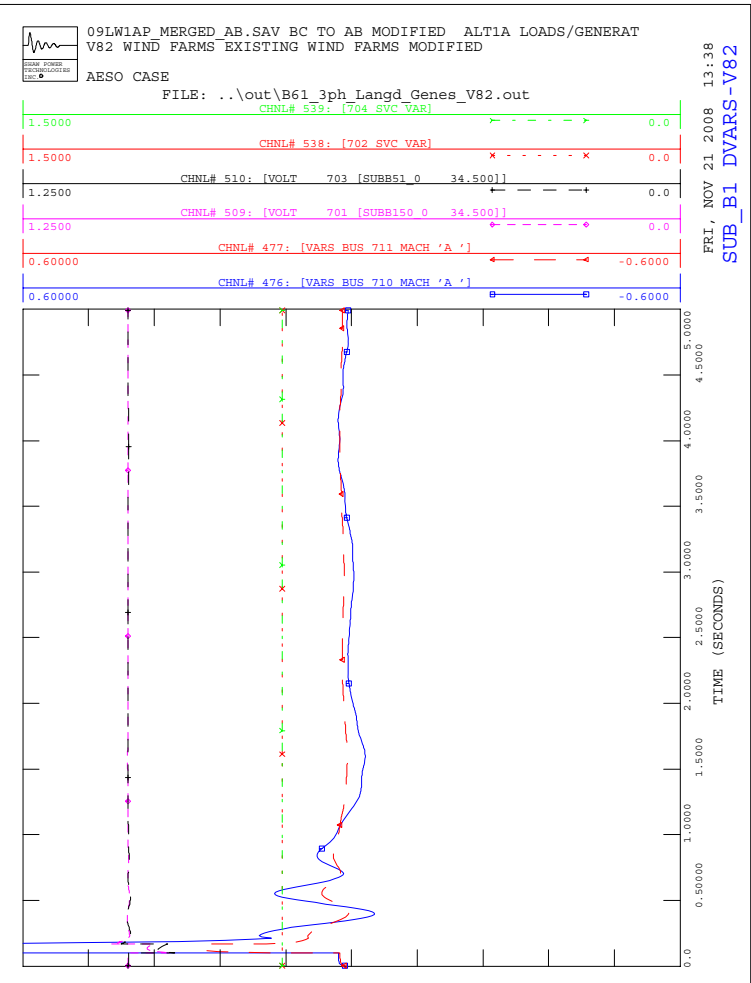
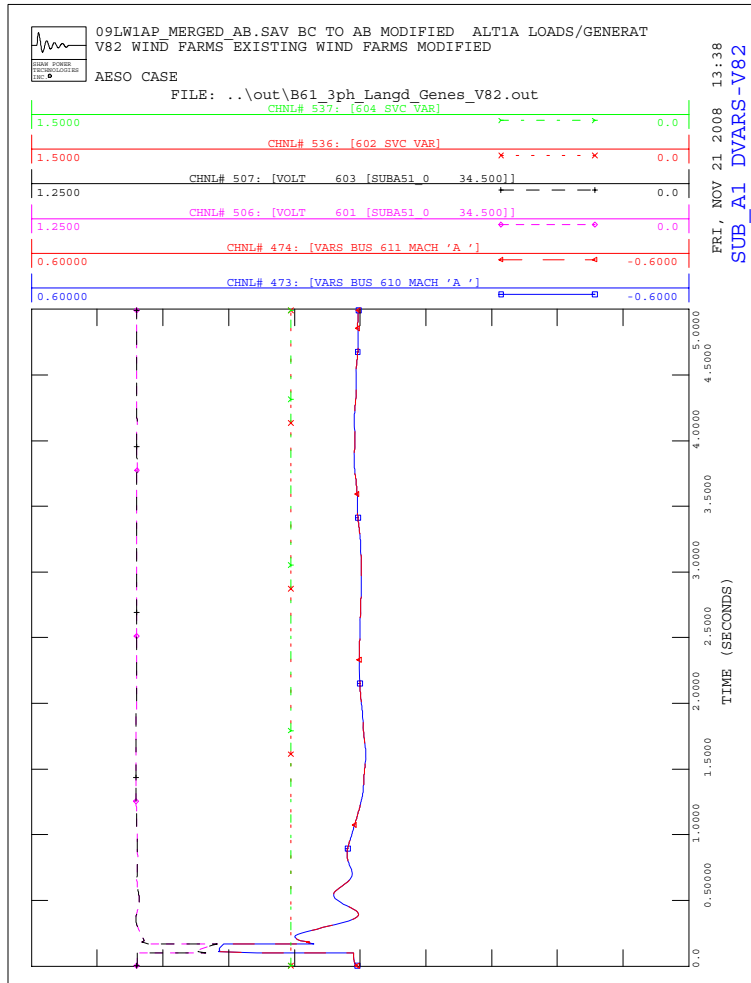


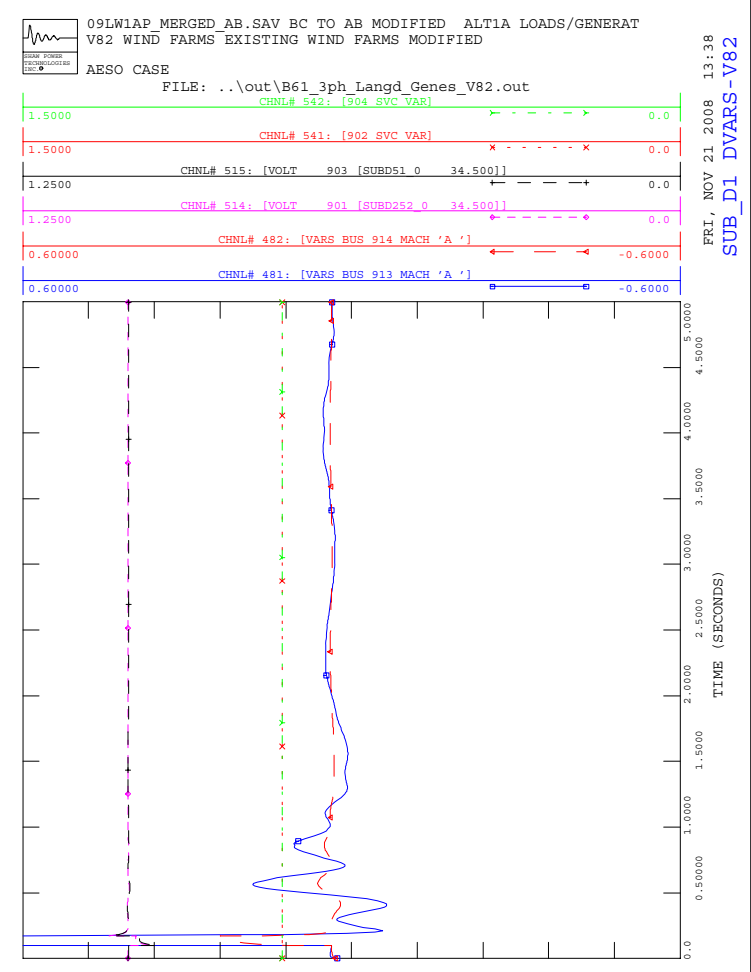
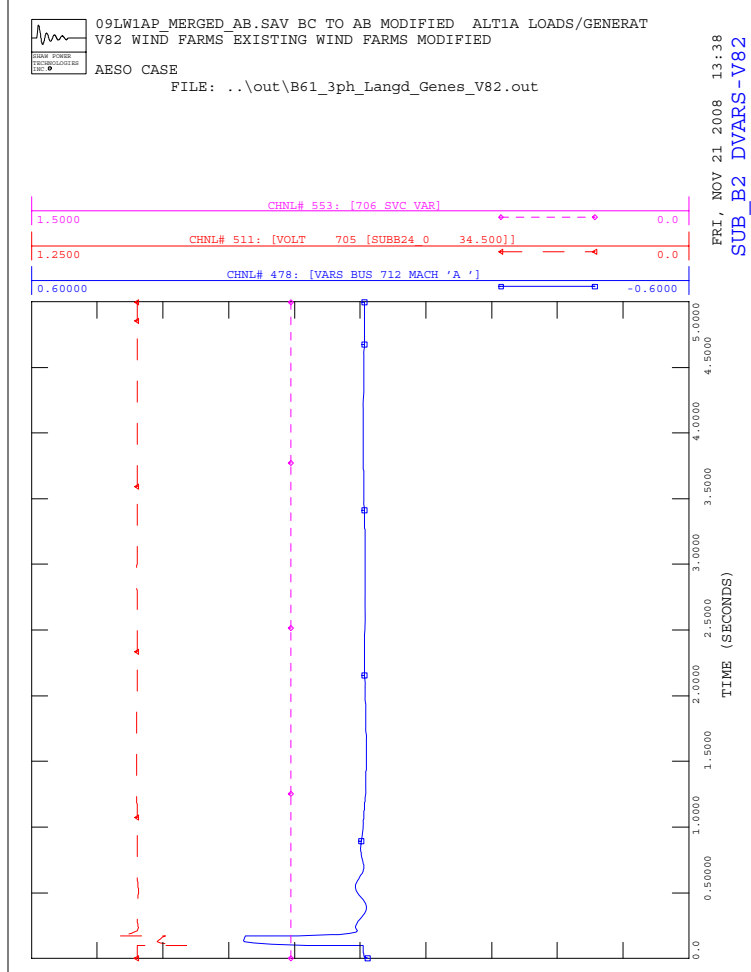
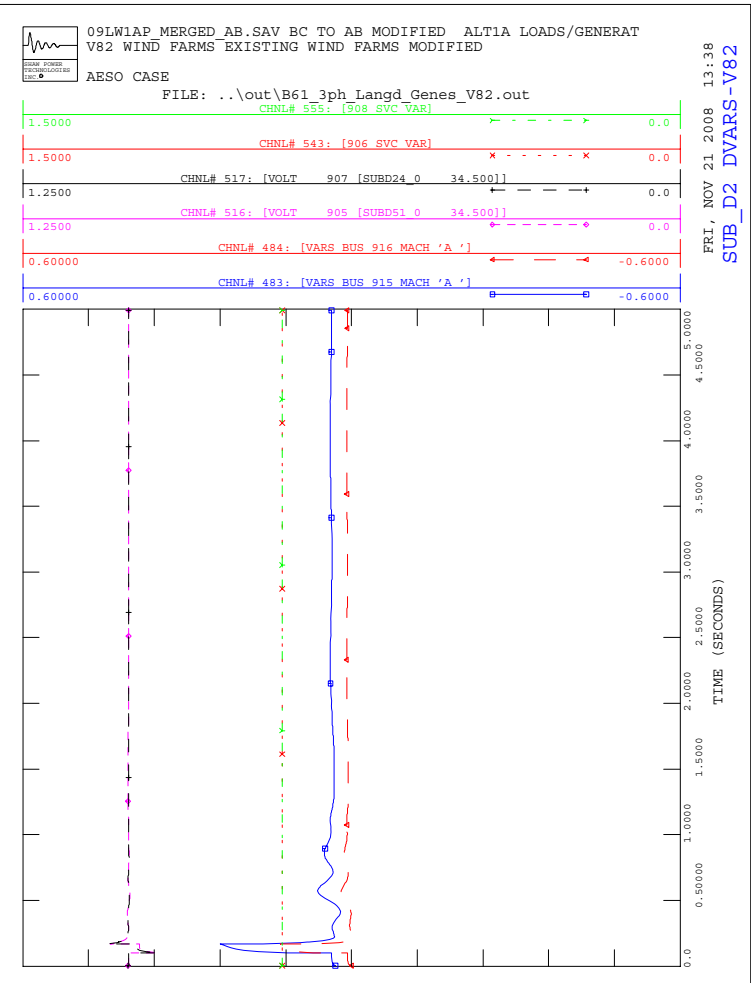
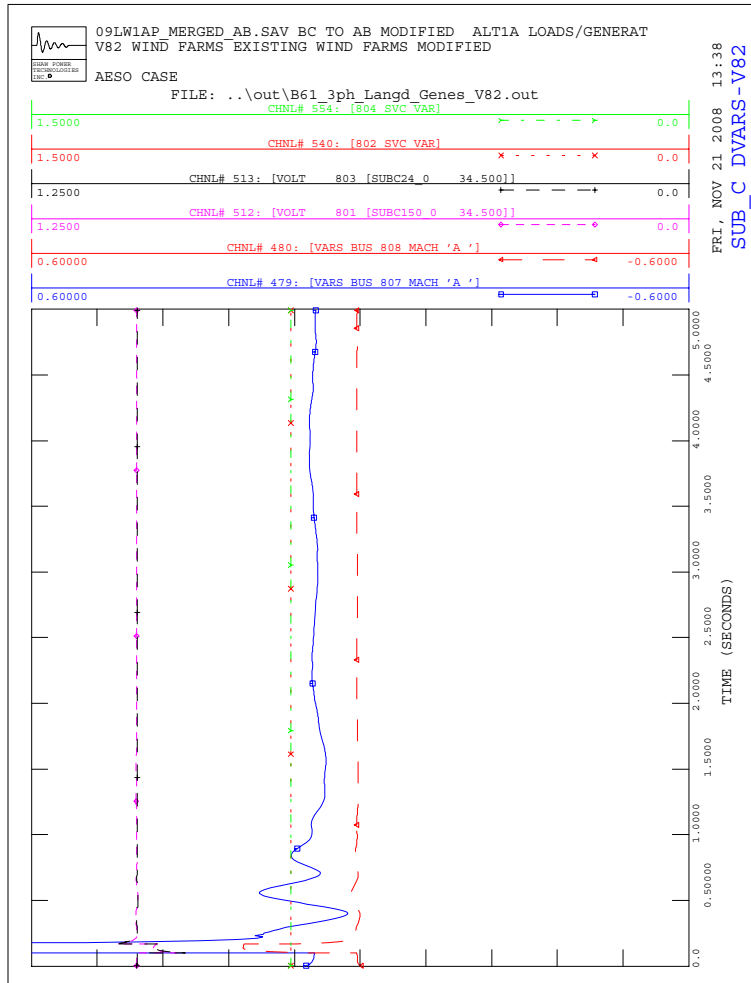


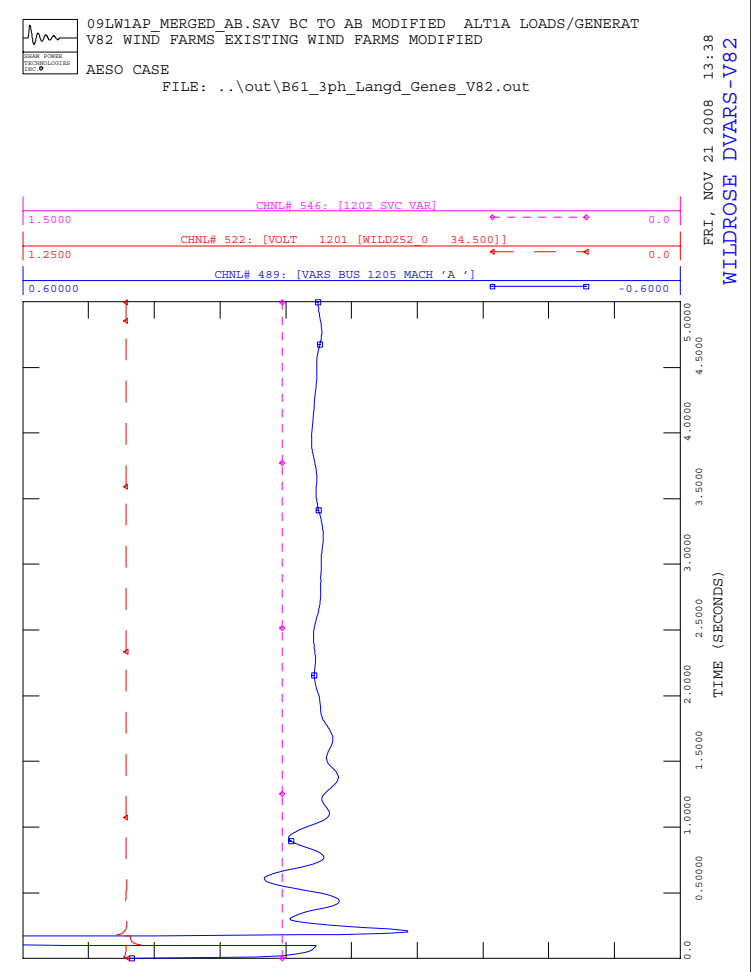
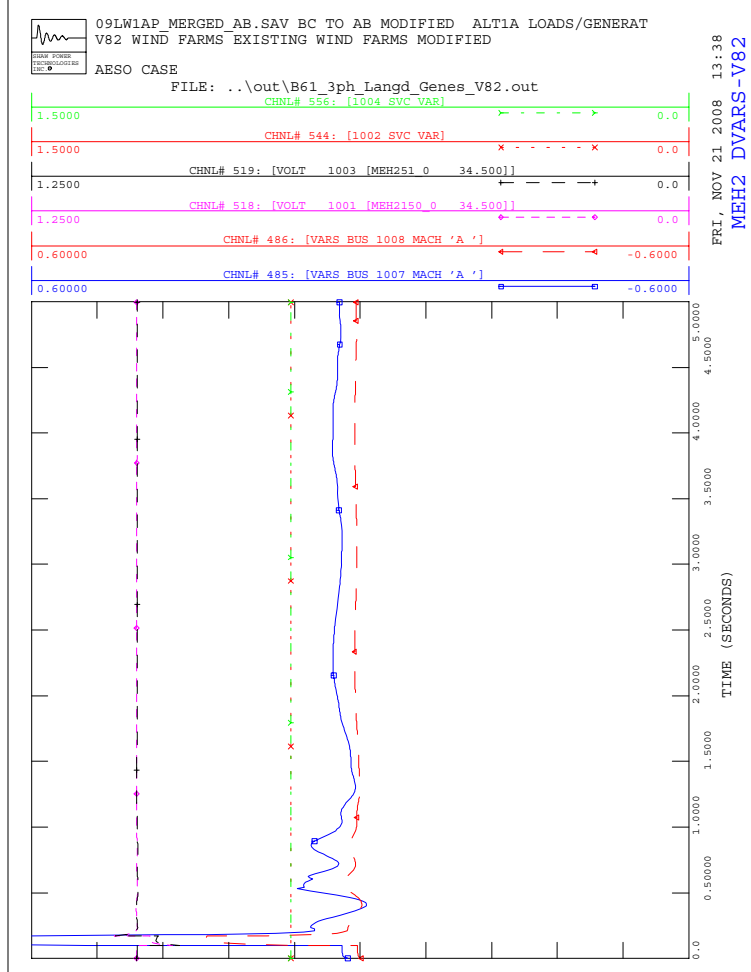
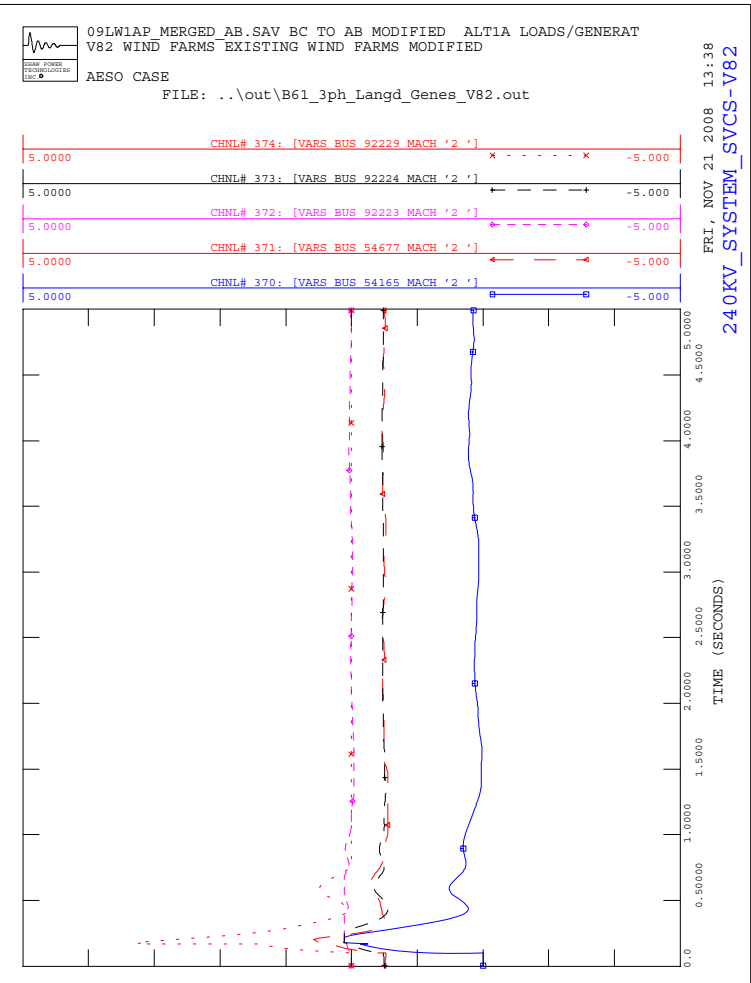
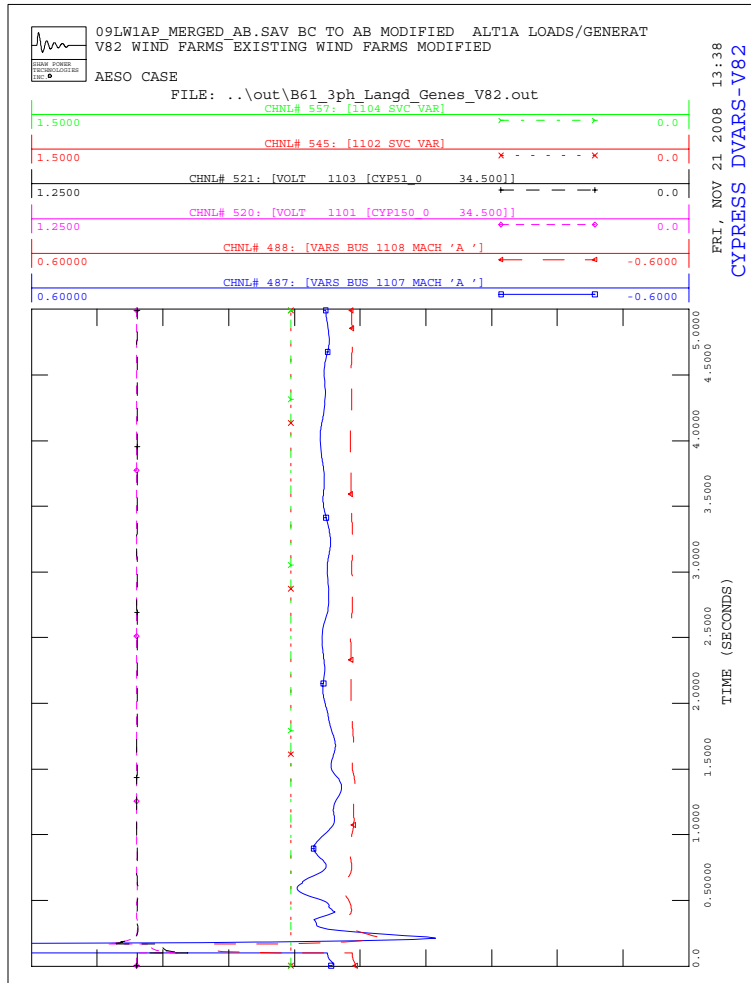












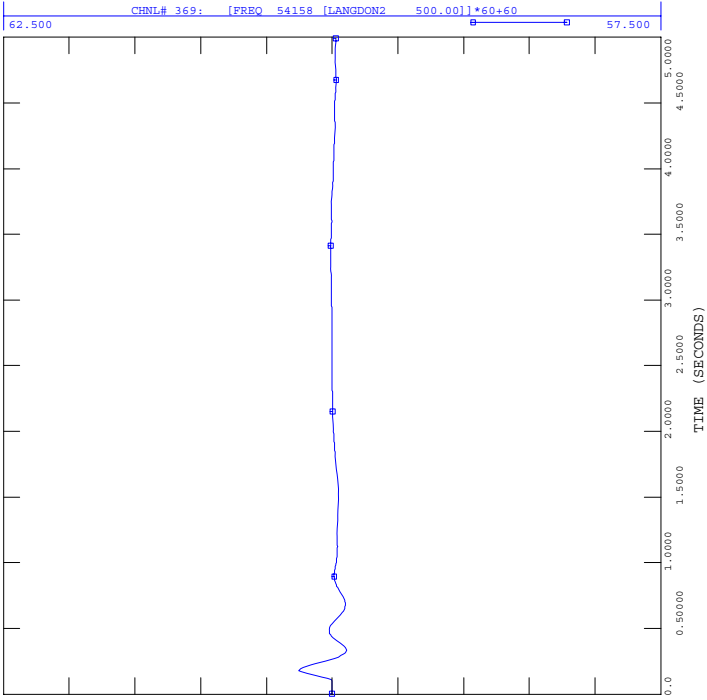


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\B61_3ph_Langd_Genes_V82.out

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LANGDON_FRQ-V82

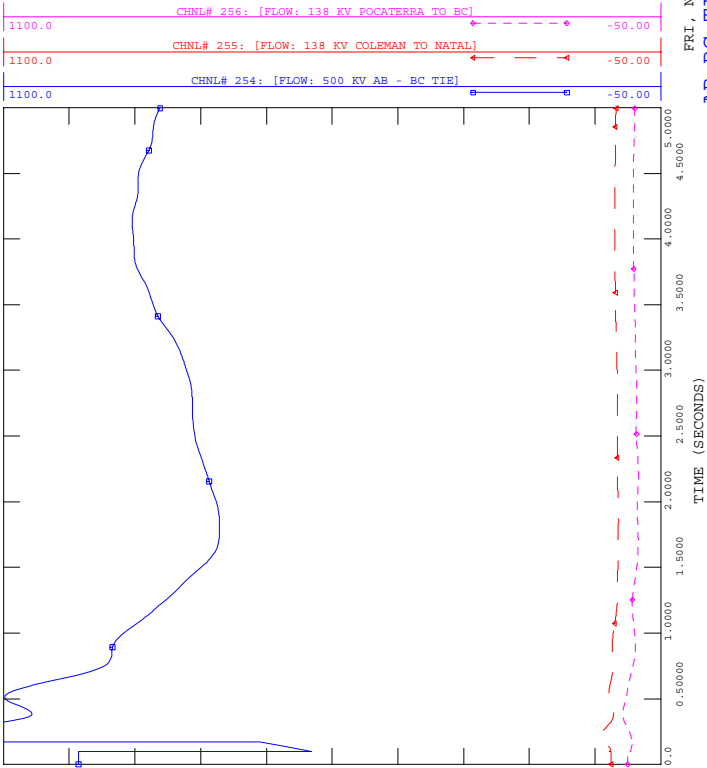


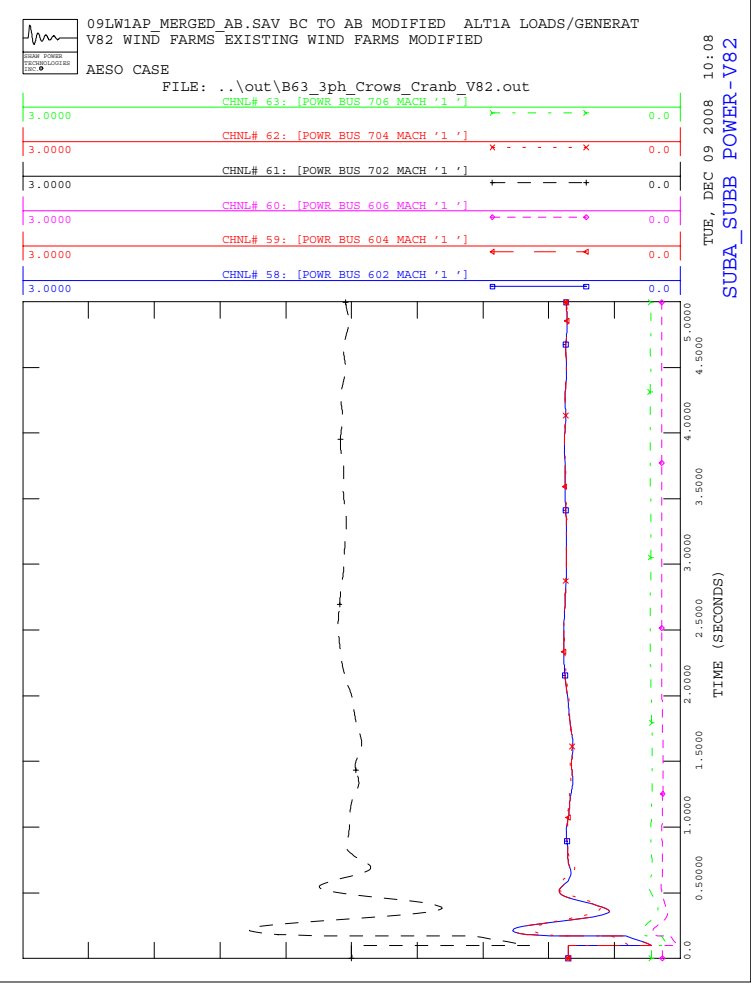
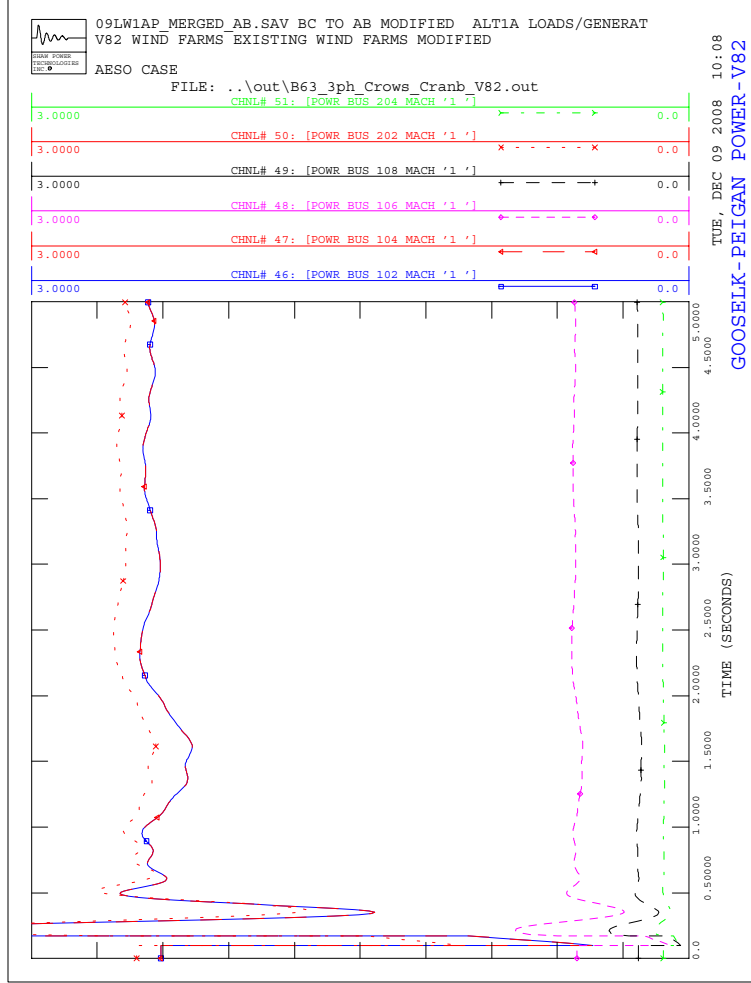
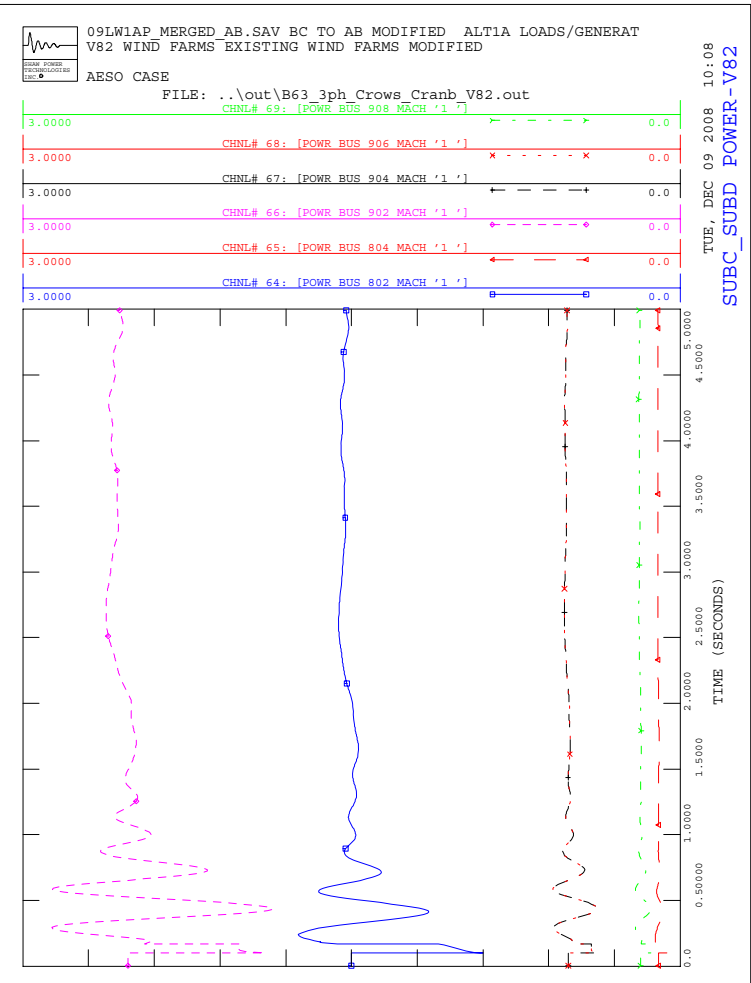
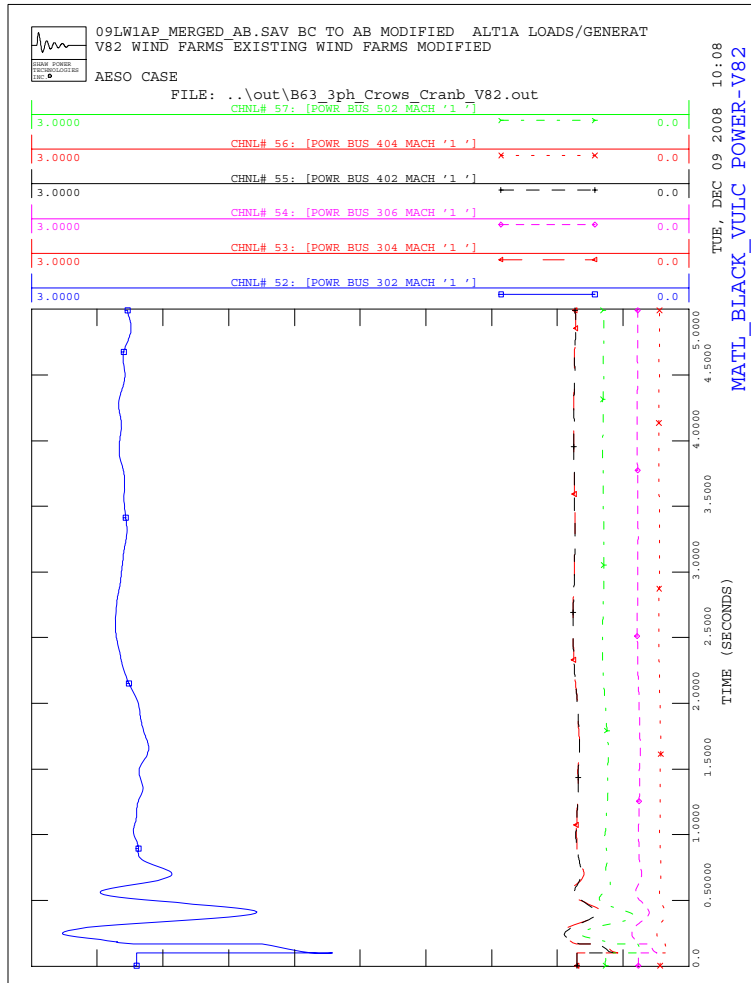
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

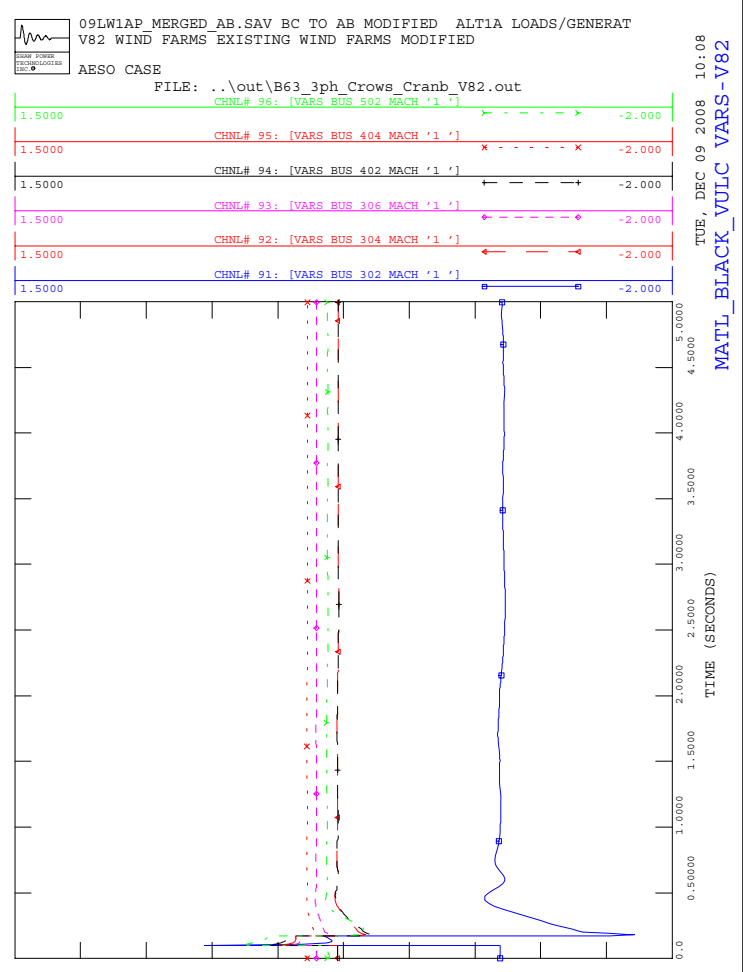
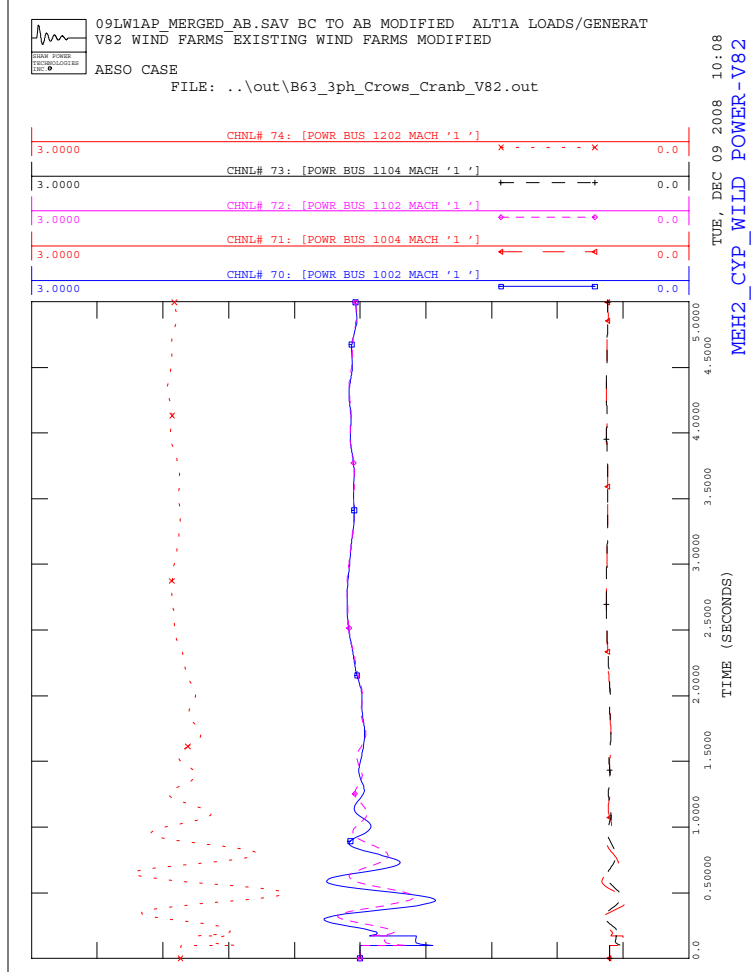
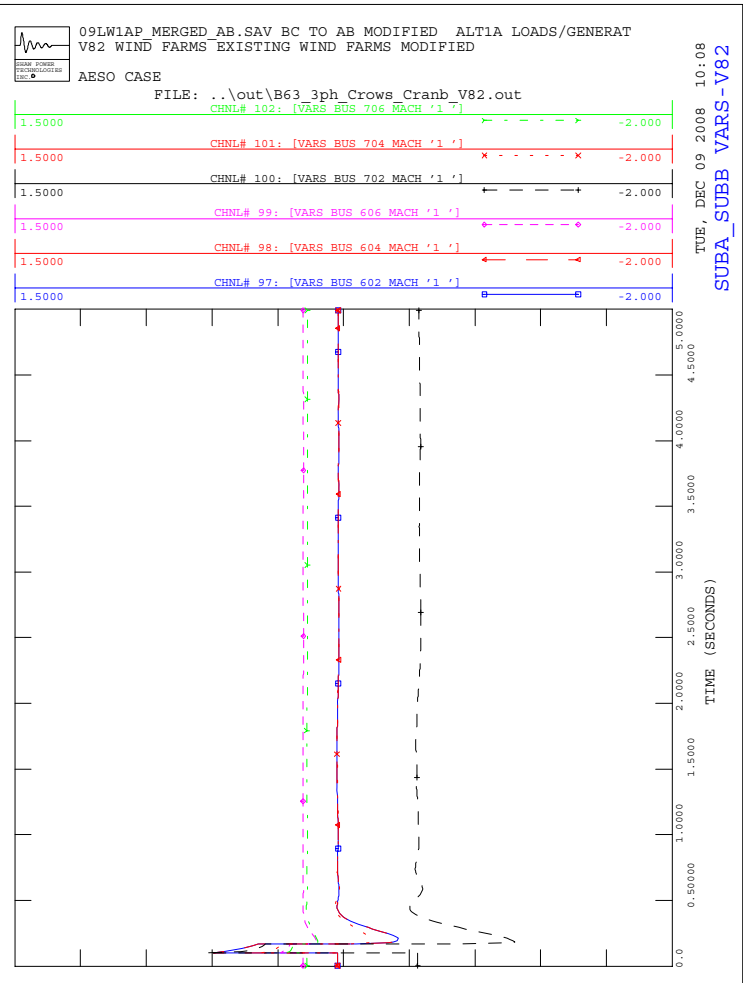
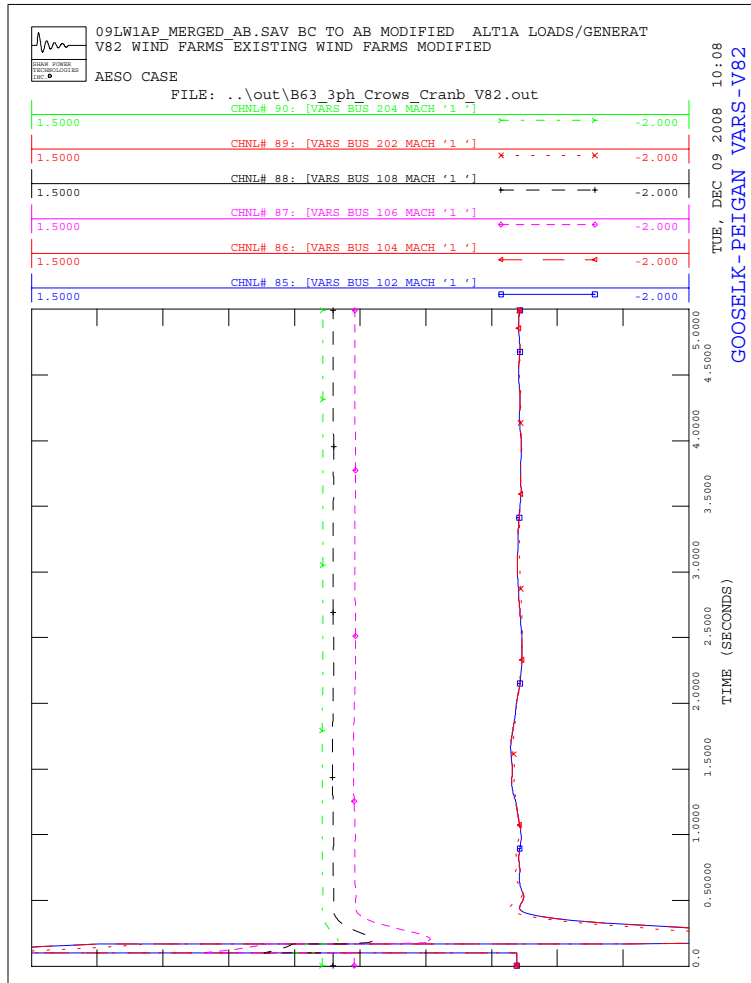
ABSO CASE

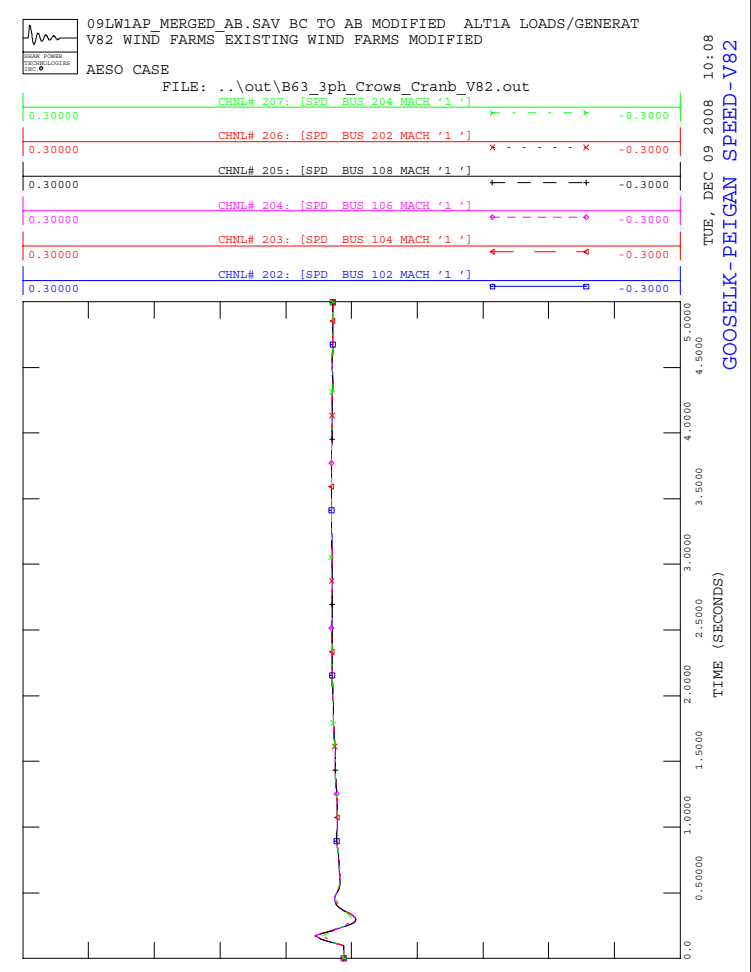
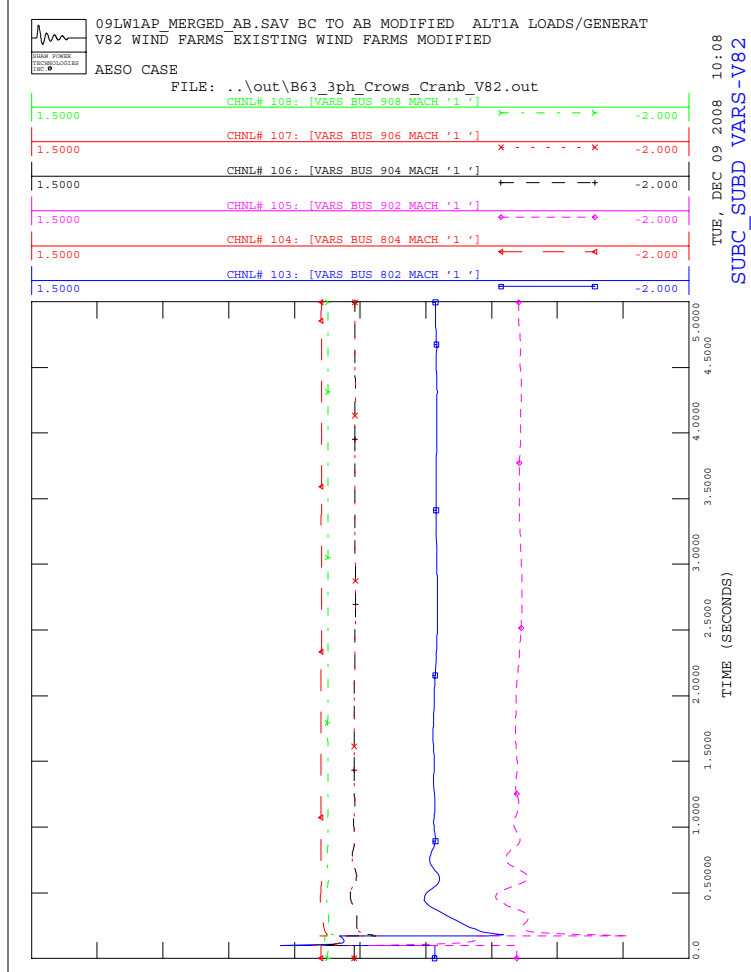
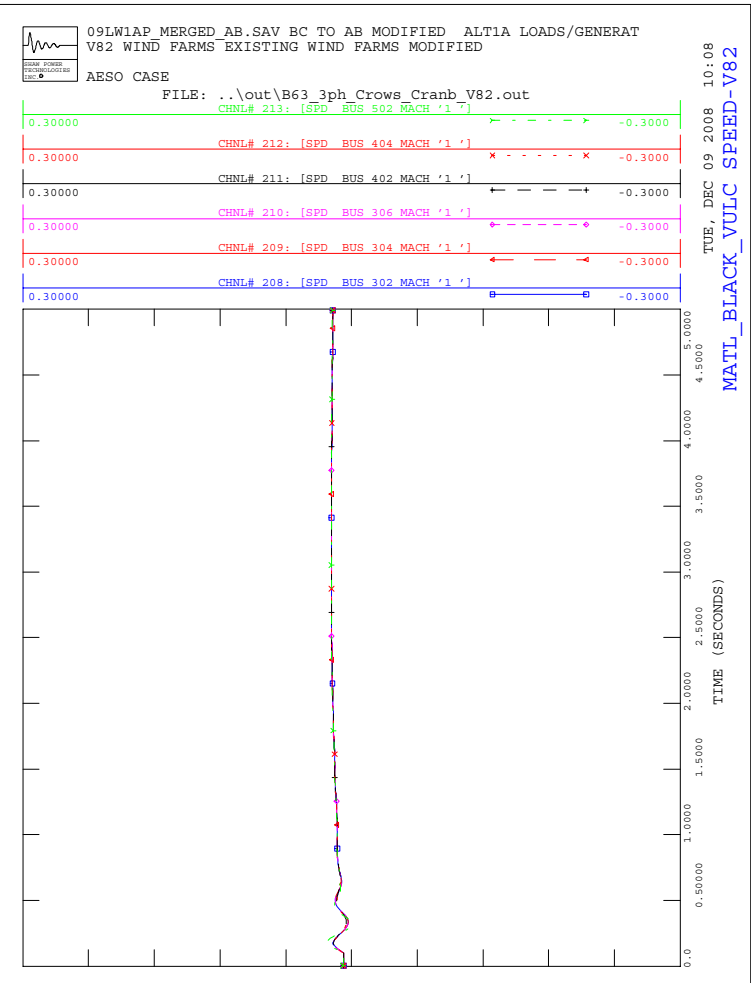
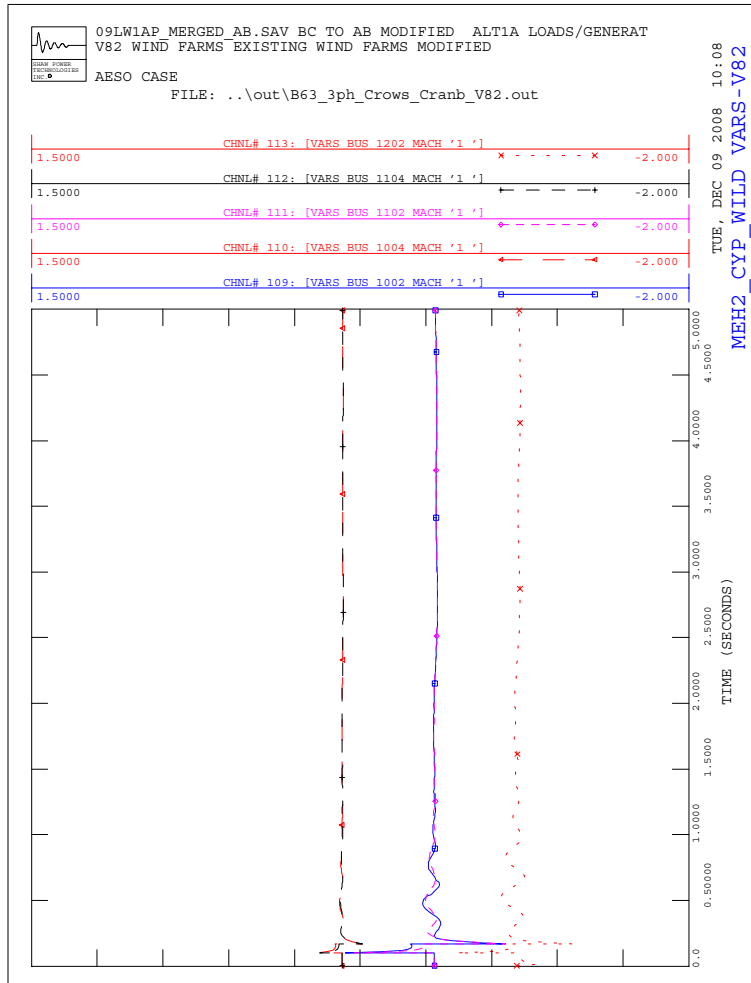
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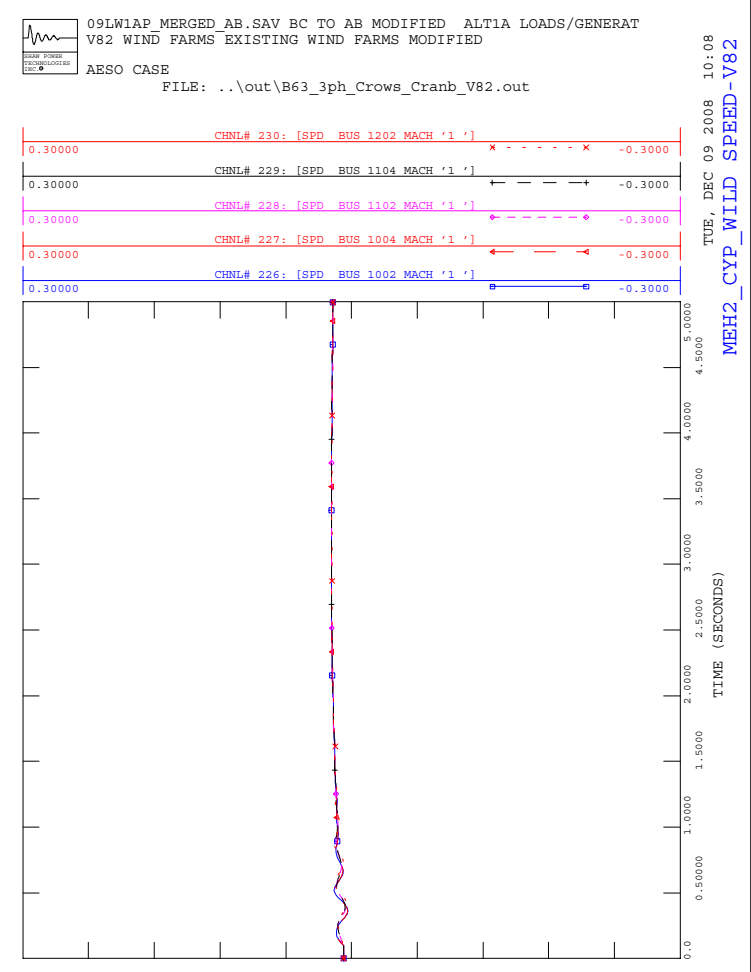
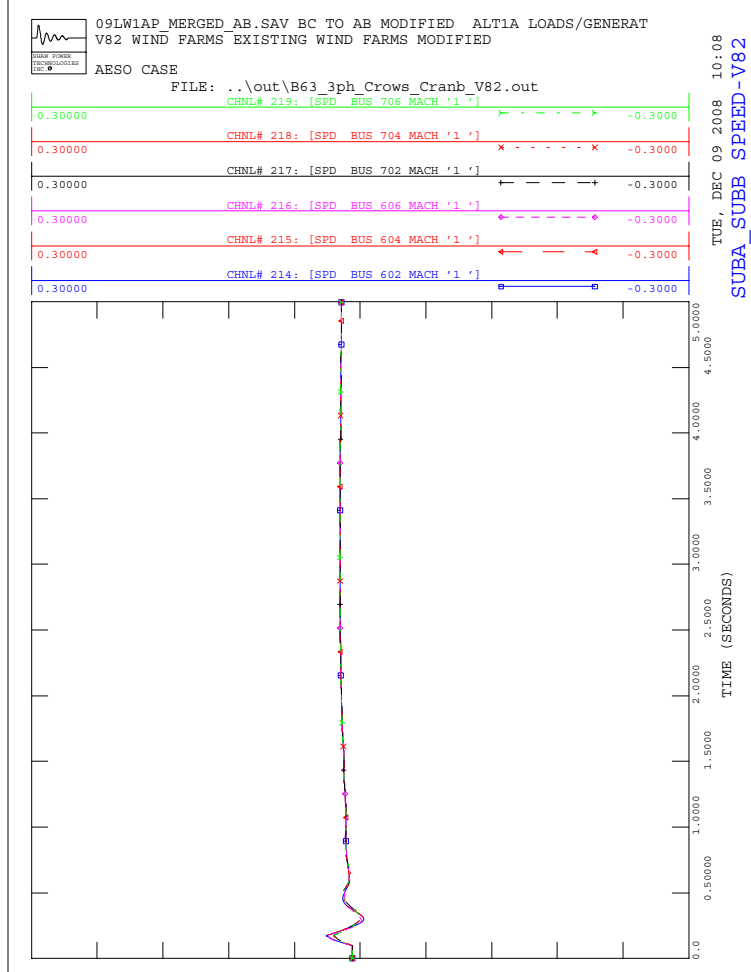
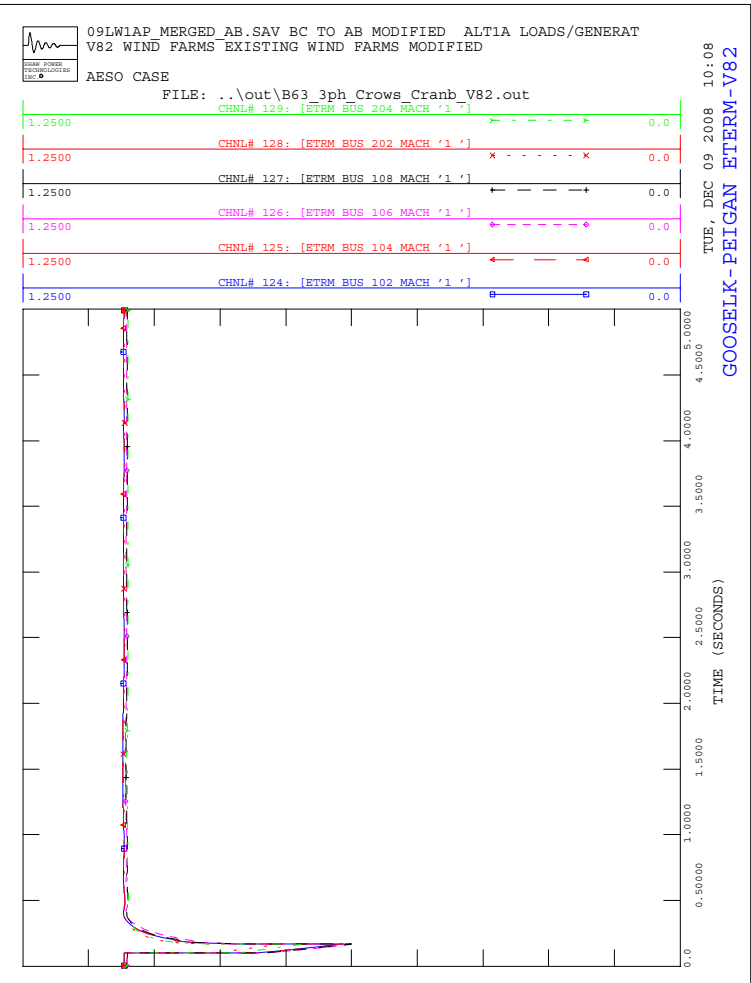
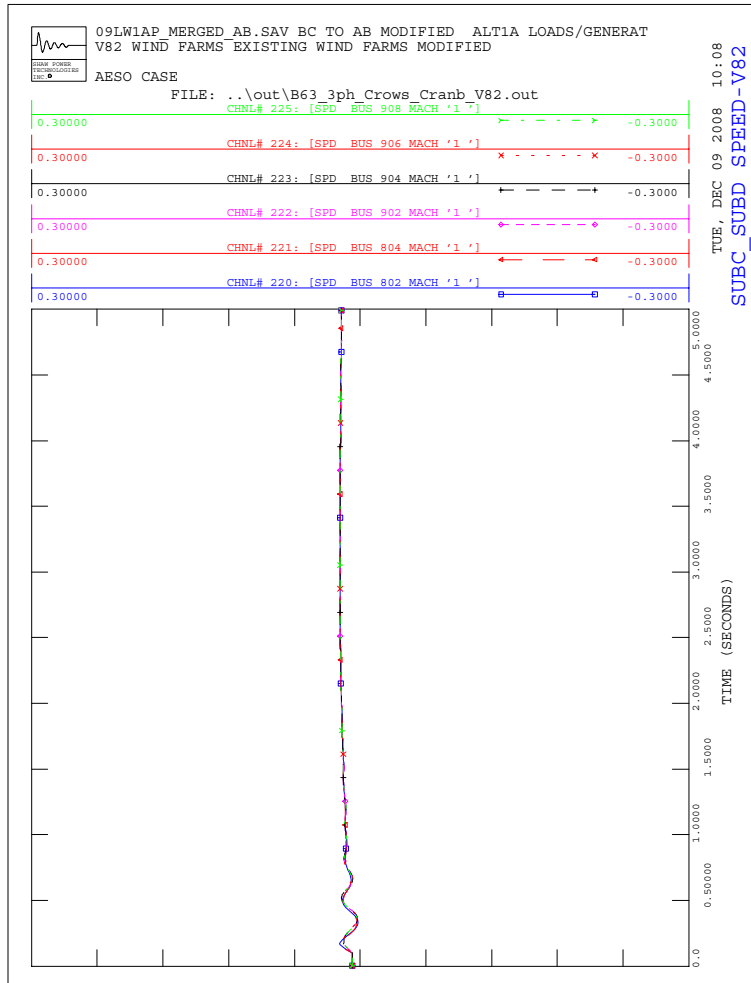
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AB_BC_TIE_FLOWS-V82

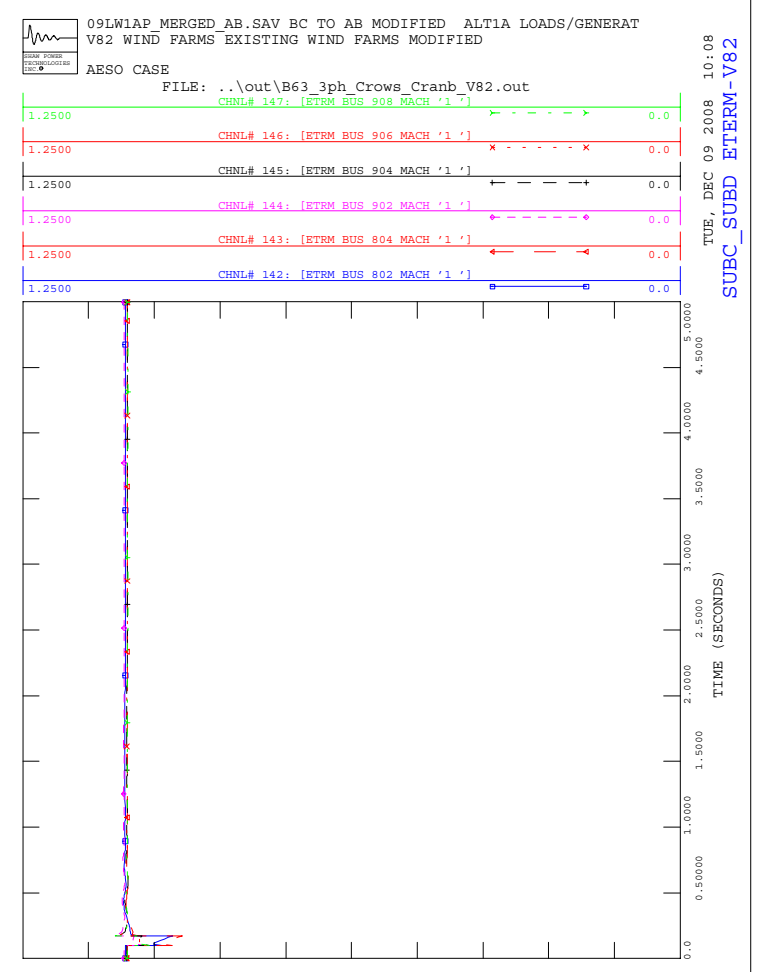
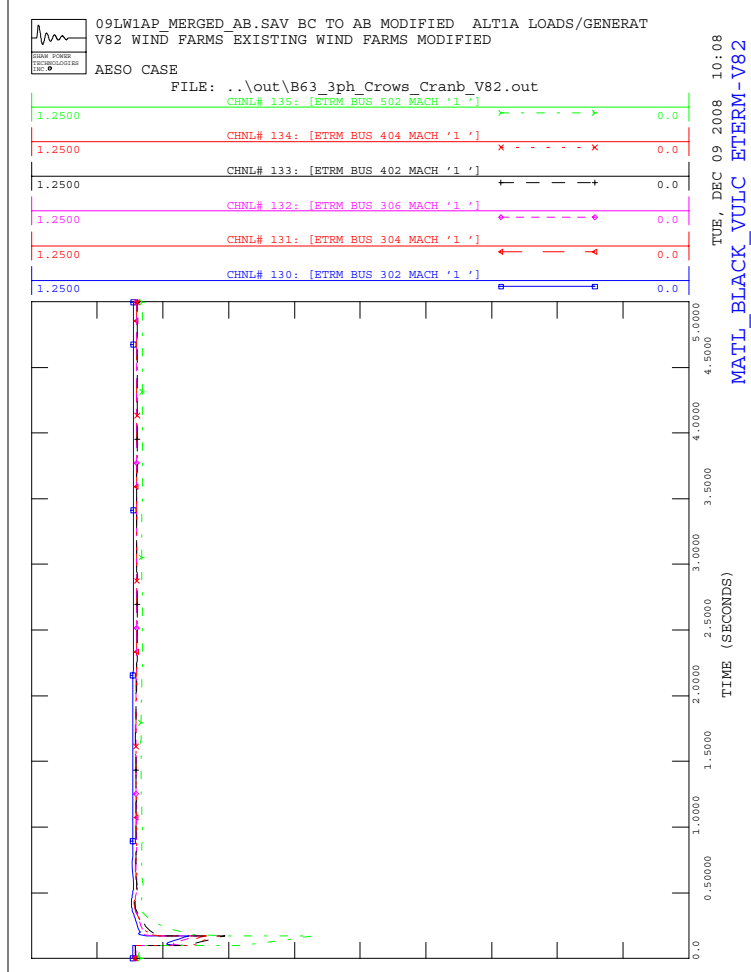
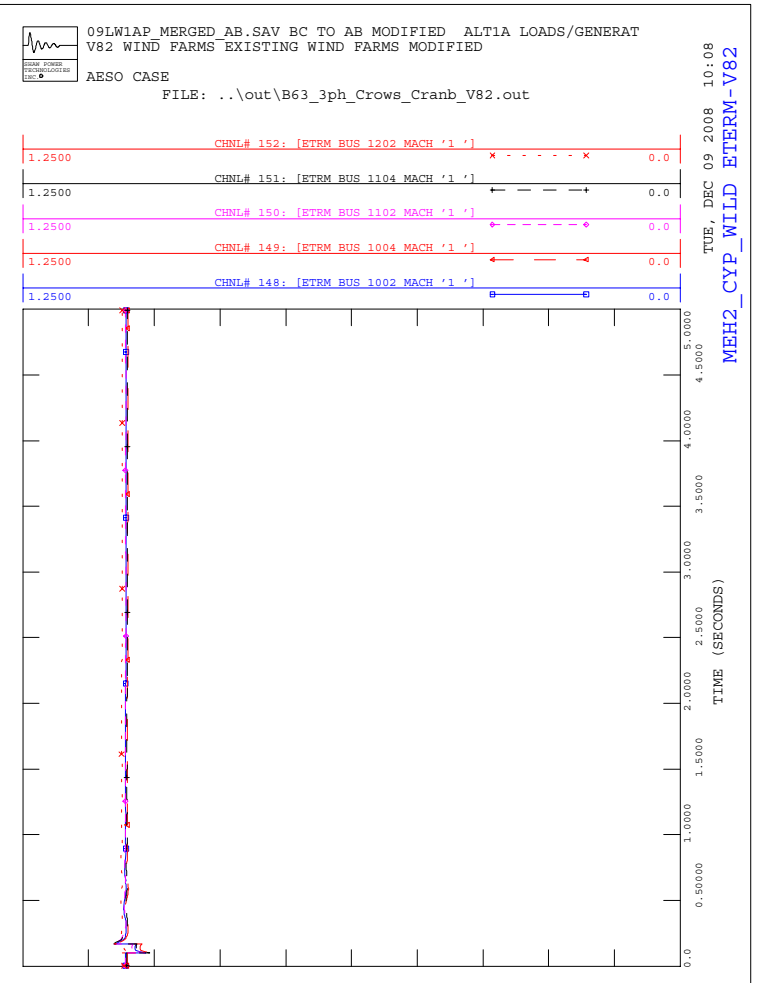
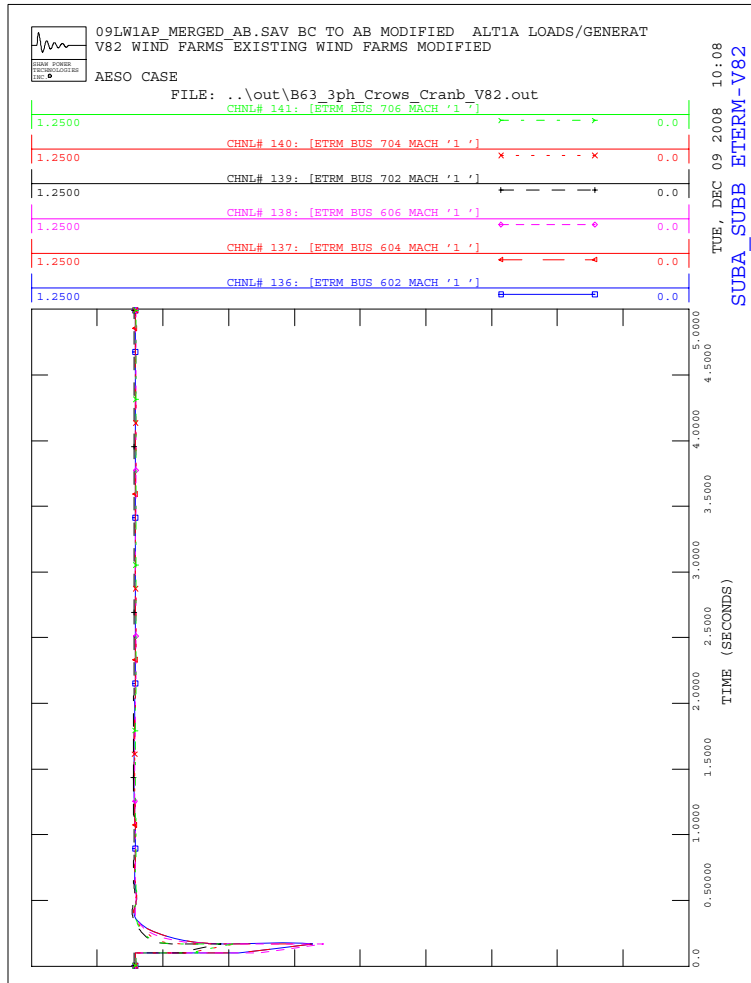


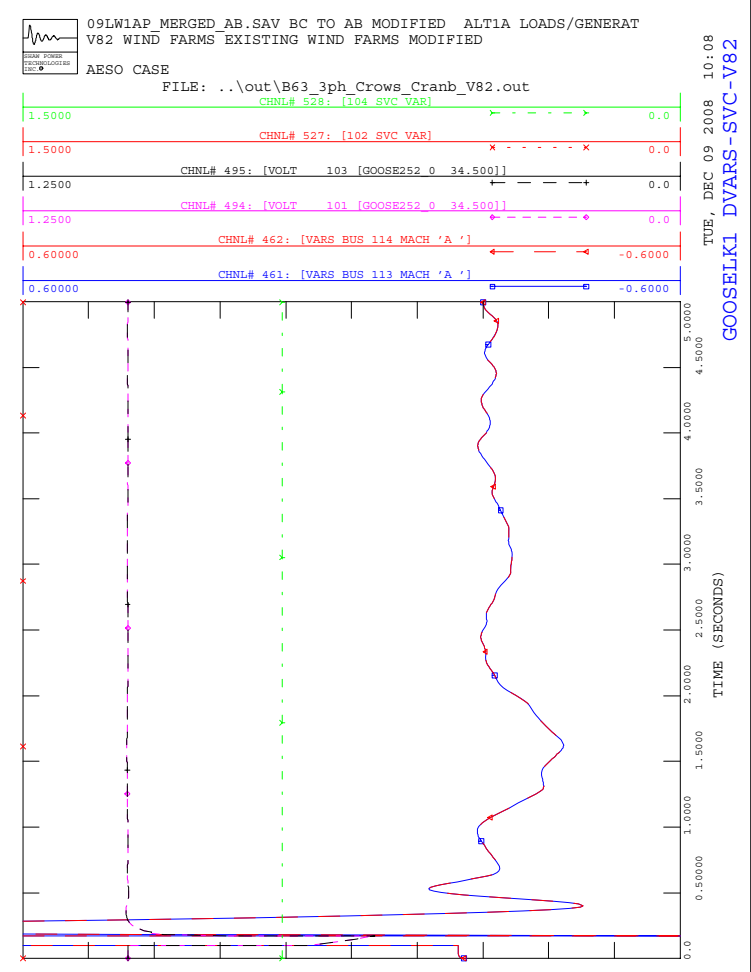
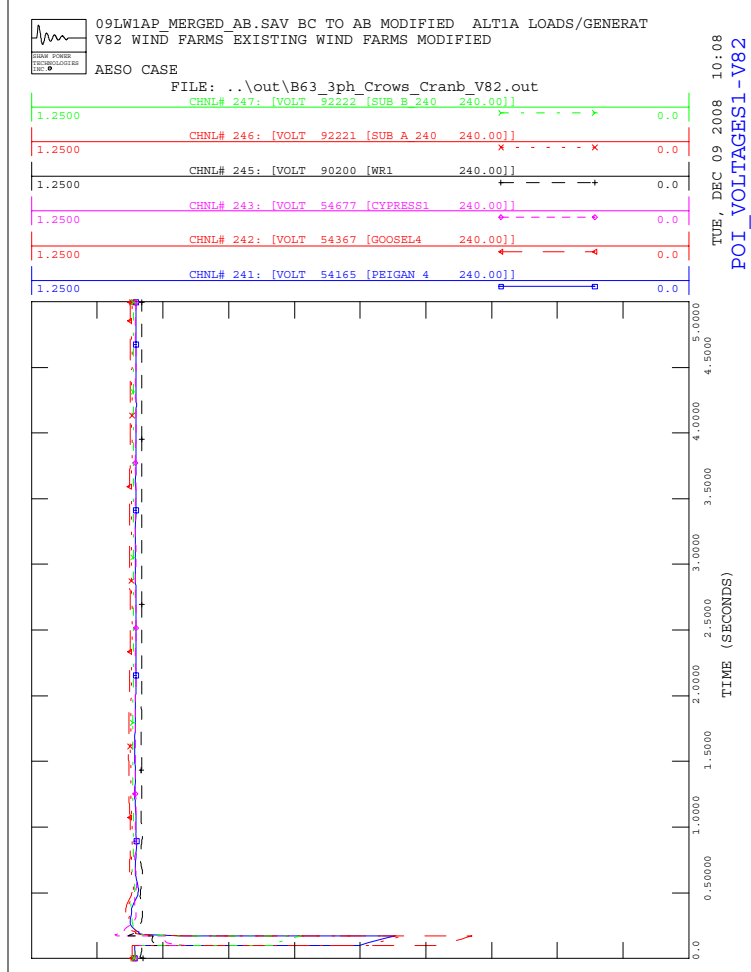
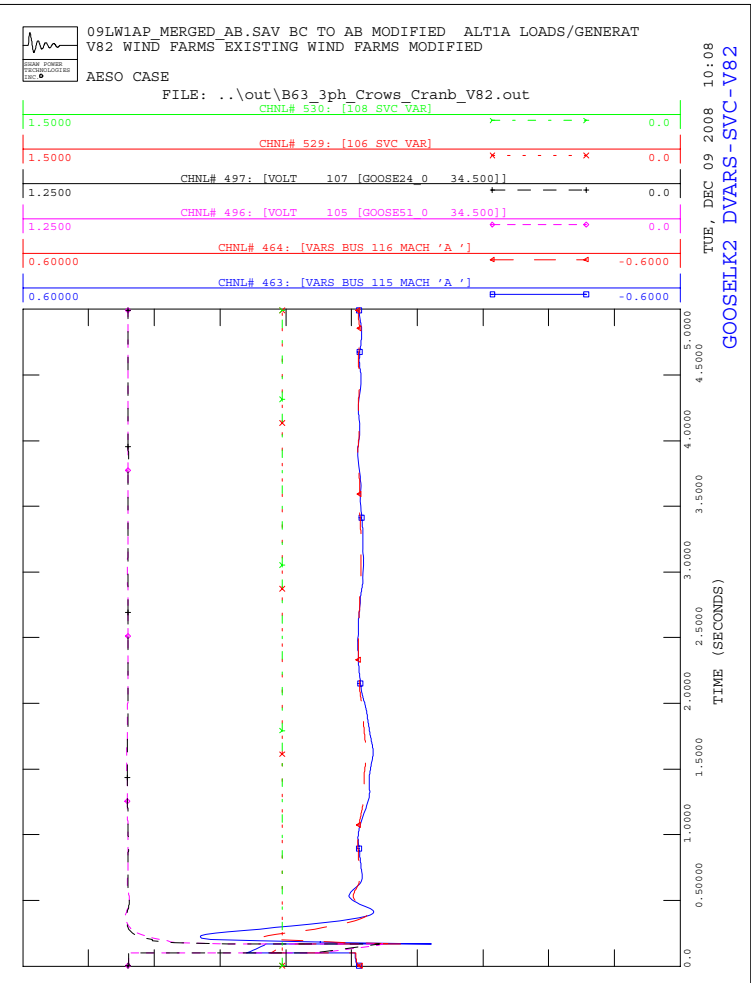
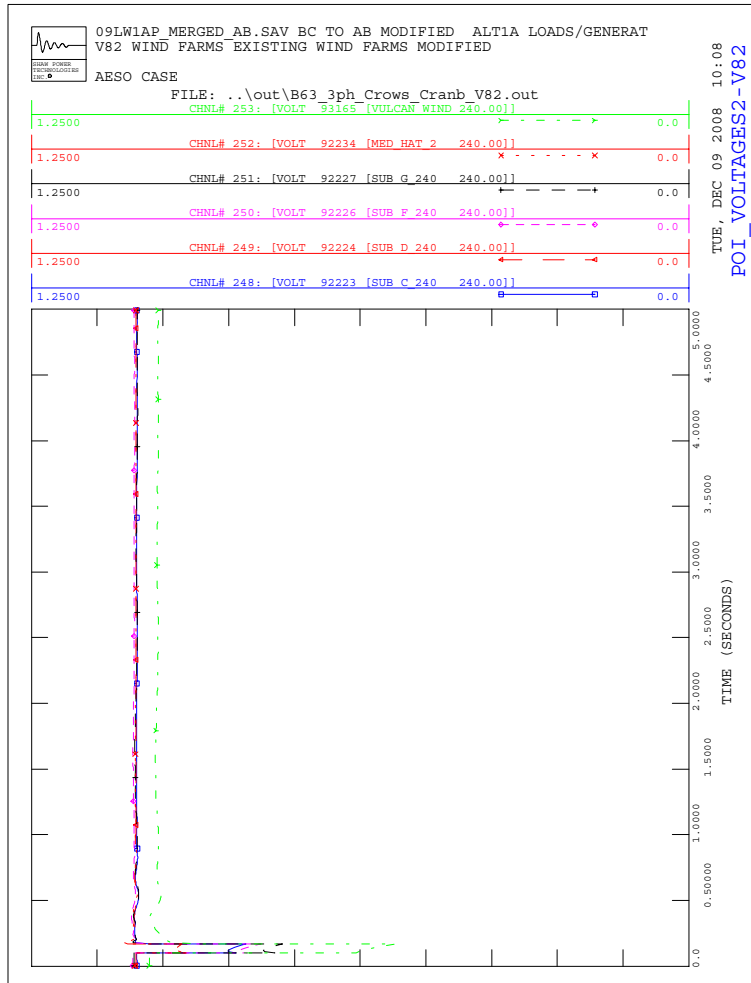


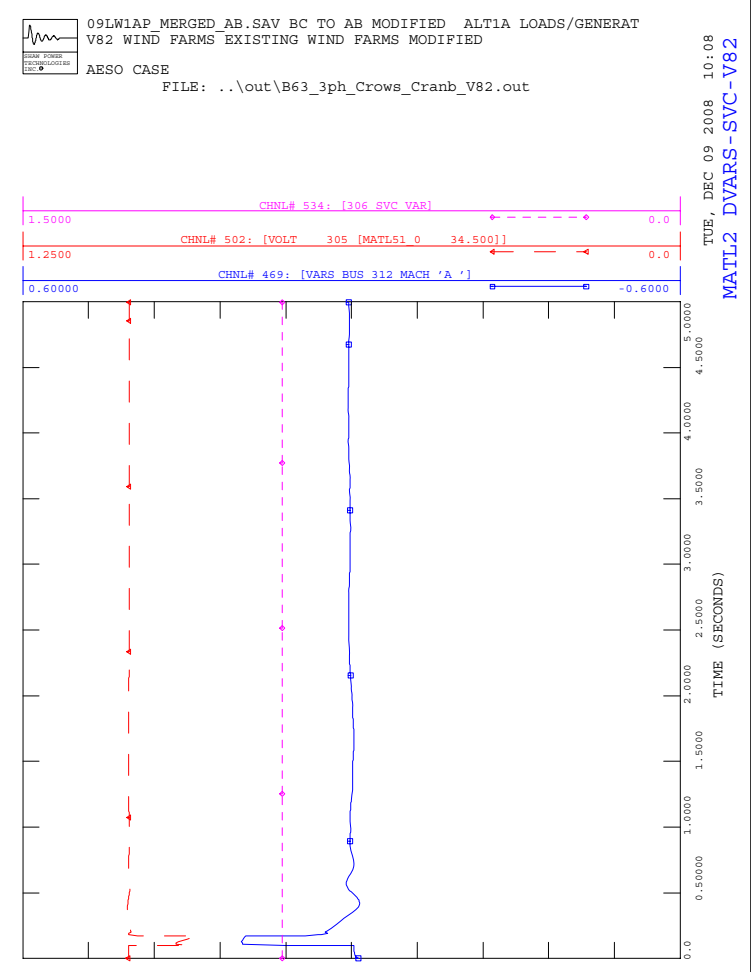
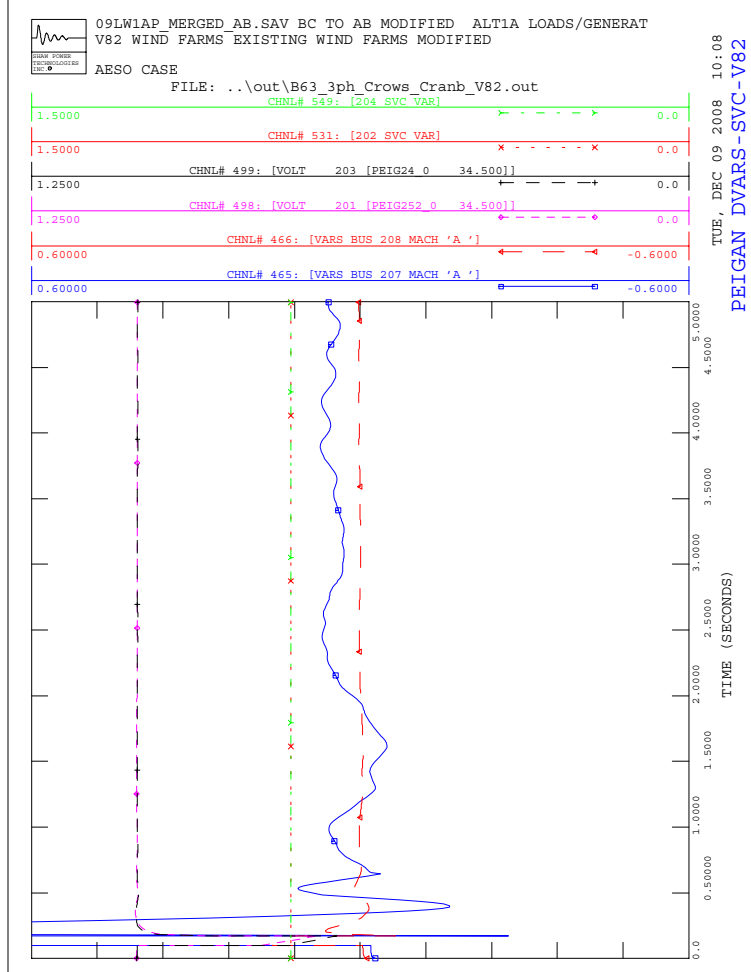
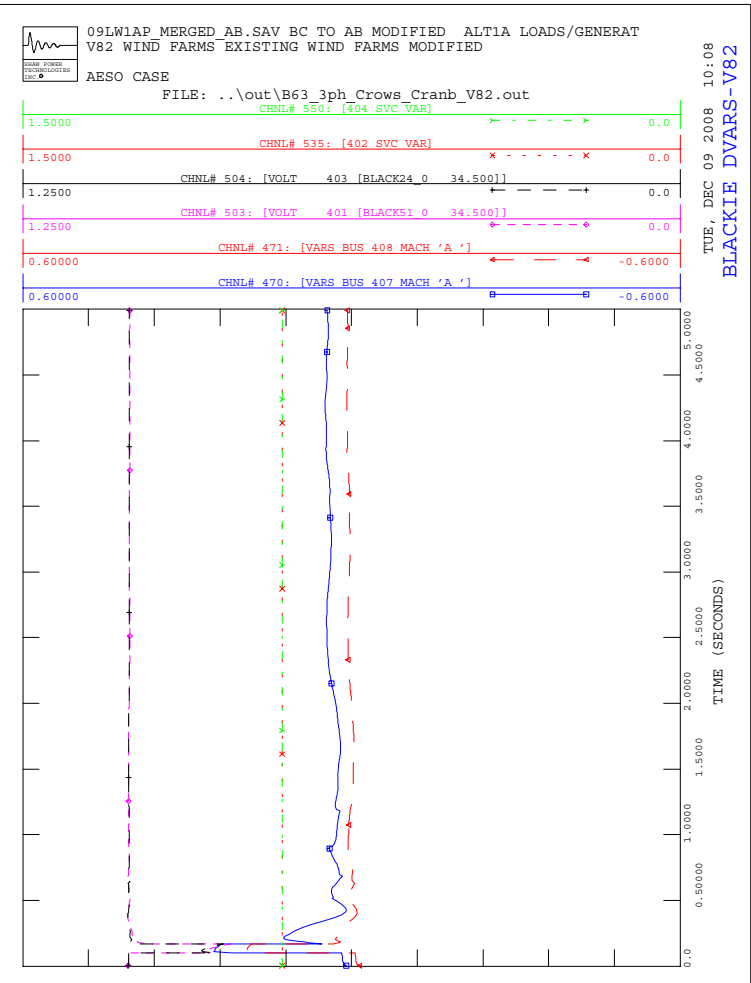
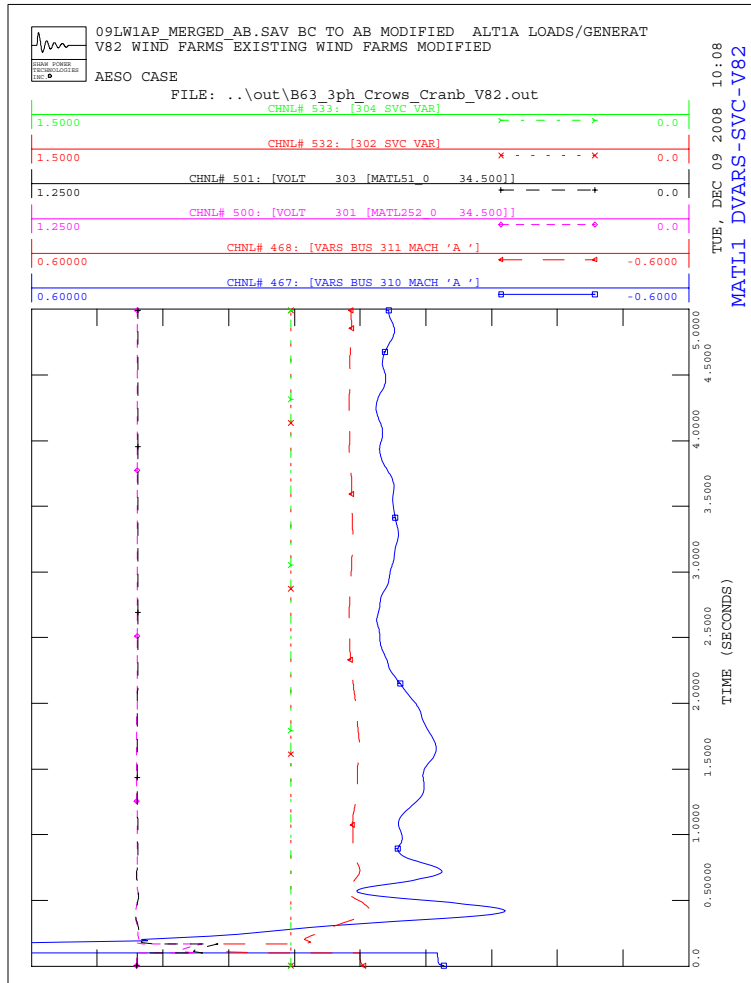


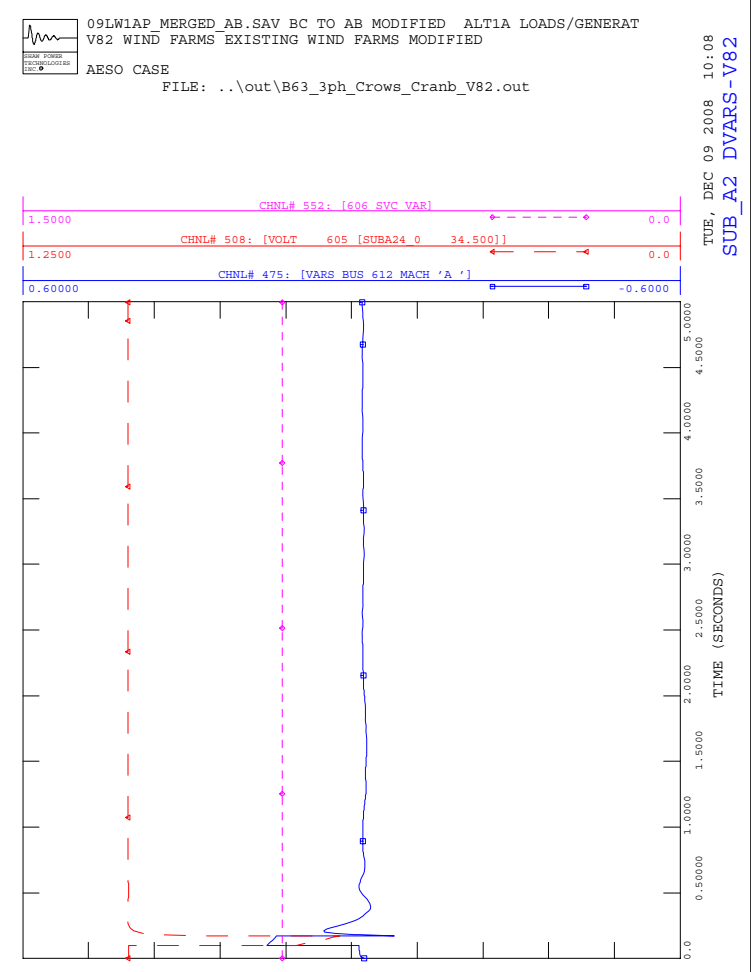
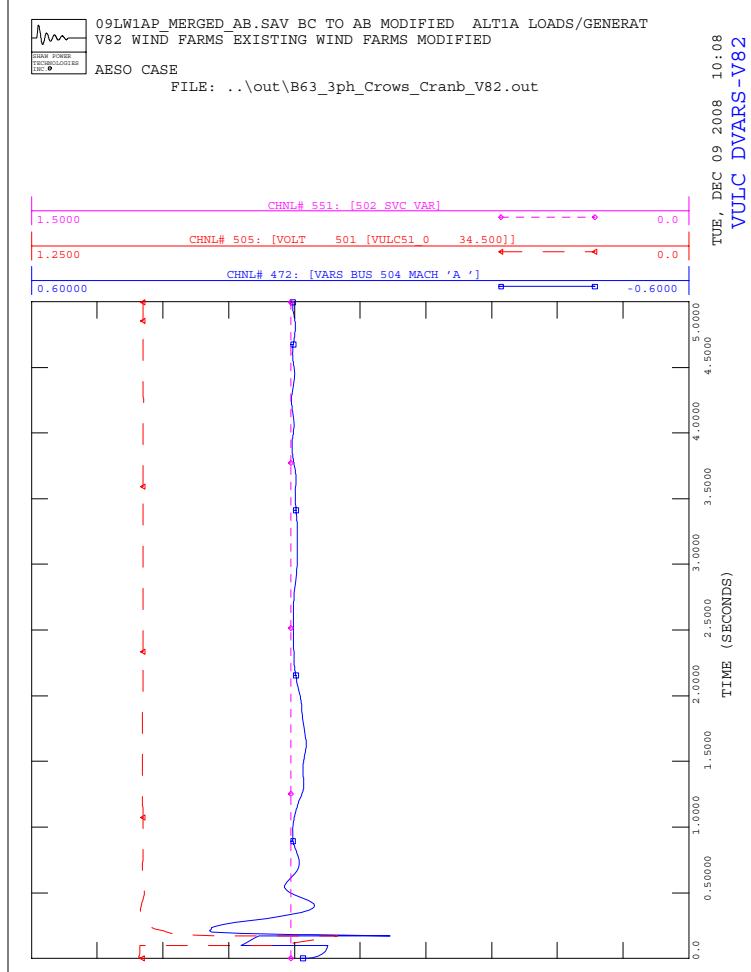
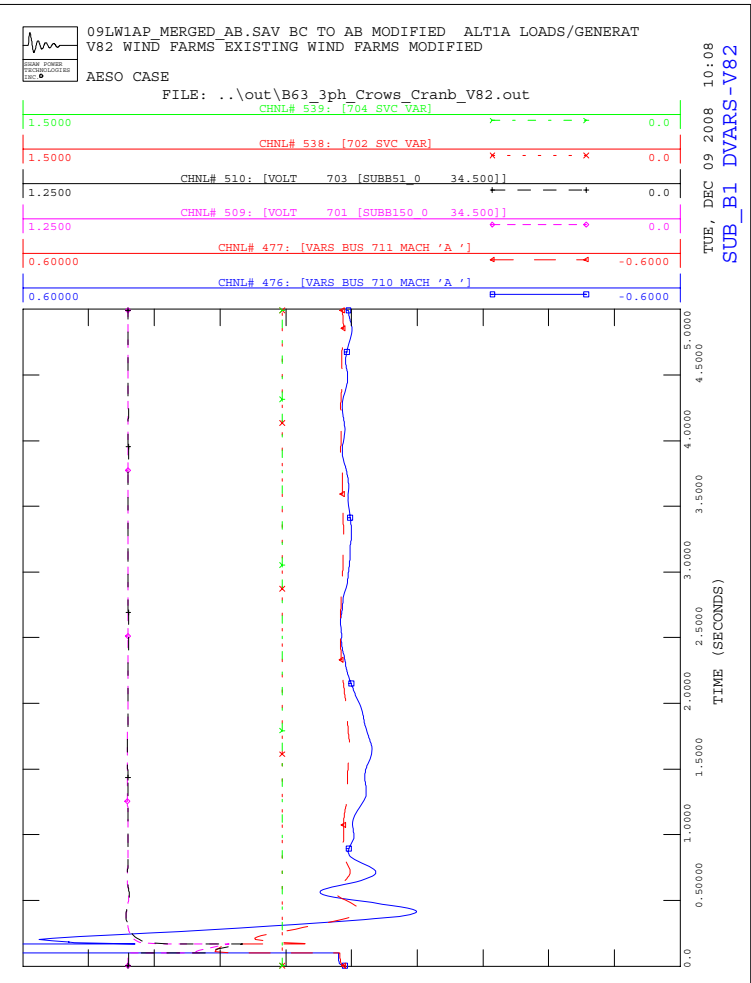
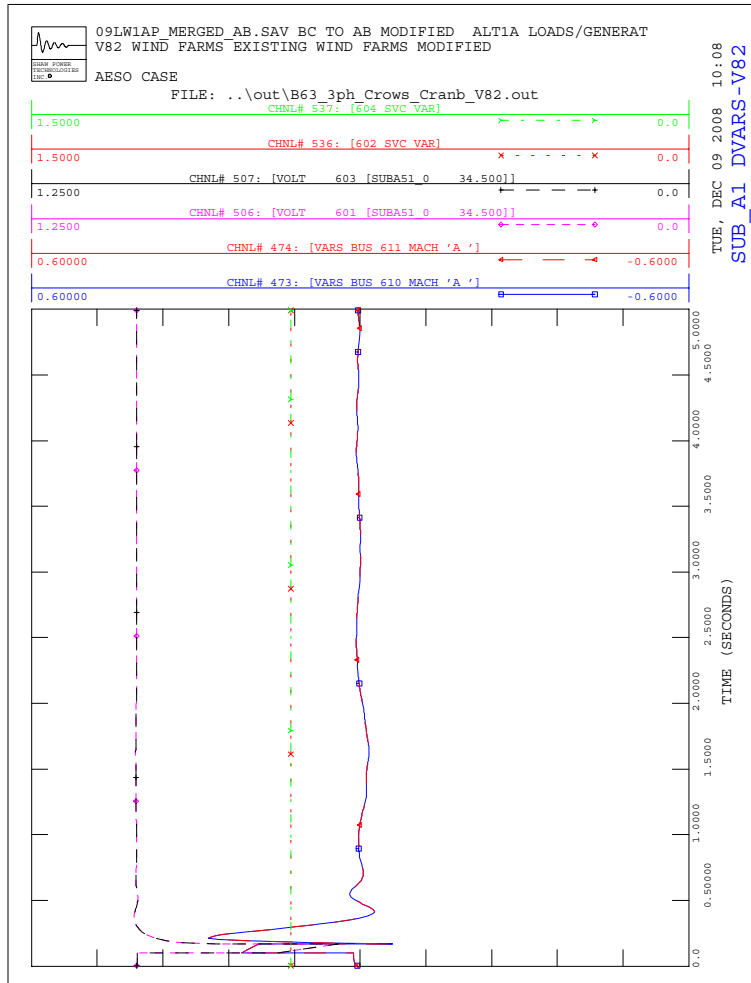


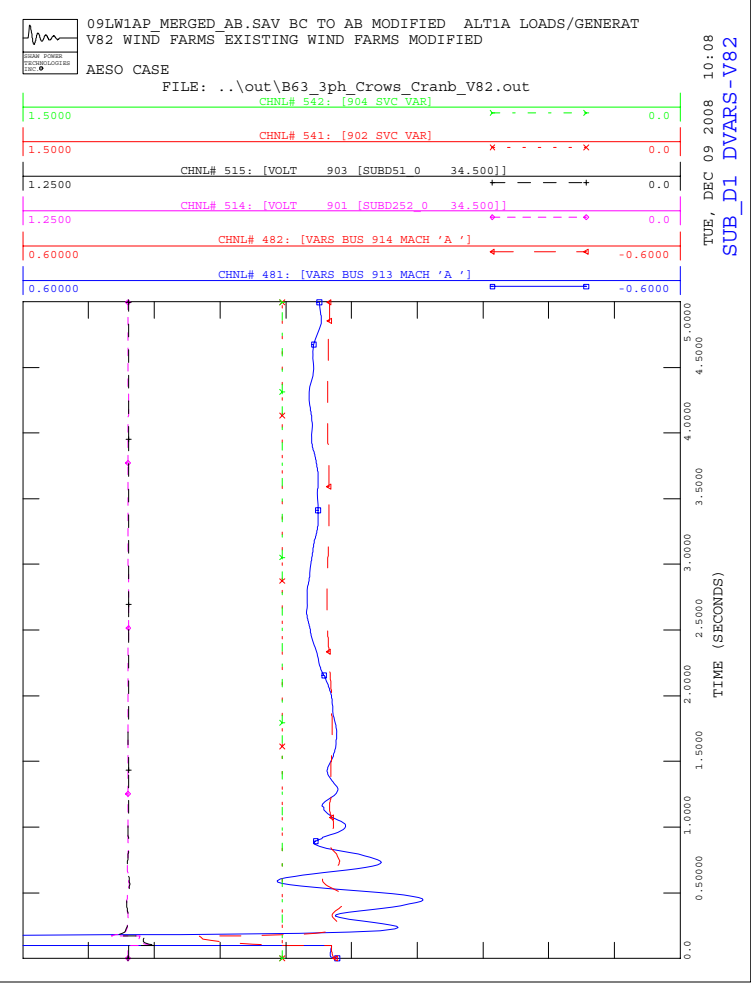
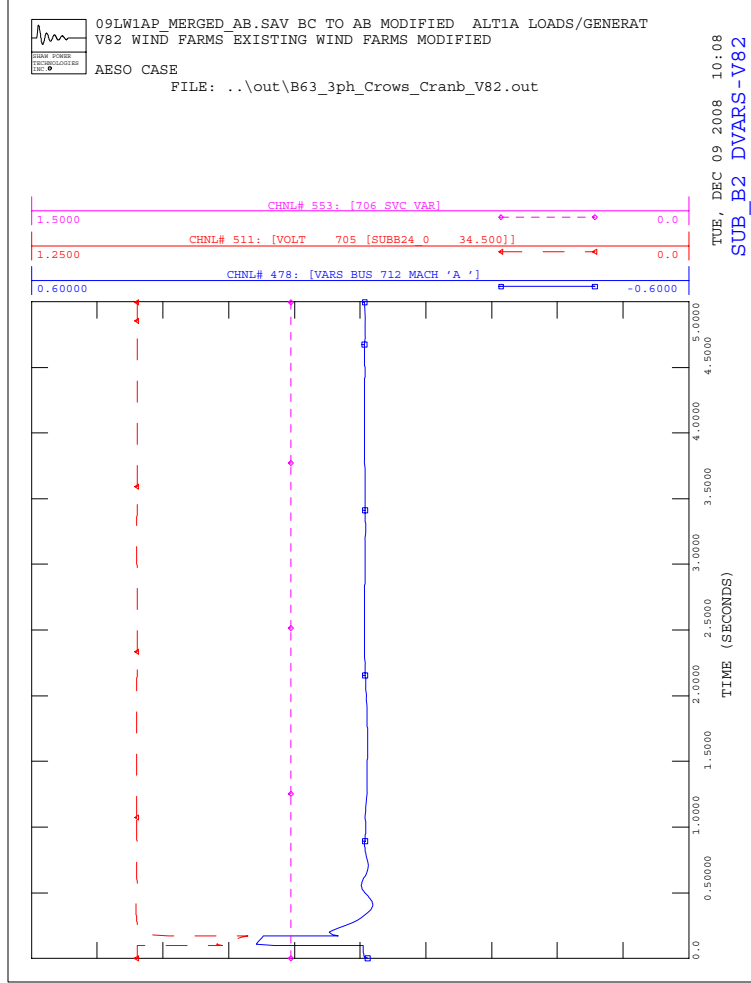
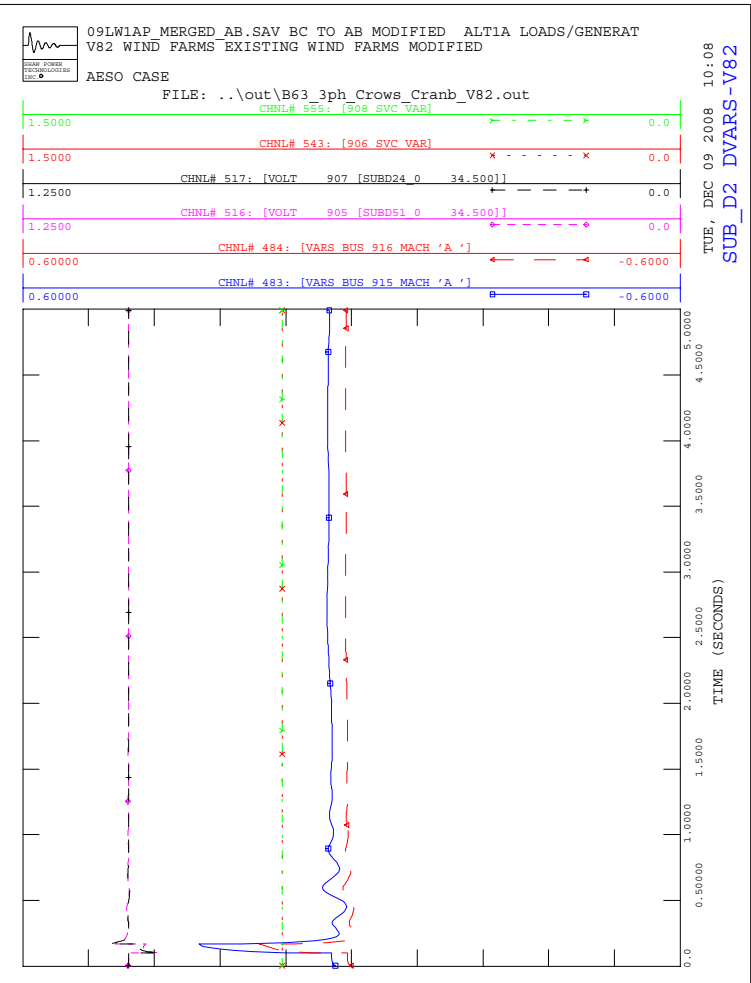
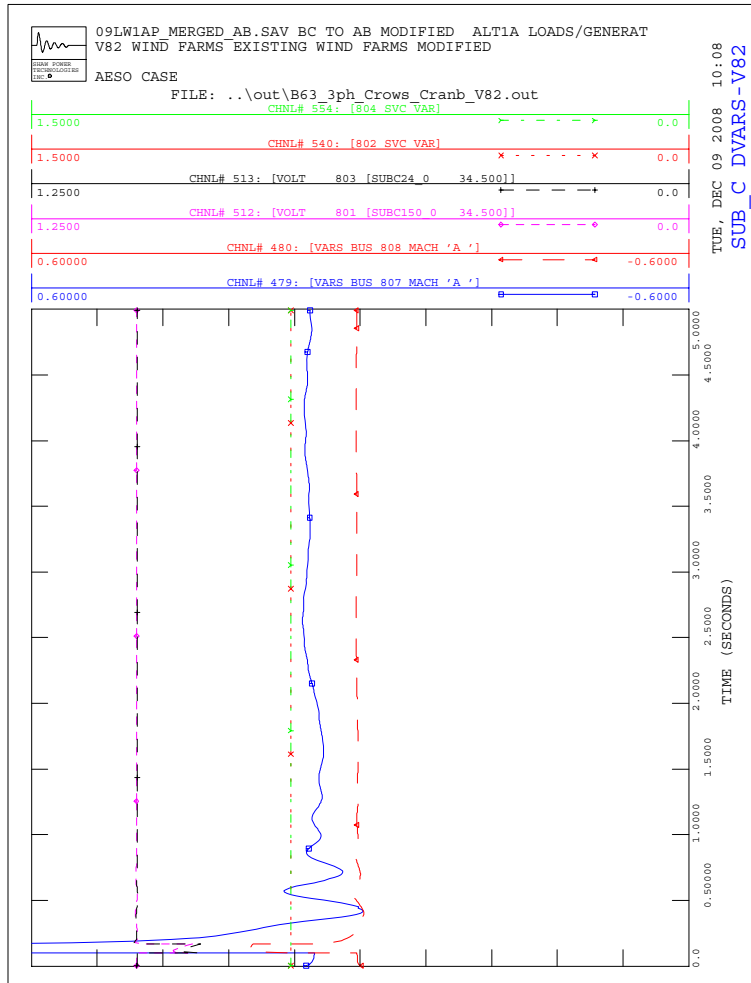


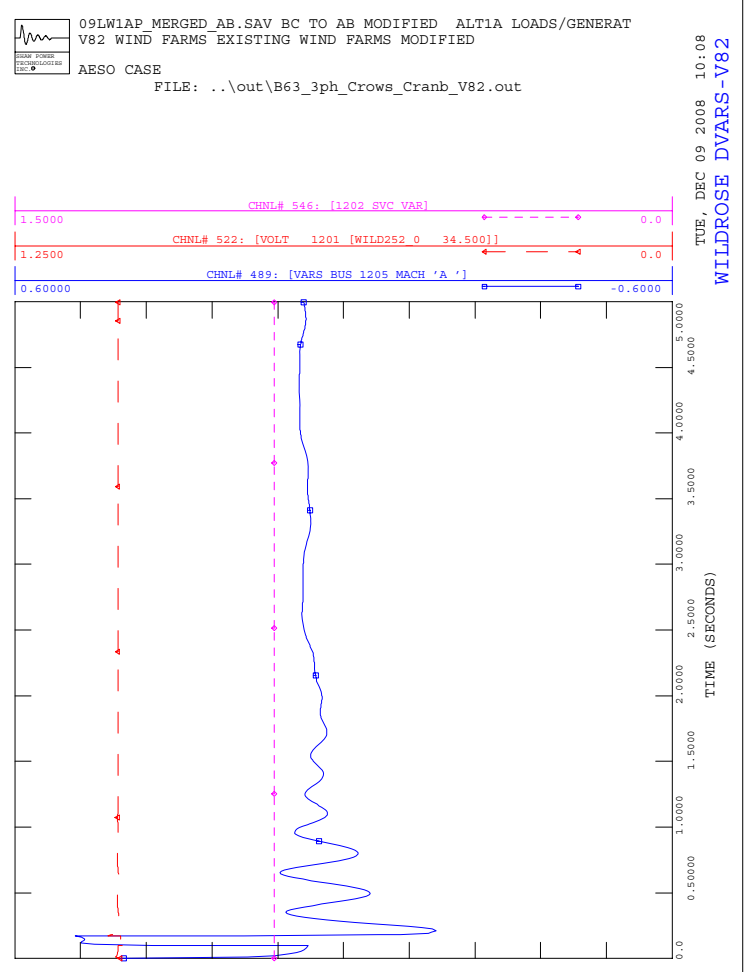
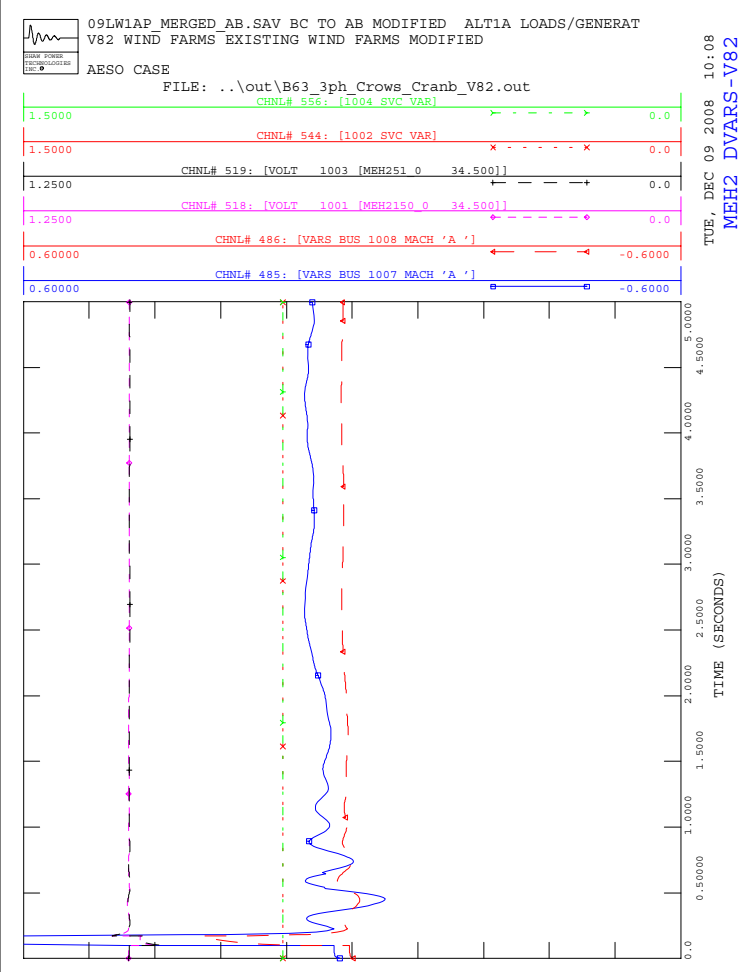
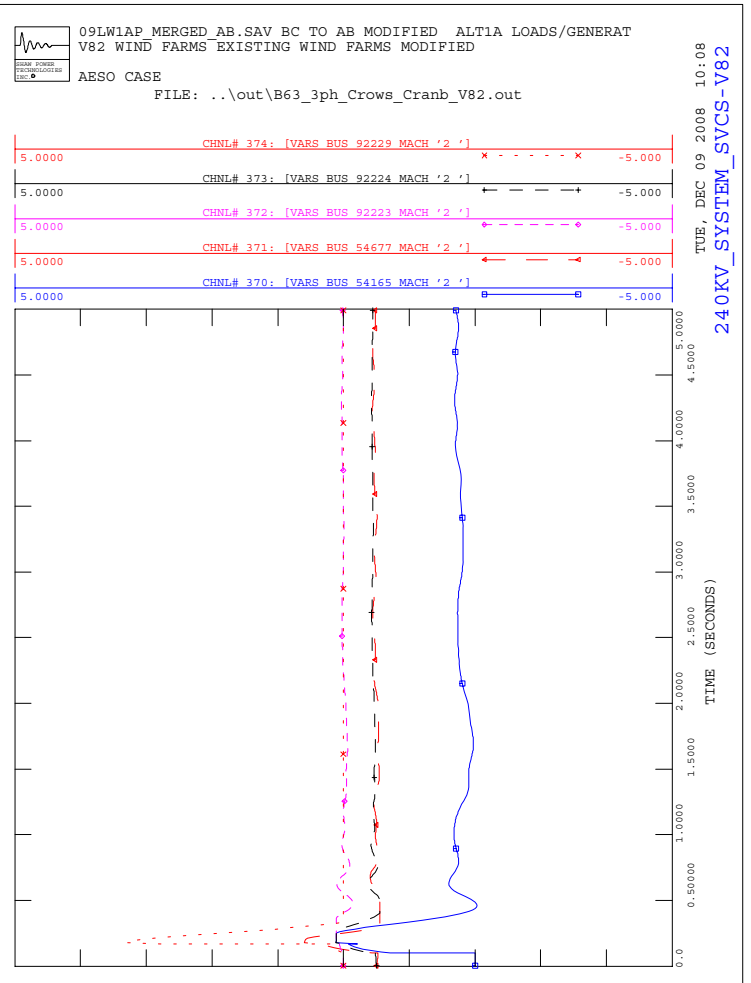
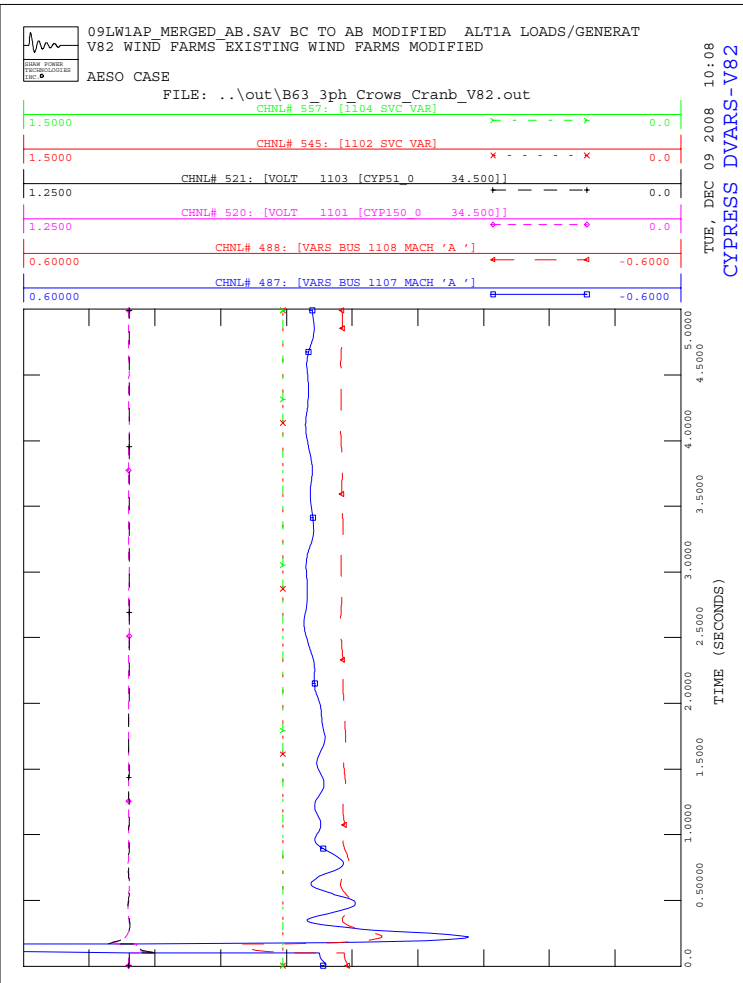








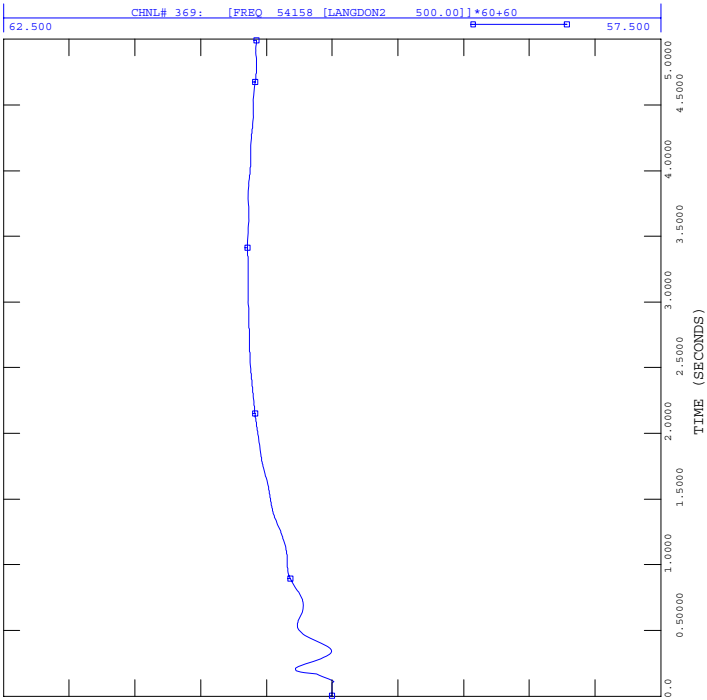






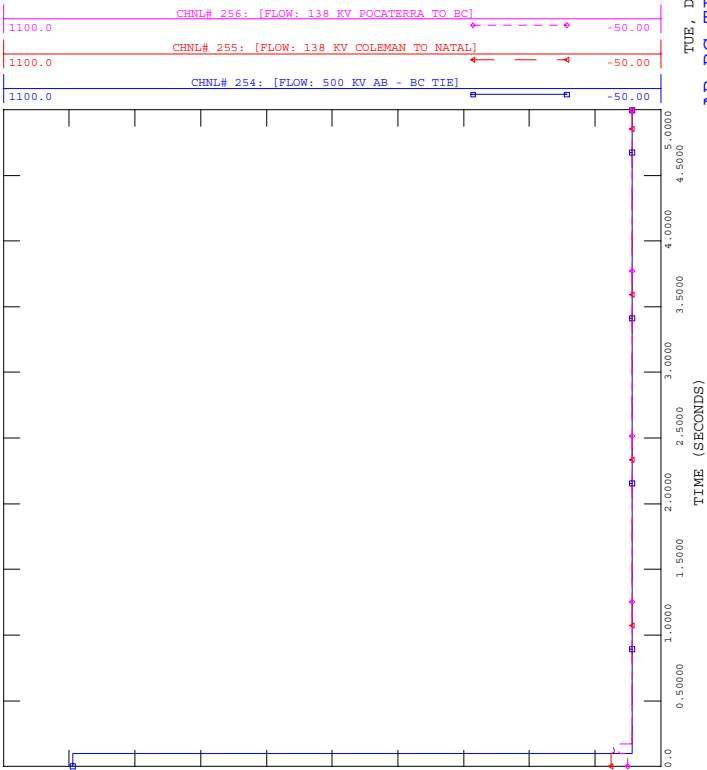
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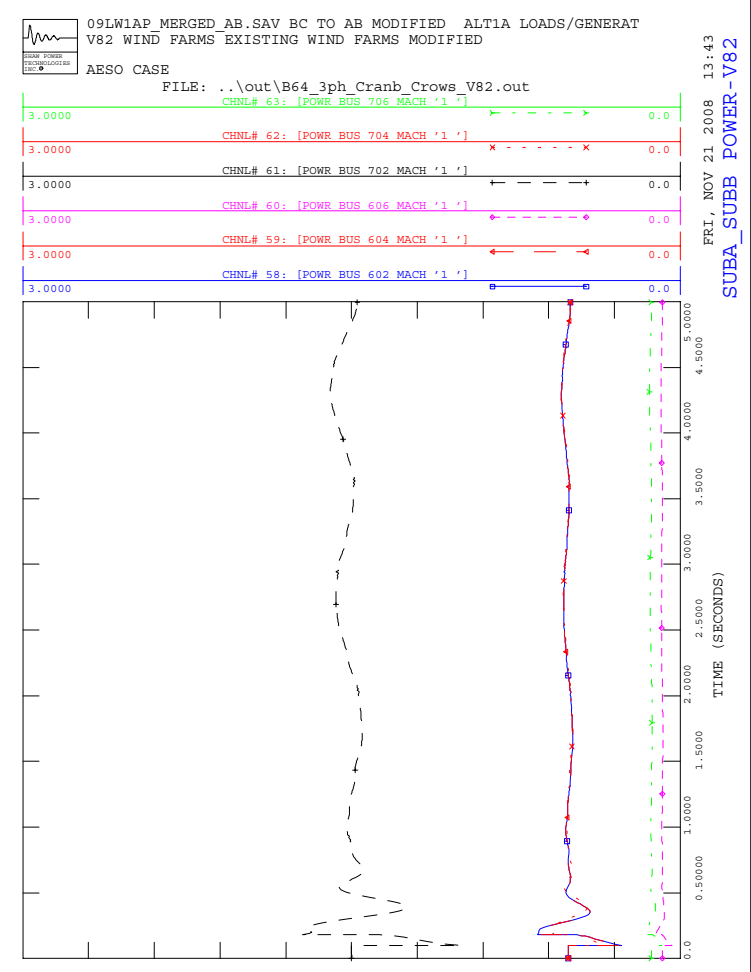
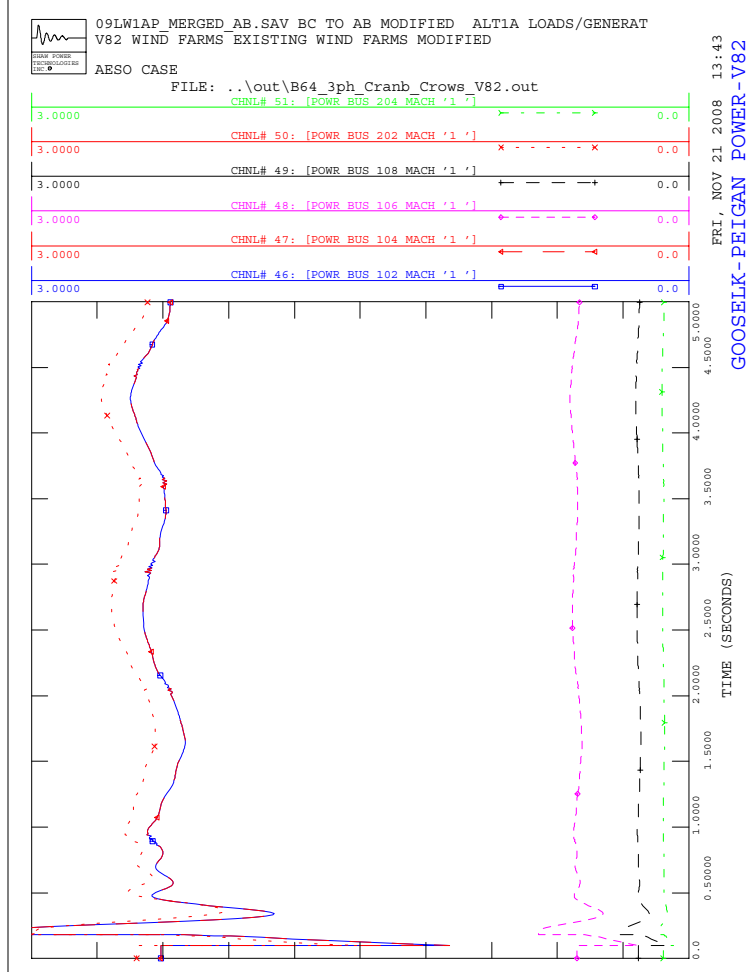
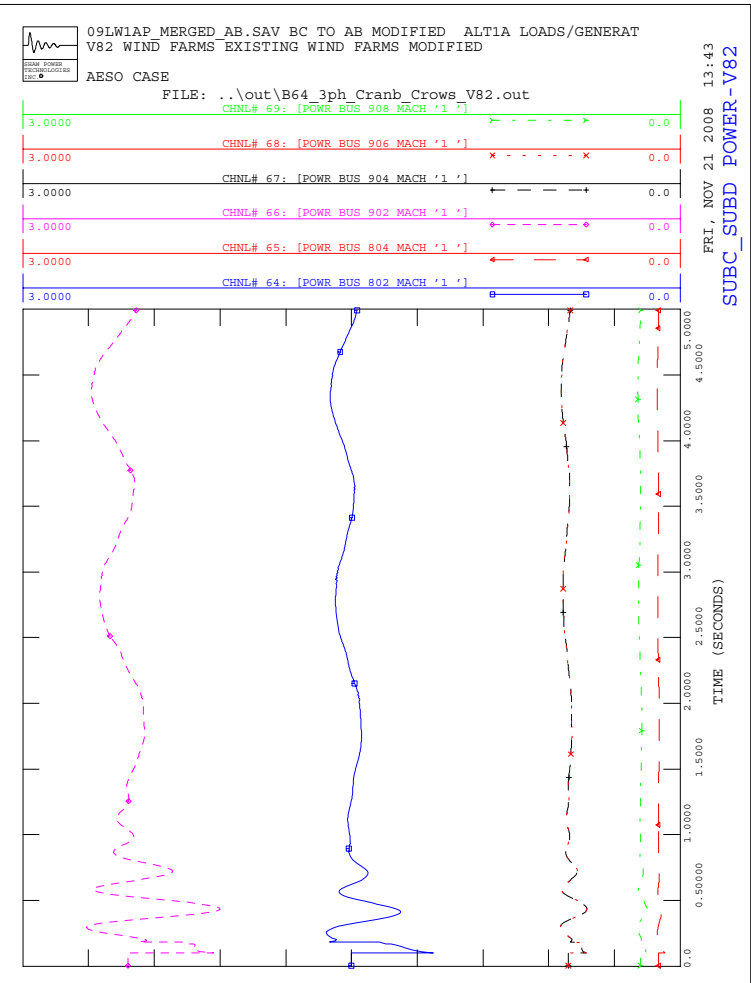
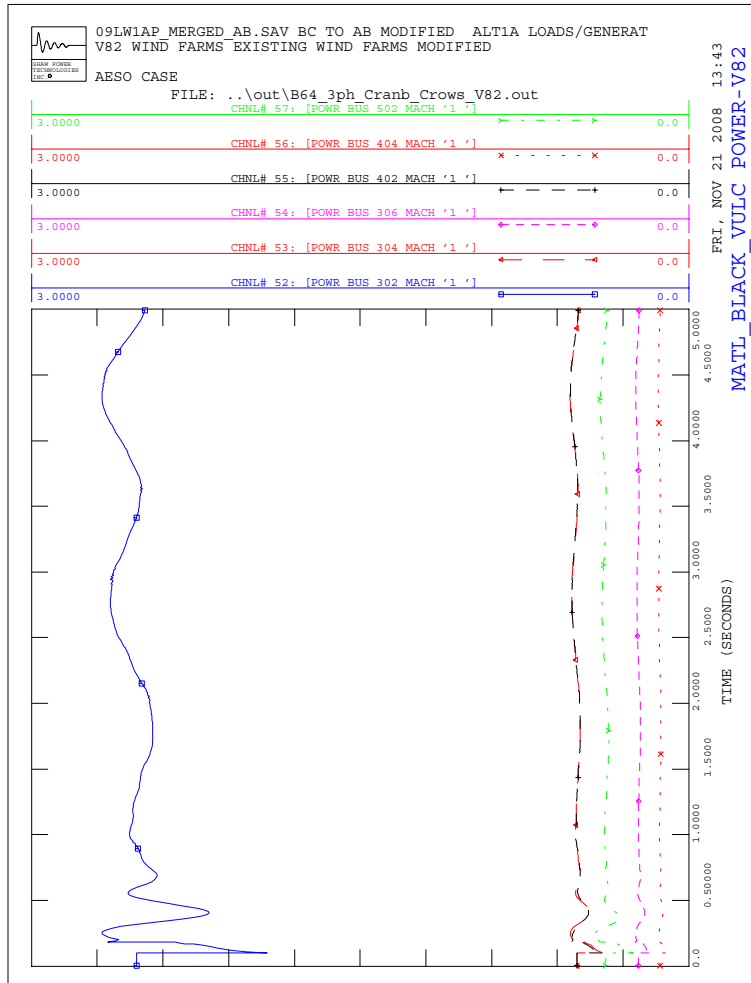
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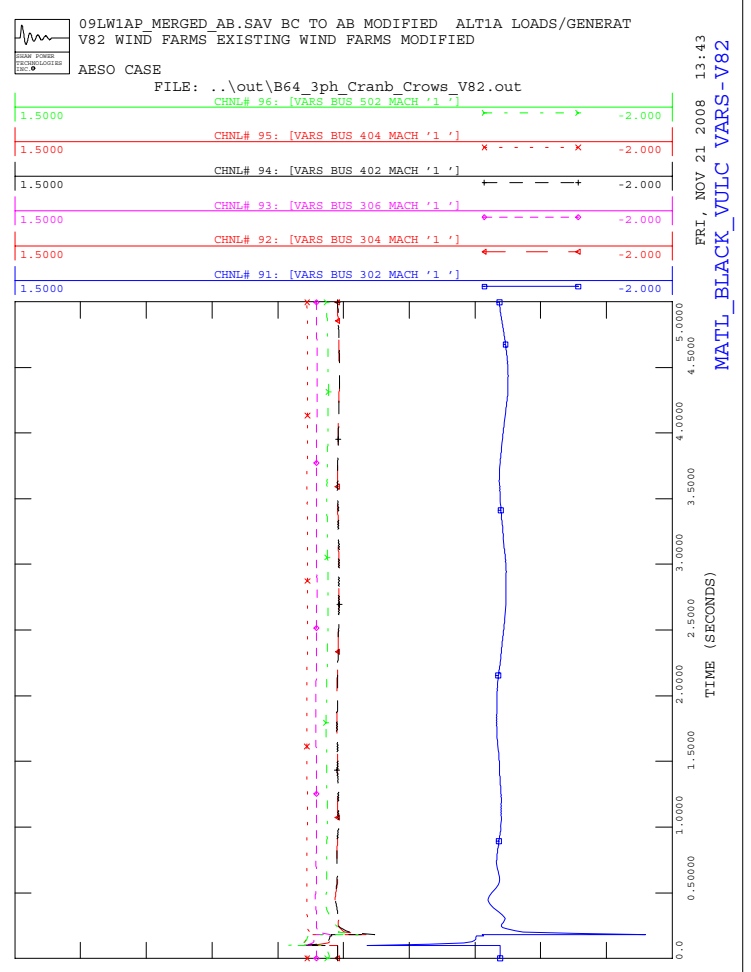
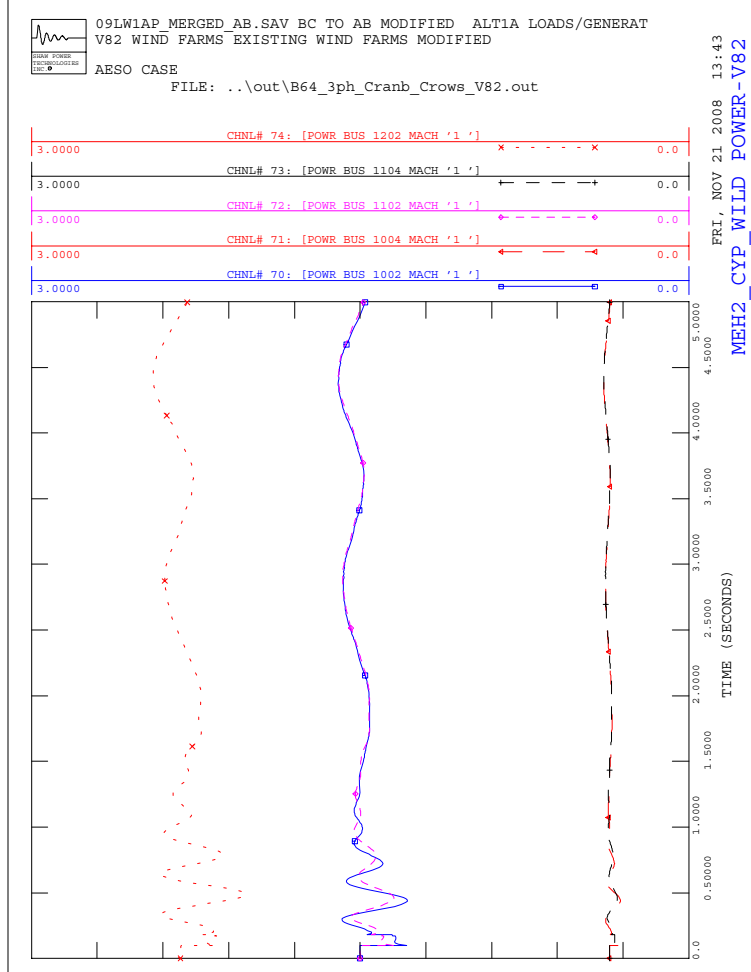
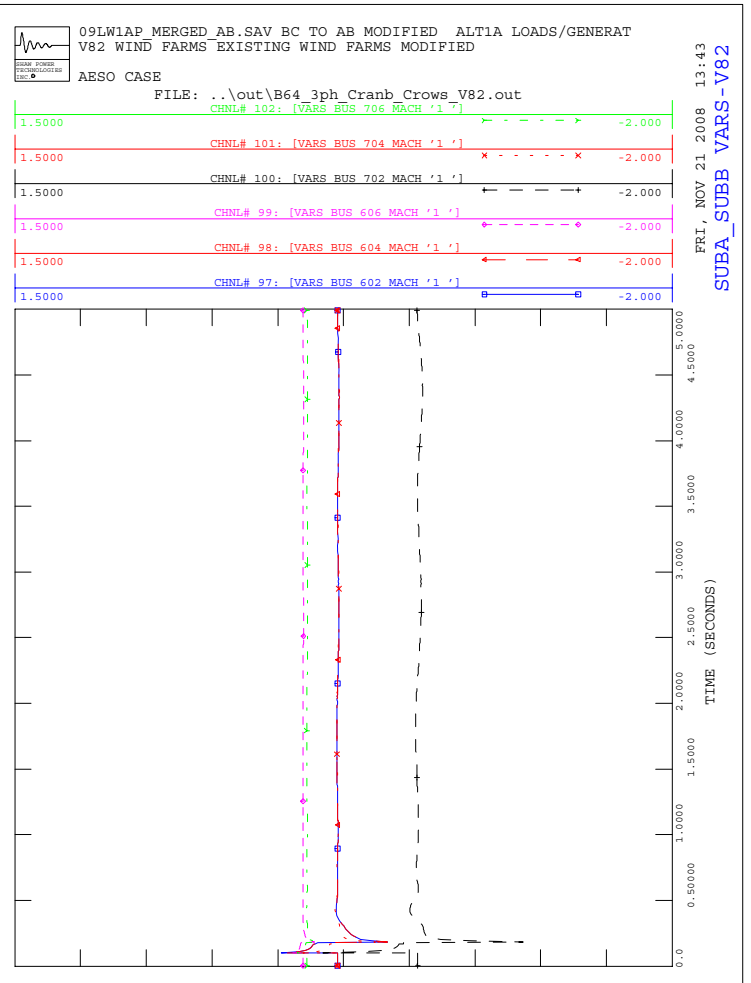
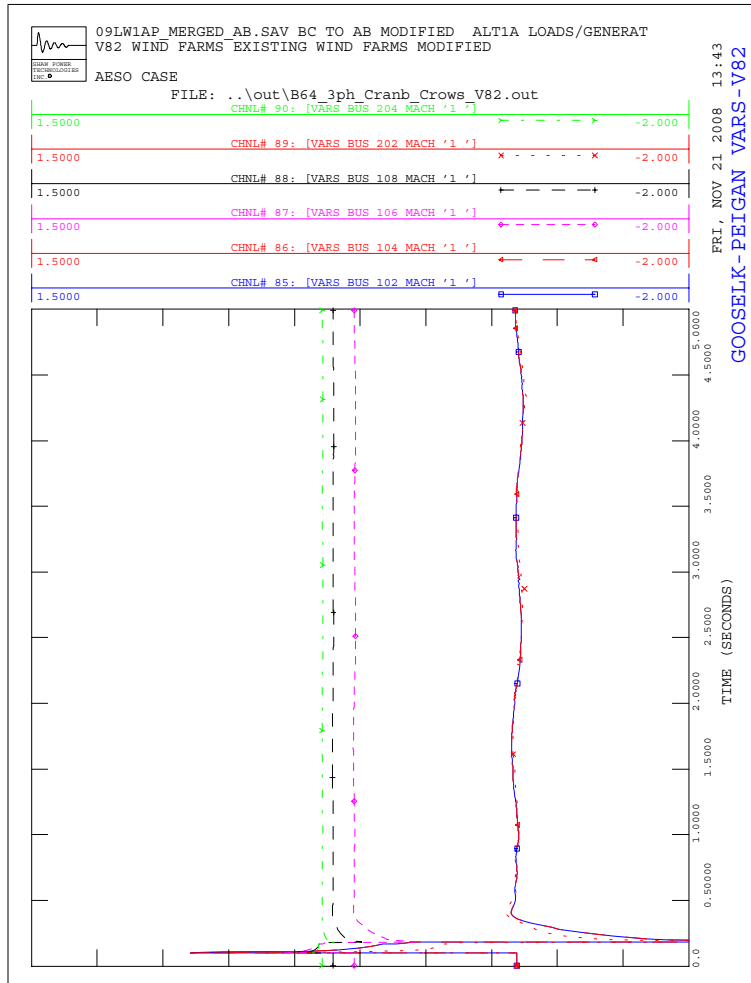


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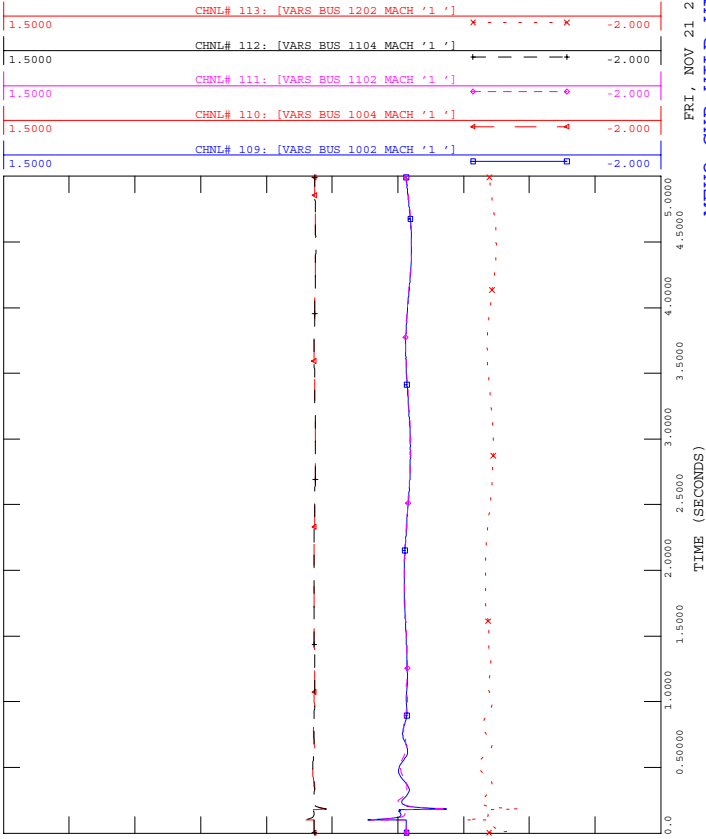






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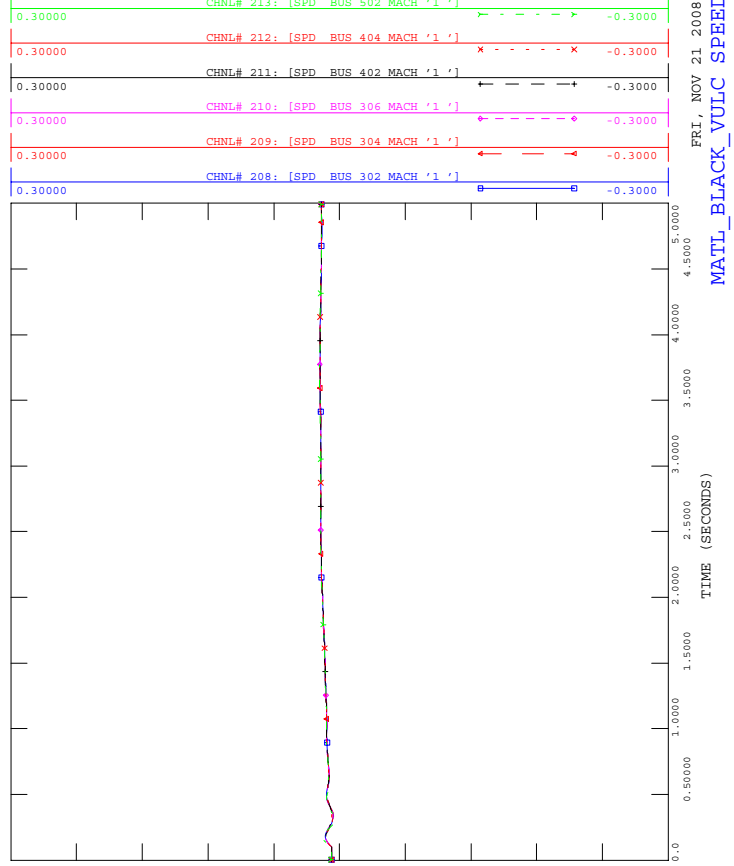
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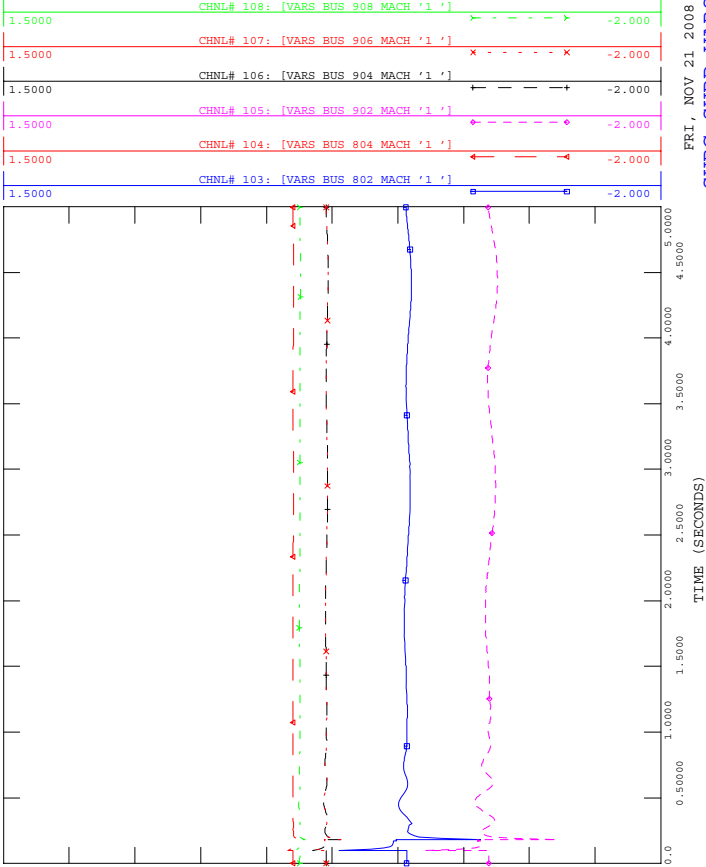
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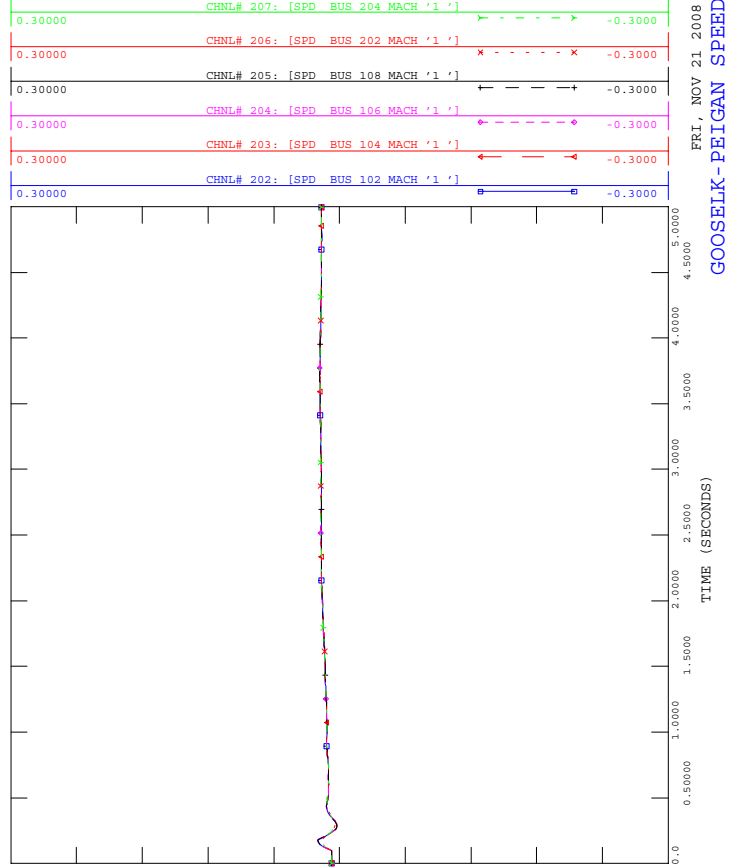
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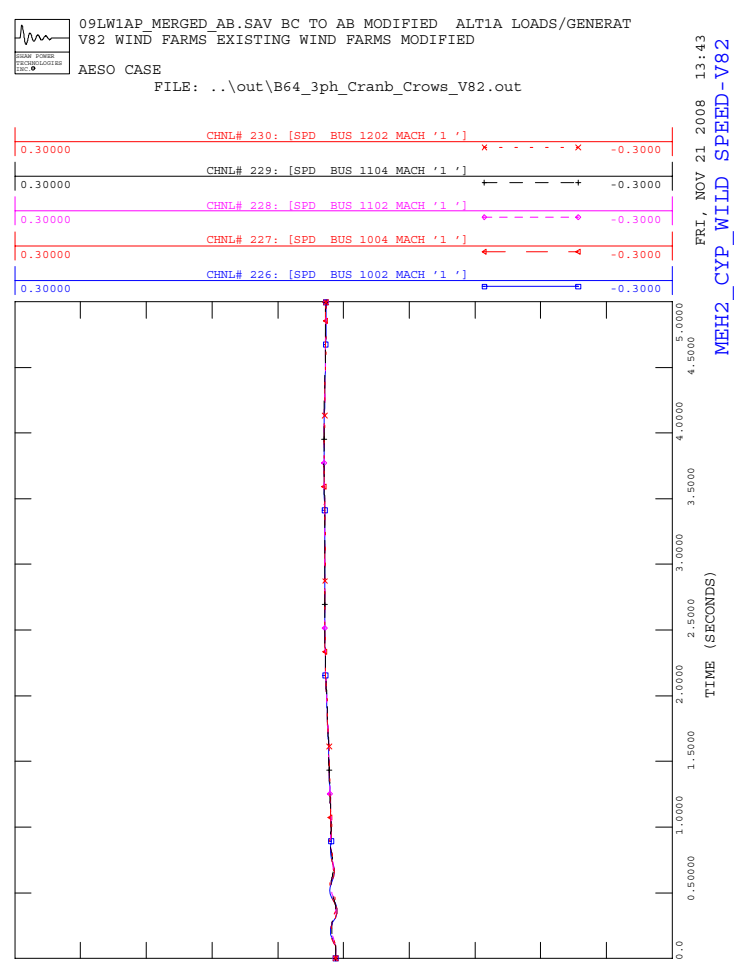
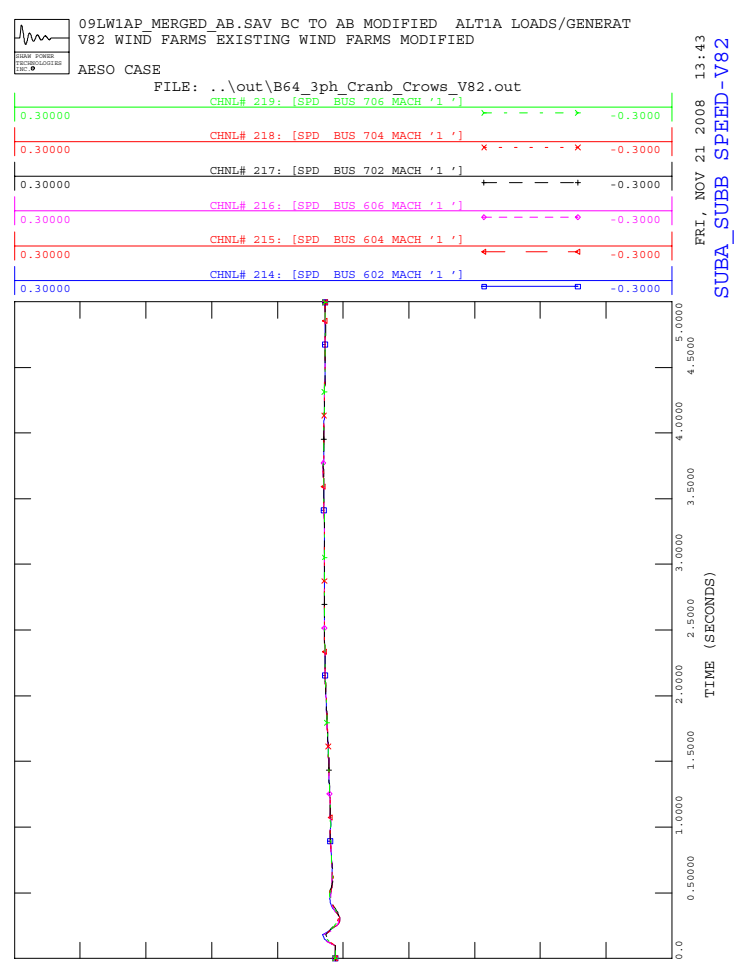
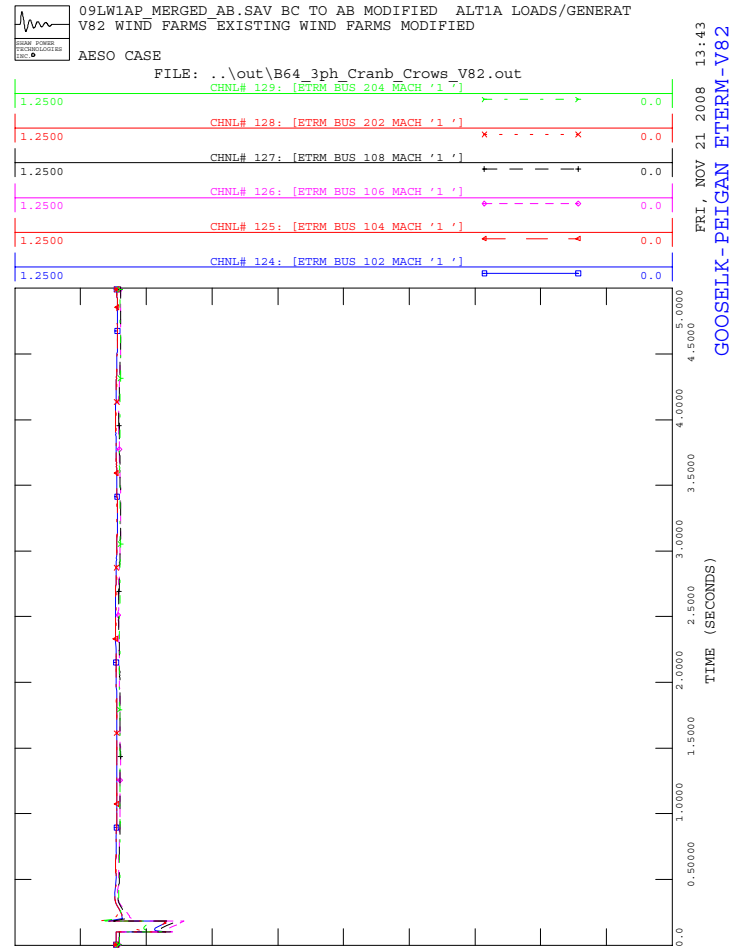
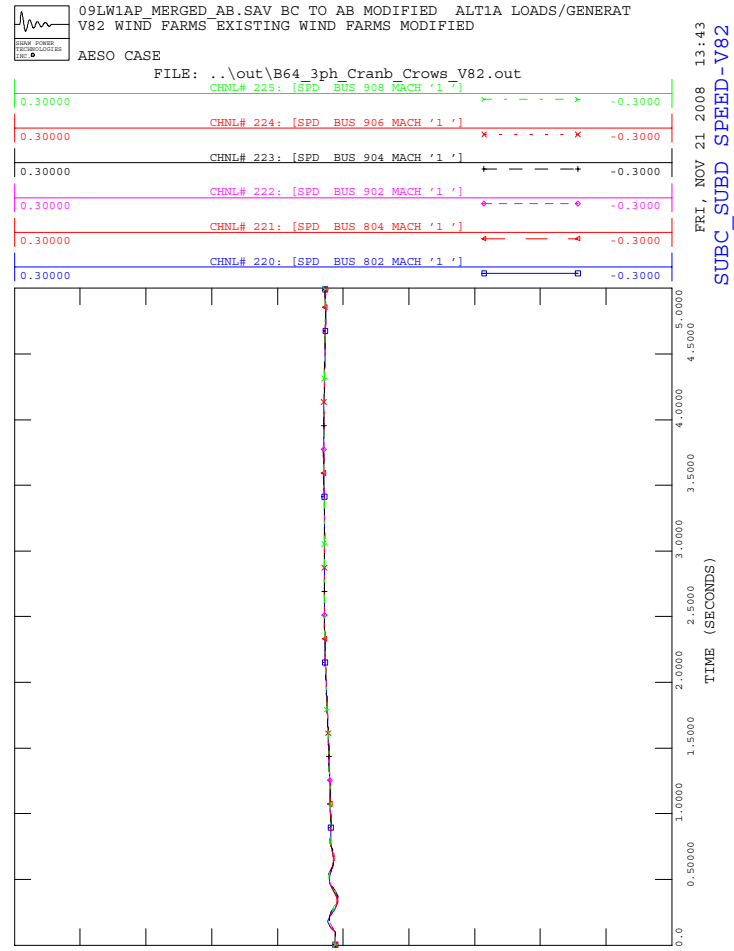
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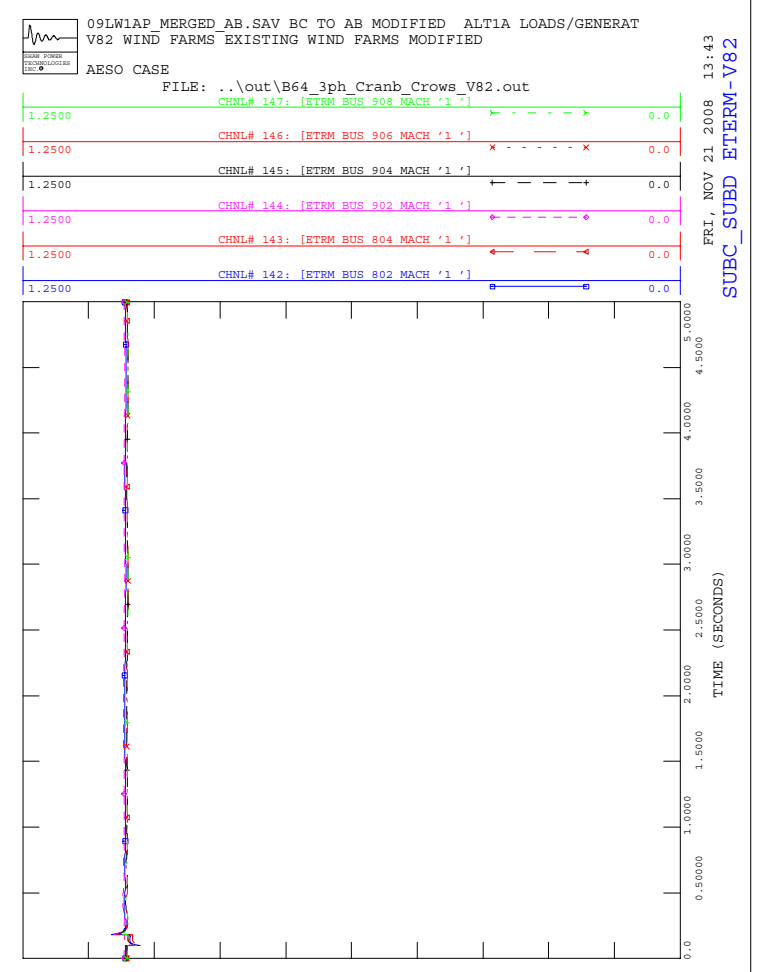
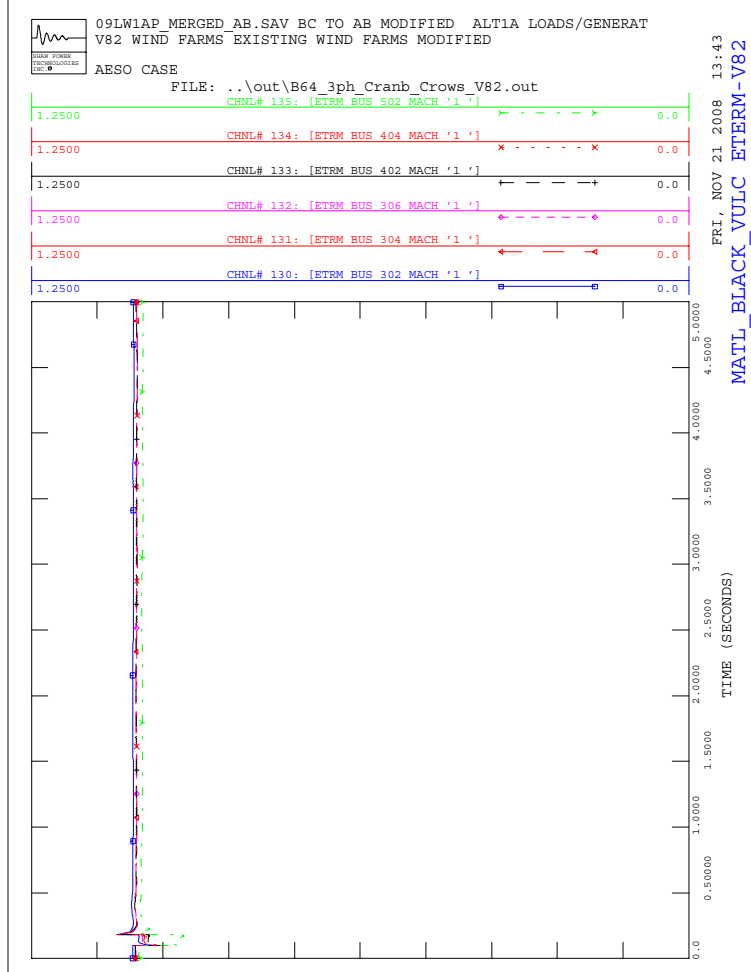
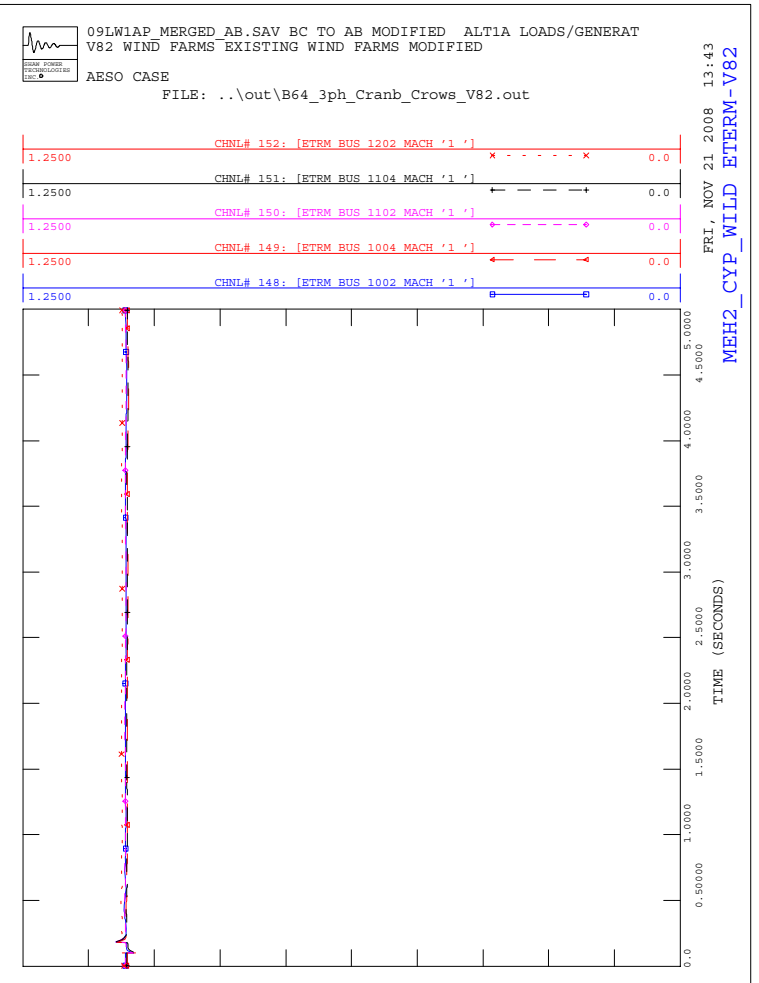
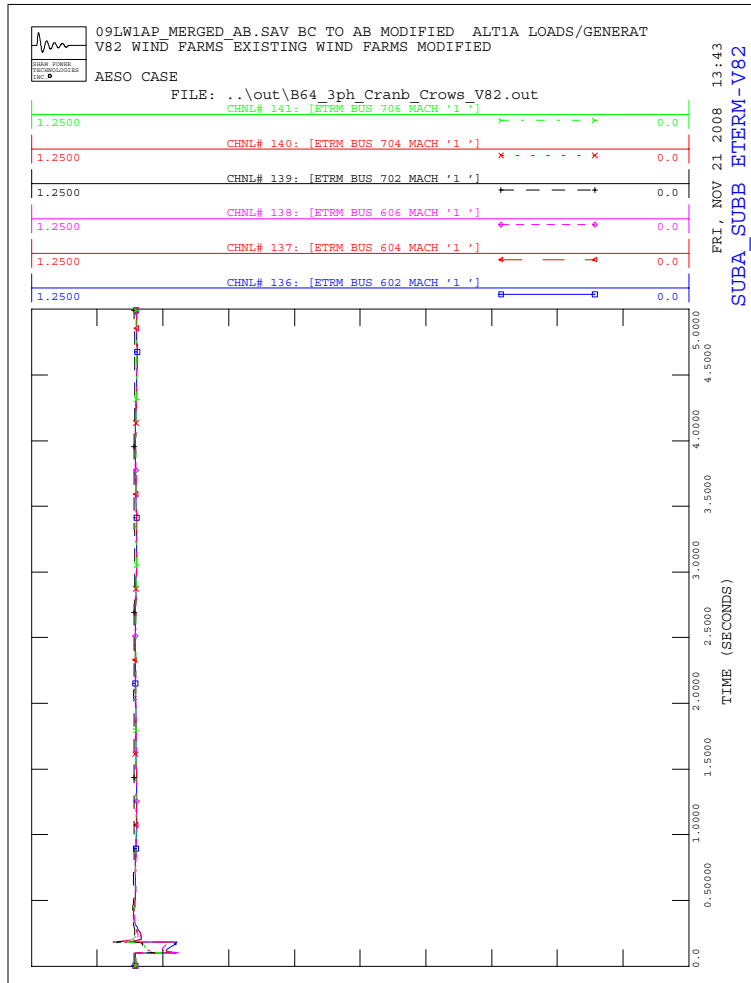
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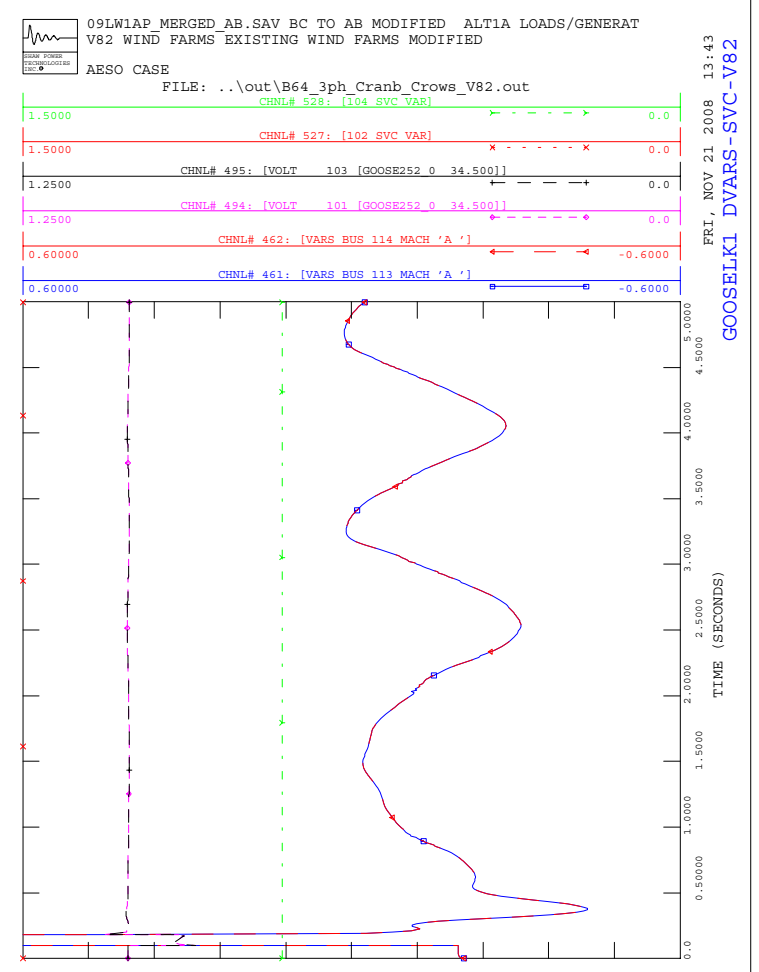
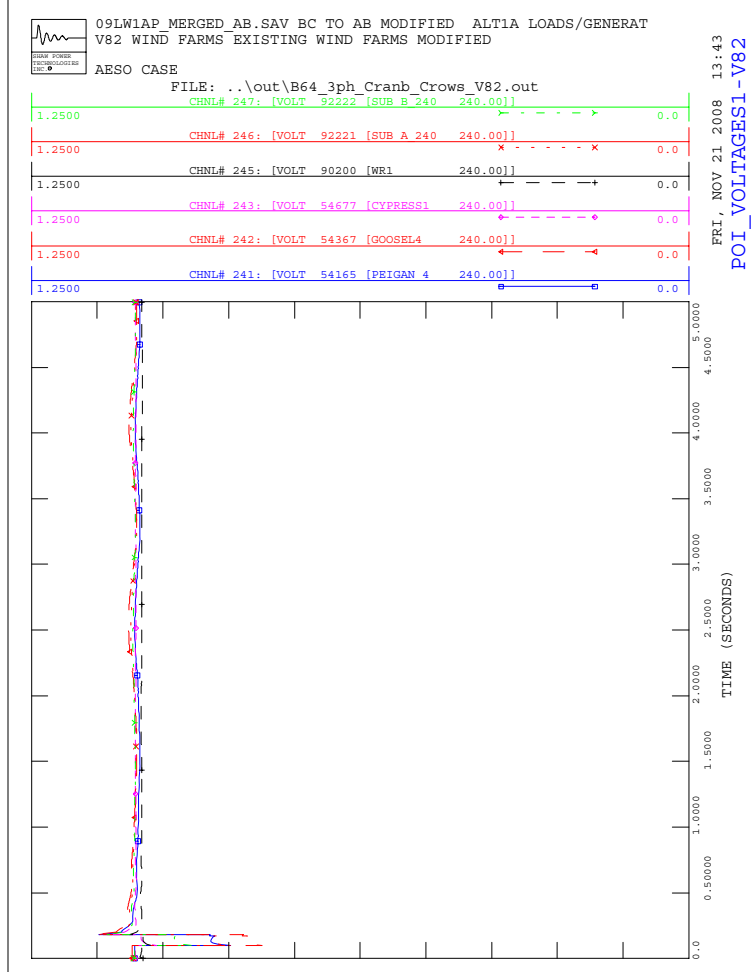
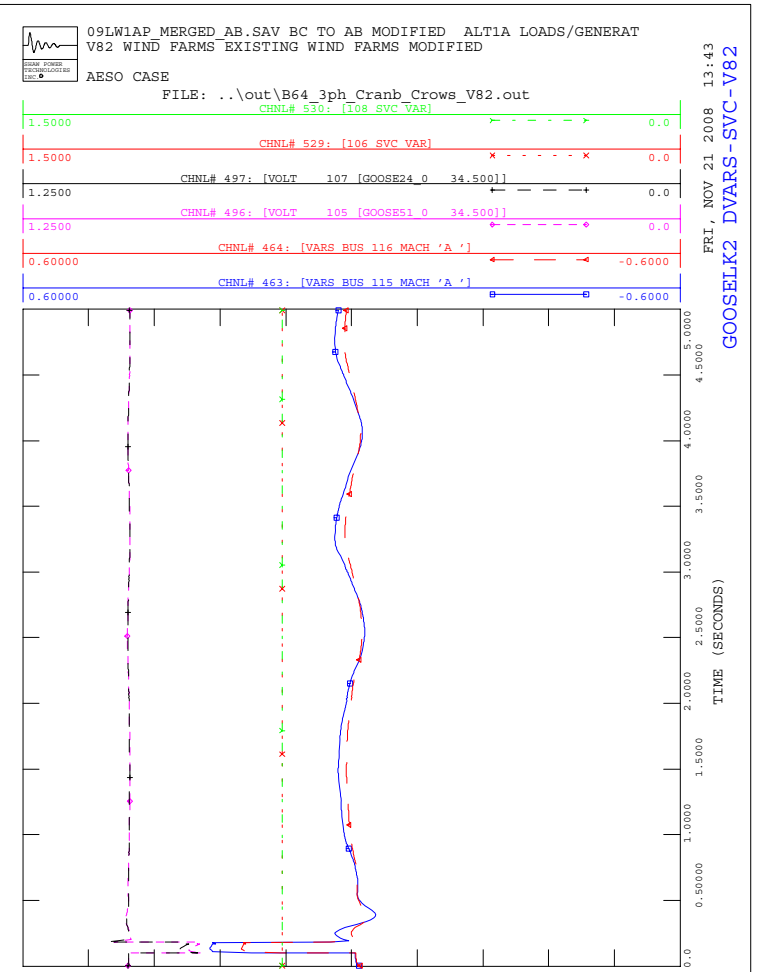
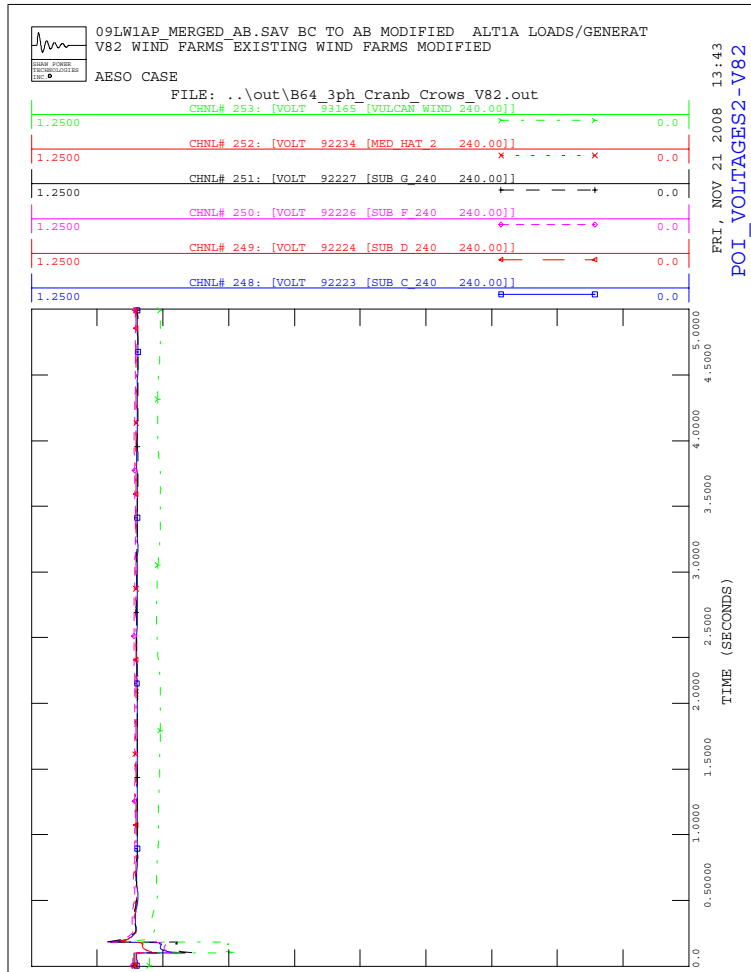
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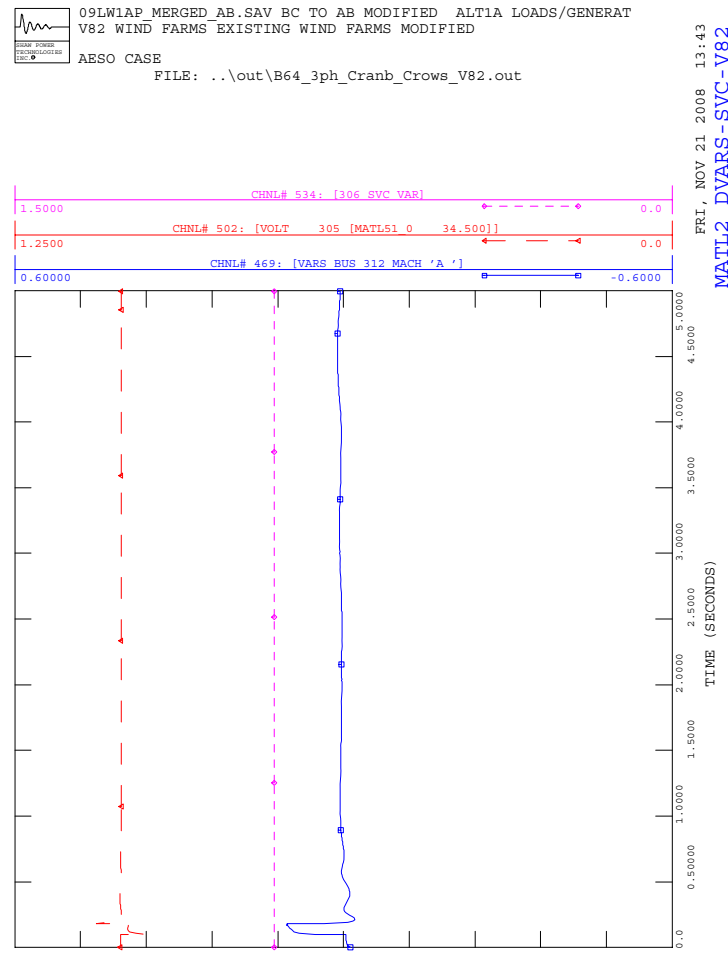
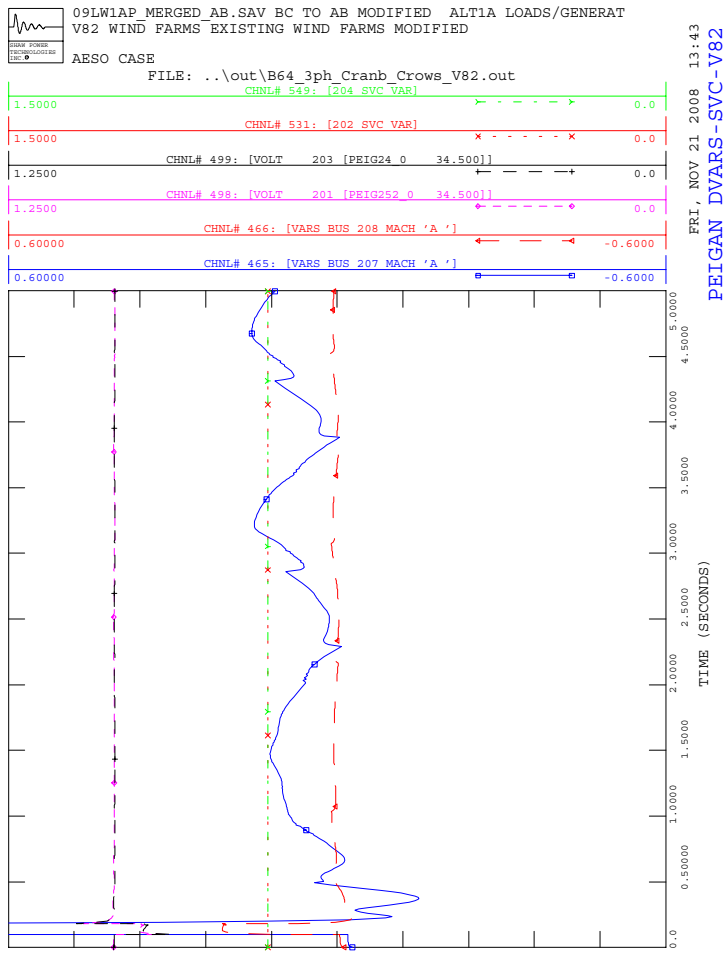
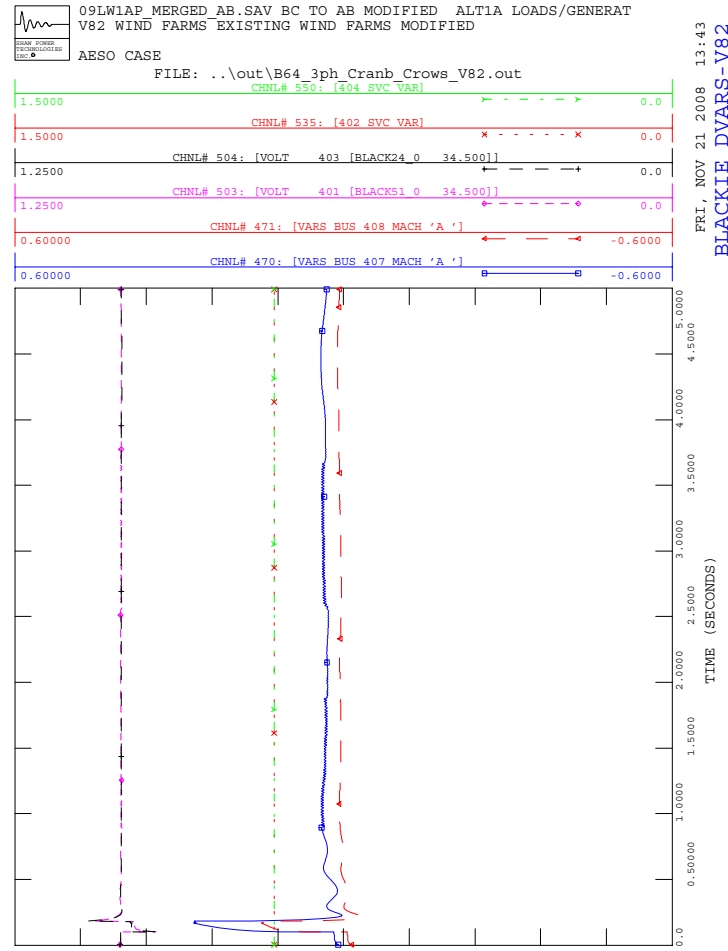
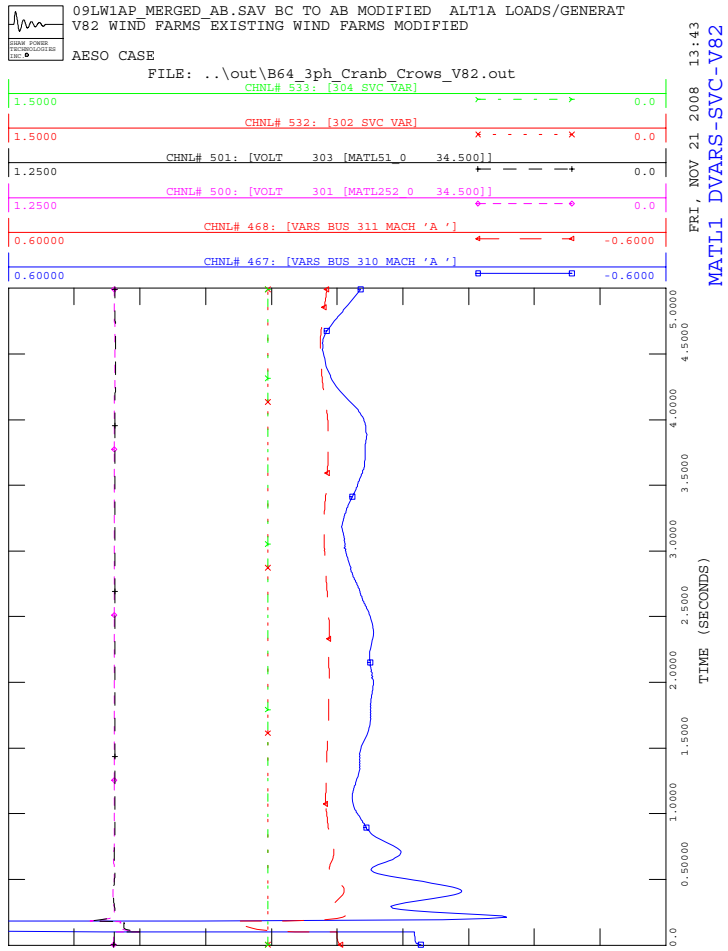


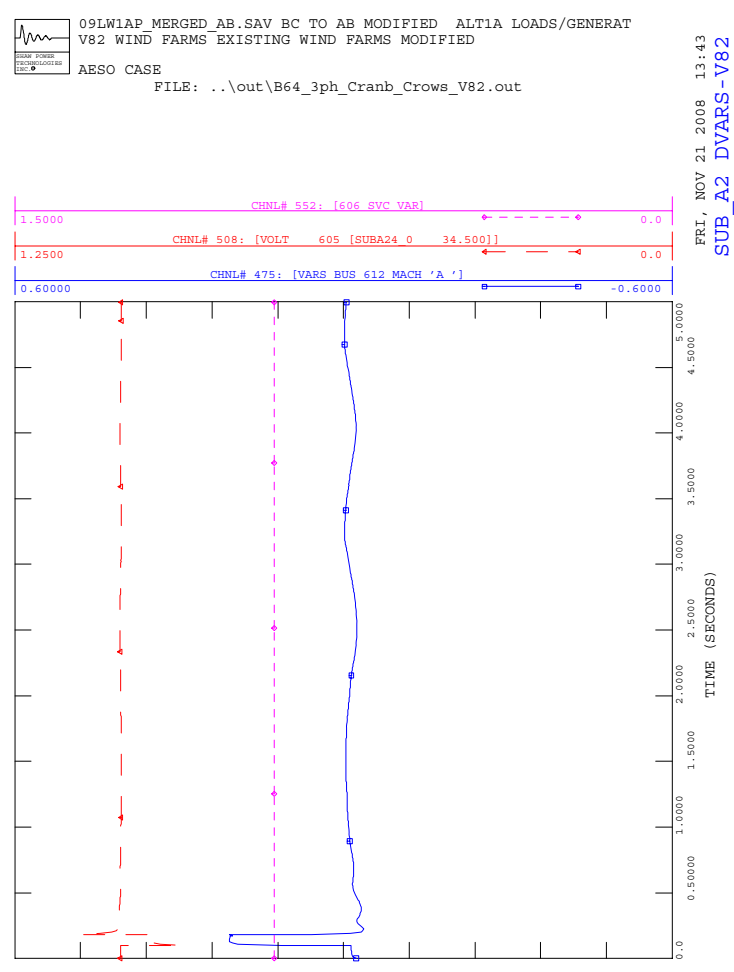
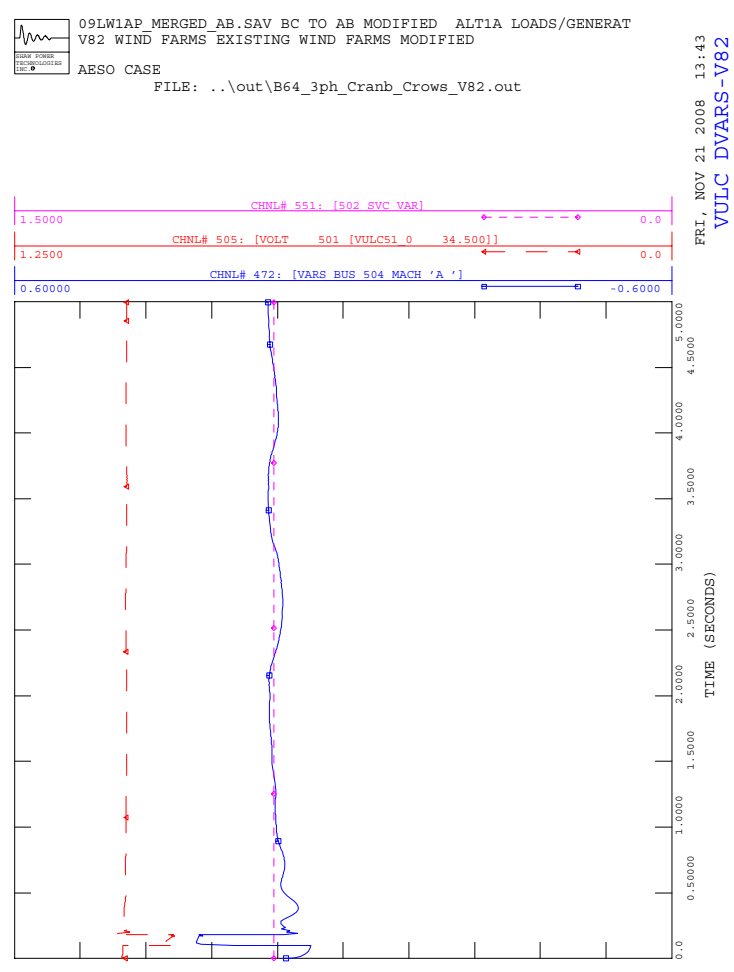
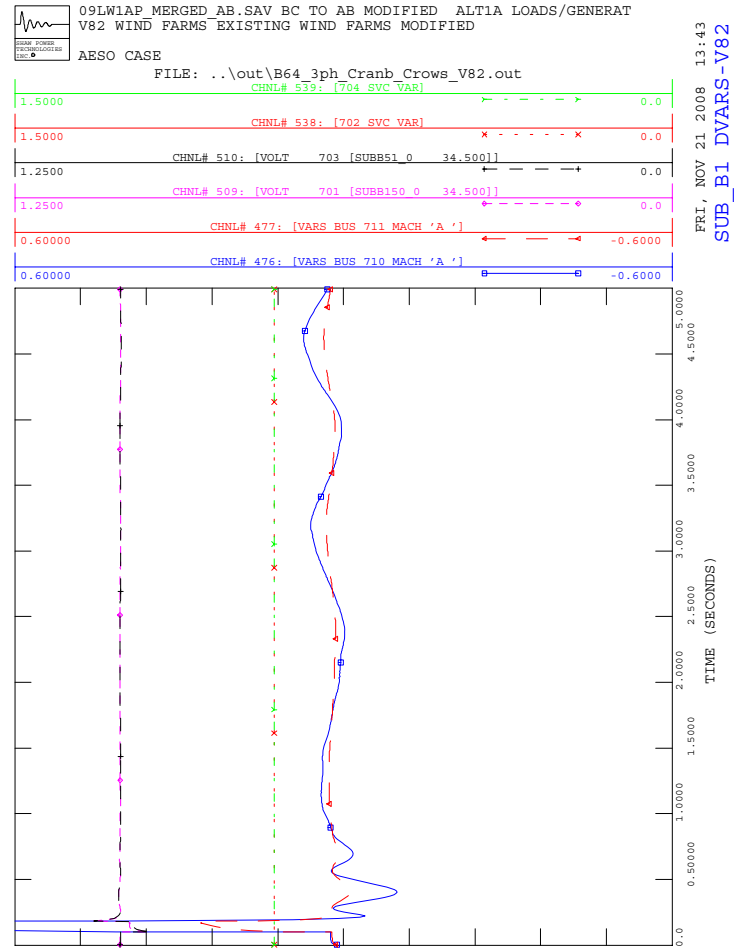
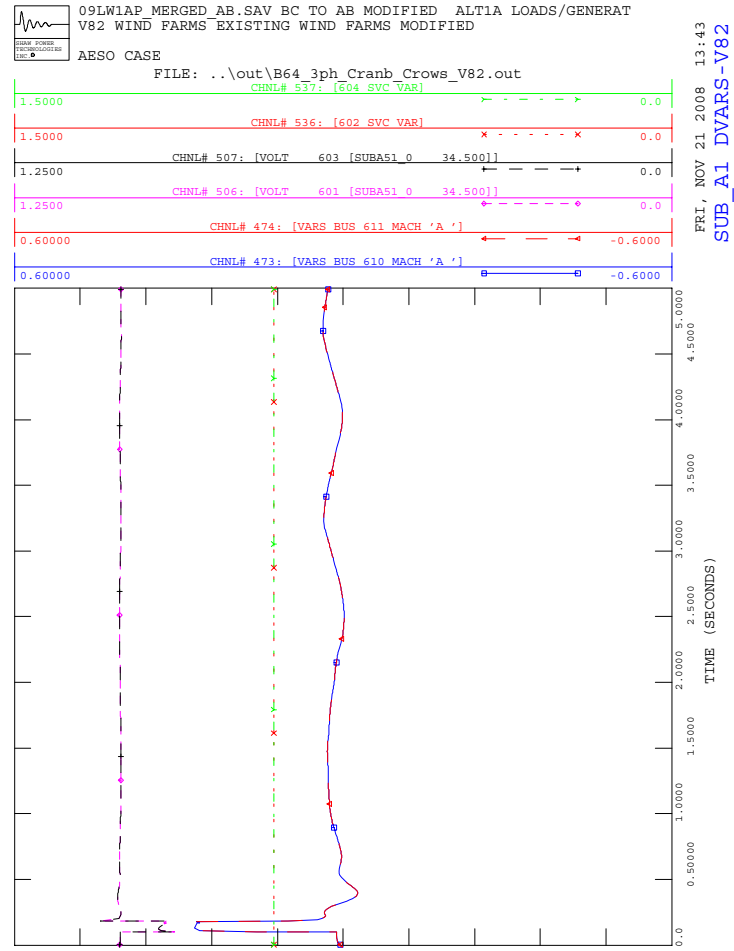
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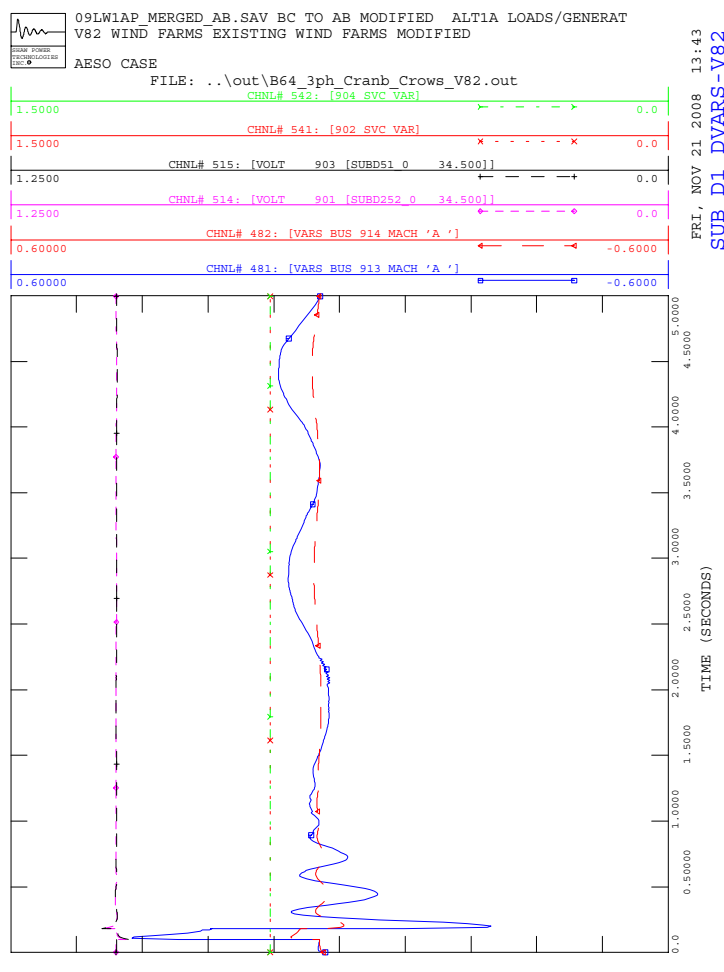
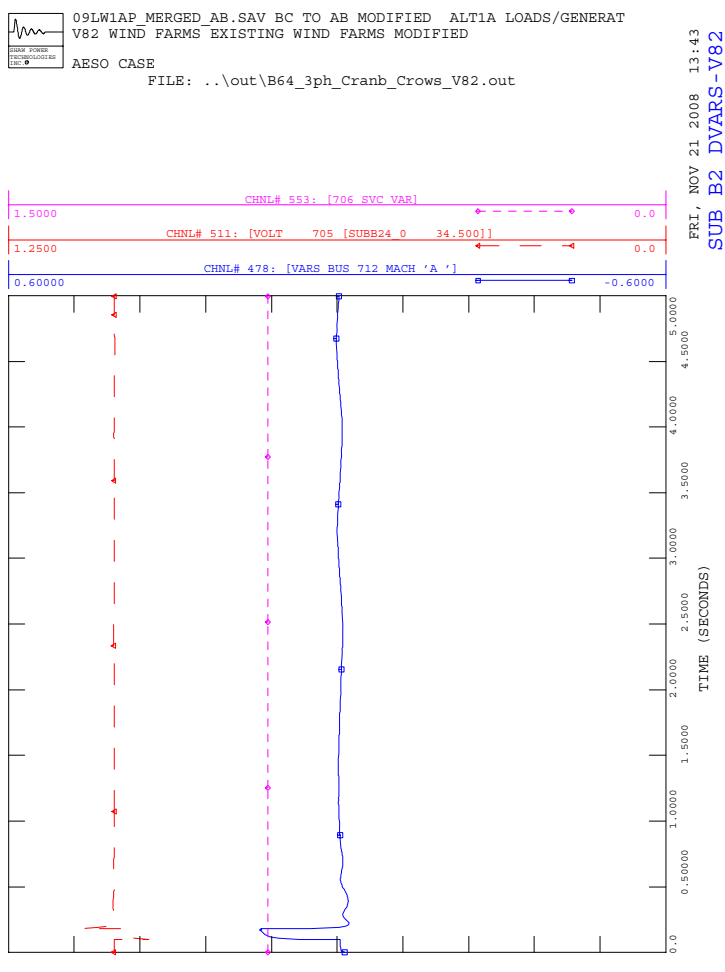
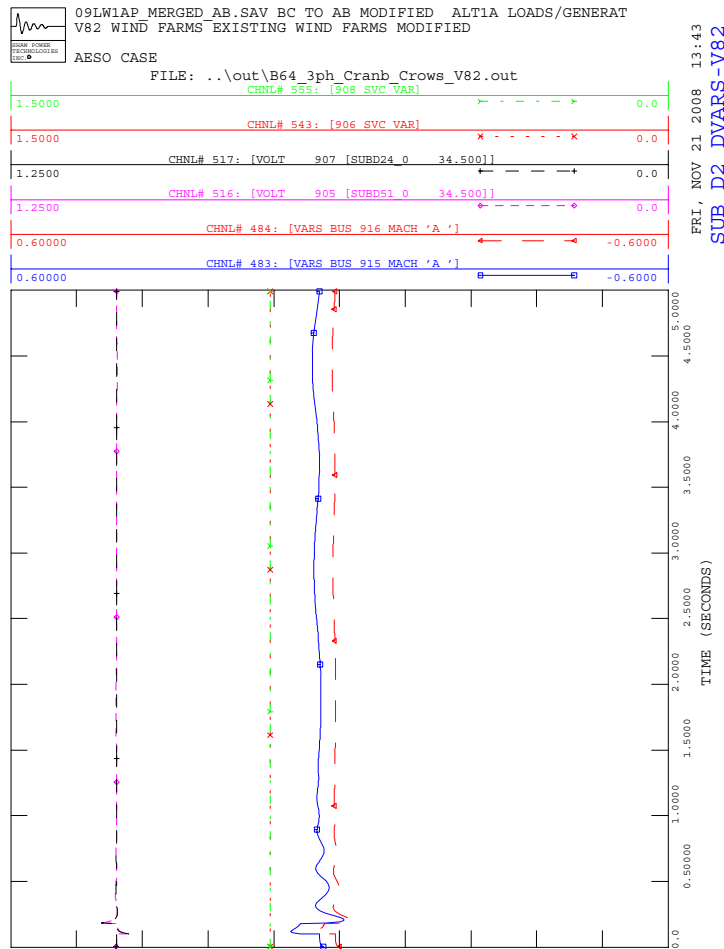
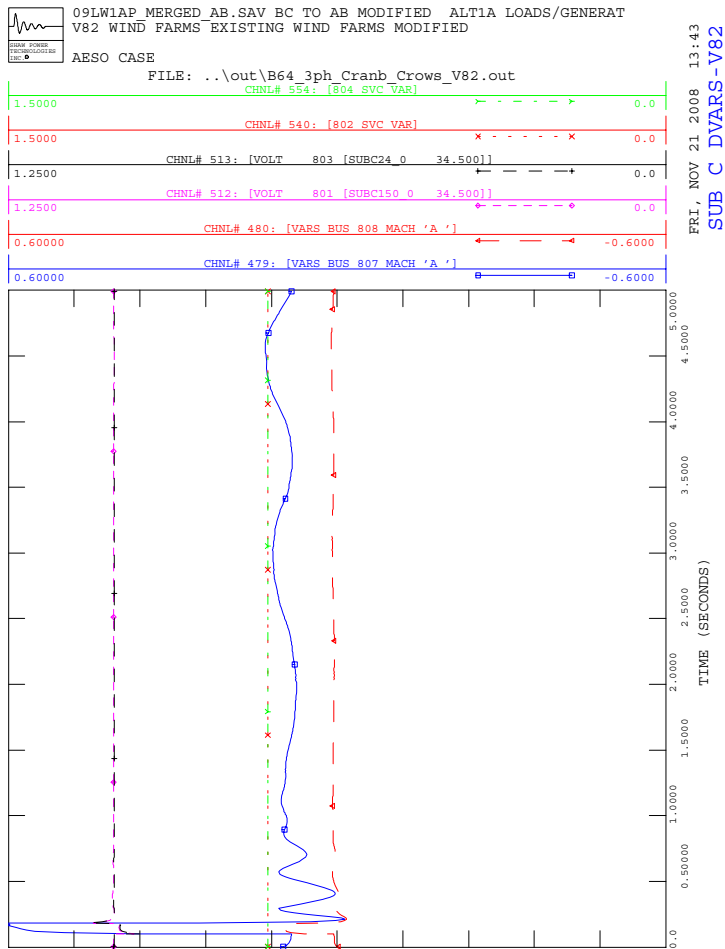


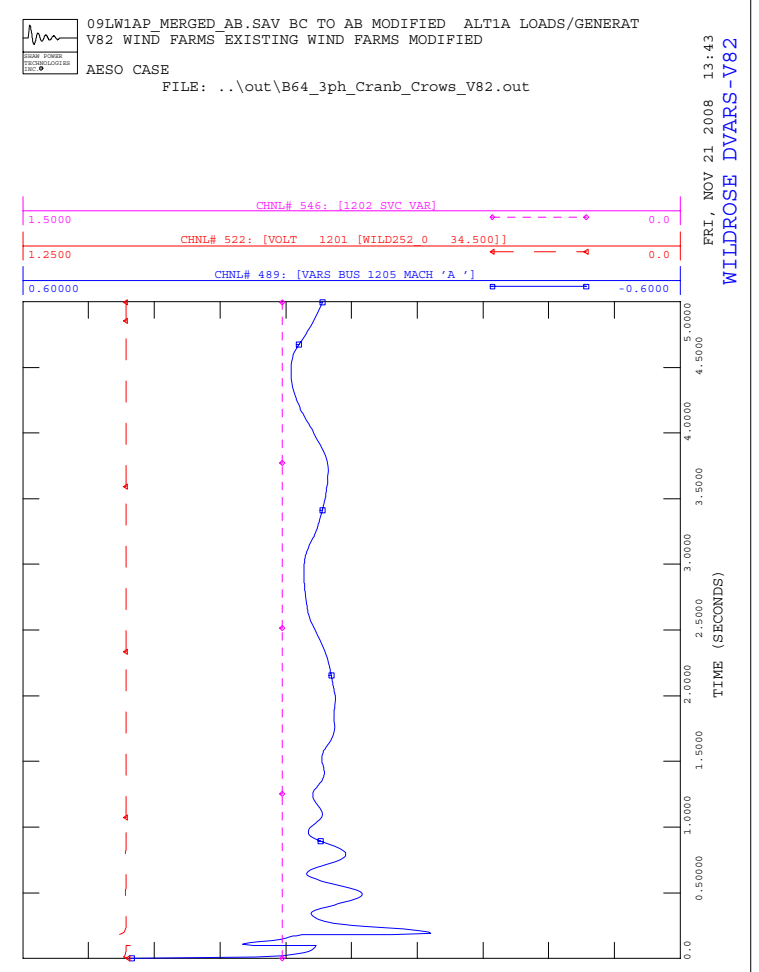
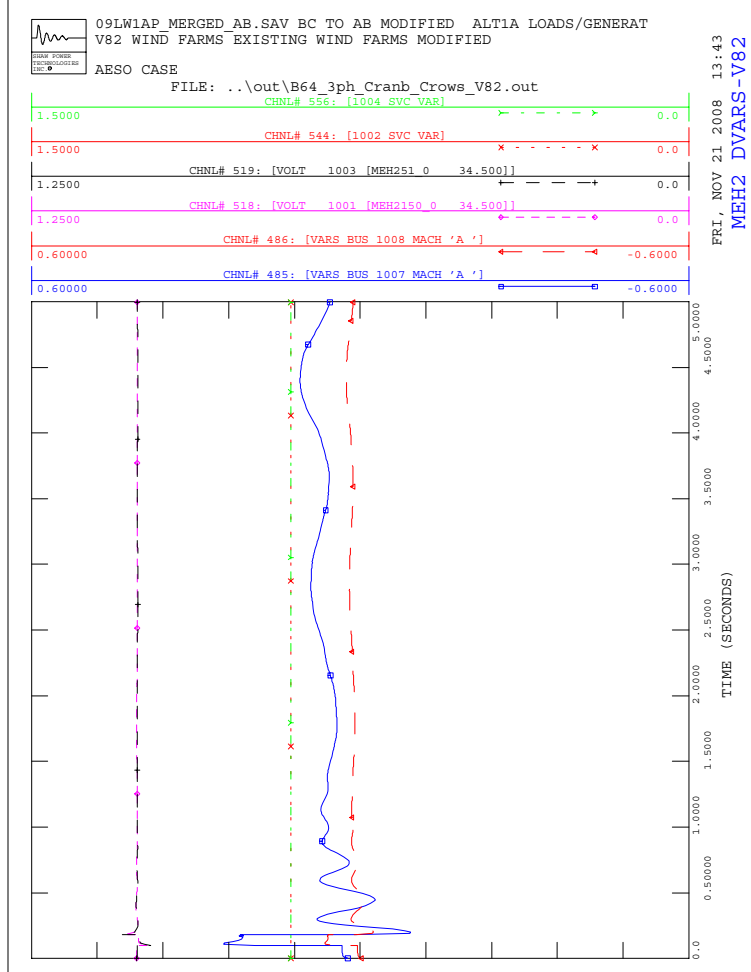
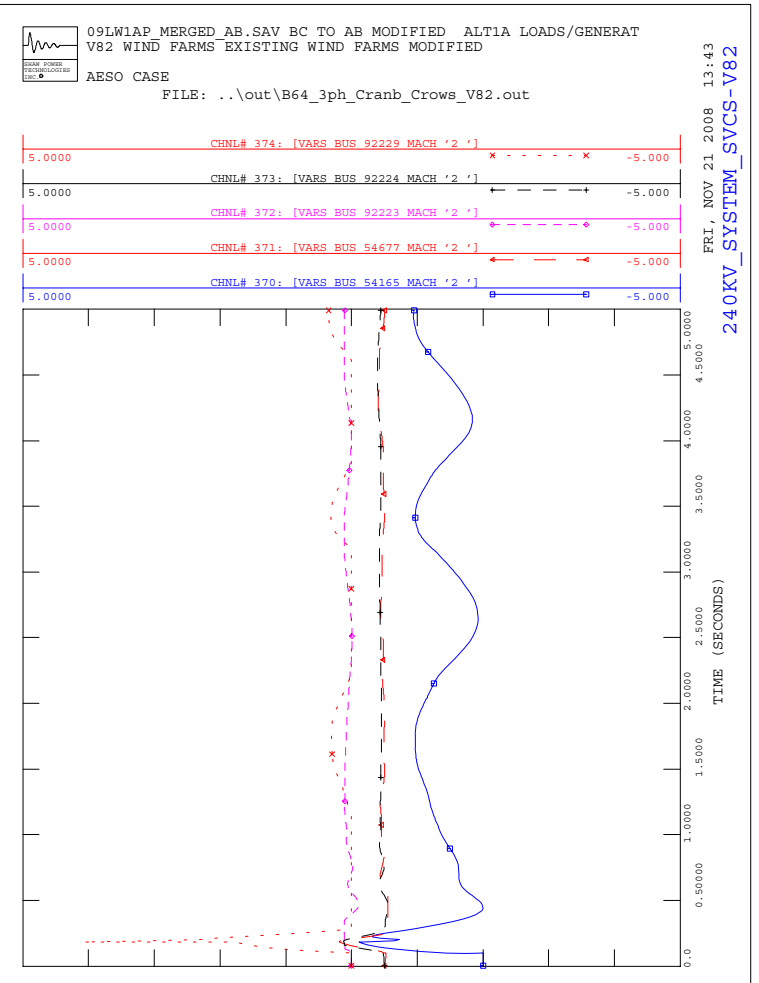
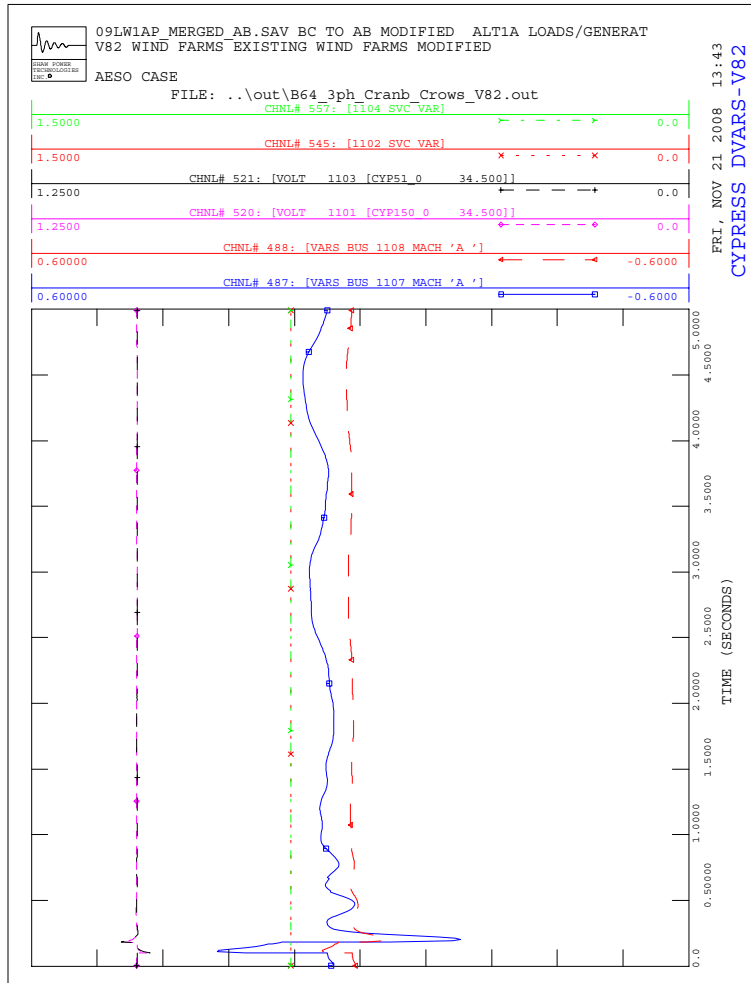








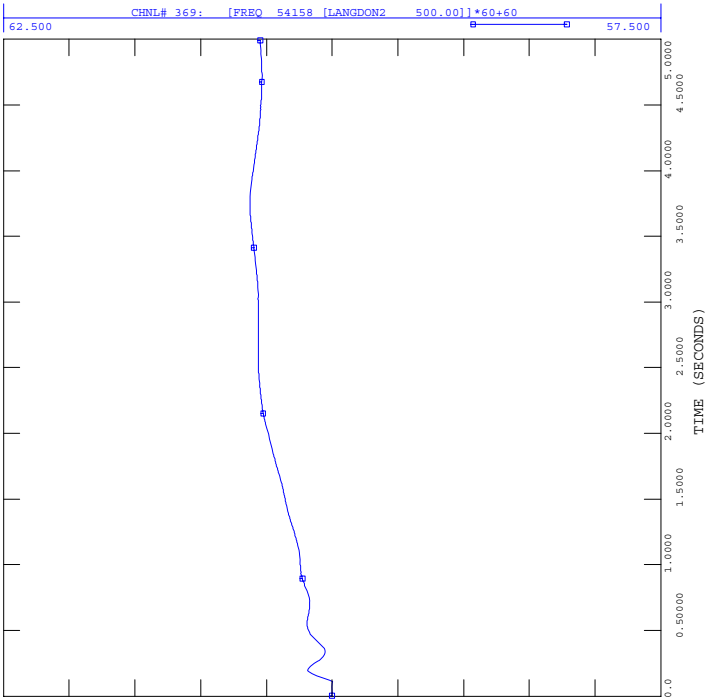






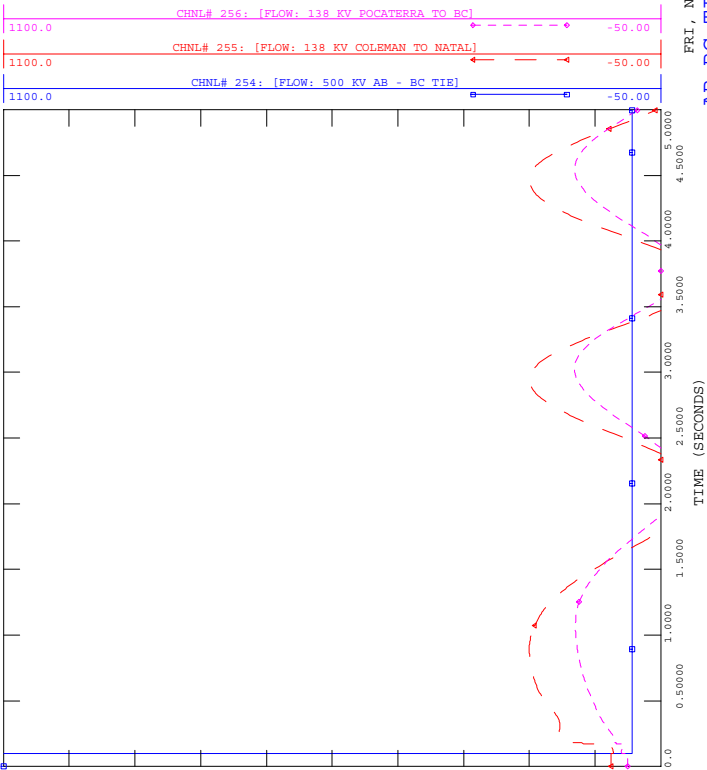
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ABSO CASE
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LANGDON_FRQ-V82



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ABSO CASE
FILE: ..\out\B64_3ph_Cranb_Crows_V82.out

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AB_BC_TIE_FLOWS-V82



Category C5 Fault Analysis Results

Category C5 fault analysis was performed for the 2017 Summer Light - Alternative 1A case. Category C5 faults are defined as double line-to-ground faults of a double circuited transmission tower with normal clearing time. Figures E-4, E-5, and E-6 show the locations where the Category C5 faults were applied to the system. The impedances of the double line to ground faults were calculated at the faulted locations on the Alternative 1A system. Table E-2 summarizes the fault descriptions and results for the Category C5 fault analysis. All simulation observations reported in Table E-2 for are applicable to both V82 and GE wind turbine results. Specific transient simulation plots for Category C5 contingencies can be found in this Appendix E.

FIGURE E-4
CATEGORY C5 FAULT LOCATIONS – SOUTHWESTERN PART OF THE SOUTH SYSTEM

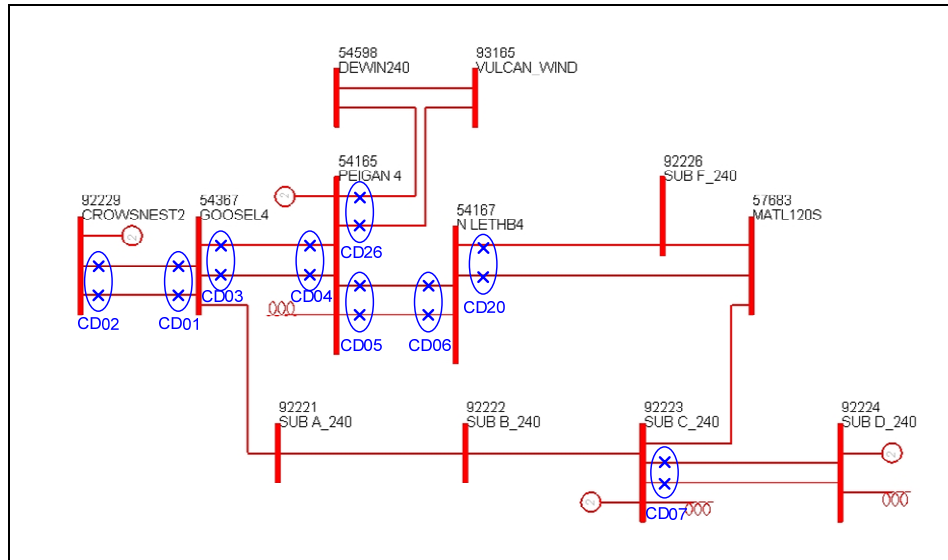


FIGURE E-5
CATEGORY C5 FAULT LOCATIONS – NORTHWESTERN PART OF THE SOUTH SYSTEM

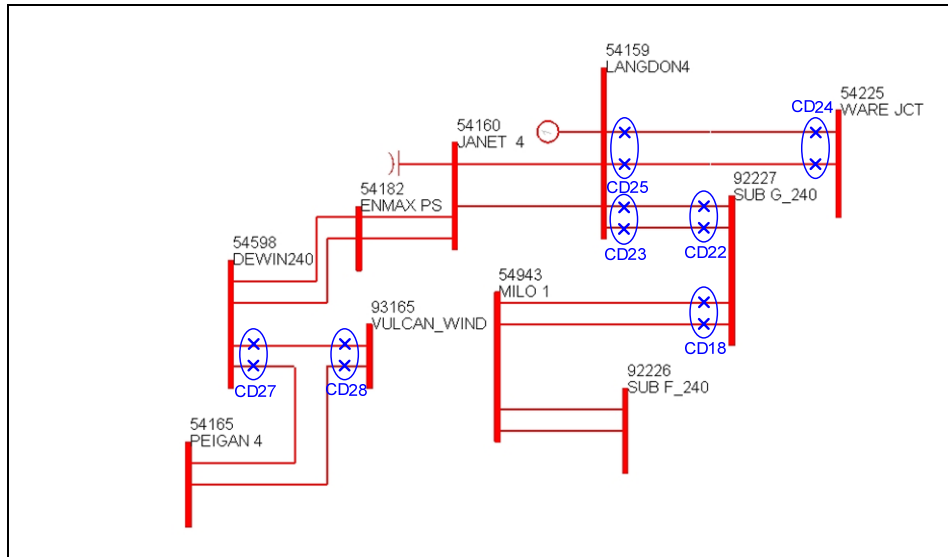
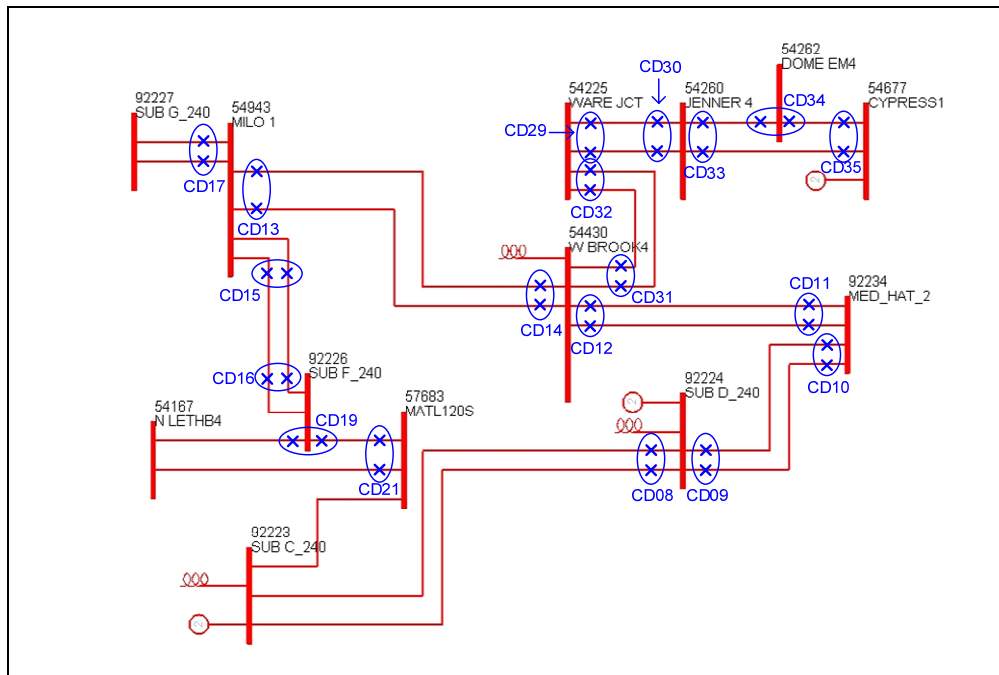


FIGURE E-6
CATEGORY C5 FAULT LOCATIONS – EASTERN PART OF THE SOUTH SYSTEM



**TABLE E-2
STABILITY RESULTS FOR C5 FAULTS
V82 AND GE1.5 TURBINE**

Case ID	Description	Observations
CD01	Double line to ground fault at Gooselake 240kV double ckt line to Crowsnest 5 cycles: trip Gooselake CB on Gooselake - Crowsnest line ckt 01 trip Gooselake CB on Gooselake - Crowsnest line ckt 02 6 cycles: trip Crowsnest CB on Gooselake - Crowsnest line ckt 01 trip Crowsnest CB on Gooselake - Crowsnest line ckt 02	System stable Good voltage recovery No load shedding
CD02*	Double line to ground fault at Crowsnest 240kV double ckt line to Gooselake 5 cycles: trip Crowsnest CB on Crowsnest - Gooselake line ckt 01 trip Crowsnest CB on Crowsnest - Gooselake line ckt 02 6 cycles: trip Gooselake CB on Crowsnest - Gooselake line ckt 01 trip Gooselake CB on Crowsnest - Gooselake line ckt 02	System stable Good voltage recovery No load shedding
CD03*	Double line to ground fault at Gooselake 240kV double ckt line to Peigan 5 cycles: trip Gooselake CB on Gooselake - Peigan line ckt 75 trip Gooselake CB on Gooselake - Peigan line ckt 76 6 cycles: trip Peigan CB on Gooselake - Peigan line ckt 75 trip Peigan CB on Gooselake - Peigan line ckt 76	System stable Good voltage recovery No load shedding
CD04	Double line to ground fault at Peigan 240kV double ckt line to Gooselake 5 cycles: trip Peigan CB on Peigan - Gooselake line ckt 75 trip Peigan CB on Peigan - Gooselake line ckt 76 6 cycles: trip Gooselake CB on Peigan - Gooselake line ckt 75 trip Gooselake CB on Peigan - Gooselake line ckt 76	System stable Good voltage recovery No load shedding
CD05*	Double line to ground fault at Peigan 240kV dbl ckt line to North_Lethbridge 5 cycles: trip Peigan CB on Peigan - North_Lethbridge line ckt 77 trip Peigan CB on Peigan - North_Lethbridge line ckt 78 6 cycles: trip North_Lethbridge CB on Peigan - North_Lethbridge line ckt 77 trip North_Lethbridge CB on Peigan - North_Lethbridge line ckt 78	System stable Good voltage recovery No load shedding
CD06	Double line to ground fault at North_Lethbridge 240kV dbl ckt line to Peigan 5 cycles: trip North_Lethbridge CB on North_Lethbridge - Peigan line ckt 77 trip North_Lethbridge CB on North_Lethbridge - Peigan line ckt 78 6 cycles: trip Peigan CB on North_Lethbridge - Peigan line ckt 77 trip Peigan CB on North_Lethbridge - Peigan line ckt 78	System stable Good voltage recovery No load shedding
CD07*	Double line to ground fault at SubC 240kV double ckt line to SubD 5 cycles: trip SubC CB on SubC - SubD line ckt 1 trip SubC CB on SubC - SubD line ckt 2 6 cycles: trip SubD CB on SubC - SubD line ckt 1 trip SubD CB on SubC - SubD line ckt 2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

**TABLE E-2
STABILITY RESULTS FOR C5 FAULTS
V82 AND GE1.5 TURBINE**

Case ID	Description	Observations
CD08	Double line to ground fault at SubD 240kV double ckt line to SubC 5 cycles: trip SubD CB on SubD - SubC line ckt 1 trip SubD CB on SubD - SubC line ckt 2 6 cycles: trip SubC CB on SubD - SubC line ckt 1 trip SubC CB on SubD - SubC line ckt 2	System stable Good voltage recovery No load shedding
CD09	Double line to ground fault at SubD 240kV double ckt line to Medicine_Hat2 5 cycles: trip SubD CB on SubD - Medicine_Hat2 line ckt 1 trip SubD CB on SubD - Medicine_Hat2 line ckt 2 6 cycles: trip Medicine_Hat2 CB on SubD - Medicine_Hat2 line ckt 1 trip Medicine_Hat2 CB on SubD - Medicine_Hat2 line ckt 2	System stable Good voltage recovery No load shedding
CD10	Double line to ground fault at Medicine_Hat2 240kV double ckt line to SubD 5 cycles: trip Medicine_Hat2 CB on Medicine_Hat2 - SubD line ckt 1 trip Medicine_Hat2 CB on Medicine_Hat2 - SubD line ckt 2 6 cycles: trip SubD CB on Medicine_Hat2 - SubD line ckt 1 trip SubD CB on Medicine_Hat2 - SubD line ckt 2	System stable Good voltage recovery No load shedding
CD11*	Double line to ground fault at Medicine_Hat2 240kV dbl ckt line to Westbrooks 5 cycles: trip Medicine_Hat2 CB on Medicine_Hat2 - Westbrooks line ckt 1 trip Medicine_Hat2 CB on Medicine_Hat2 - Westbrooks line ckt 2 6 cycles: trip Westbrooks CB on Medicine_Hat2 - Westbrooks line ckt 1 trip Westbrooks CB on Medicine_Hat2 - Westbrooks line ckt 2	System stable Good voltage recovery No load shedding
CD12	Double line to ground fault at Westbrooks 240kV dbl ckt line to Medicine_Hat2 5 cycles: trip Westbrooks CB on Westbrooks - Medicine_Hat2 line ckt 1 trip Westbrooks CB on Westbrooks - Medicine_Hat2 line ckt 2 6 cycles: trip Medicine_Hat2 CB on Westbrooks - Medicine_Hat2 line ckt 1 trip Medicine_Hat2 CB on Westbrooks - Medicine_Hat2 line ckt 2	System stable Good voltage recovery No load shedding
CD13	Double line to ground fault at Milo 240kV double ckt line to Westbrooks 5 cycles: trip Milo CB on Milo - Westbrooks line ckt 23 trip Milo CB on Milo - Westbrooks line ckt 35 6 cycles: trip Westbrooks CB on Milo - Westbrooks line ckt 23 trip Westbrooks CB on Milo - Westbrooks line ckt 35	System stable Good voltage recovery No load shedding
CD14	Double line to ground fault at Westbrooks 240kV double ckt line to Milo 5 cycles: trip Westbrooks CB on Westbrooks - Milo line ckt 23 trip Westbrooks CB on Westbrooks - Milo line ckt 35 6 cycles: trip Milo CB on Westbrooks - Milo line ckt 23 trip Milo CB on Westbrooks - Milo line ckt 35	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

**TABLE E-2
STABILITY RESULTS FOR C5 FAULTS
V82 AND GE1.5 TURBINE**

Case ID	Description	Observations
CD15	Double line to ground fault at Milo 240kV double ckt line to SubF 5 cycles: trip Milo CB on Milo - SubF line ckt 23 trip Milo CB on Milo - SubF line ckt 24 6 cycles: trip SubF CB on Milo - SubF line ckt 23 trip SubF CB on Milo - SubF line ckt 24	System stable Good voltage recovery No load shedding
CD16	Double line to ground fault at SubF 240kV double ckt line to Milo 5 cycles: trip SubF CB on SubF - Milo line ckt 23 trip SubF CB on SubF - Milo line ckt 24 6 cycles: trip Milo CB on SubF - Milo line ckt 23 trip Milo CB on SubF - Milo line ckt 24	System stable Good voltage recovery No load shedding
CD17	Double line to ground fault at Milo 240kV double ckt line to SubG 5 cycles: trip Milo CB on Milo - SubG line ckt 27 trip Milo CB on Milo - SubG line ckt 24 6 cycles: trip SubG CB on Milo - SubG line ckt 27 trip SubG CB on Milo - SubG line ckt 24	System stable Good voltage recovery No load shedding
CD18	Double line to ground fault at SubG 240kV double ckt line to Milo 5 cycles: trip SubG CB on SubG - Milo line ckt 27 trip SubG CB on SubG - Milo line ckt 24 6 cycles: trip Milo CB on SubG - Milo line ckt 27 trip Milo CB on SubG - Milo line ckt 24	System stable Good voltage recovery No load shedding
CD19	Dbl line to ground fault at SubF 240kV dbl ckt line to Matl and N_Lethbridge 5 cycles: trip SubF CB on SubF - Matl line ckt 23 trip SubF CB on SubF - North_Lethbridge line ckt 24 6 cycles: trip Matl CB on SubF - Matl line ckt 23 trip North_Lethbridge CB on SubF - North_Lethbridge line ckt 24	System stable Good voltage recovery No load shedding
CD20*	Dbl line to ground fault at N_Lethbridge 240kV dbl ckt line to SubF and Matl 5 cycles: trip North_Lethbridge CB on North_Lethbridge - SubF line ckt 24 trip North_Lethbridge CB on North_Lethbridge - Matl line ckt 1 6 cycles: trip SubF CB on North_Lethbridge - SubF line ckt 24 trip Matl CB on North_Lethbridge - Matl line ckt 1	System stable Good voltage recovery No load shedding
CD21	Dbl line to gnd fault at Matl 240kV dbl ckt line to SubF and N_Lethbridge 5 cycles: trip Matl CB on Matl - SubF line ckt 23 trip Matl CB on Matl - North_Lethbridge line ckt 1 6 cycles: trip SubF CB on Matl - SubF line ckt 23 trip North_Lethbridge CB on Matl - North_Lethbridge line ckt 1	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

**TABLE E-2
STABILITY RESULTS FOR C5 FAULTS
V82 AND GE1.5 TURBINE**

Case ID	Description	Observations
CD22	Double line to ground fault at SubG 240kV double ckt line to Langdon 5 cycles: trip SubG CB on SubG - Langdon line ckt 27 trip SubG CB on SubG - Langdon line ckt 24 6 cycles: trip Langdon CB on SubG - Langdon line ckt 27 trip Langdon CB on SubG - Langdon line ckt 24	System stable Good voltage recovery No load shedding
CD23*	Double line to ground fault at Langdon 240kV double ckt line to SubG 5 cycles: trip Langdon CB on Langdon - SubG line ckt 27 trip Langdon CB on Langdon - SubG line ckt 24 6 cycles: trip SubG CB on Langdon - SubG line ckt 27 trip SubG CB on Langdon - SubG line ckt 24	System stable Good voltage recovery No load shedding
CD24*	Double line to ground fault at Ware_Junction 240kV dbl ckt line to Langdon 5 cycles: trip Ware_Junction CB on Ware_Junction - Langdon line ckt 1 trip Ware_Junction CB on Ware_Junction - Langdon line ckt 2 6 cycles: trip Langdon CB on Ware_Junction - Langdon line ckt 1 trip Langdon CB on Ware_Junction - Langdon line ckt 2	System stable Good voltage recovery No load shedding
CD25	Double line to ground fault at Langdon 240kV dbl ckt line to Ware_Junction 5 cycles: trip Langdon CB on Langdon - Ware_Junction line ckt 1 trip Langdon CB on Langdon - Ware_Junction line ckt 2 6 cycles: trip Ware_Junction CB on Langdon - Ware_Junction line ckt 1 trip Ware_Junction CB on Langdon - Ware_Junction line ckt 2	System stable Good voltage recovery No load shedding
CD26	Double line to ground fault at Peigan 240kV dbl ckt line to Dewin and Vulcan 5 cycles: trip Peigan CB on Peigan - Dewin line ckt 2 trip Peigan CB on Peigan - Vulcan line ckt 1 6 cycles: trip Dewin CB on Peigan - Dewin line ckt 2 trip Vulcan CB on Peigan - Vulcan line ckt 1	System stable Good voltage recovery No load shedding
CD27*	Double line to ground fault at Dewin 240kV dbl ckt line to Vulcan and Peigan 5 cycles: trip Dewin CB on Dewin - Vulcan line ckt 1 trip Dewin CB on Dewin - Peigan line ckt 2 6 cycles: trip Vulcan CB on Dewin - Vulcan line ckt 1 trip Peigan CB on Dewin - Peigan line ckt 2	System stable Good voltage recovery No load shedding
CD28	Double line to ground fault at Vulcan 240kV dbl ckt line to Dewin and Peigan 5 cycles: trip Vulcan CB on Vulcan - Dewin line ckt 1 trip Vulcan CB on Vulcan - Peigan line ckt 1 6 cycles: trip Dewin CB on Vulcan - Dewin line ckt 1 trip Peigan CB on Vulcan - Peigan line ckt 1	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

**TABLE E-2
STABILITY RESULTS FOR C5 FAULTS
V82 AND GE1.5 TURBINE**

Case ID	Description	Observations
CD29	Double line to ground fault at Ware_Junction 240kV dbl ckt line to Jenner 5 cycles: trip Ware_Junction CB on Ware_Junction - Jenner line ckt 44 trip Ware_Junction CB on Ware_Junction - Jenner line ckt 51 6 cycles: trip Jenner CB on Ware_Junction - Jenner line ckt 44 trip Jenner CB on Ware_Junction - Jenner line ckt 51	System stable Good voltage recovery No load shedding
CD30	Double line to ground fault at Jenner 240kV dbl ckt line to Ware_Junction 5 cycles: trip Jenner CB on Jenner - Ware_Junction line ckt 44 trip Jenner CB on Jenner - Ware_Junction line ckt 51 6 cycles: trip Ware_Junction CB on Jenner - Ware_Junction line ckt 44 trip Ware_Junction CB on Jenner - Ware_Junction line ckt 51	System stable Good voltage recovery No load shedding
CD31*	Dbl line to ground fault at Westbrooks 240kV dbl ckt line to Ware_Junction 5 cycles: trip Westbrooks CB on Westbrooks - Ware_Junction line ckt 31 trip Westbrooks CB on Westbrooks - Ware_Junction line ckt 33 6 cycles: trip Ware_Junction CB on Westbrooks - Ware_Junction line ckt 31 trip Ware_Junction CB on Westbrooks - Ware_Junction line ckt 33	System stable Good voltage recovery No load shedding
CD32	Dbl line to ground fault at Ware_Junction 240kV dbl ckt line to Westbrooks 5 cycles: trip Ware_Junction CB on Ware_Junction - Westbrooks line ckt 31 trip Ware_Junction CB on Ware_Junction - Westbrooks line ckt 33 6 cycles: trip Westbrooks CB on Ware_Junction - Westbrooks line ckt 31 trip Westbrooks CB on Ware_Junction - Westbrooks line ckt 33	System stable Good voltage recovery No load shedding
CD33*	Dbl line to gnd fault at Jenner 240kV dbl ckt line to Empress and Cypress 5 cycles: trip Jenner CB on Jenner - Dome_Empress line ckt 51 trip Jenner CB on Jenner - Cypress line ckt 45 6 cycles: trip Dome_Empress CB on Jenner - Dome_Empress line ckt 51 trip Cypress CB on Jenner - Cypress line ckt 45	System stable Good voltage recovery No load shedding
CD34	Dbl line to gnd fault at Empress 240kV dbl ckt line to Jenner and Cypress 5 cycles: trip Dome_Empress CB on Dome_Empress - Jenner line ckt 51 trip Dome_Empress CB on Dome_Empress - Cypress line ckt 45 6 cycles: trip Jenner CB on Dome_Empress - Jenner line ckt 51 trip Cypress CB on Dome_Empress - Cypress line ckt 45	System stable Good voltage recovery No load shedding
CD35	Dbl line to gnd fault at Cypress 240kV dbl ckt line to Jenner and Empress 5 cycles: trip Cypress CB on Cypress - Jenner line ckt 45 trip Cypress CB on Cypress - Dome_Empress line ckt 45 6 cycles: trip Jenner CB on Cypress - Jenner line ckt 45 trip Dome_Empress CB on Cypress - Dome_Empress line ckt 45	System stable Good voltage recovery No load shedding

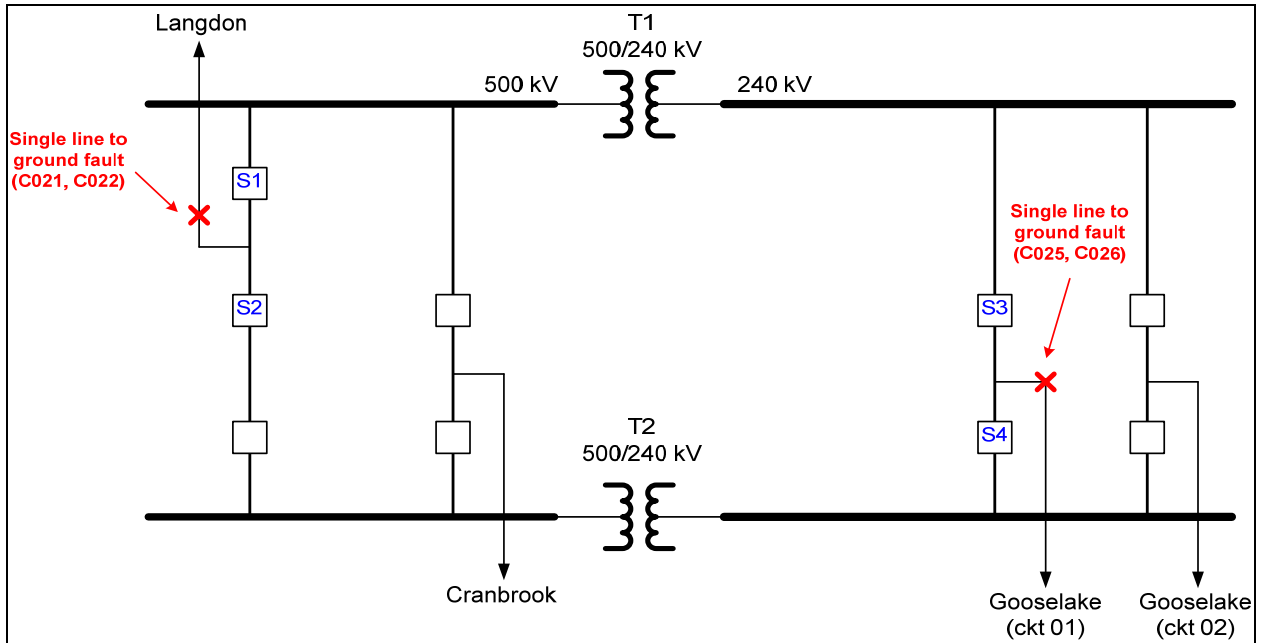
* Stability simulation plots for V82 machine are included in Appendix E.

Category C7 Fault Analysis

Category C7 fault analysis was performed for the 2017 Summer Light - Alternative 1A case. Category C7 faults are defined as single line-to-ground faults of transmission lines with delayed clearing time (stuck breaker condition). For each substation in the south system, the fault location was assumed to be on the 240 kV line with the largest power flow. This fault location was then simulated for with a stuck breaker at the near end substation as a worst case condition. For breaker and a half or ring-bus substation configurations, the breakers on either side of the faulted line were considered in separate stuck breaker simulations. The impedances of the single line to ground faults were calculated at the faulted locations on the Alternative 1A system.

Figure E-7 shows the locations where the Category C7 faults were applied at the Crowsnest Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-3 summarizes the fault descriptions and results for the Category C7 faults at Crowsnest Substation. All simulation observations reported in Table E-3 for are applicable to both V82 and GE wind turbine results. Specific transient simulation plots for Category C7 contingencies can be found in this appendix E.

**FIGURE E-7
STUCK BREAKER FAULT LOCATIONS AT CROWSNEST**



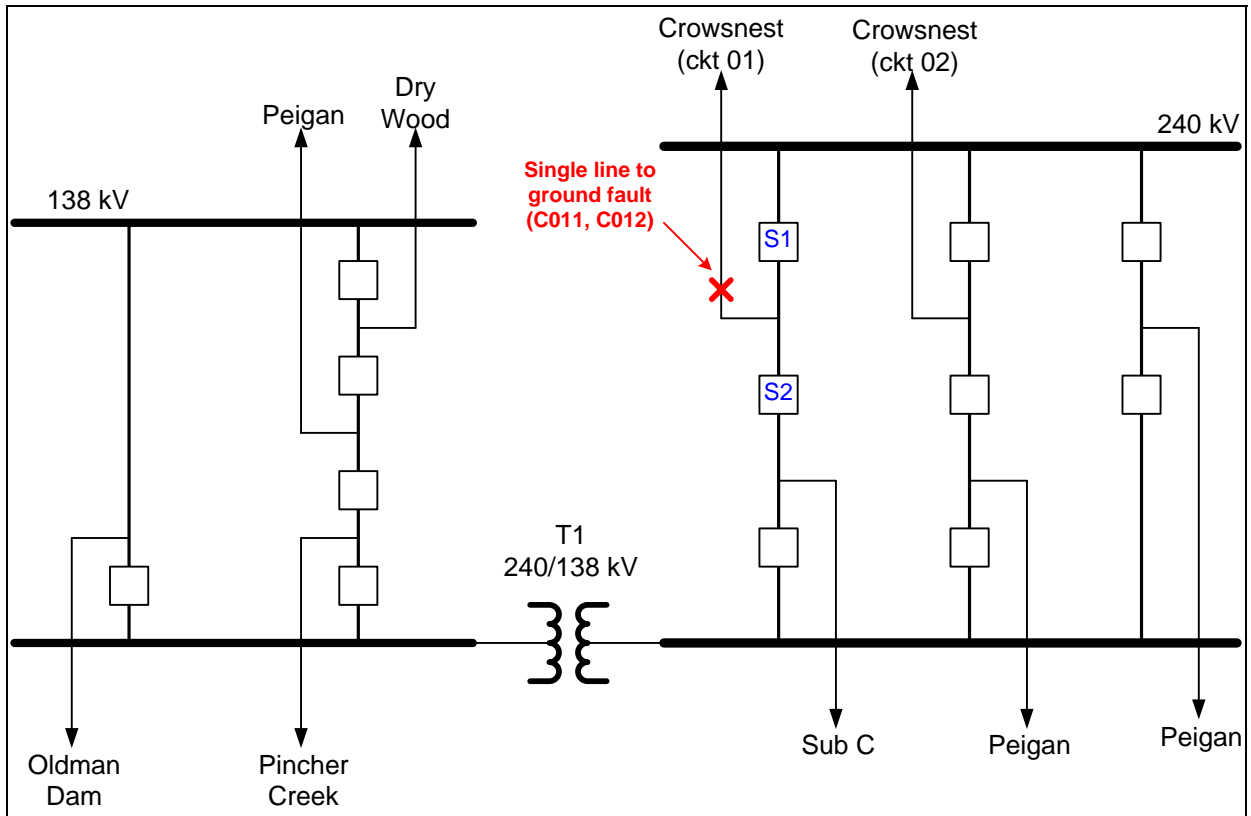
**TABLE E-3
STABILITY RESULTS FOR C7 FAULTS AT CROWNEST
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C021*	Single line fault at Crowsnest 500kV line to Langdon 6 cycles: trip bkr on Crowsnest - Langdon 500 kV line ckt 01 at Langdon 18 cycles: trip Crowsnest transformer(T1) trip bkr on Crowsnest - Langdon 500 kV line ckt 01 at Crowsnest	S1	System stable Good voltage recovery No load shedding
C022	Single line fault at Crowsnest 500kV line to Langdon 6 cycles: trip bkr on Crowsnest - Langdon 500 kV ckt 01 at Langdon 18 cycles: trip bkr on Crowsnest - Langdon 500 kV ckt 01 at Crowsnest	S2	System stable Good voltage recovery No load shedding
C025	Single line fault at Crowsnest 240kV line to Gooselake 6 cycles: trip bkr on Crowsnest - Gooselake 240 kV ckt 01 at Gooselake 18 cycles: trip Crowsnest transformer(T1) trip bkr on Crowsnest - Gooselake 240 kV ckt 01 at Crowsnest	S3	System stable Good voltage recovery No load shedding
C026	Single line fault at Crowsnest 240kV line to Gooselake 6 cycles: trip bkr on Crowsnest - Gooselake 240 kV ckt 01 at Gooselake 18 cycles: trip Crowsnest transformer(T2) trip bkr on Crowsnest - Gooselake 240 kV ckt 01 at Crowsnest	S4	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-8 shows the locations where the Category C7 faults were applied at the Goose Lake Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-4 summarizes the fault descriptions and results for the Category C7 faults at Goose Lake Substation. All simulation observations reported in Table E-4 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-8
STUCK BREAKER FAULT LOCATION AT GOOSE LAKE**



**TABLE E-4
STABILITY RESULTS FOR C7 FAULTS AT GOOSE LAKE
V82 AND GE1.5 TURBINE**

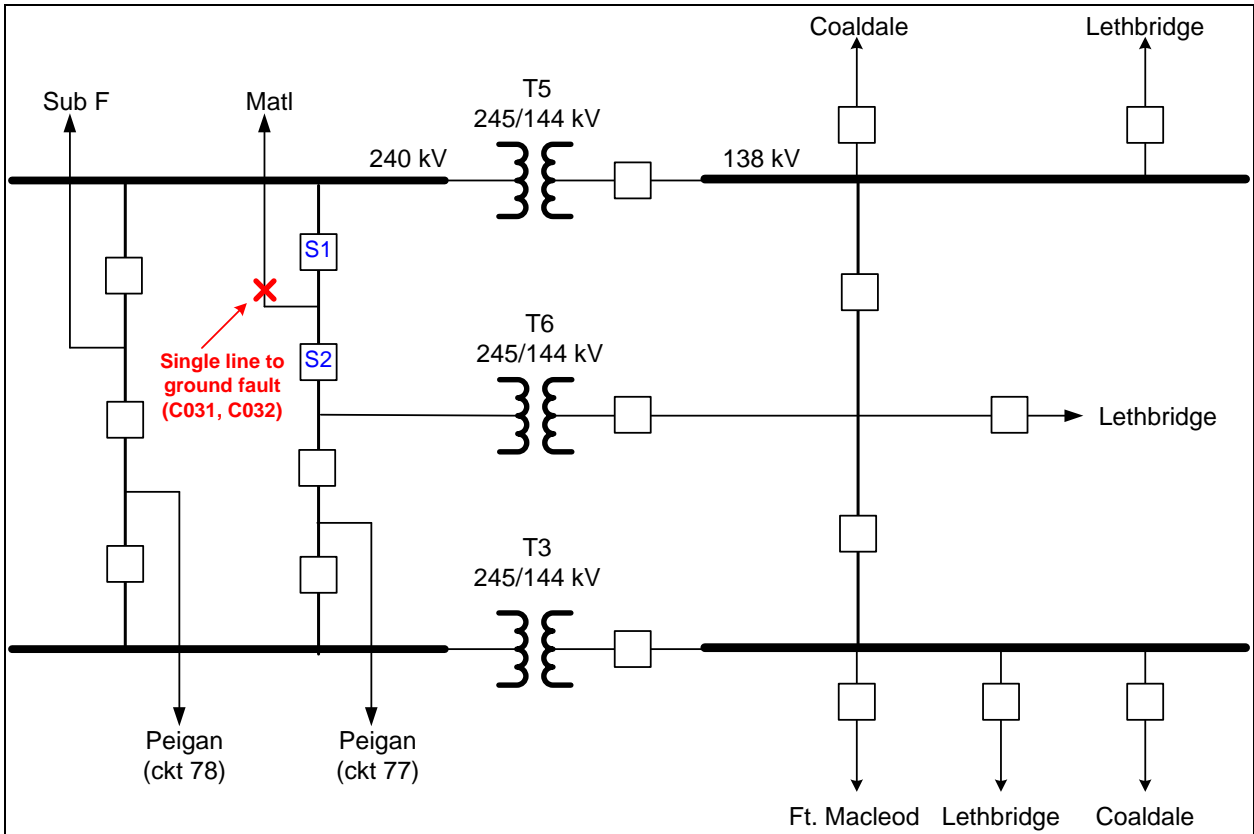
Case ID	Description	Stuck Bkr#	Observations
C011*	Single line fault at Gooselake 240kV line to Crowsnest 6 cycles: trip bkr on Gooselake - Crowsnest 240 kV ckt 01 at Crowsnest 18 cycles: trip bkr on Gooselake - Crowsnest 240 kV ckt 01 at Gooselake	S1	System stable Good voltage recovery No load shedding
C012	Single line fault at Gooselake 240kV line to Crowsnest 6 cycles: trip bkr on Gooselake - Crowsnest 240 kV ckt 01 at Crowsnest 18 cycles: trip Gooselake - SubA 240 kV line ckt 1 trip bkr on Gooselake - Crowsnest 240 kV line ckt 01 at Gooselake	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-9 shows the locations where the Category C7 faults were applied at the North Lethbridge Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-5

summarizes the fault descriptions and results for the Category C7 faults at North Lethbridge Substation. All simulation observations reported in Table E-5 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-9
STUCK BREAKER FAULT LOCATION AT NORTH LETHBRIDGE**



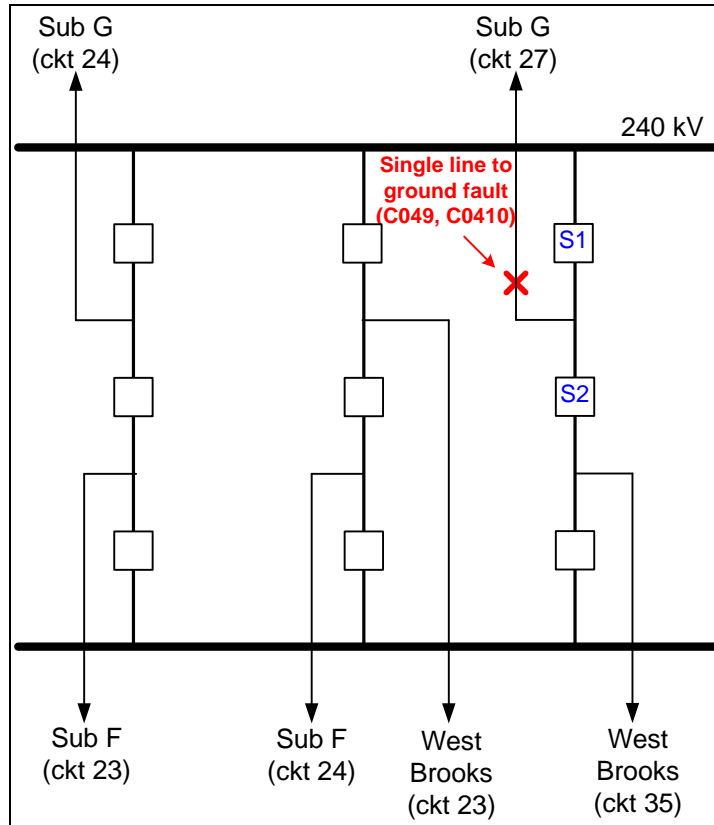
**TABLE E-5
STABILITY RESULTS FOR C7 FAULTS AT NORTH LETHBRIDGE
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C031*	Single line fault at North_Lethbridge 240kV line to Matl 6 cycles: trip bkr on North_Lethbridge - Matl 240 kV line ckt 1 at Matl 18 cycles: trip North_Lethbridge transformer(T5) trip bkr on North_Lethbridge - Matl 240 kV line ckt 1 at N_Lethbridge	S1	System stable Good voltage recovery No load shedding
C032	Single line fault at North_Lethbridge 240kV line to Matl 6 cycles: trip bkr on North_Lethbridge - Matl 240 kV line ckt 1 at Matl 18 cycles: trip North_Lethbridge - Peigan 240 kV line ckt 77 trip bkr on North_Lethbridge - Matl 240 kV line ckt 1 at N_Lethbridge	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-10 shows the locations where the Category C7 faults were applied at the Milo Junction Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-6 summarizes the fault descriptions and results for the Category C7 faults at Milo Junction Substation. All simulation observations reported in Table E-6 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-10
STUCK BREAKER FAULT LOCATION AT MILO JUNCTION**



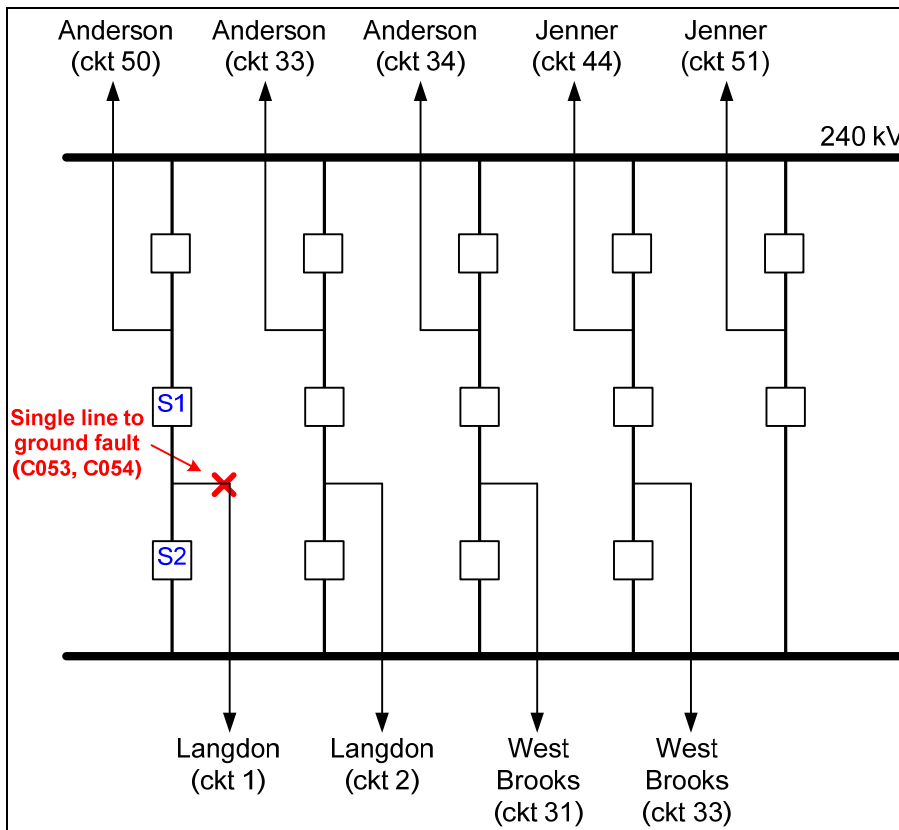
**TABLE E-6
STABILITY RESULTS FOR C7 FAULTS AT MILO JUNCTION
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C049*	Single line fault at Milo_Junction 240kV line to SubG 6 cycles: trip bkr on Milo_Junction - SubG 240 kV ckt 27 at SubG 18 cycles: trip bkr on Milo_Junction - SubG 240 kV ckt 27 at Milo_Junction	S1	System stable Good voltage recovery No load shedding
C0410	Single line fault at Milo_Junction 240kV line to SubG 6 cycles: trip bkr on Milo_Junction - SubG 240 kV ckt 27 at SubG 18 cycles: trip Milo_Junction - West_Brooks 240 kV line ckt 35 trip bkr on Milo_Junction - SubG 240 kV ckt 27 at Milo_Junction	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-11 shows the locations where the Category C7 faults were applied at the Ware Junction Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-7 summarizes the fault descriptions and results for the Category C7 faults at Ware Junction Substation. All simulation observations reported in Table E-7 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-11
STUCK BREAKER FAULT LOCATION AT WARE JUNCTION**



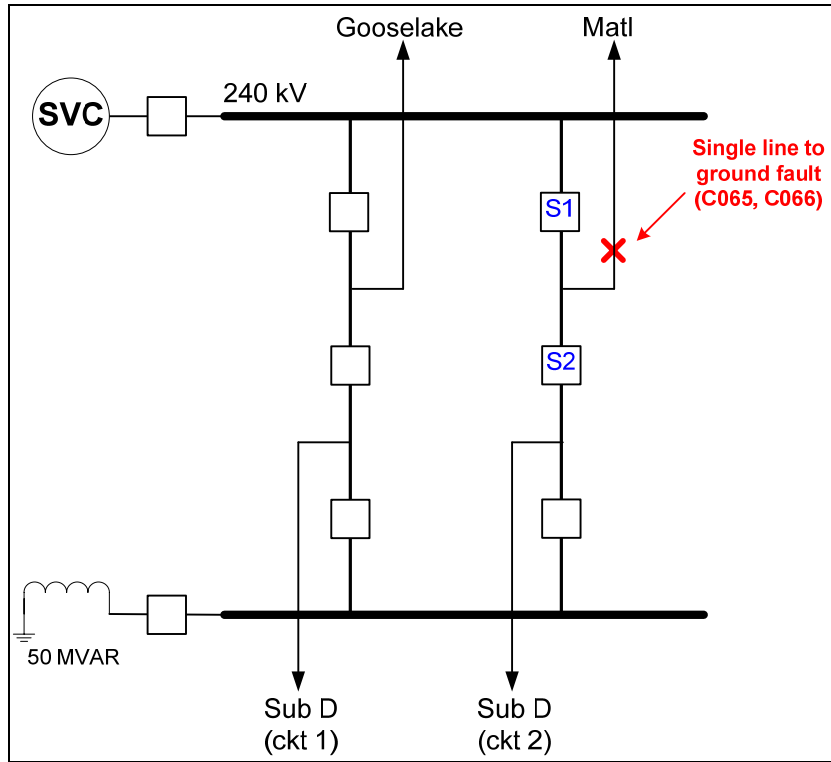
**TABLE E-7
STABILITY RESULTS FOR C7 FAULTS AT WARE JUNCTION
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C053*	Single line fault at Ware_Junction 240kV line to Langdon 6 cycles: trip bkr on Ware_Junction - Langdon 240 kV ckt 1 at Langdon 18 cycles: trip Ware_Junction - Anderson 240 kV line ckt 50 trip bkr on Ware_Junction - Langdon 240 kV ckt 1 at Ware_Junctn	S1	System stable Good voltage recovery No load shedding
C054	Single line fault at Ware_Junction 240kV line to Langdon 6 cycles: trip bkr on Ware_Junctn - Langdon 240 kV line ckt 1 at Langdon 18 cycles: trip bkr on Ware_Junctn - Langdon 240 kV ckt 1 at Ware_Junctn	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-12 shows the locations where the Category C7 faults were applied at the Sub C Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-8 summarizes the fault descriptions and results for the Category C7 faults at Sub C Substation. All simulation observations reported in Table E-8 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-12
STUCK BREAKER FAULT LOCATION AT SUB C**



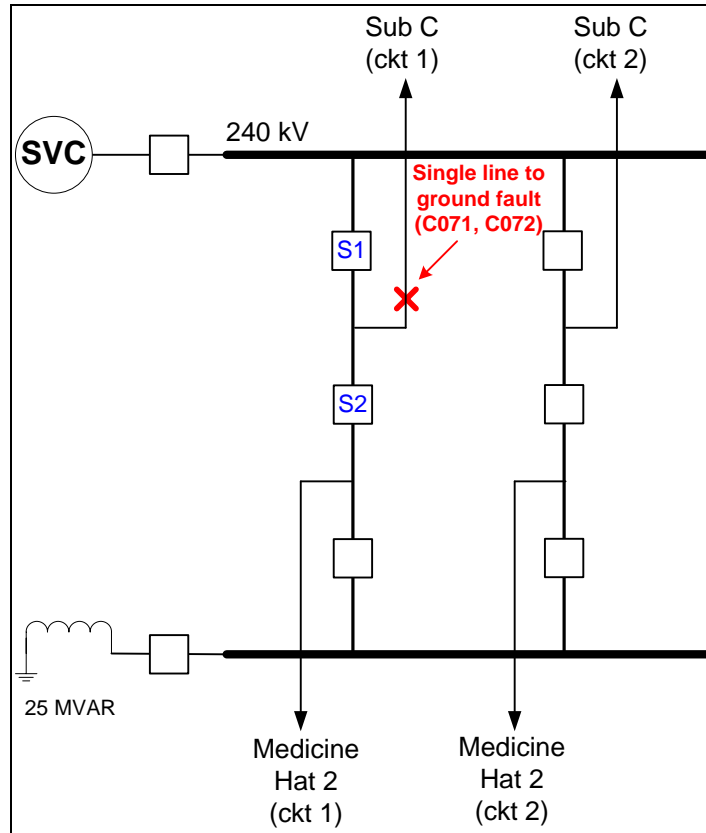
**TABLE E-8
STABILITY RESULTS FOR C7 FAULTS AT SUB C
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C065*	Single line fault at SubC 240kV line - MATL 240 kV Line 6 cycles: trip bkr on SubC - MATL 240 kV line at MATL 18 cycles: trip 240 kV SubC SVC trip bkr on SubC - MATL 240 kV line at SubC	S1	System stable Good voltage recovery No load shedding
C066	Single line fault at SubC 240kV line - MATL 240 kV Line 6 cycles: trip bkr on SubC - MATL 240 kV line at MATL 18 cycles: trip SubC 240kV line to SubD 240 kV Line ckt 2 trip bkr on SubC - MATL 240 kV line at SubC	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-13 shows the locations where the Category C7 faults were applied at the Sub D Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-9 summarizes the fault descriptions and results for the Category C7 faults at Sub D Substation. All simulation observations reported in Table E-9 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-13
STUCK BREAKER FAULT LOCATION AT SUB D**



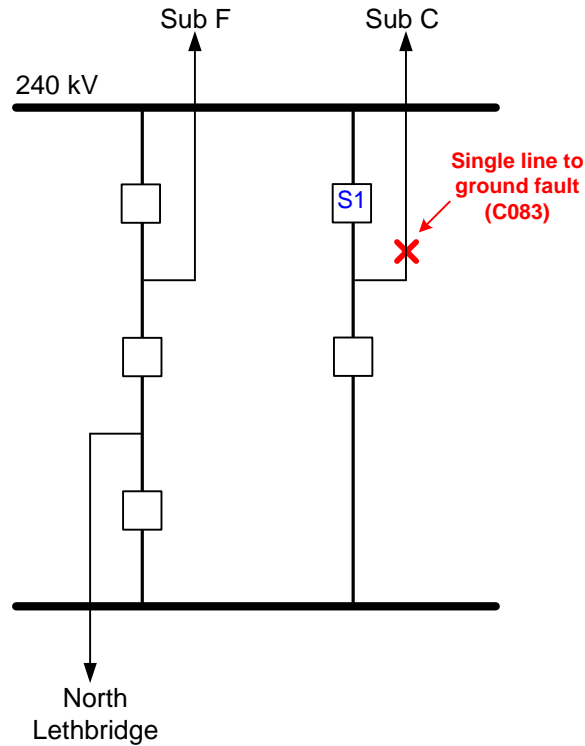
**TABLE E-9
STABILITY RESULTS FOR C7 FAULTS AT SUB D
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C071*	Single line fault at SubD 240kV line - SubC 240 kV Line ckt 1 6 cycles: trip bkr on SubD - SubC 240 kV line ckt 1 at SubC 18 cycles: trip 240 kV SubD SVC trip bkr on SubD - SubC 240 kV line ckt 1 at SubD	S1	System stable Good voltage recovery No load shedding
C072	Single line fault at SubD 240kV line - SubC 240 kV Line ckt 1 6 cycles: trip bkr on SubD - SubC 240 kV line ckt 1 at SubC 18 cycles: trip SubD to Med Hat2 240 kV line trip bkr on SubD - SubC 240 kV line ckt 1 at SubD	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-14 shows the locations where the Category C7 faults were applied at the MATL Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-10 summarizes the fault descriptions and results for the Category C7 faults at MATL Substation. All simulation observations reported in Table E-10 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-14
STUCK BREAKER FAULT LOCATION AT MATL**

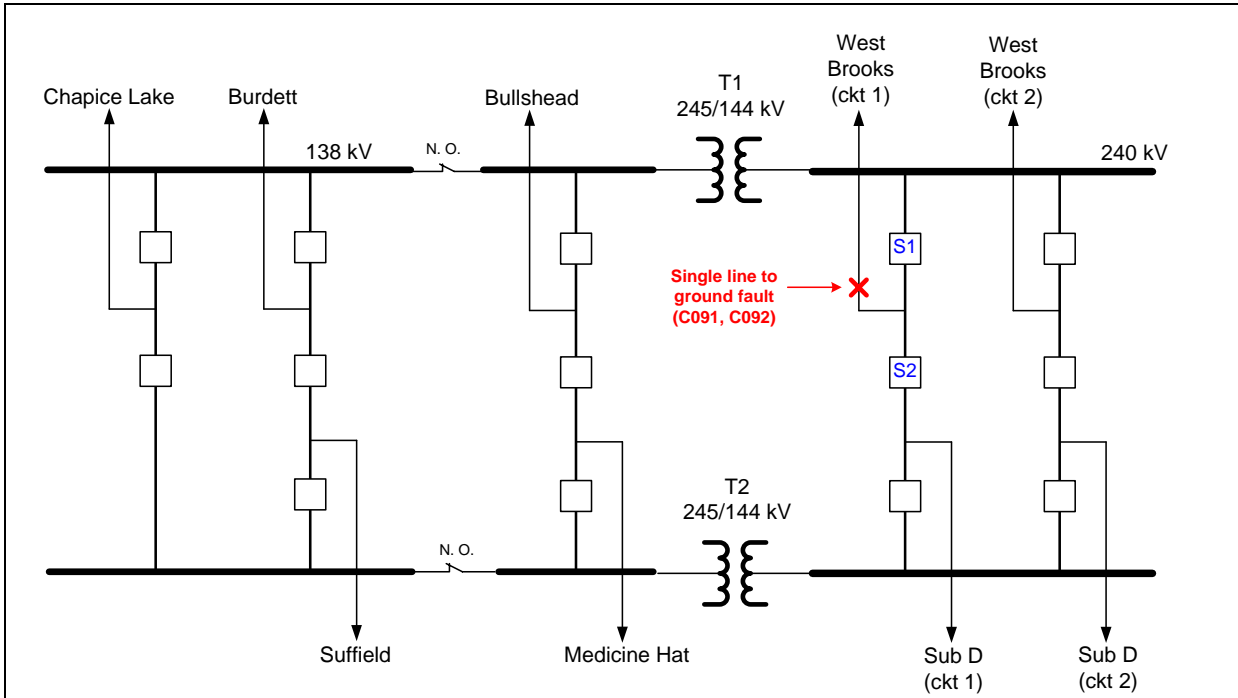


**TABLE E-10
STABILITY RESULTS FOR C7 FAULTS AT MATL
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C083	Single line fault at MATL 240kV line - SubC Line D 6 cycles: trip bkr on MATL - SubC 240 kV Line D at SubC 18 cycles: trip bkr on MATL - SubC 240 kV Line D at MATL	S1	System stable Good voltage recovery No load shedding

Figure E-15 shows the locations where the Category C7 faults were applied at the Medicine Hat2 Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-11 summarizes the fault descriptions and results for the Category C7 faults at Medicine Hat2 Substation. All simulation observations reported in Table E-11 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-15
STUCK BREAKER FAULT LOCATION AT MEDICINE HAT 2**



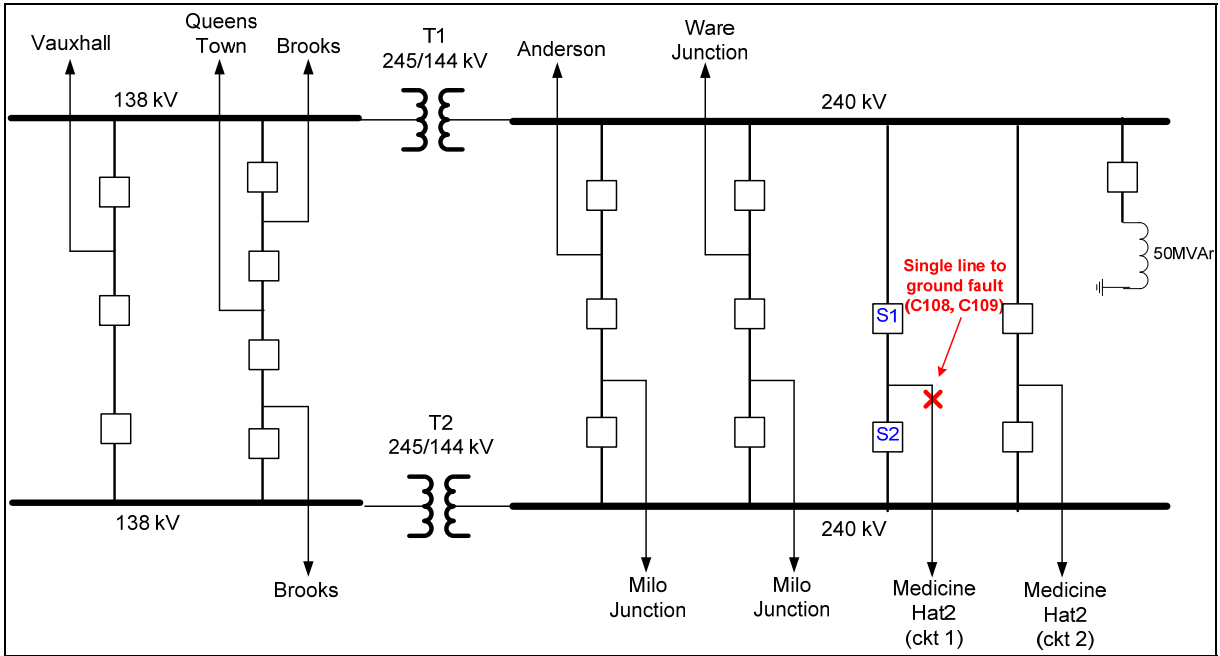
**TABLE E-11
STABILITY RESULTS FOR C7 FAULTS AT MEDICINE HAT 2
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C091 *	Single line fault at Med Hat2 240kV line - Westbrooks 240 kV Line ckt 1 6 cycles: trip bkr on Med Hat2 - Westbrooks 240 kV ckt 1 at Westbrooks 18 cycles: trip 240 kV/138 kV Transformer T1 at Med Hat 2 trip bkr on Med Hat2 - Westbrooks 240 kV ckt 1 at Med Hat2	S1	System stable Good voltage recovery No load shedding
C092	Single line fault at Med Hat2 240kV line - Westbrooks 240 kV Line ckt 1 6 cycles: trip bkr on Med Hat2 - Westbrooks 240 kV ckt 1 at Westbrooks 18 cycles: trip 240 kV line from Med Hat2 to SubD ckt 1 trip bkr on Med Hat2 - Westbrooks 240 kV ckt 1 at Med Hat2	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-16 shows the locations where the Category C7 faults were applied at the West Brooks Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-12 summarizes the fault descriptions and results for the Category C7 faults at West Brooks Substation. All simulation observations reported in Table E-12 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-16
STUCK BREAKER FAULT LOCATION AT WEST BROOKS**

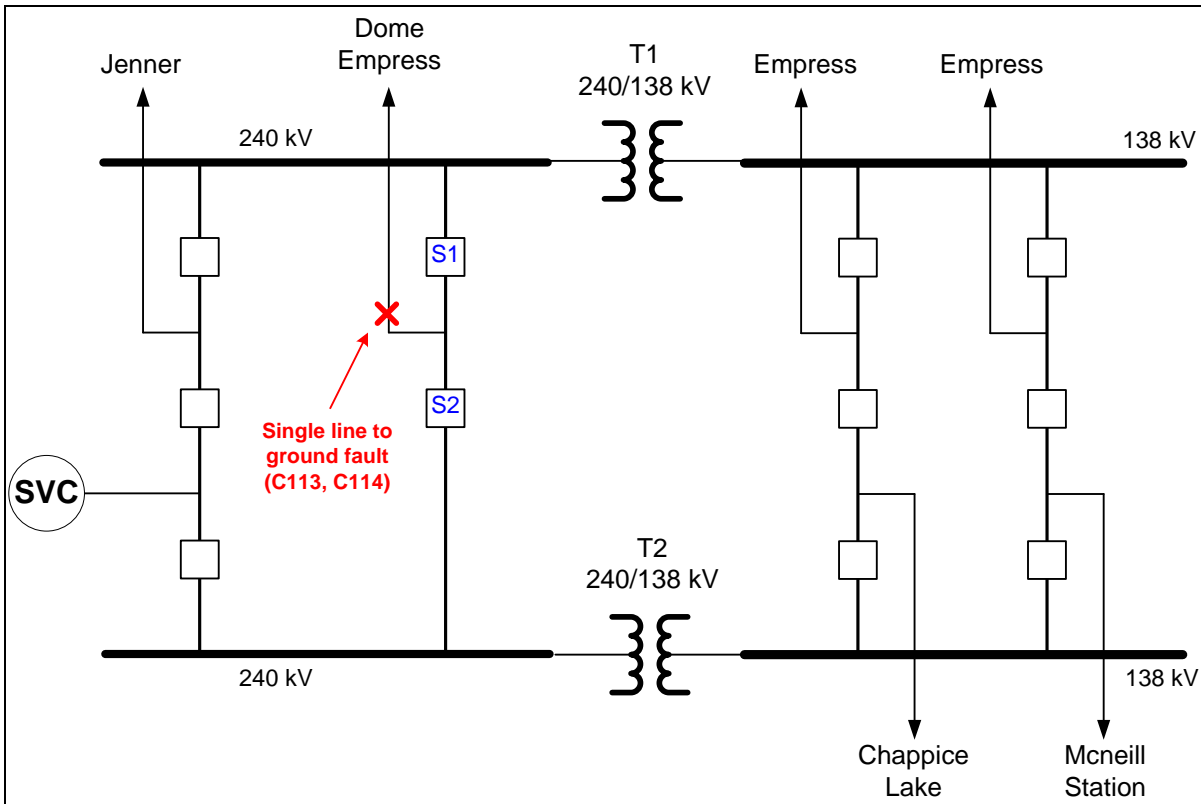


**TABLE E-12
STABILITY RESULTS FOR C7 FAULTS AT WEST BROOKS
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C108	Single line fault at Westbrooks 240kV line - Med Hat2 240 kV Line ckt 1 6 cycles: trip bkr on Westbrooks - Med Hat2 240 kV ckt 1 at Med Hat2 18 cycles: trip 240 kV/138 kV Transformer T1 at Westbrooks trip 50 Mvar Reactor at Westbrooks trip bkr on Westbrooks - Med Hat2 240 kV ckt 1 at Westbrooks	S1	System stable Good voltage recovery No load shedding
C109	Single line fault at Westbrooks 240kV line - Med Hat2 240 kV Line ckt 1 6 cycles: trip bkr on Westbrooks - Med Hat2 240 kV ckt 1 at Med Hat2 18 cycles: trip 240 kV/138 kV Transformer T2 at Westbrooks trip bkr on Westbrooks - Med Hat2 240 kV ckt 1 at Westbrooks	S2	System stable Good voltage recovery No load shedding

Figure E-17 shows the locations where the Category C7 faults were applied at the Cypress Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-13 summarizes the fault descriptions and results for the Category C7 faults at Cypress Substation. All simulation observations reported in Table E-13 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-17
STUCK BREAKER FAULT LOCATION AT CYPRESS**

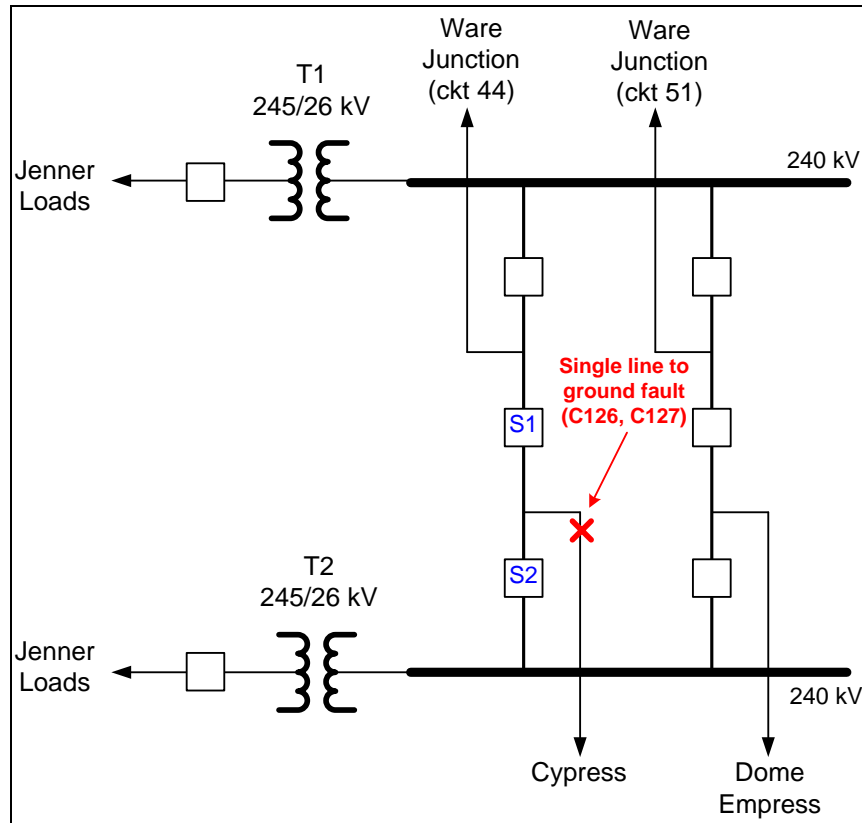


**TABLE E-13
STABILITY RESULTS FOR C7 FAULTS AT CYPRESS
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C113	Single line fault at Cypress 240kV line to Empress 6 cycles: trip bkr on Cypress - Empress 240 kV ckt 45 at Empress 18 cycles: trip Cypress transformer(T1) trip bkr on Cypress - Empress 240 kV ckt 45 at Cypress	S1	System stable Good voltage recovery No load shedding
C114	Single line fault at Cypress 240kV line to Empress 6 cycles: trip bkr on Cypress - Empress 240 kV ckt 45 at Empress 18 cycles: trip Cypress transformer(T2) trip bkr on Cypress - Empress 240 kV ckt 45 at Cypress	S2	System stable Good voltage recovery No load shedding

Figure E-18 shows the locations where the Category C7 faults were applied at the Jenner Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-14 summarizes the fault descriptions and results for the Category C7 faults at Jenner Substation. All simulation observations reported in Table E-14 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-18
STUCK BREAKER FAULT LOCATION AT JENNER**

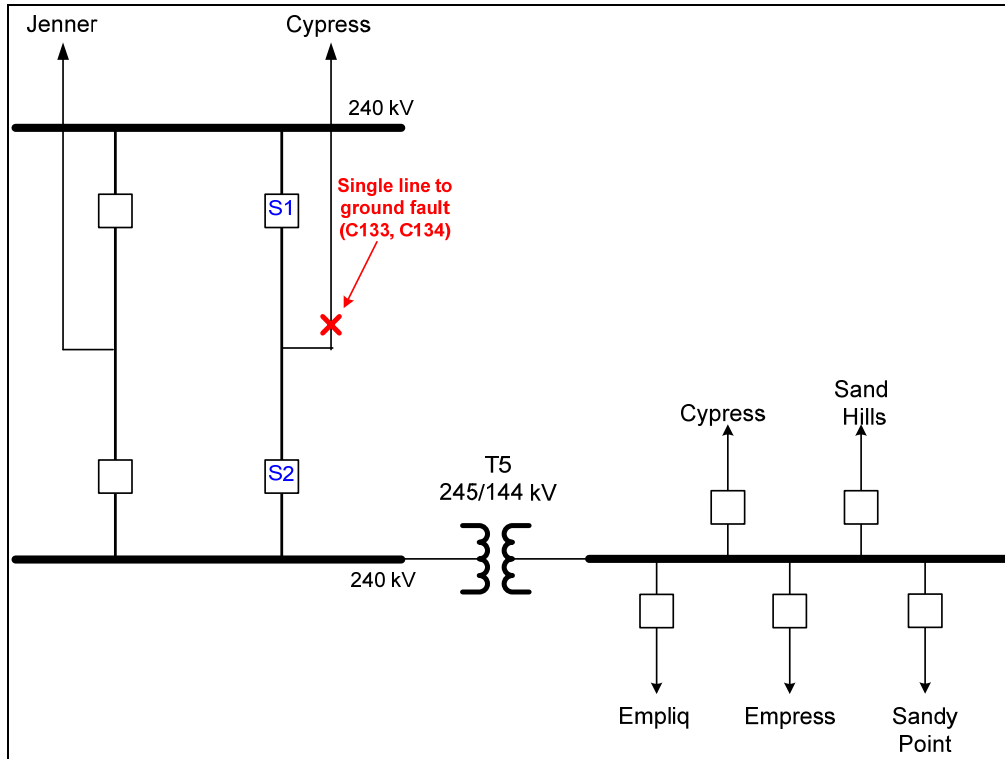


**TABLE E-14
STABILITY RESULTS FOR C7 FAULTS AT JENNER
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C126	Single line fault at Jenner 240kV line to Cypress 6 cycles: trip bkr on Jenner - Cypress 240 kV line ckt 45 at Cypress 18 cycles: trip Jenner - Ware_Junction 240 kV line ckt 44 trip bkr on Jenner - Cypress 240 kV line ckt 45 at Jenner	S1	System stable Good voltage recovery No load shedding
C127	Single line fault at Jenner 240kV line to Cypress 6 cycles: trip bkr on Jenner - Cypress 240 kV line ckt 45 at Cypress 18 cycles: trip Jenner transformer(T2) trip bkr on Jenner - Cypress 240 kV line ckt 45 at Jenner	S2	System stable Good voltage recovery No load shedding

Figure E-19 shows the locations where the Category C7 faults were applied at the Empress Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-15 summarizes the fault descriptions and results for the Category C7 faults at Empress Substation. All simulation observations reported in Table E-15 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-19
STUCK BREAKER FAULT LOCATION AT EMPRESS**

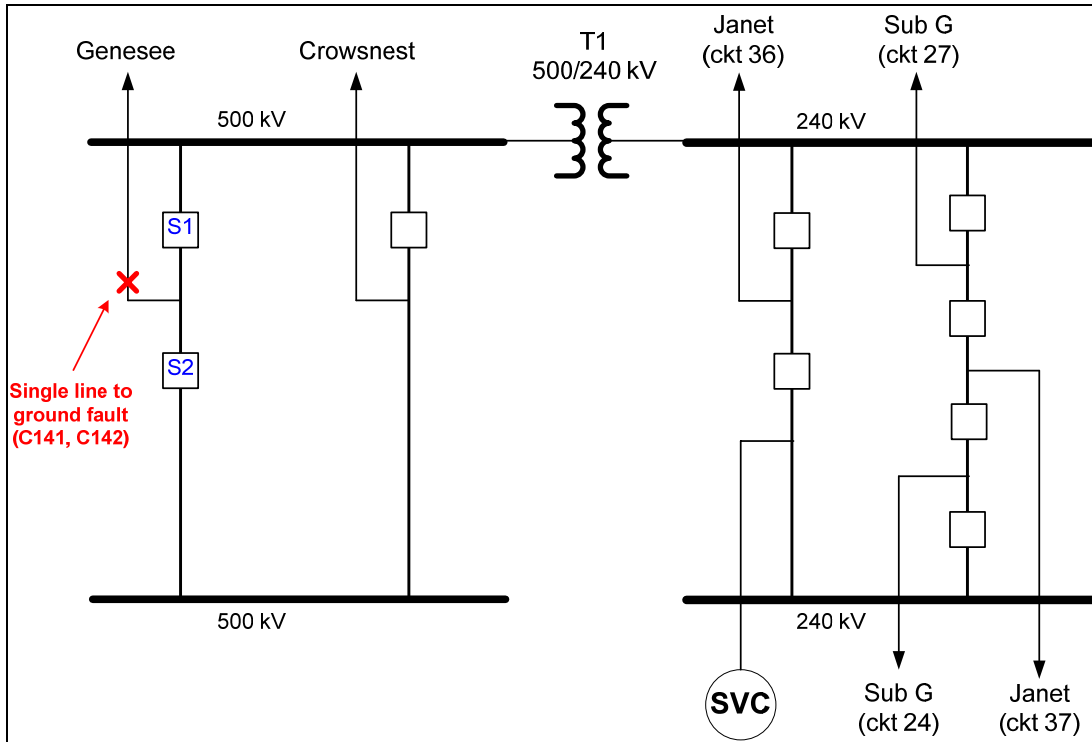


**TABLE E-15
STABILITY RESULTS FOR C7 FAULTS AT EMPRESS
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C133	Single line fault at Empress 240kV line to Cypress 6 cycles: trip bkr on Empress - Cypress 240 kV line ckt 45 at Cypress 18 cycles: trip bkr on Empress - Cypress 240 kV line ckt 45 at Empress	S1	System stable Good voltage recovery No load shedding
C134	Single line fault at Empress 240kV line to Cypress 6 cycles: trip bkr on Empress - Cypress 240 kV line ckt 45 at Cypress 18 cycles: trip Empress transformer(T5) trip Empress - Sand_Hills 138 kV line trip Empress - Cypress 138 kV line trip Empress - Empressa7 138 kV line trip Empress - Sandy_point 138 kV line trip Empress - Empliqtp 138 kV line trip bkr on Empress - Cypress 240 kV line ckt 45 at Empress	S2	System stable Good voltage recovery No load shedding

Figure E-20 shows the locations where the Category C7 faults were applied at the Langdon Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-16 summarizes the fault descriptions and results for the Category C7 faults at Langdon Substation. All simulation observations reported in Table E-16 for are applicable to both V82 and GE wind turbine model results.

**FIGURE E-20
STUCK BREAKER FAULT LOCATION AT LANGDON**



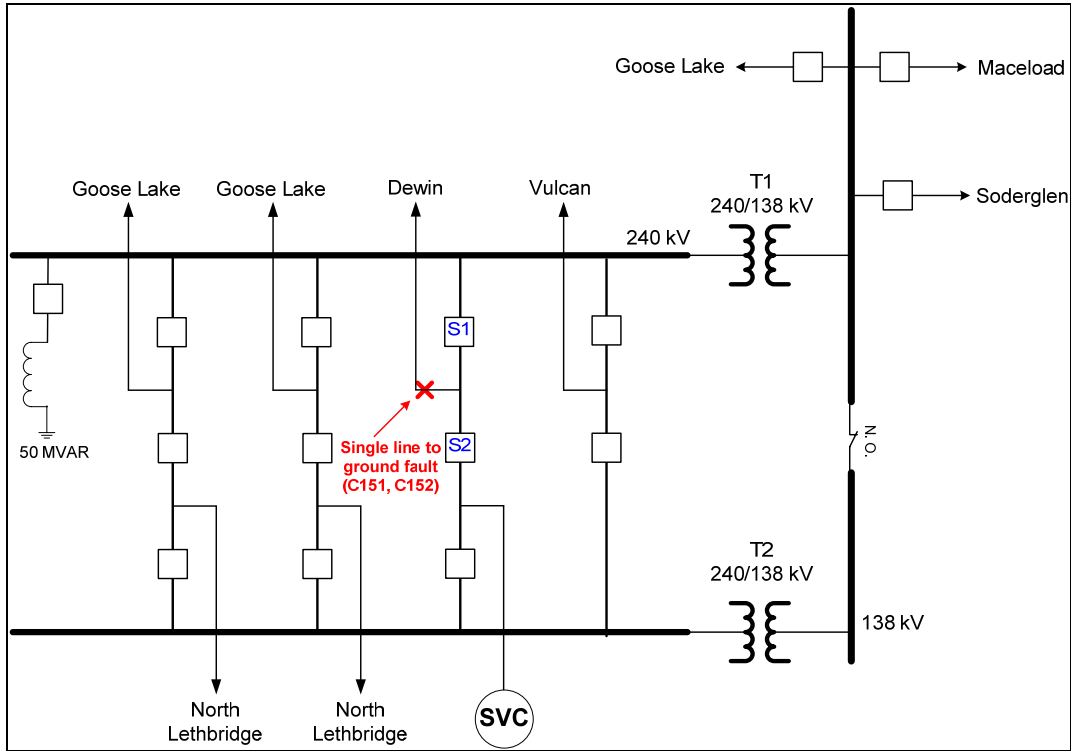
**TABLE E-16
STABILITY RESULTS FOR C7 FAULTS AT LANGDON
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C141*	Single line fault at Langdon 500kV line to Genesee 6 cycles: trip bkr on Langdon - Genesee 500 kV ckt 05 at Genesee 18 cycles: trip Langdon transformer(T2) trip bkr on Langdon - Genesee 500 kV line at Langdon	S1	System stable Good voltage recovery No load shedding
C142	Single line fault at Langdon 500kV line to Genesee 6 cycles: trip bkr on Langdon - Genesee 500 kV line at Genesee 18 cycles: trip Langdon - Crowsnest 500 kV line trip bkr on Langdon - Genesee 500 kV line at Langdon	S2	System stable Good voltage recovery No load shedding

* Stability simulation plots for V82 machine are included in Appendix E.

Figure E-21 shows the locations where the Category C7 faults were applied at the Peigan Substation. Each of the stuck breaker conditions considered are labeled with a breaker number in the figure. Table E-17 summarizes the fault descriptions and results for the Category C7 faults at Peigan Substation. All simulation observations reported in Table E-17 for are applicable to both V82 and GE wind turbine model results.

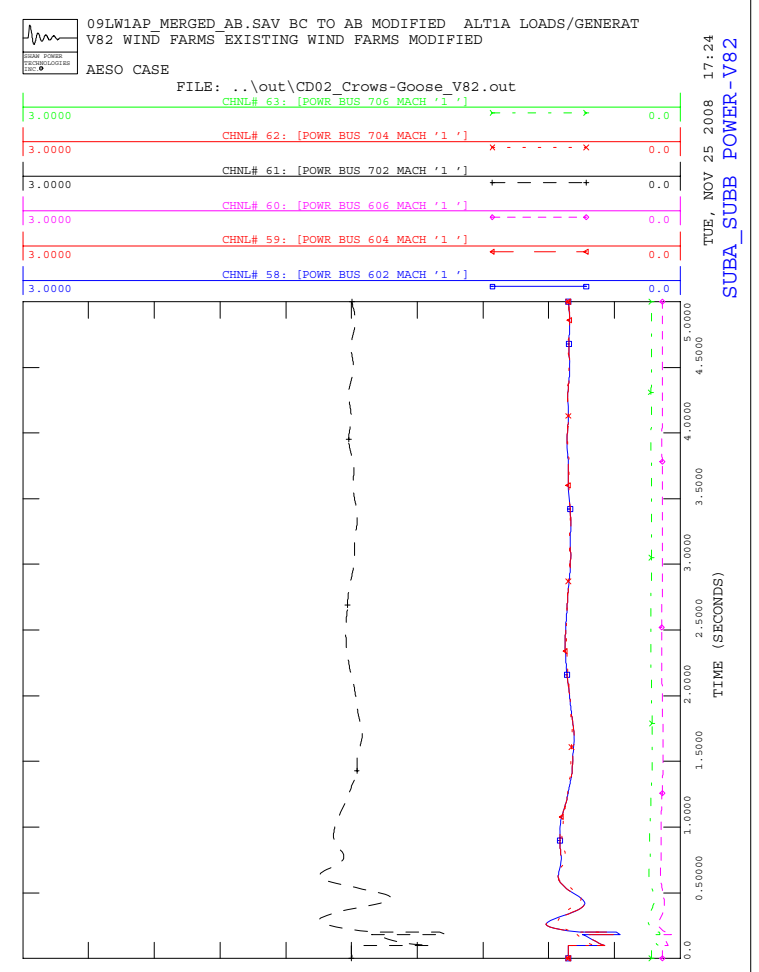
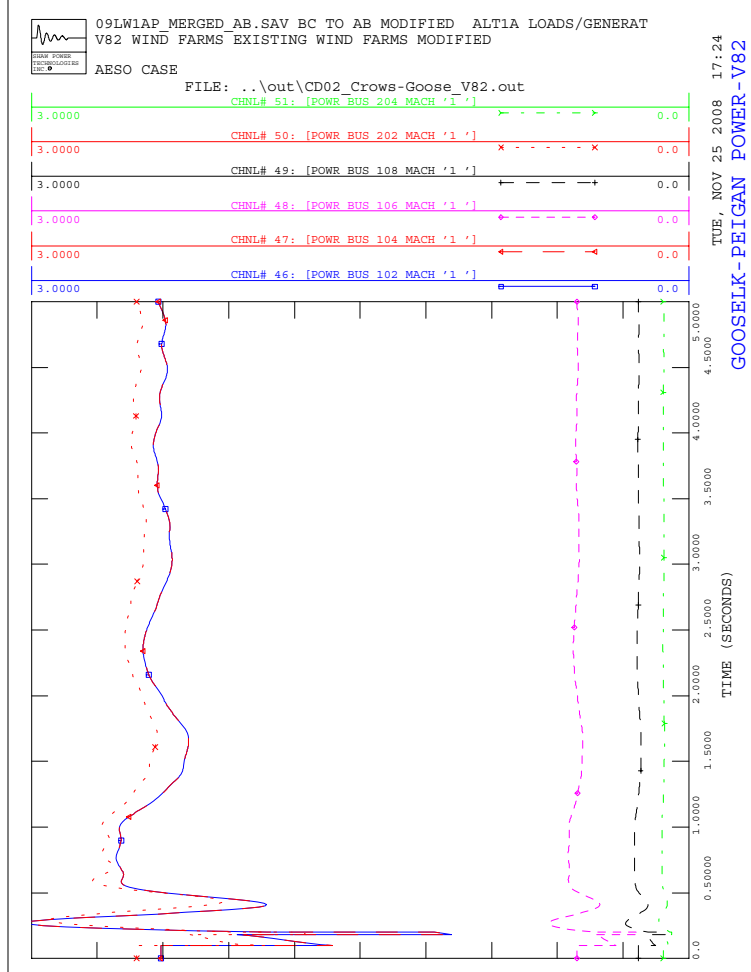
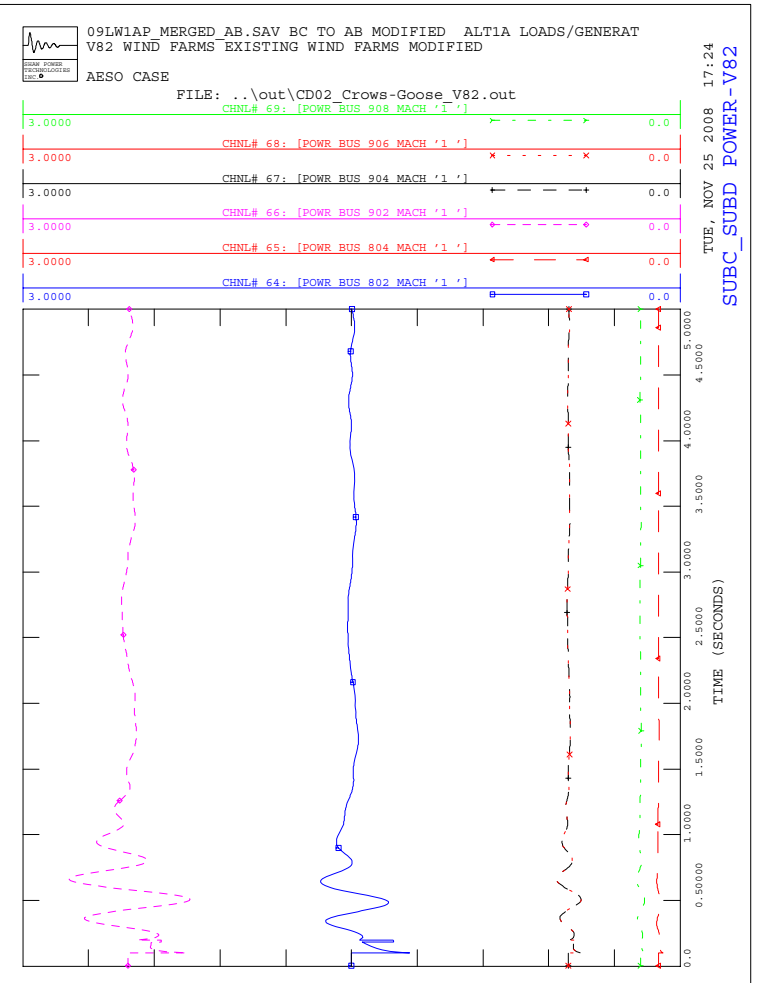
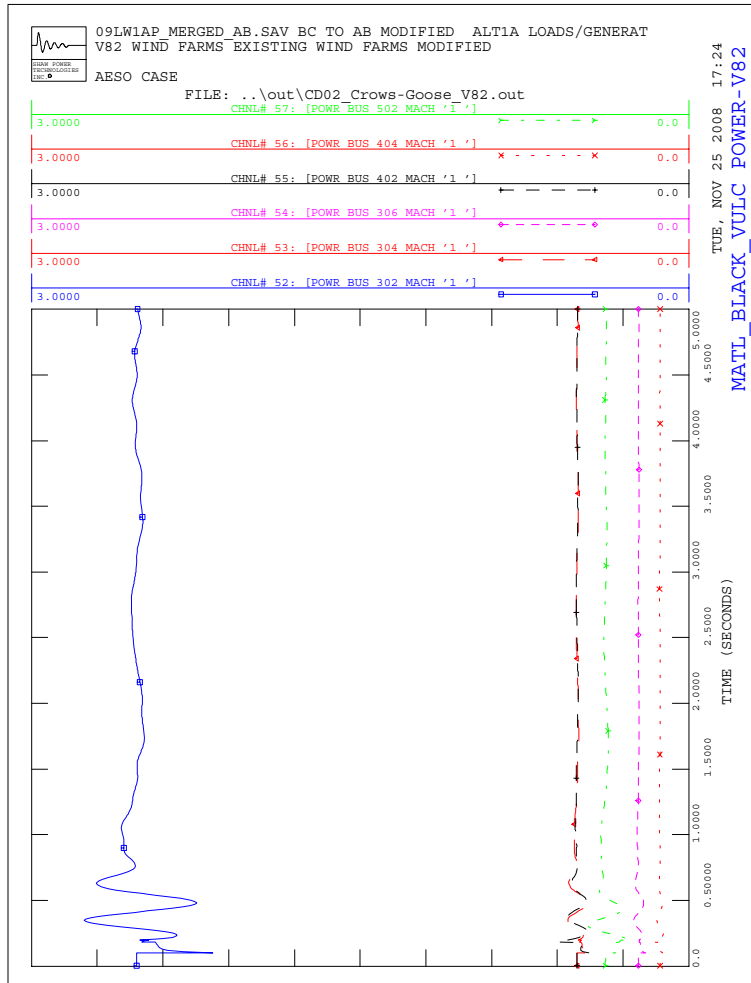
**FIGURE E-21
STUCK BREAKER FAULT LOCATION AT PEIGAN**

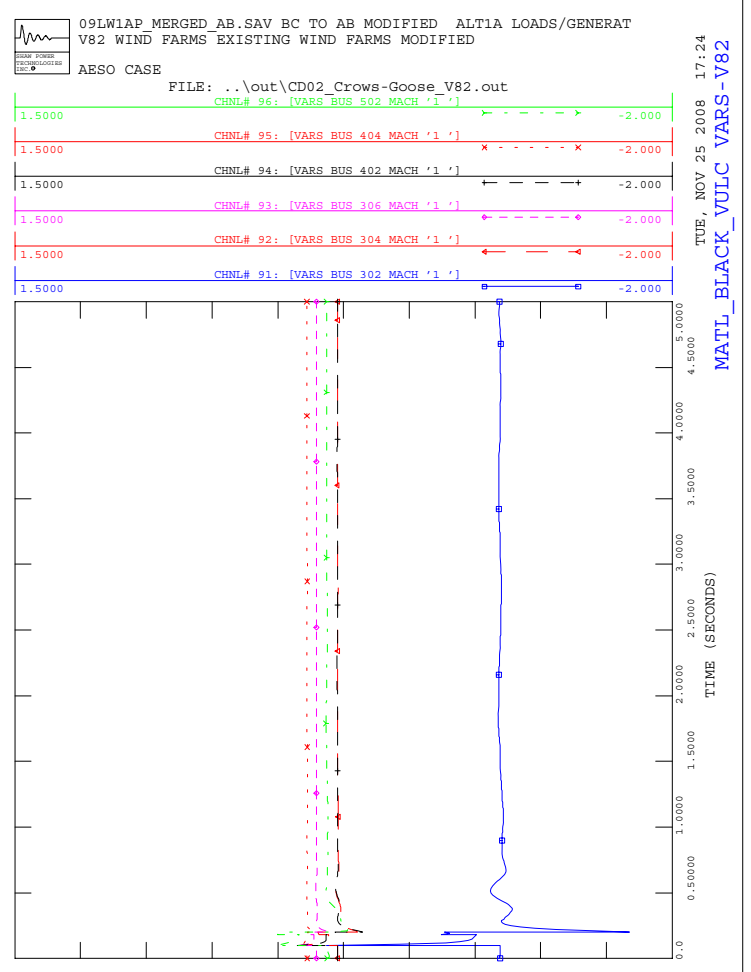
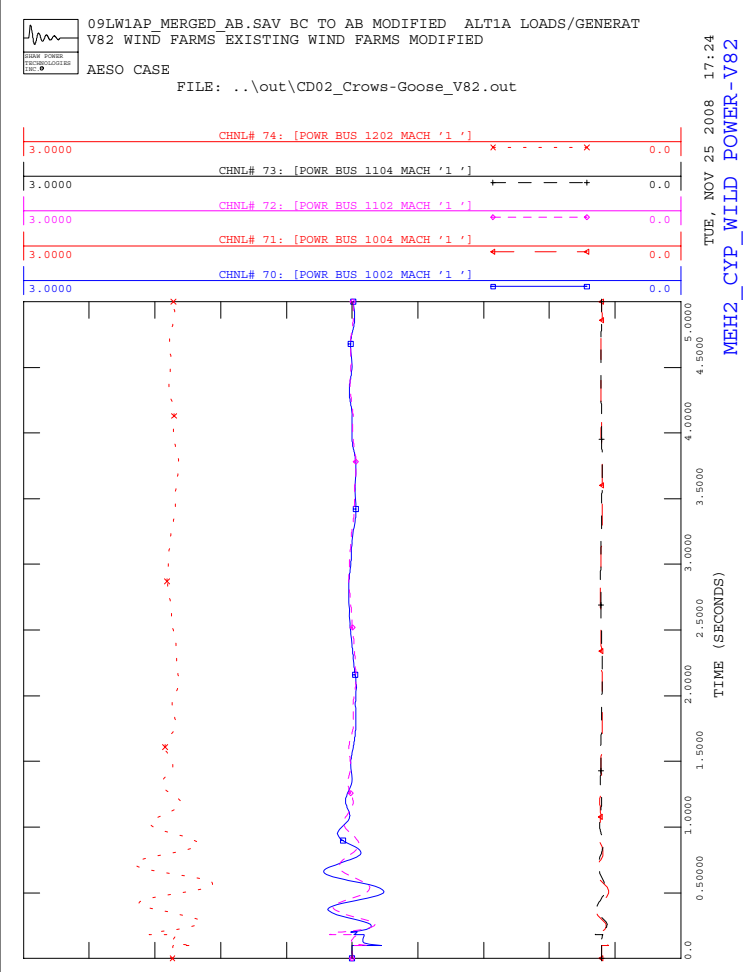
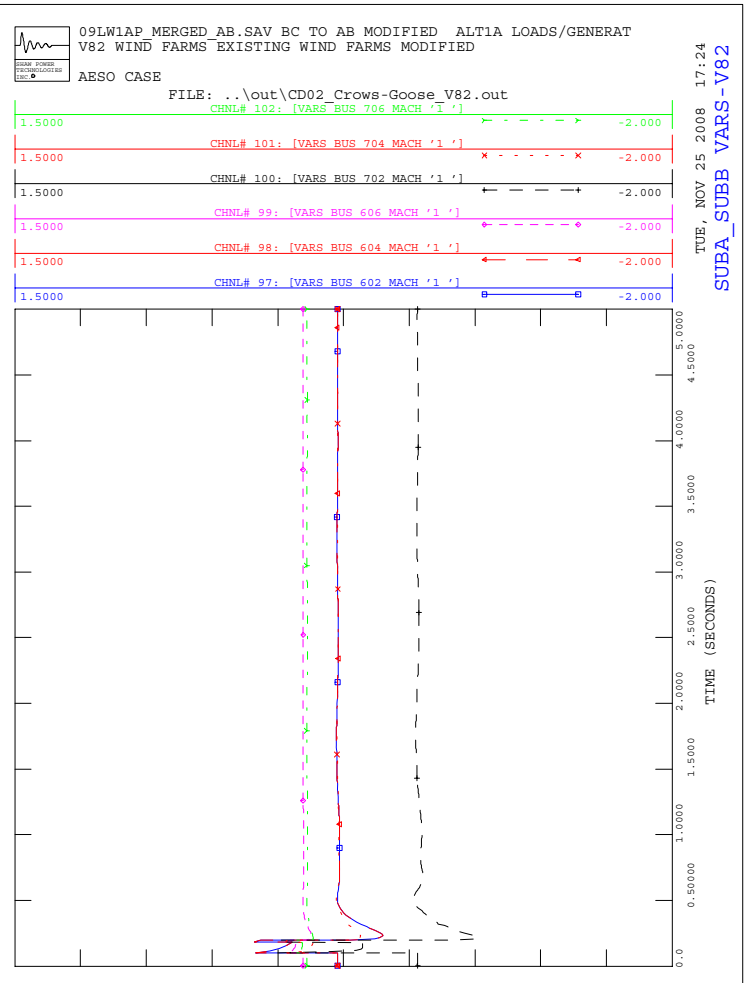
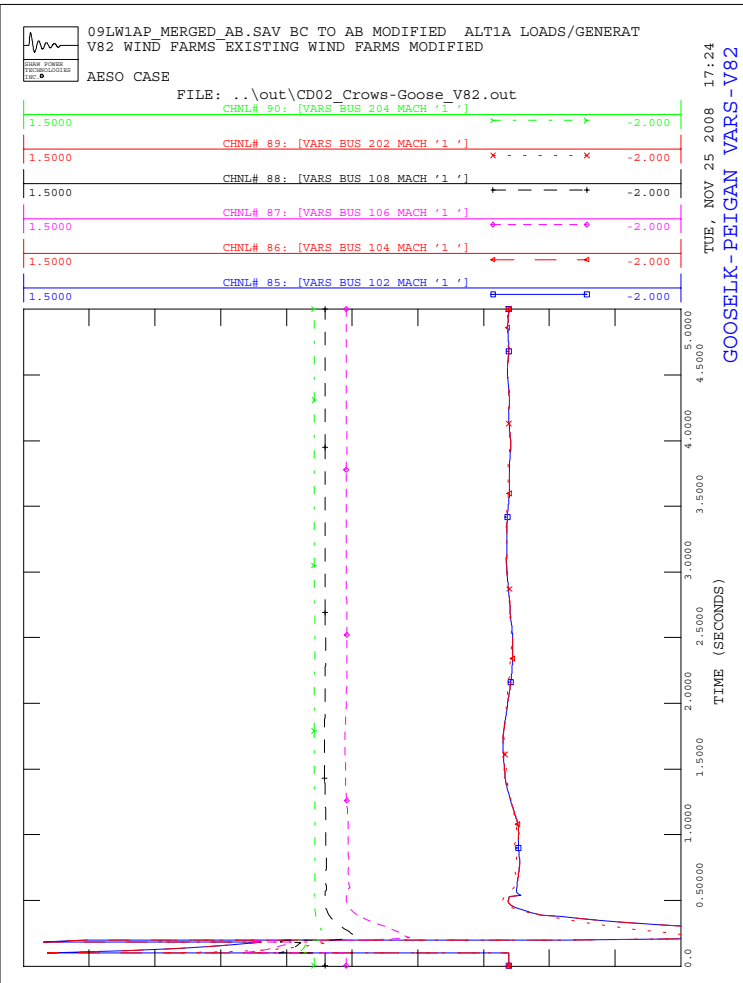


**TABLE E-17
STABILITY RESULTS FOR C7 FAULTS AT PEIGAN
V82 AND GE1.5 TURBINE**

Case ID	Description	Stuck Bkr#	Observations
C151*	Single line fault at Peigan 240kV line to Dewin 6 cycles: trip bkr on Peigan - Dewin 240 kV line ckt 2 at Dewin 18 cycles: trip Peigan transformer(T1) trip 50 Mvar Reactor at Peigan trip Peigan - Macleod 138 kV line trip Peigan - Kettles 138 kV line trip Peigan - Sodertp 138 kV line trip bkr on Peigan - Dewin 240 kV line ckt 2 at Peigan	S1	System stable Good voltage recovery No load shedding
C152	Single line fault at Peigan 240kV line to Dewin 6 cycles: trip bkr on Peigan - Dewin 240 kV line ckt 2 at Dewin 18 cycles: trip Peigan SVC trip bkr on Peigan - Dewin 240 kV line ckt 2 at Peigan	S2	System stable Good voltage recovery No load shedding

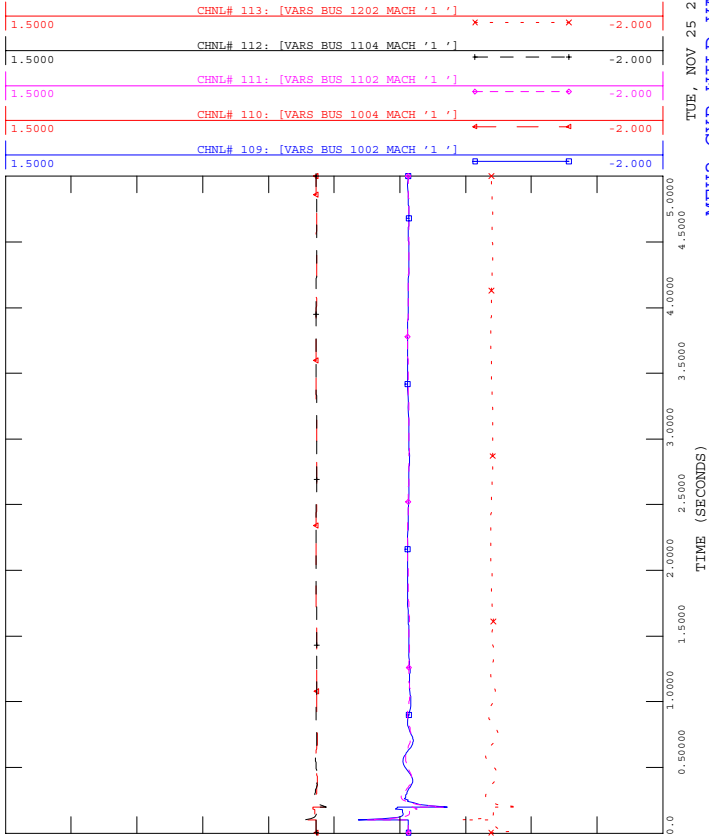
* Stability simulation plots for V82 machine are included in Appendix E.





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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

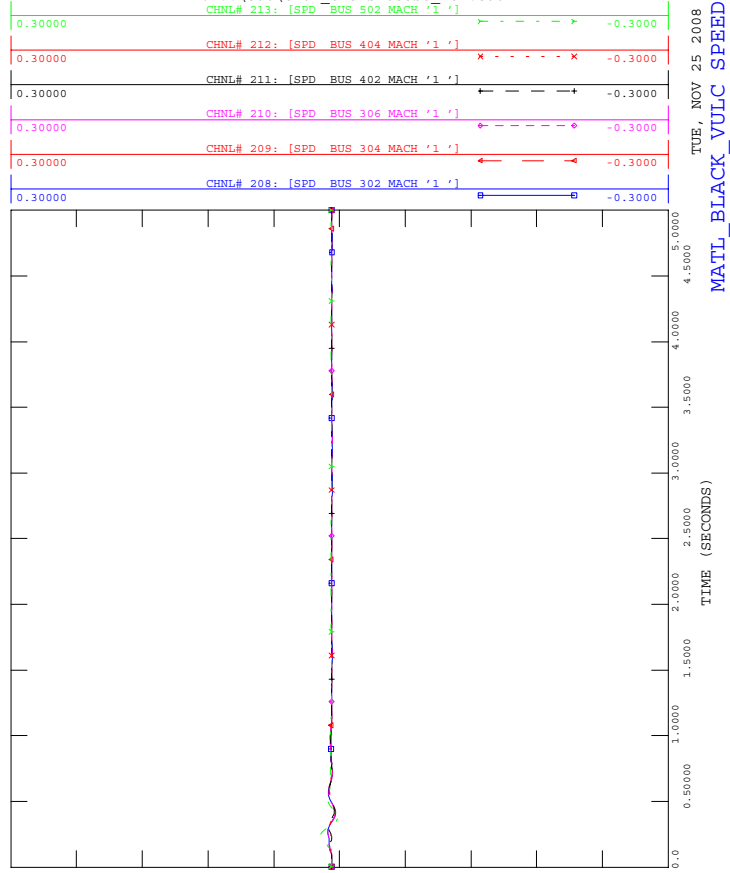
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TUE, NOV 25 2008 17:24
 MEH2_CYP_WILD VARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

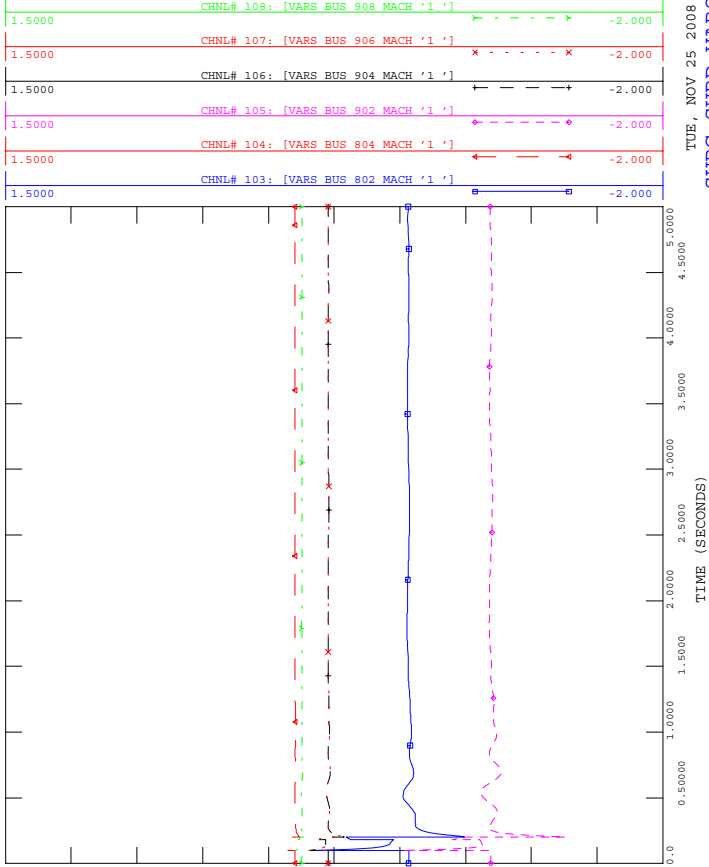
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TUE, NOV 25 2008 17:24
 MAIL_BLACK_VULC SPEED-V82

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 AESO CASE

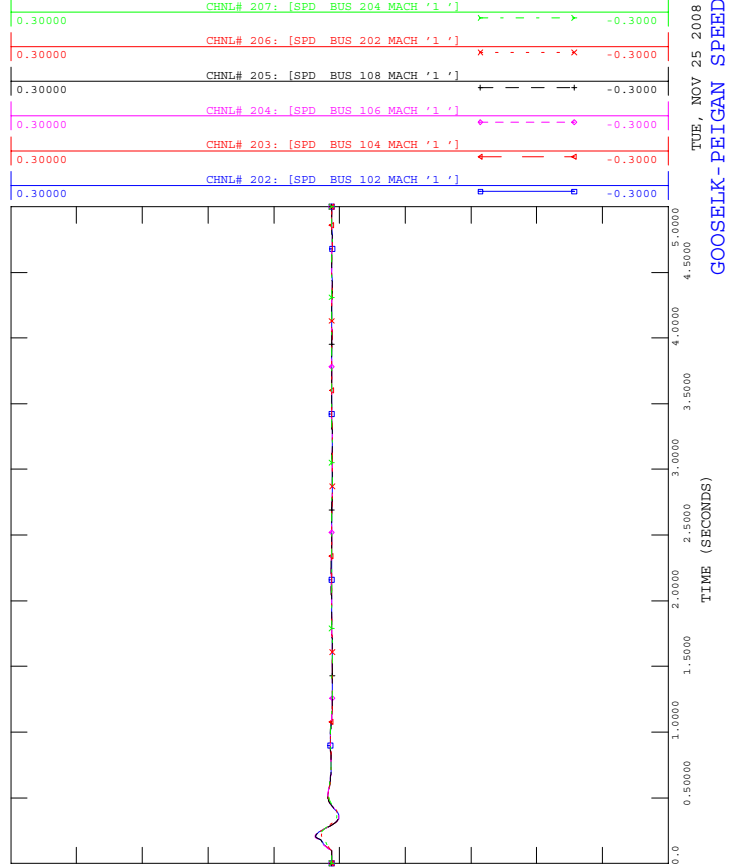
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 SUBC_SUBD VARS-V82

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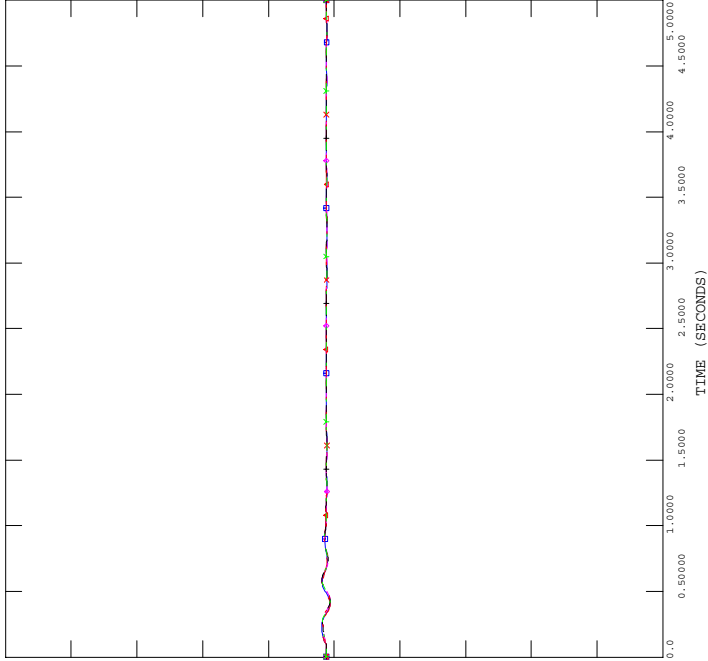
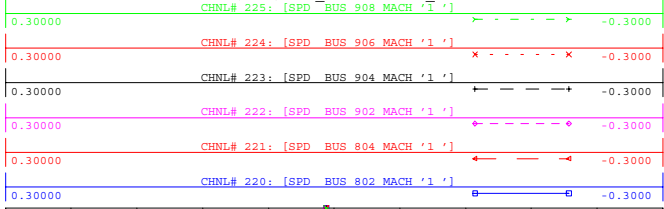
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TUE, NOV 25 2008 17:24
 GOOSELK-PEIGAN SPEED-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

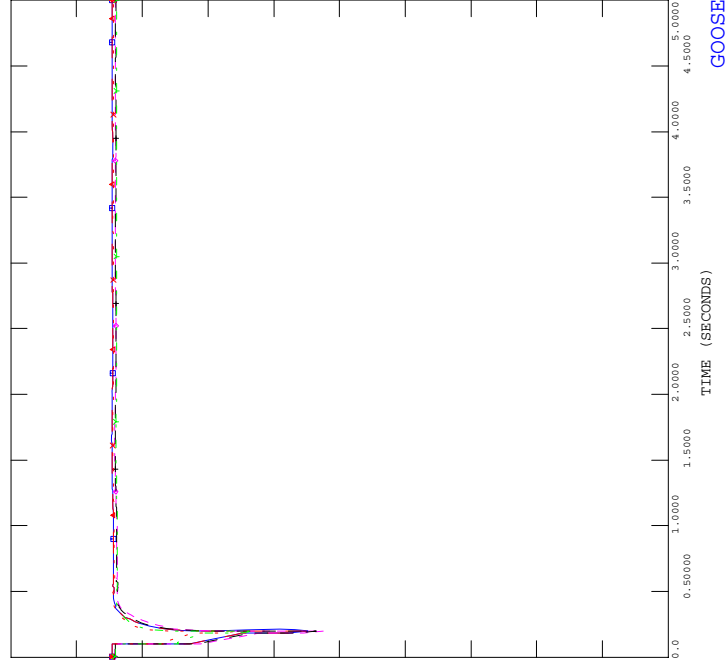
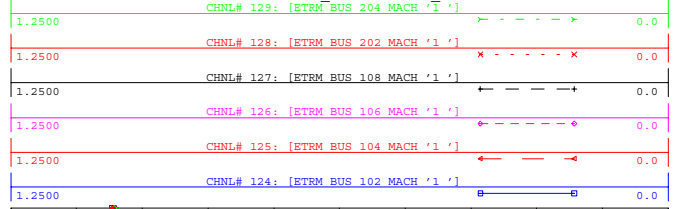
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SUBC_SUBD SPEED-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

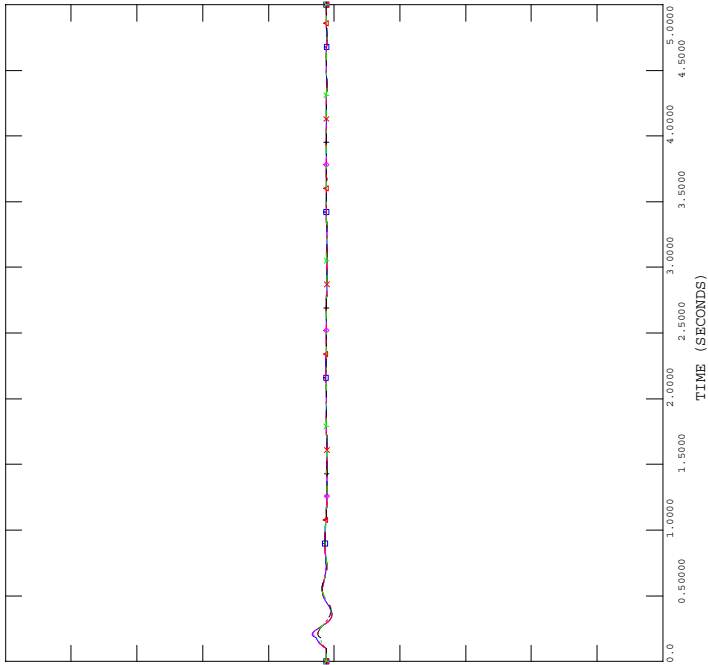
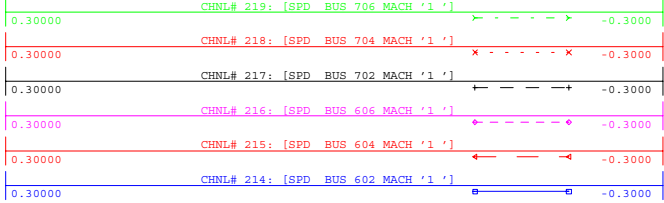
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GOOSELK-PEIGAN ETERM-V82

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ABSO CASE

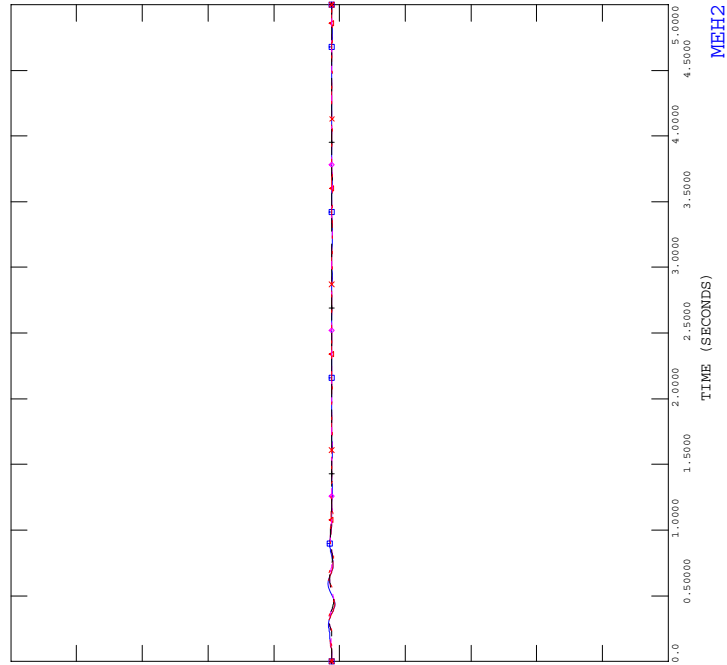
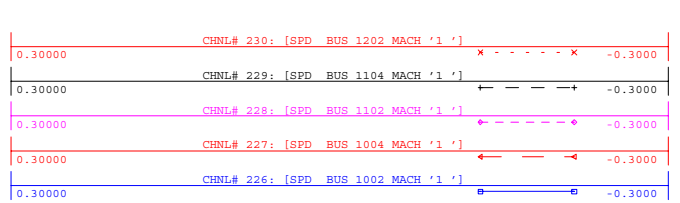
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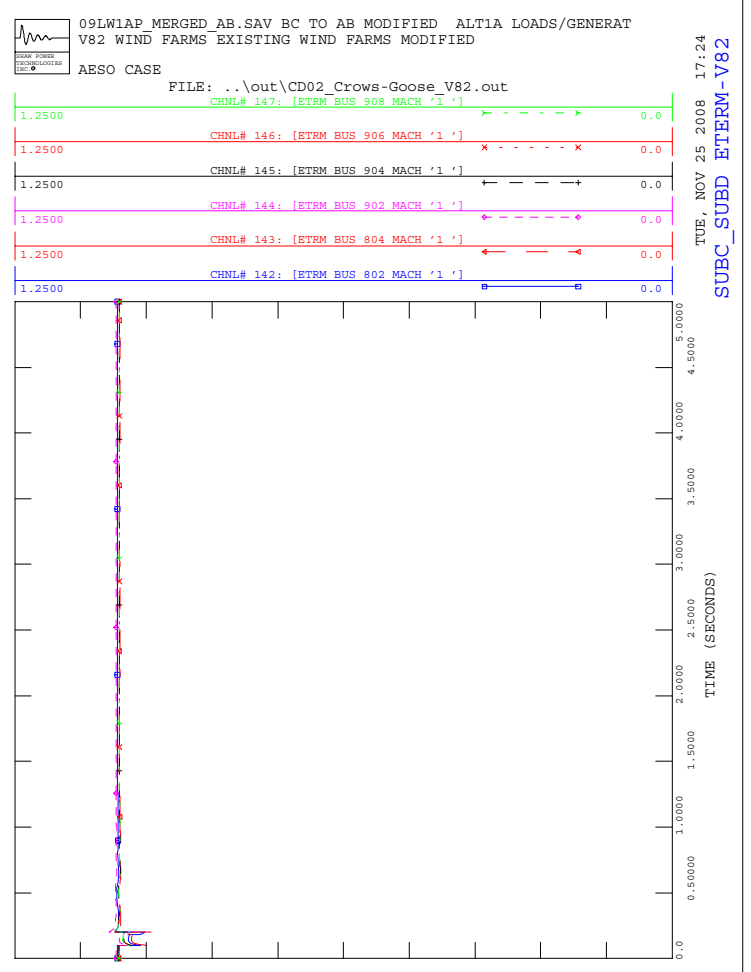
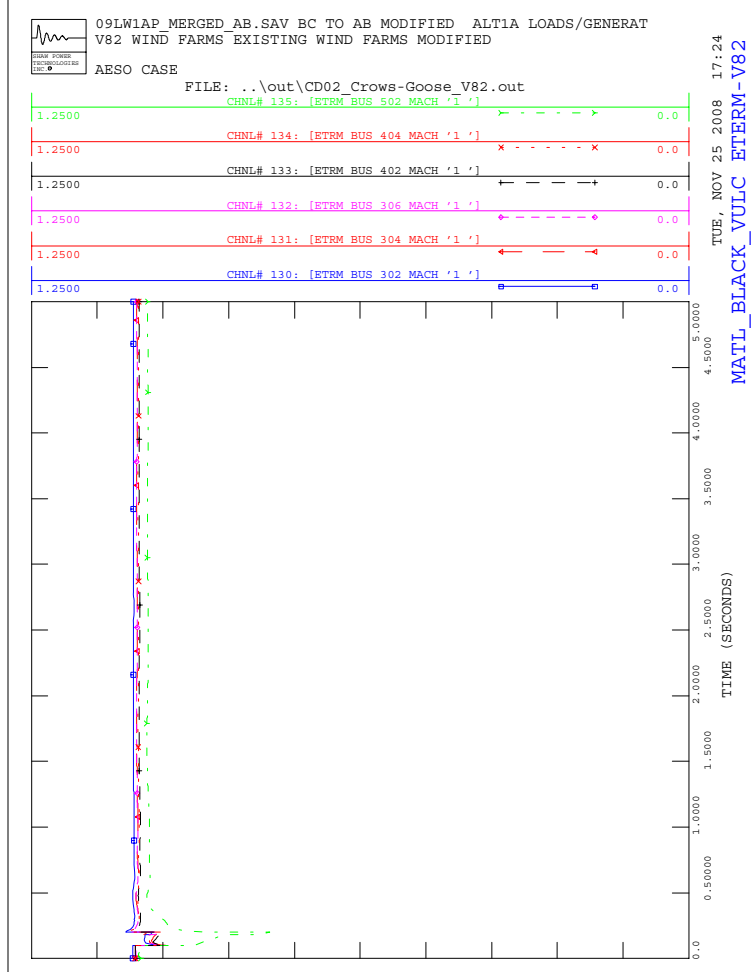
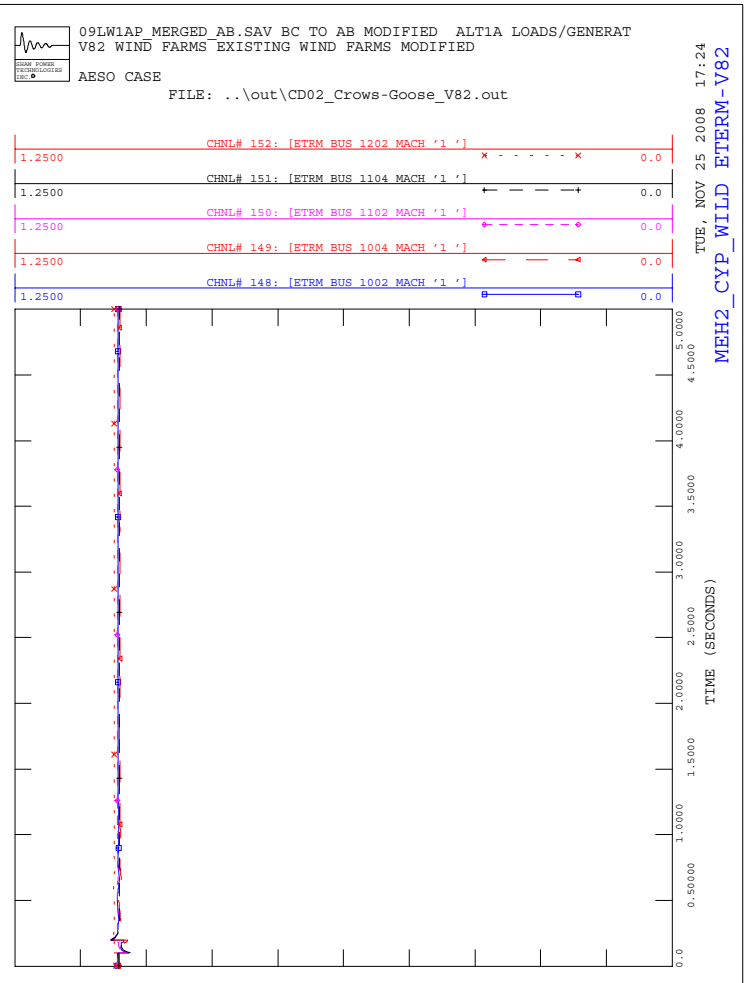
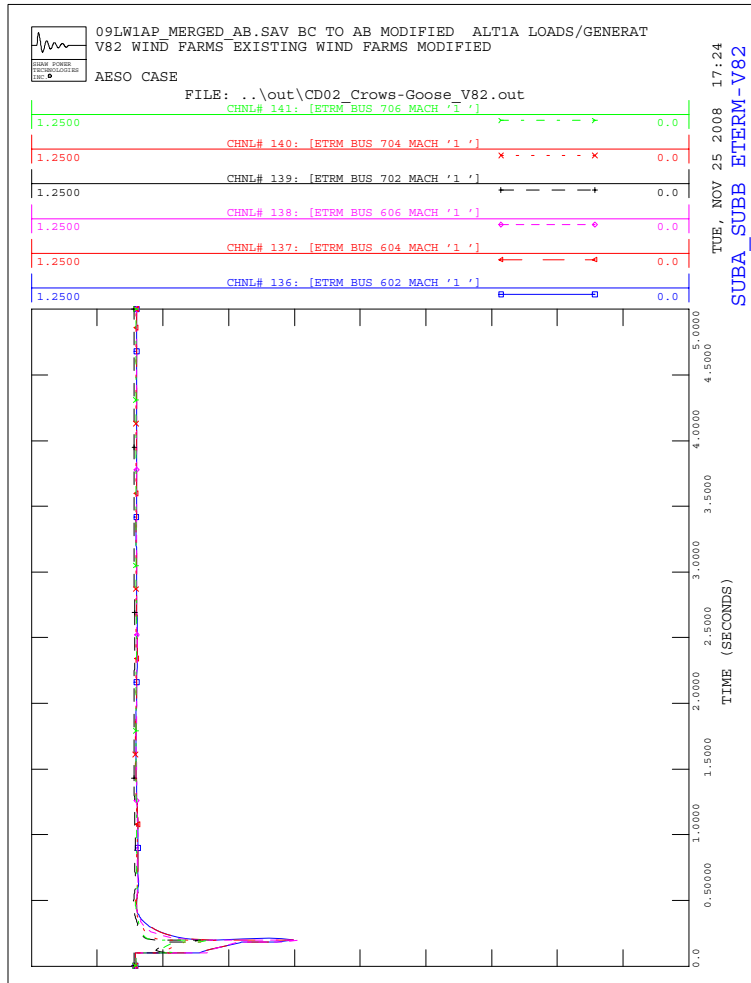
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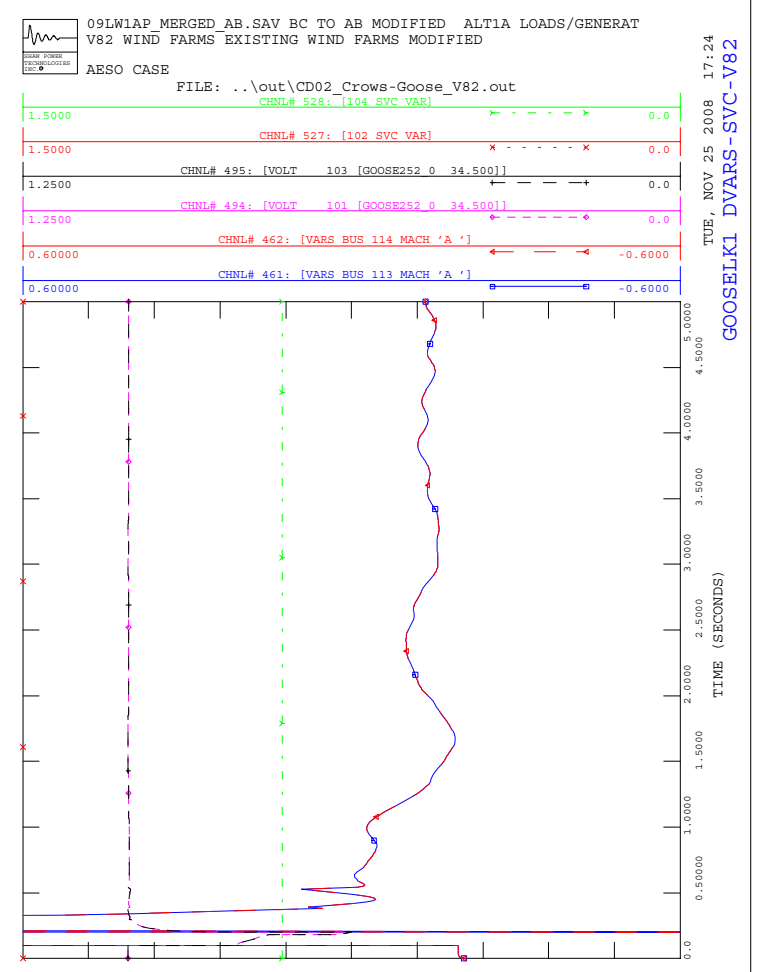
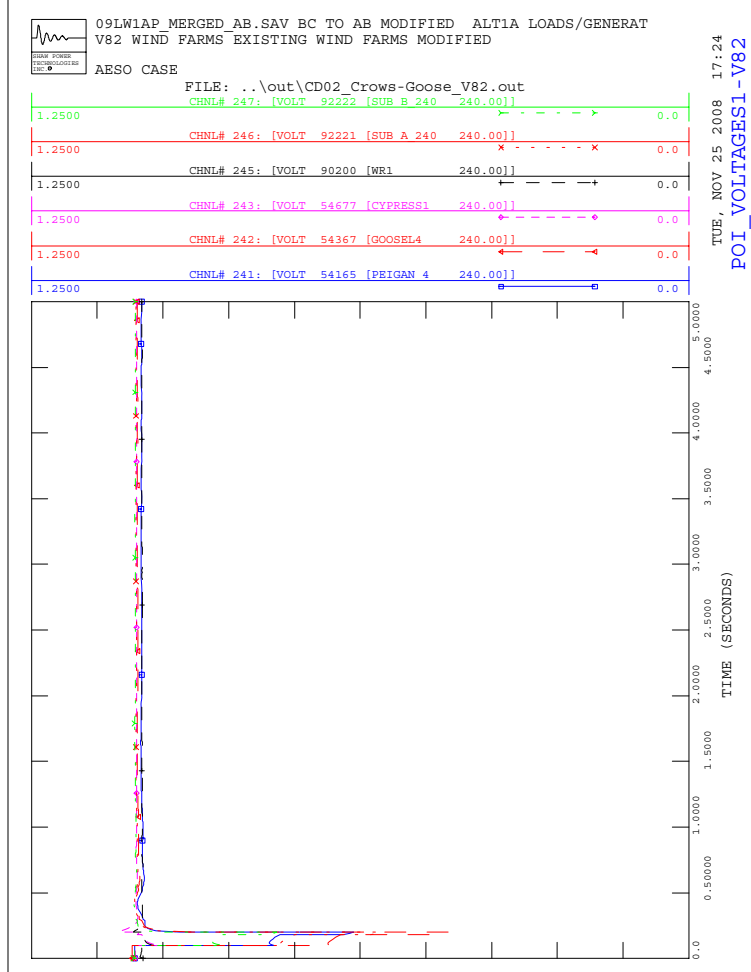
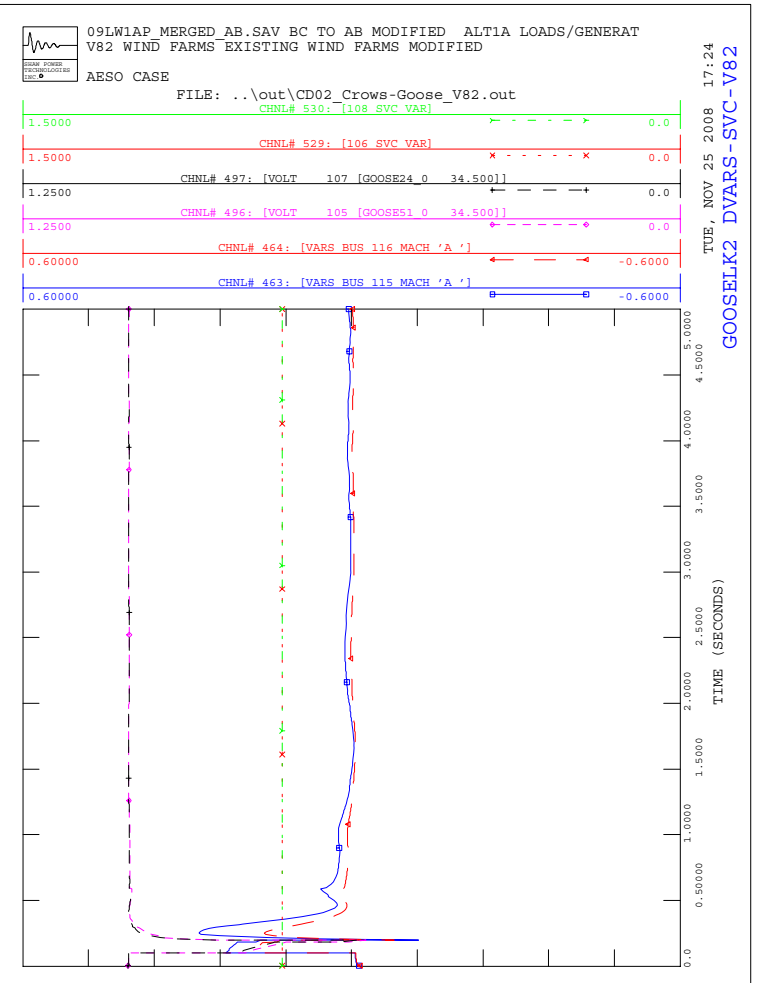
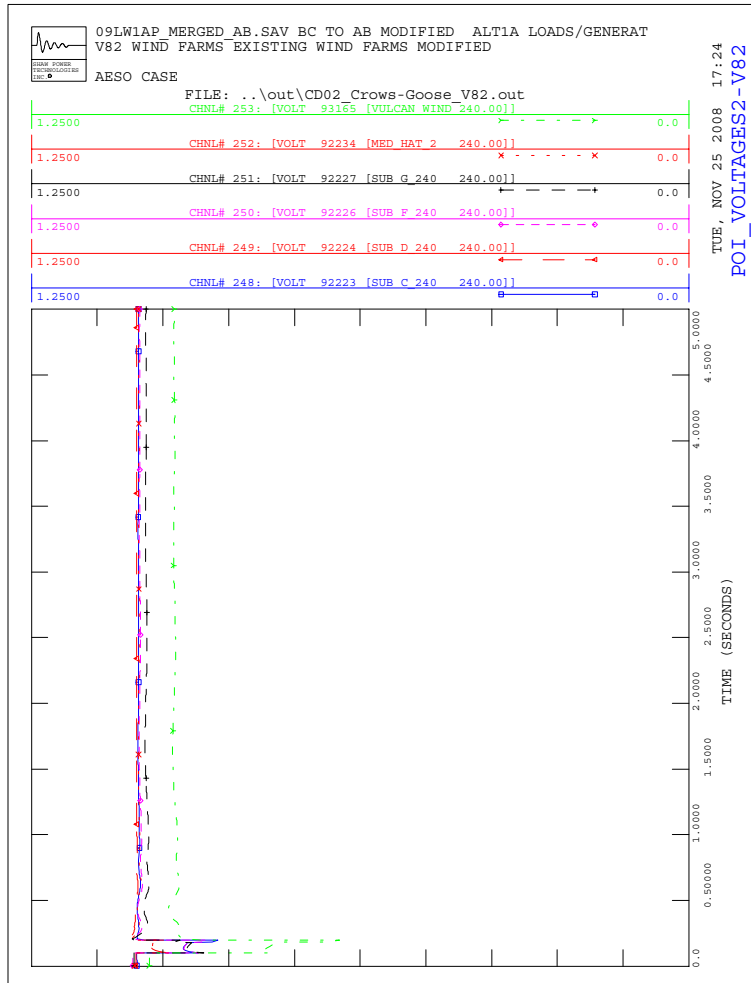
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

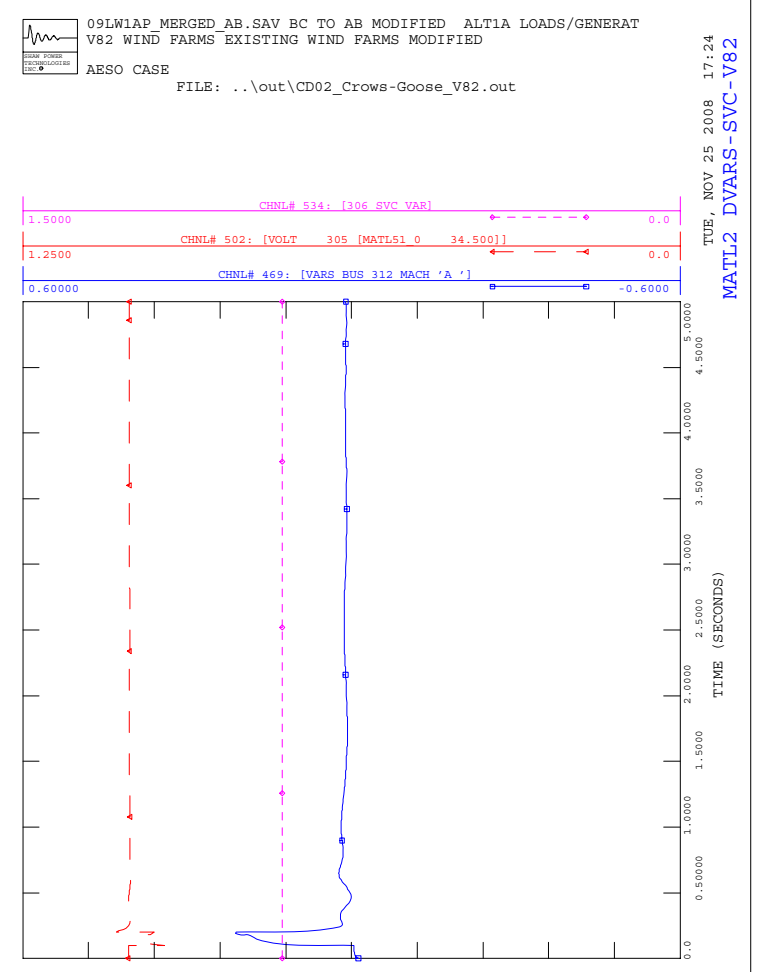
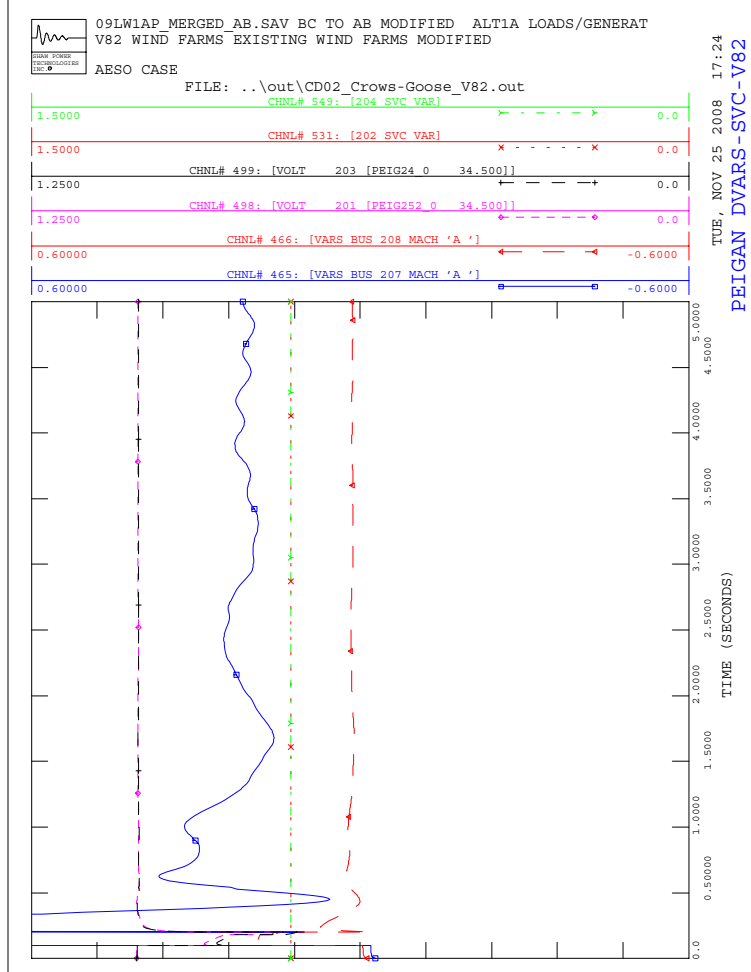
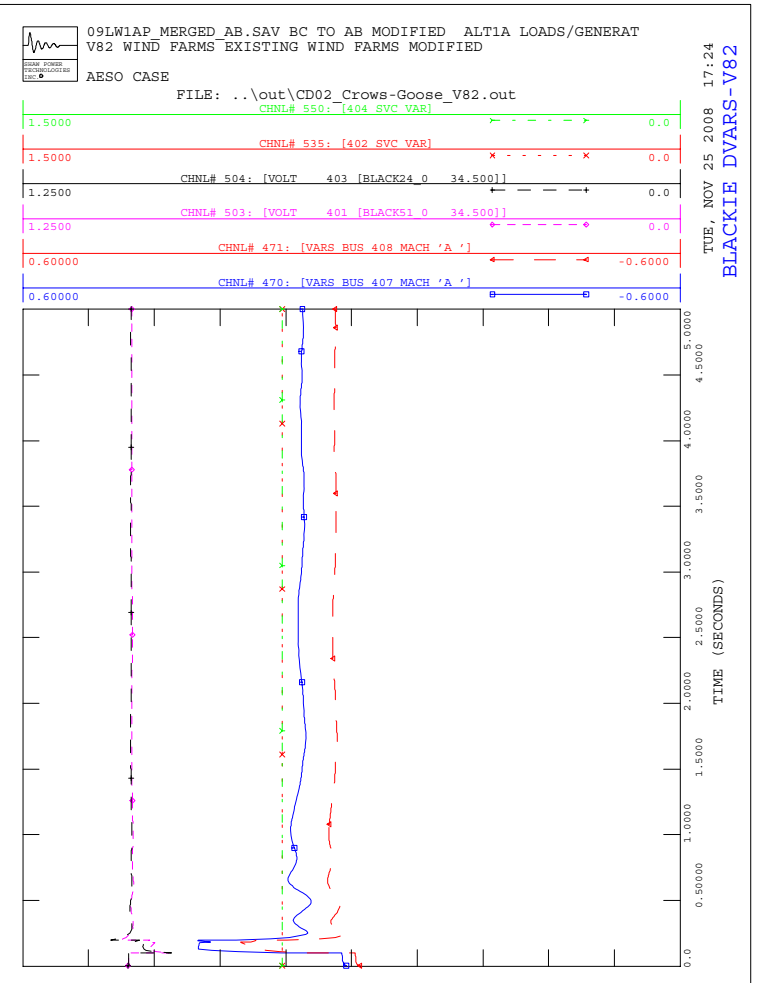
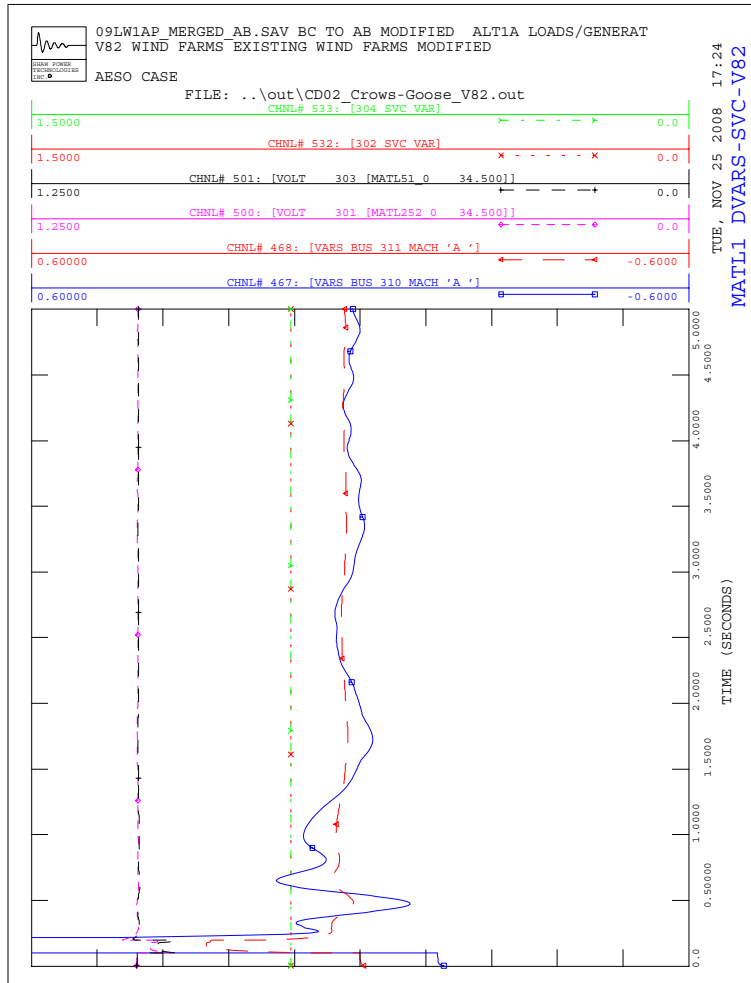
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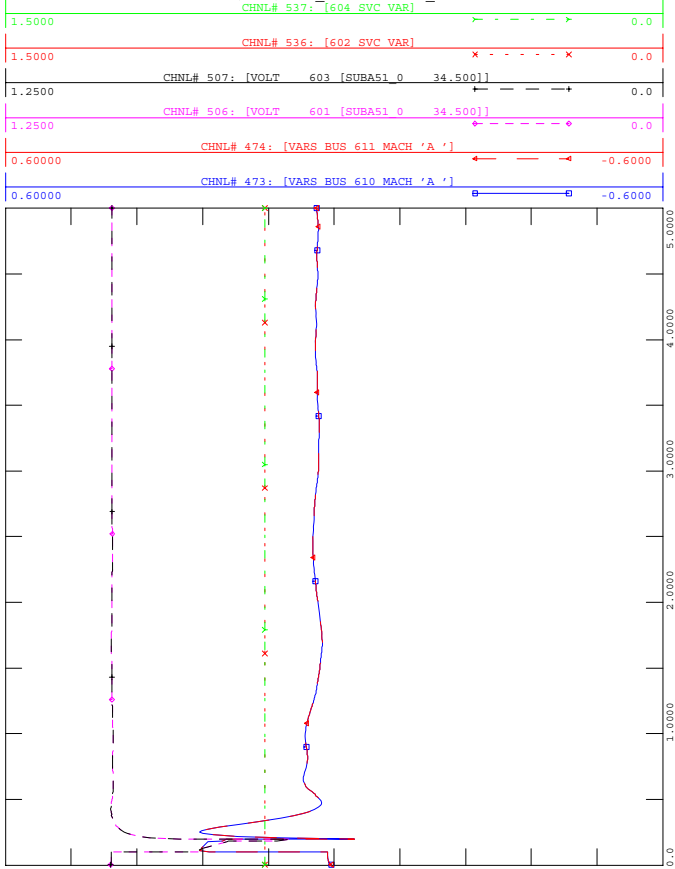






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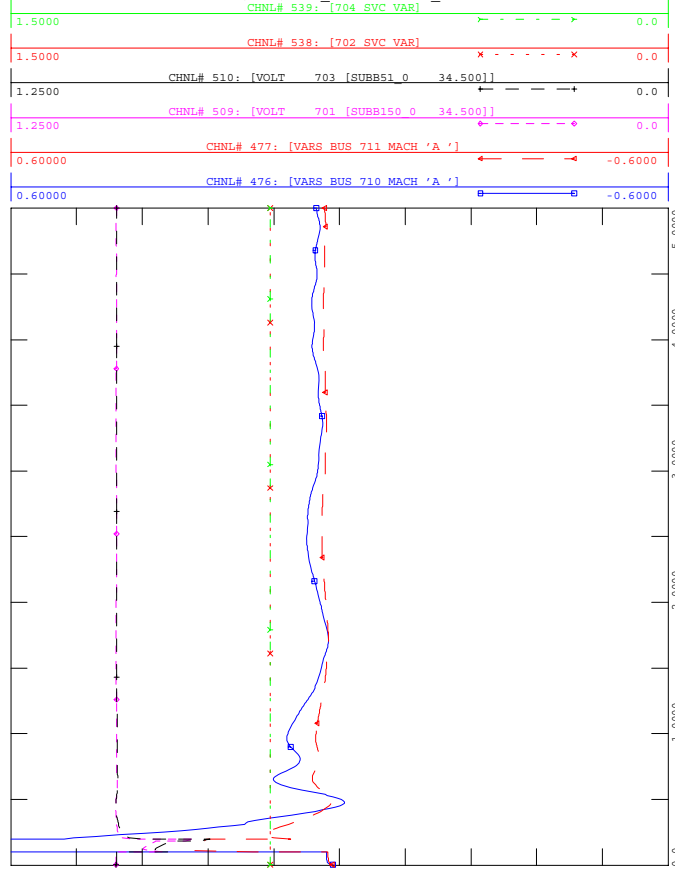
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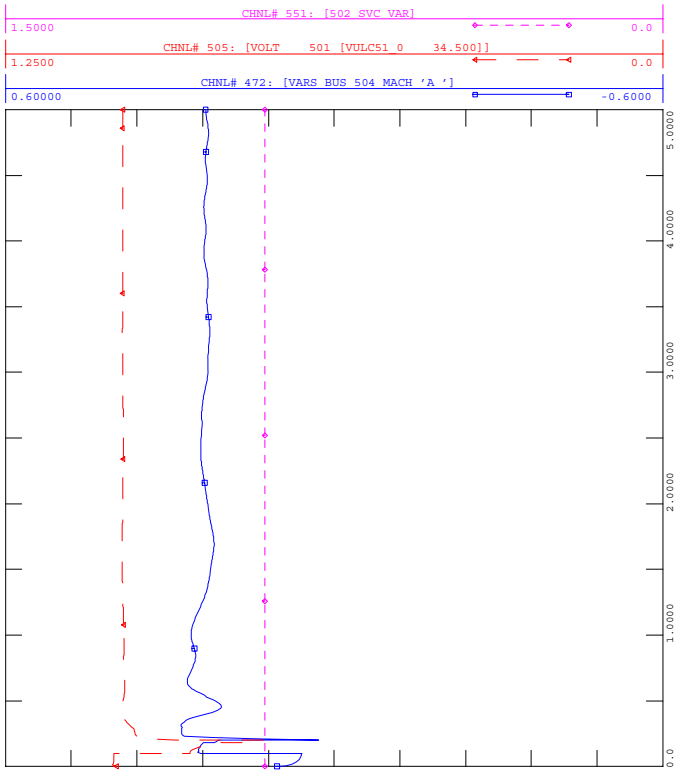
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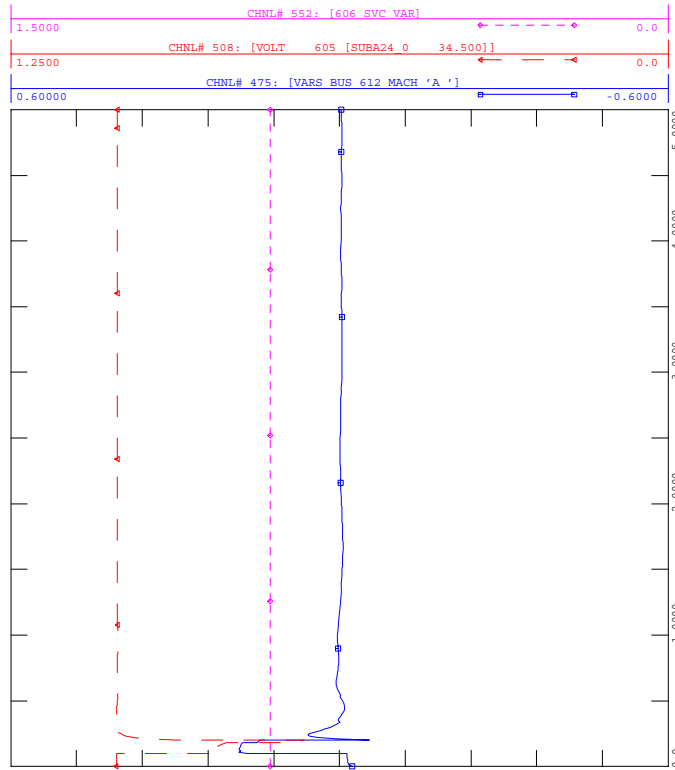
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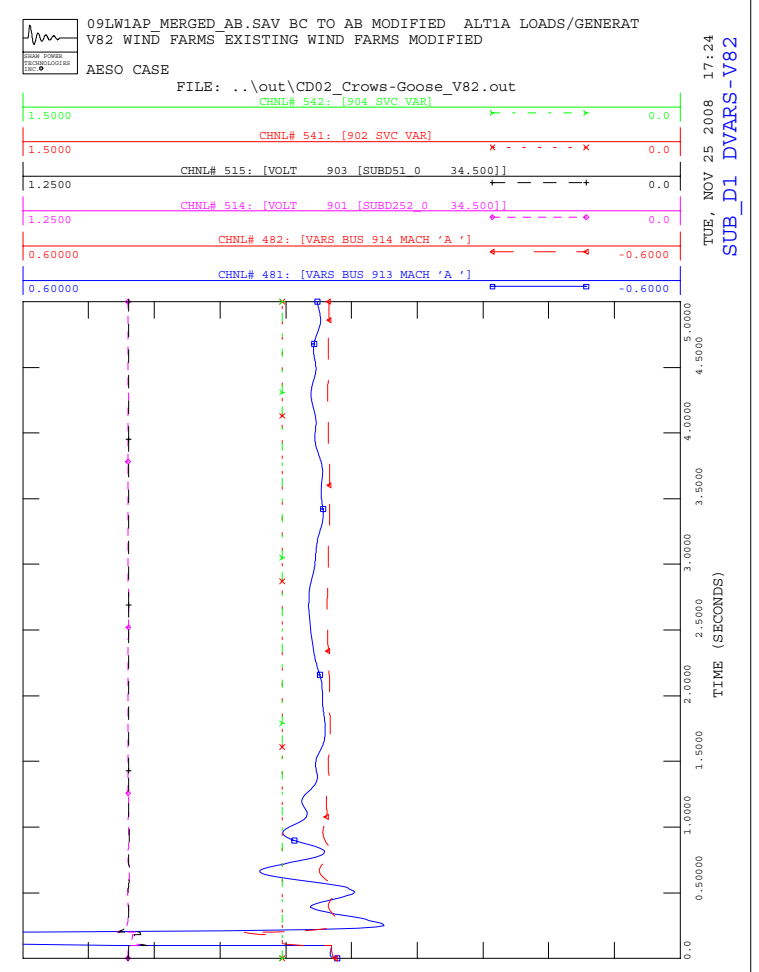
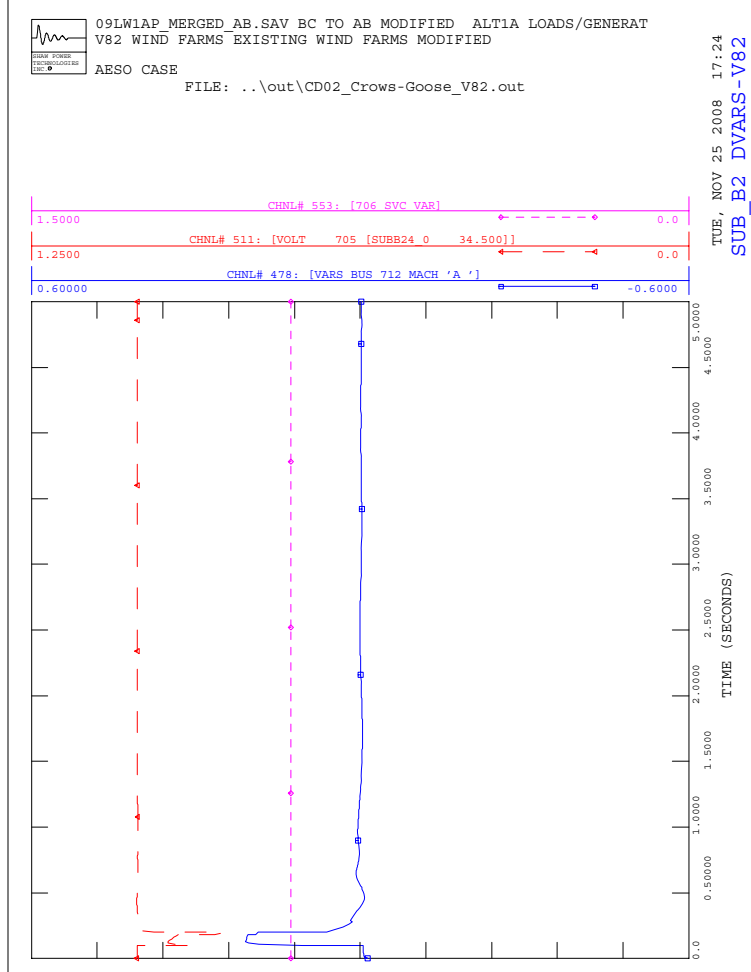
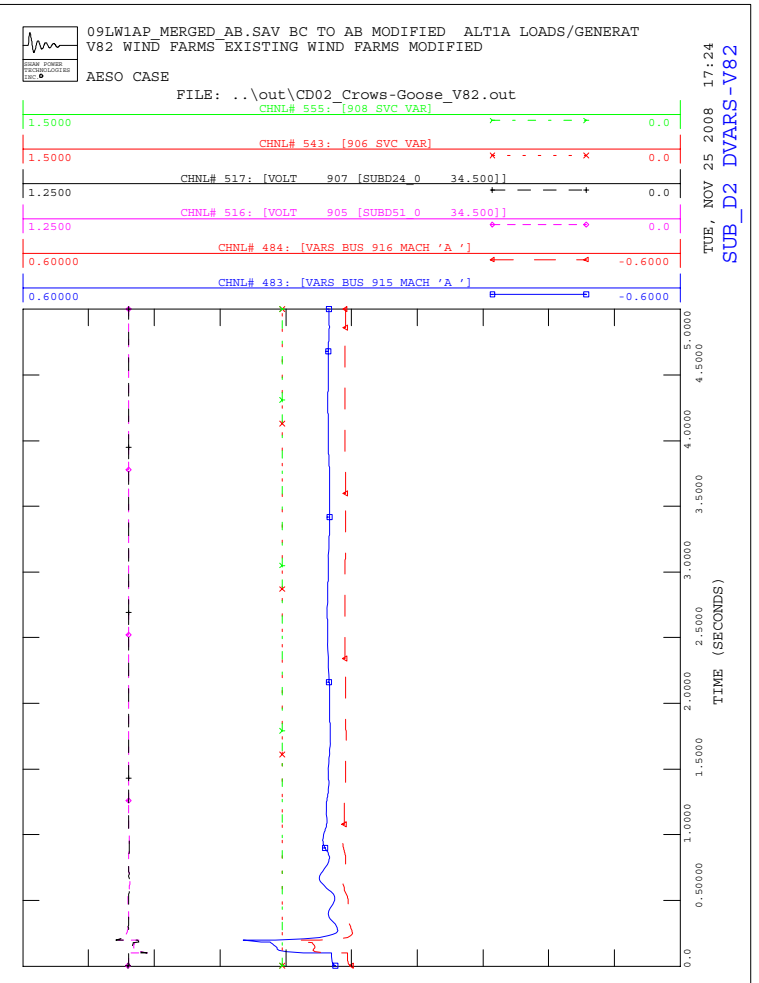
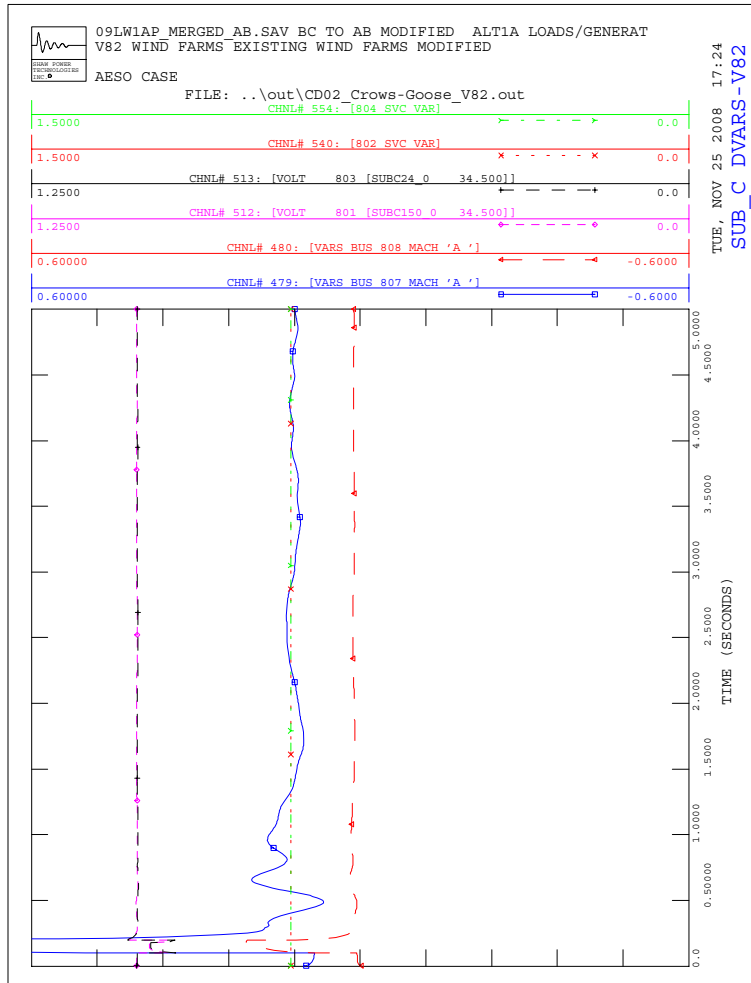
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VULC DVARS-V82

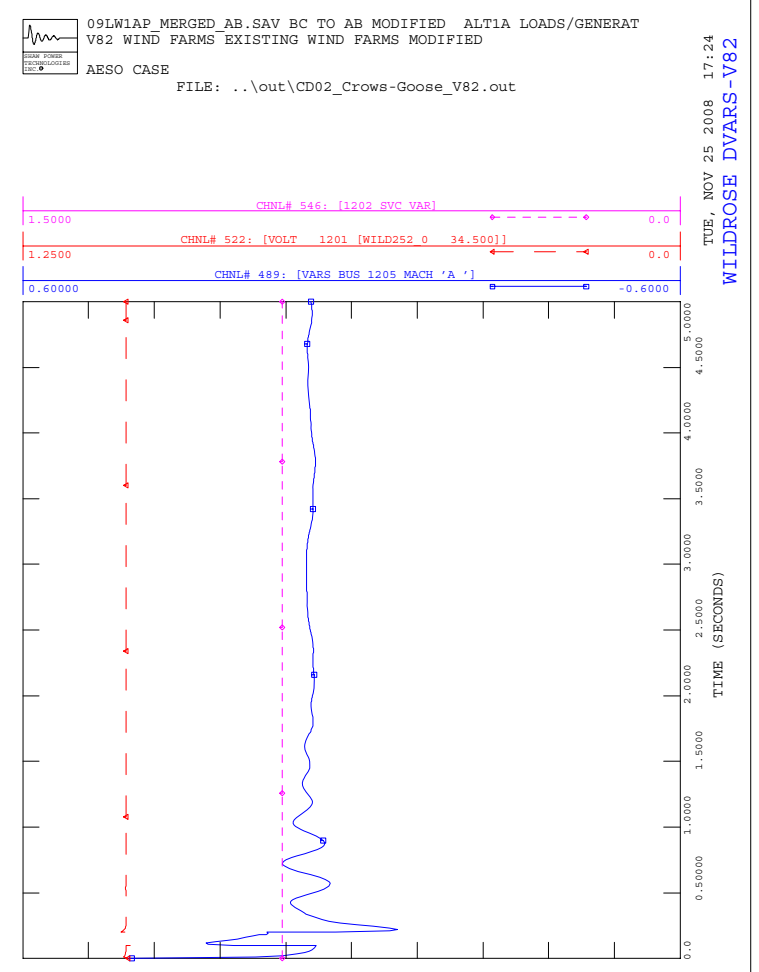
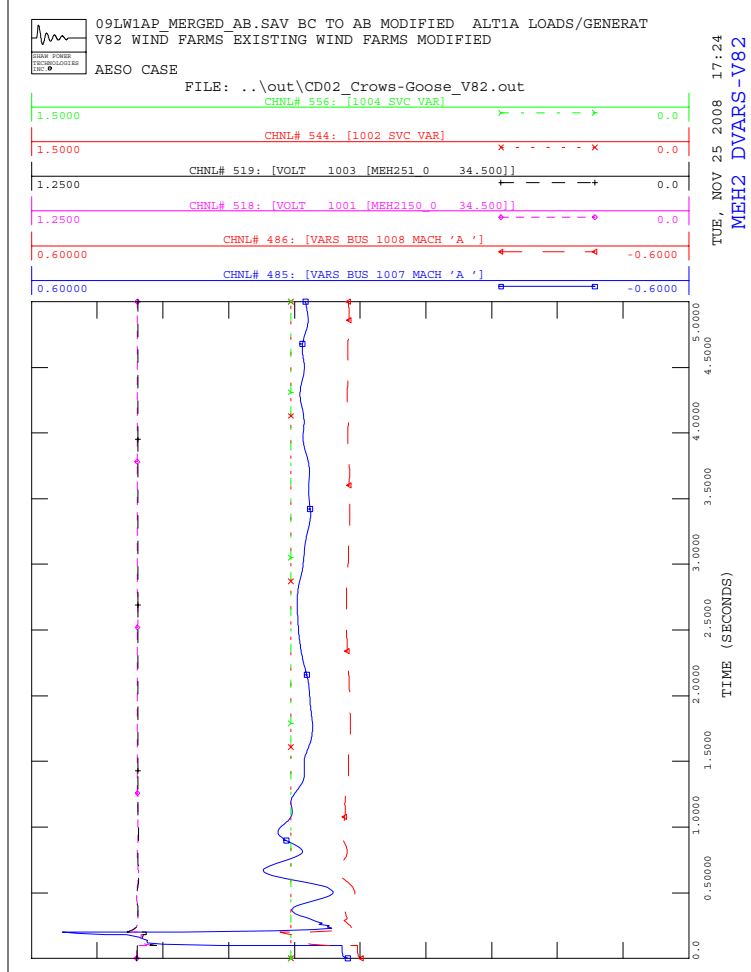
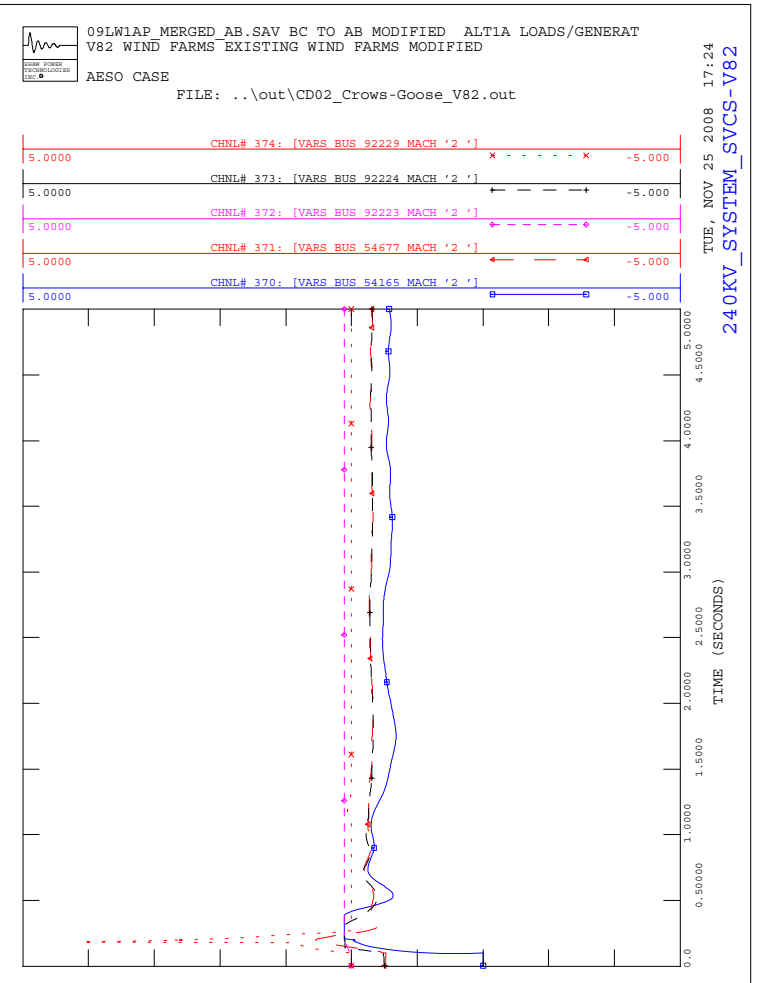
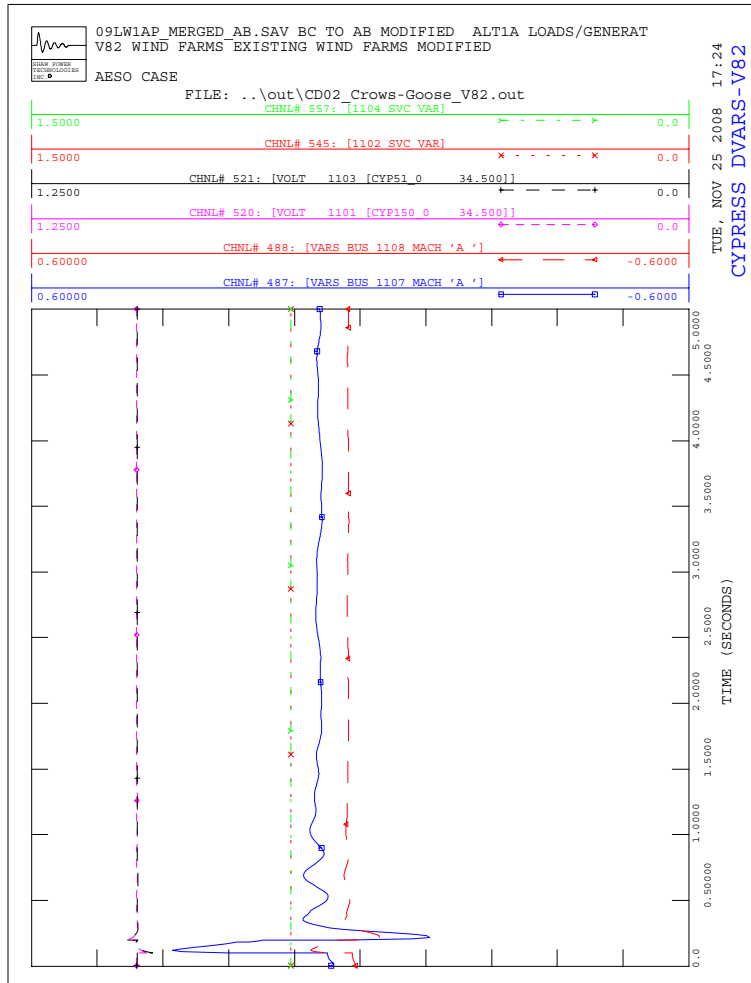
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

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TUE, NOV 25 2008 17:24
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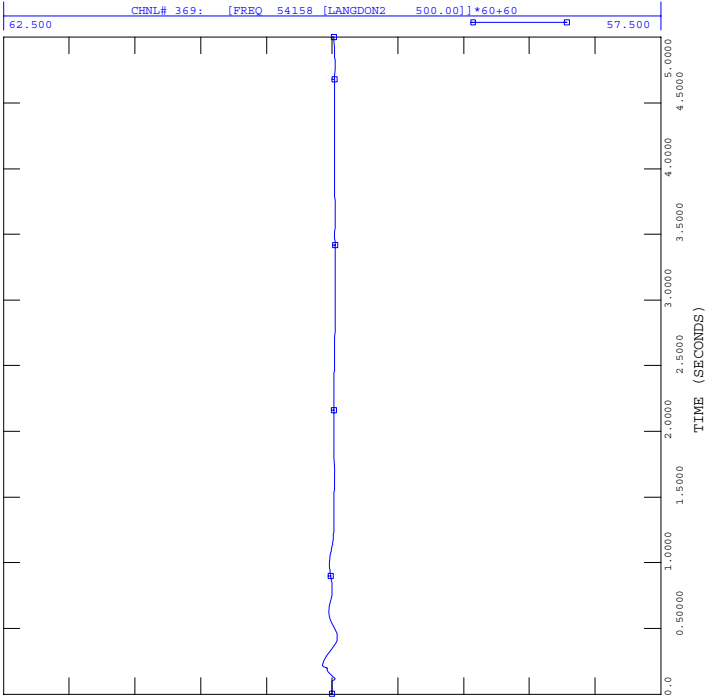


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ABSO CASE

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TUE, NOV 25 2008 17:24
LANGDON_FRQ-V82

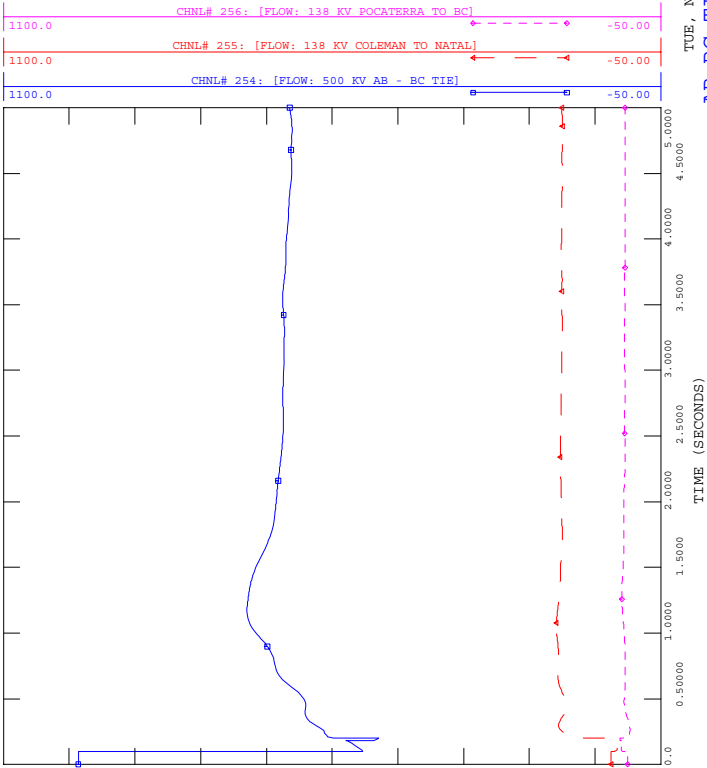


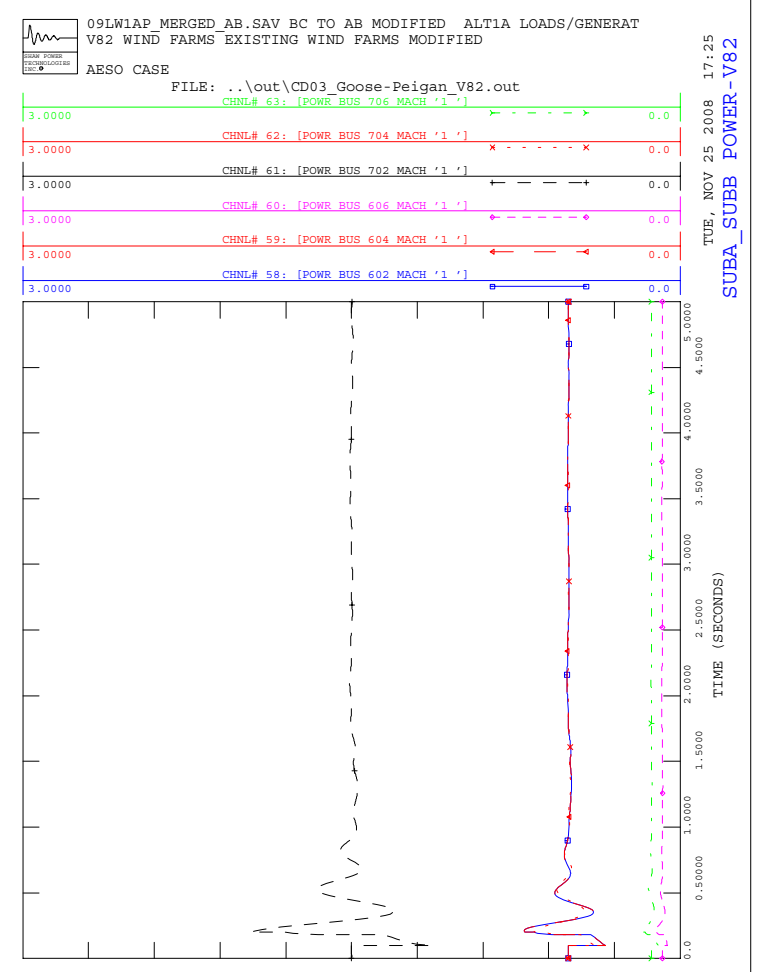
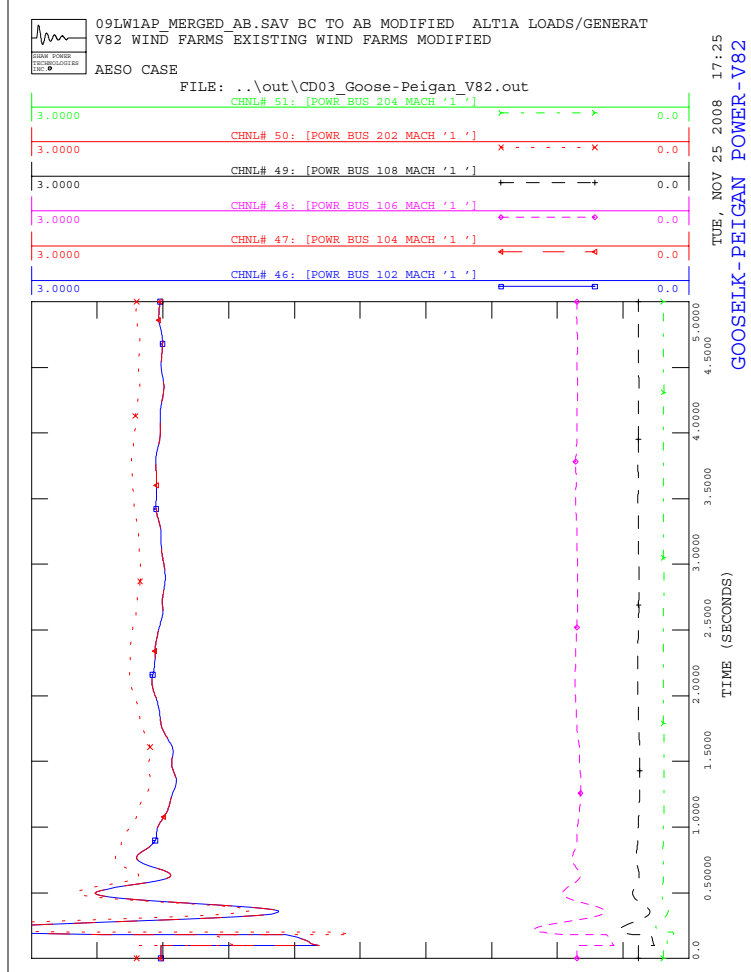
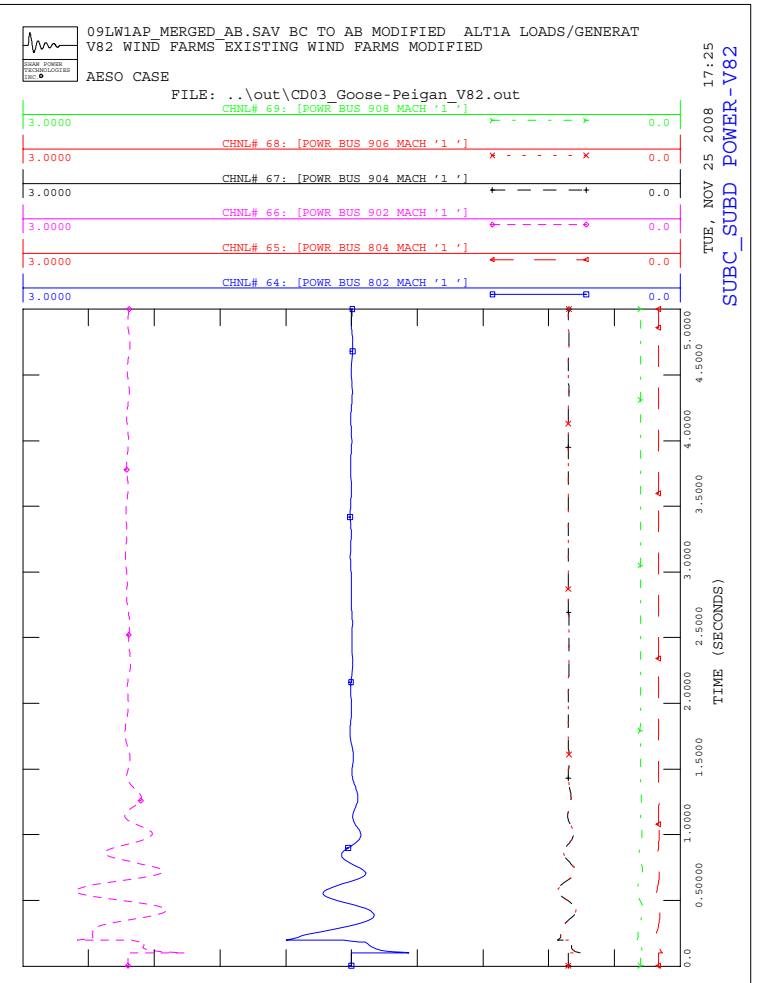
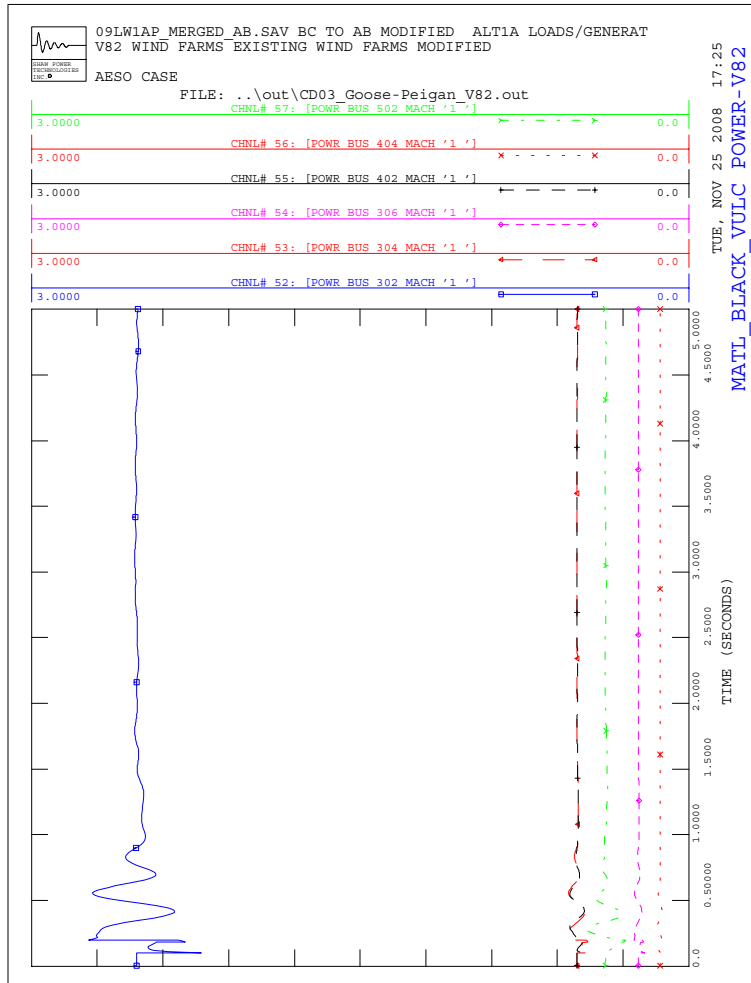
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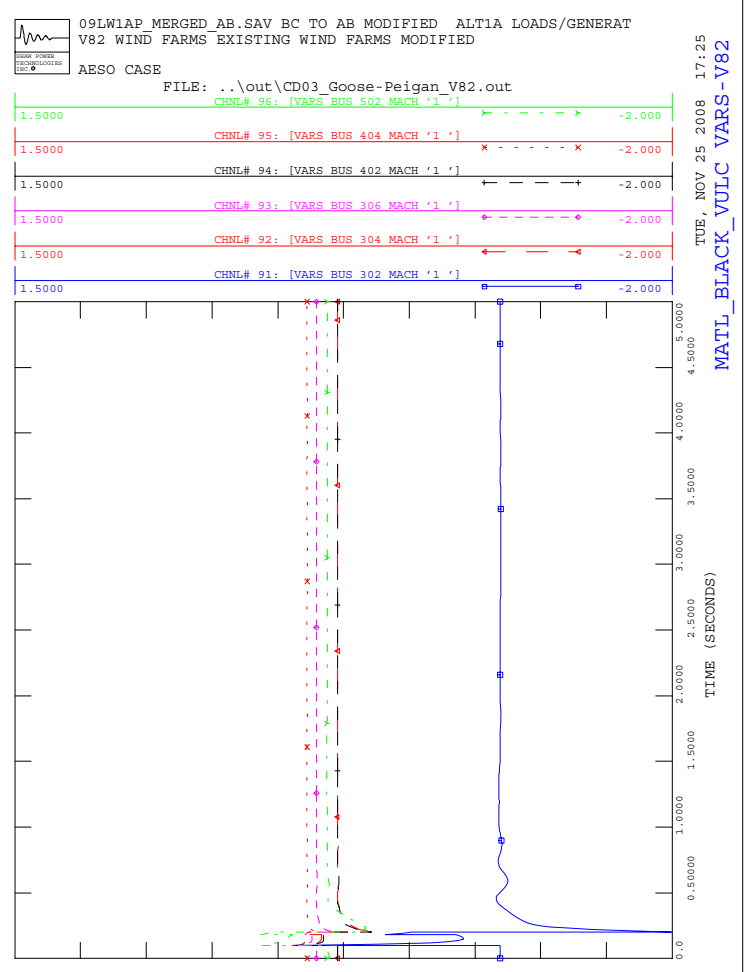
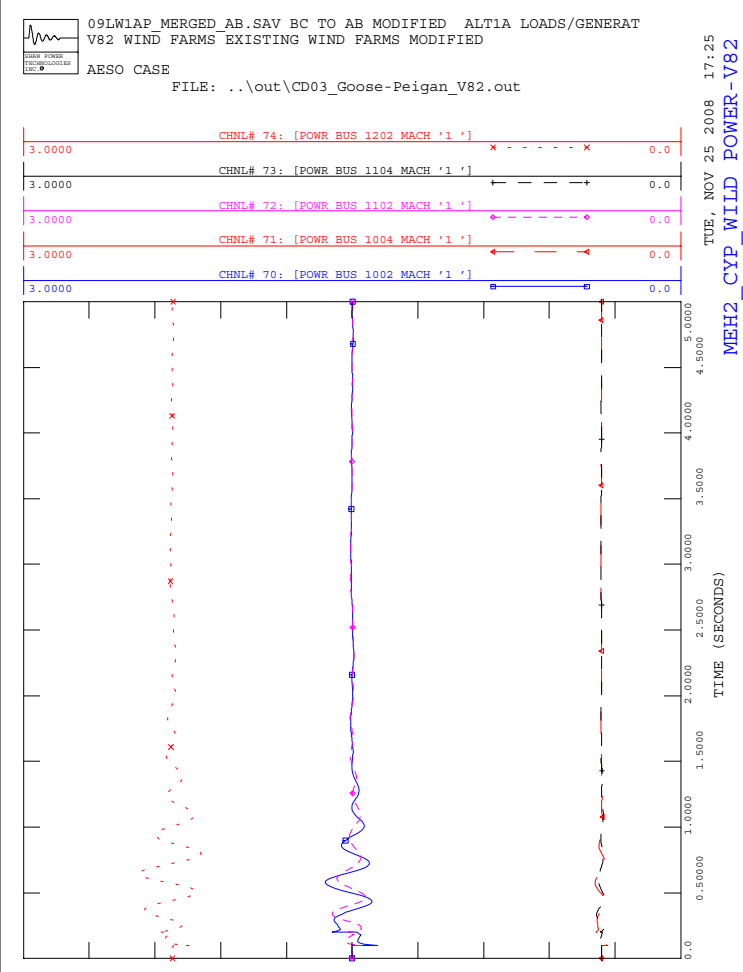
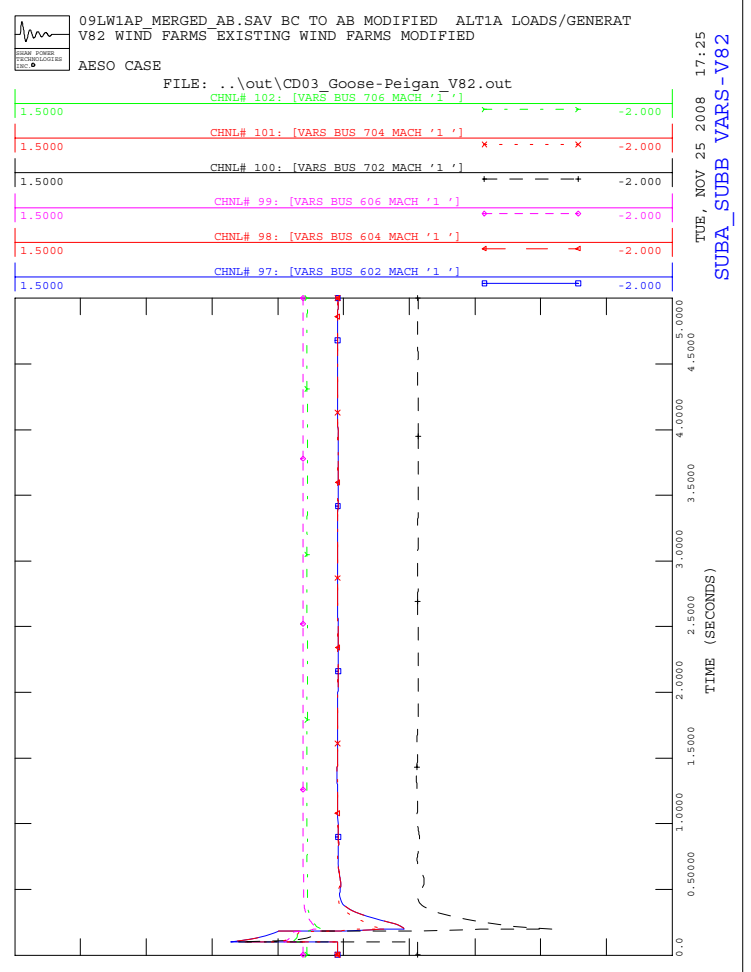
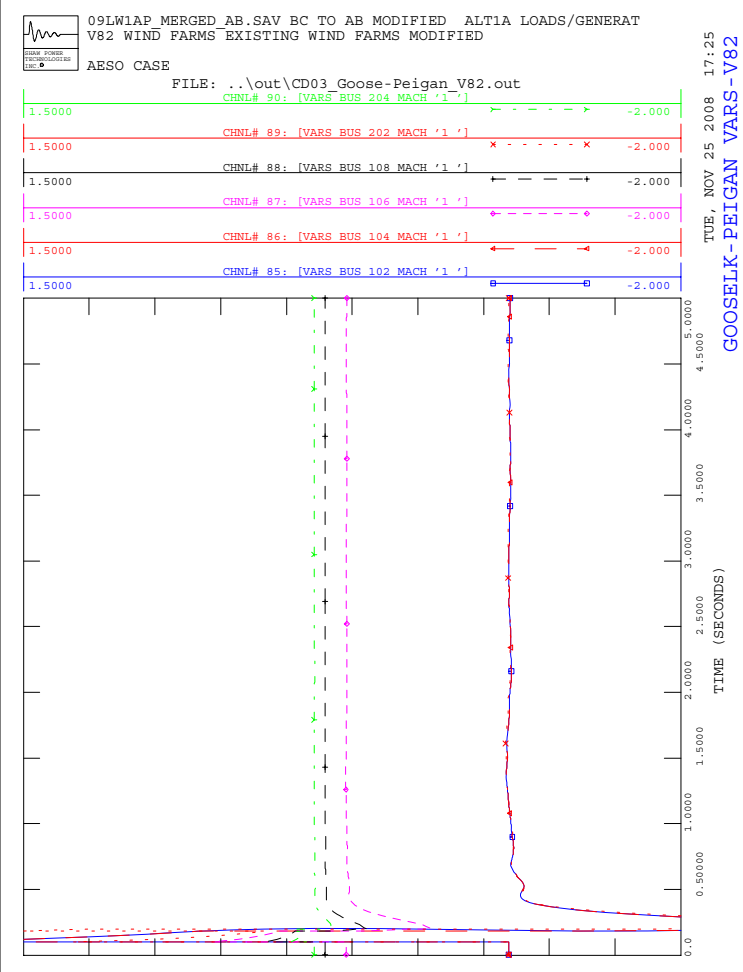
ABSO CASE

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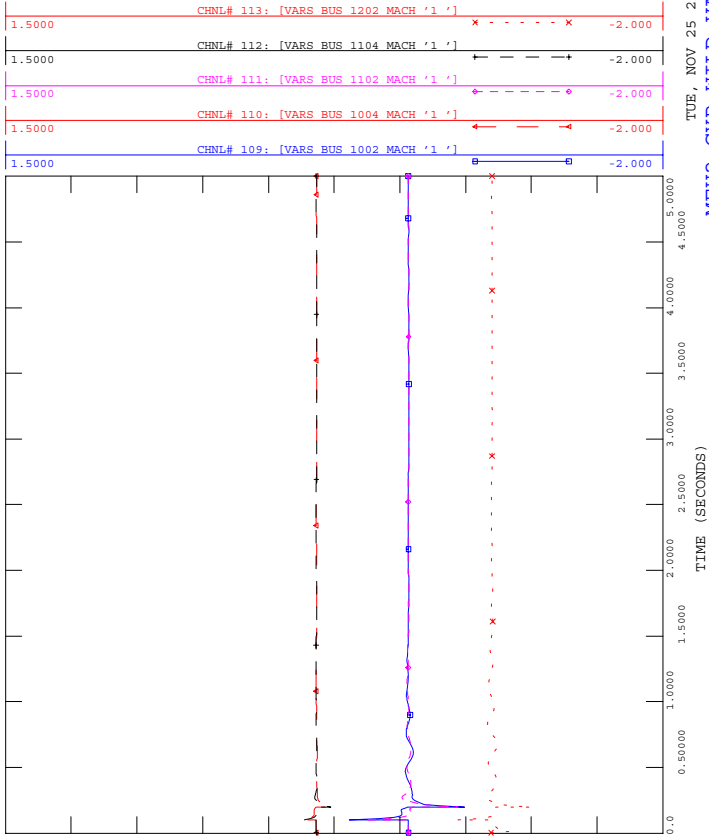






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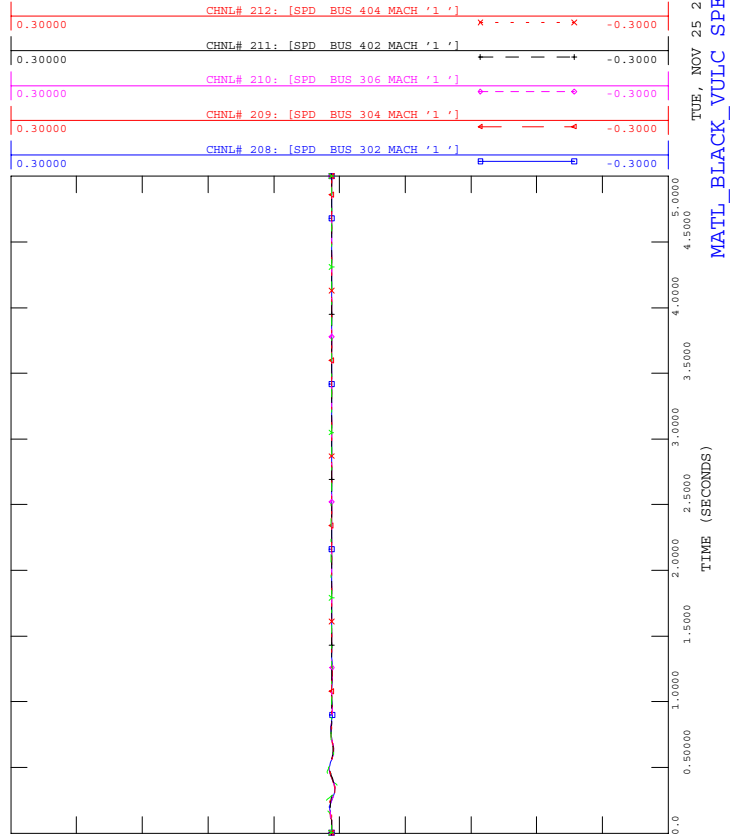
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ABSO CASE

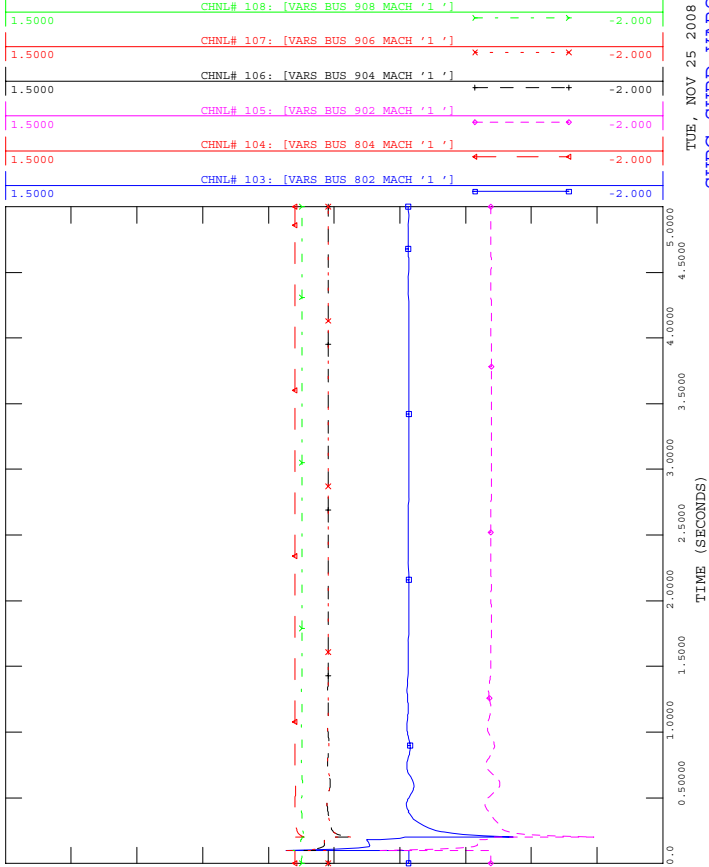
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TUE, NOV 25 2008 17:25
MAIL_BLACK_VULC_SPEED-V82

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ABSO CASE

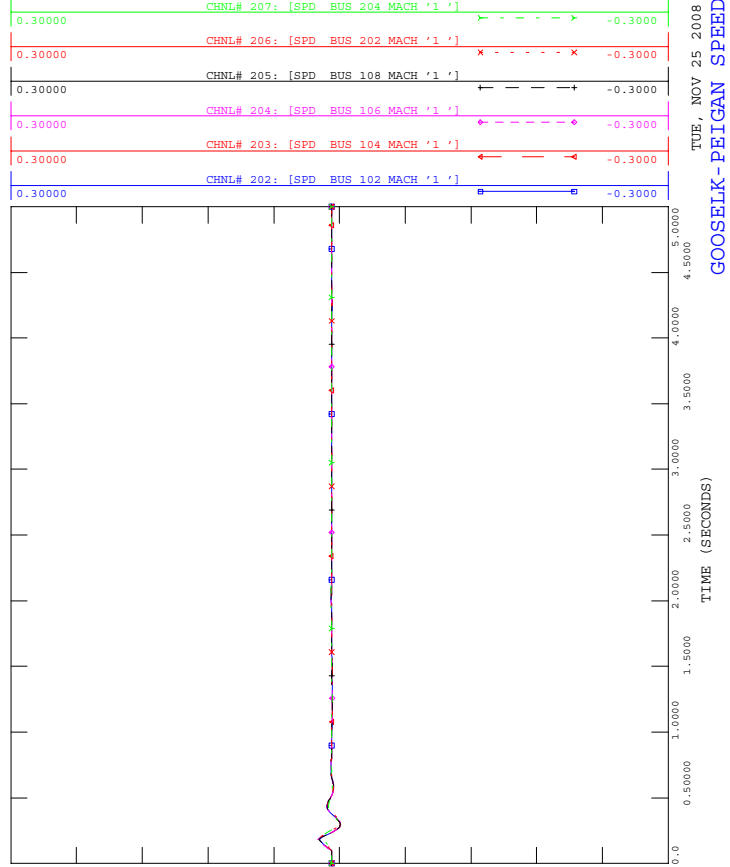
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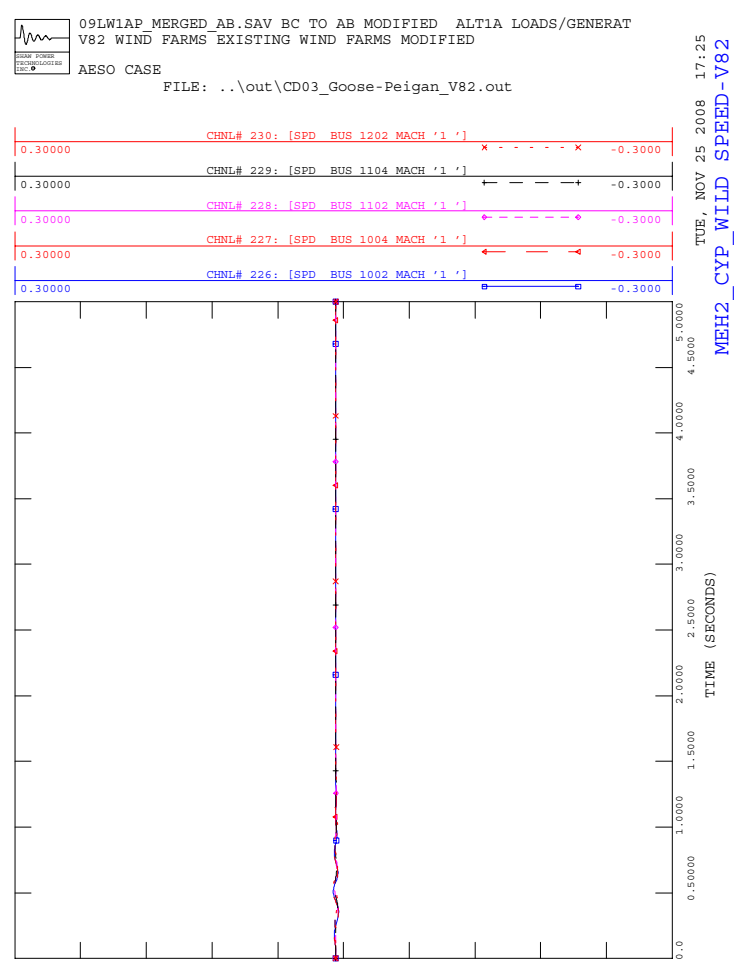
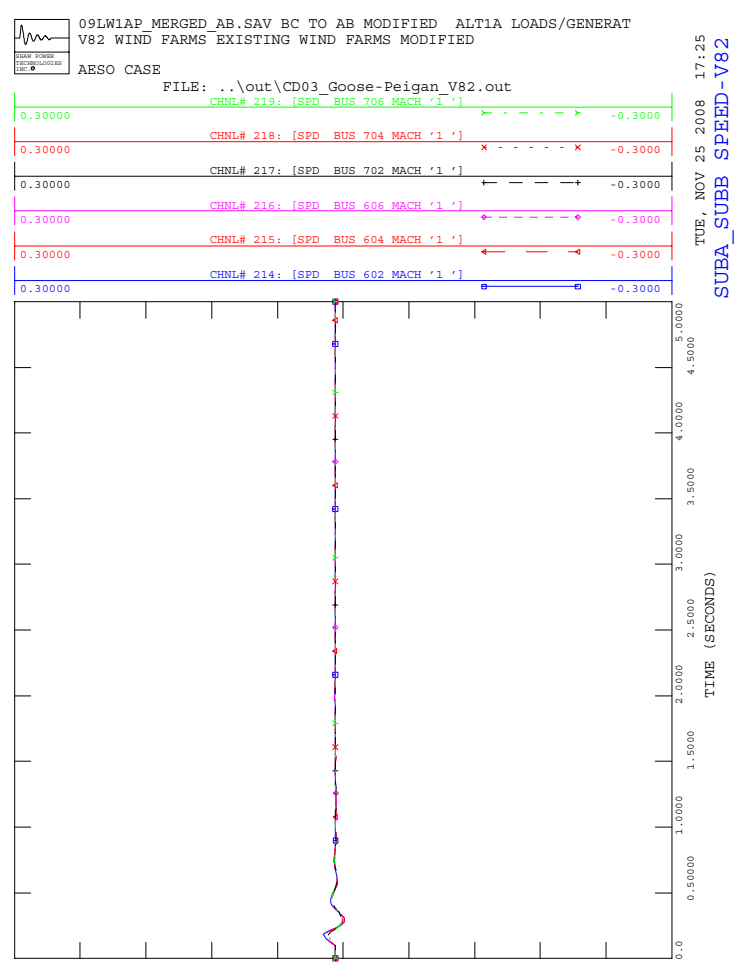
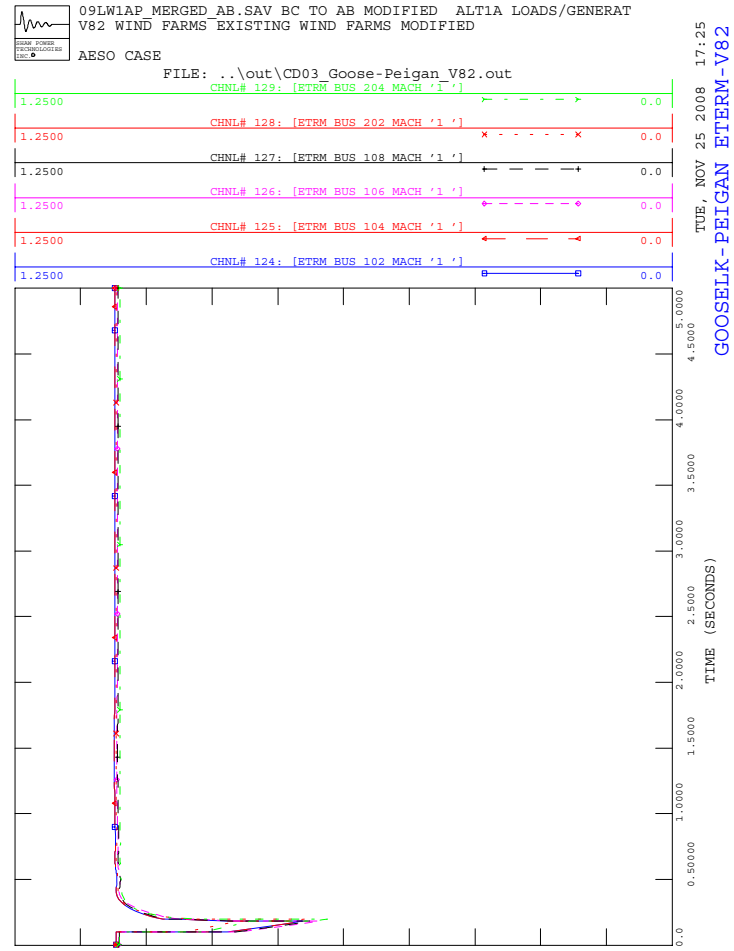
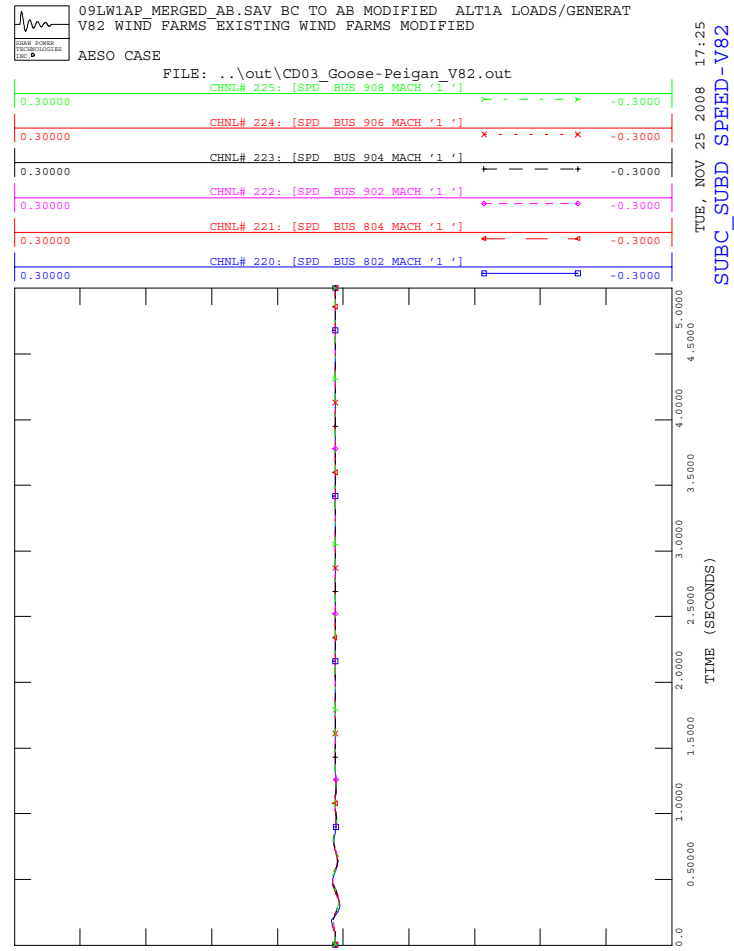
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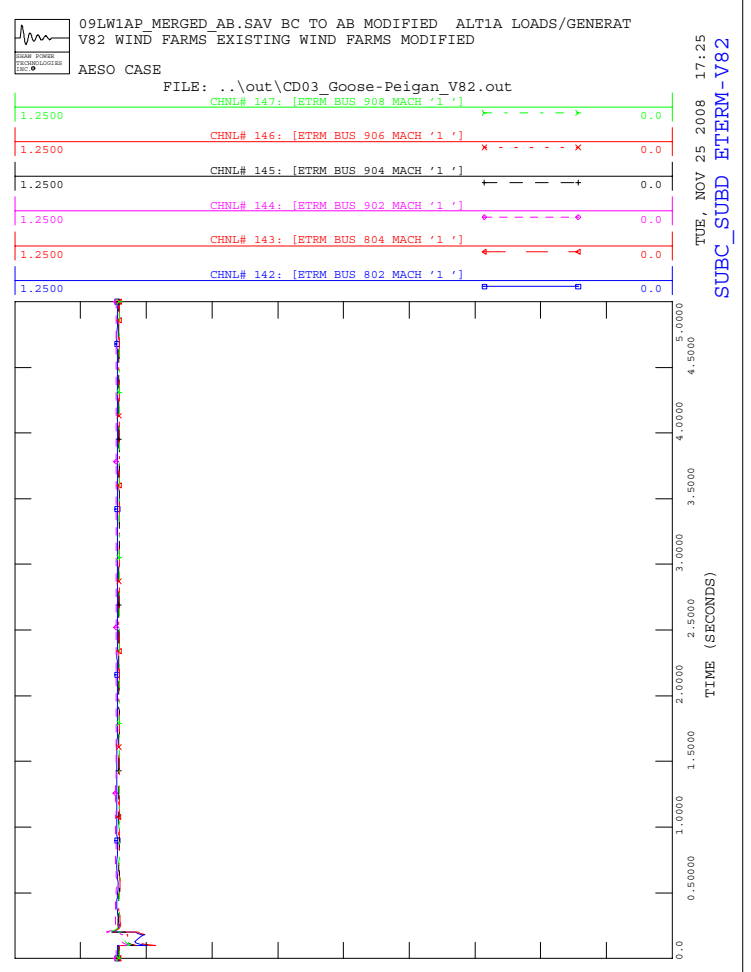
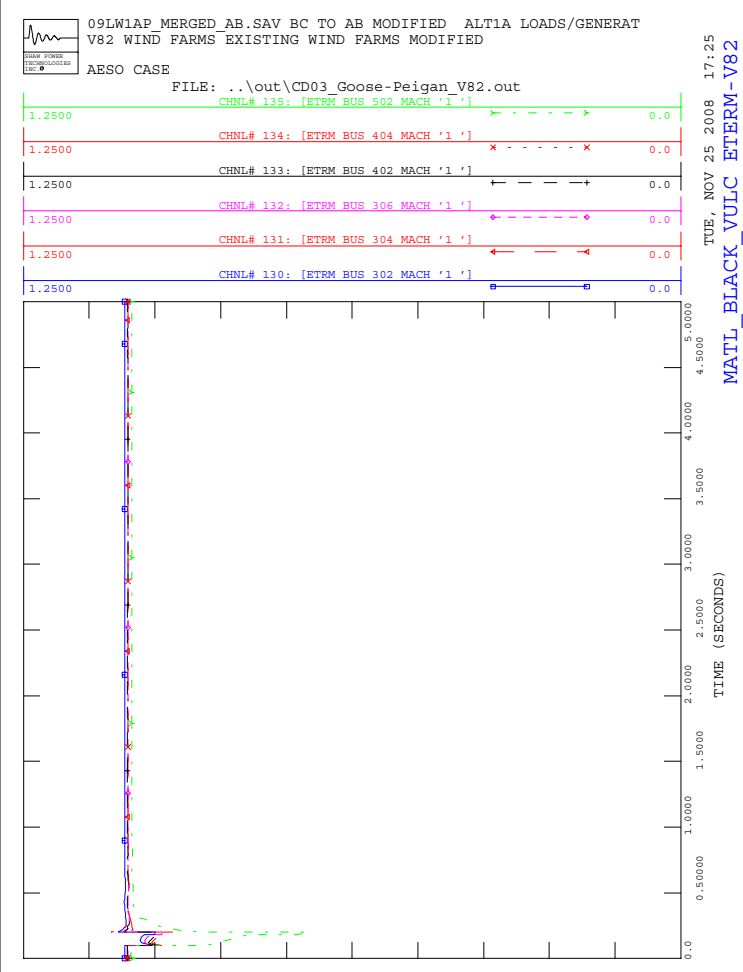
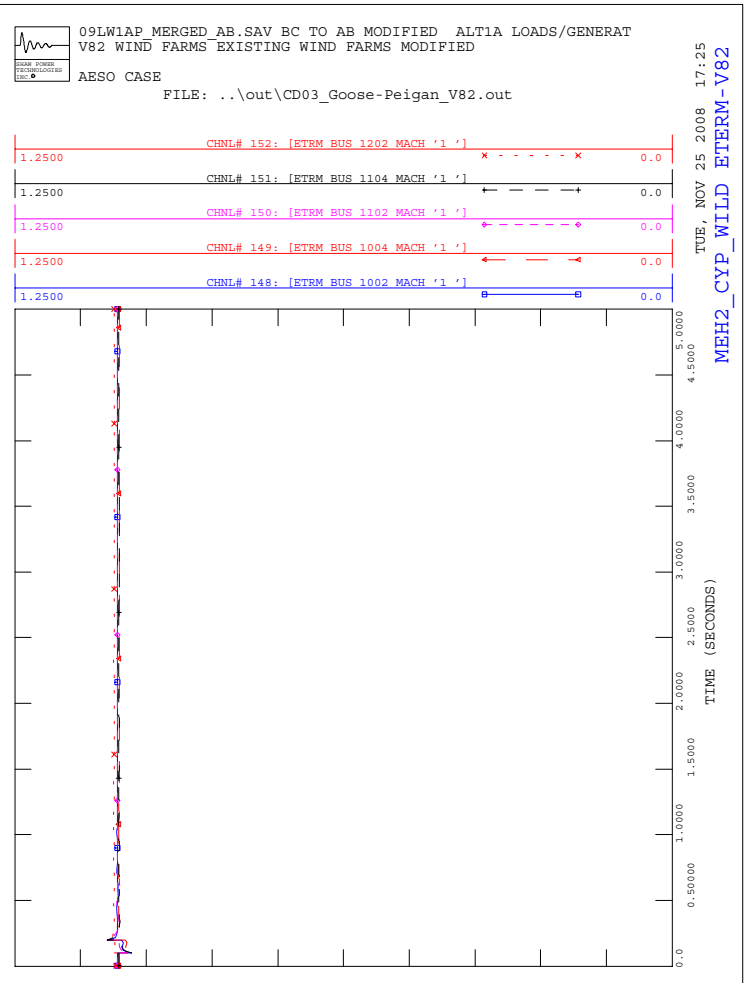
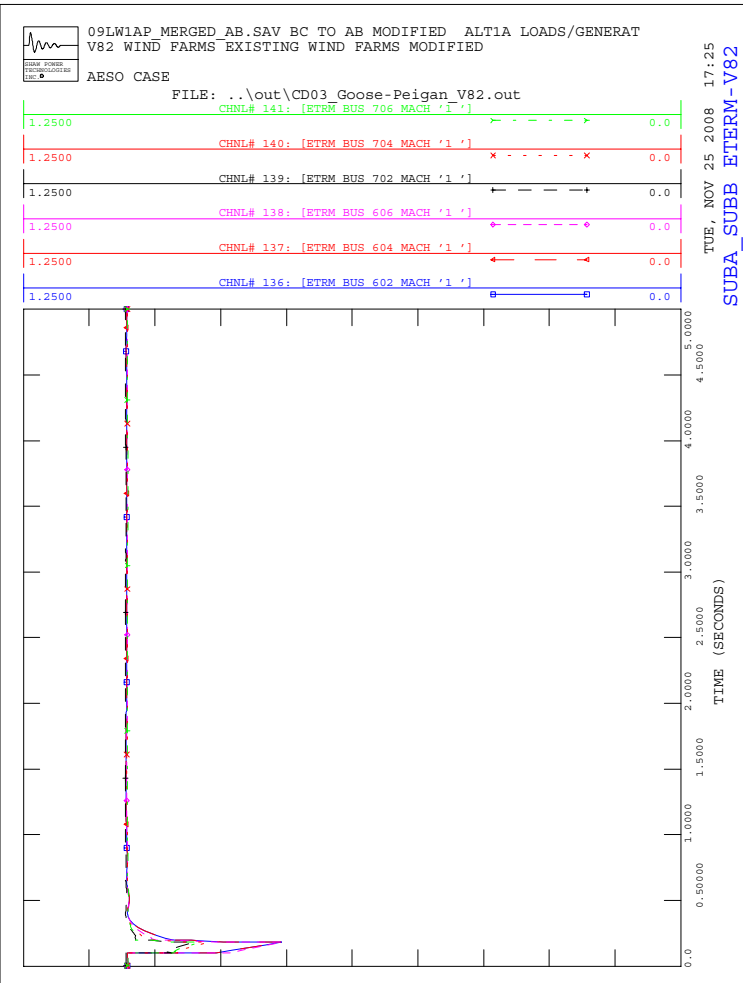
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
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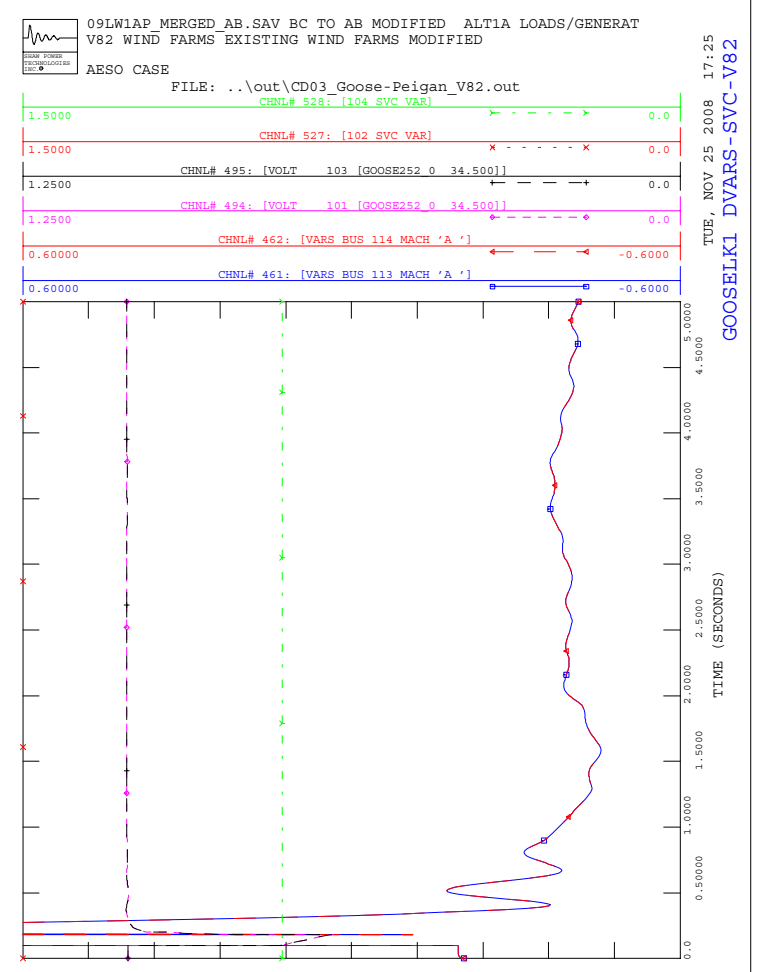
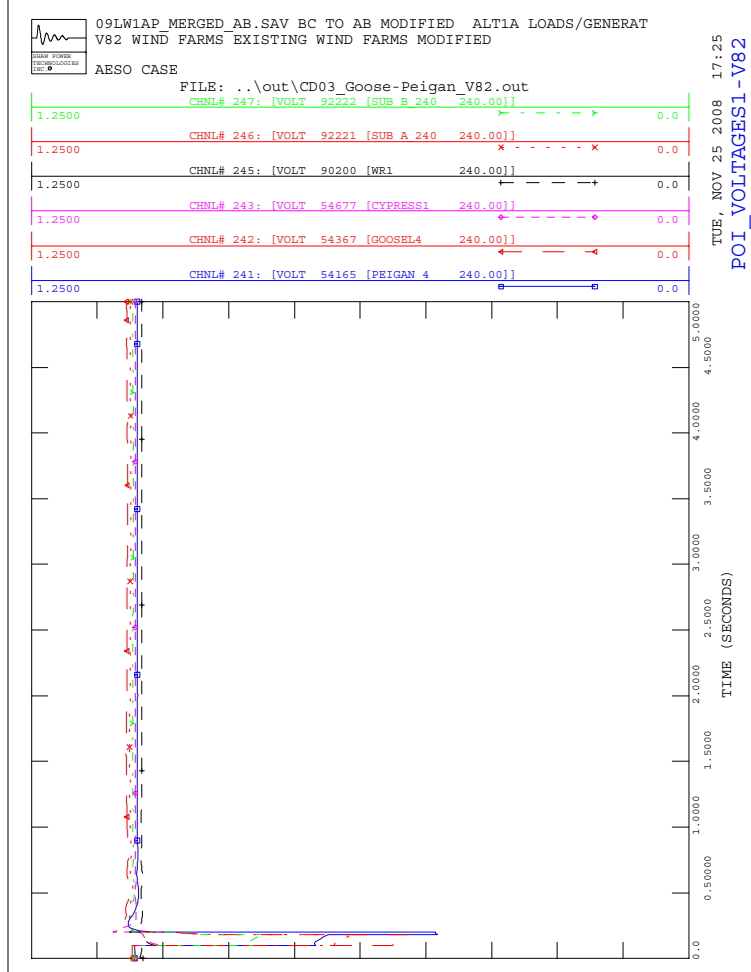
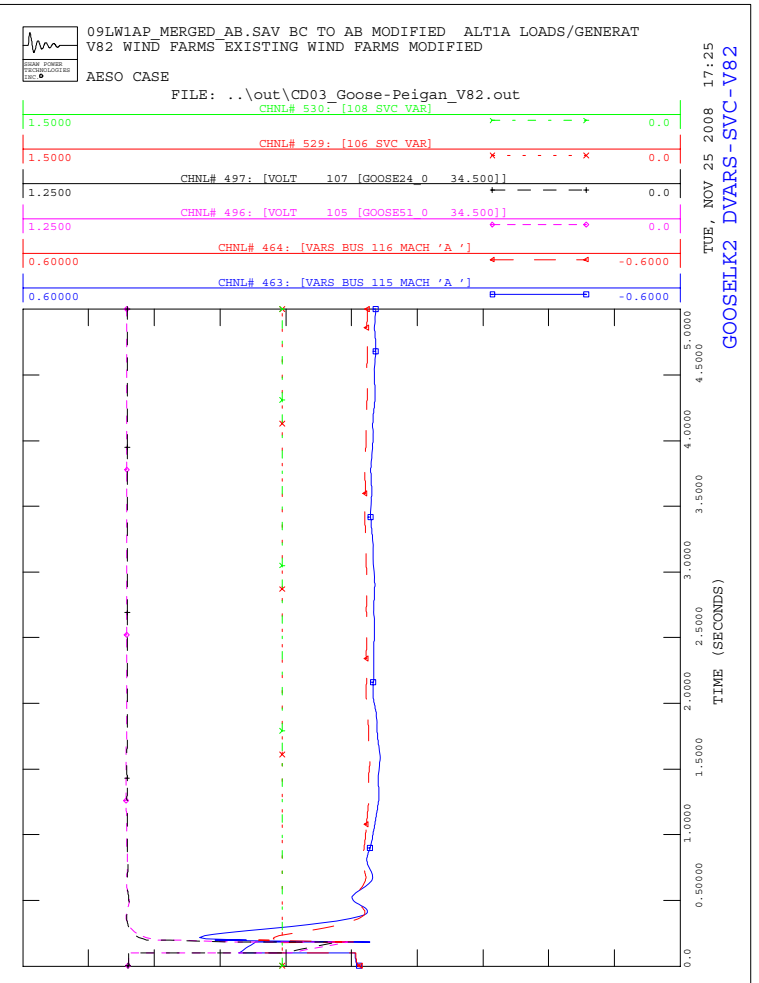
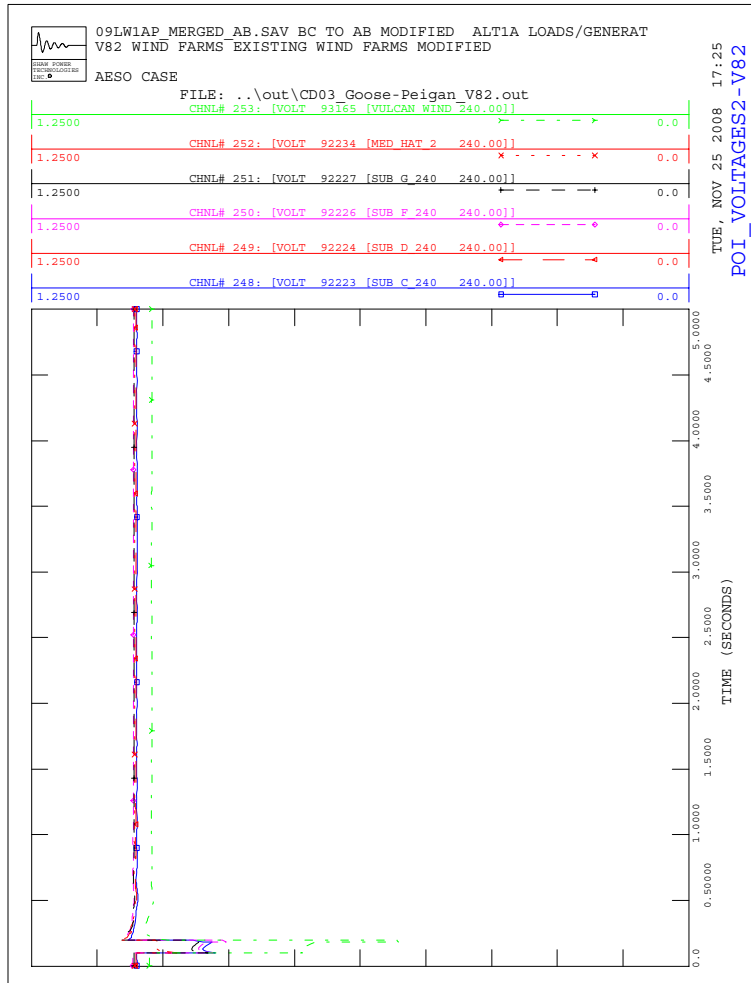
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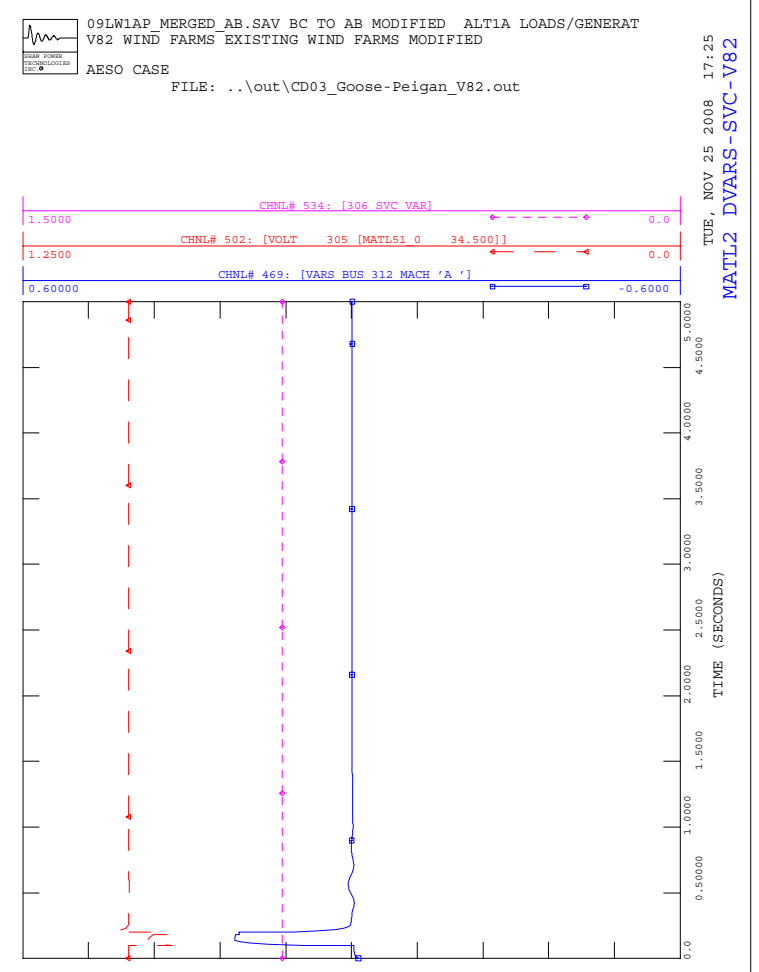
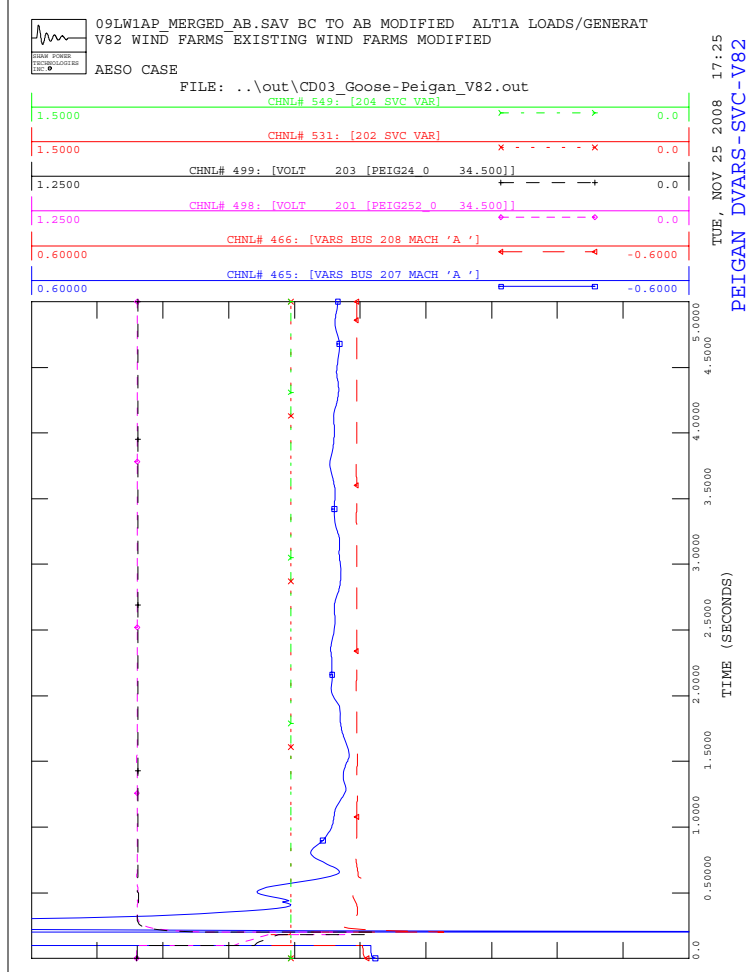
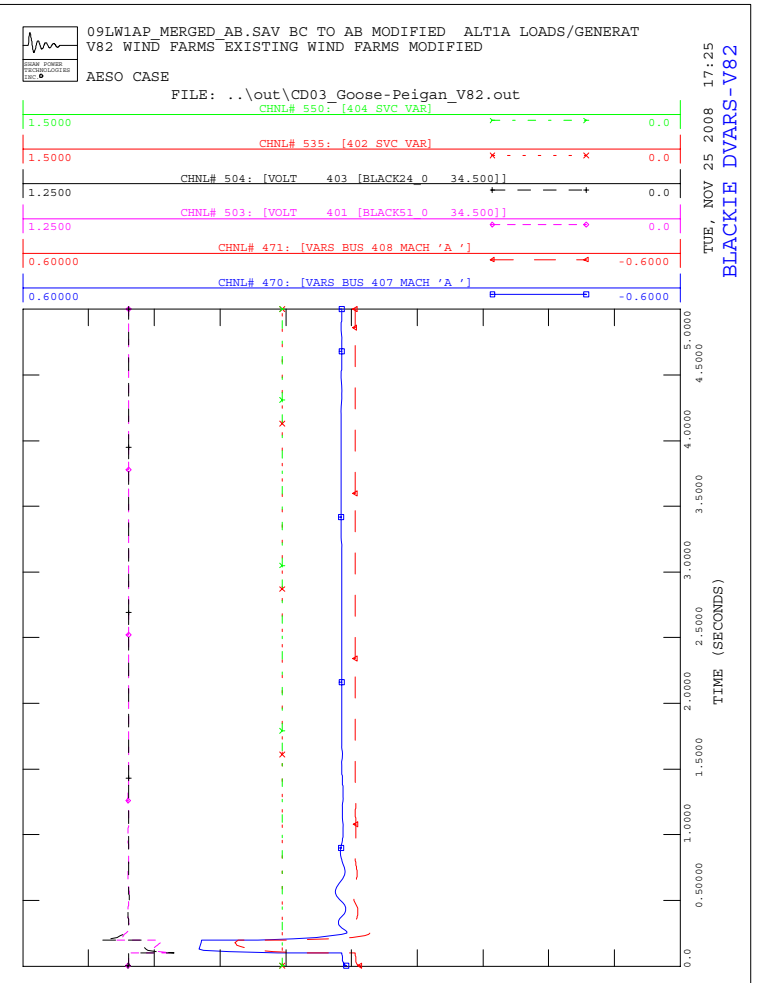
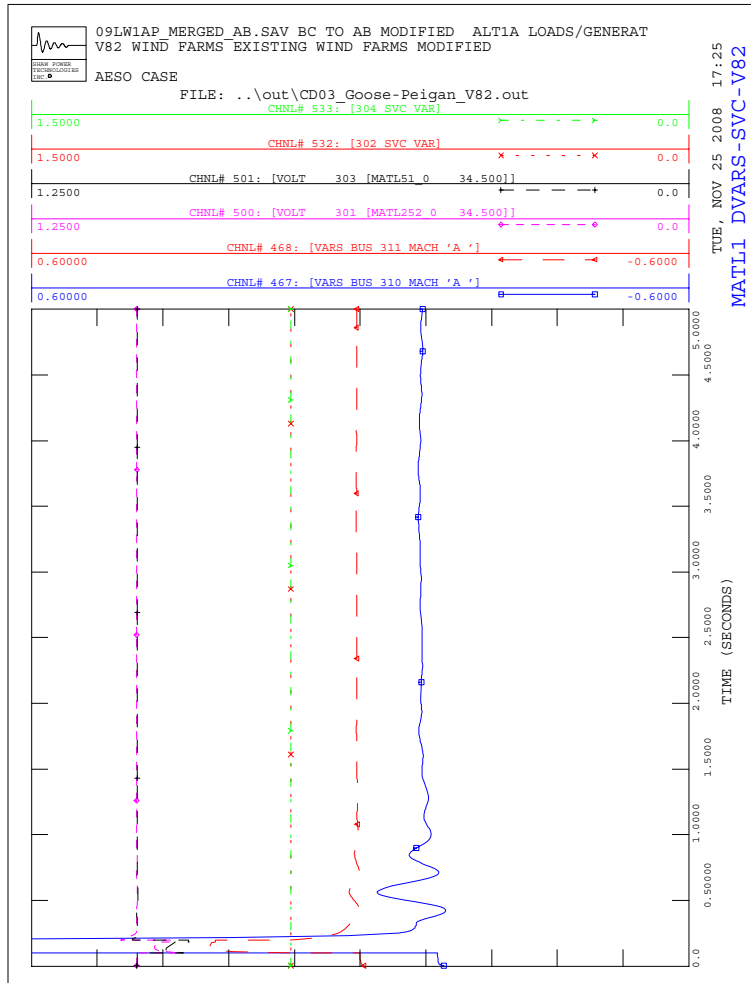


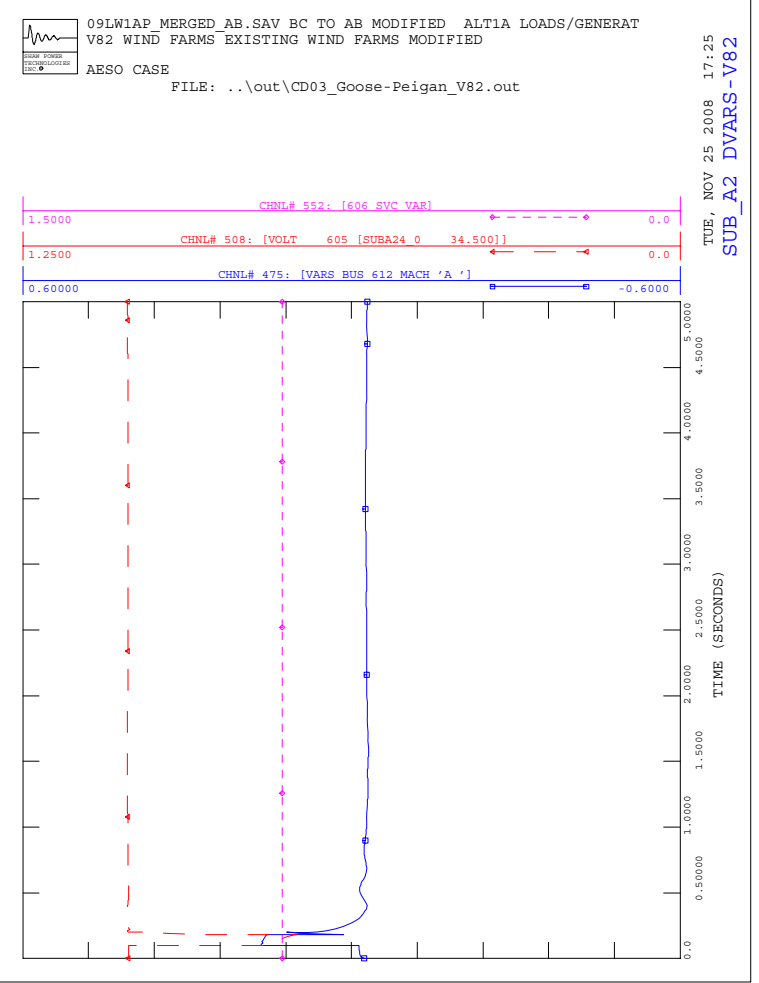
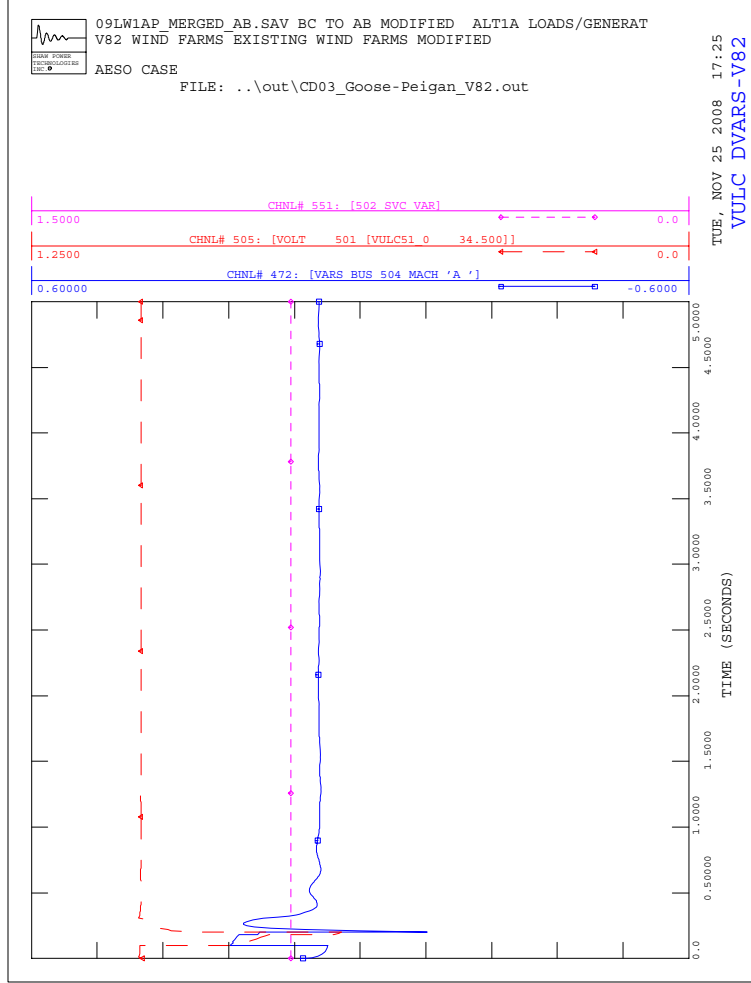
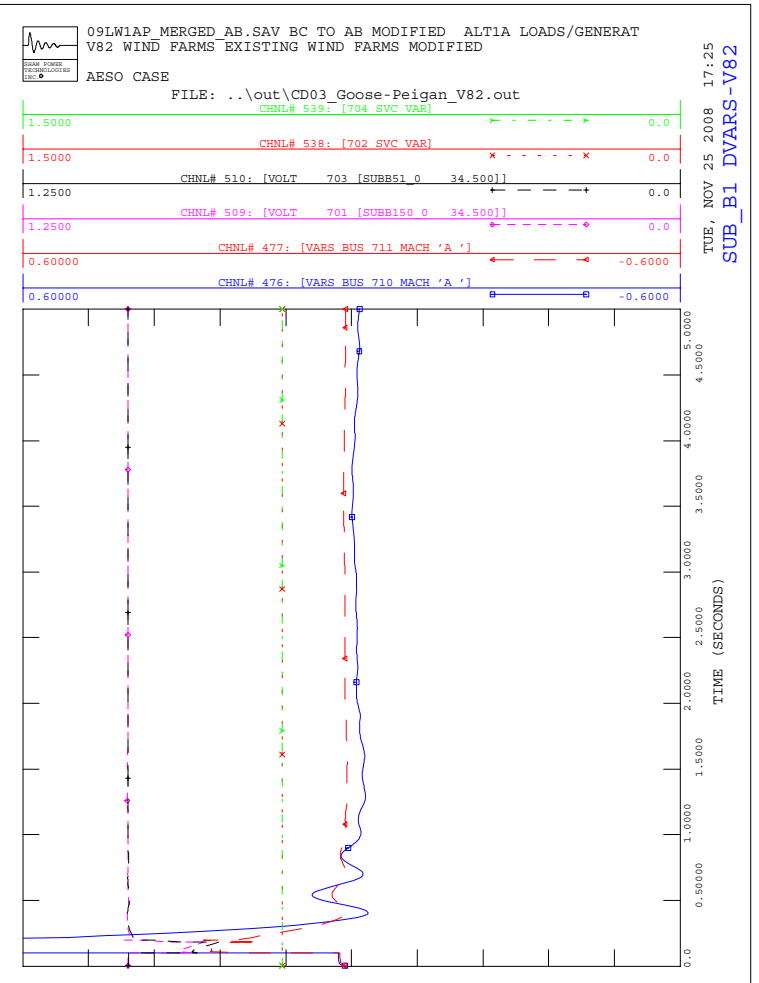
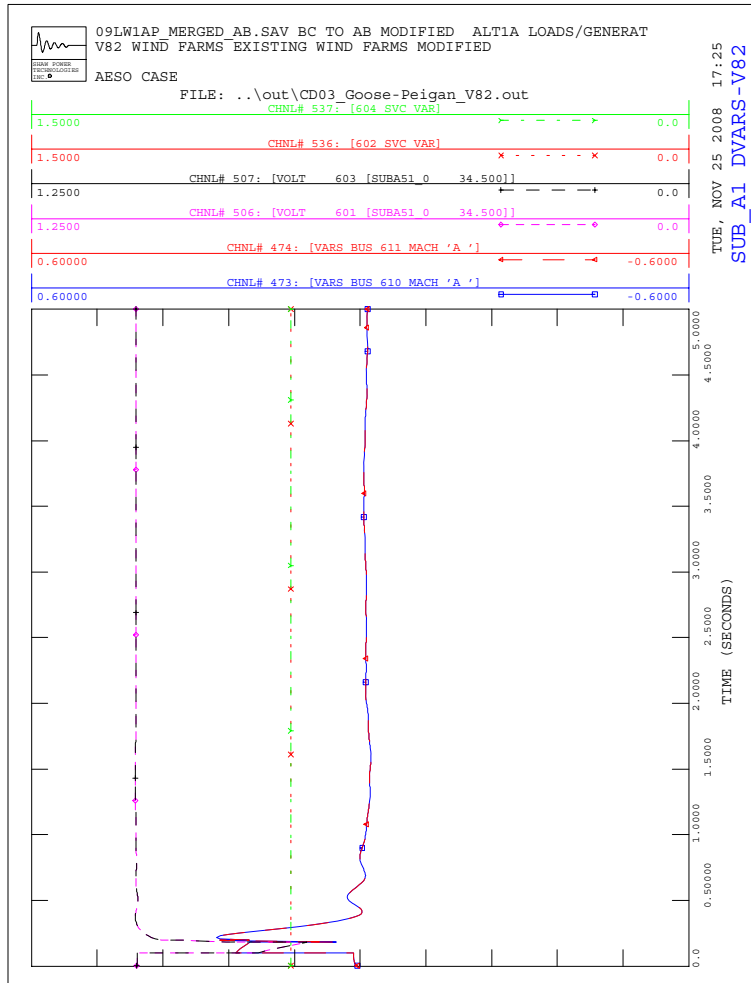
TUE, NOV 25 2008 17:25
GOOSELK-PEIGAN_SPEED-V82

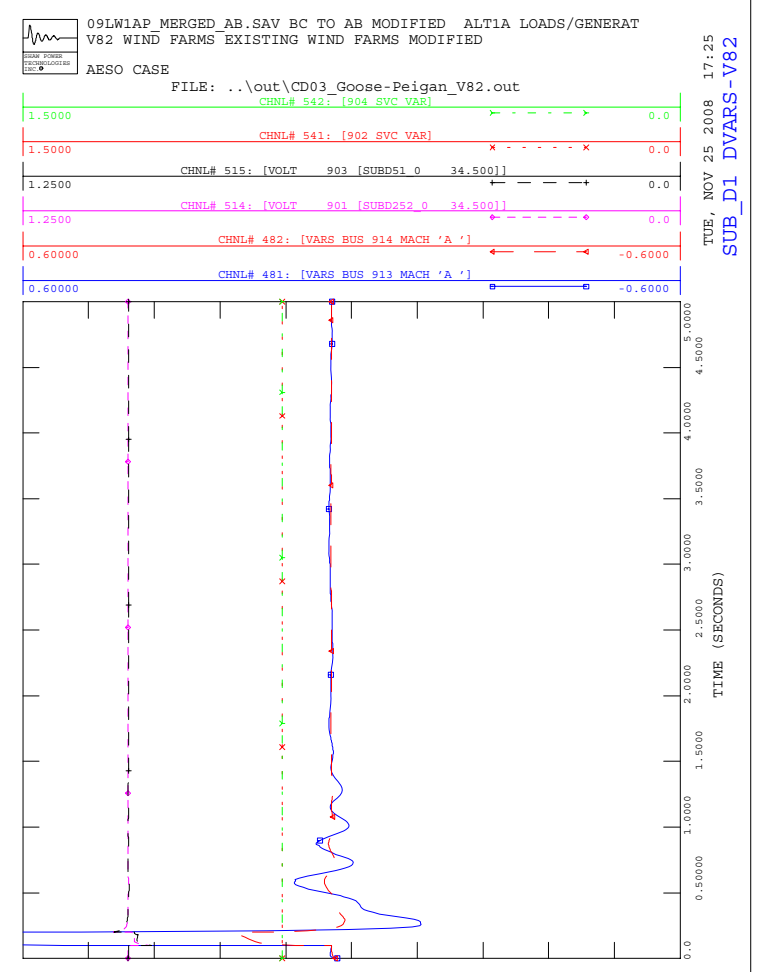
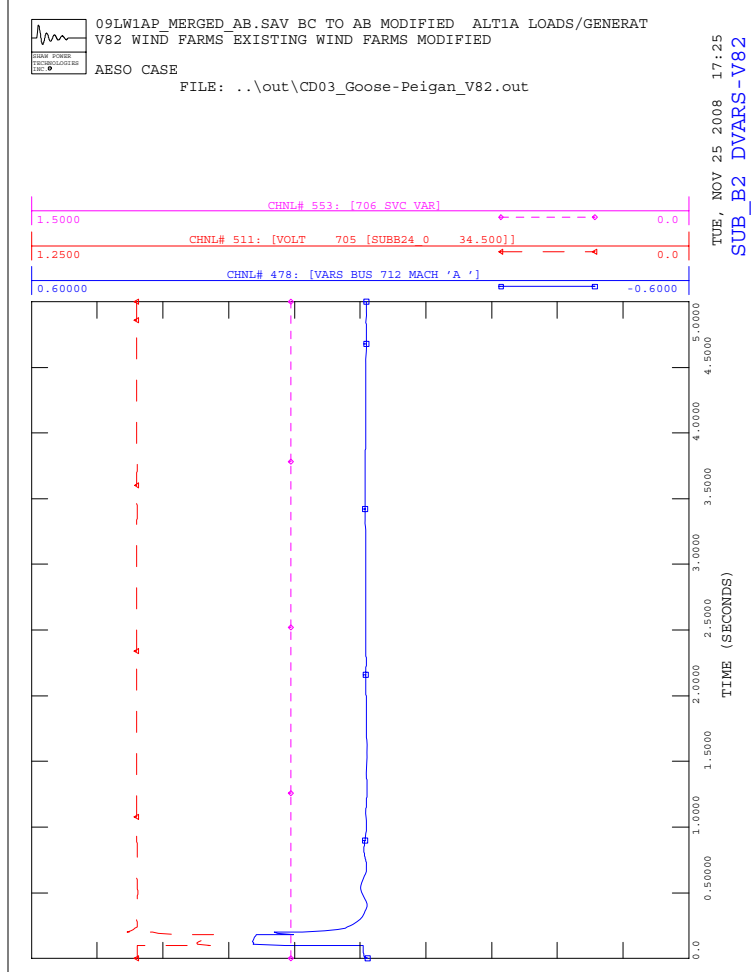
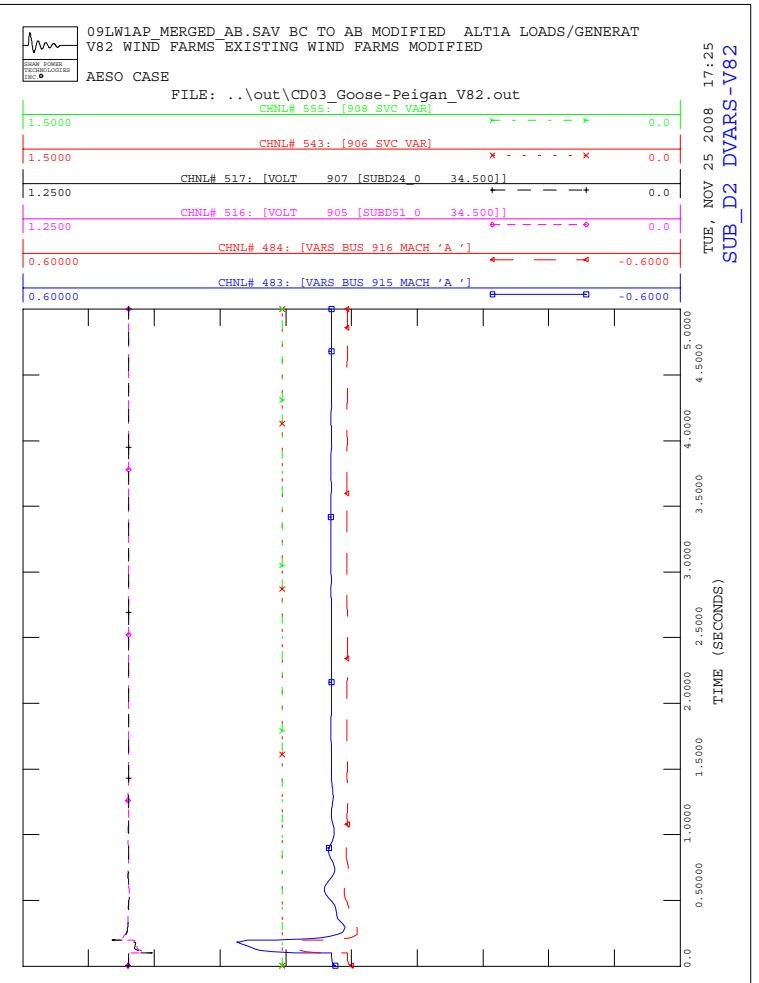
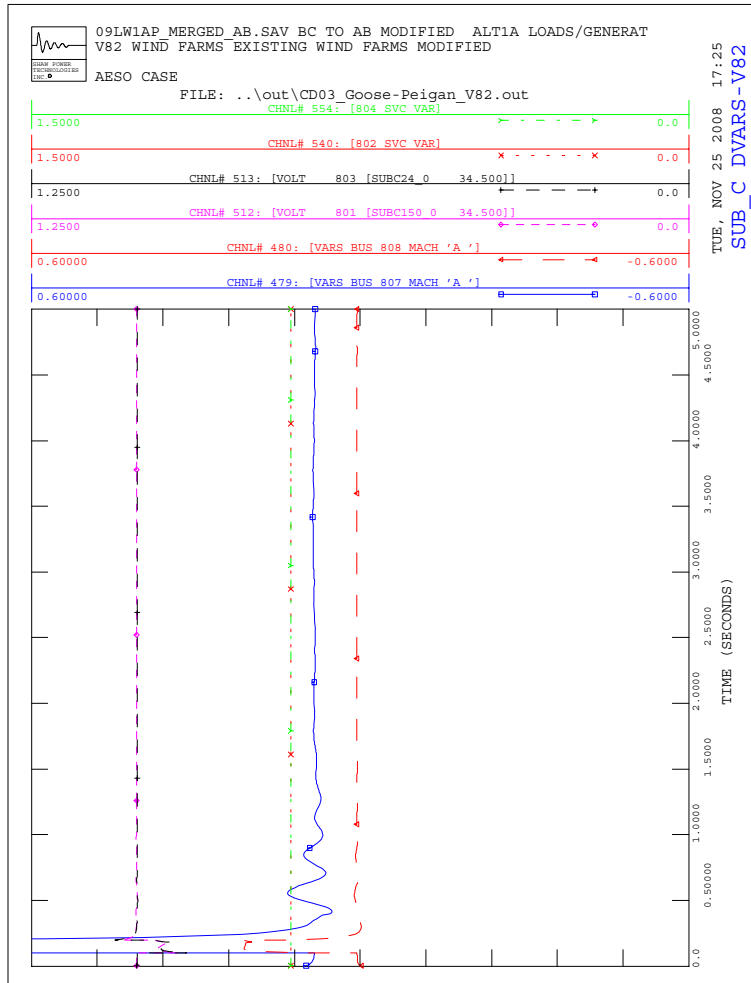


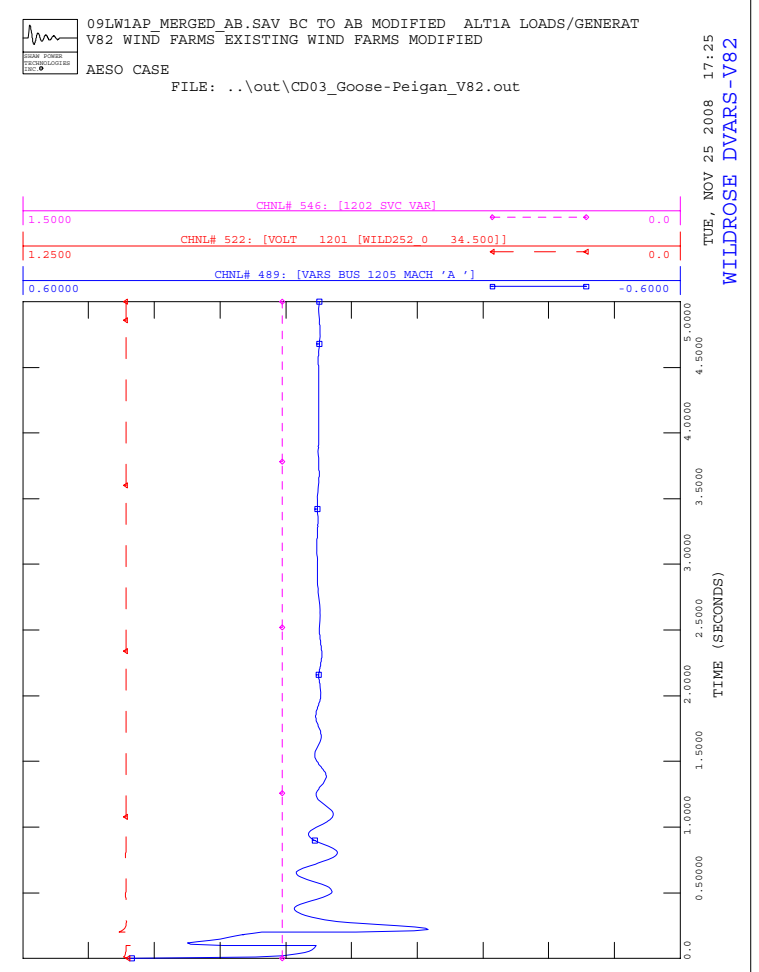
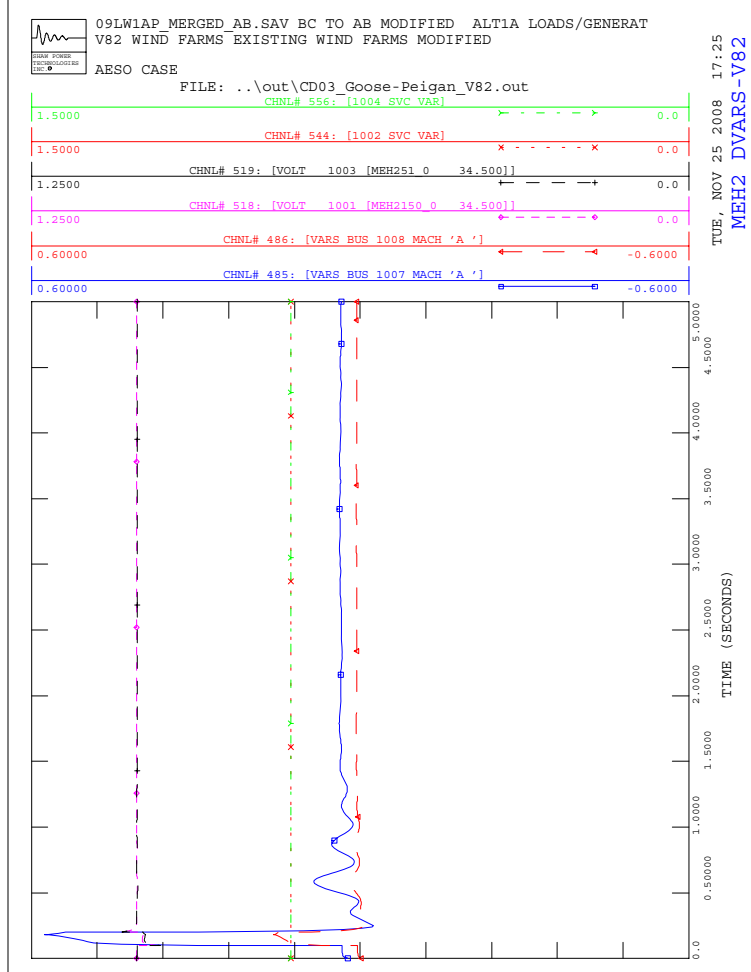
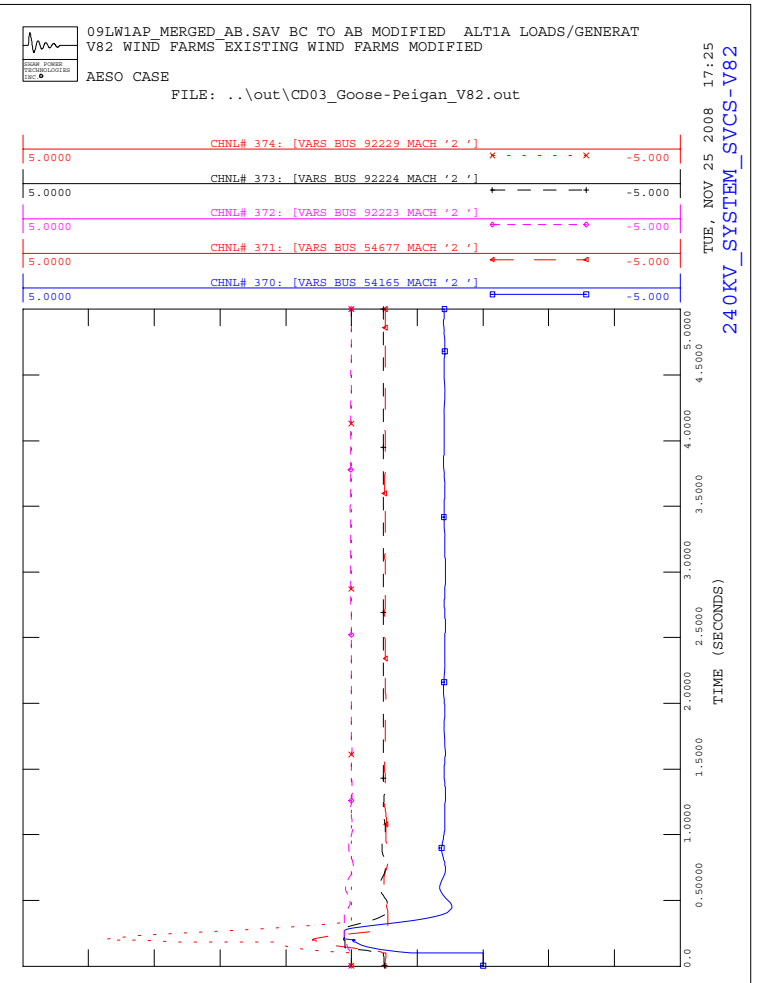
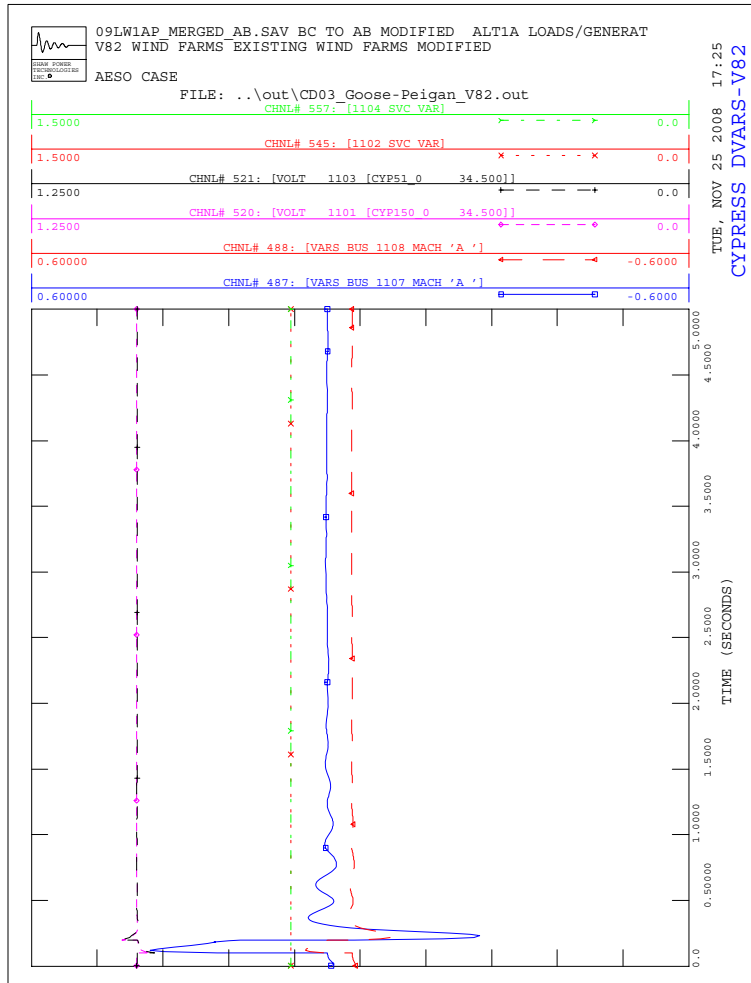












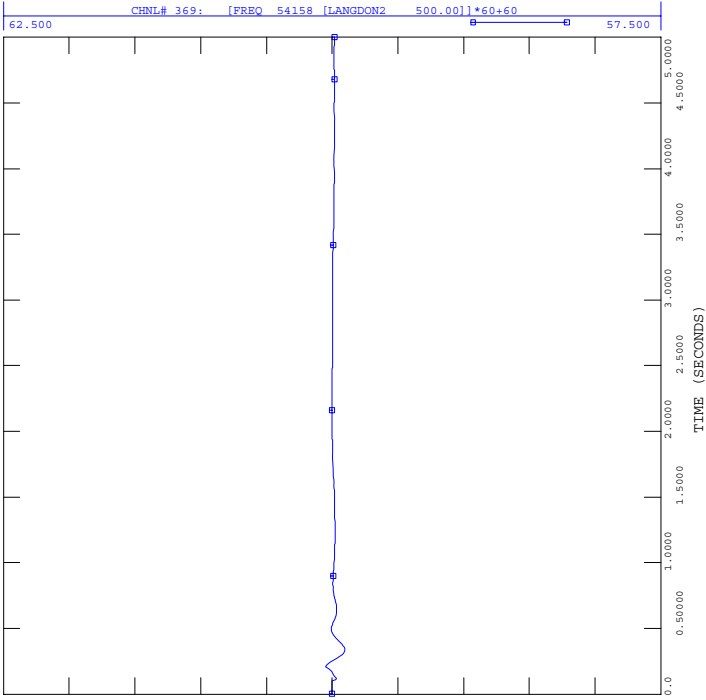


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD03_Goose-Peigan_V82.out

TUE, NOV 25 2008 17:25
LANGDON_FRQ-V82

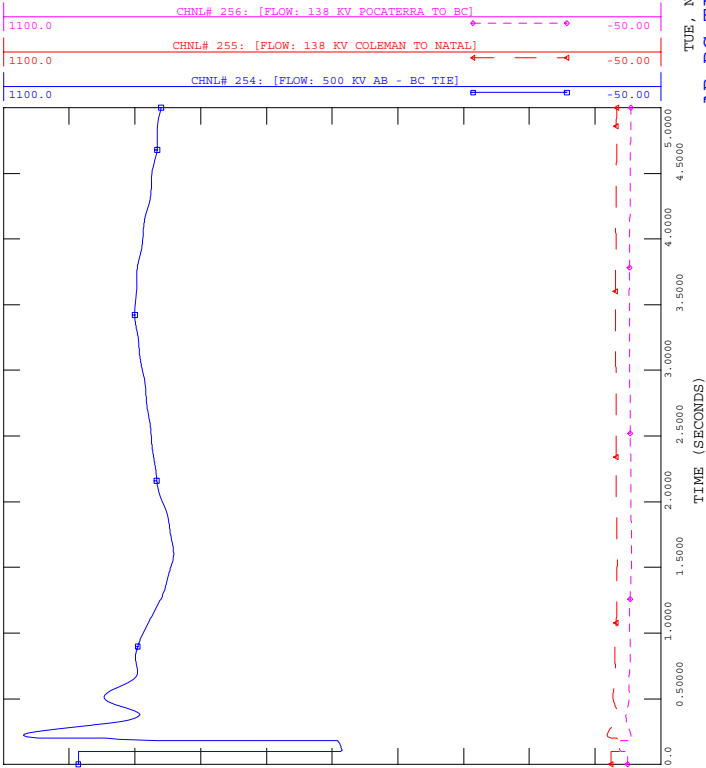


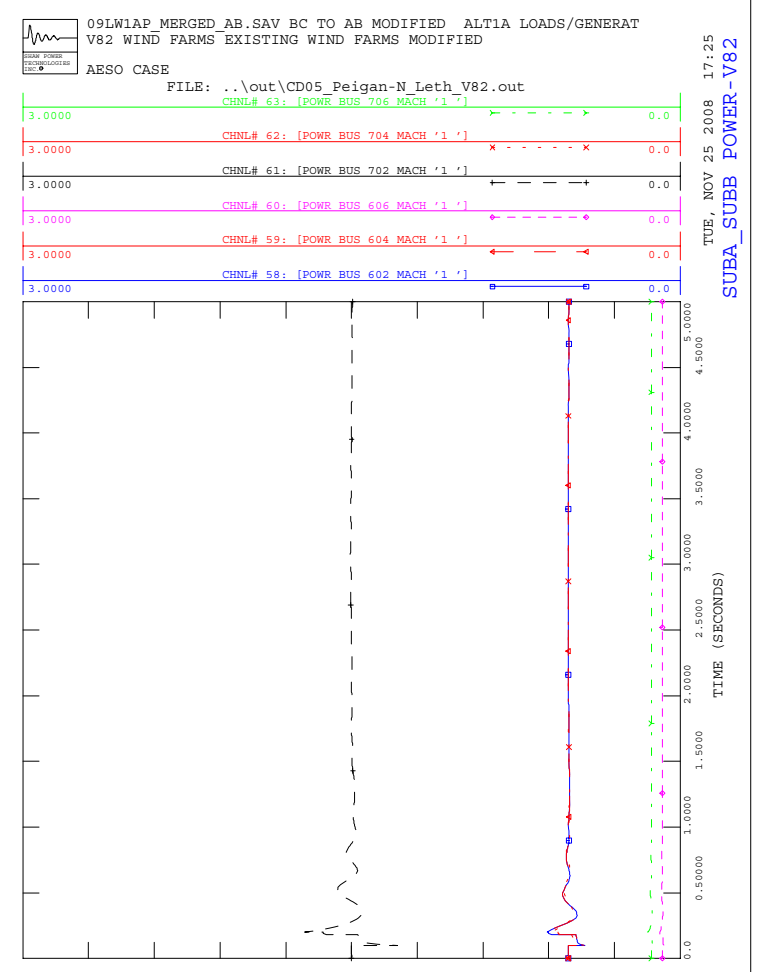
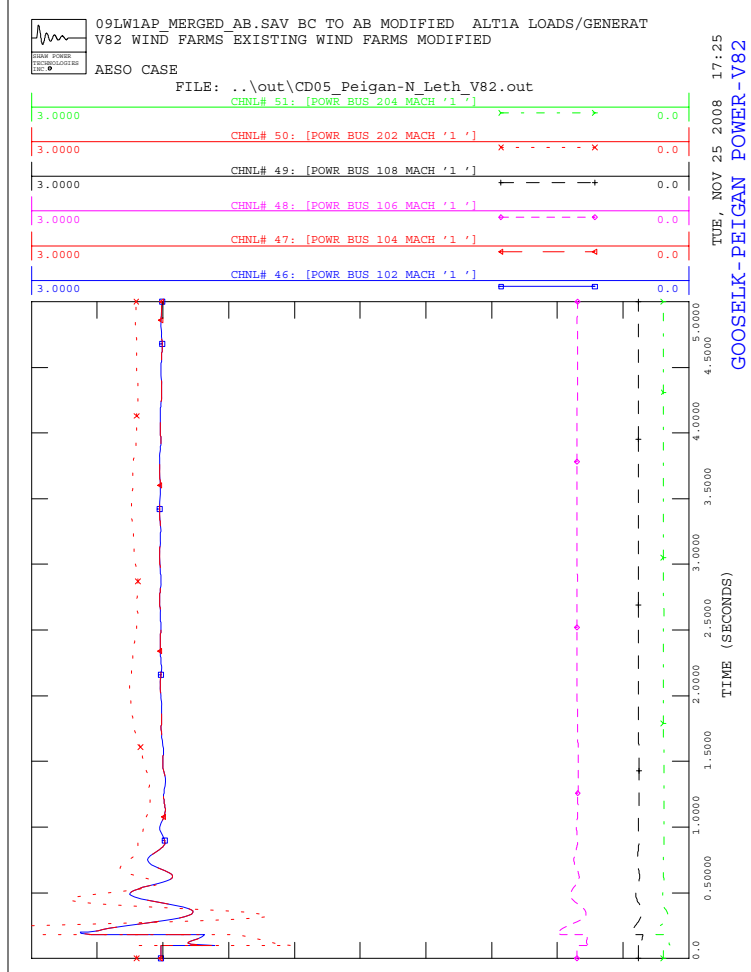
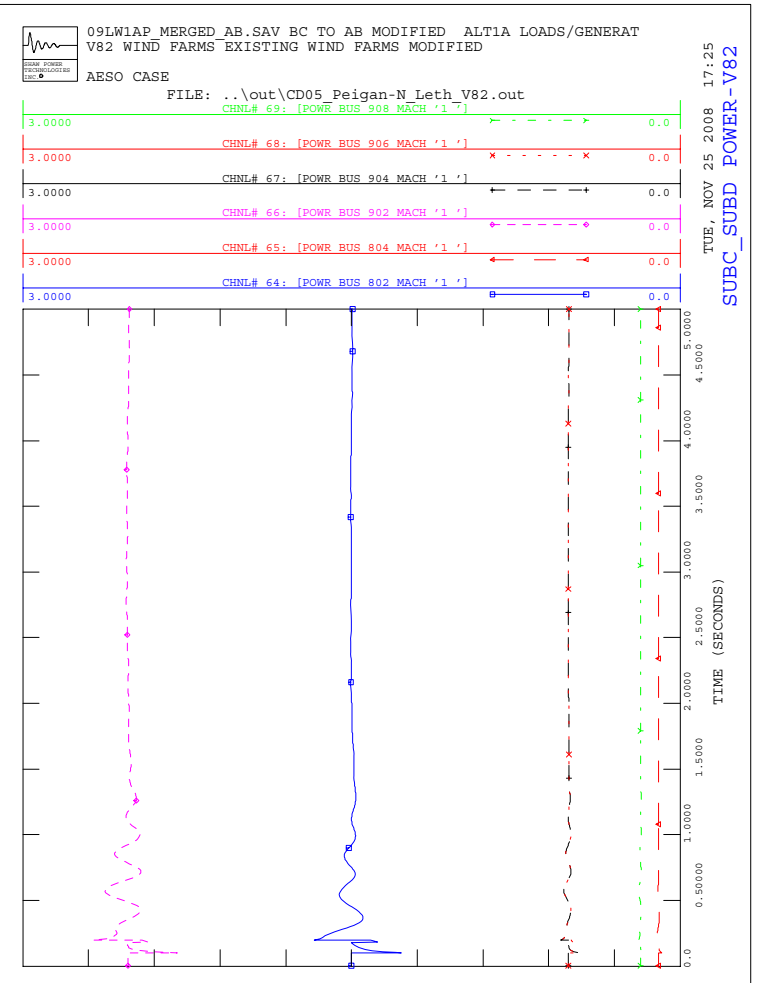
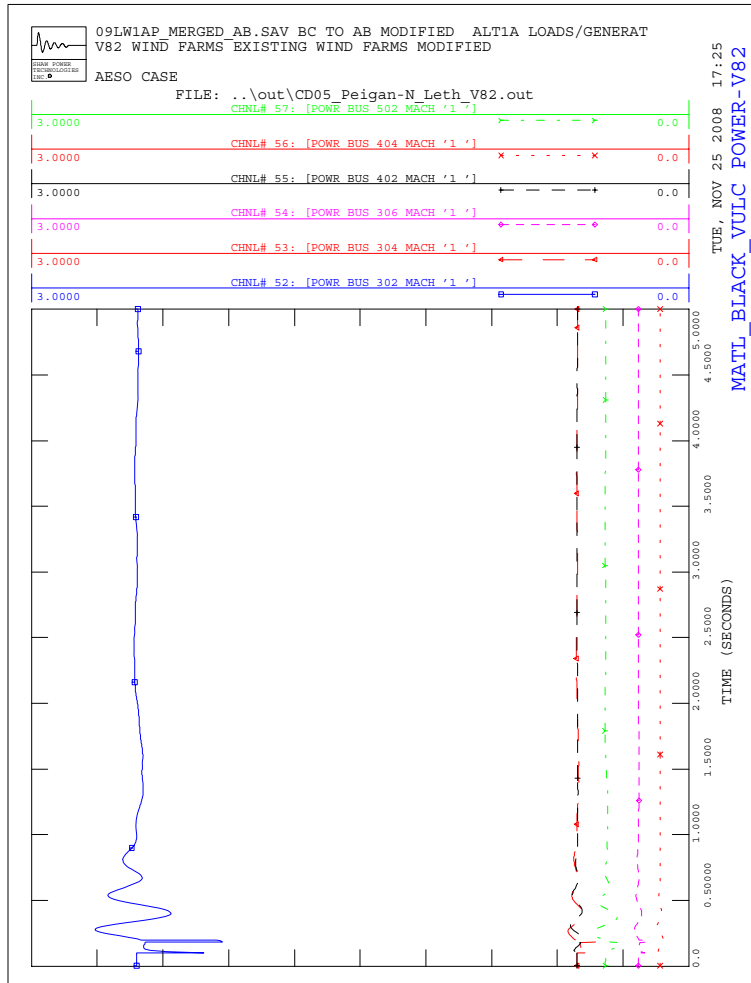
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

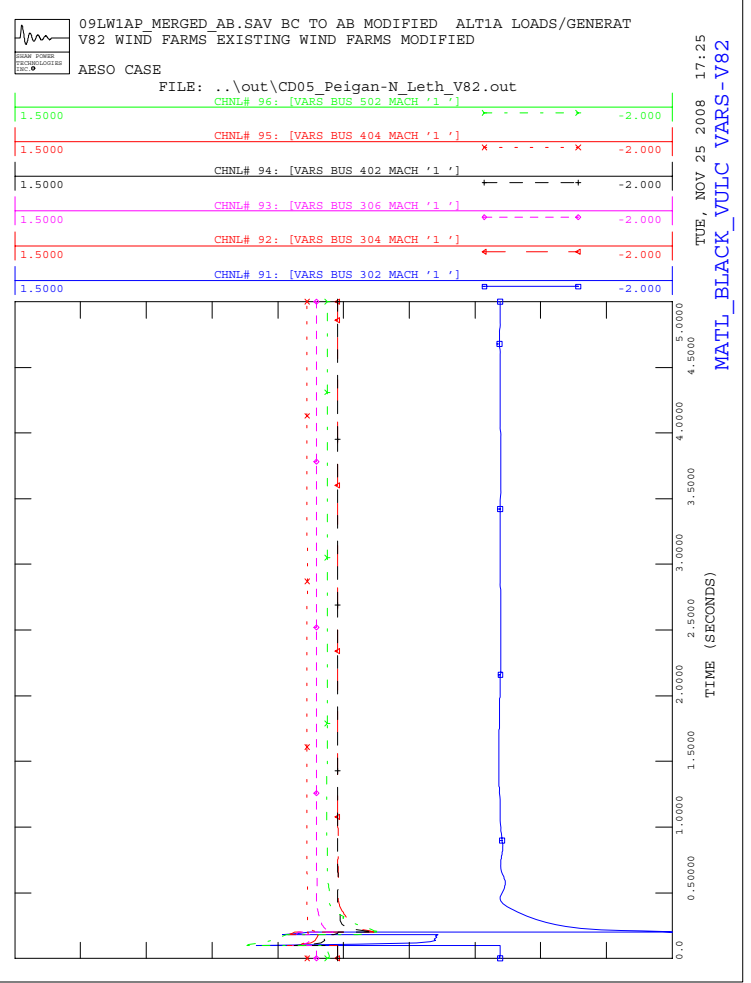
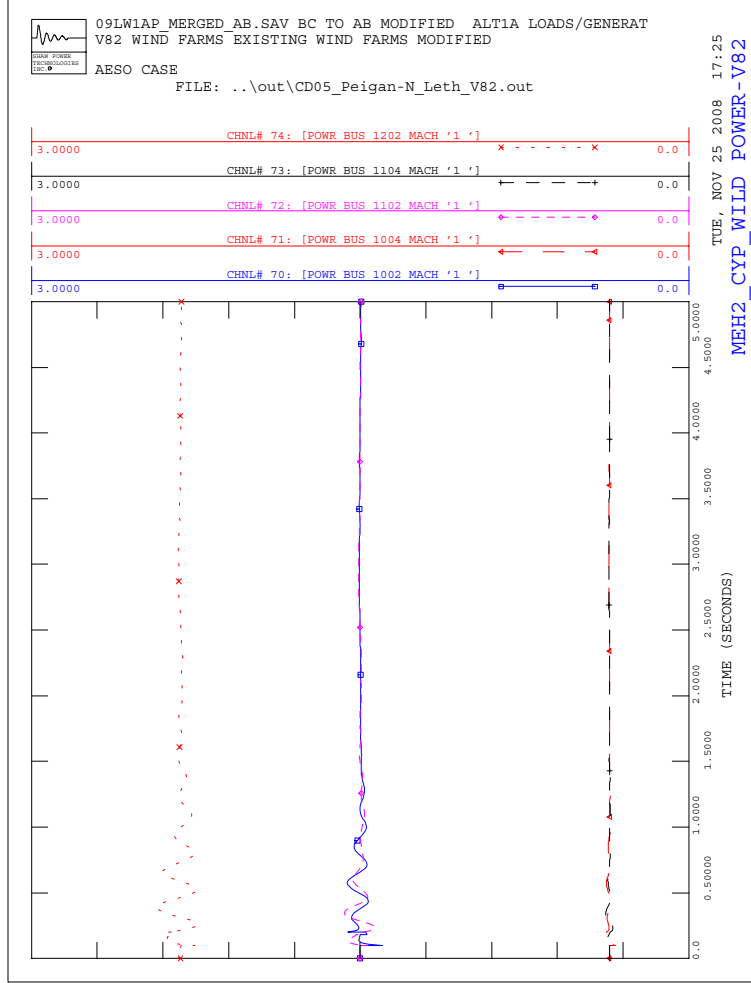
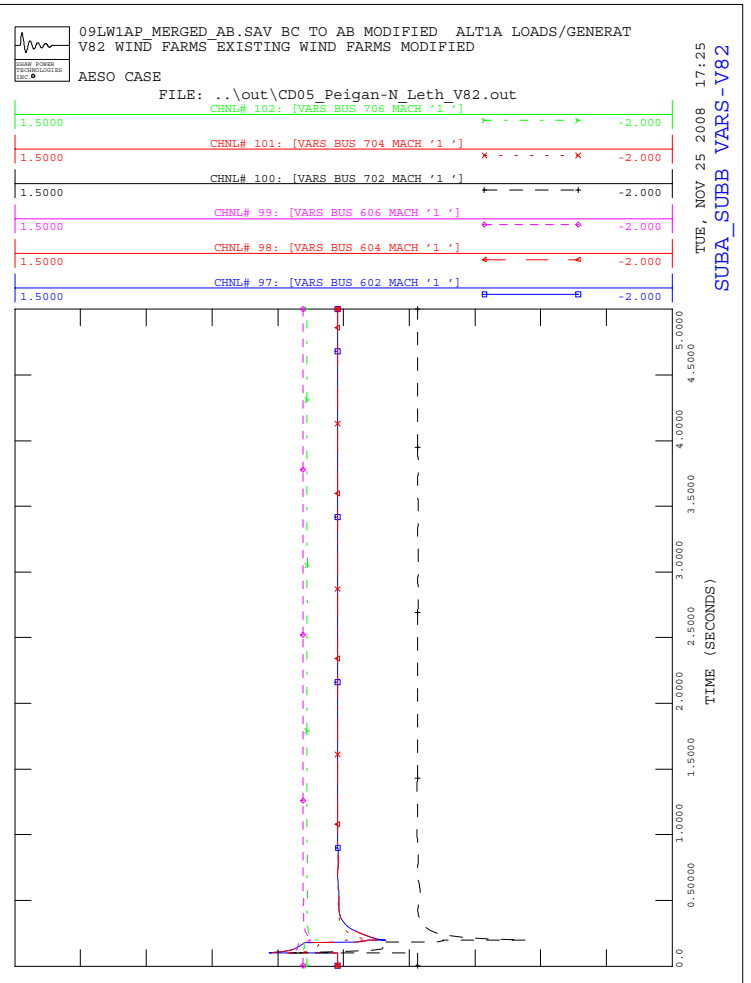
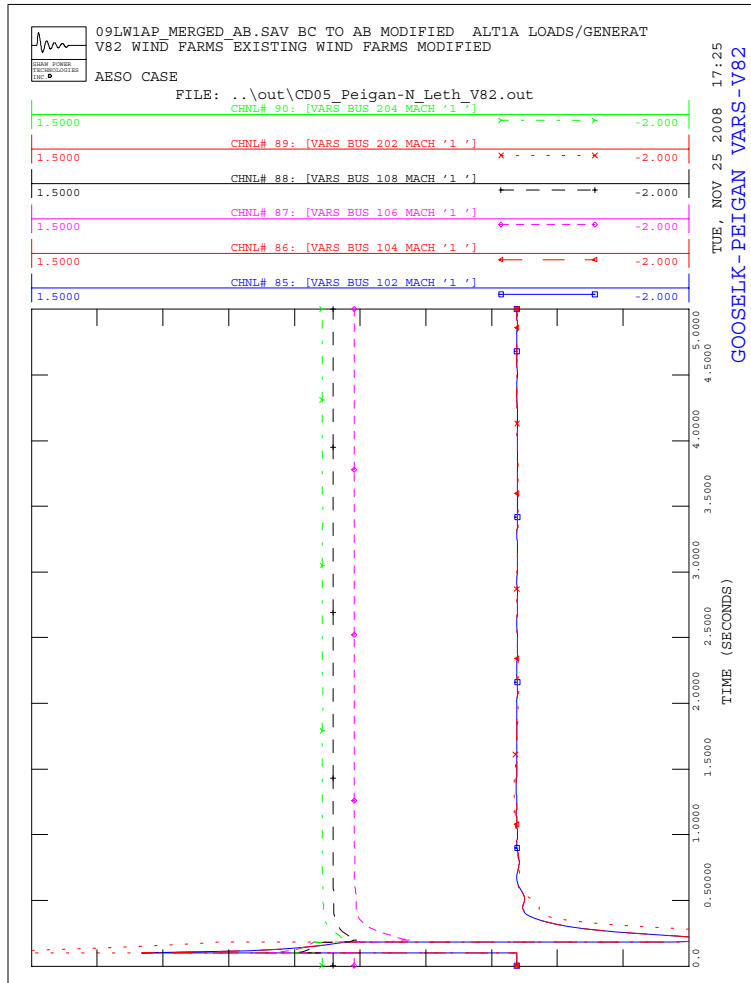
ABSO CASE

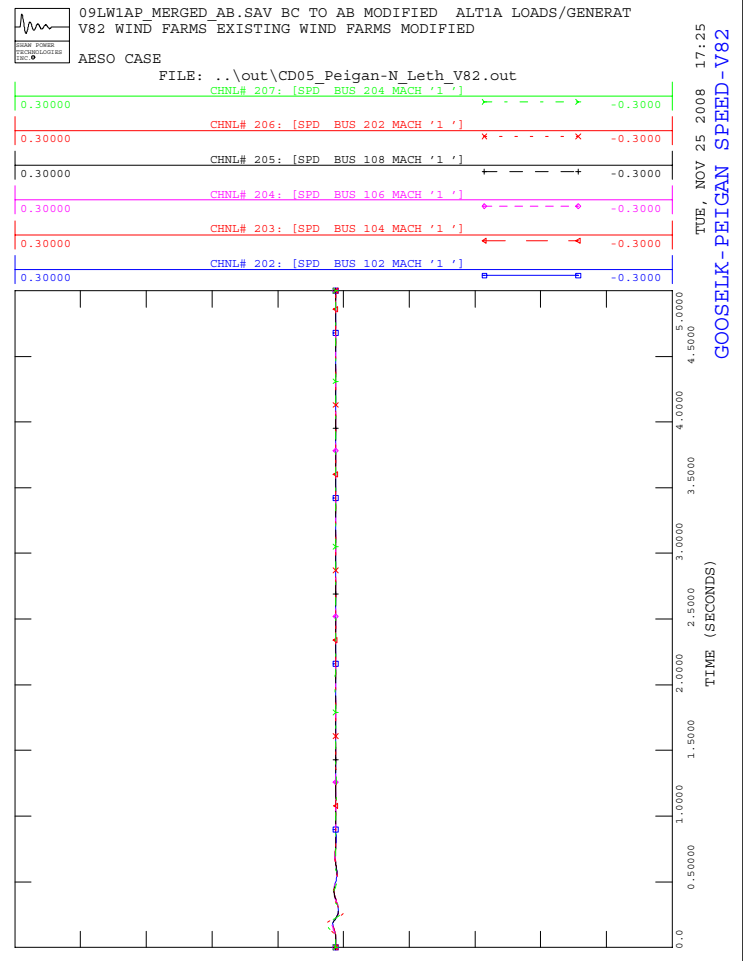
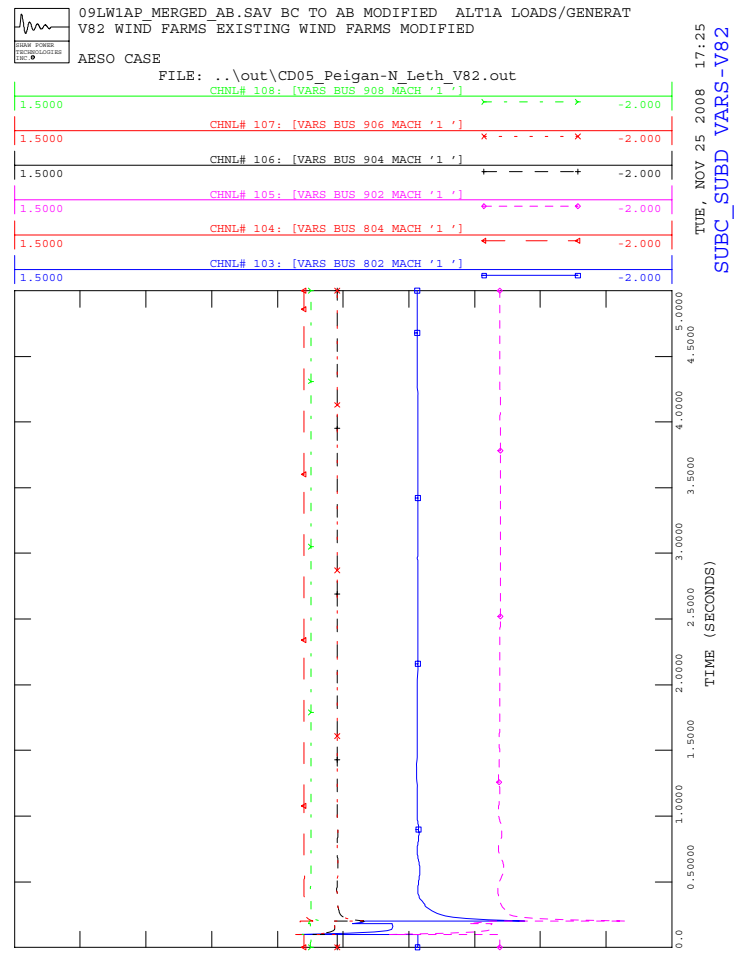
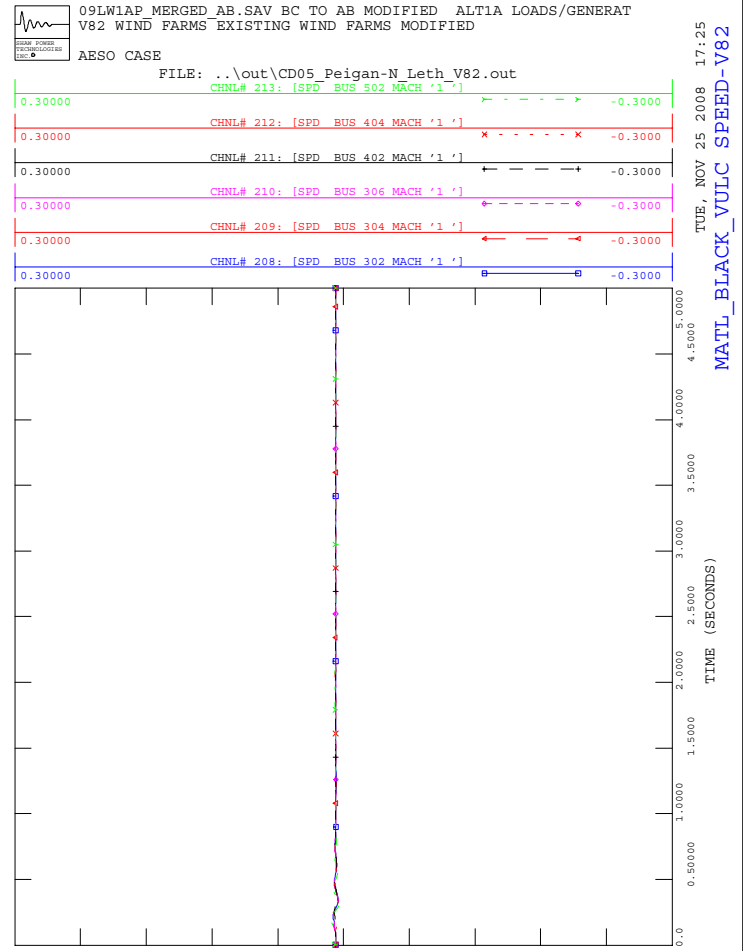
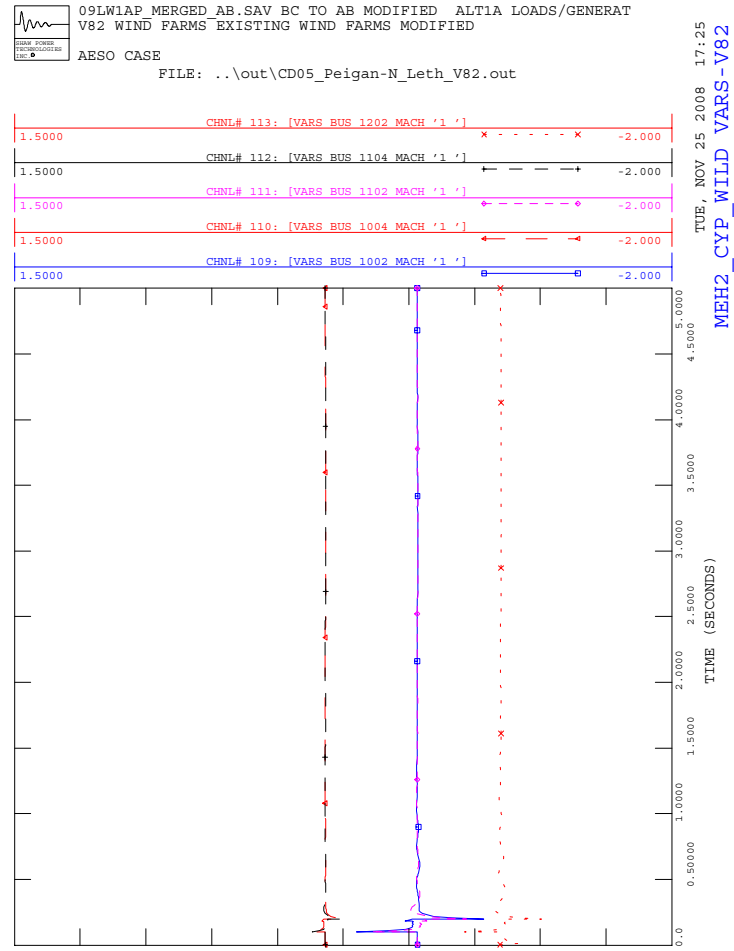
FILE: ..\out\CD03_Goose-Peigan_V82.out

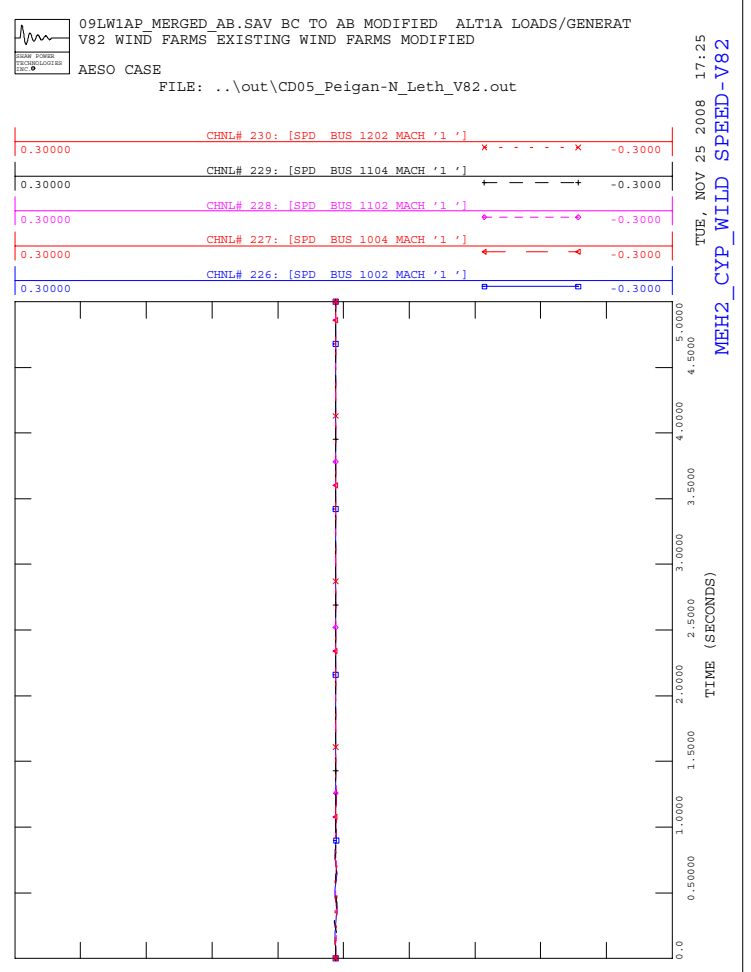
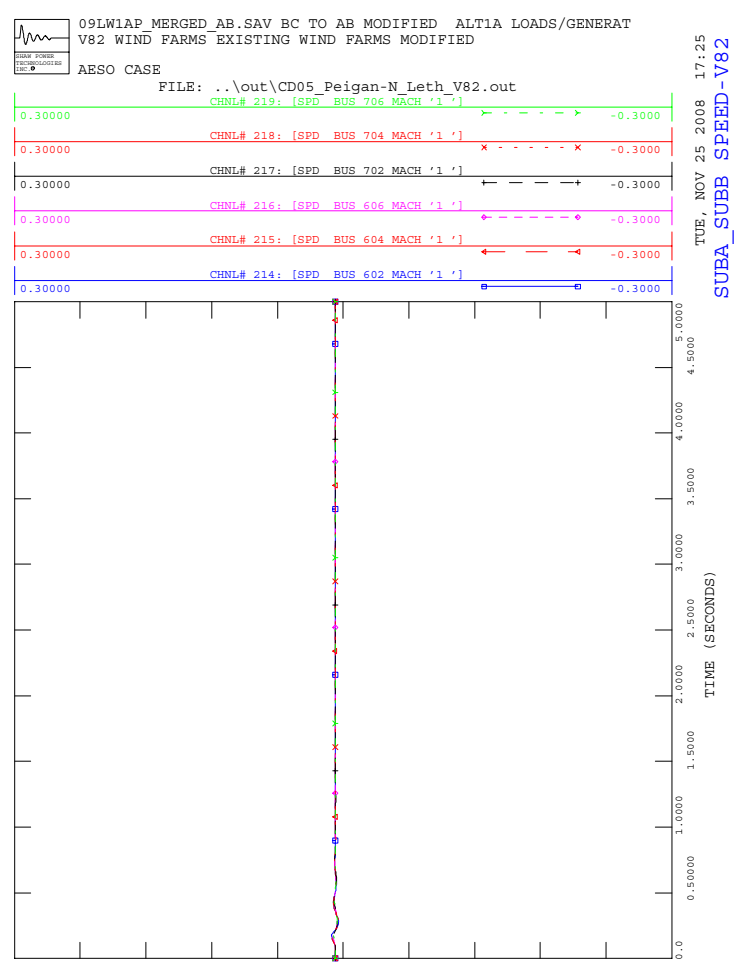
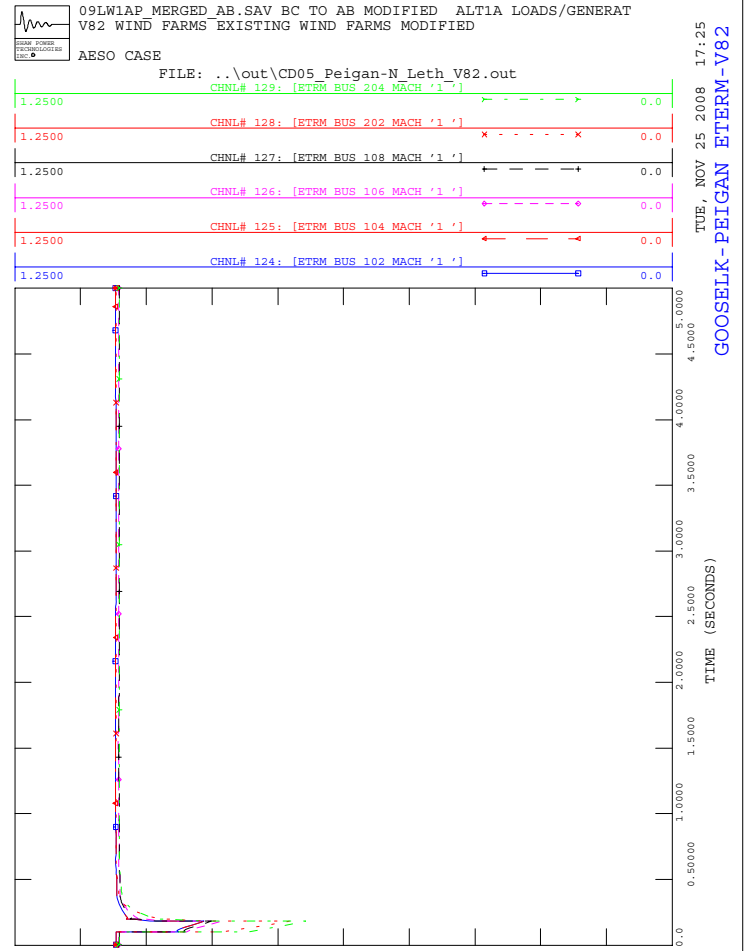
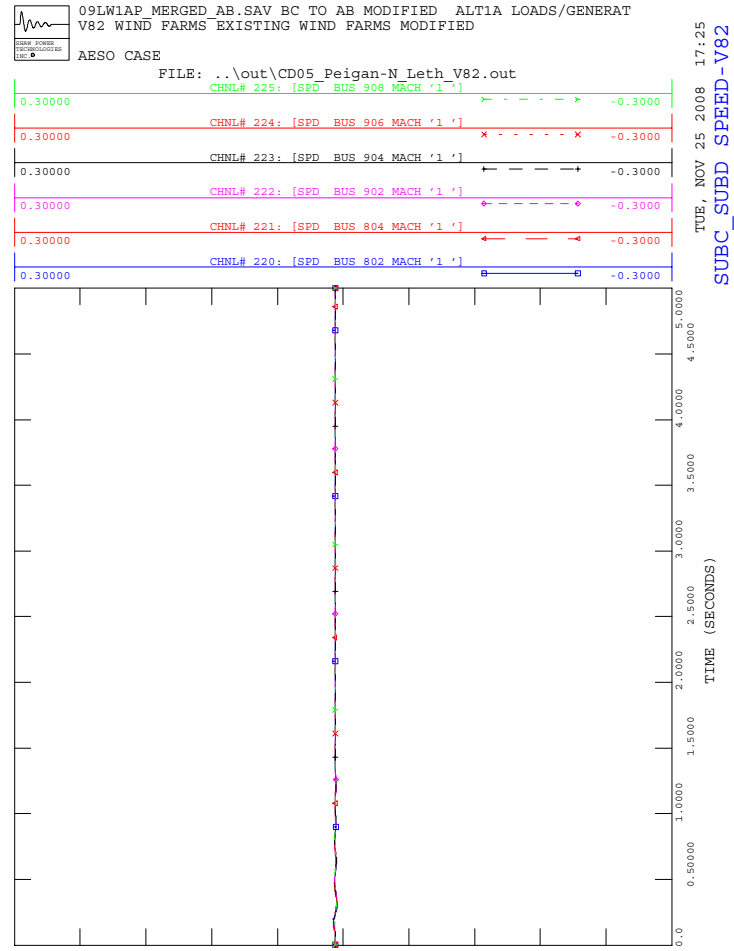
TUE, NOV 25 2008 17:25
AB_BC_TIE_FLOWS-V82

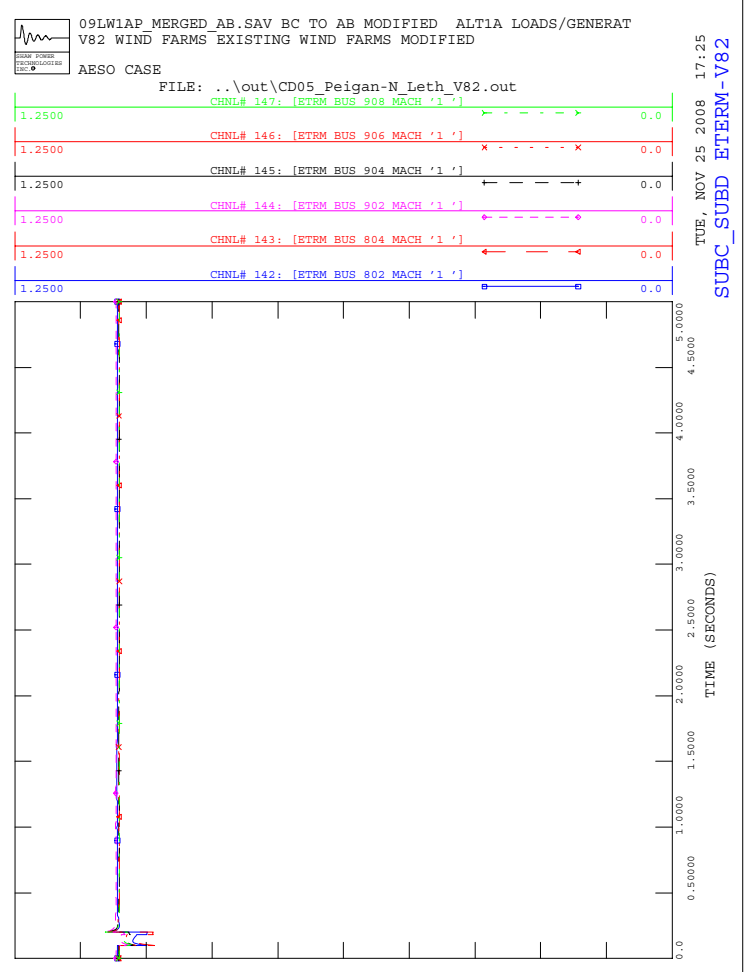
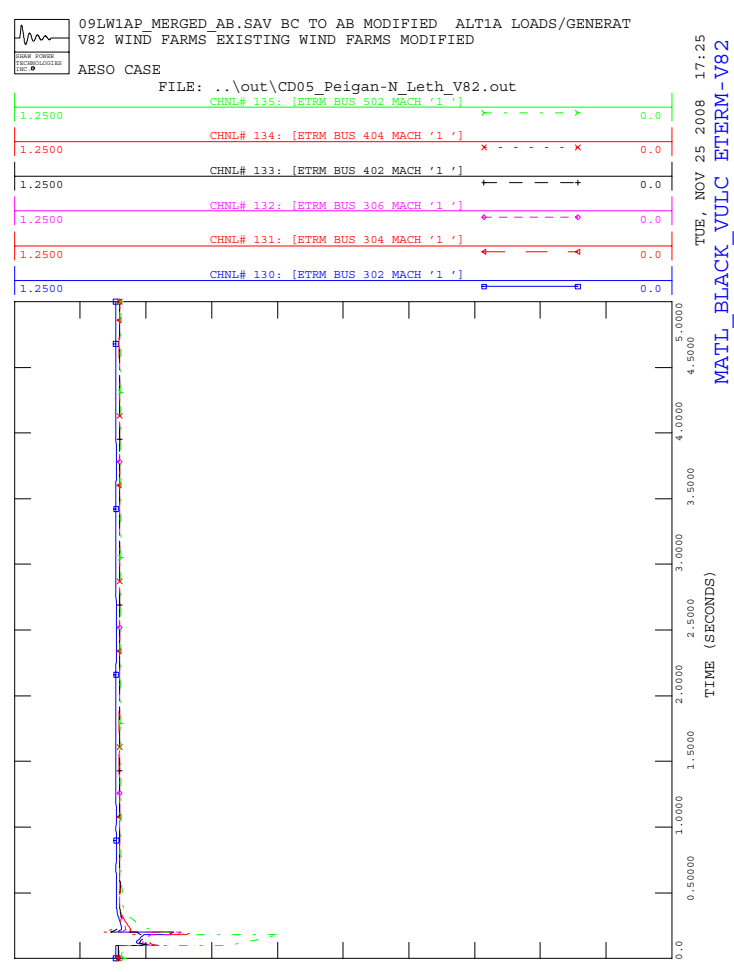
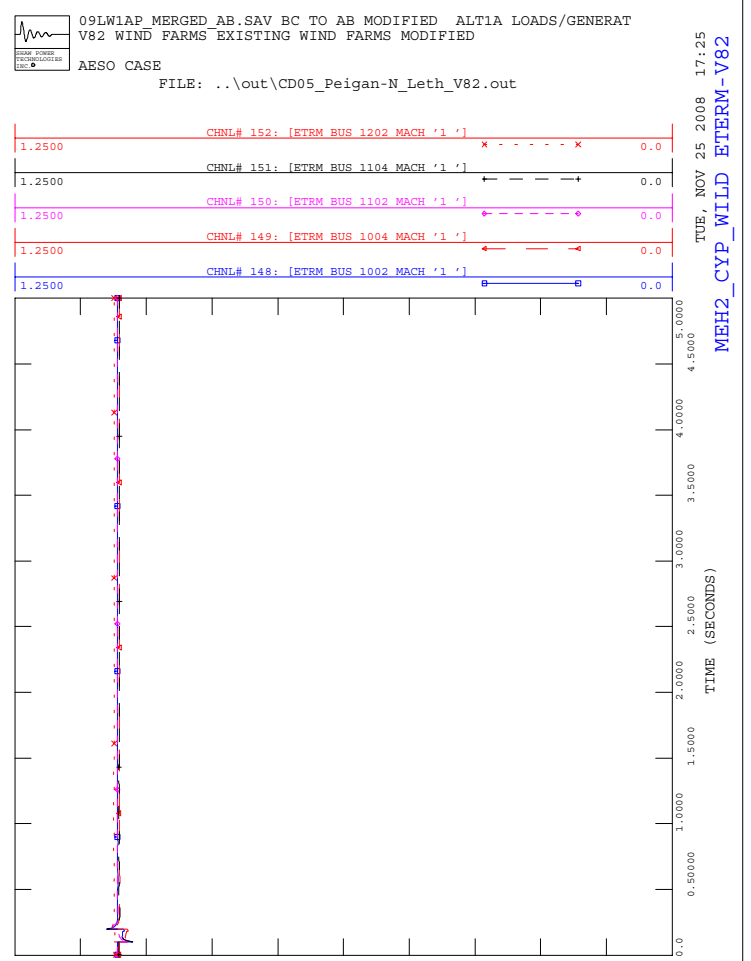
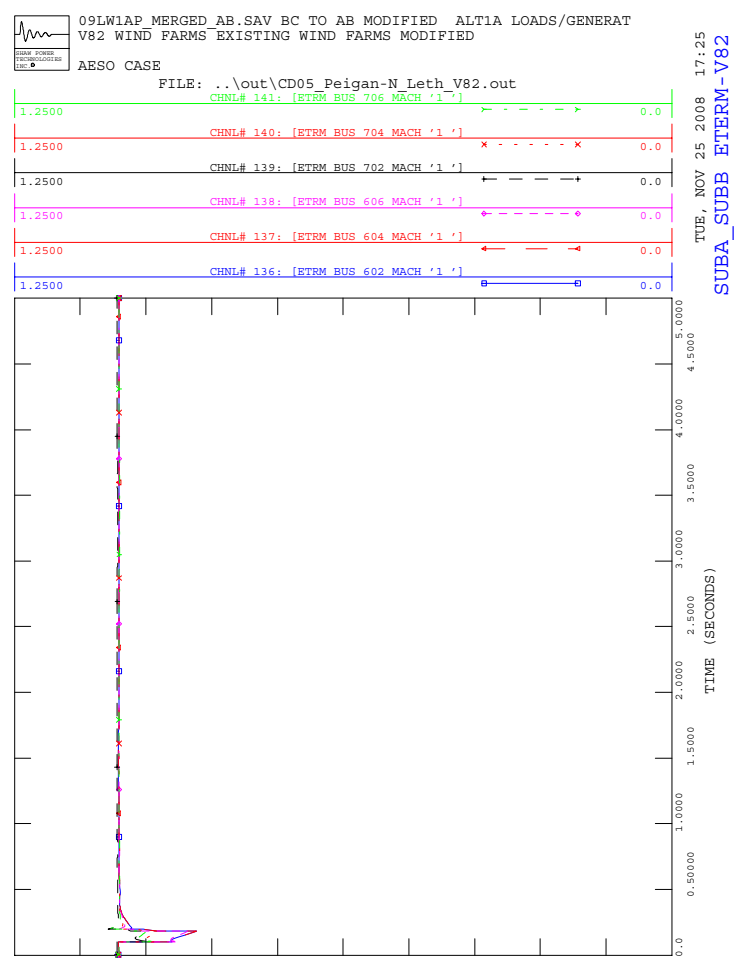


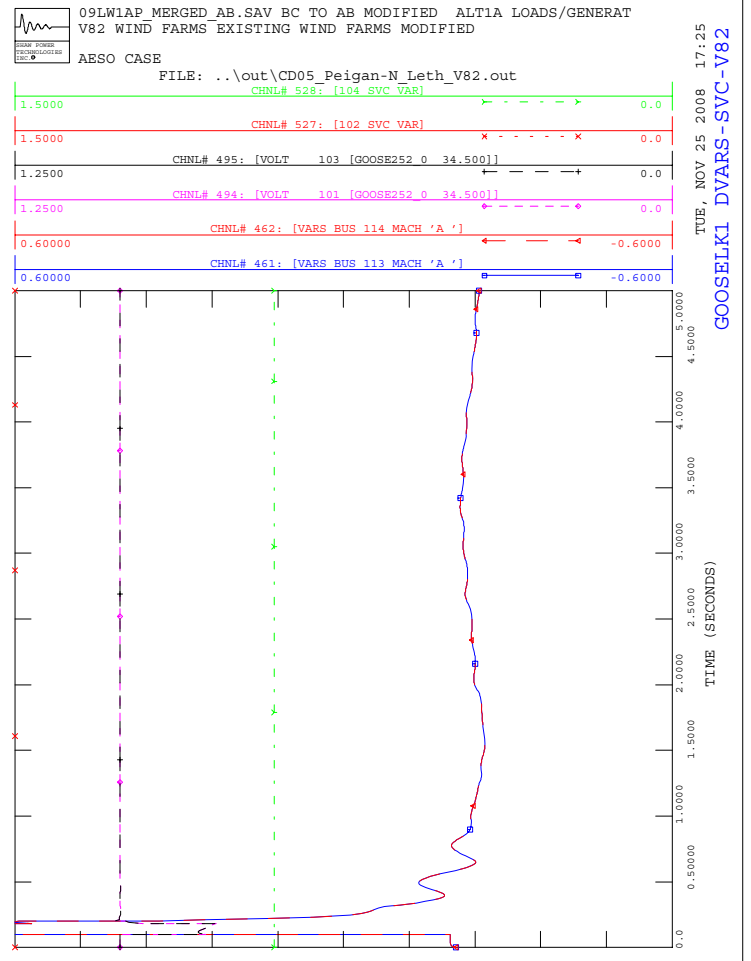
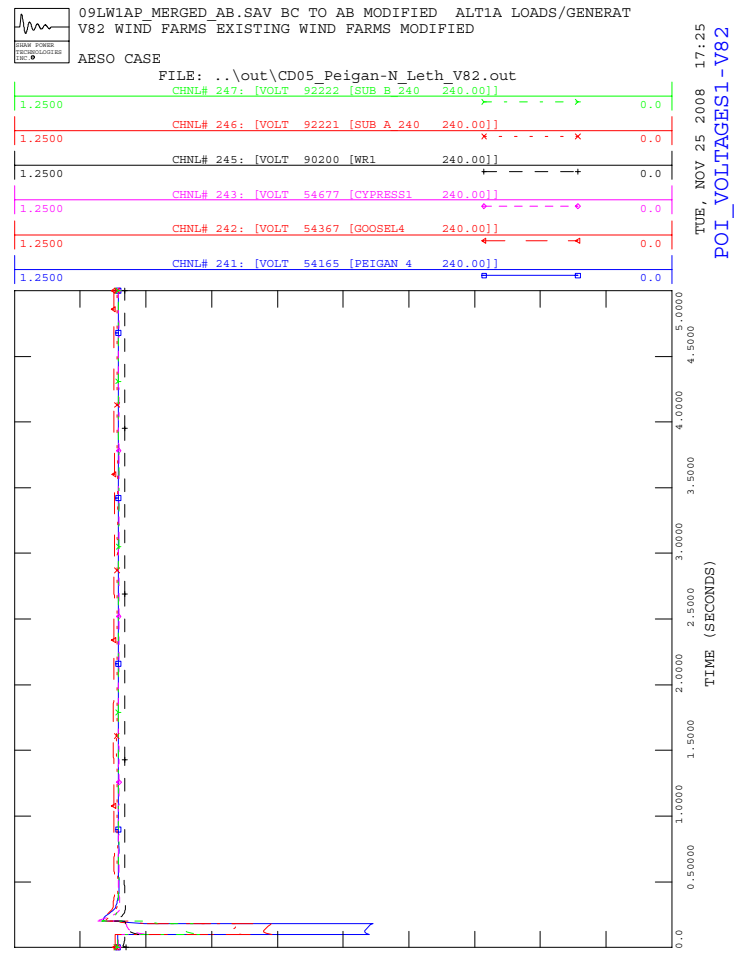
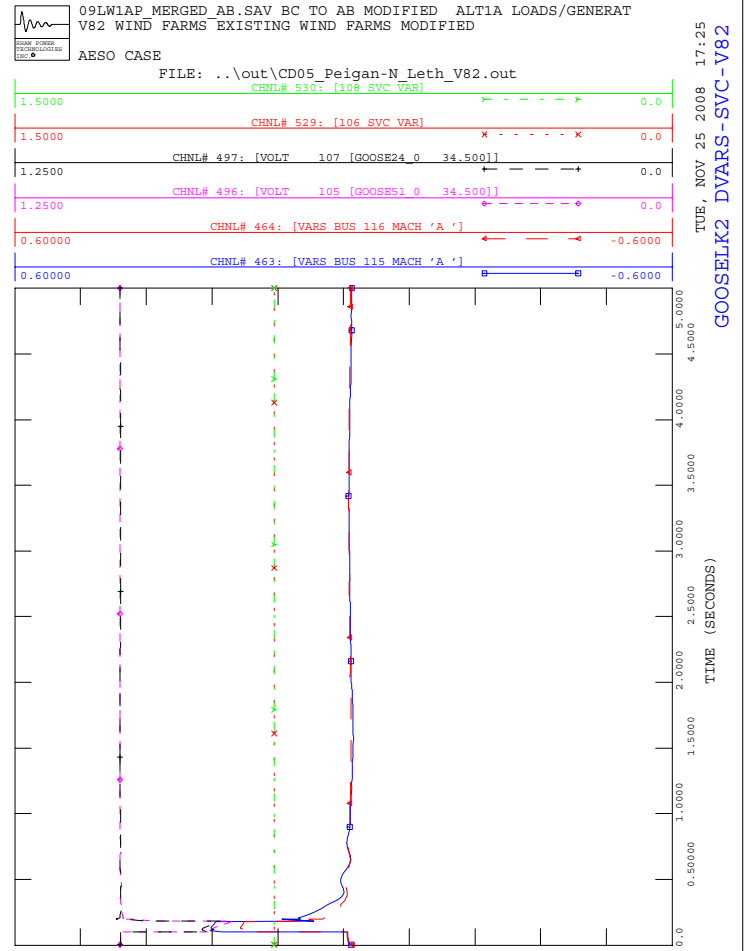
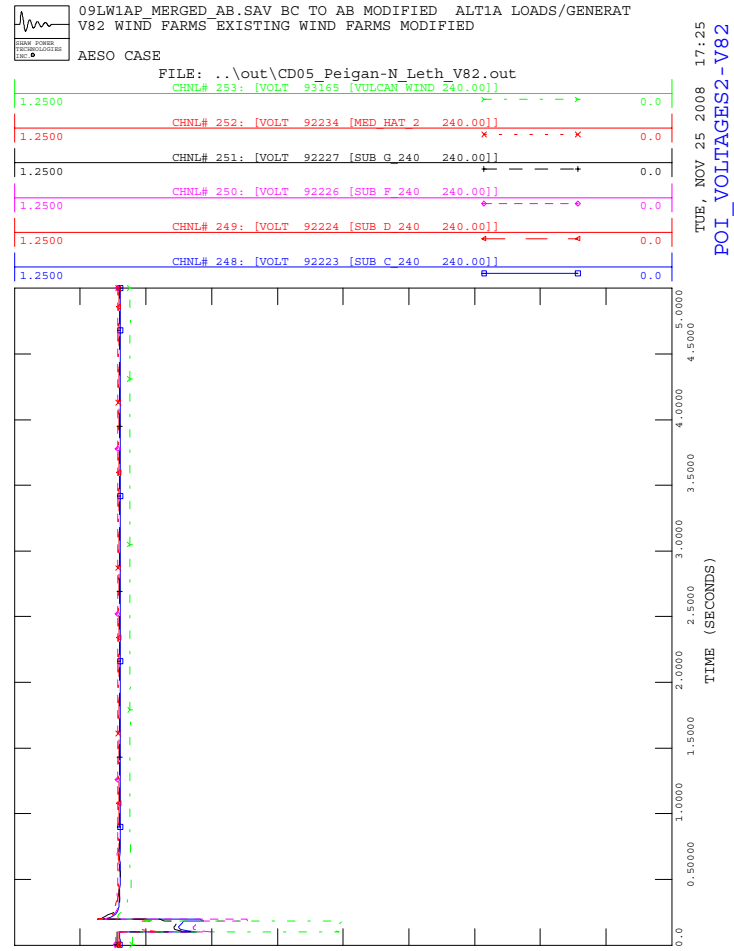


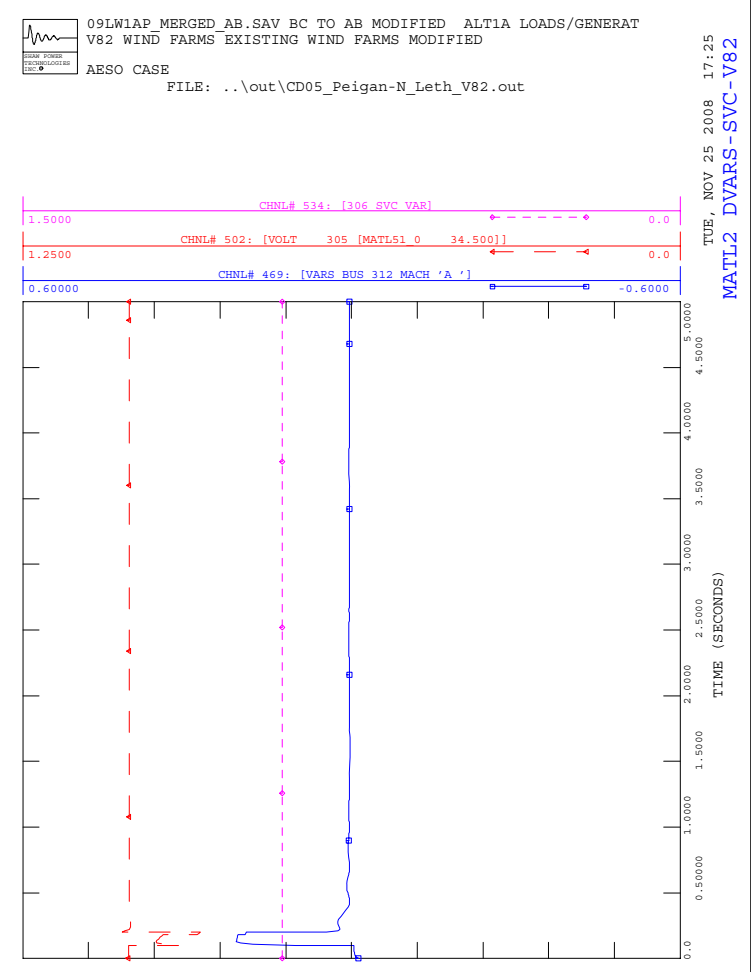
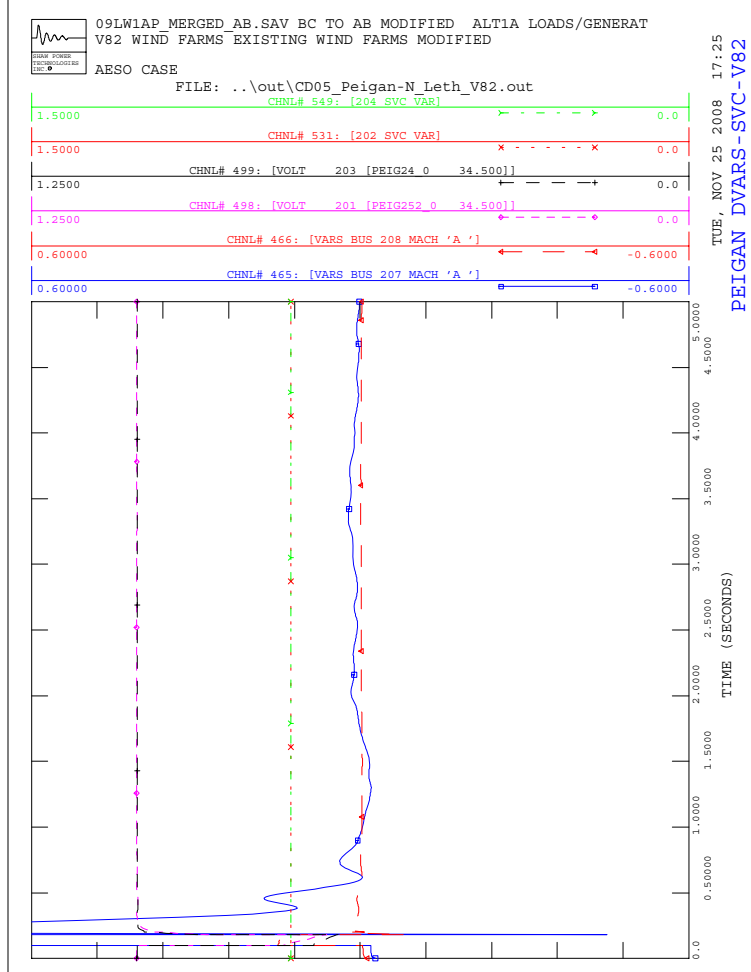
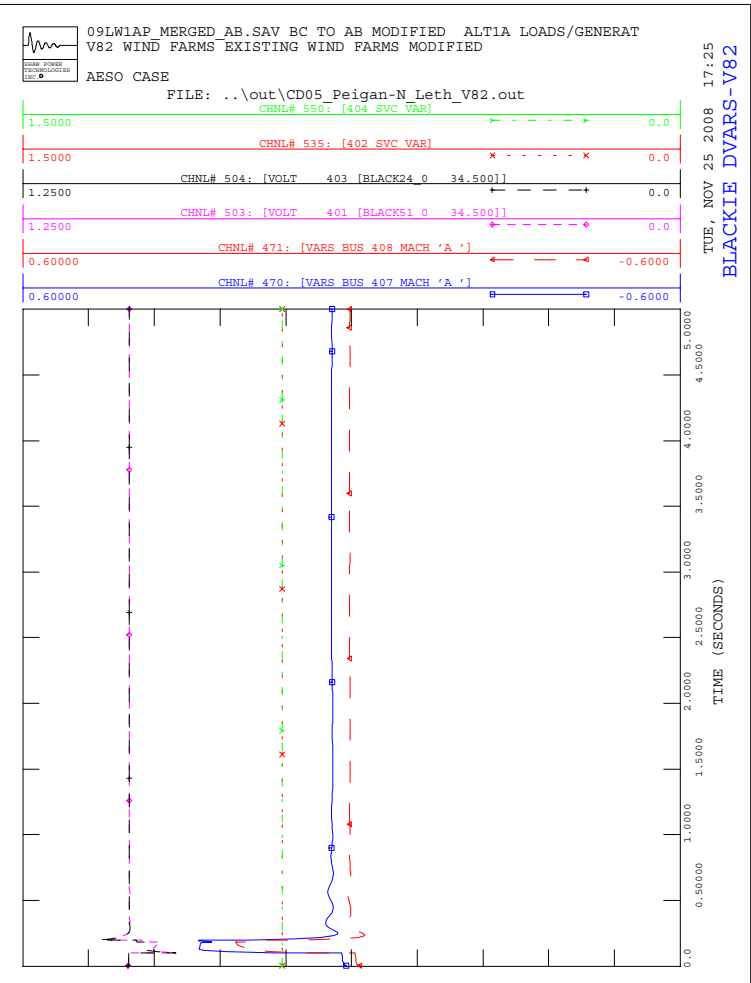
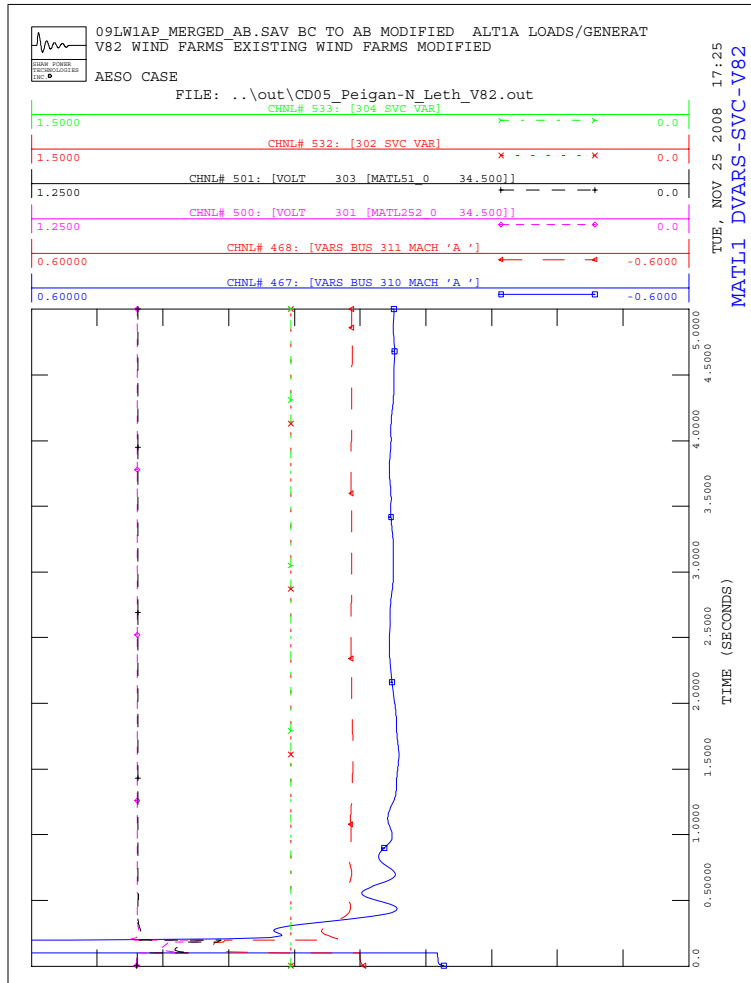


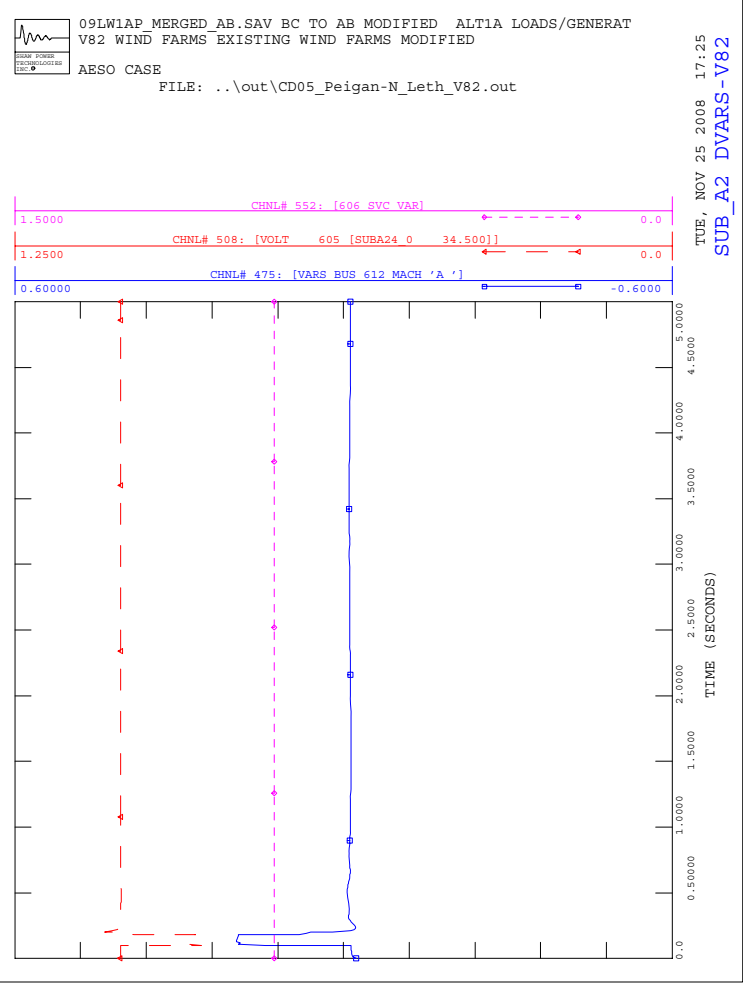
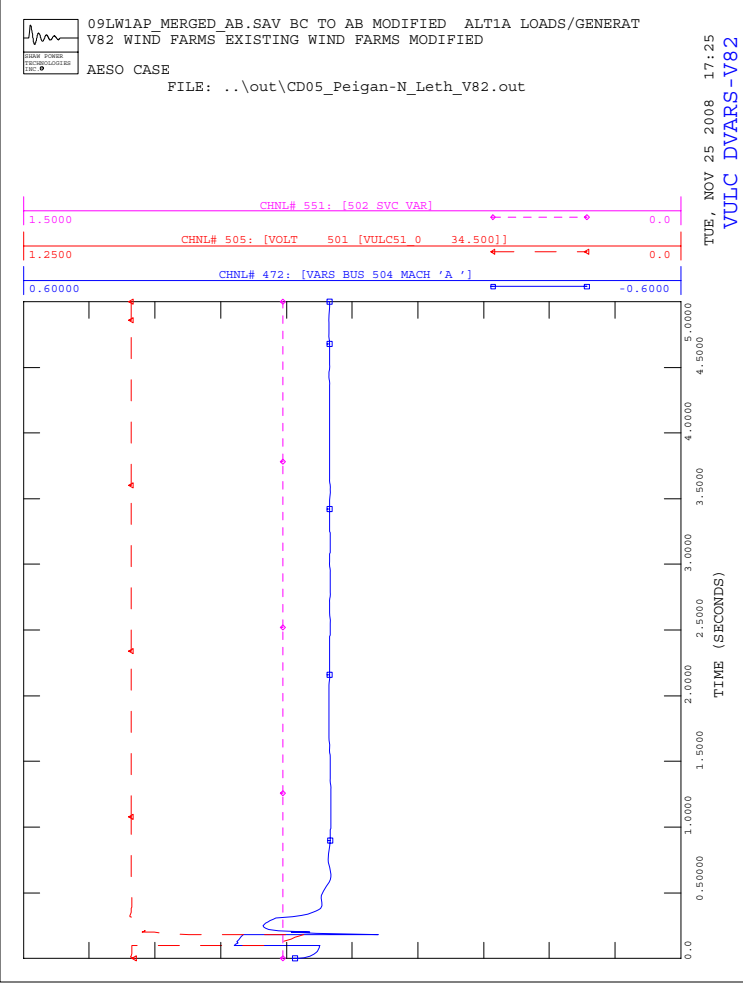
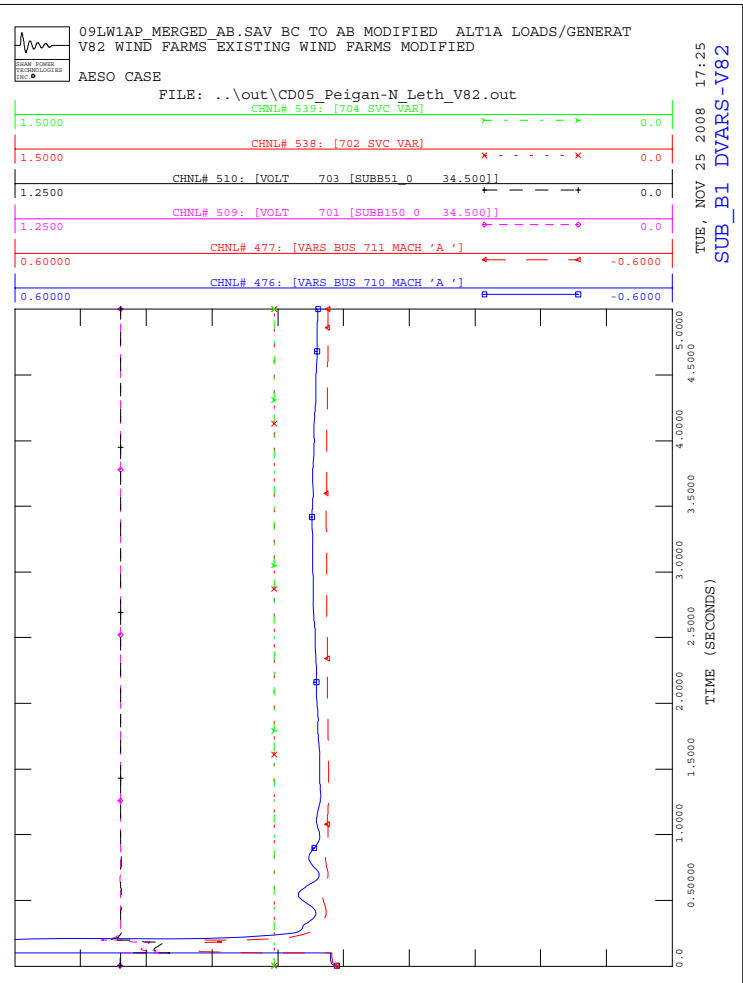
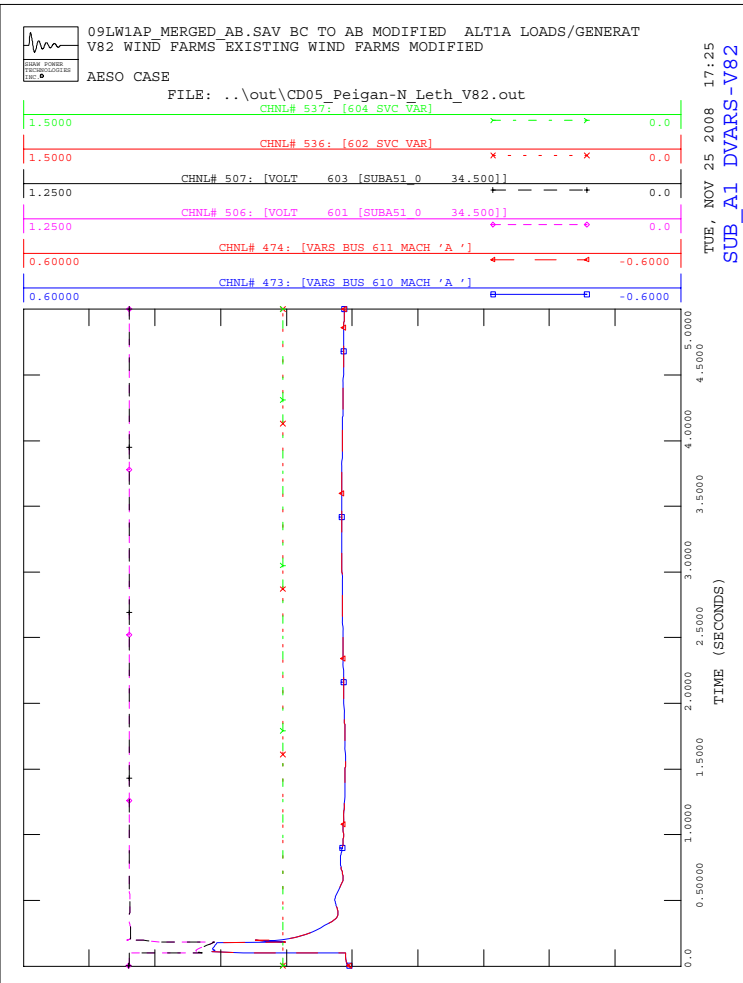


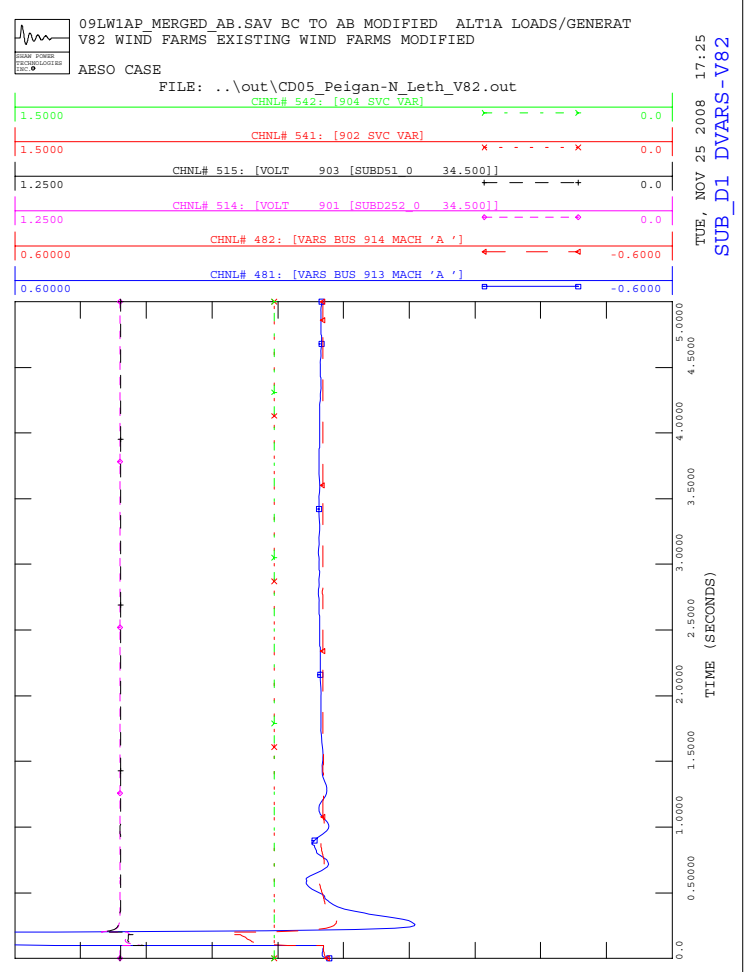
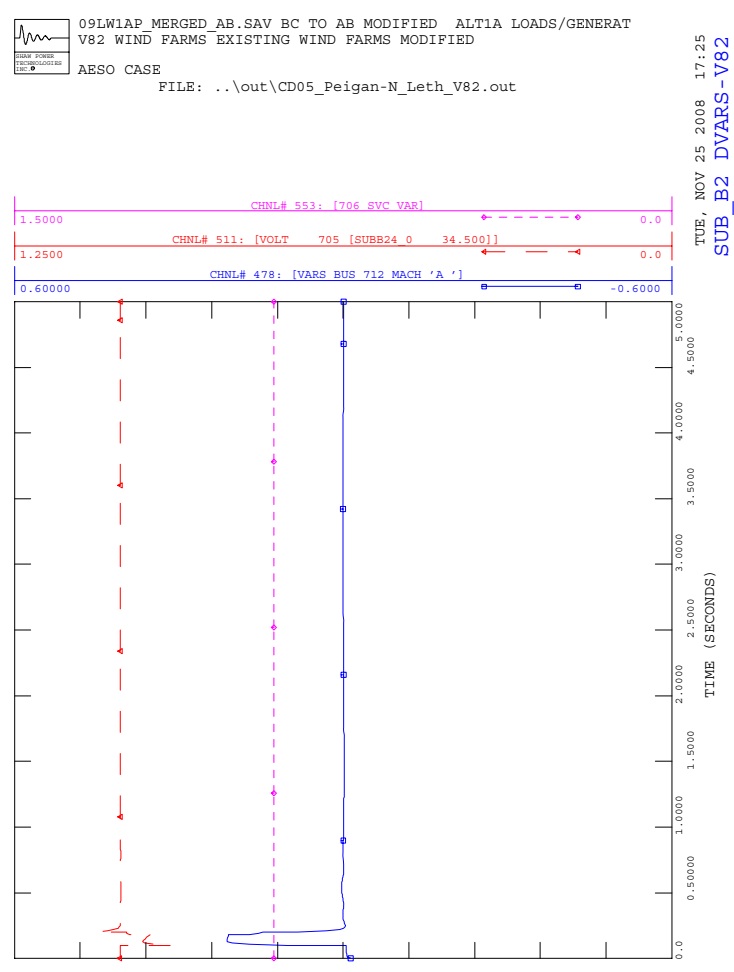
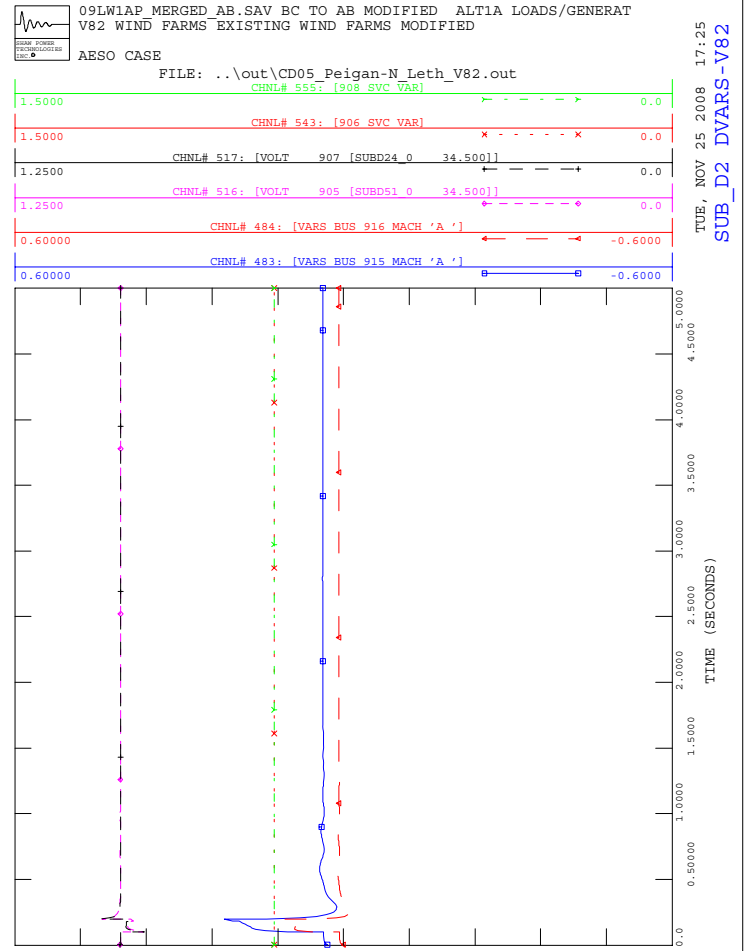
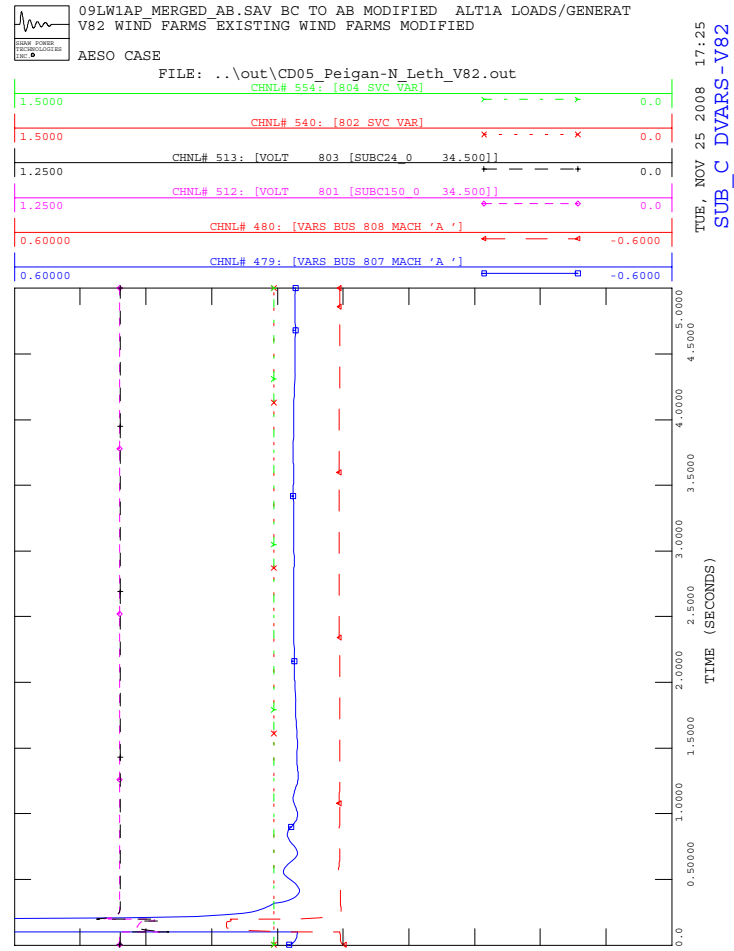


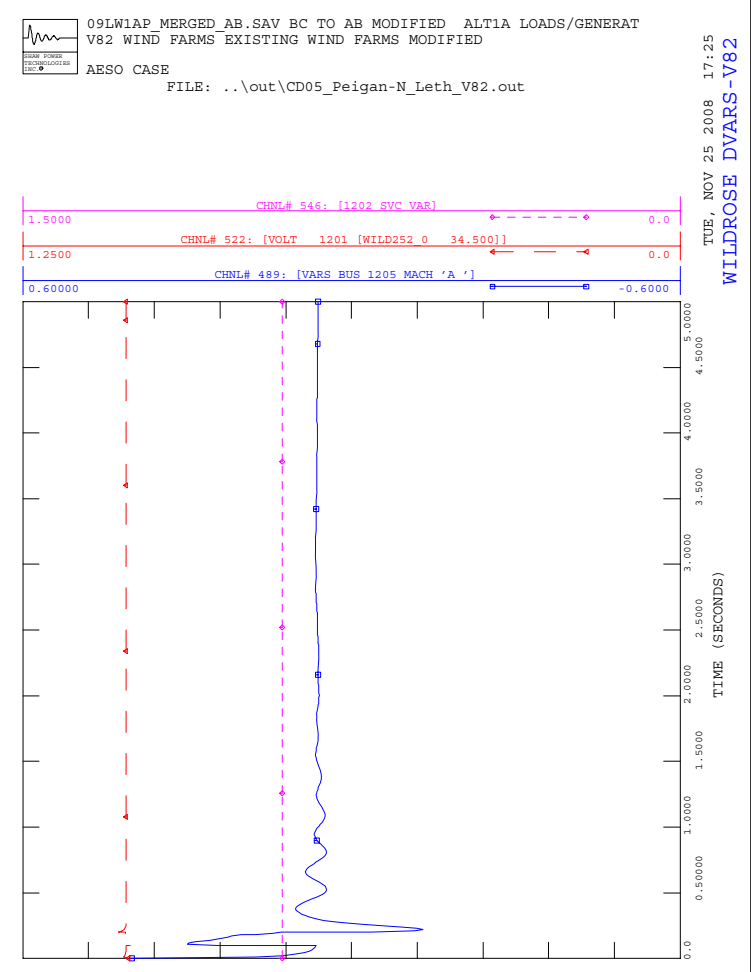
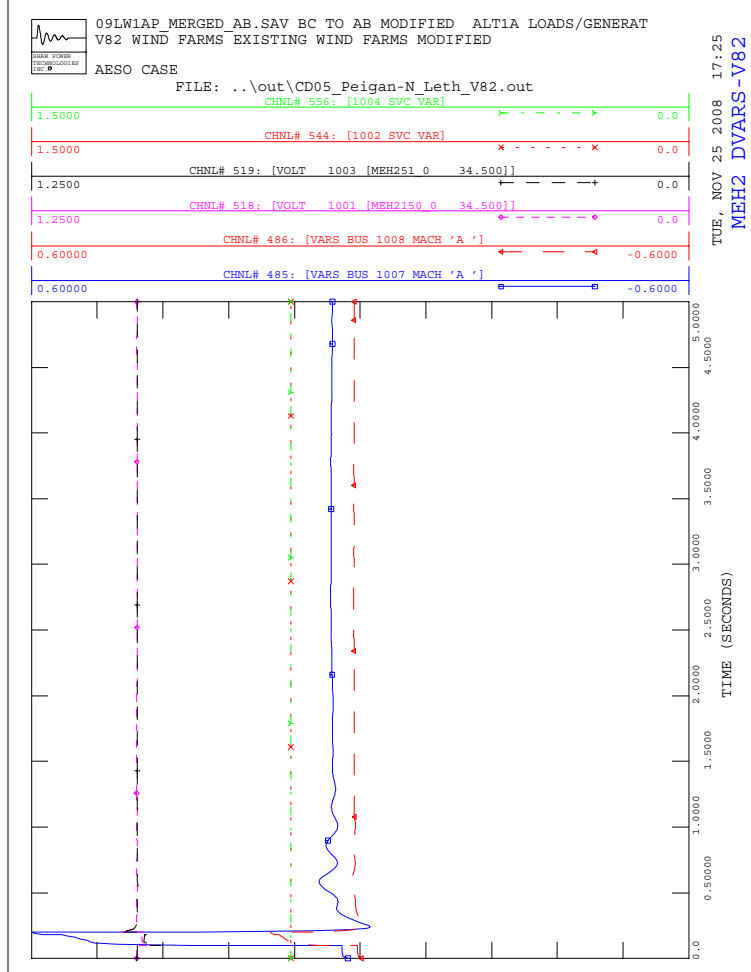
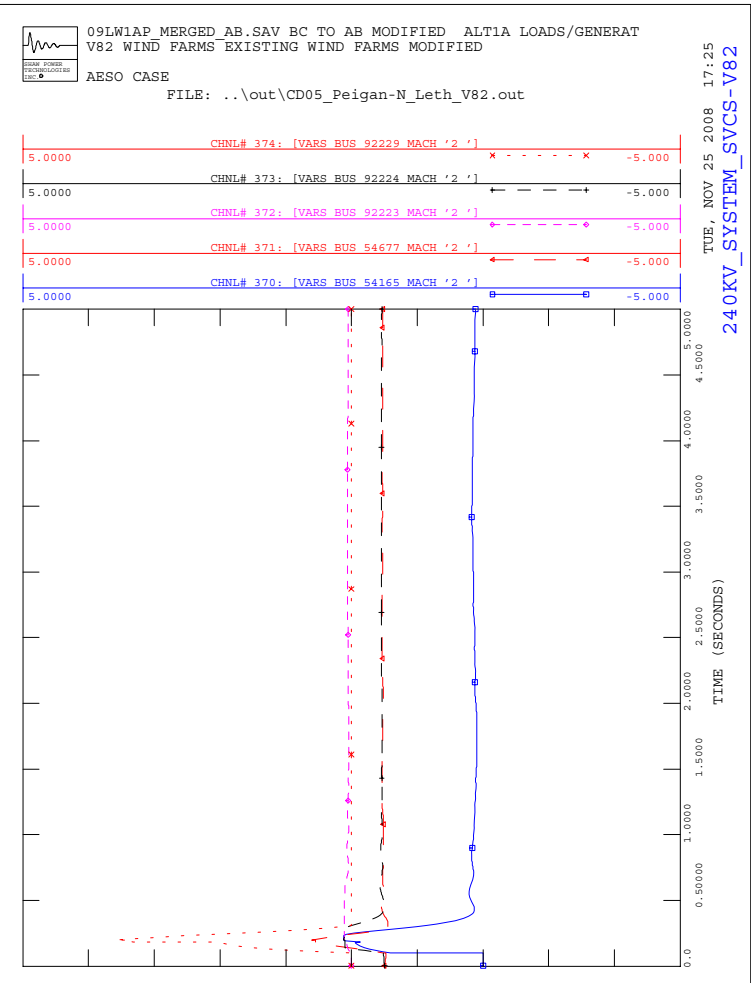
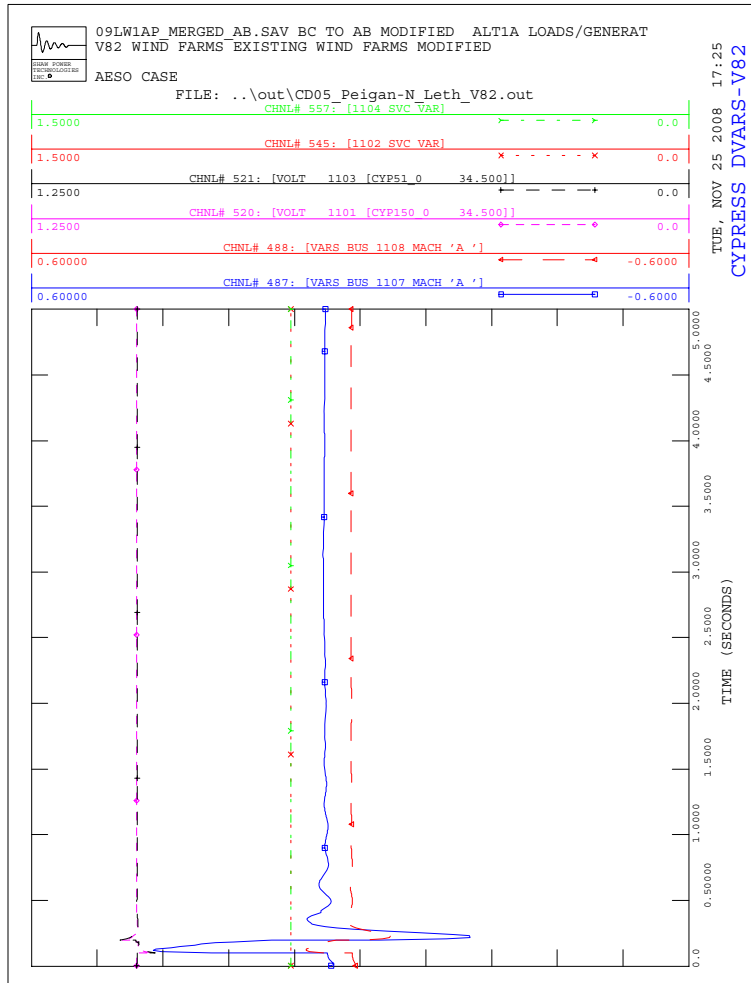












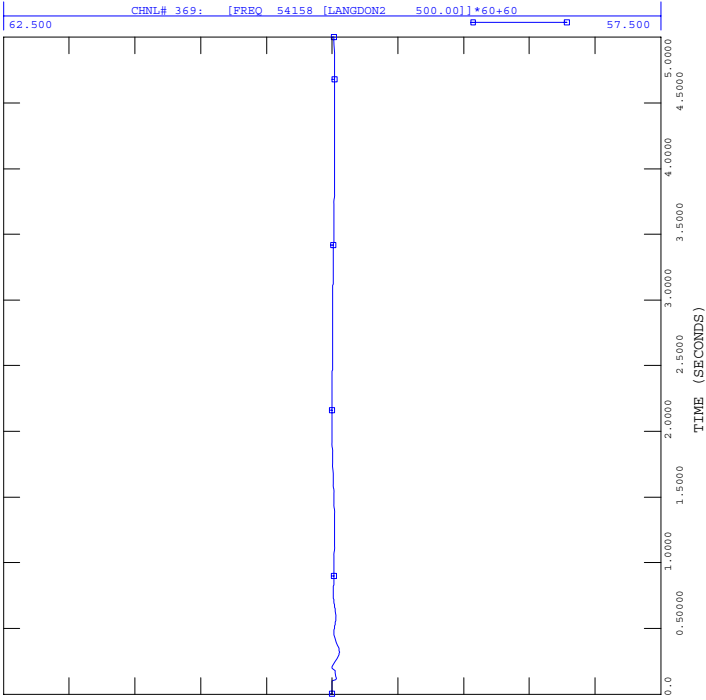


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD05_Peigan-N_Leth_V82.out

TUE, NOV 25 2008 17:25
LANGDON_FRQ-V82

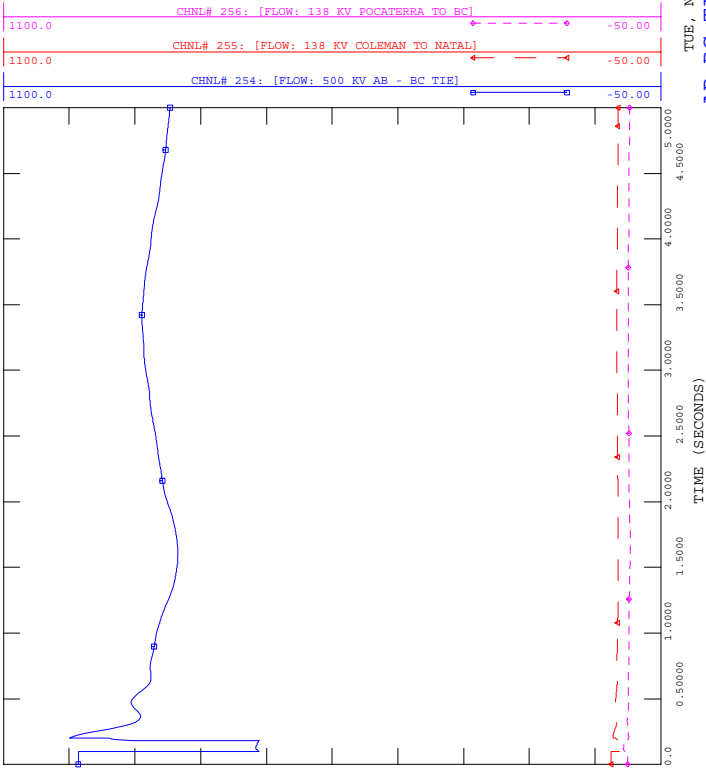


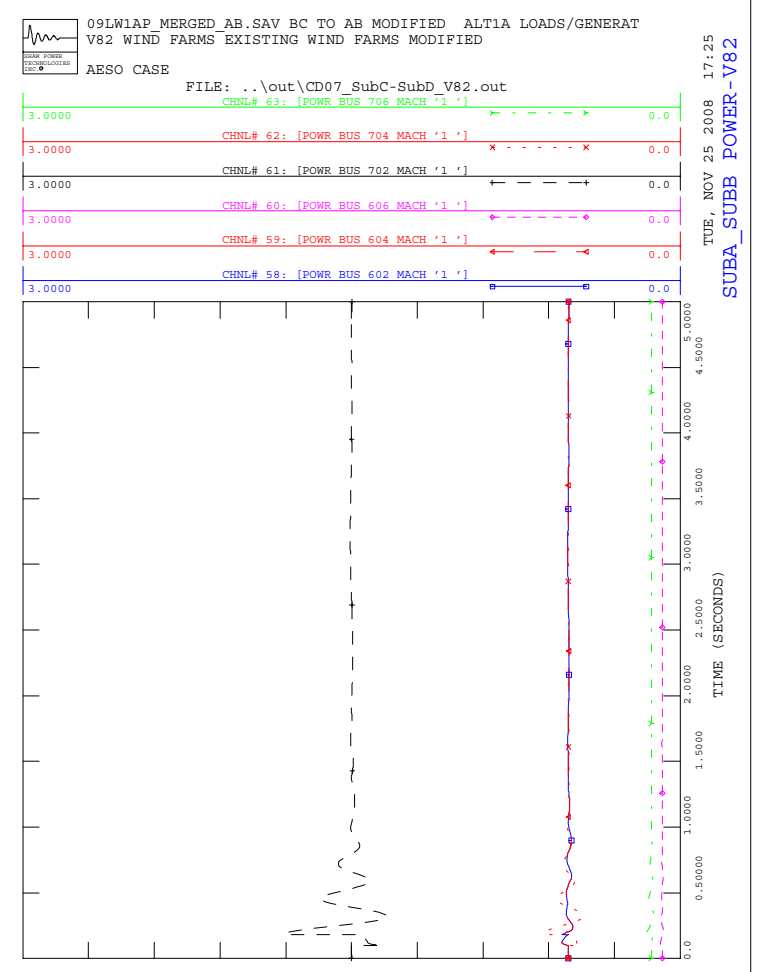
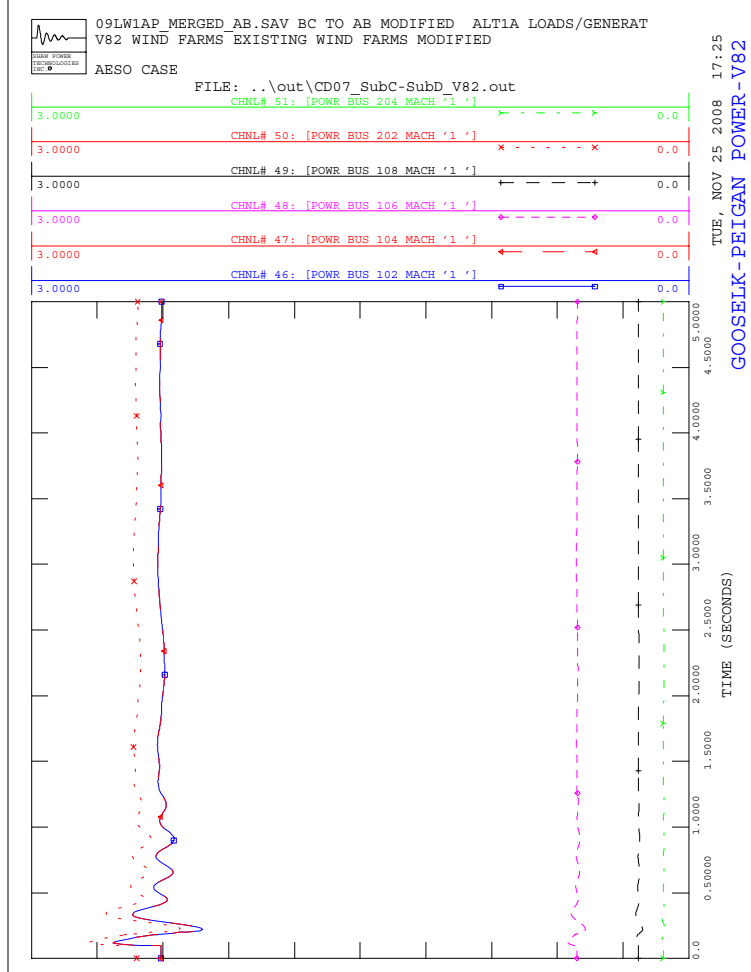
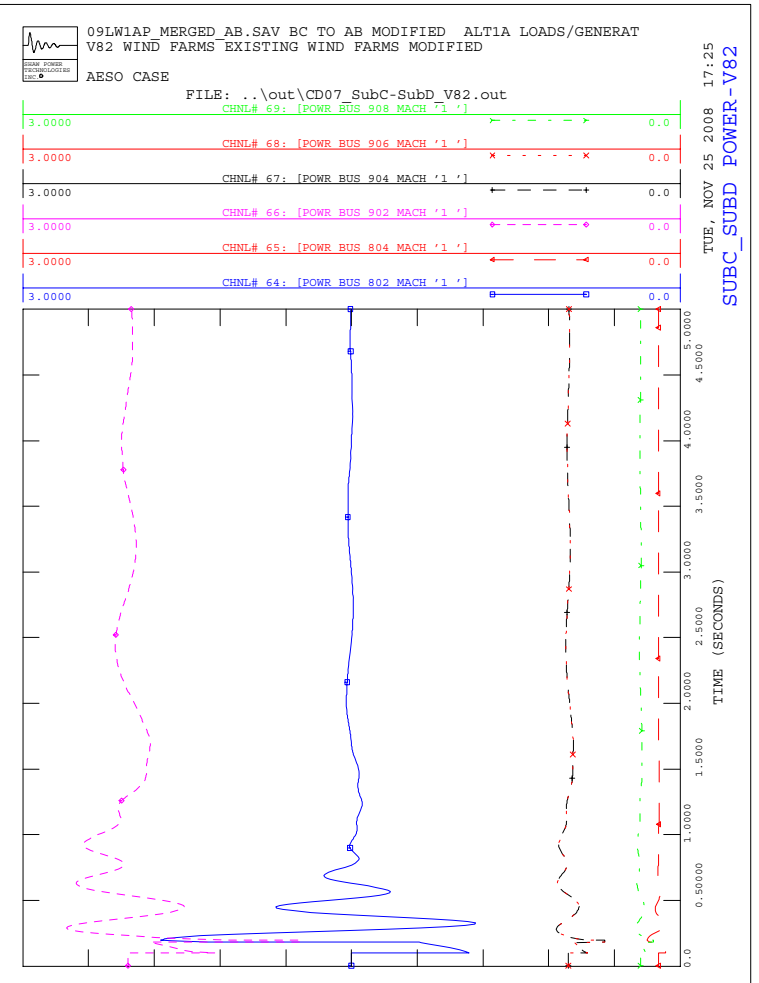
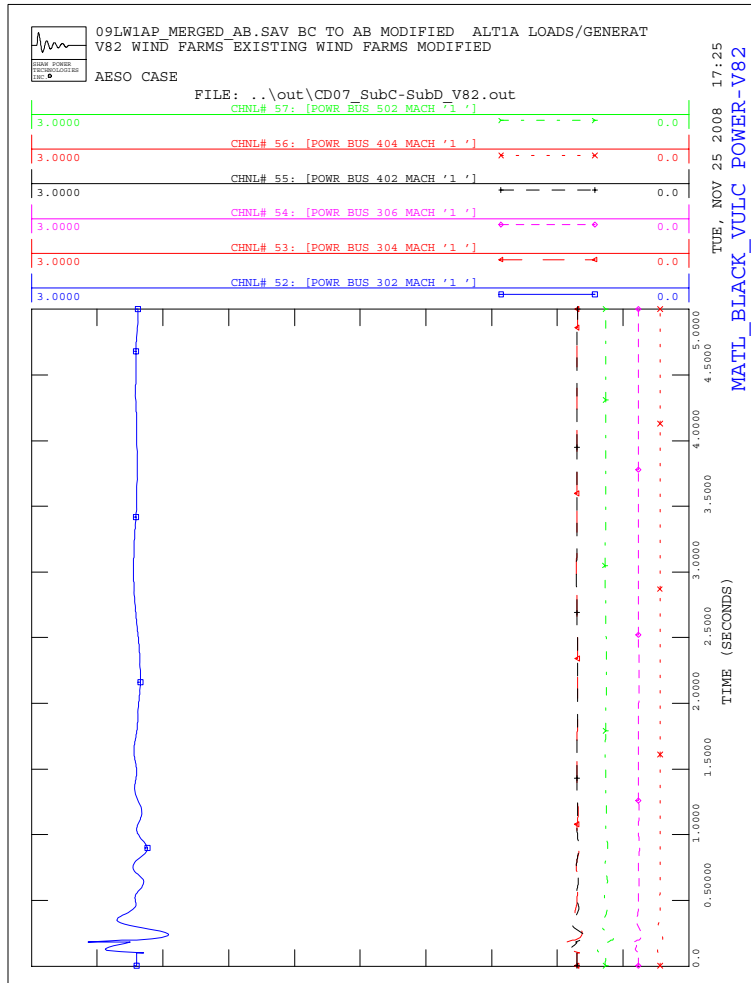
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

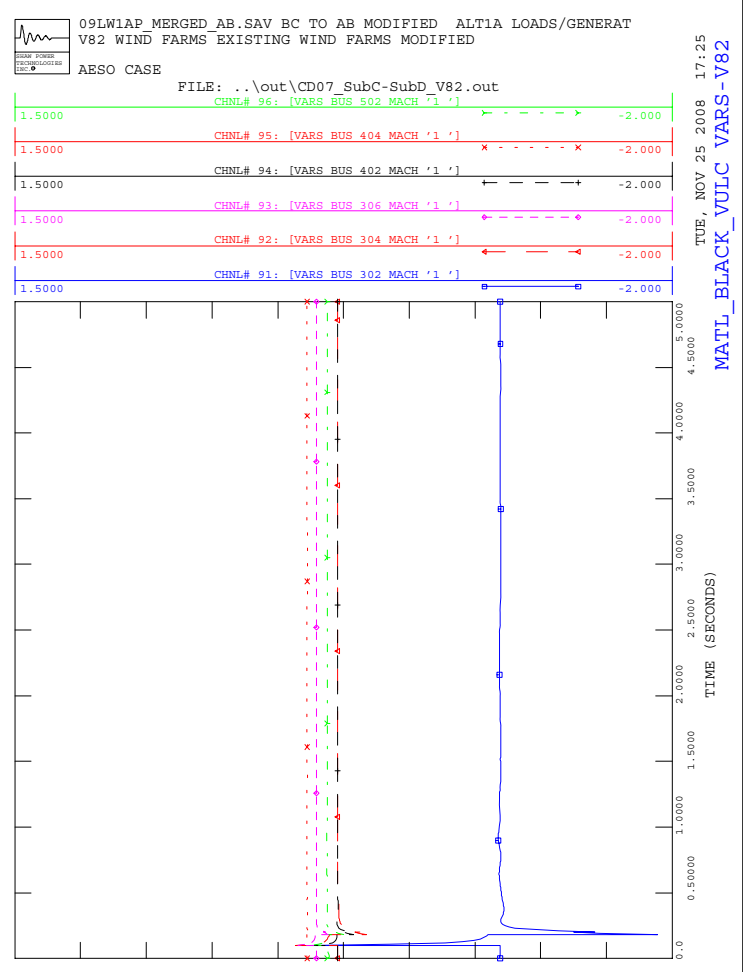
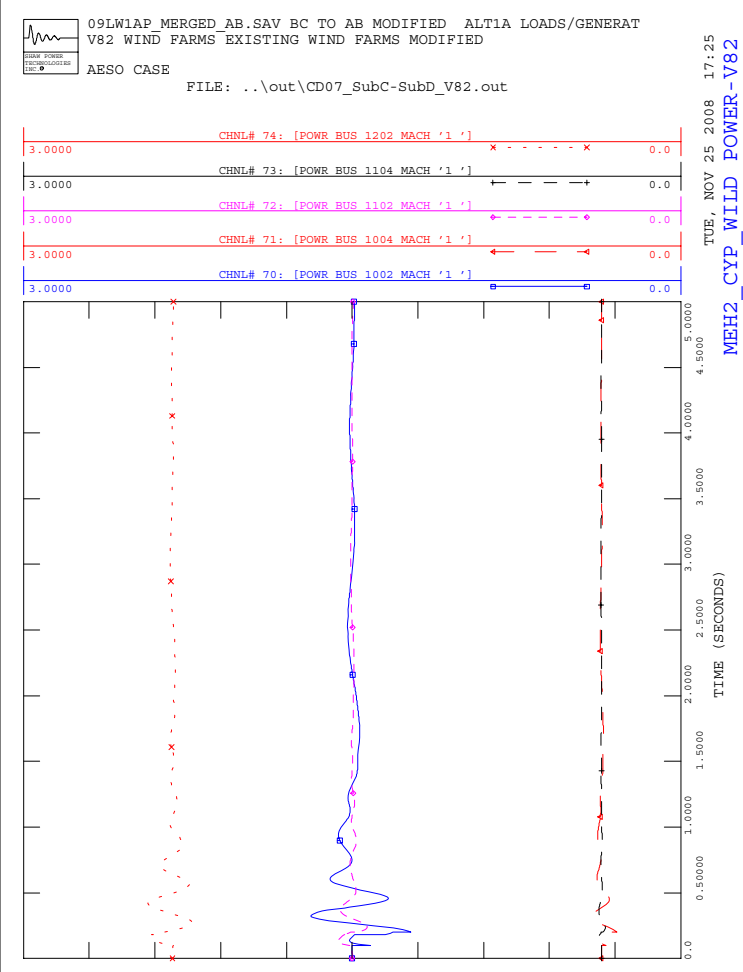
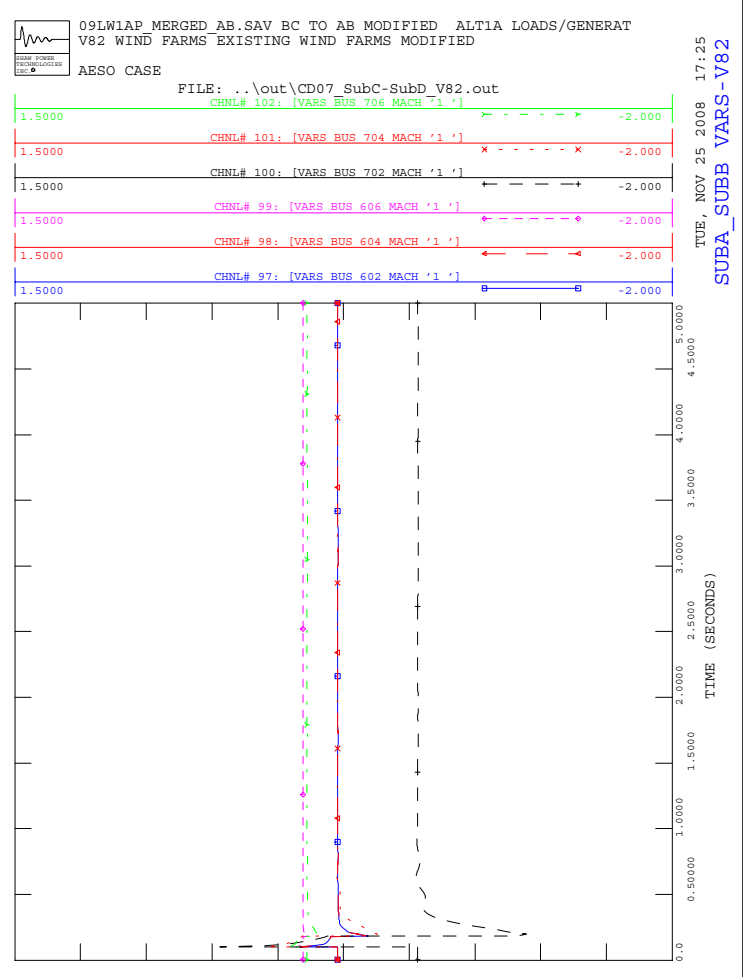
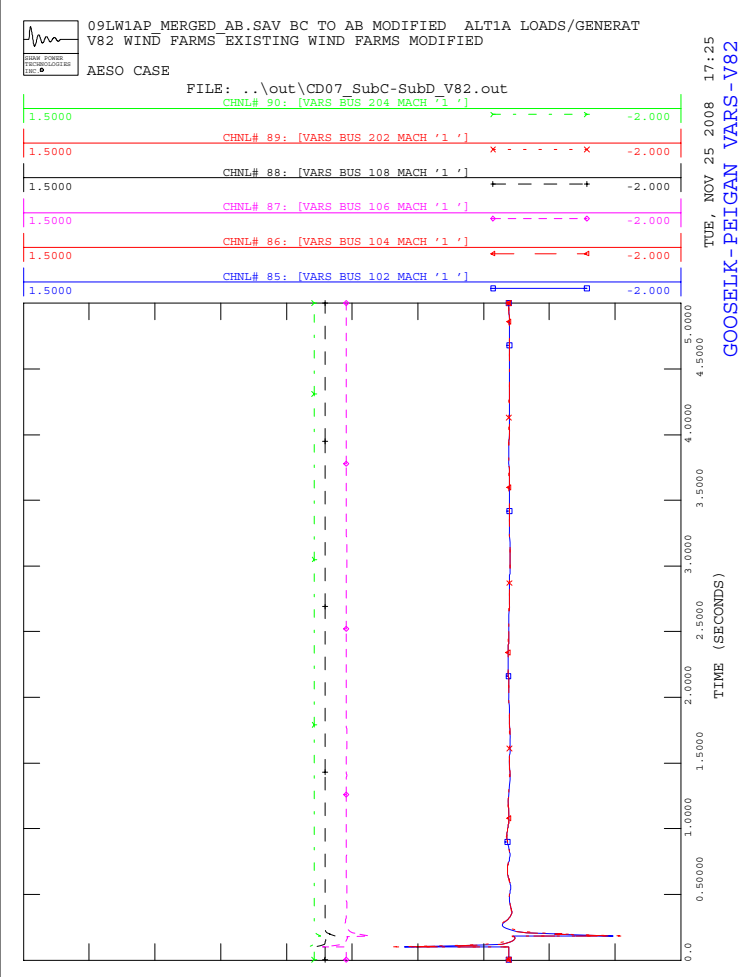
ABSO CASE

FILE: ..\out\CD05_Peigan-N_Leth_V82.out

TUE, NOV 25 2008 17:25
AB_BC_TIE_FLOWS-V82

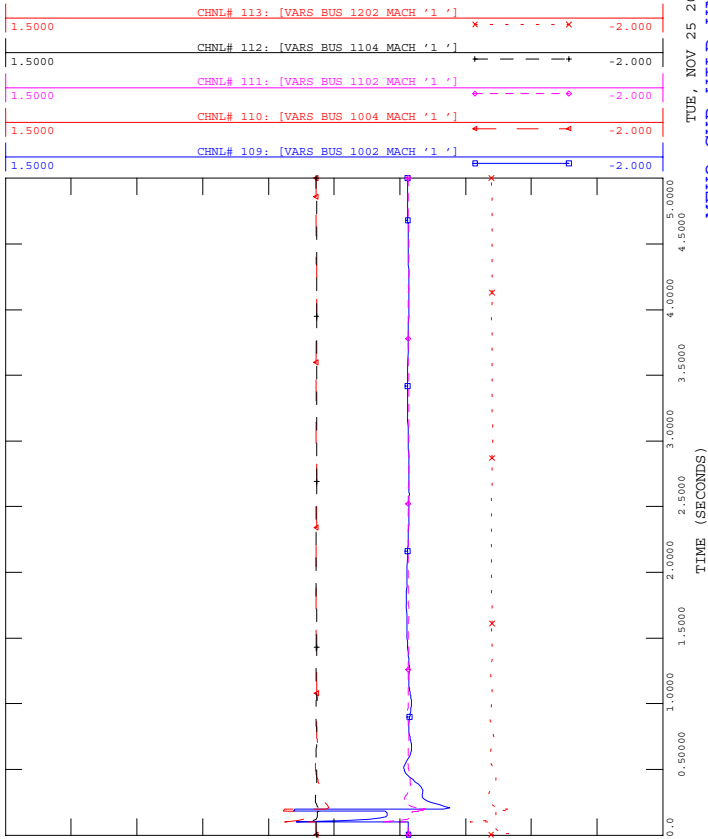






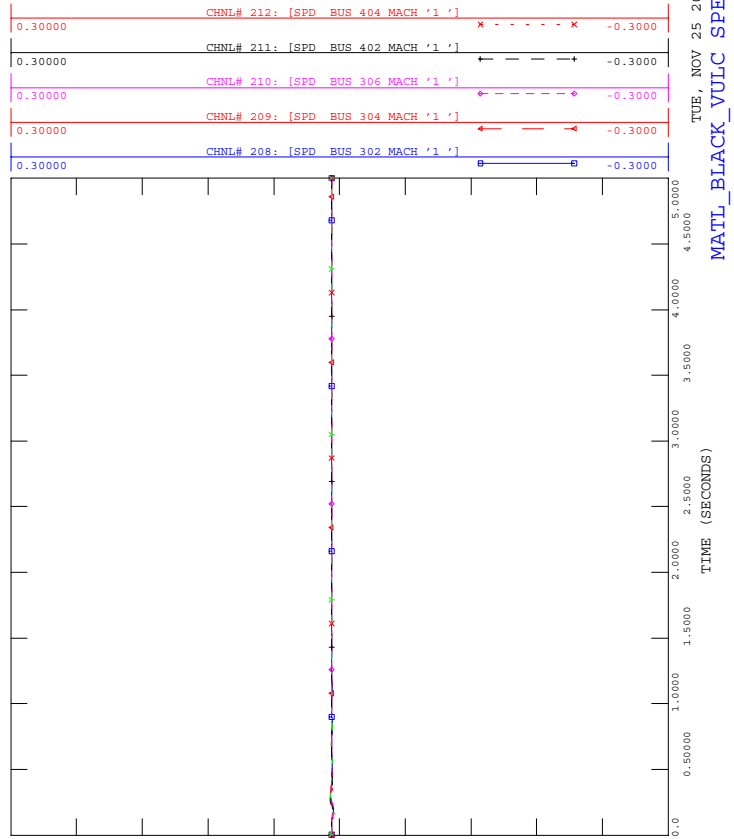
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD07_SubC-SubD_V82.out



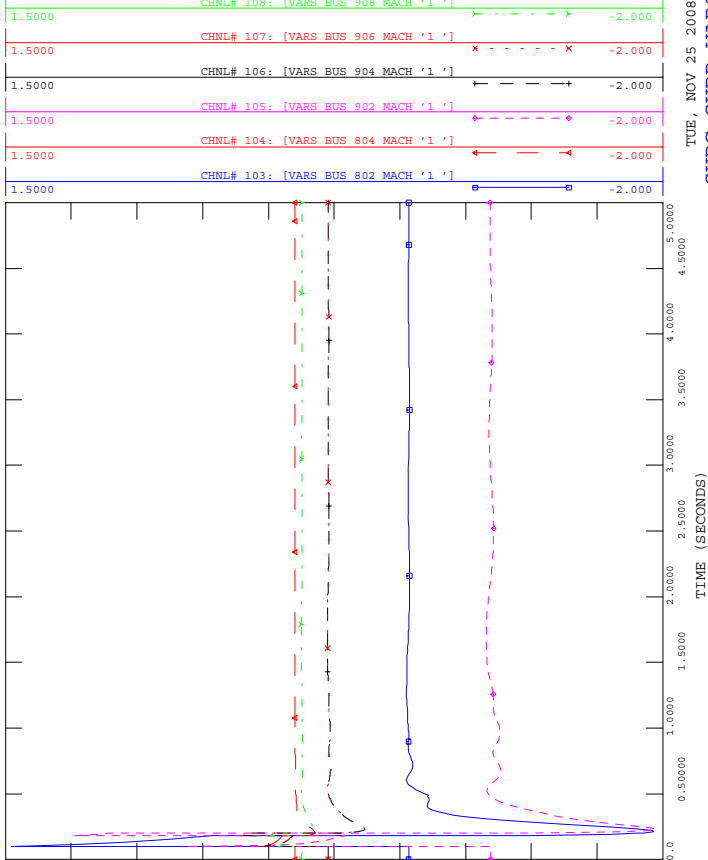
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD07_SubC-SubD_V82.out



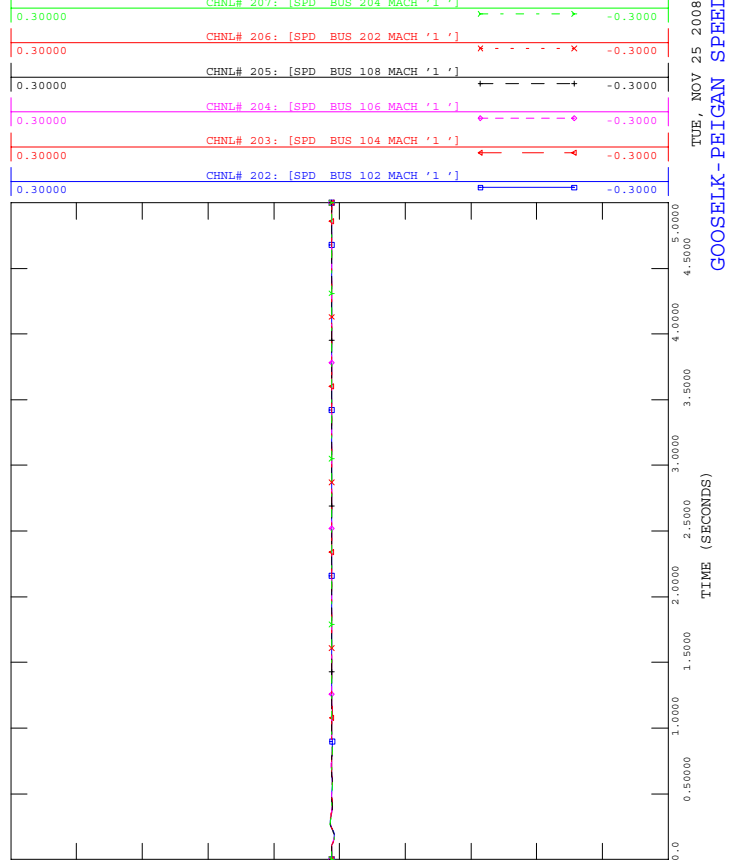
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

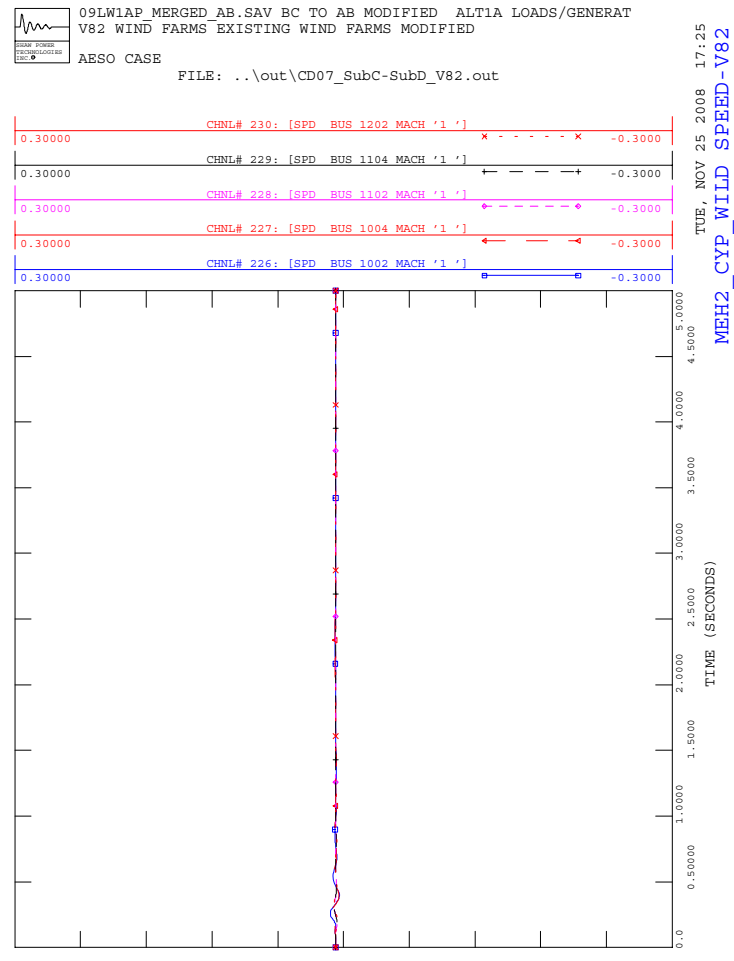
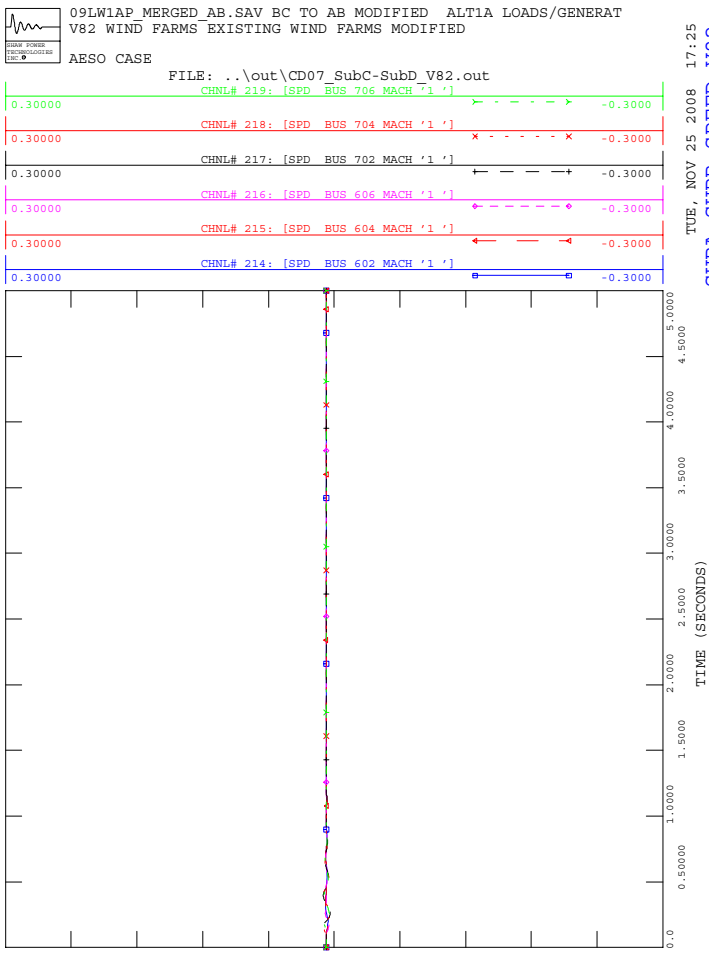
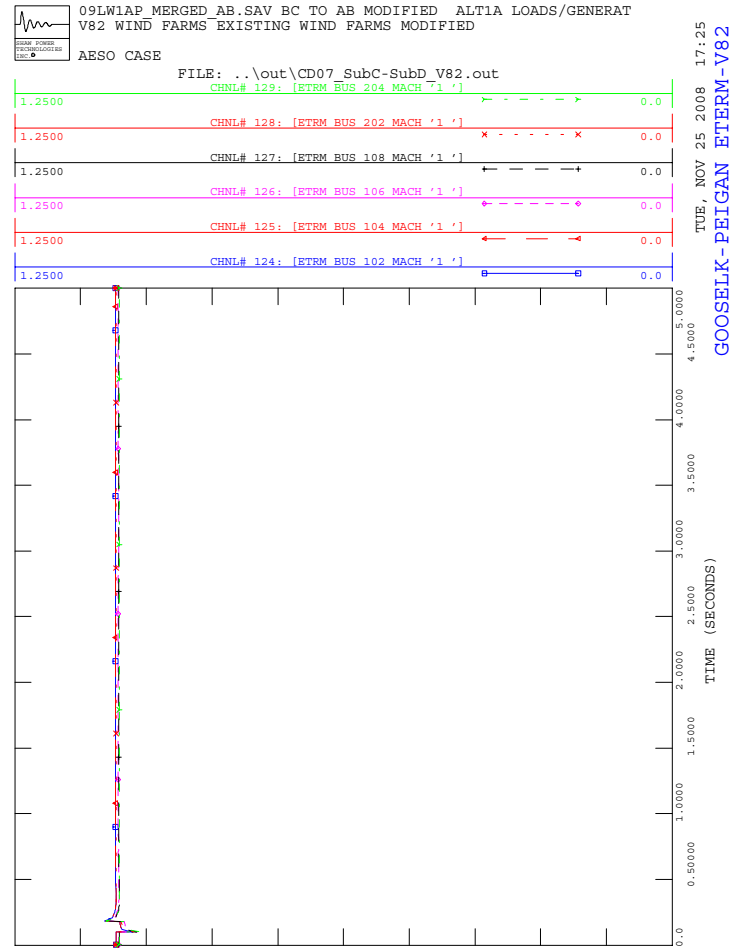
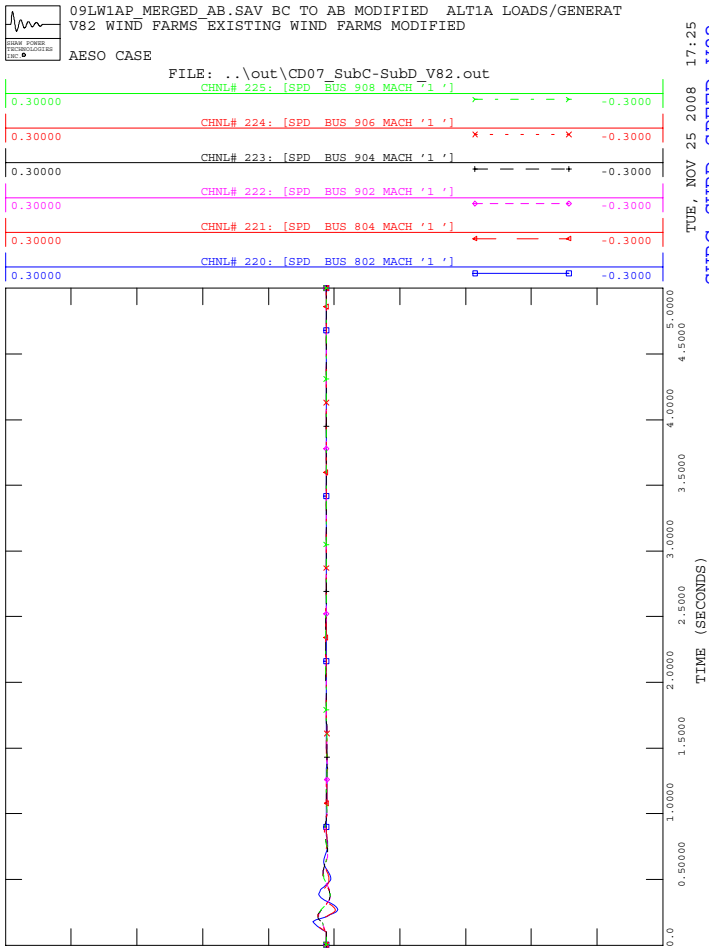
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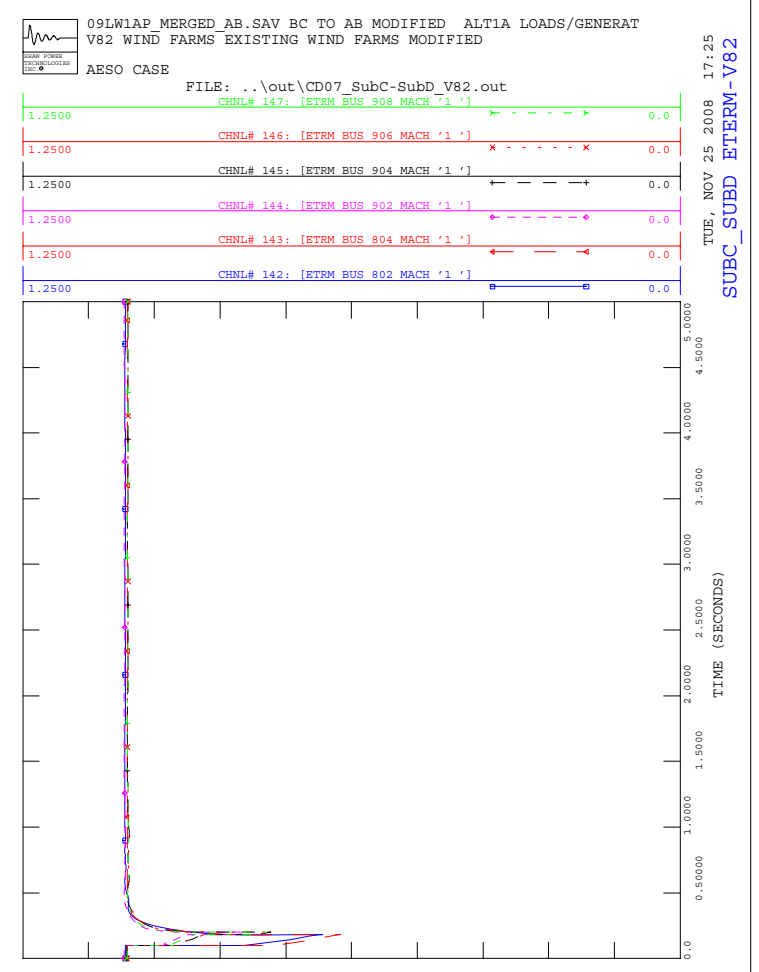
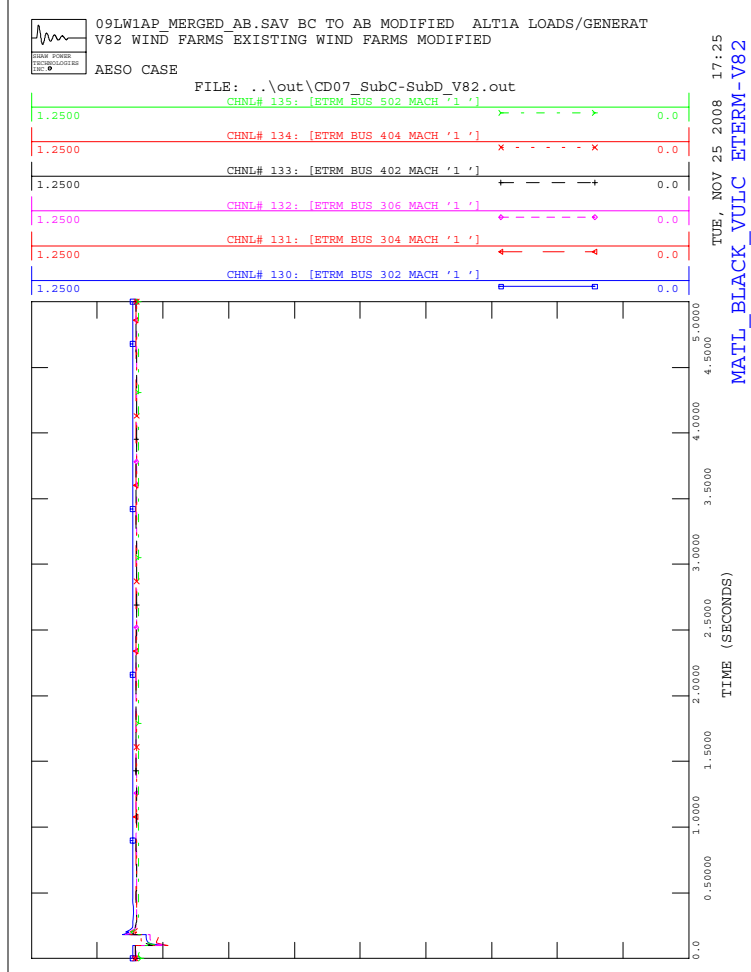
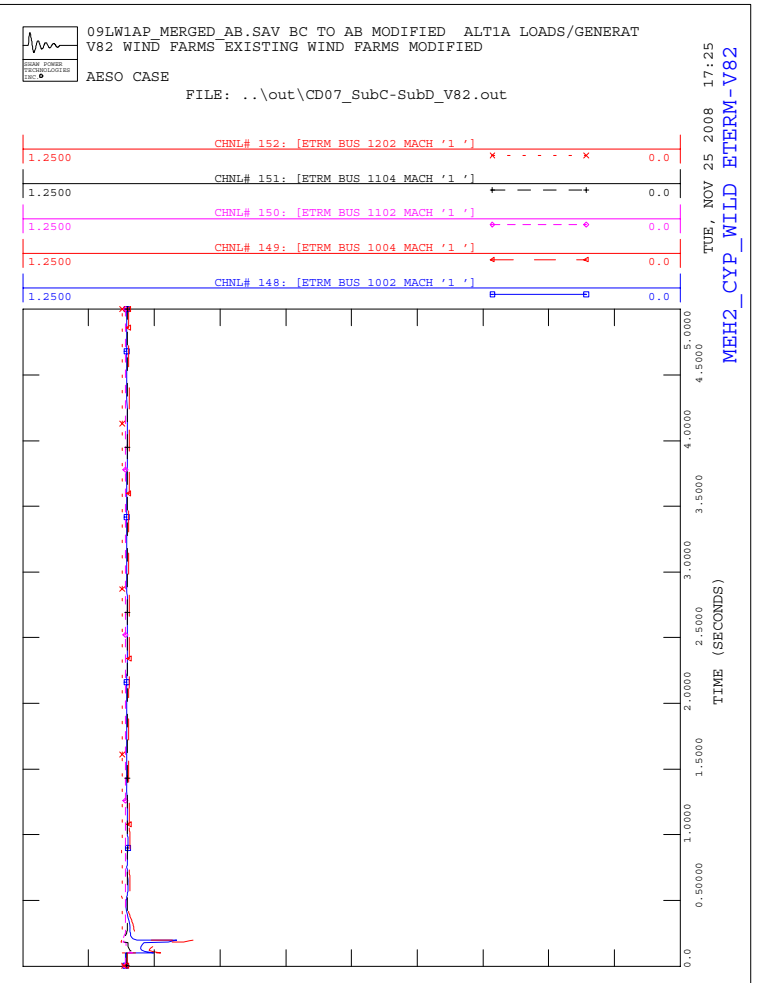
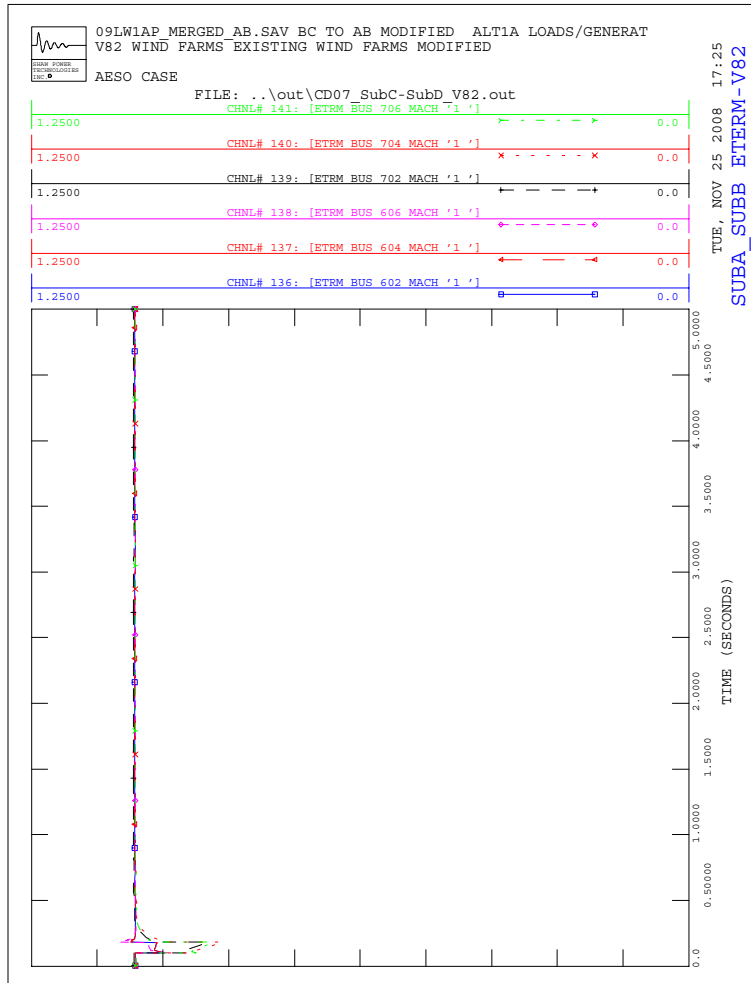


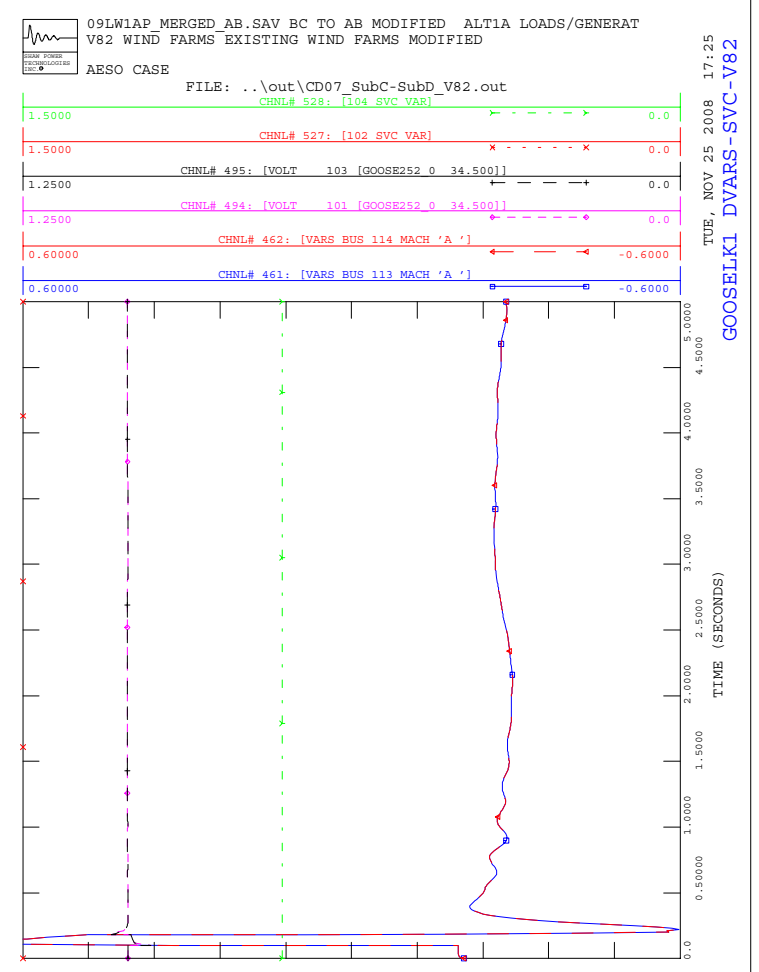
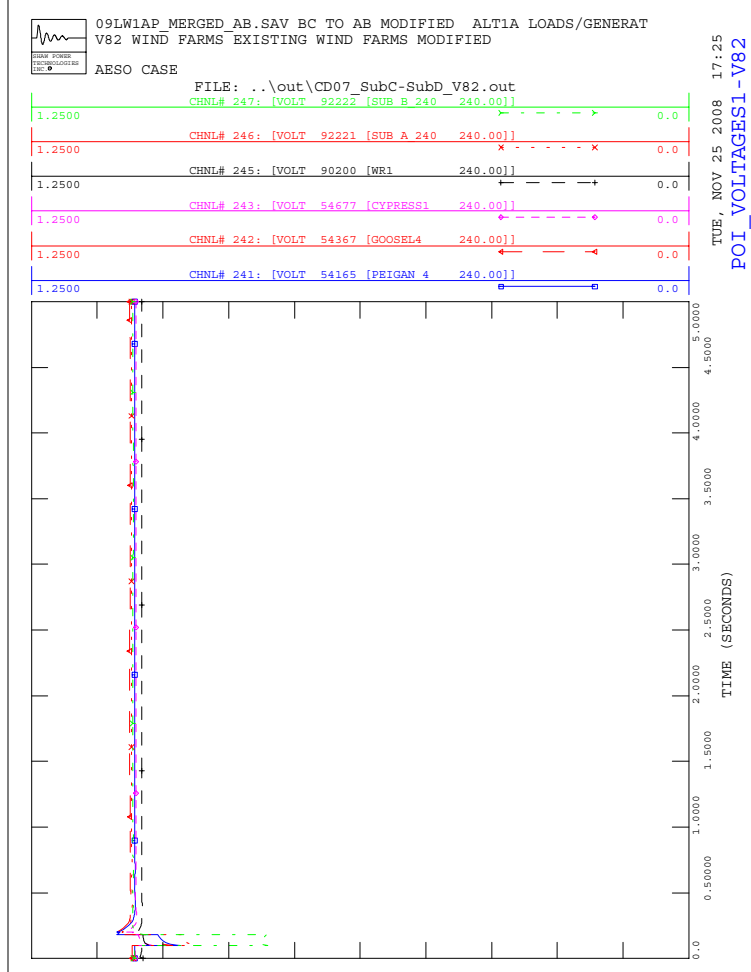
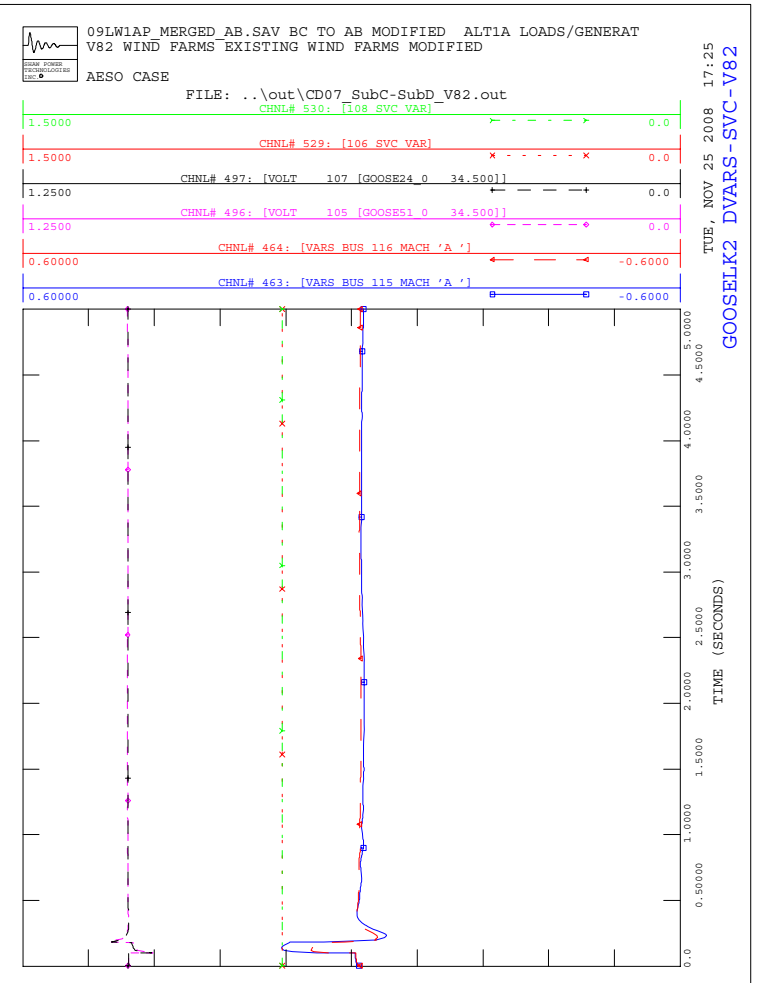
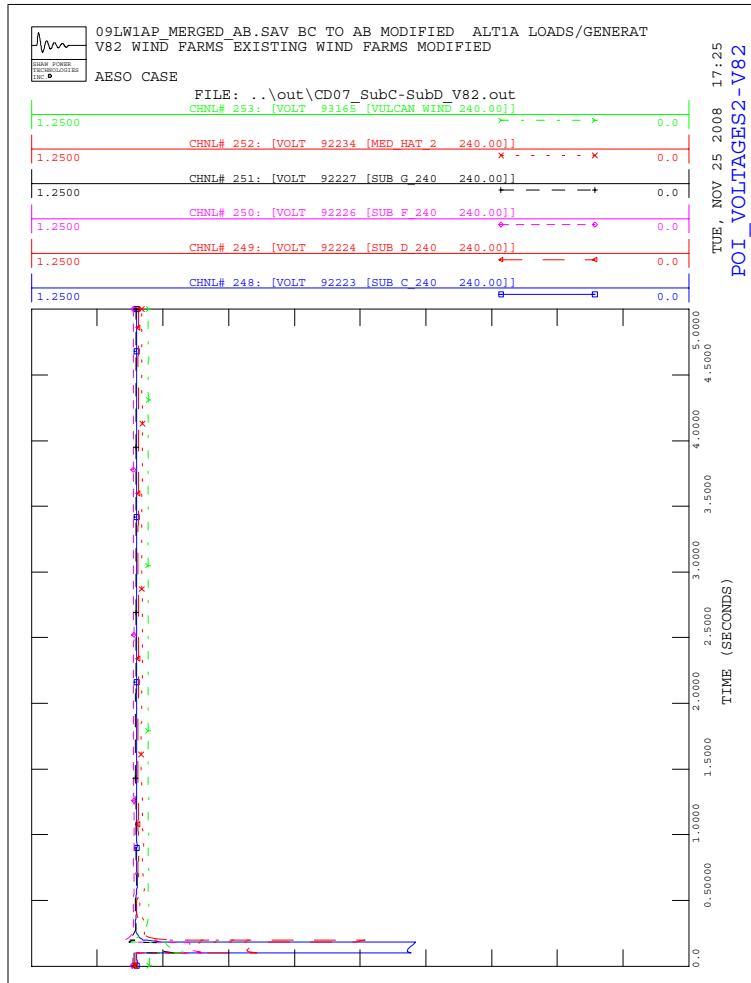
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

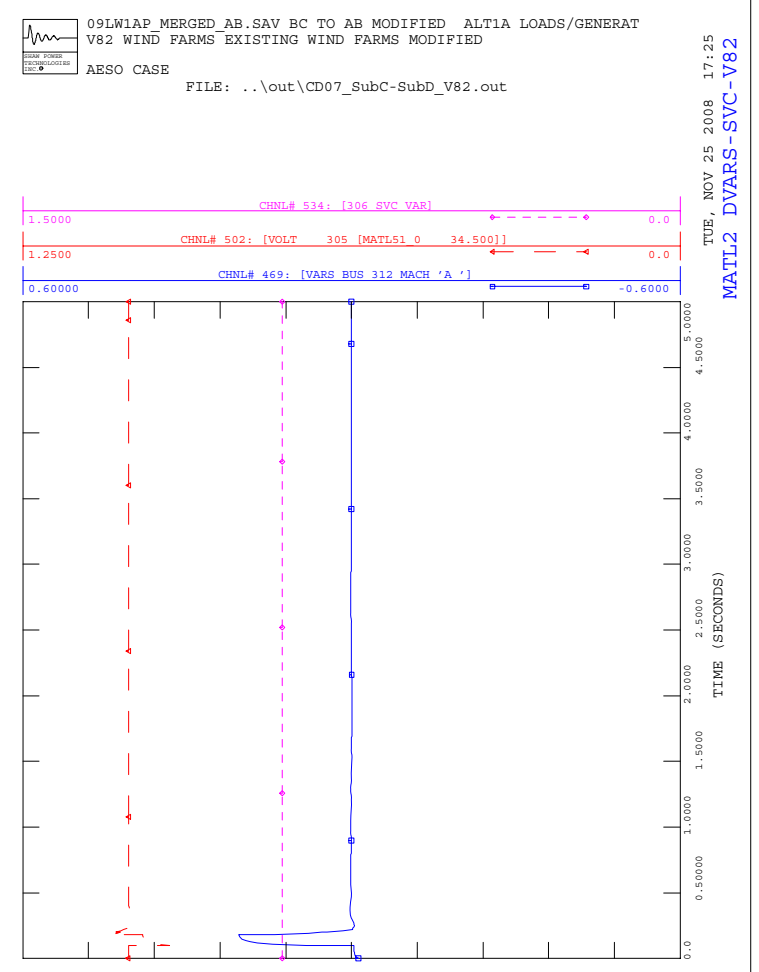
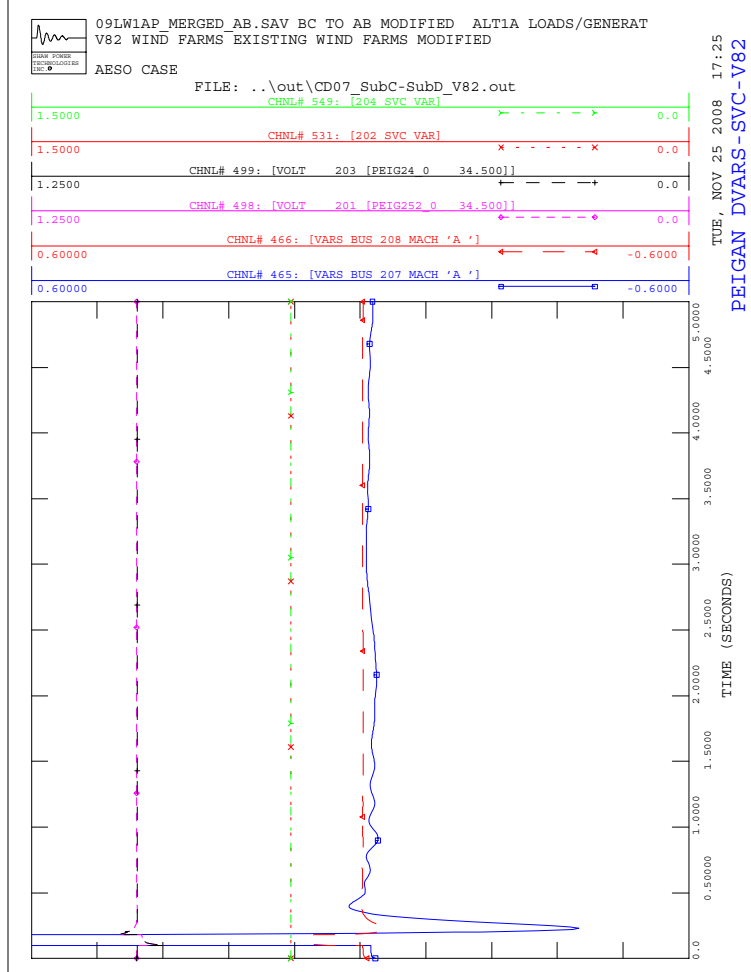
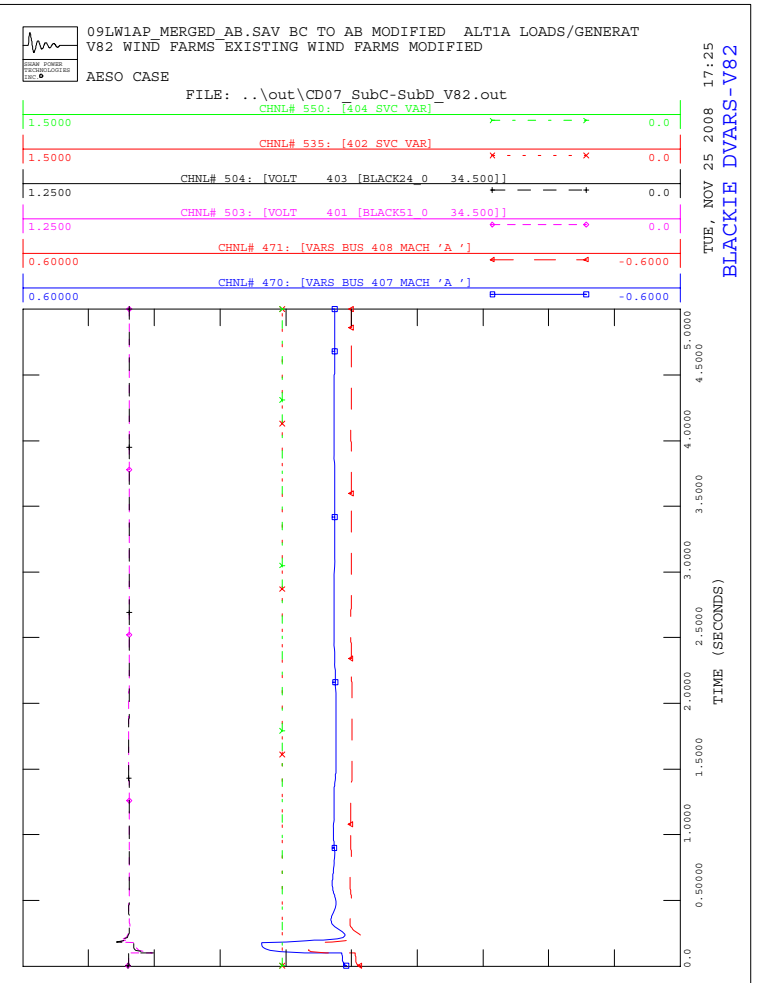
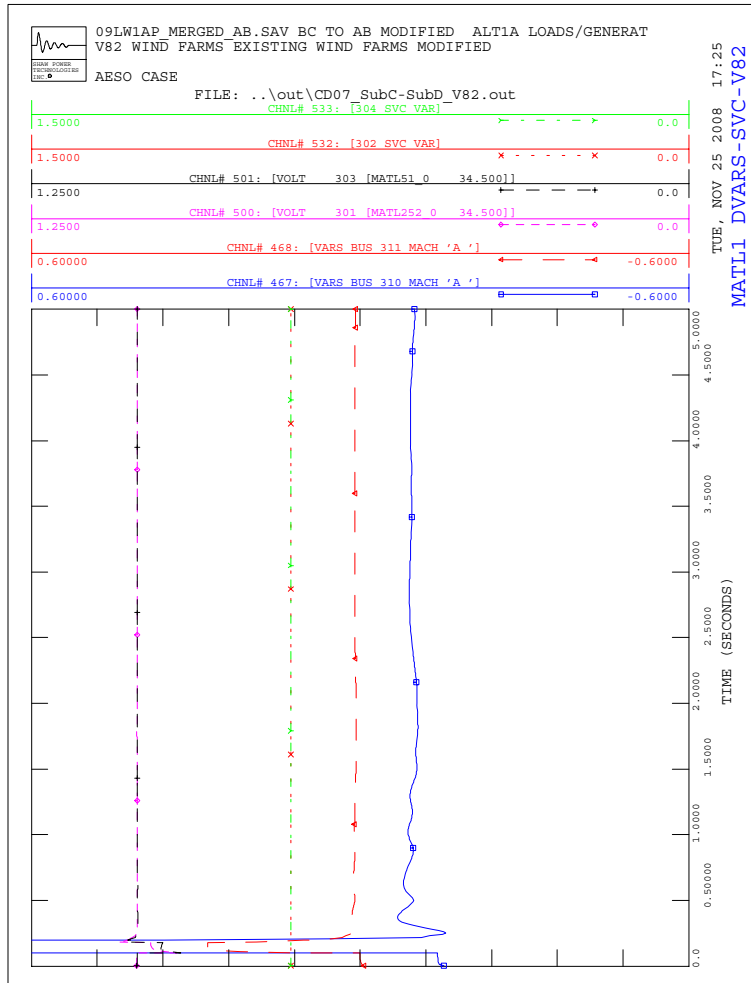
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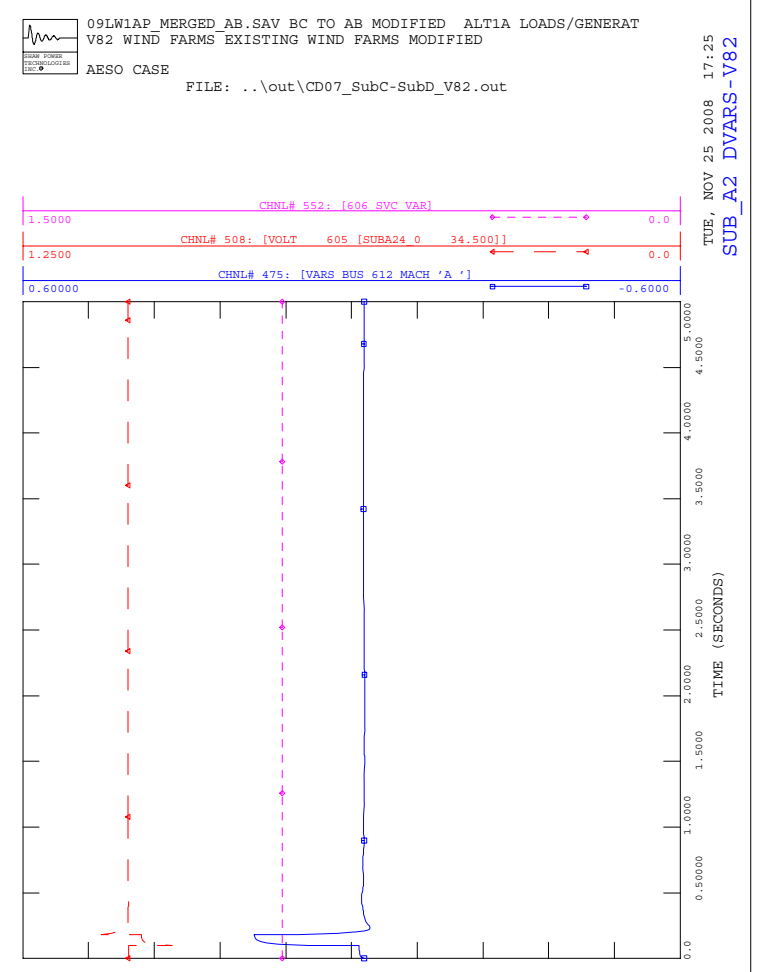
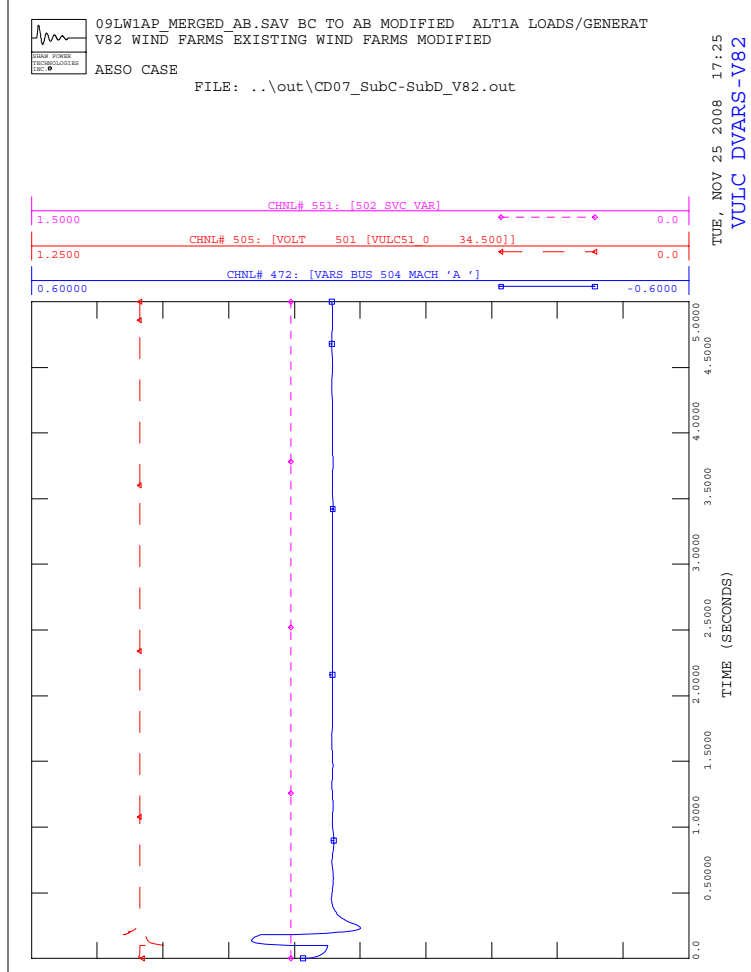
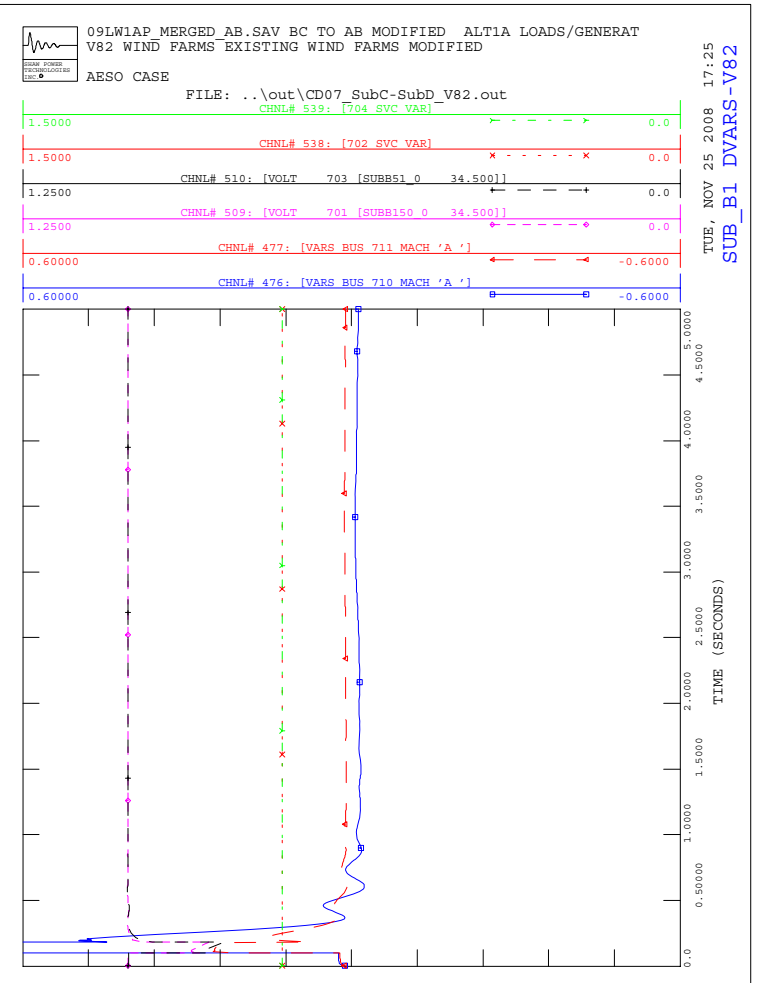
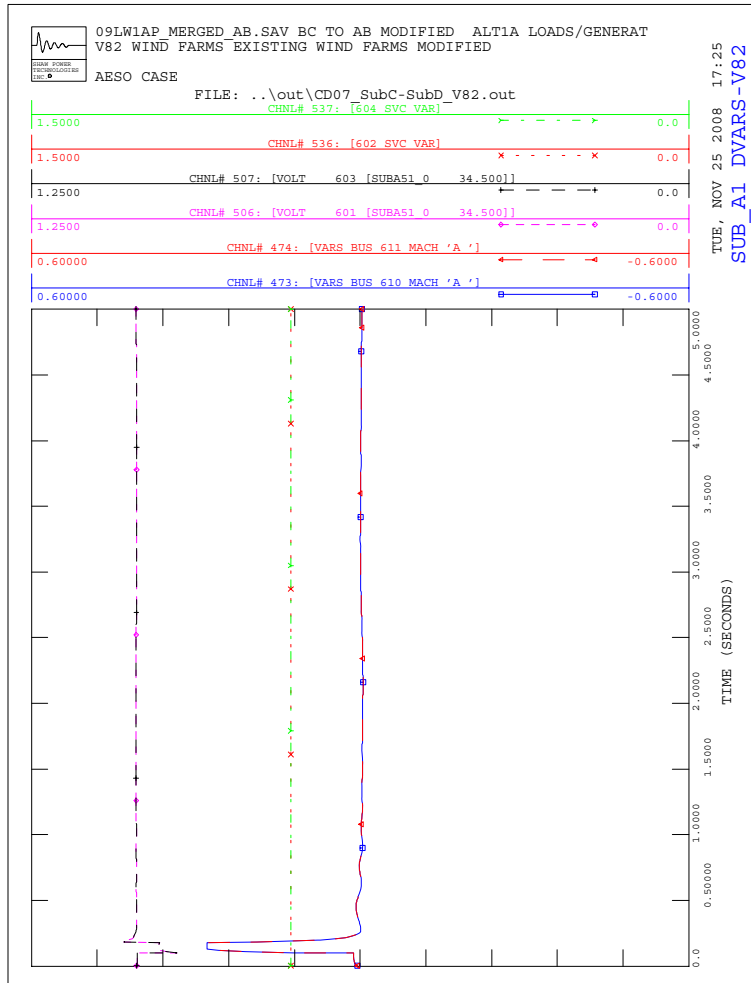


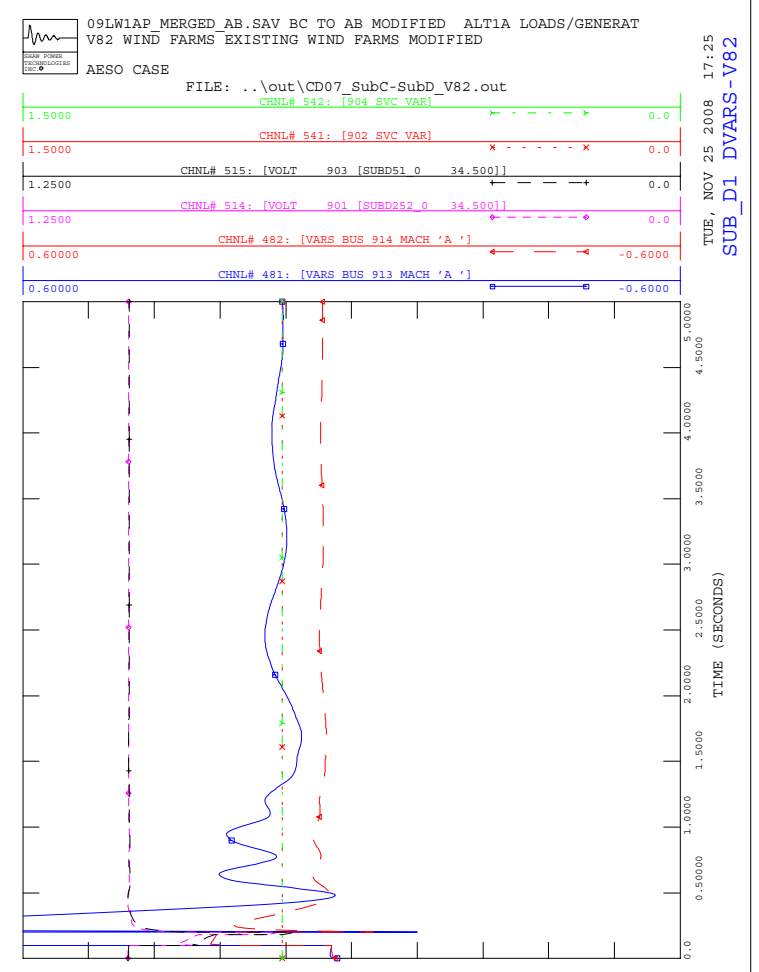
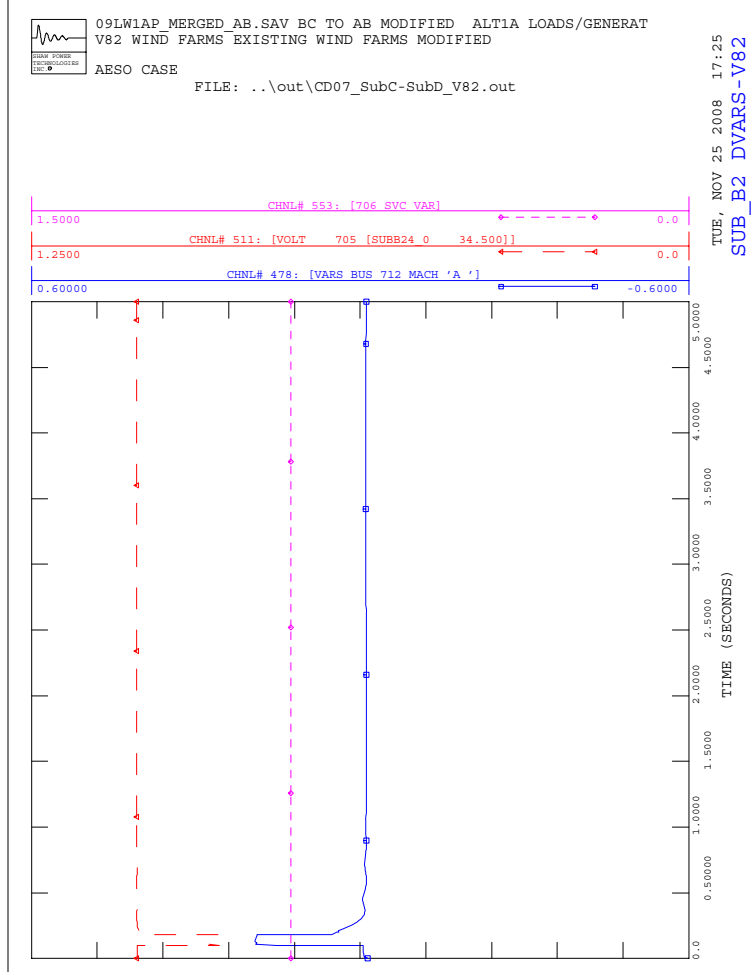
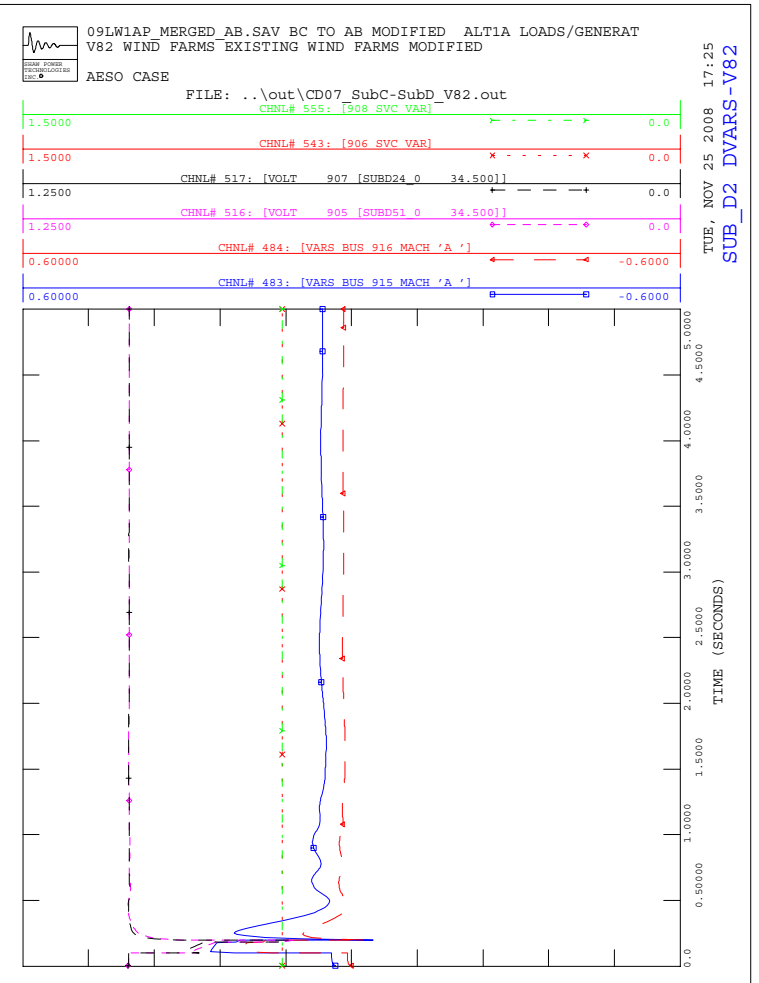
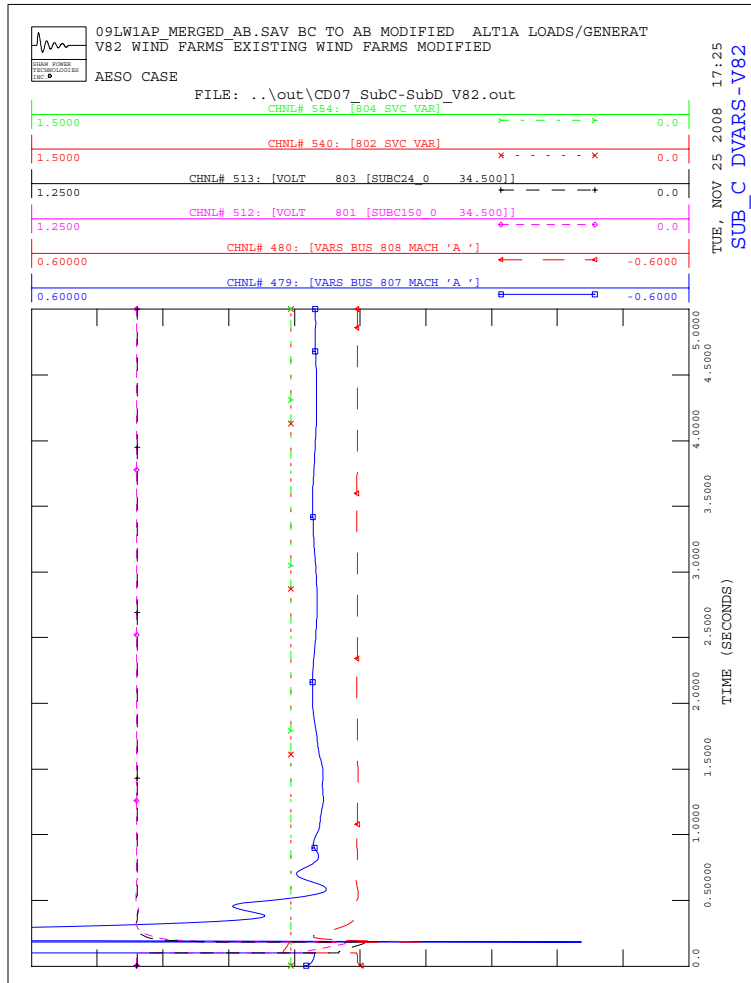


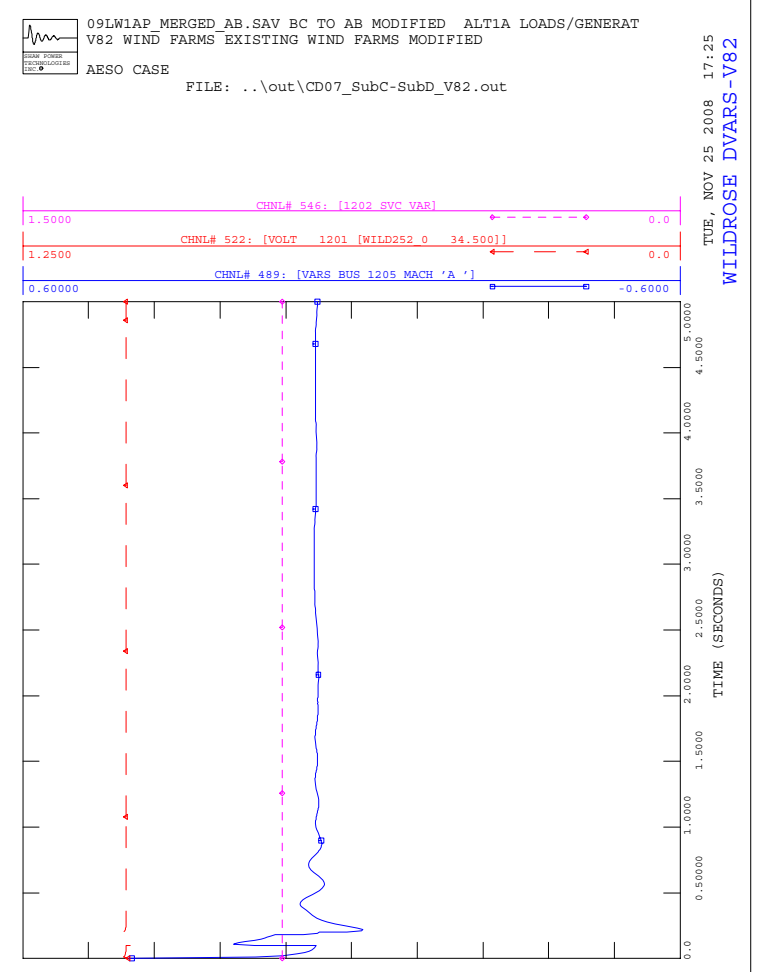
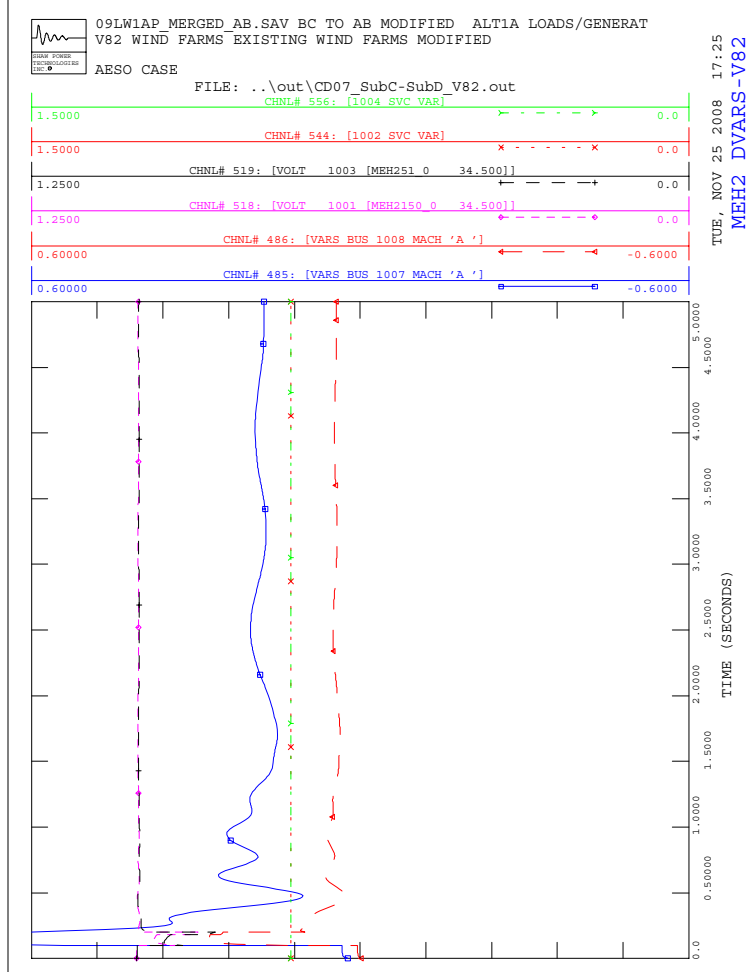
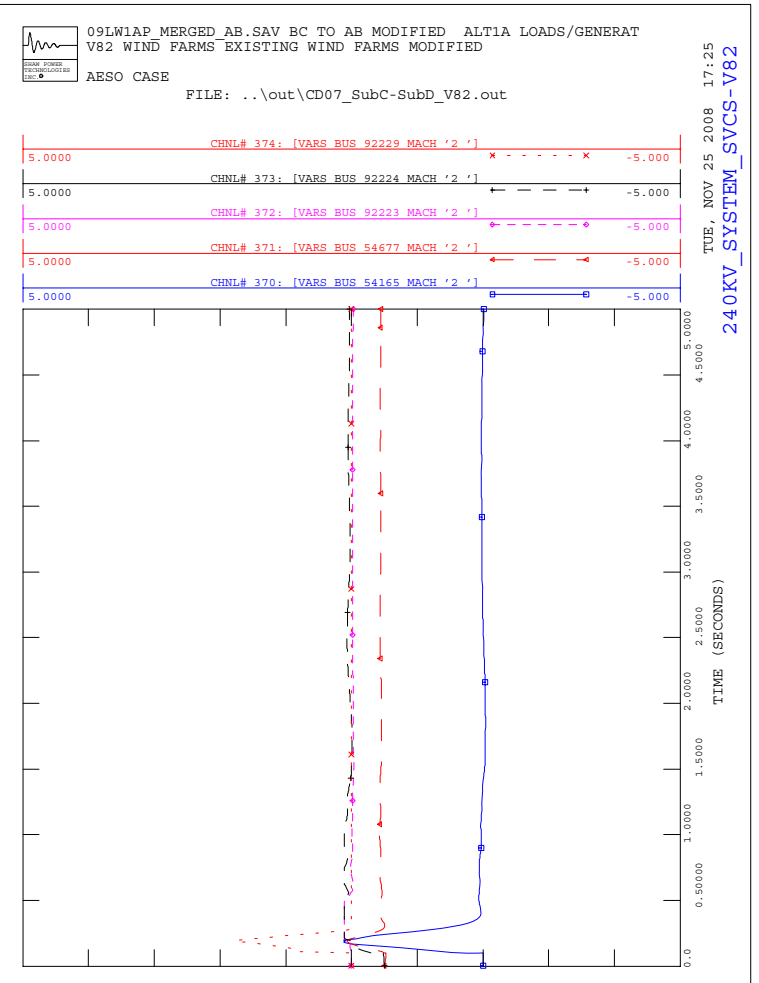
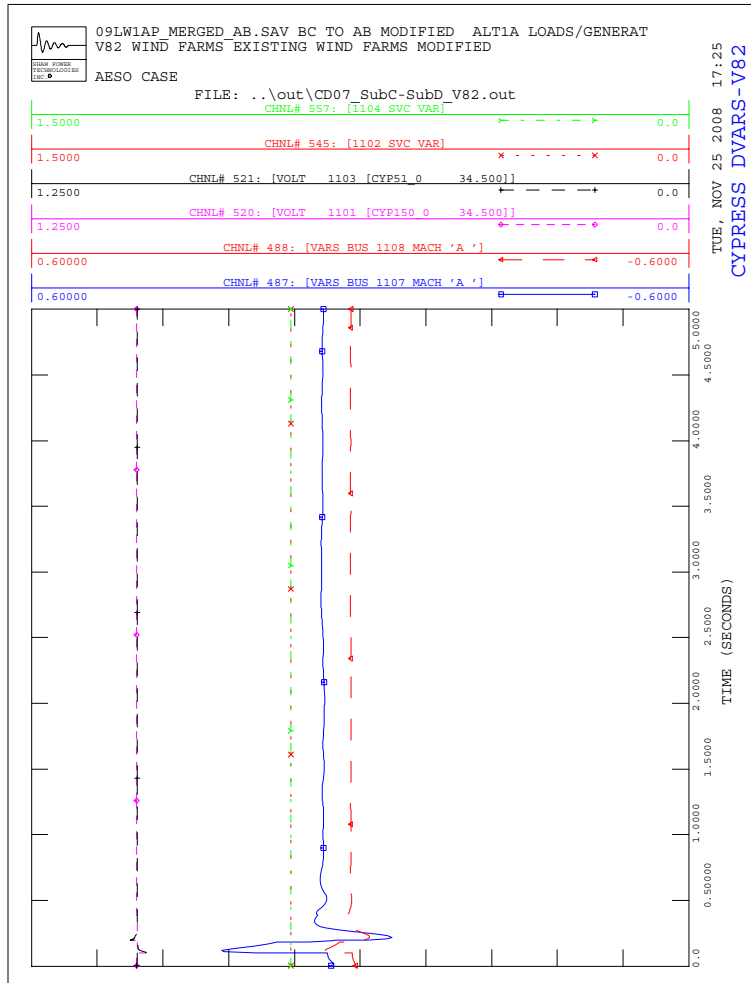












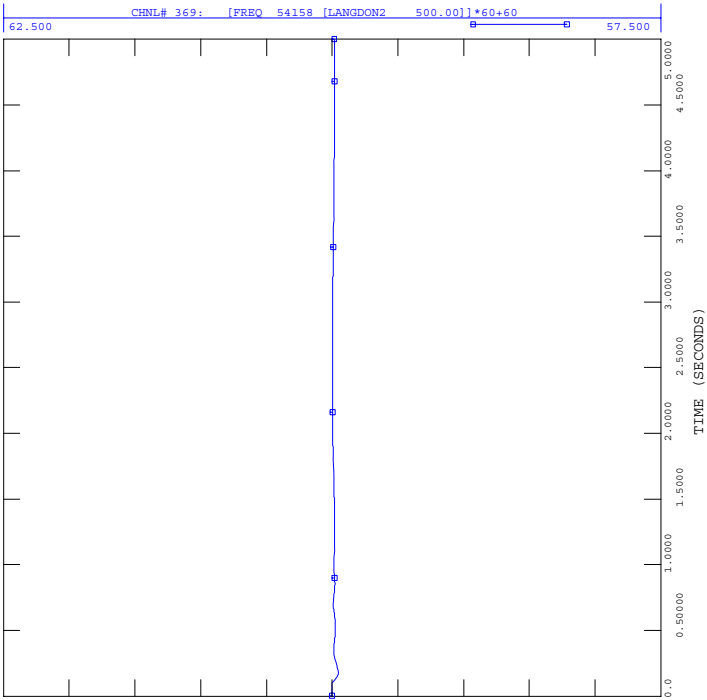


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD07_SubC-SubD_V82.out

TUE, NOV 25 2008 17:25
LANGDON_FRQ-V82

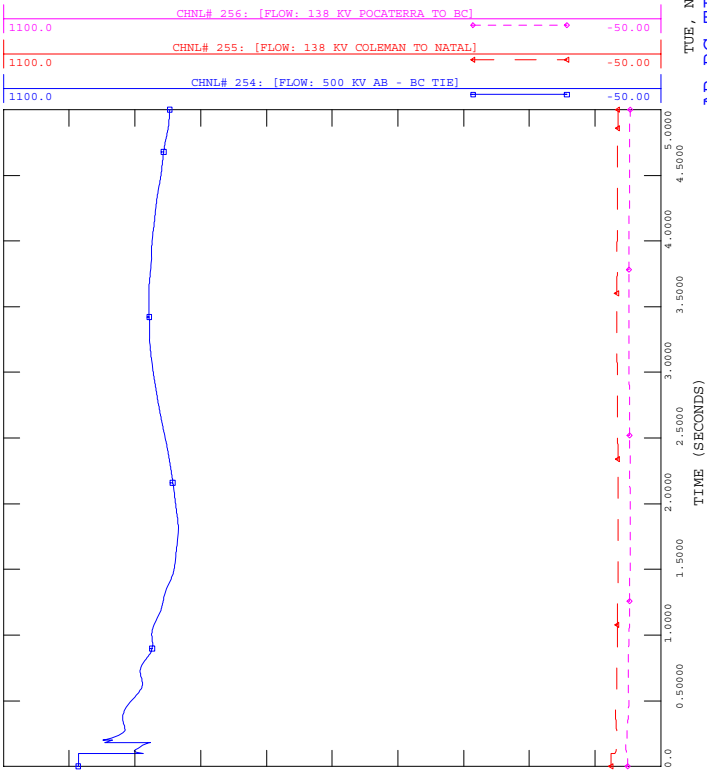


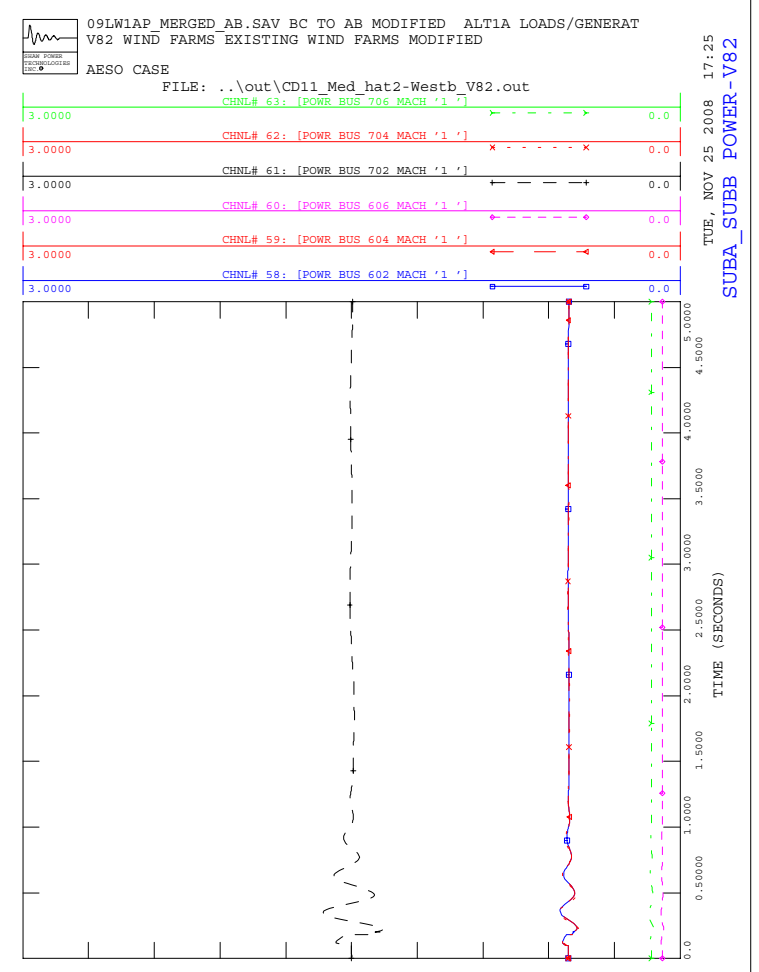
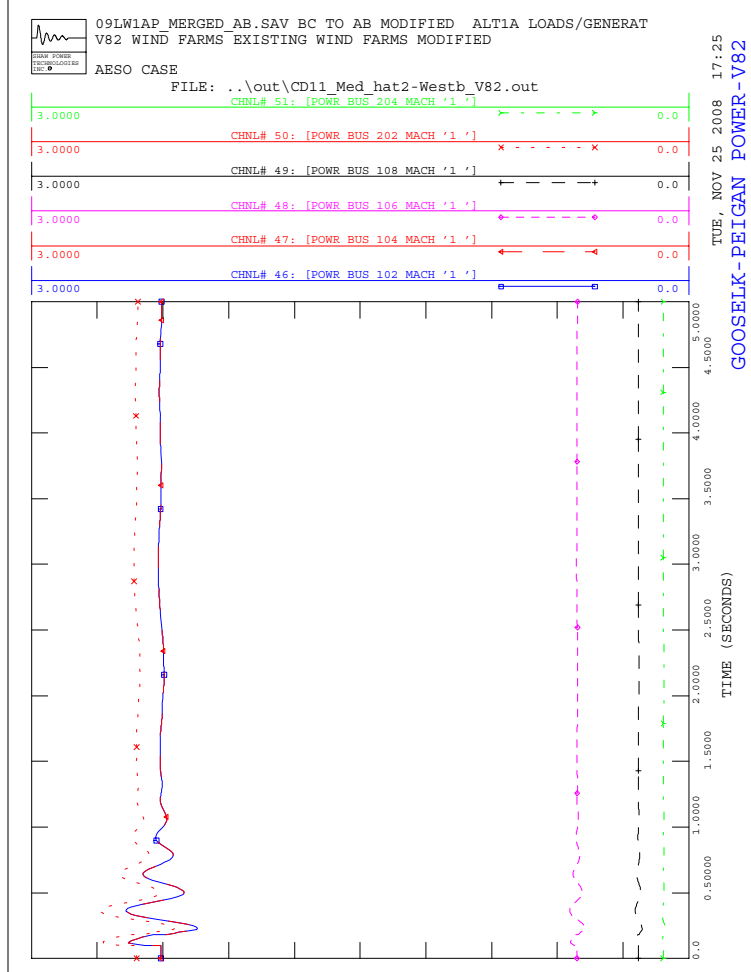
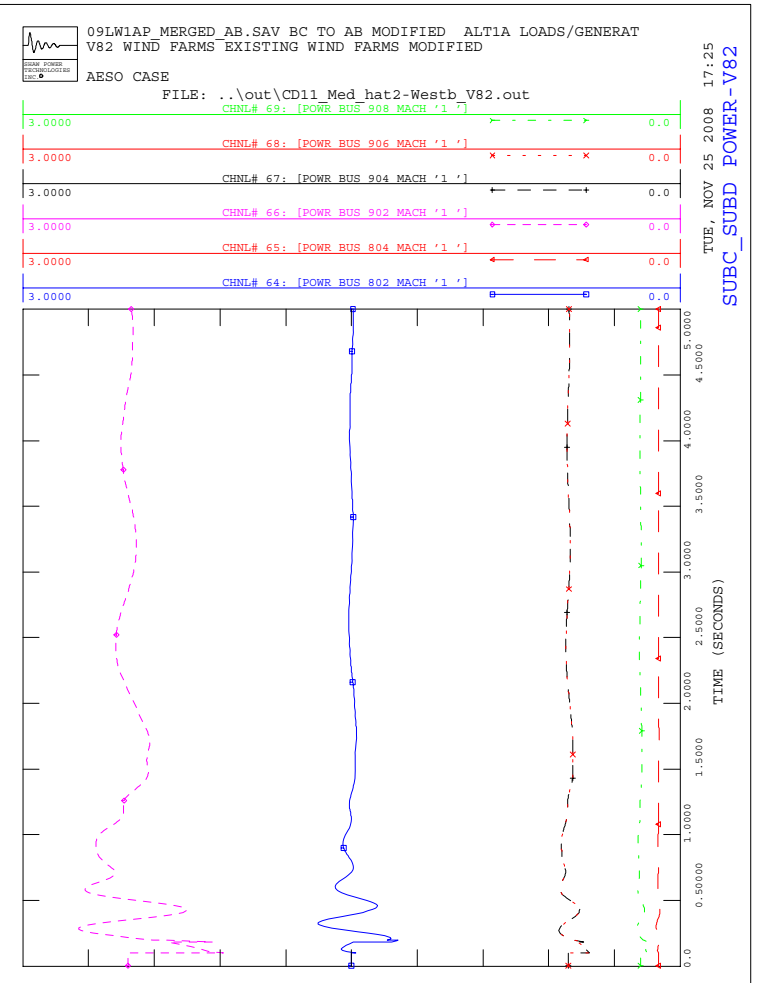
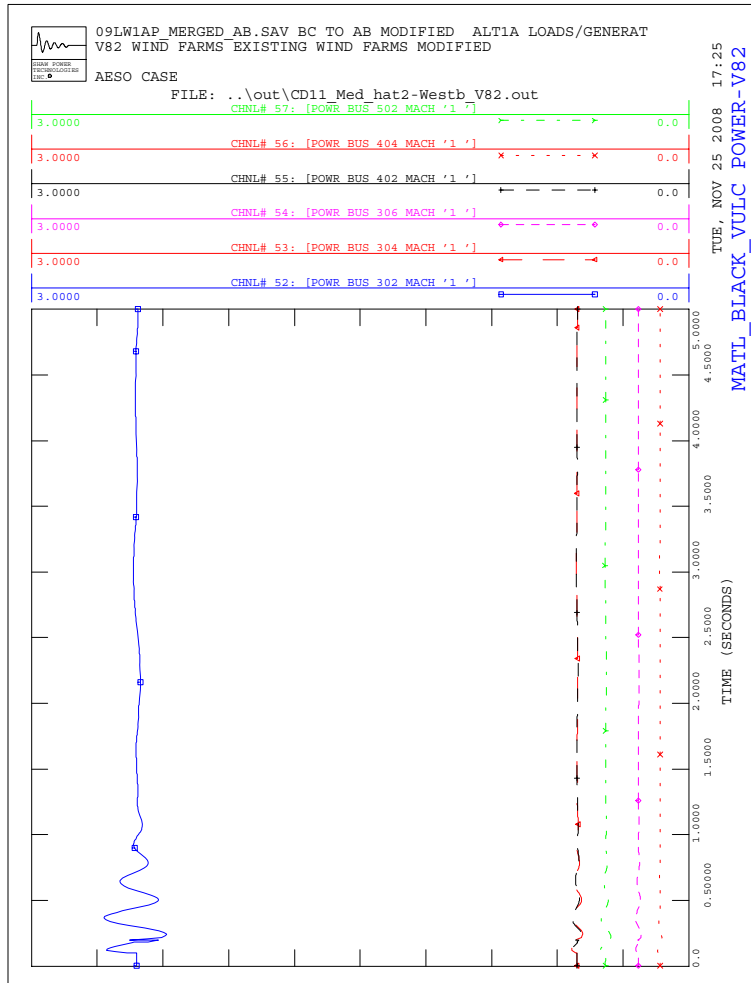
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

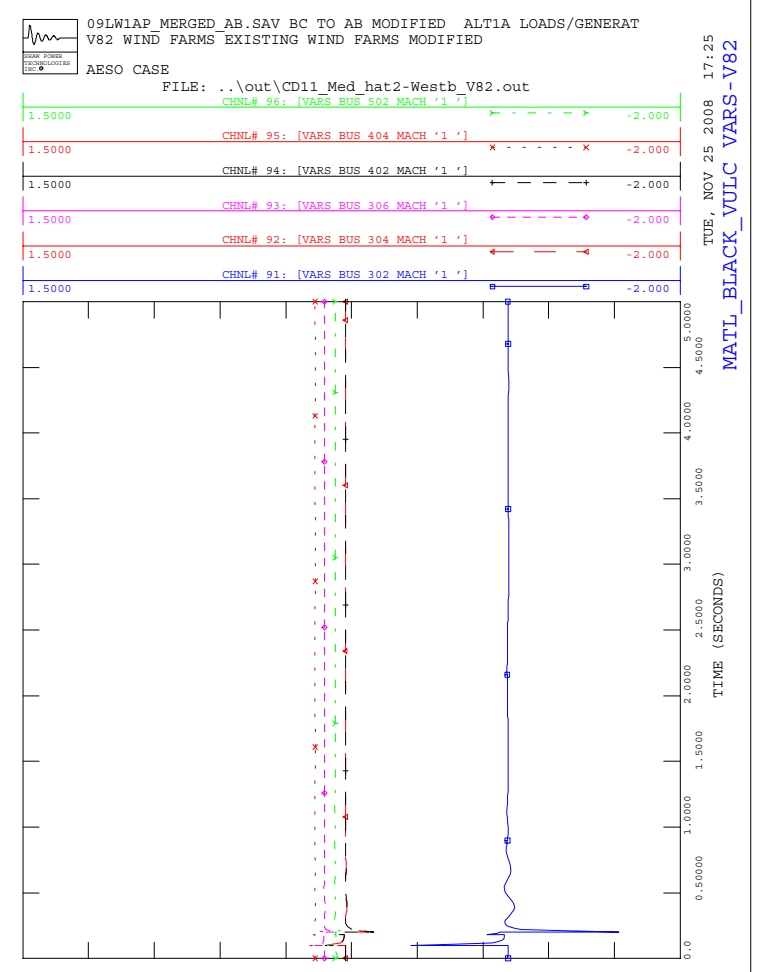
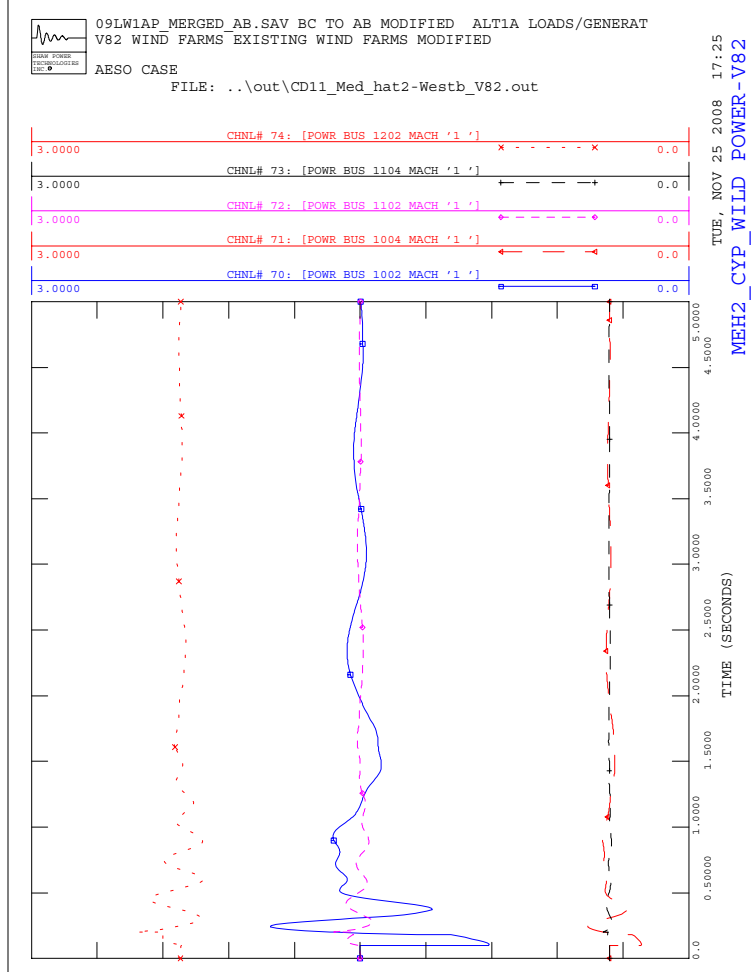
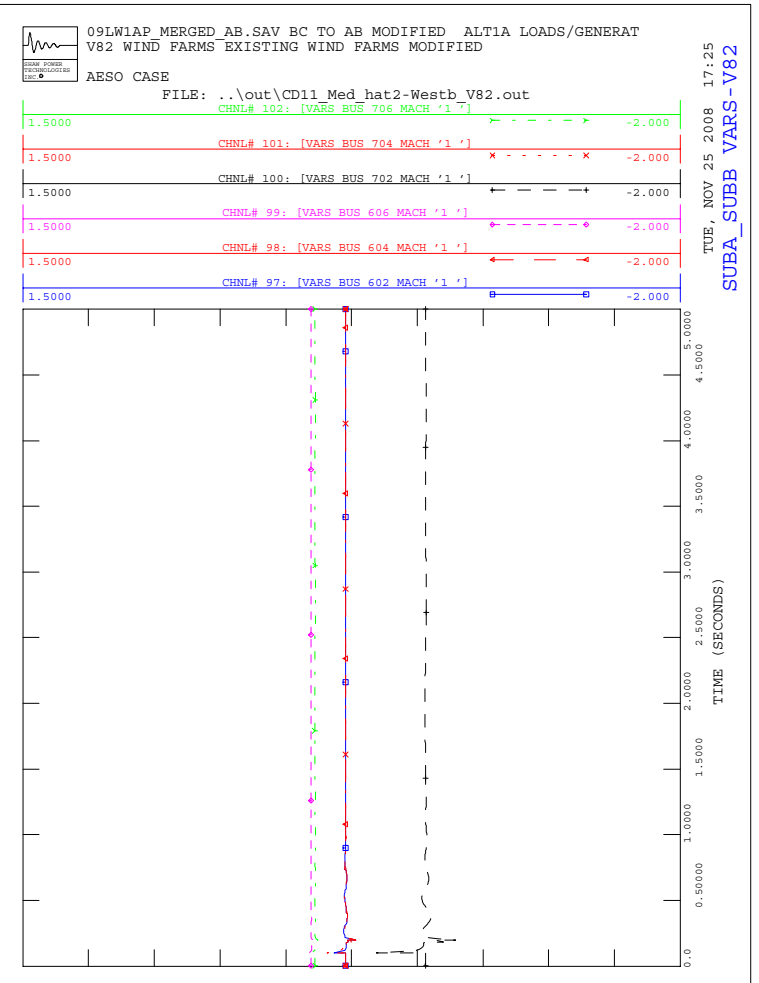
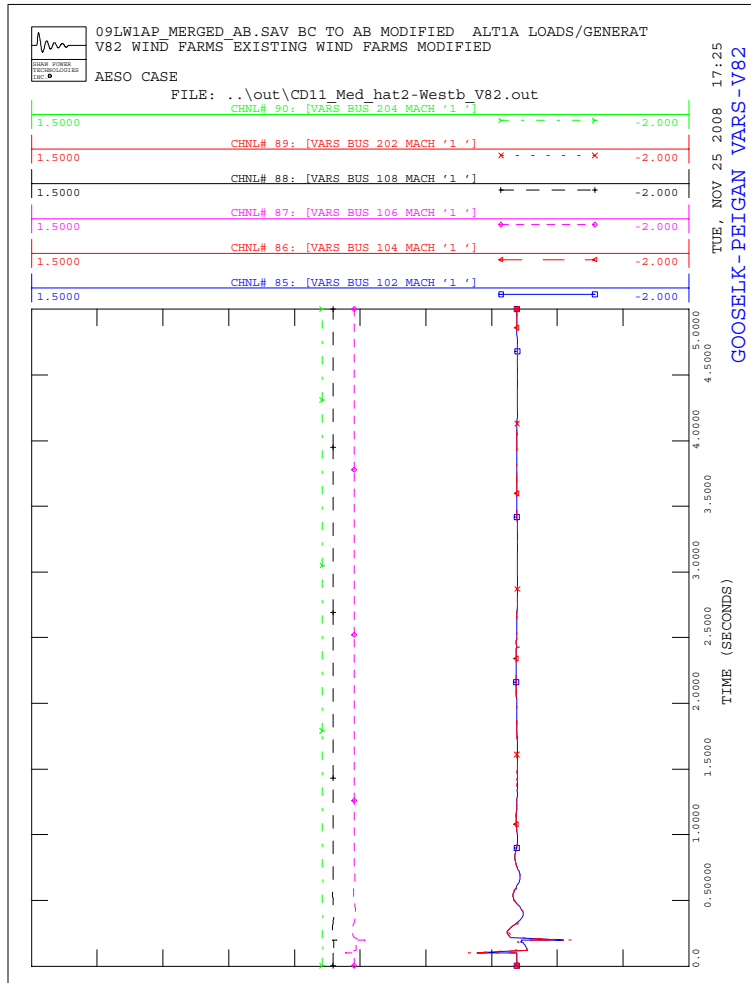
ABSO CASE

FILE: ..\out\CD07_SubC-SubD_V82.out

TUE, NOV 25 2008 17:25
AB_BC_TIE_FLOWS-V82

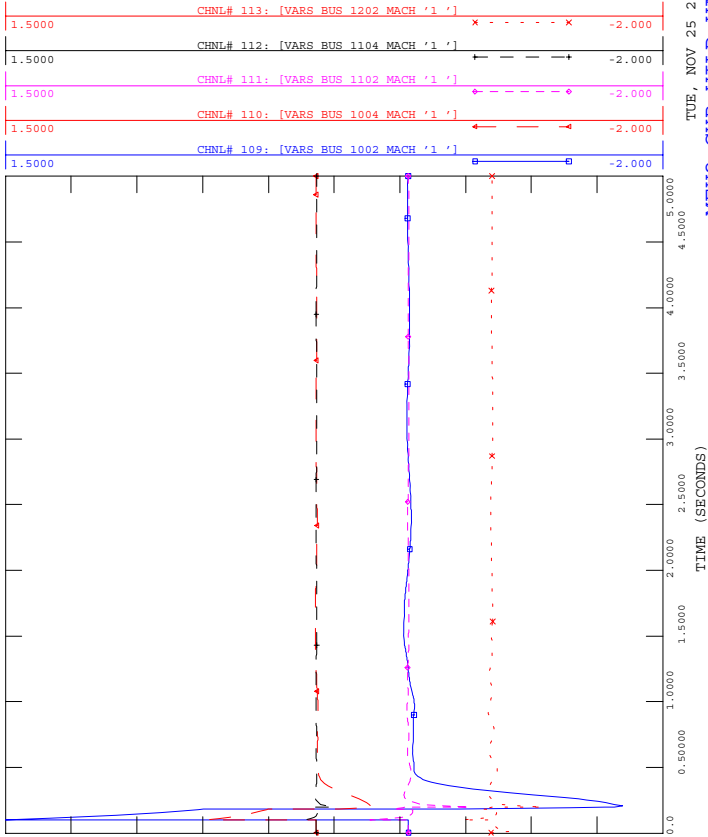






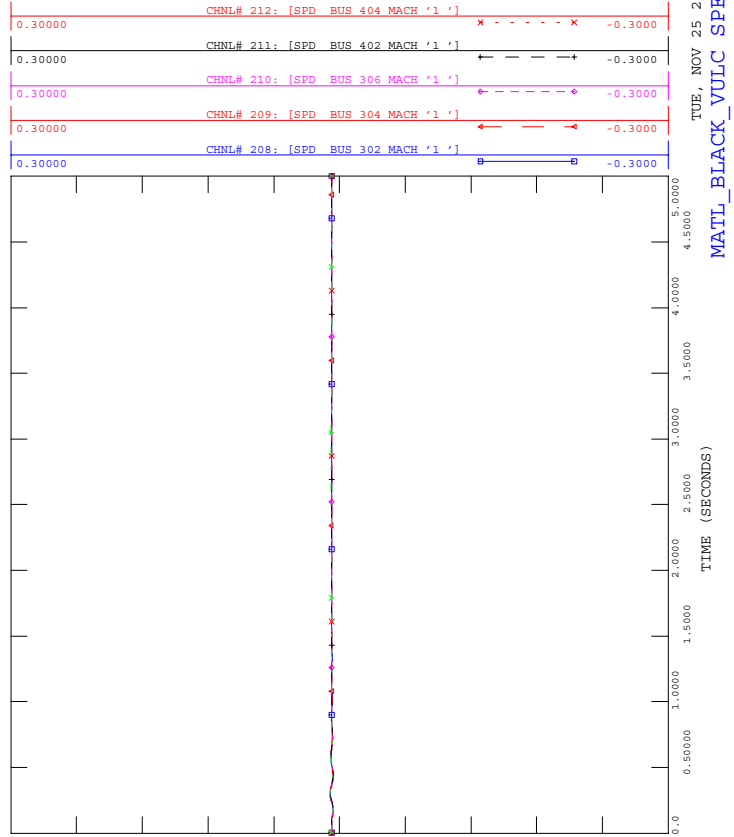
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out



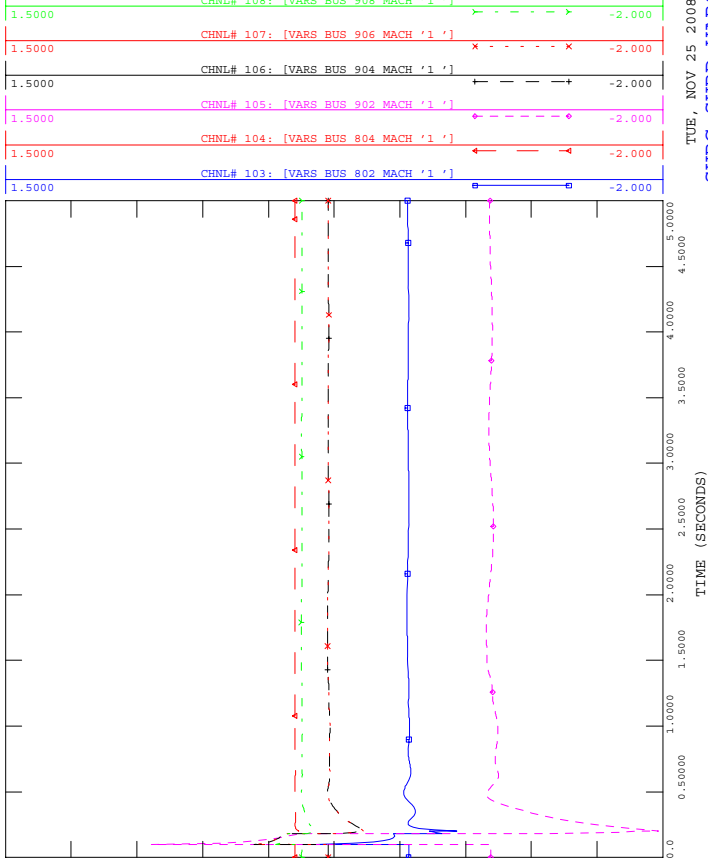
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out



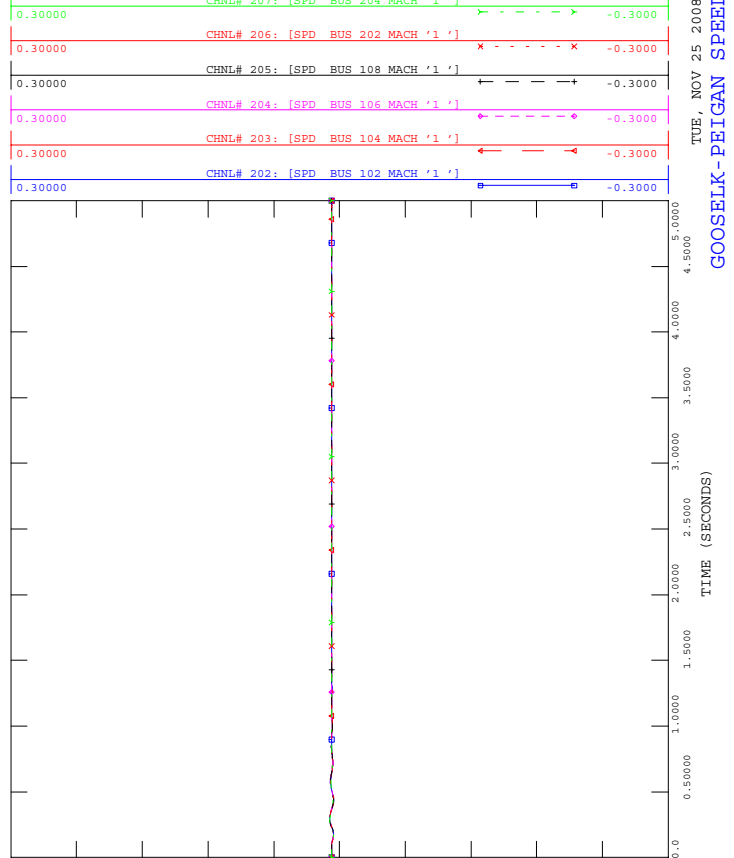
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out



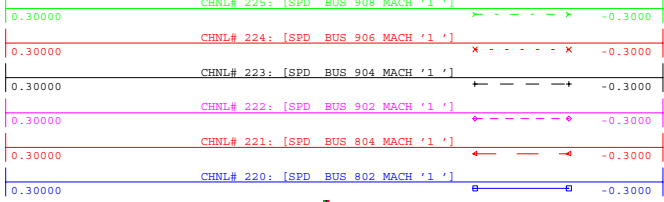
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out

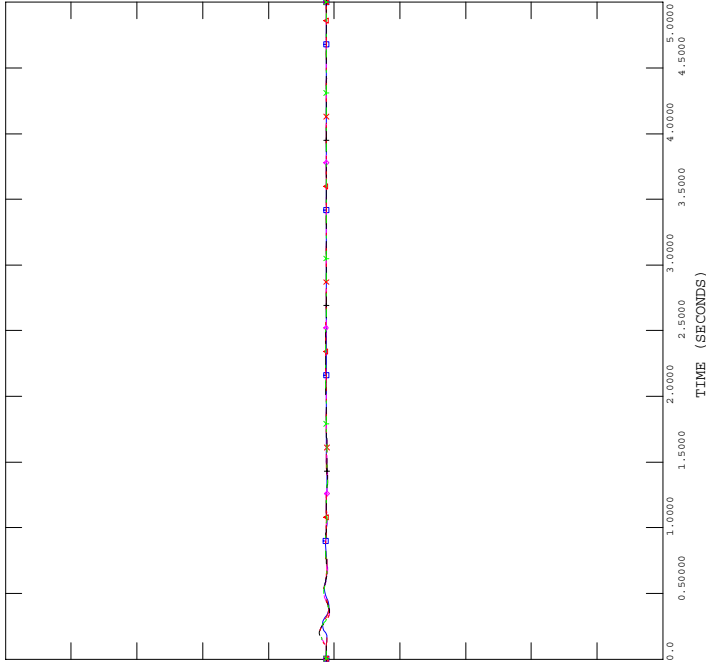


09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out
CHNL# 225: [SPD_BUS 908 MACH '1 ']

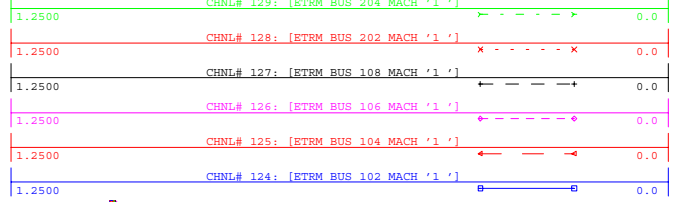


TUE, NOV 25 2008 17:25
SUBC_SUBD SPEED -V82

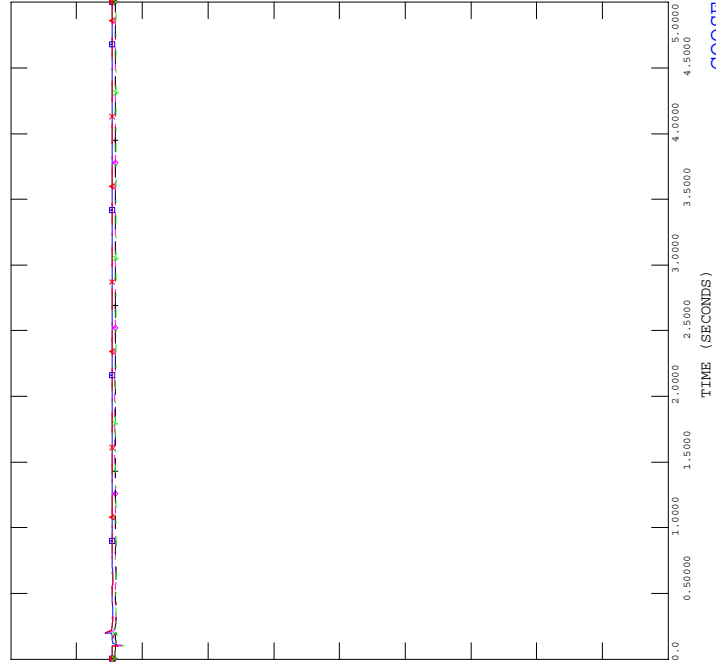


09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out
CHNL# 129: [ETRM_BUS 204 MACH '1 ']

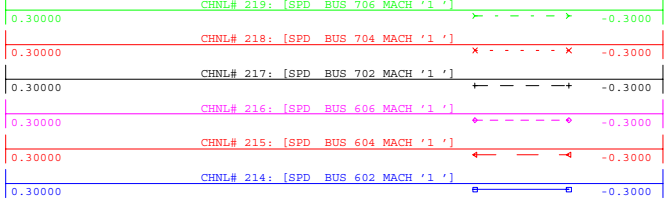


TUE, NOV 25 2008 17:25
GOOSELK-PEIGAN ETERM -V82

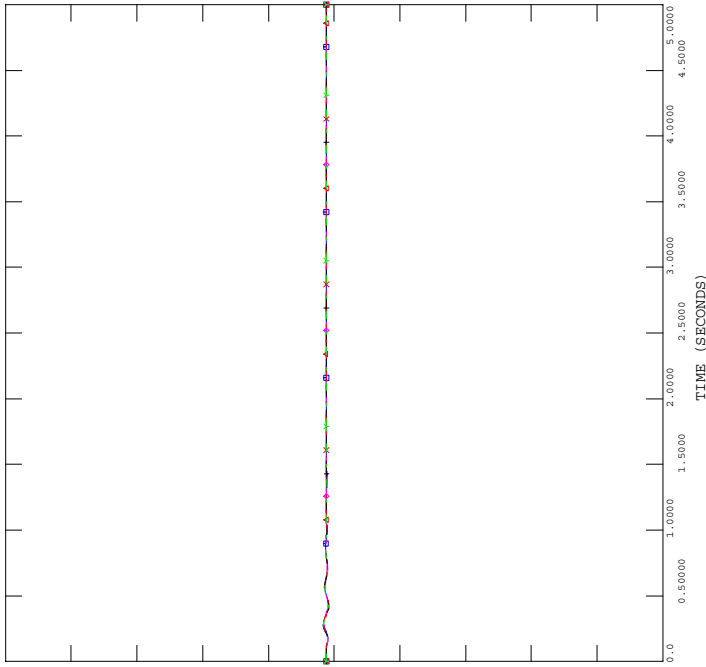


09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out
CHNL# 219: [SPD_BUS 706 MACH '1 ']

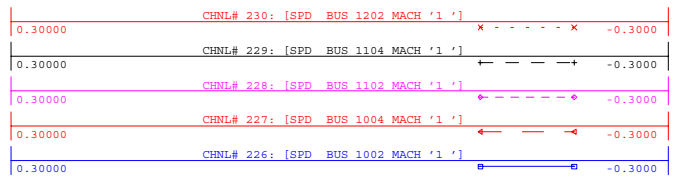


TUE, NOV 25 2008 17:25
SUBA_SUBD SPEED -V82

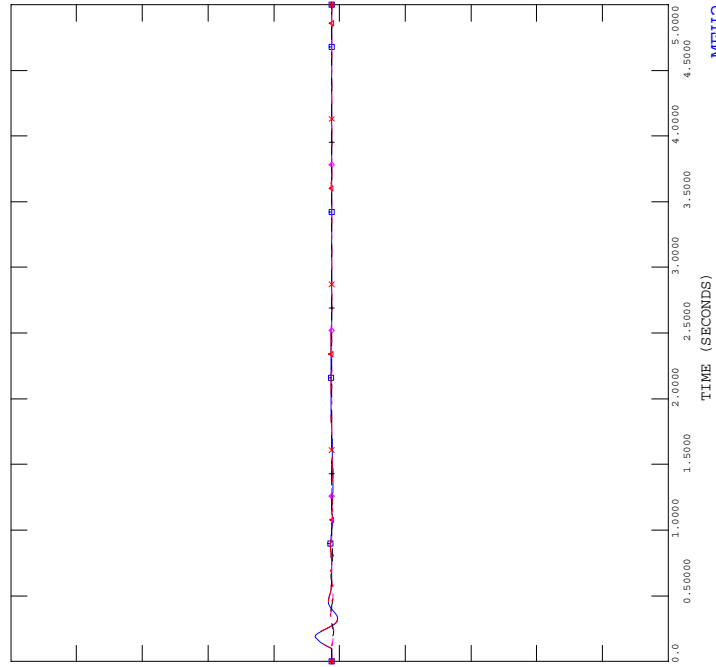


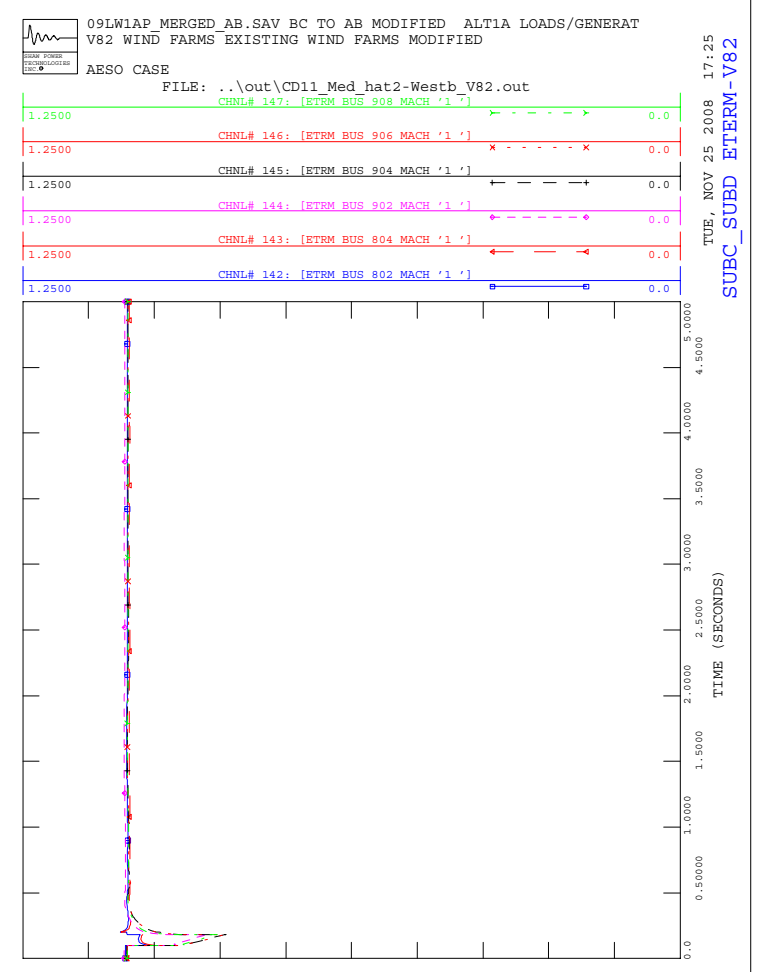
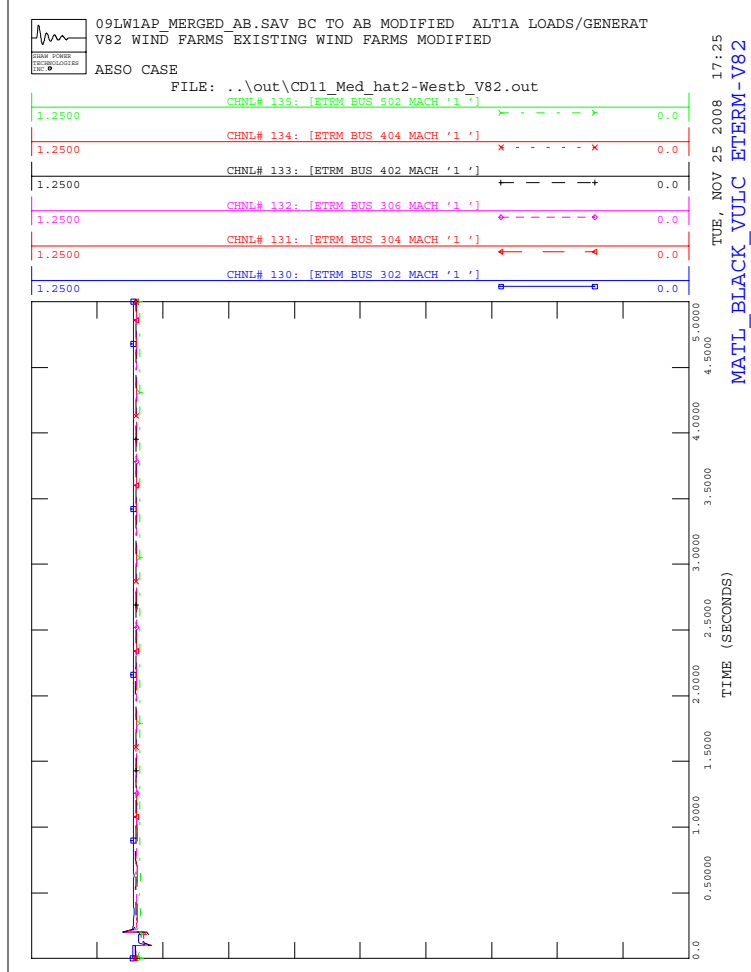
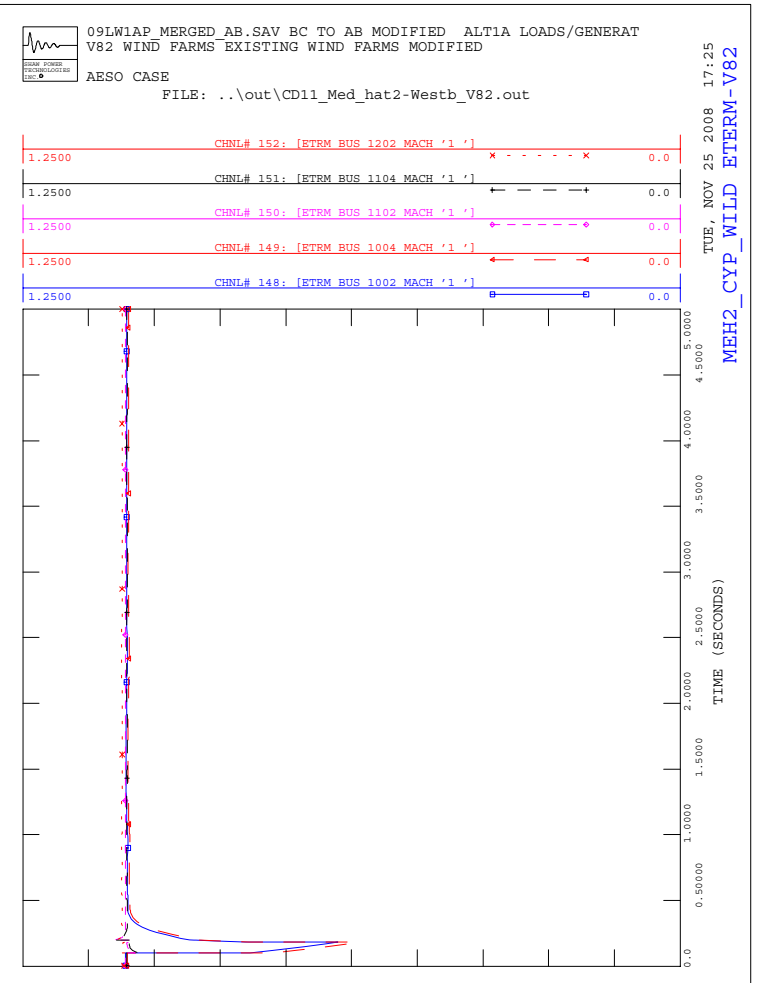
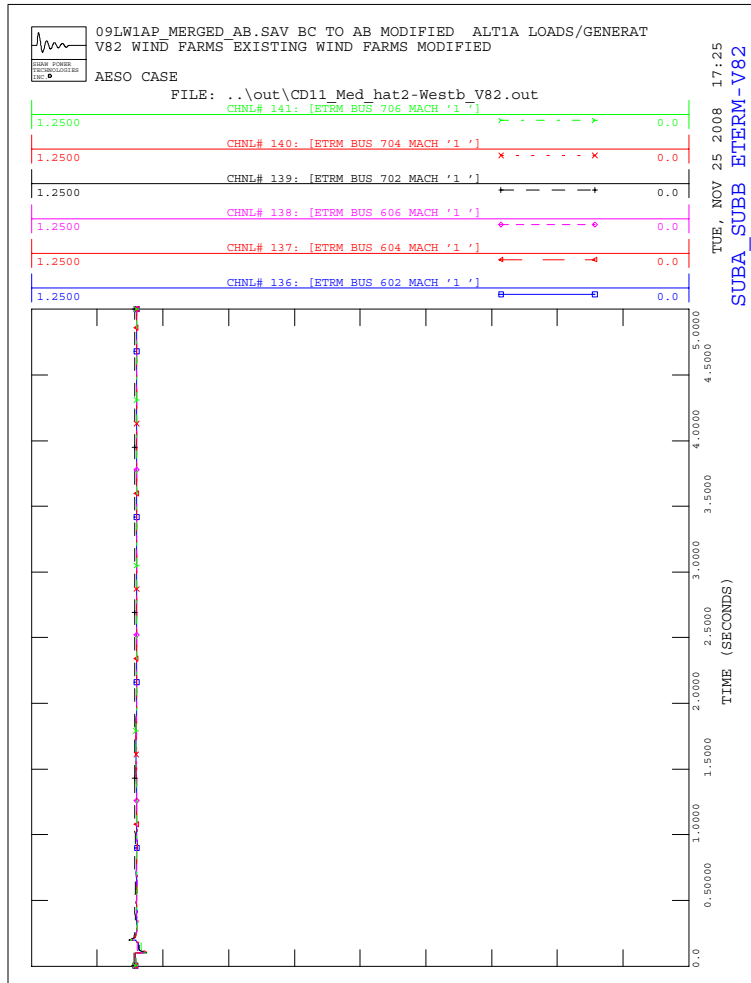
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

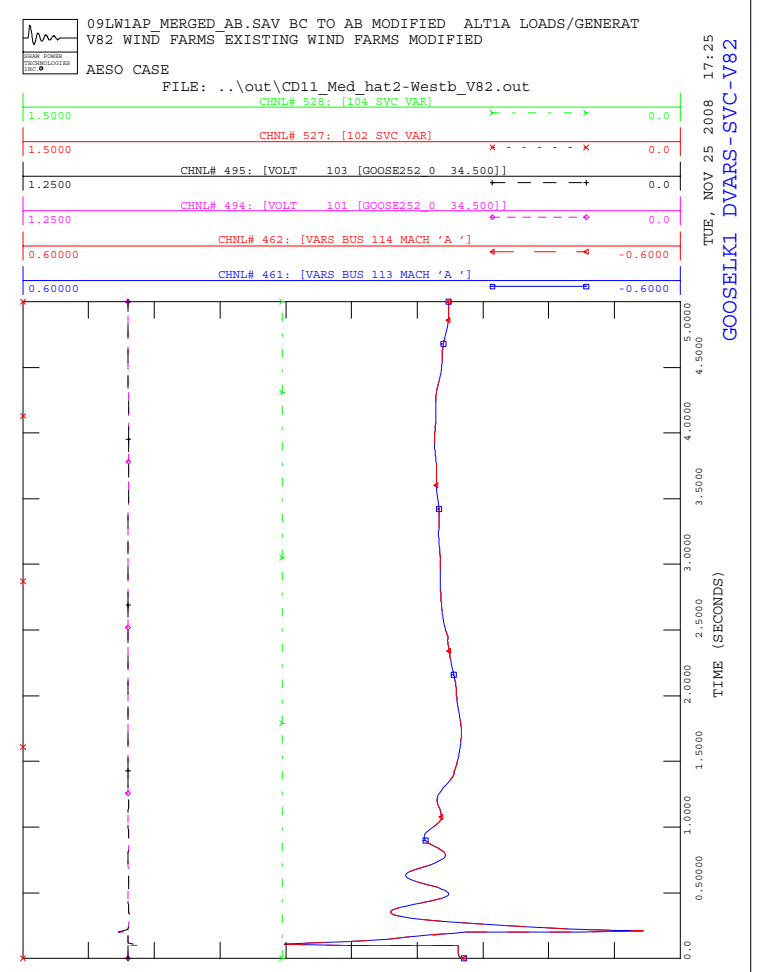
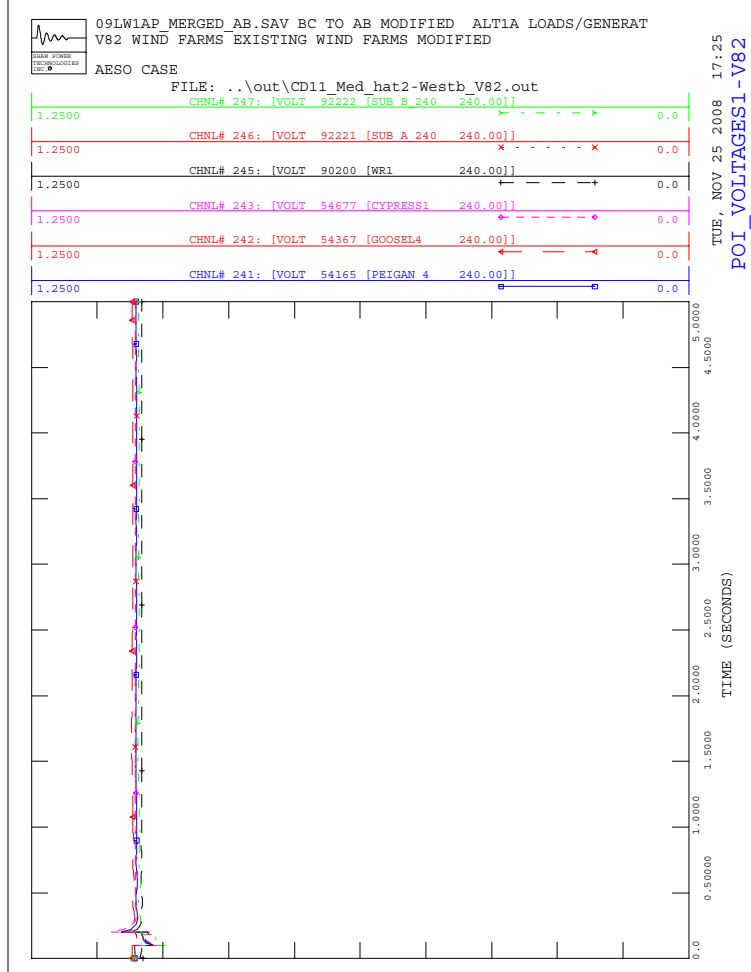
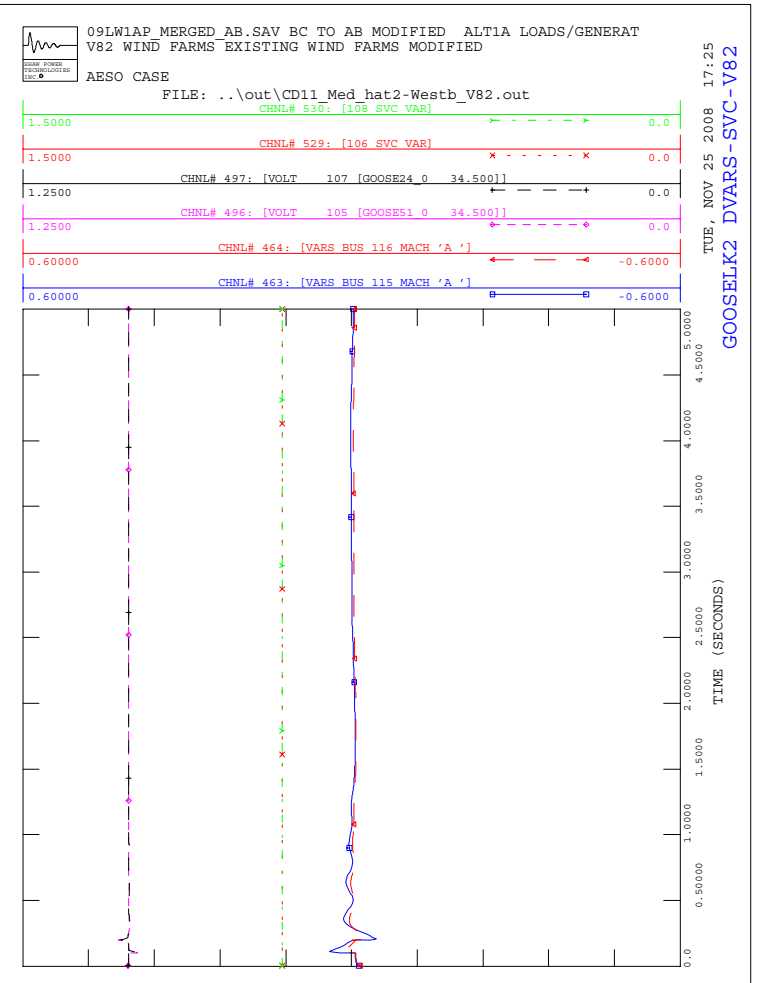
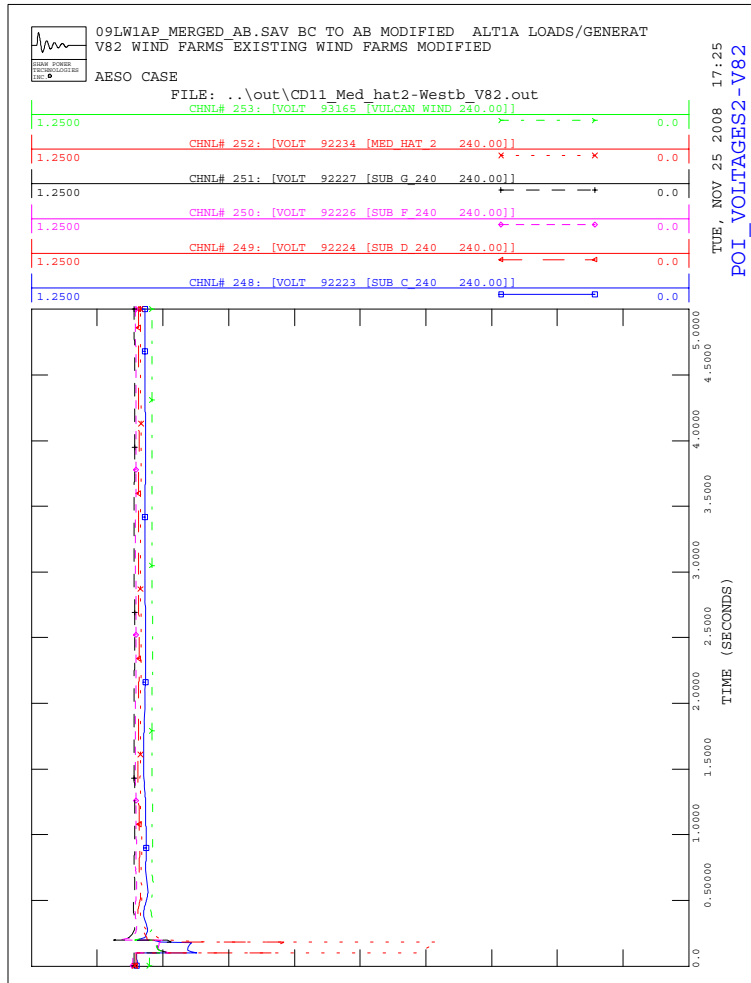
FILE: ..\out\CD11_Med_hat2-Westb_V82.out

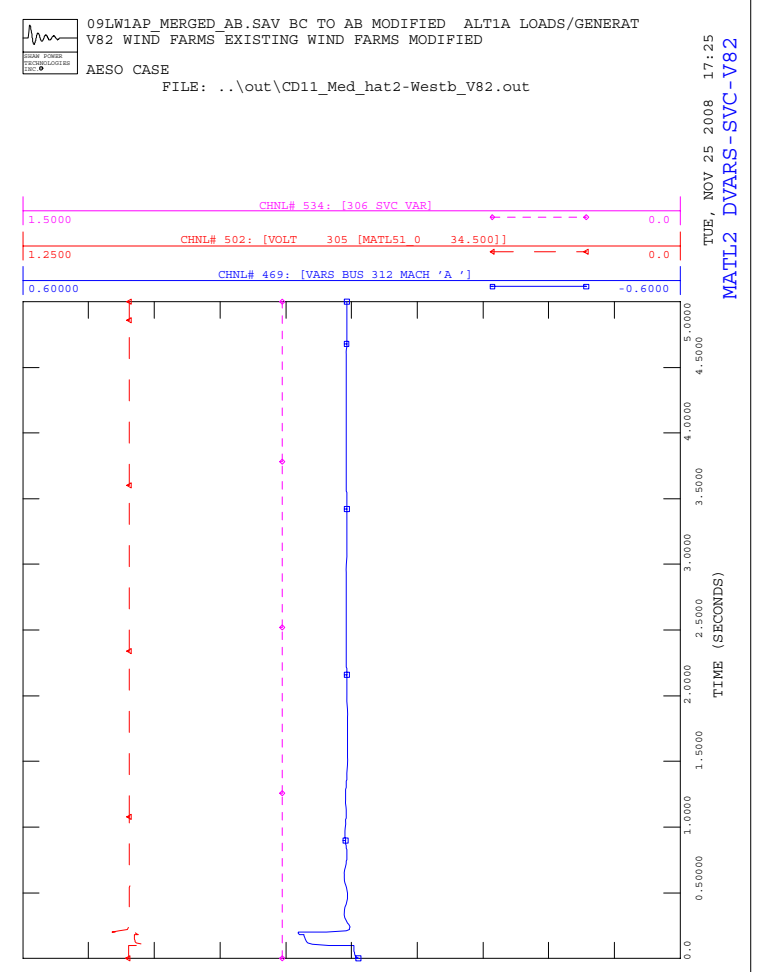
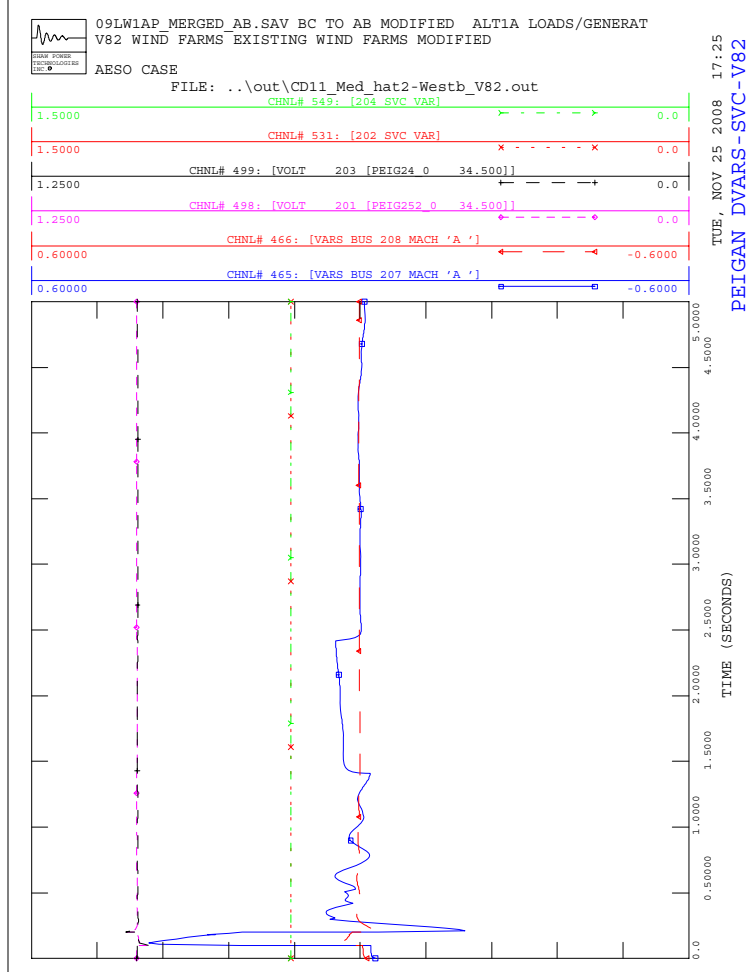
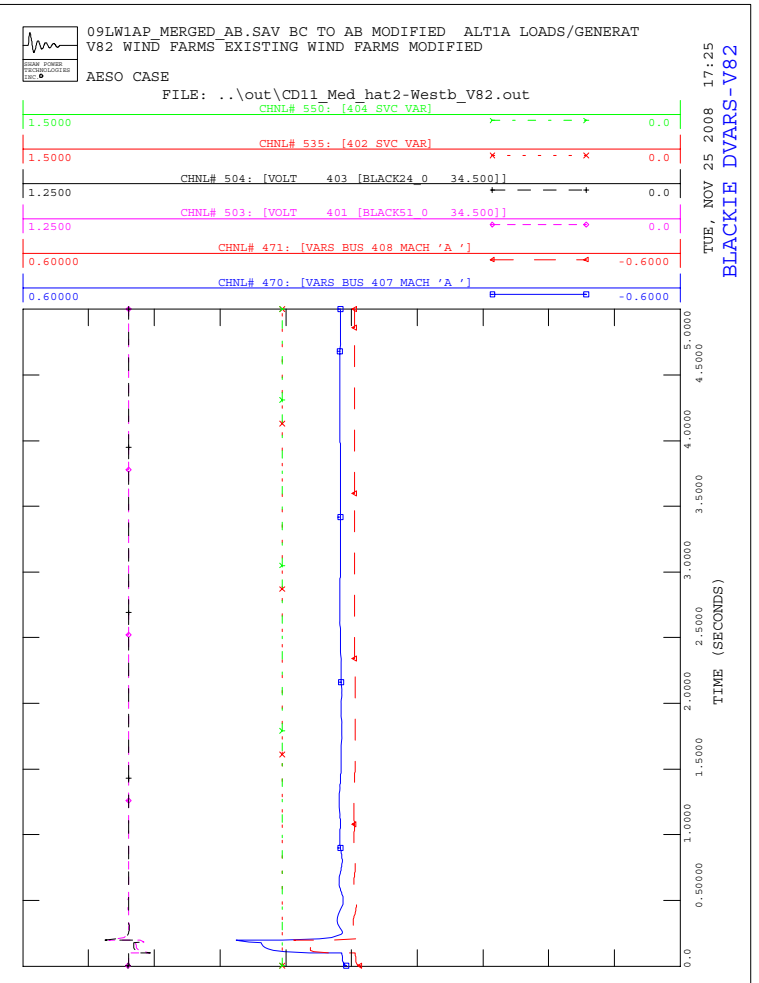
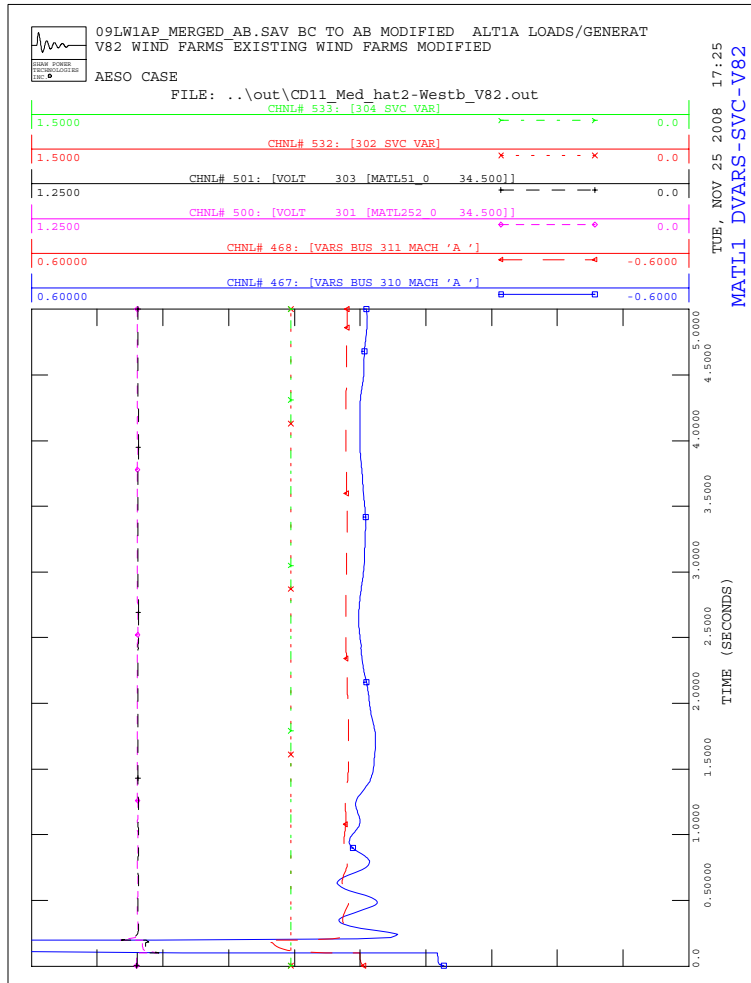


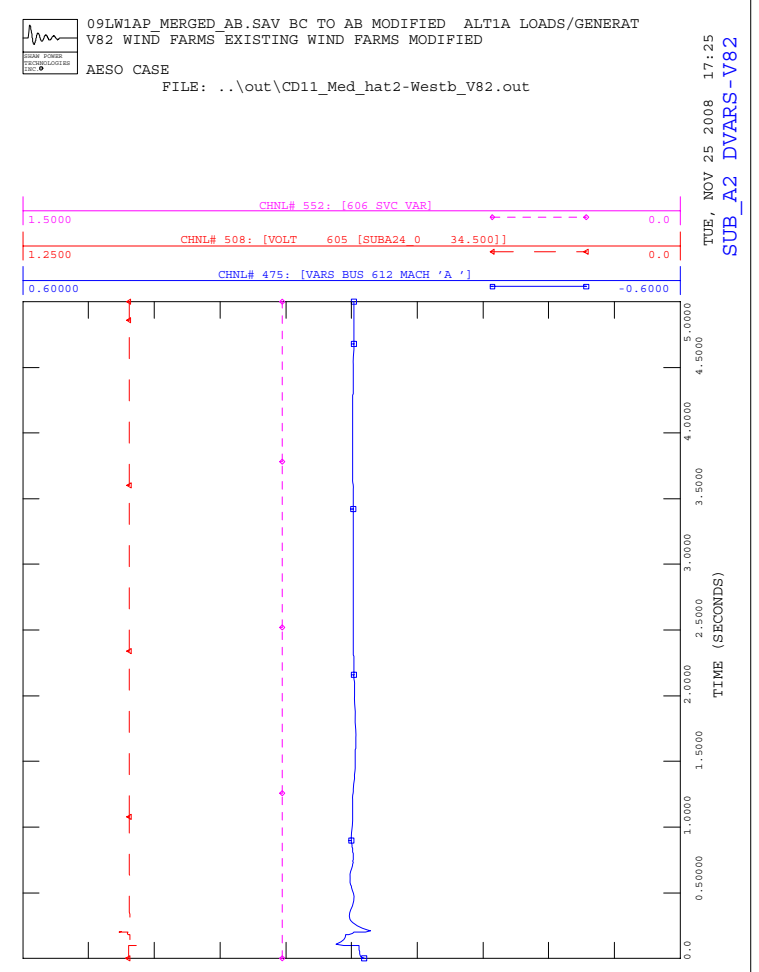
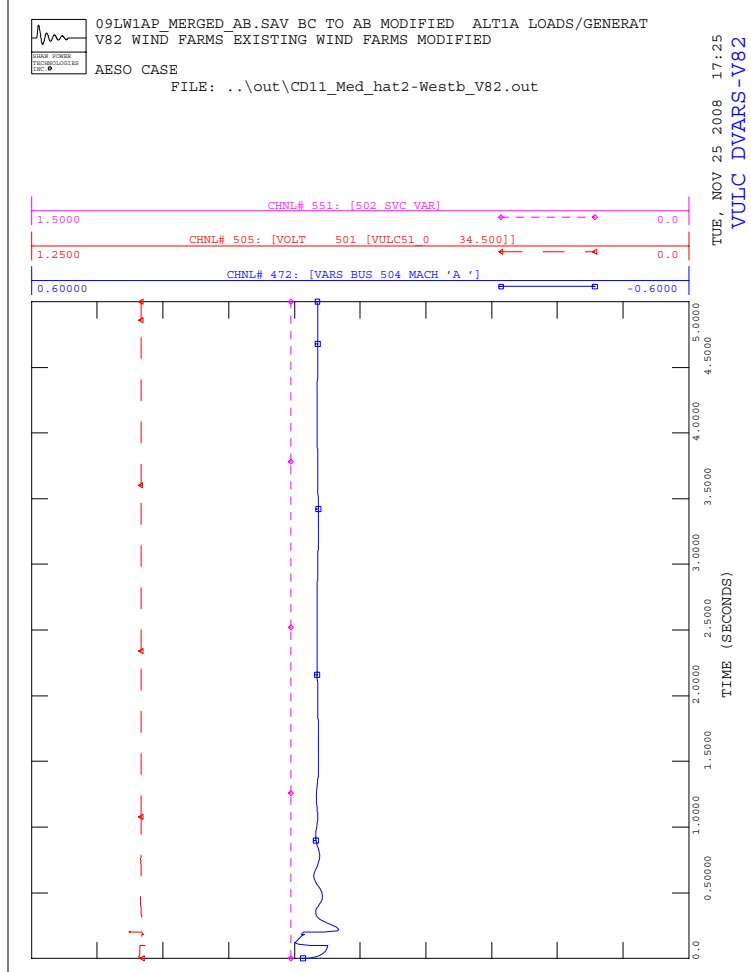
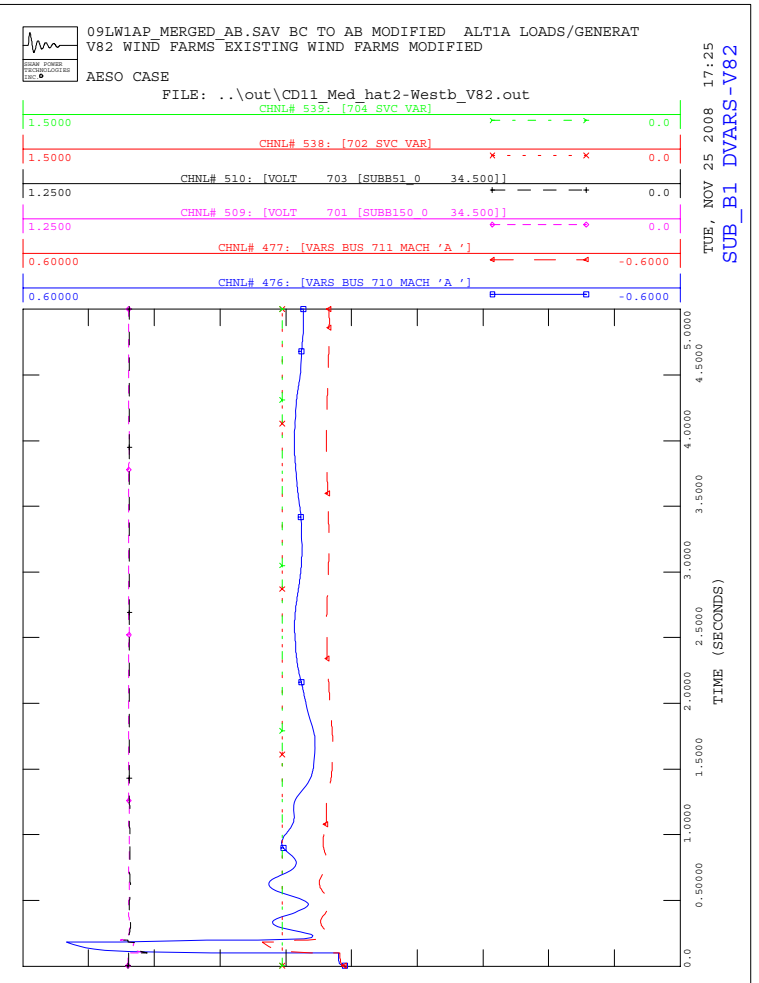
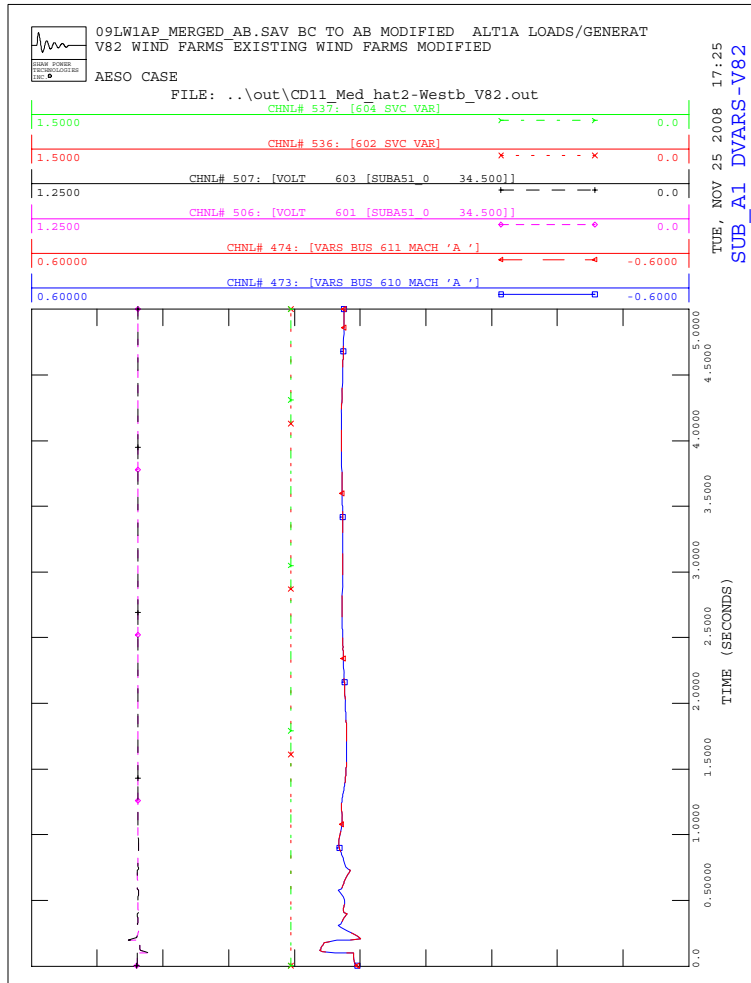
TUE, NOV 25 2008 17:25
MEH2_CYP_WILD SPEED -V82

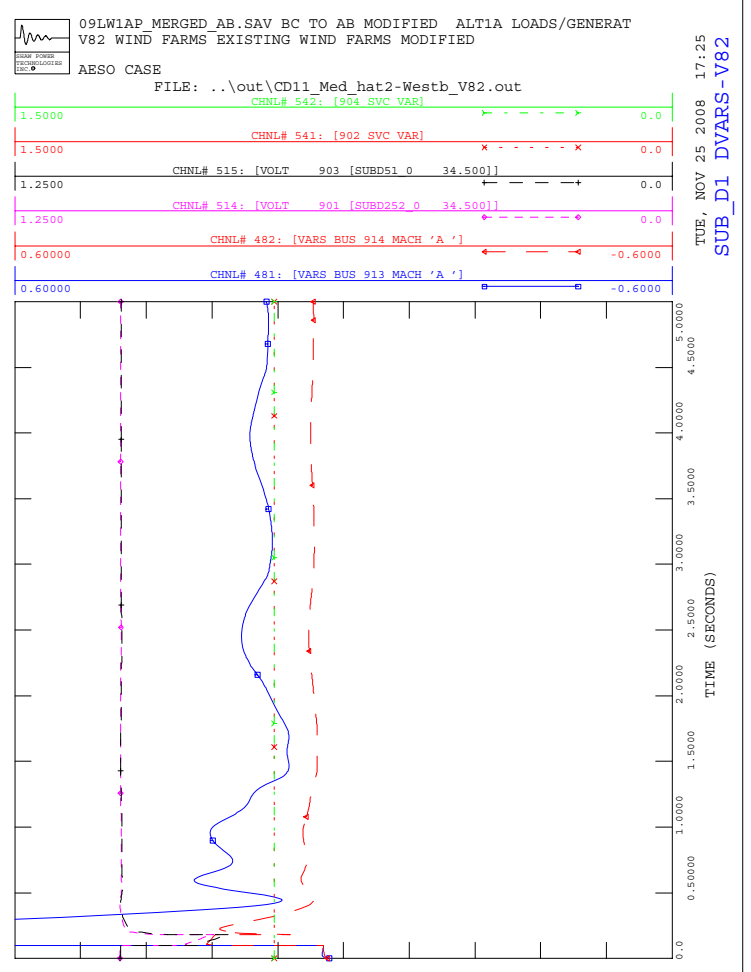
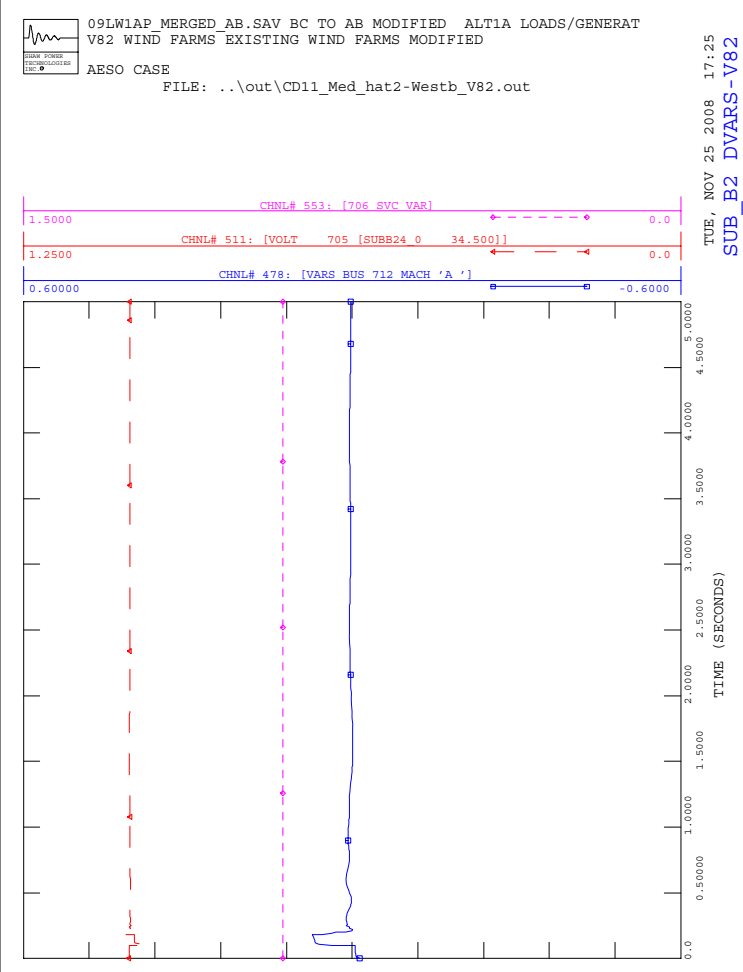
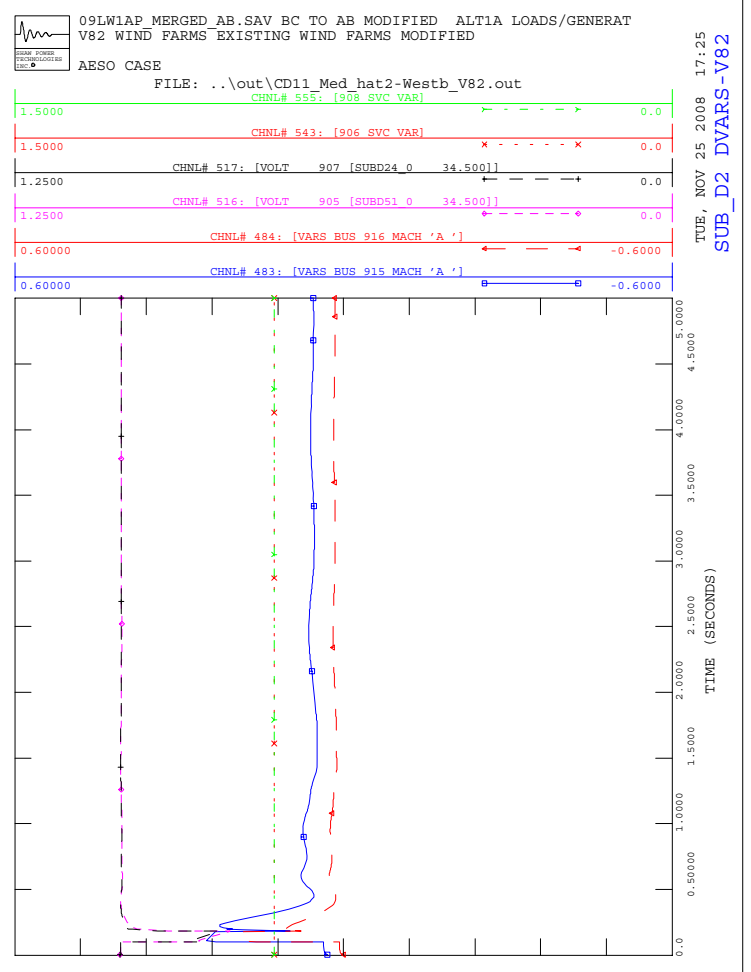
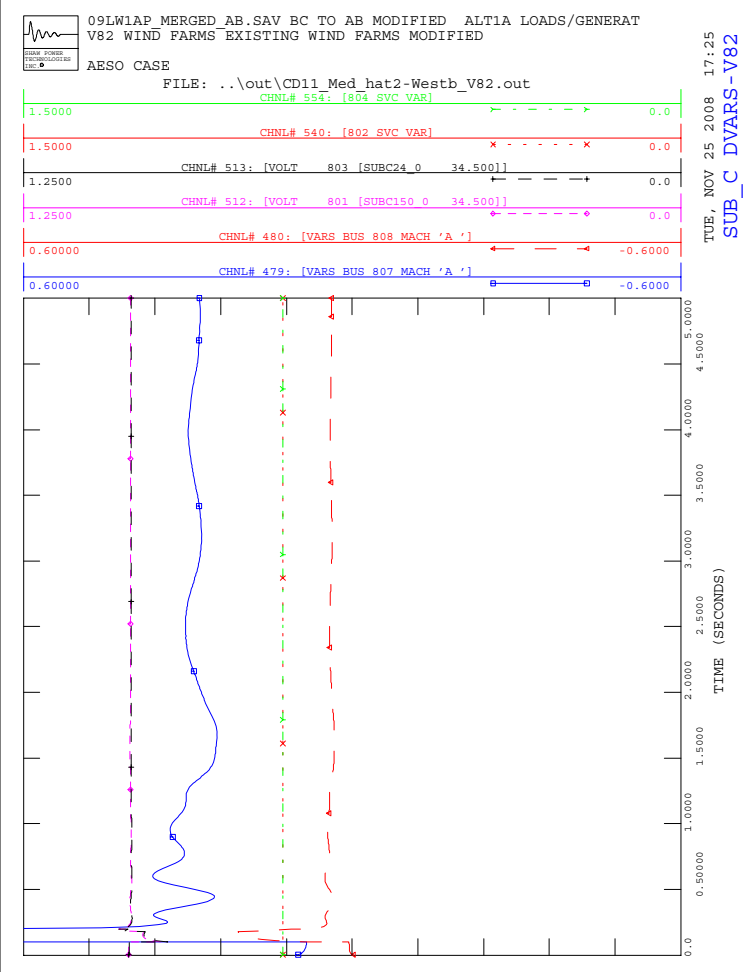


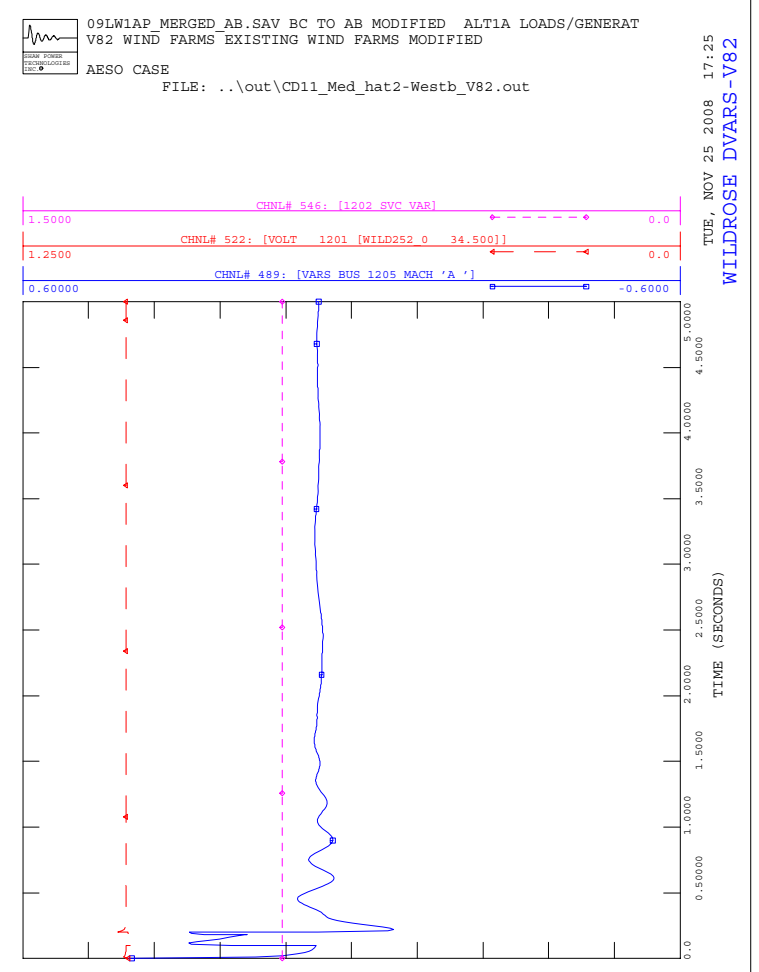
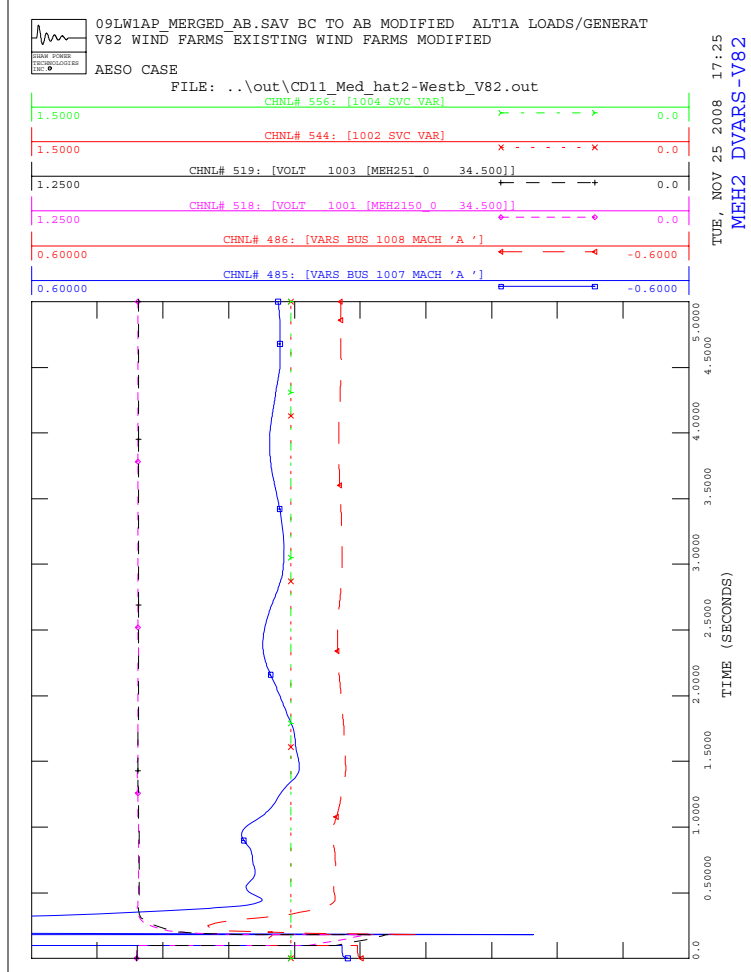
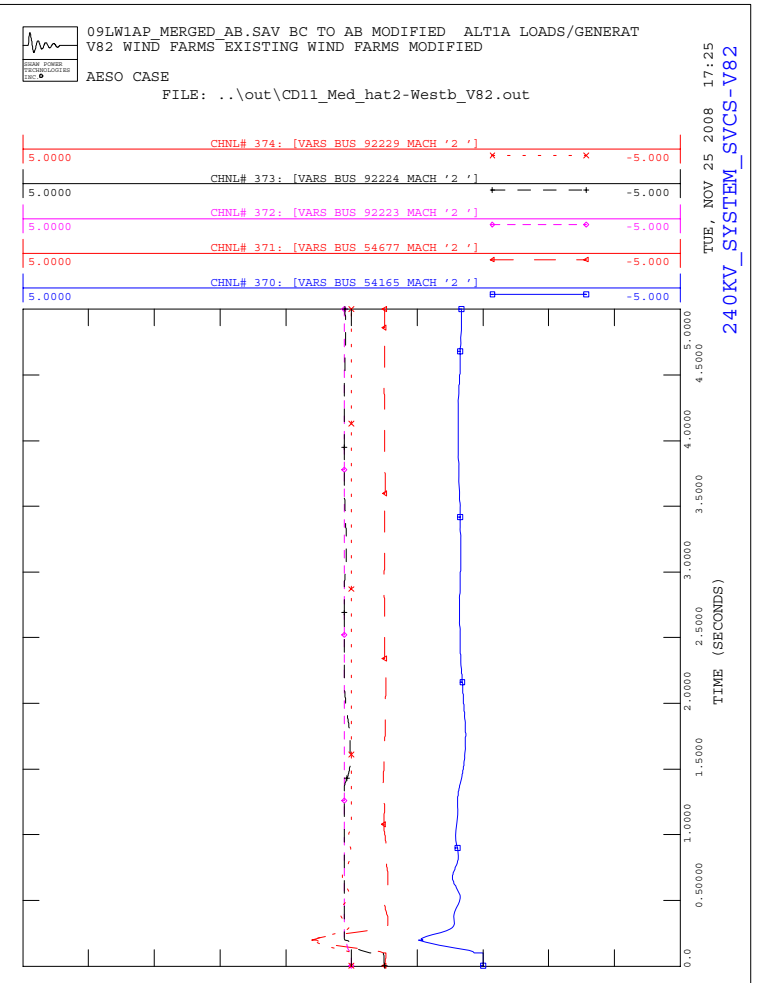
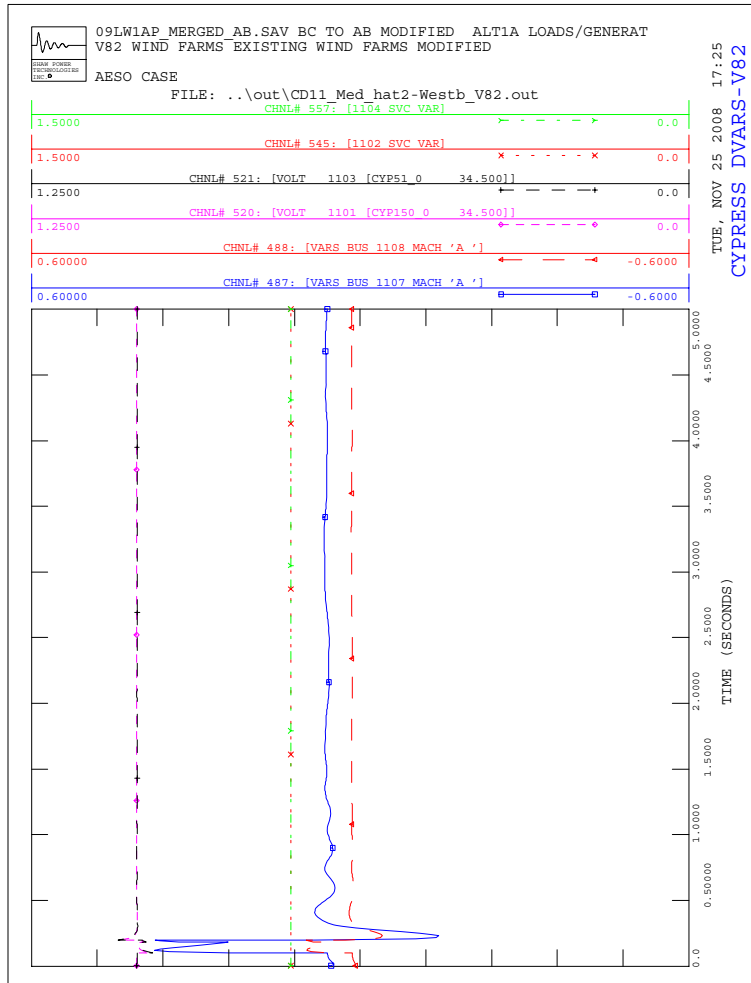












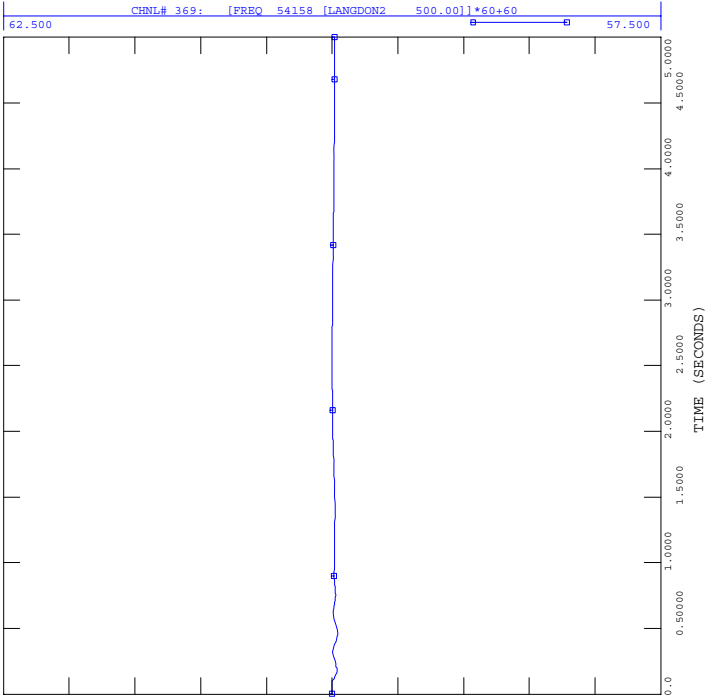


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out

TUE, NOV 25 2008 17:25
LANGDON_FRQ-V82

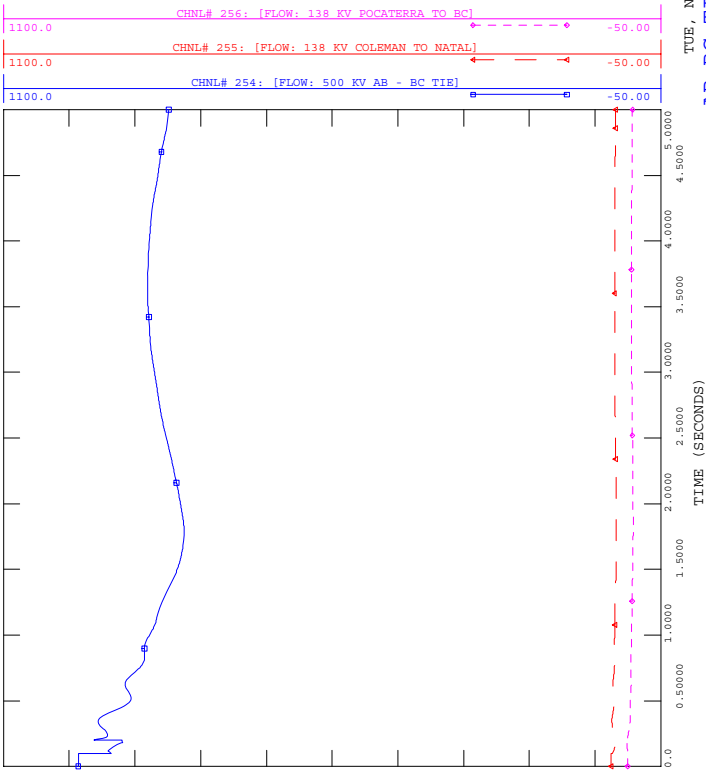


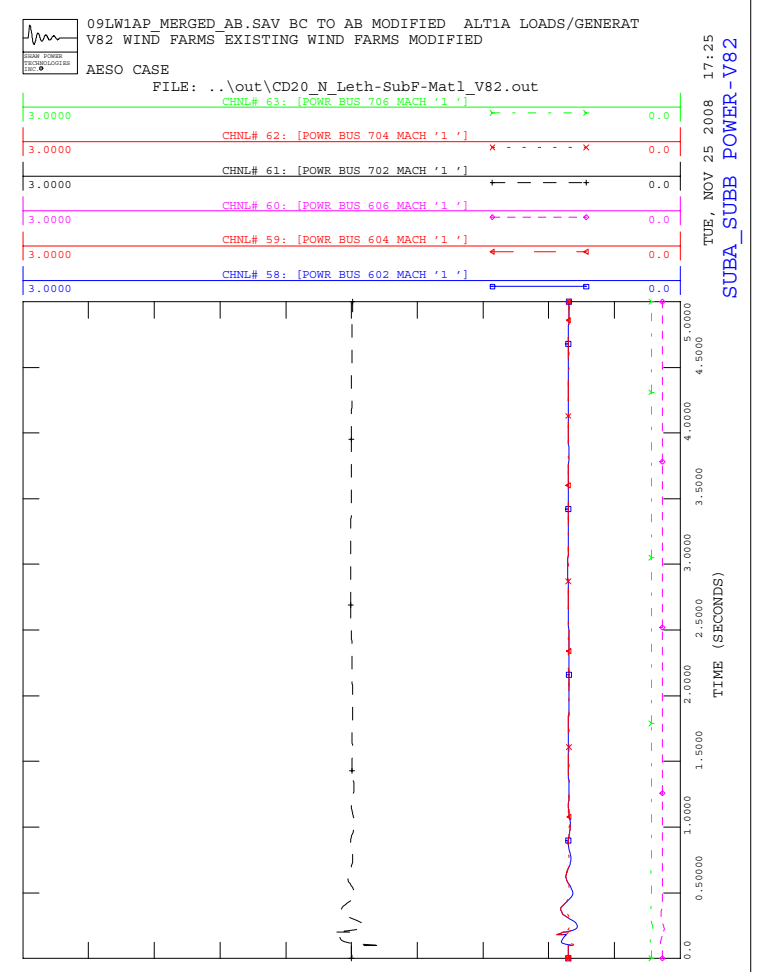
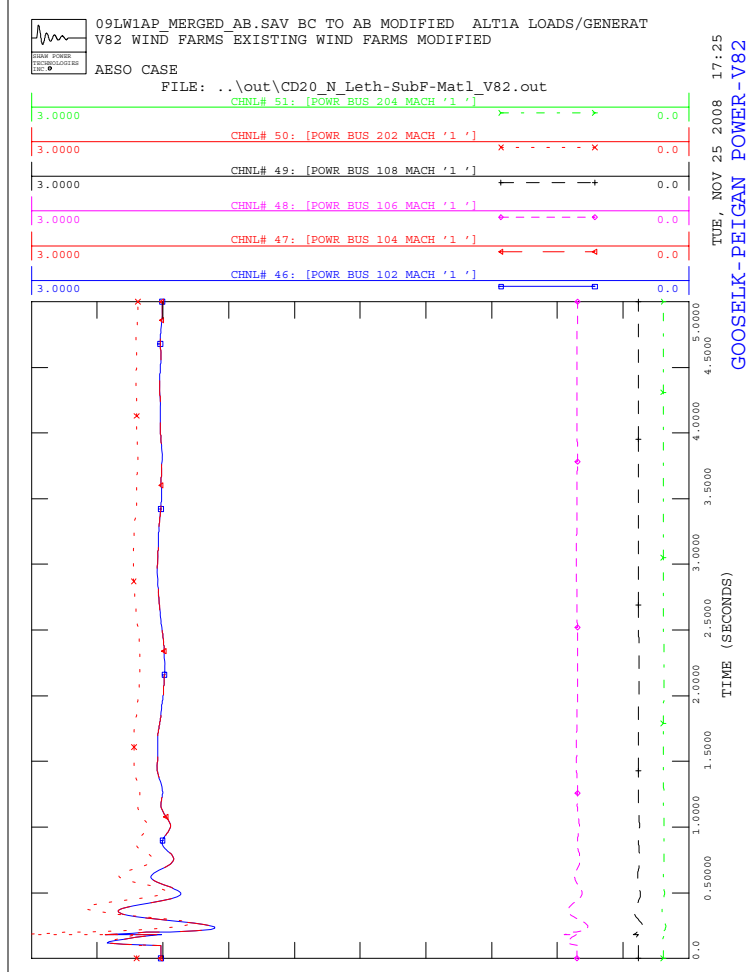
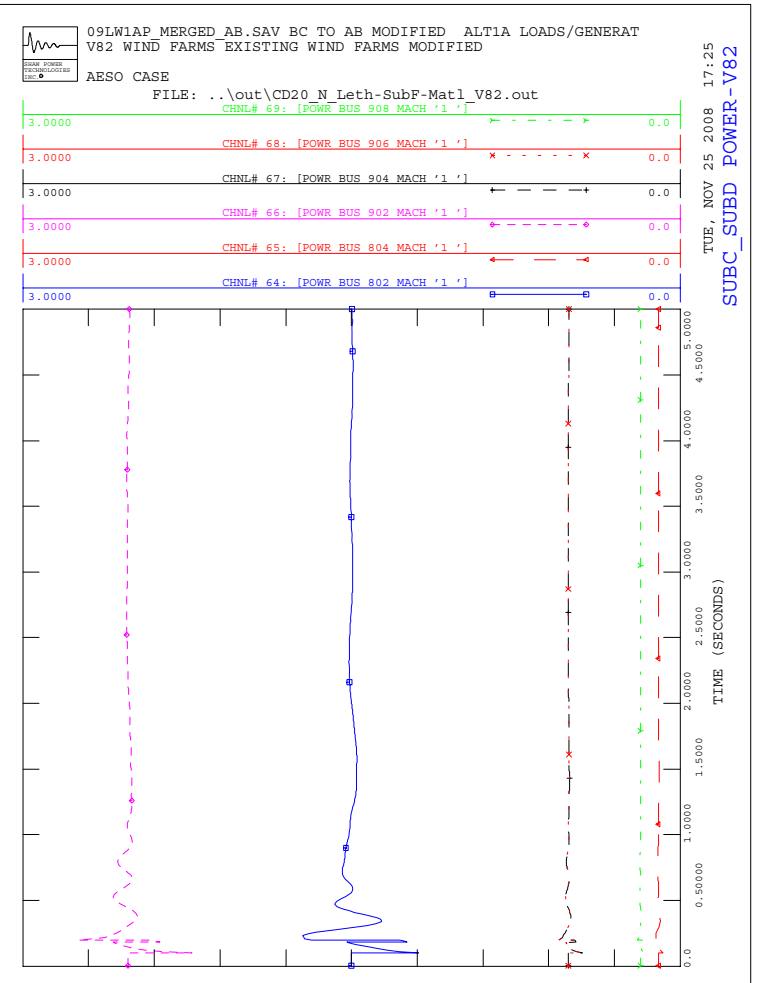
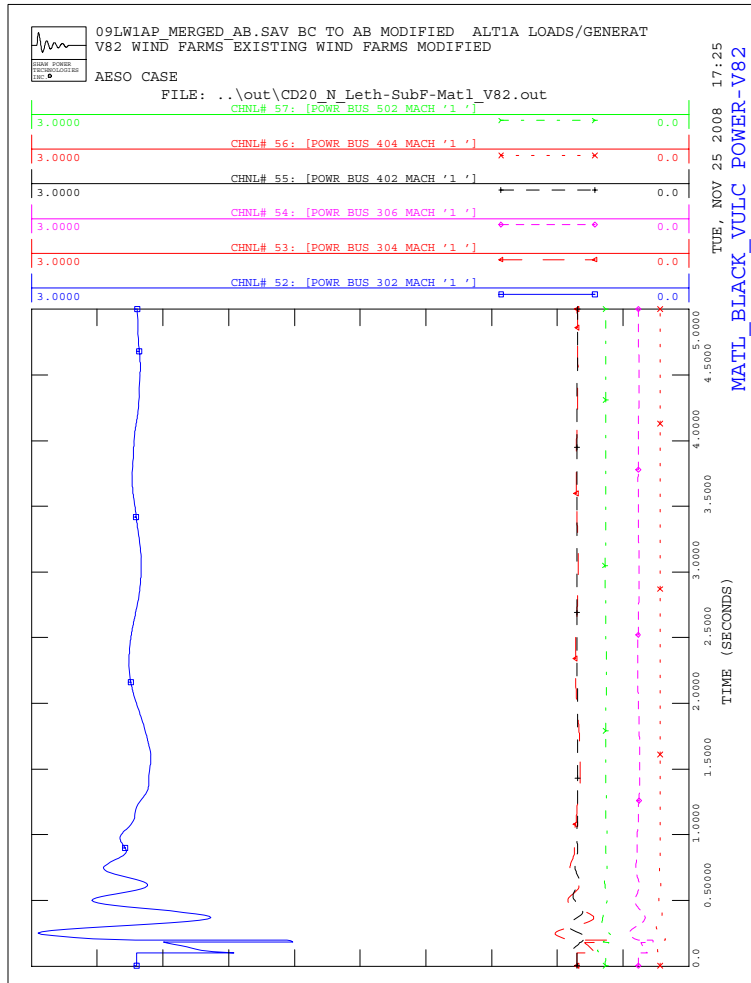
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

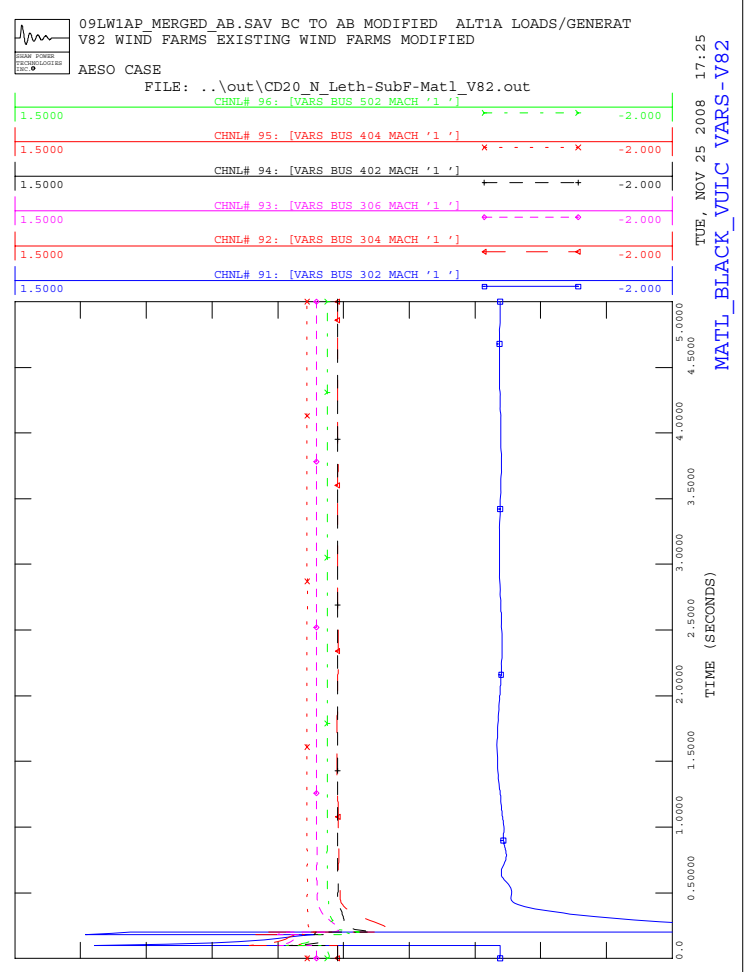
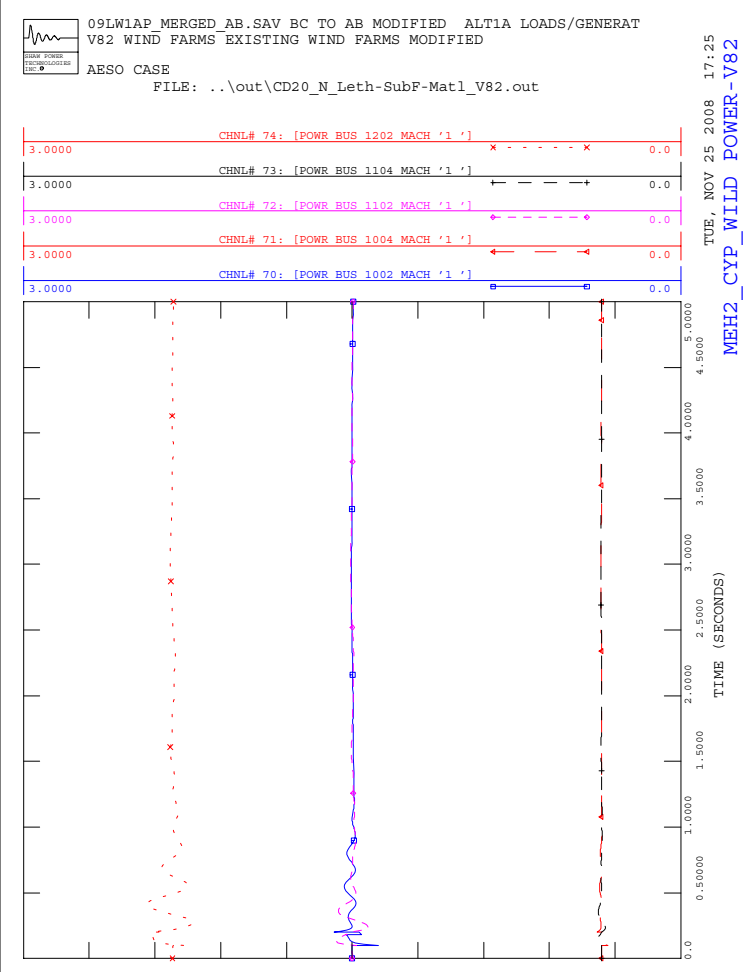
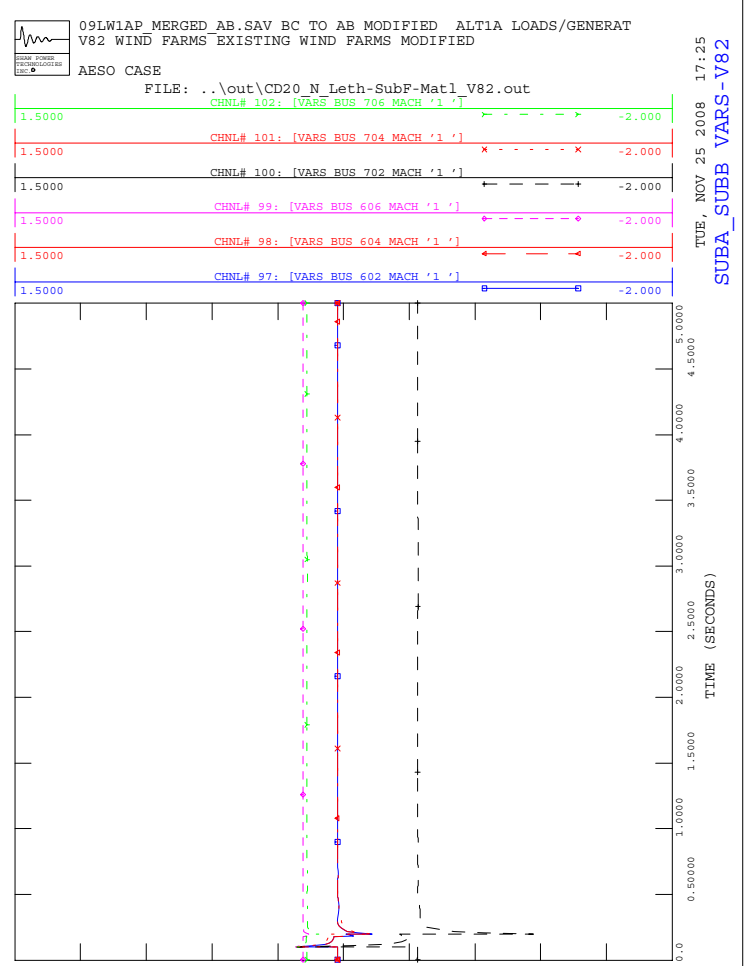
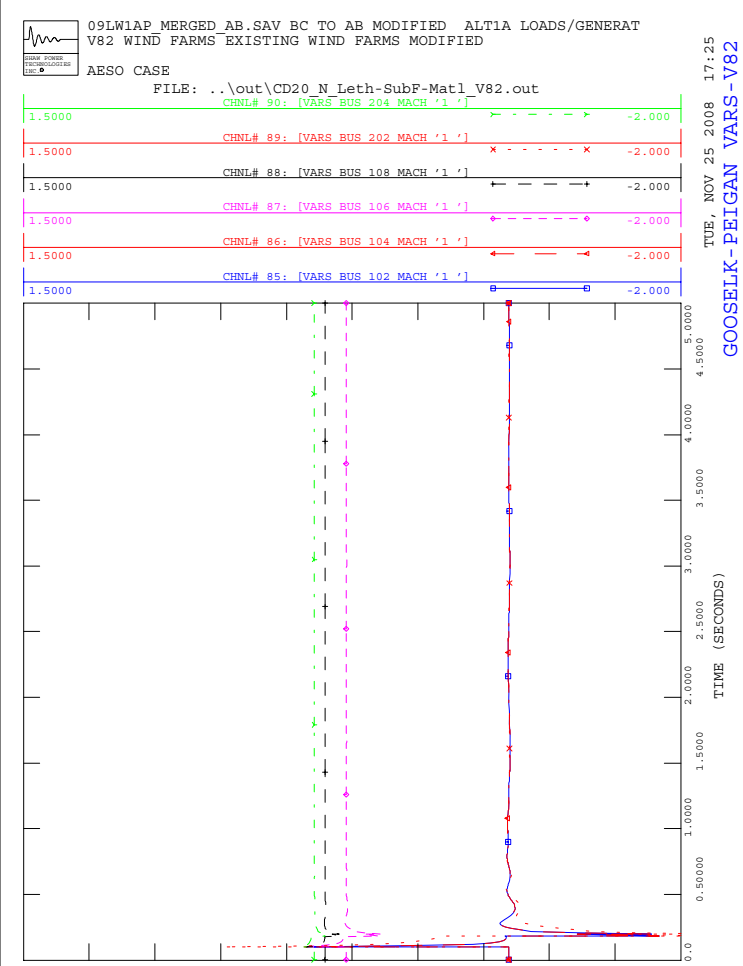
ABSO CASE

FILE: ..\out\CD11_Med_hat2-Westb_V82.out

TUE, NOV 25 2008 17:25
AB_BC_TIE_FLOWS-V82

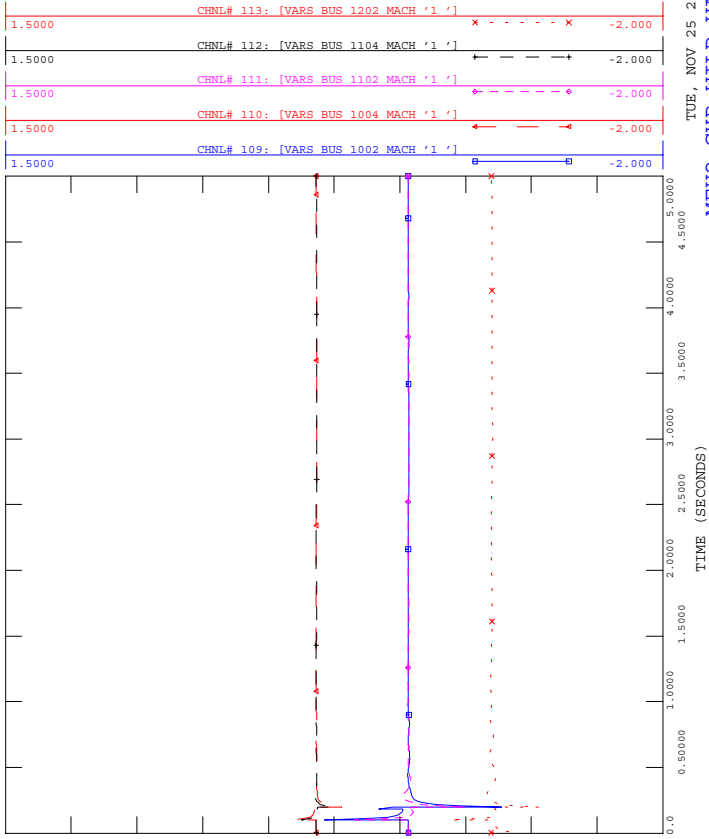






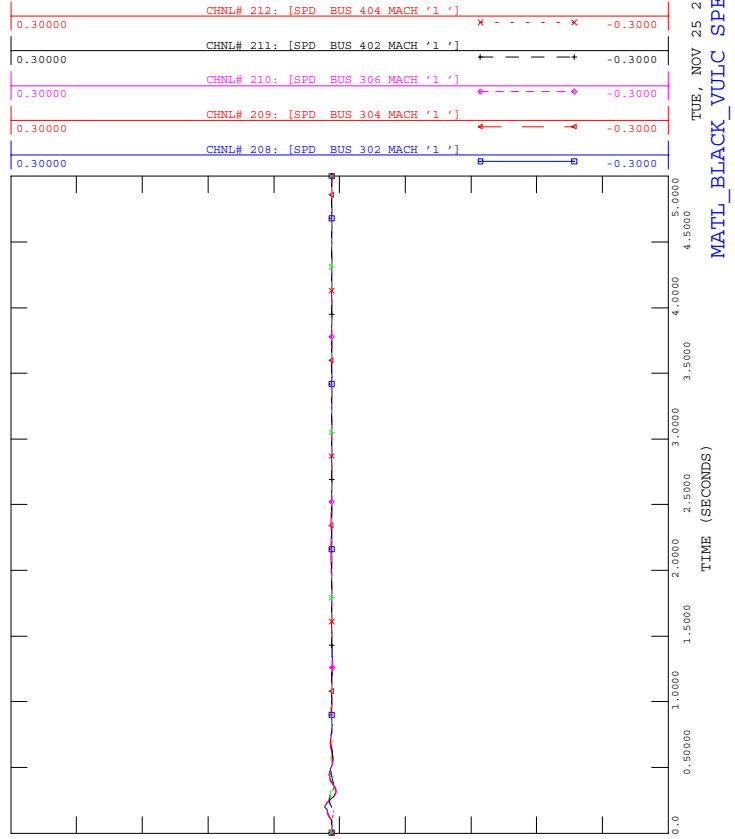
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD20_N_Leth-SubF-Mat1_V82.out



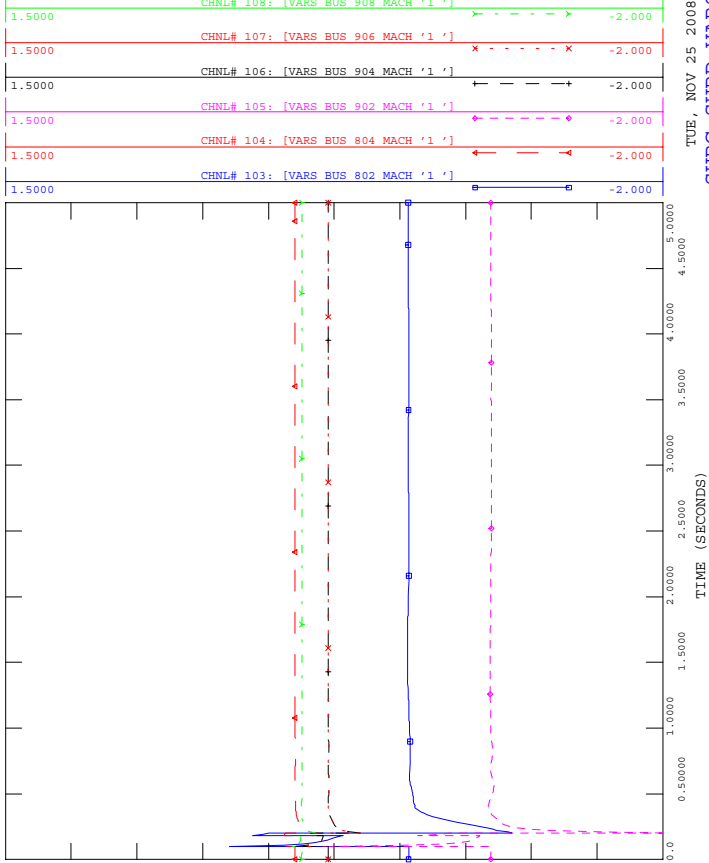
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD20_N_Leth-SubF-Mat1_V82.out



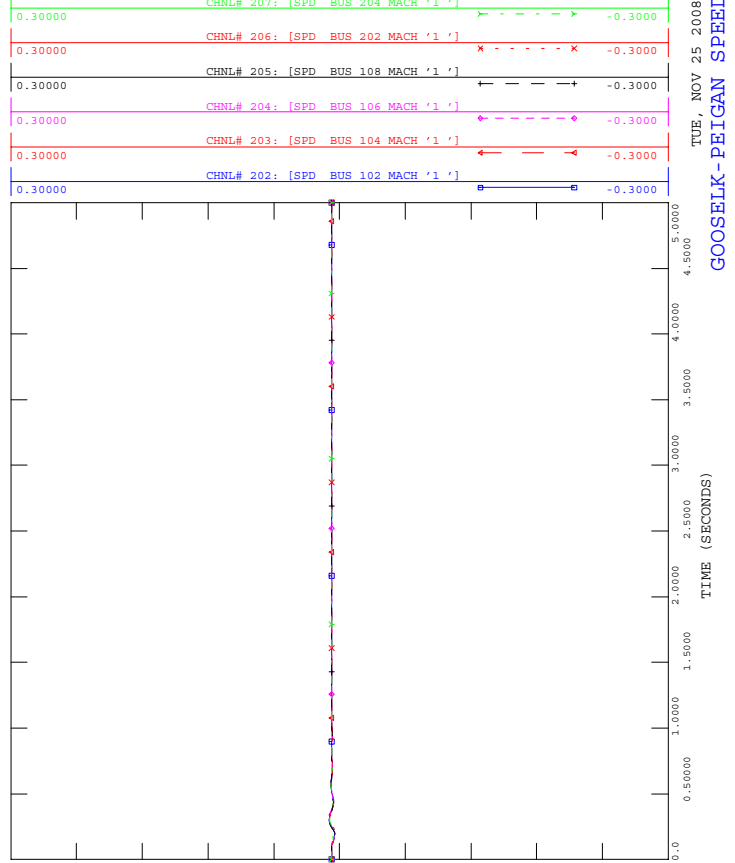
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

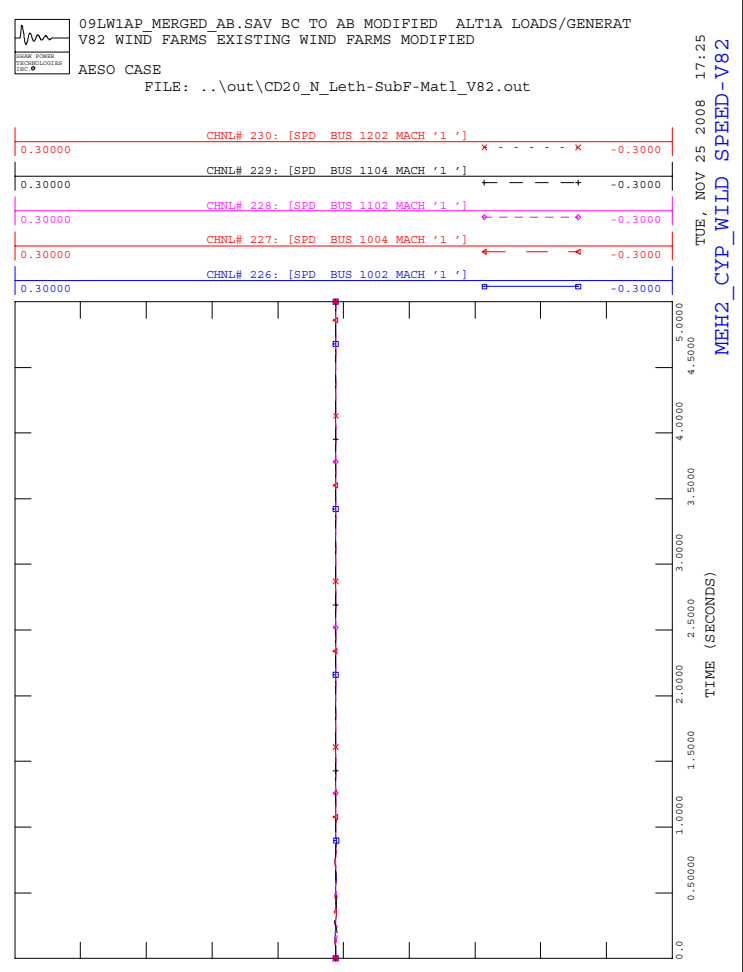
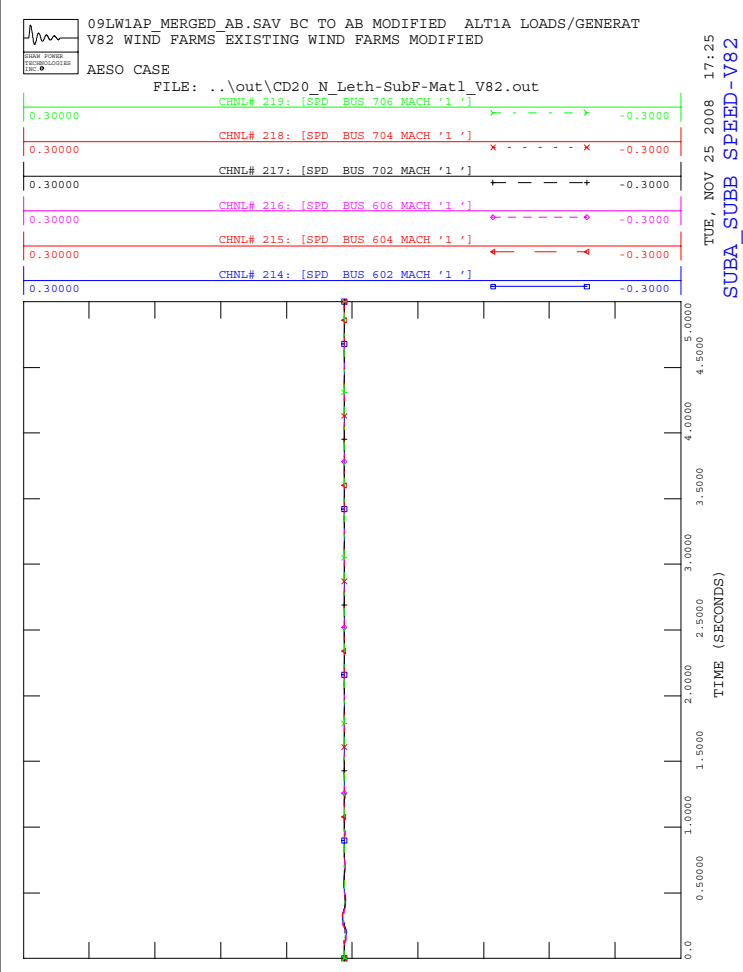
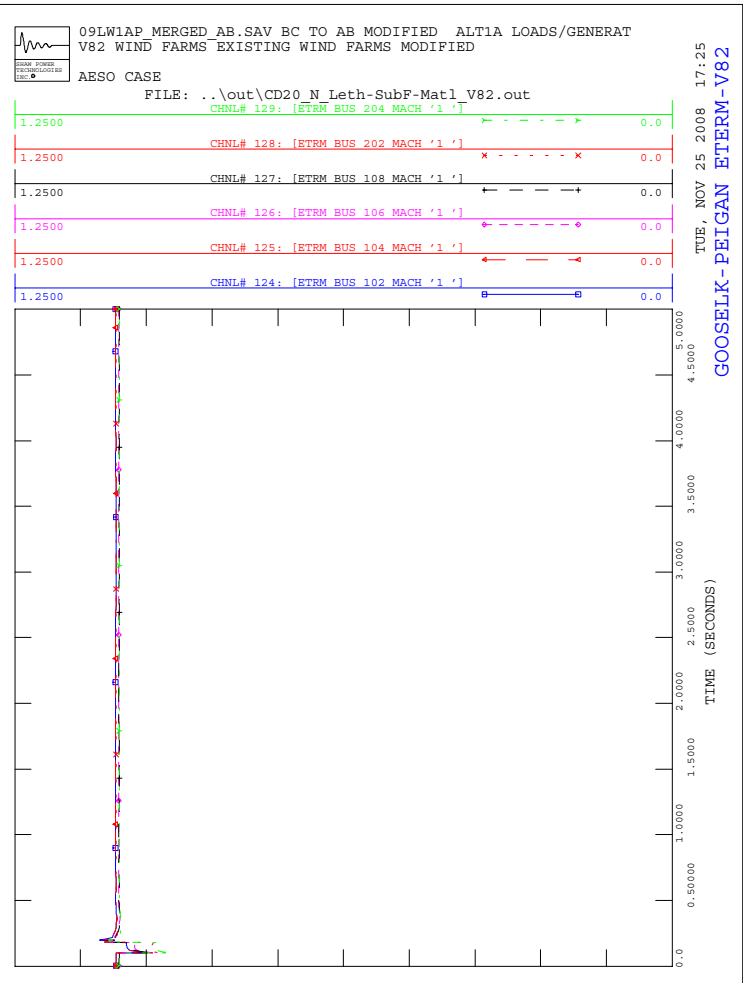
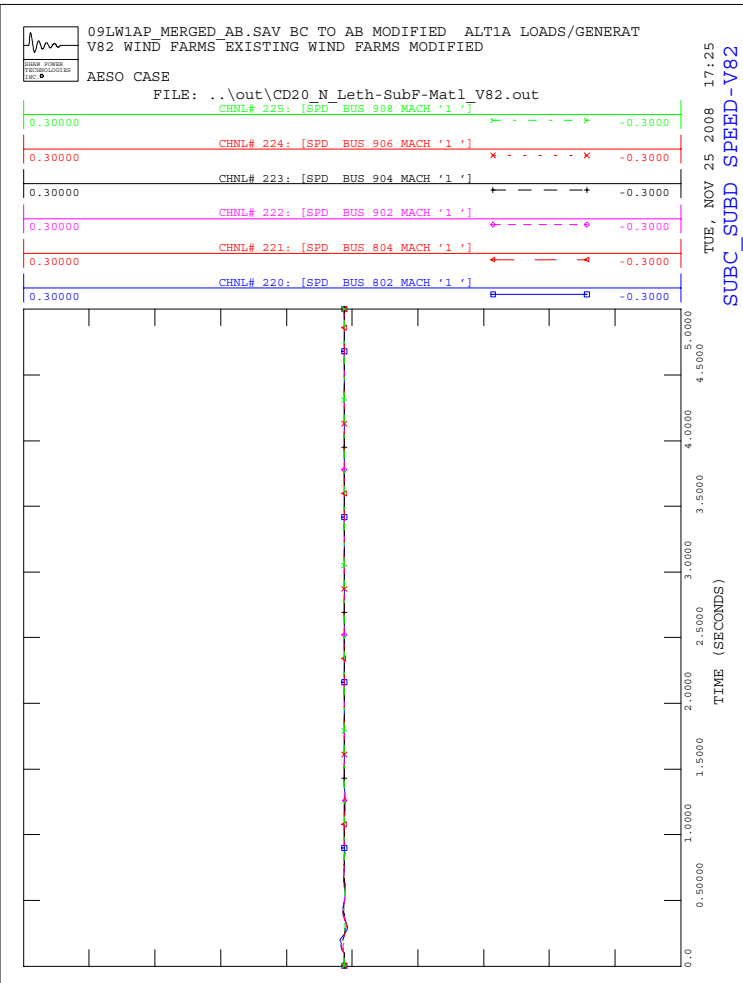
FILE: ..\out\CD20_N_Leth-SubF-Mat1_V82.out

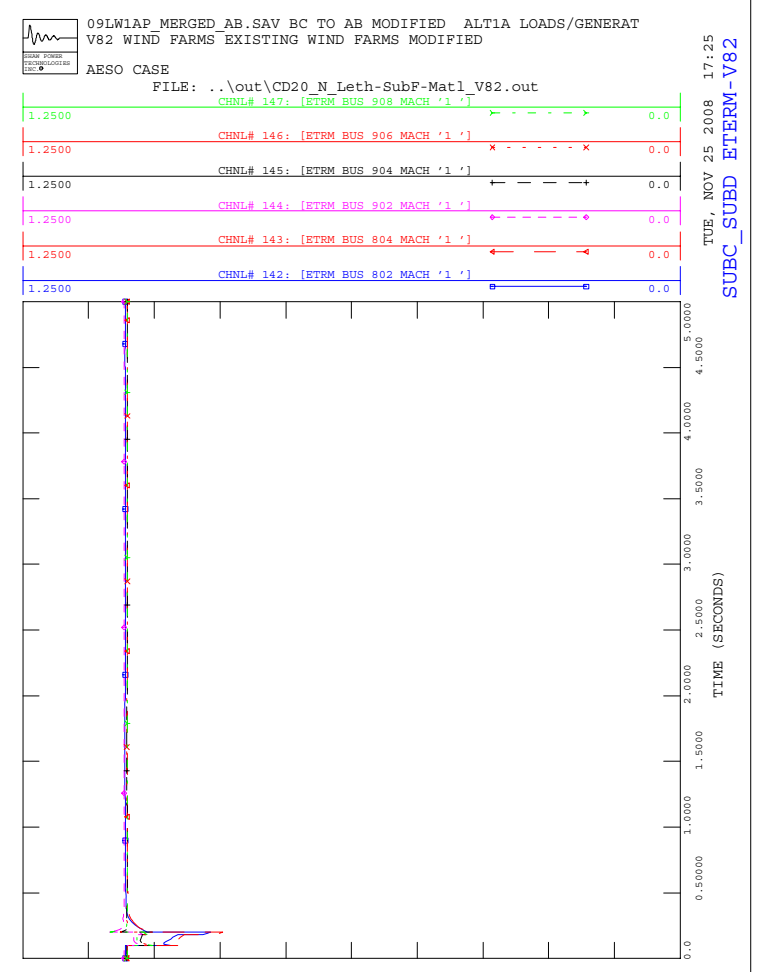
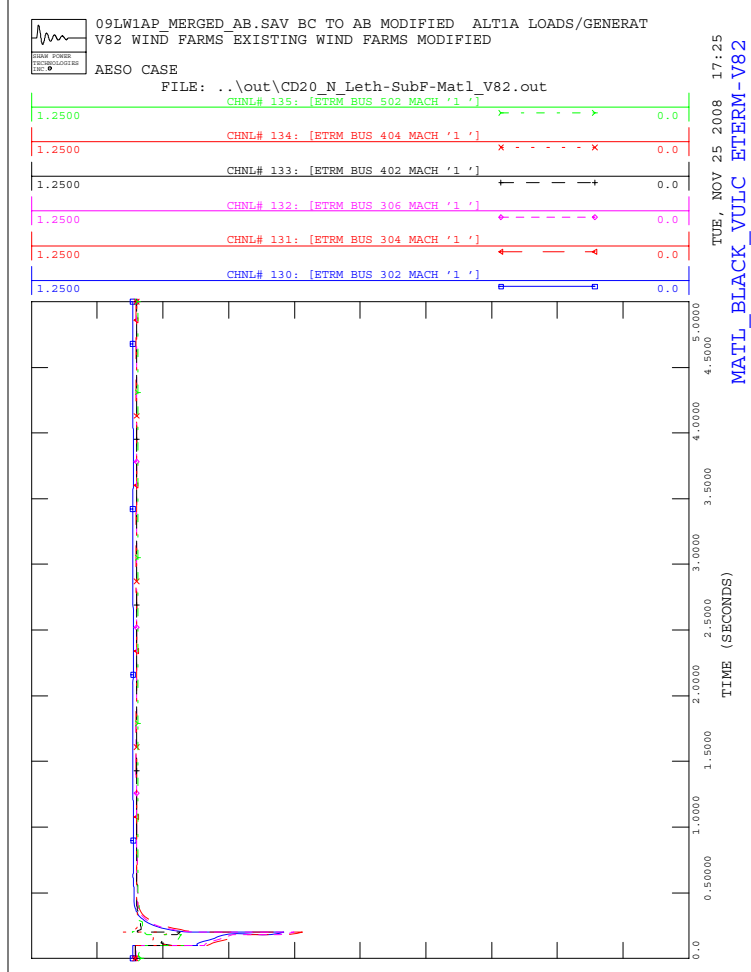
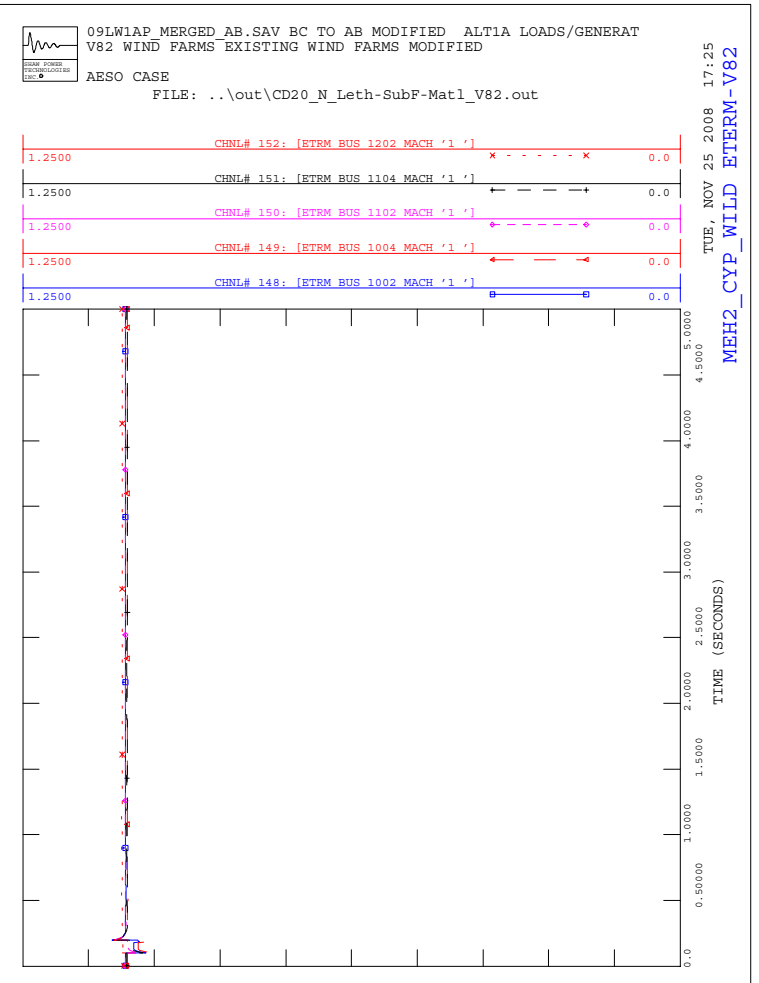
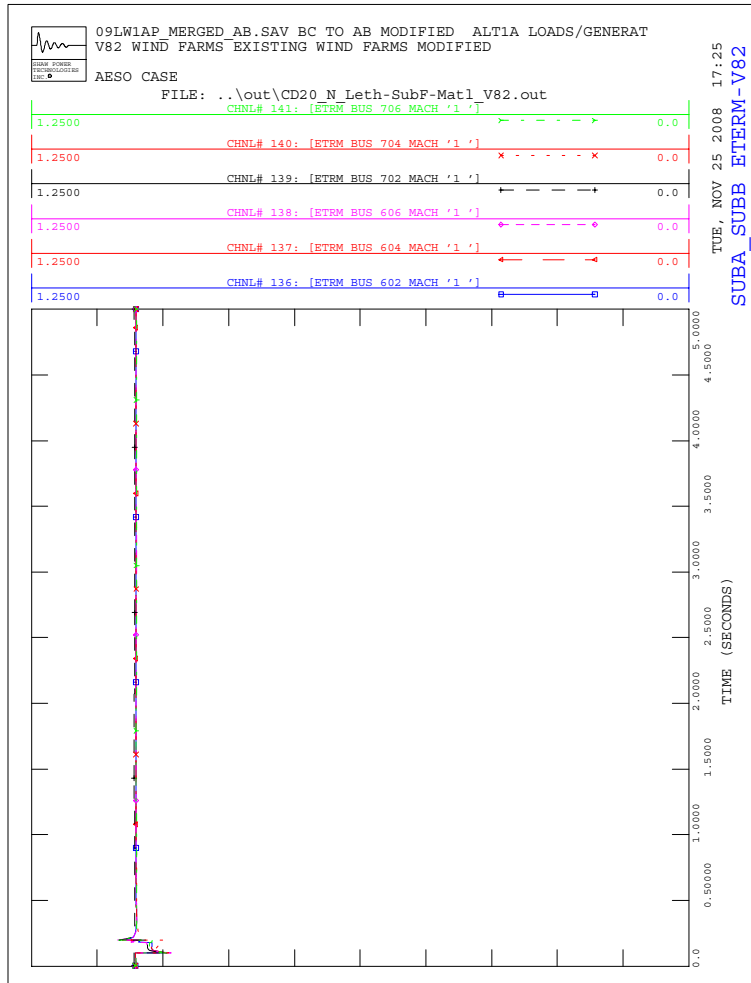


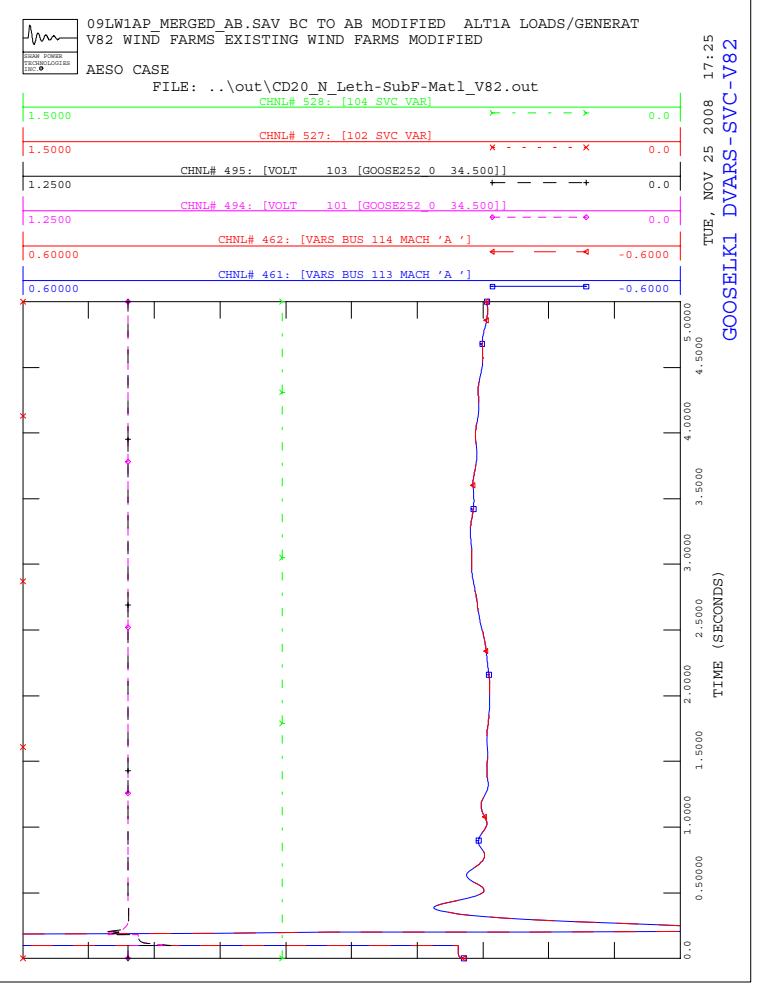
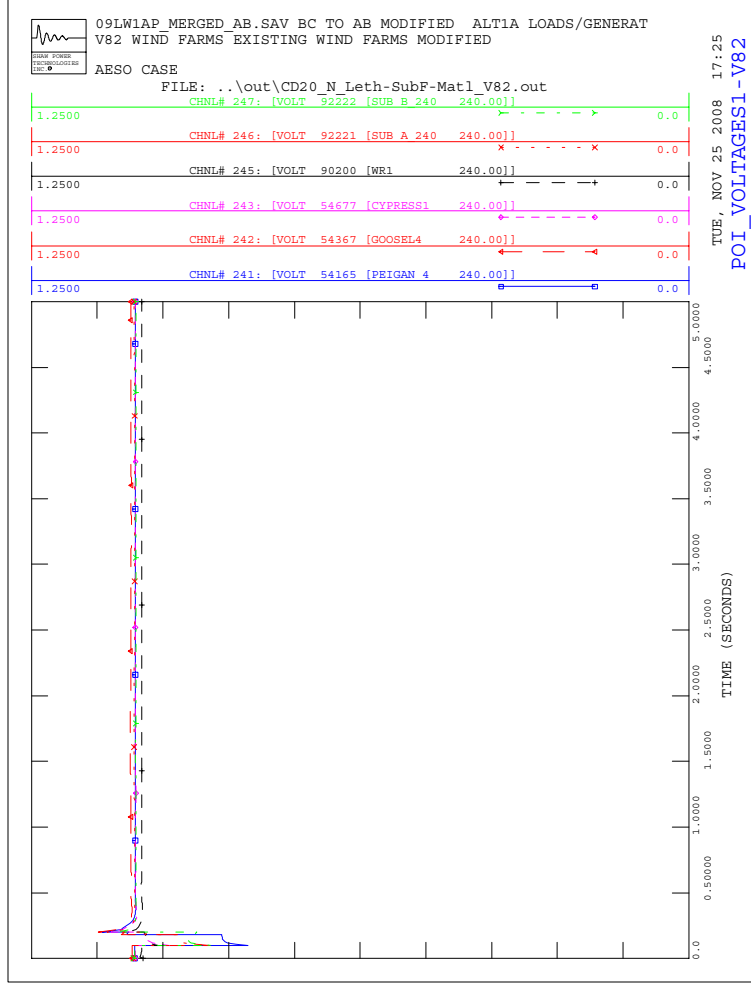
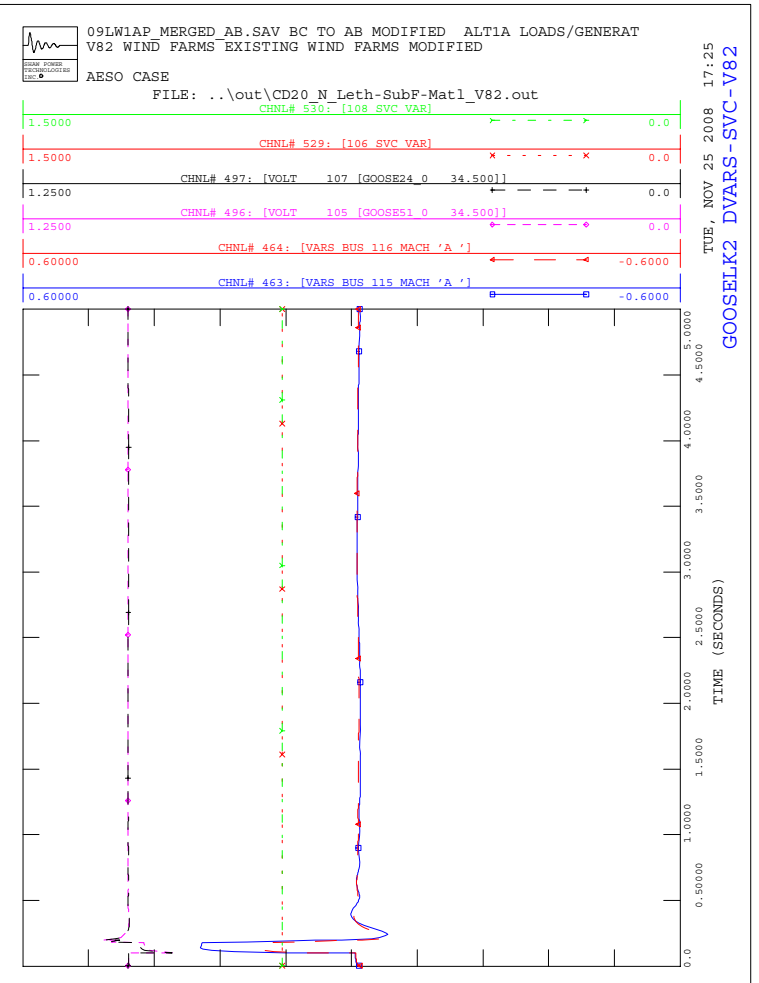
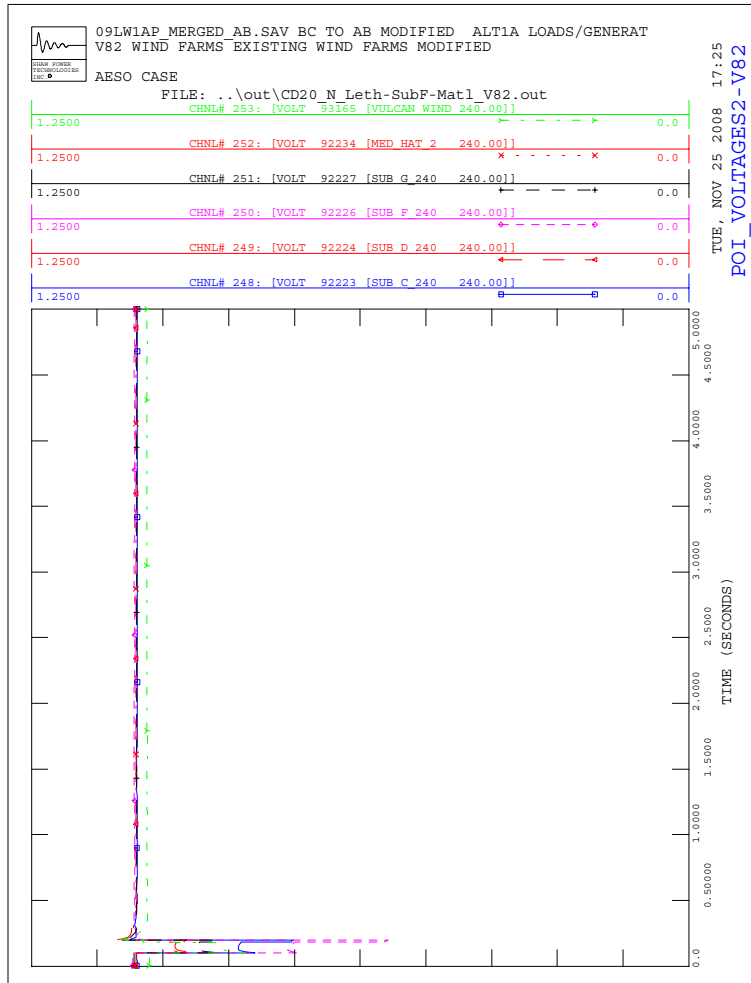
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

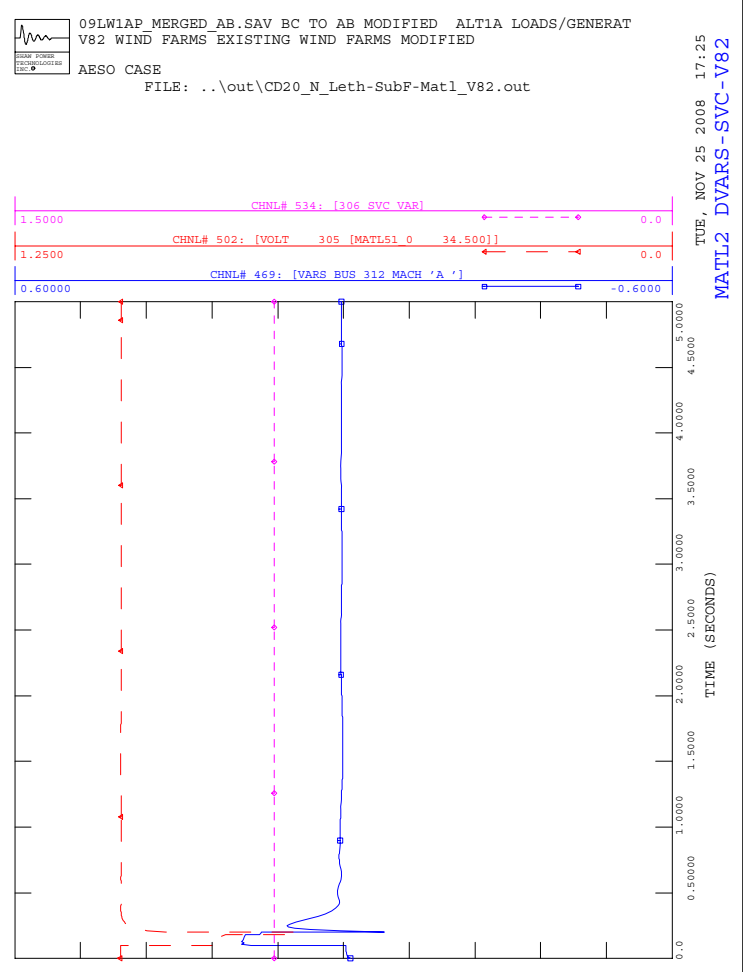
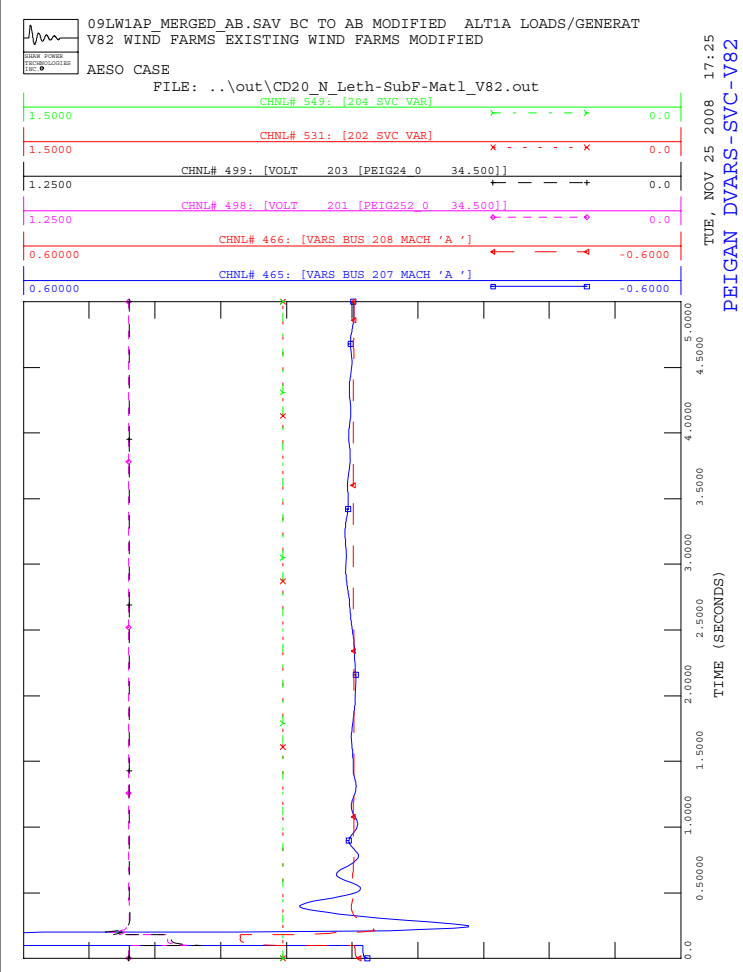
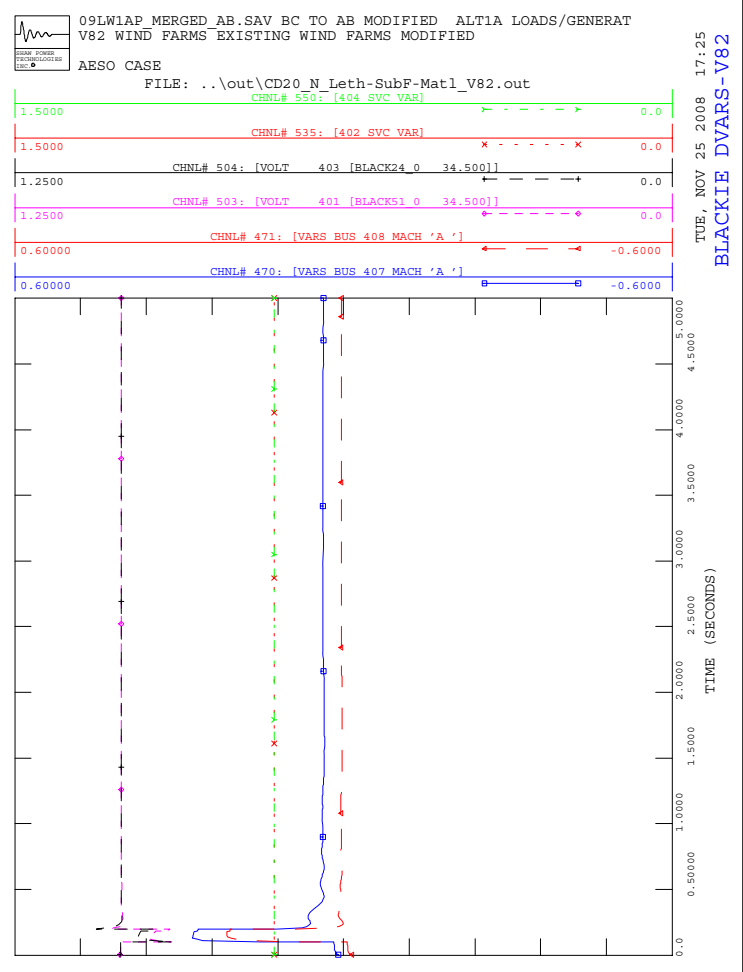
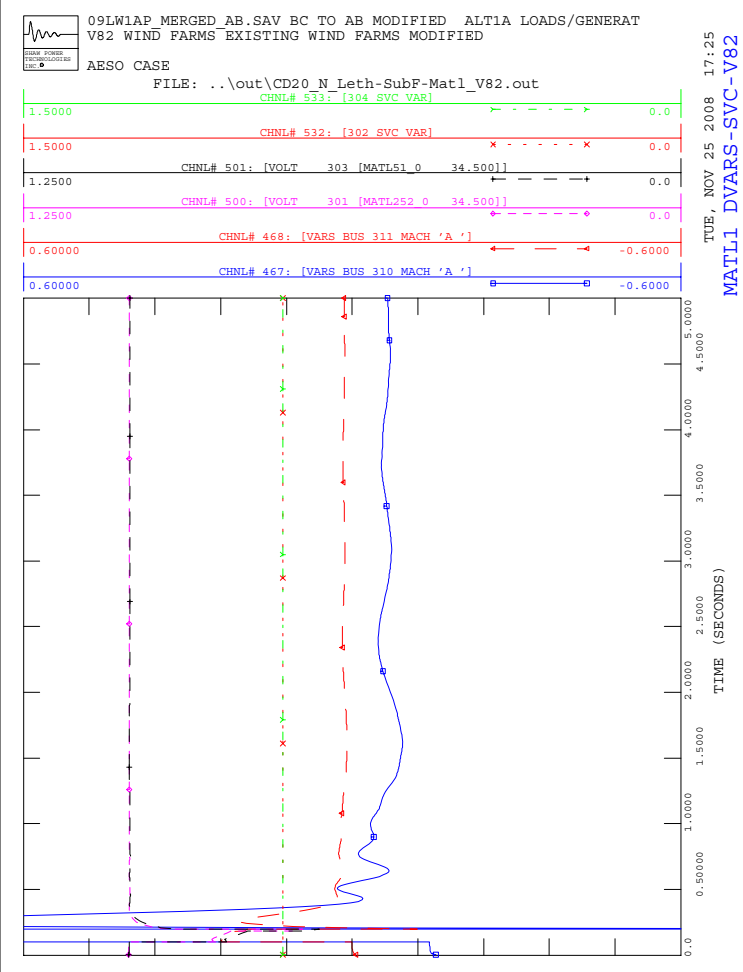
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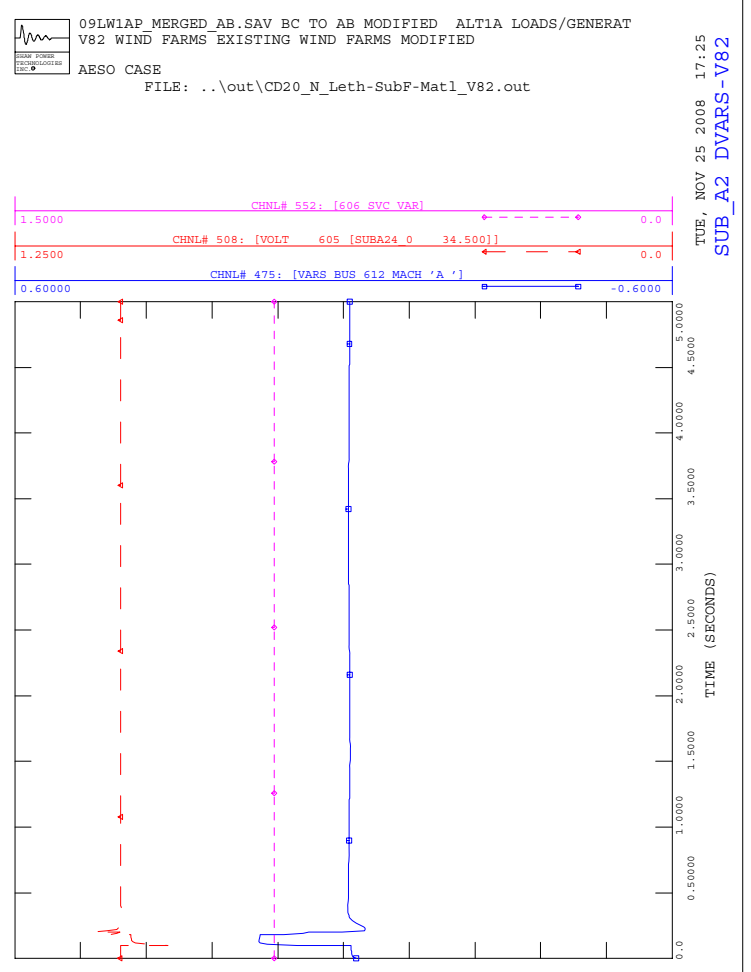
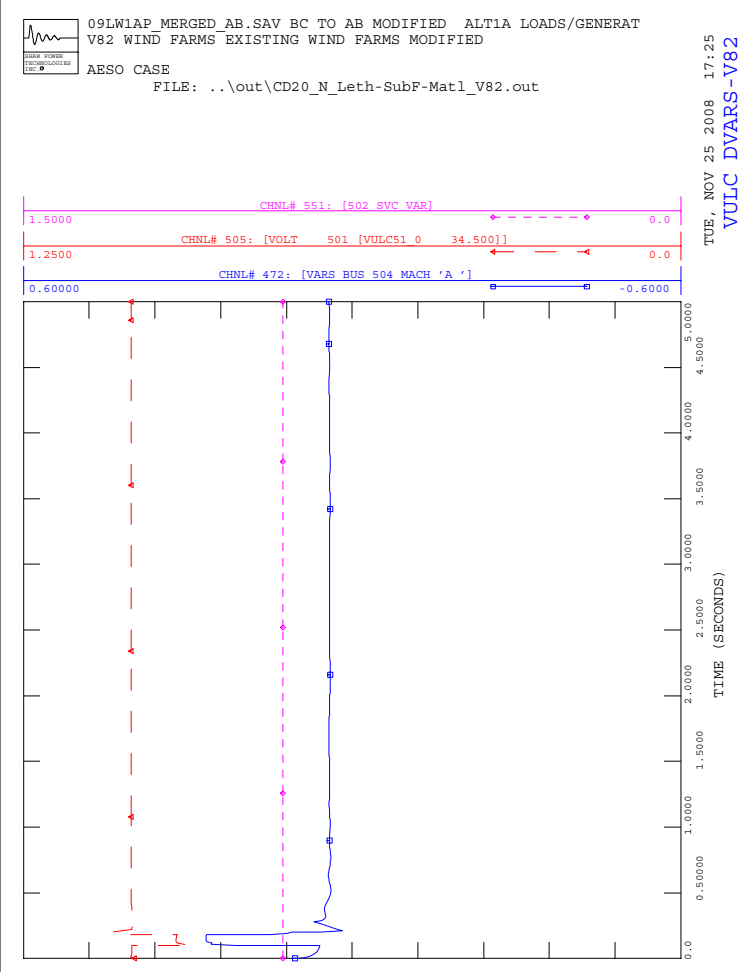
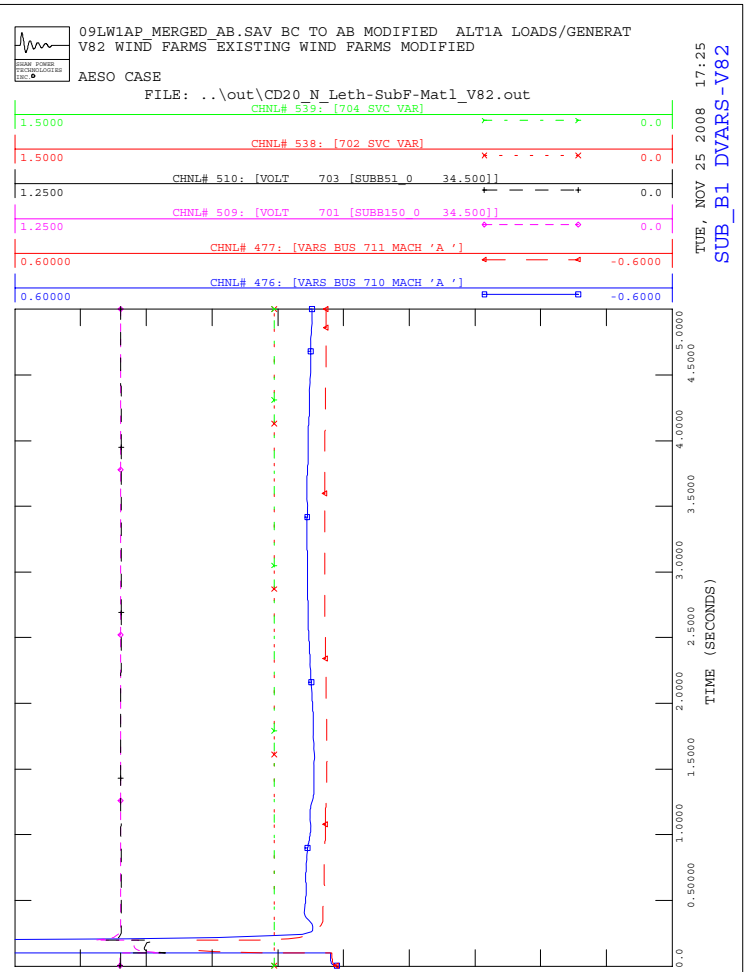
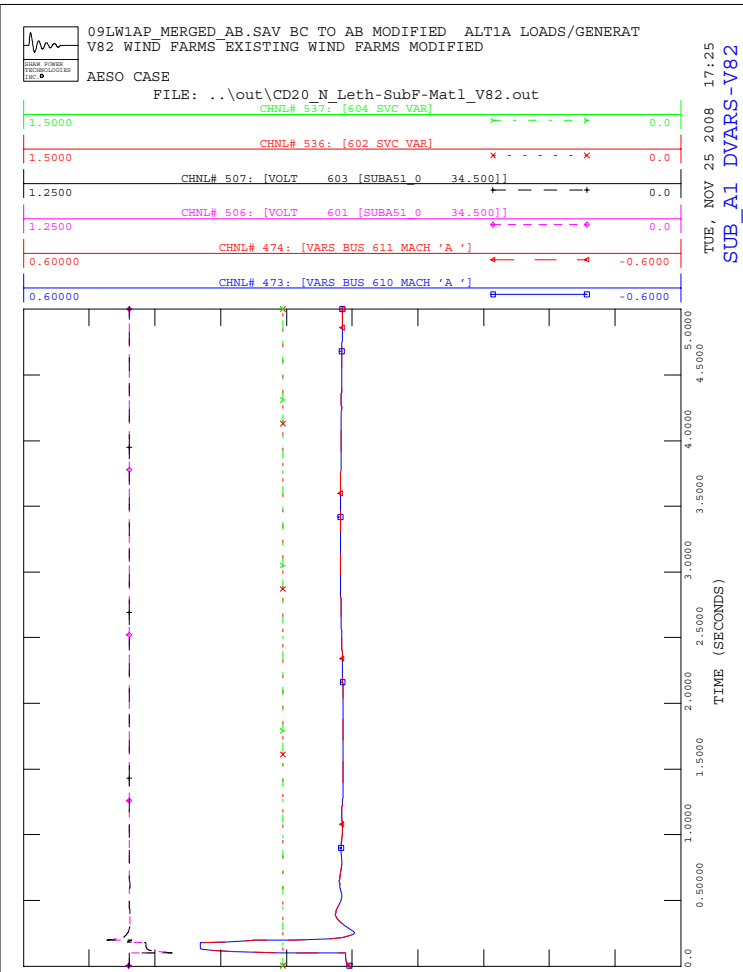


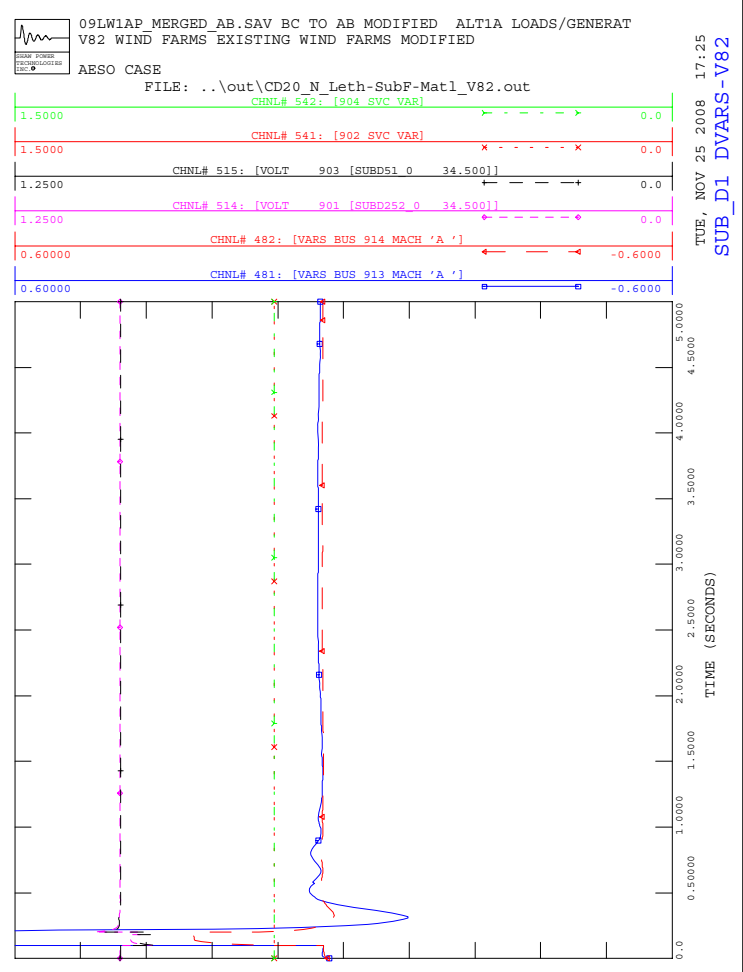
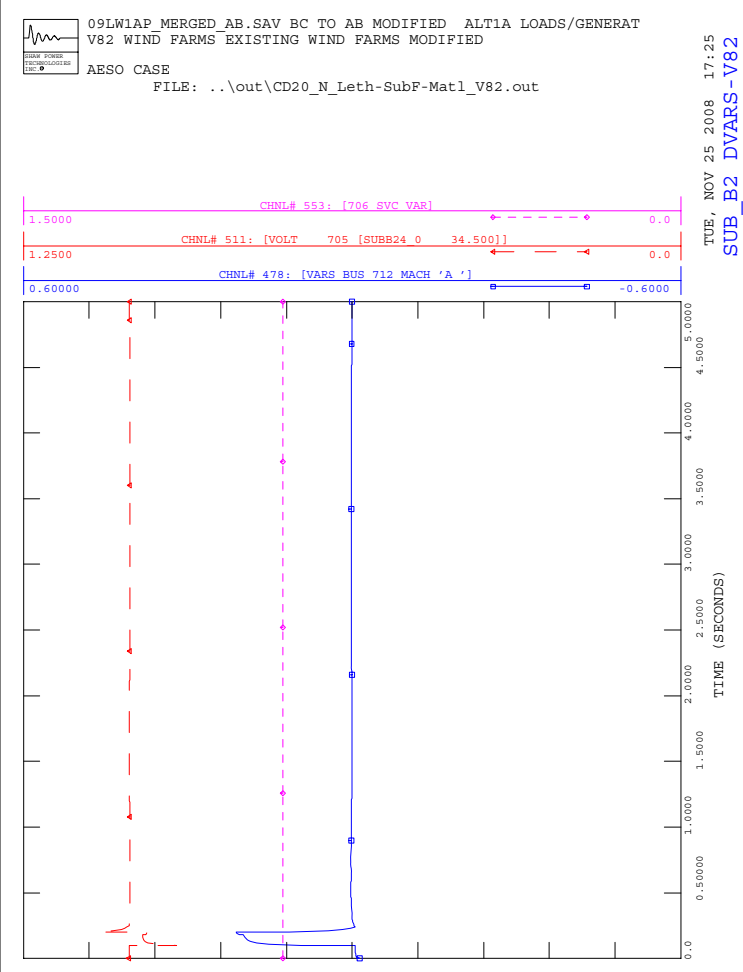
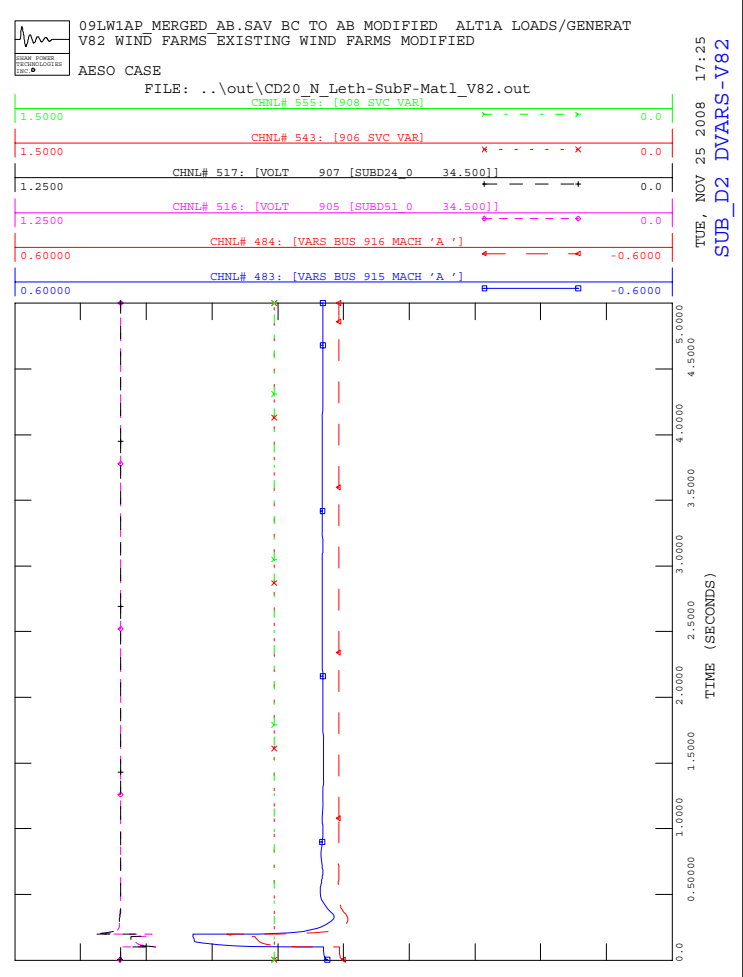
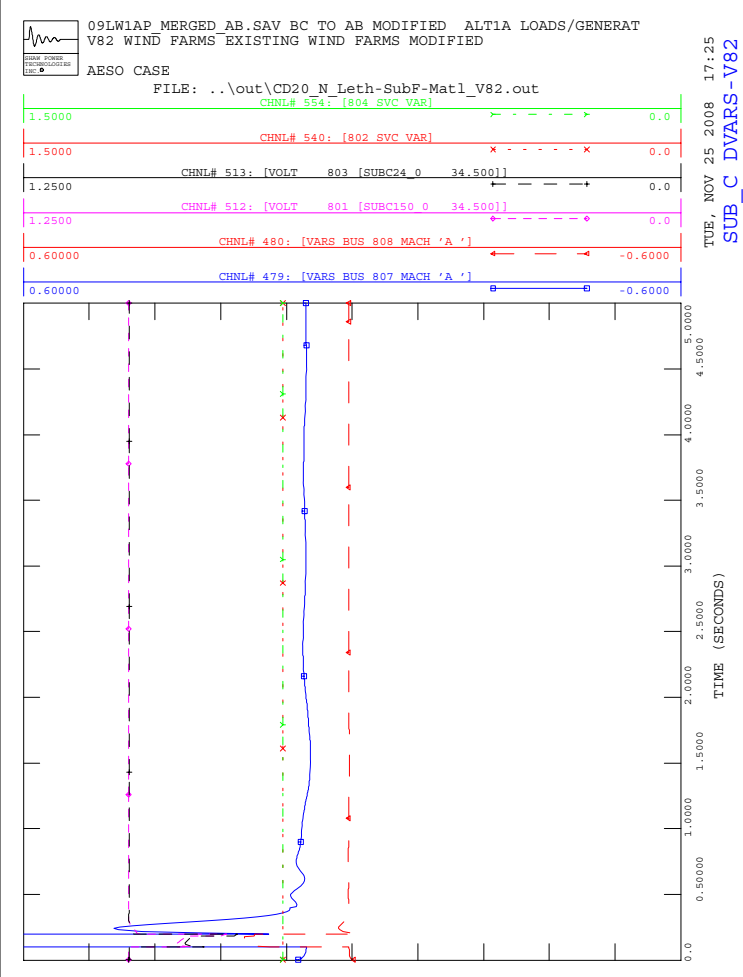


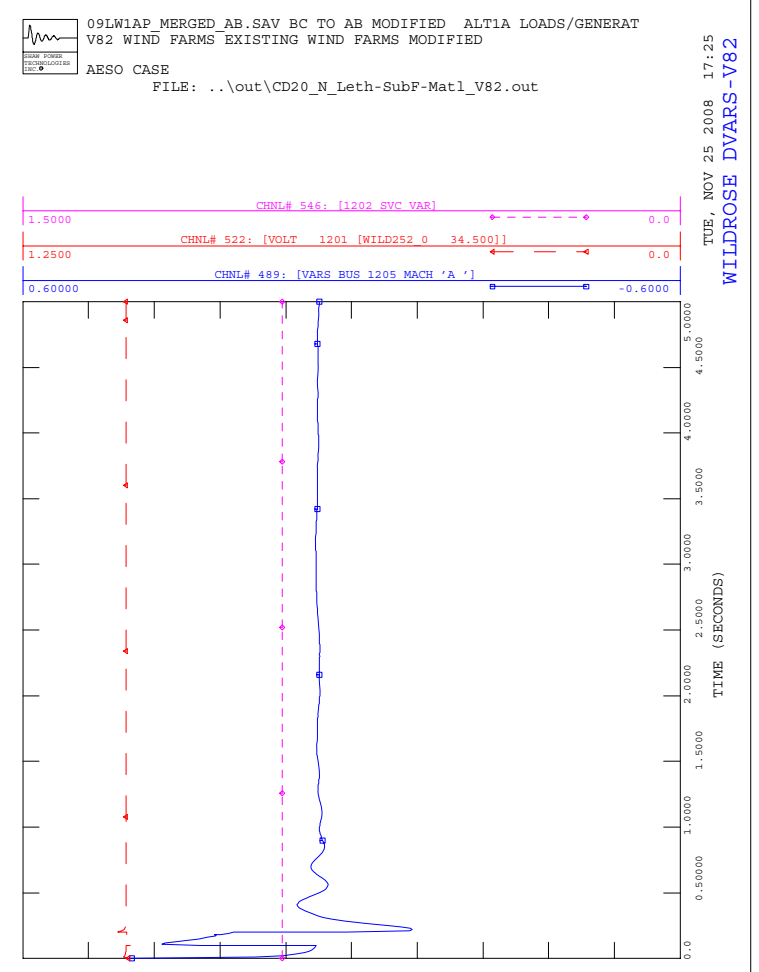
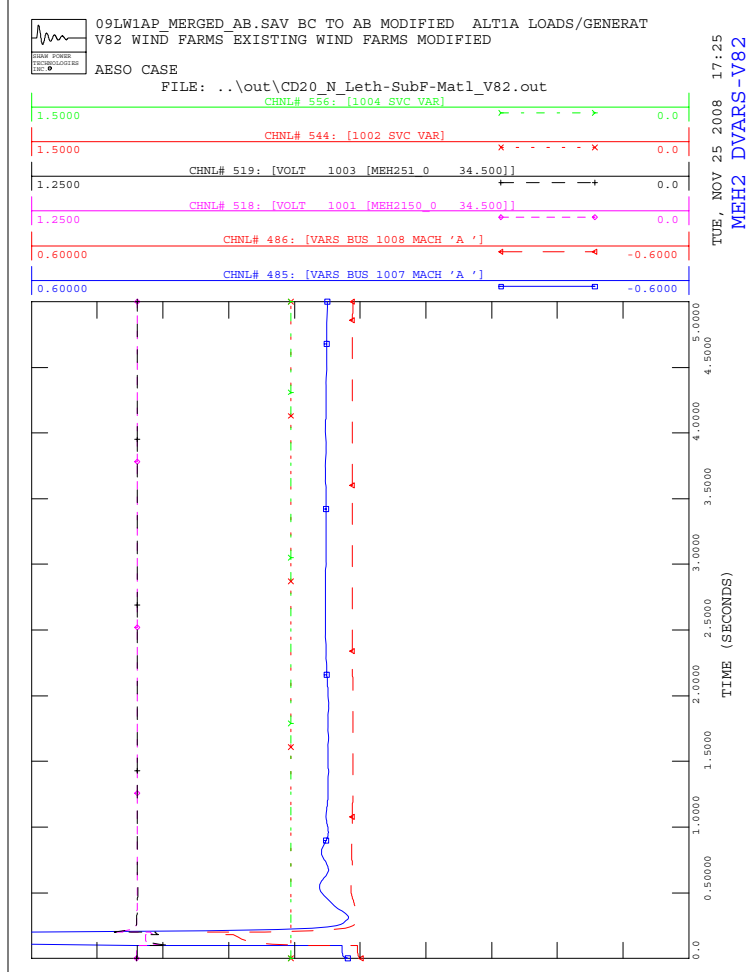
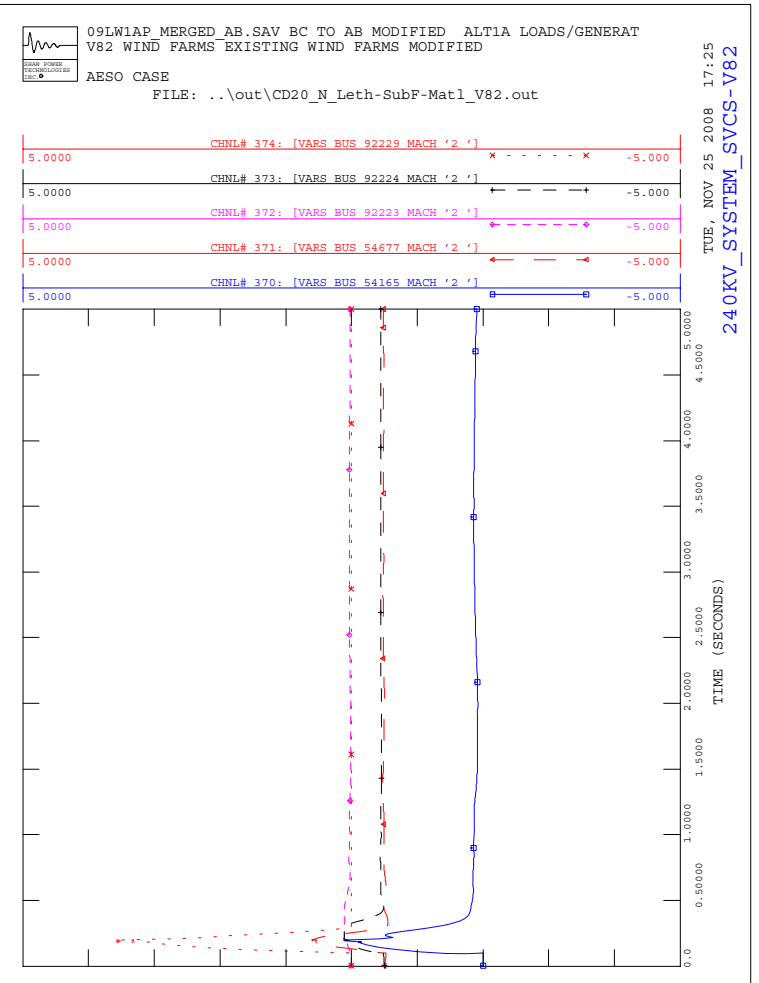
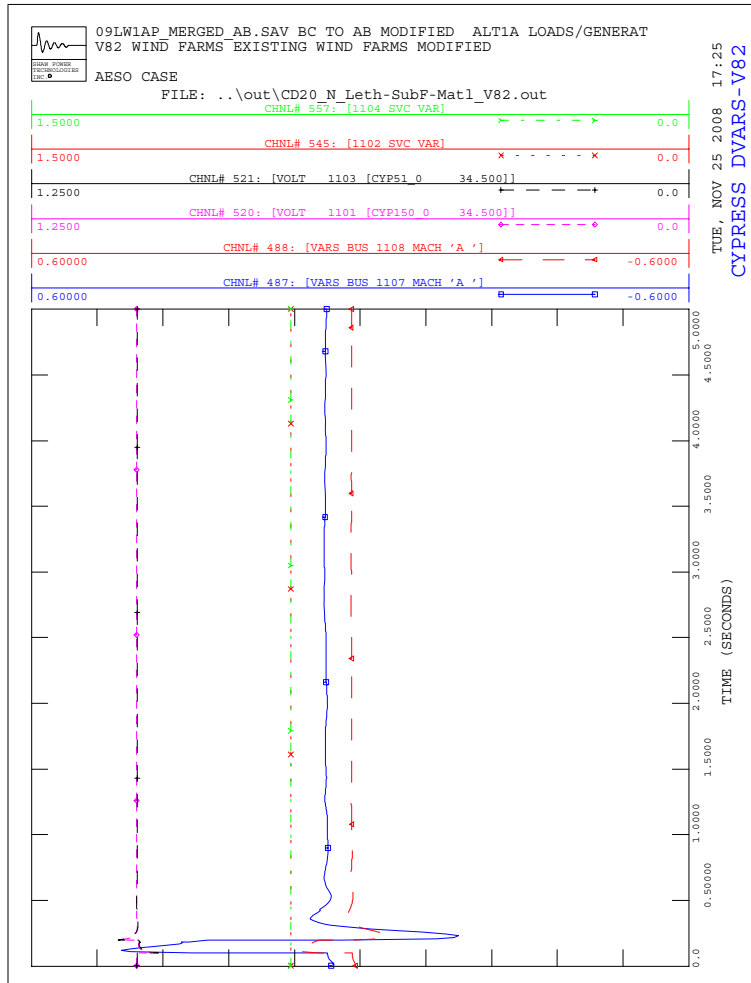






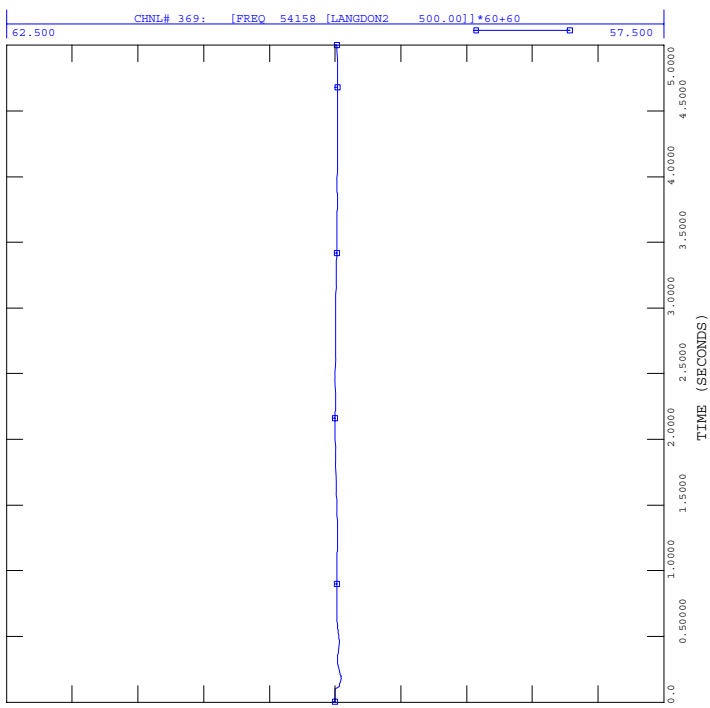






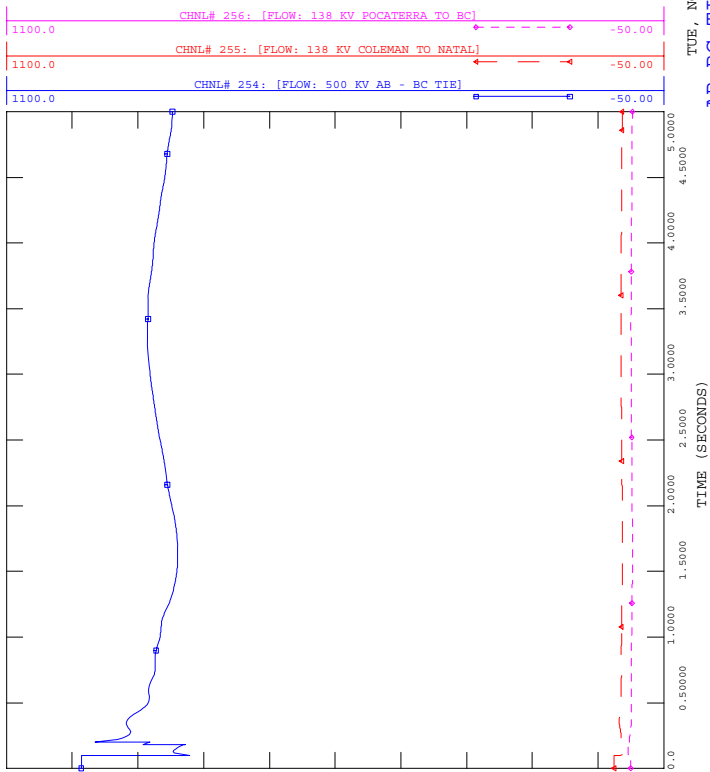
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\CD20_N_Leth-SubF-Mat1_V82.out

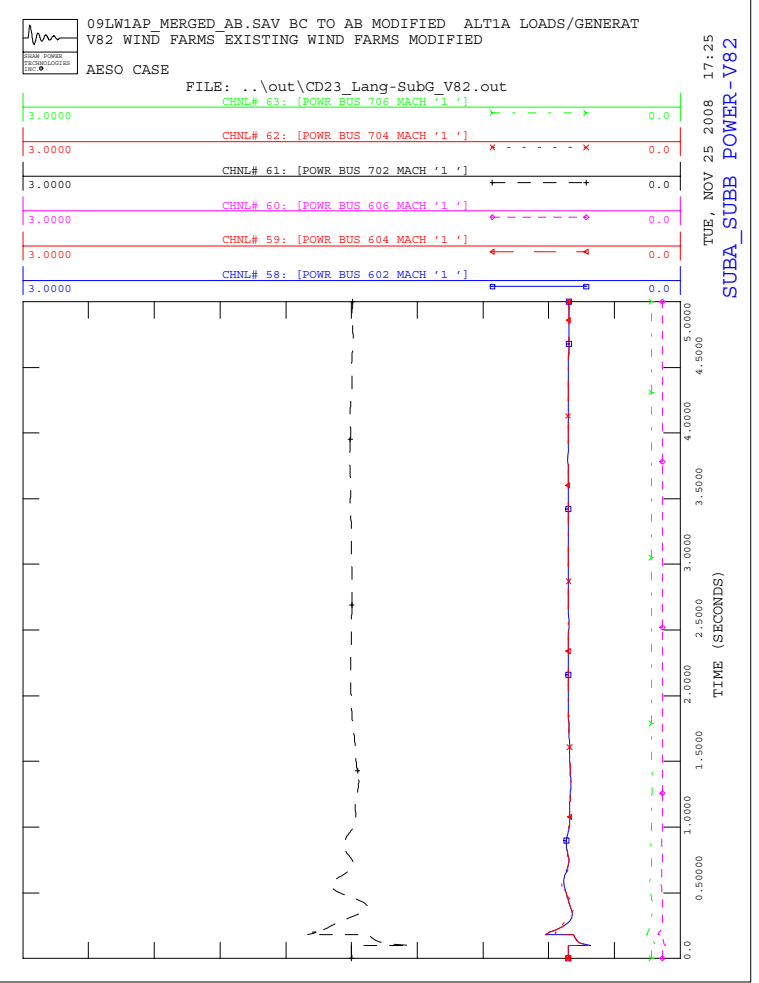
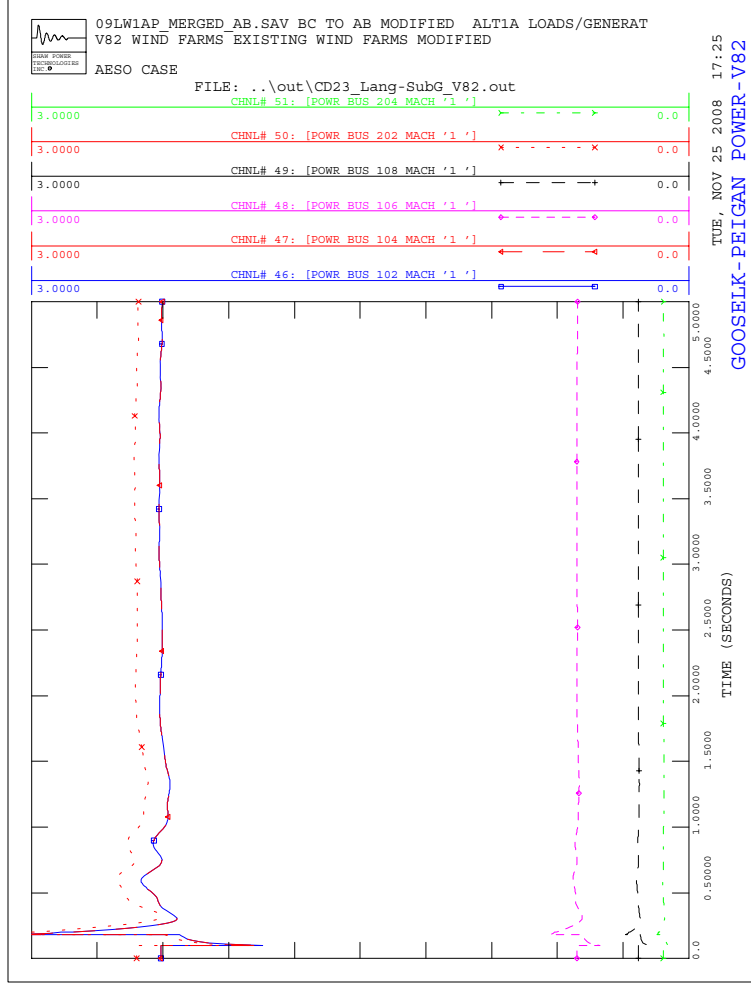
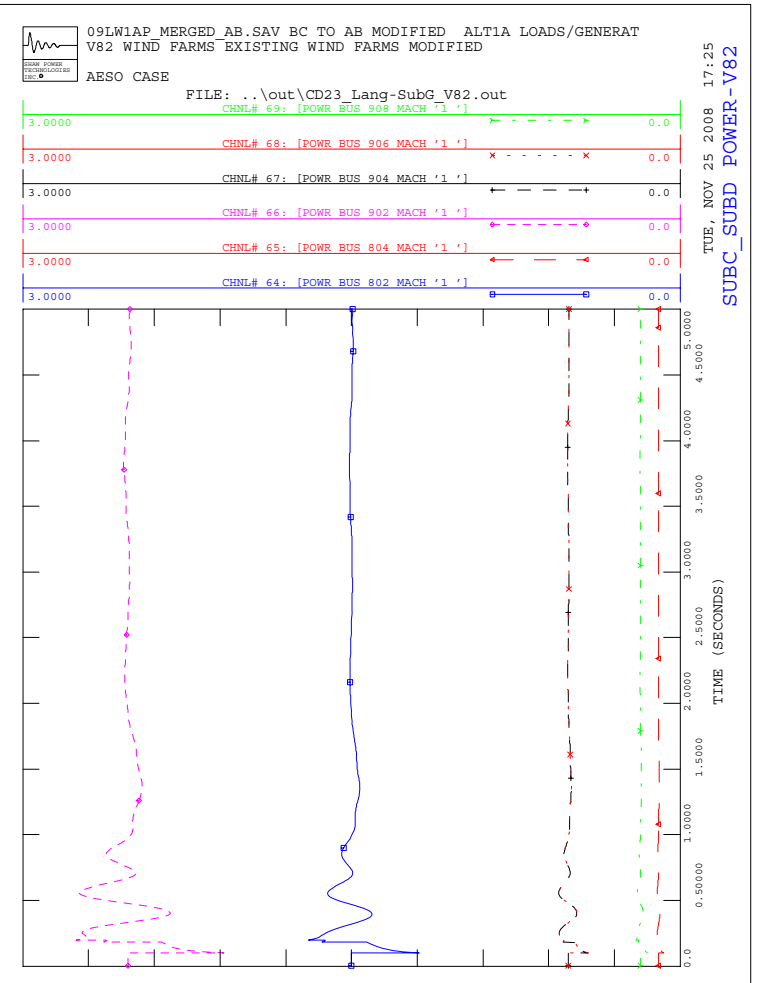
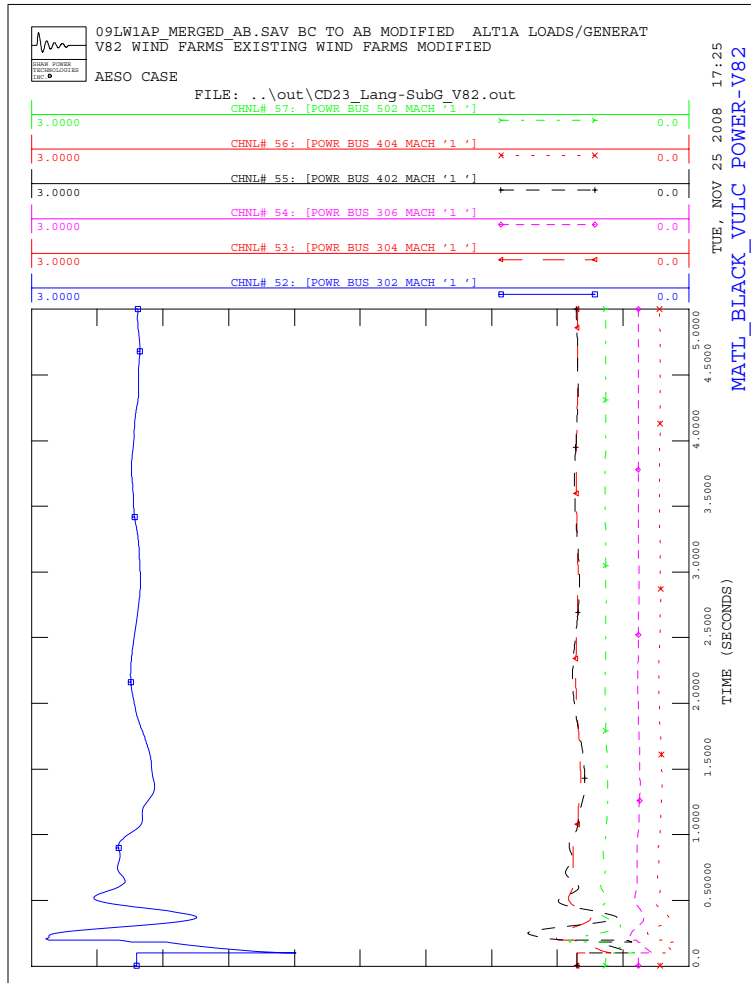
TUE, NOV 25 2008 17:25
LANGDON_FRQ-V82

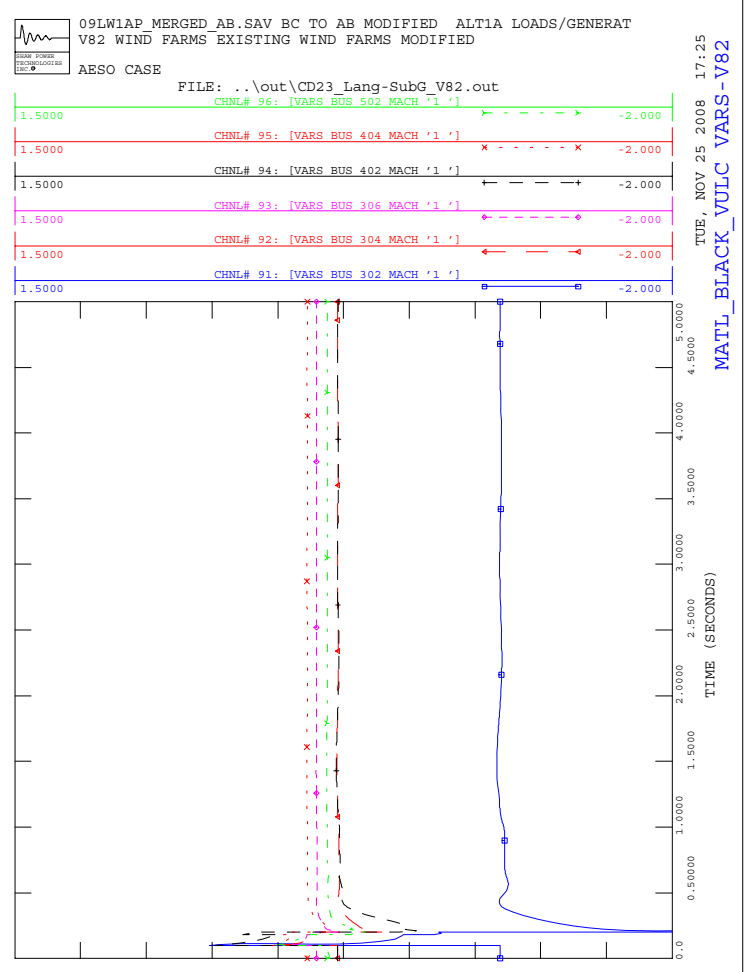
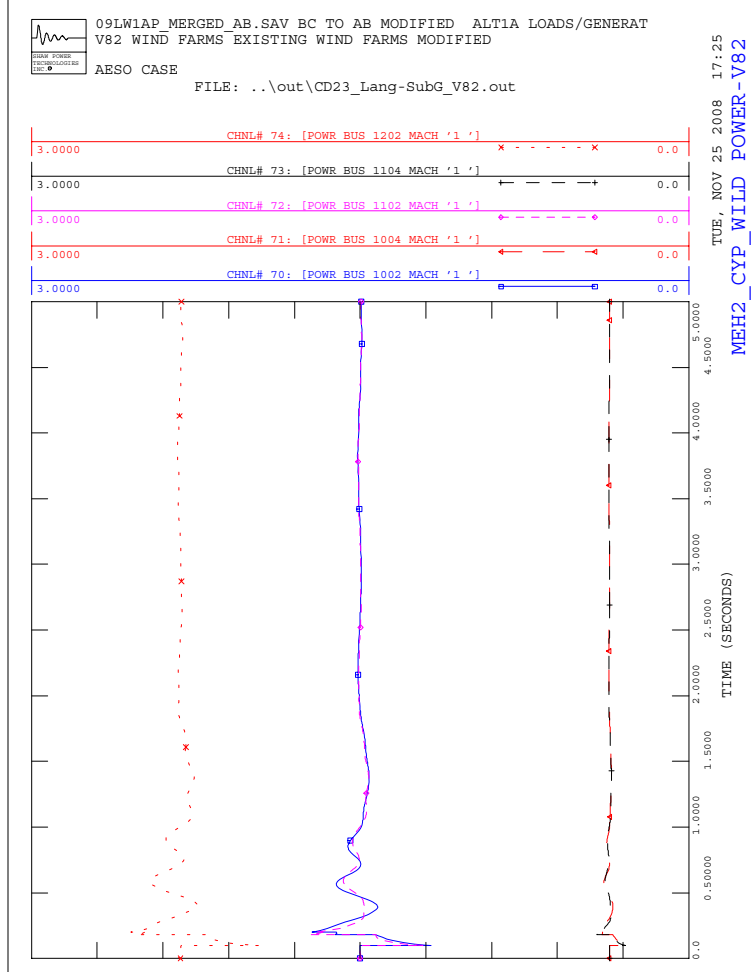
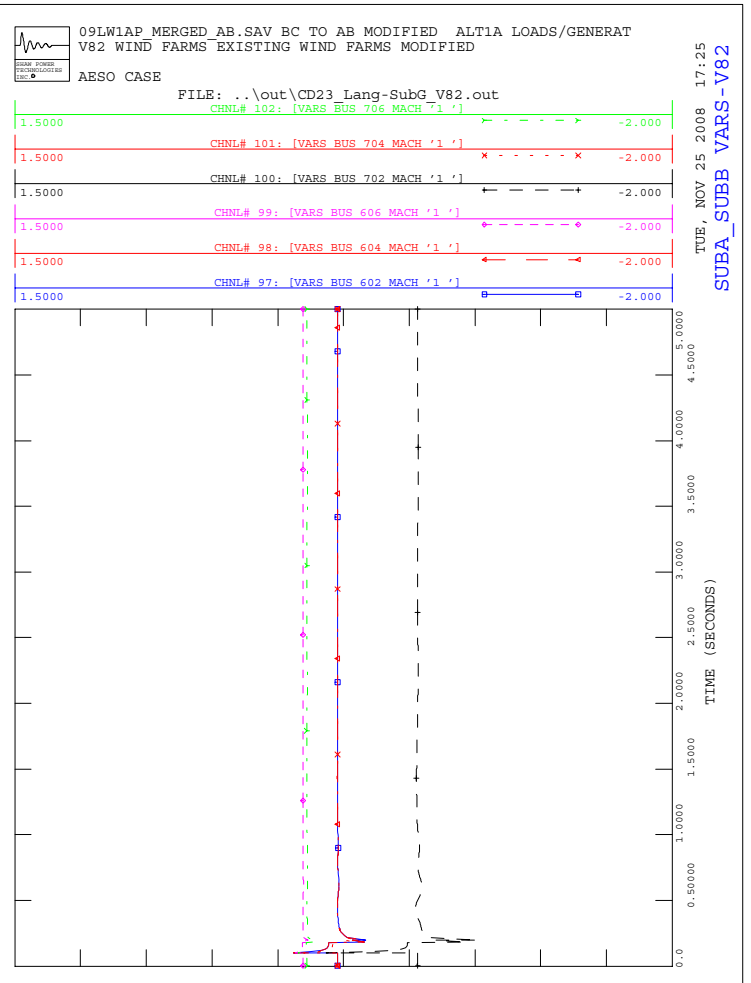
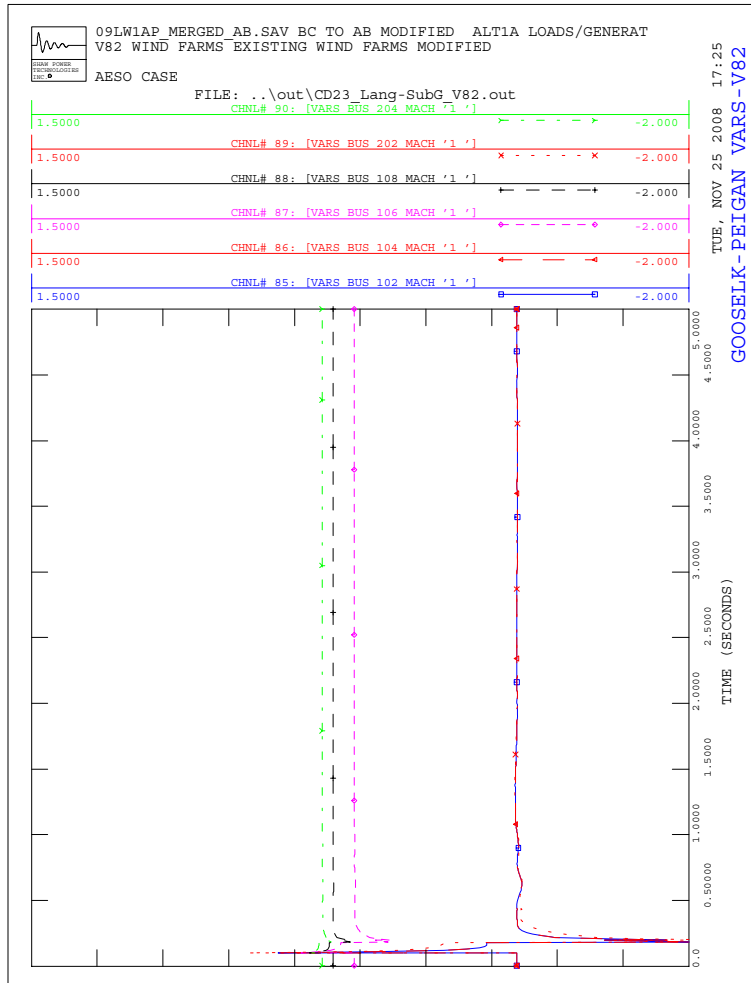


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\CD20_N_Leth-SubF-Mat1_V82.out

TUE, NOV 25 2008 17:25
AB_BC_TIE_FLOWS-V82

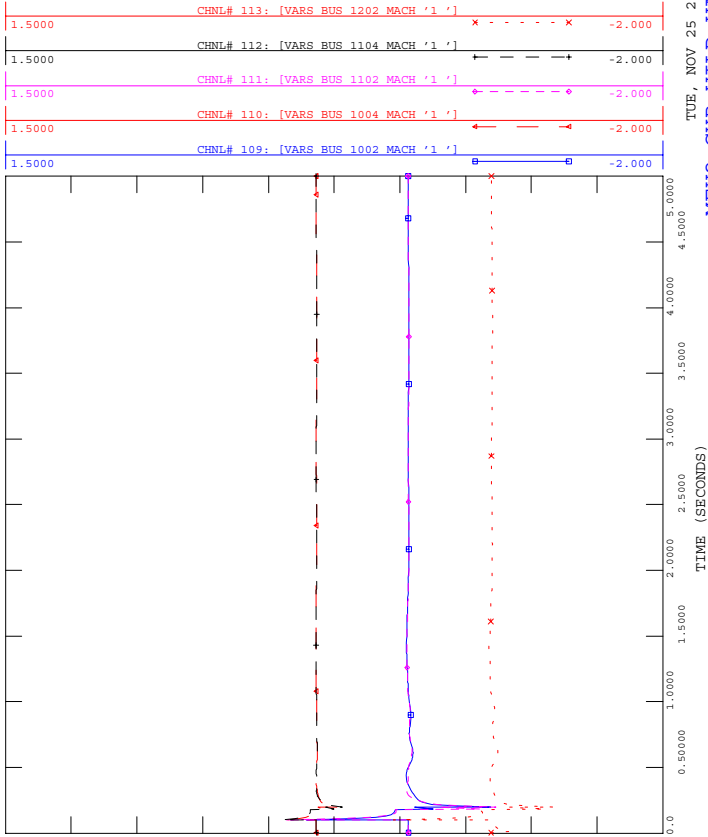






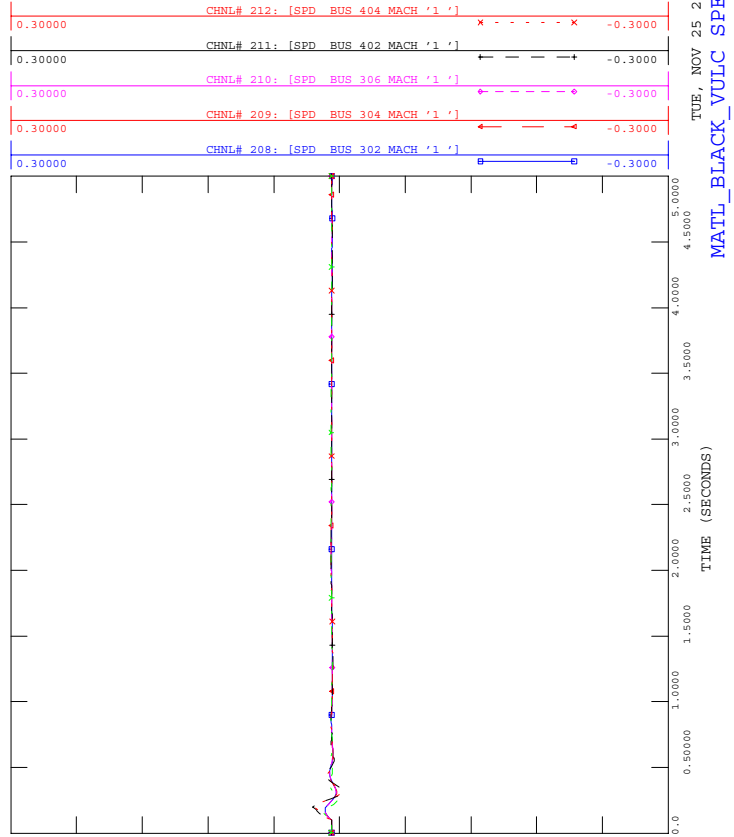
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD23_Lang-SubG_V82.out



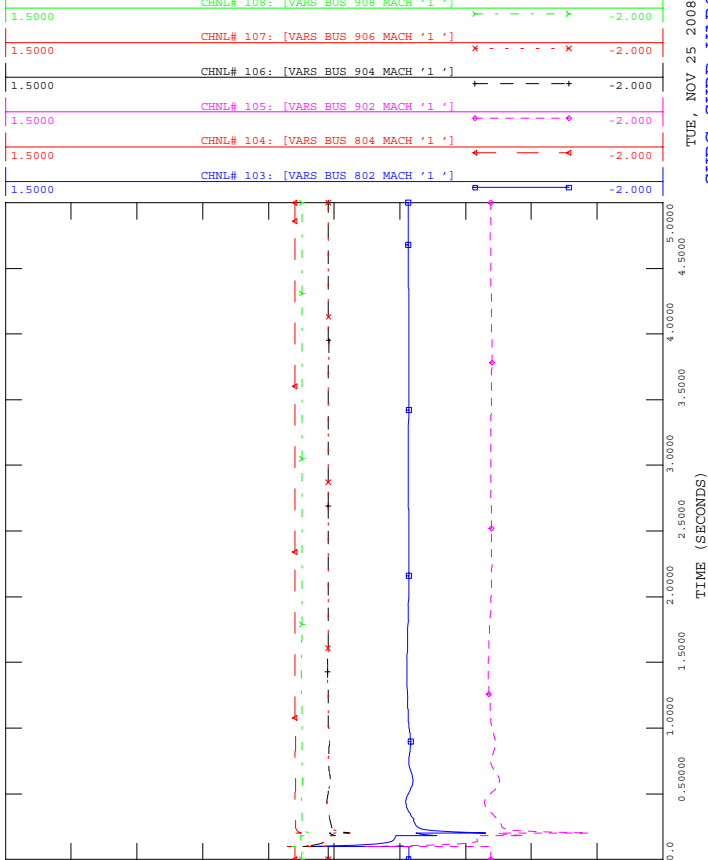
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 AESO CASE

FILE: ..\out\CD23_Lang-SubG_V82.out



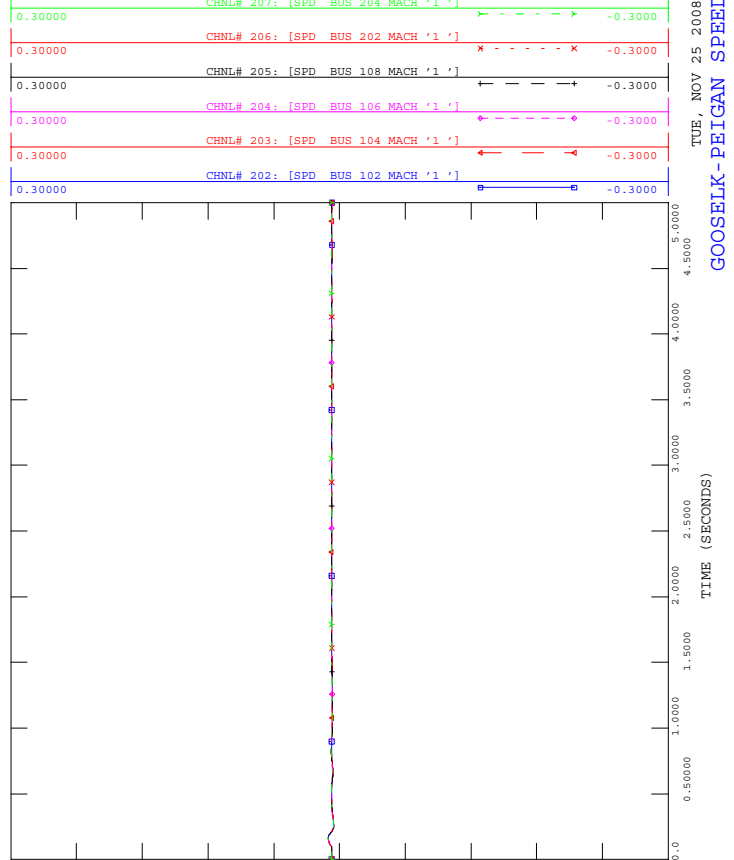
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 AESO CASE

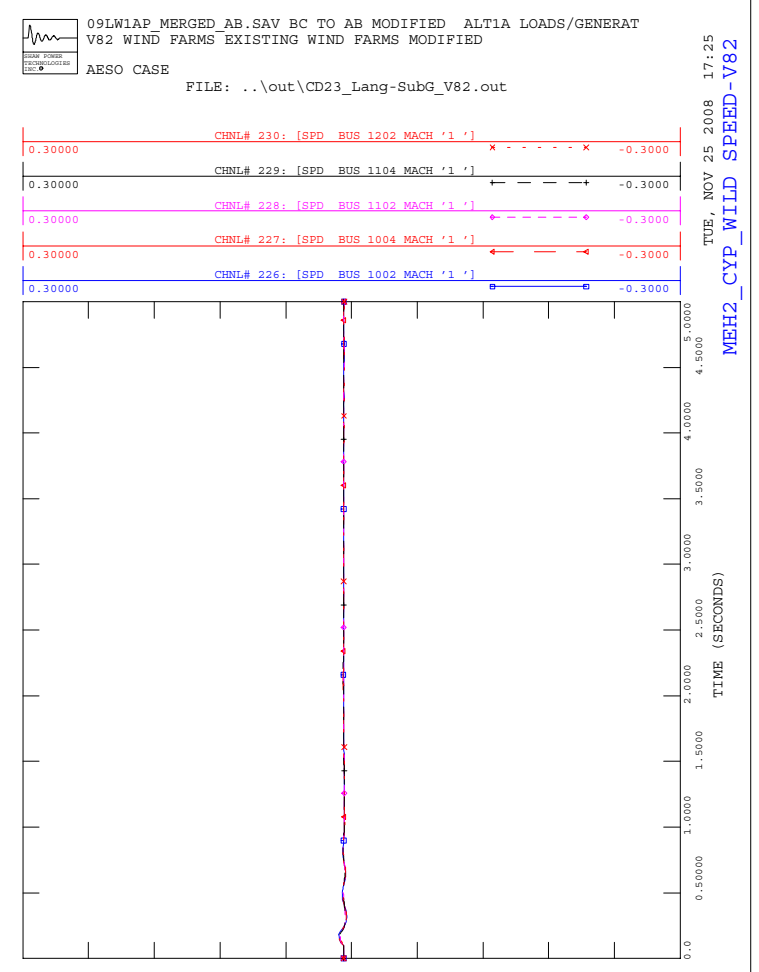
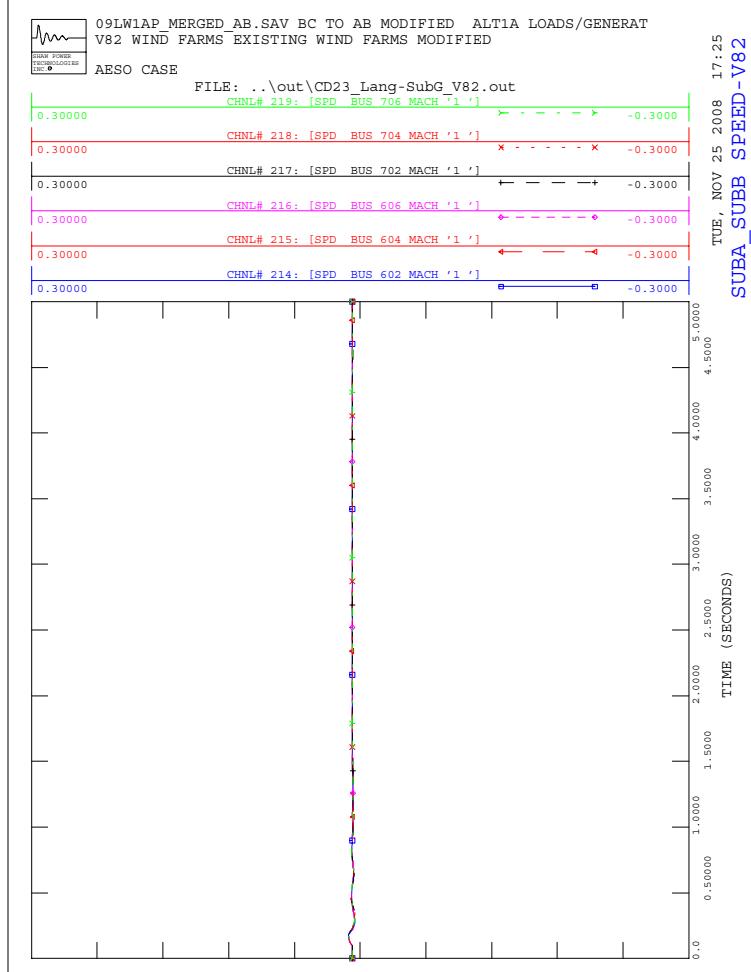
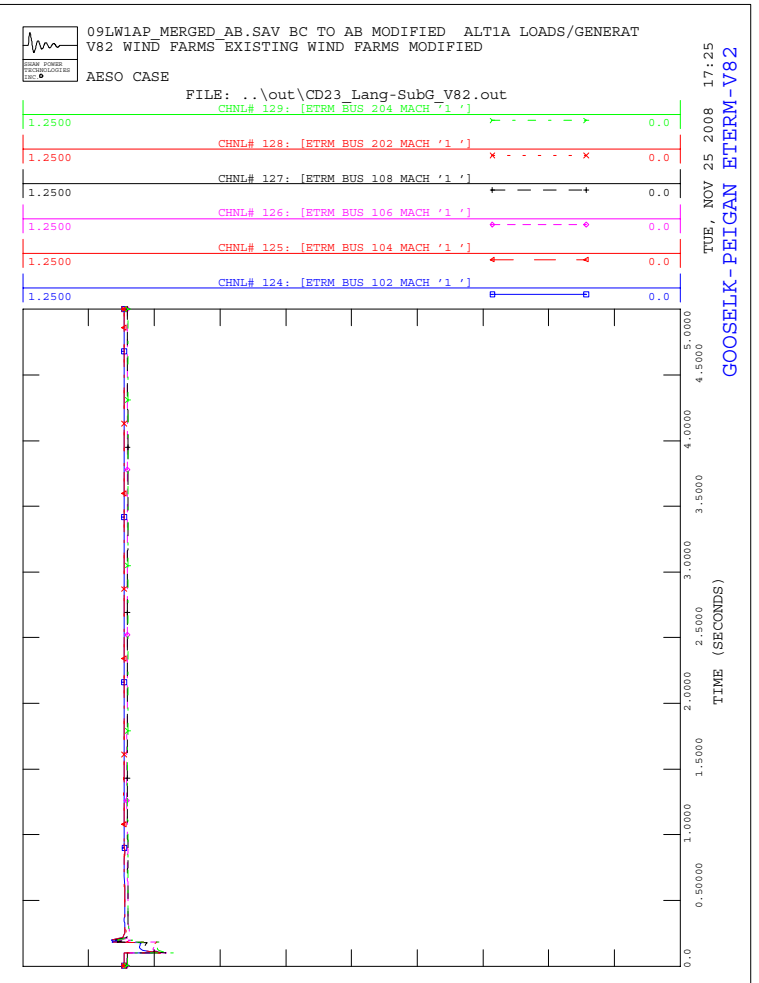
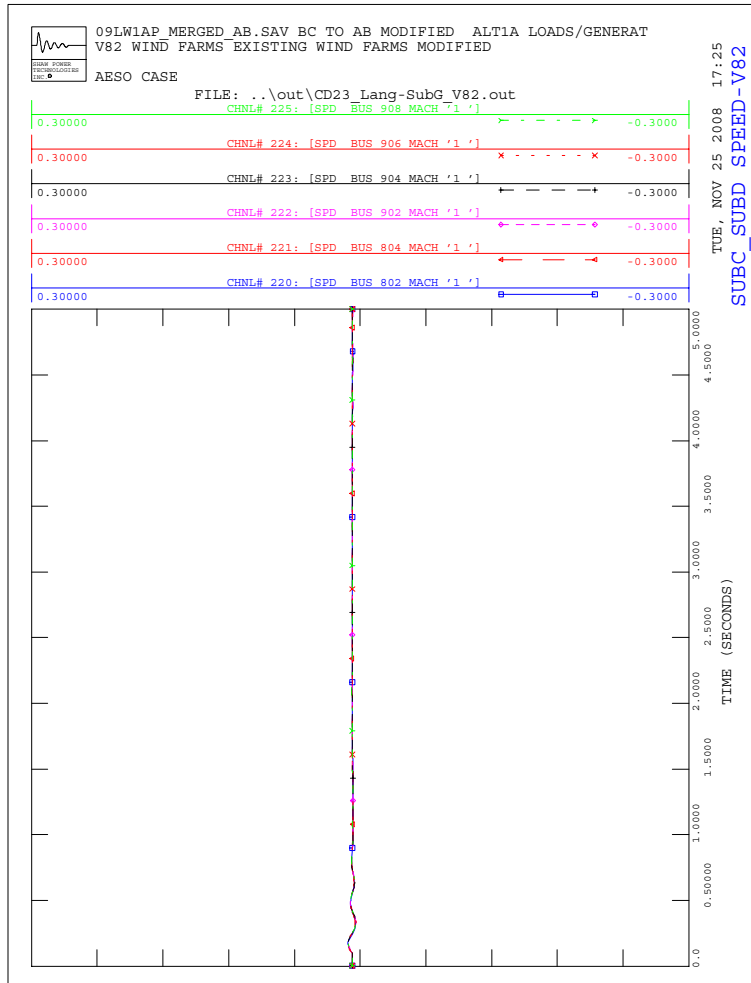
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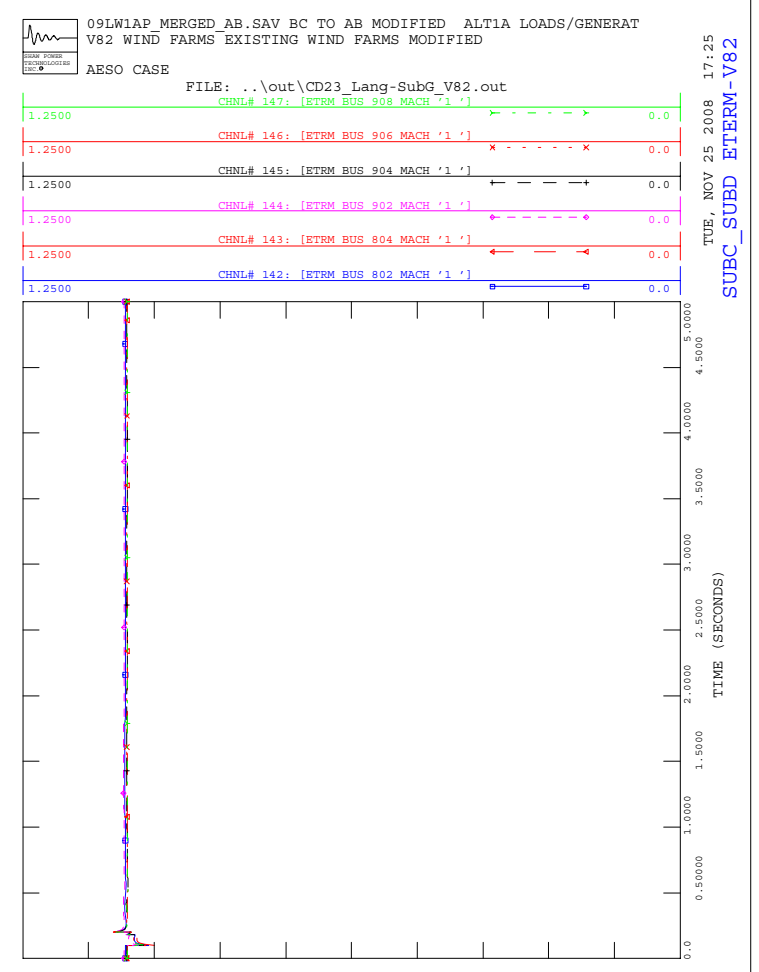
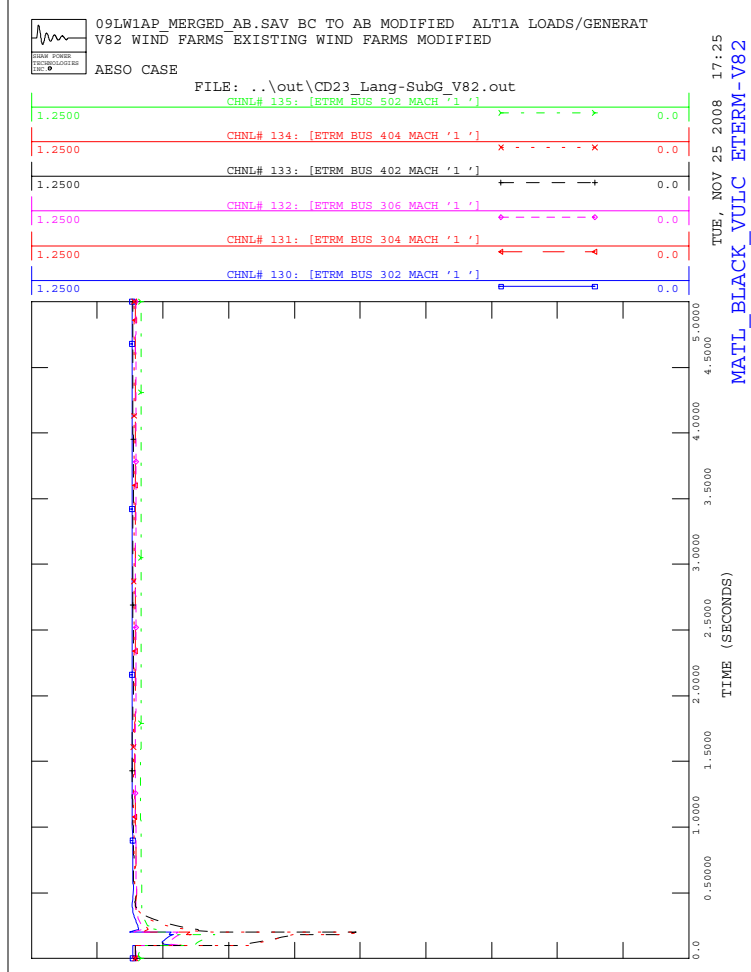
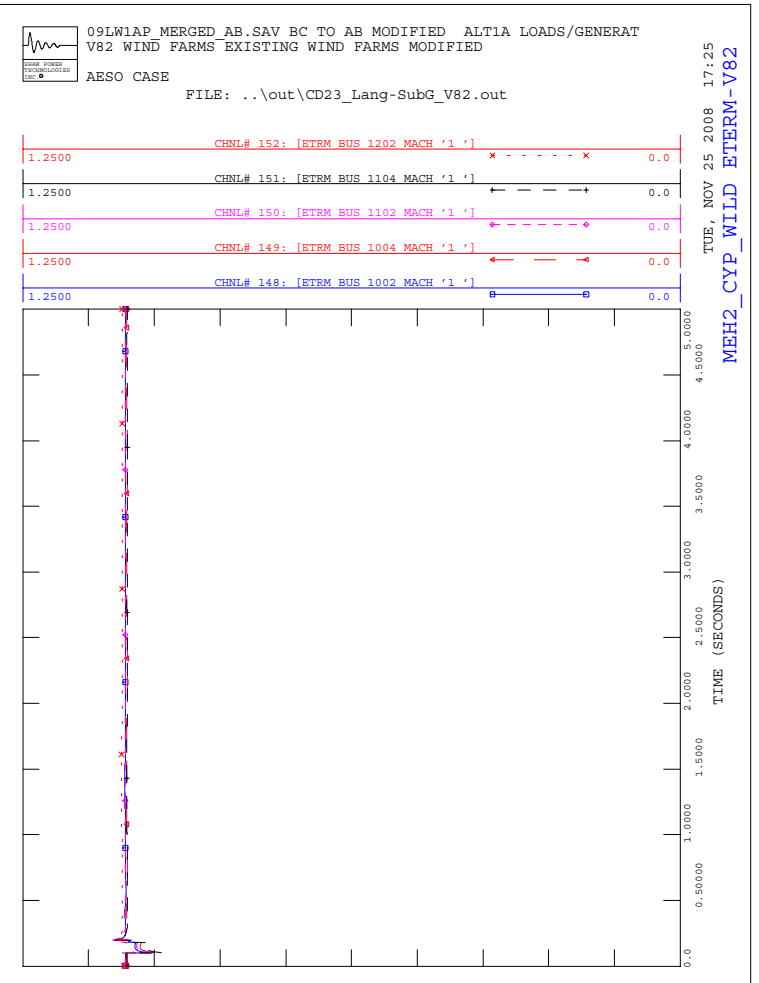
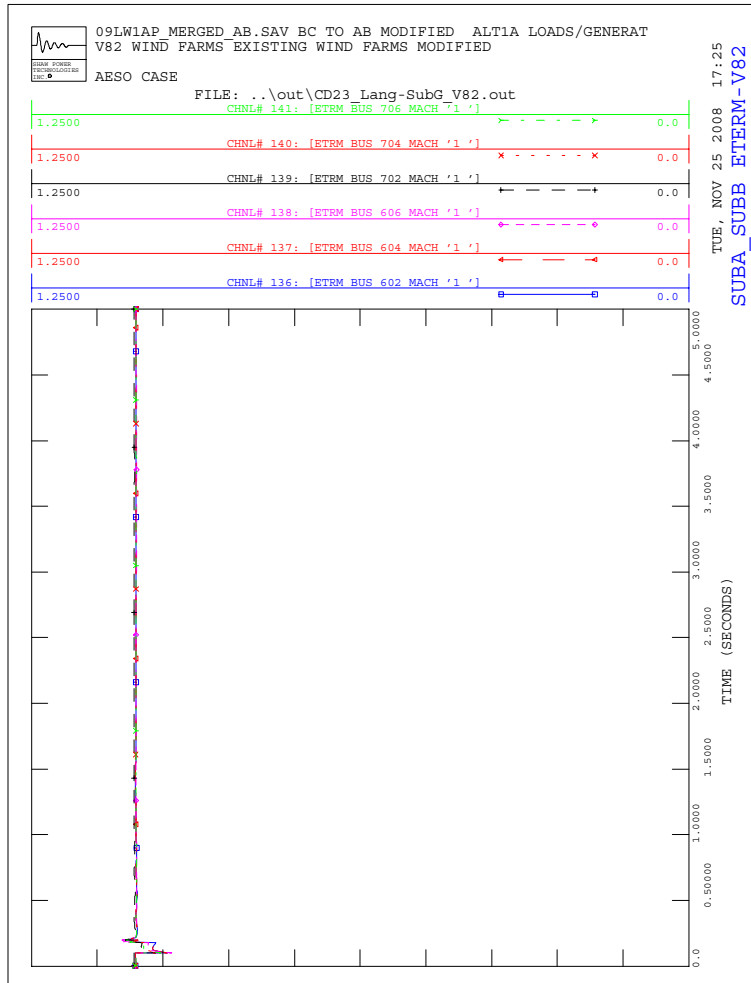


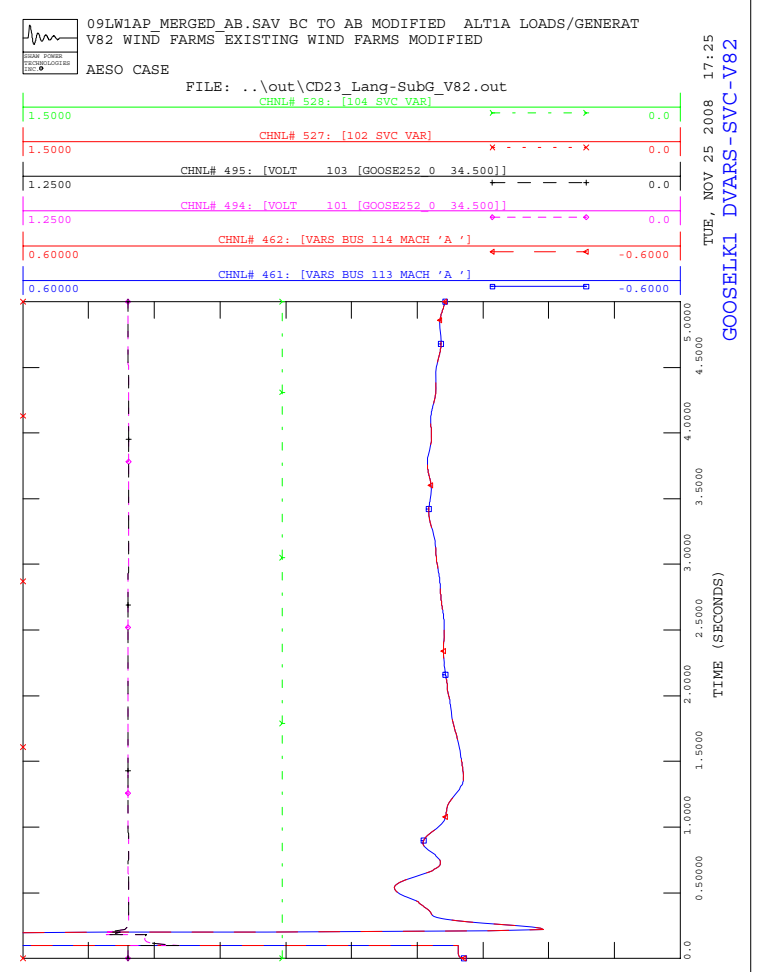
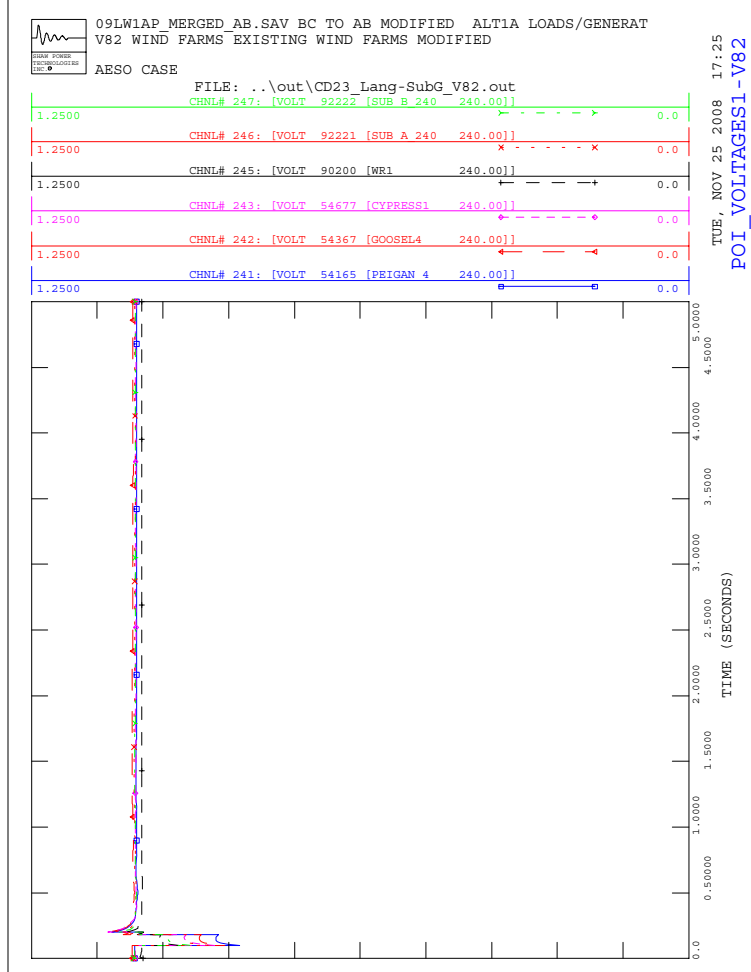
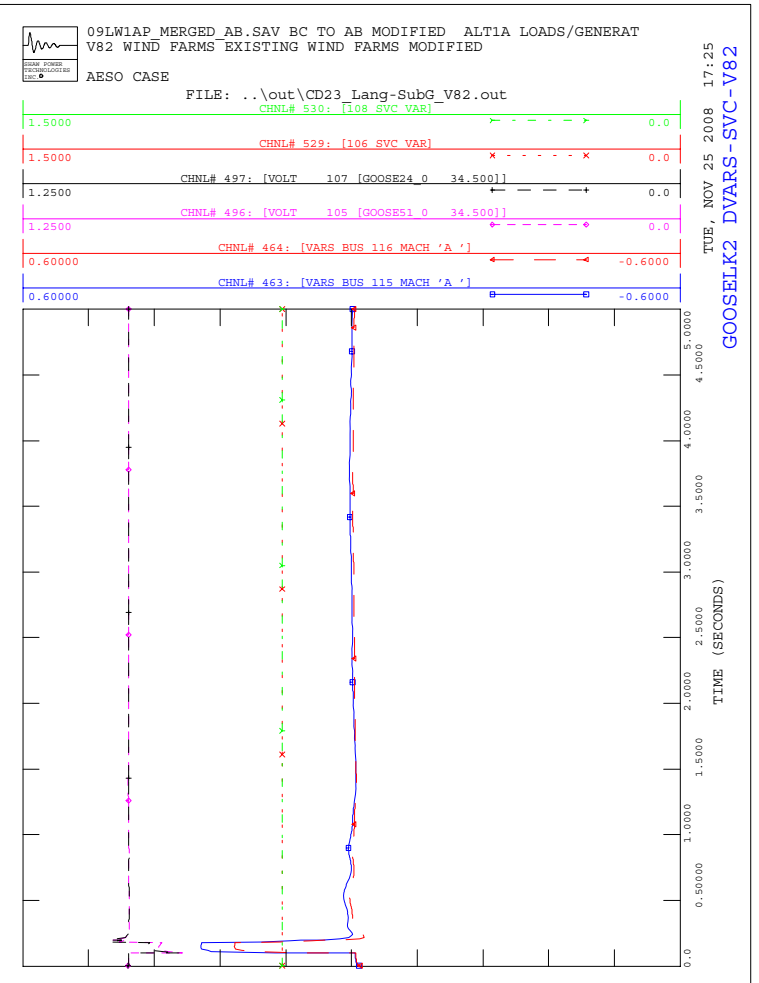
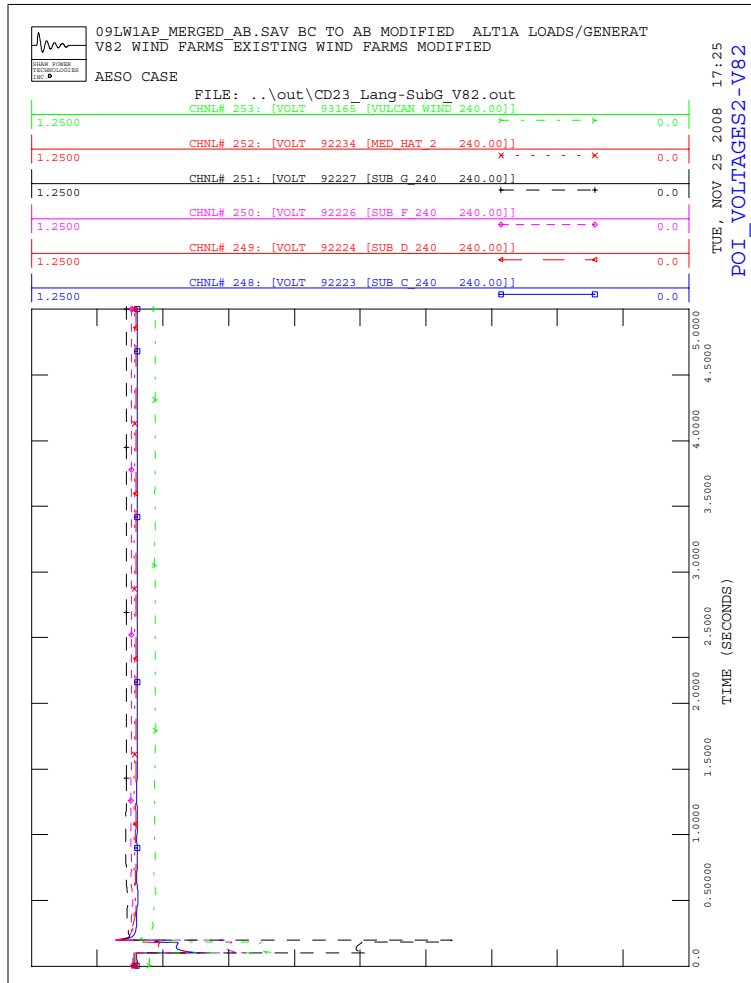
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

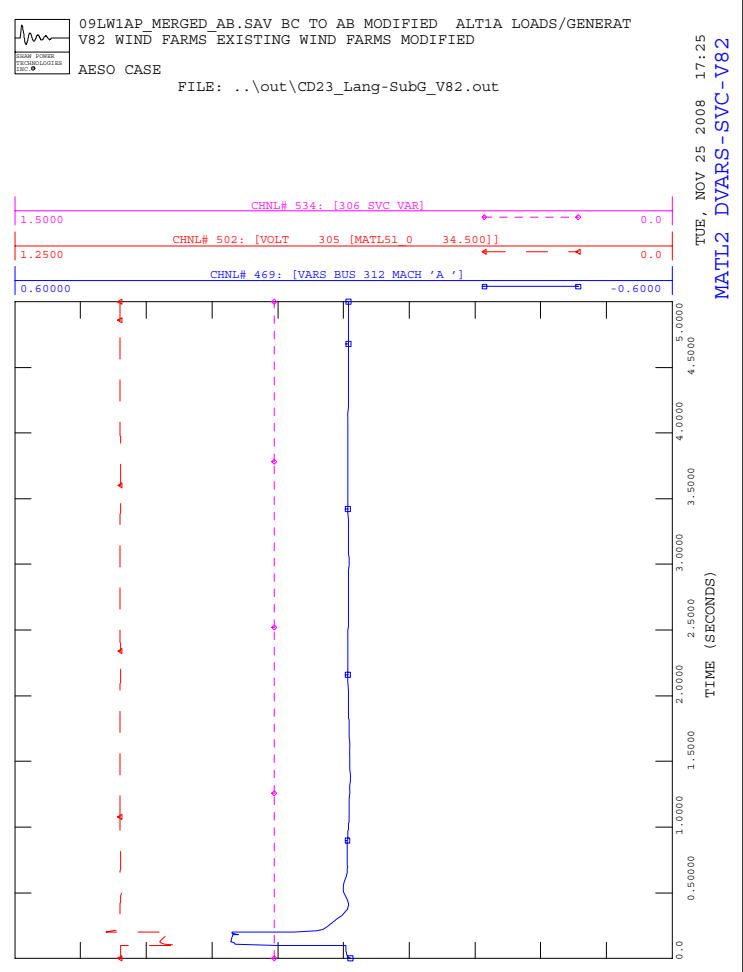
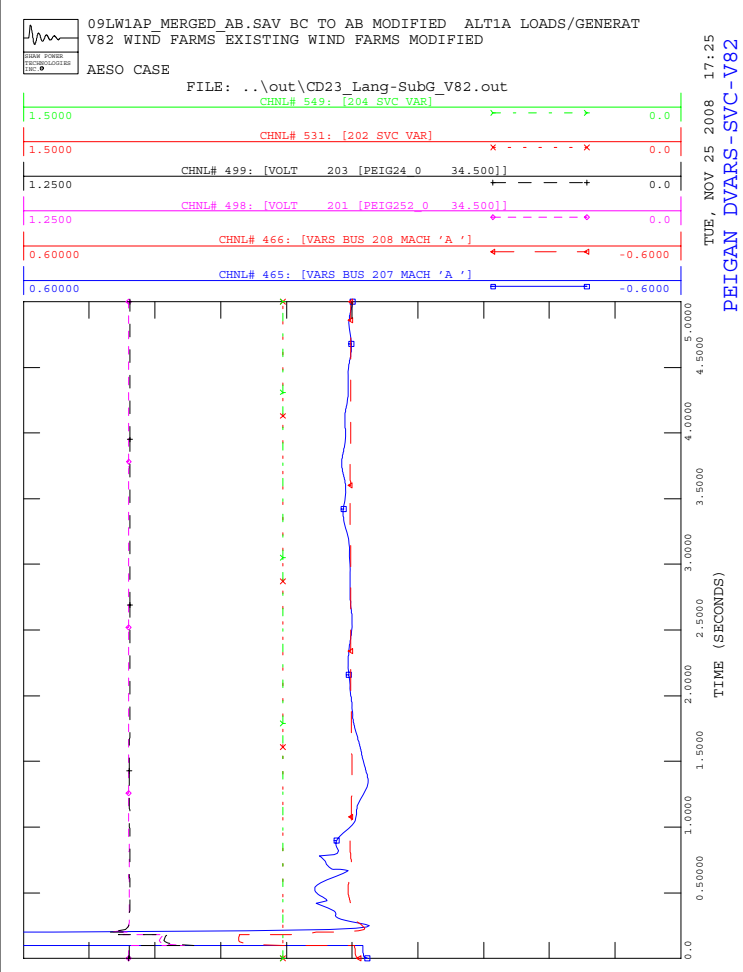
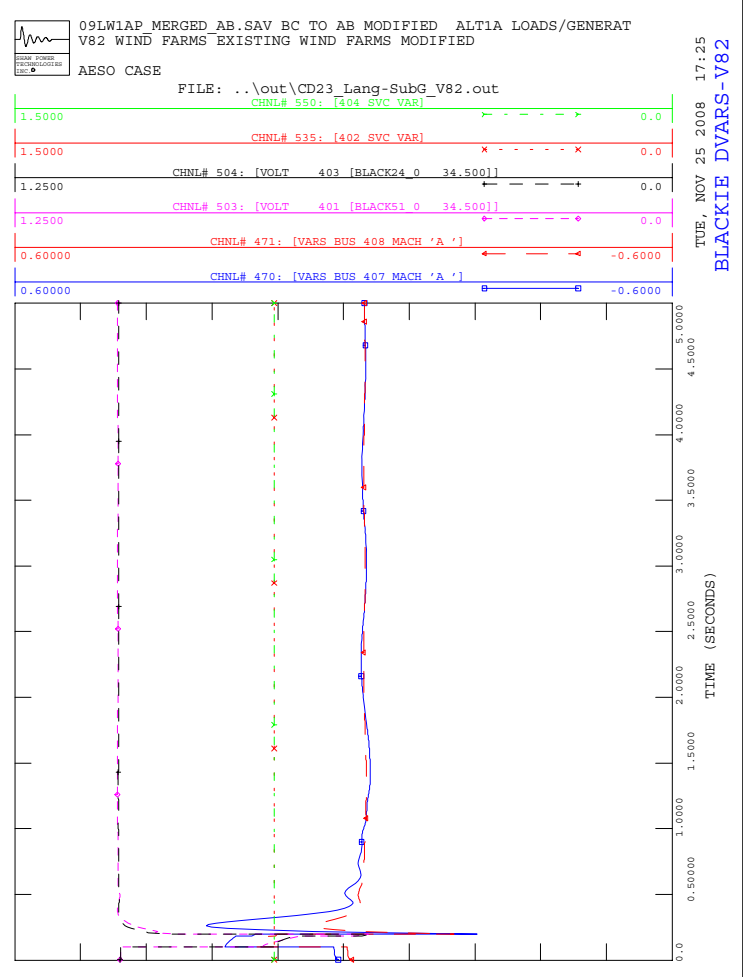
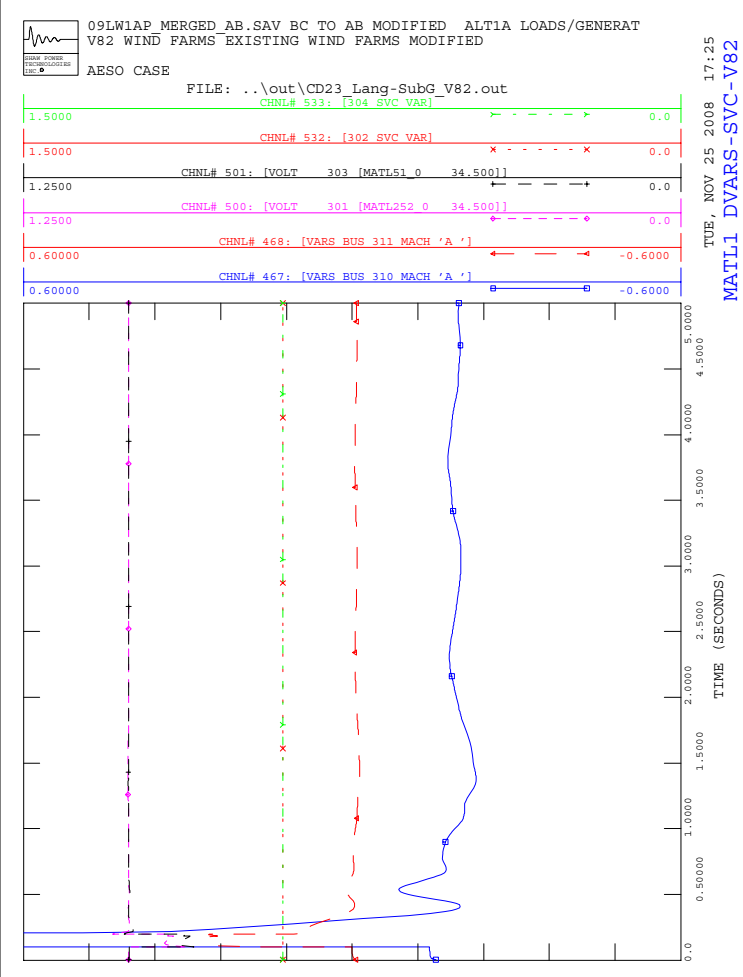
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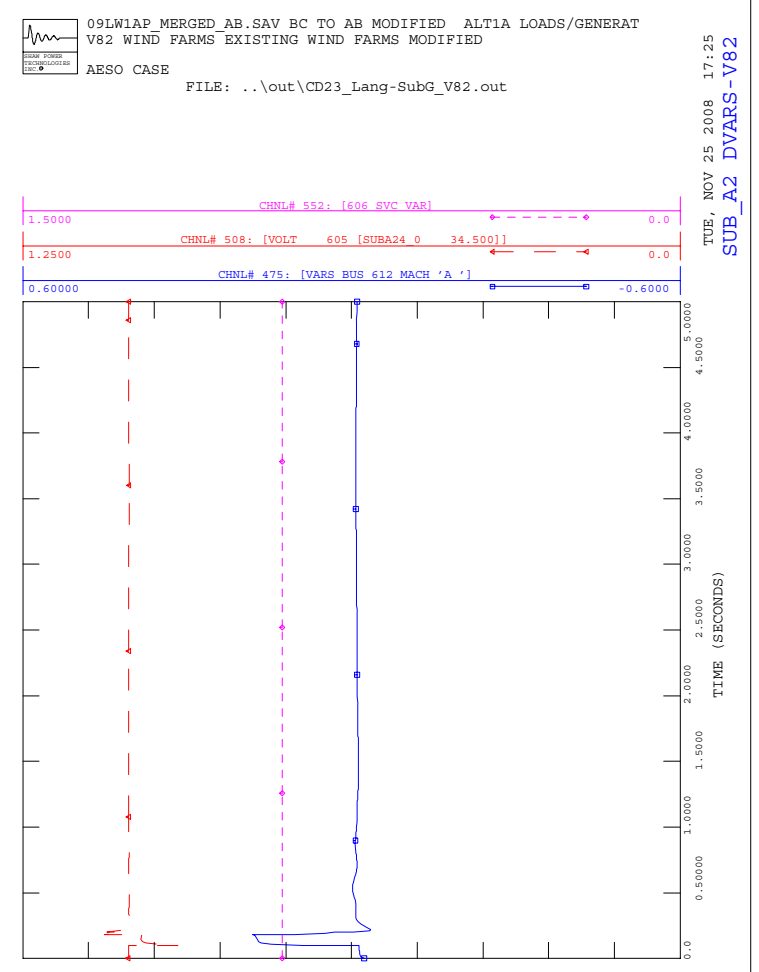
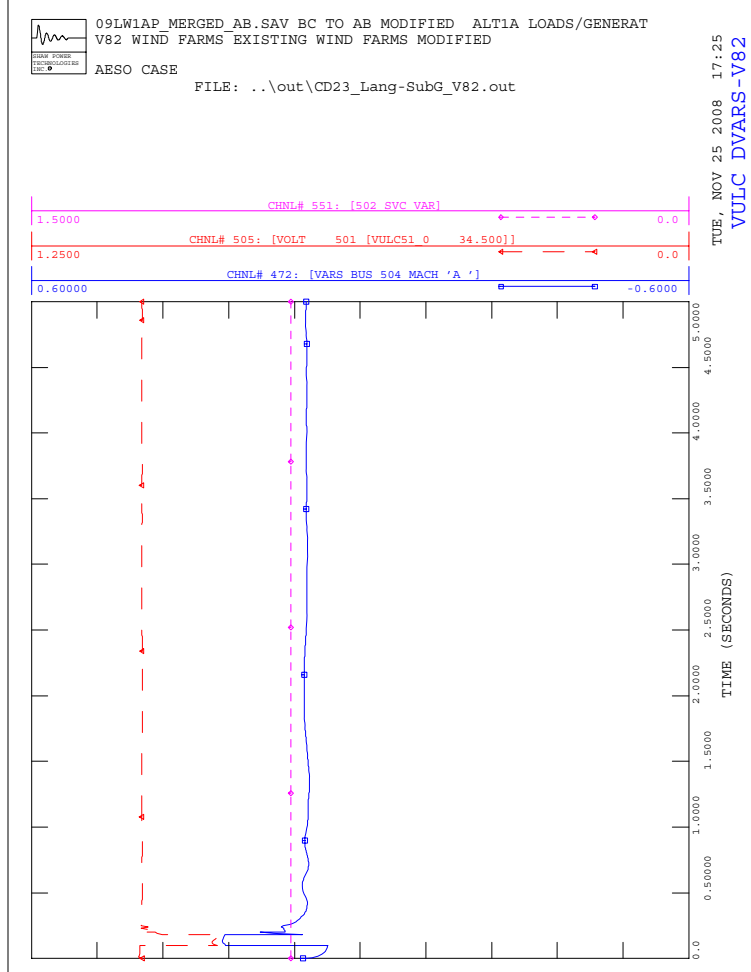
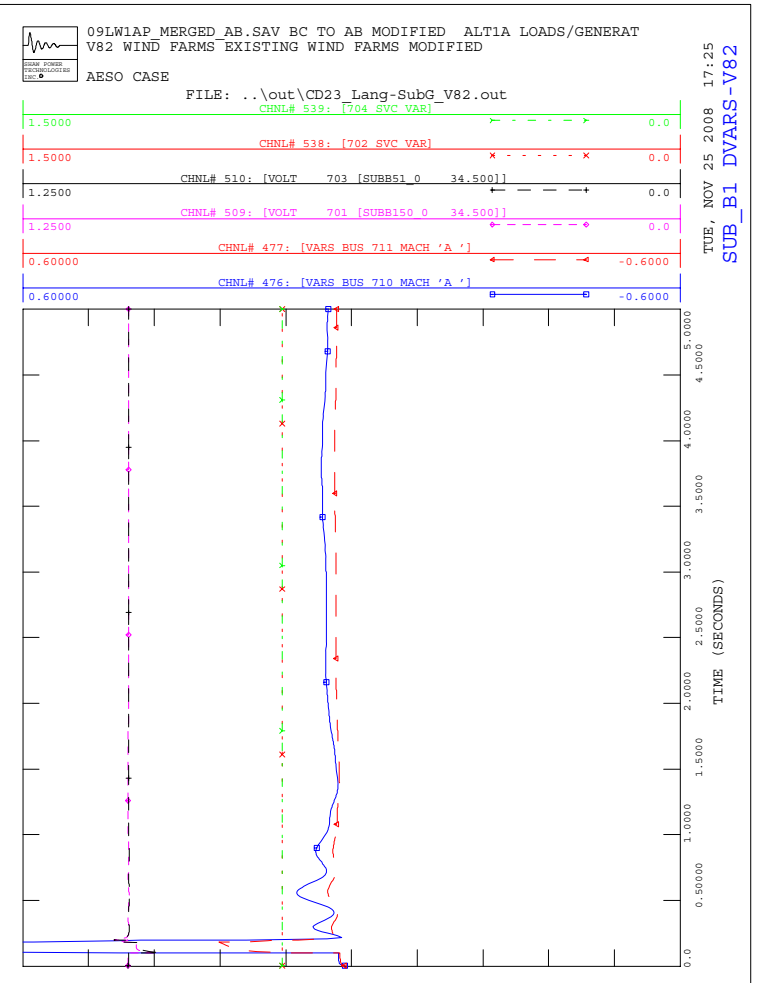
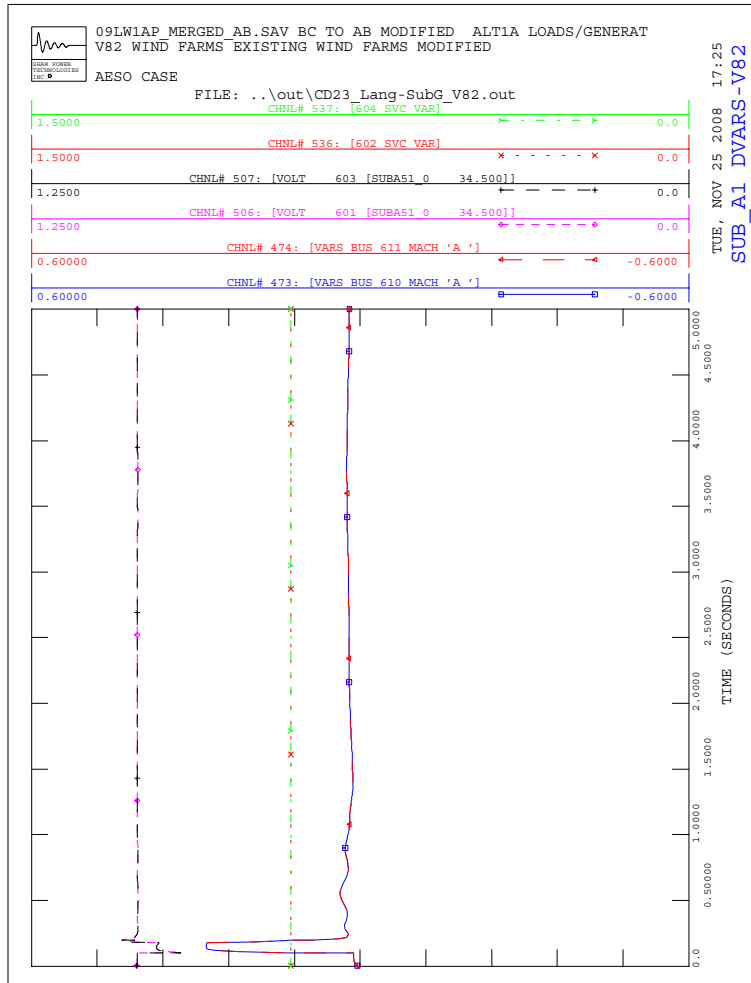






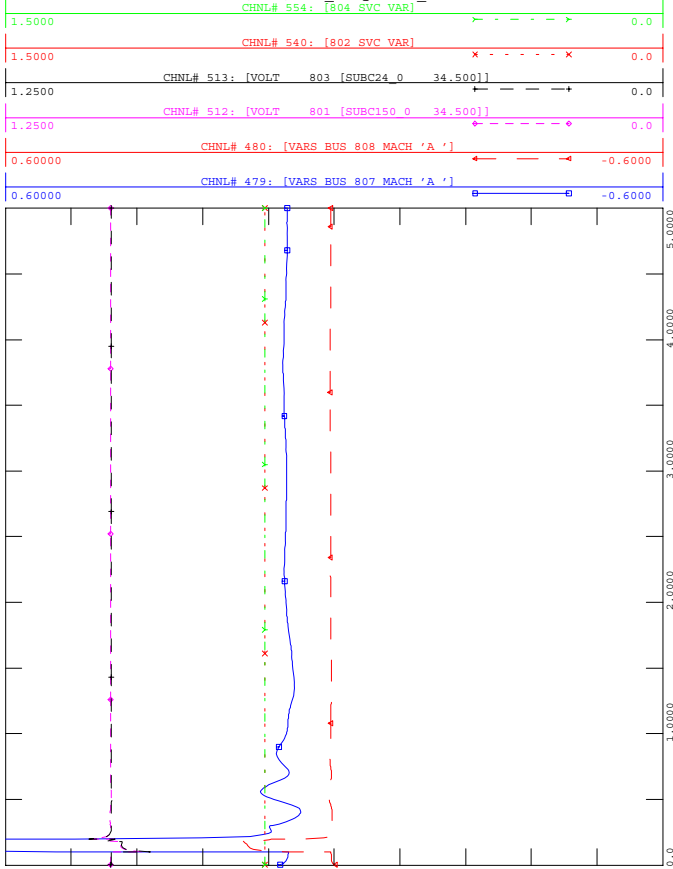






09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

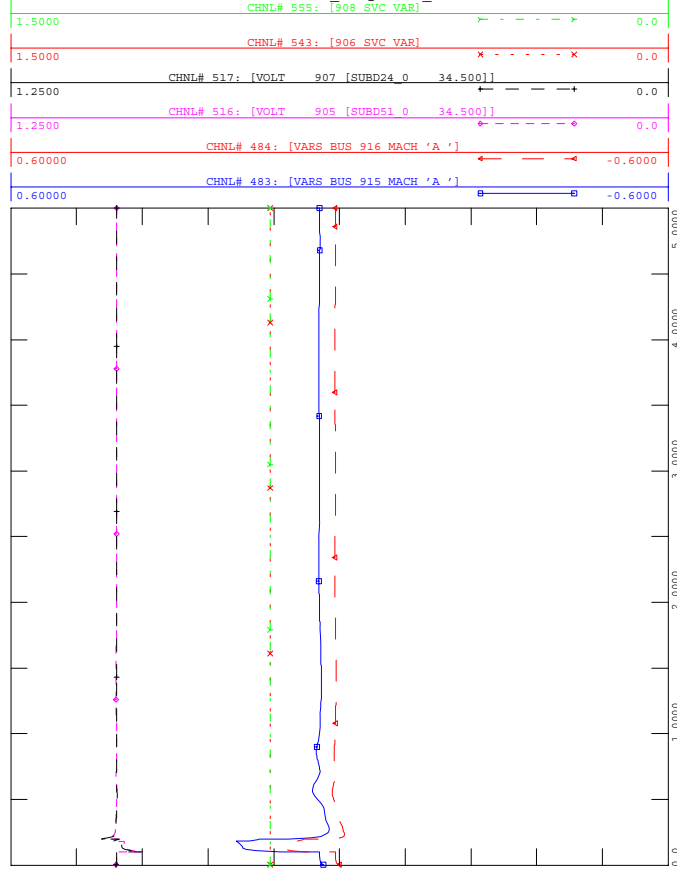
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TUE, NOV 25 2008 17:25
 SUB_C DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

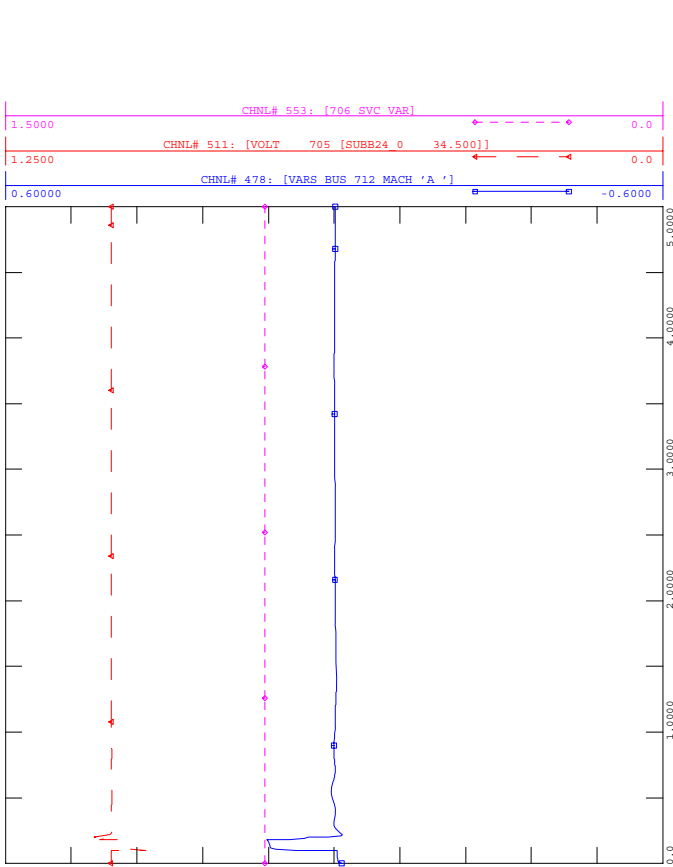
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TUE, NOV 25 2008 17:25
 SUB_D2 DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

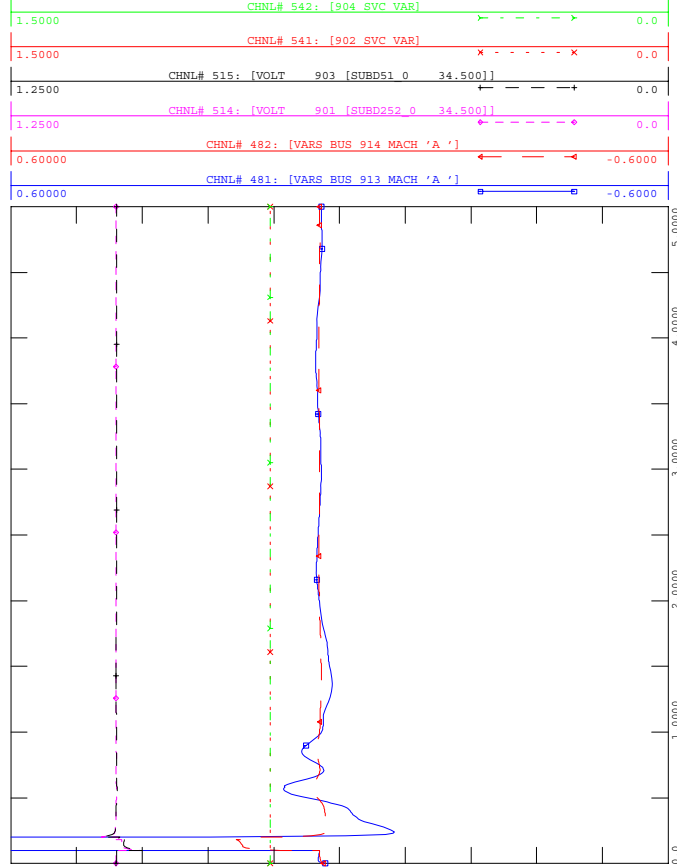
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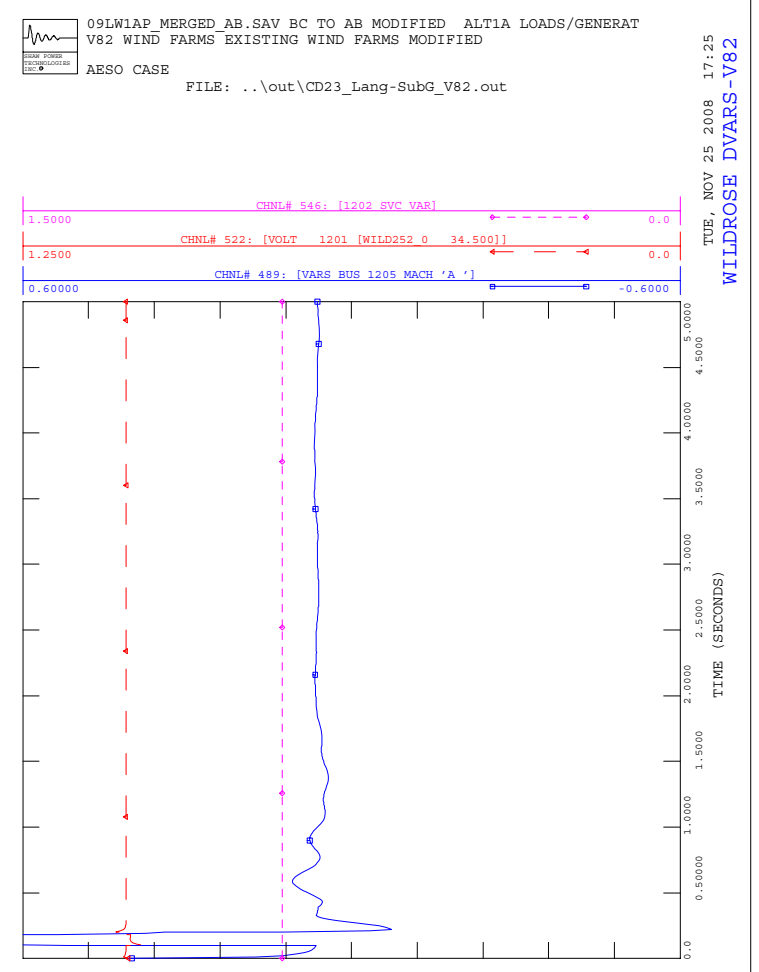
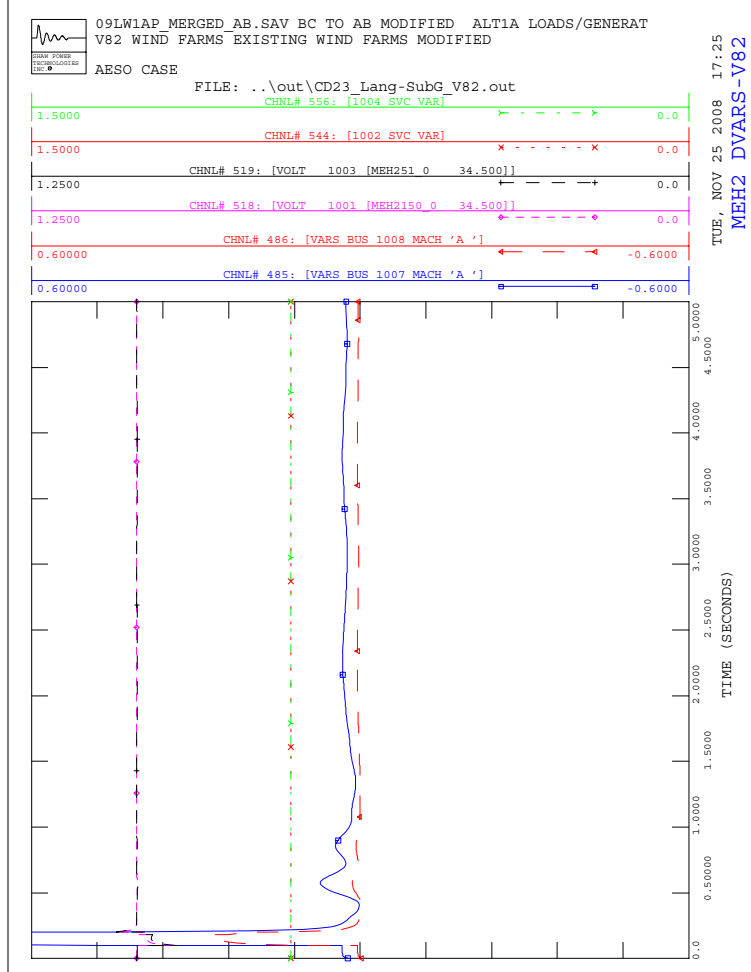
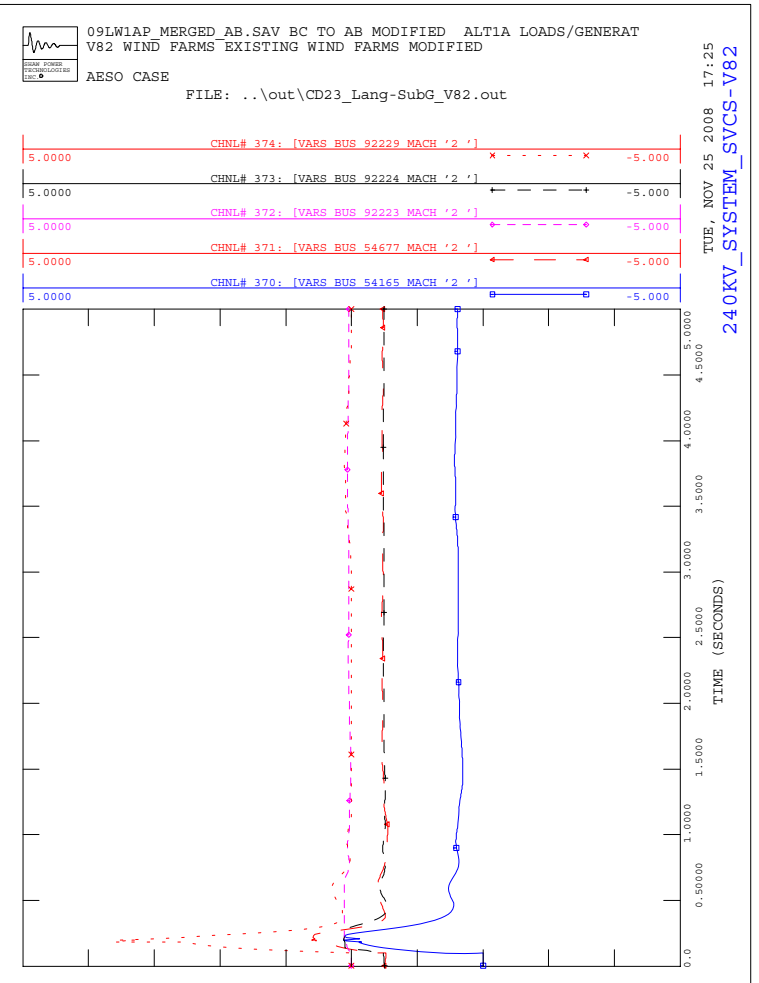
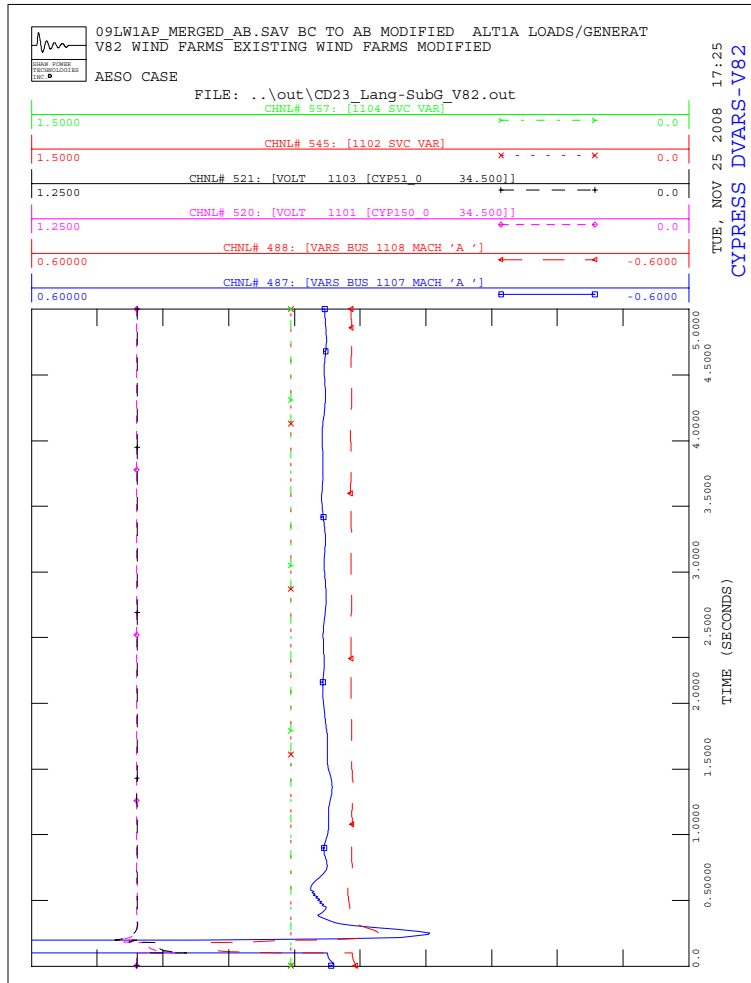
TUE, NOV 25 2008 17:25
 SUB_B2 DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

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TUE, NOV 25 2008 17:25
 SUB_D1 DVARS-V82



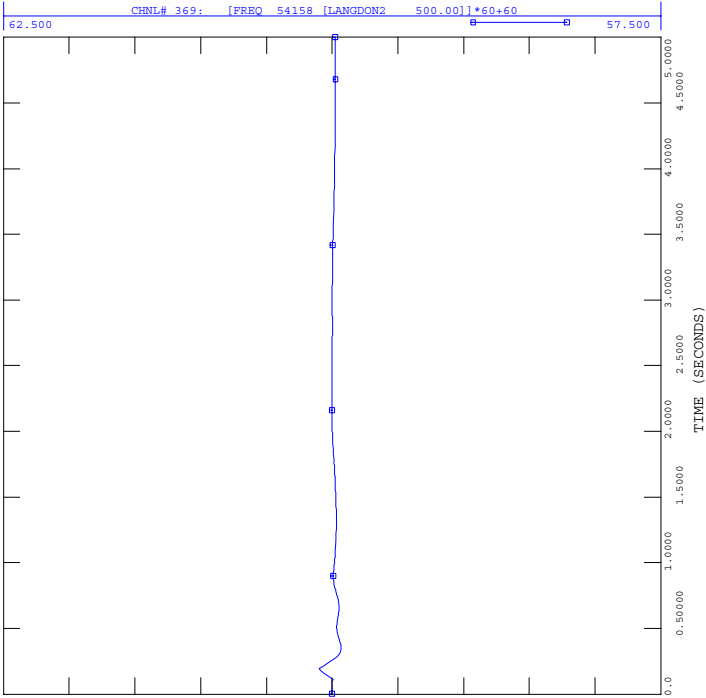


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD23_Lang-SubG_V82.out

TUE, NOV 25 2008 17:25
LANGDON_FRQ-V82

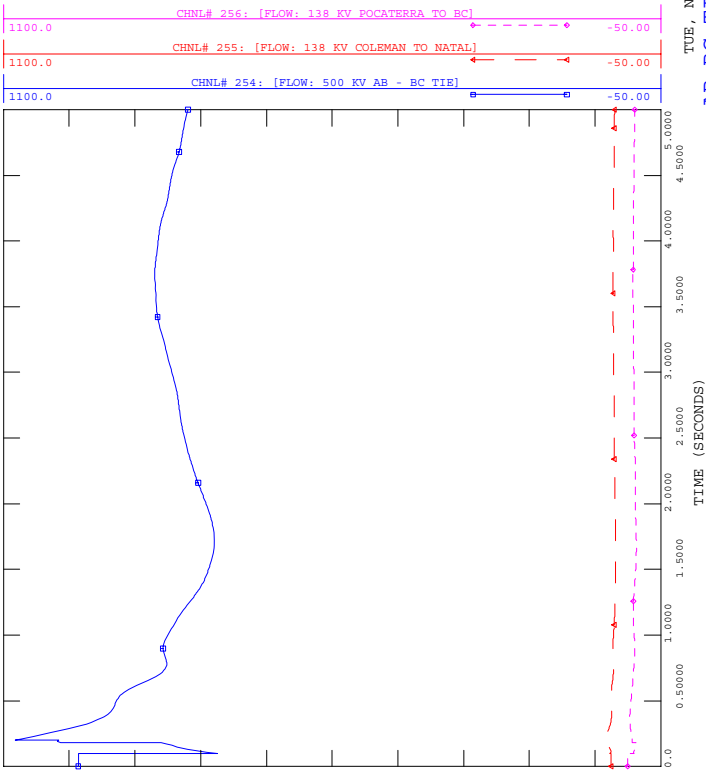


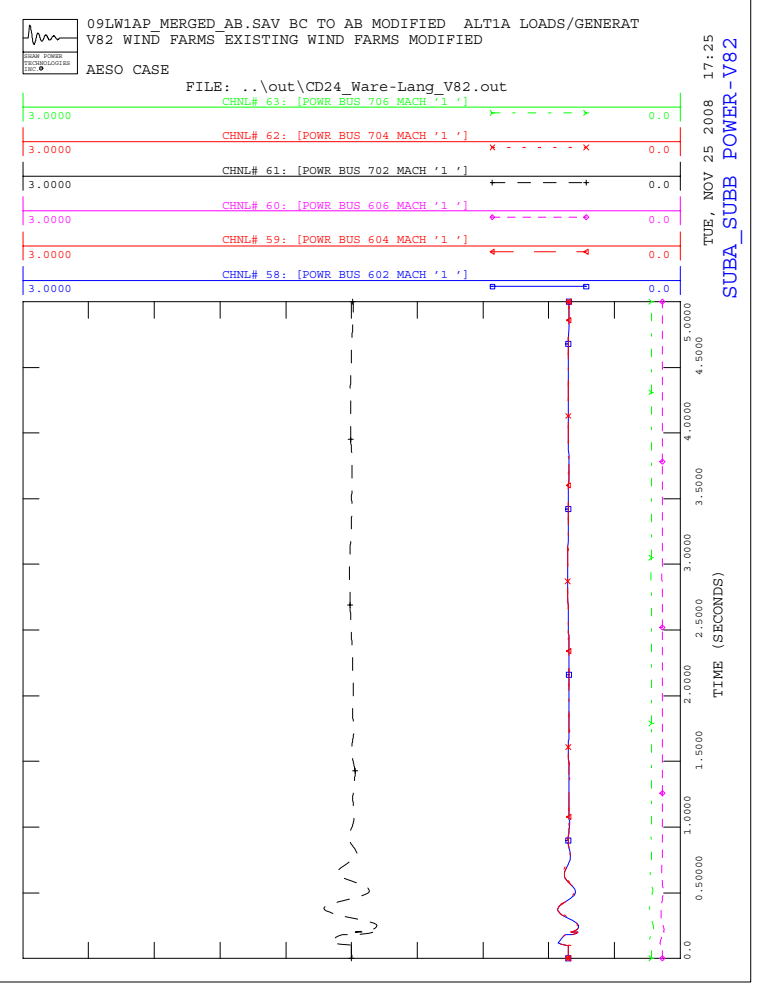
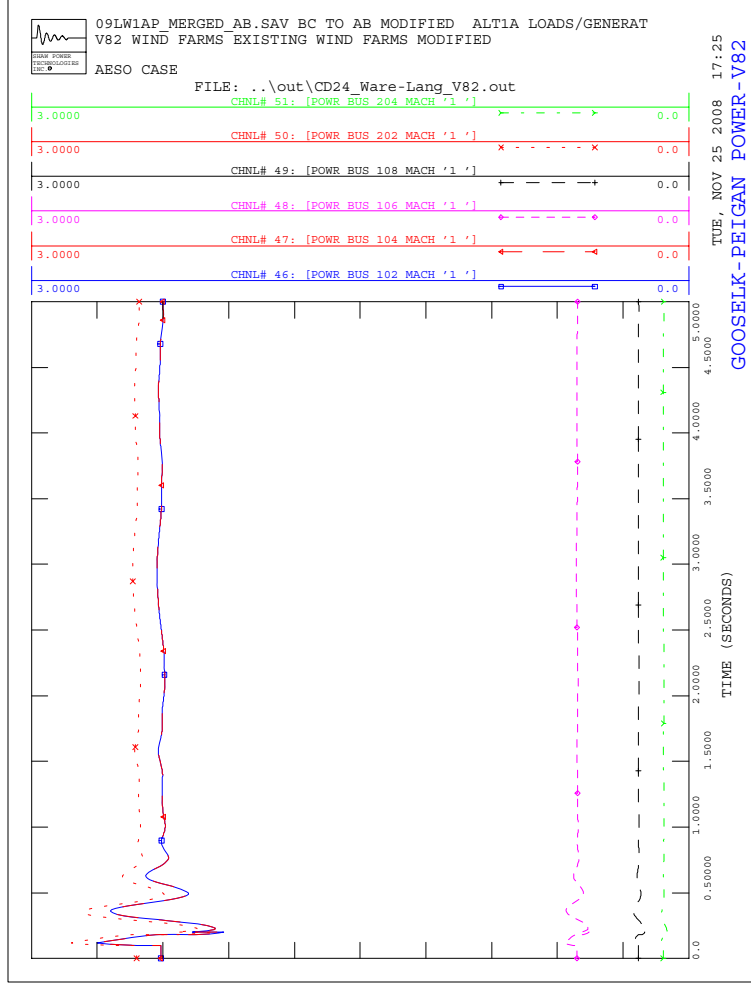
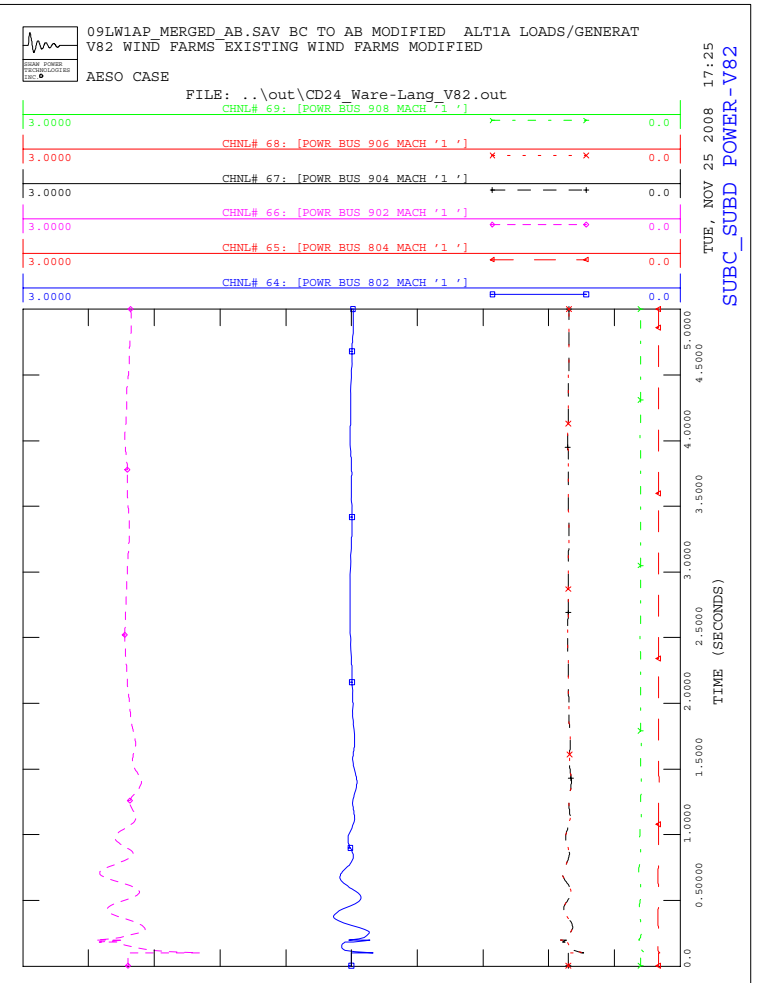
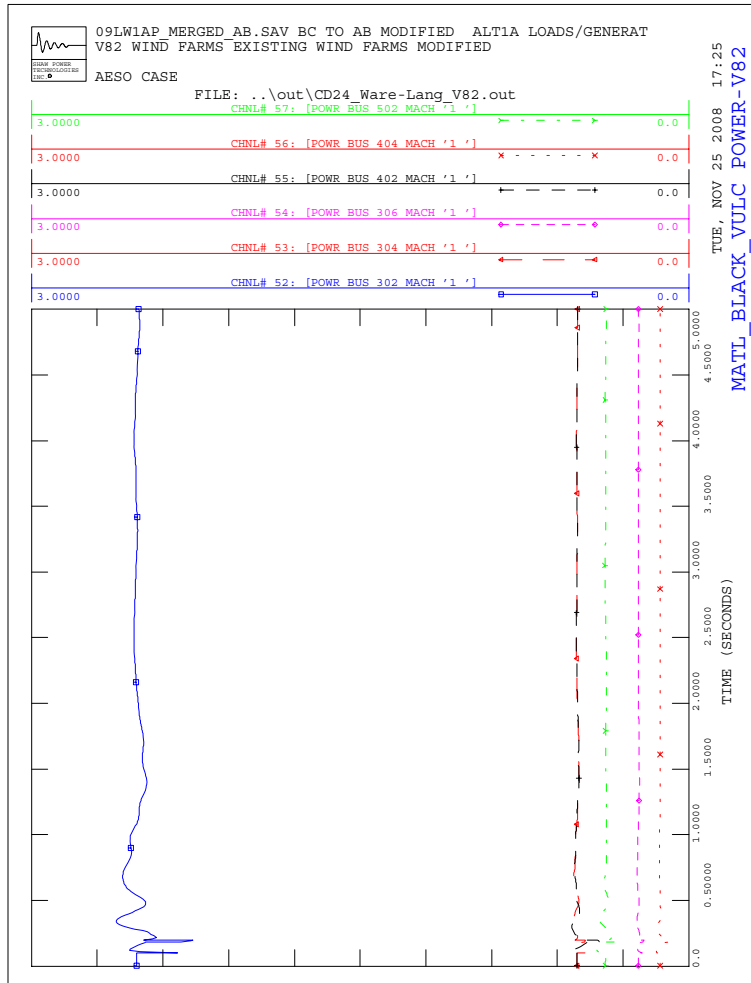
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

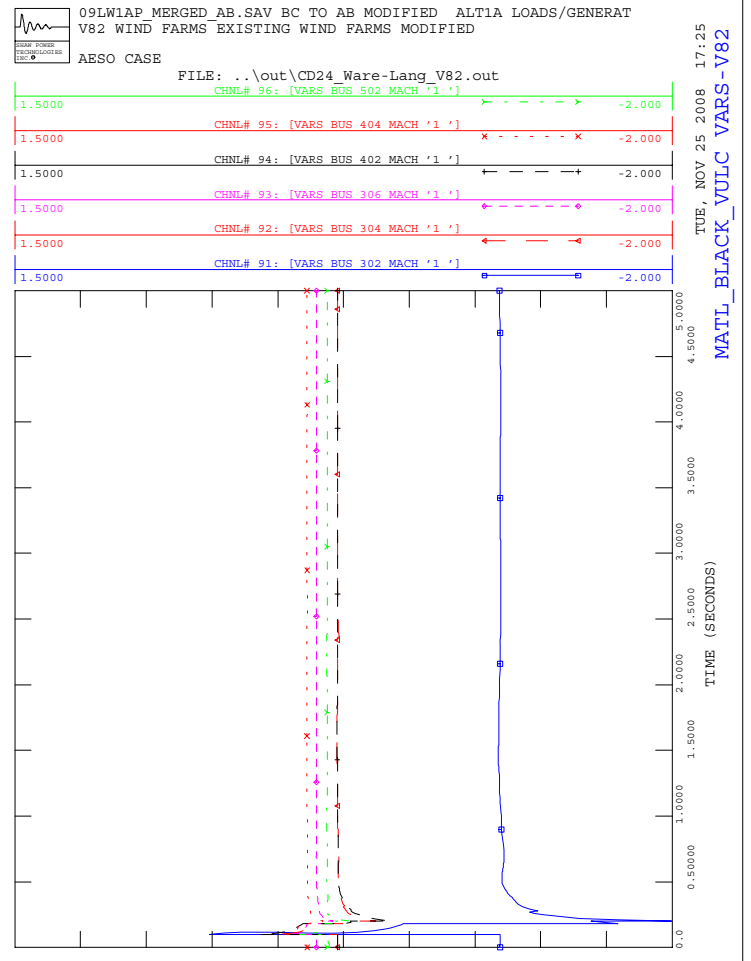
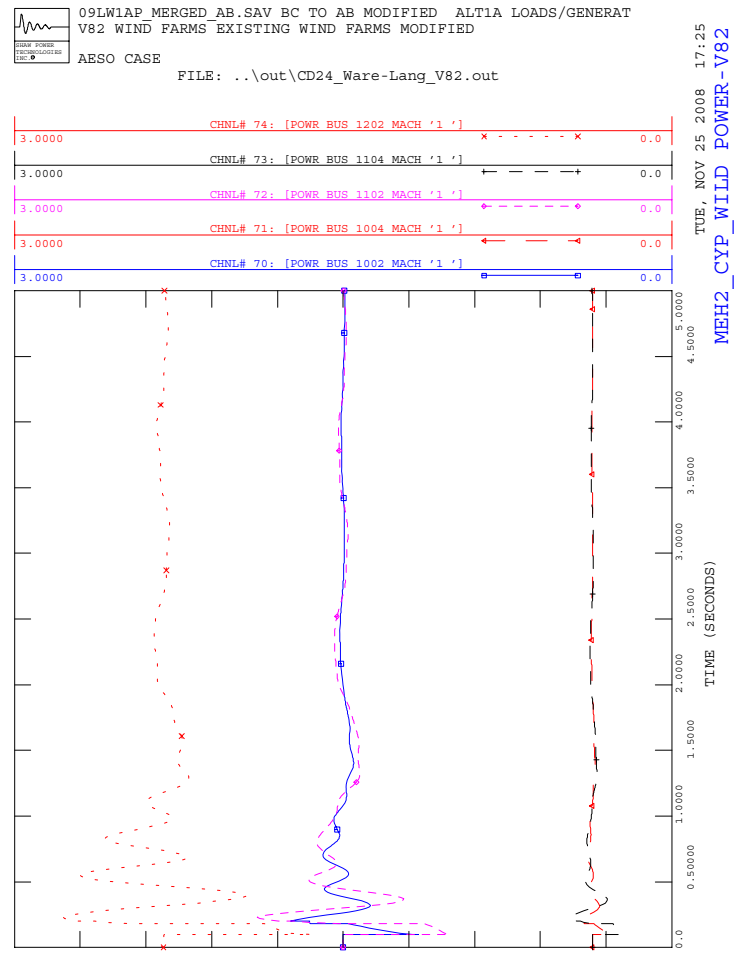
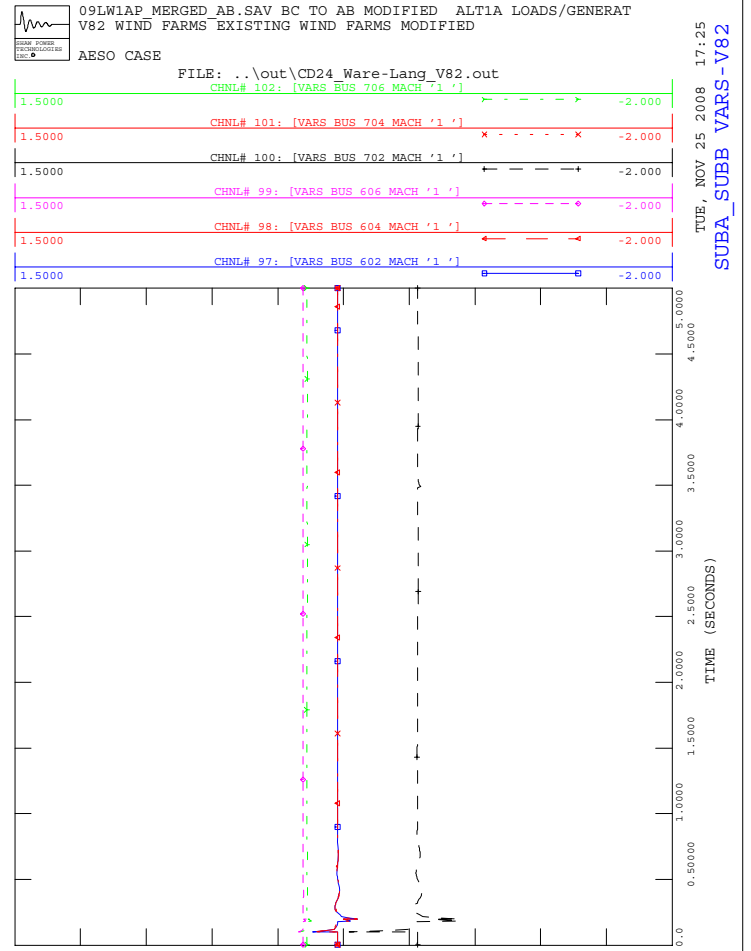
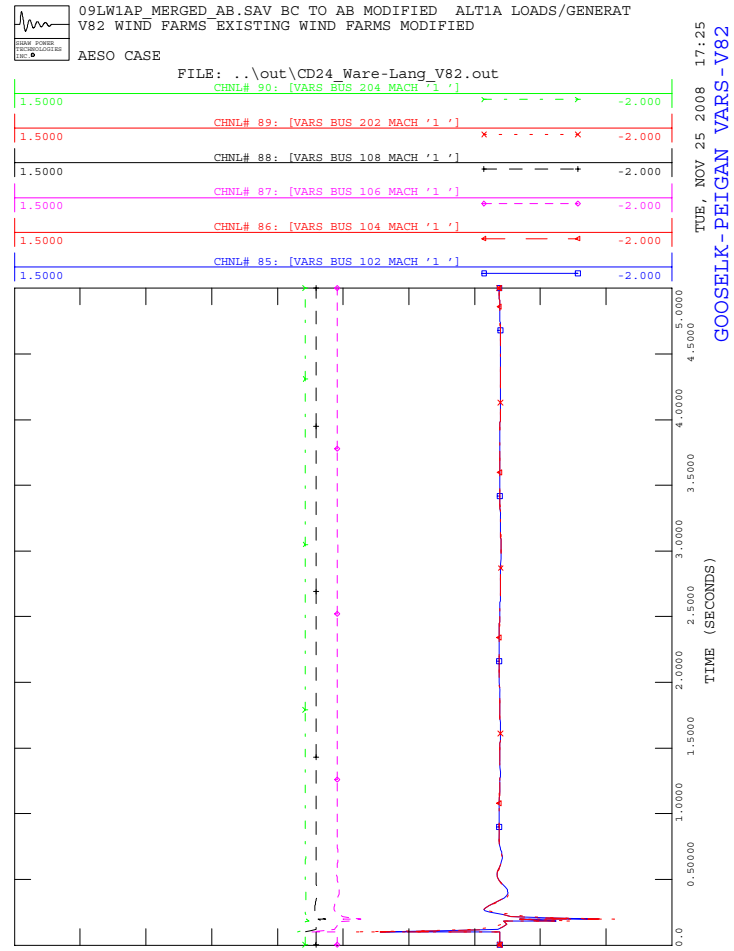
ABSO CASE

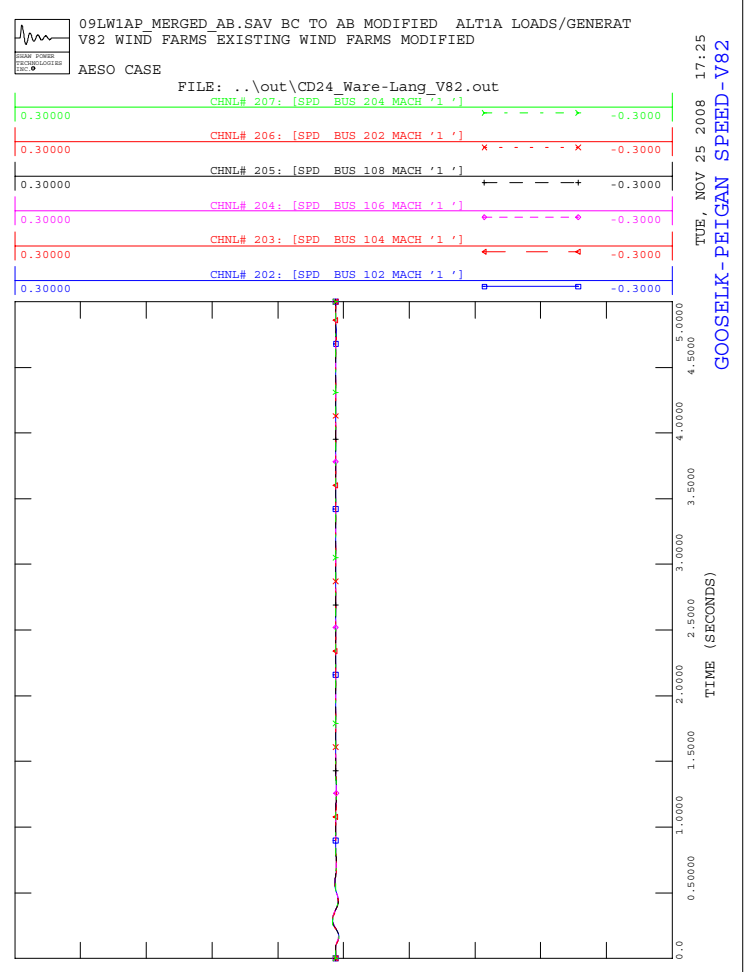
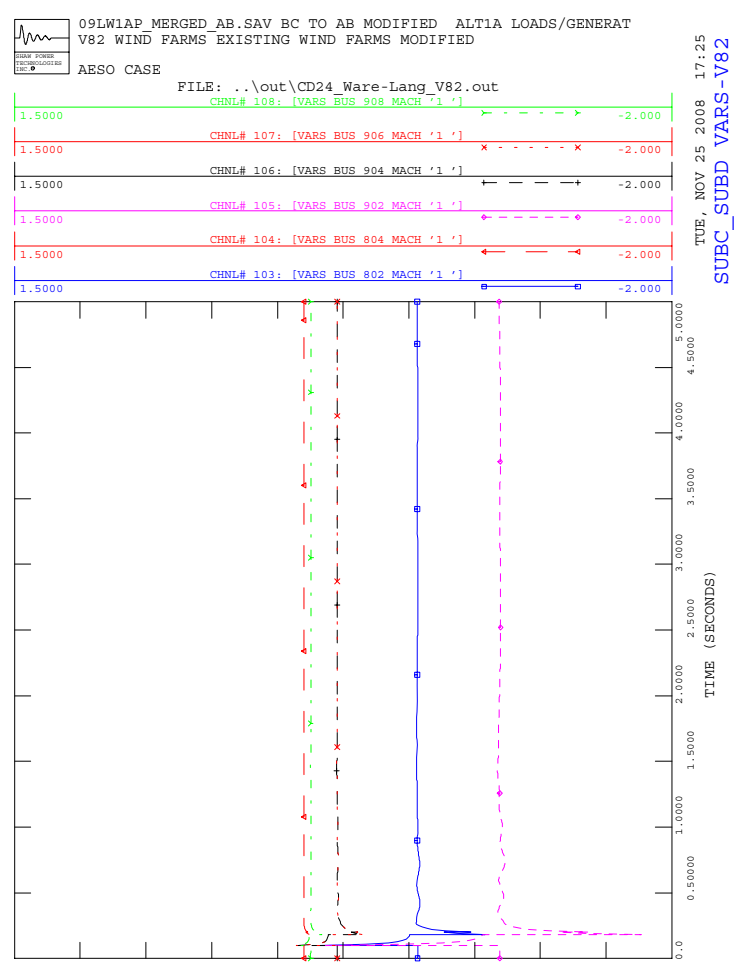
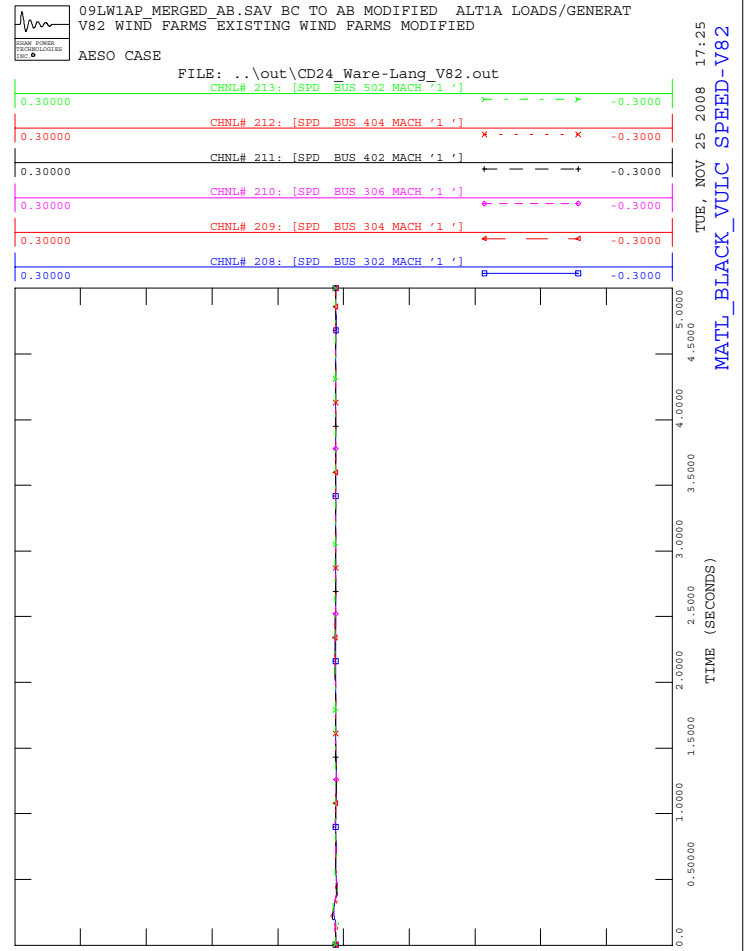
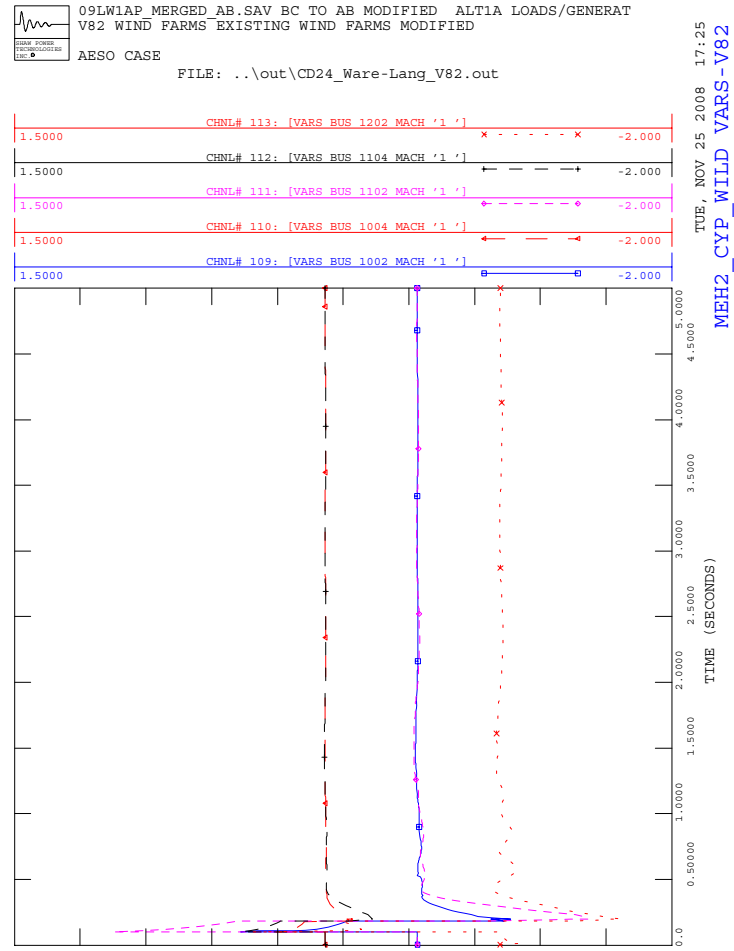
FILE: ..\out\CD23_Lang-SubG_V82.out

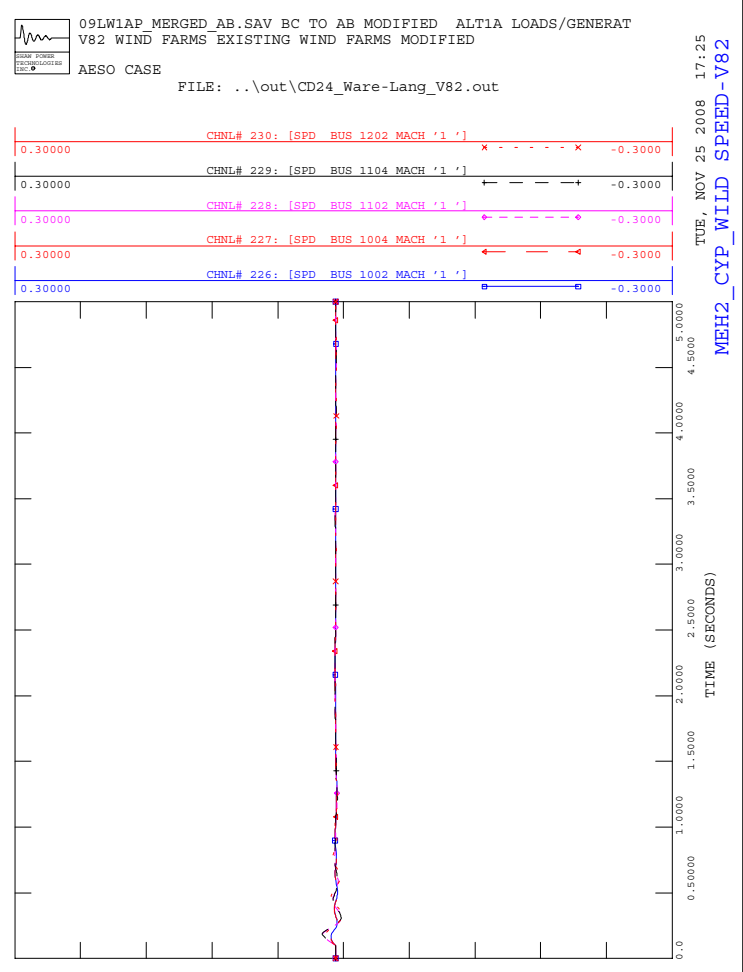
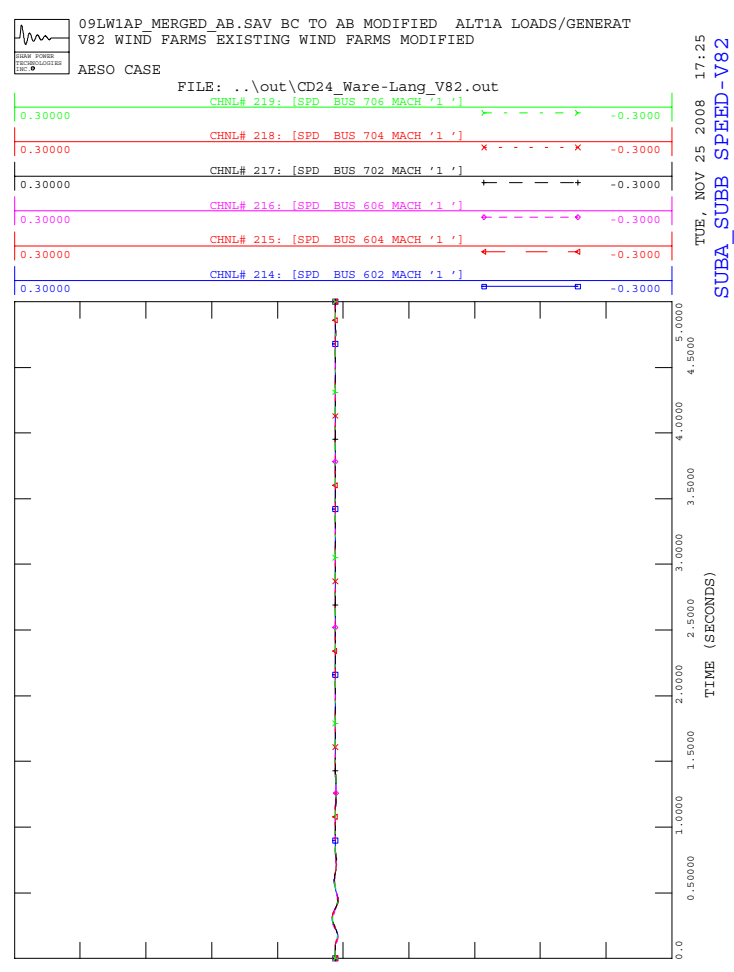
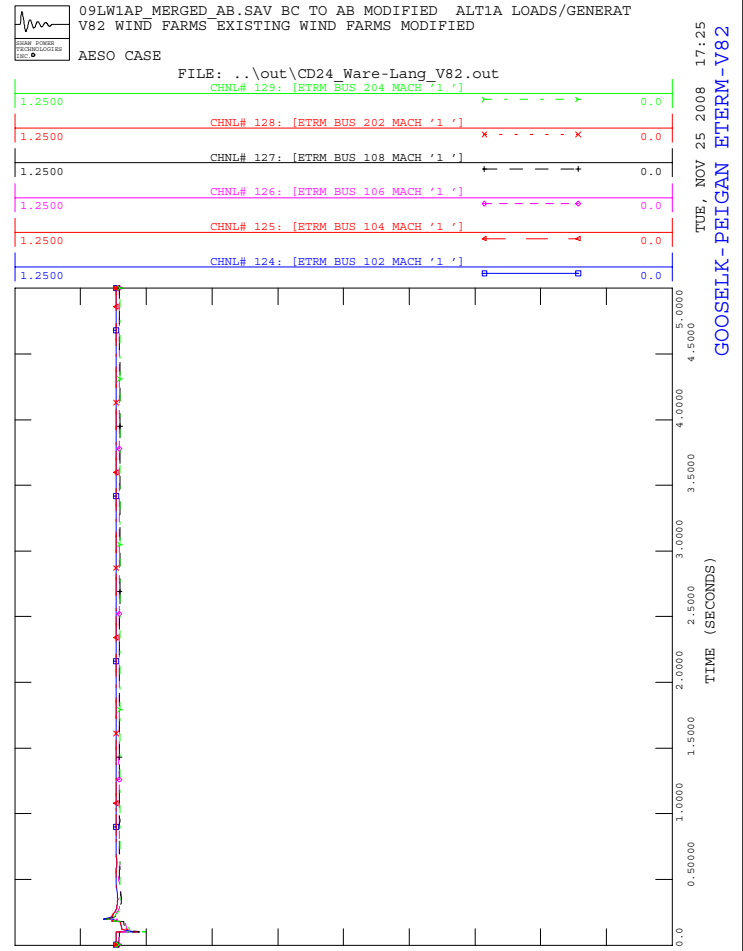
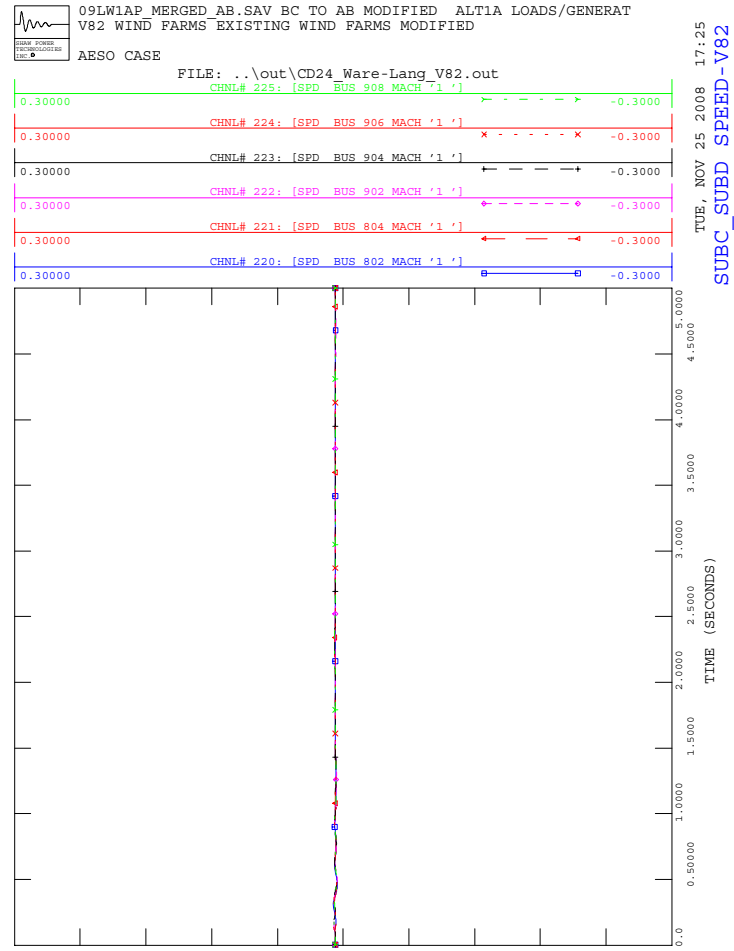
TUE, NOV 25 2008 17:25
AB_BC_TIE_FLOWS-V82

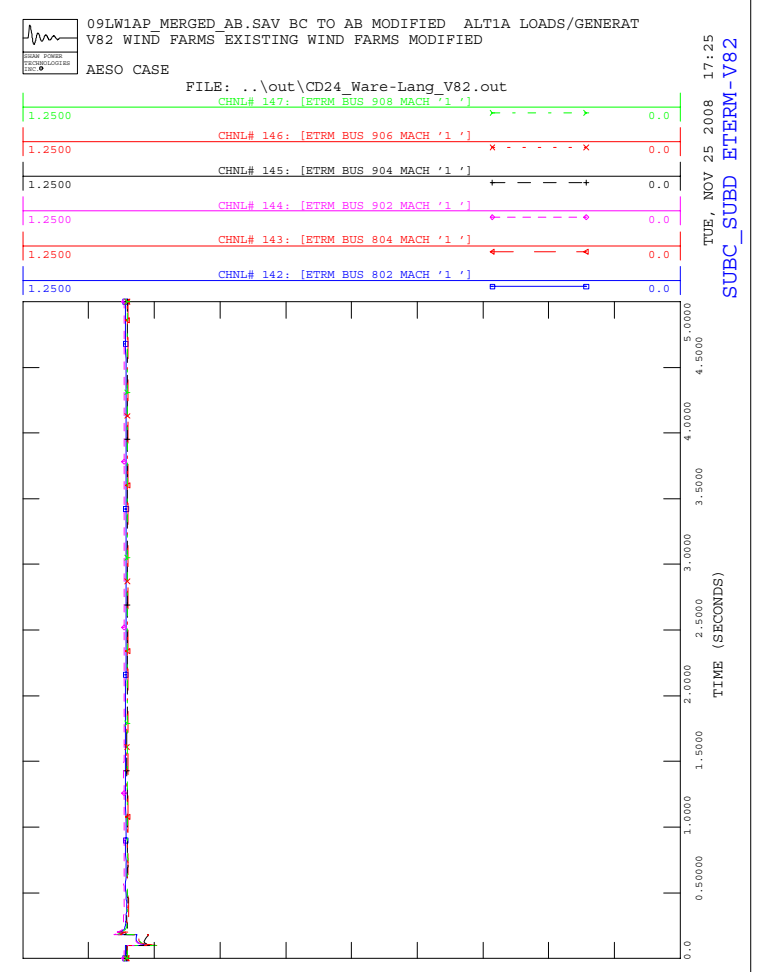
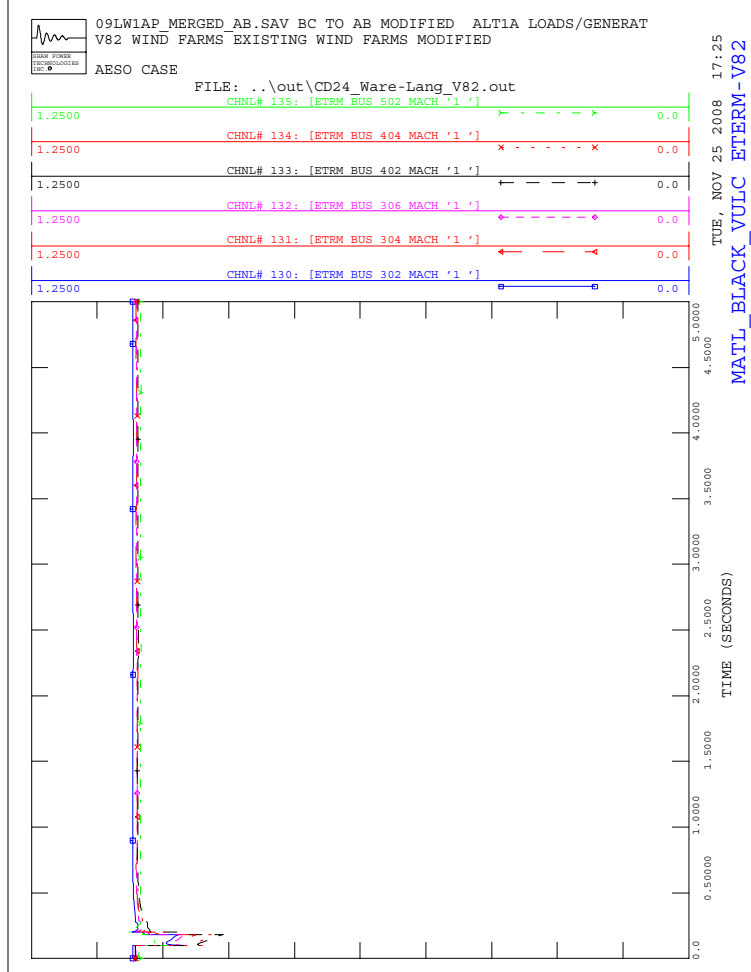
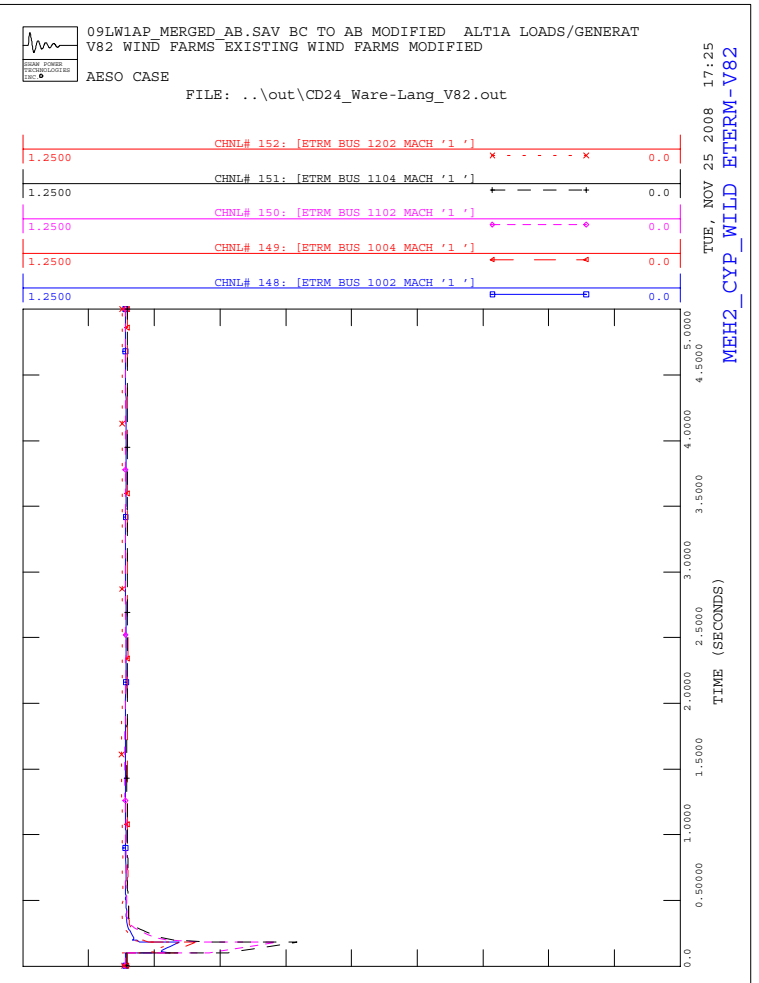
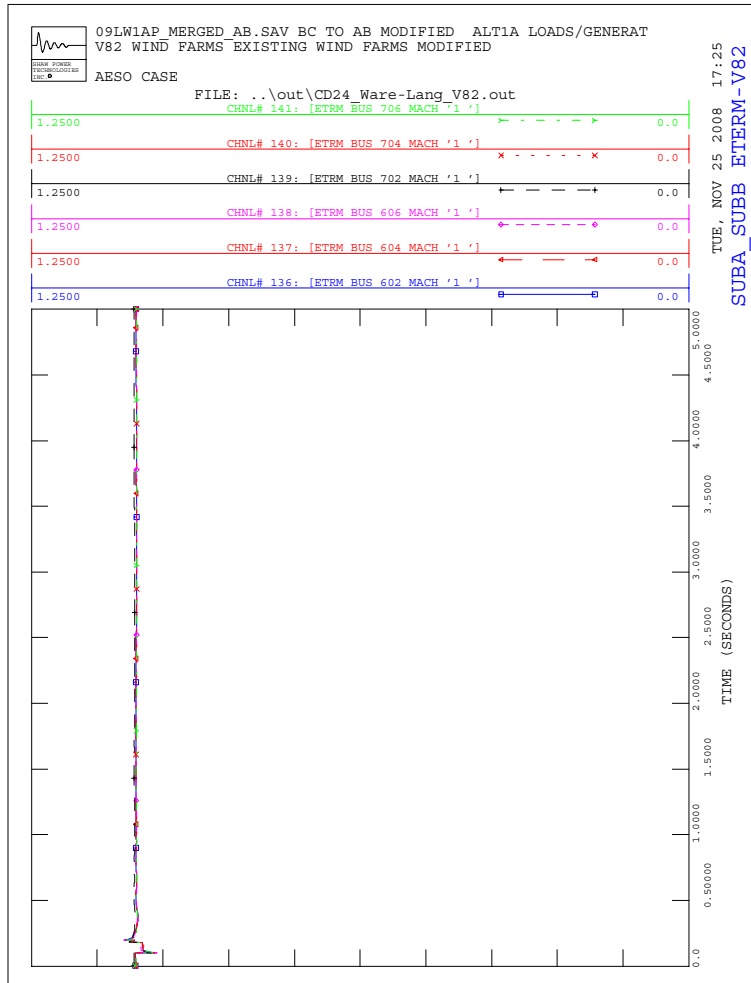


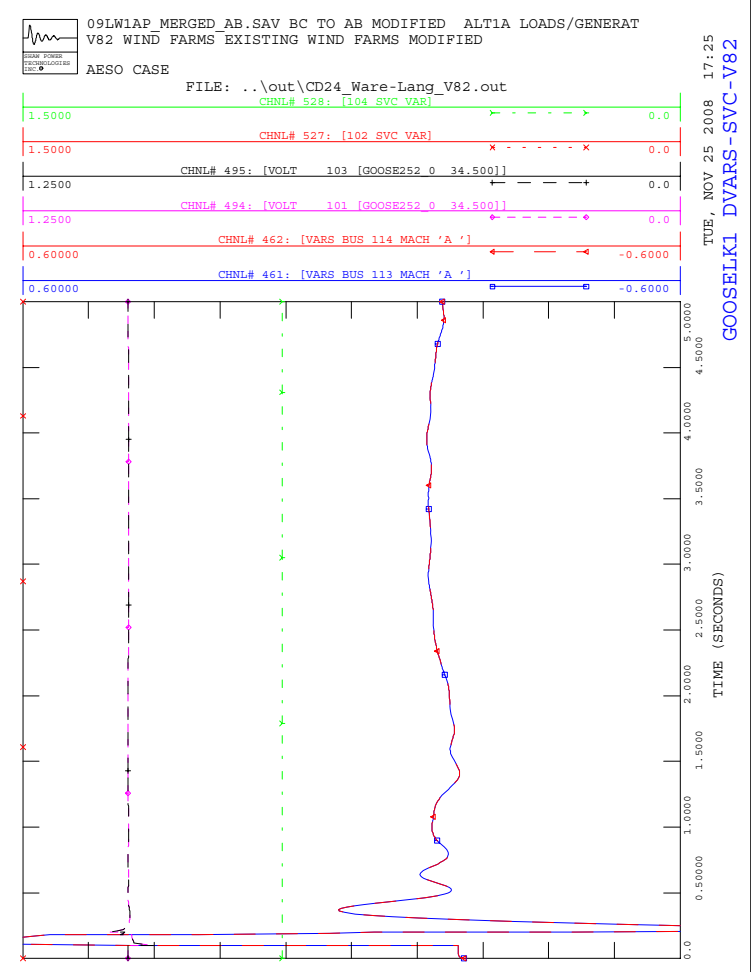
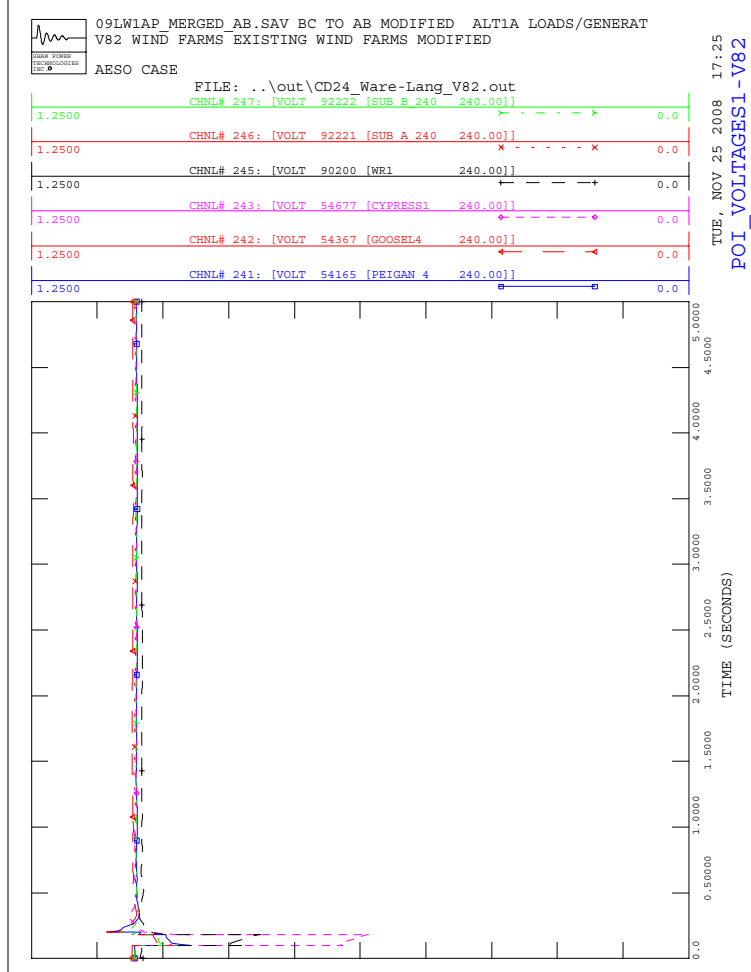
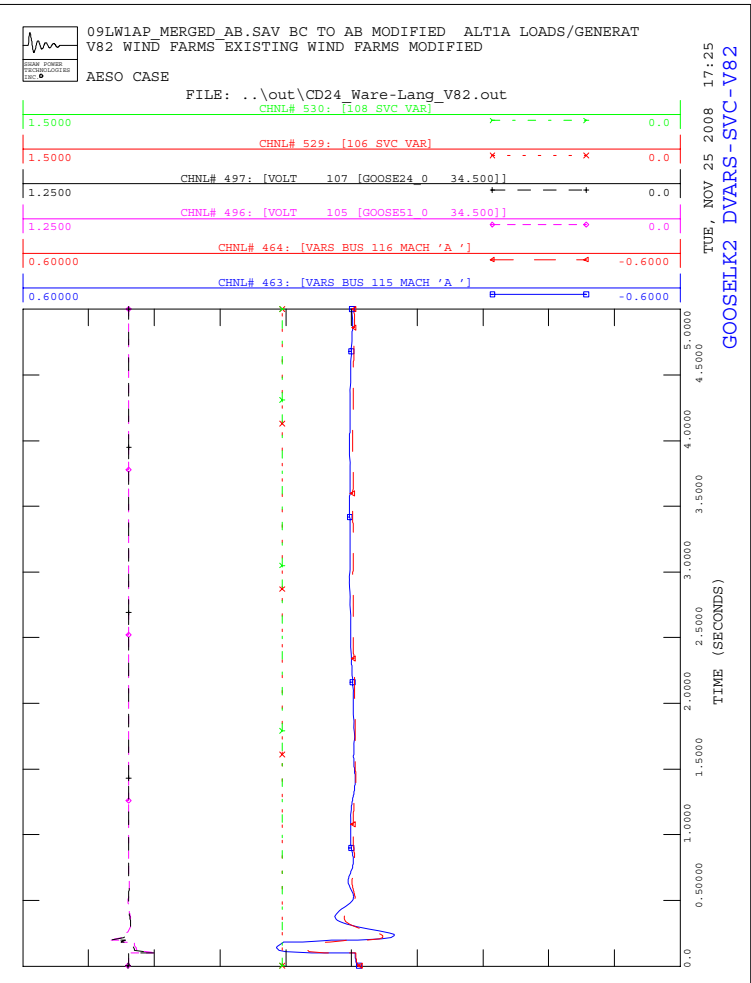
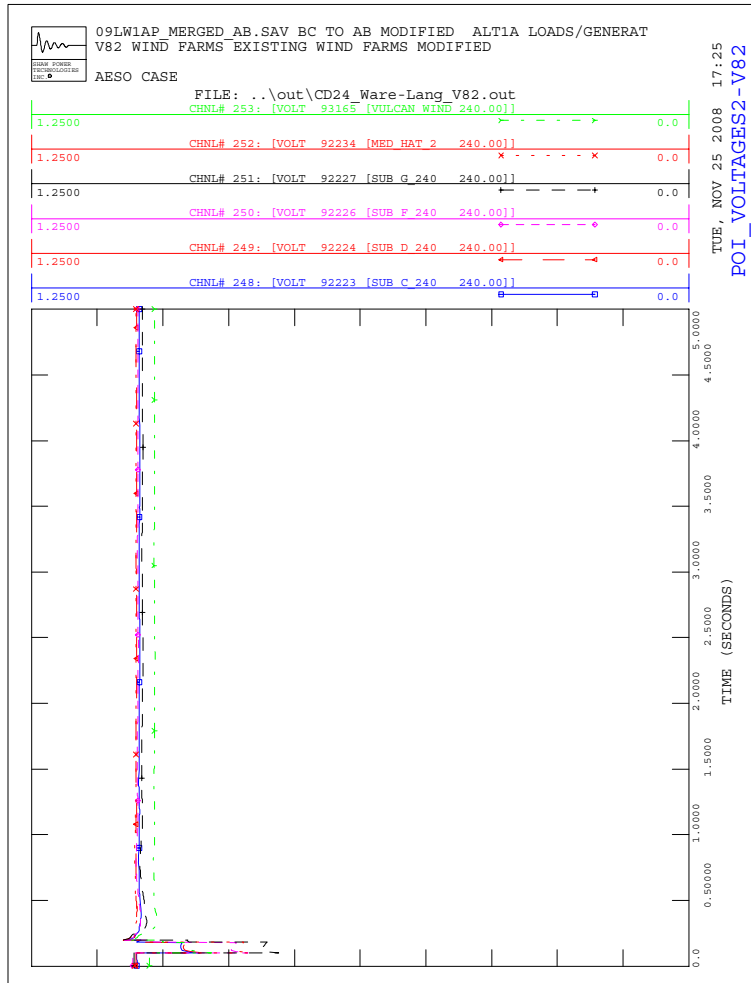


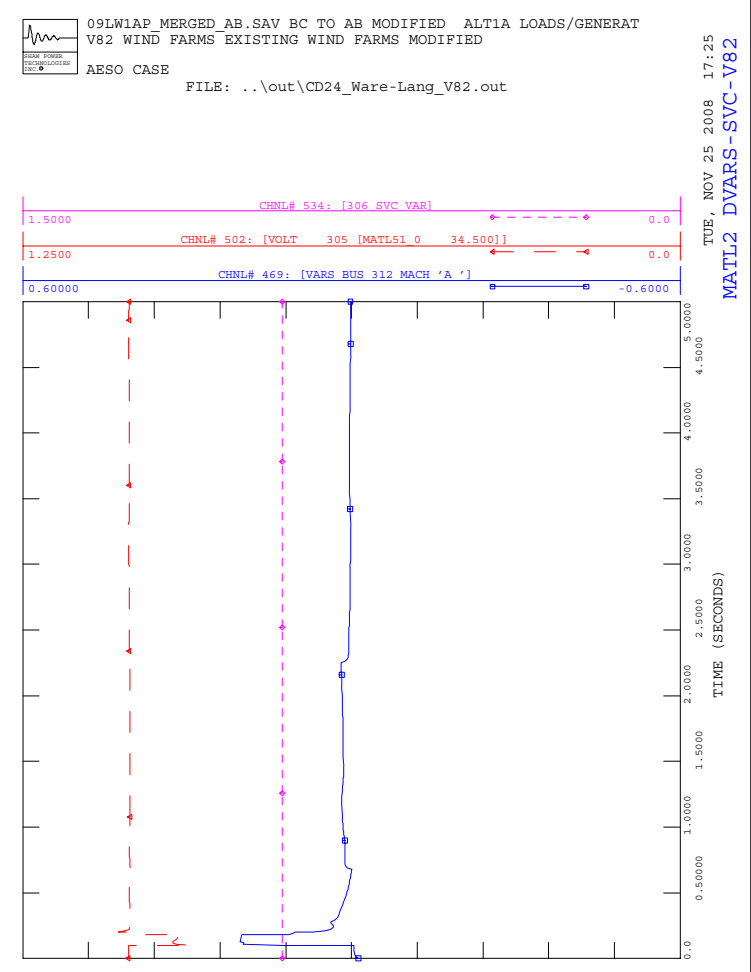
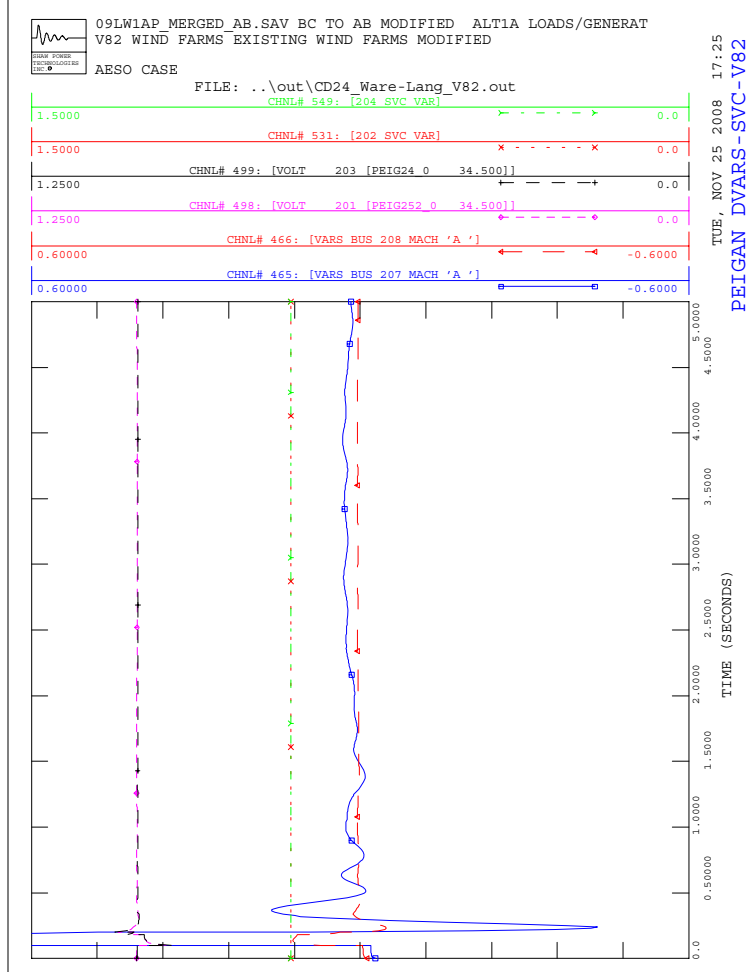
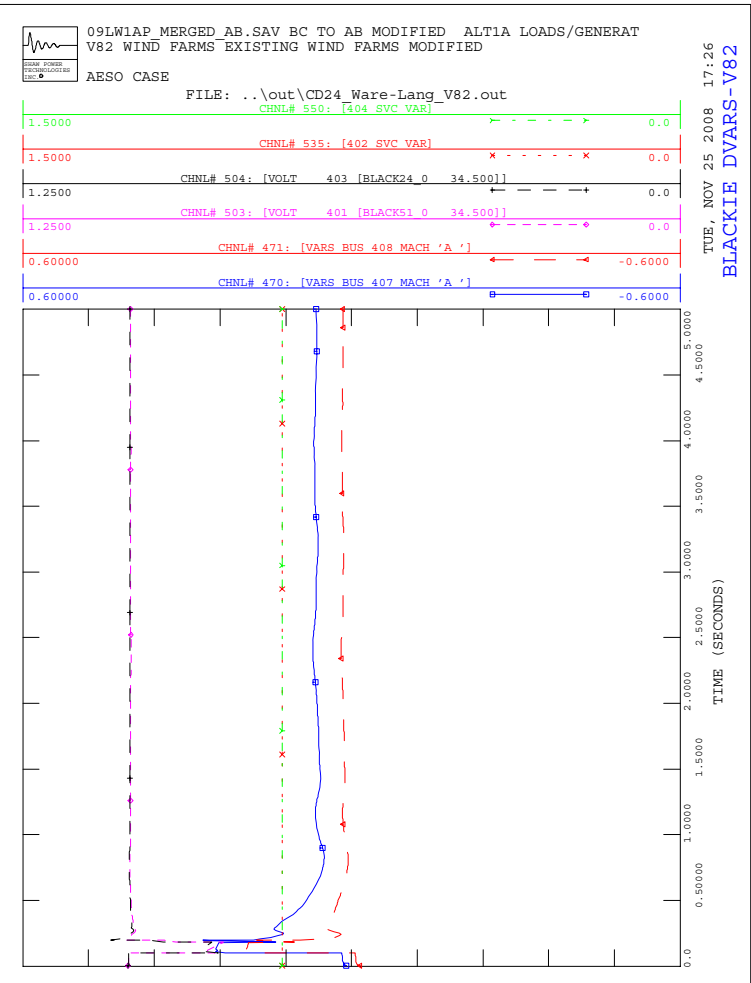
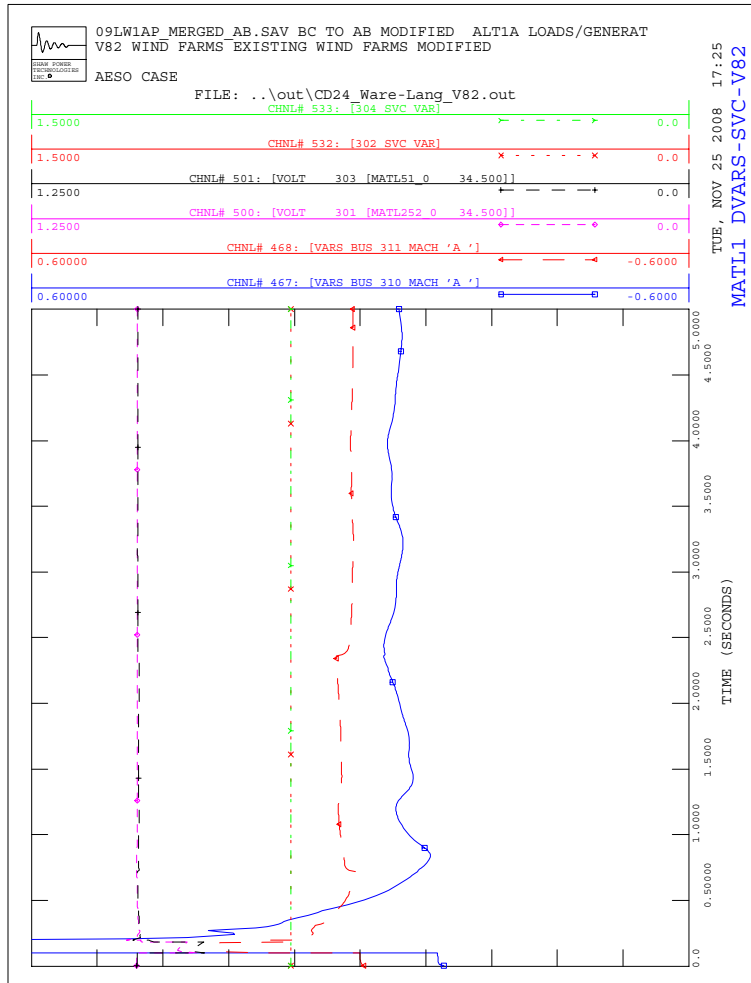


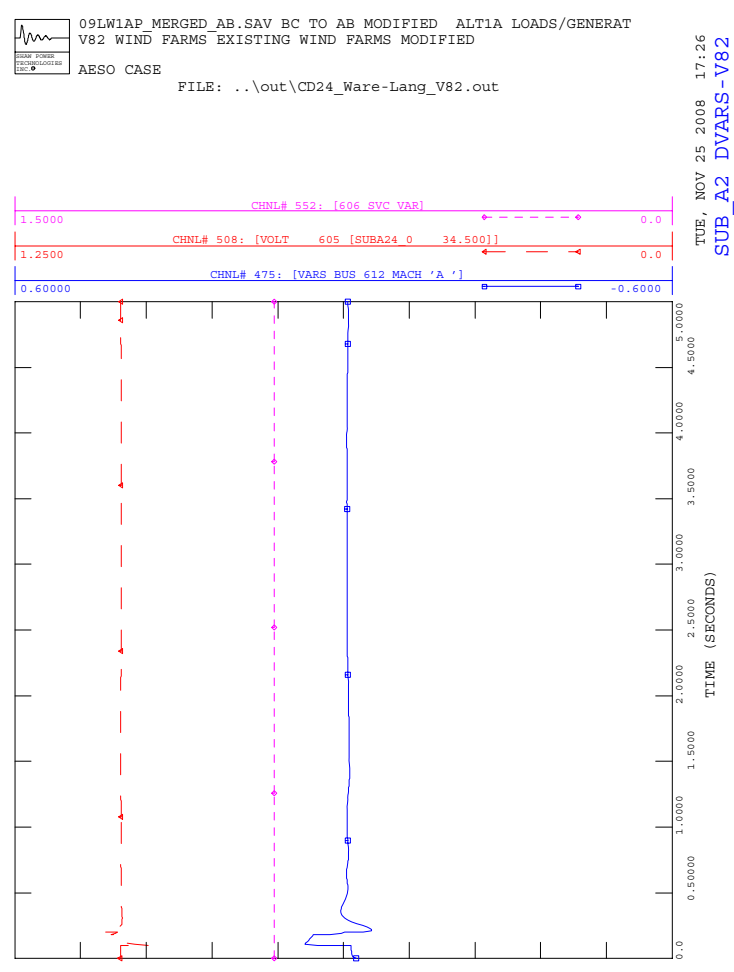
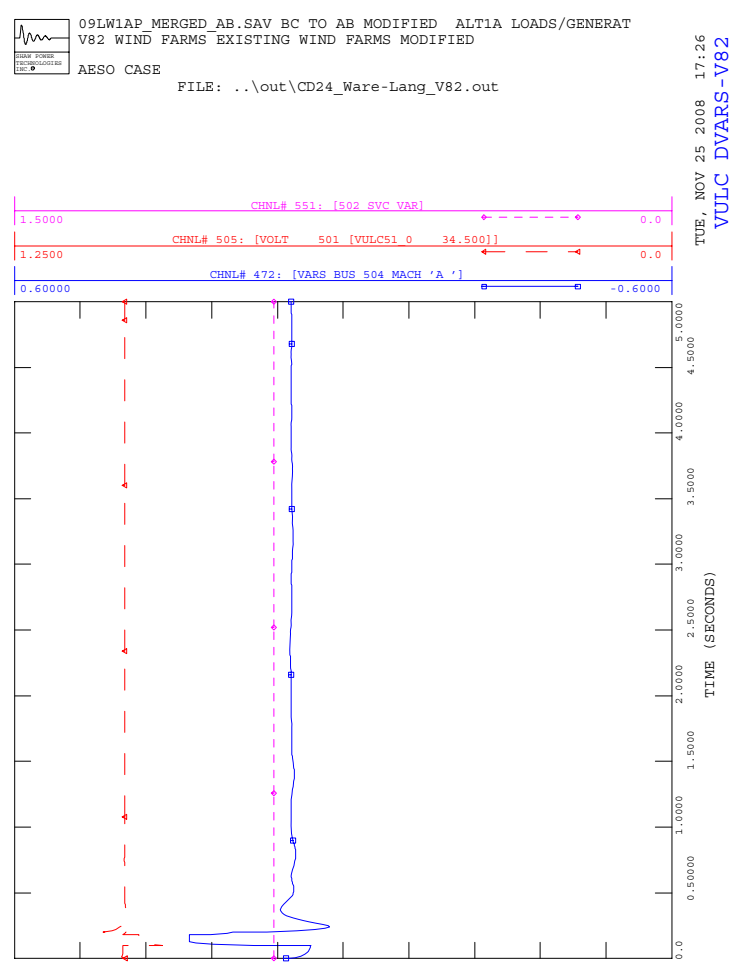
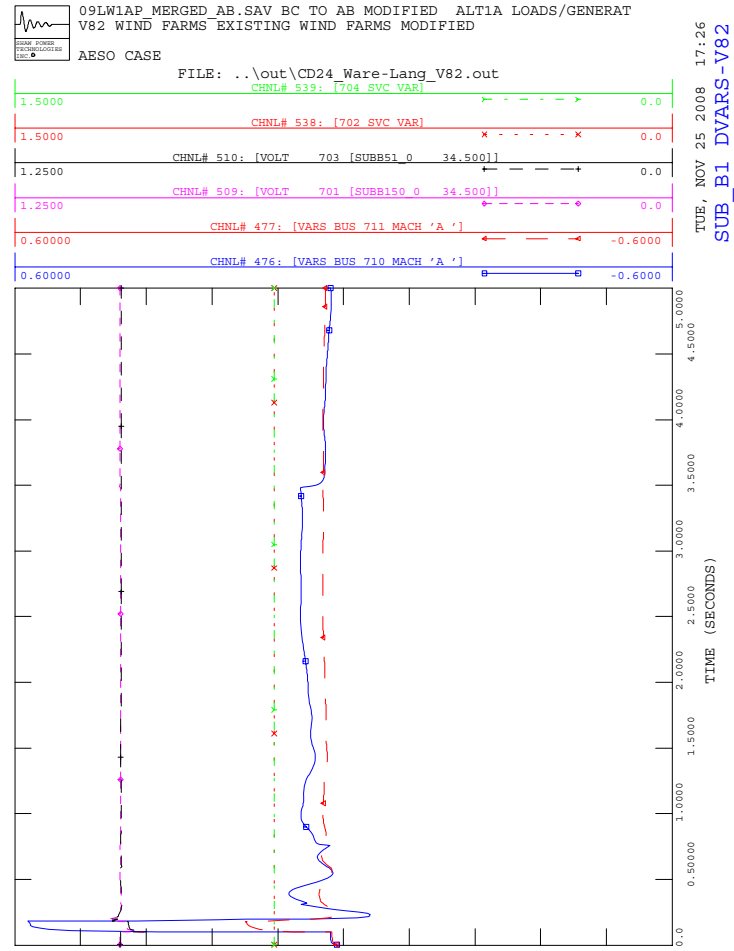
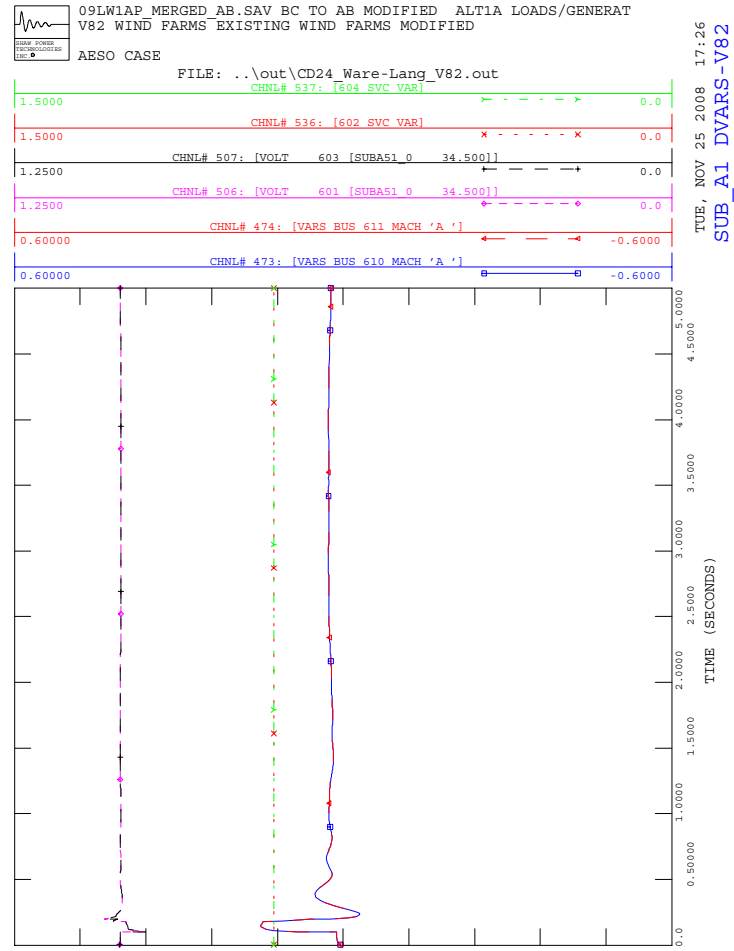


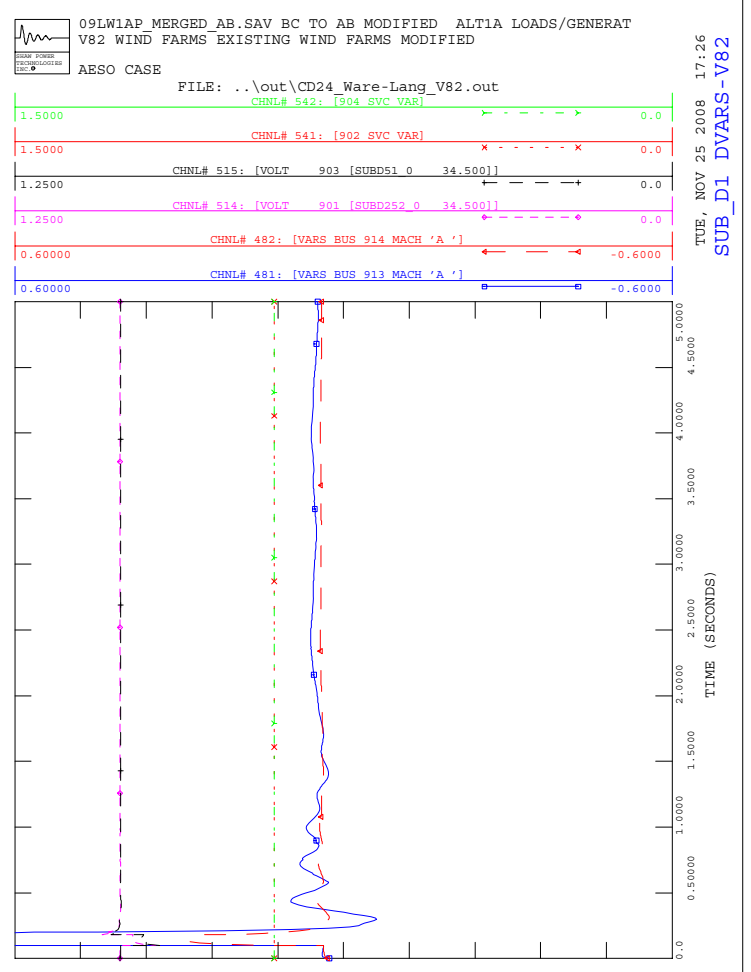
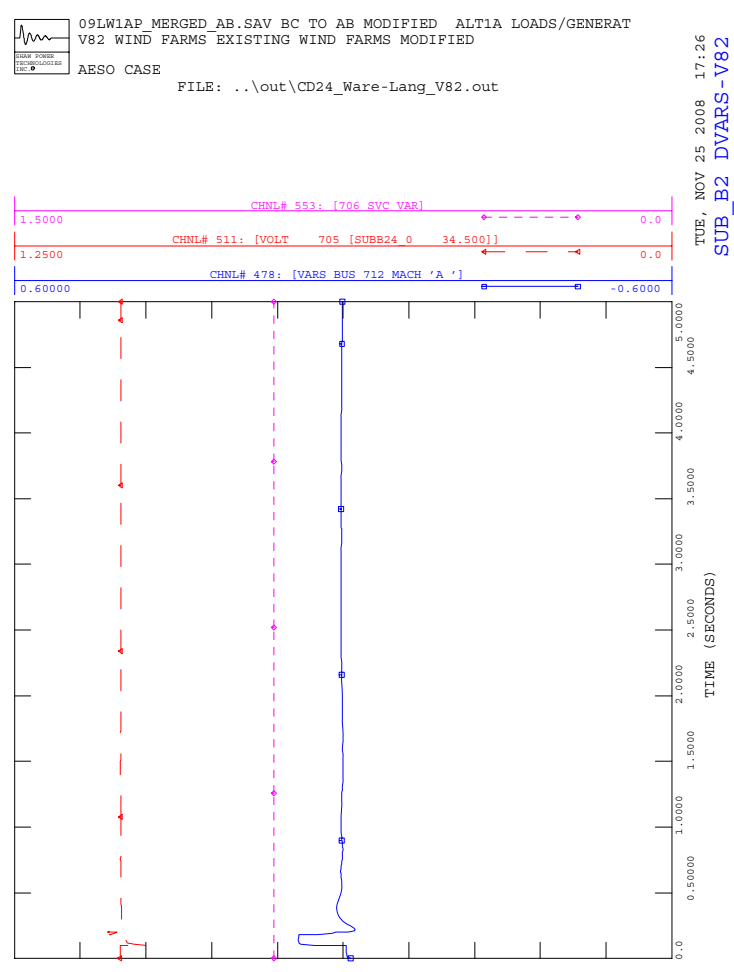
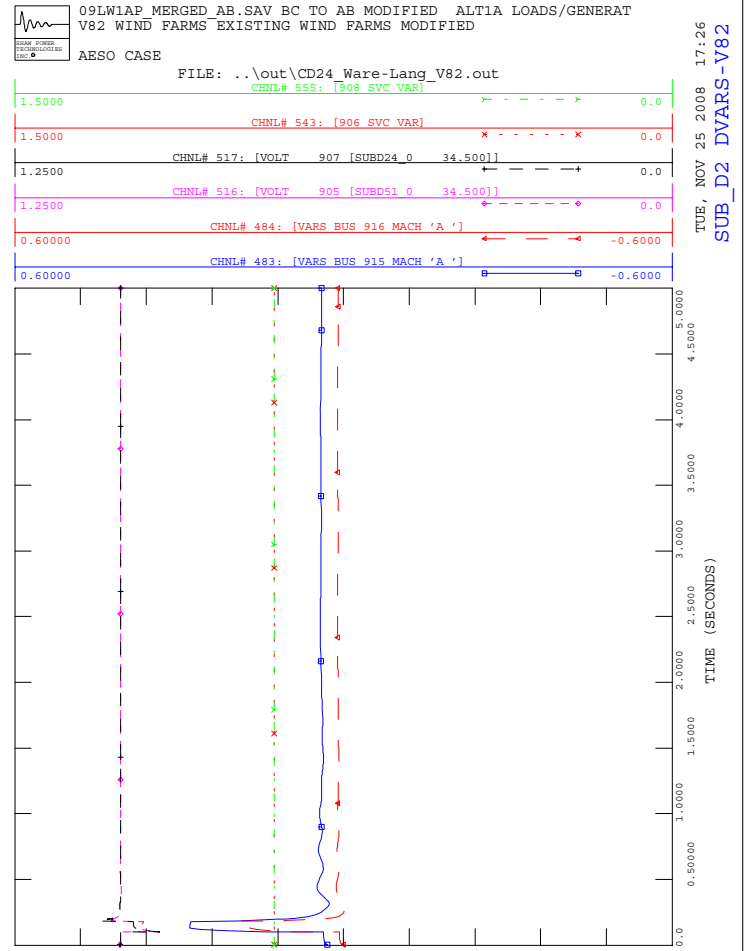
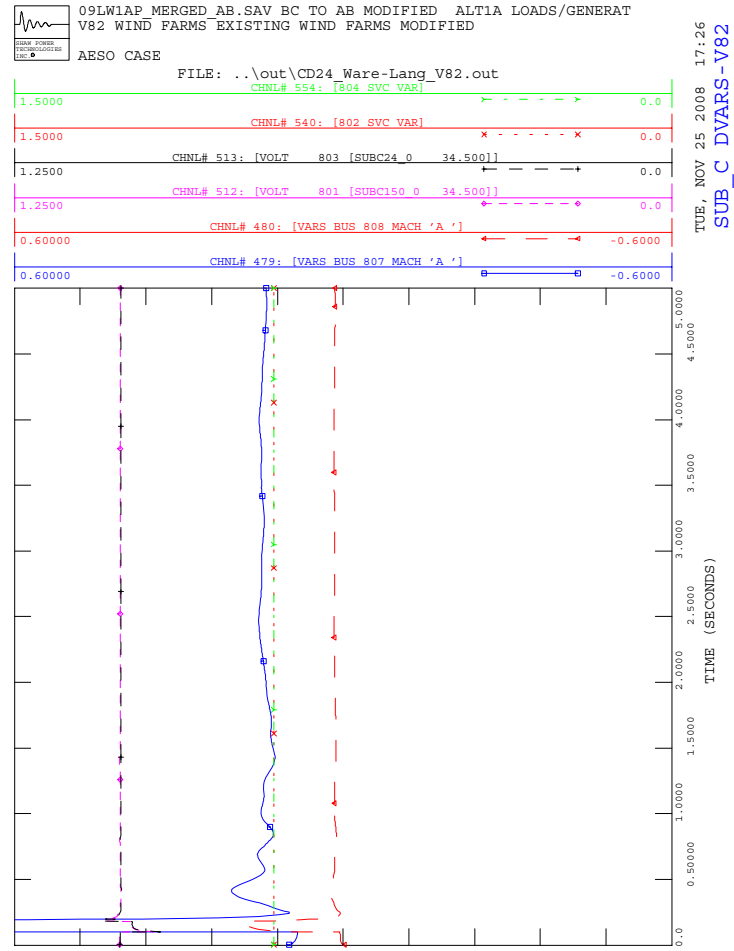


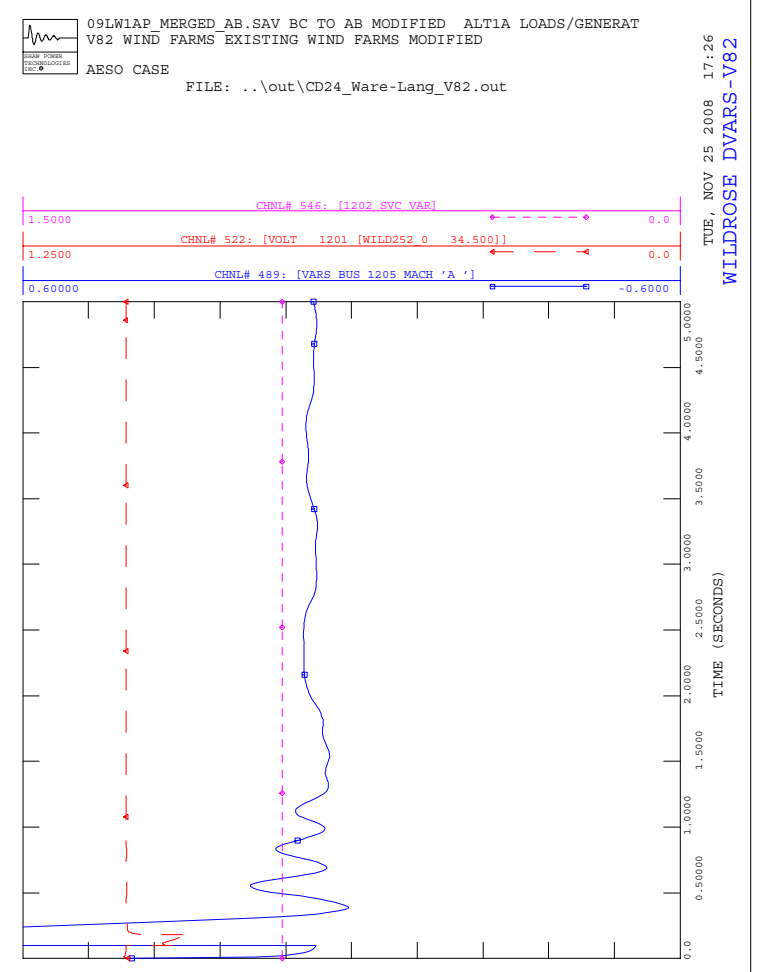
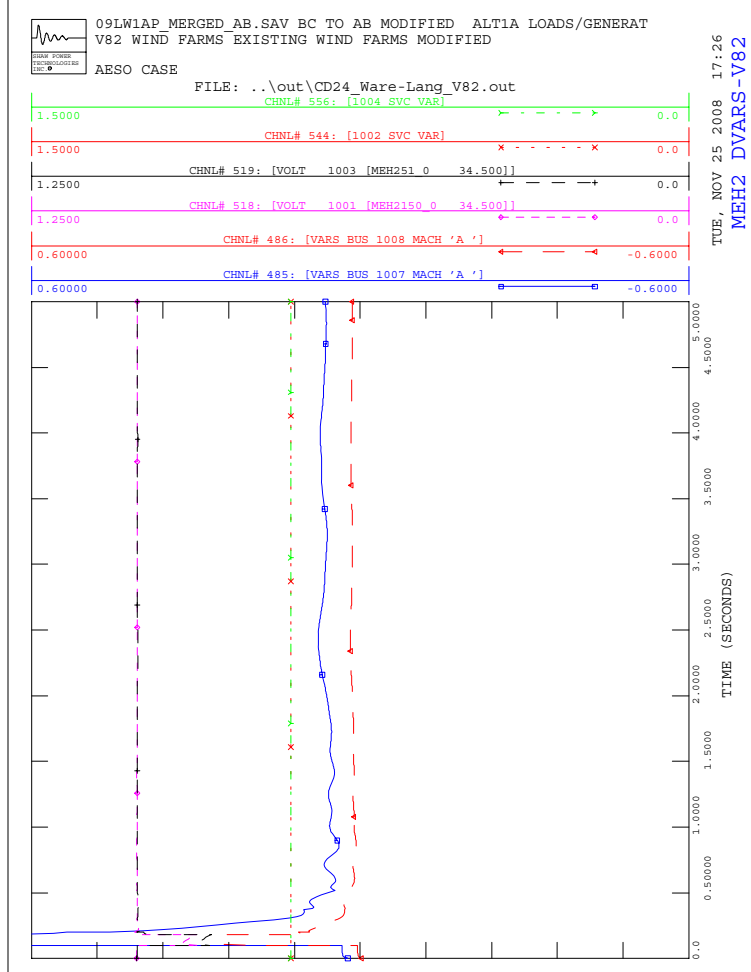
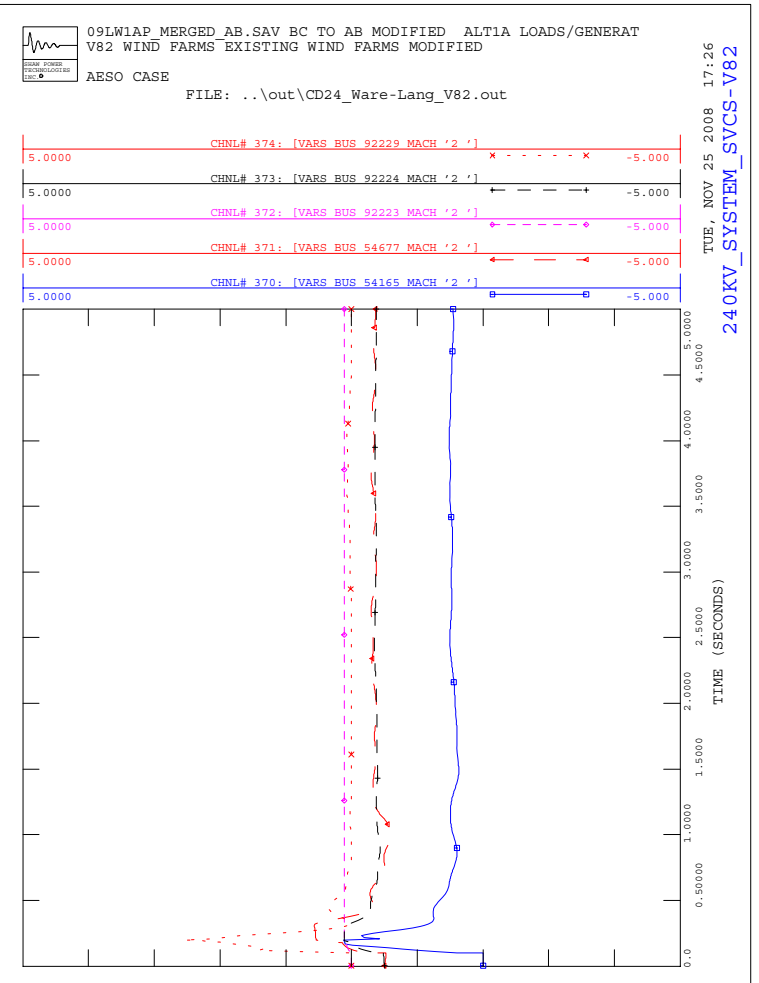
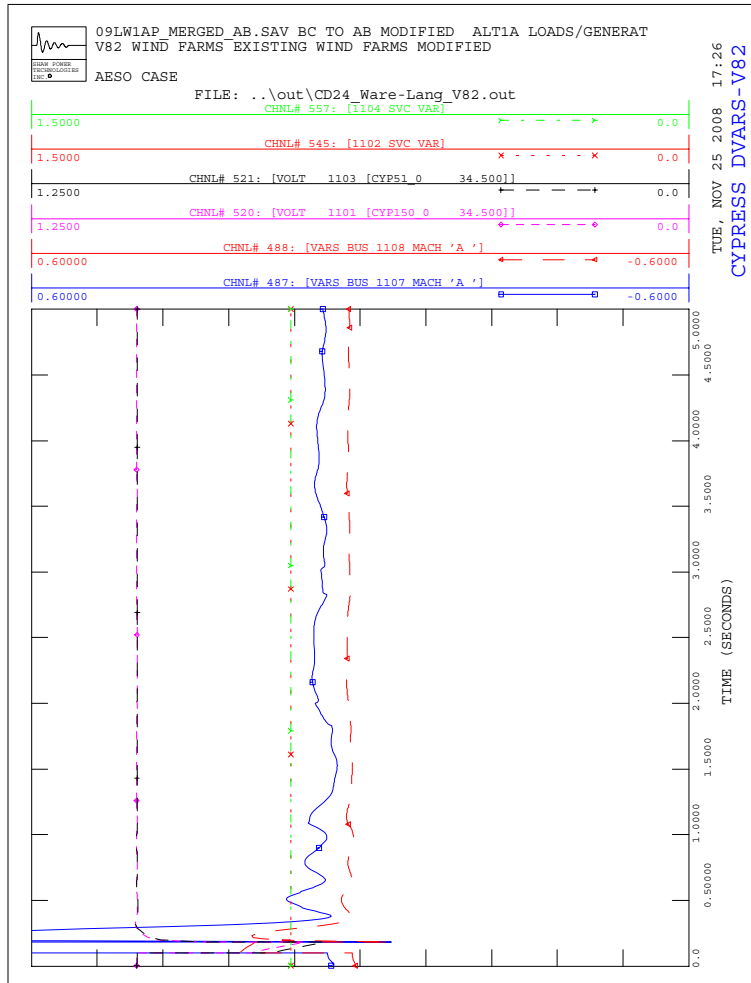












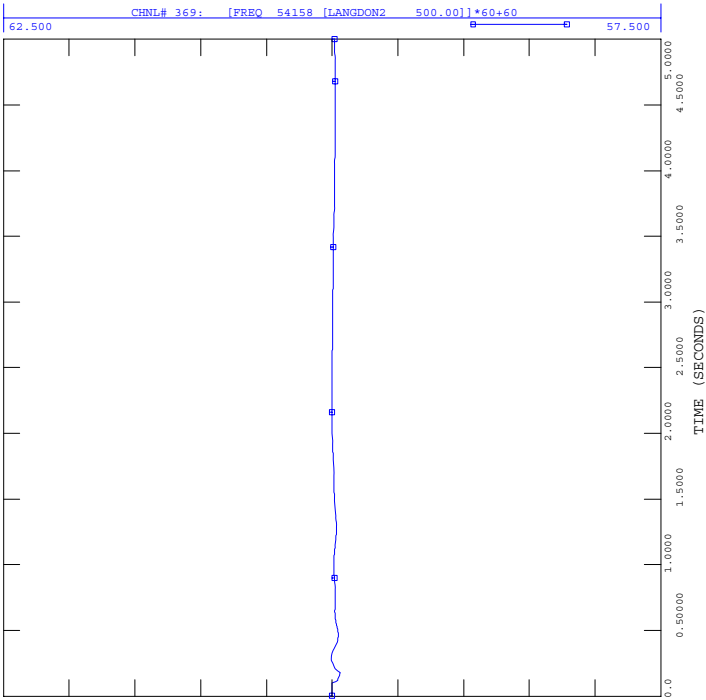


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD24_Ware-Lang_V82.out

TUE, NOV 25 2008 17:26
LANGDON_FRQ-V82

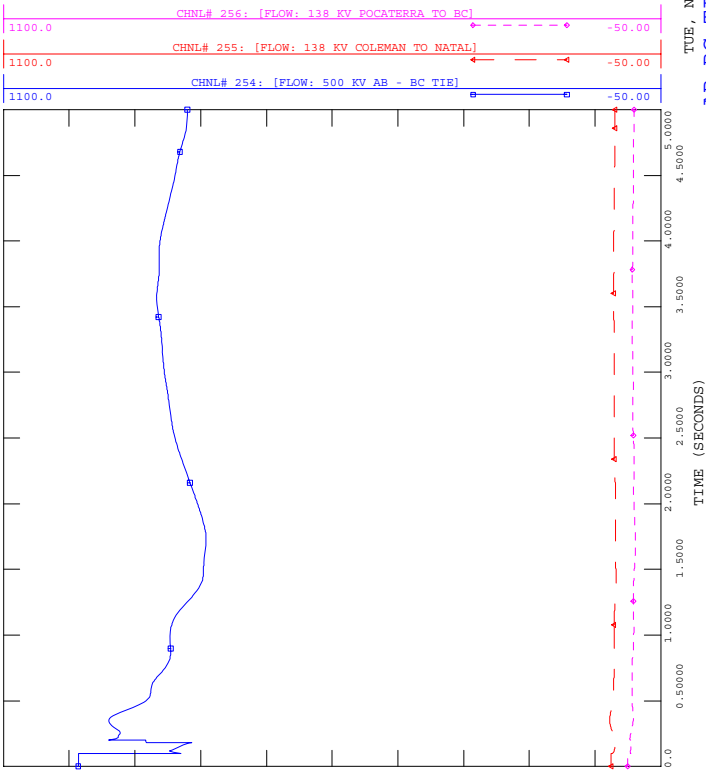


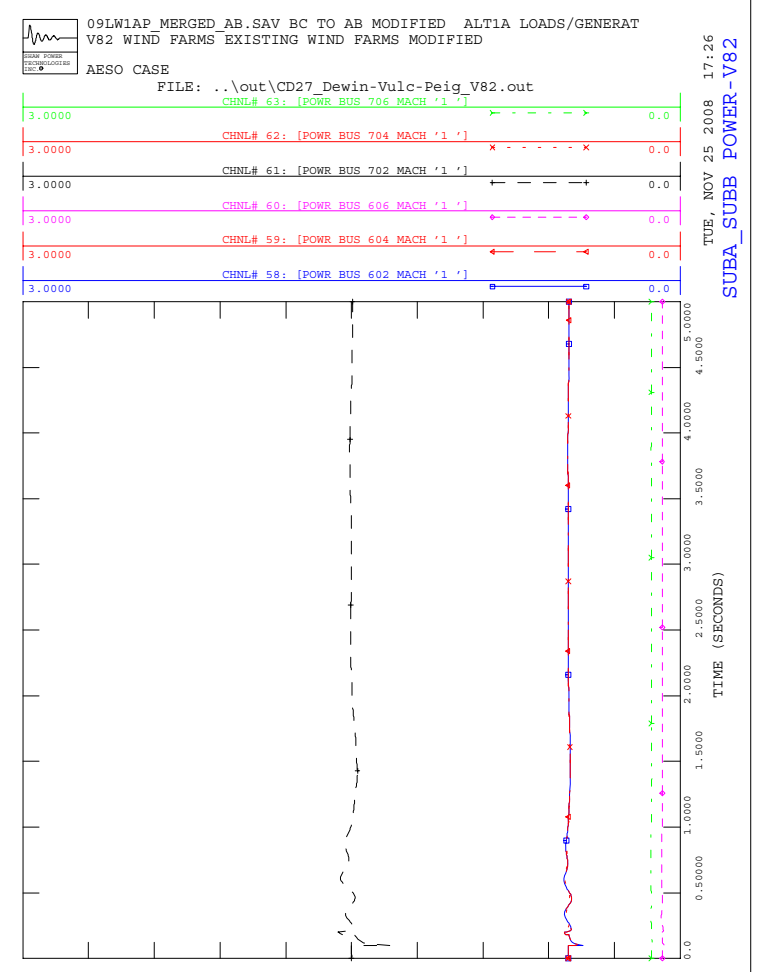
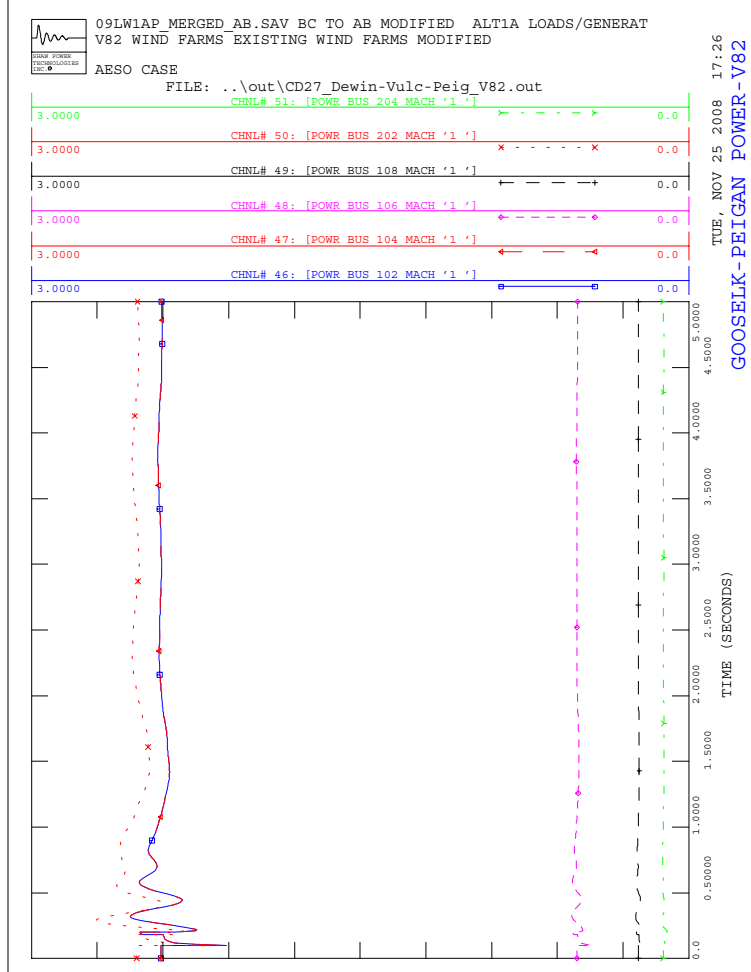
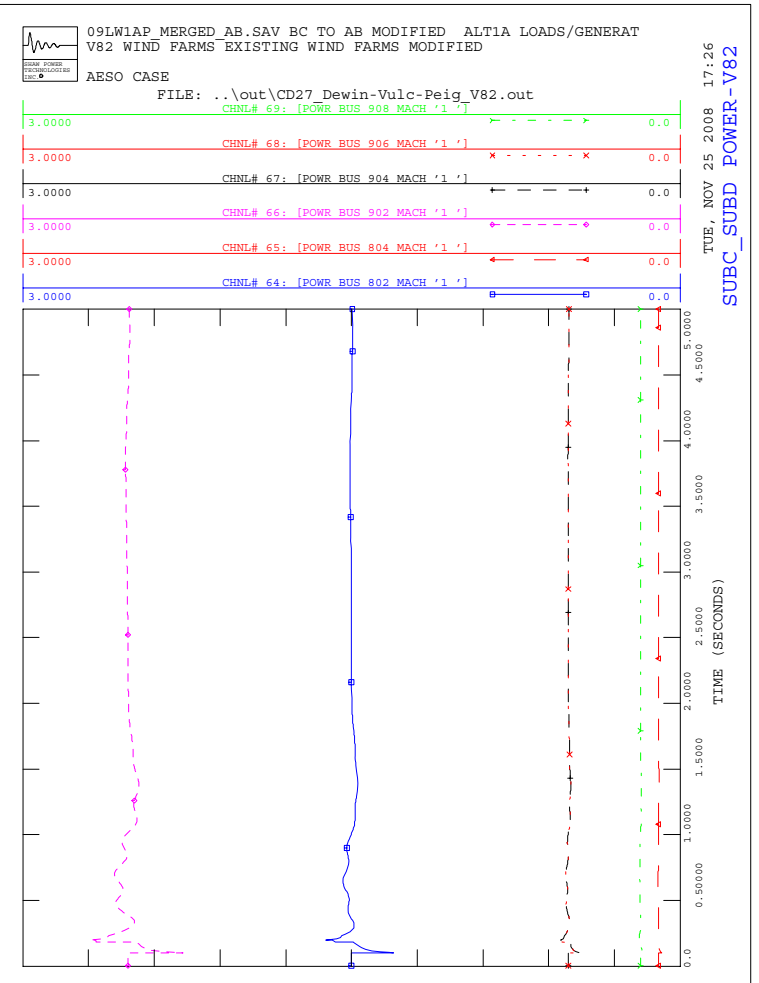
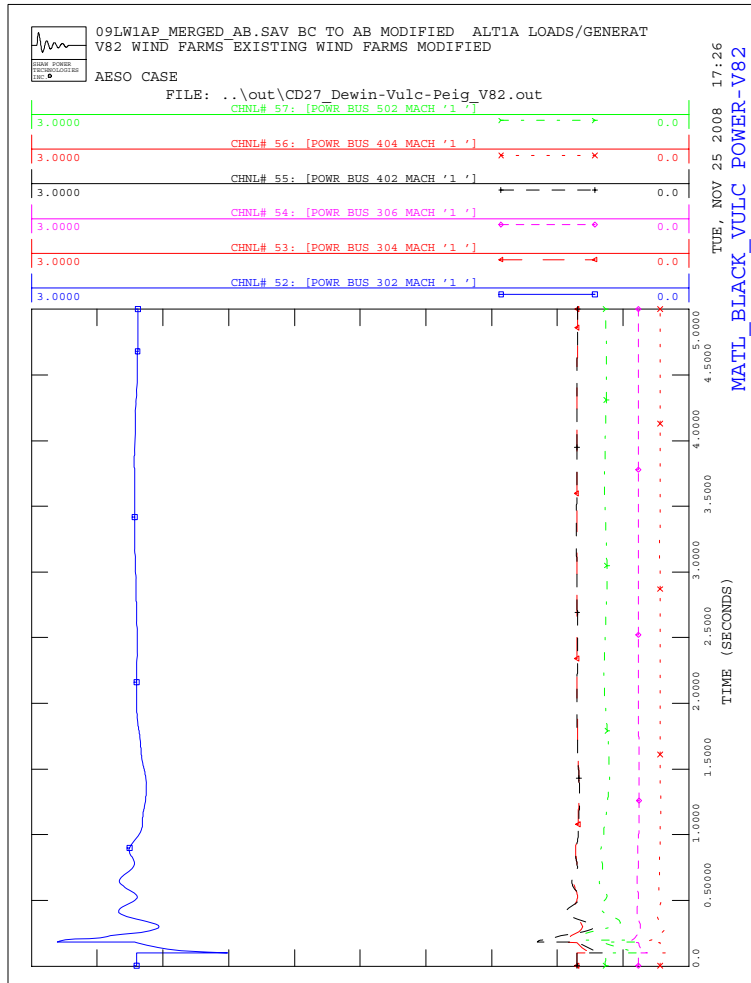
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

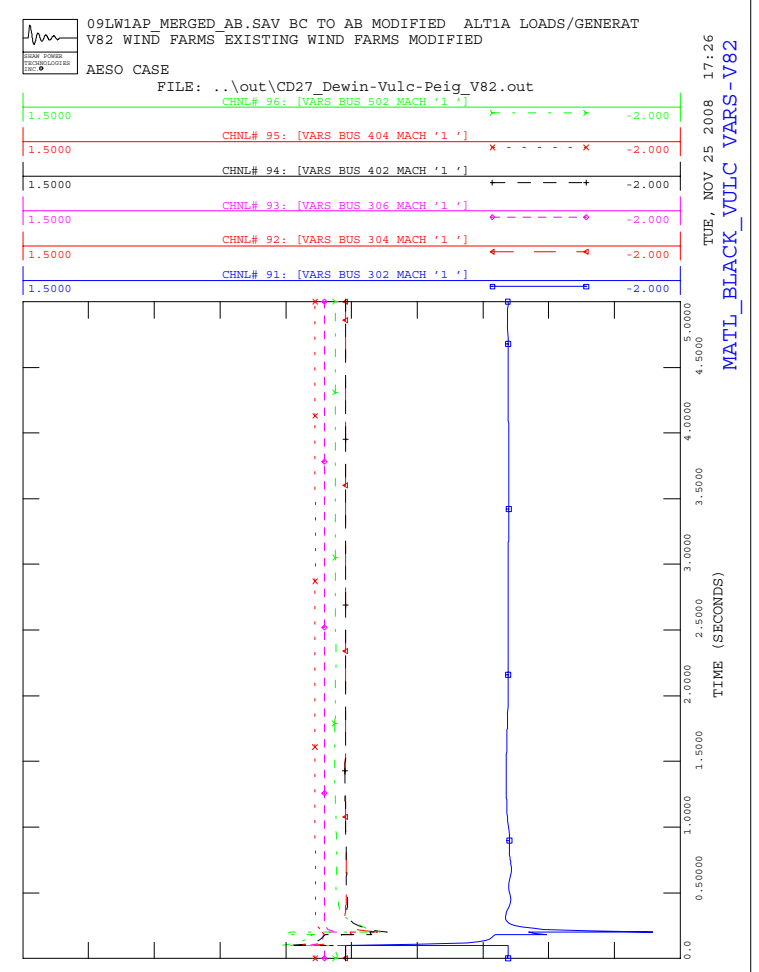
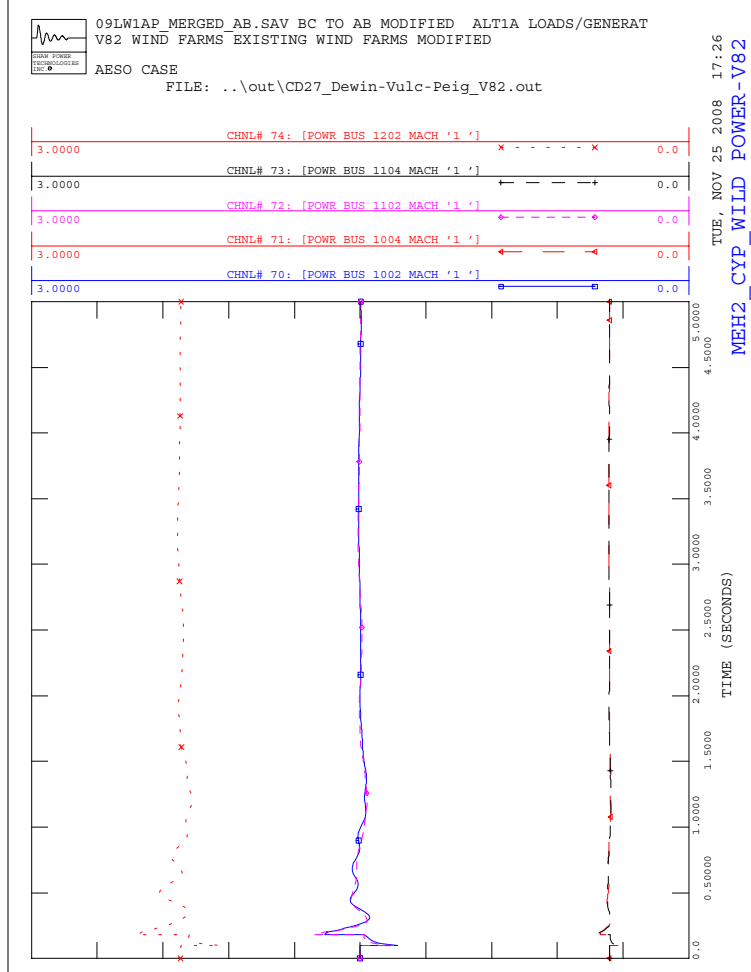
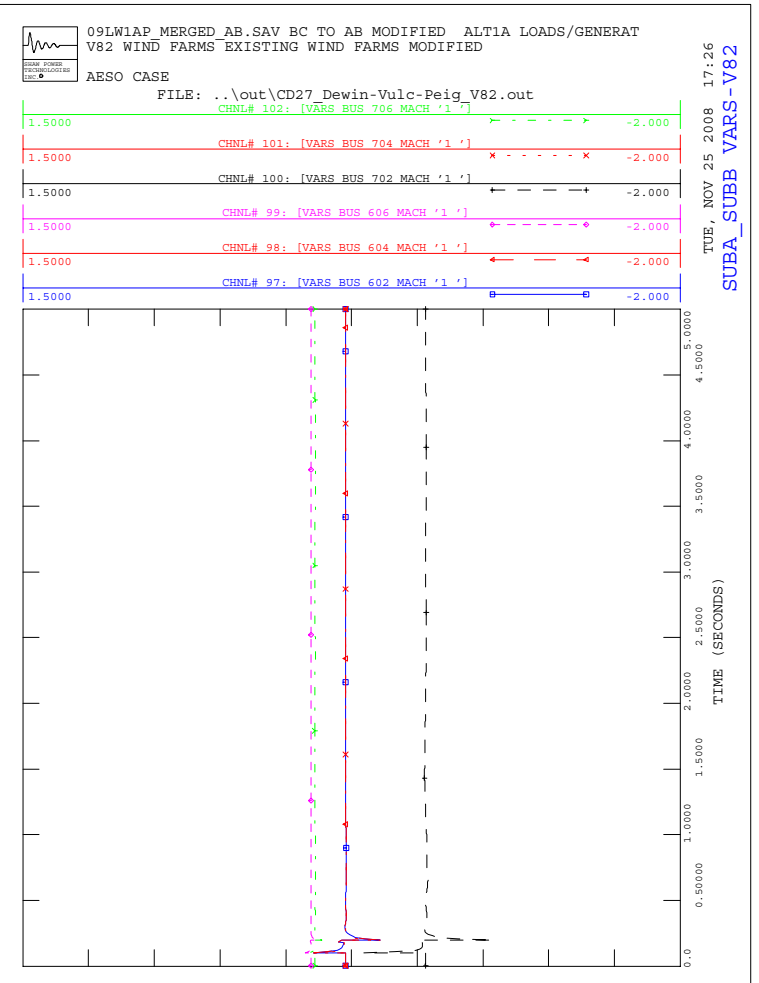
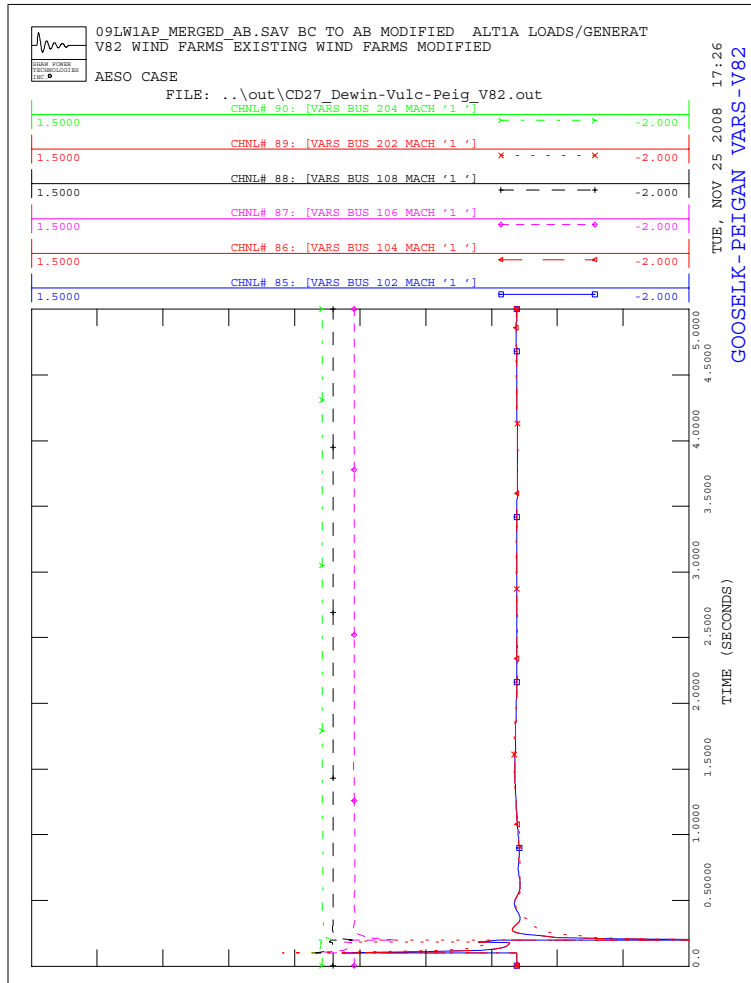
ABSO CASE

FILE: ..\out\CD24_Ware-Lang_V82.out

TUE, NOV 25 2008 17:26
AB_BC_TIE_FLOWS-V82

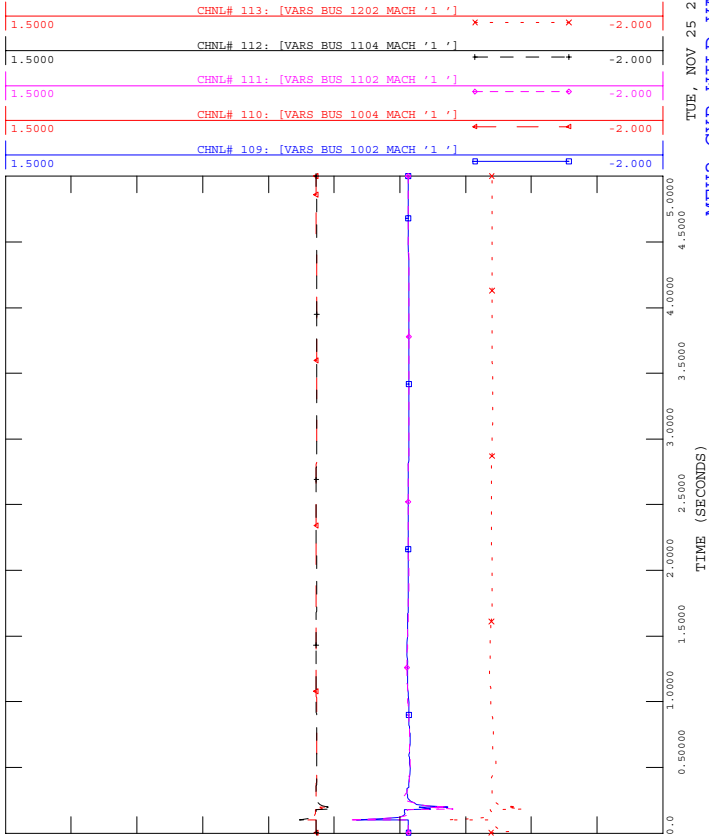






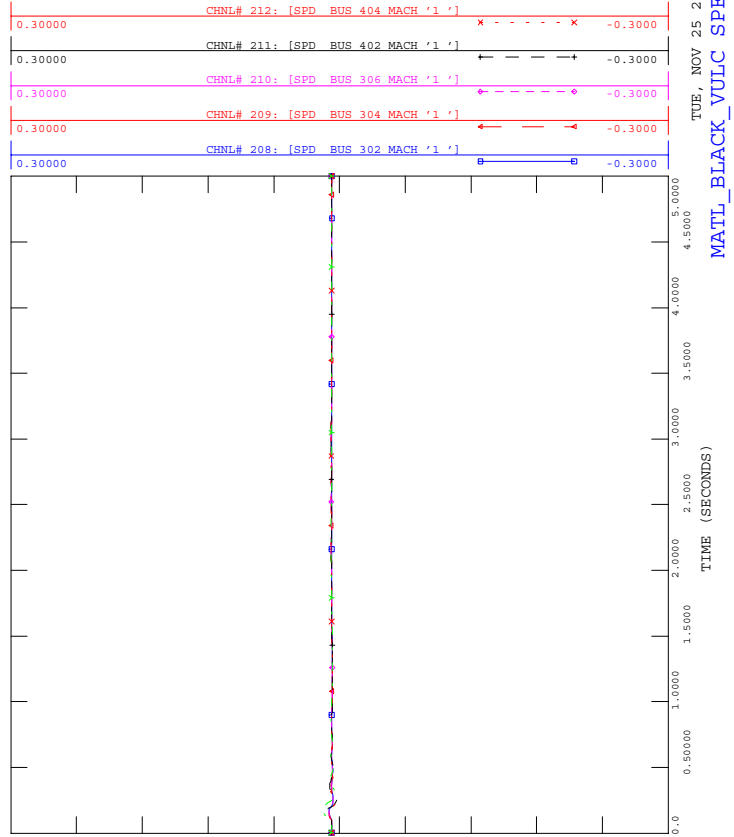
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD27_Dewin-Vulc-Peig_V82.out



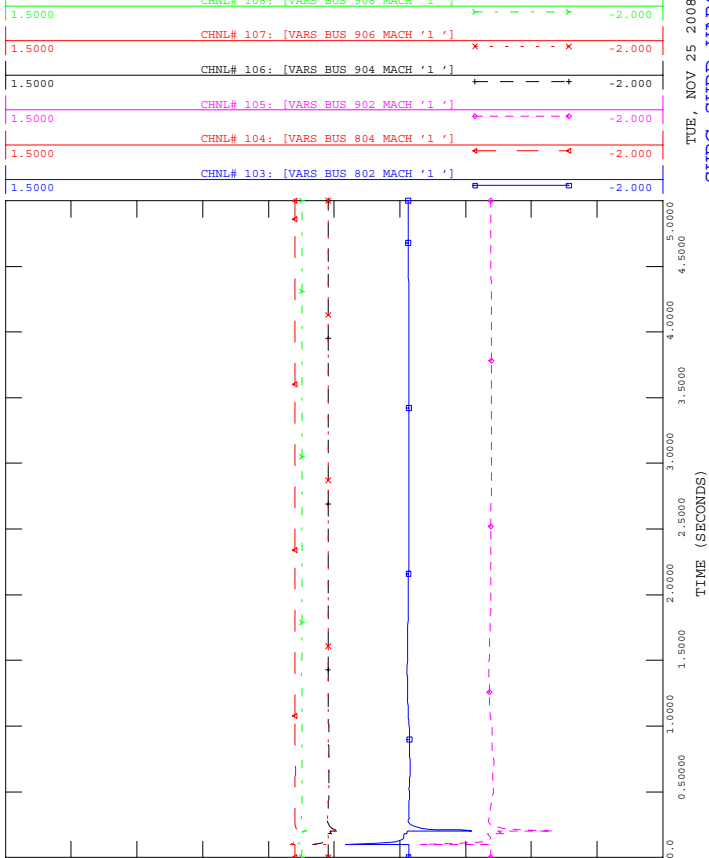
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD27_Dewin-Vulc-Peig_V82.out



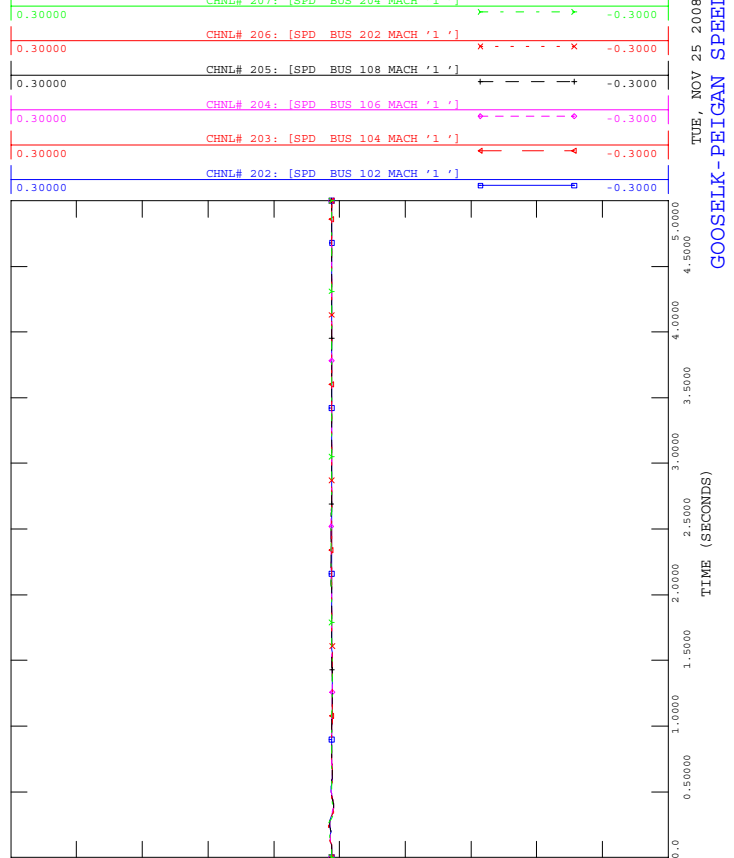
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

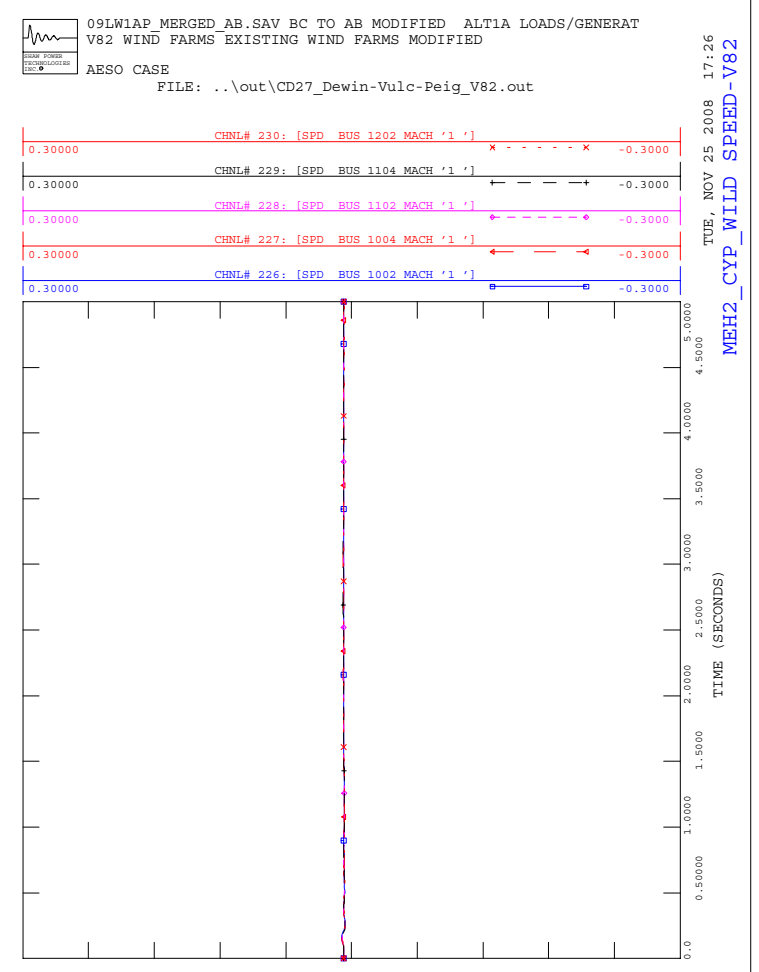
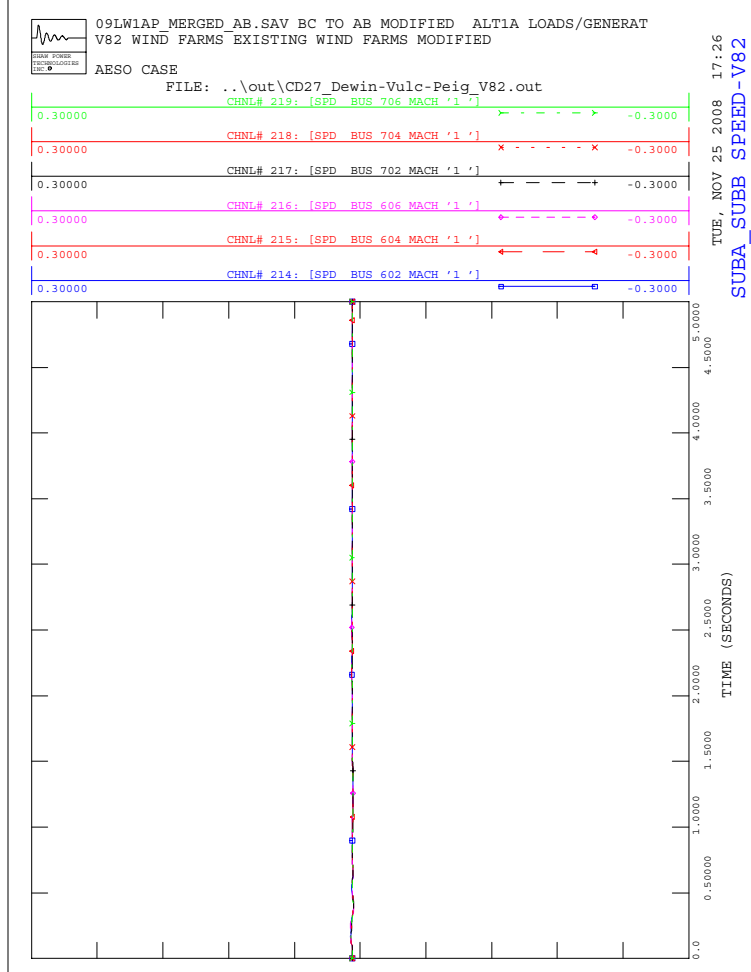
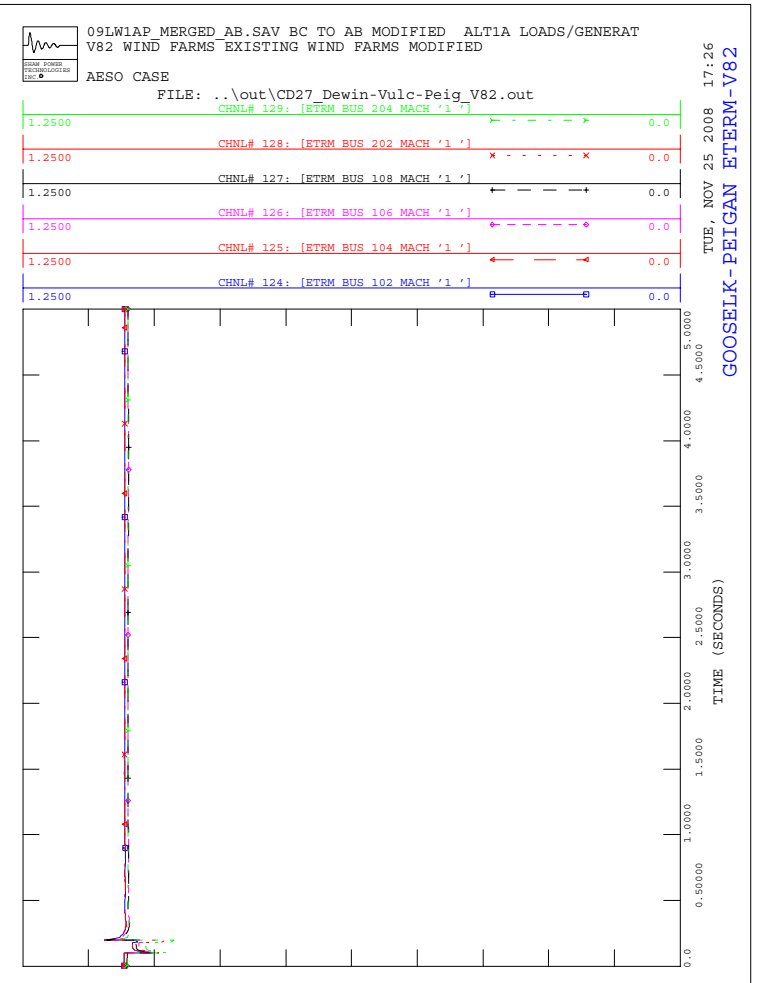
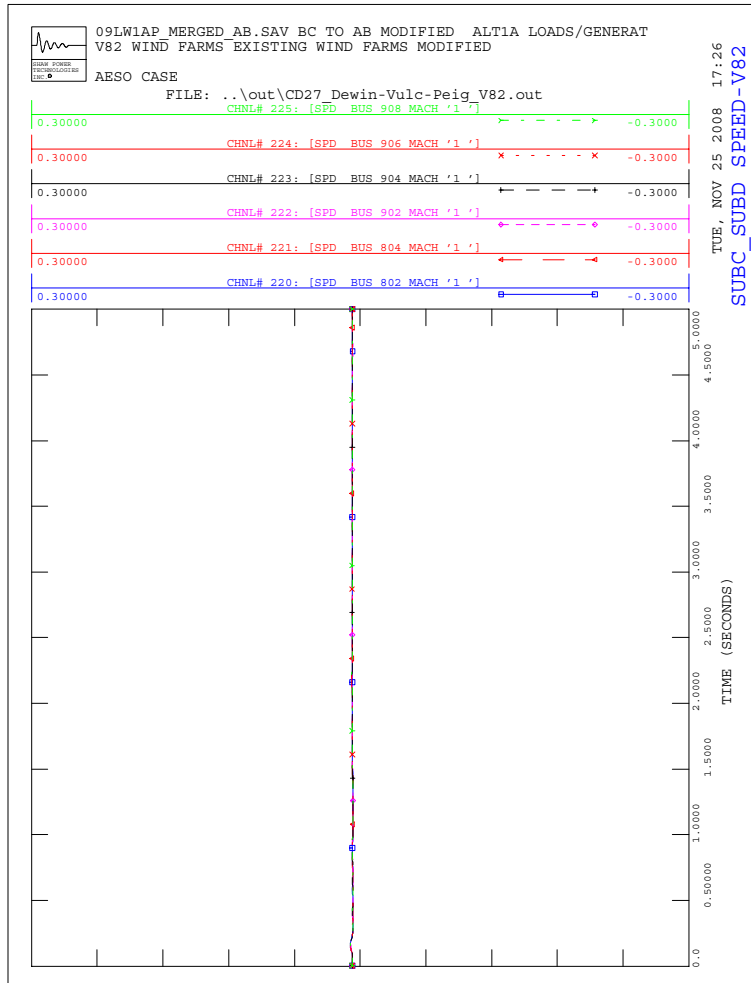
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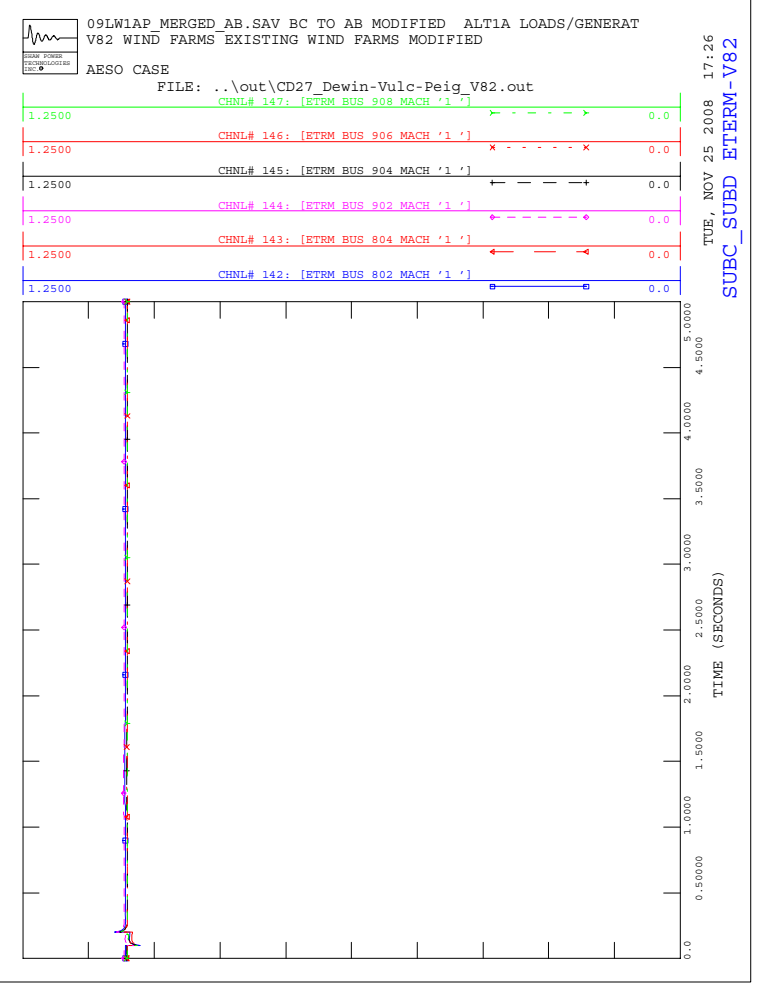
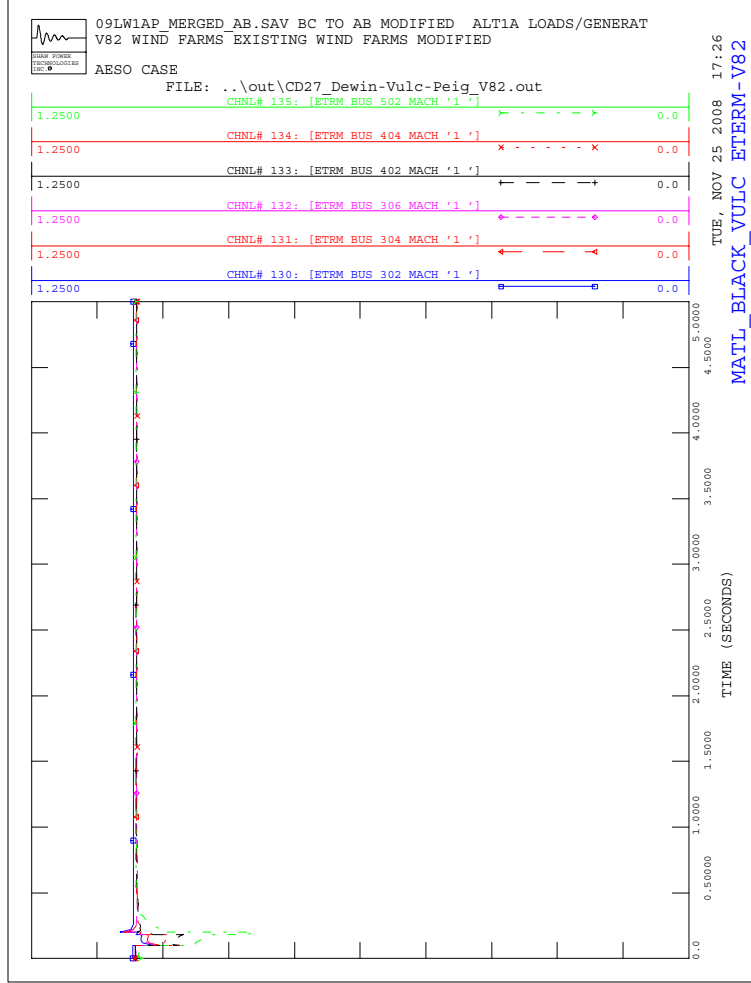
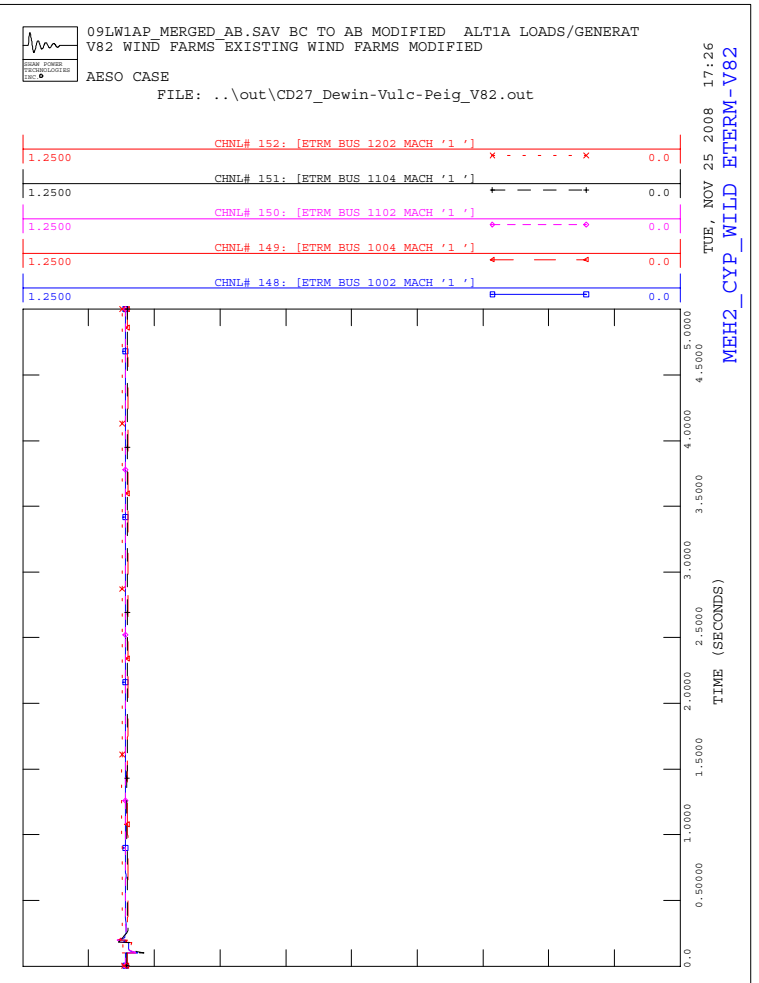
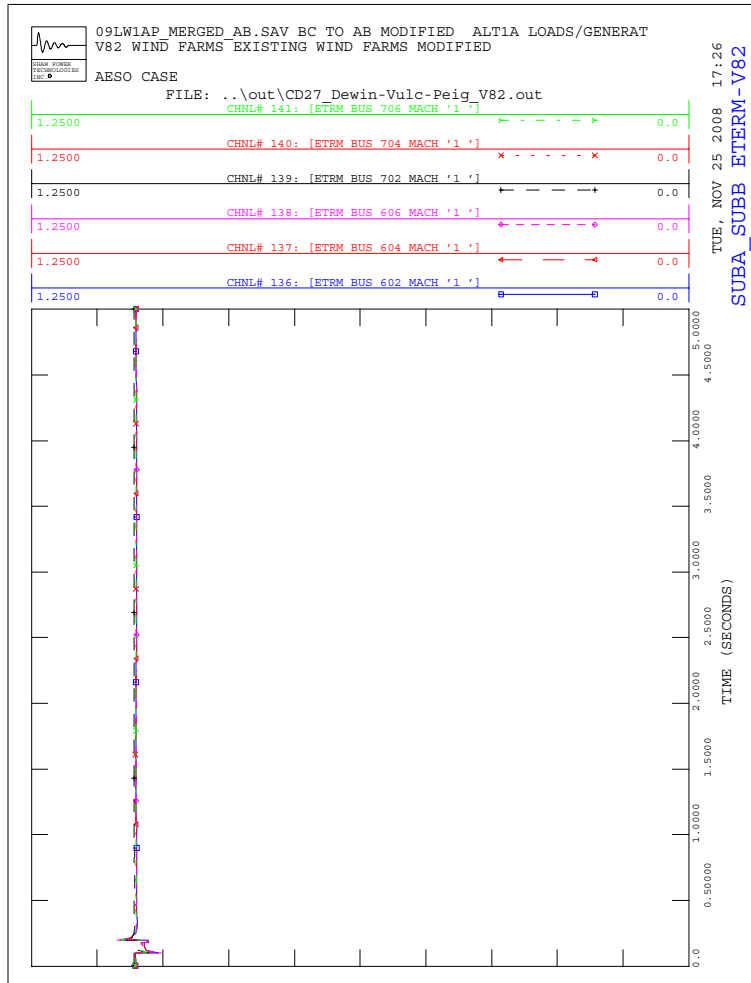


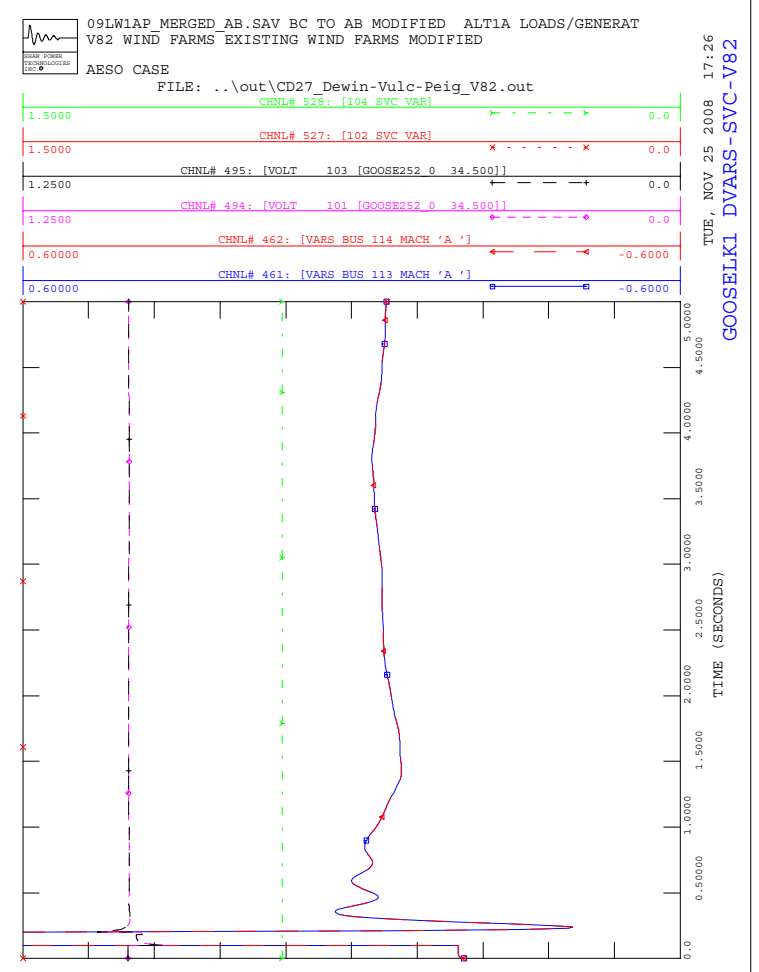
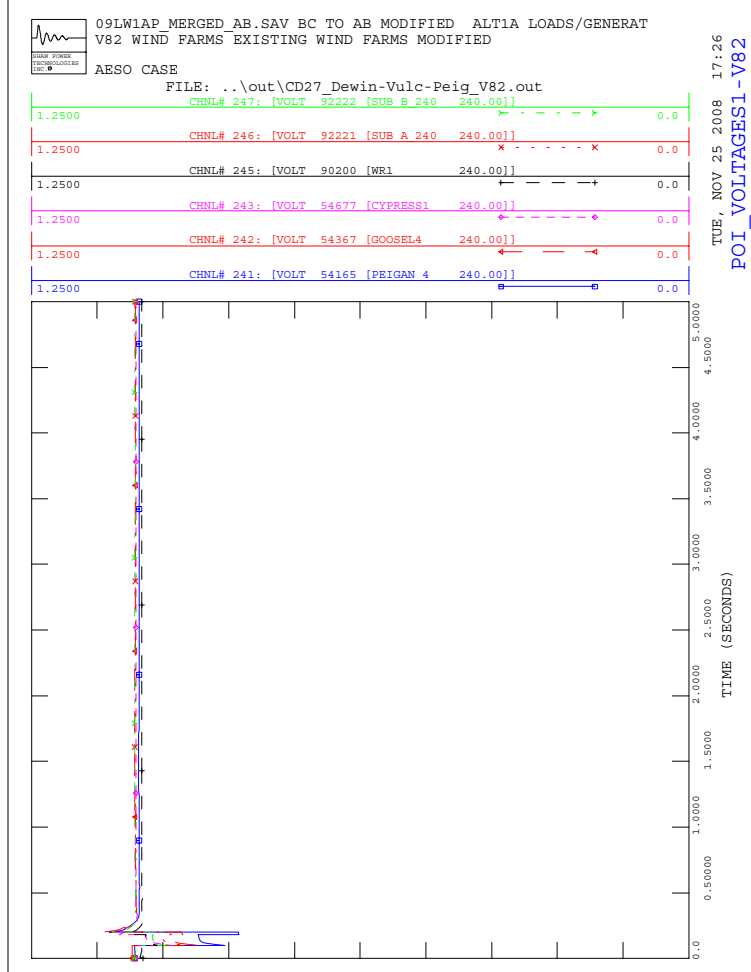
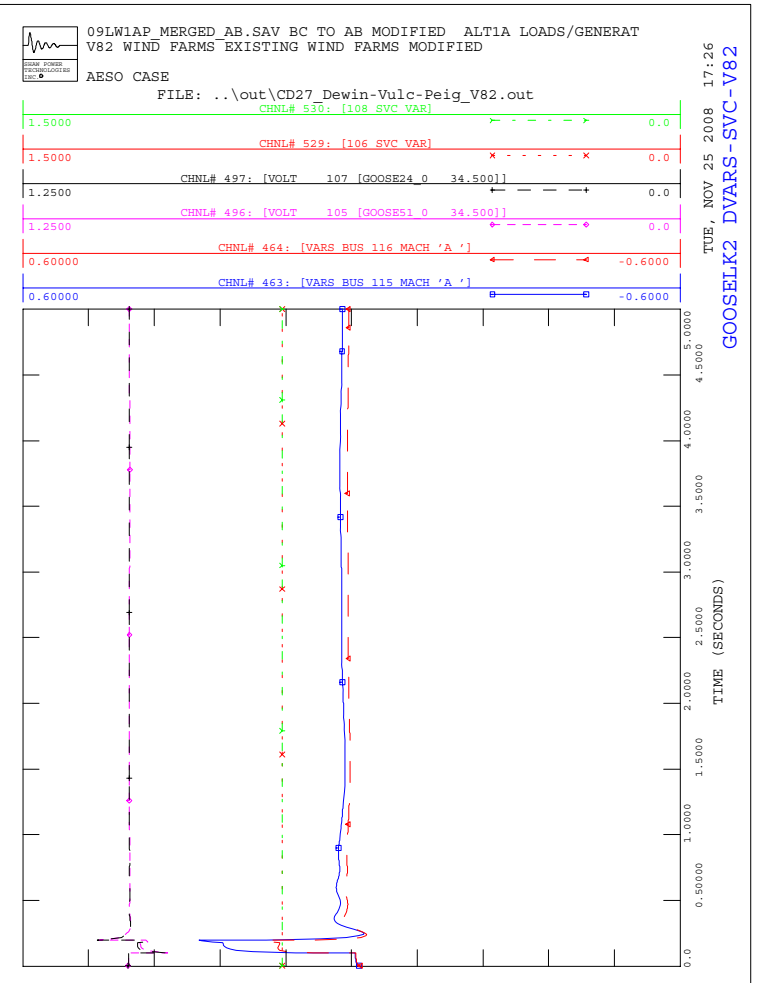
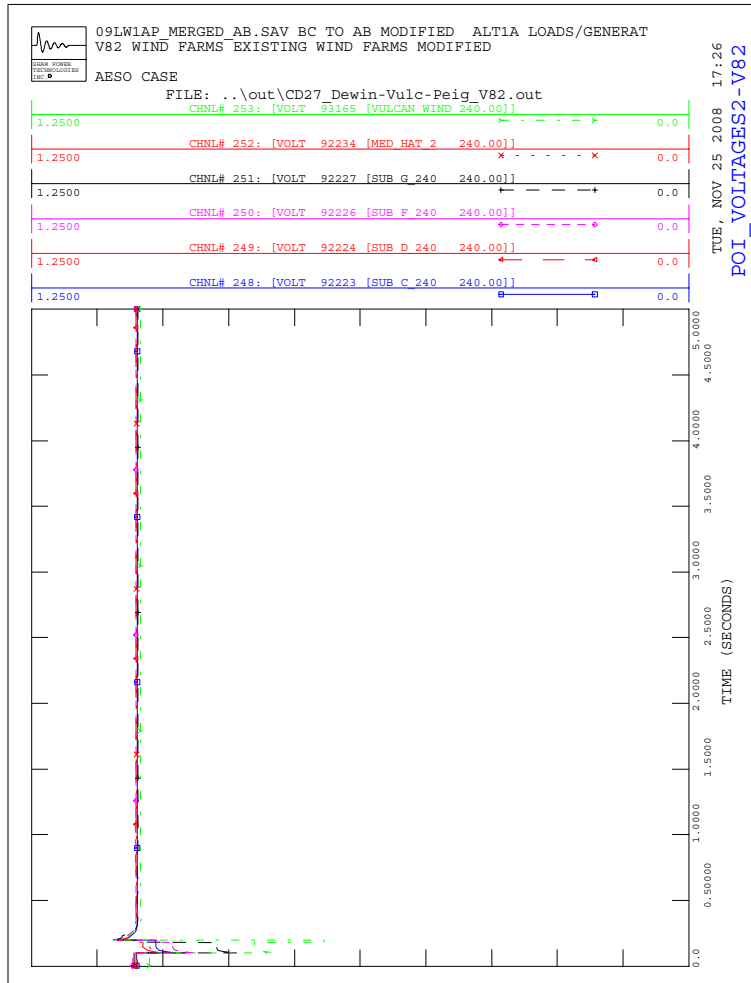
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

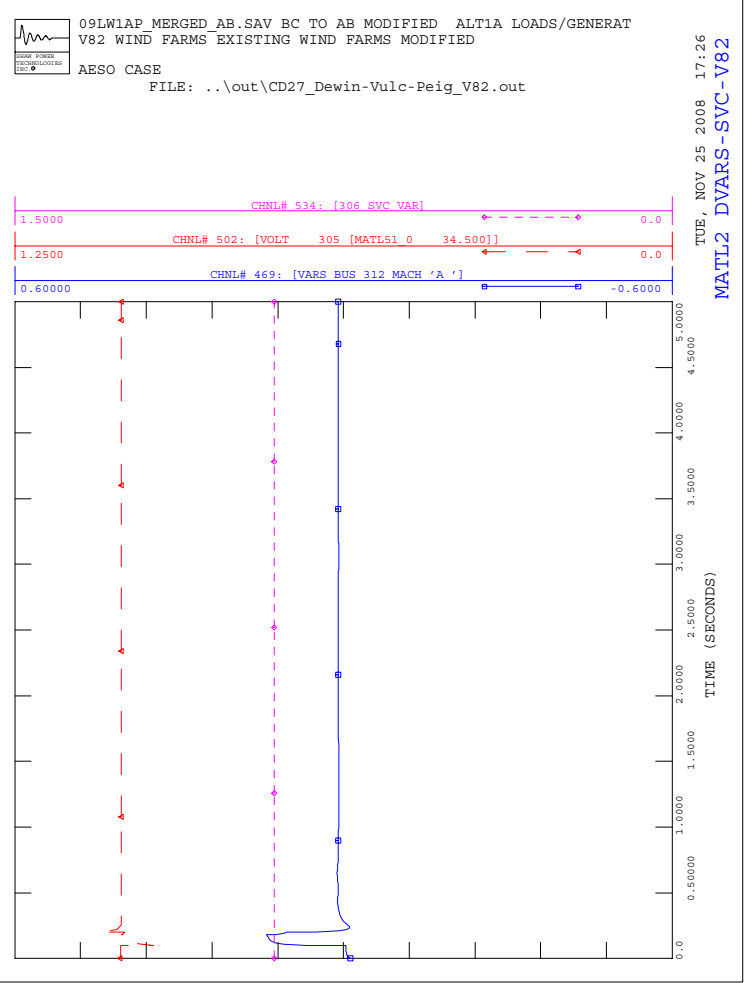
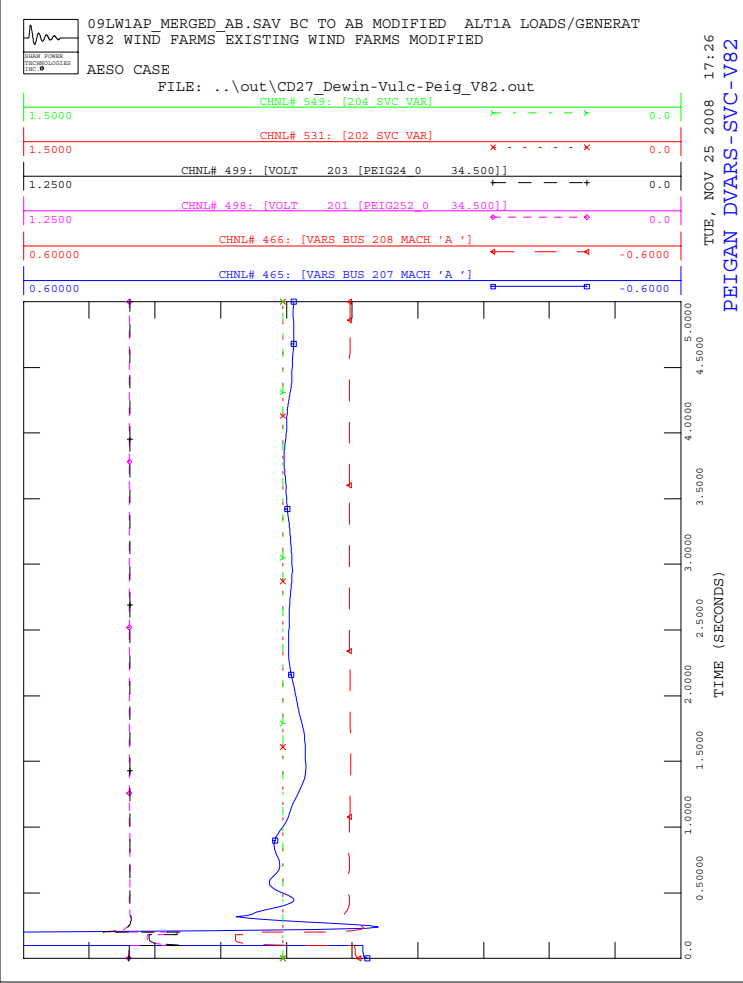
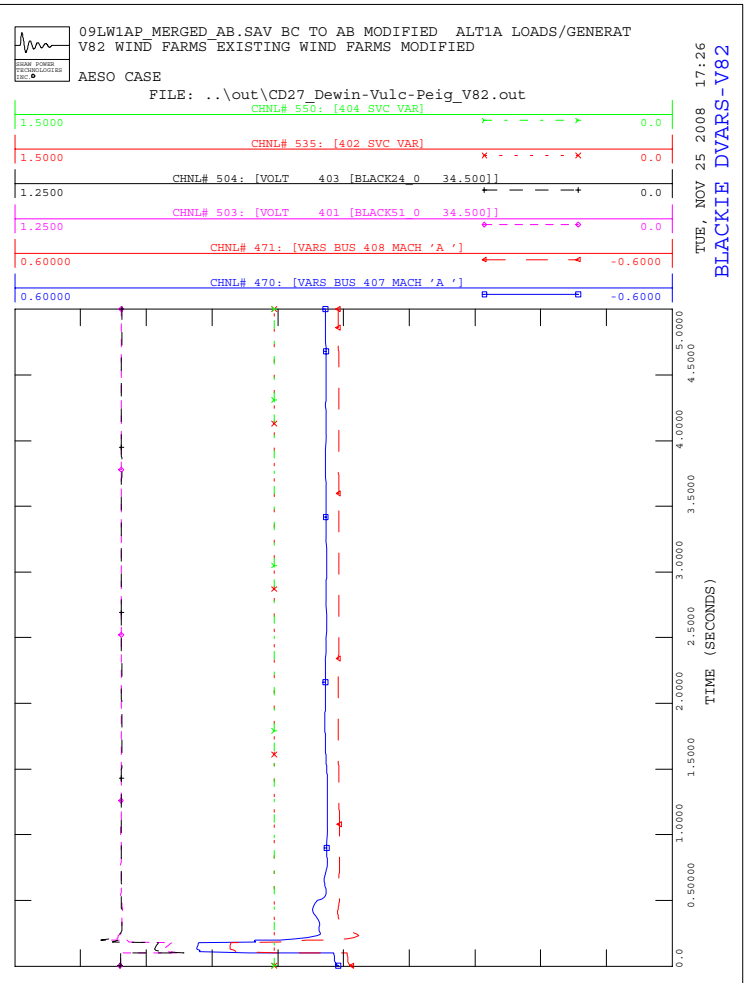
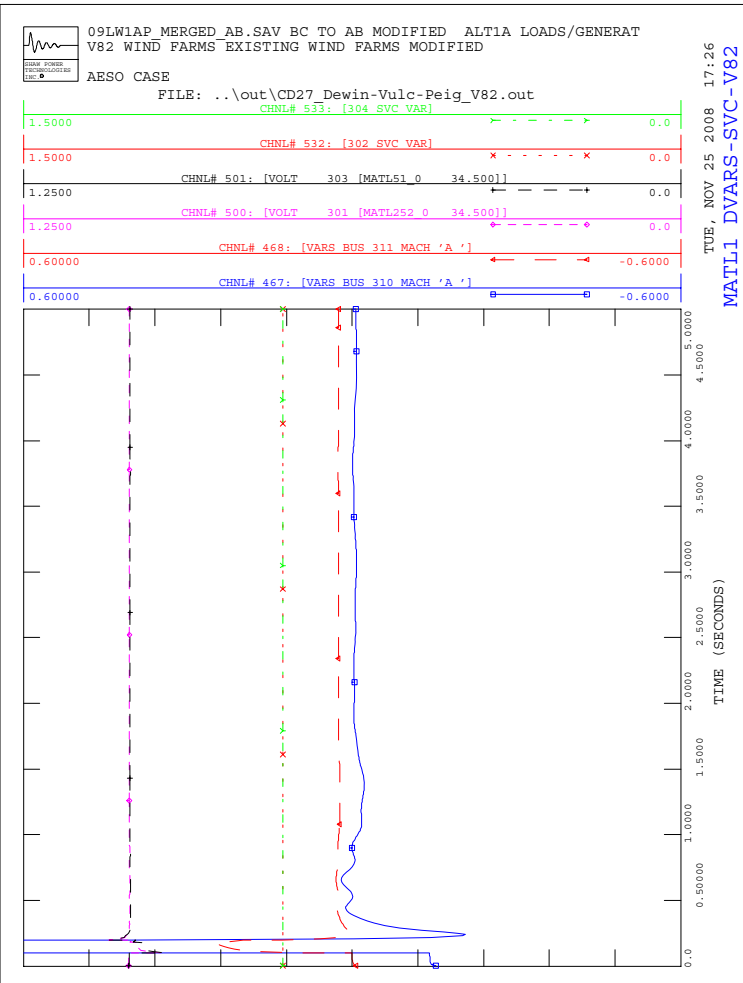
FILE: ..\out\CD27_Dewin-Vulc-Peig_V82.out

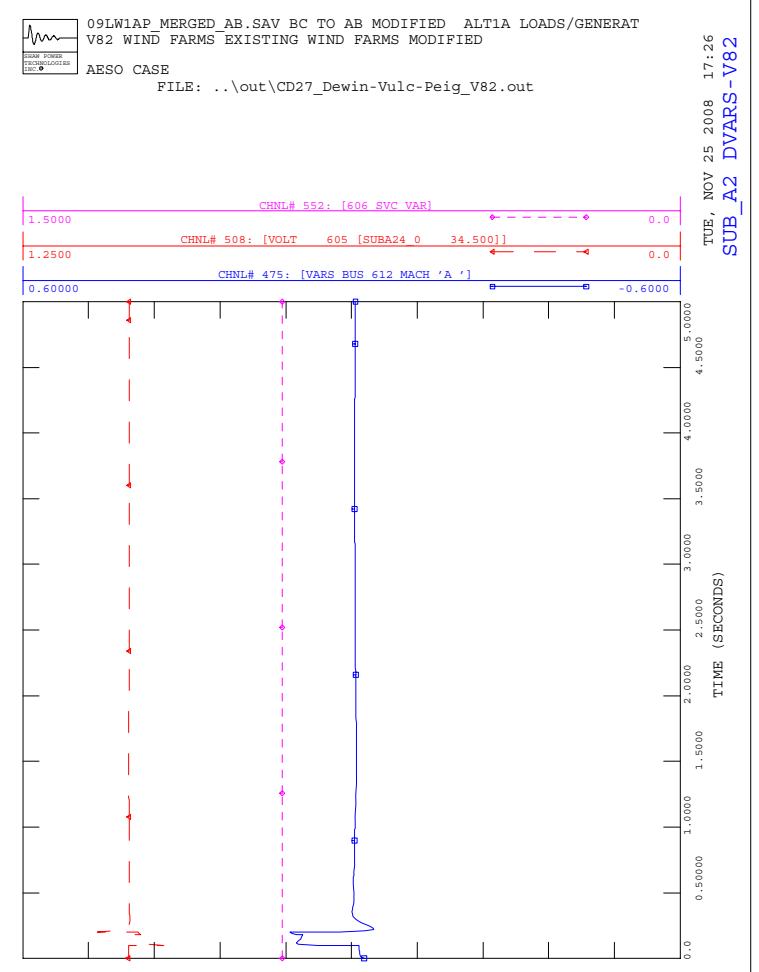
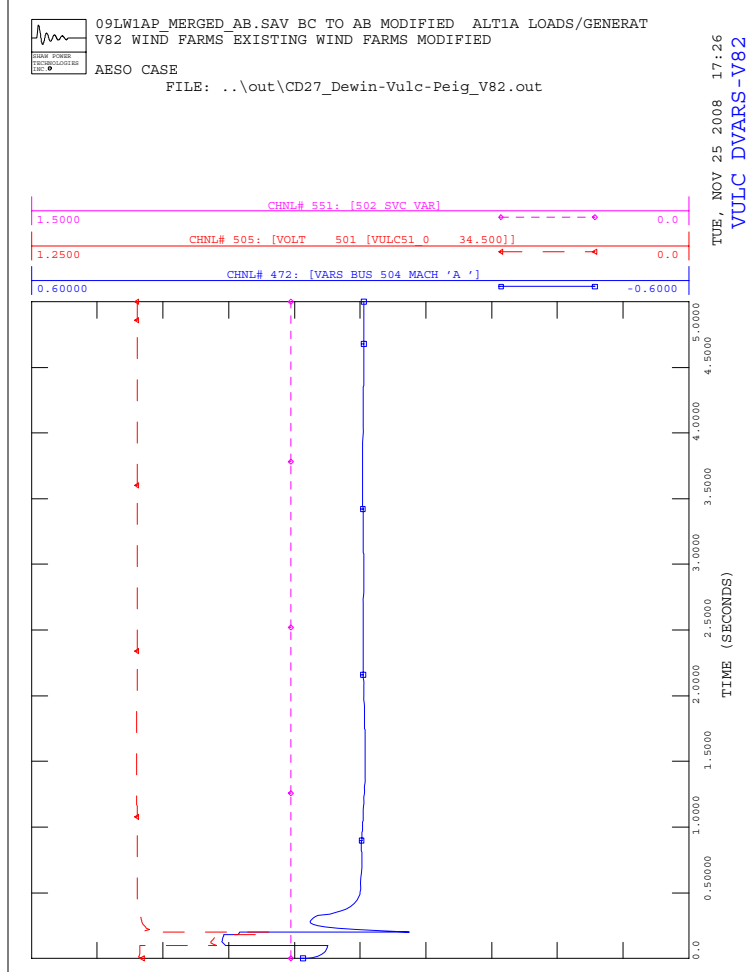
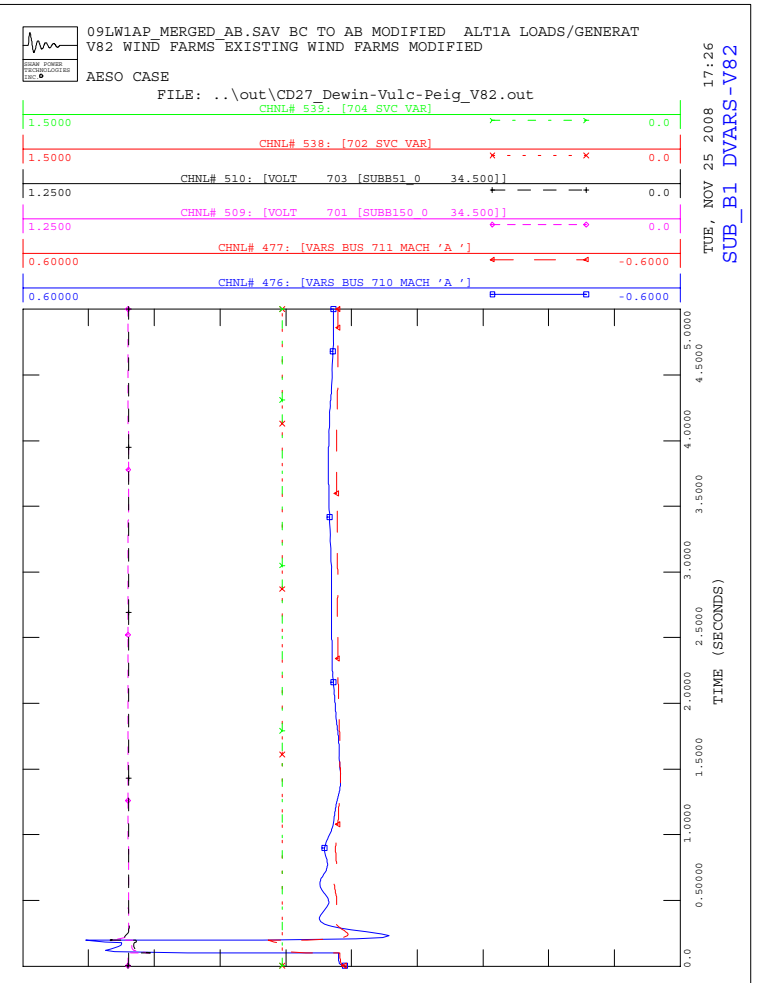
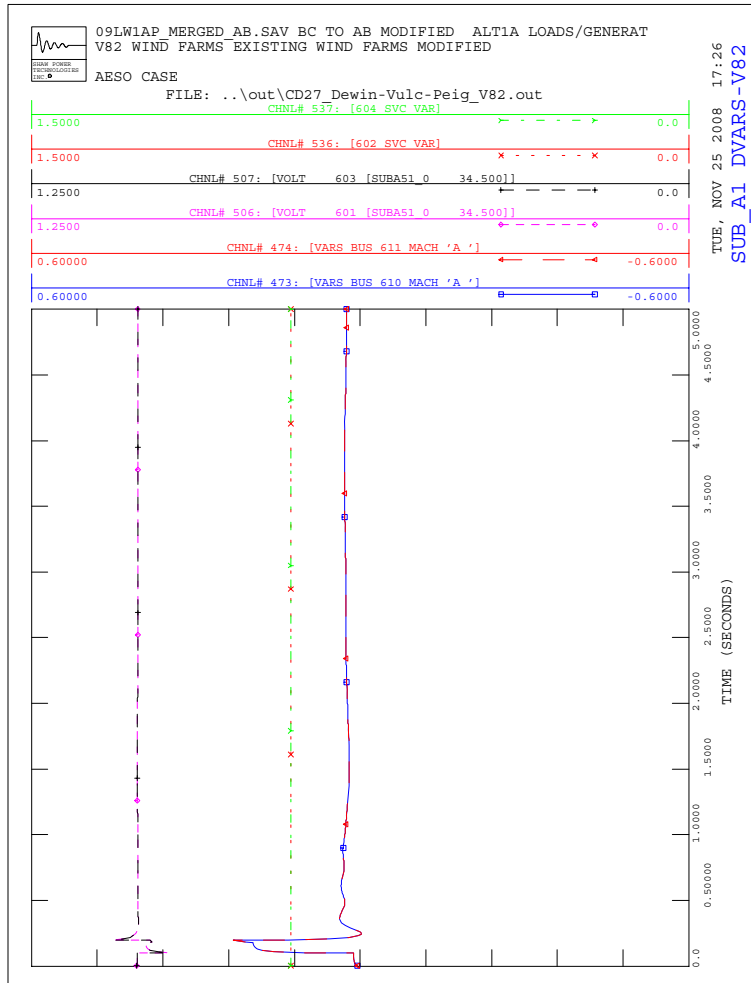


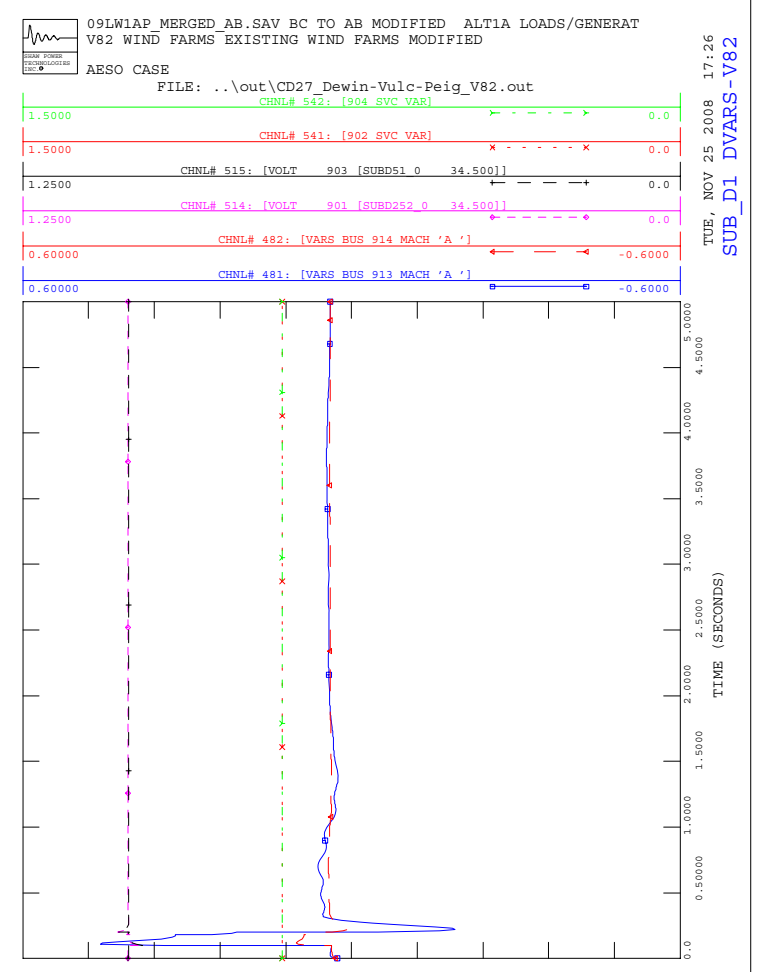
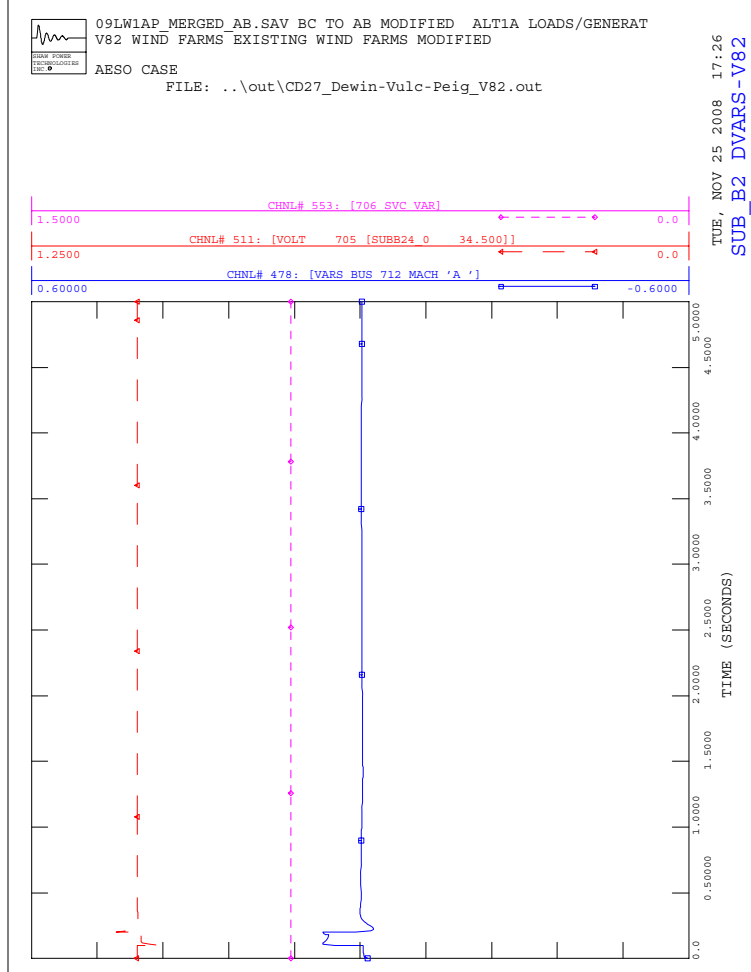
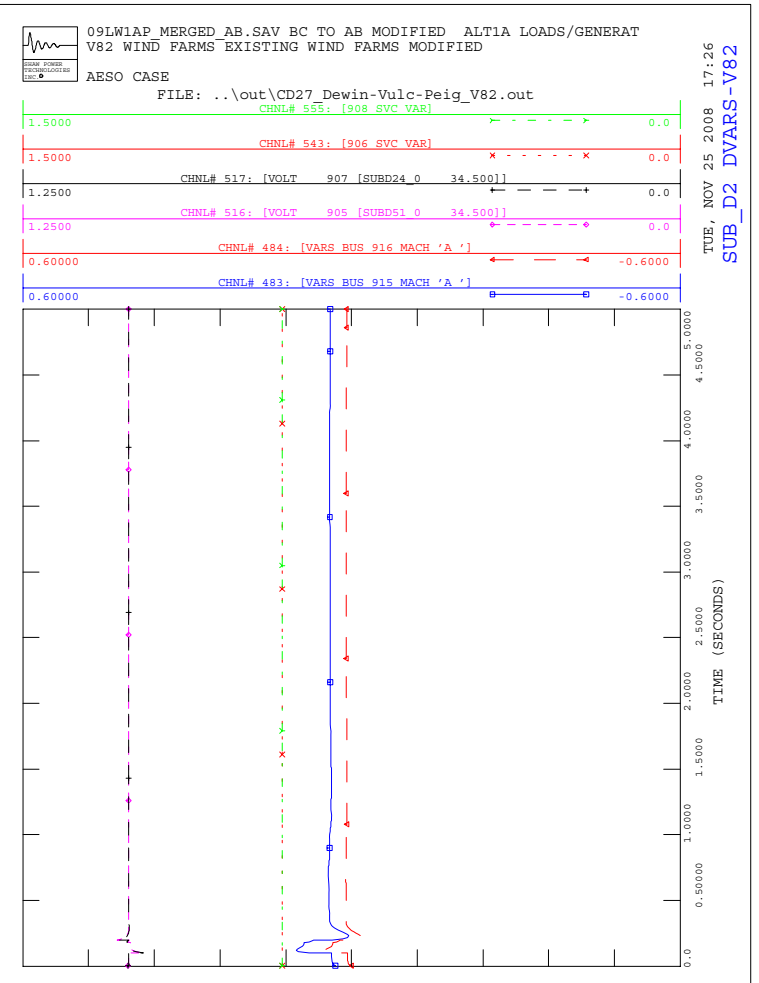
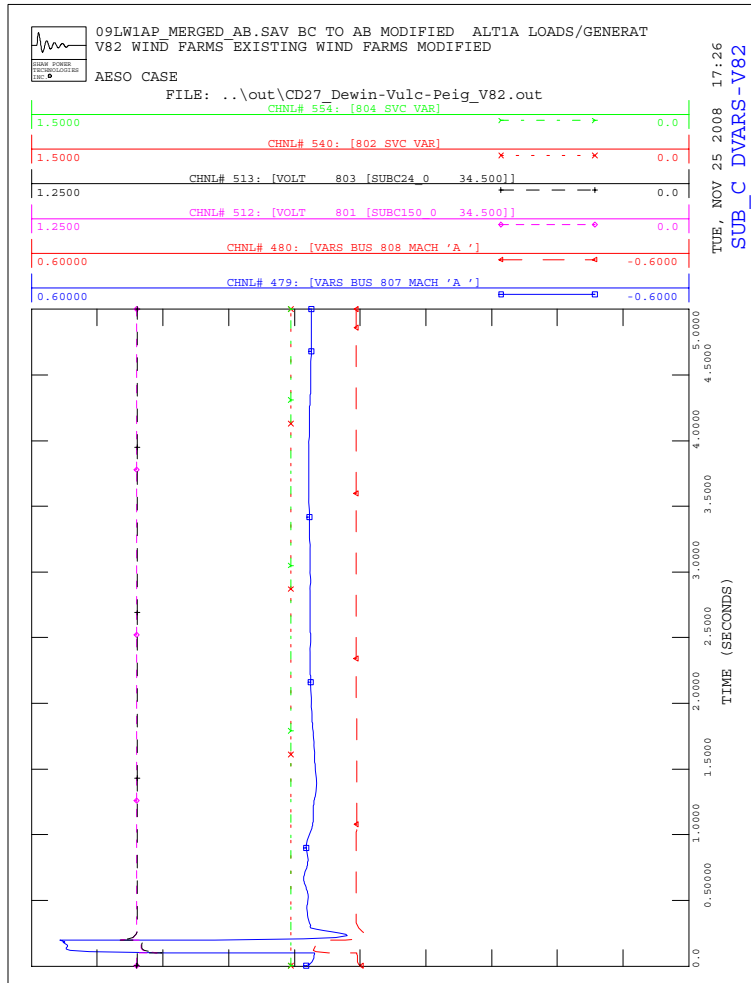


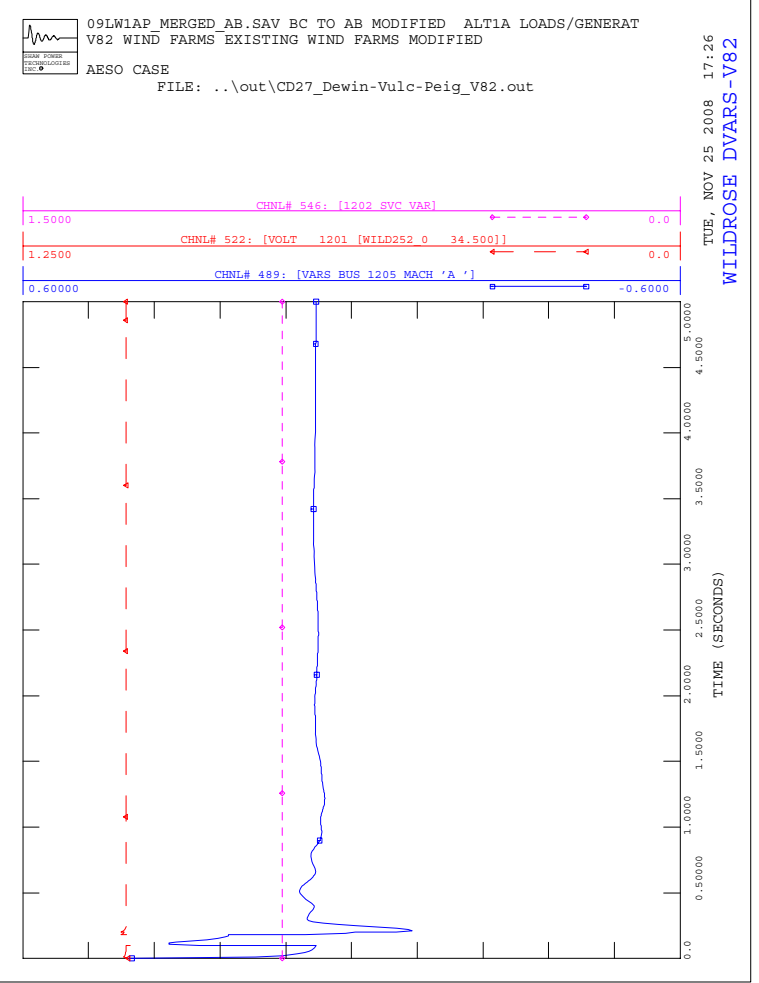
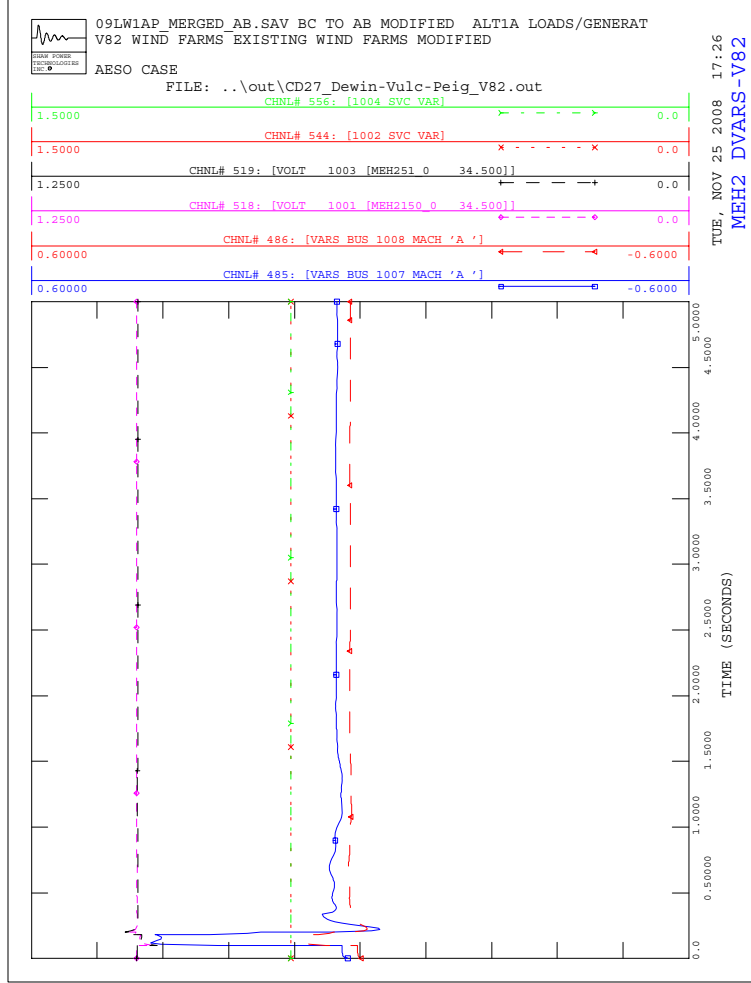
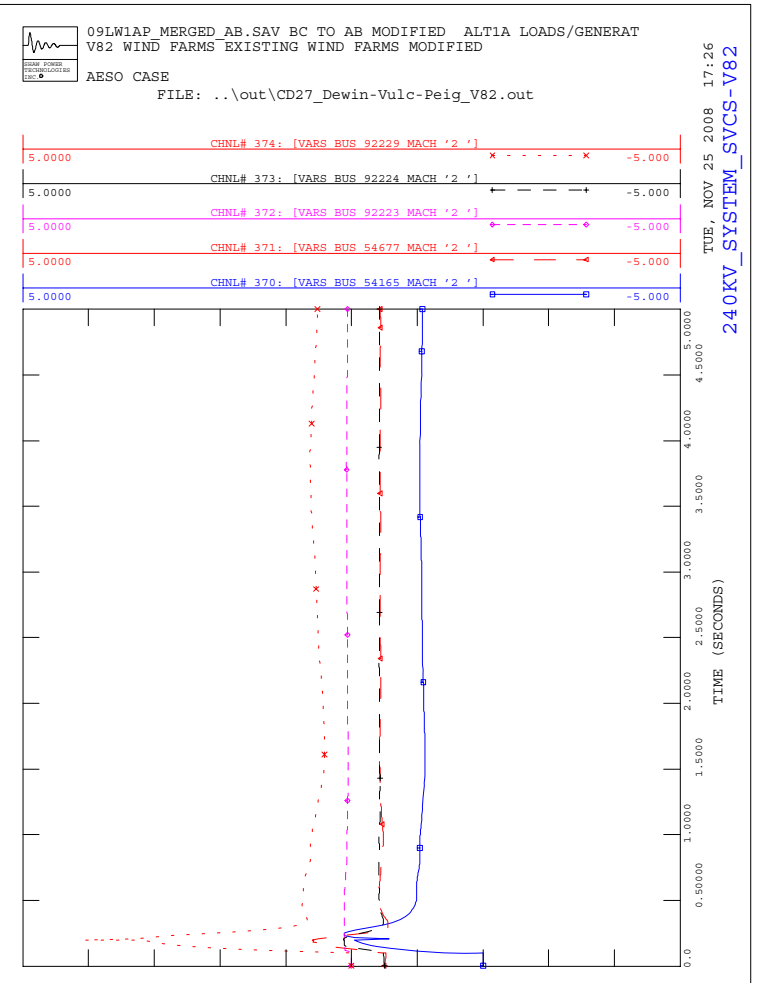
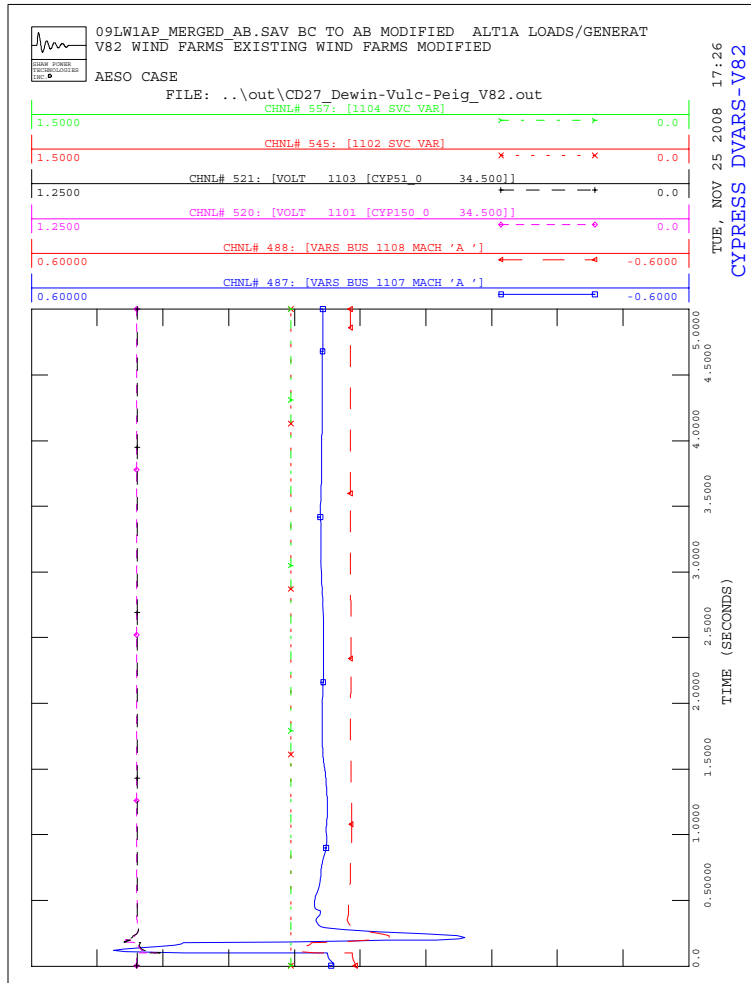








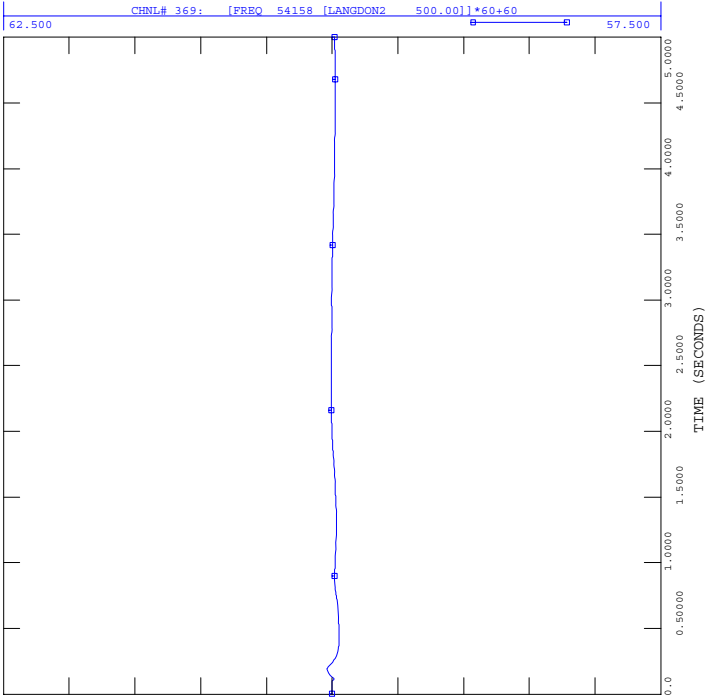






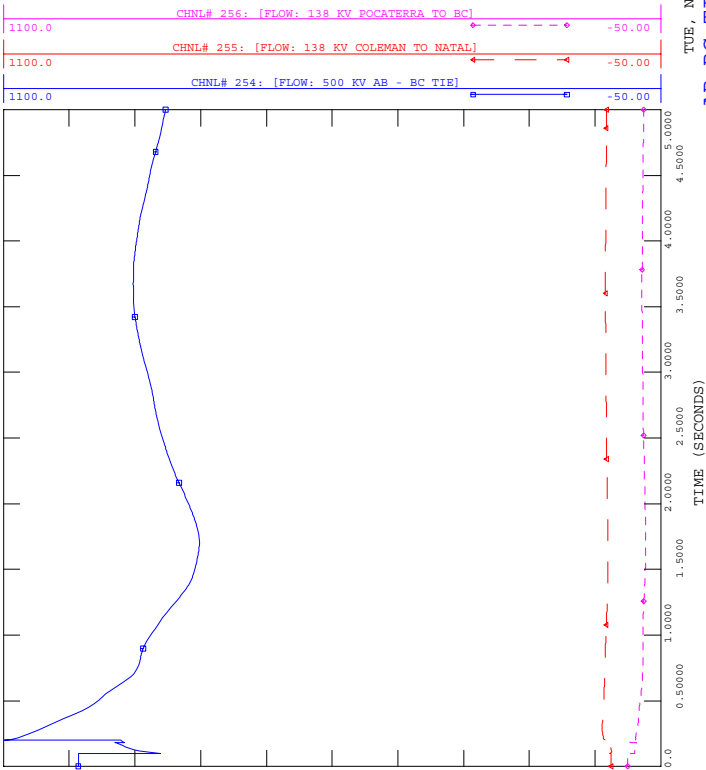
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\CD27_Dewin-Vulc-Peig_V82.out

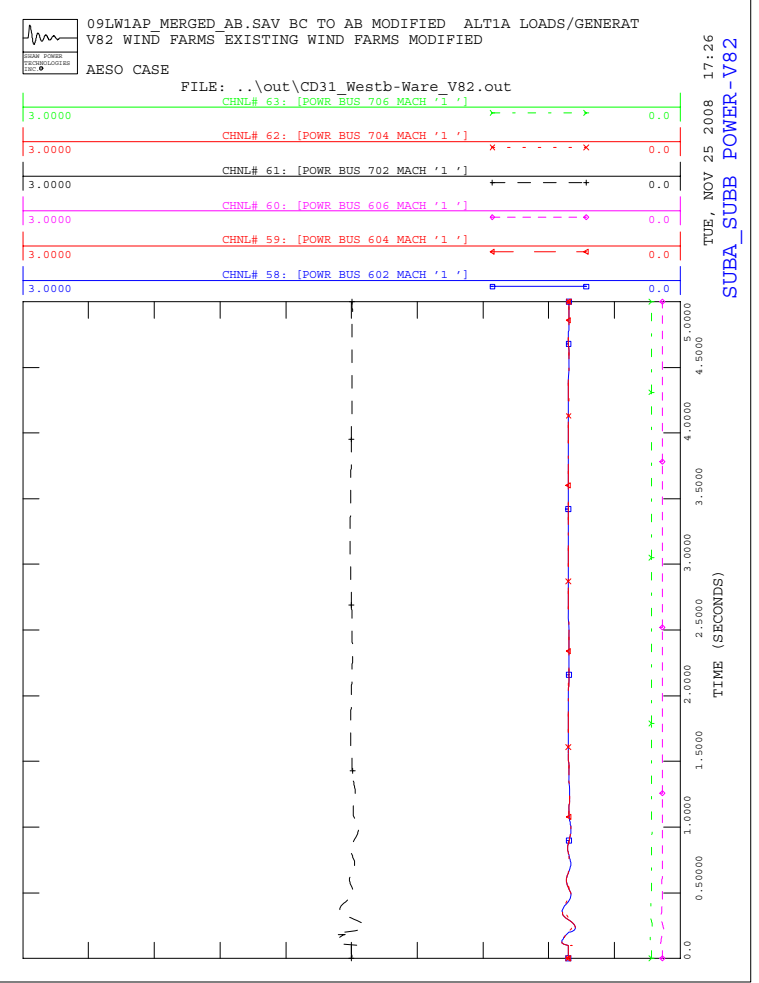
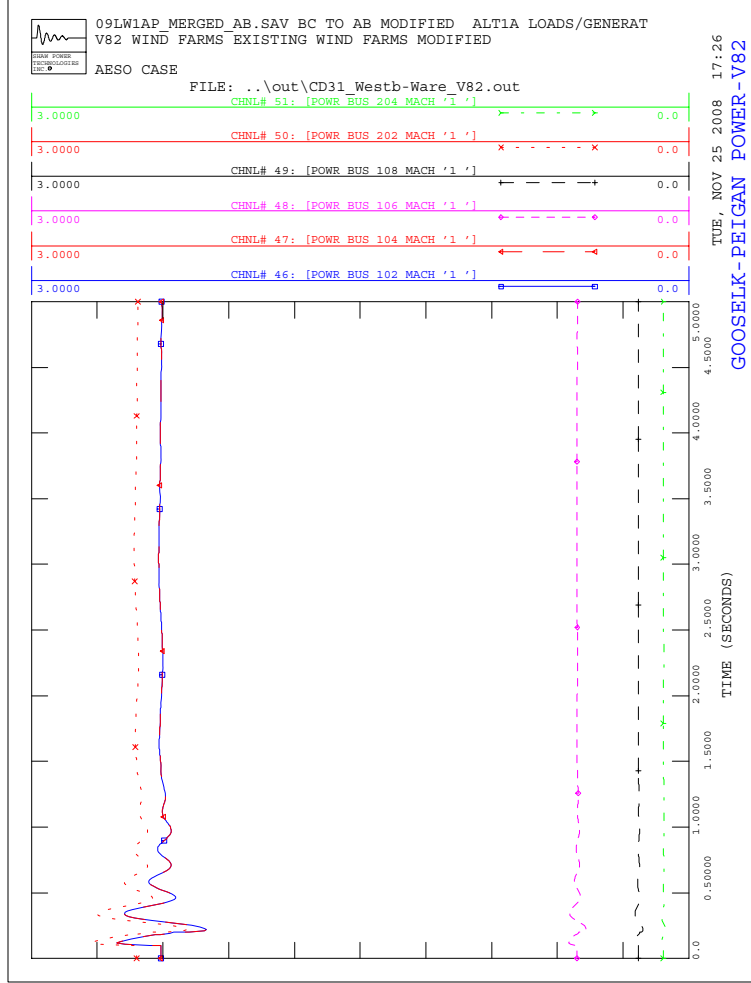
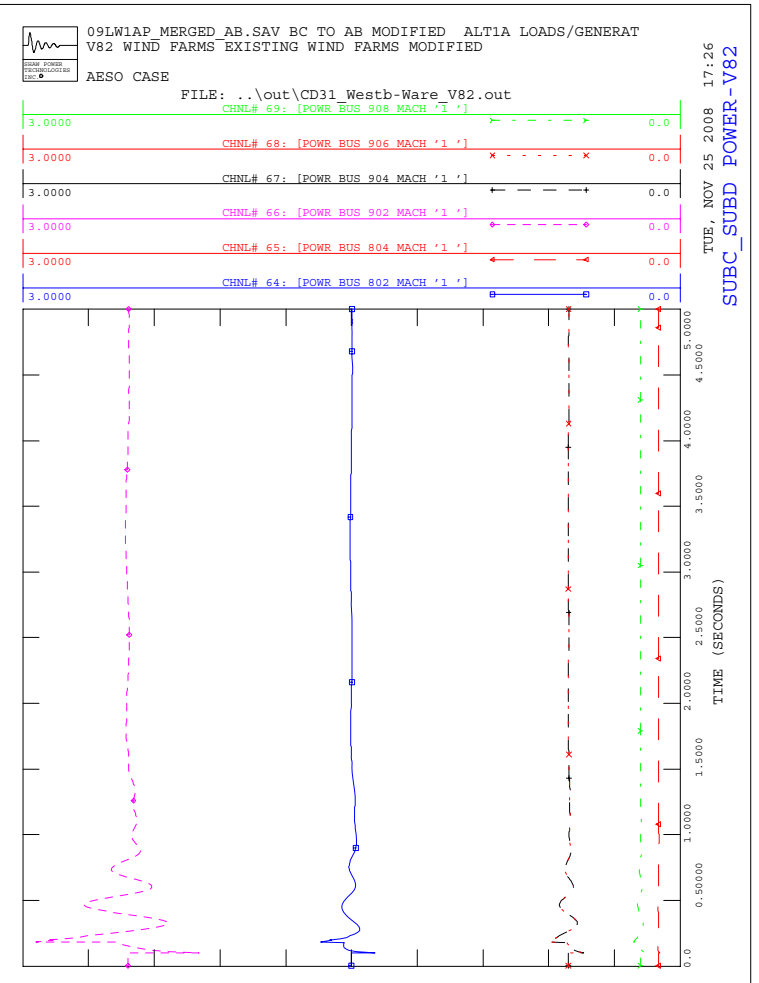
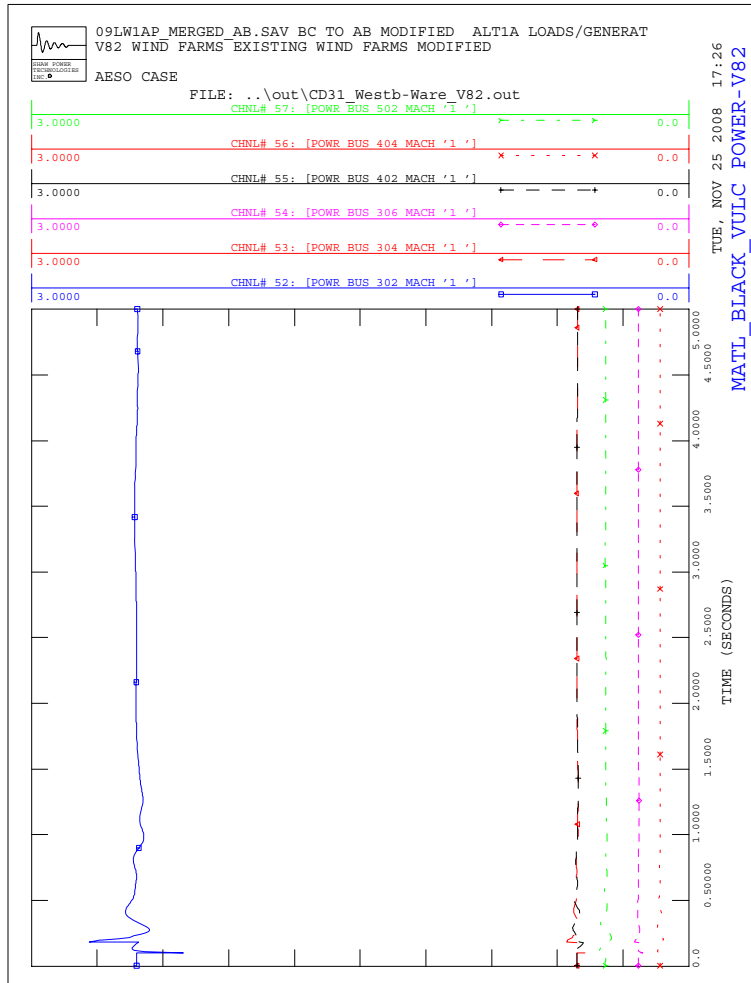
TUE, NOV 25 2008 17:26
LANGDON_FRQ-V82

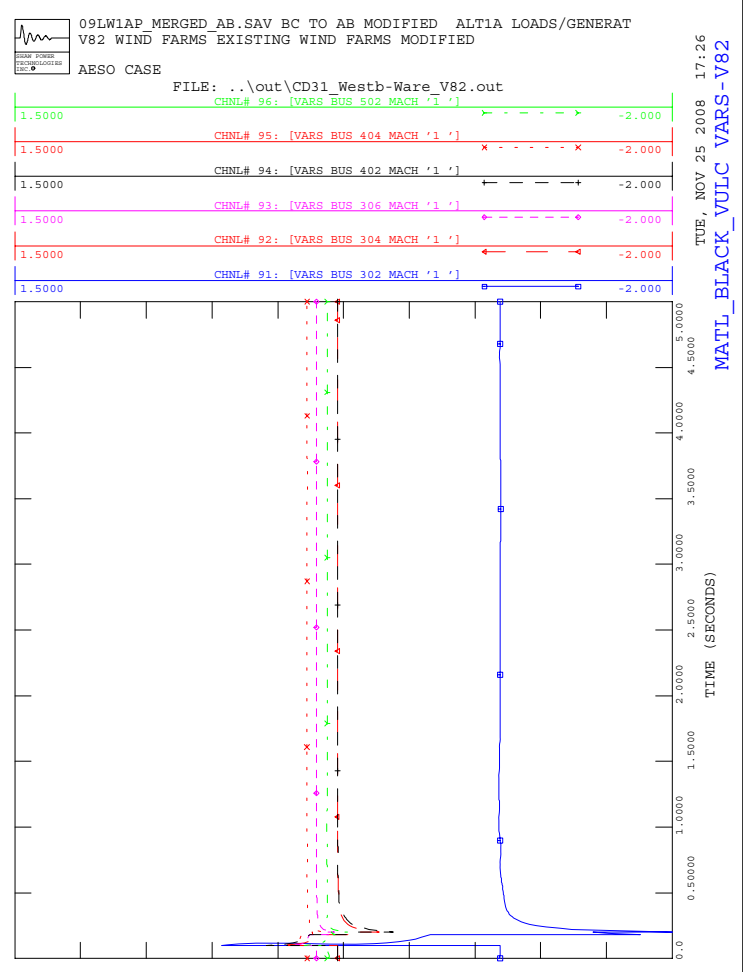
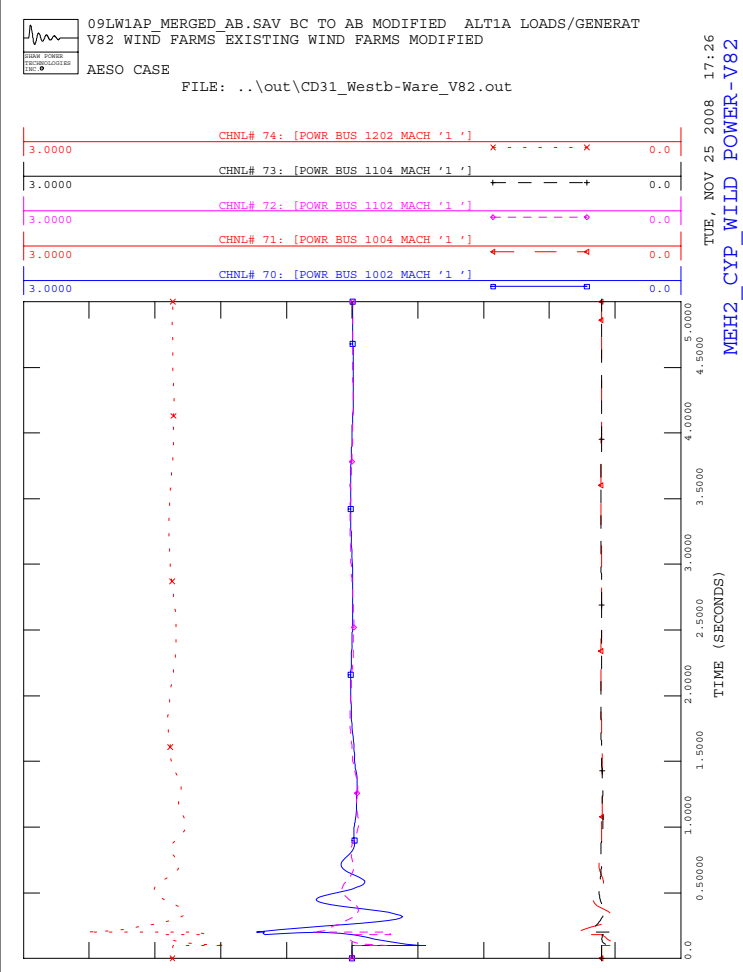
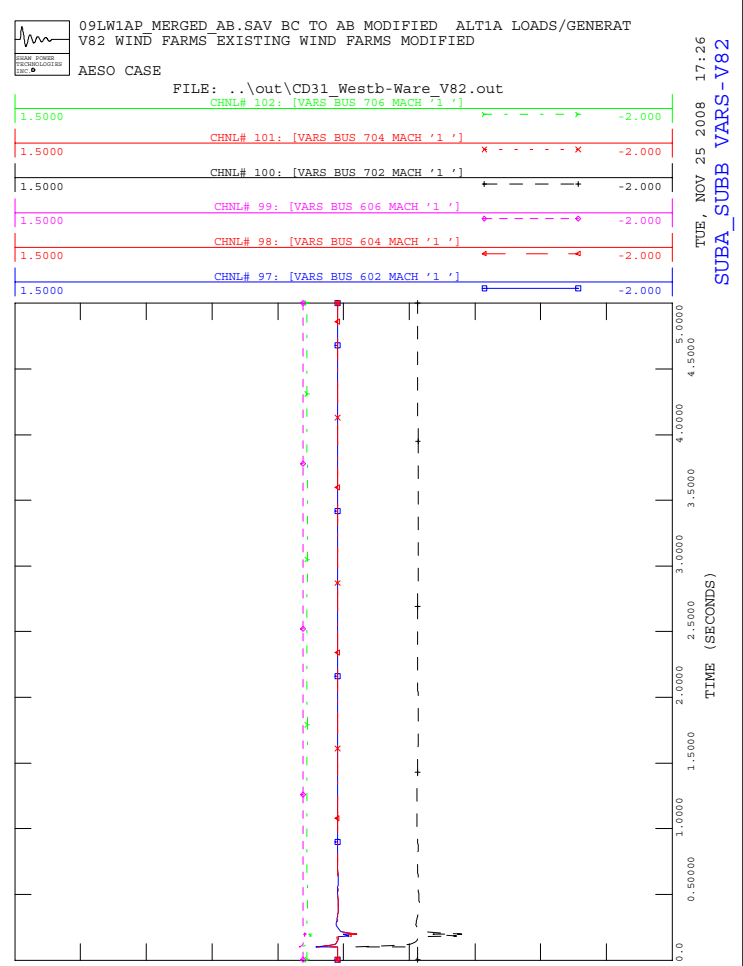
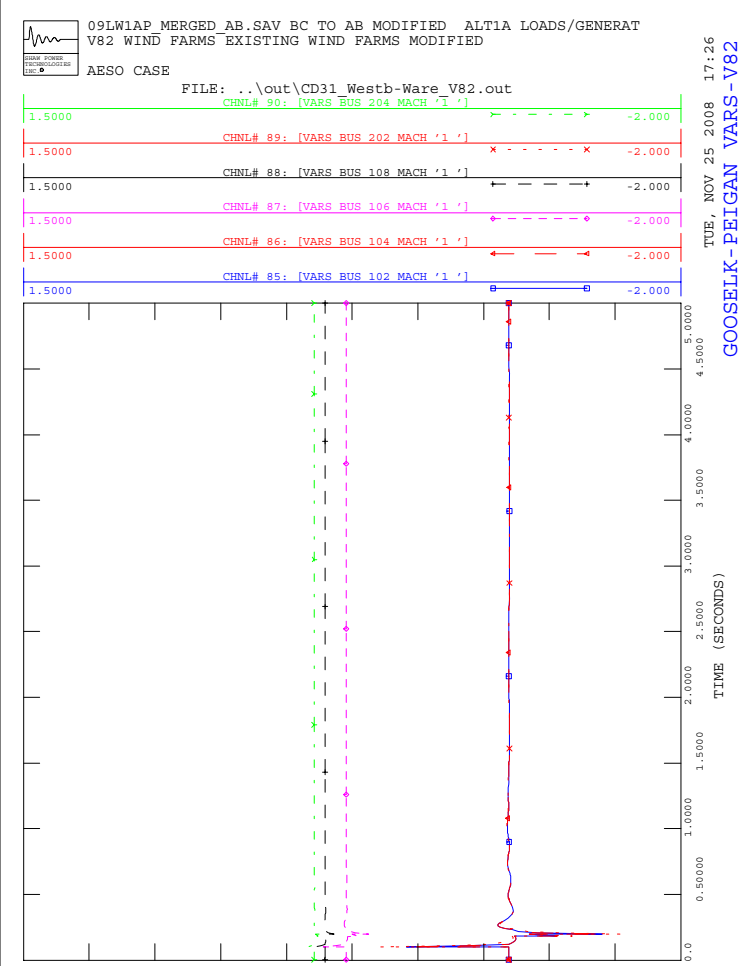


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\CD27_Dewin-Vulc-Peig_V82.out

TUE, NOV 25 2008 17:26
AB_BC_TIE_FLOWS-V82

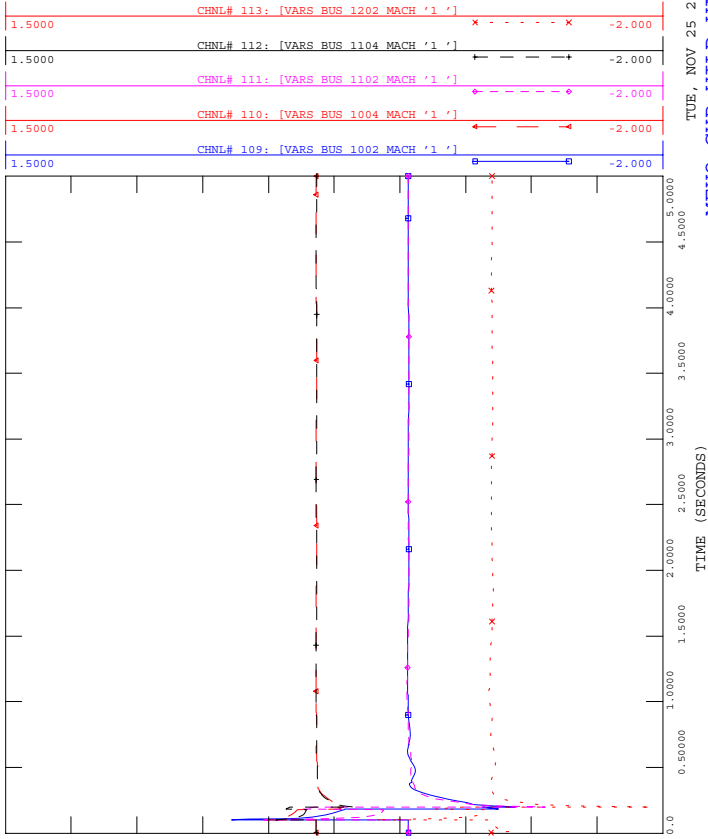






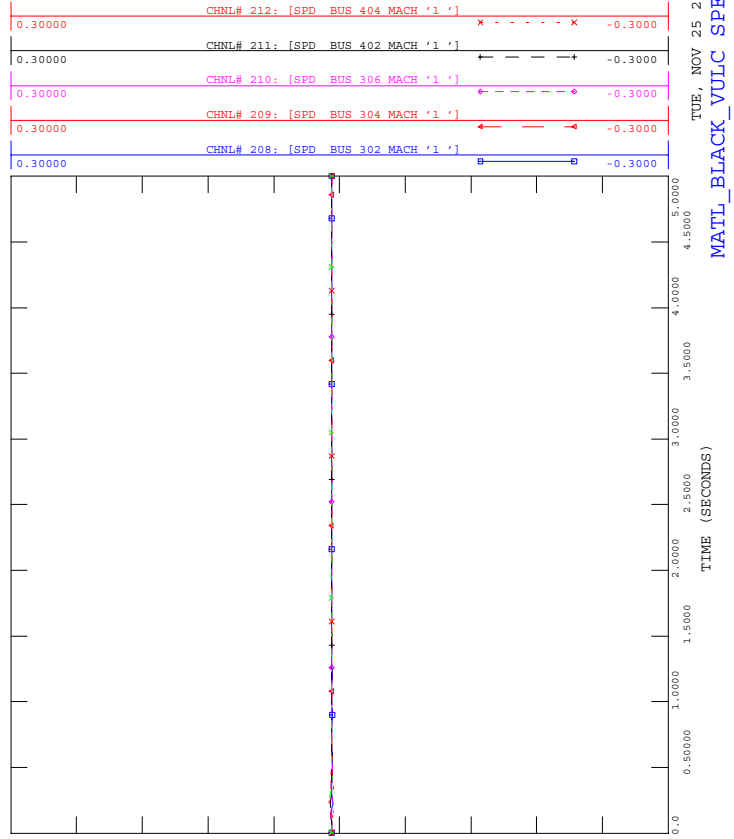
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out



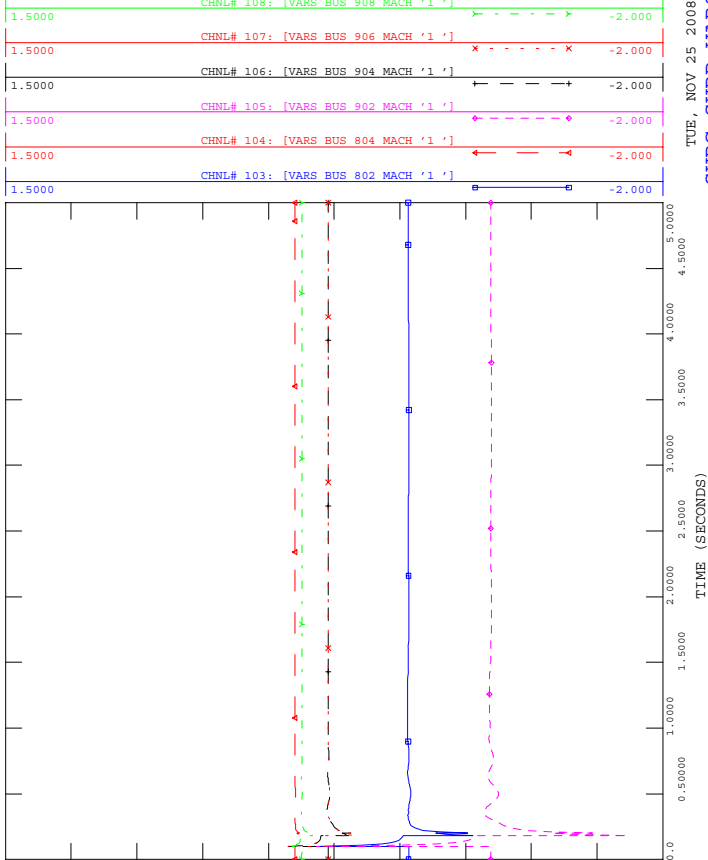
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 AESO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out



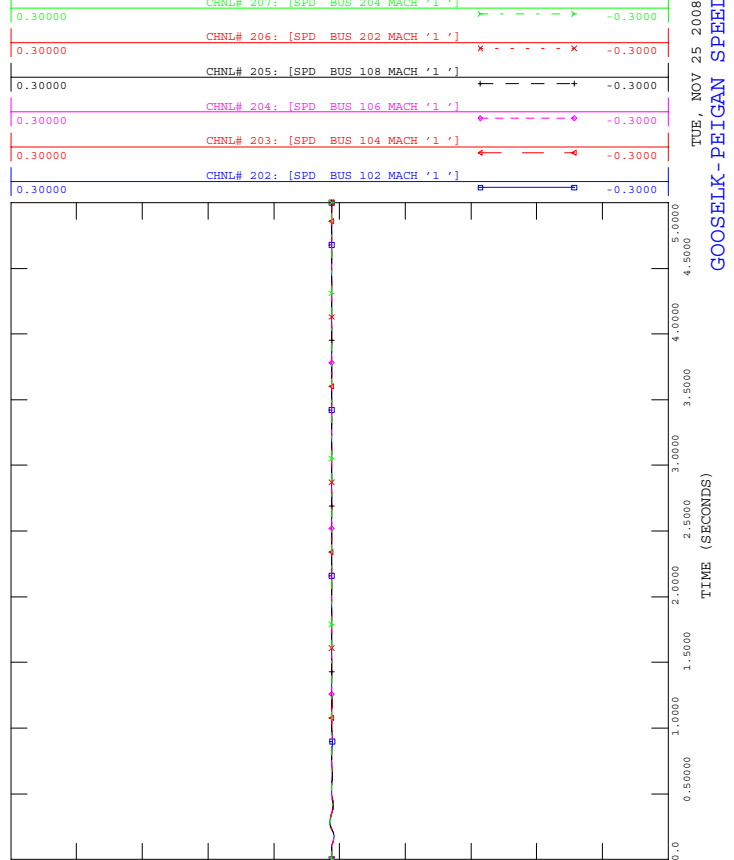
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 AESO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out



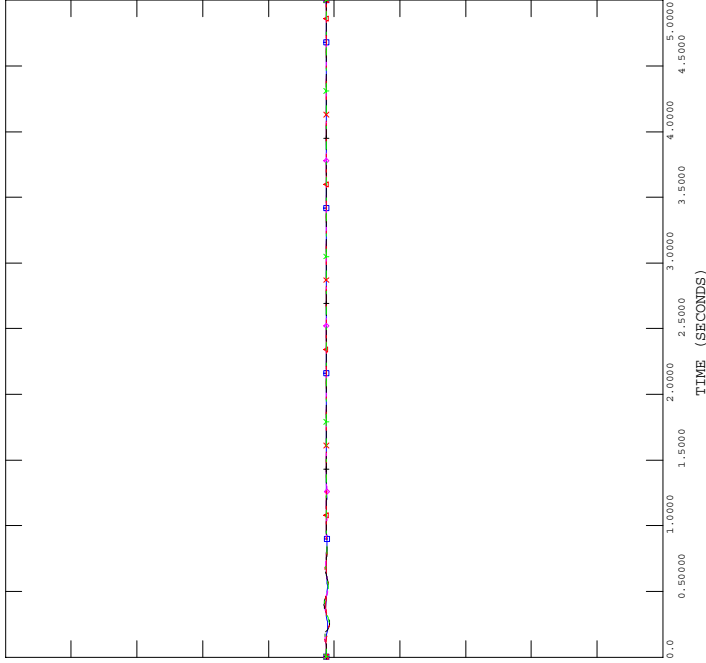
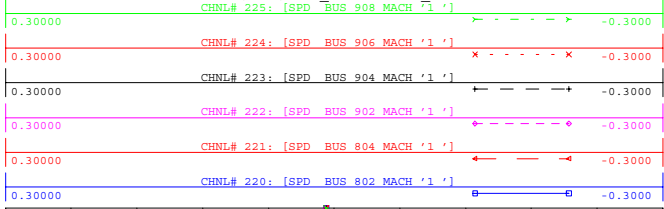
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out



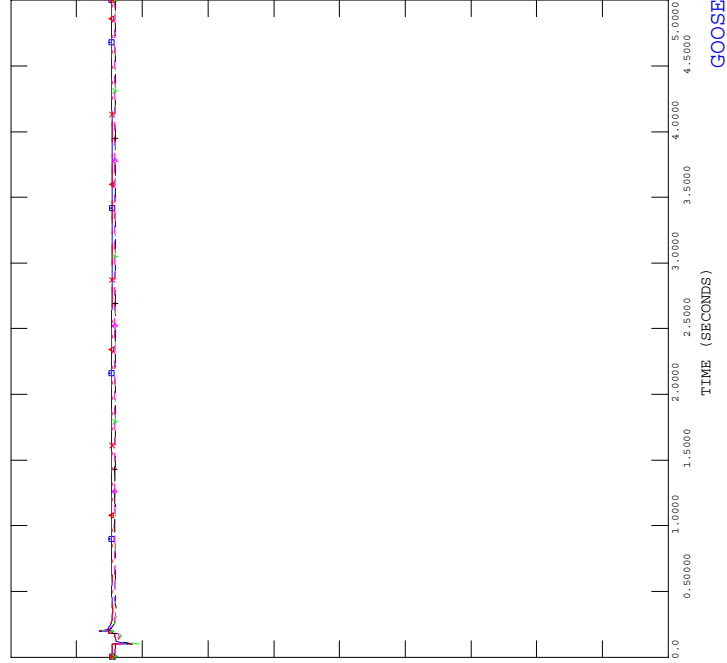
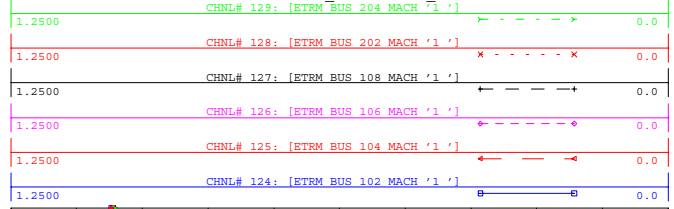
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out



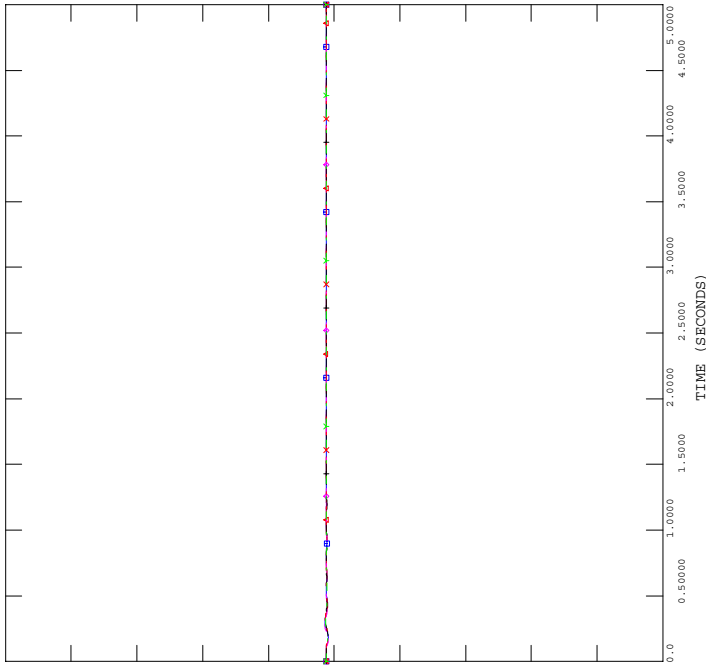
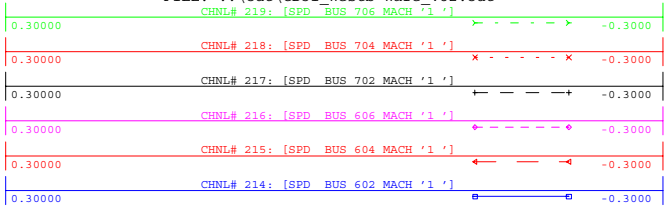
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out



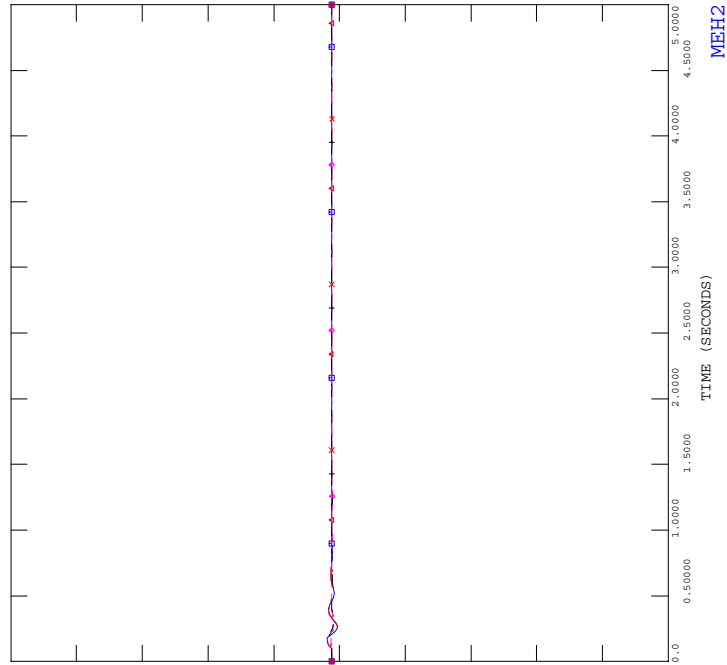
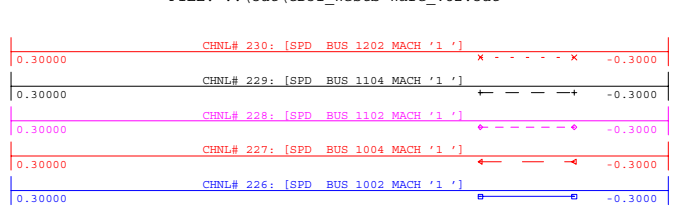
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

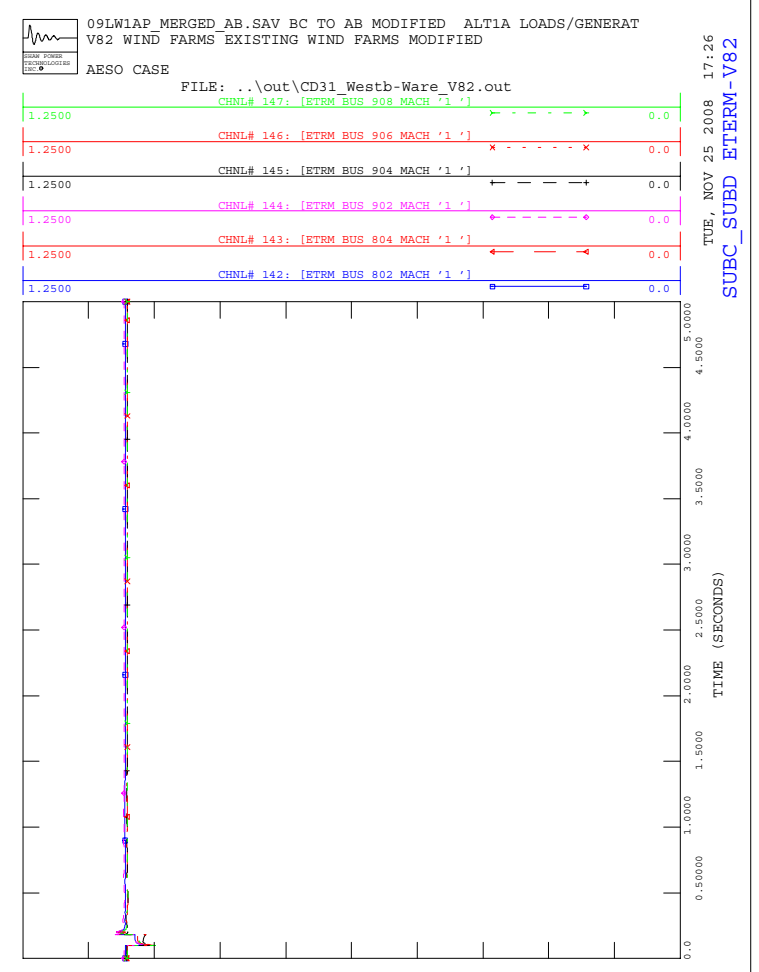
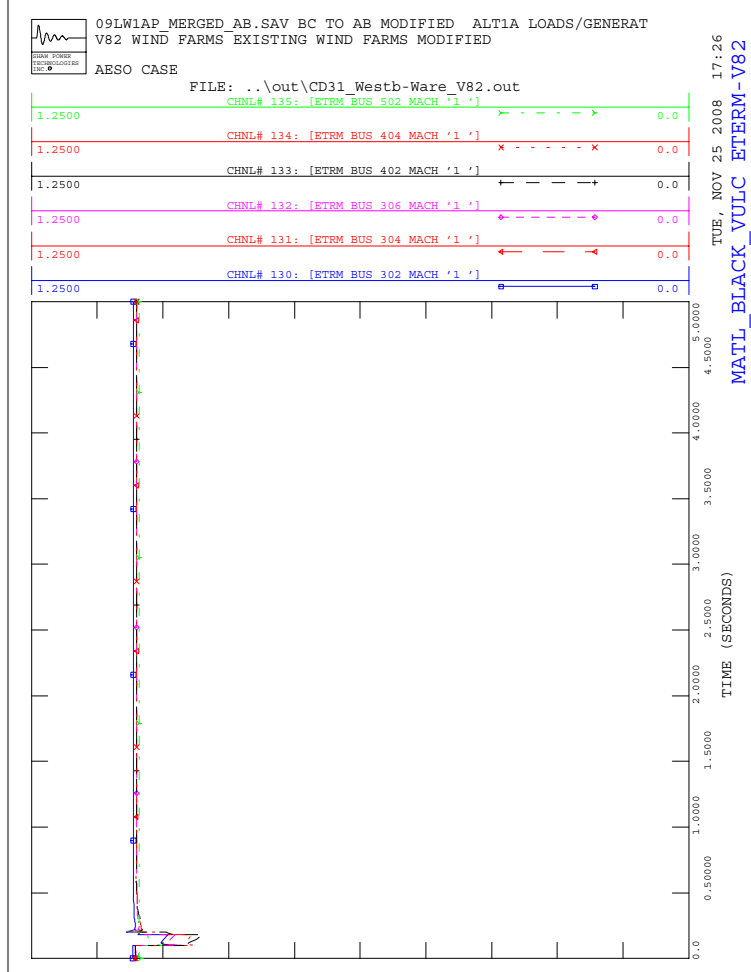
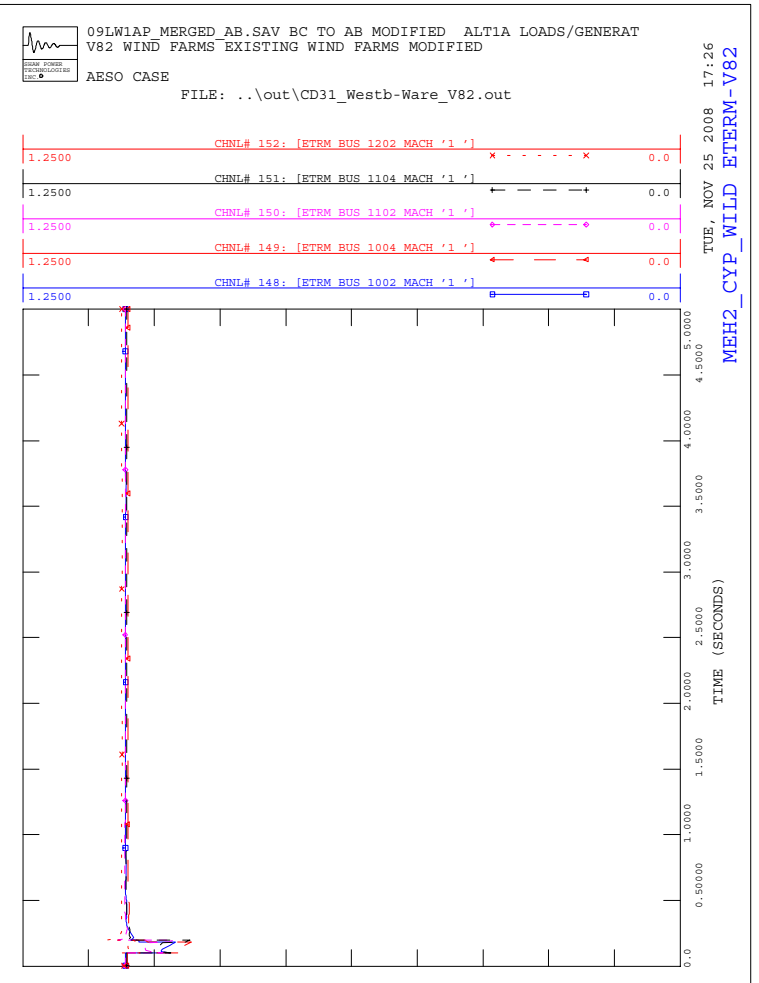
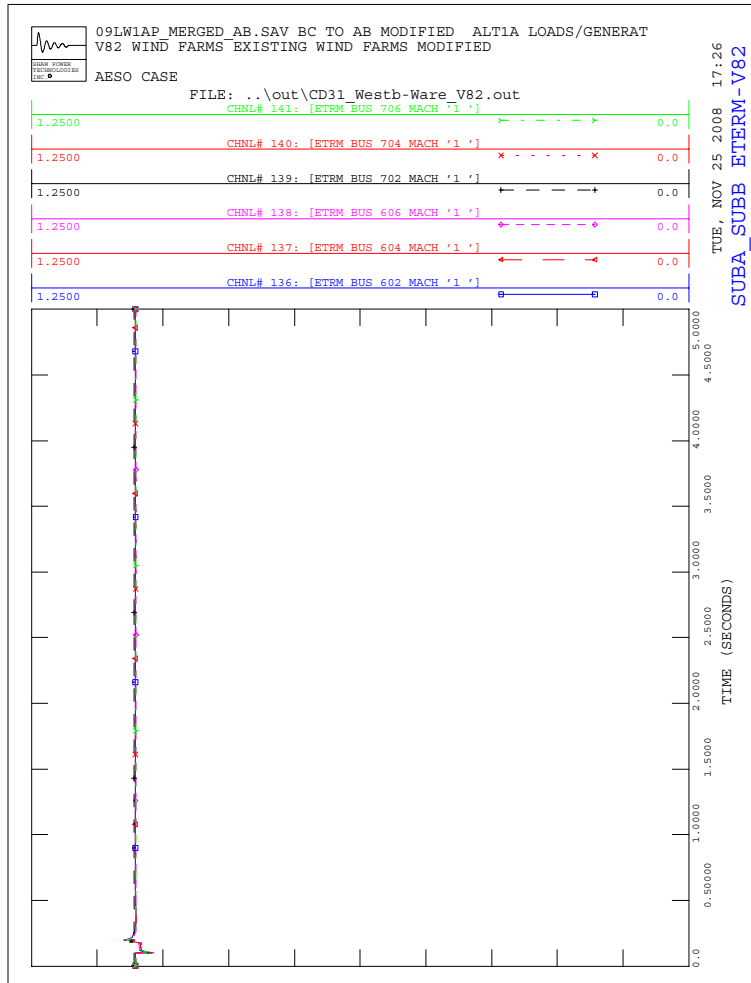
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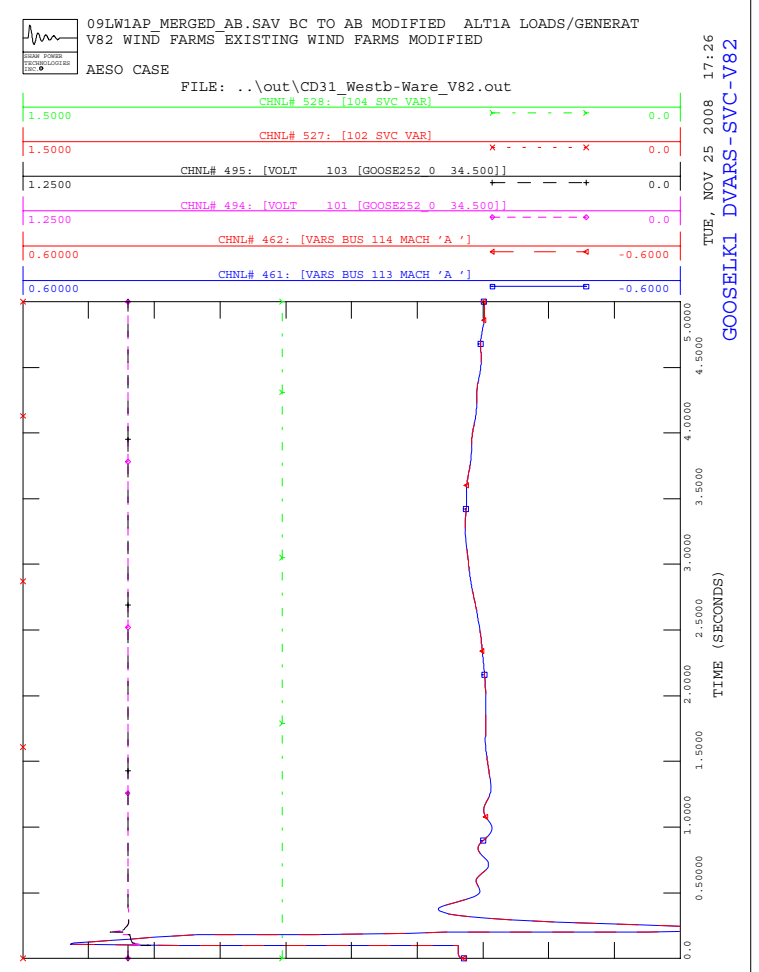
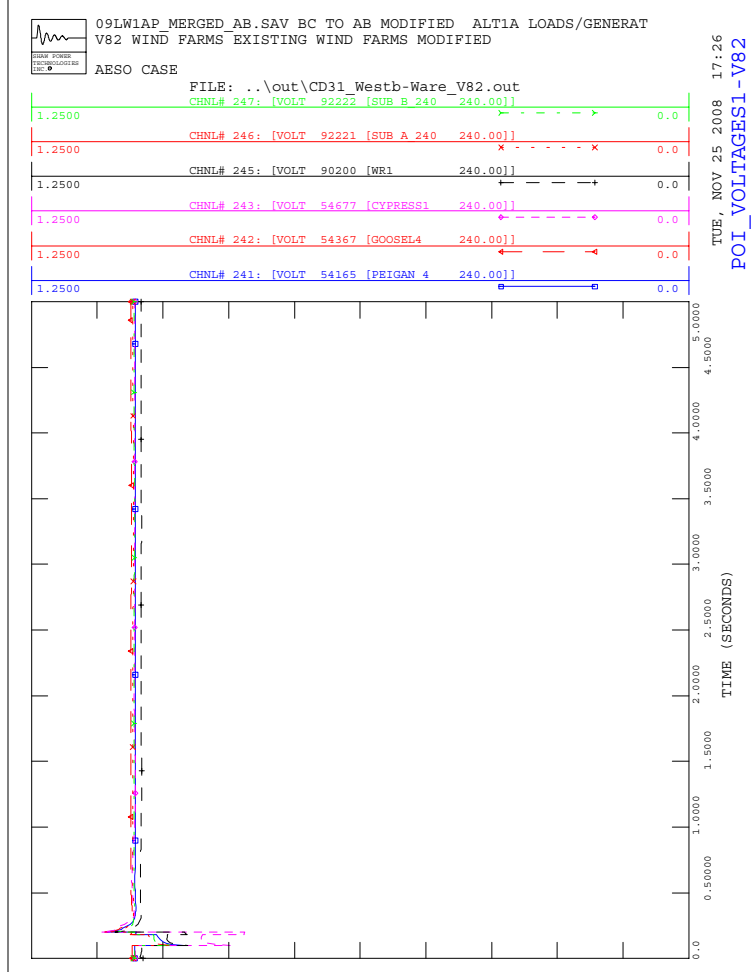
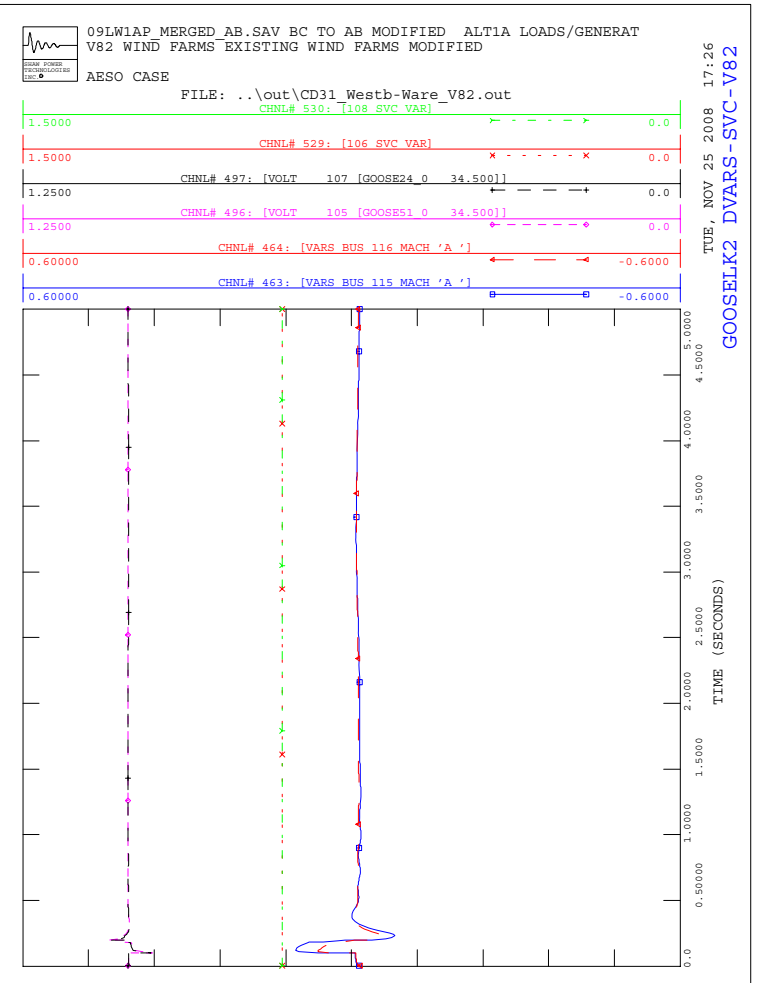
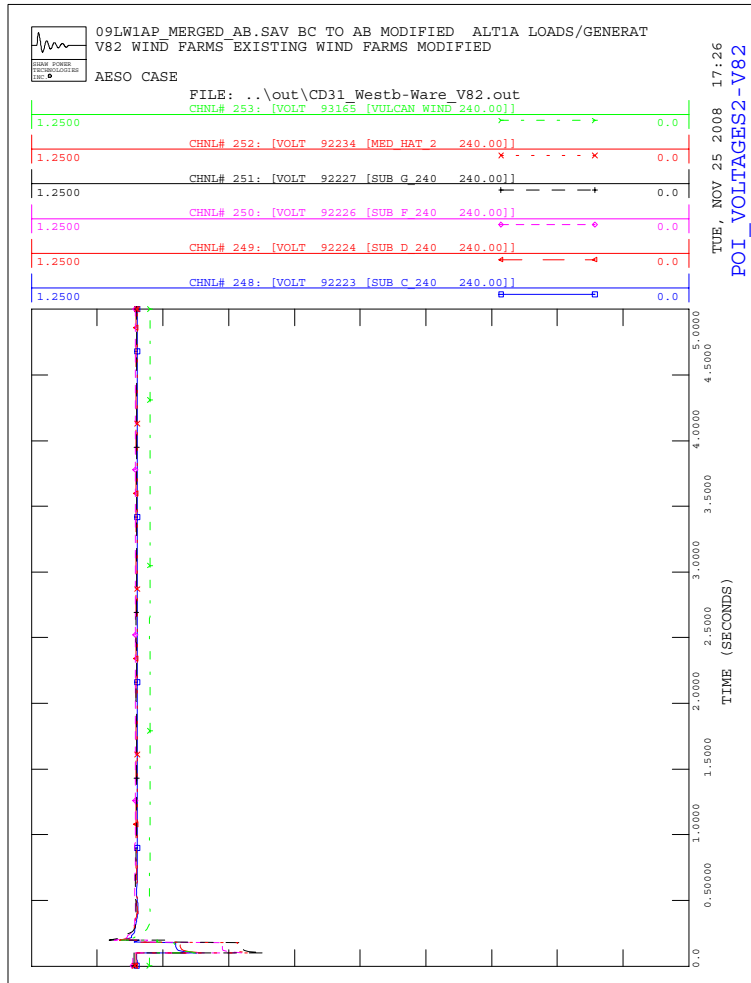


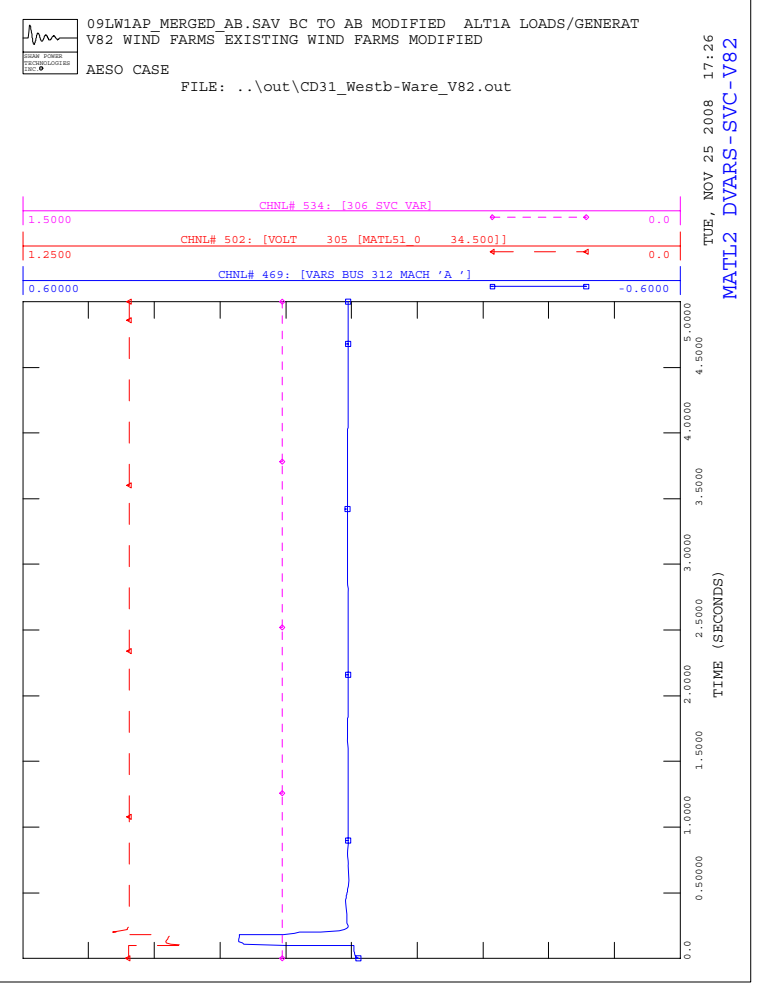
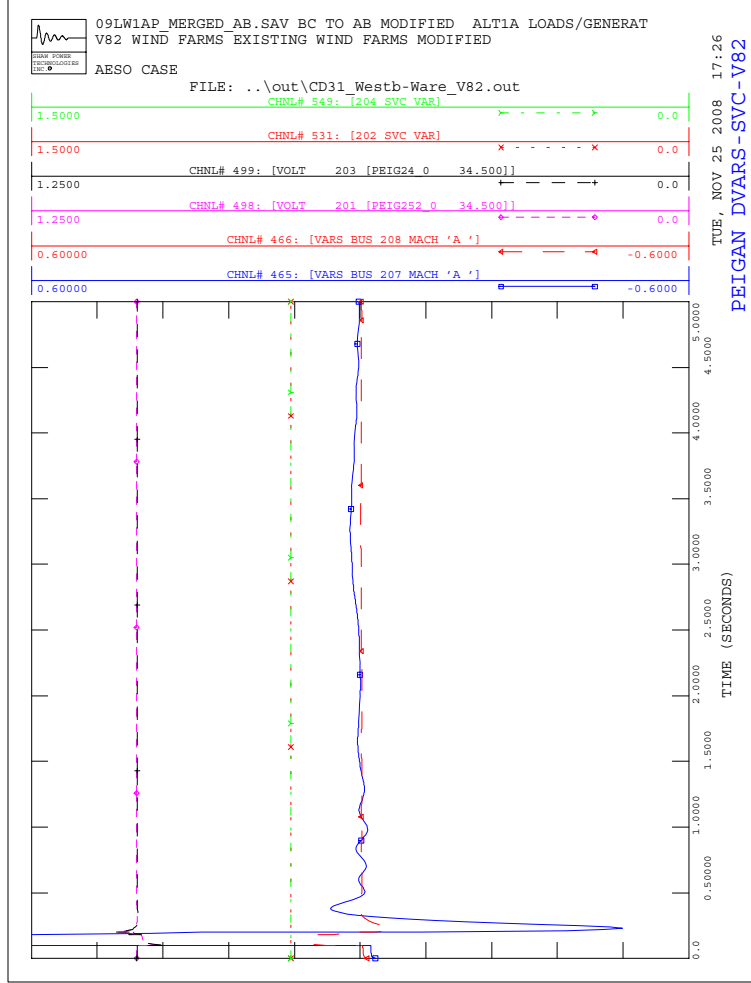
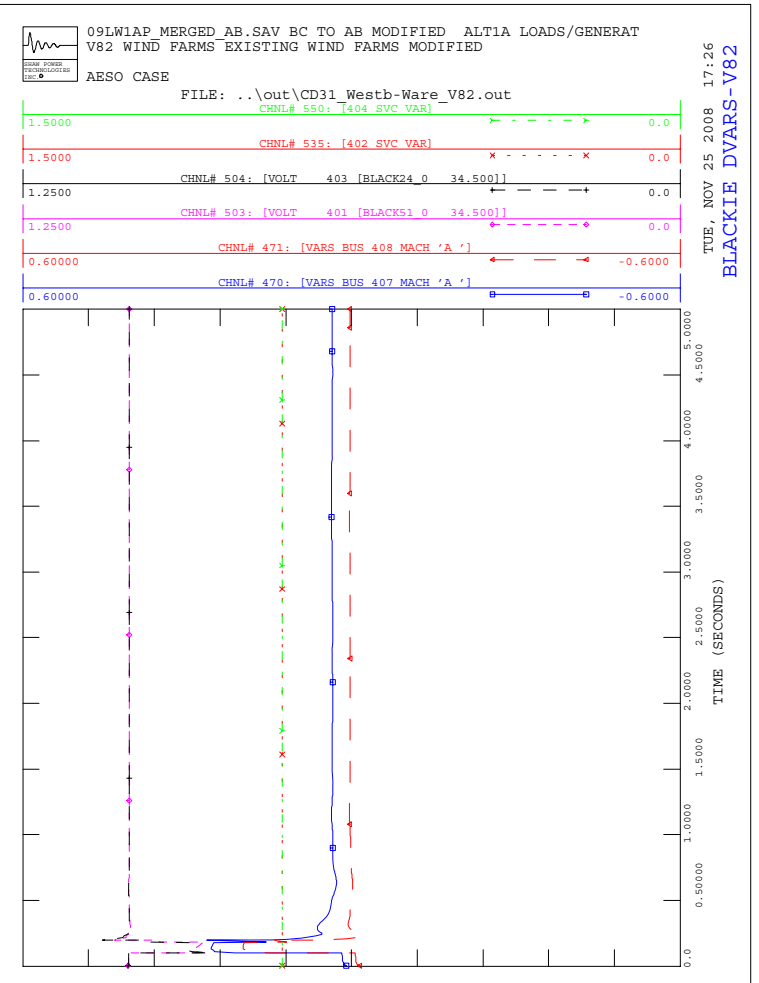
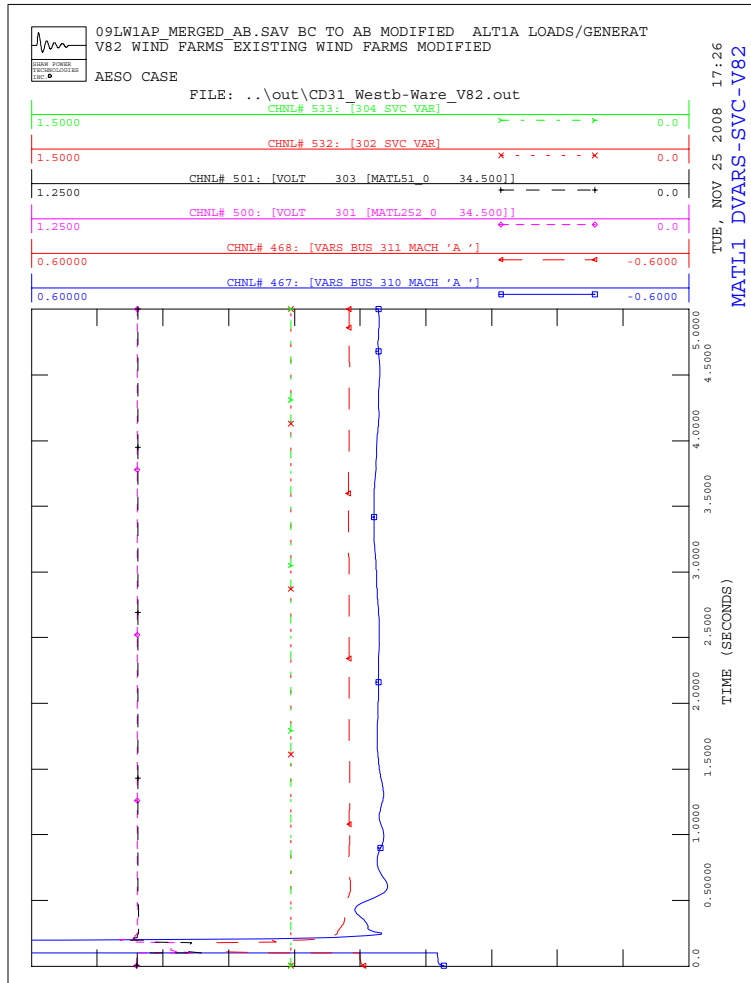
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

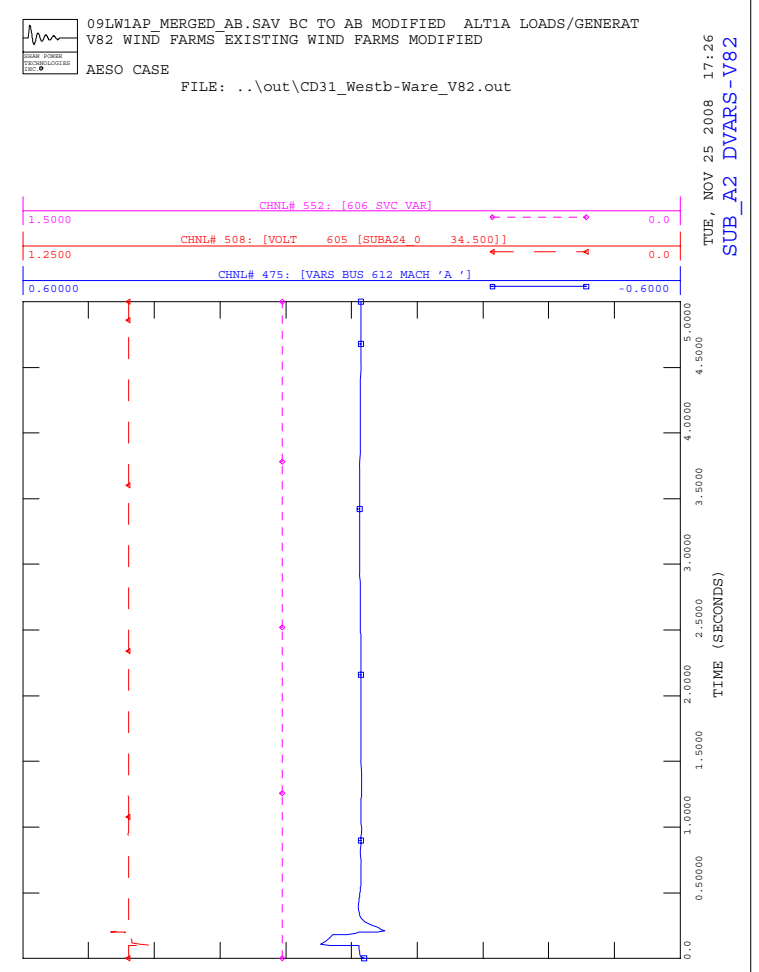
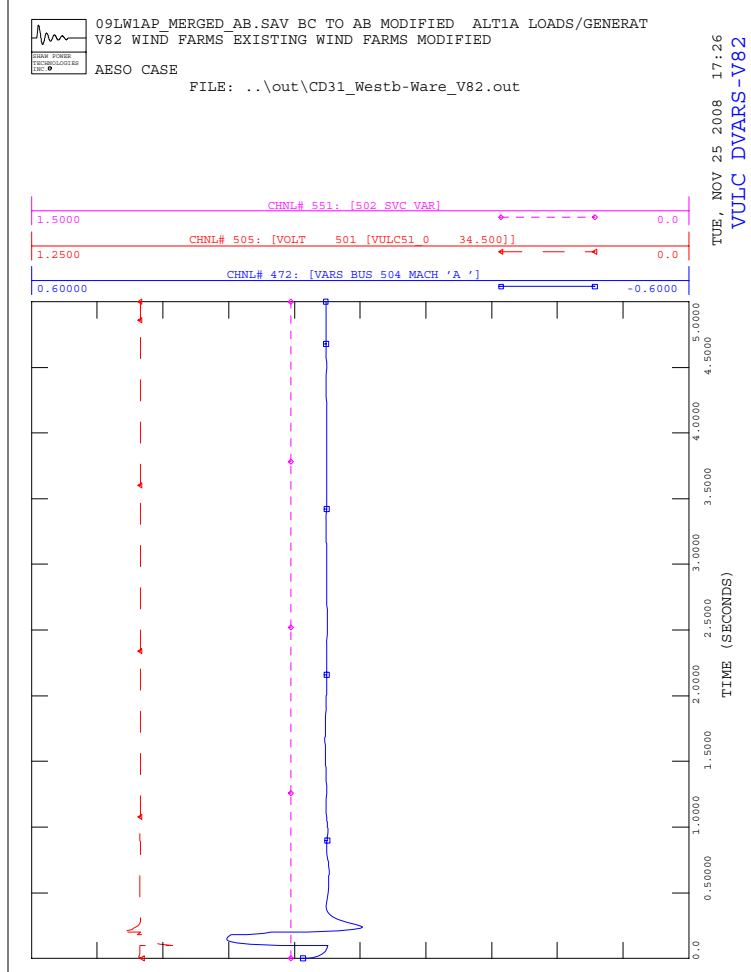
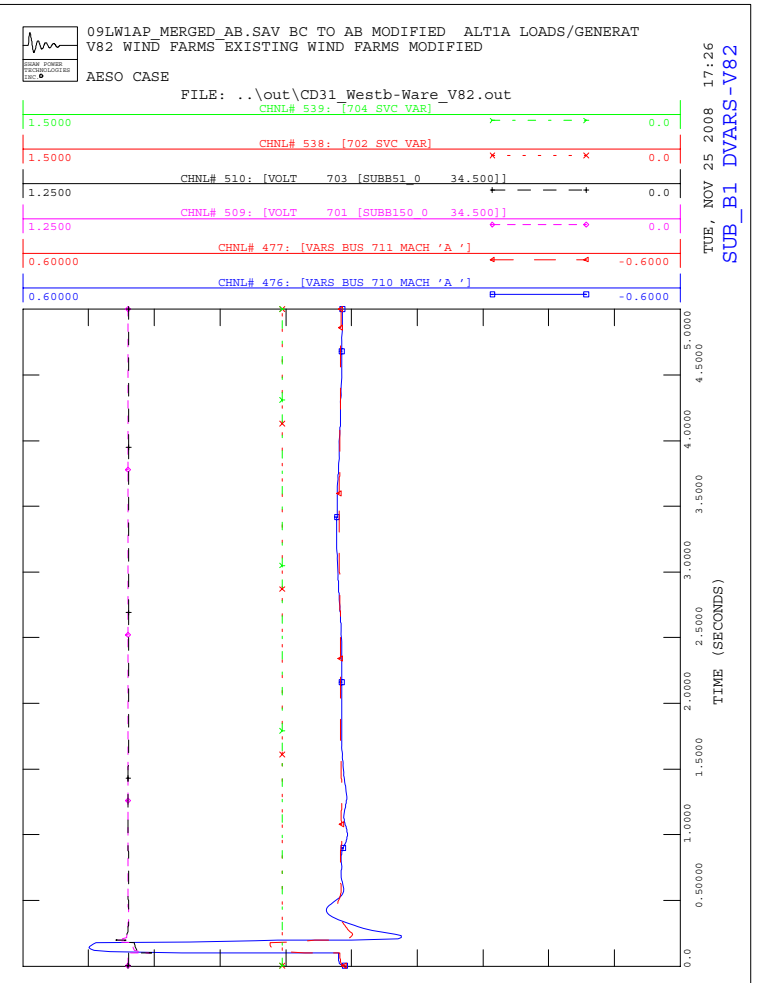
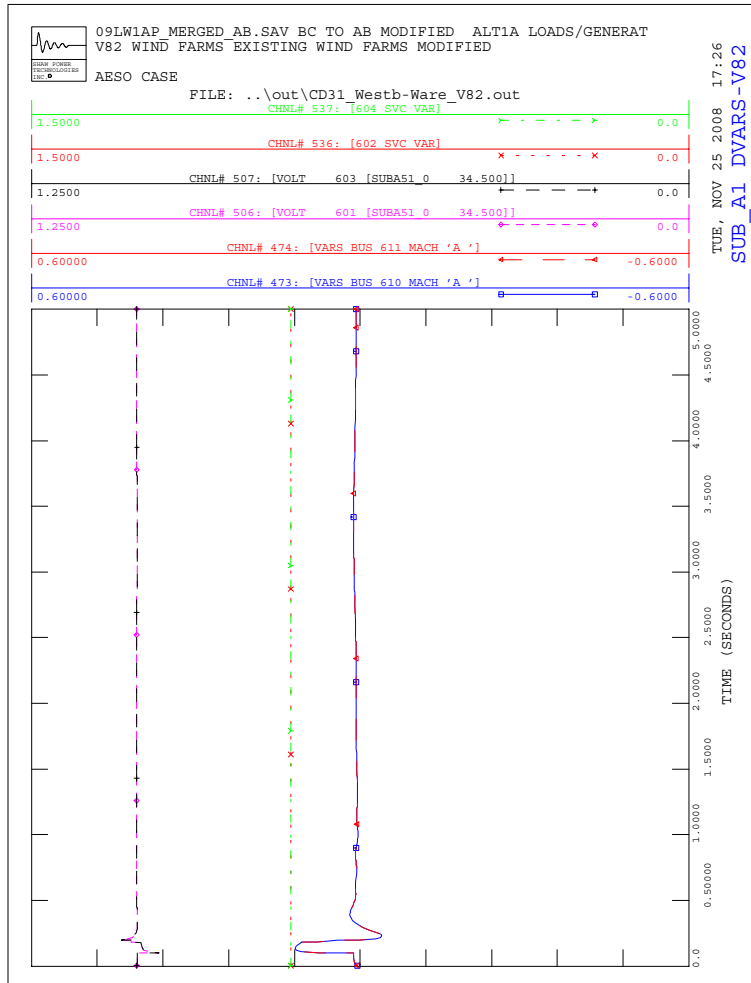
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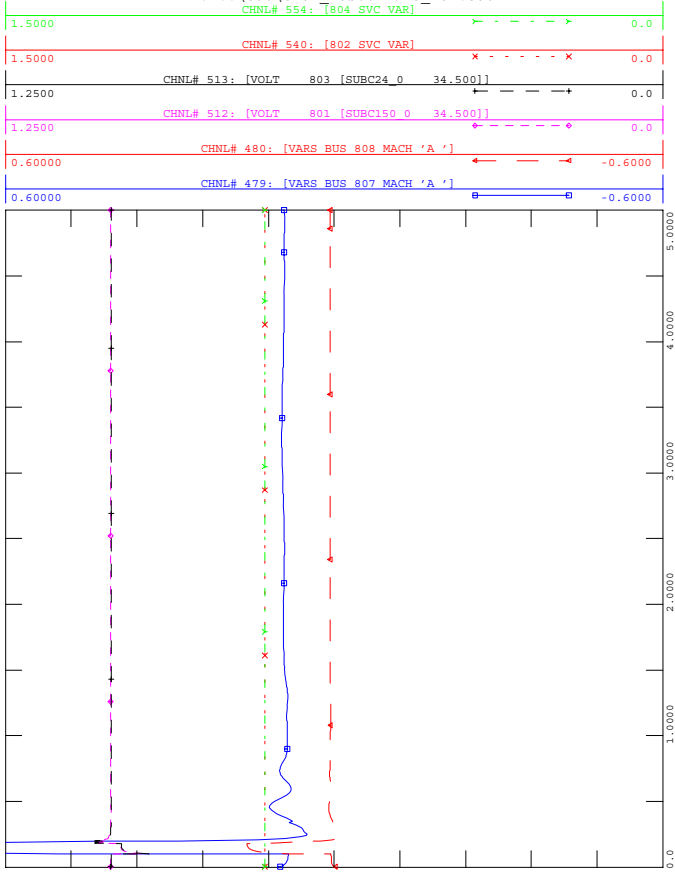






09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

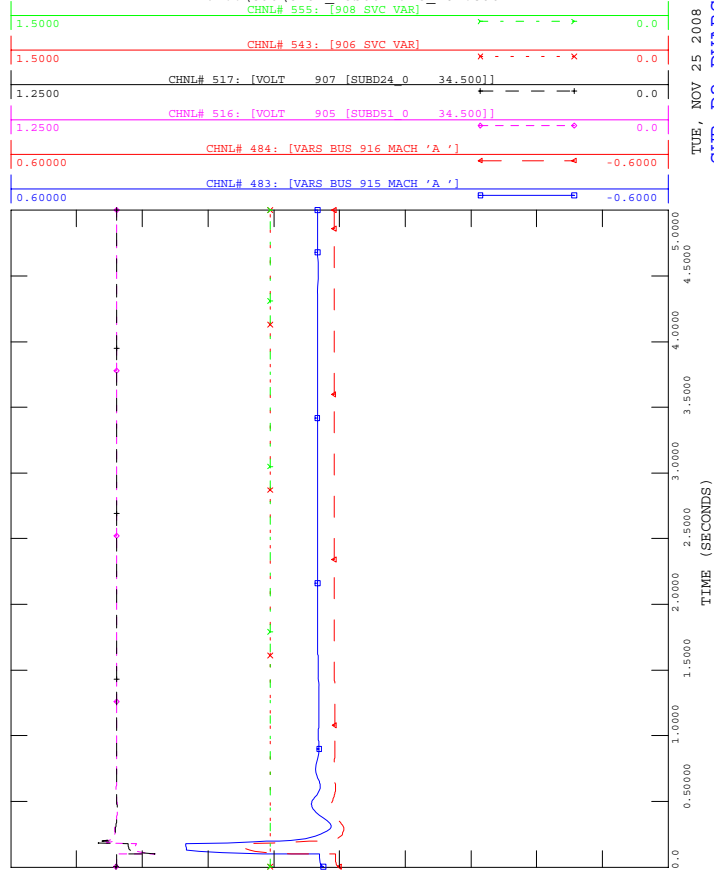
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TUE, NOV 25 2008 17:26
 SUB_C DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

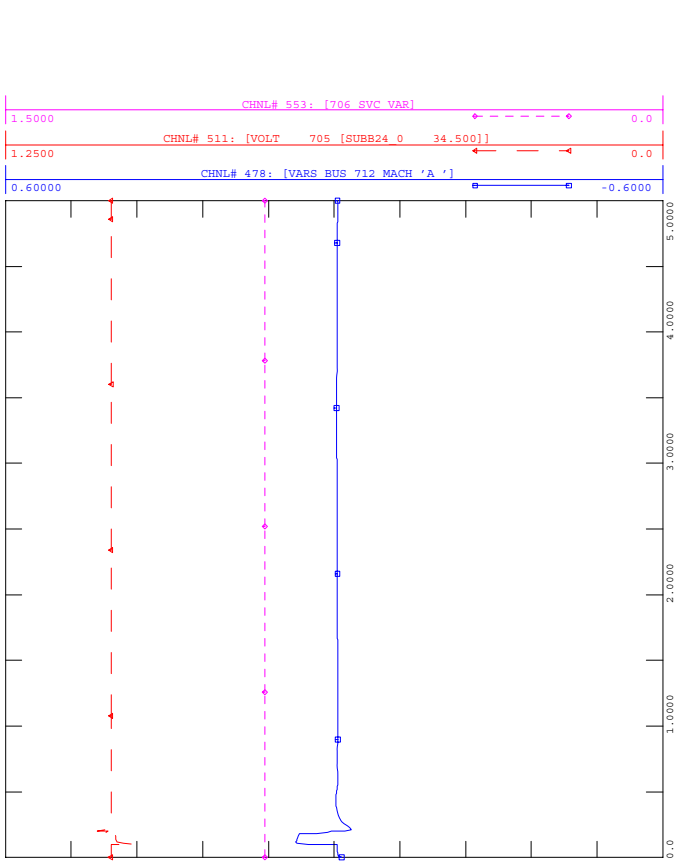
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TUE, NOV 25 2008 17:26
 SUB_D2 DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

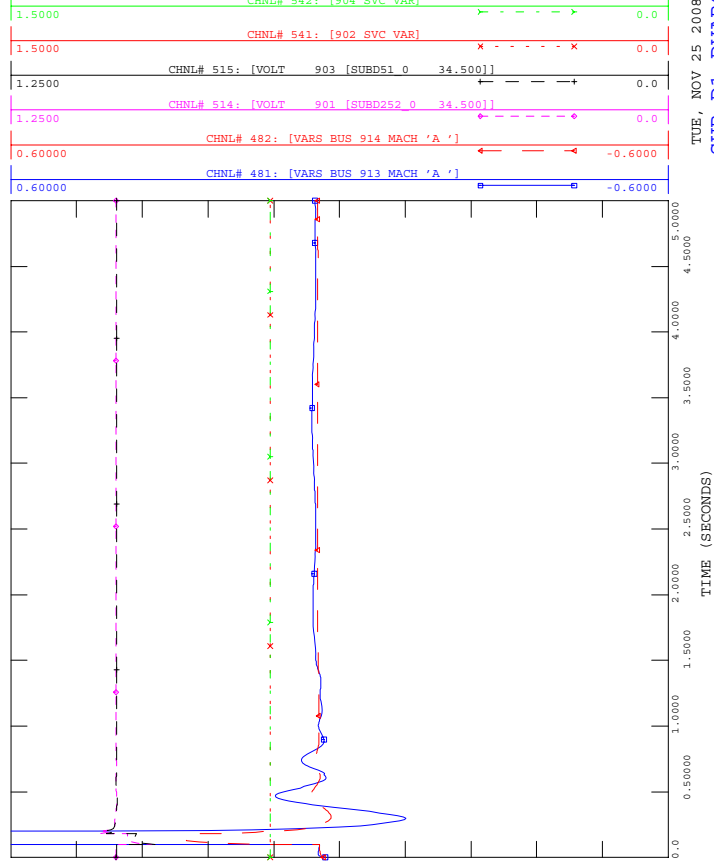
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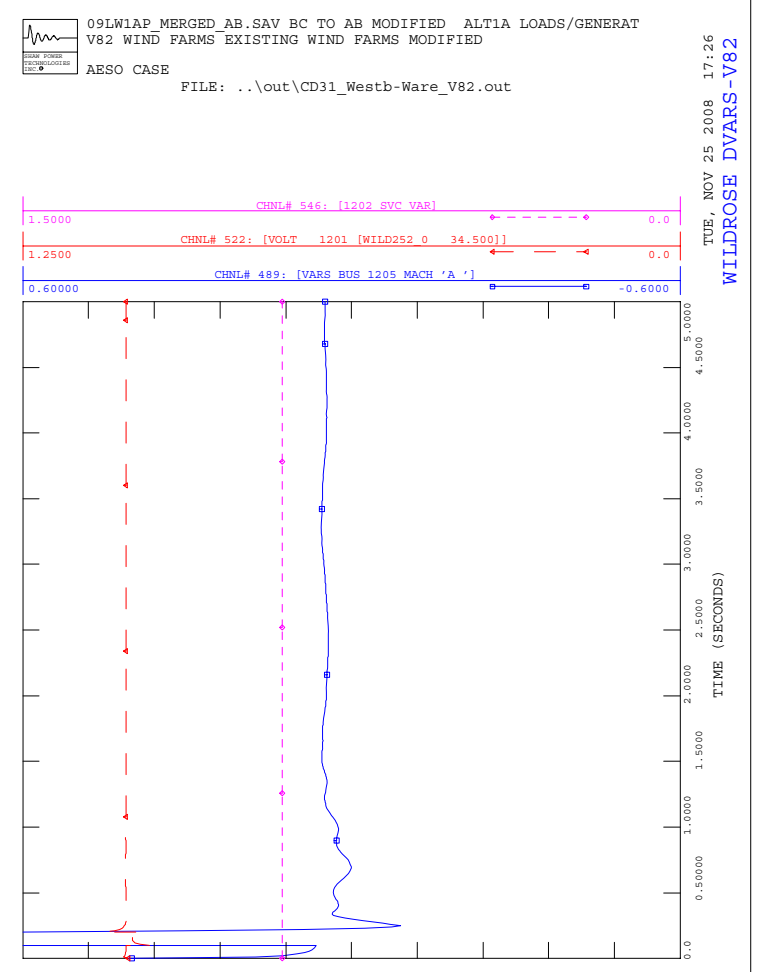
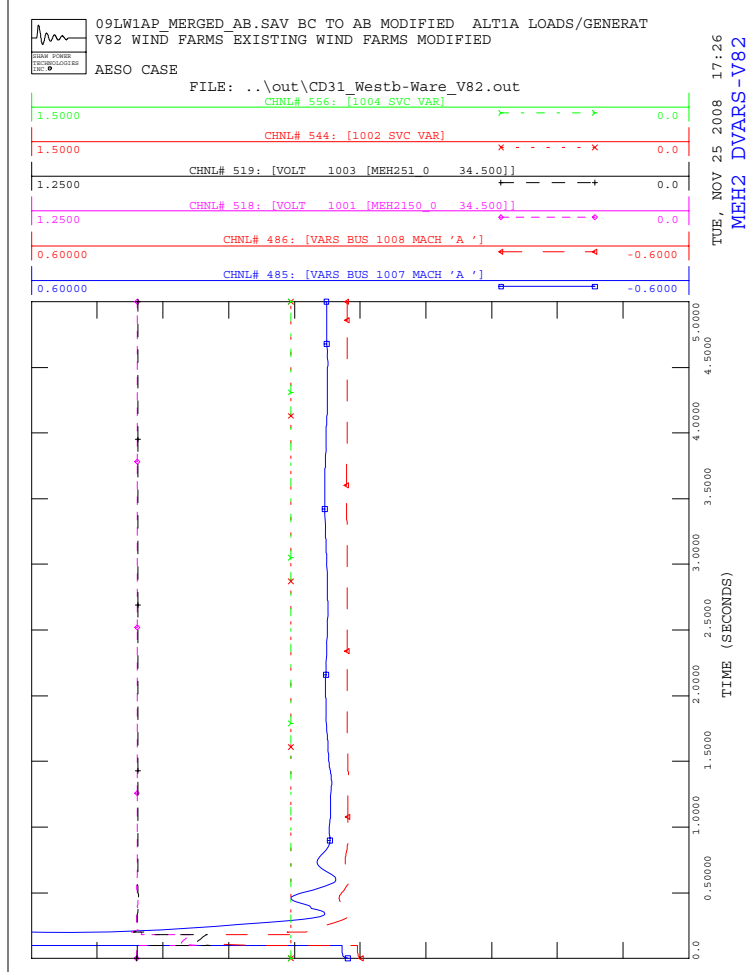
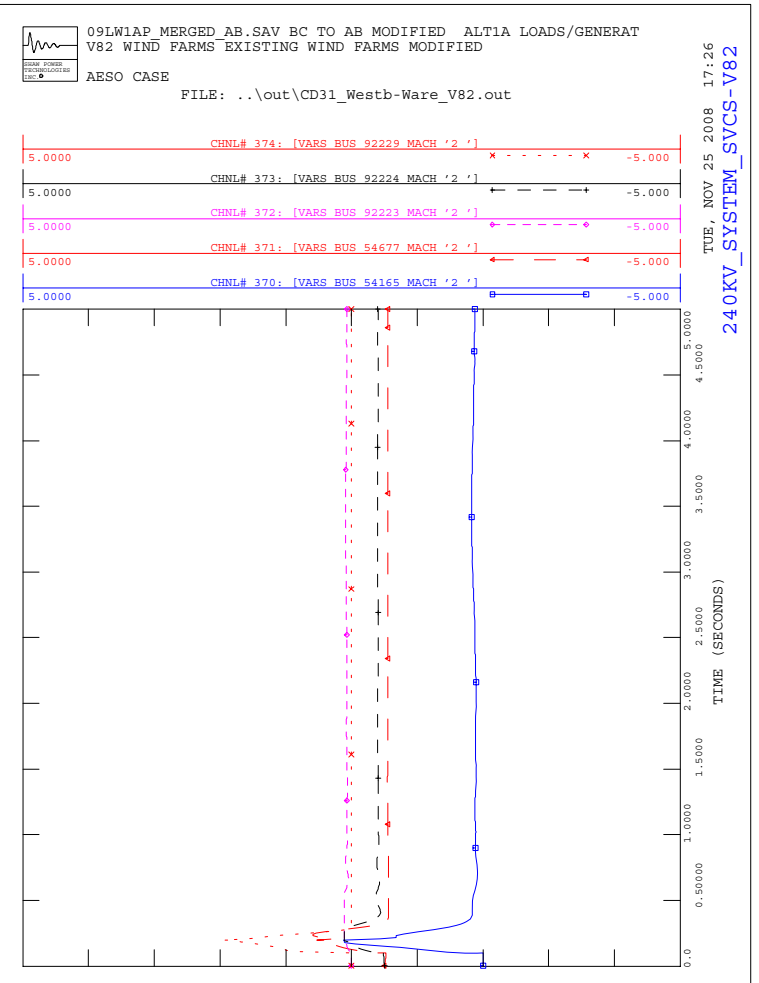
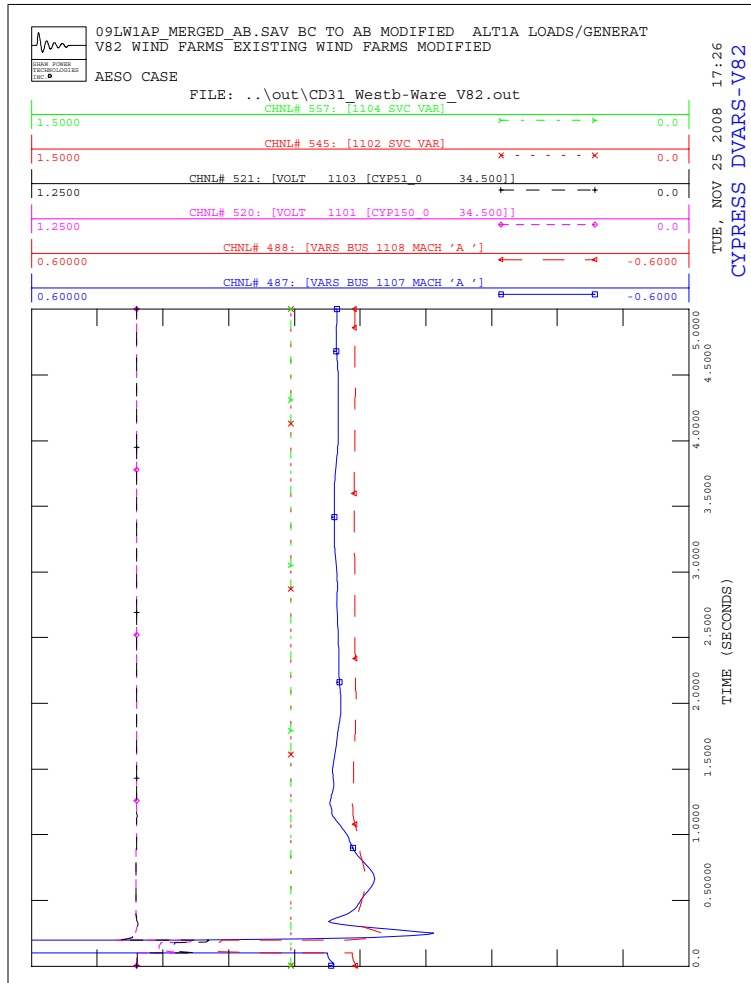
TUE, NOV 25 2008 17:26
 SUB_B2 DVARS-V82

09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out



TUE, NOV 25 2008 17:26
 SUB_D1 DVARS-V82



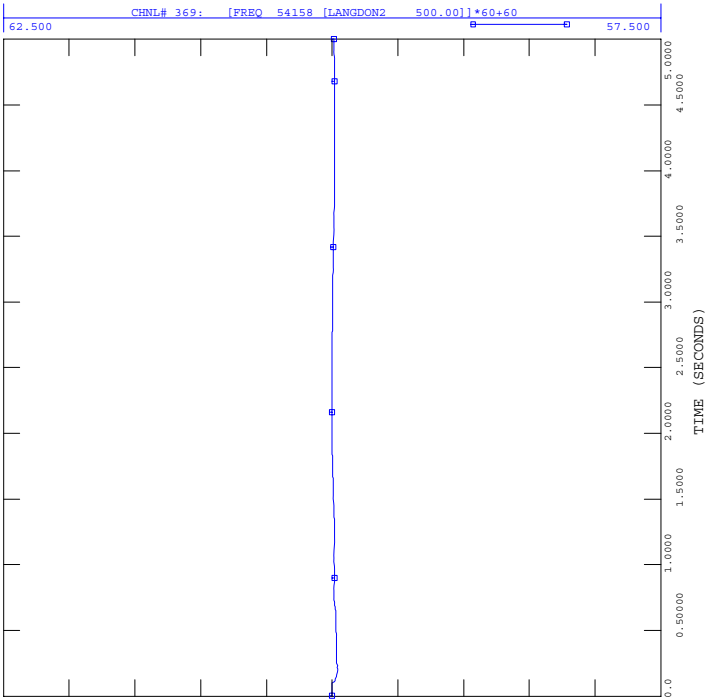


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out

TUE, NOV 25 2008 17:26
LANGDON_FRQ-V82

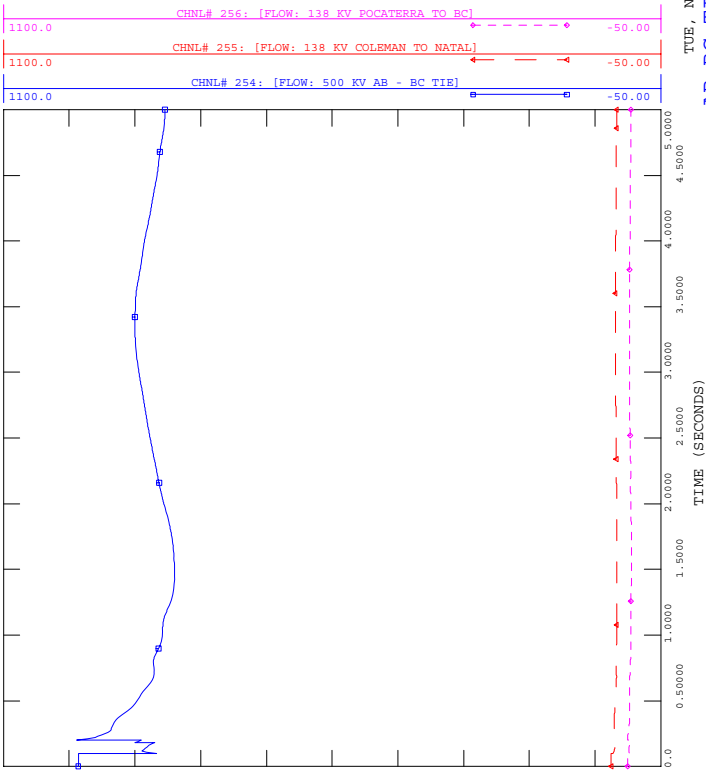


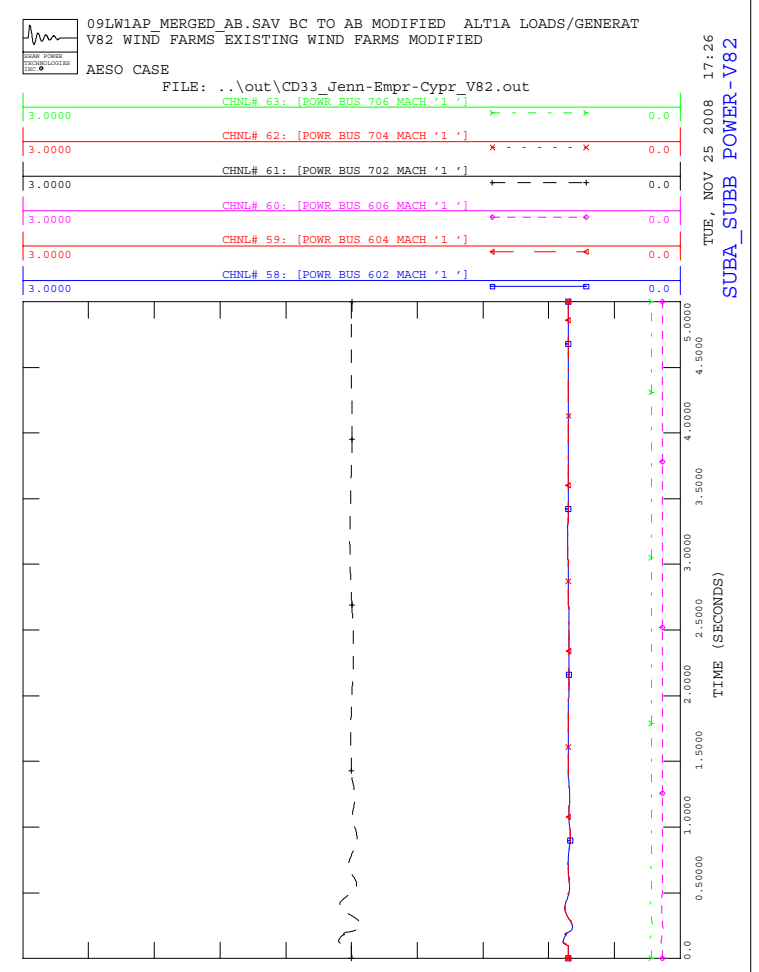
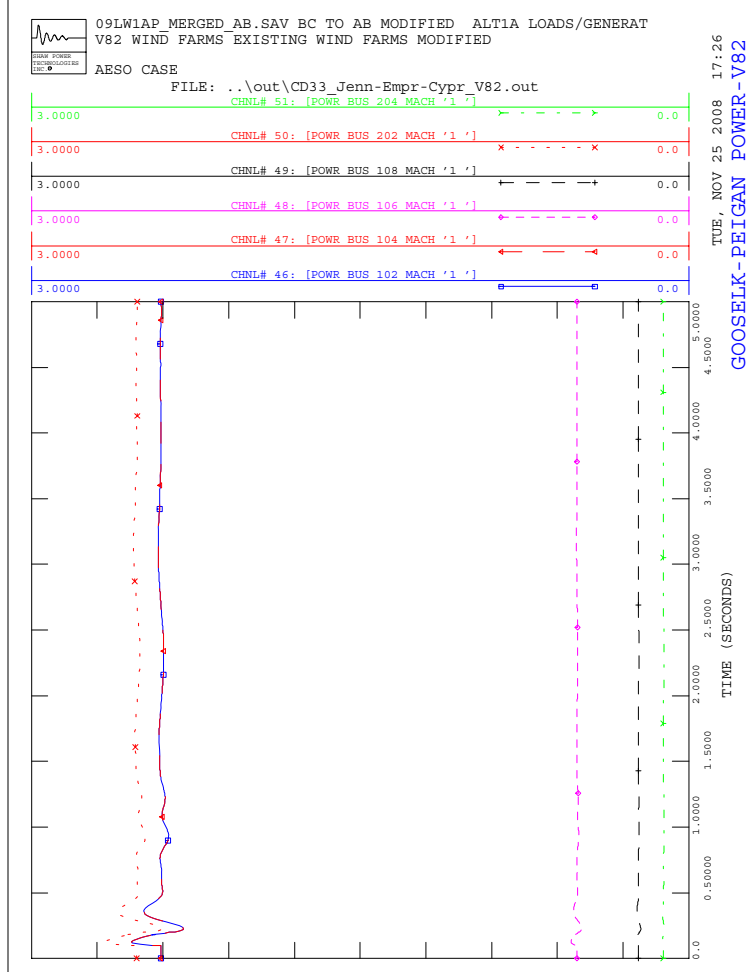
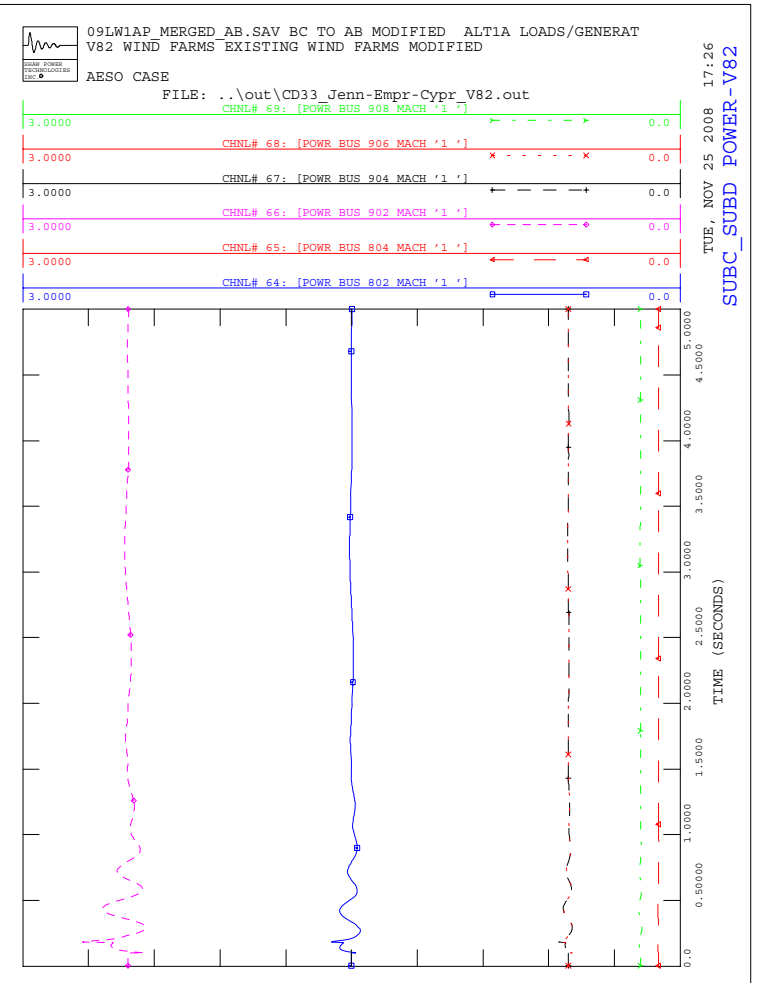
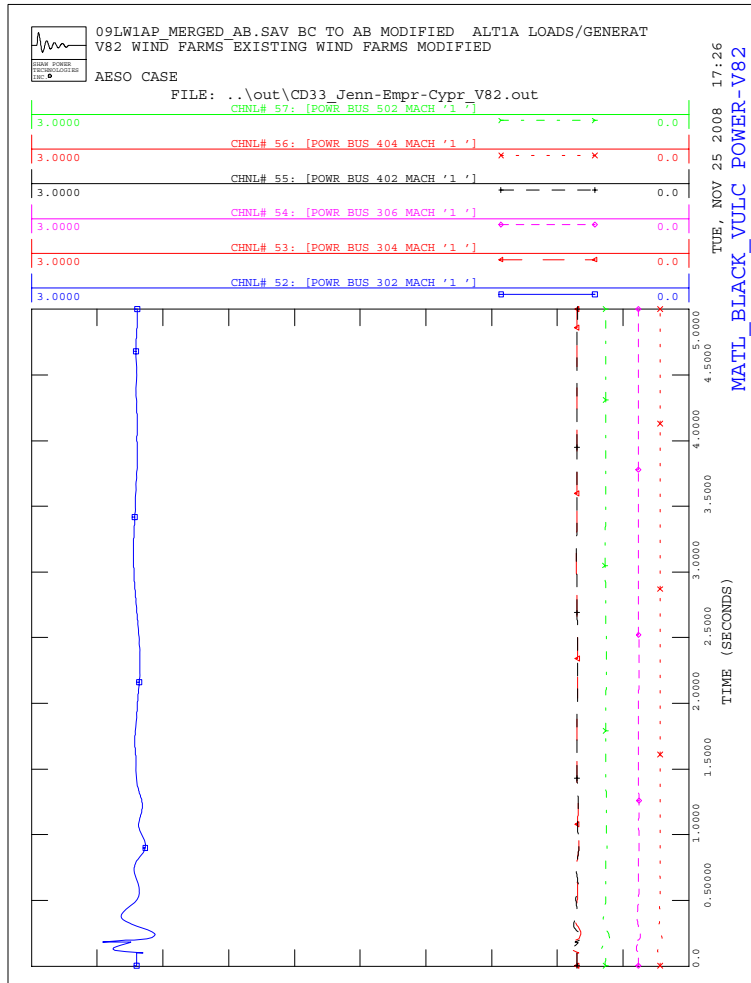
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

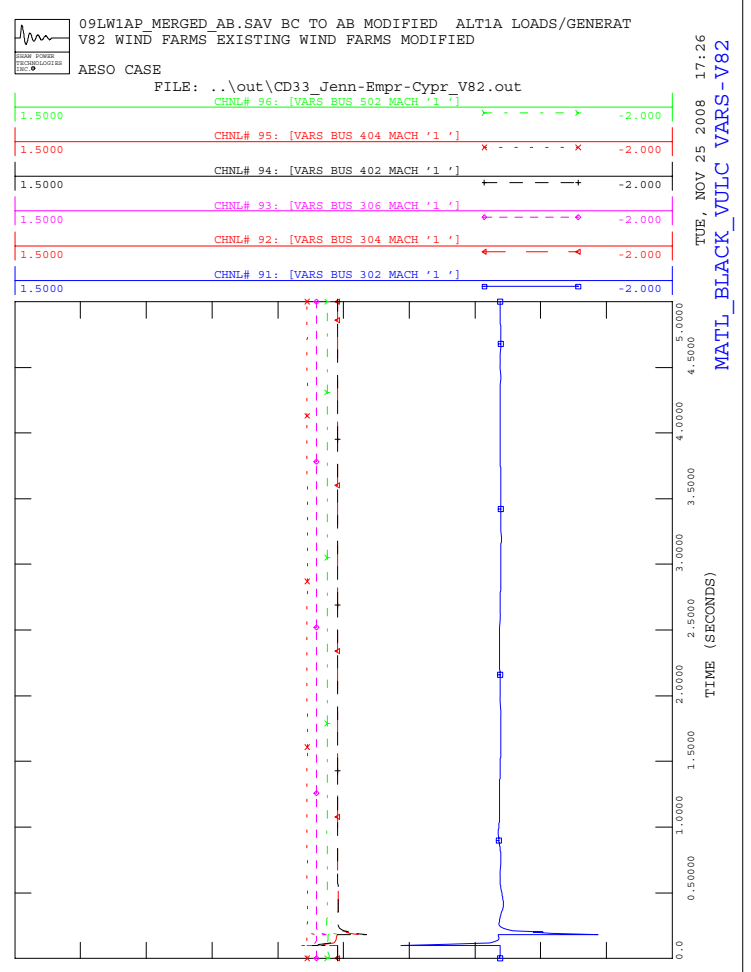
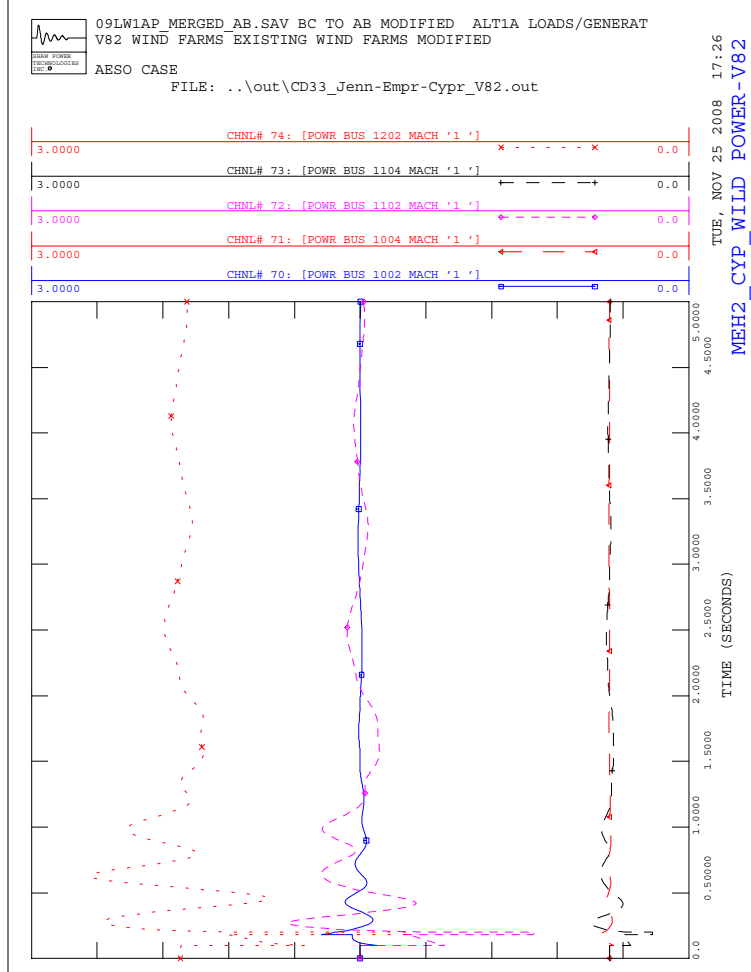
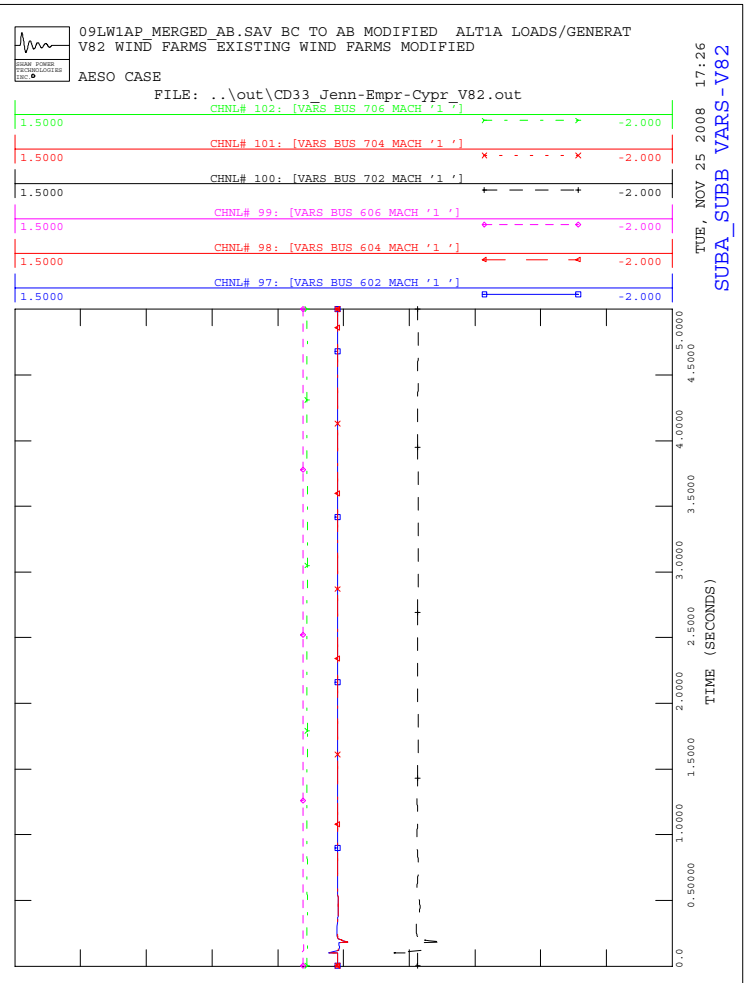
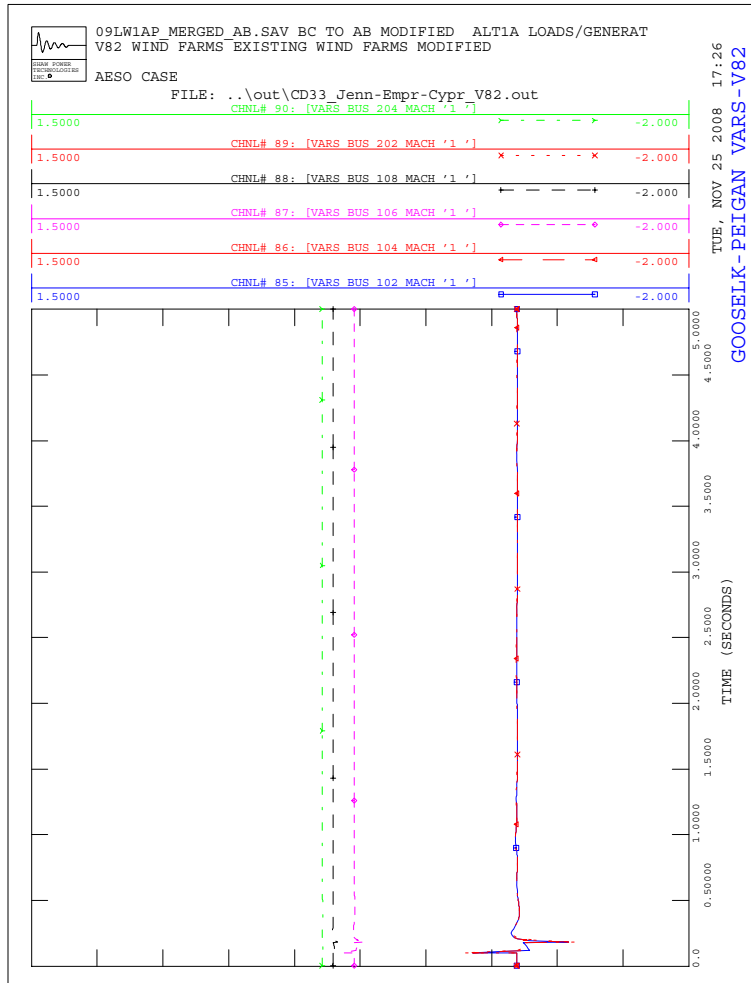
ABSO CASE

FILE: ..\out\CD31_Westb-Ware_V82.out

TUE, NOV 25 2008 17:26
AB_BC_TIE_FLOWS-V82

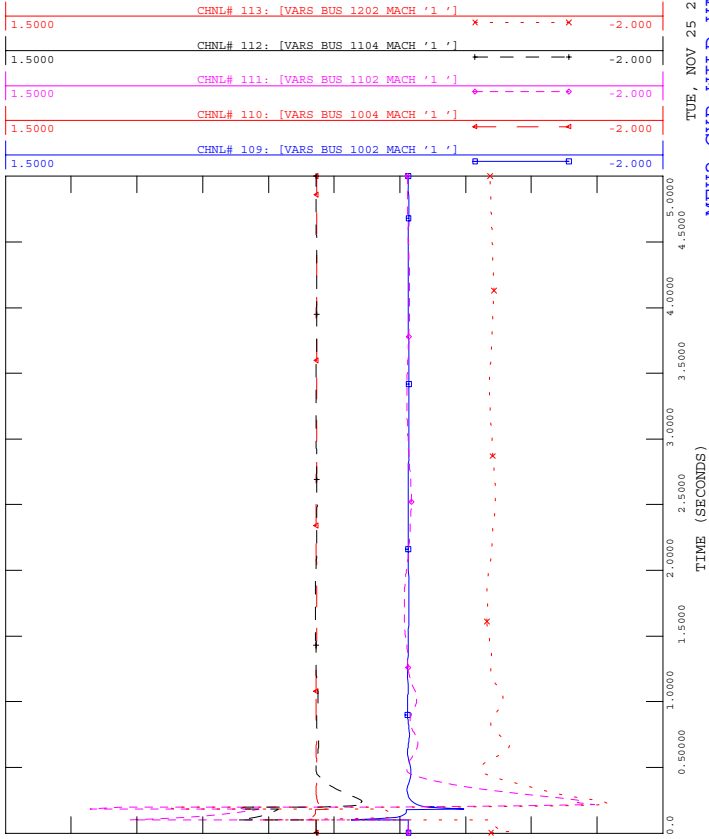






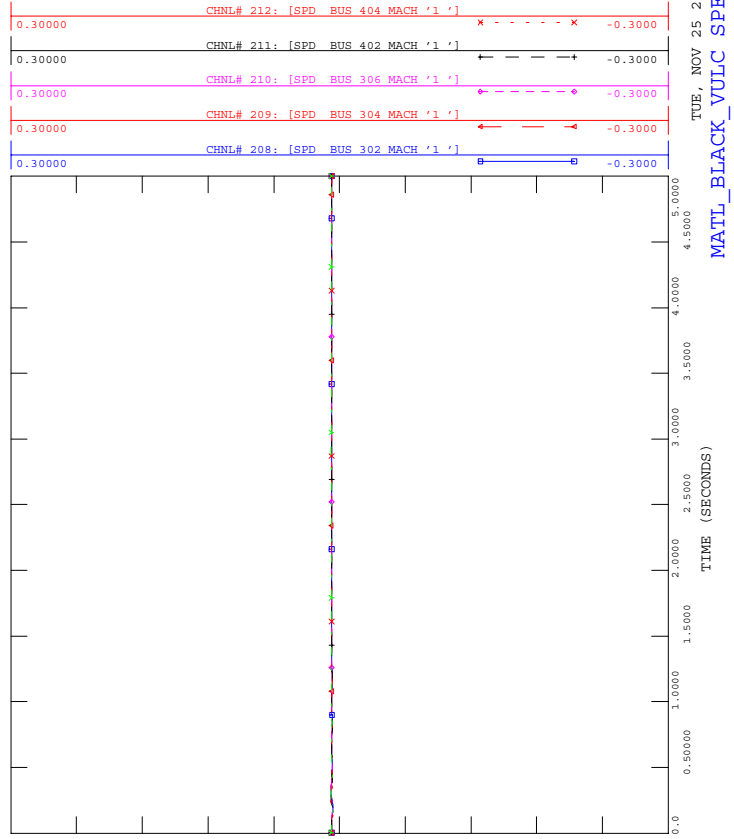
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD33_Jenn-Empr-Cypr_V82.out



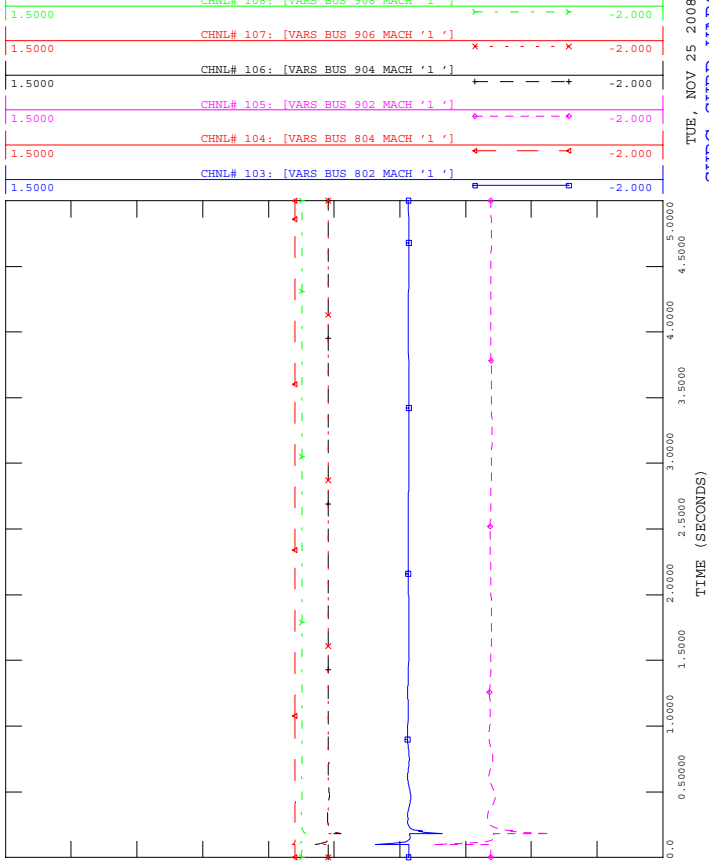
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

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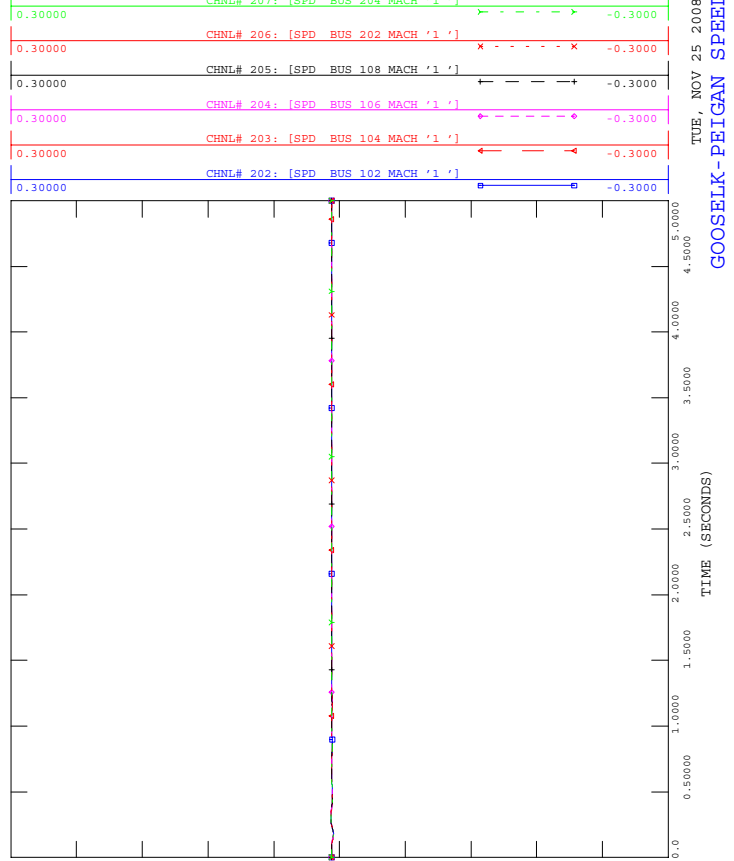
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

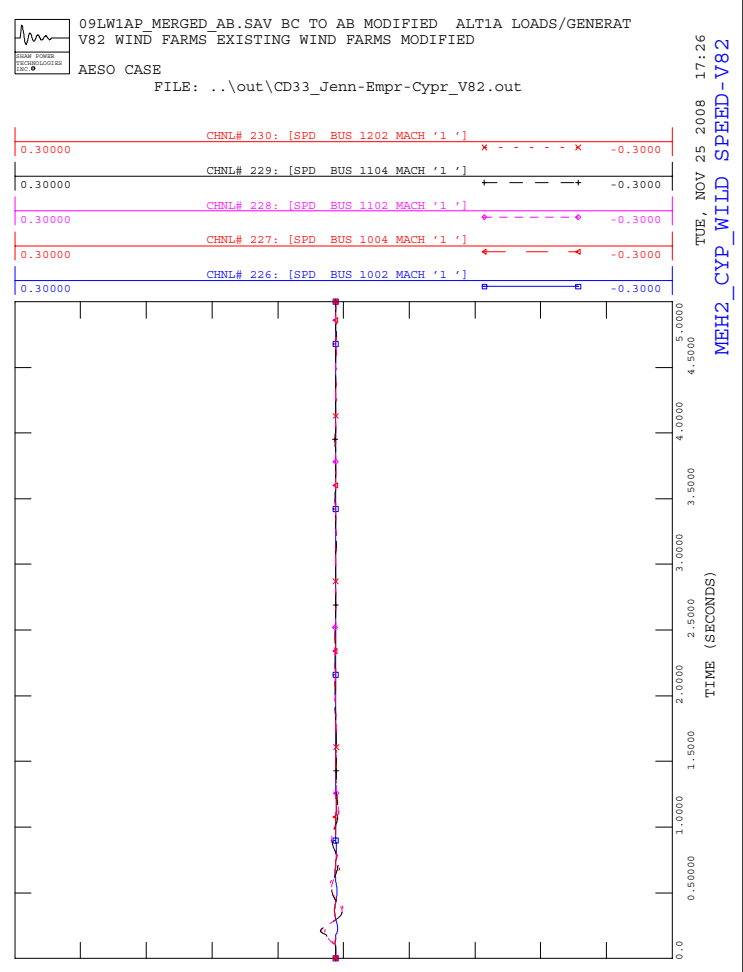
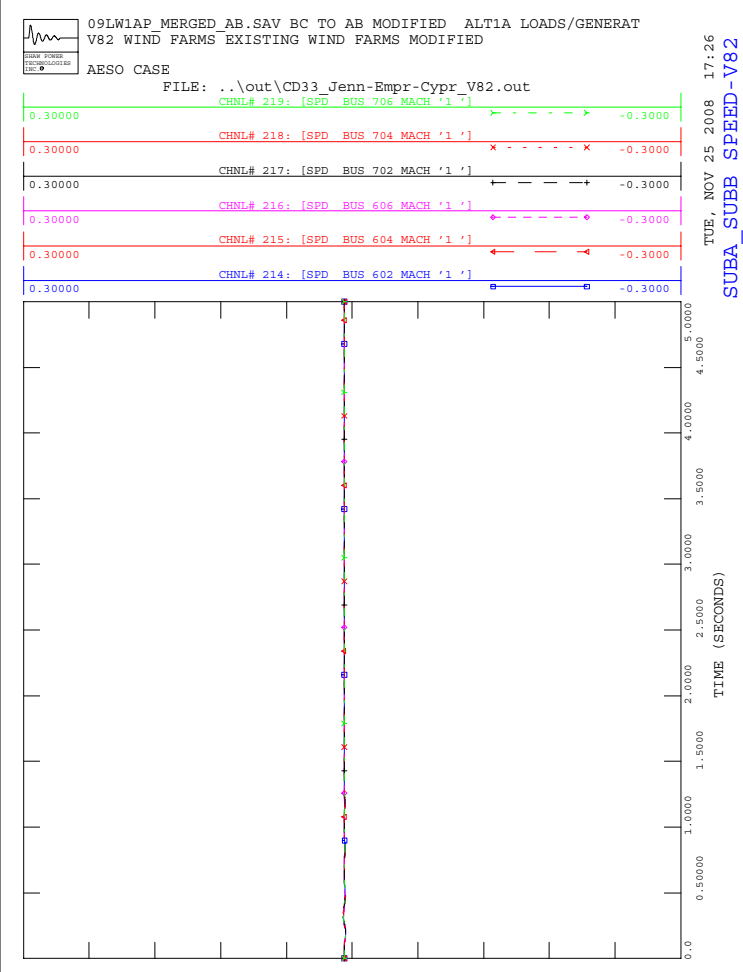
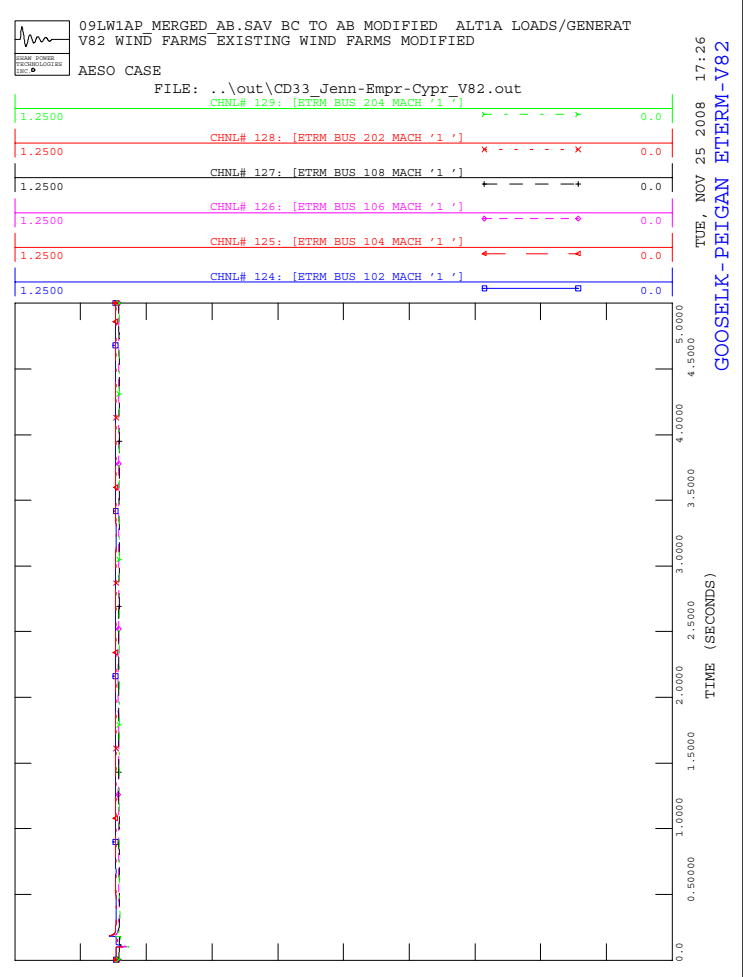
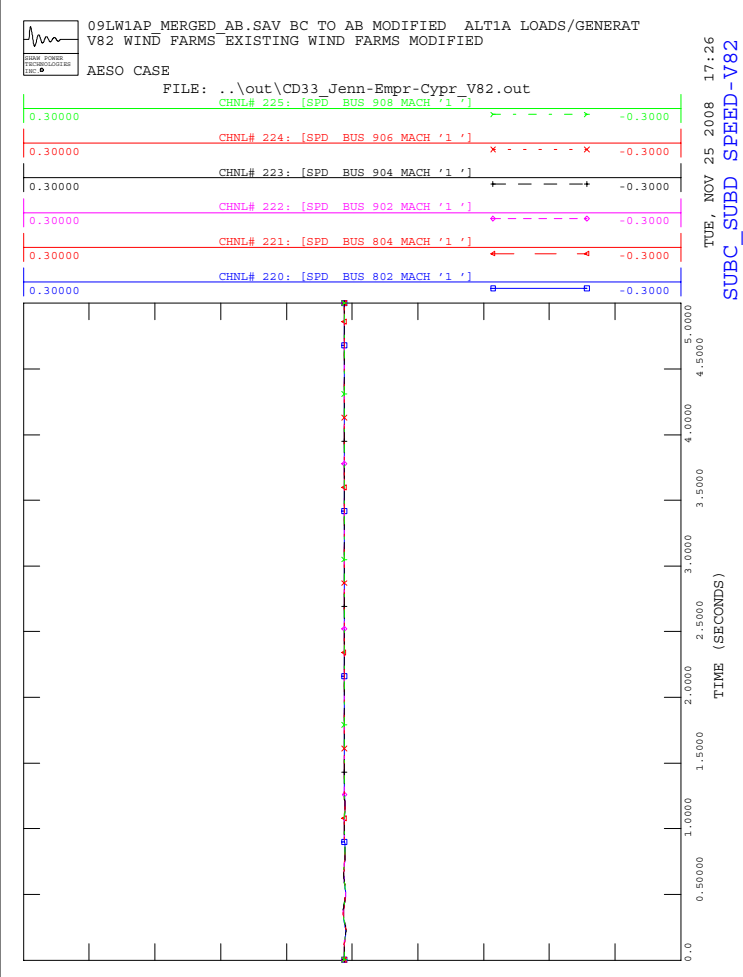
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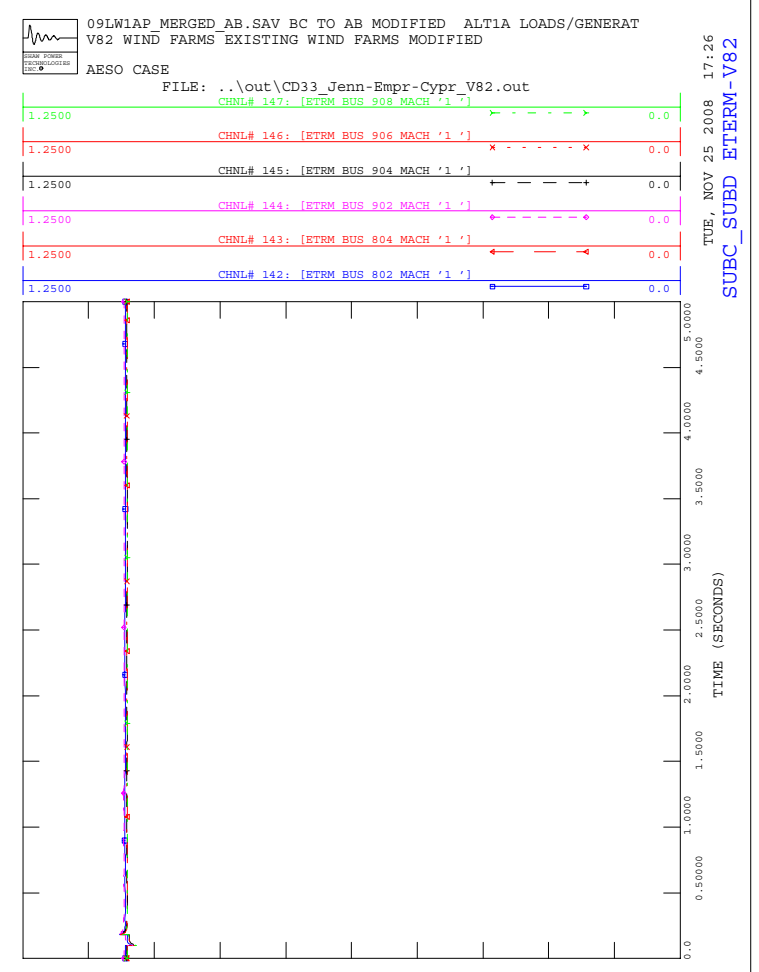
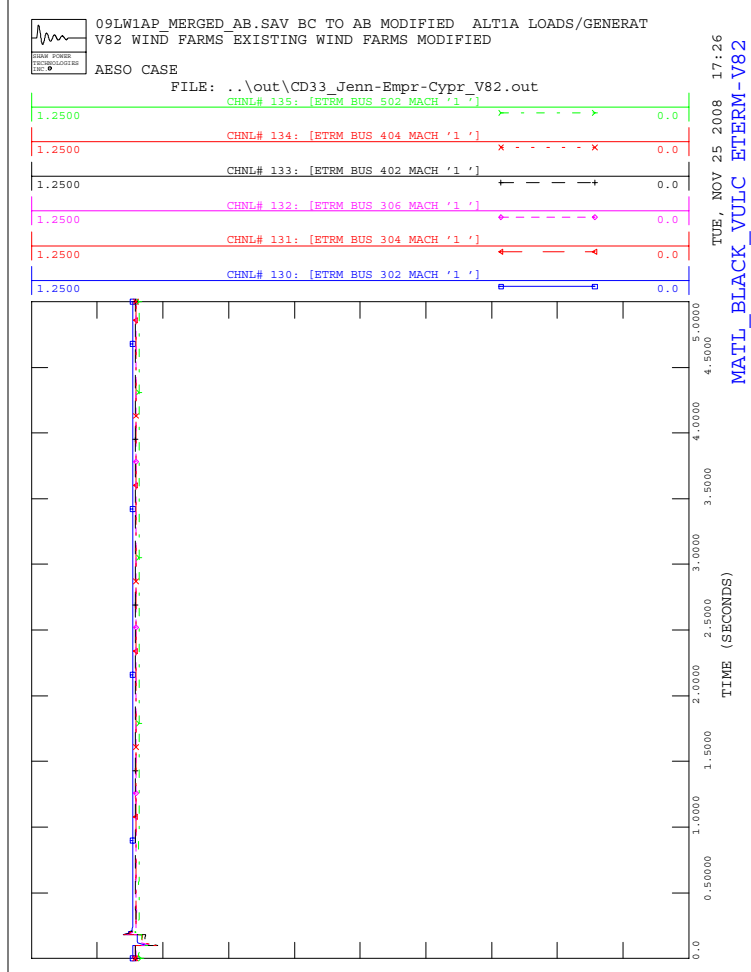
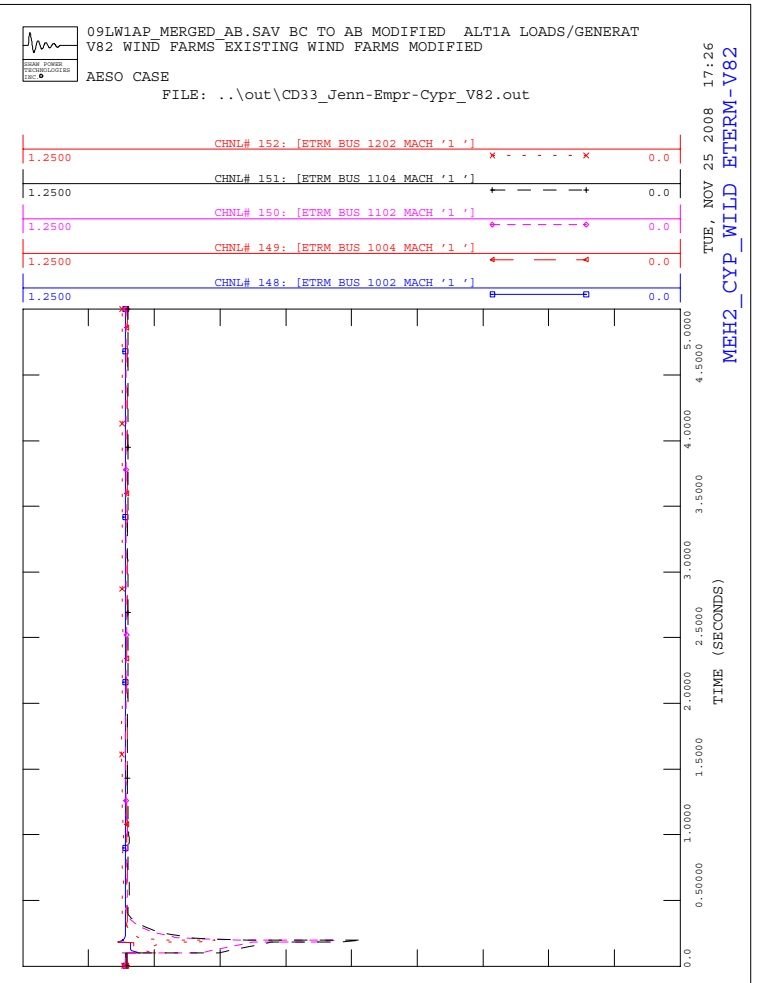
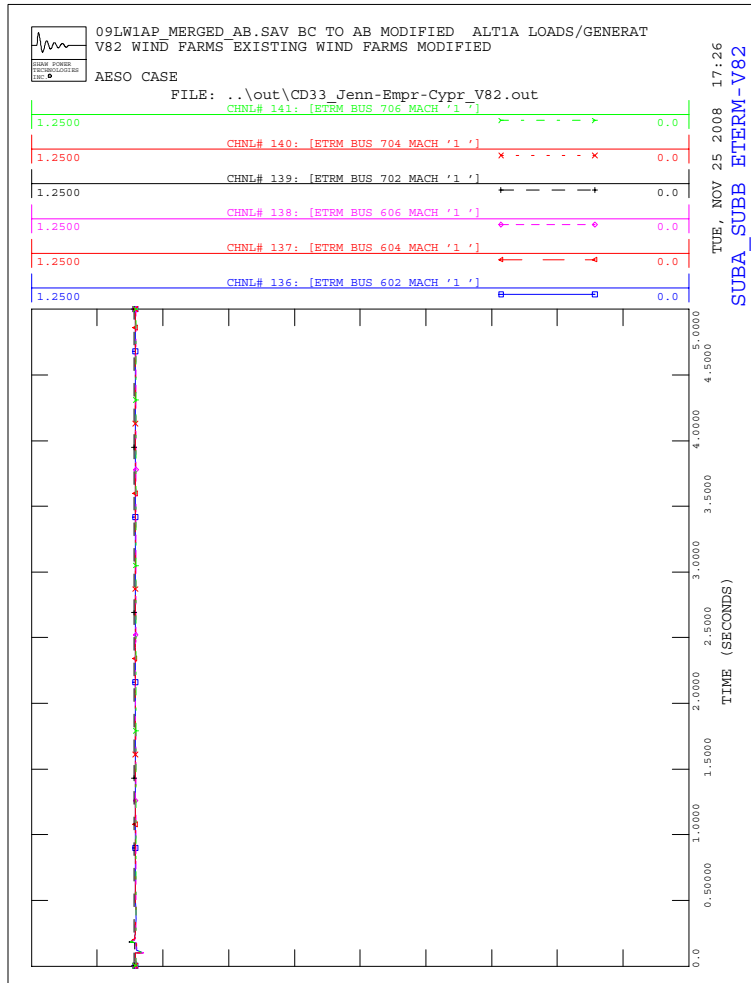


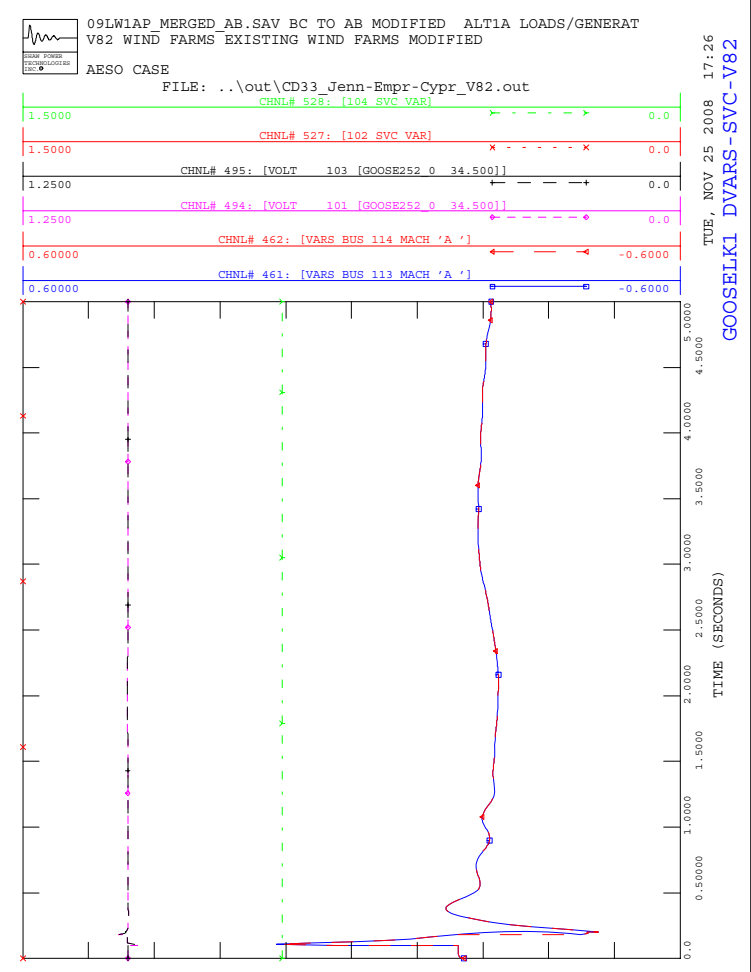
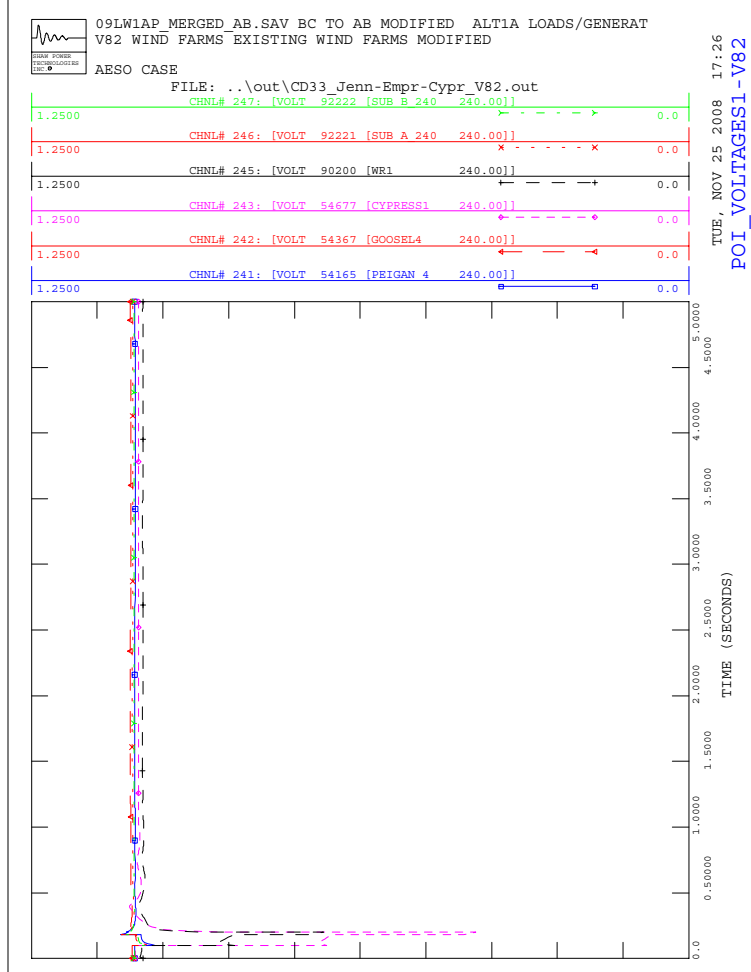
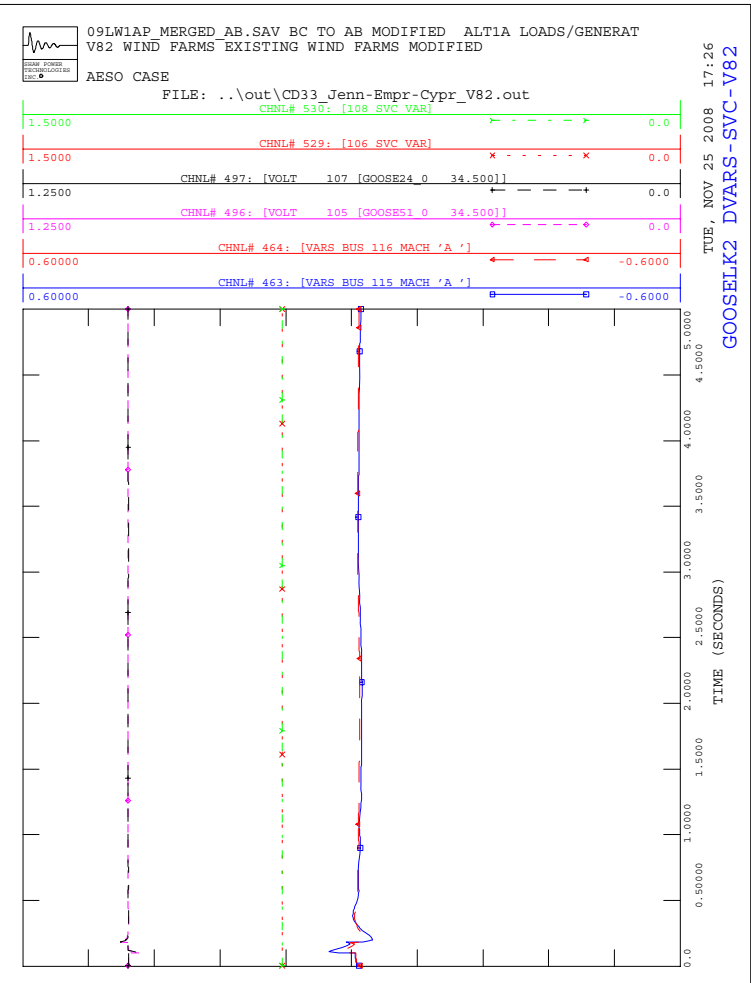
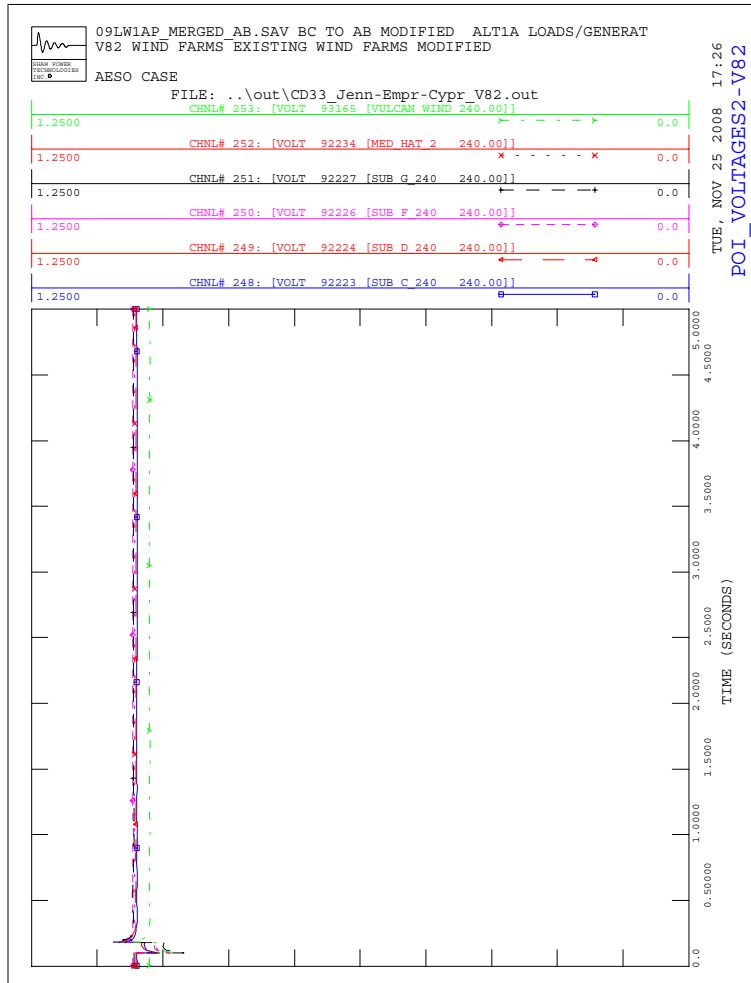
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\CD33_Jenn-Empr-Cypr_V82.out



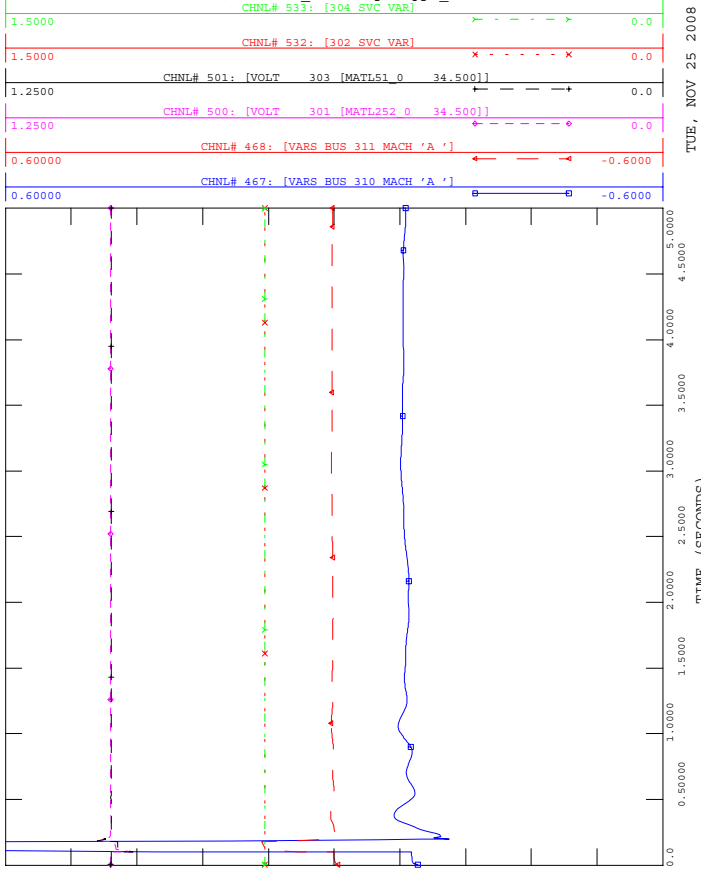






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ABSO CASE

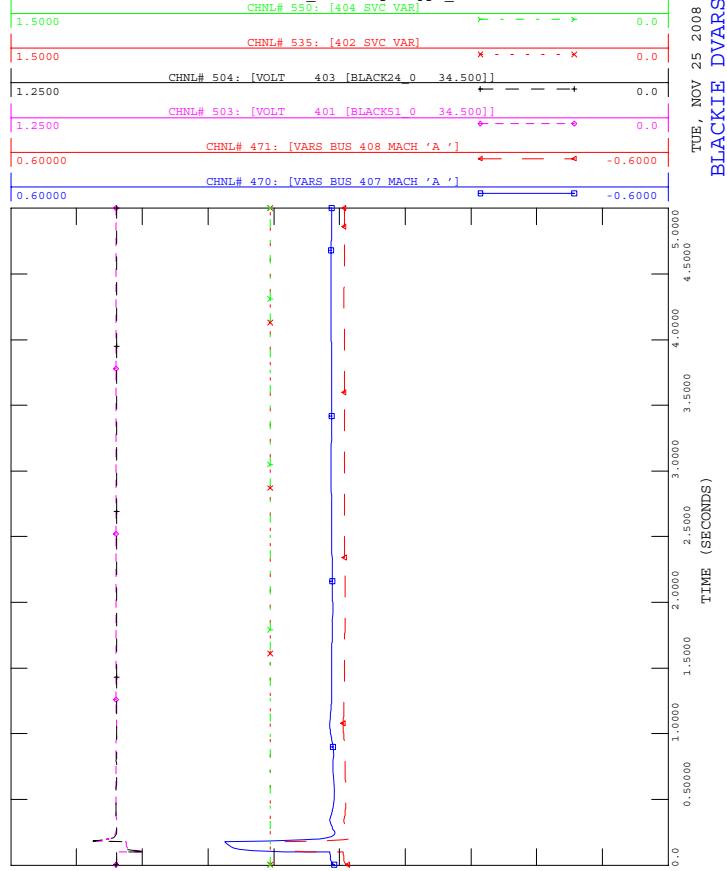
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TUE, NOV 25 2008 17:26
MATL1 DVARS-SVC-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

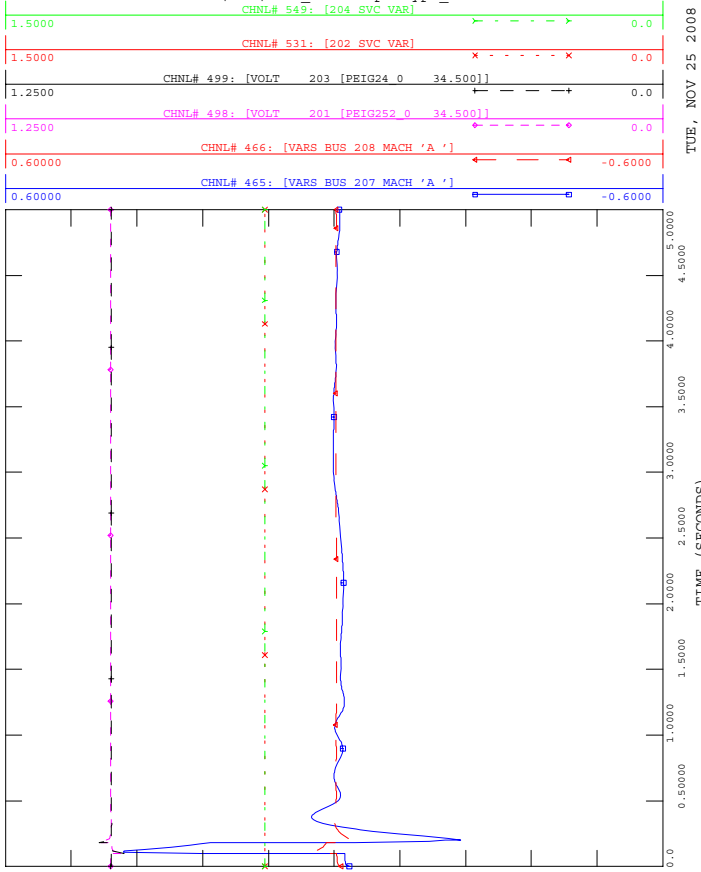
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TUE, NOV 25 2008 17:26
BLACKIE DVARS-V82

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ABSO CASE

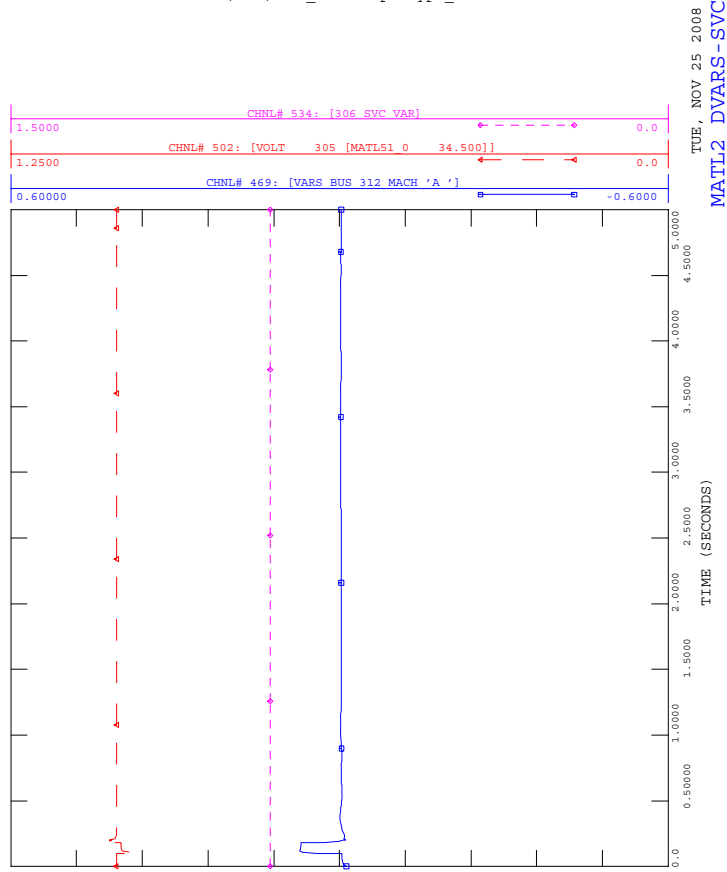
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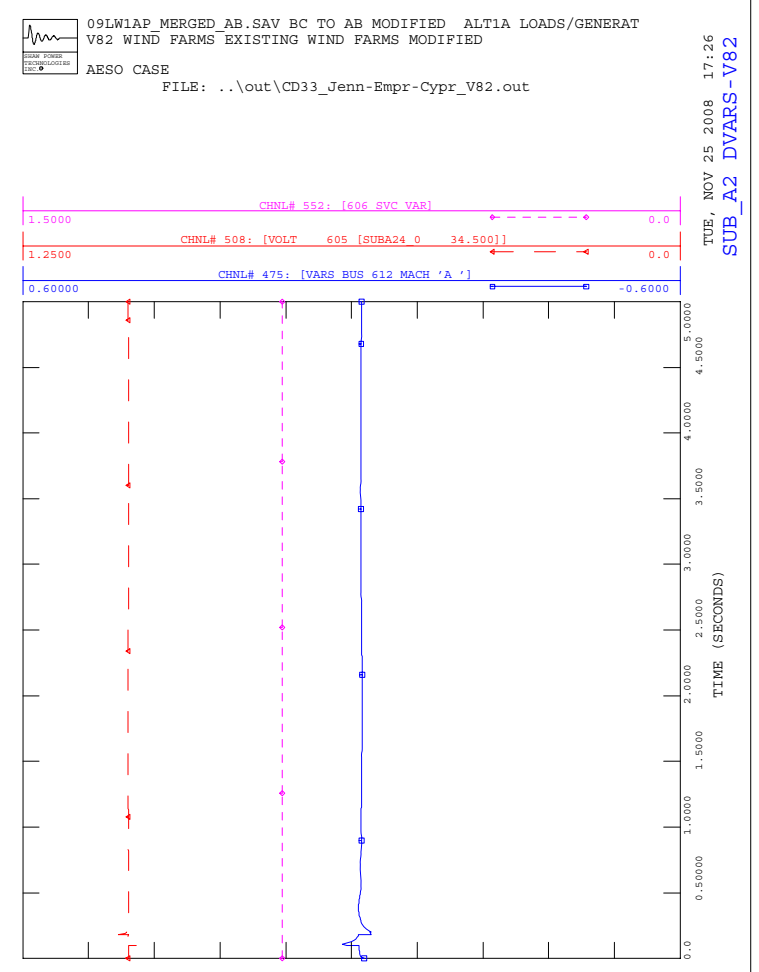
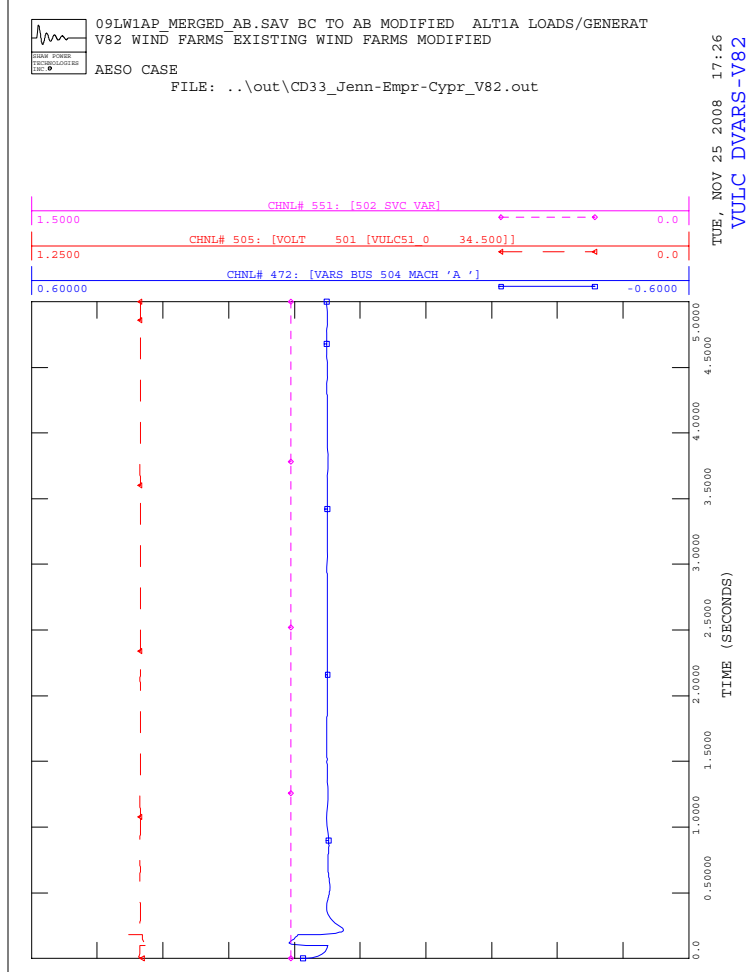
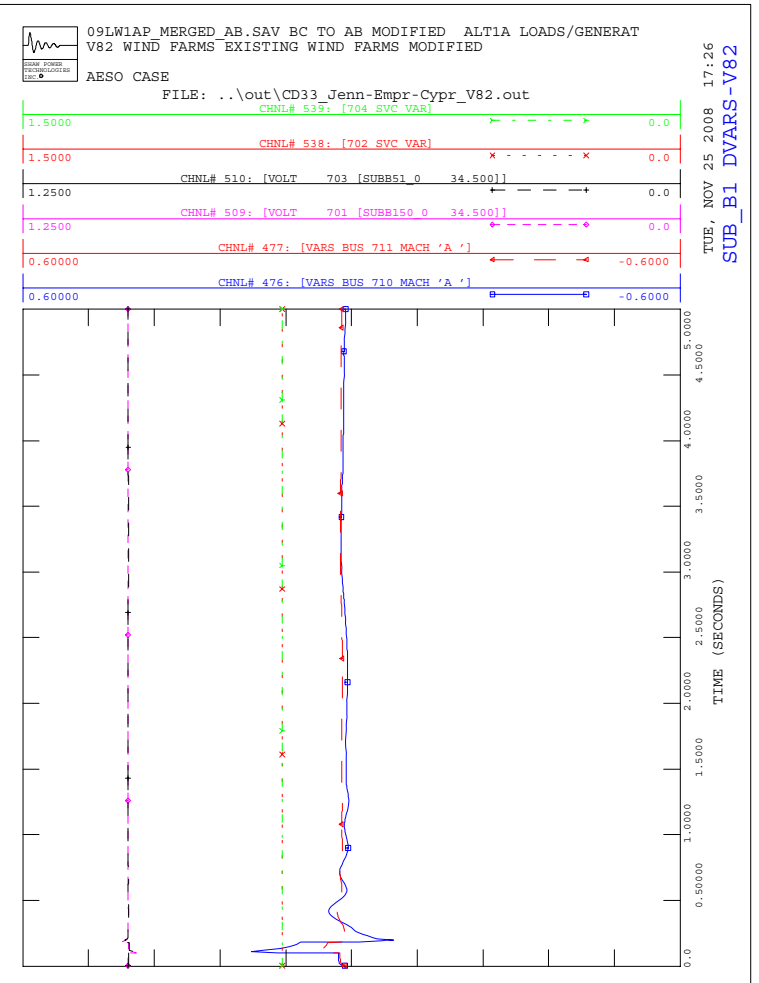
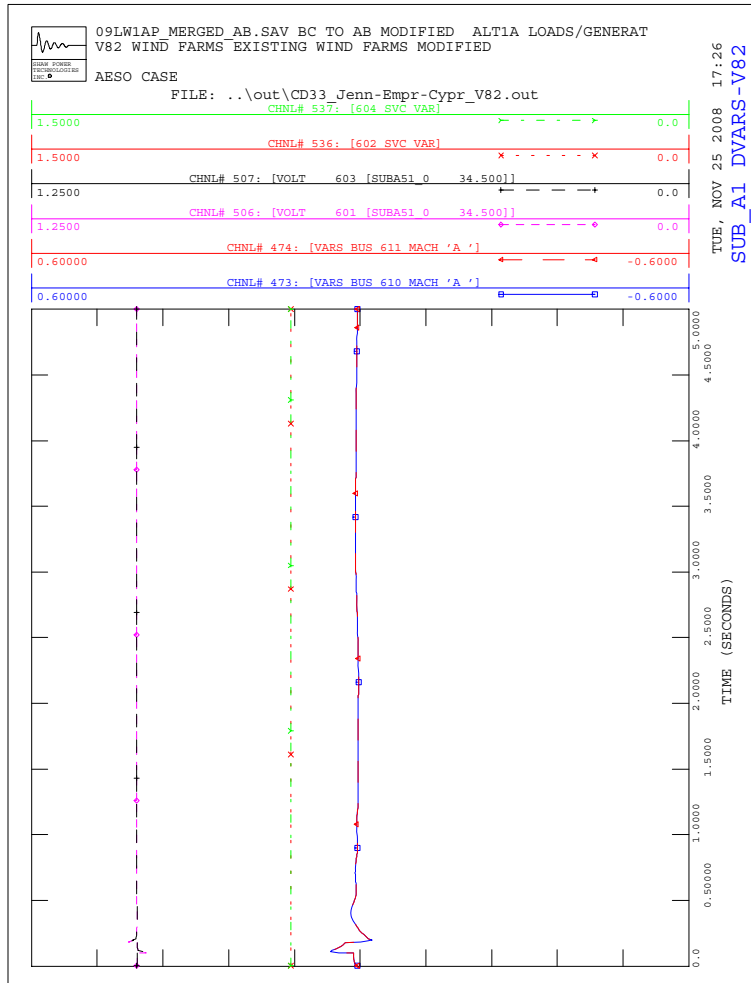
TUE, NOV 25 2008 17:26
PEIGAN DVARS-SVC-V82

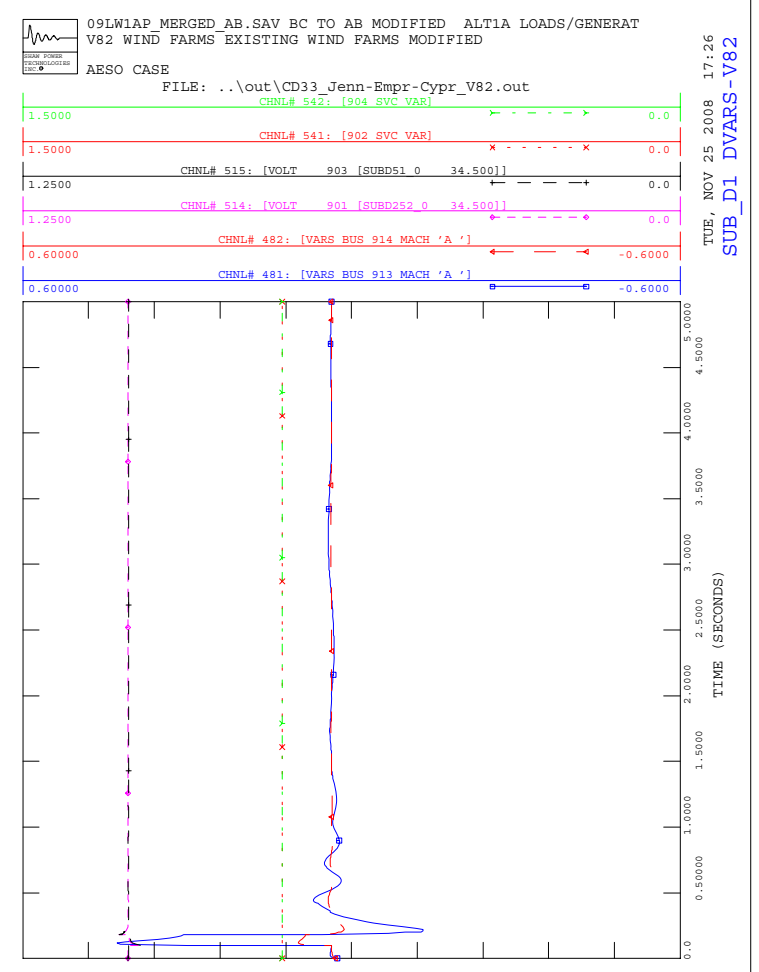
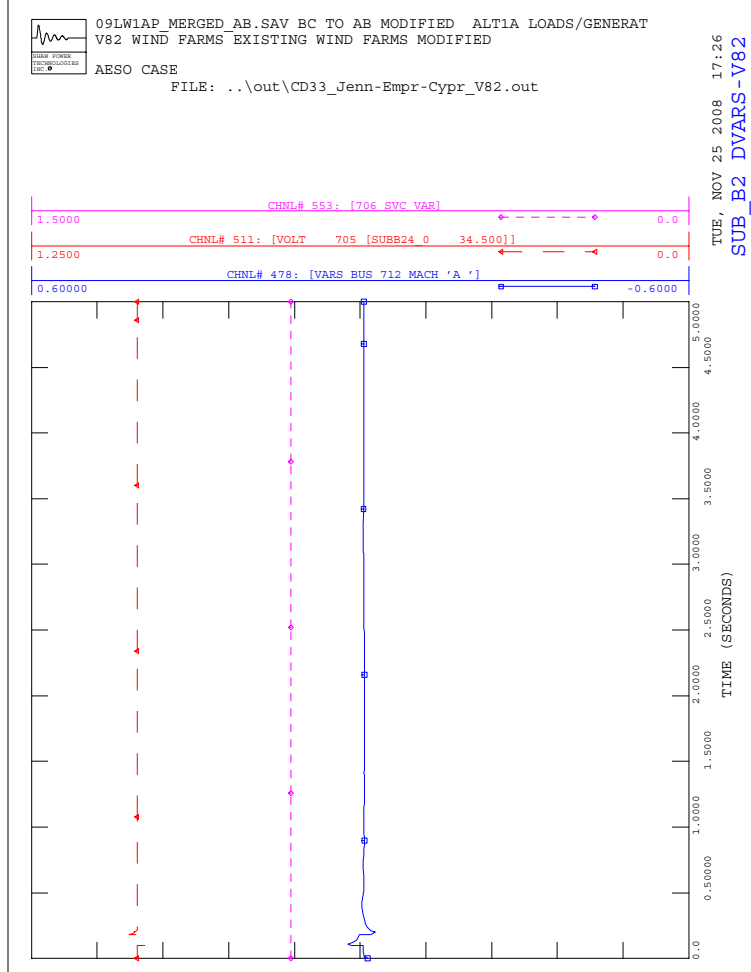
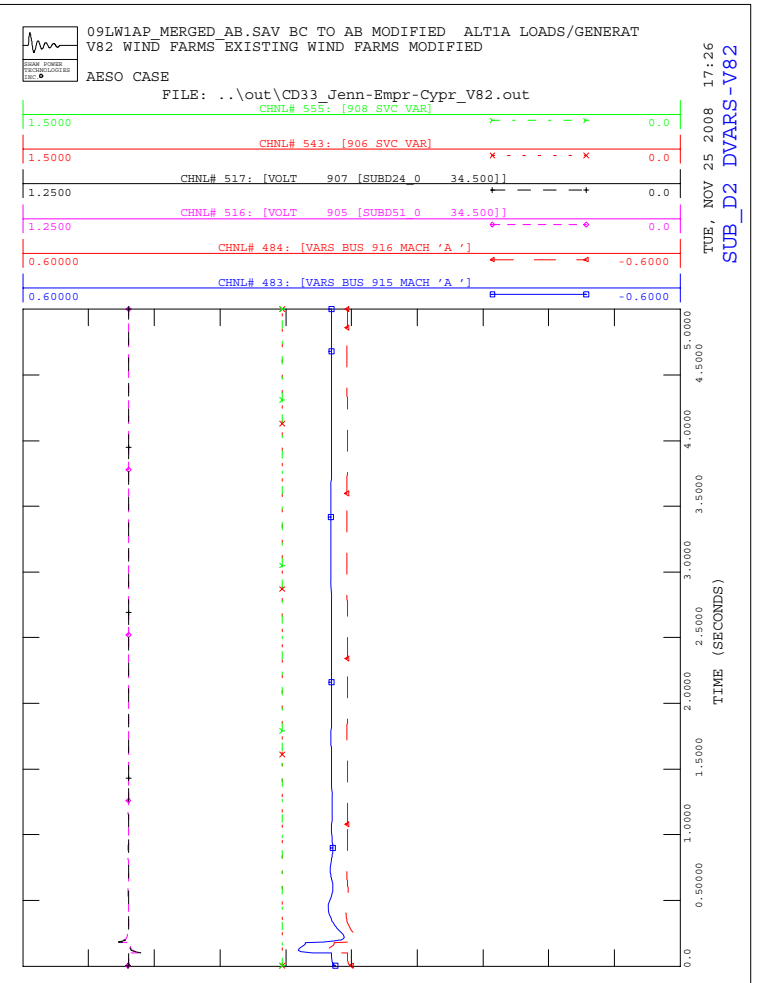
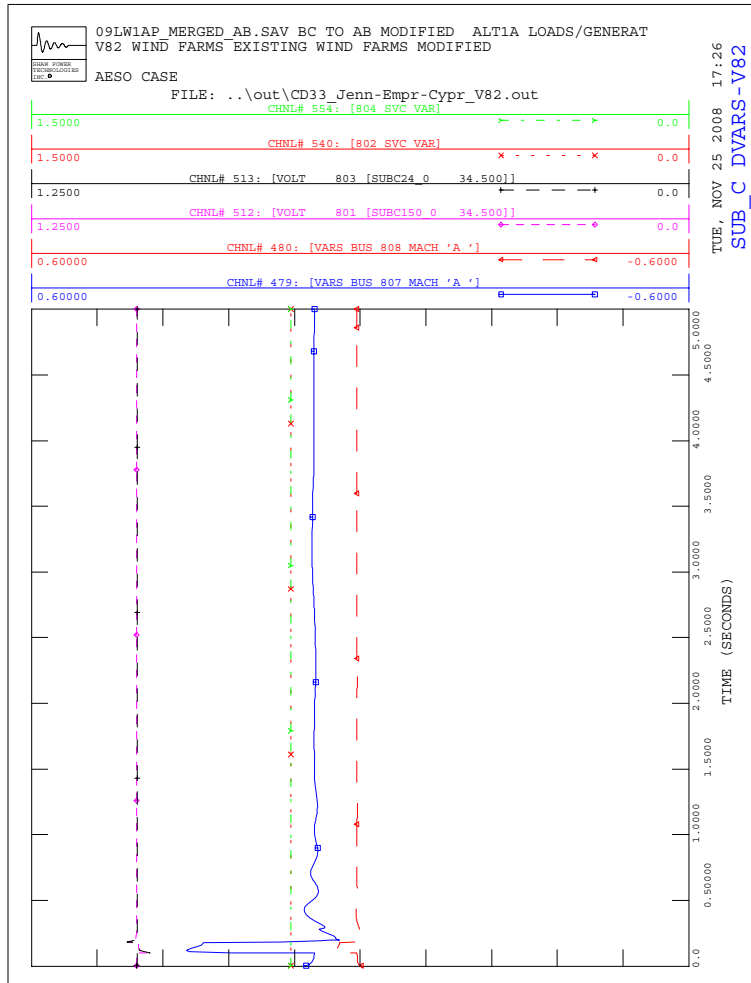
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ABSO CASE

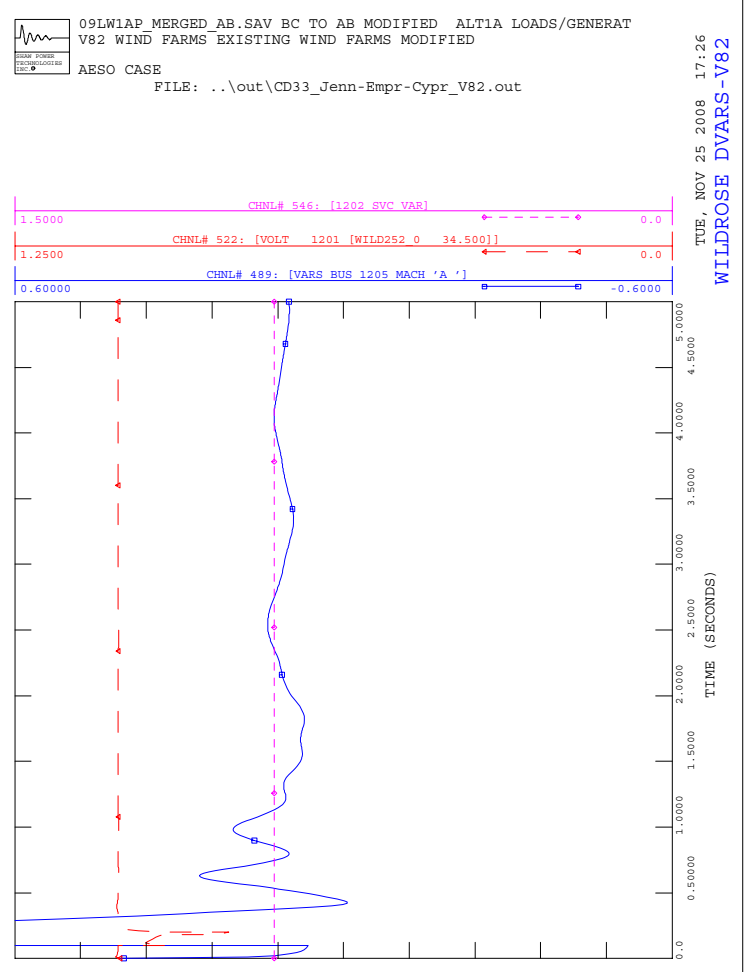
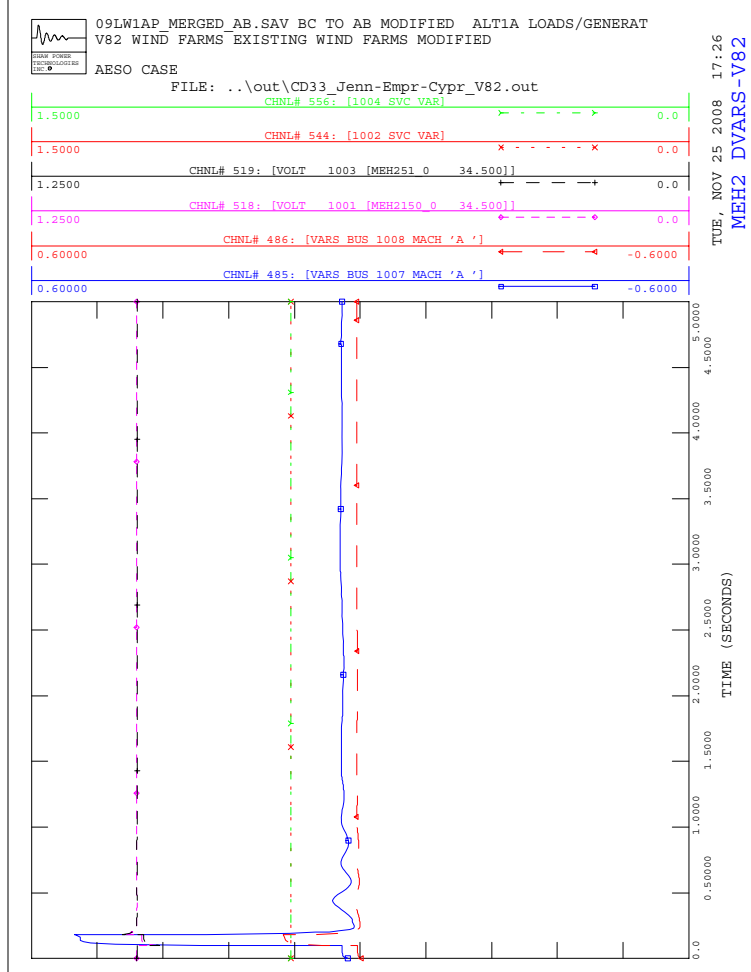
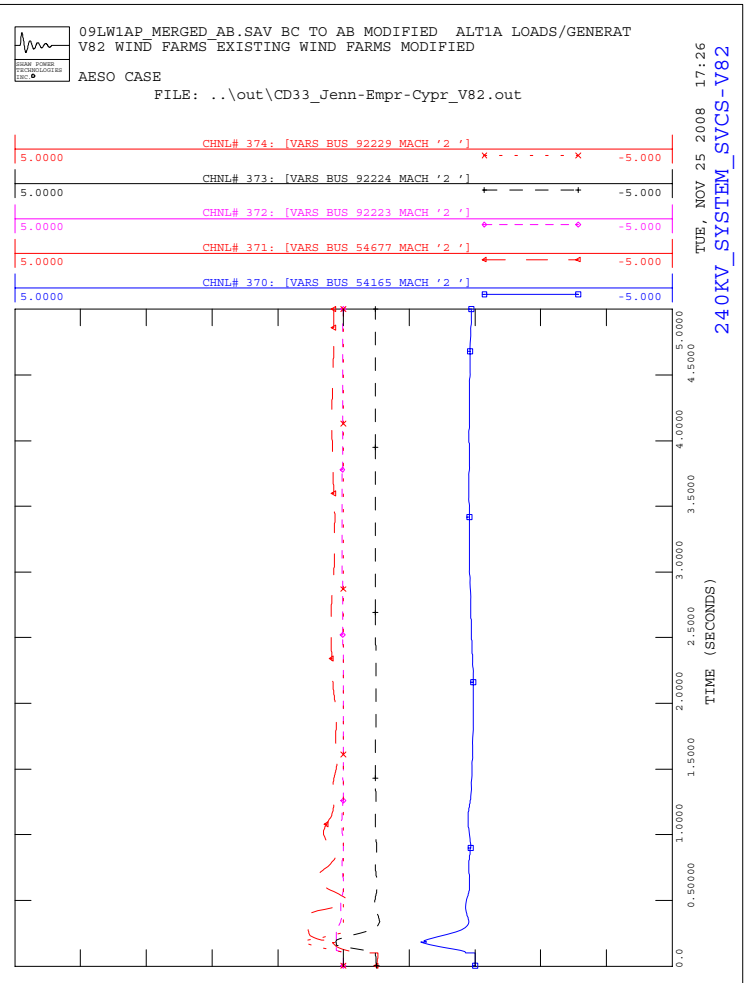
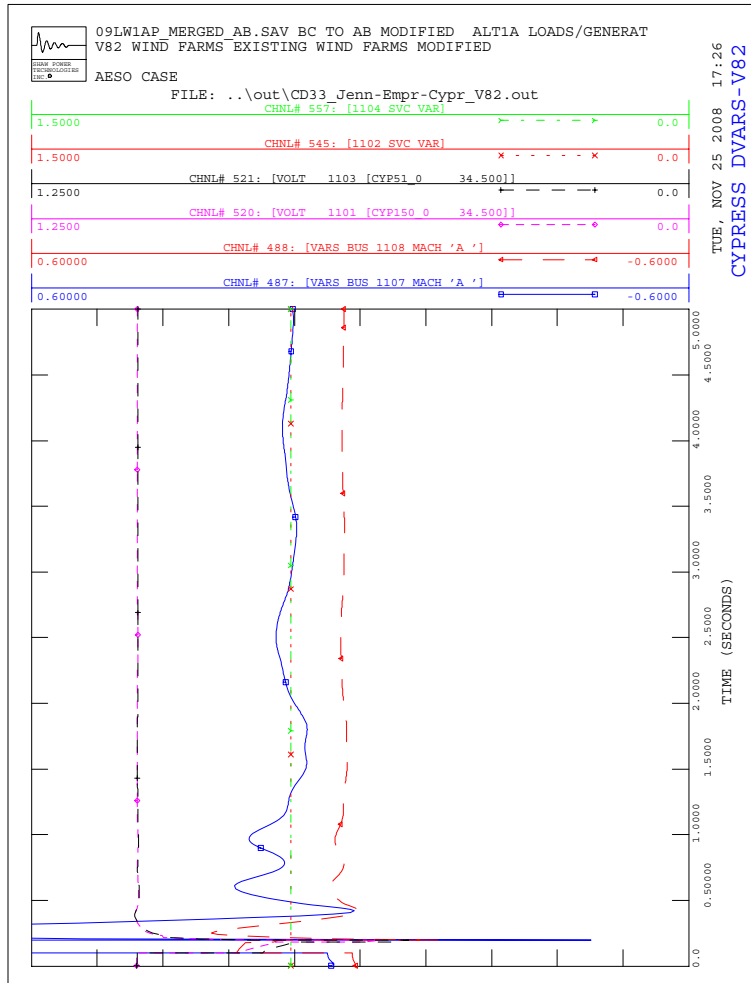
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TUE, NOV 25 2008 17:26
MATL2 DVARS-SVC-V82







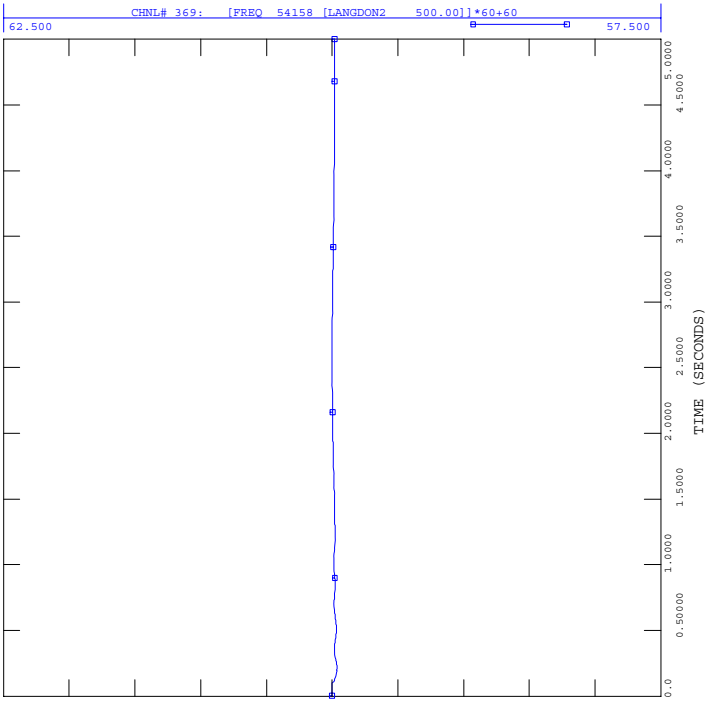


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\CD33_Jenn-Empr-Cypr_V82.out

TUE, NOV 25 2008 17:26
LANGDON_FRQ-V82

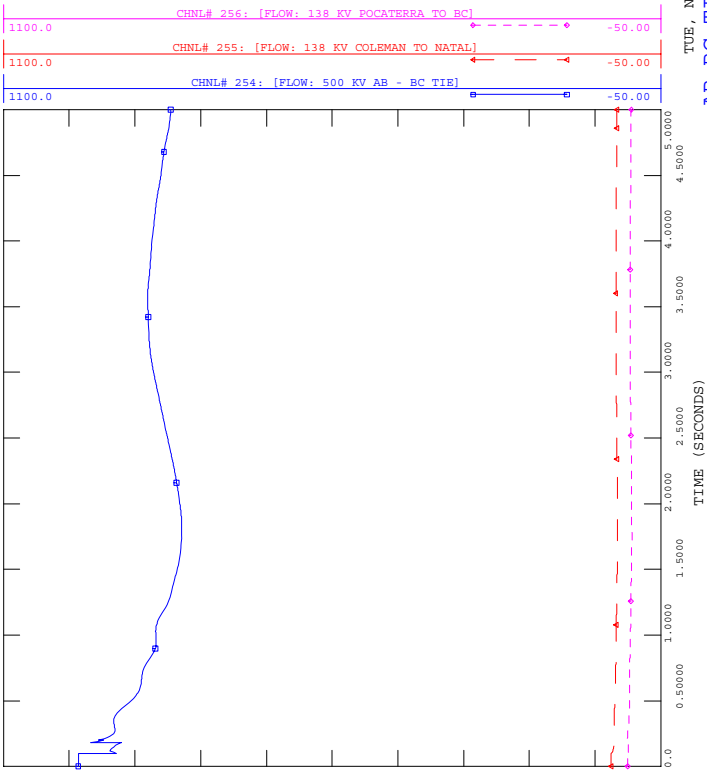


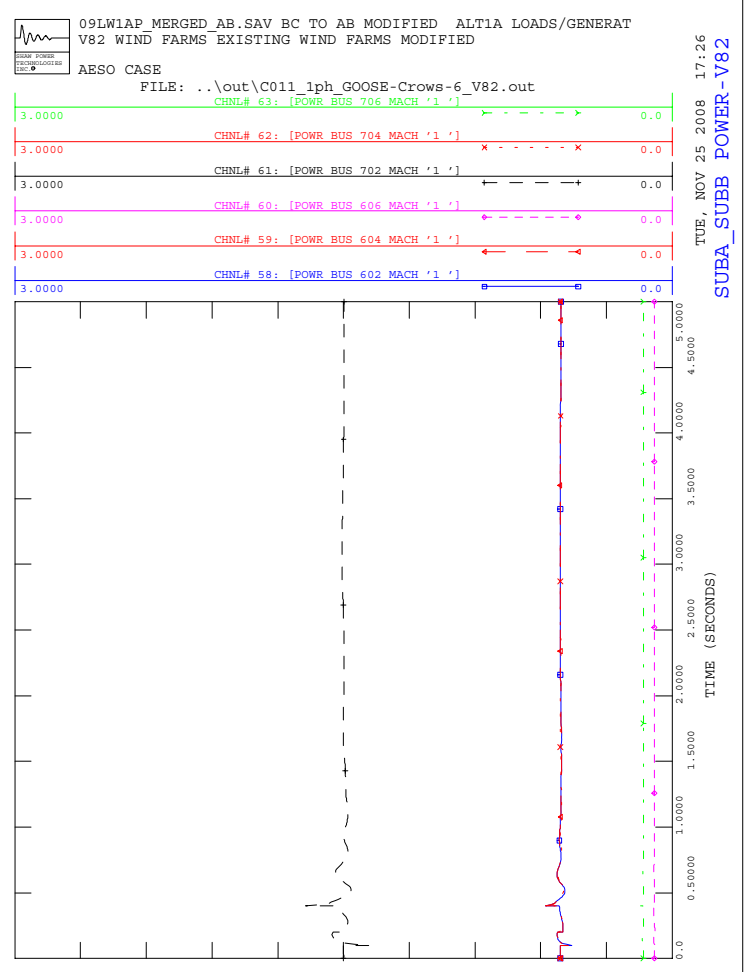
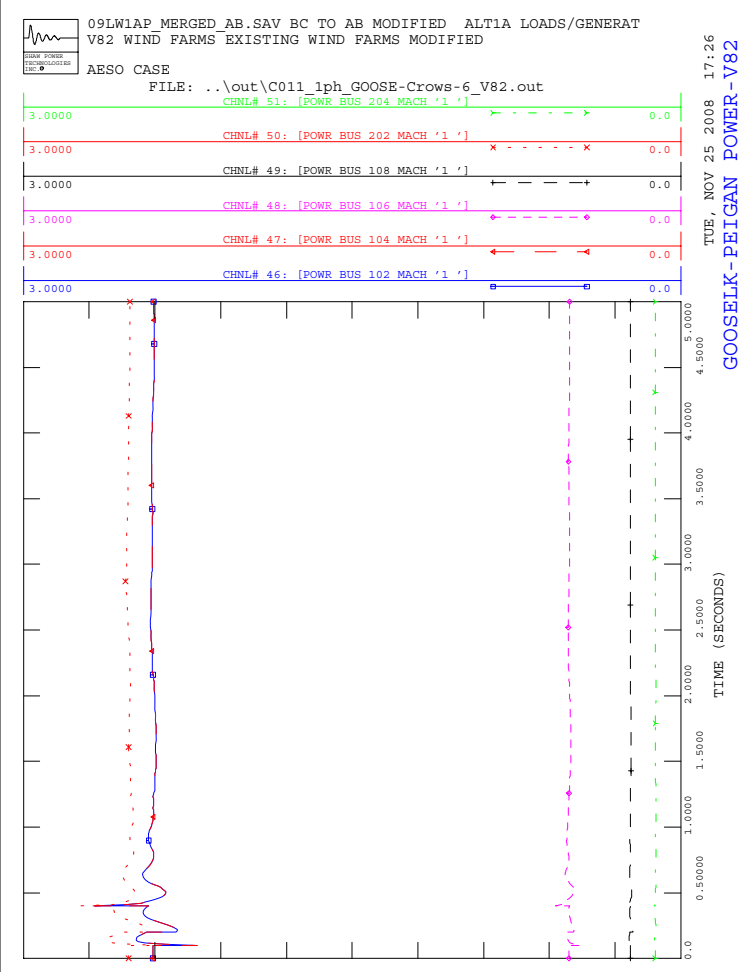
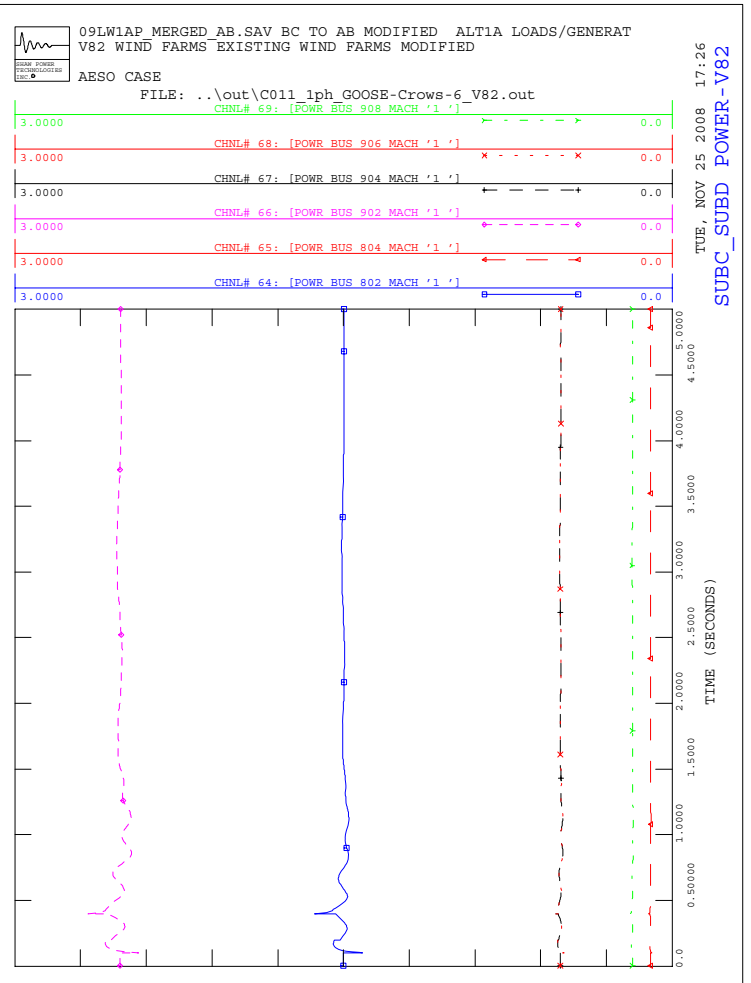
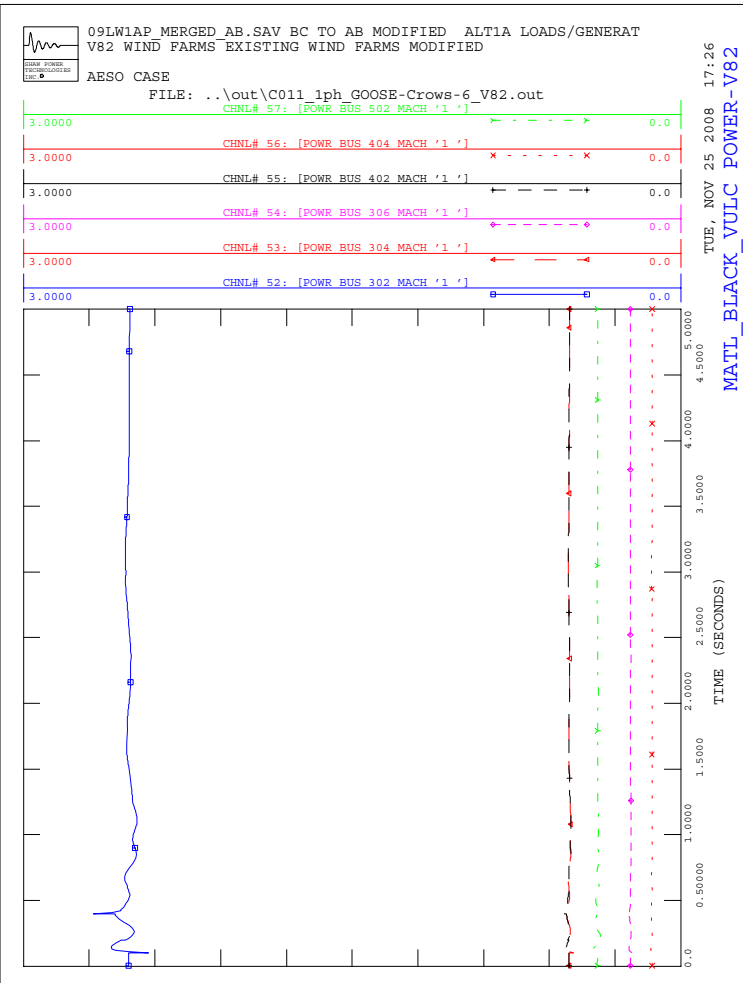
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

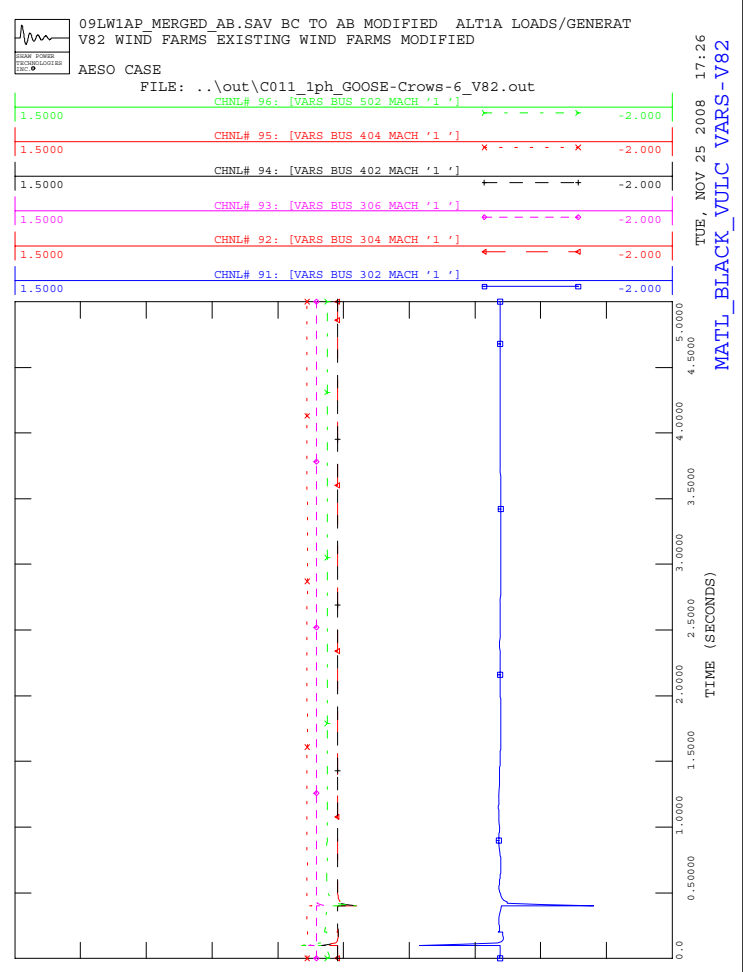
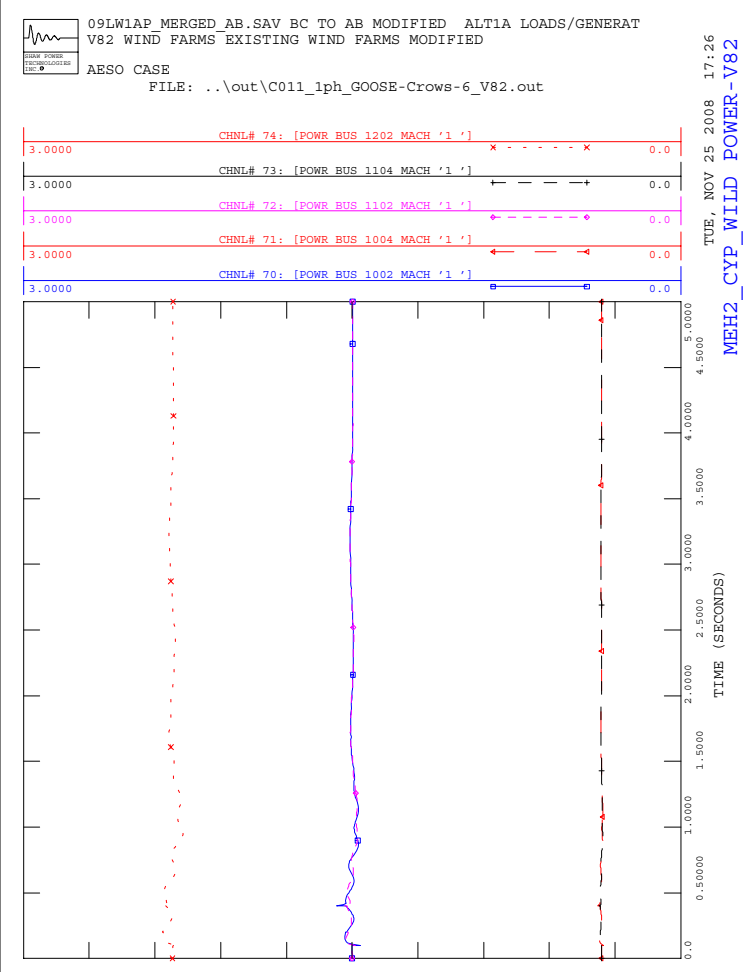
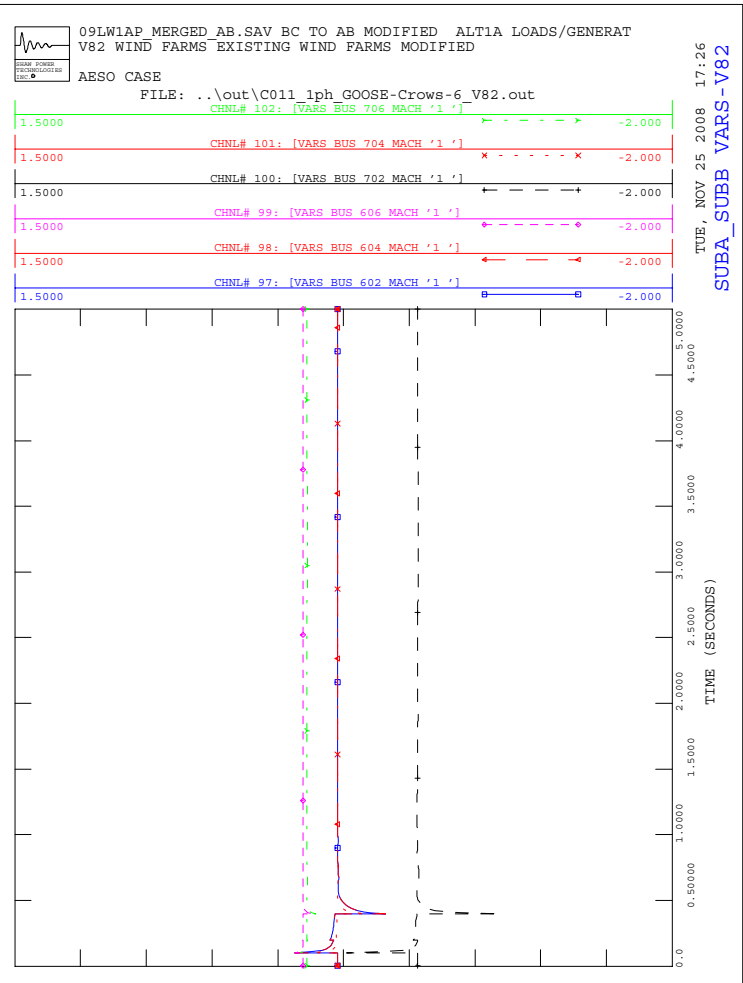
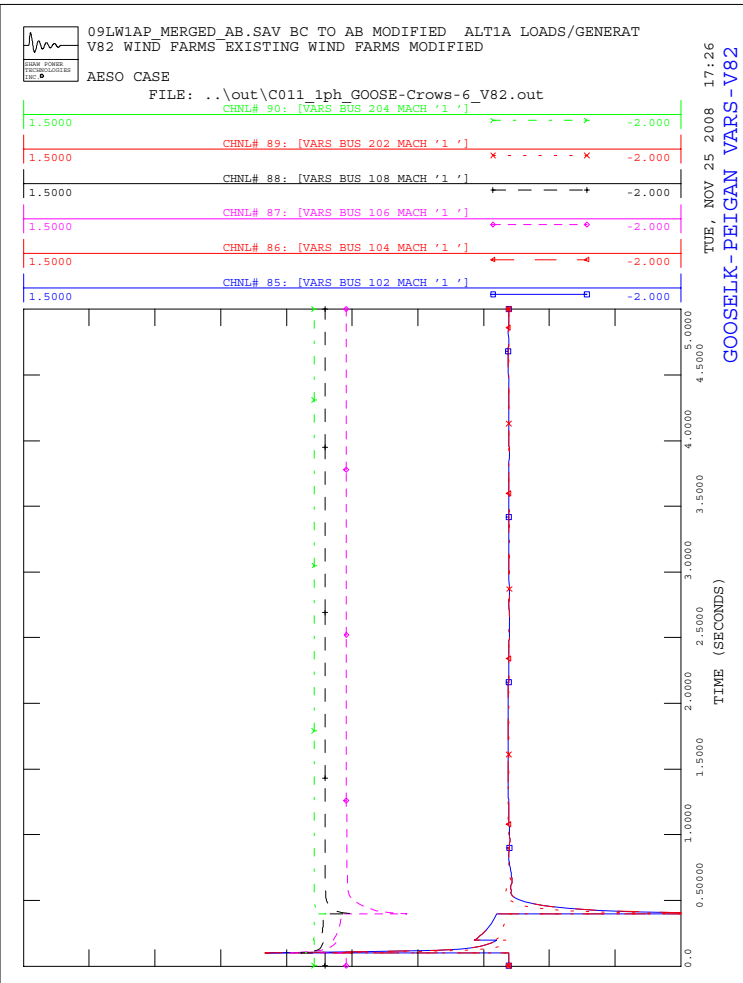
ABSO CASE

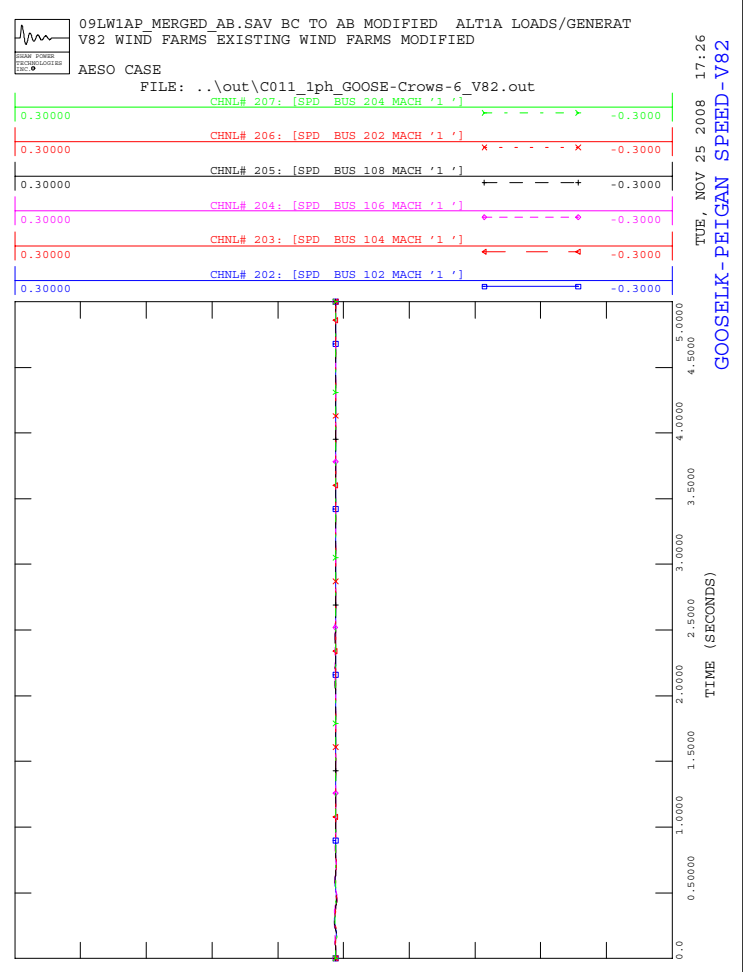
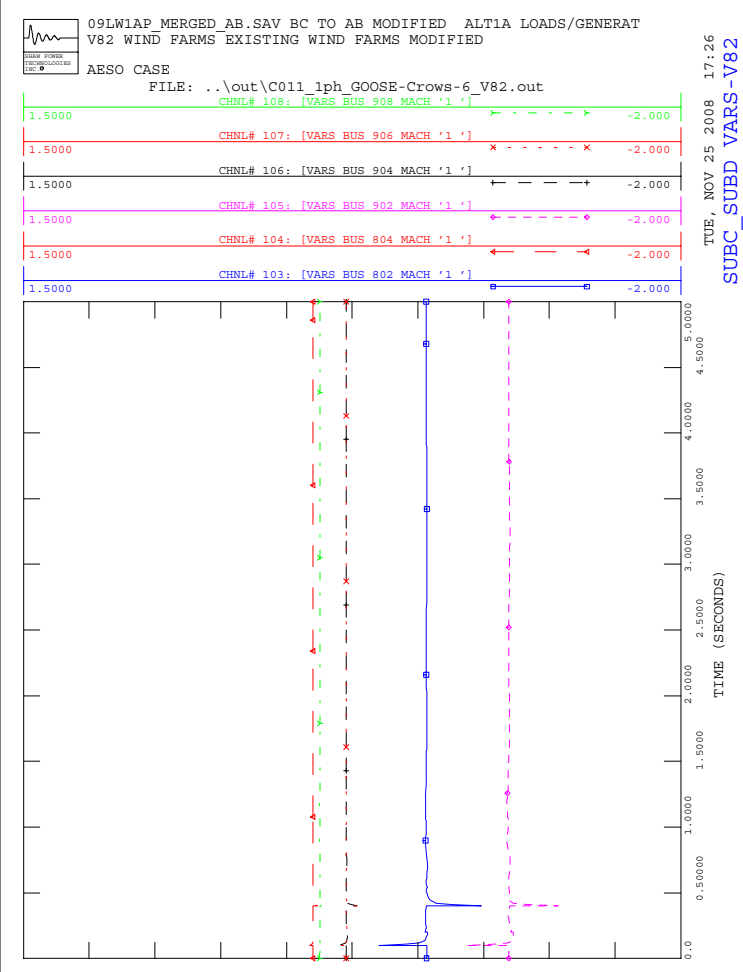
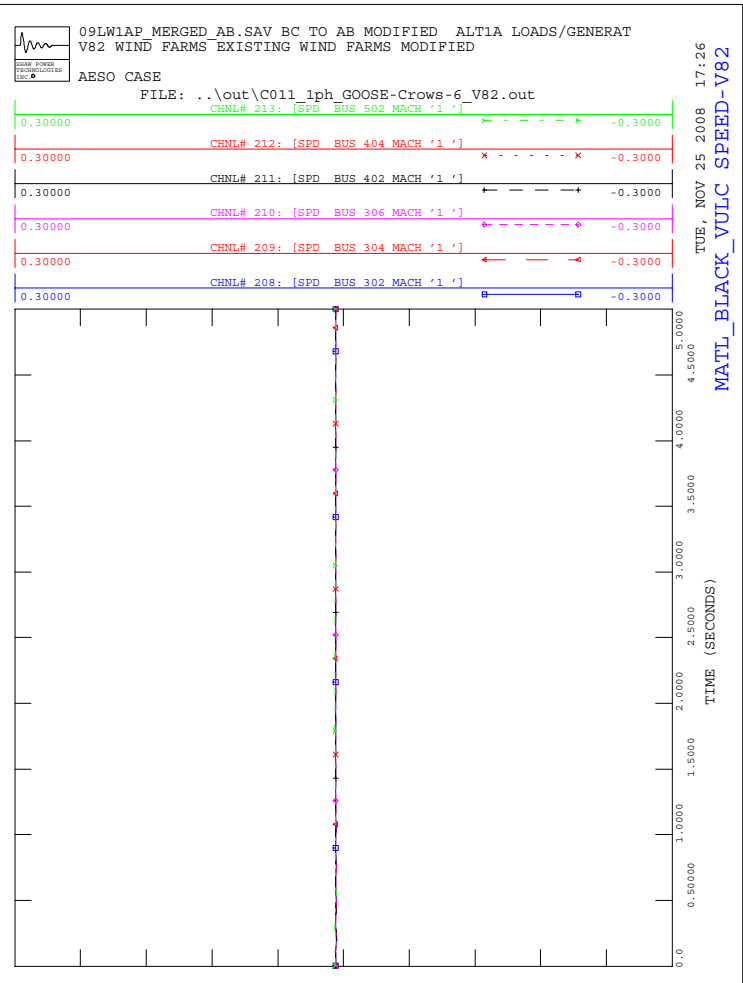
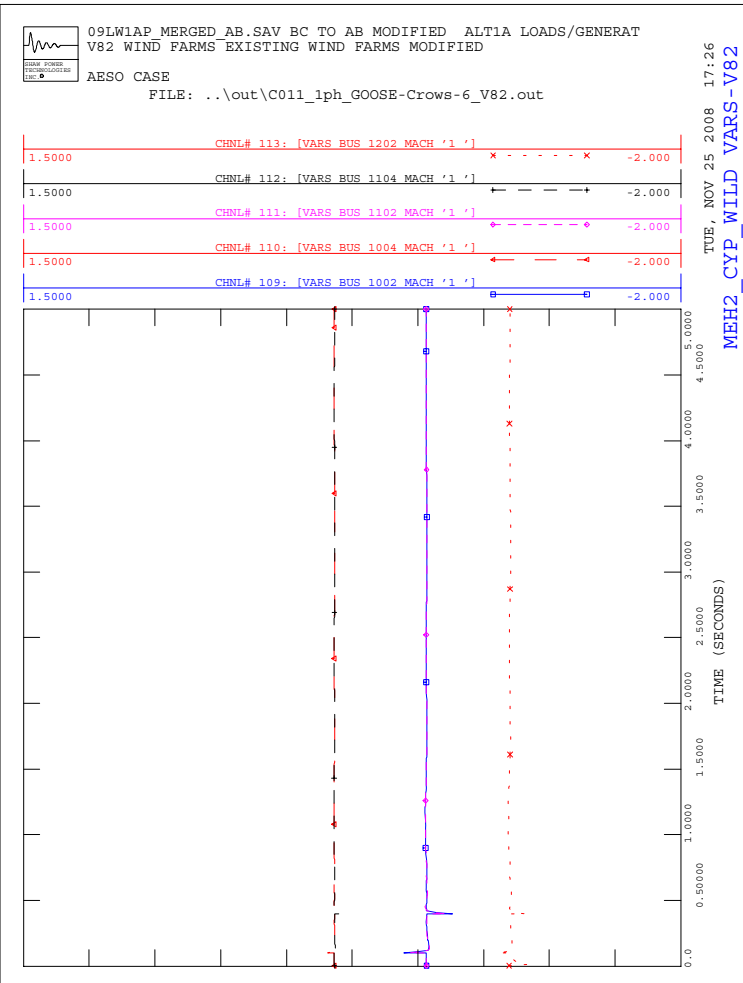
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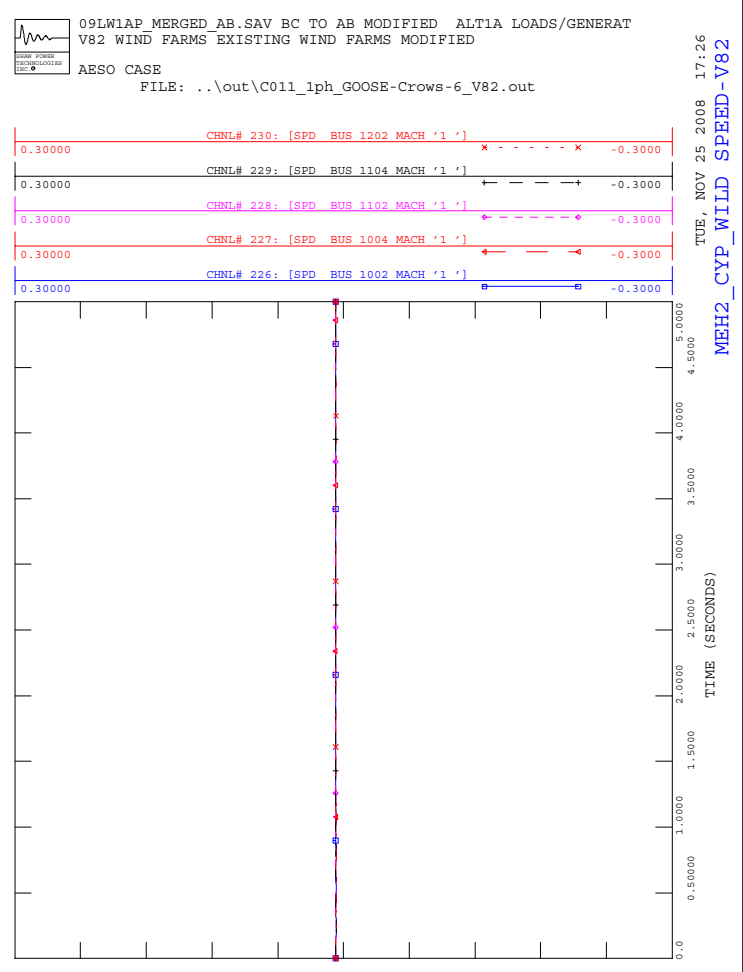
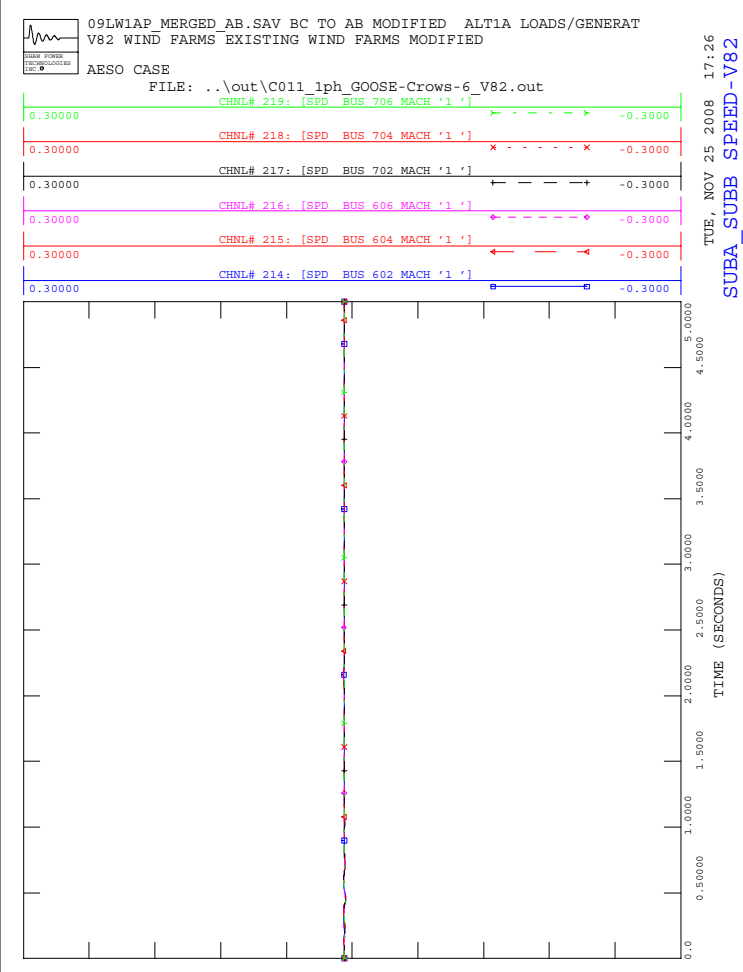
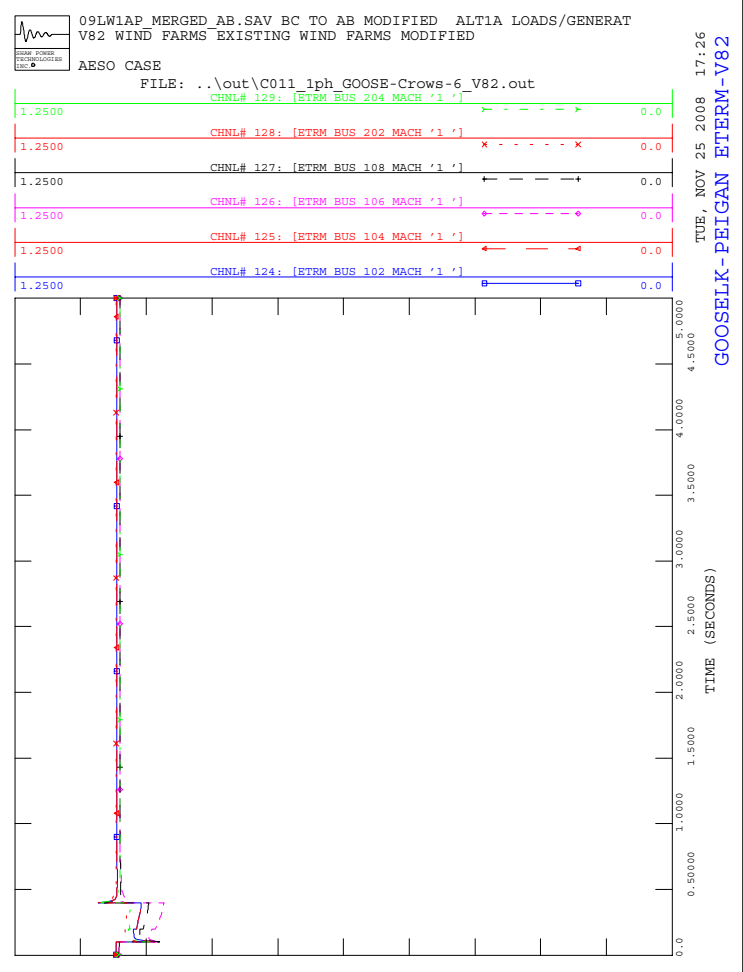
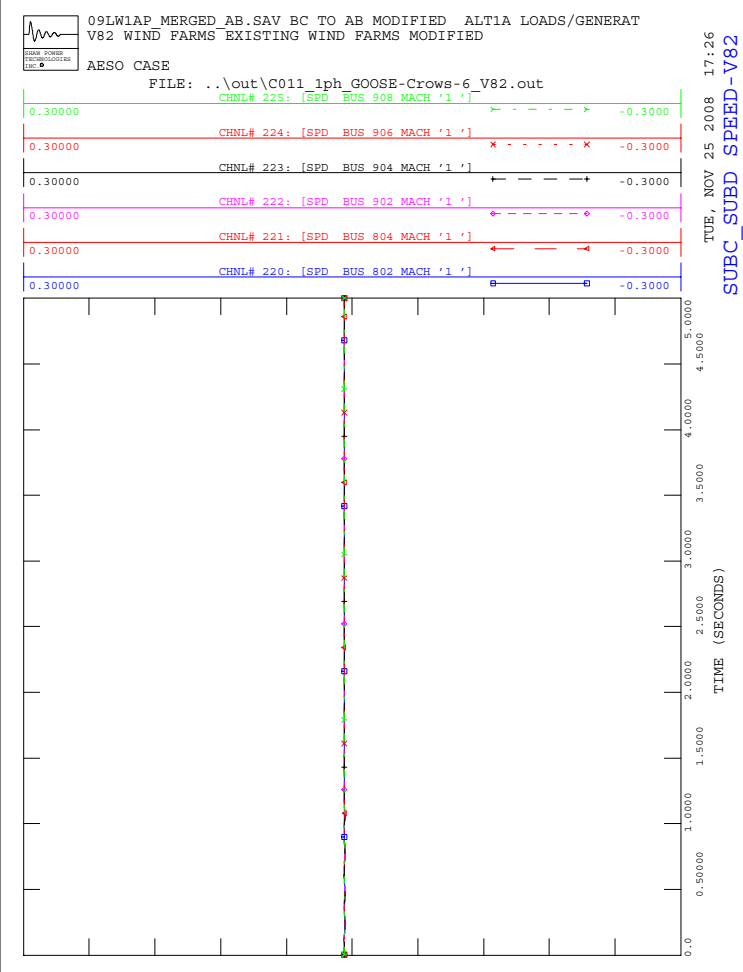
TUE, NOV 25 2008 17:26
AB_BC_TIE_FLOWS-V82

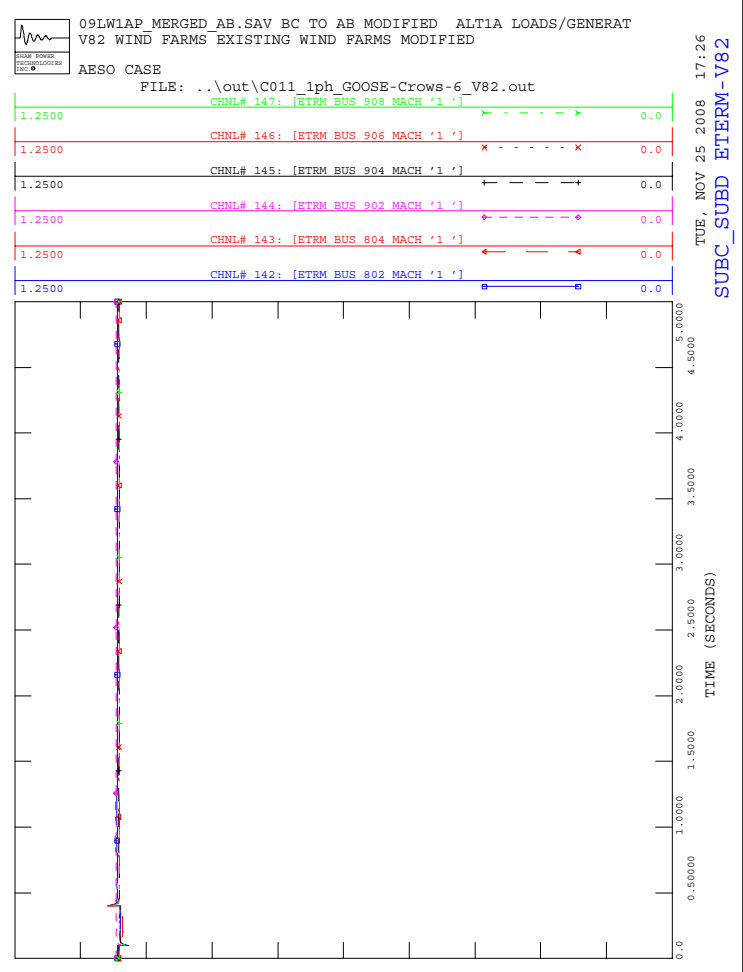
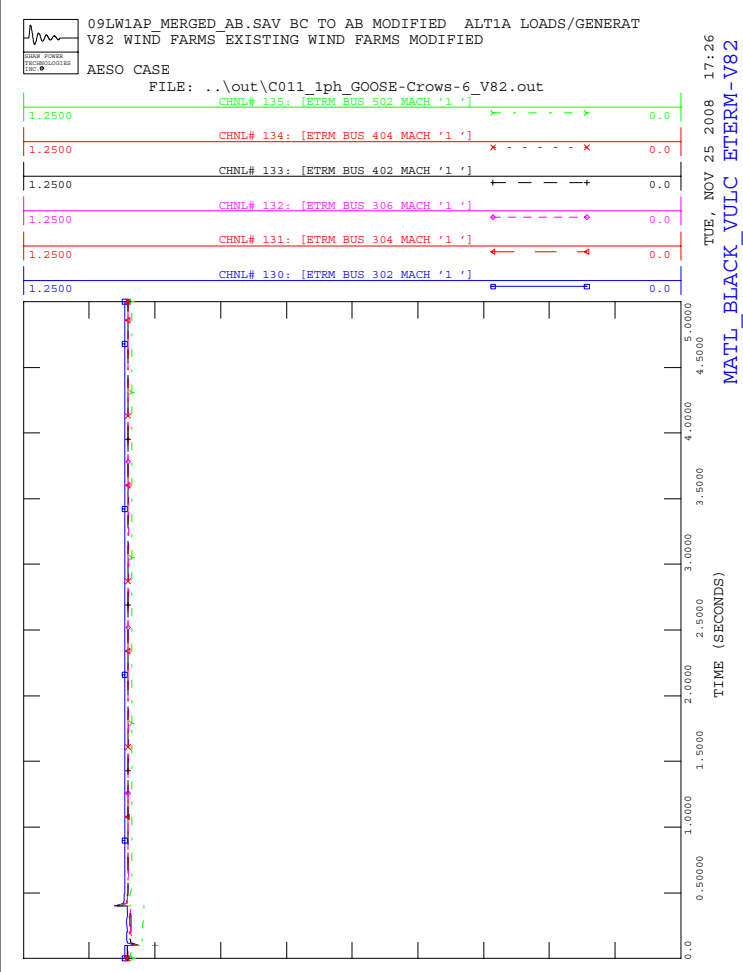
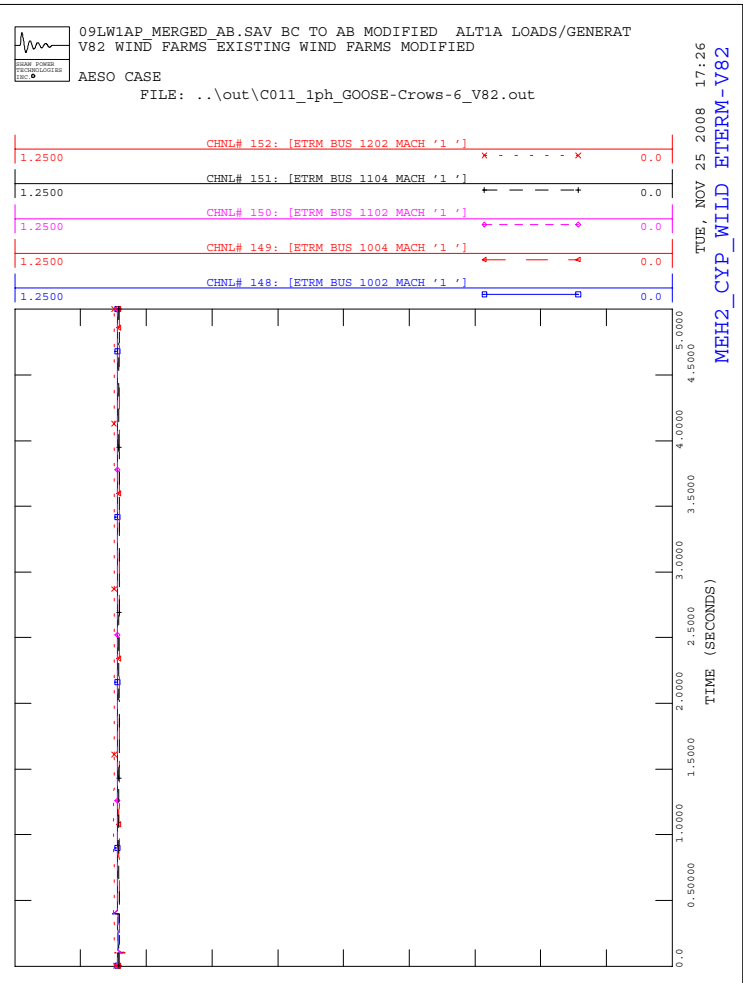
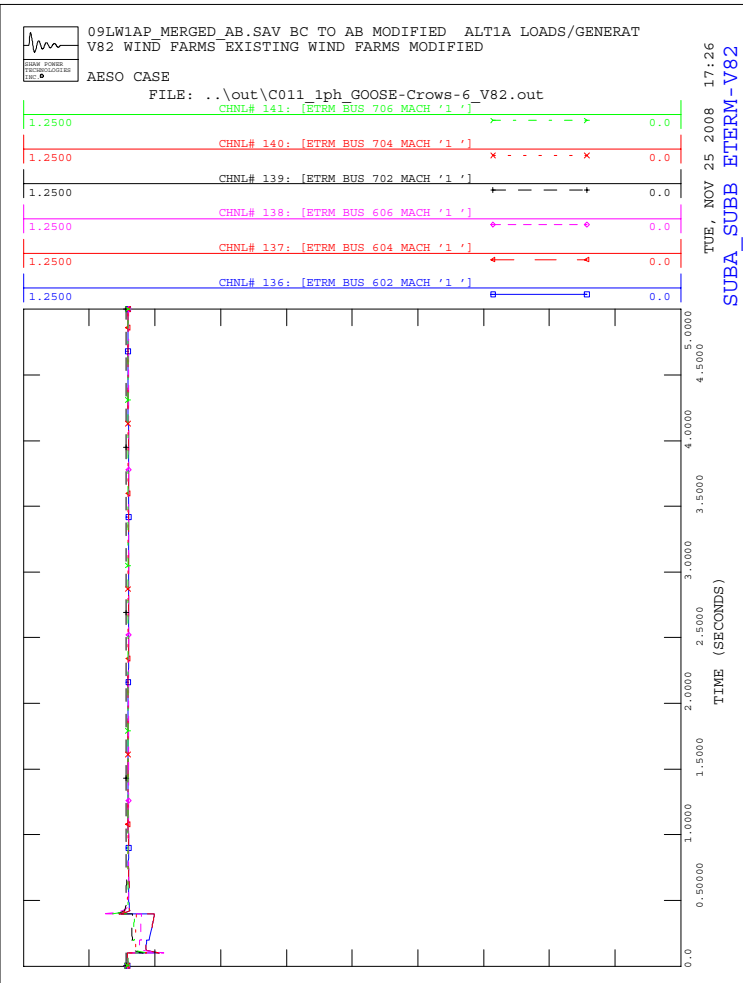


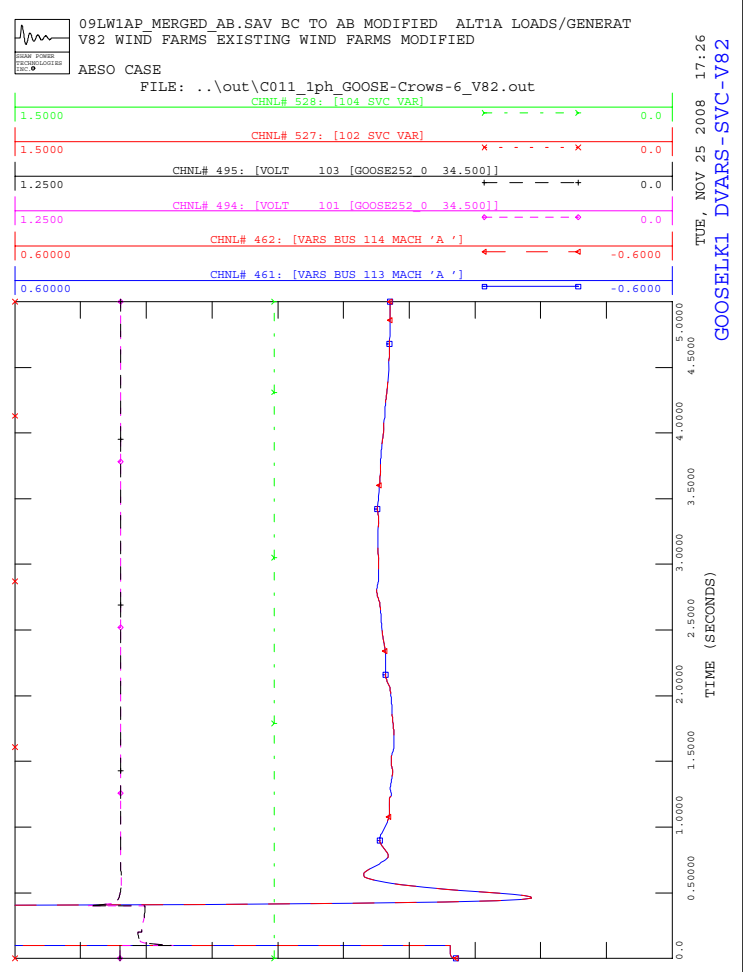
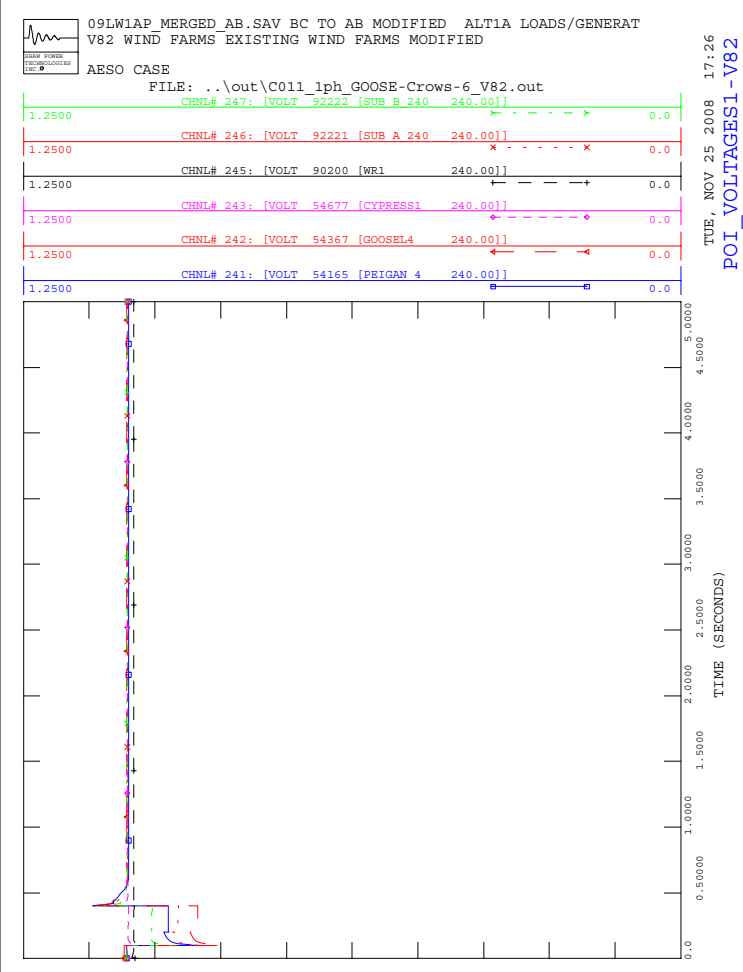
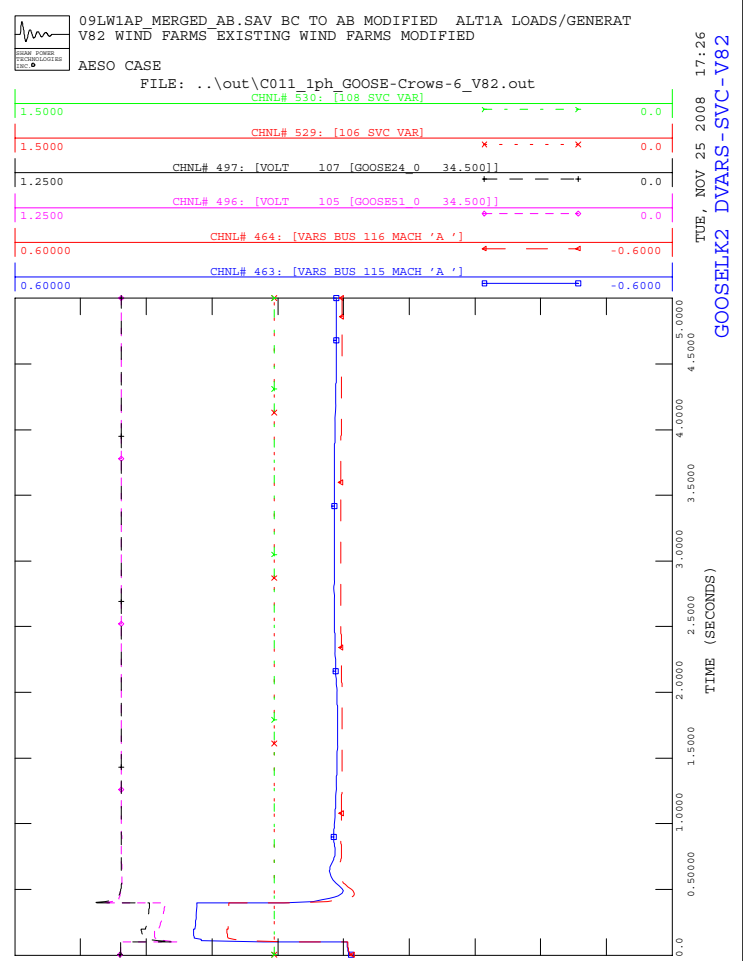
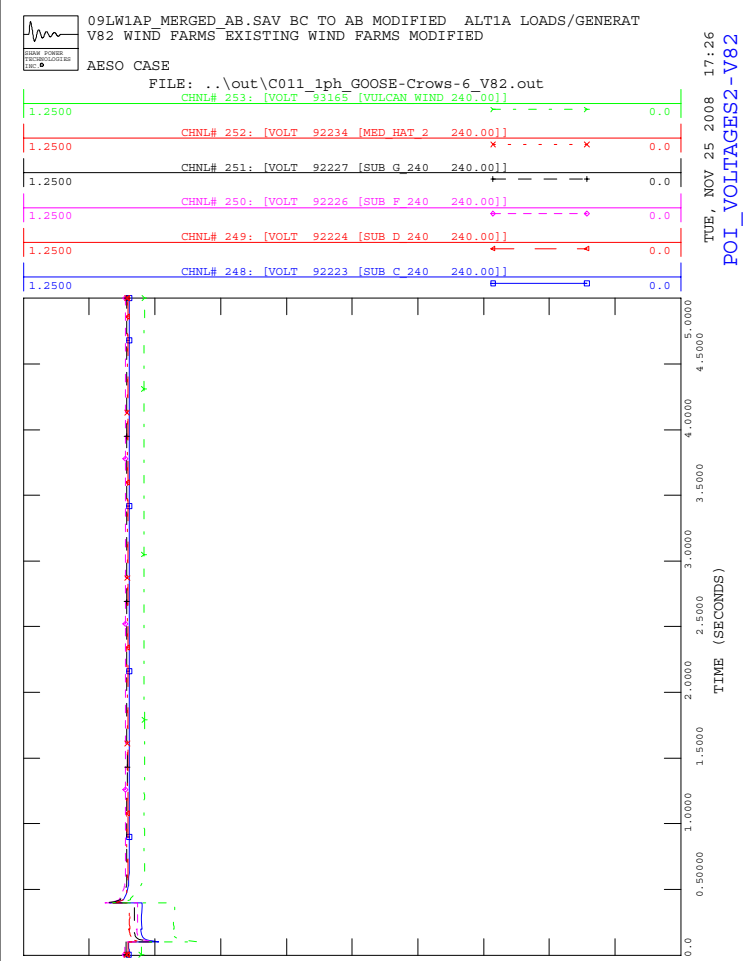


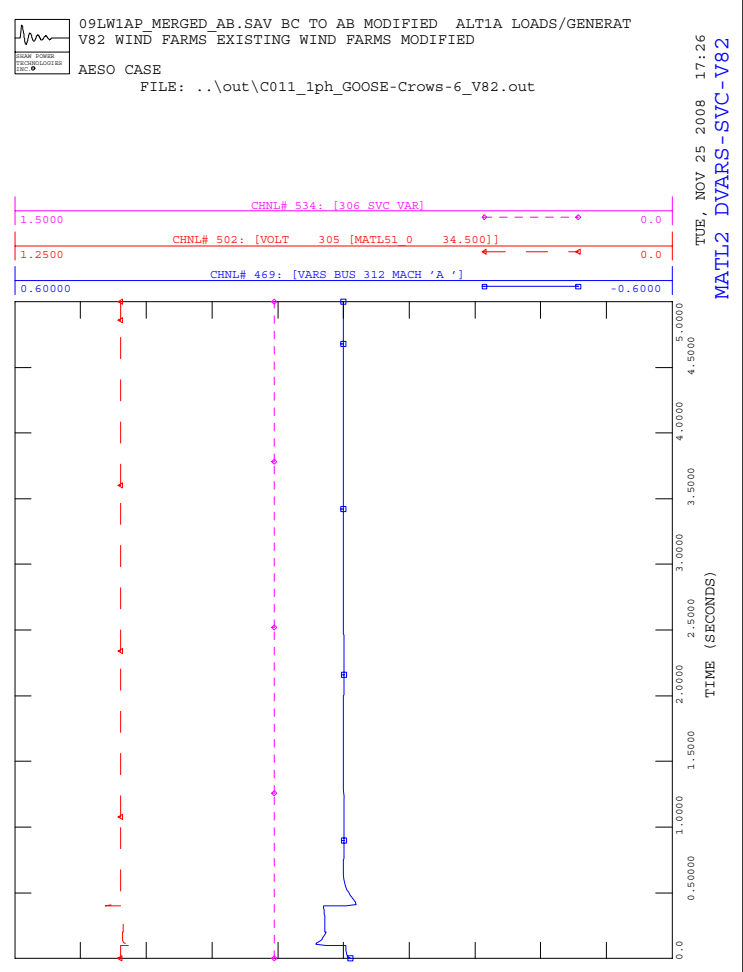
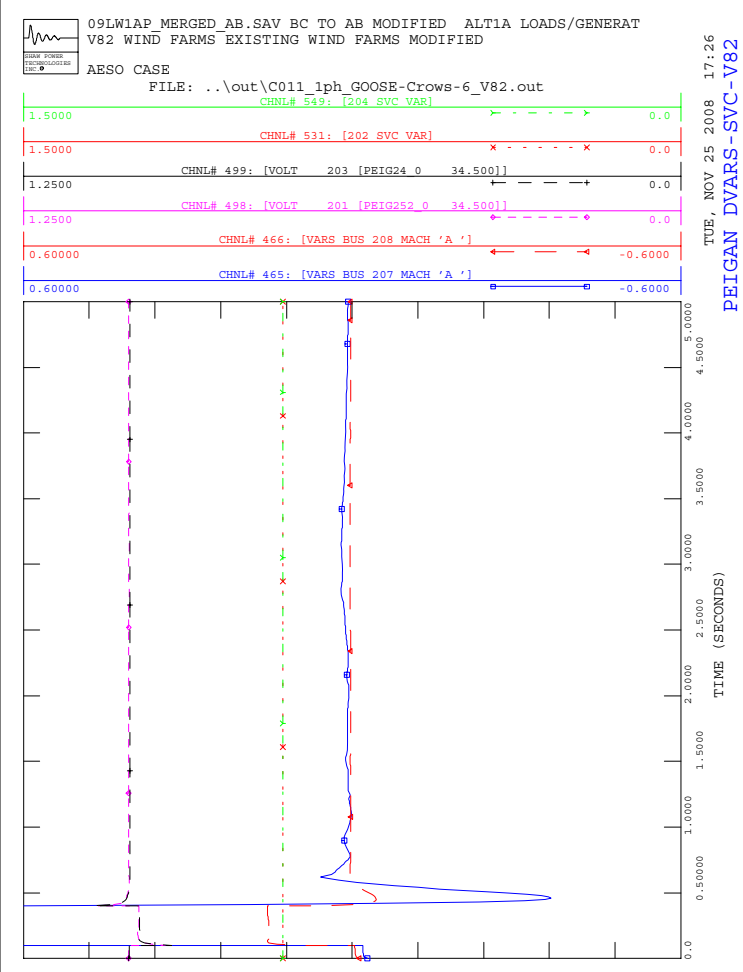
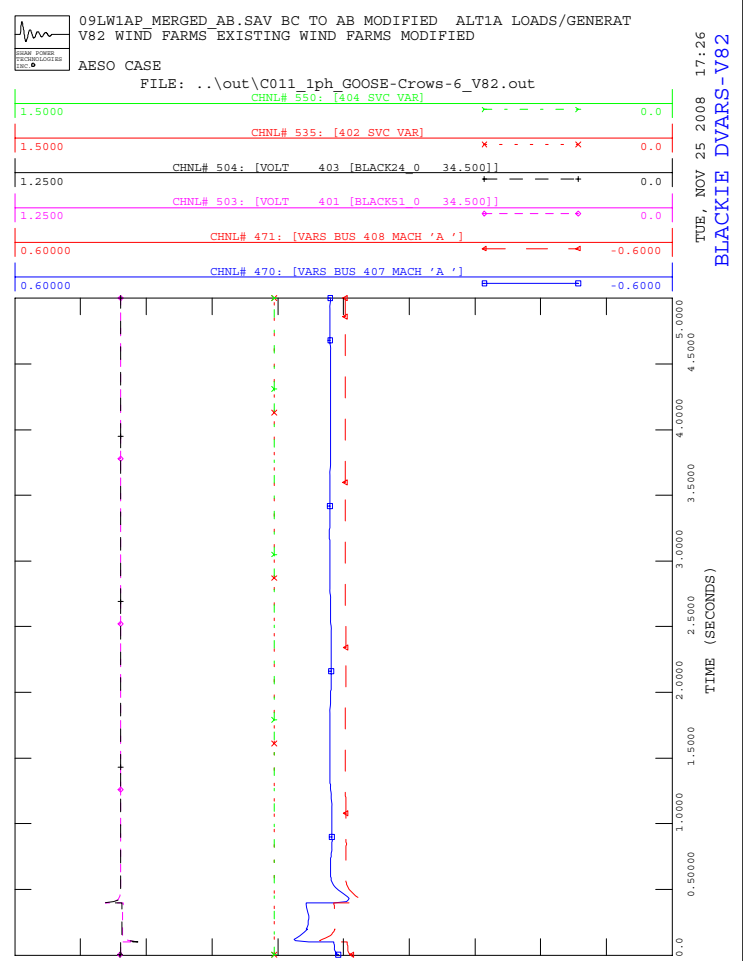
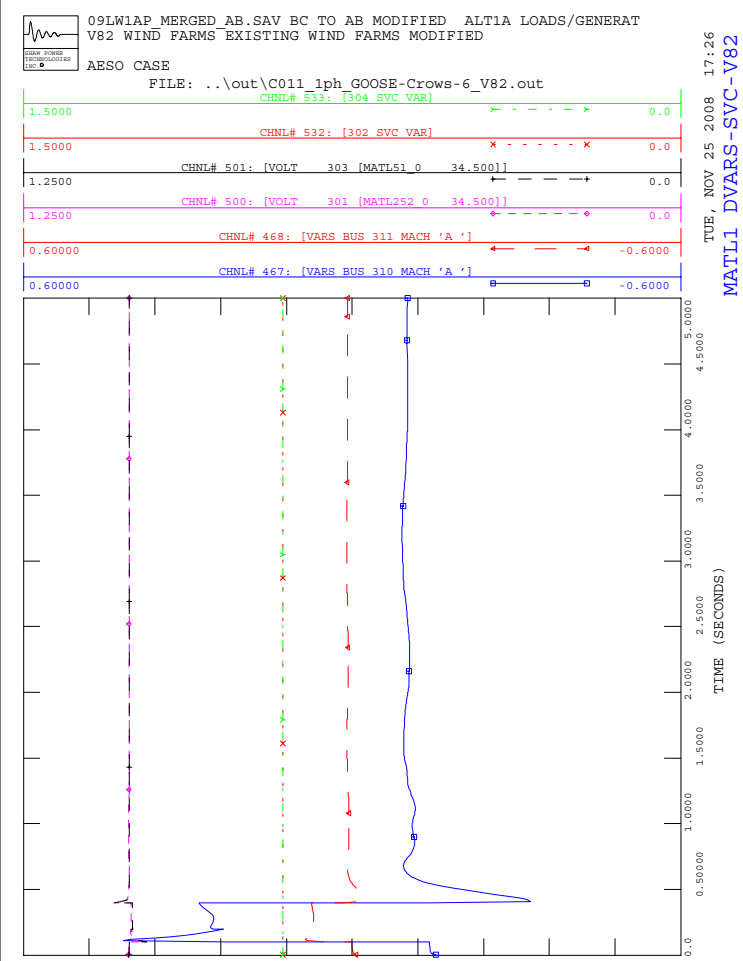


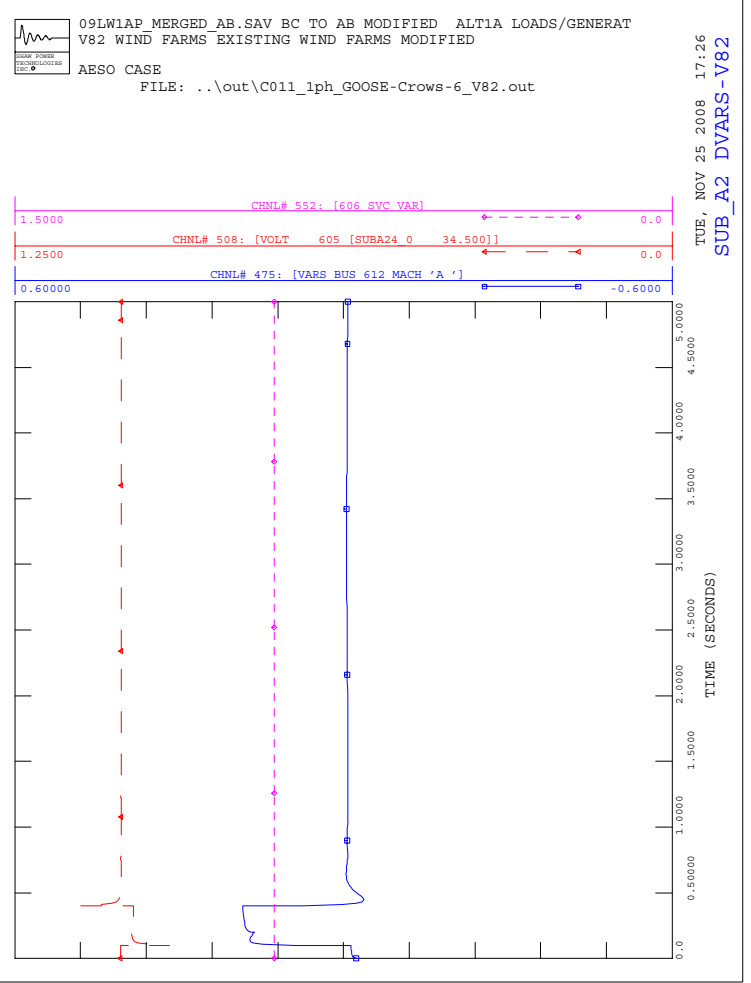
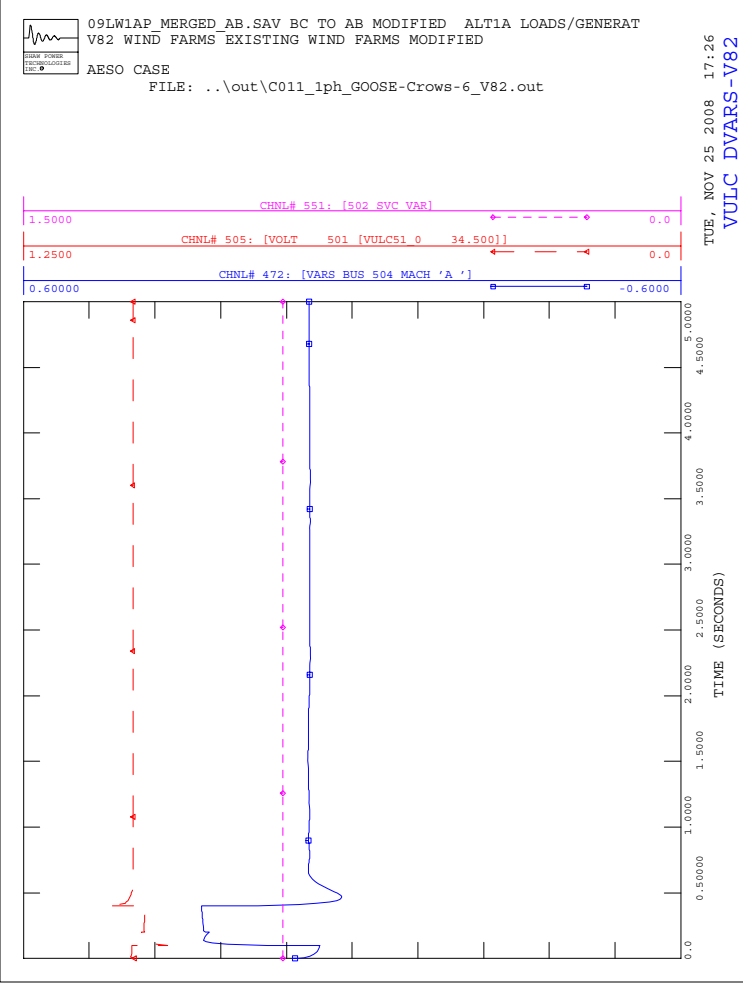
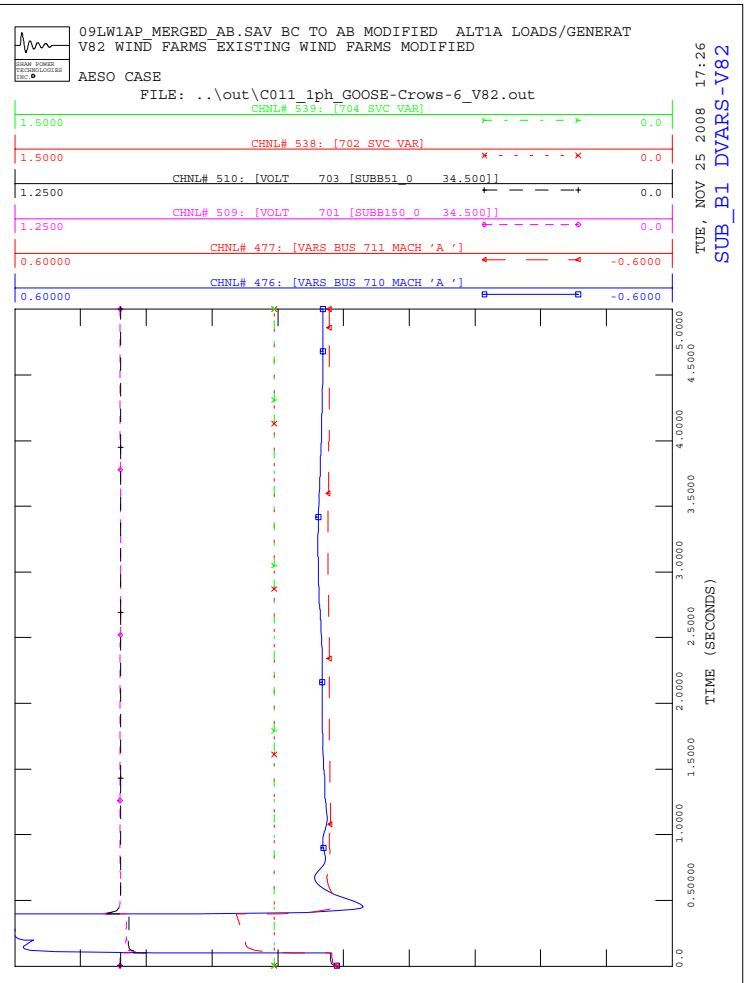
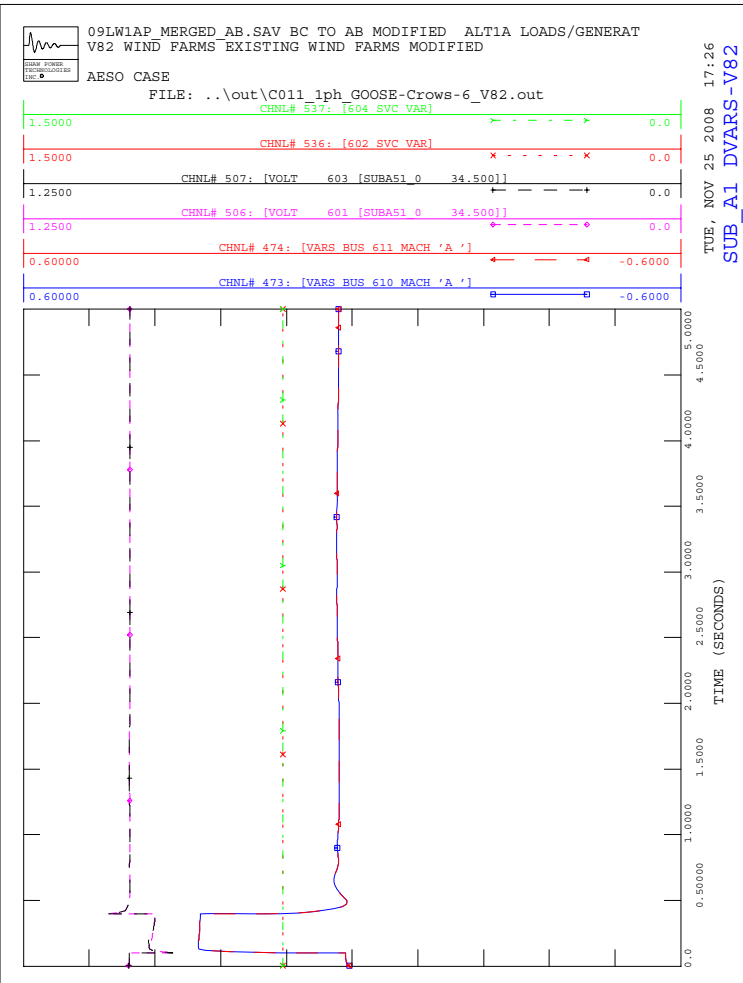


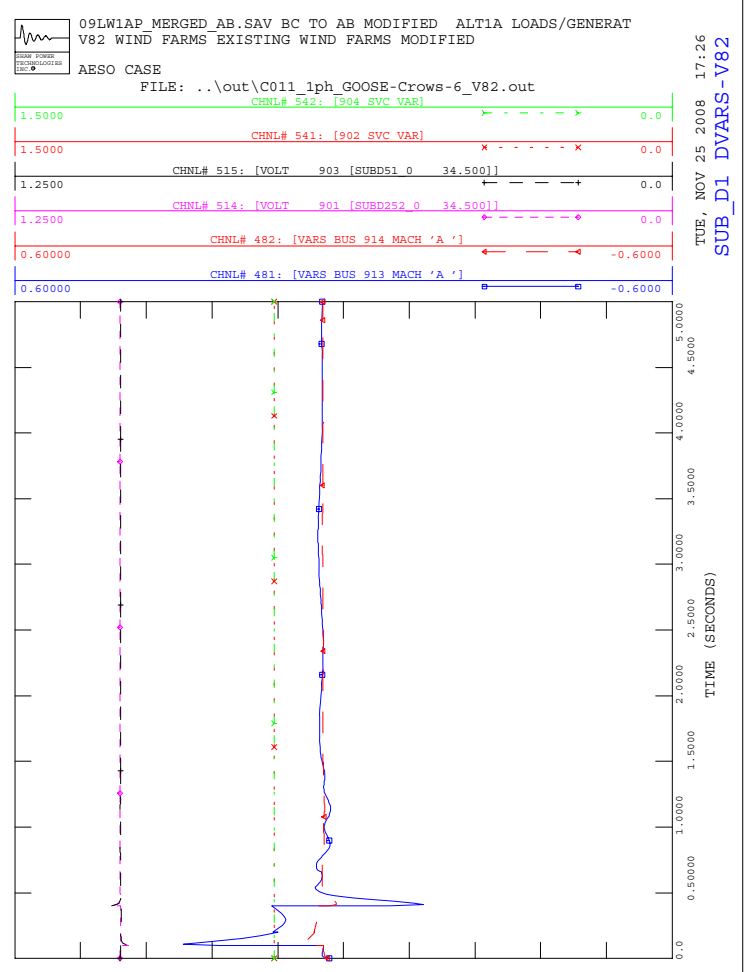
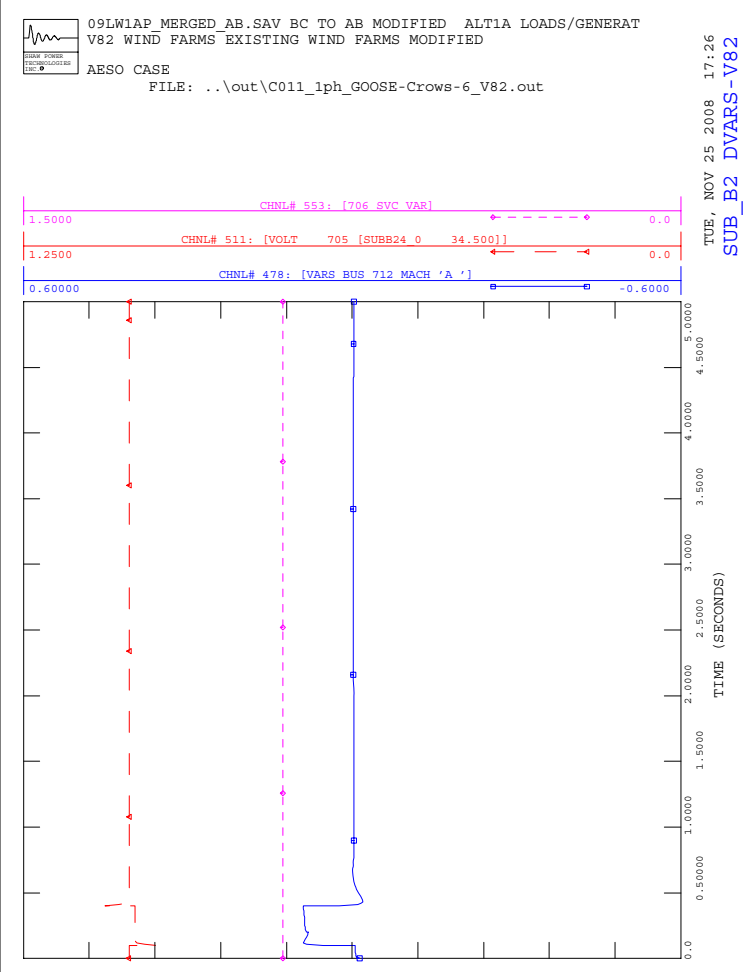
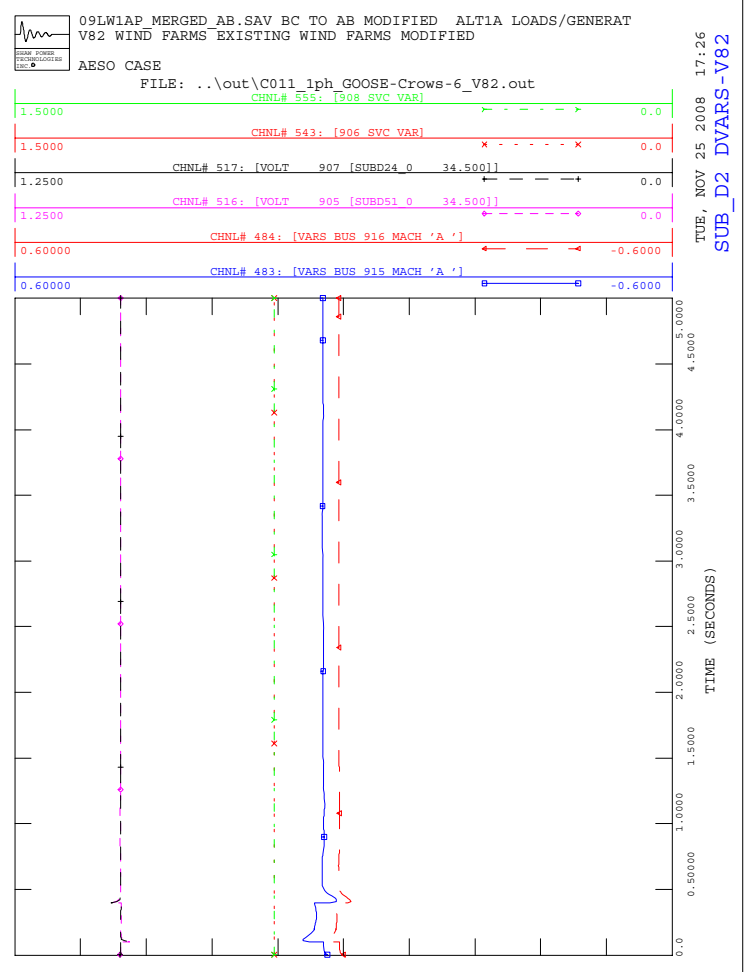
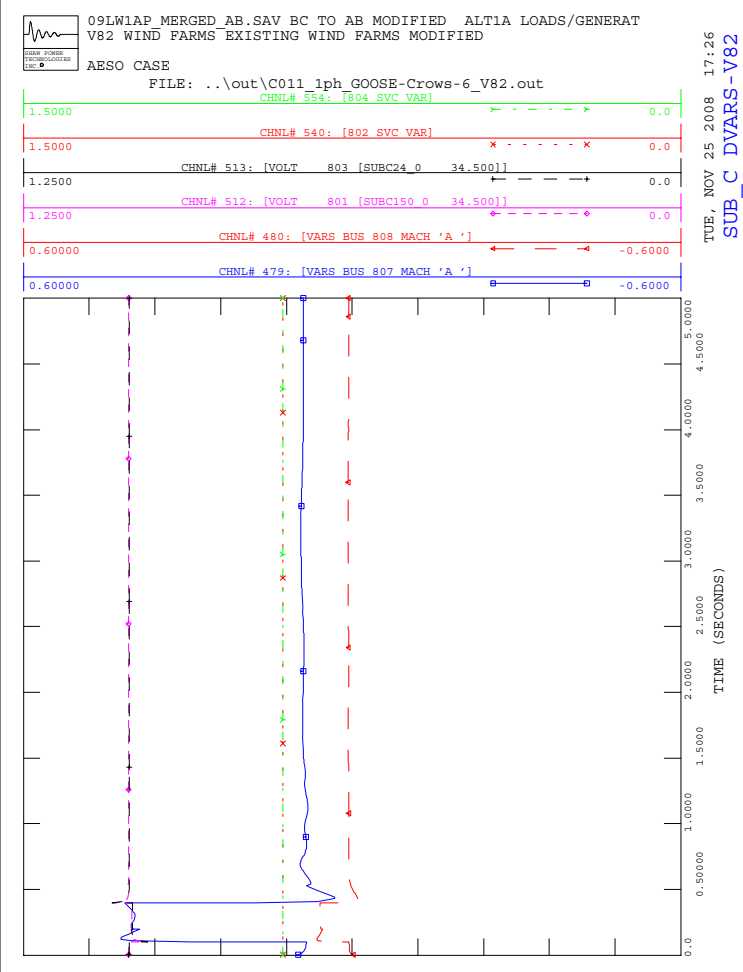


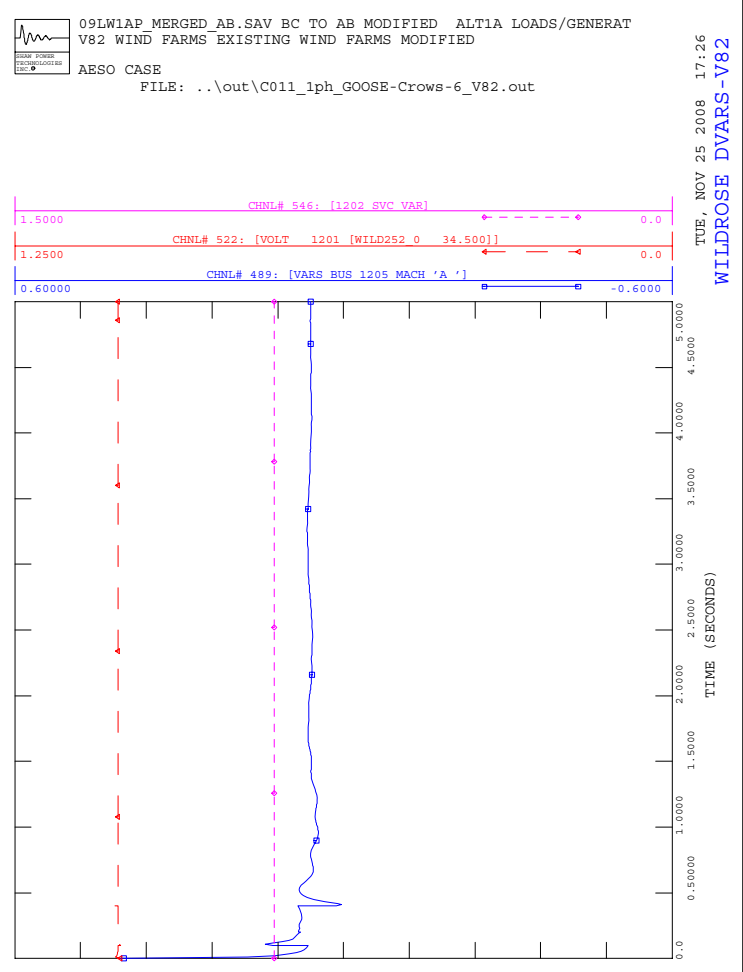
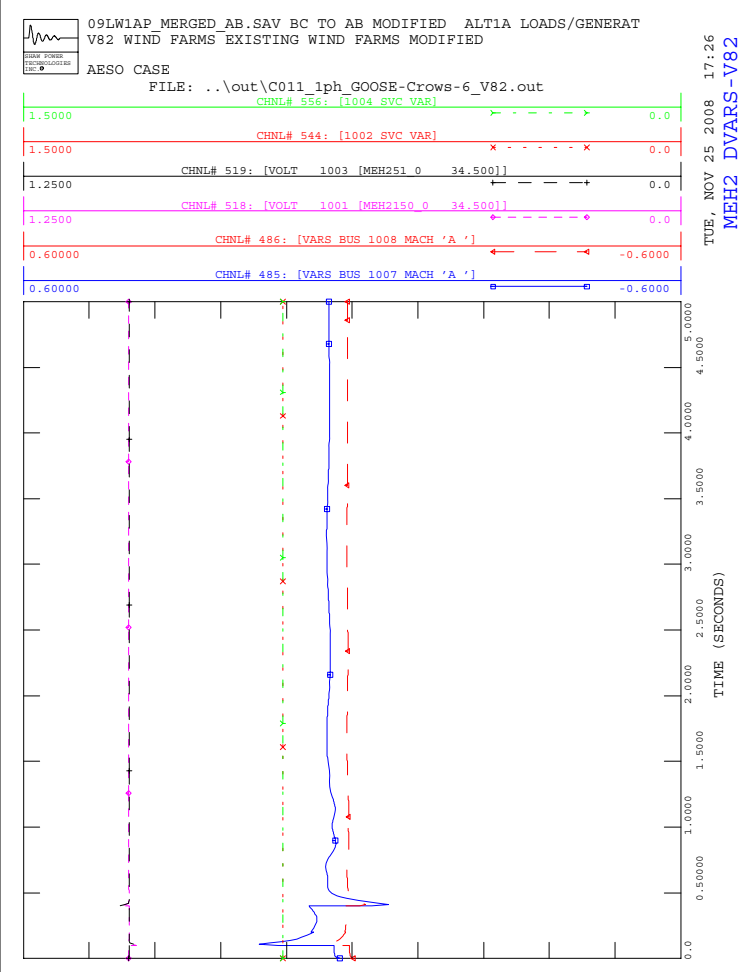
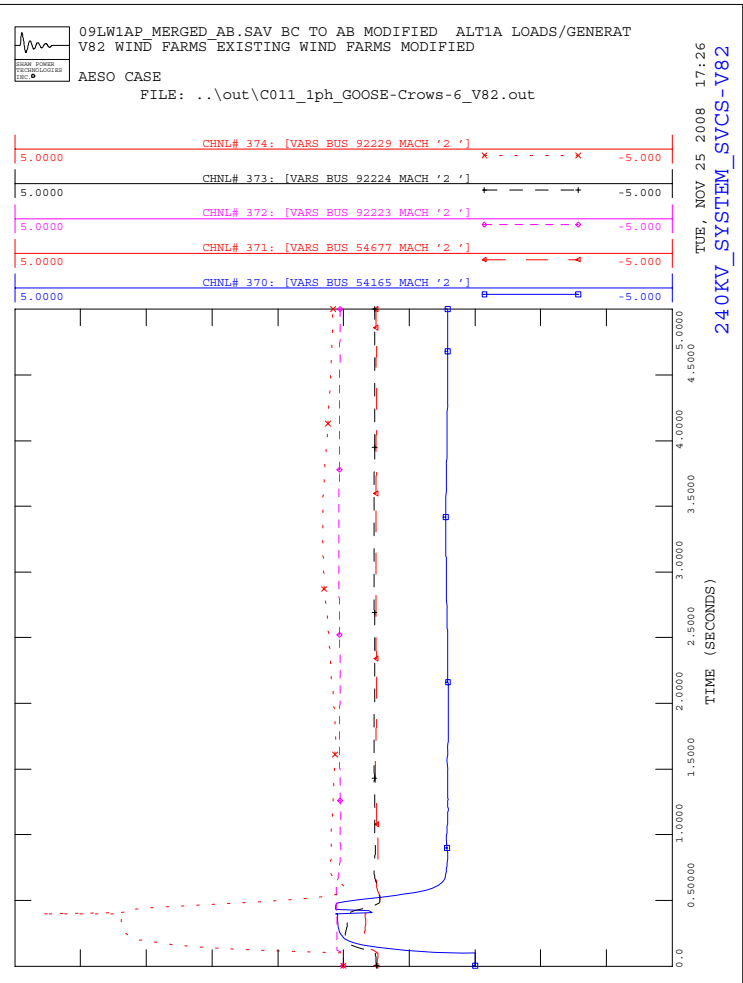
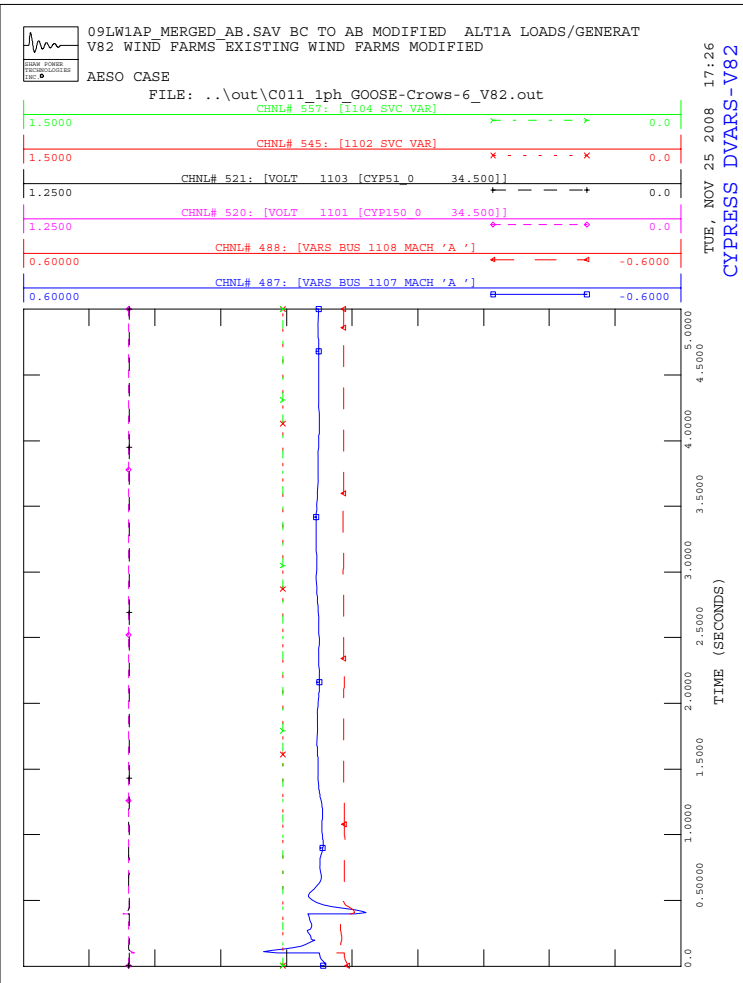








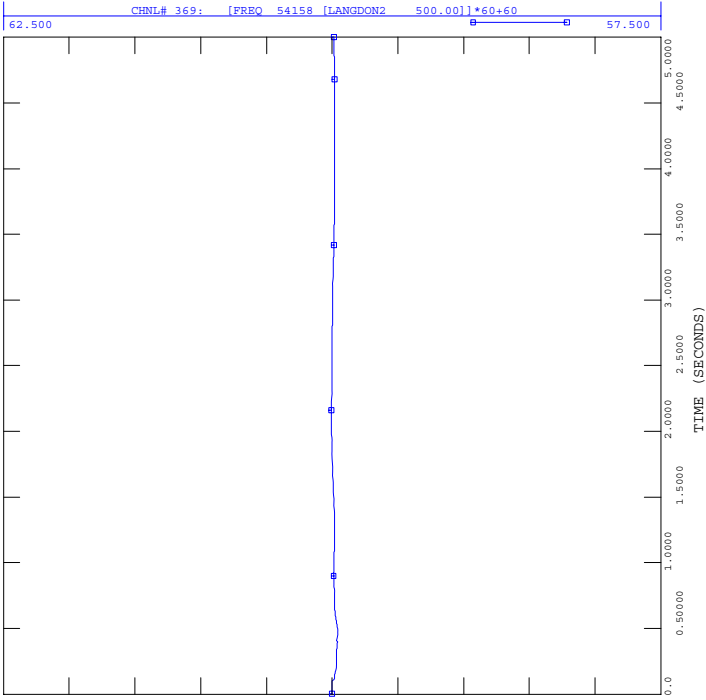






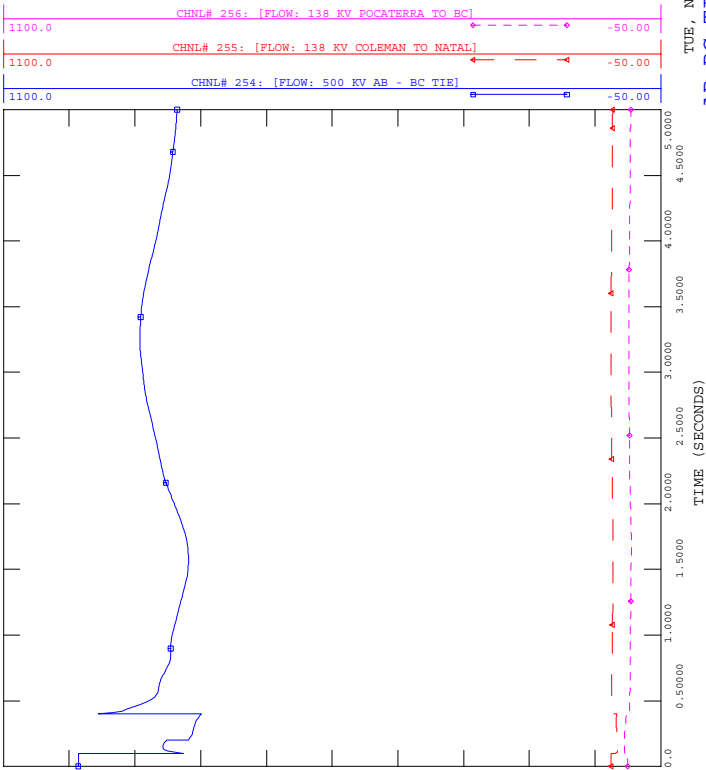
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C011_1ph_GOOSE-Crows-6_V82.out

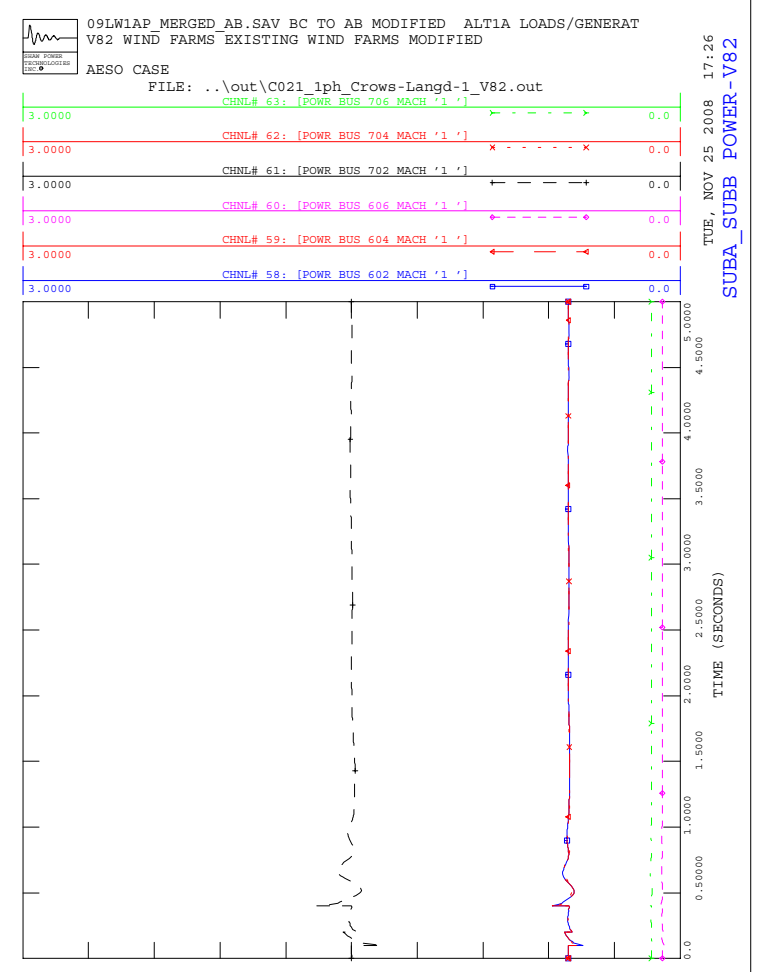
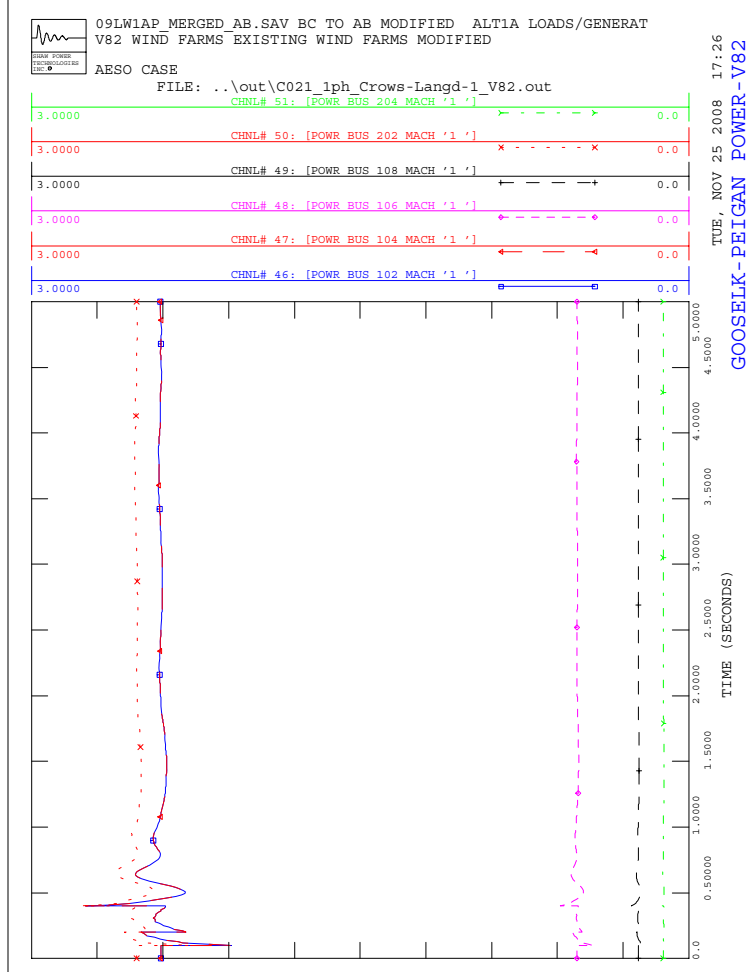
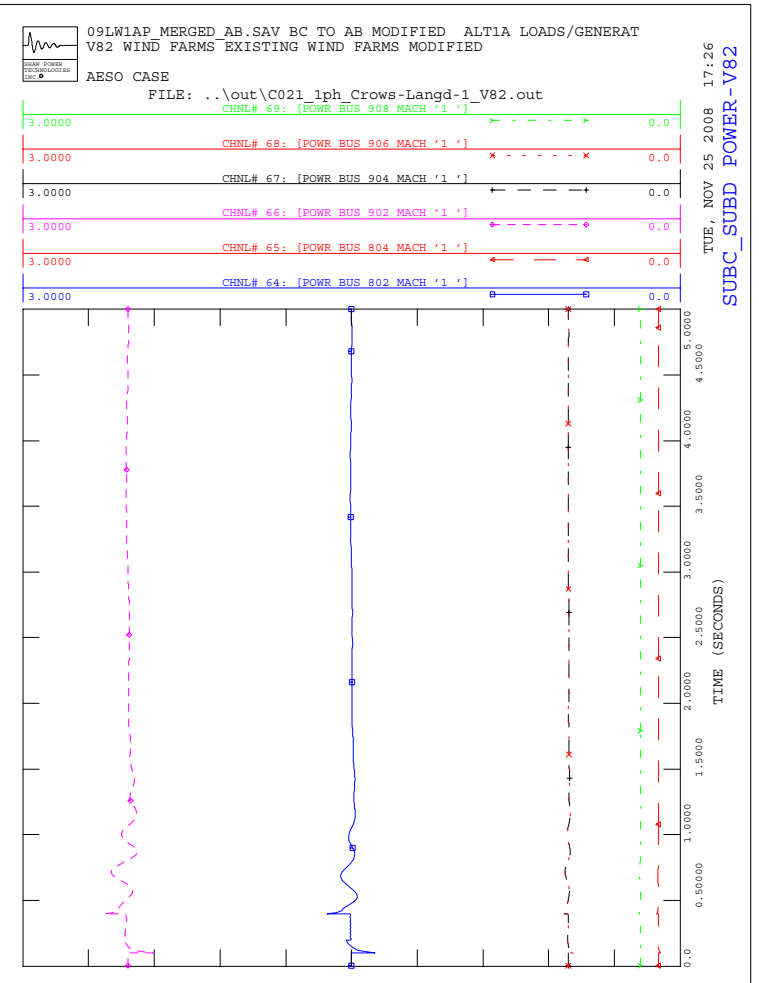
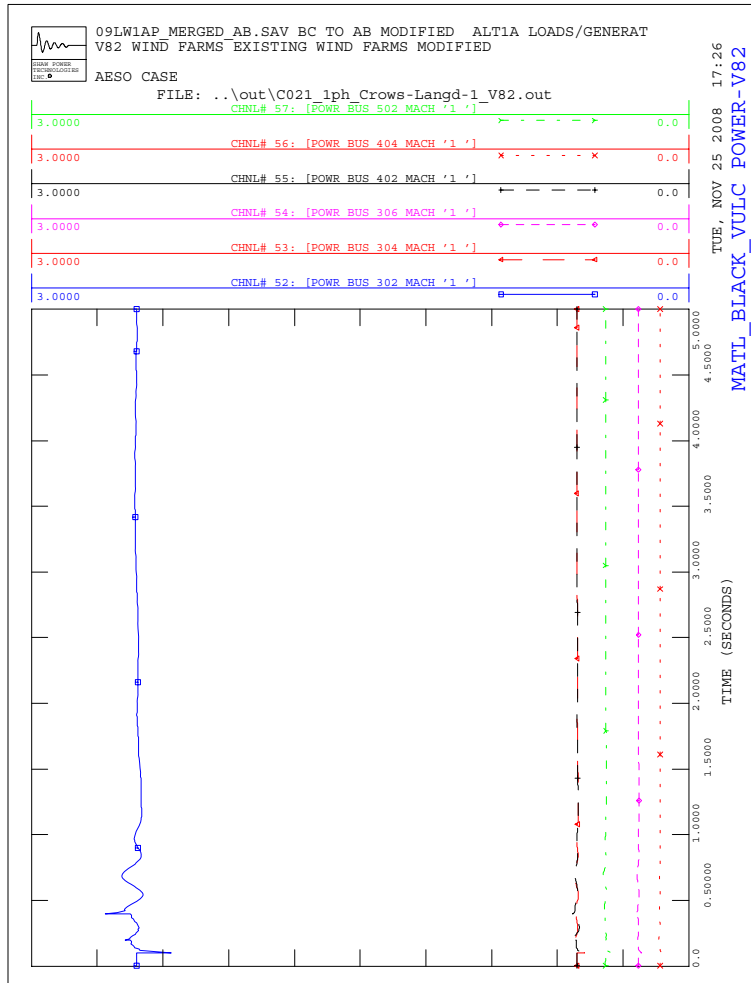
TUE, NOV 25 2008 17:26
LANGDON_FRQ-V82

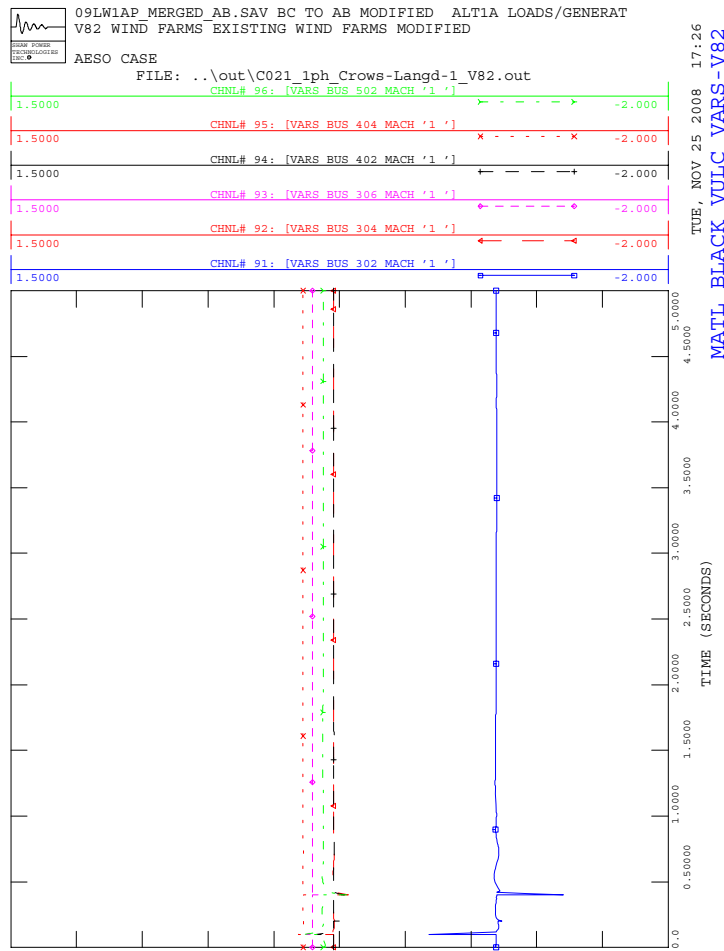
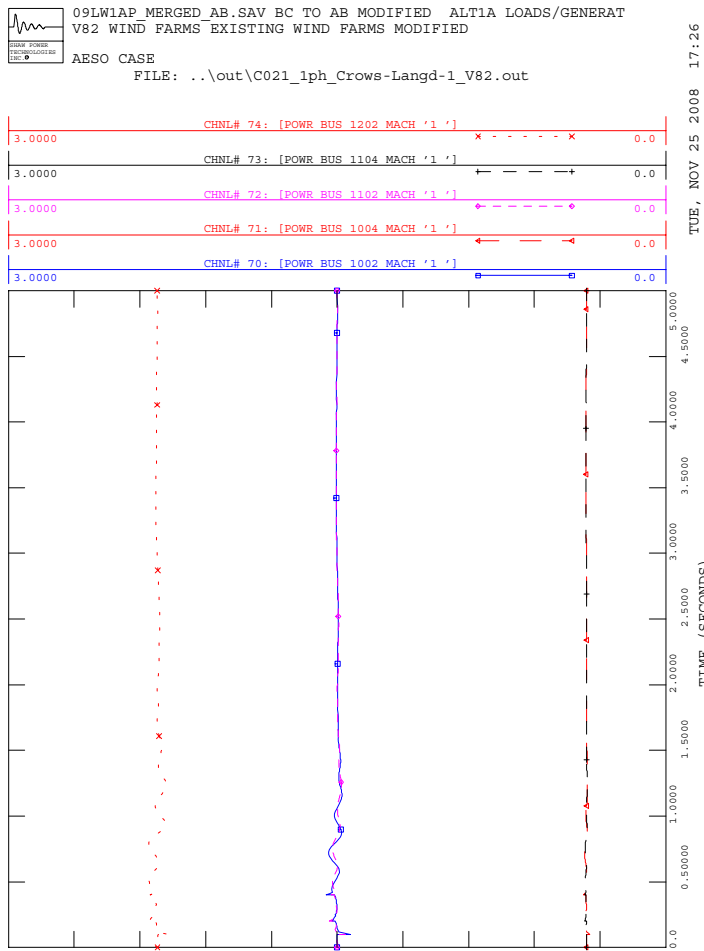
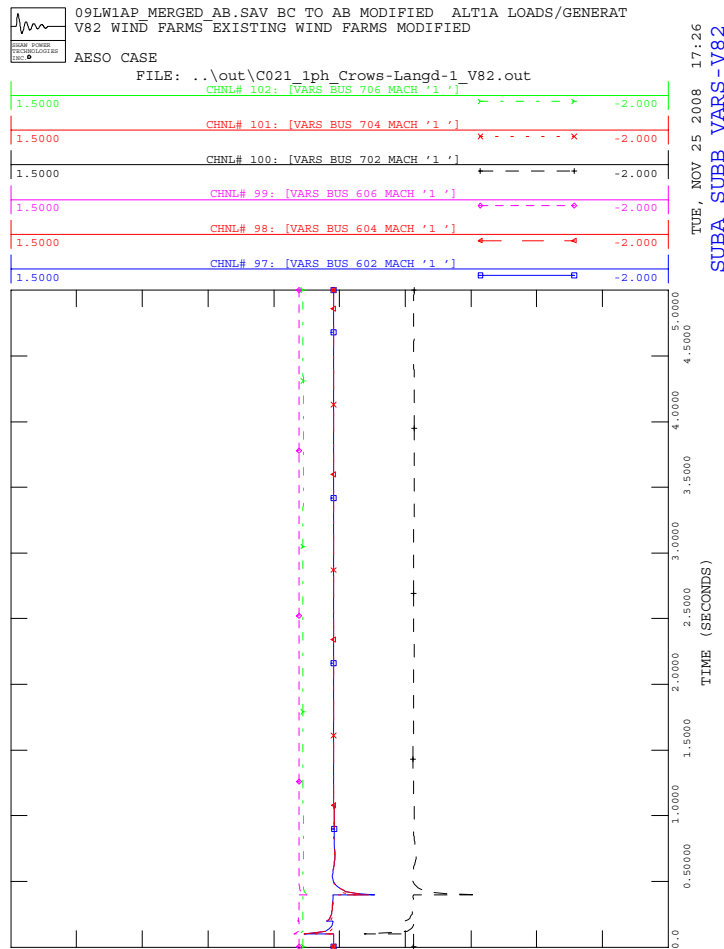
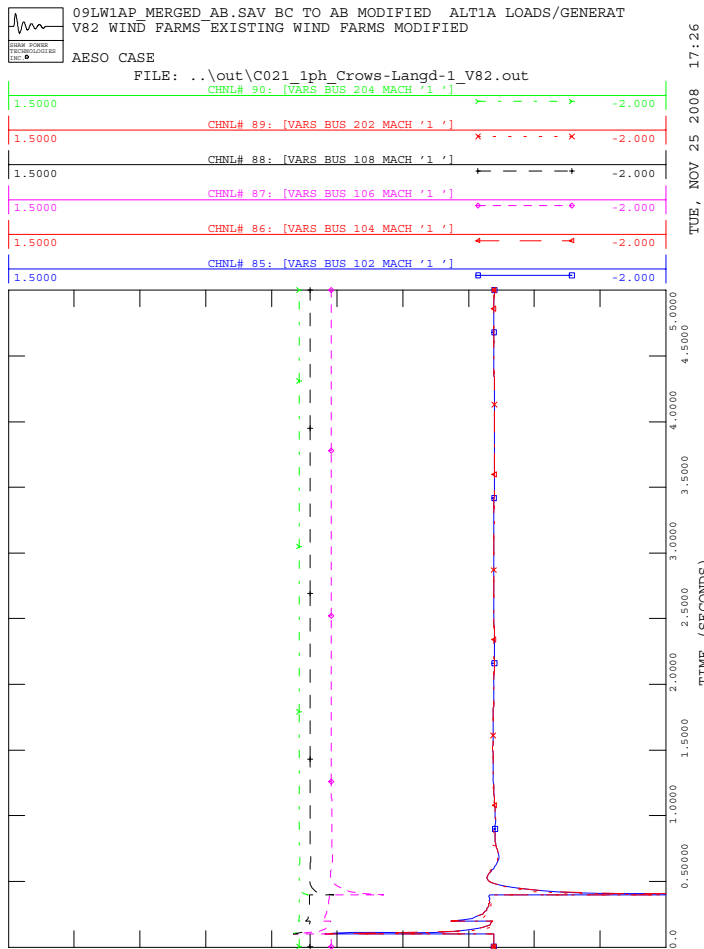


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C011_1ph_GOOSE-Crows-6_V82.out

TUE, NOV 25 2008 17:26
AB_BC_TIE_FLOWS-V82





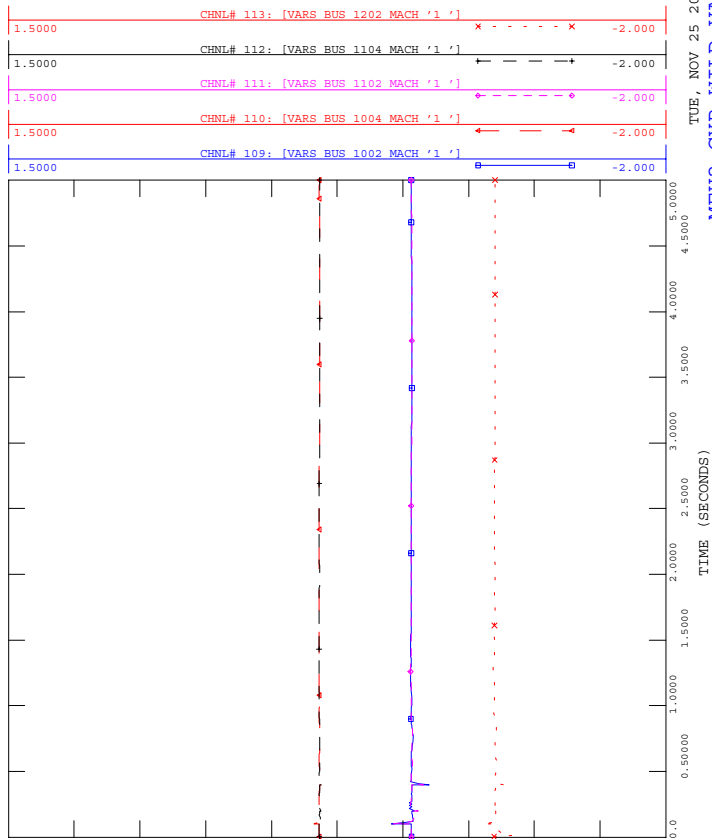


09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED



ABSO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



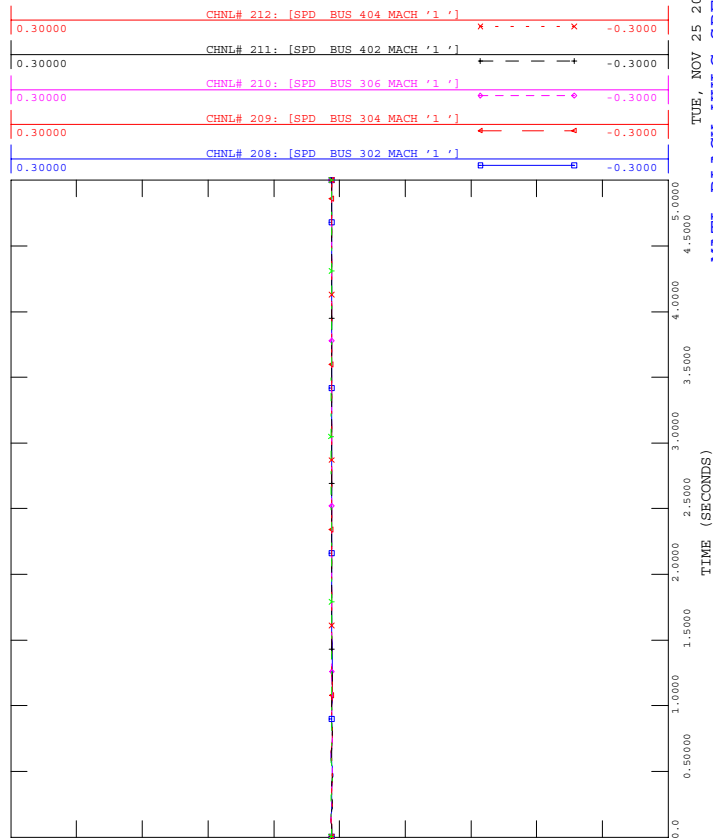
TUE, NOV 25 2008 17:26
MEH2_CYP_WILD_VARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED



ABSO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



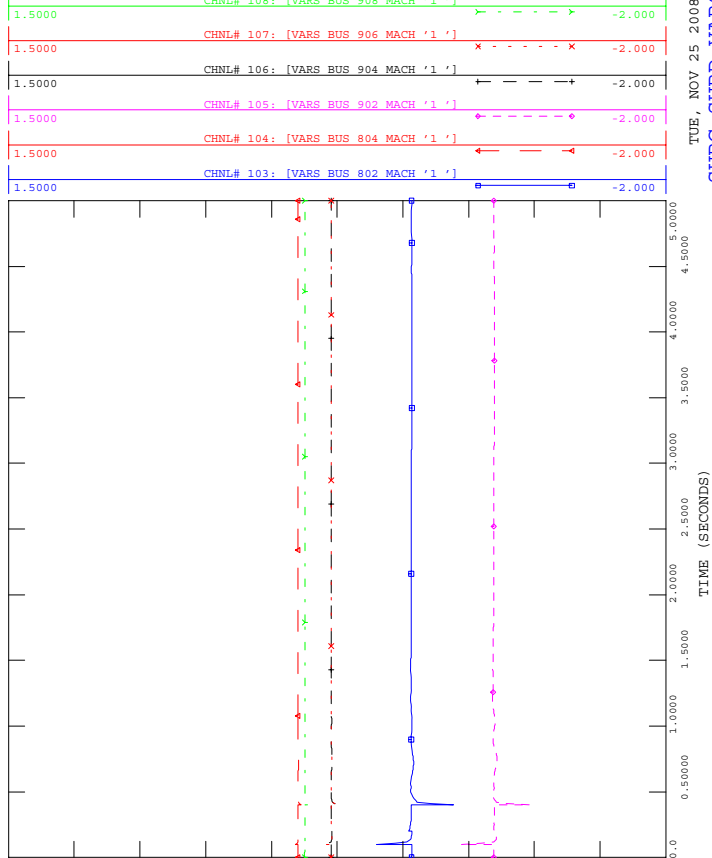
TUE, NOV 25 2008 17:26
MAIL_BLACK_VULC_SPEED-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED



ABSO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



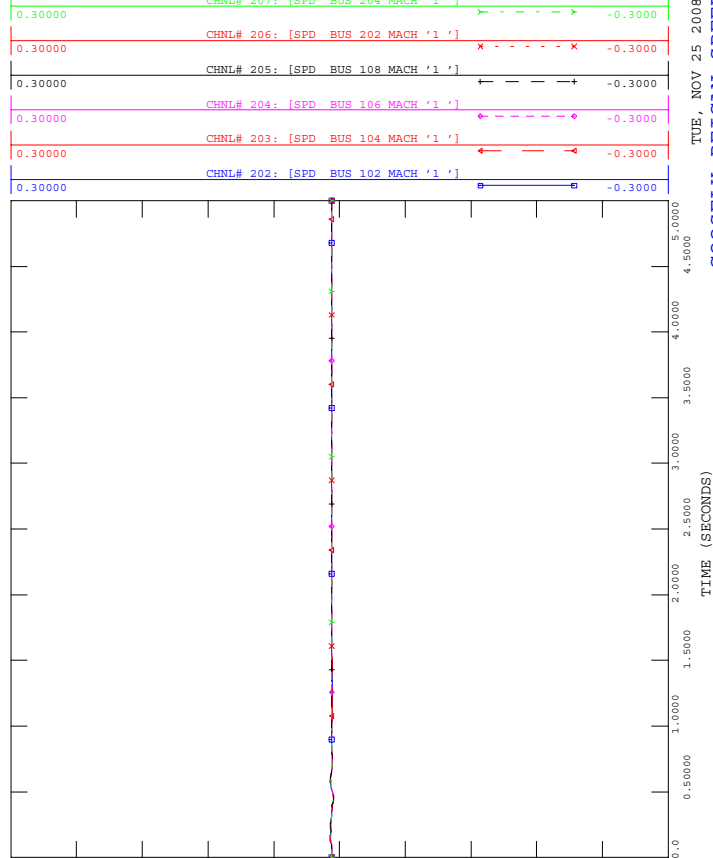
TUE, NOV 25 2008 17:26
SUBC_SUBD_VARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

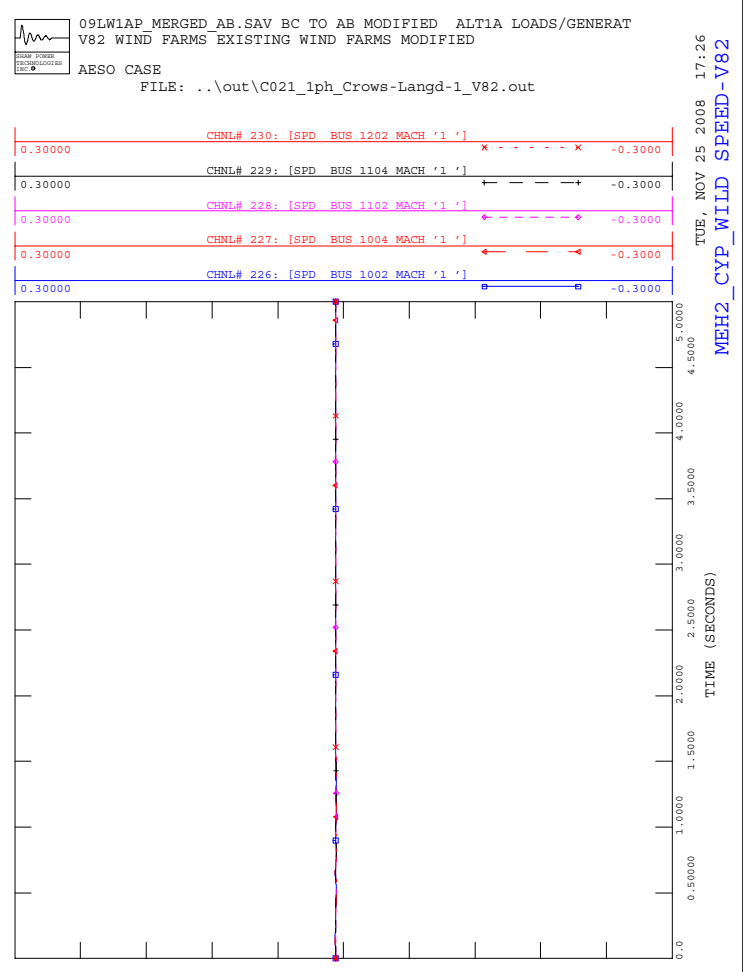
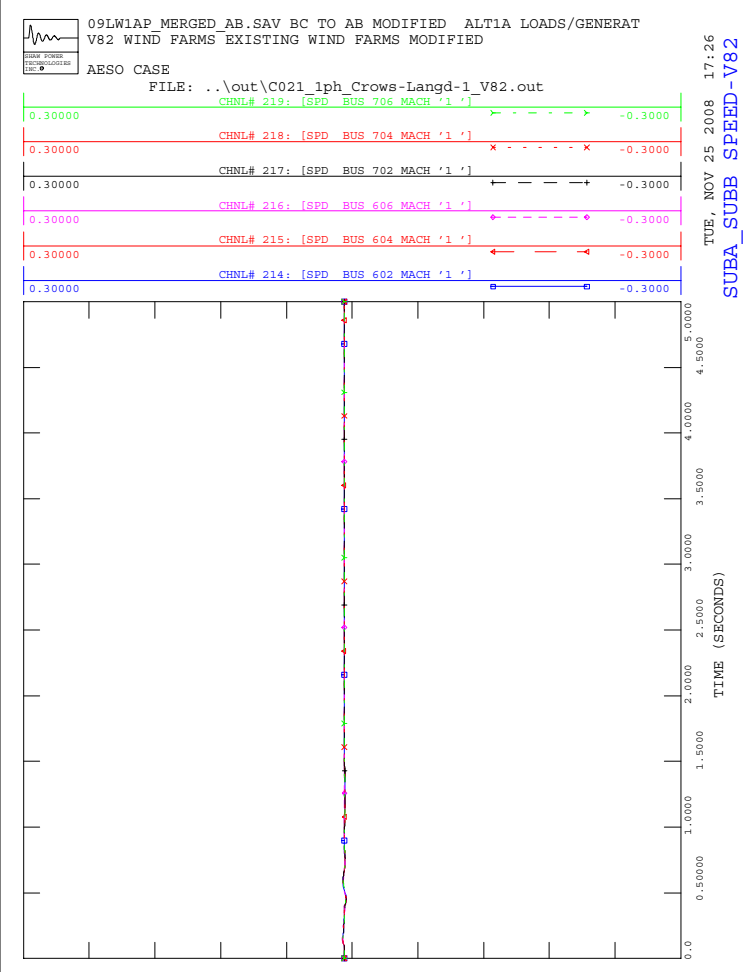
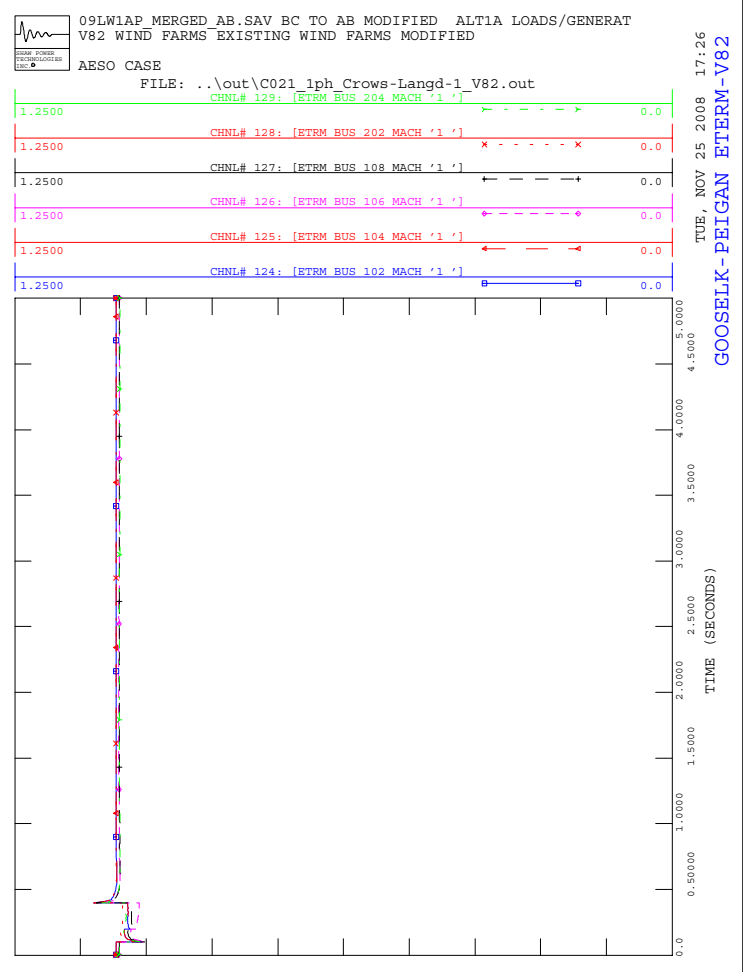
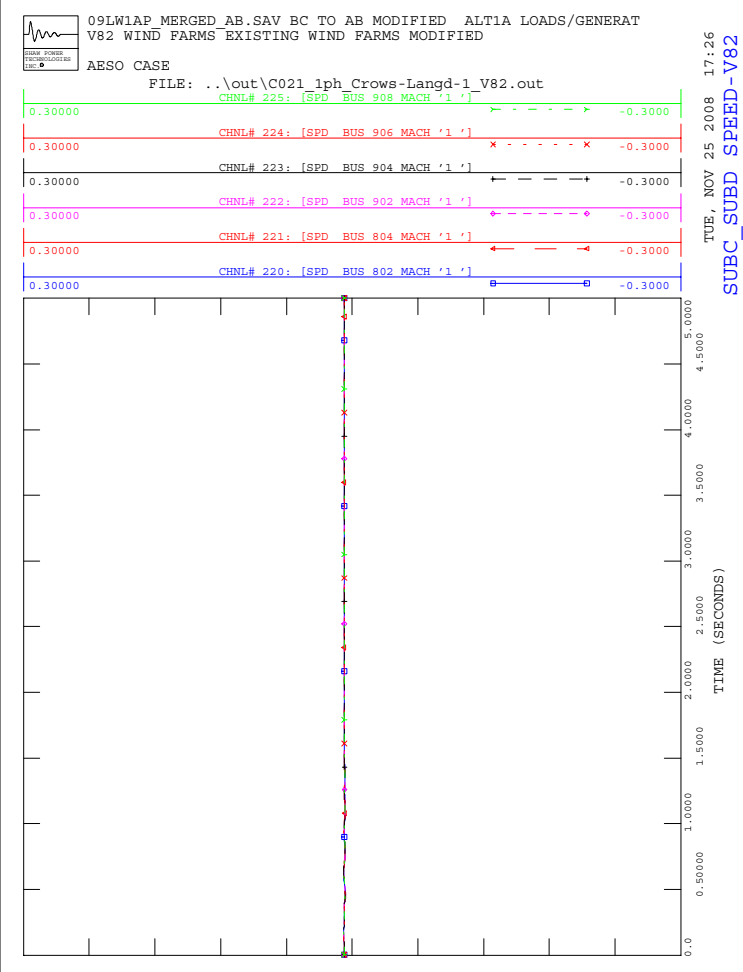


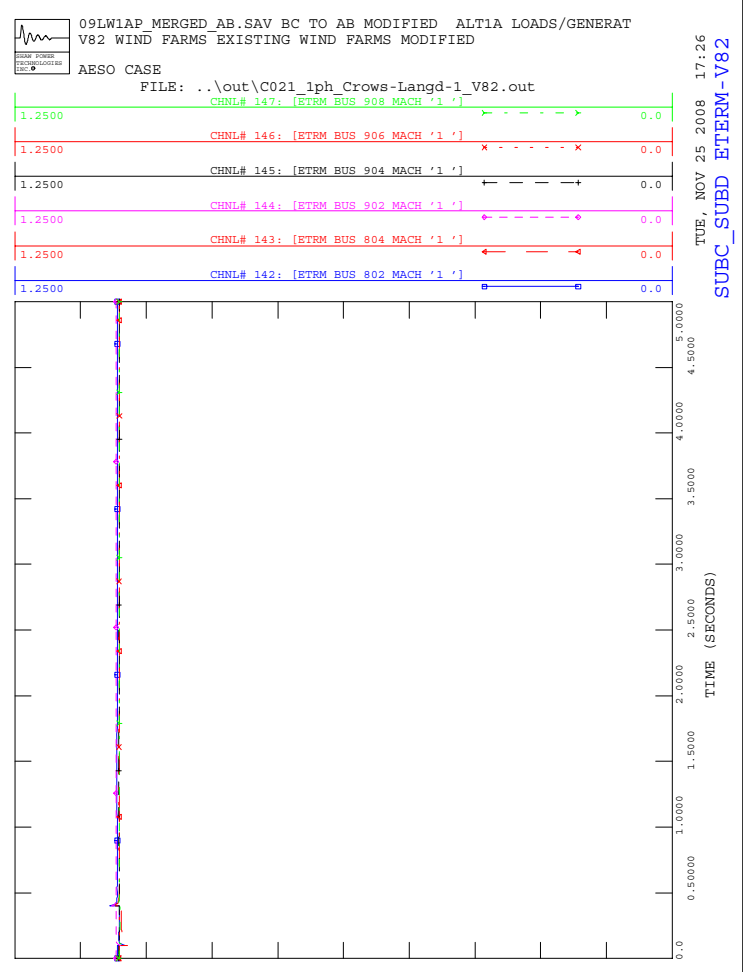
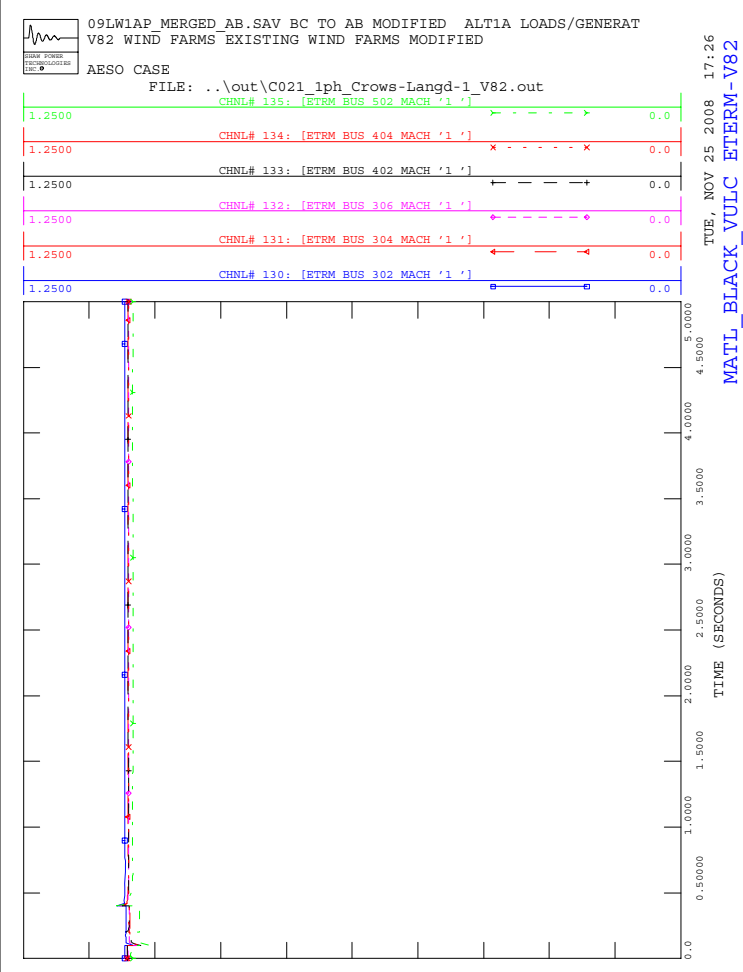
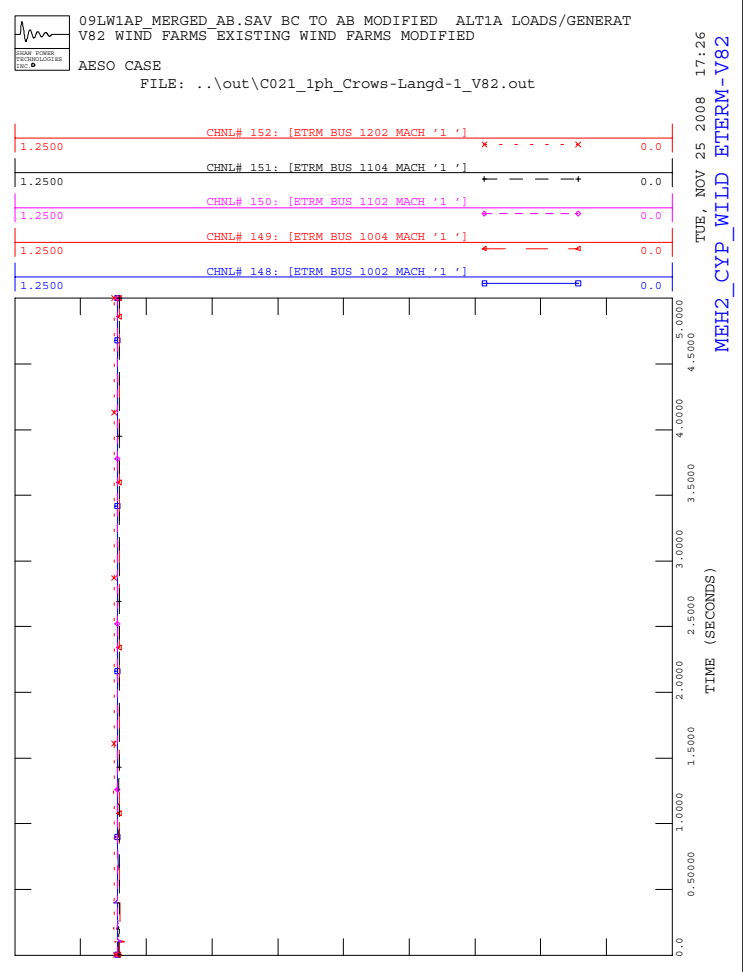
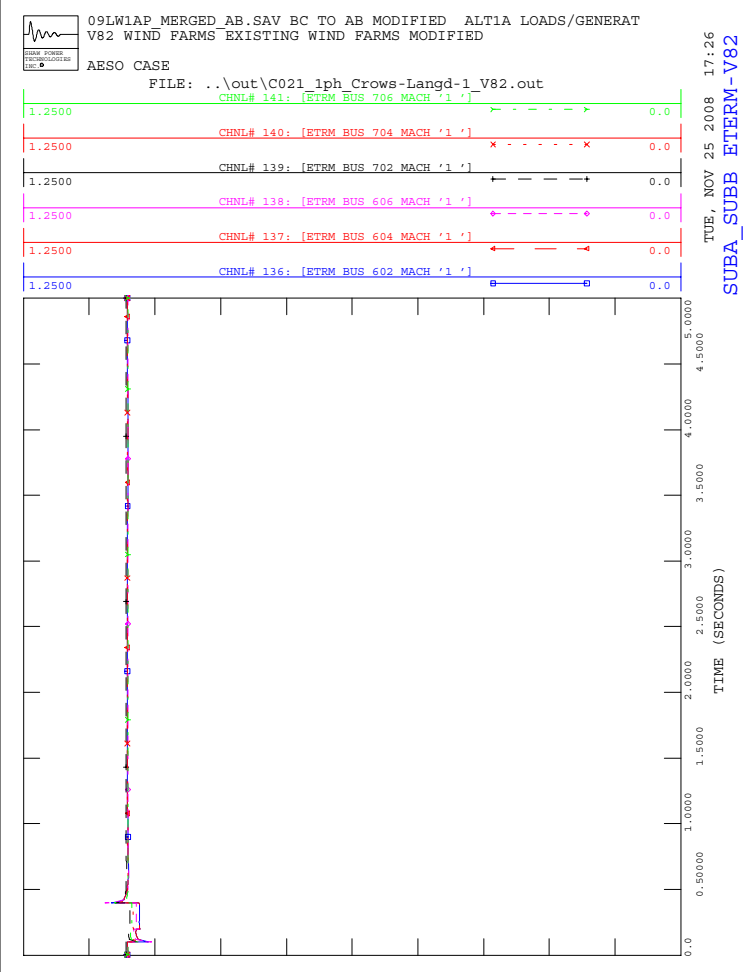
ABSO CASE

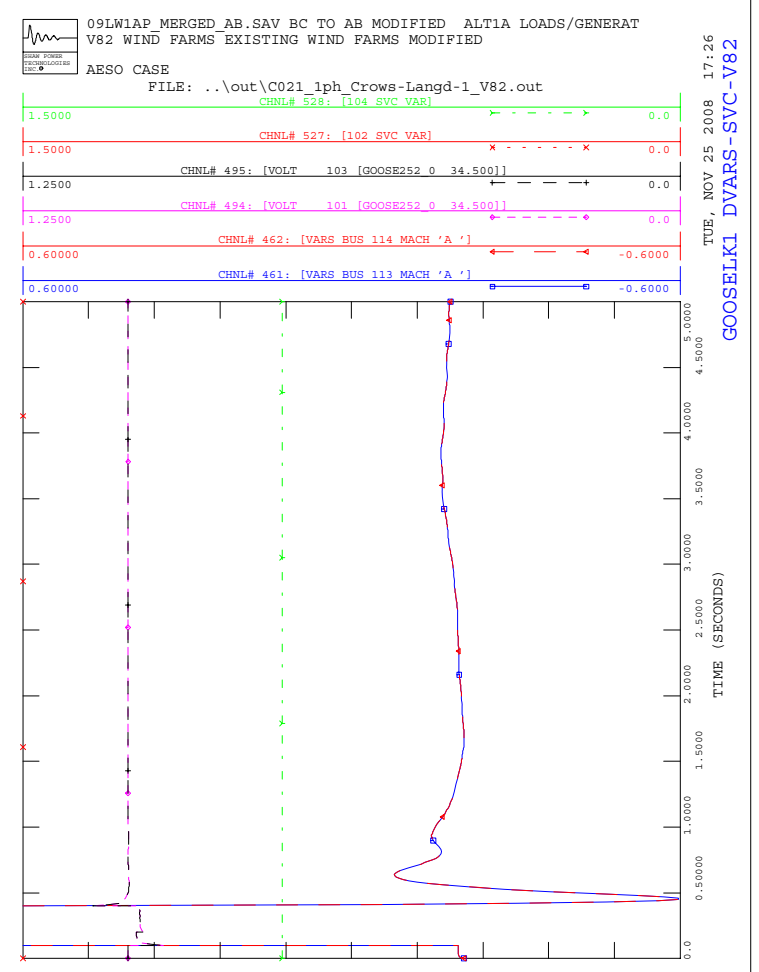
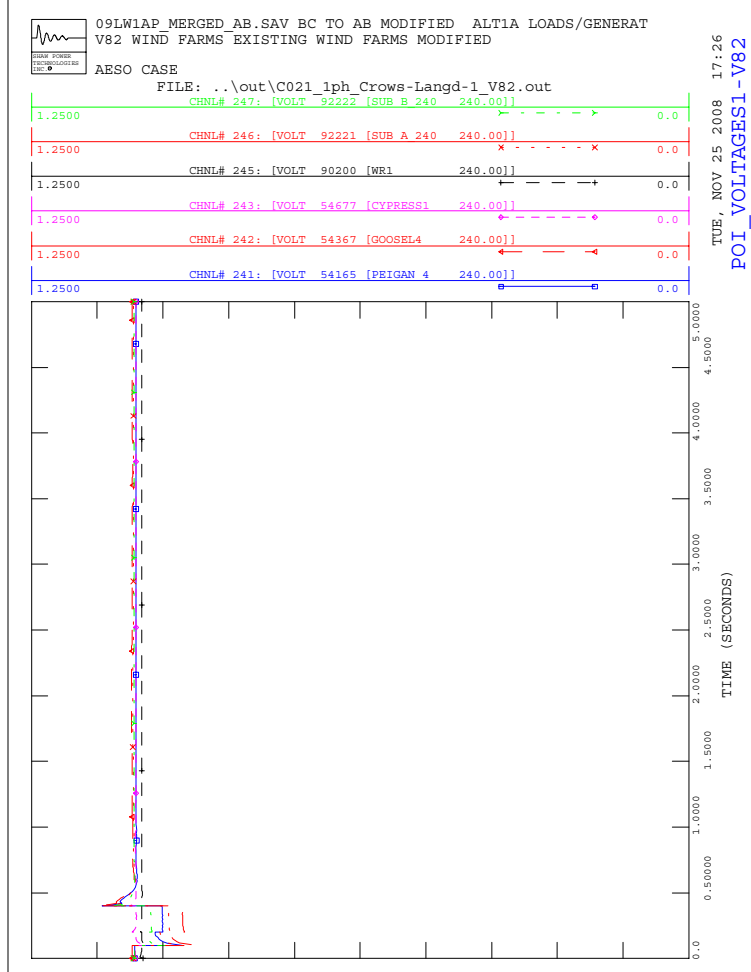
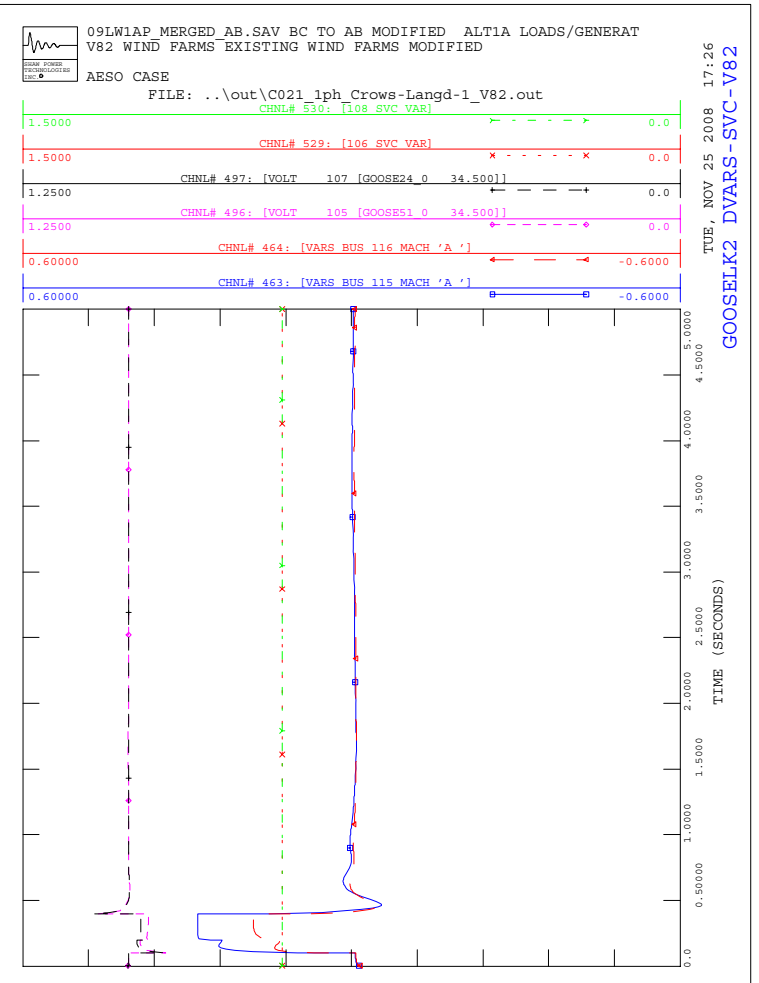
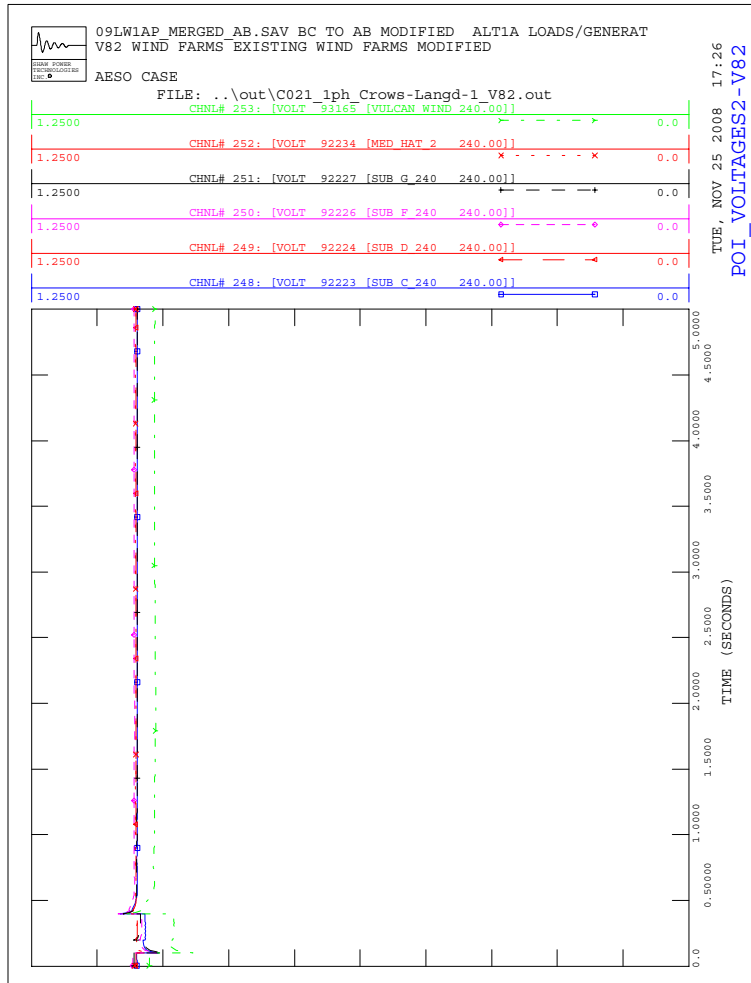
FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



TUE, NOV 25 2008 17:26
GOOSELK-PEIGAN_SPEED-V82

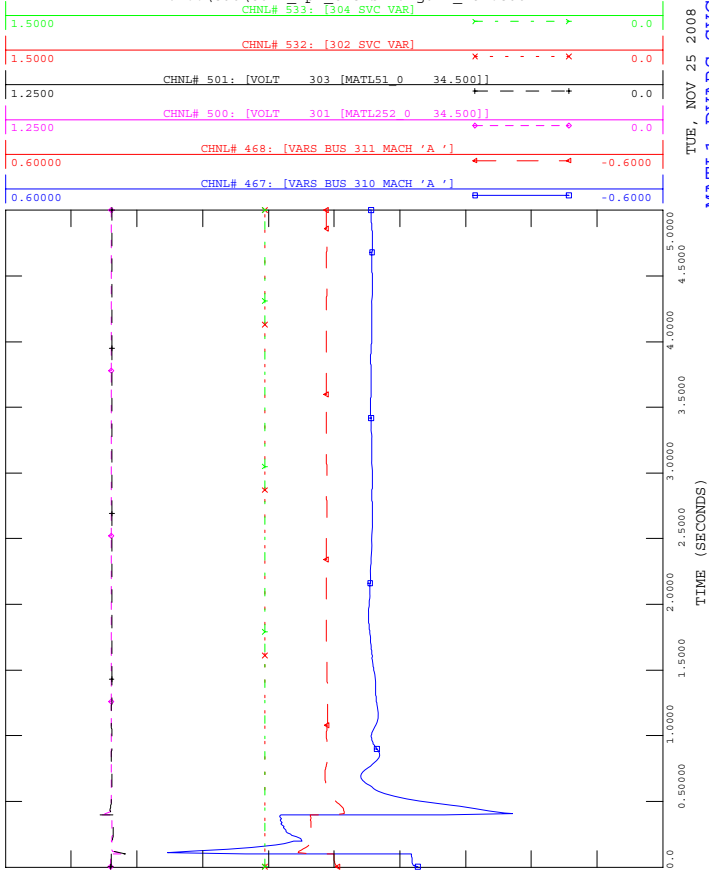






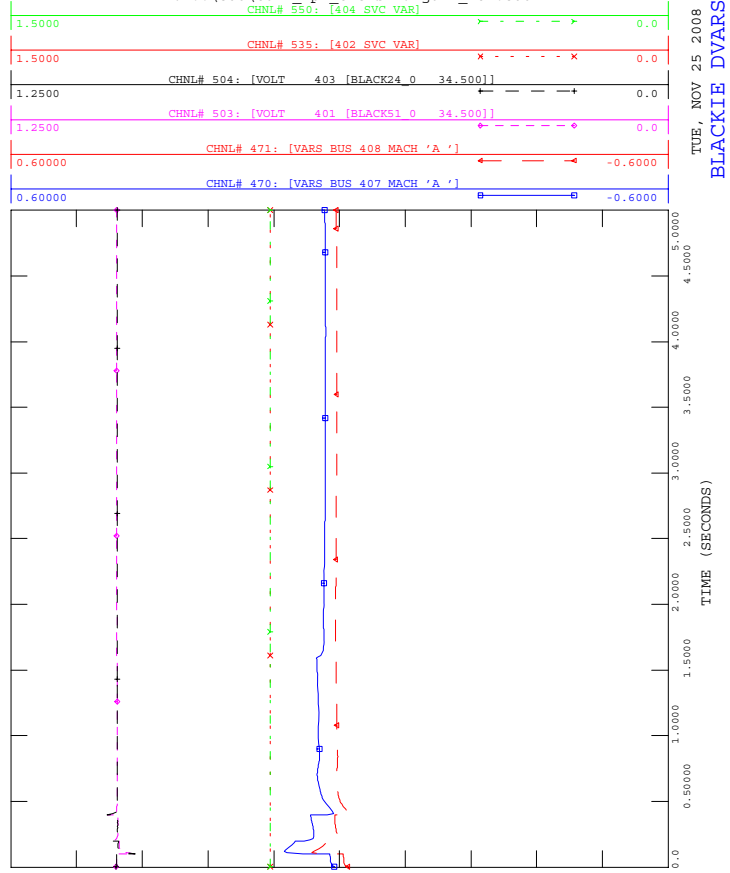
09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



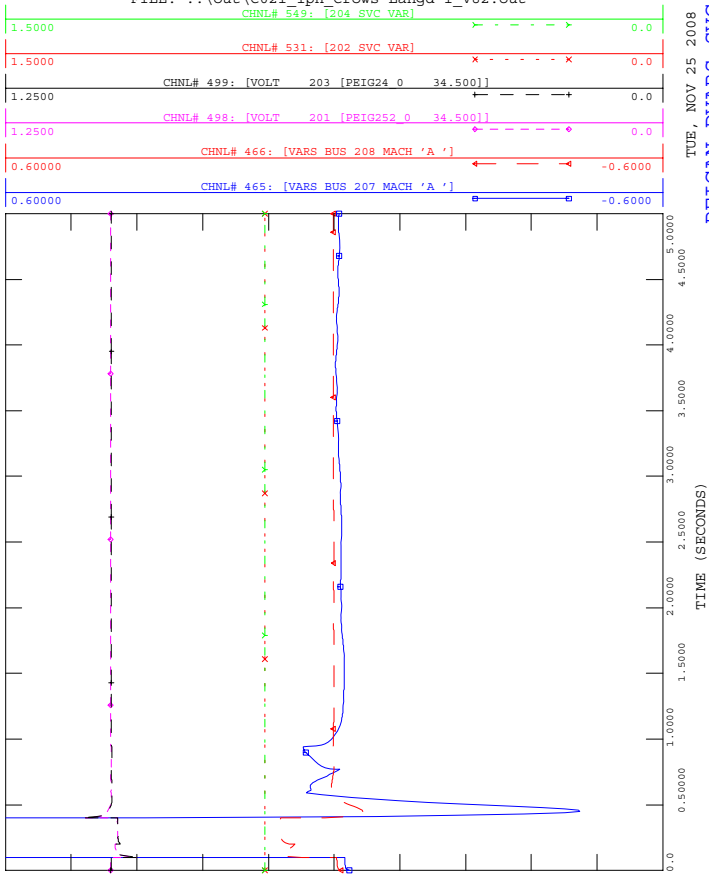
09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



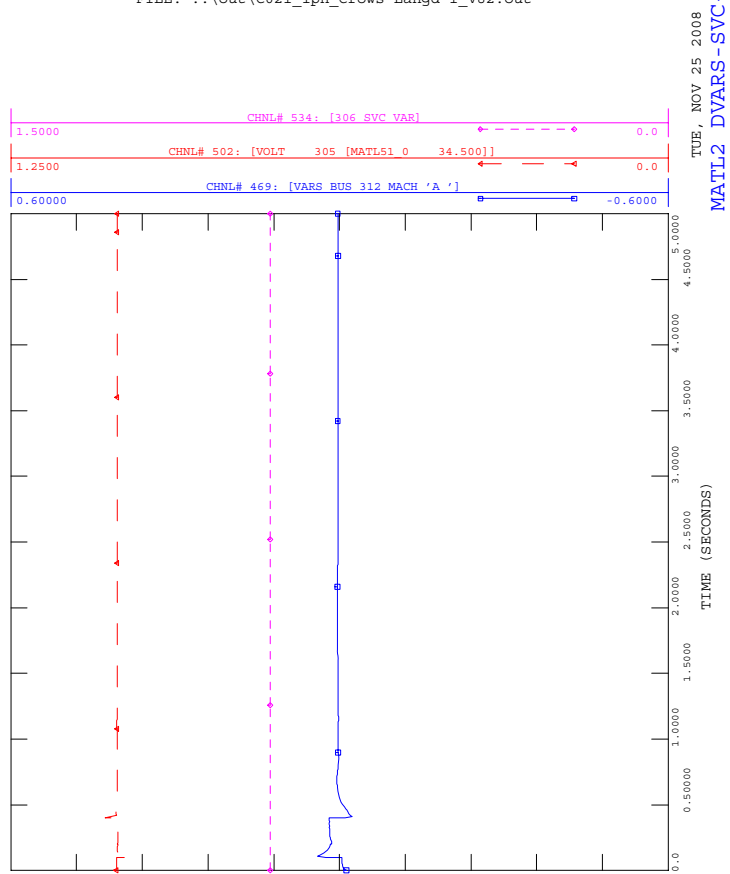
09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

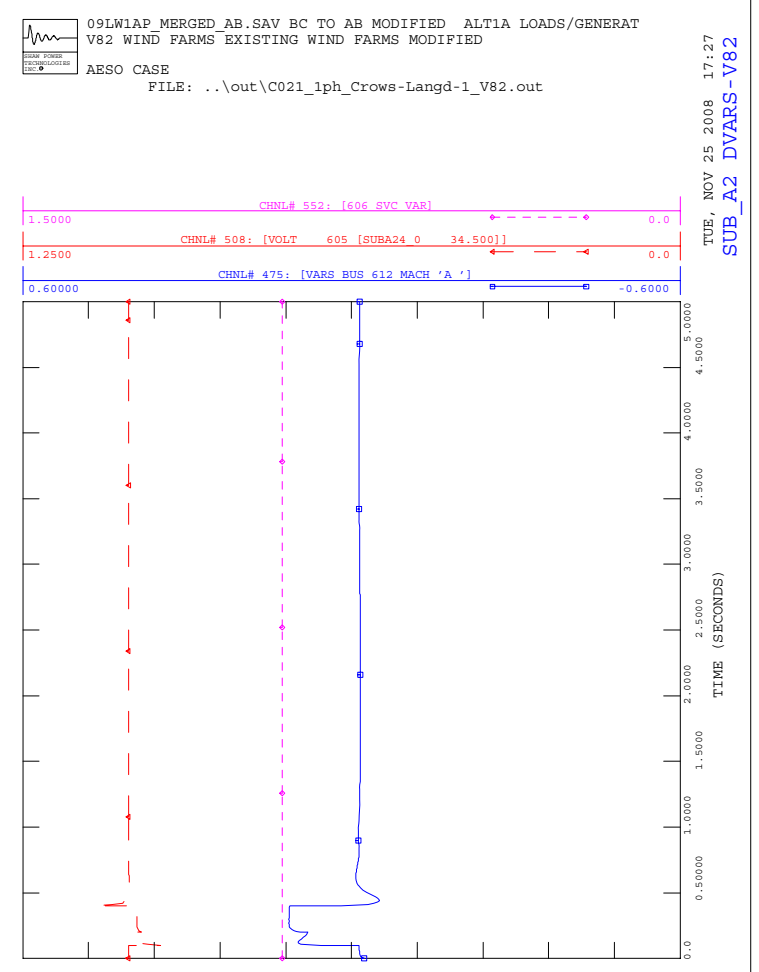
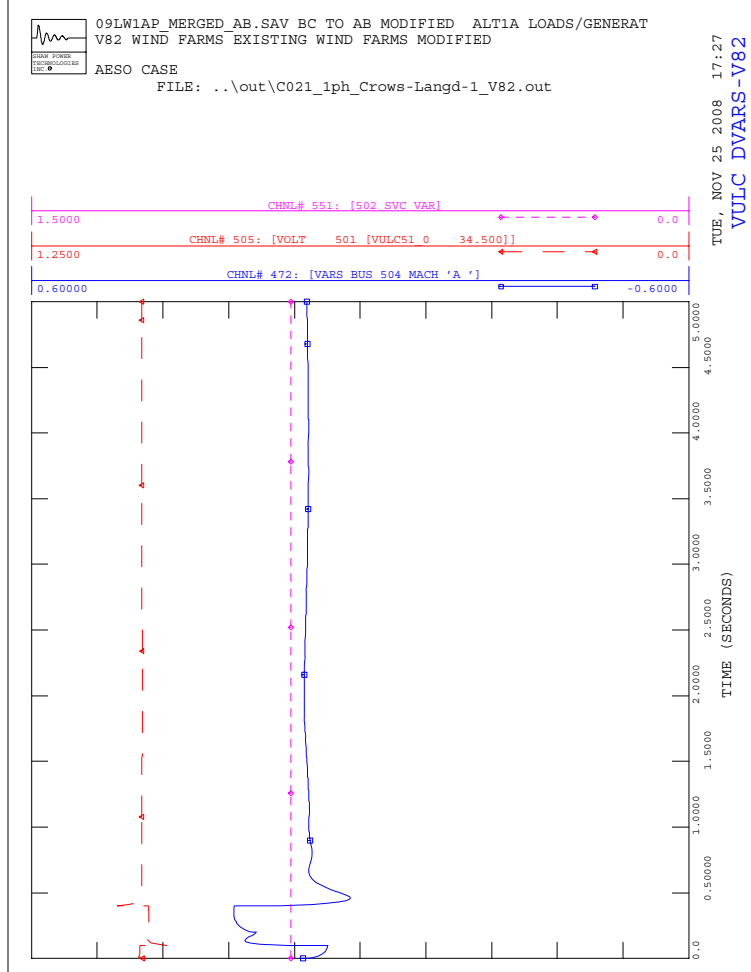
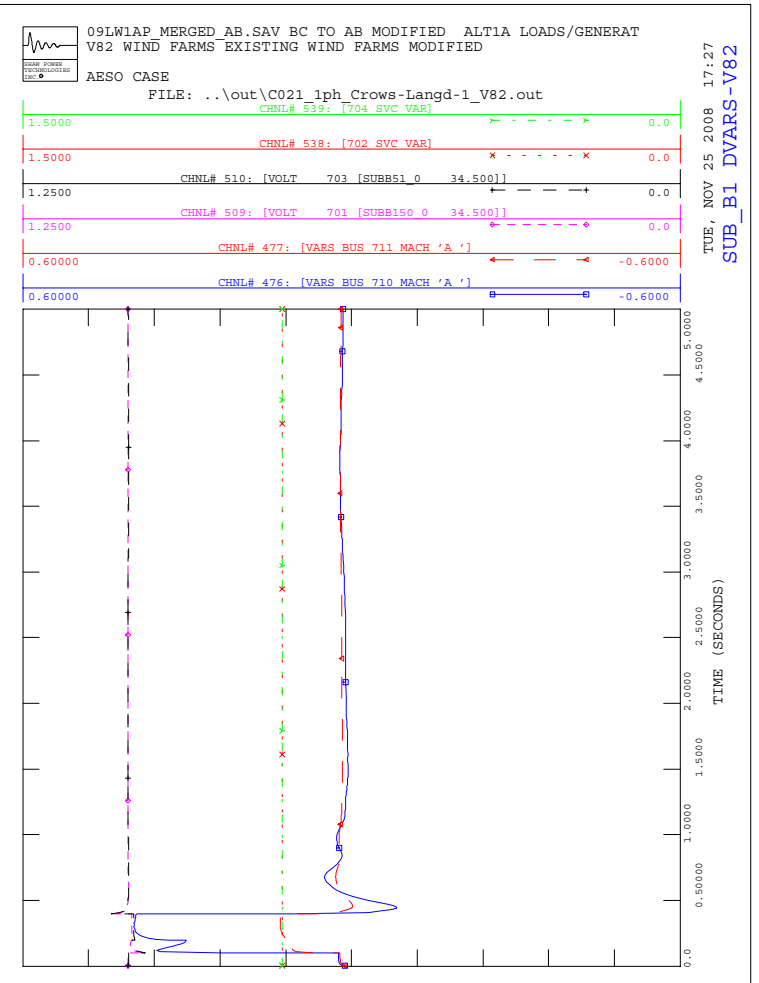
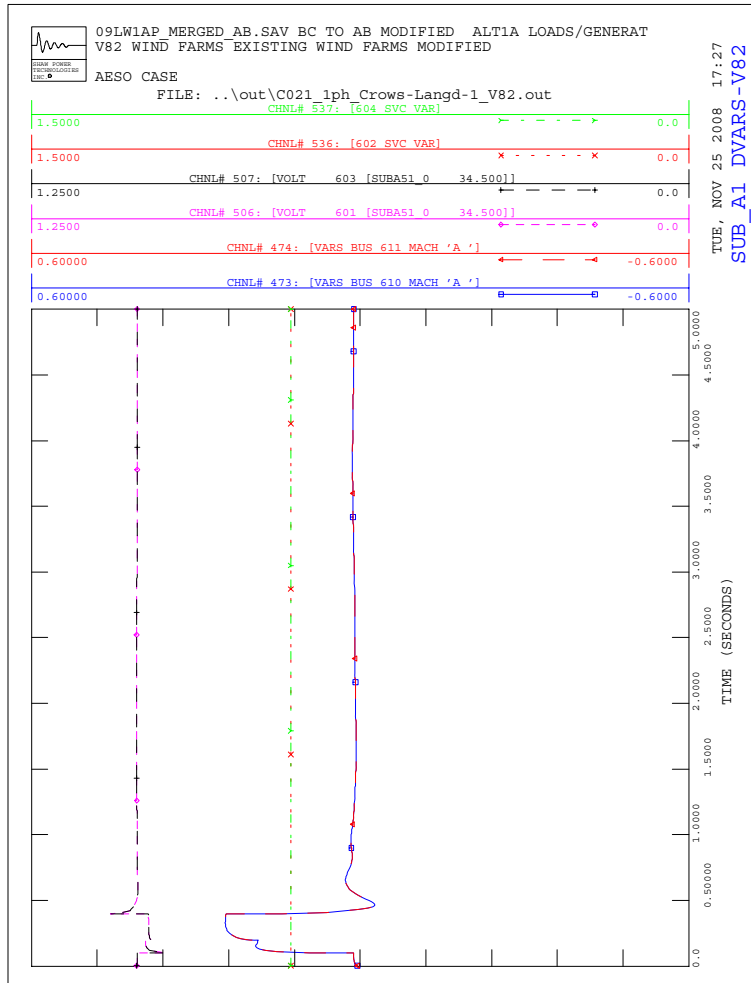
FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE

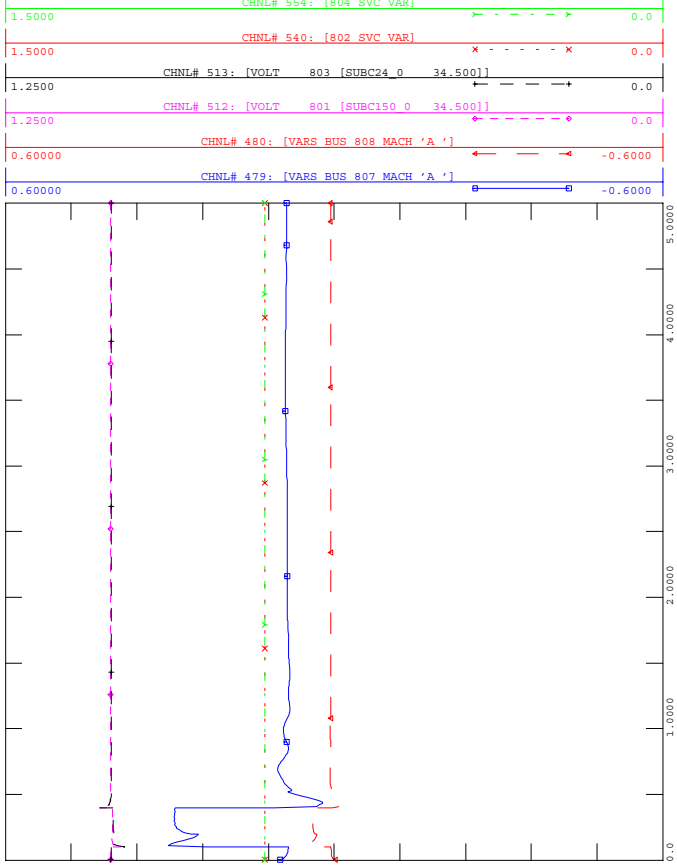
FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out





09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

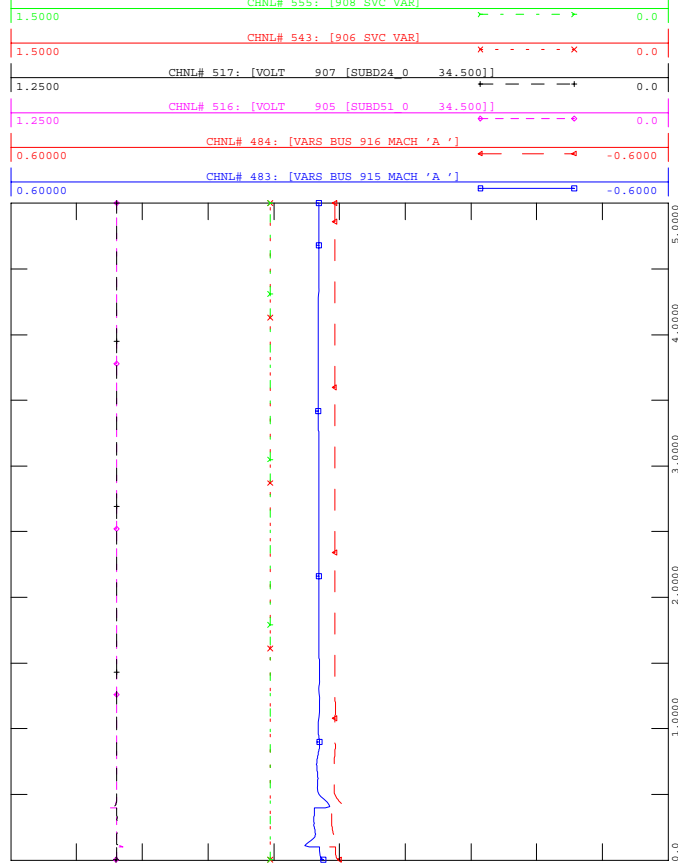
FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



TUE, NOV 25 2008 17:27
 SUB_C DVARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

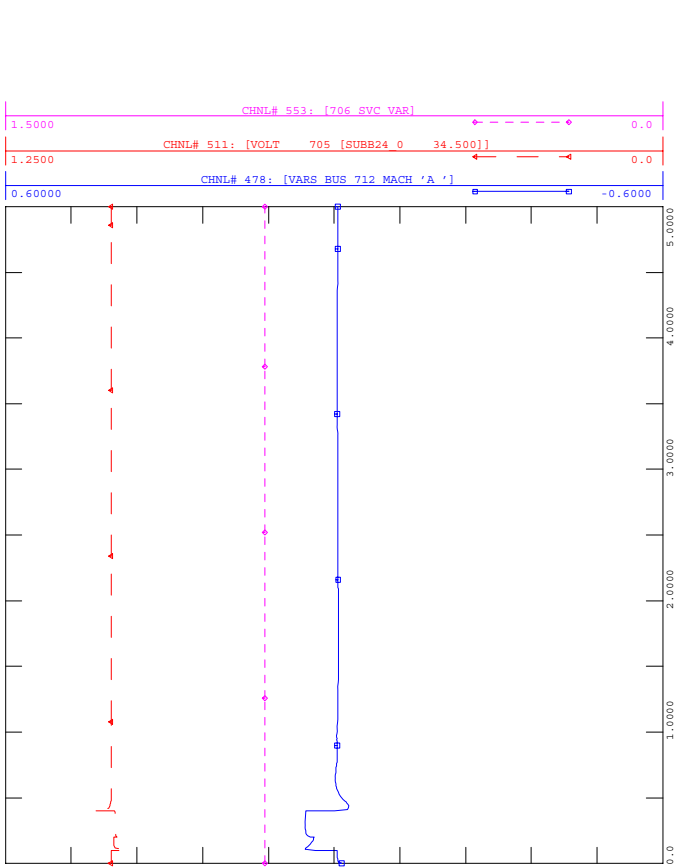
FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



TUE, NOV 25 2008 17:27
 SUB_D2 DVARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

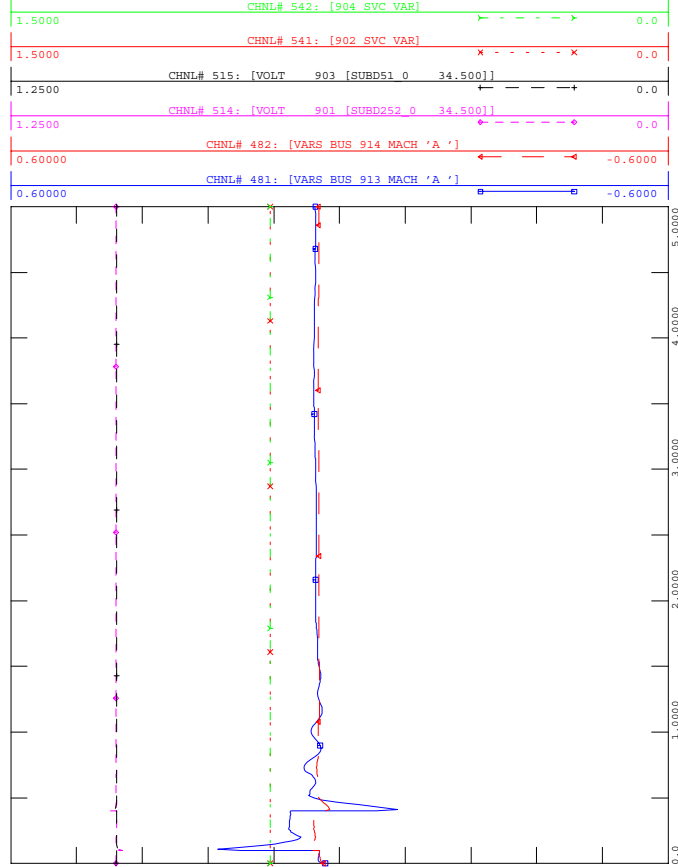
FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



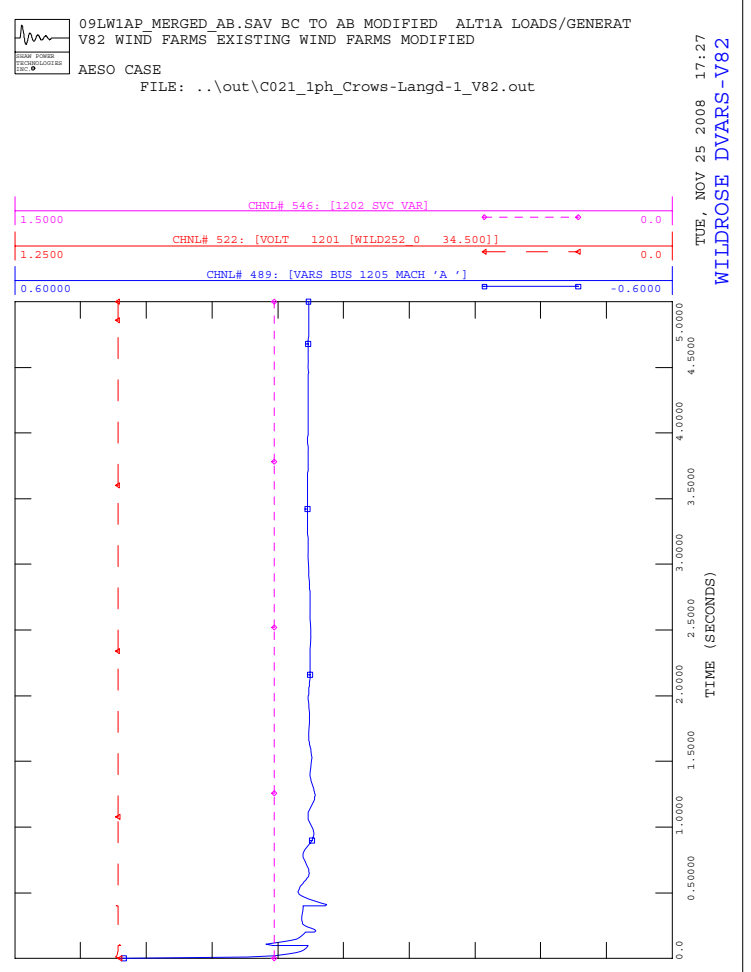
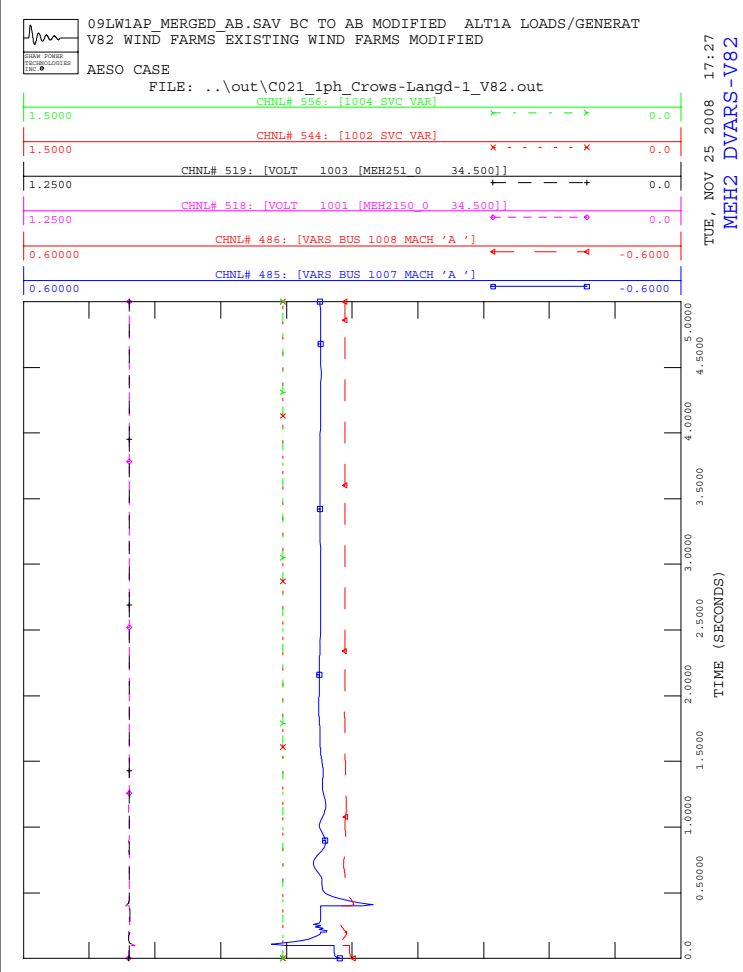
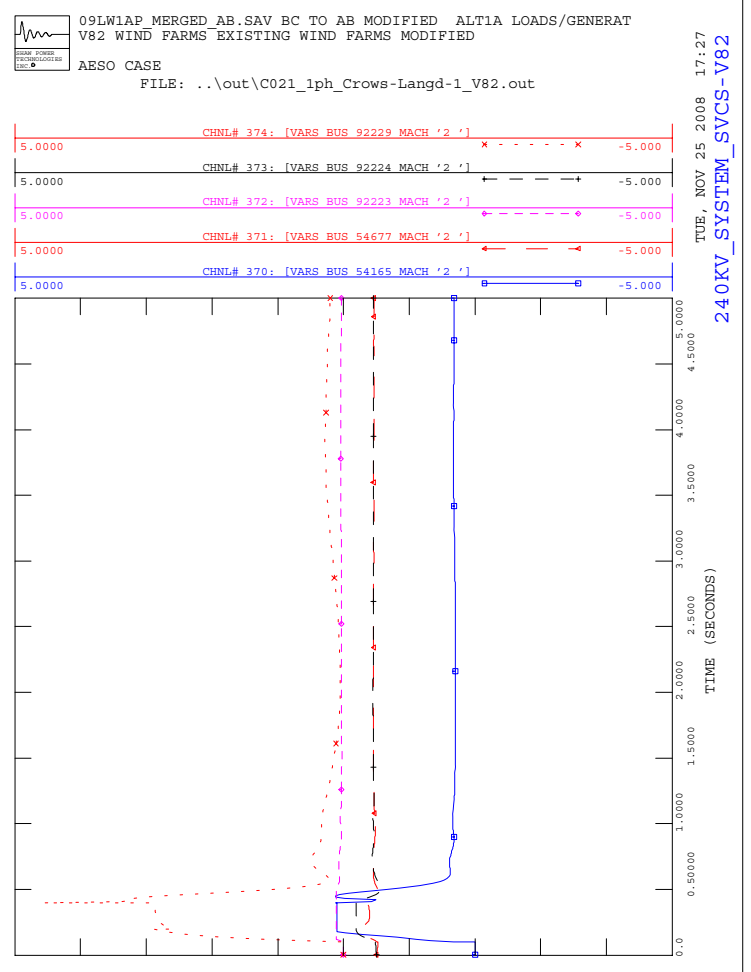
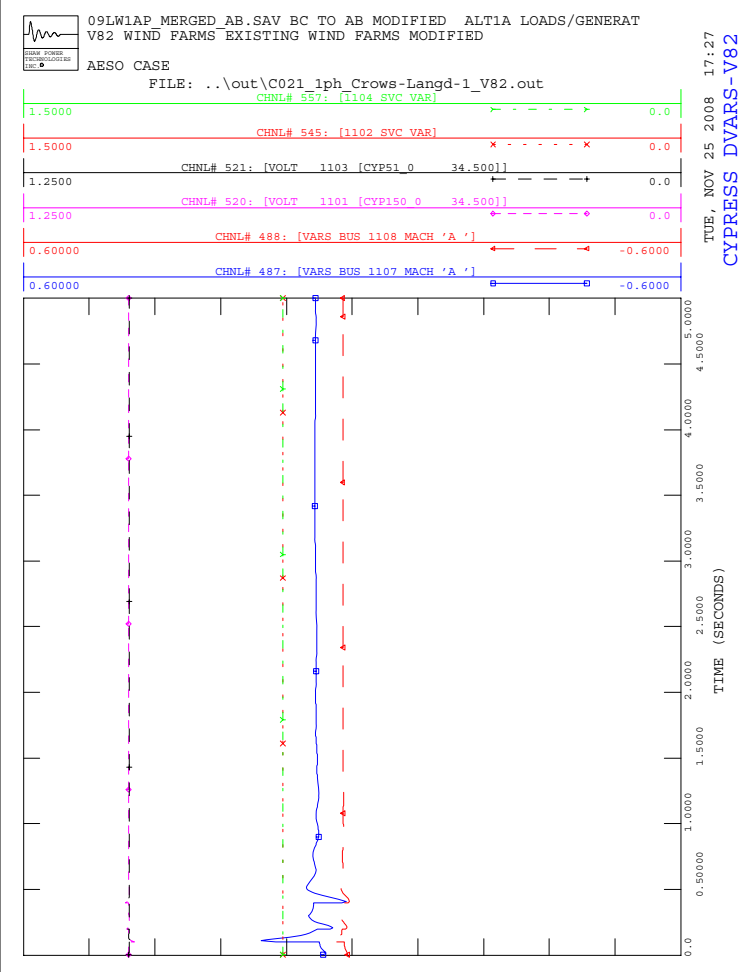
TUE, NOV 25 2008 17:27
 SUB_B2 DVARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out



TUE, NOV 25 2008 17:27
 SUB_D1 DVARS-V82



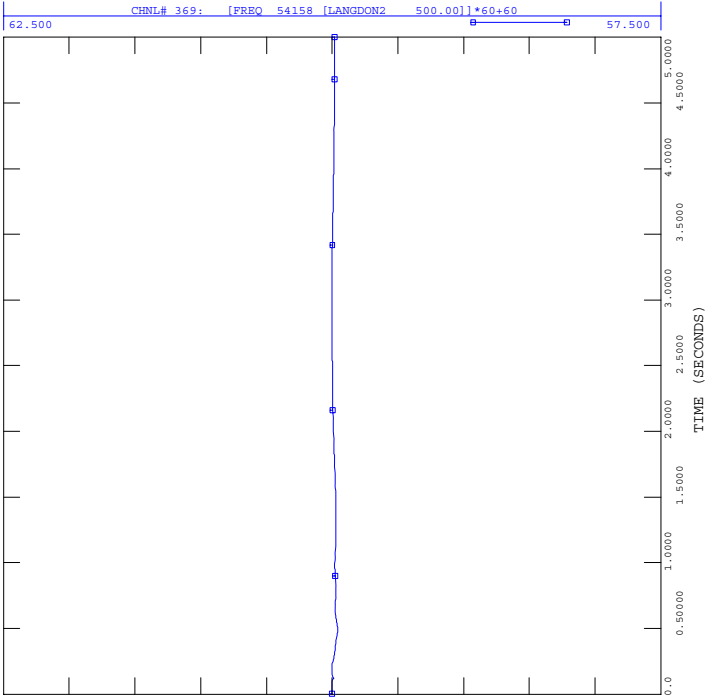


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out

TUE, NOV 25 2008 17:27
LANGDON_FRQ-V82

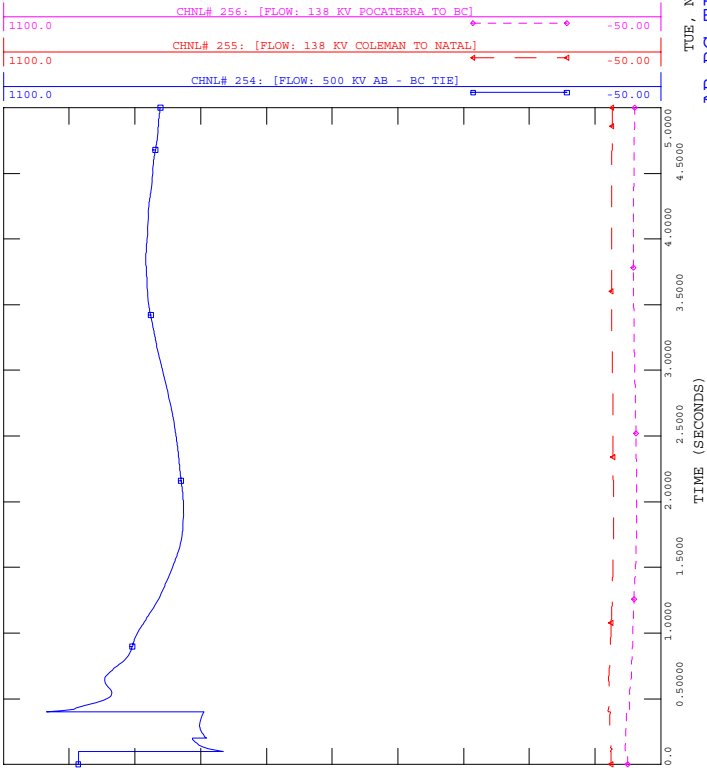


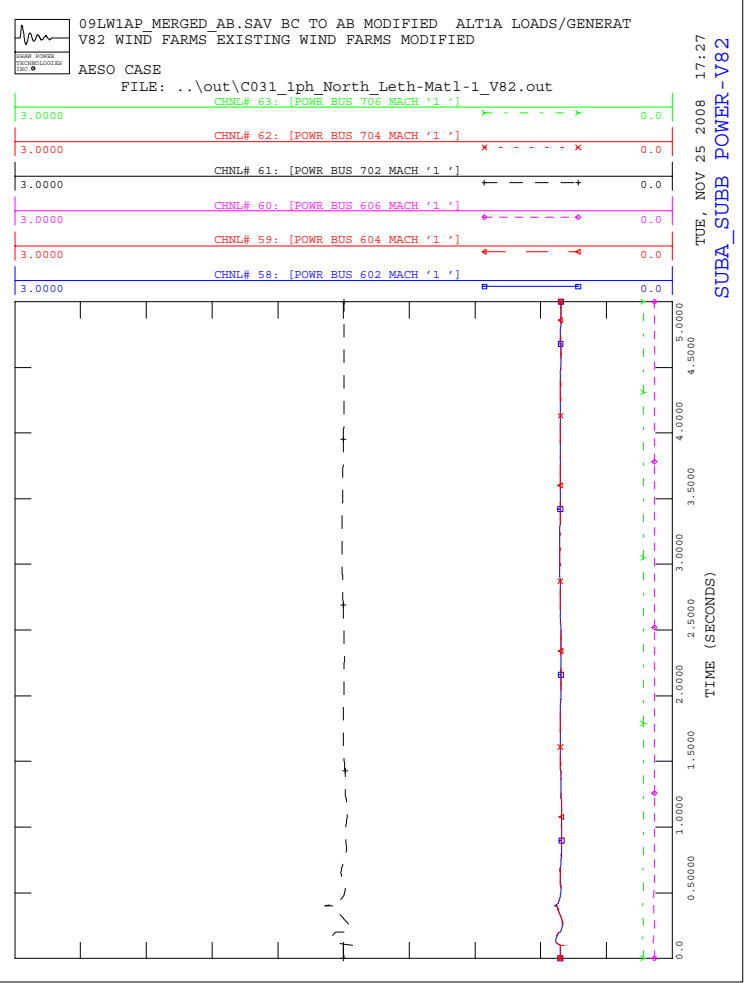
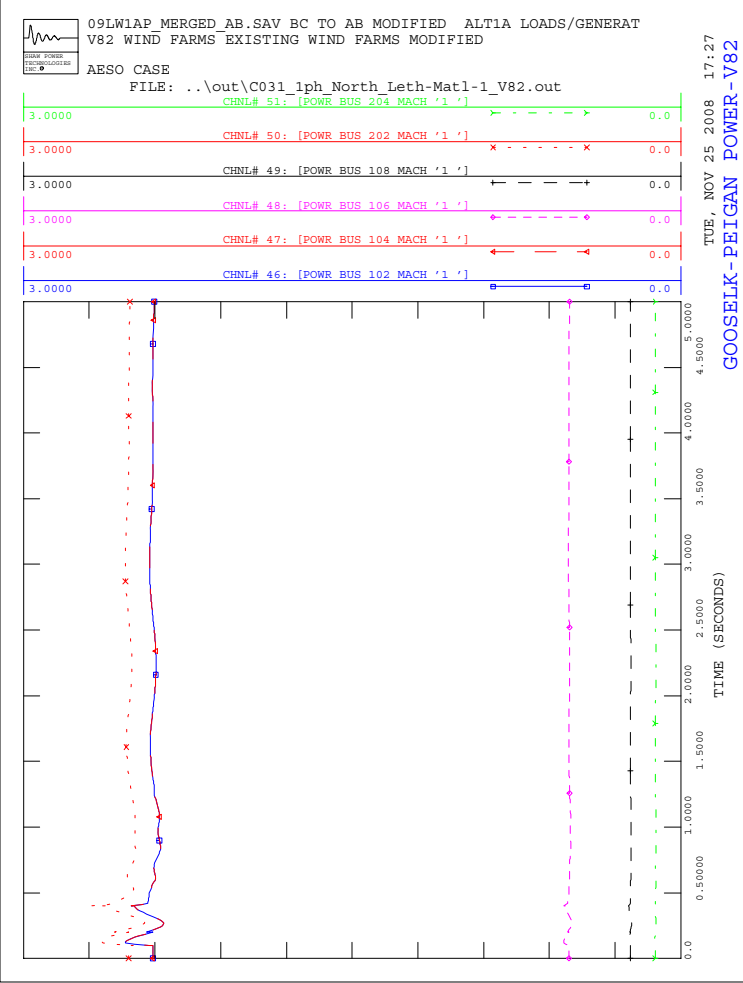
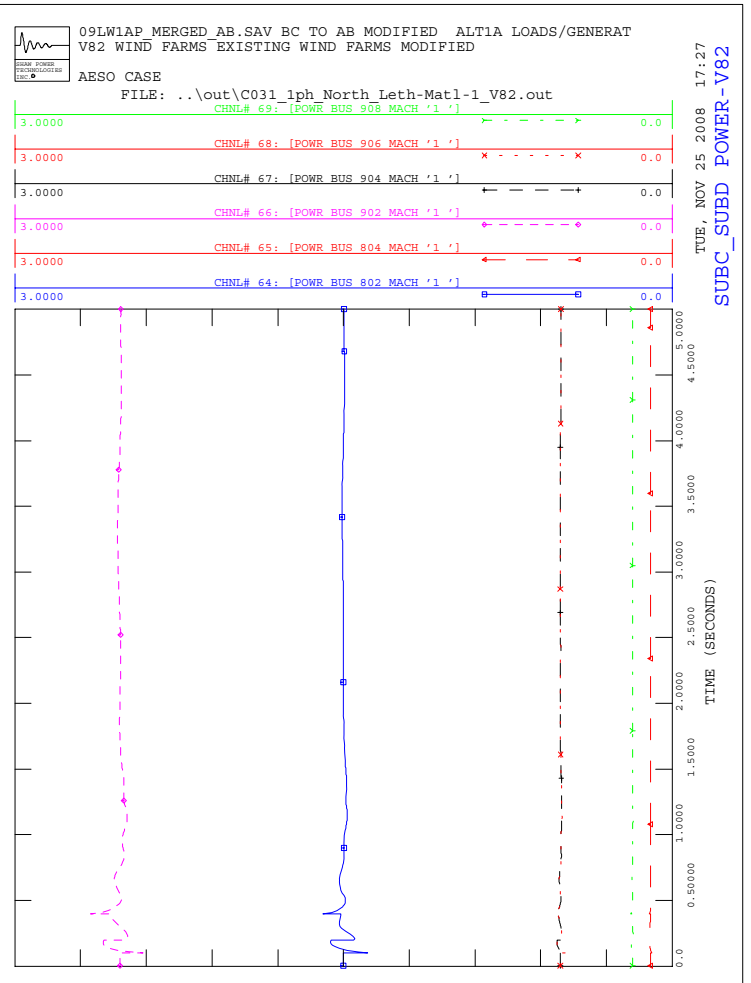
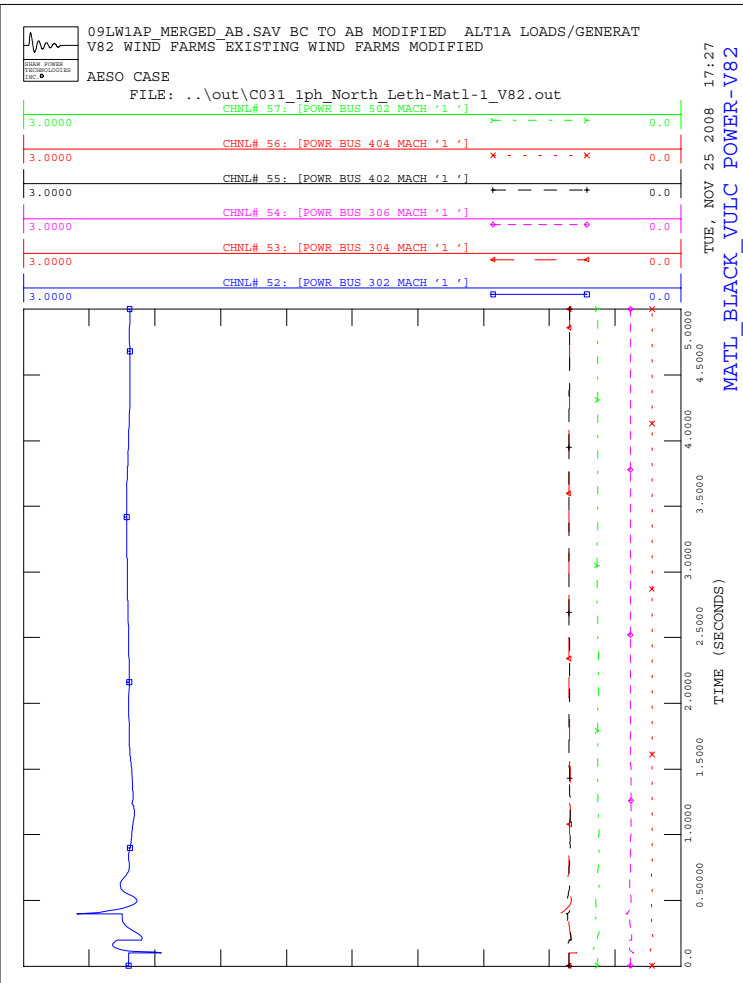
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

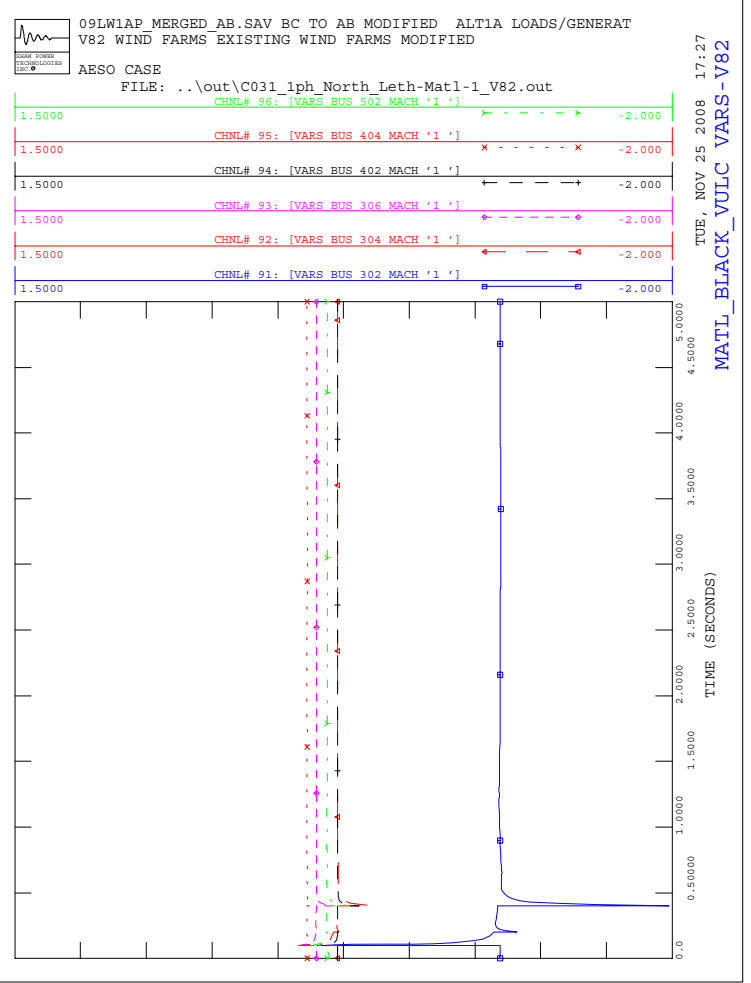
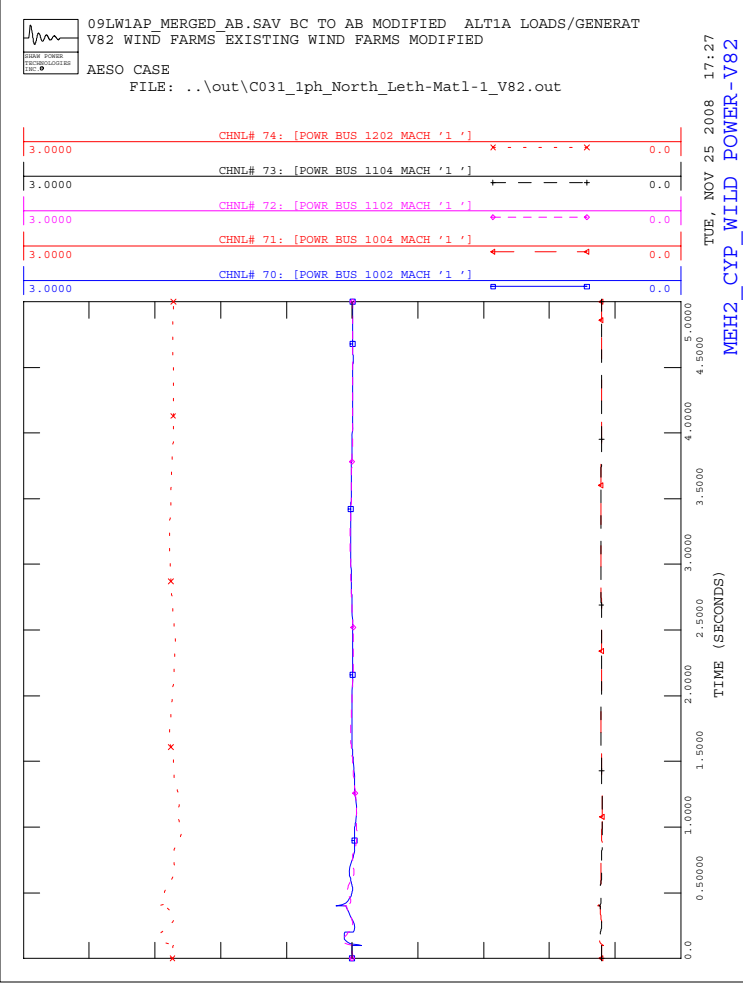
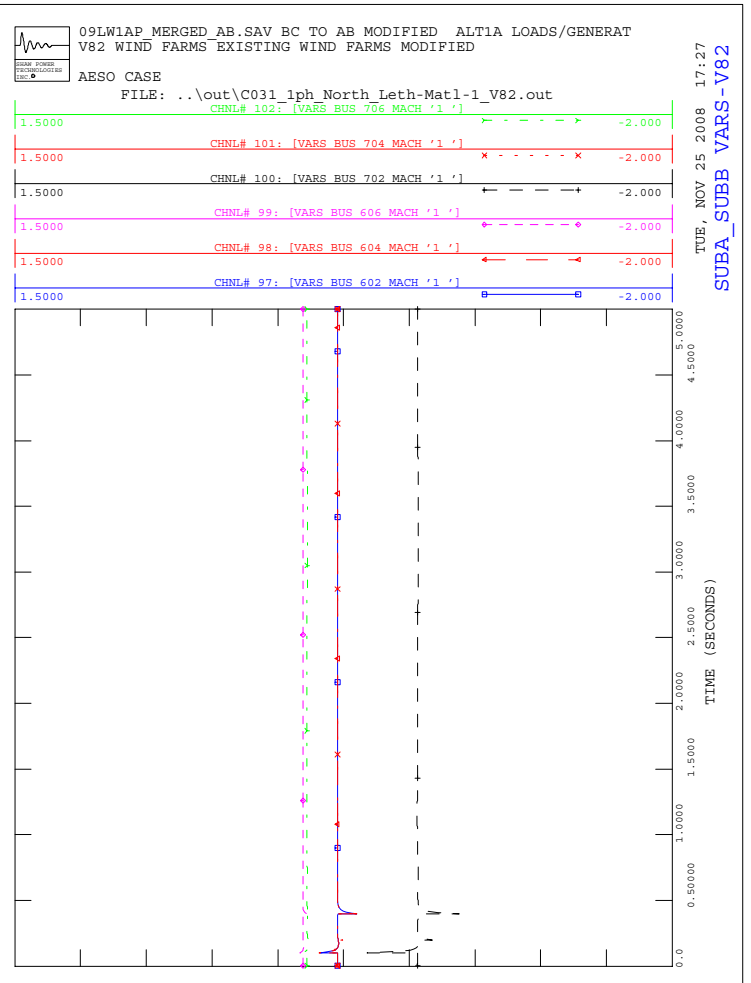
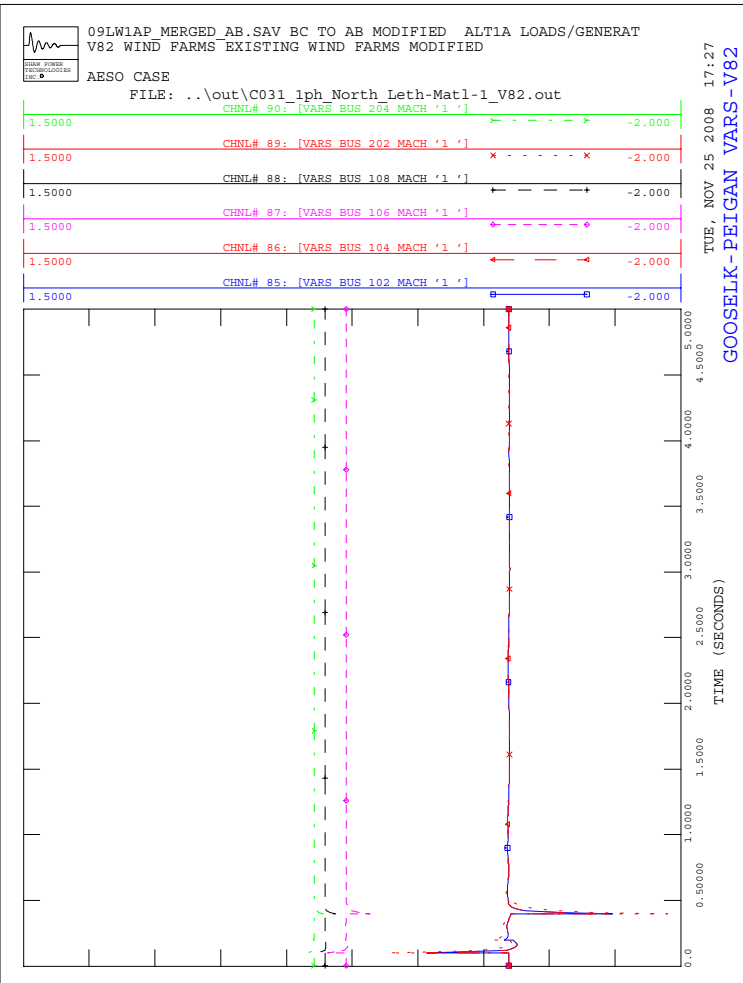
ABSO CASE

FILE: ..\out\C021_1ph_Crows-Langd-1_V82.out

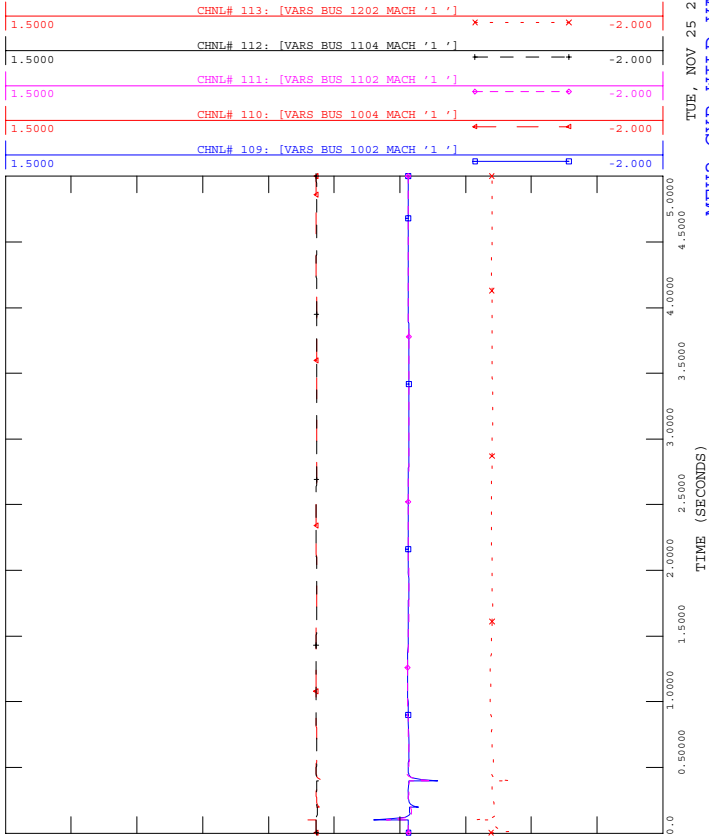
TUE, NOV 25 2008 17:27
AB_BC_TIE_FLOWS-V82





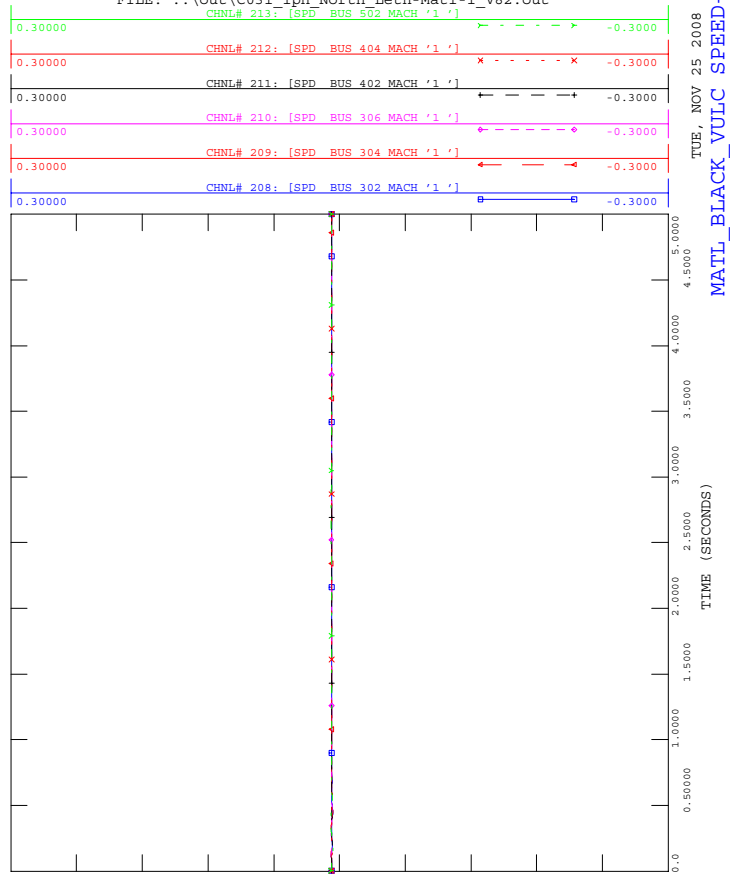


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
 FILE: ..\out\C031_1ph_North_Leth-Matl-1_V82.out



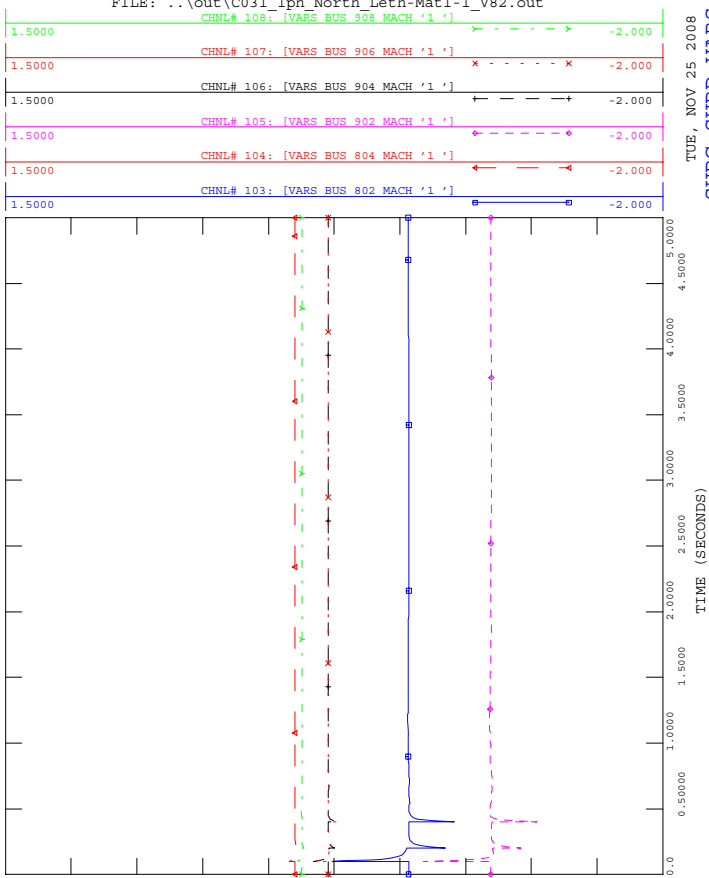
TUE, NOV 25 2008 17:27
 MEH2_CYP_WILD_VARS-V82

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
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 AESO CASE
 FILE: ..\out\C031_1ph_North_Leth-Matl-1_V82.out



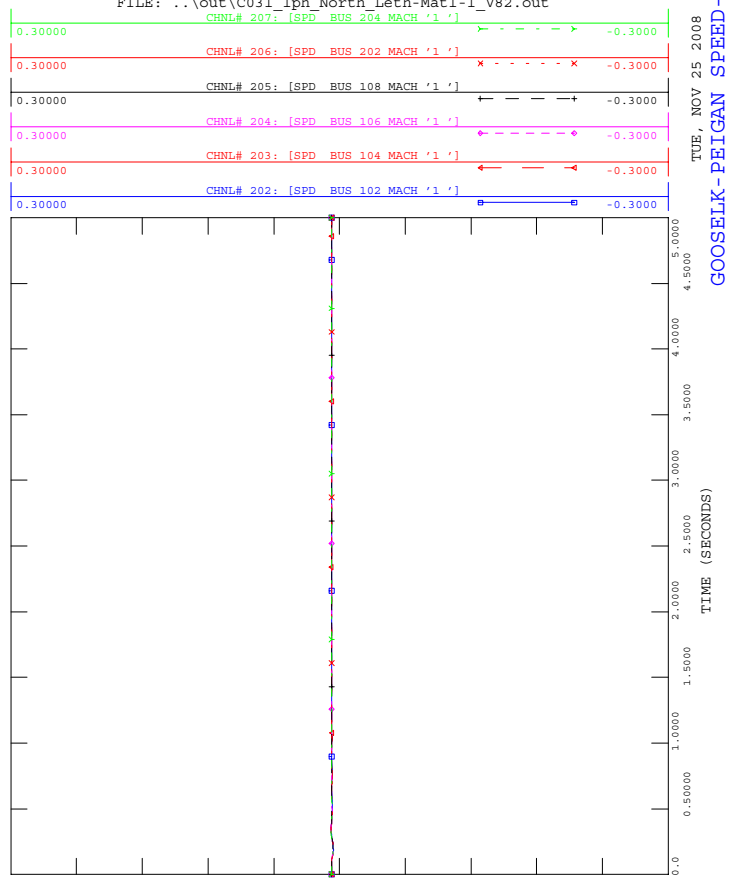
TUE, NOV 25 2008 17:27
 MATL_BLACK_VULC_SPEED-V82

09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
 FILE: ..\out\C031_1ph_North_Leth-Matl-1_V82.out

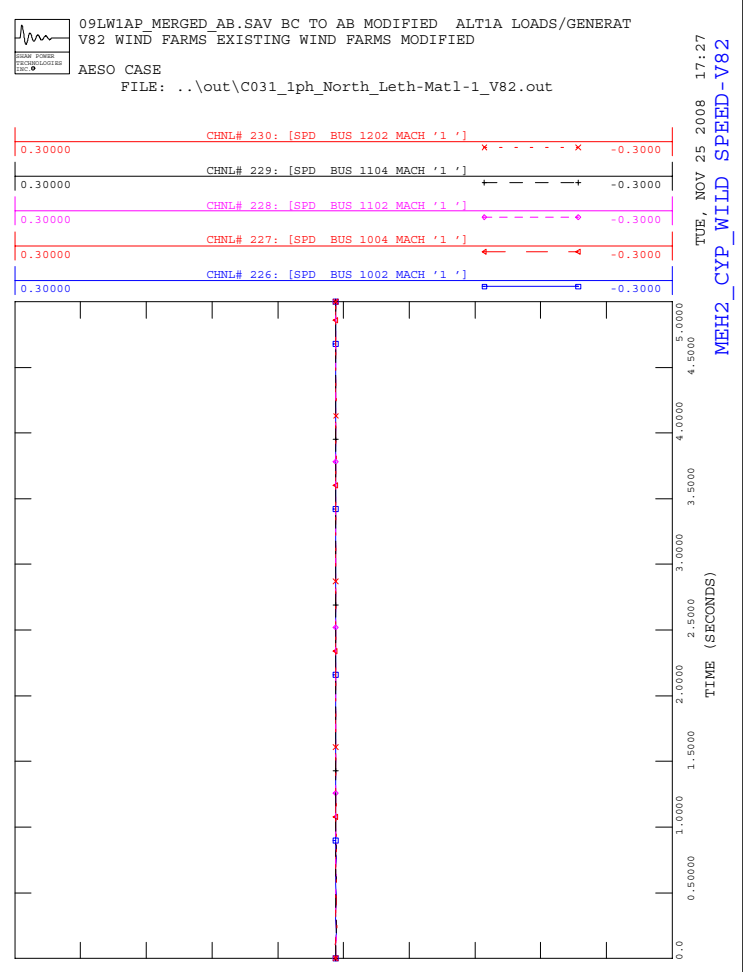
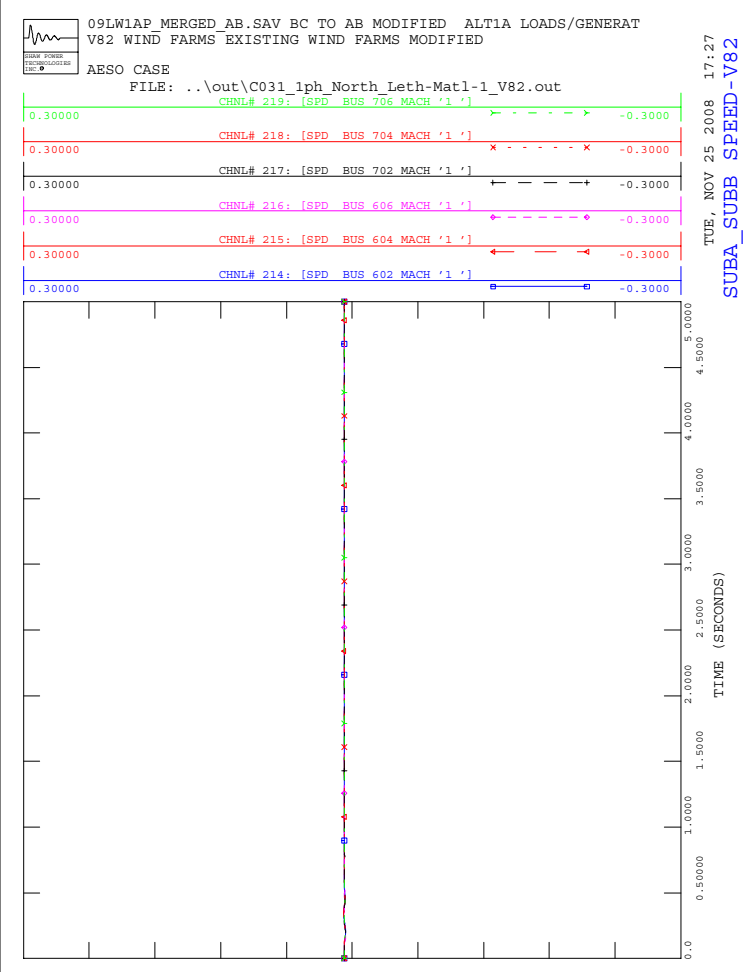
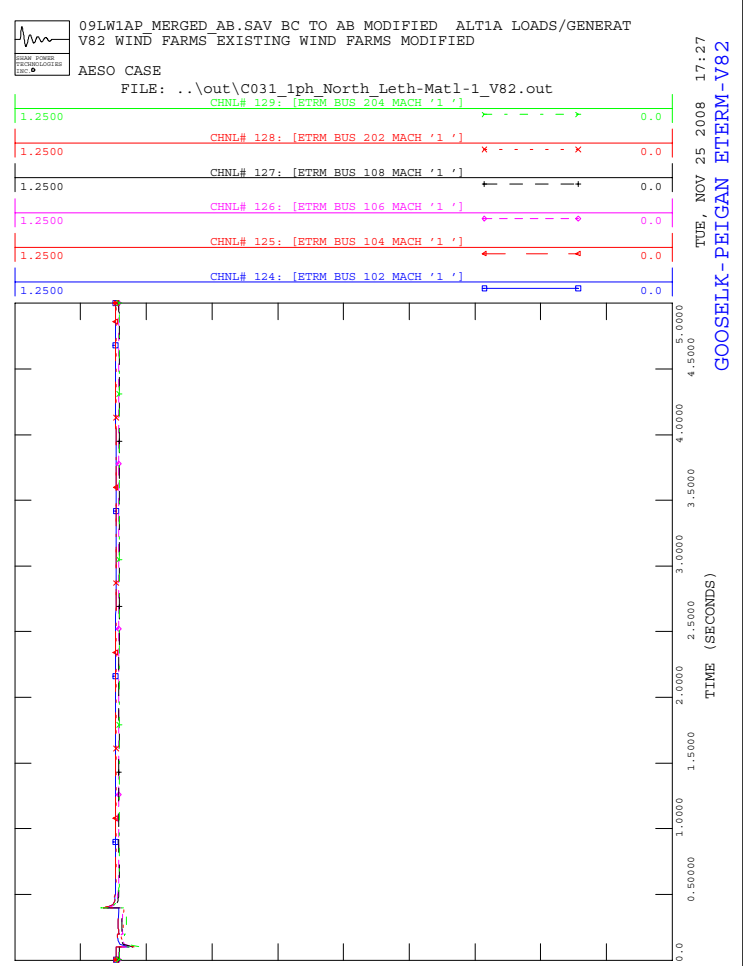
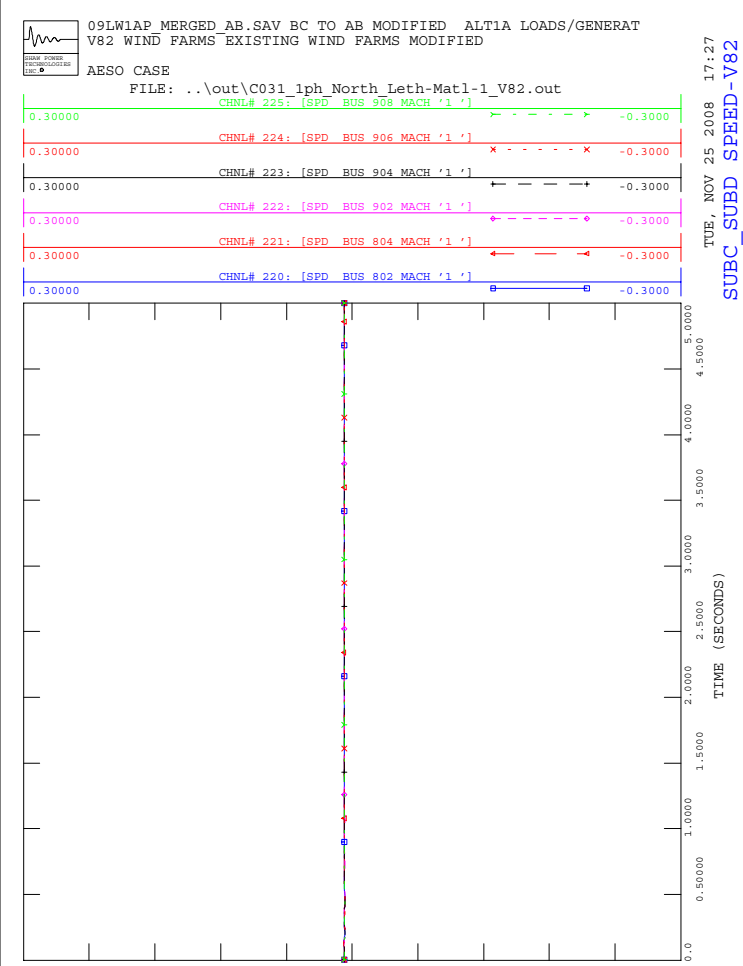


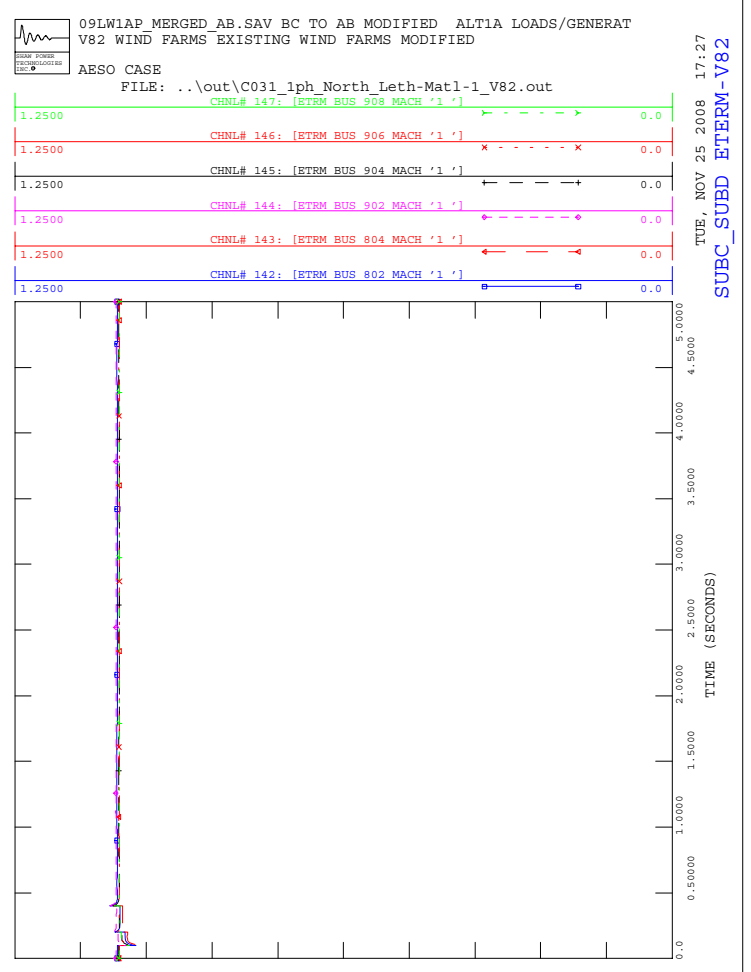
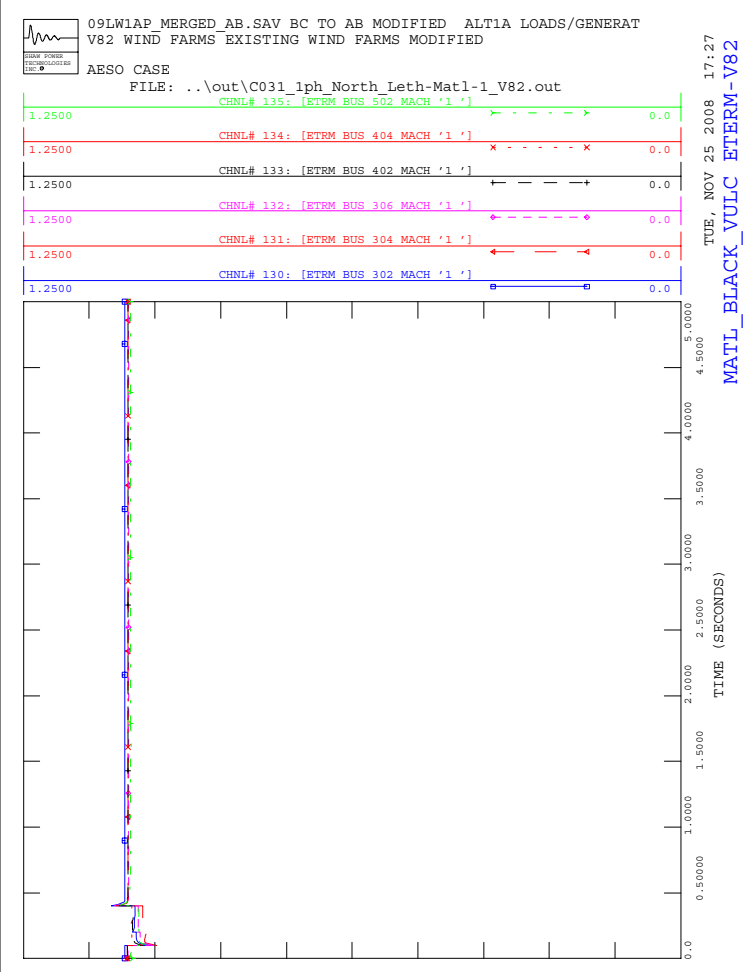
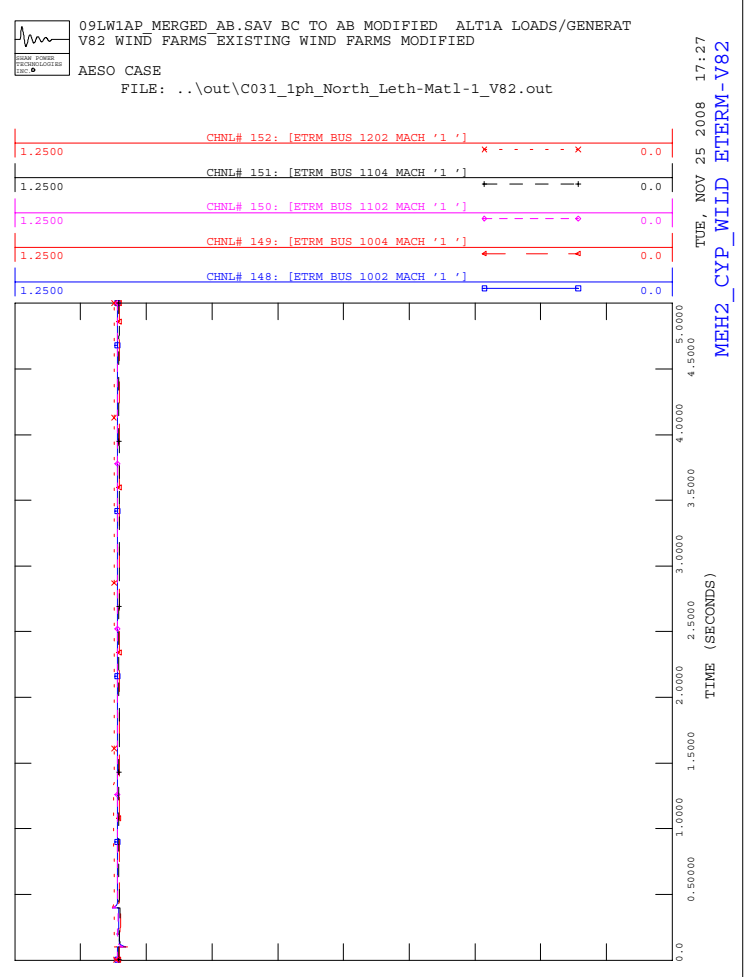
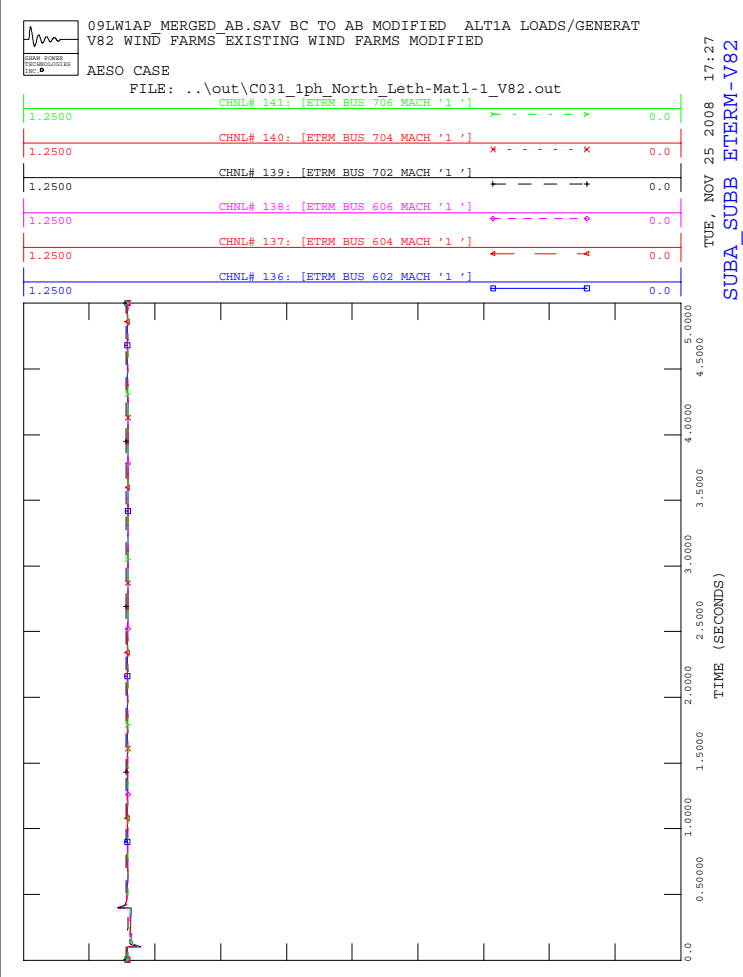
TUE, NOV 25 2008 17:27
 SUBC_SUBD_VARS-V82

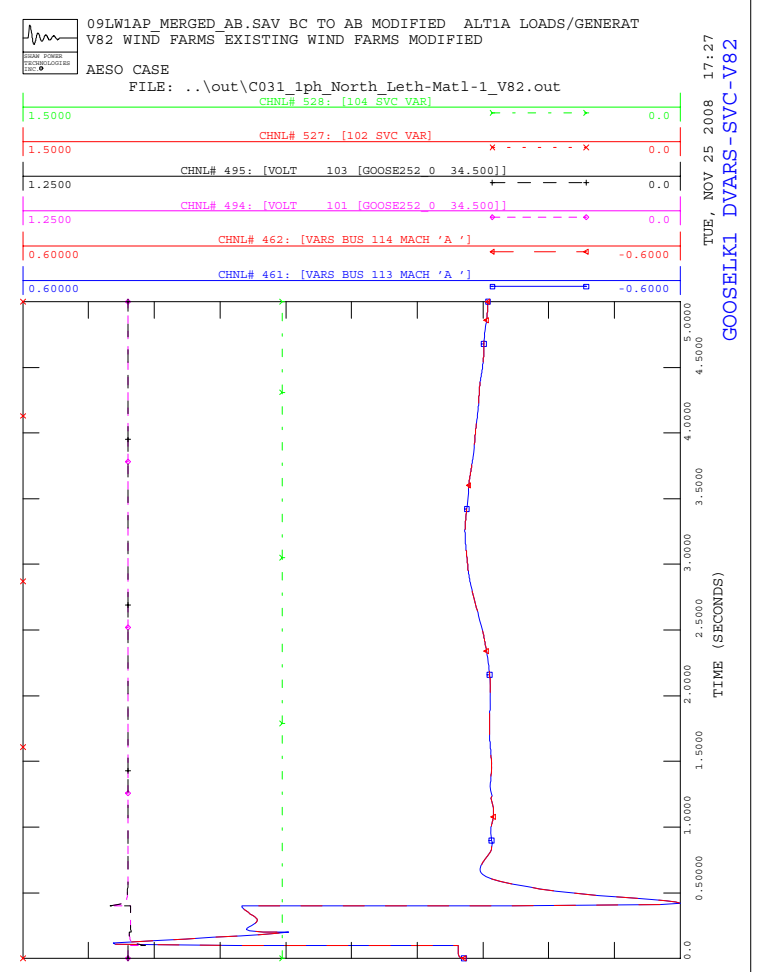
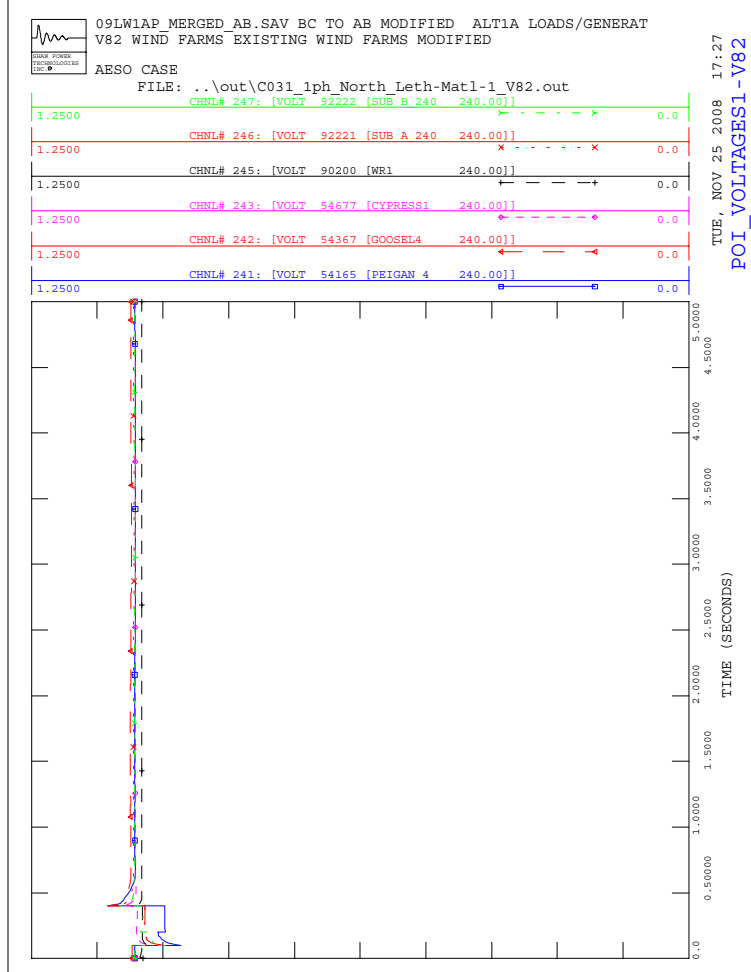
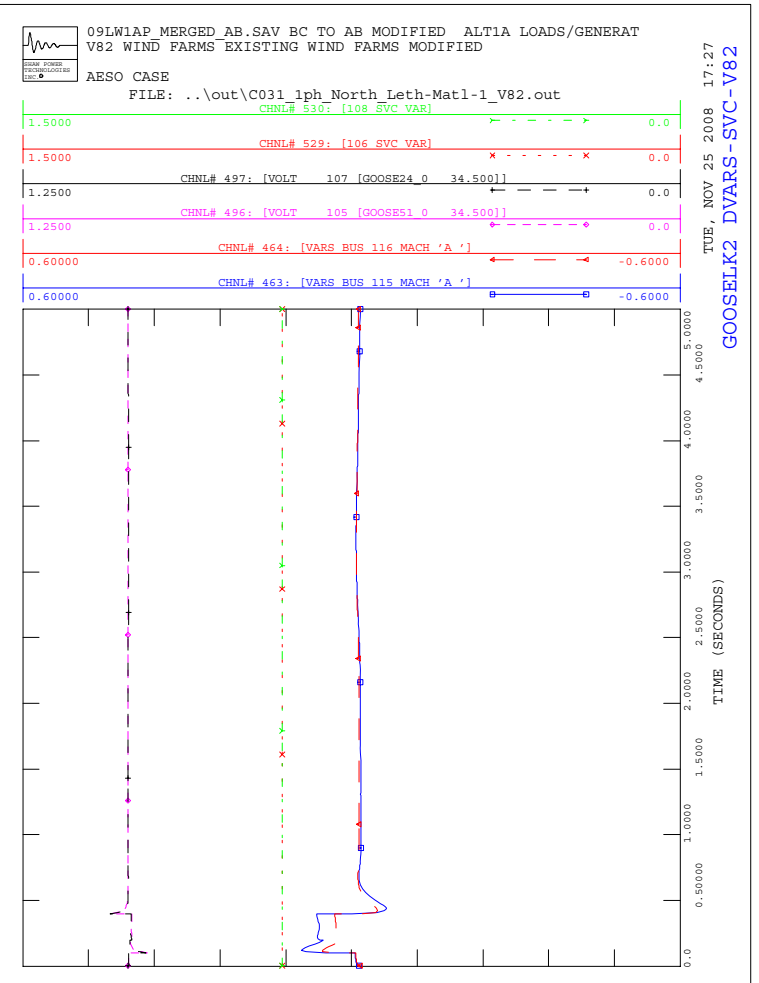
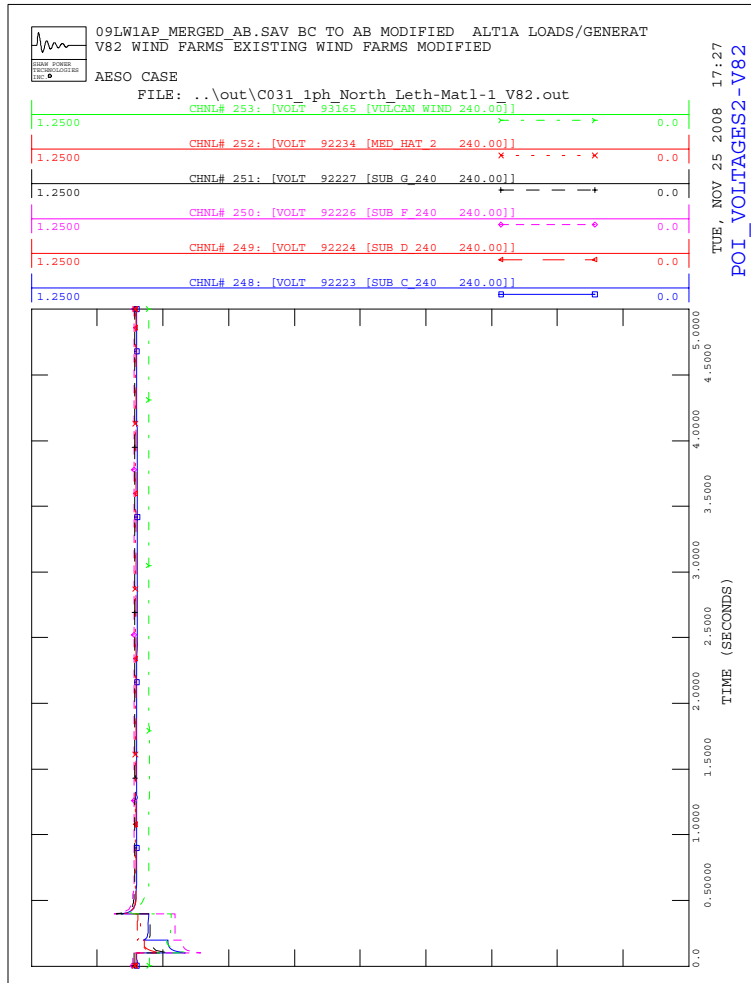
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
 FILE: ..\out\C031_1ph_North_Leth-Matl-1_V82.out



TUE, NOV 25 2008 17:27
 GOOSELK-PEIGAN_SPEED-V82

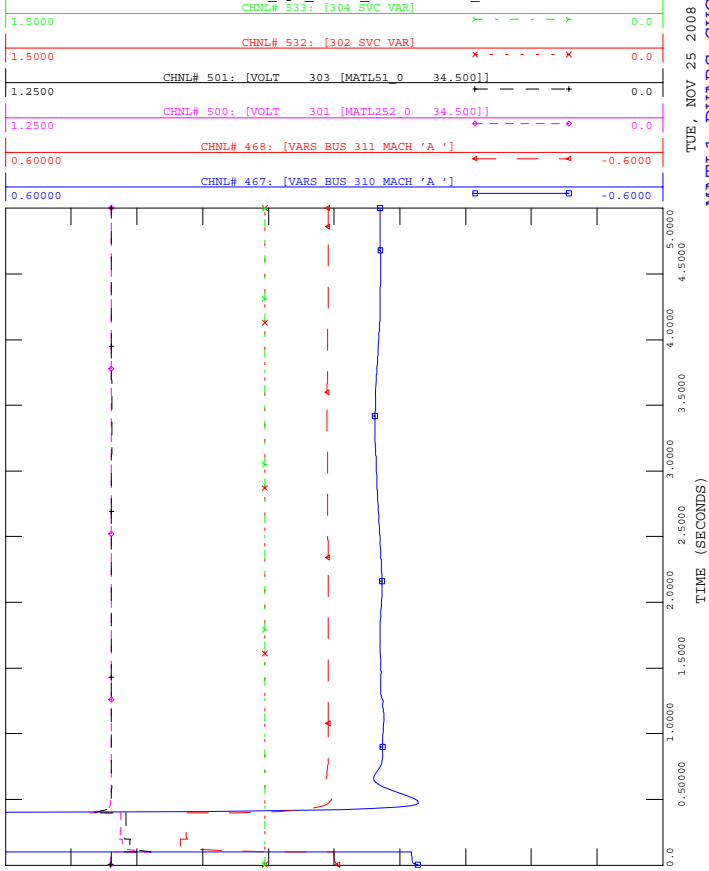






09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1 LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

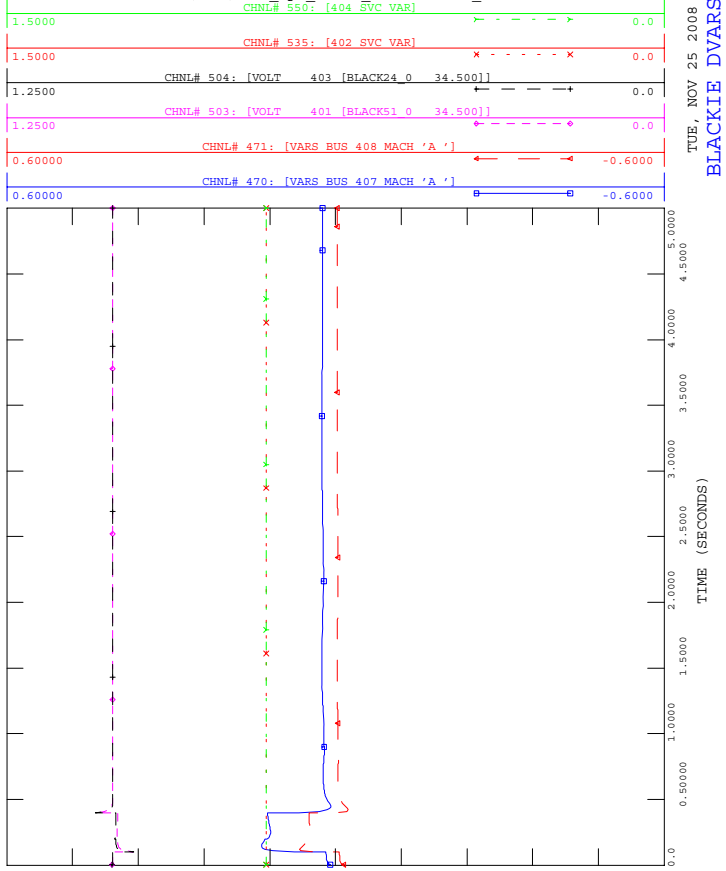
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TUE, NOV 25 2008 17:27
 MATL1 DVARS-SVC-V82

09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1 LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

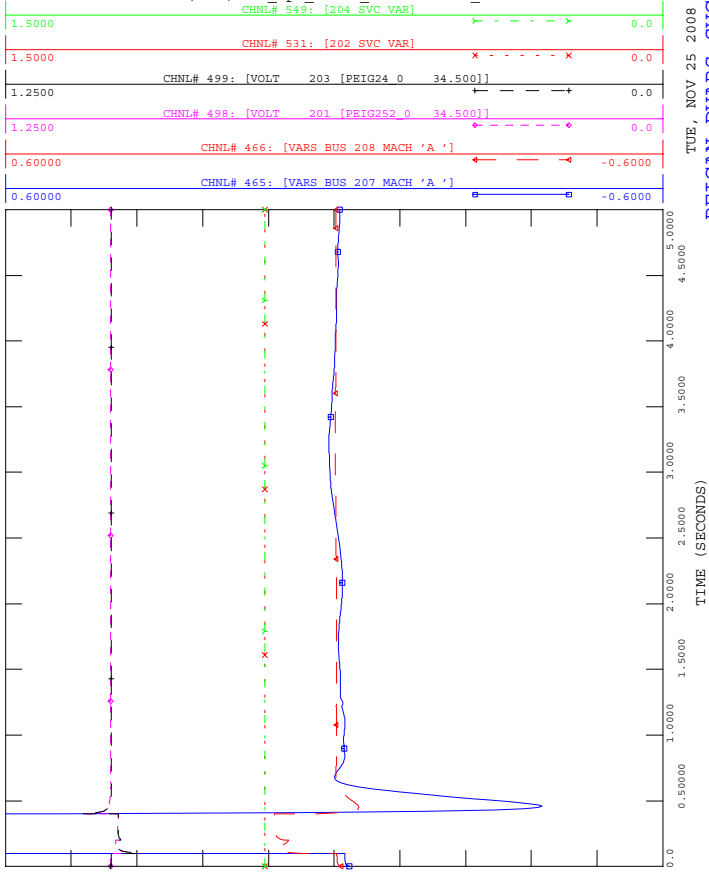
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TUE, NOV 25 2008 17:27
 BLACKIE DVARS-V82

09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1 LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

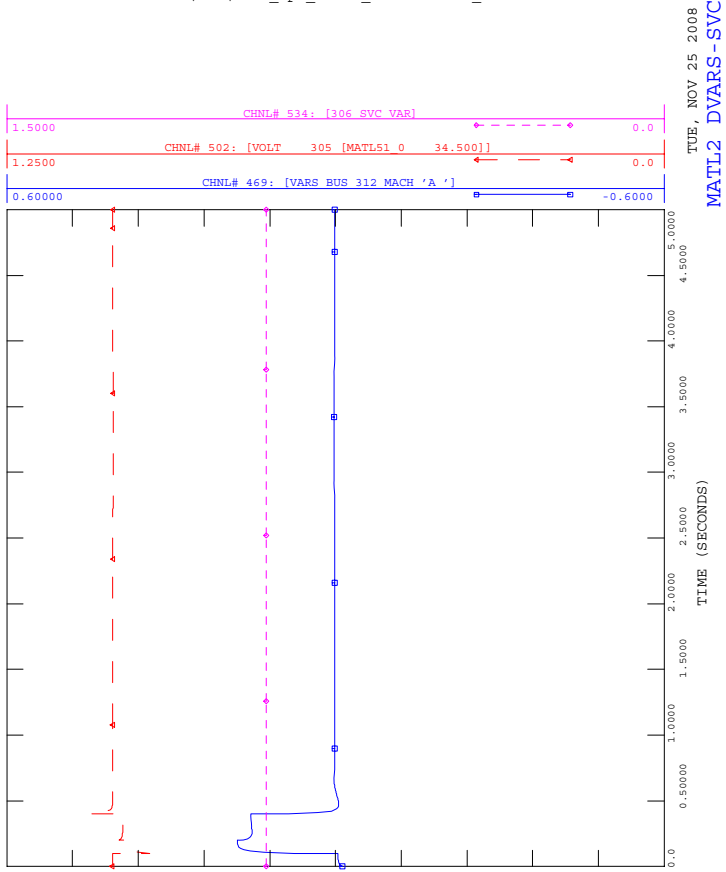
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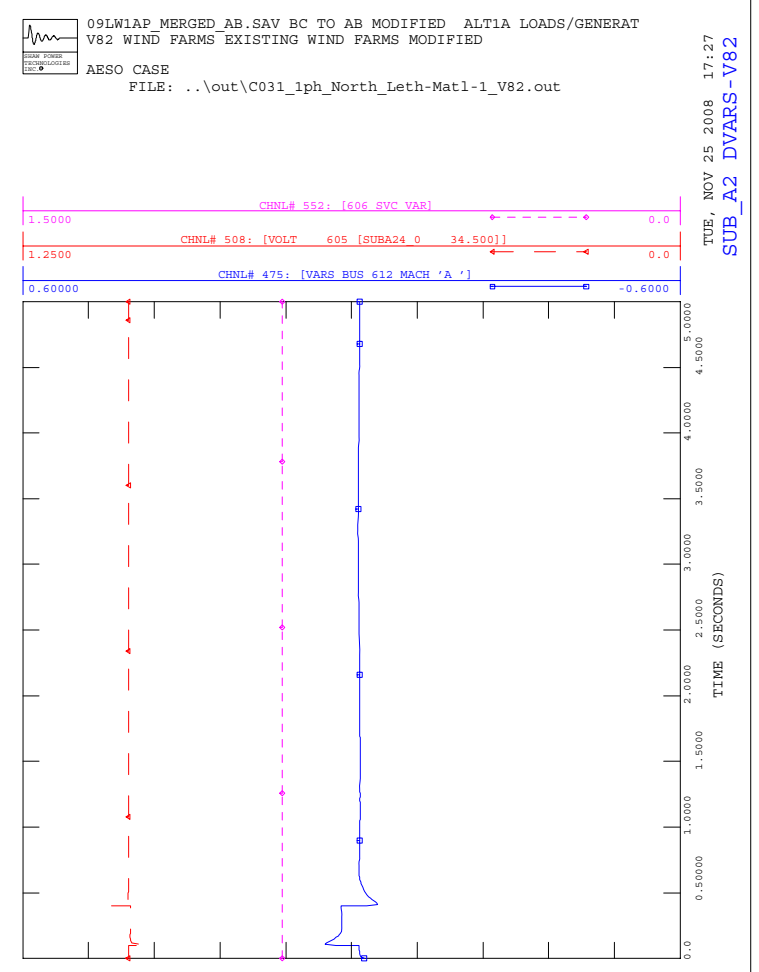
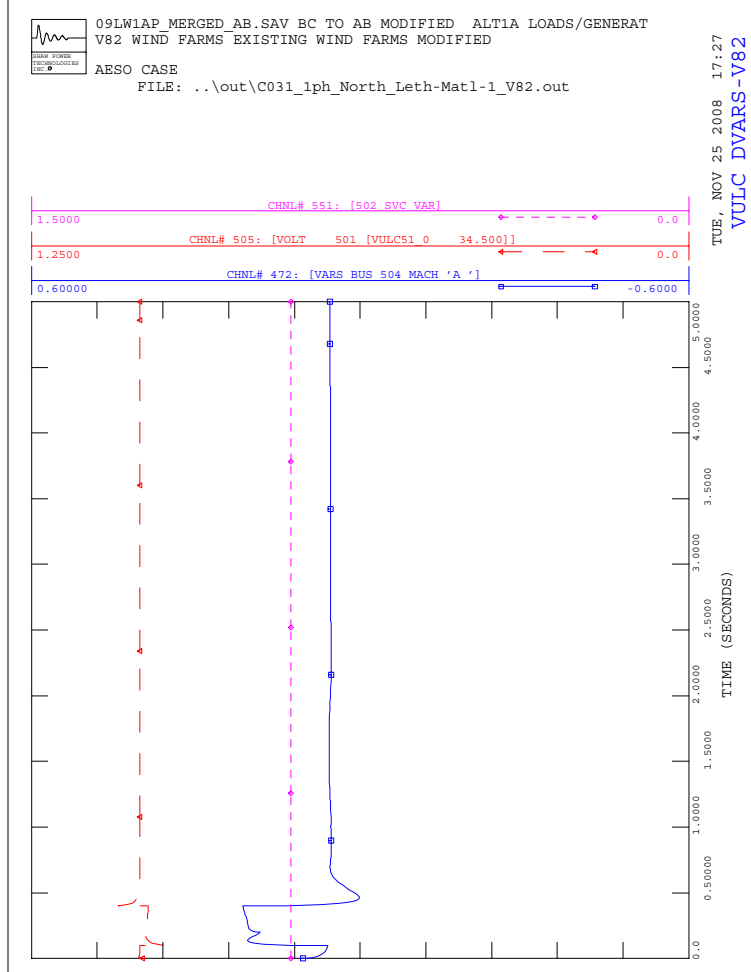
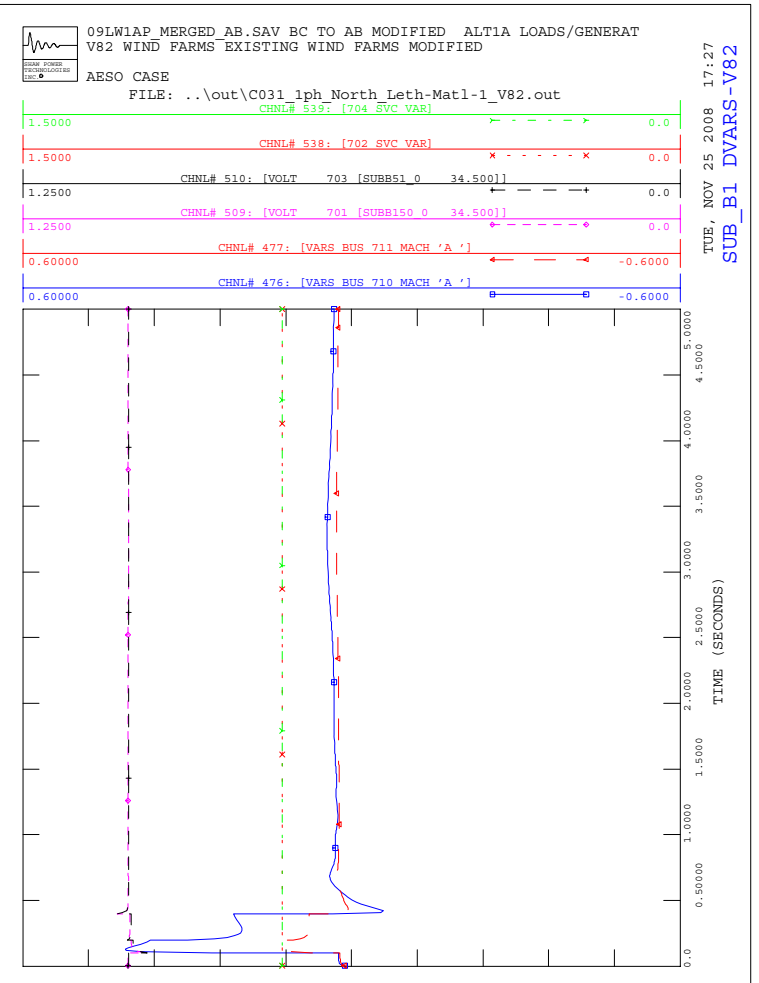
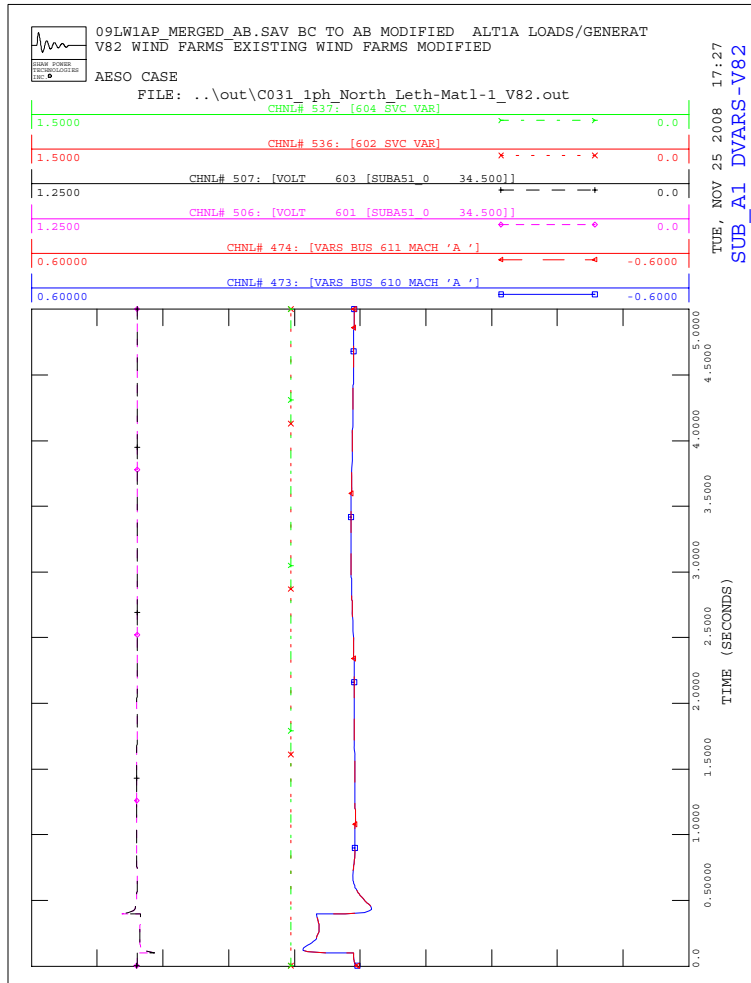
TUE, NOV 25 2008 17:27
 PEIGAN DVARS-SVC-V82

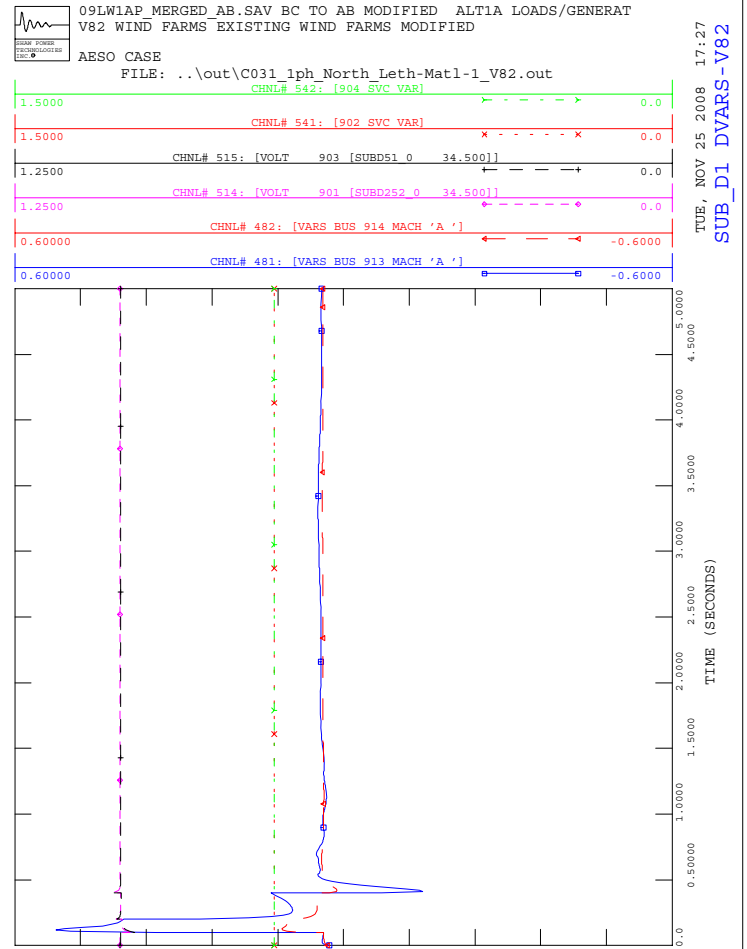
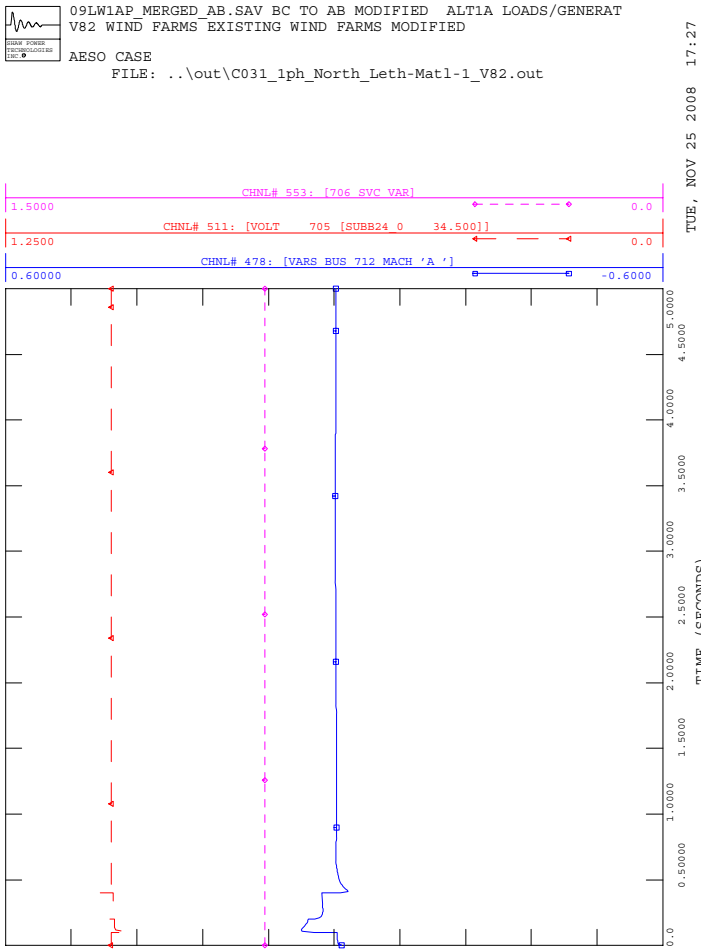
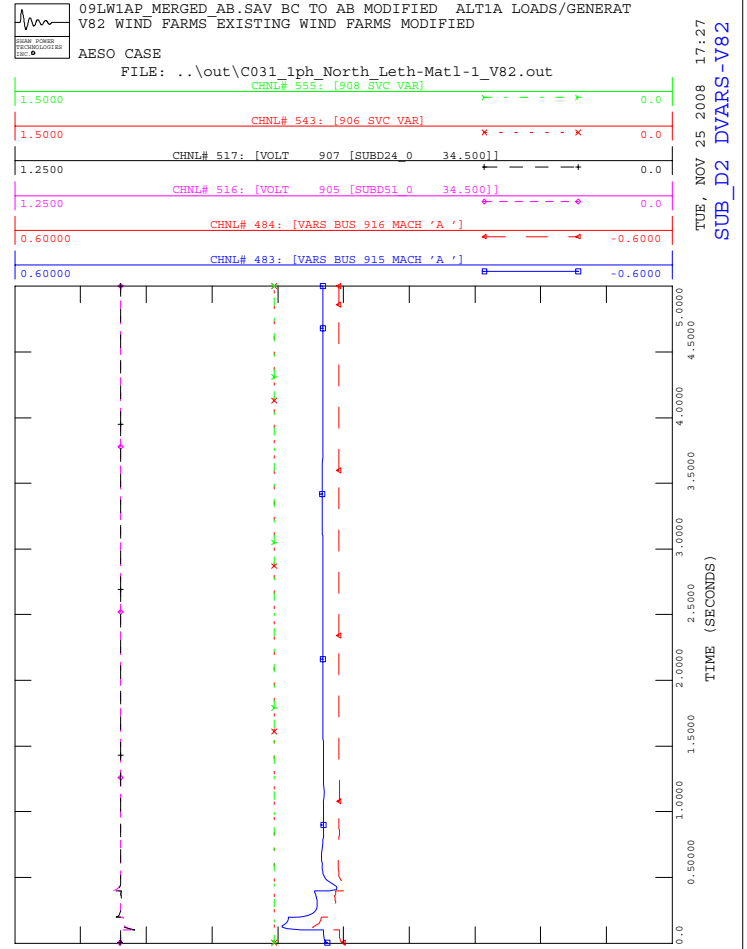
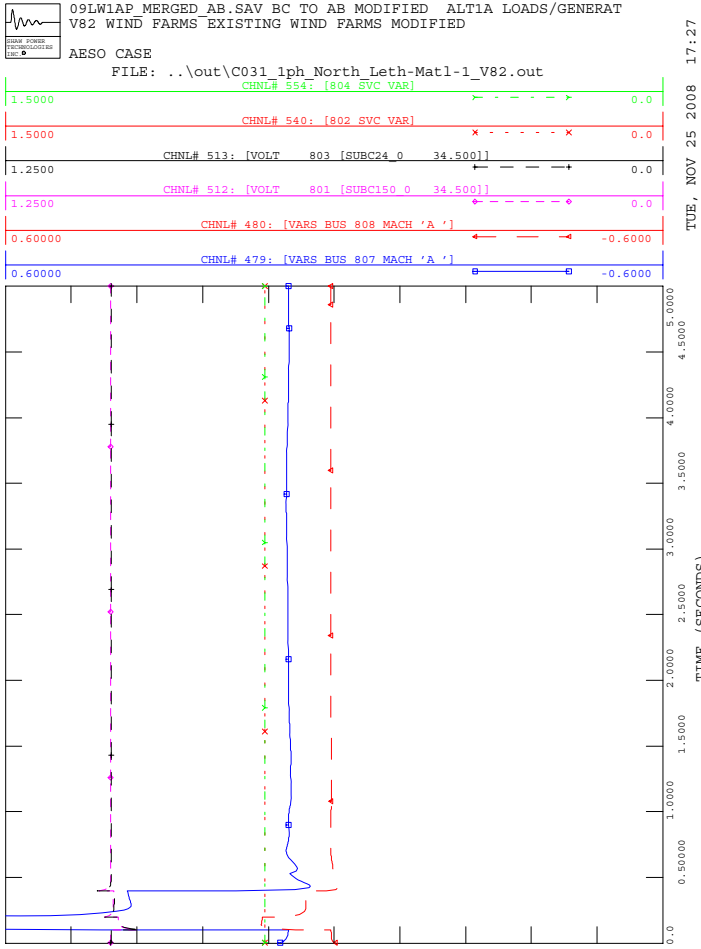
09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1 LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 ABSO CASE

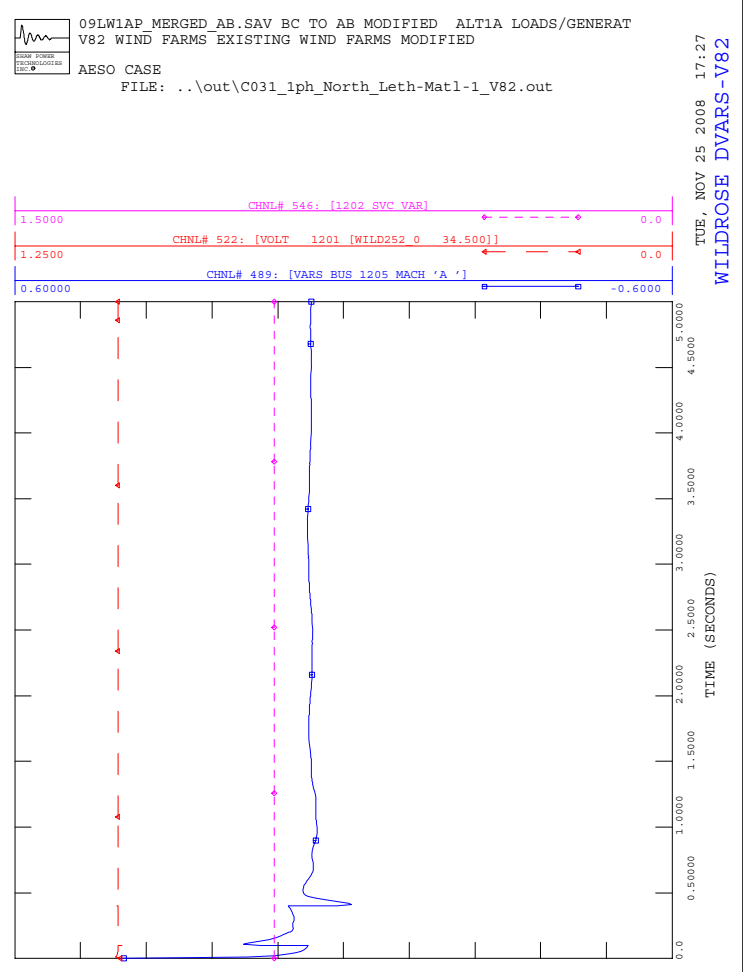
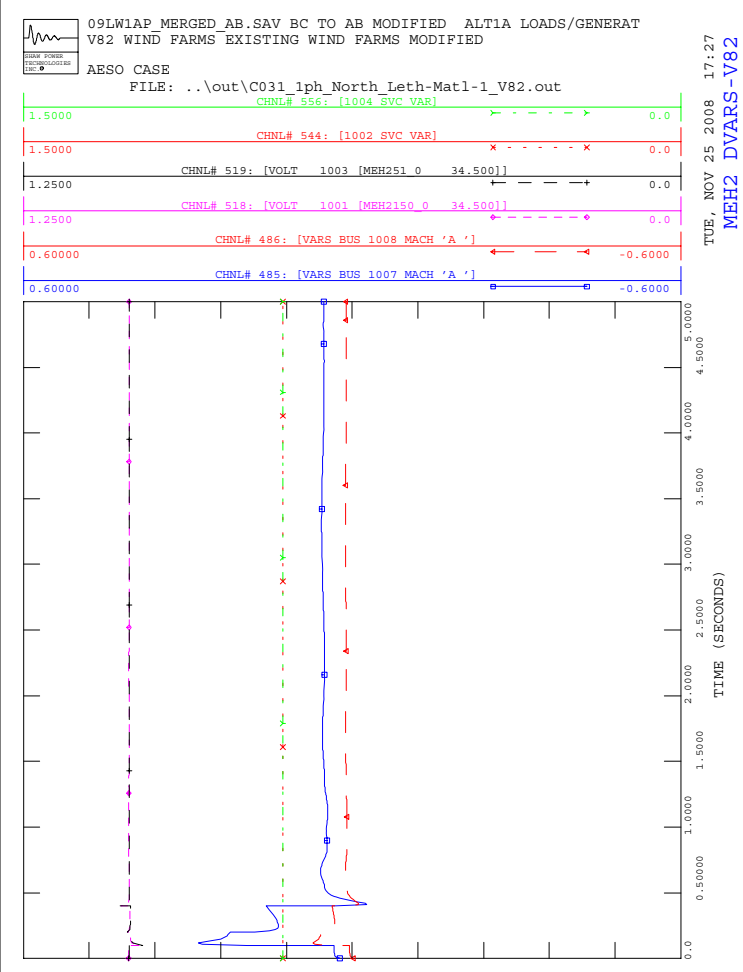
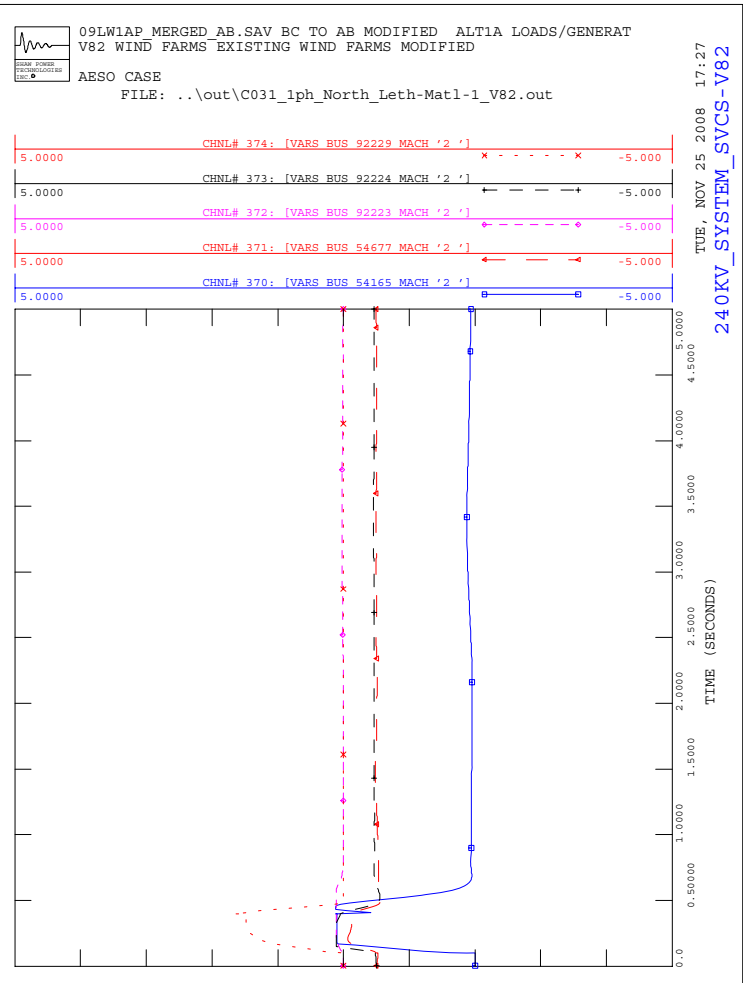
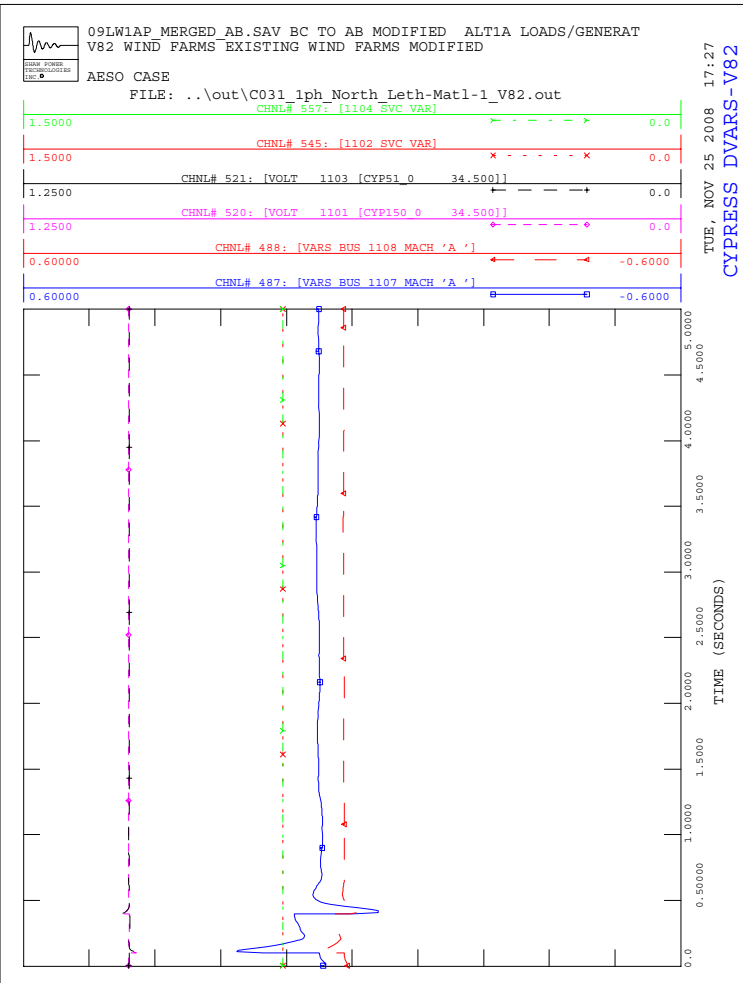
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TUE, NOV 25 2008 17:27
 MATL2 DVARS-SVC-V82



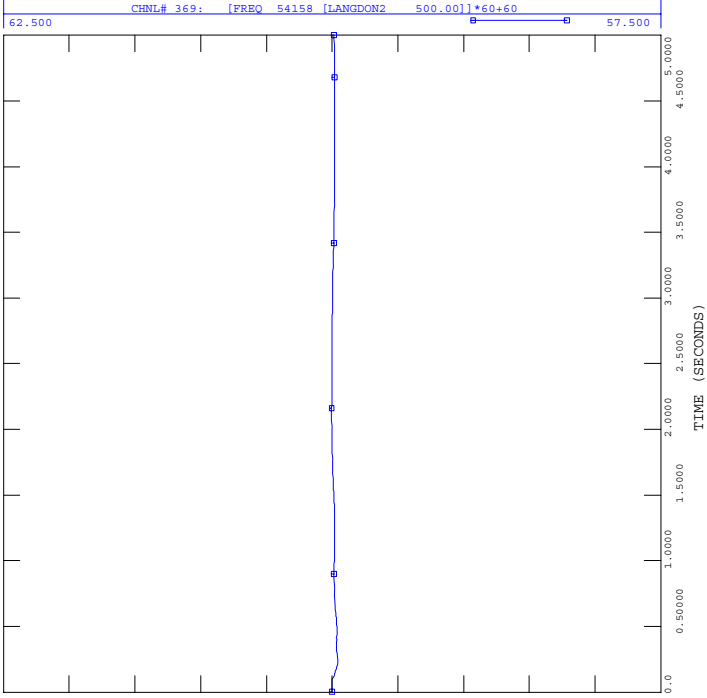






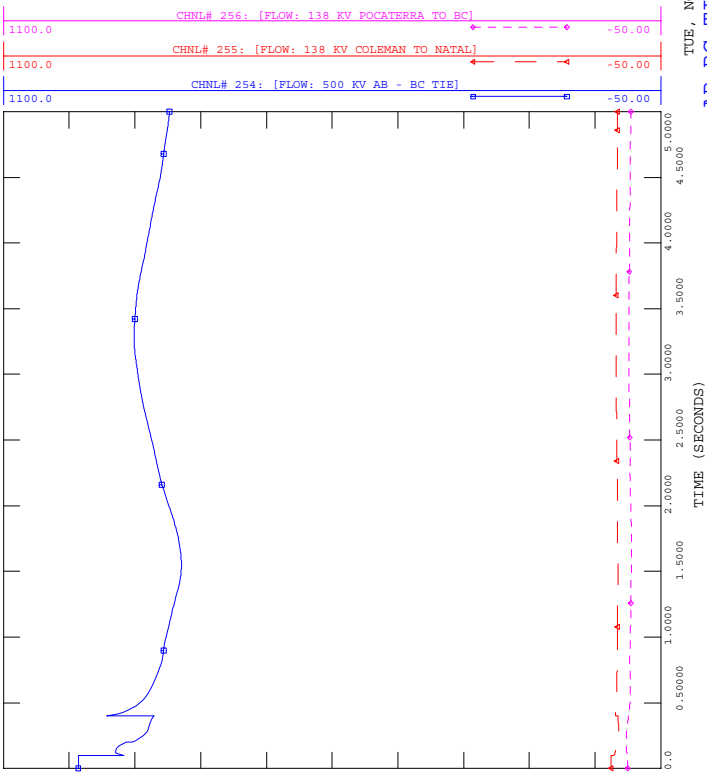
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
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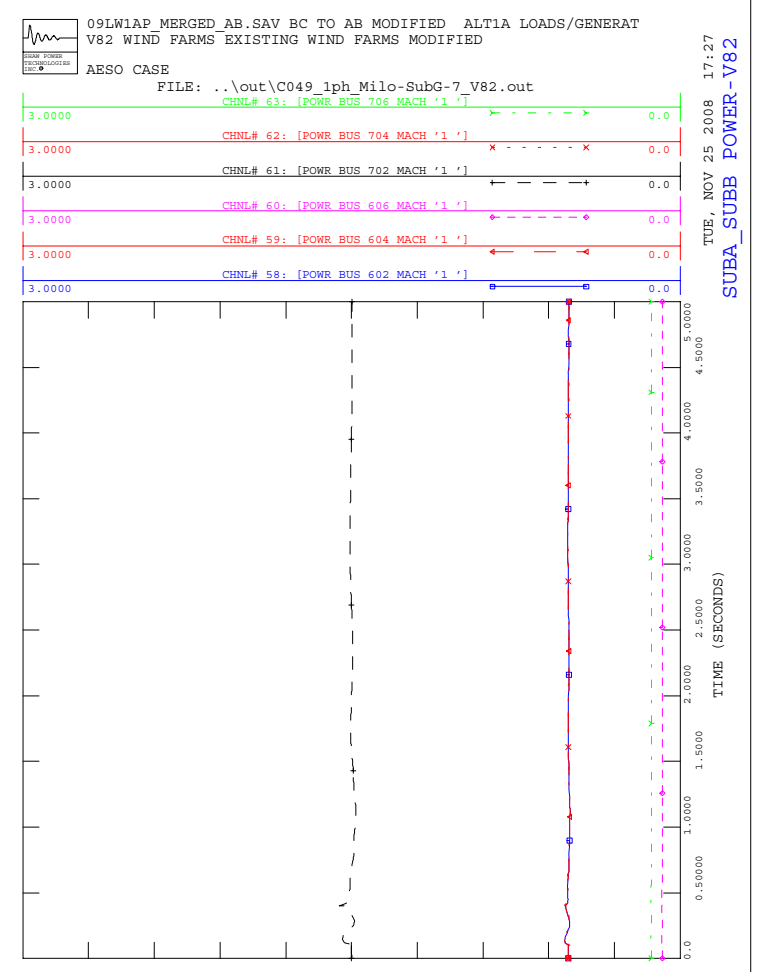
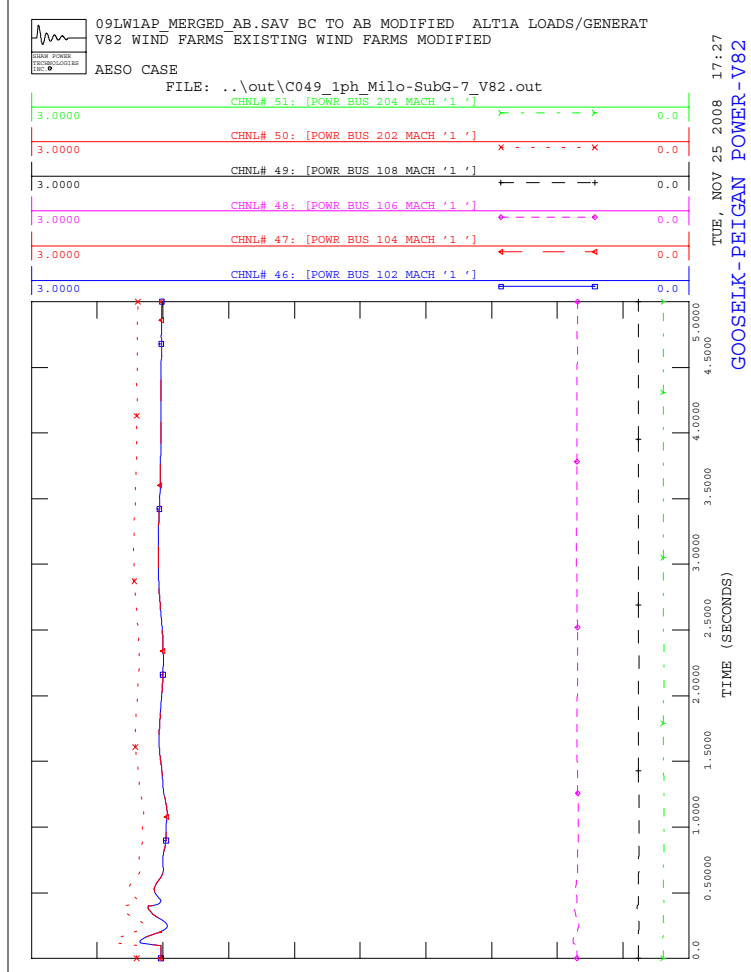
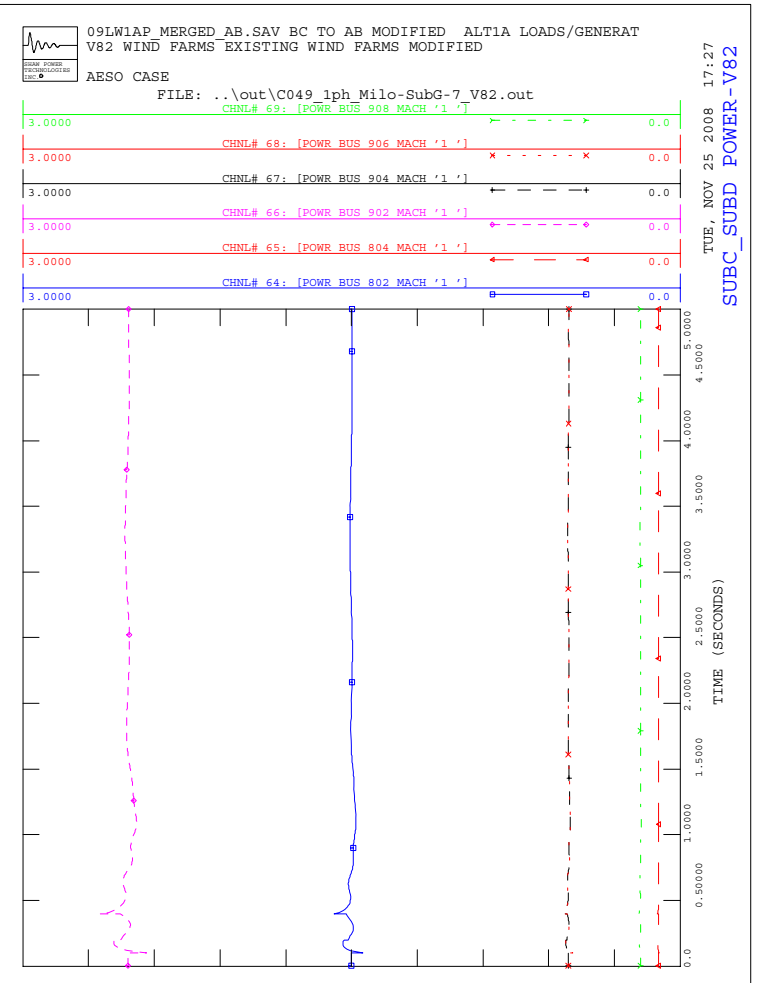
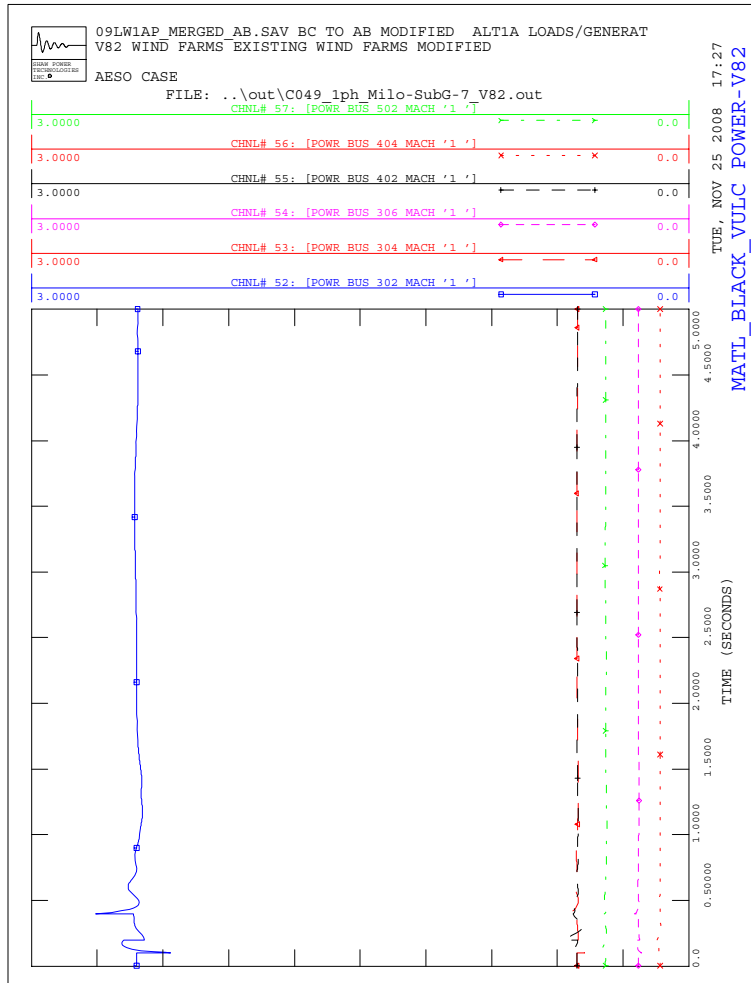
TUE, NOV 25 2008 17:27
LANGDON_FRQ-V82



09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C031_1ph_North_Leth-Matl-1_V82.out

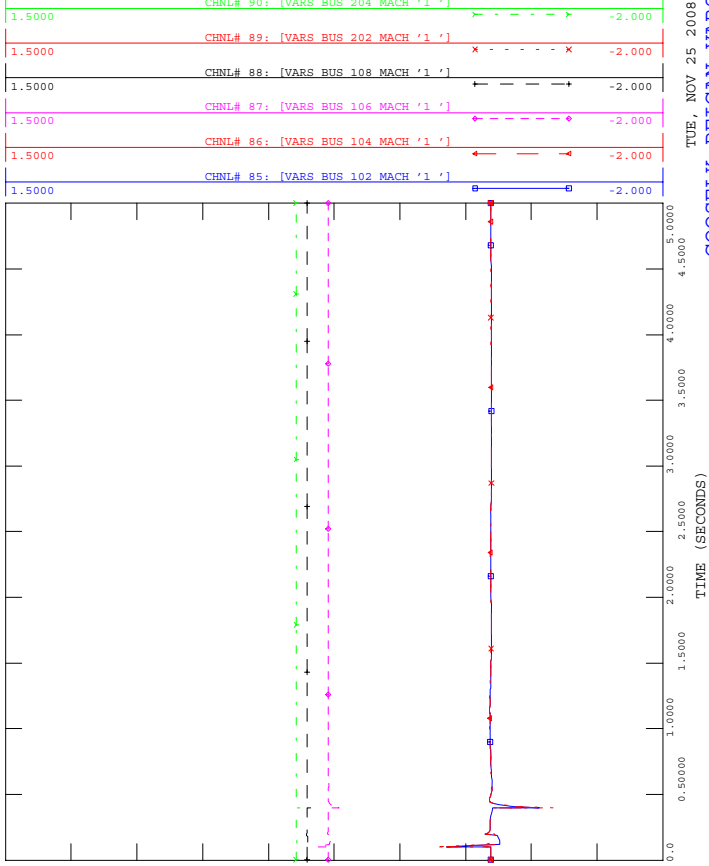
TUE, NOV 25 2008 17:27
AB_BC_TIE_FLOWS-V82





09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

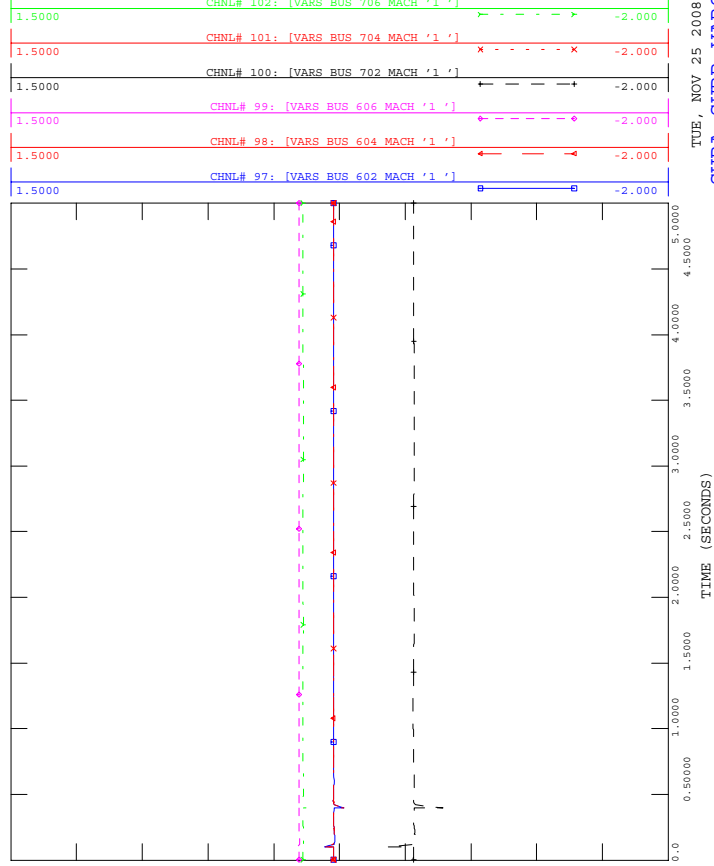
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TUE, NOV 25 2008 17:27
 GOOSELK-PEIGAN VARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

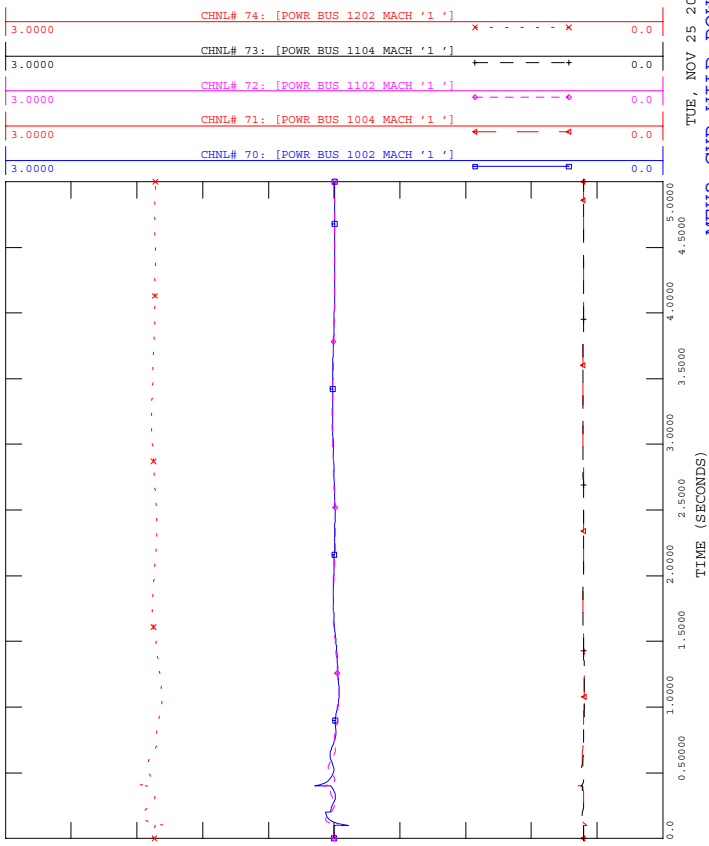
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TUE, NOV 25 2008 17:27
 SUBA_SUBB VARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

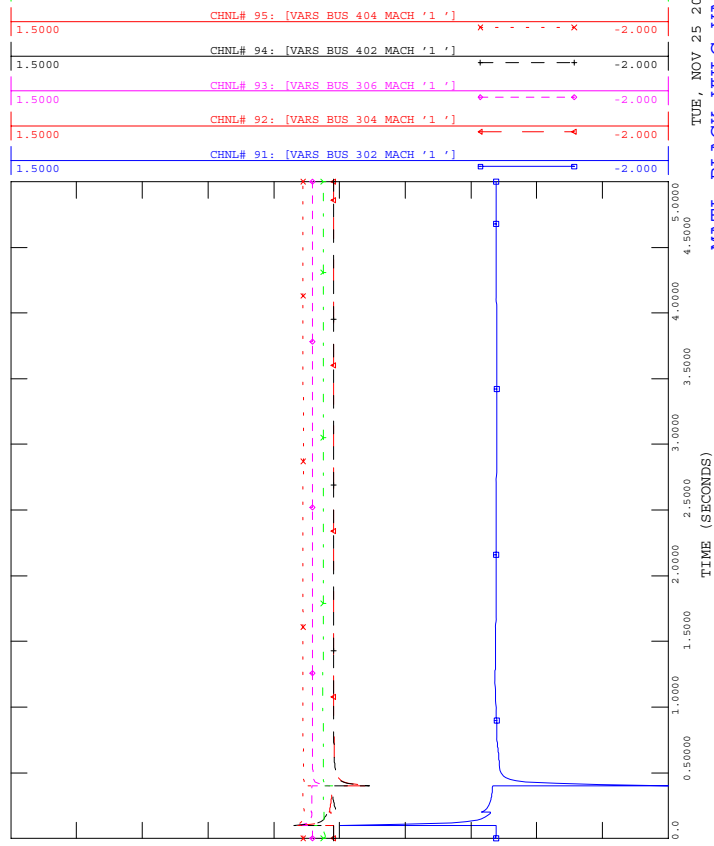
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TUE, NOV 25 2008 17:27
 MEH2_CYP_WILD_POWER-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

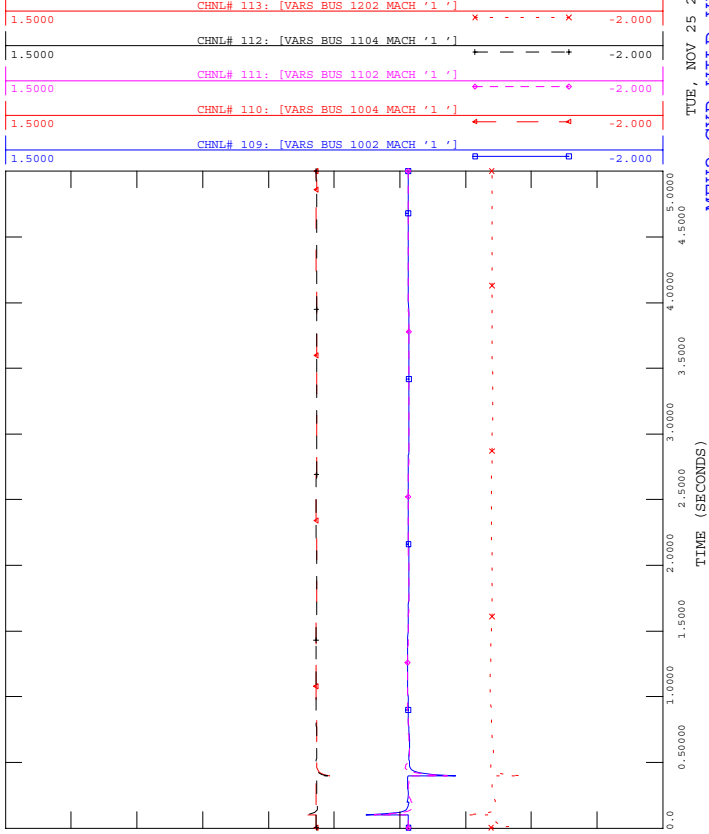
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TUE, NOV 25 2008 17:27
 MATL_BLACK_VULC VARS-V82

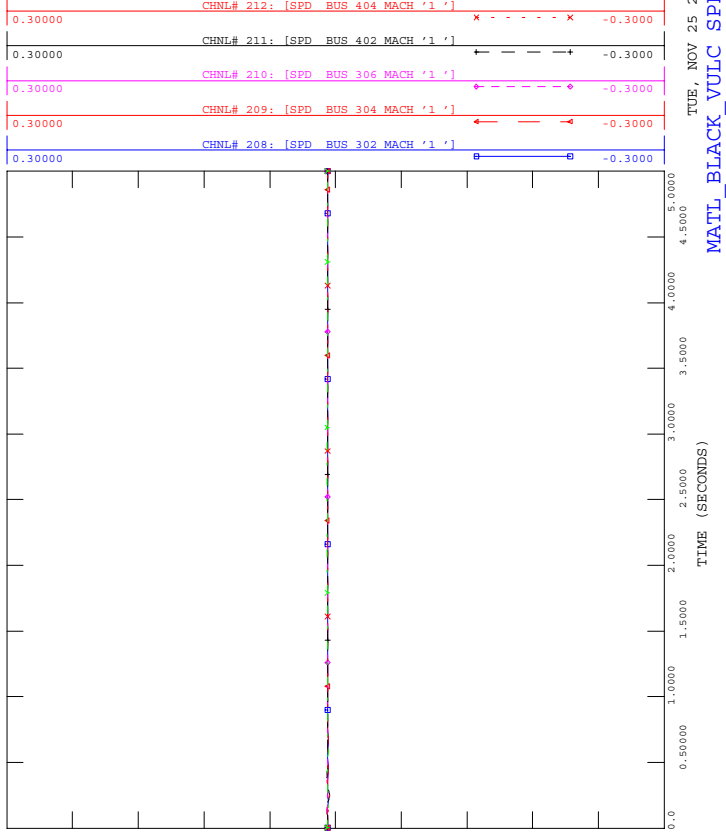
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE
FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out



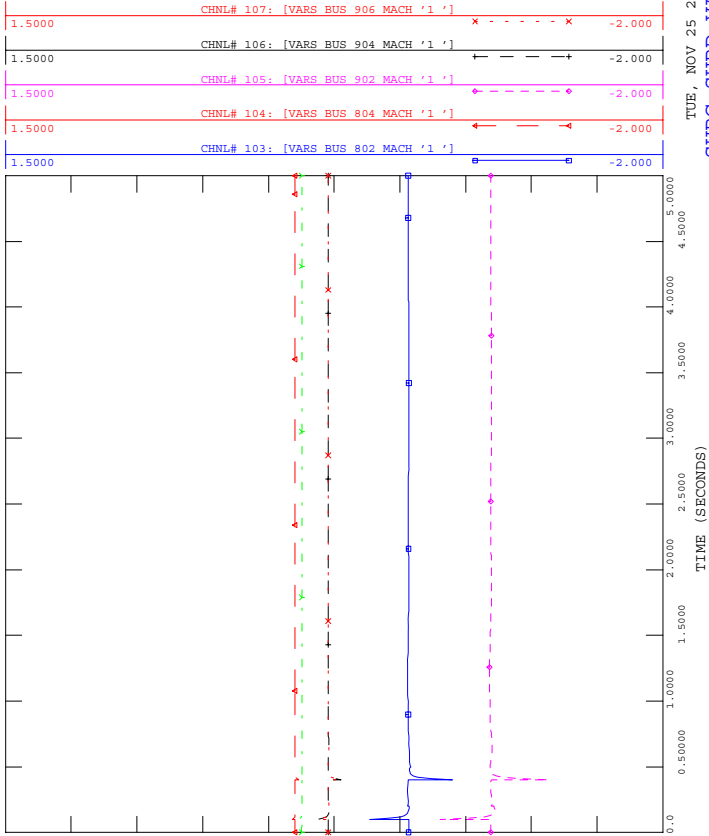
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE
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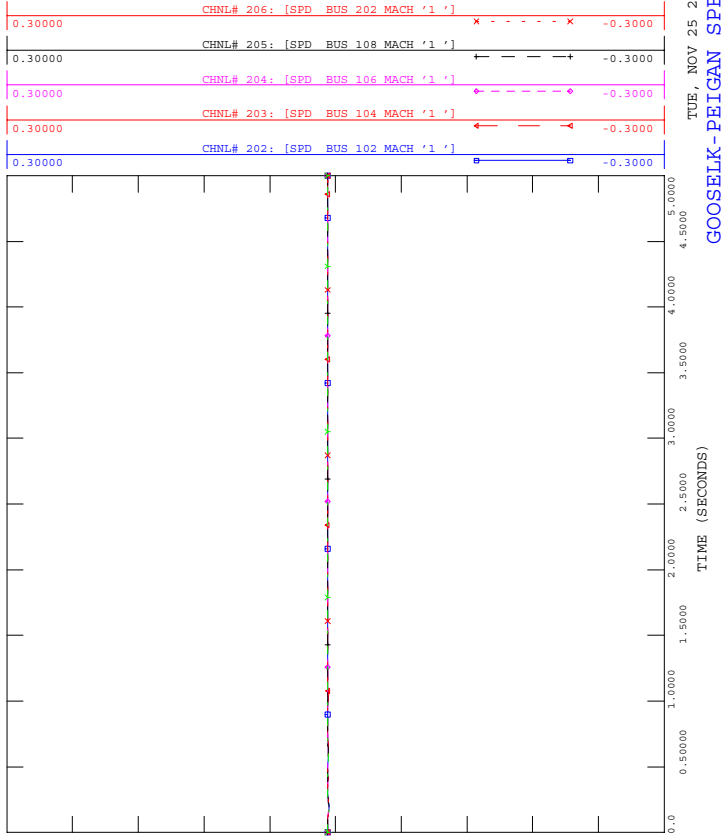
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED

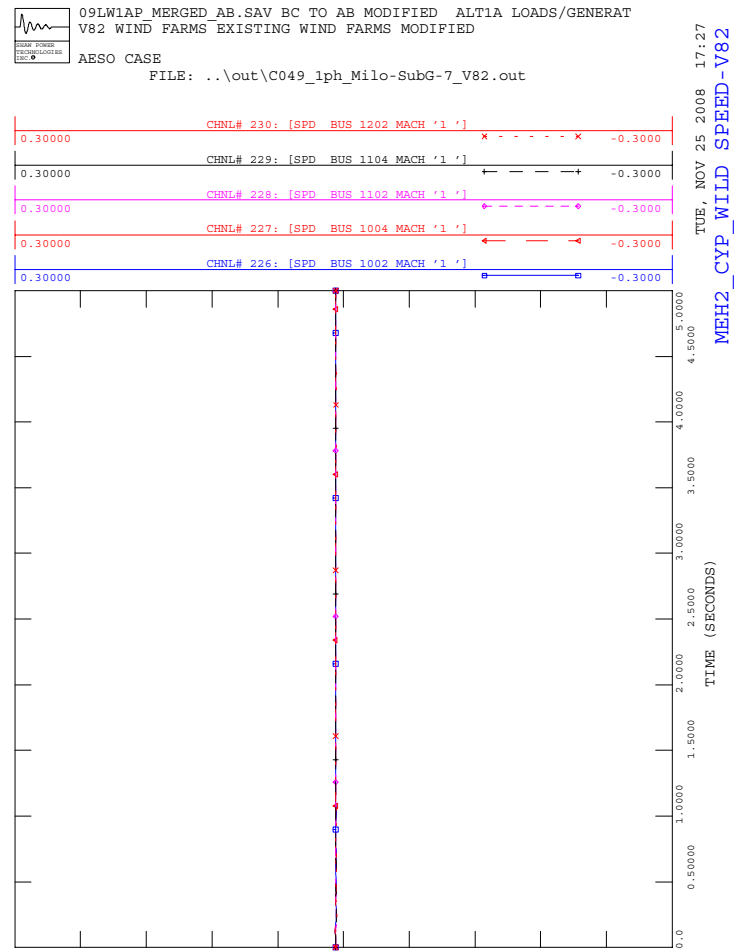
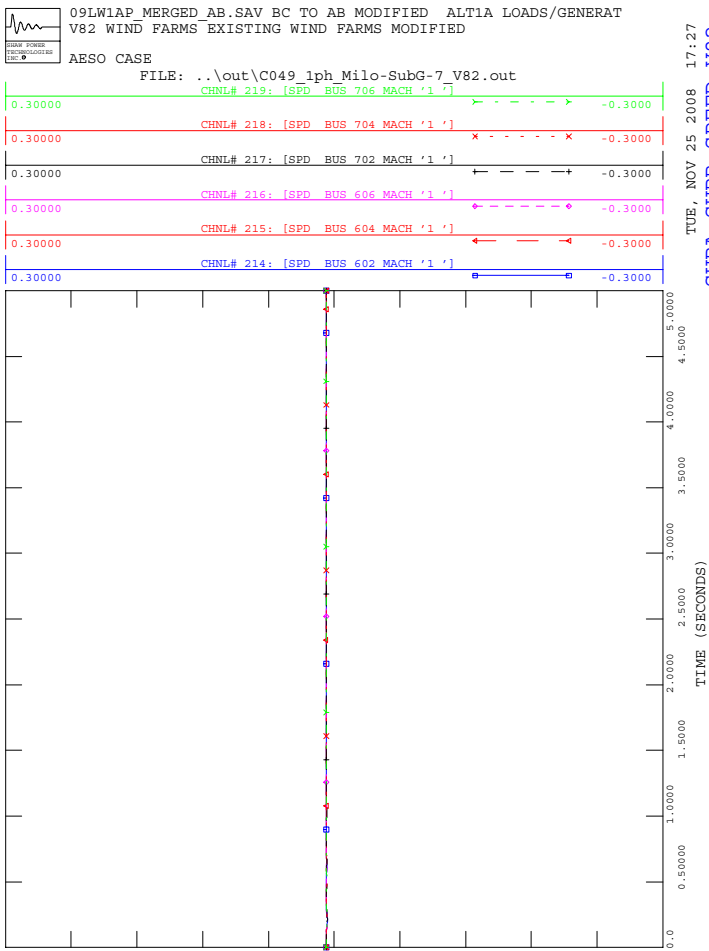
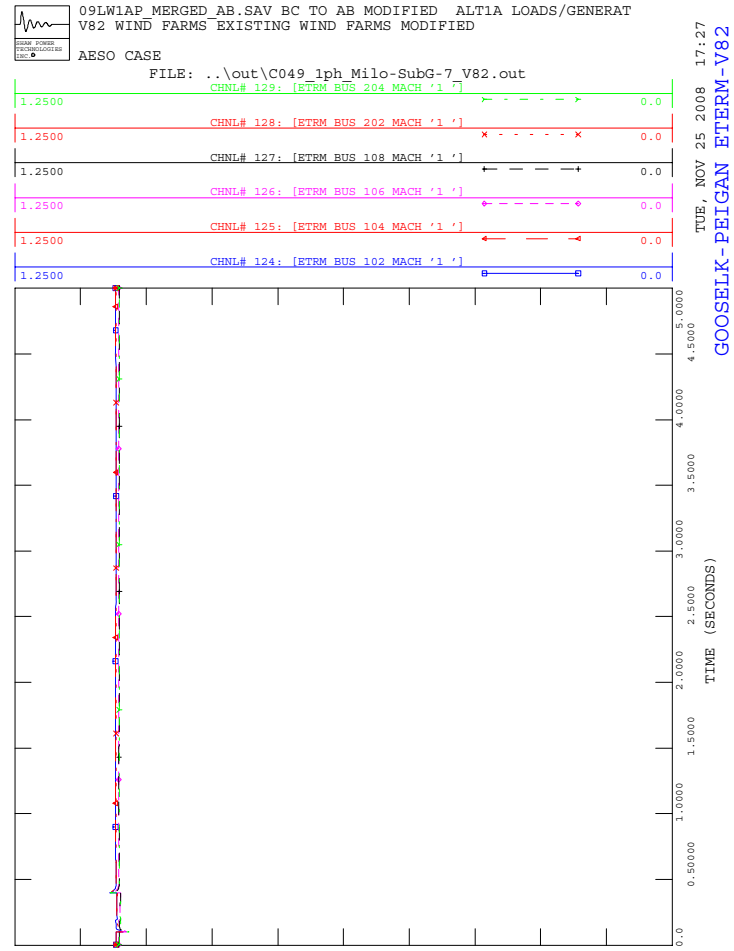
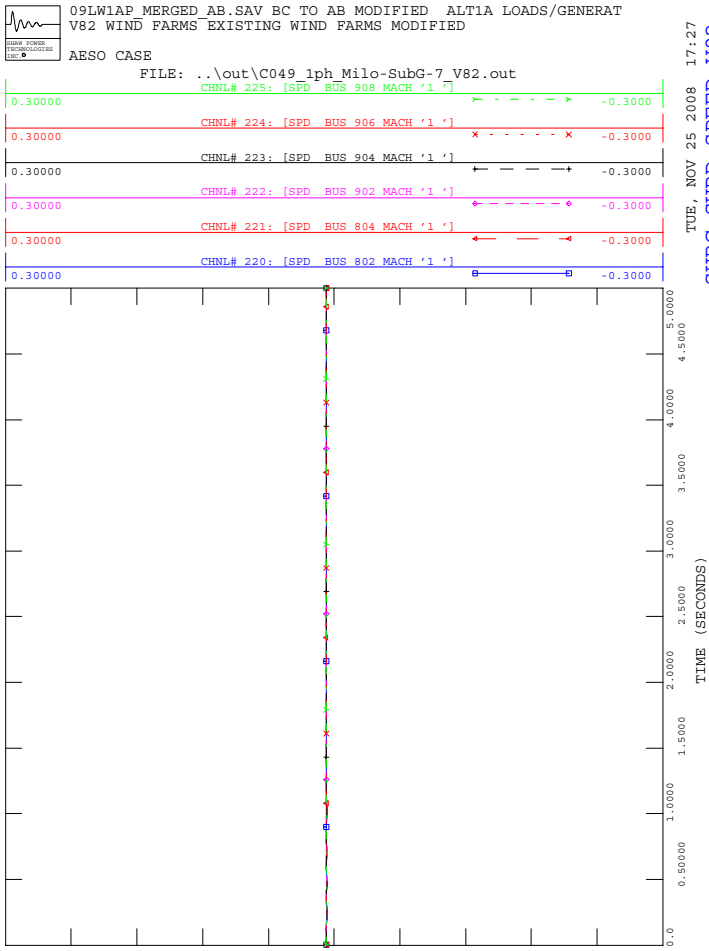
ABSO CASE
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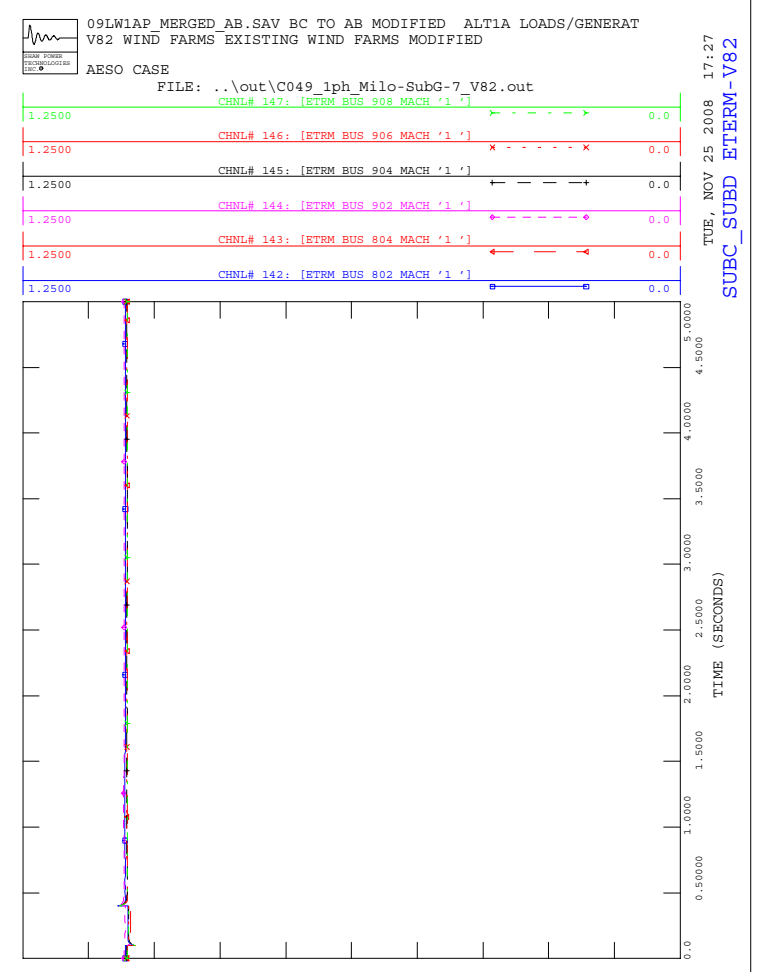
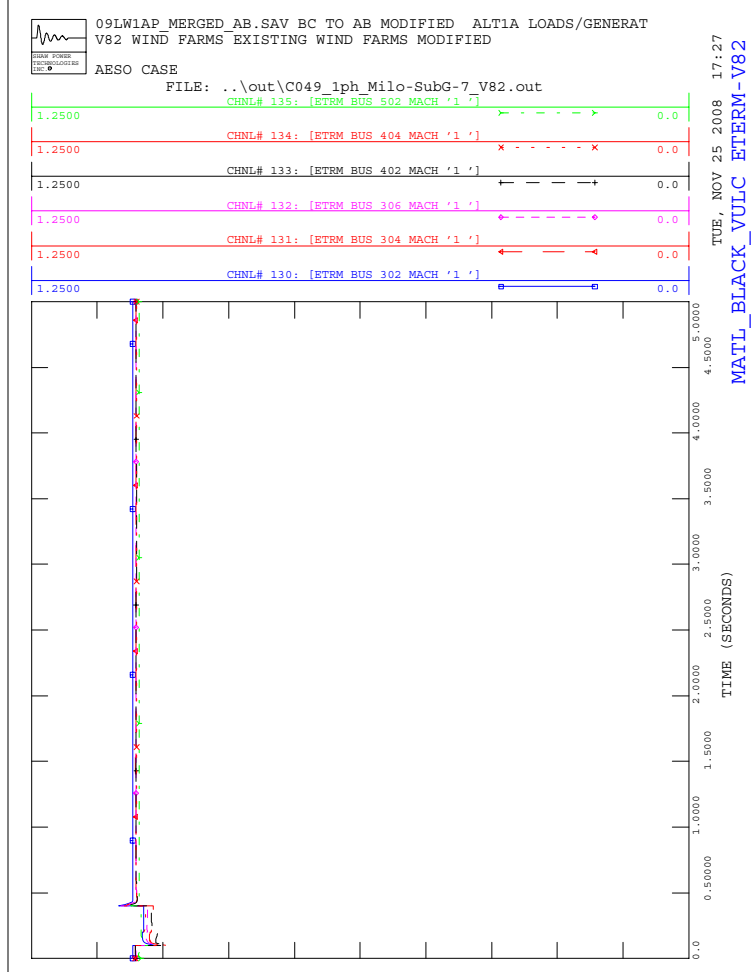
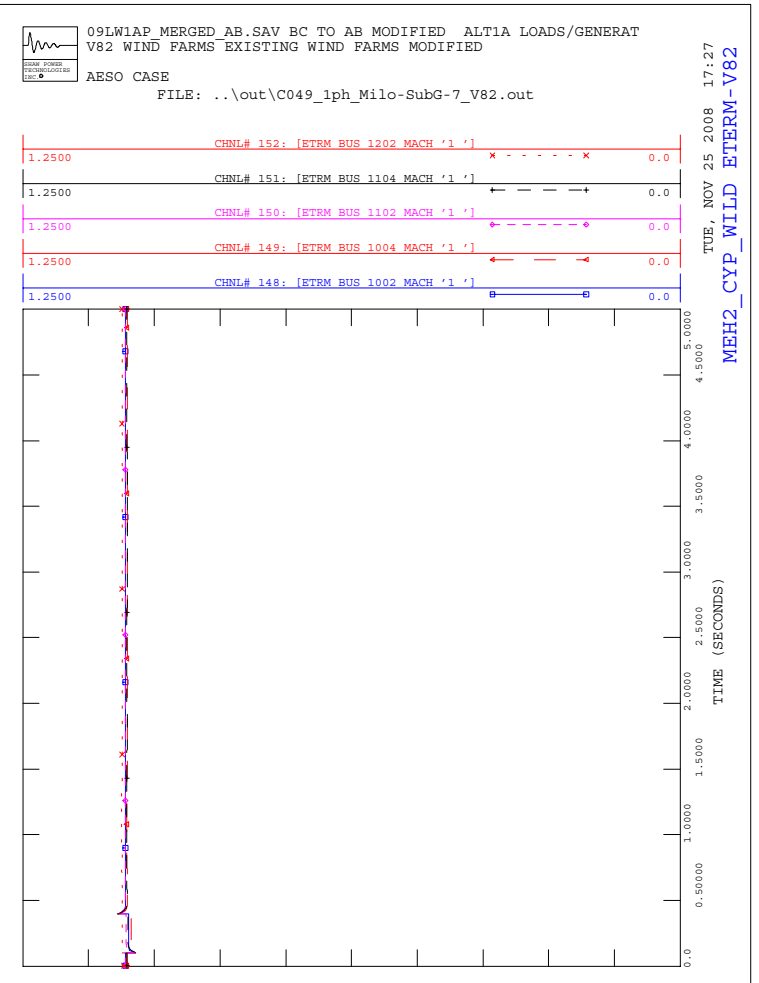
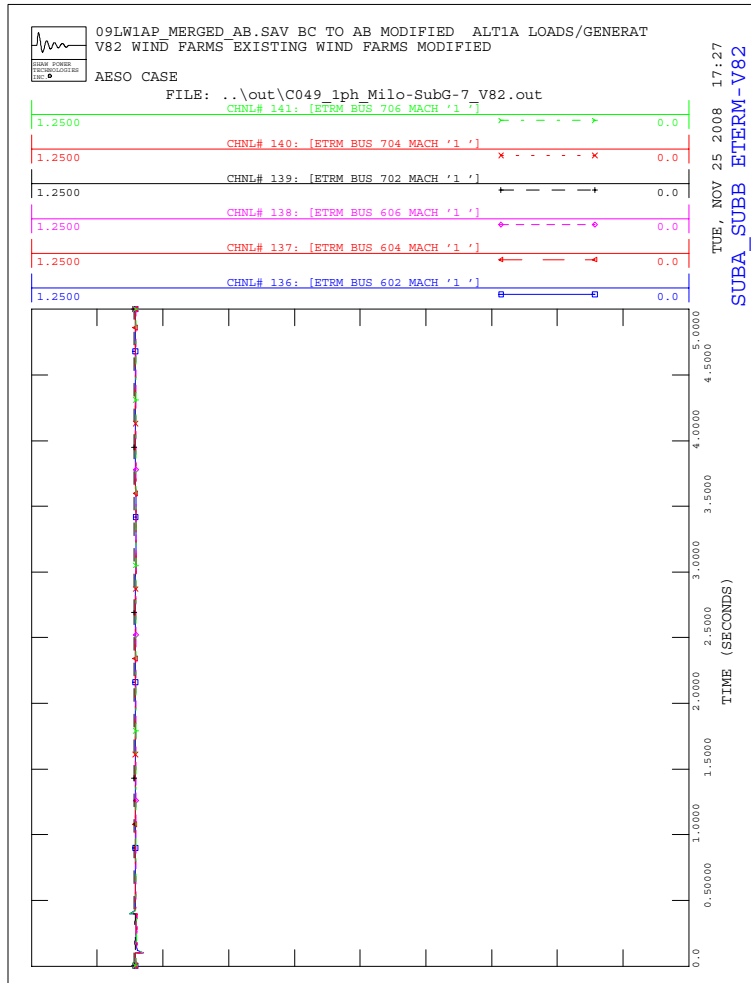


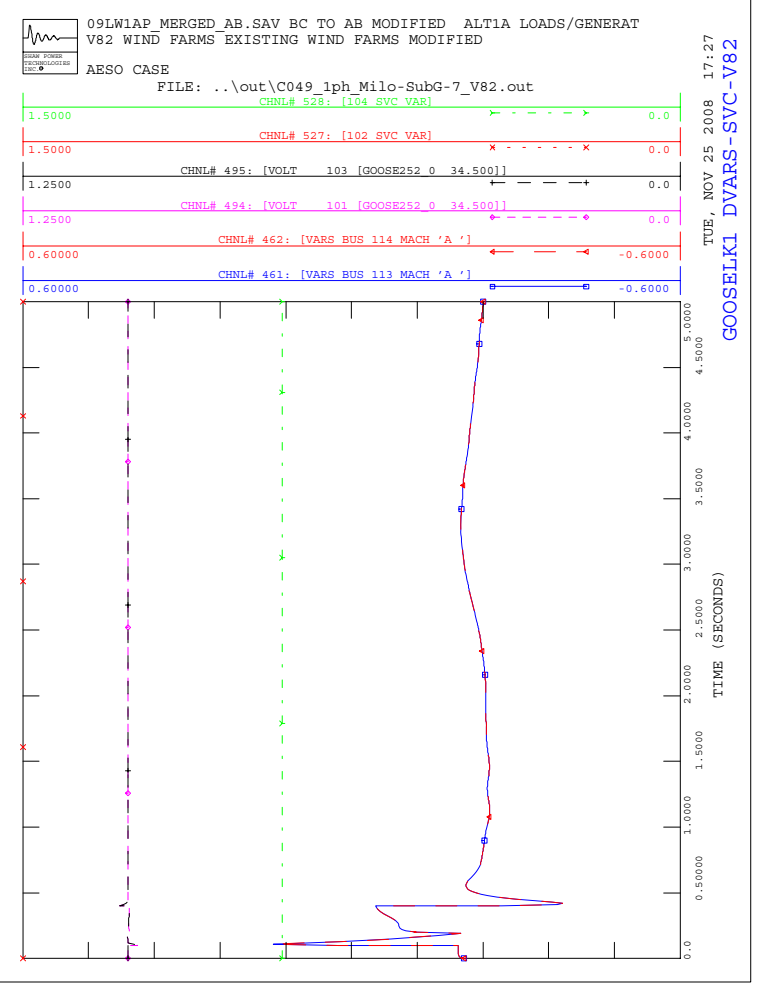
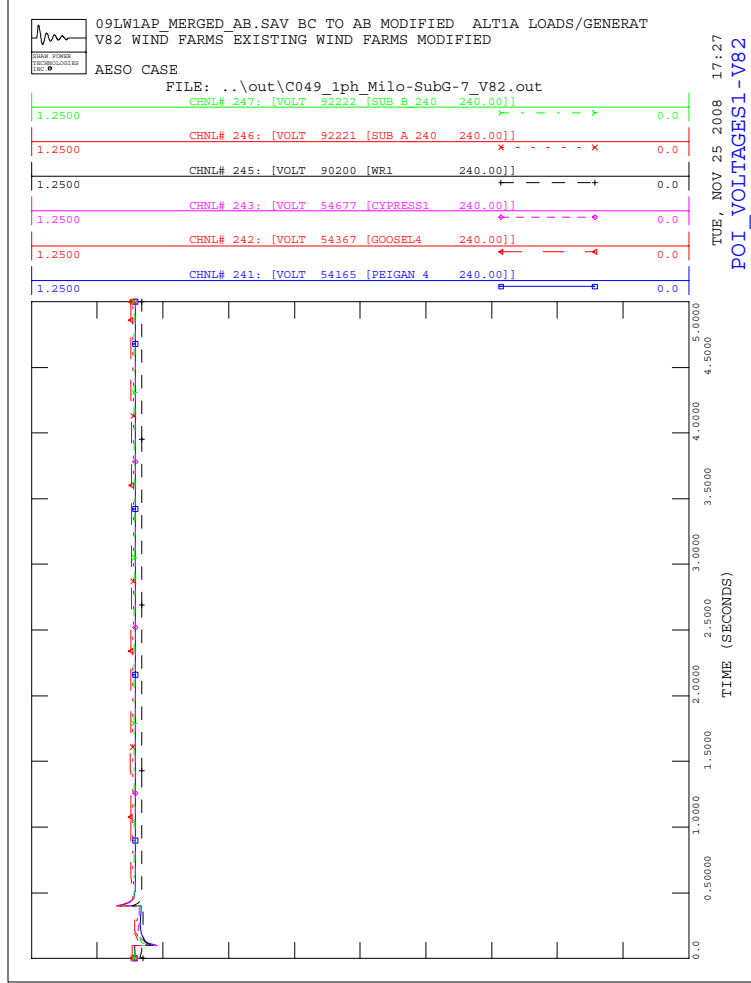
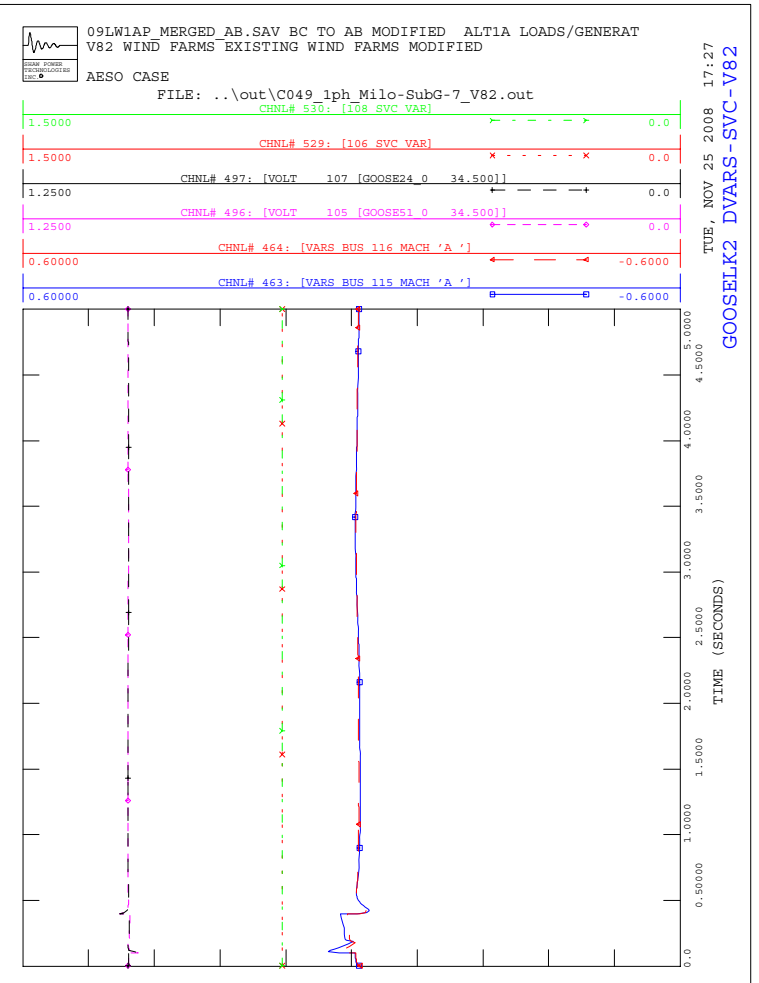
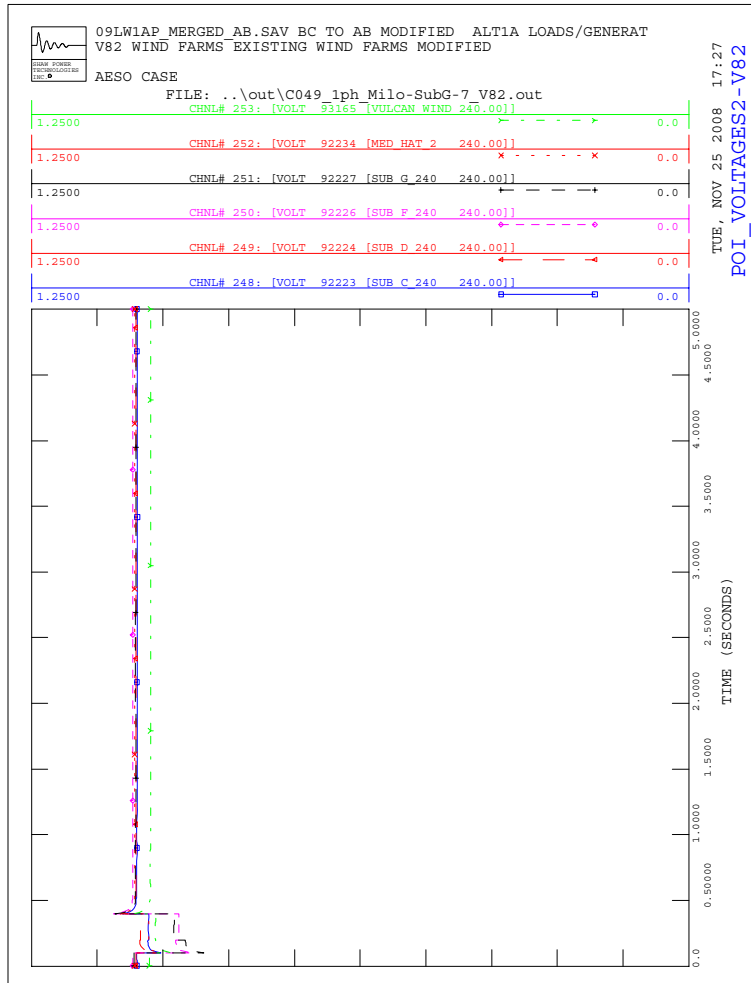
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED

ABSO CASE
FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out



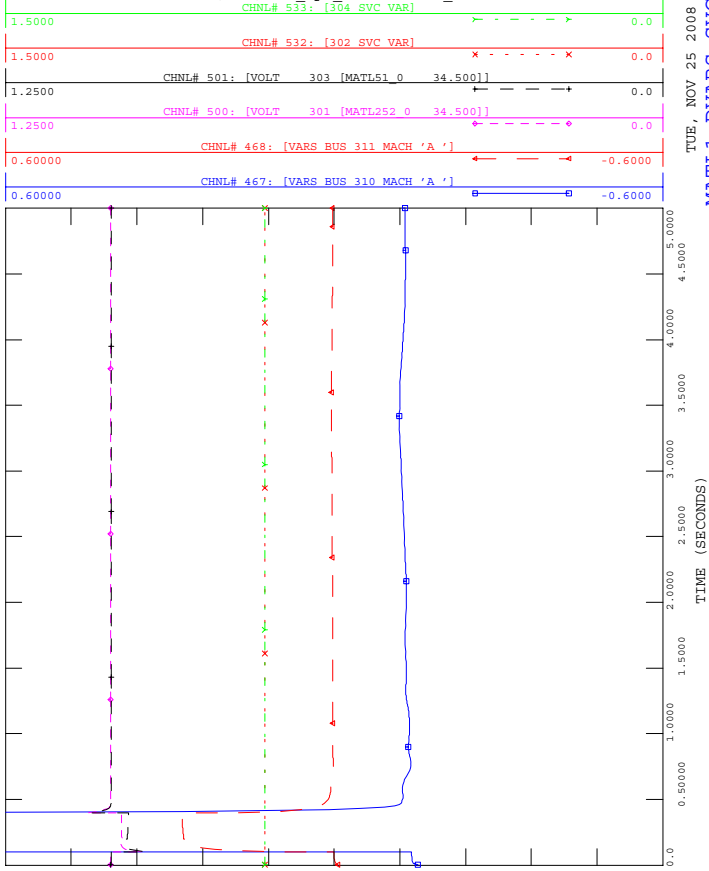






09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

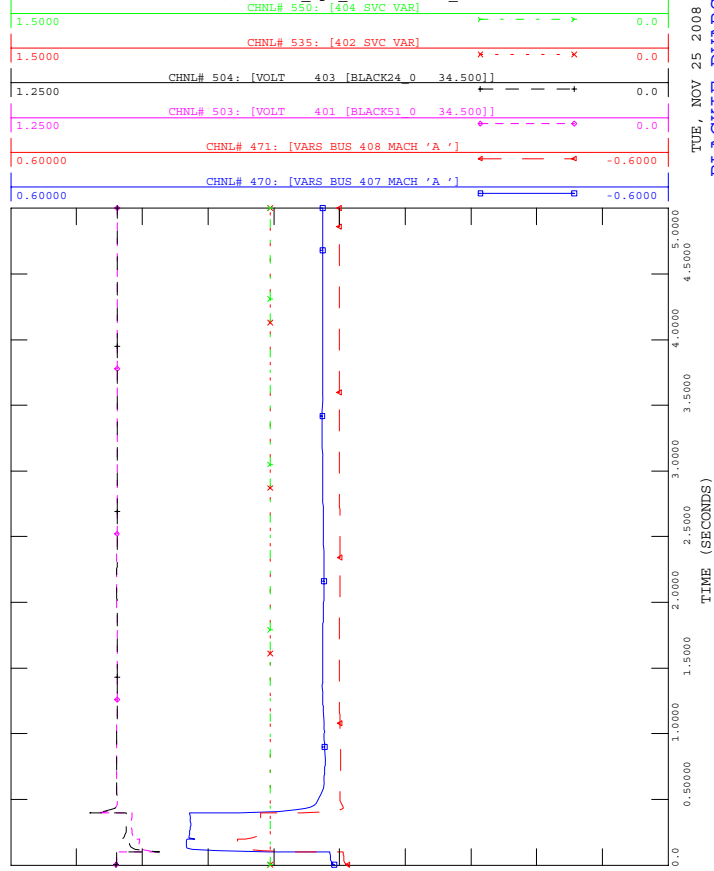
FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out



TUE, NOV 25 2008 17:27
 MATL1 DVARS-SVC-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

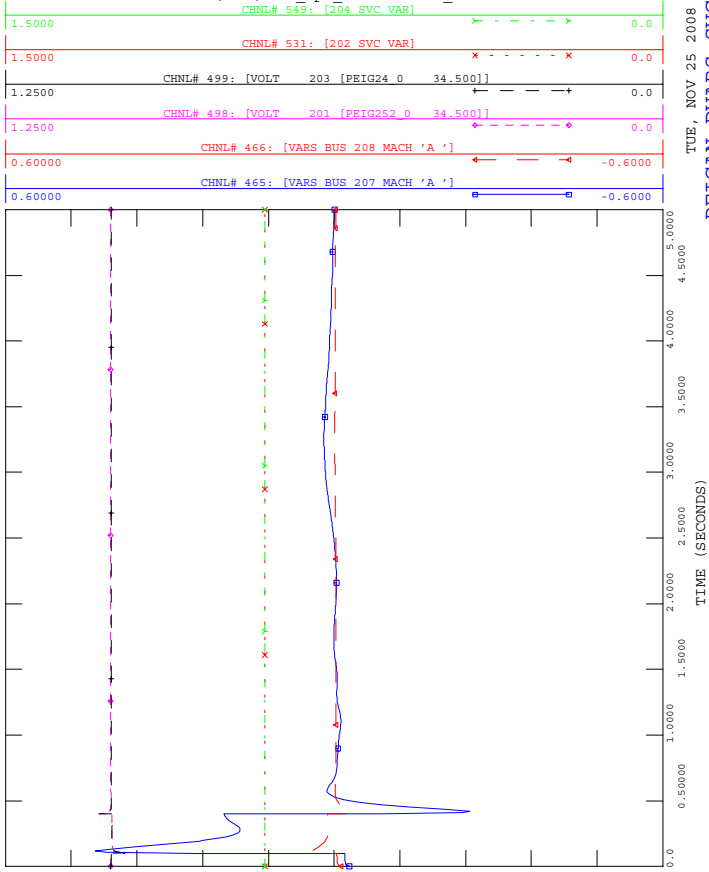
FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out



TUE, NOV 25 2008 17:27
 BLACKIE DVARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

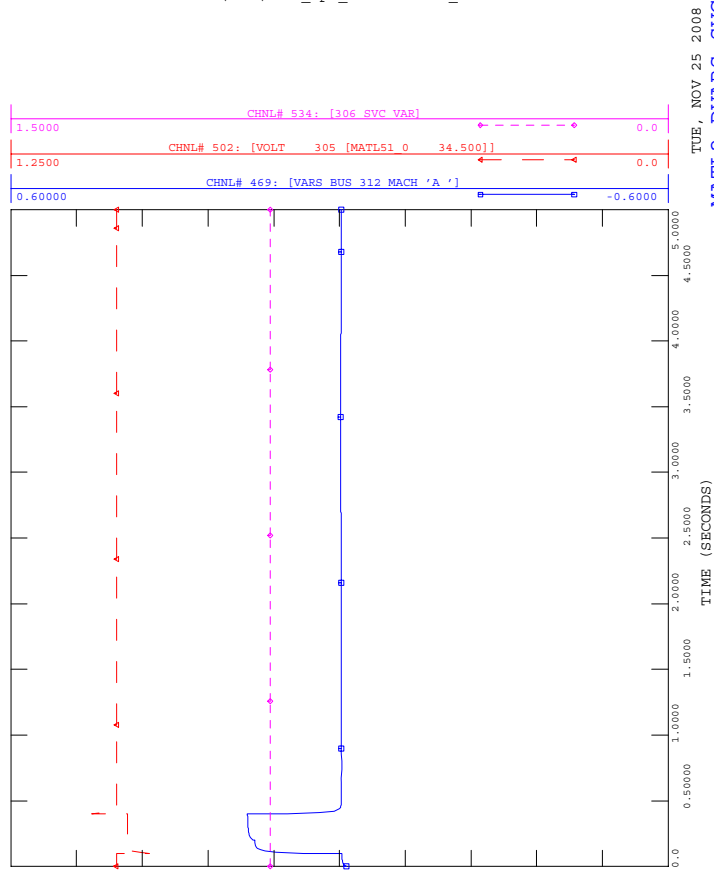
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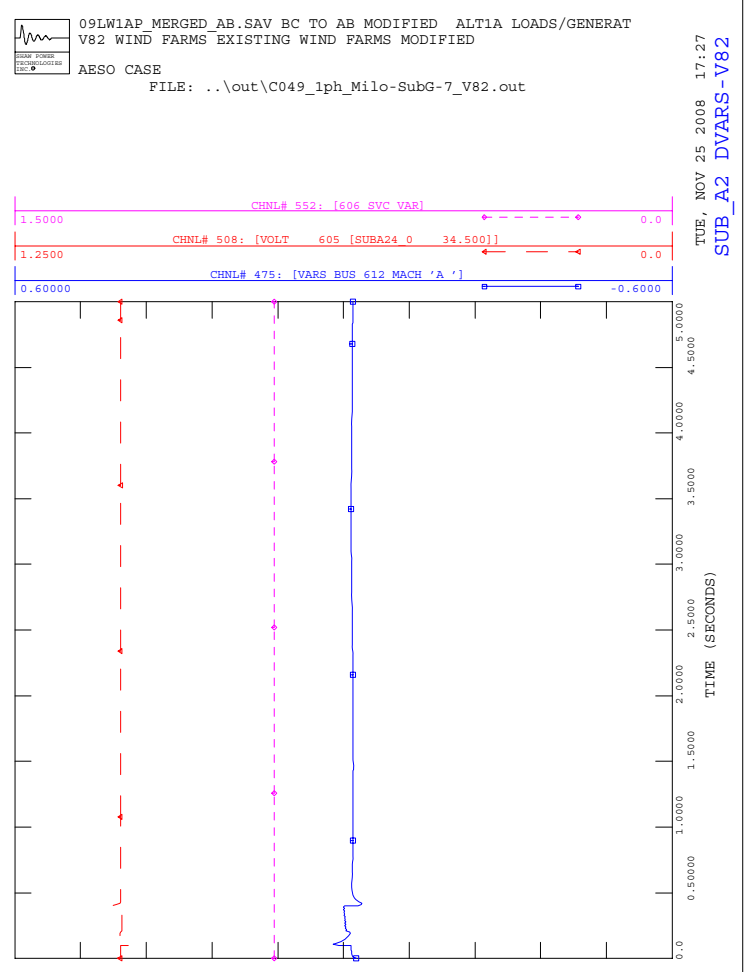
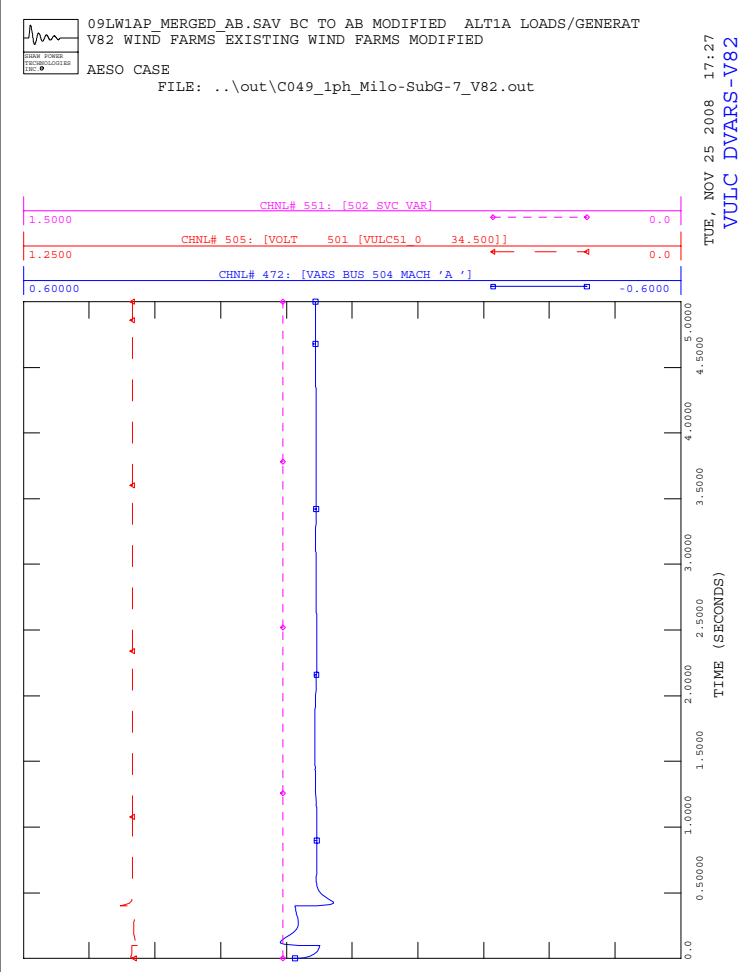
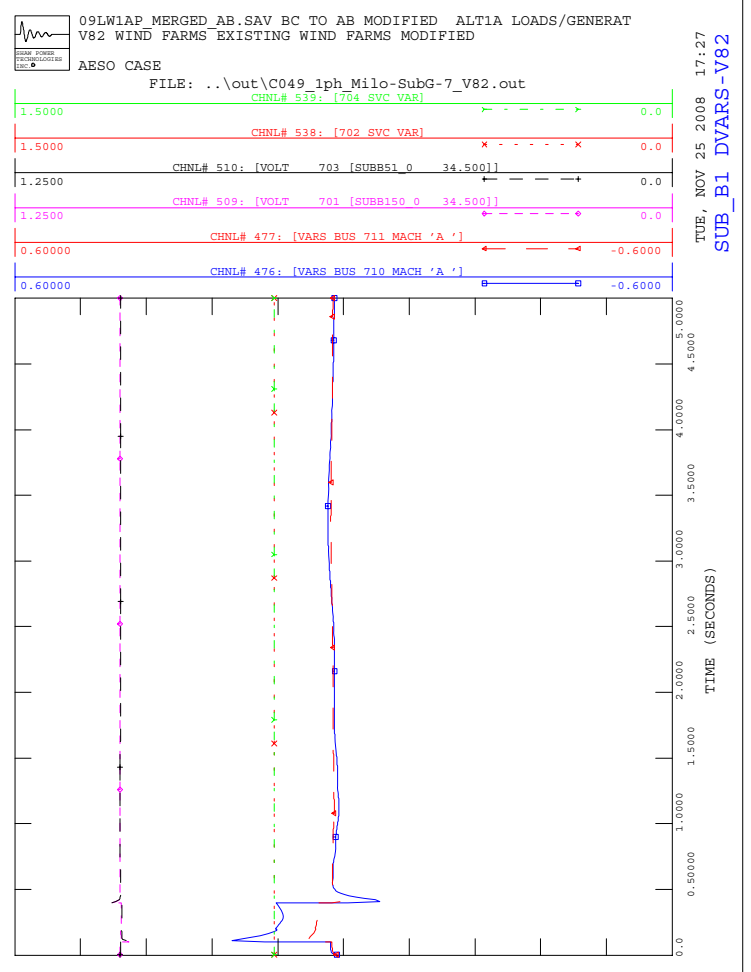
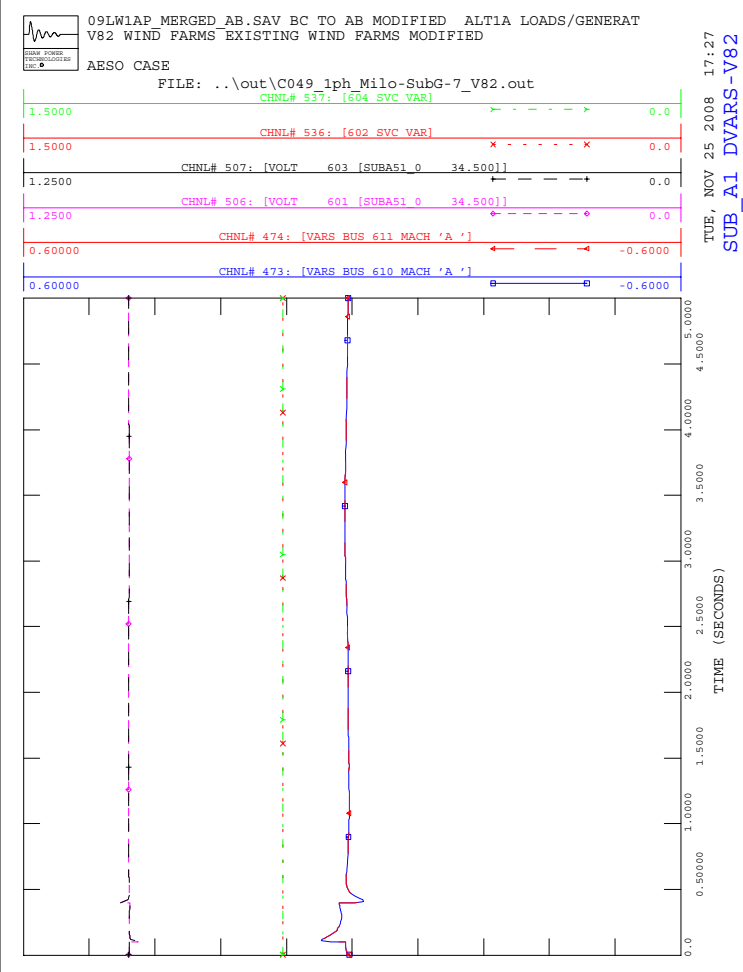
TUE, NOV 25 2008 17:27
 PEIGAN DVARS-SVC-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out

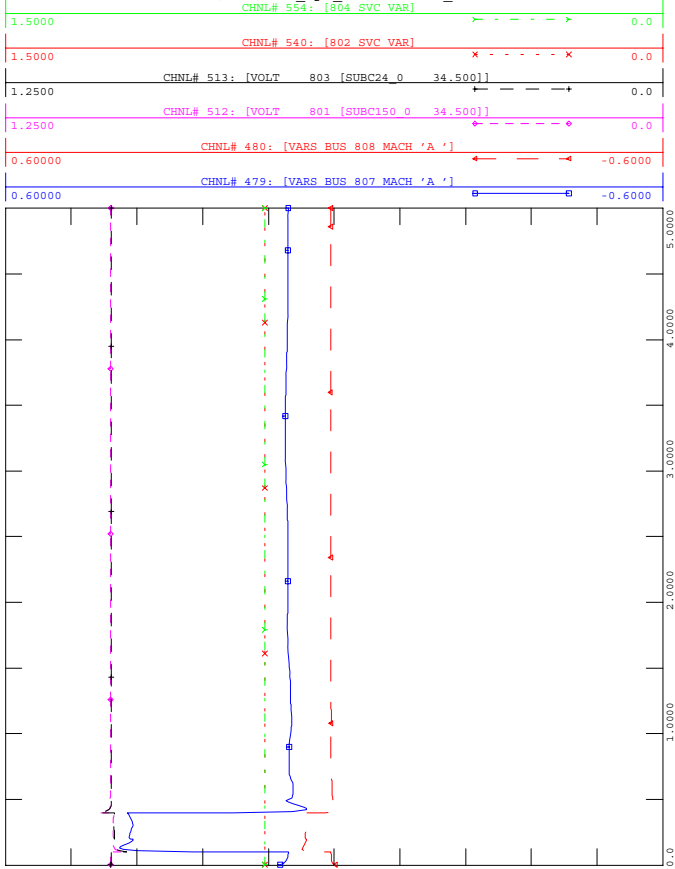


TUE, NOV 25 2008 17:27
 MATL2 DVARS-SVC-V82



09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

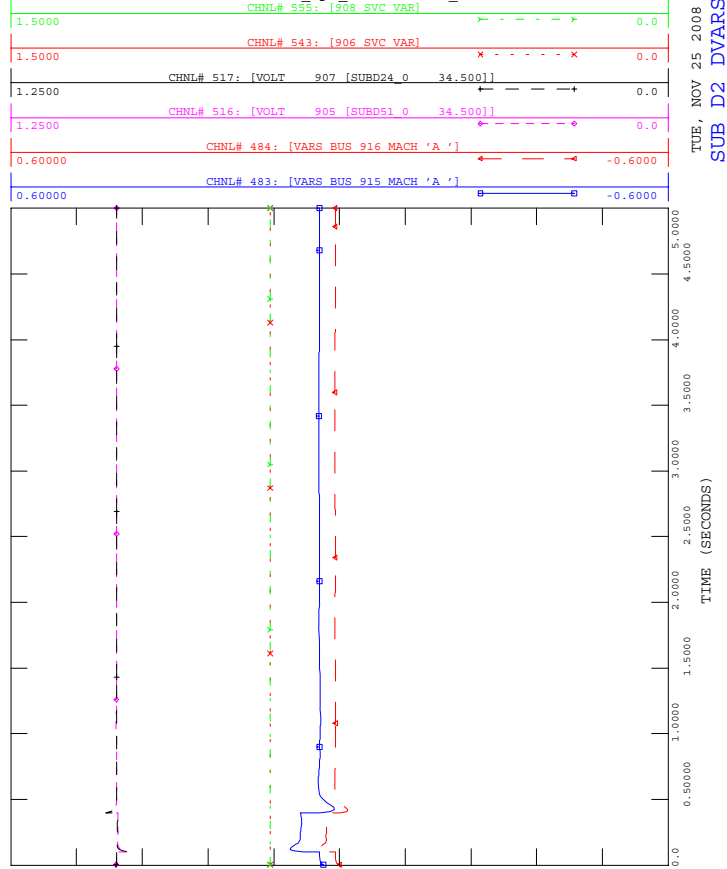
FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out



TUE, NOV 25 2008 17:27
 SUB_C DVARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

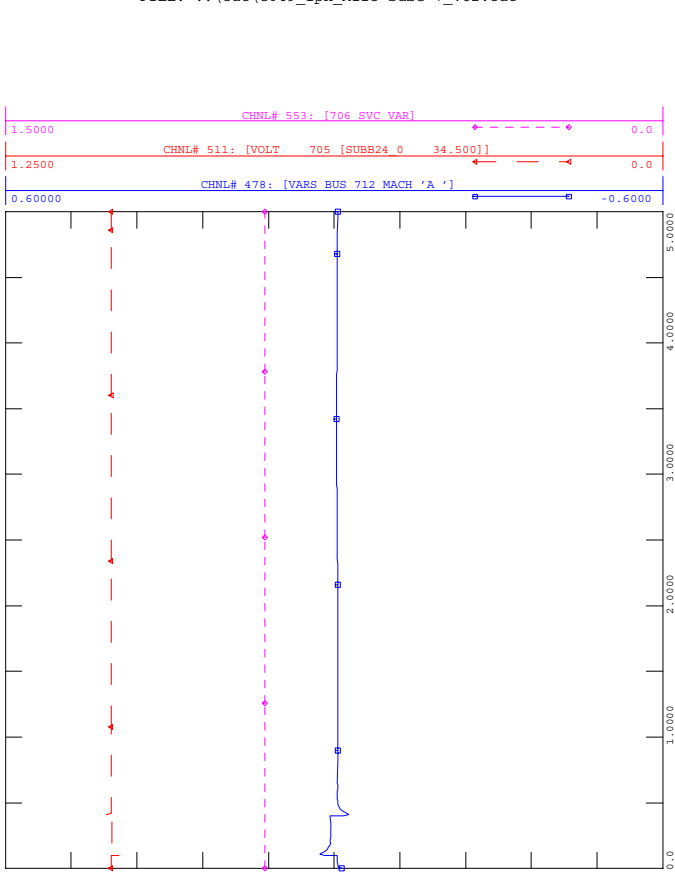
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TUE, NOV 25 2008 17:27
 SUB_D2 DVARS-V82

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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

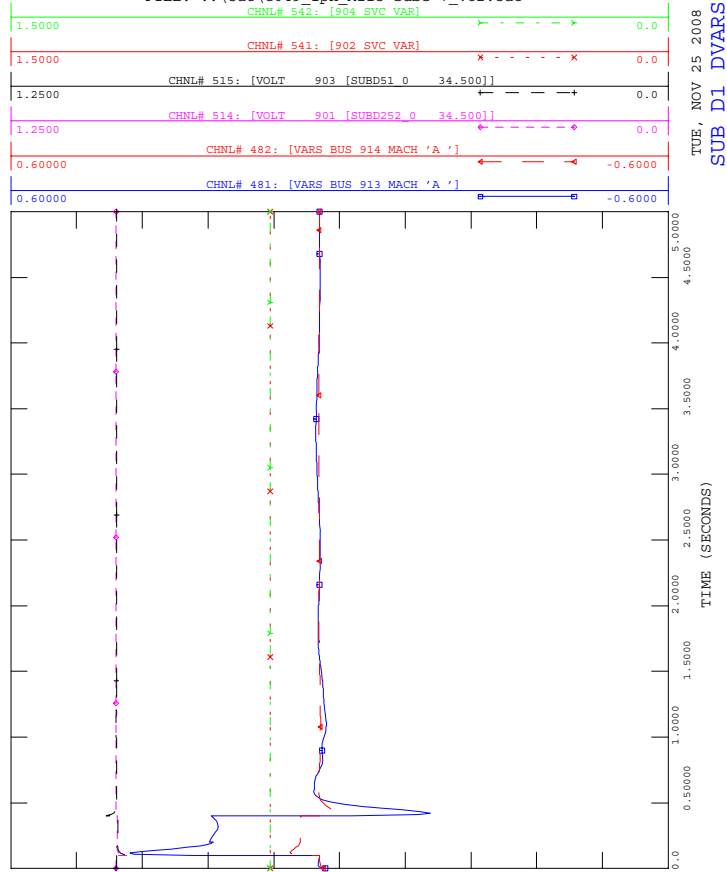
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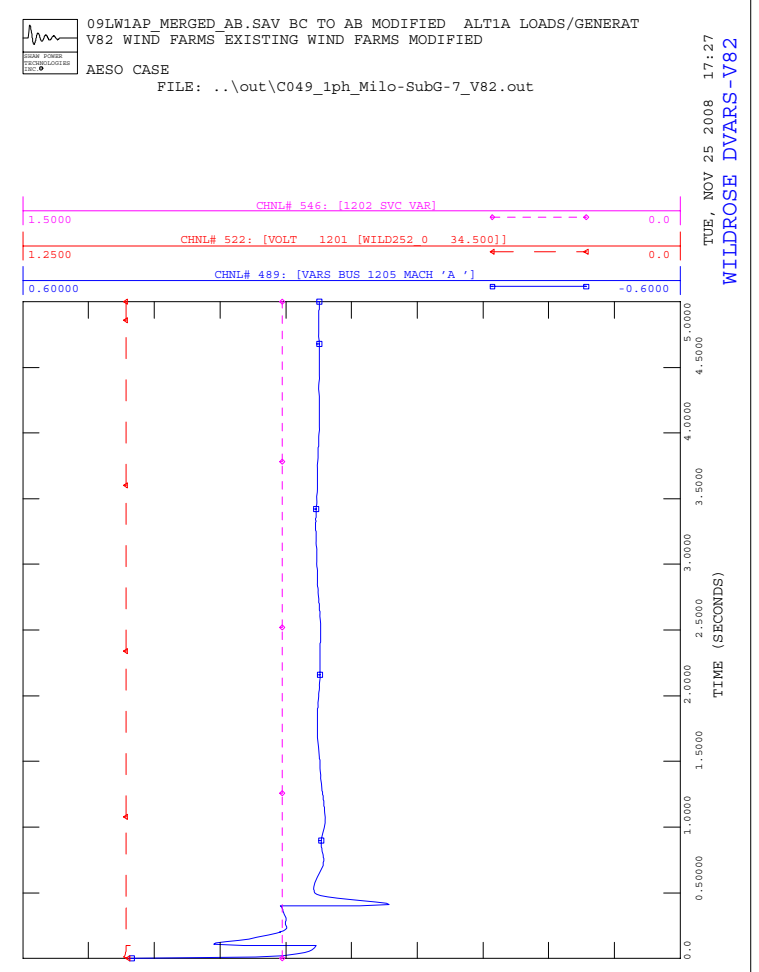
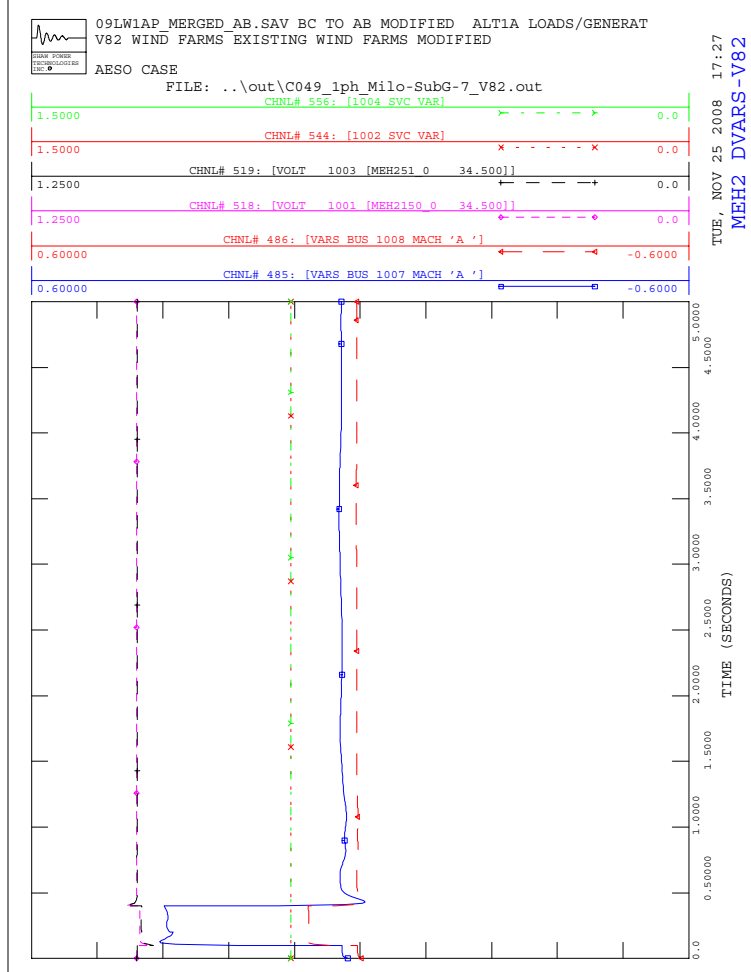
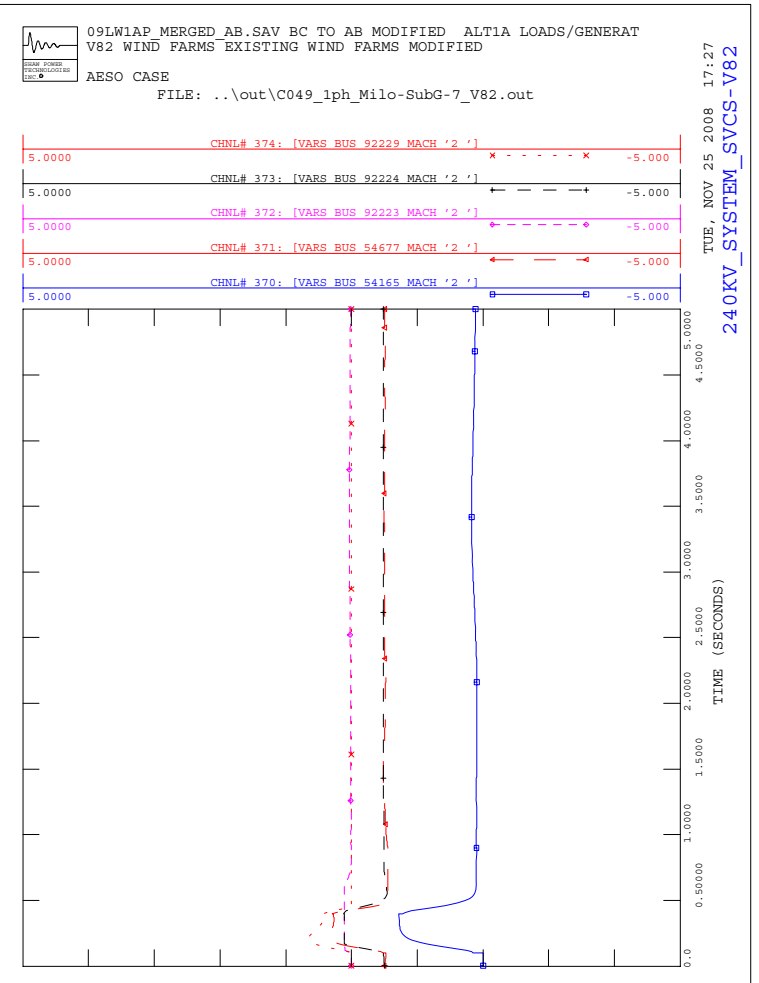
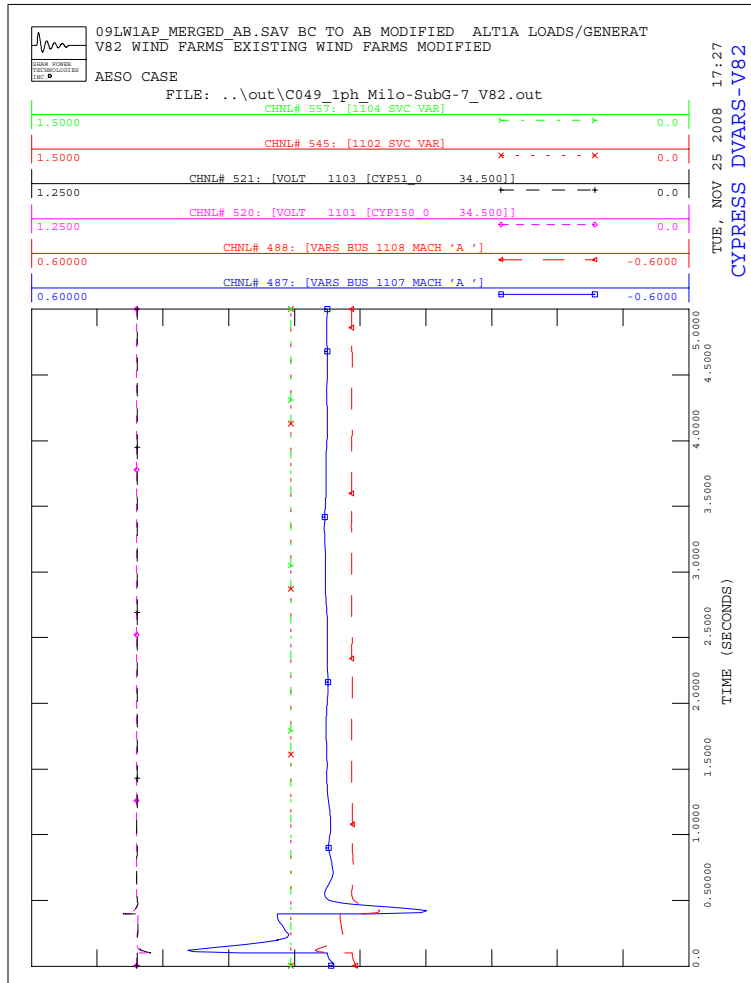
TUE, NOV 25 2008 17:27
 SUB_B2 DVARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out



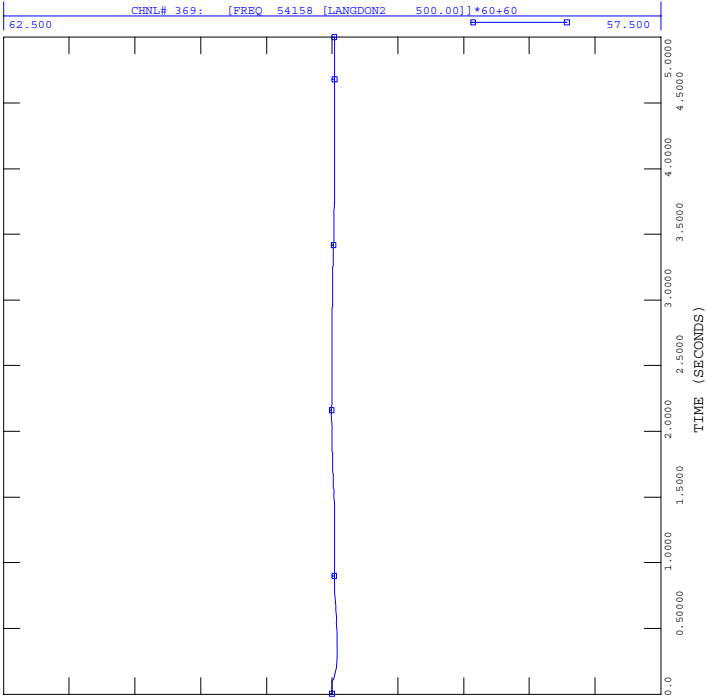
TUE, NOV 25 2008 17:27
 SUB_D1 DVARS-V82





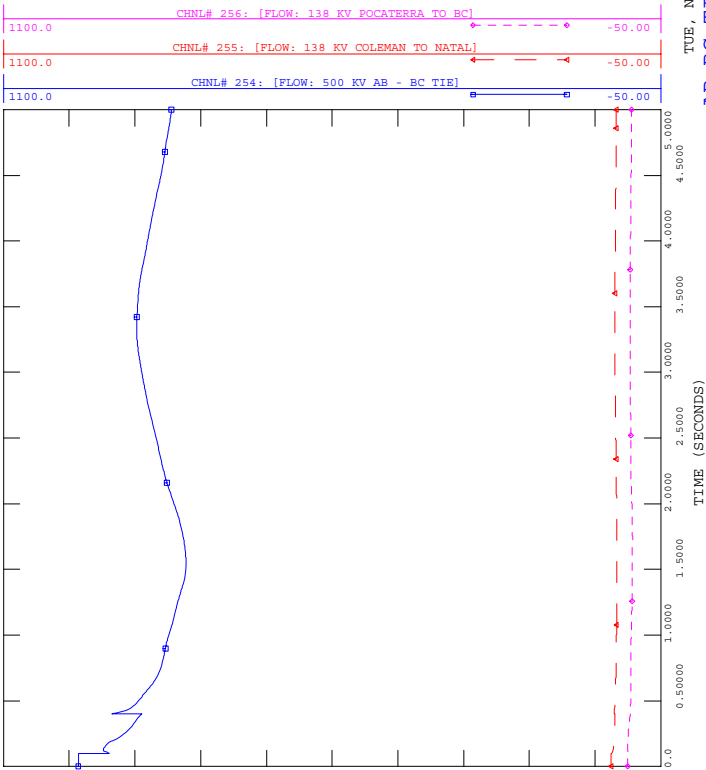
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out

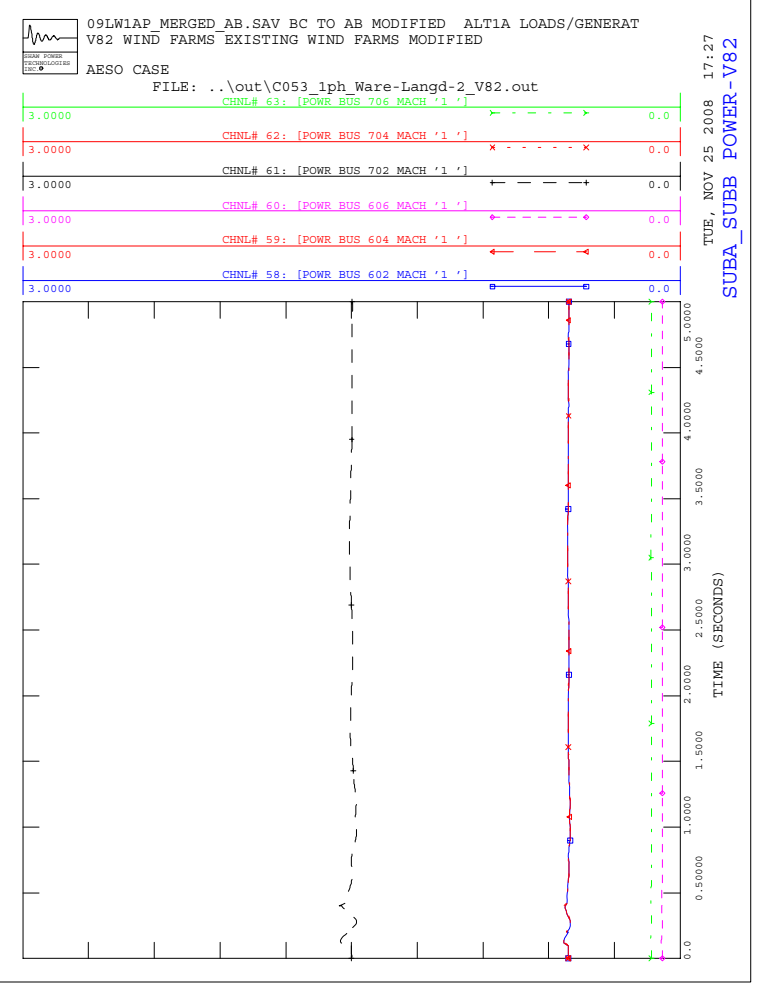
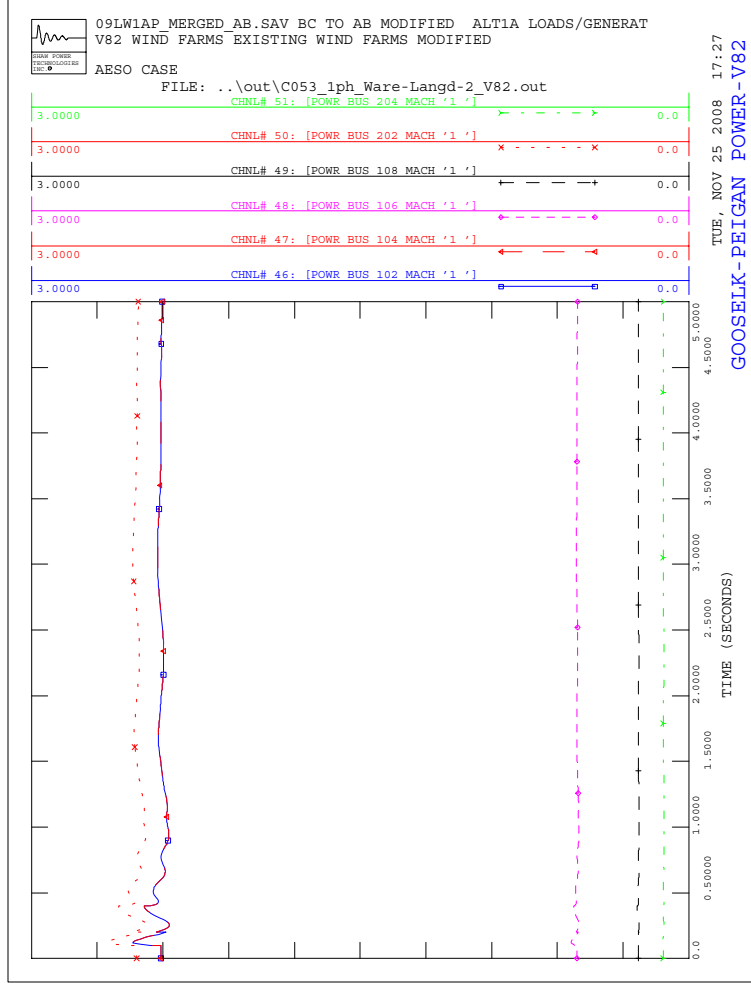
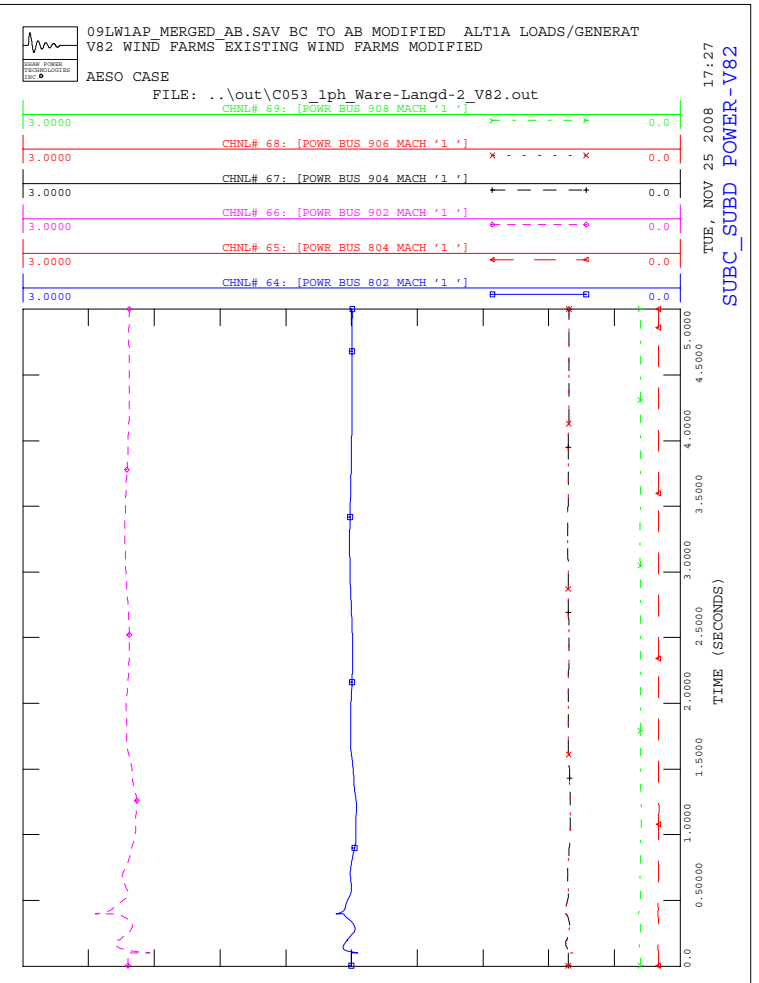
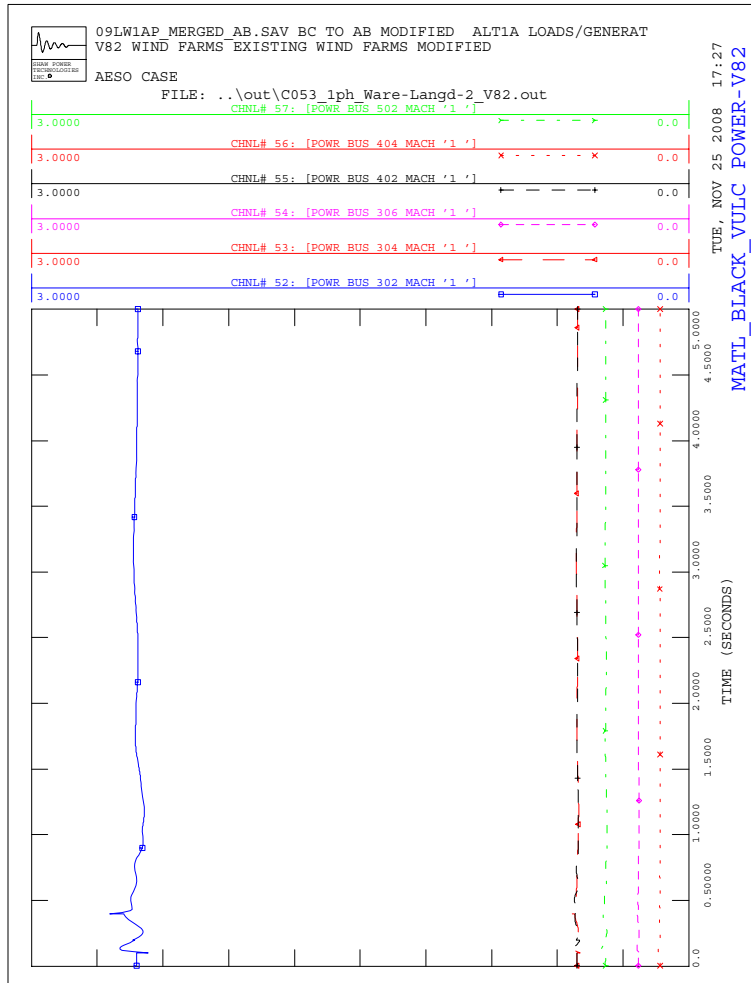
TUE, NOV 25 2008 17:27
LANGDON_FRQ-V82

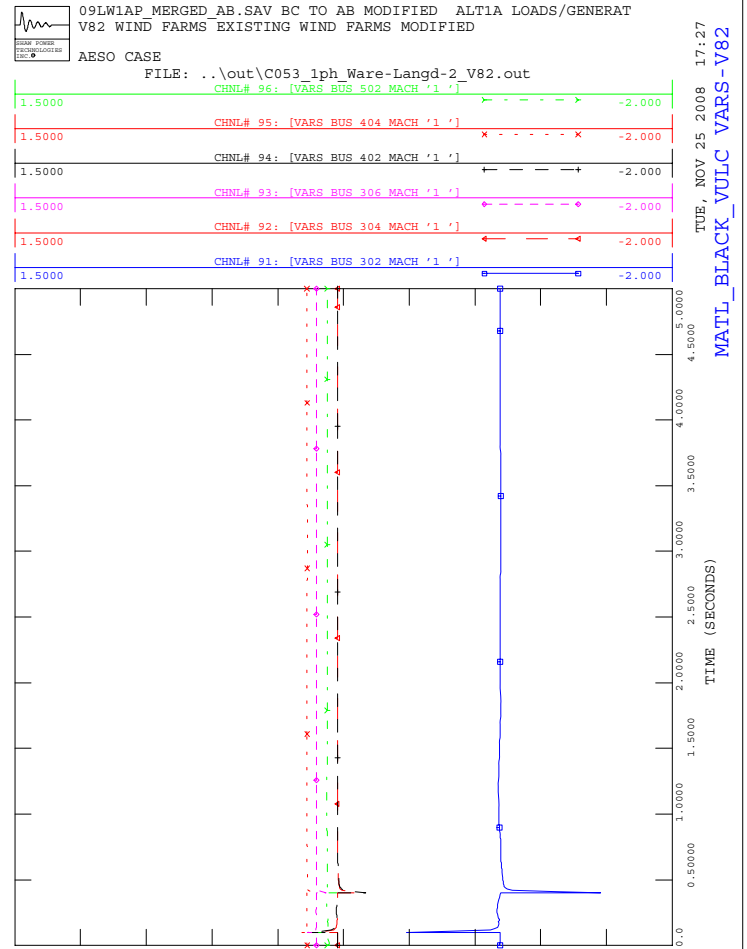
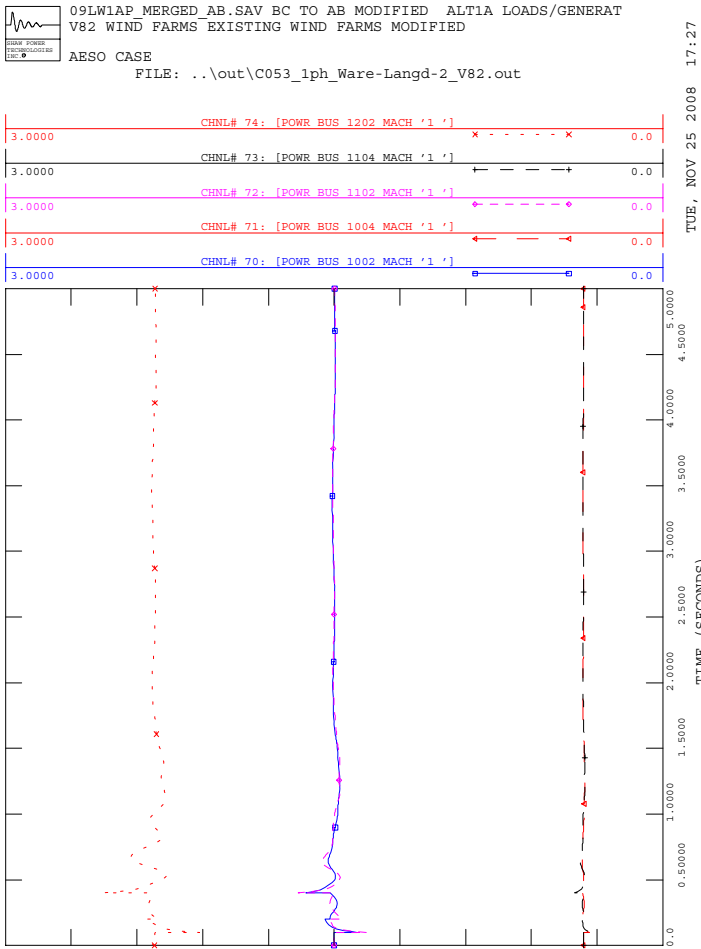
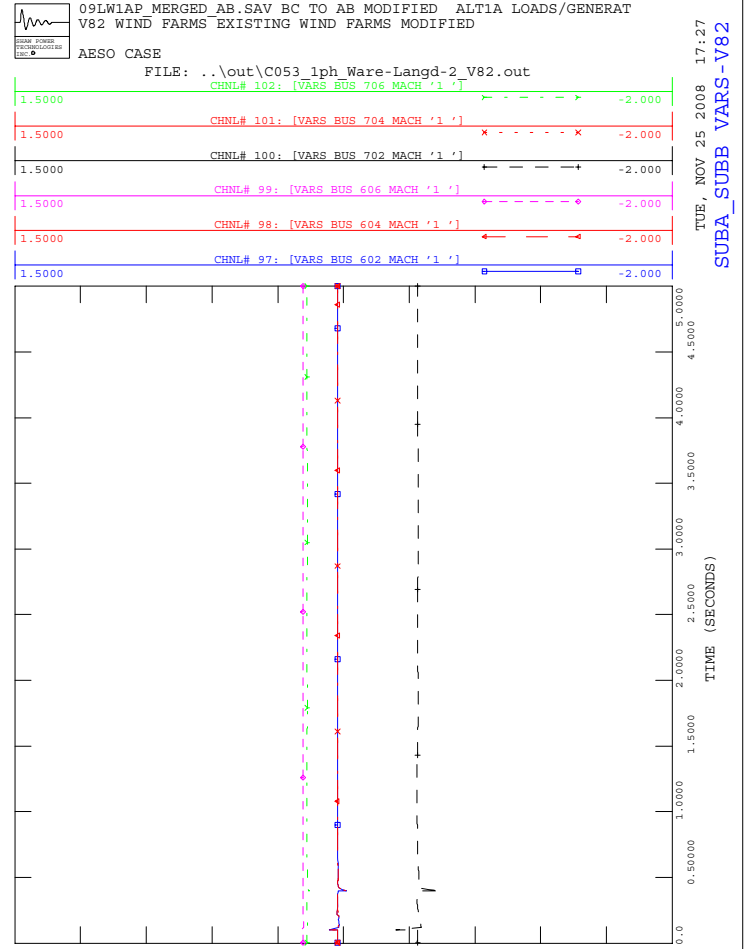
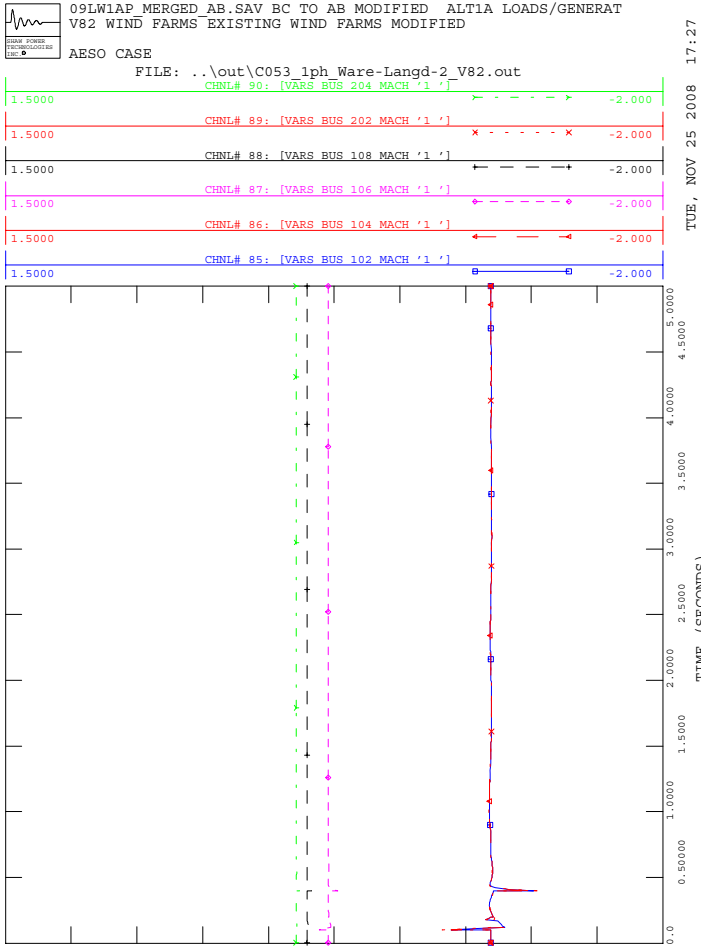


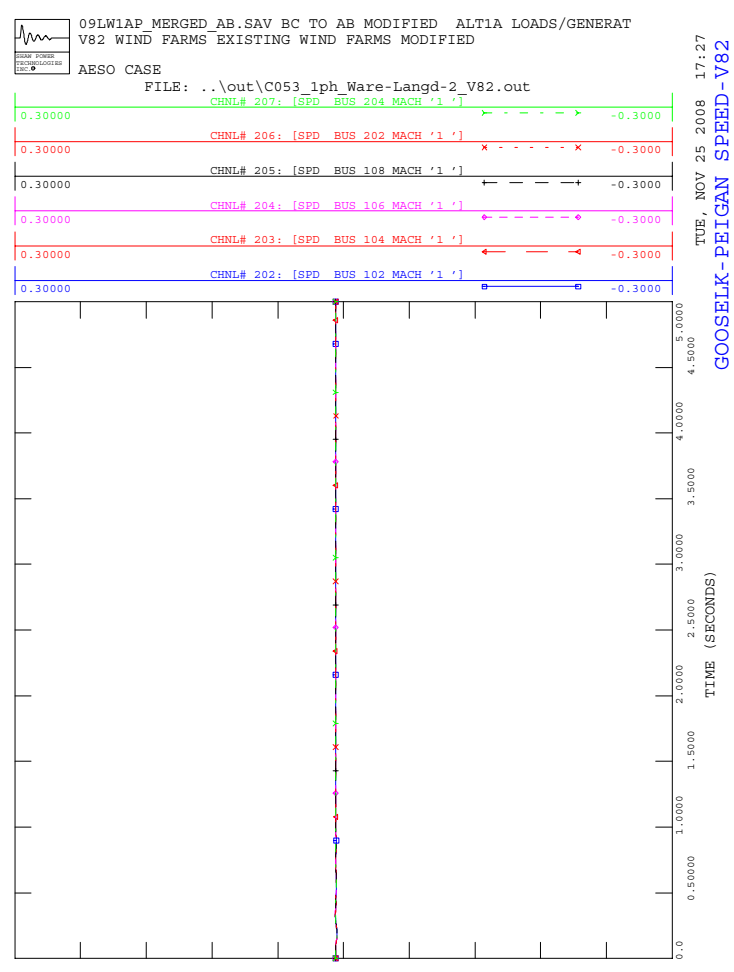
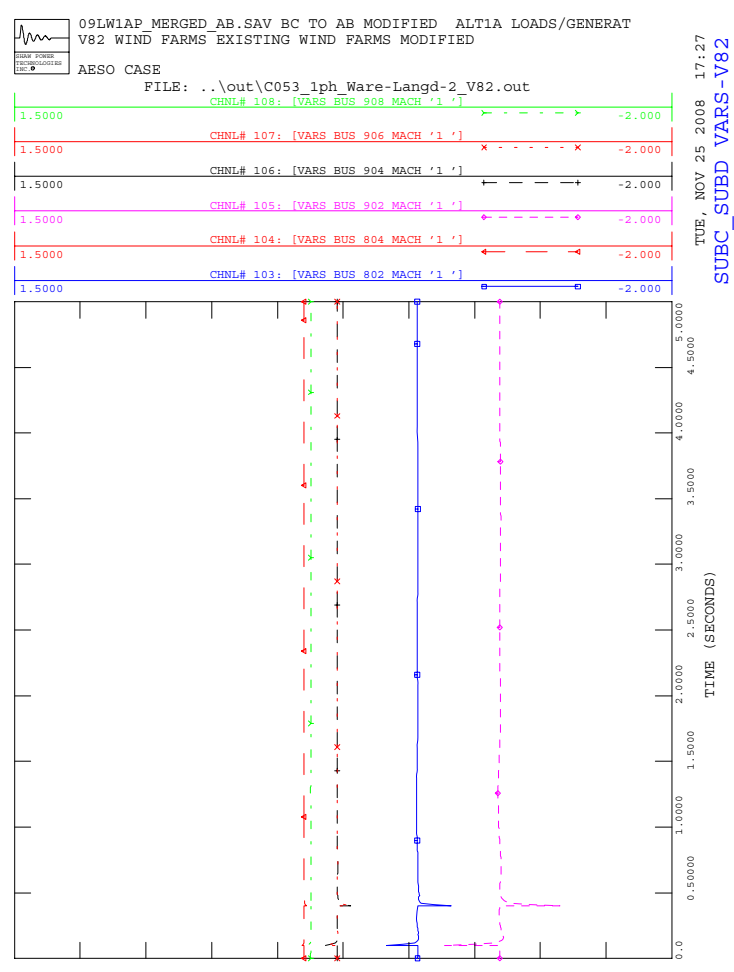
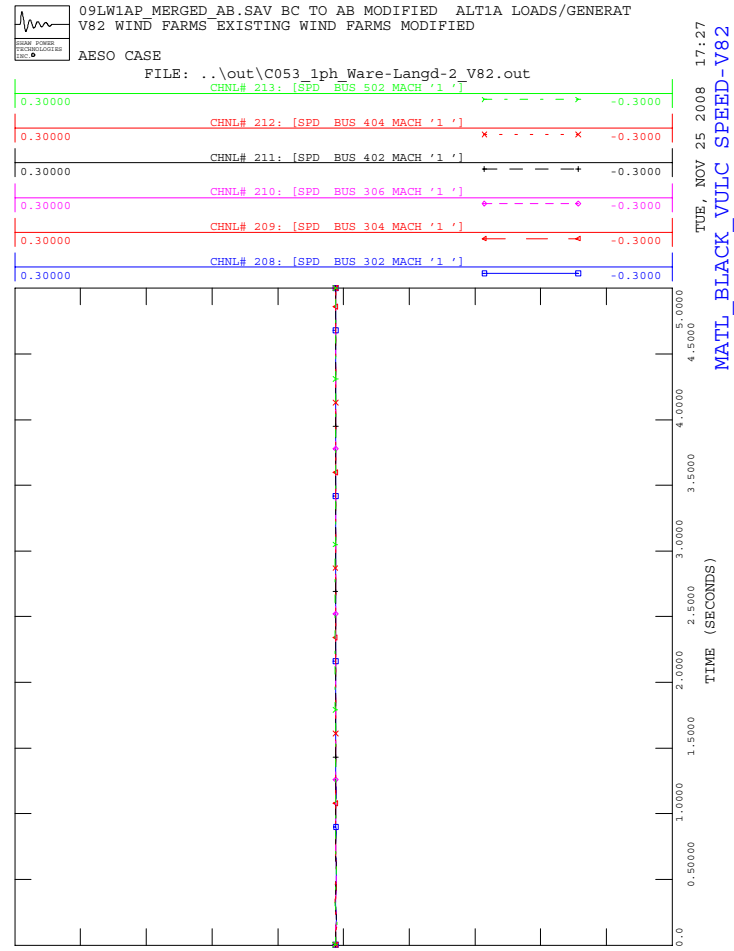
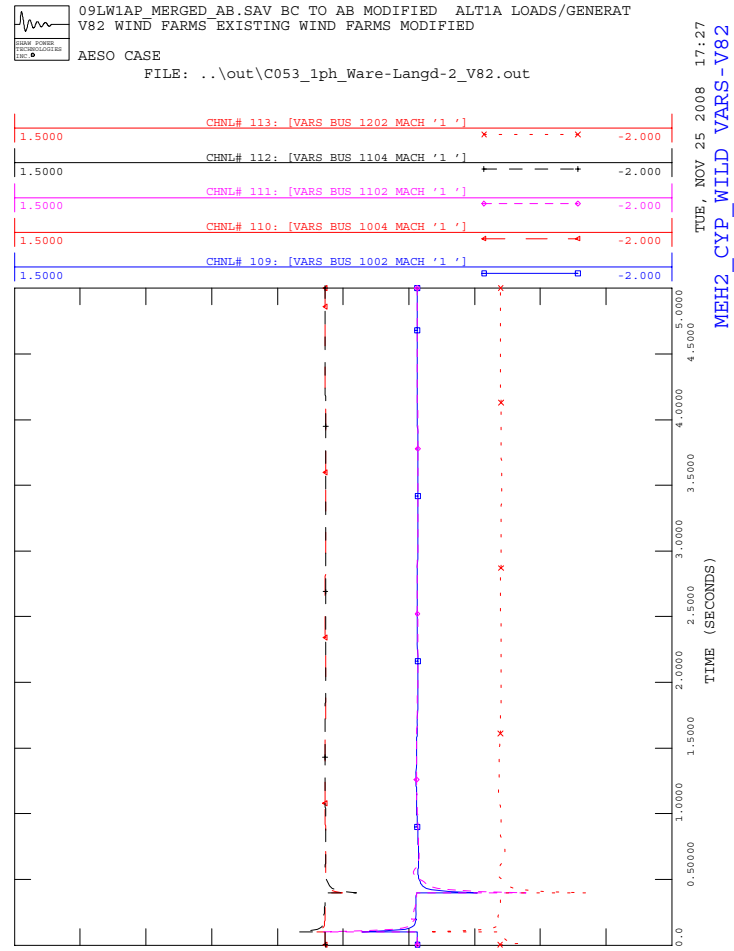
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C049_1ph_Milo-SubG-7_V82.out

TUE, NOV 25 2008 17:27
AB_BC_TIE_FLOWS-V82



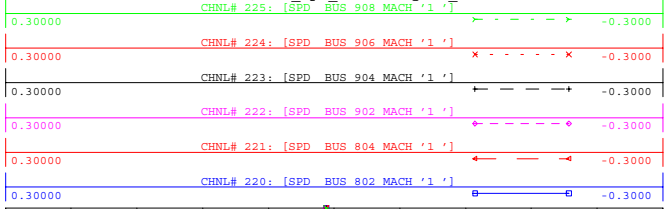






09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

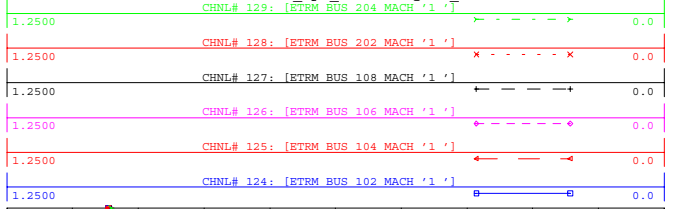
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TUE, NOV 25 2008 17:27
 SUBC_SUBD SPEED-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

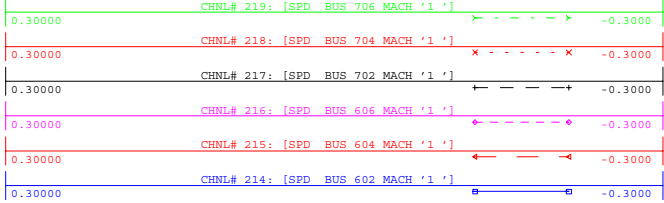
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TUE, NOV 25 2008 17:27
 GOOSELK-PEIGAN ETERM-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

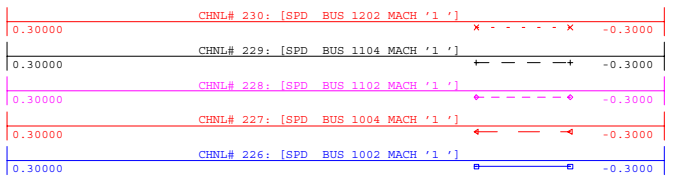
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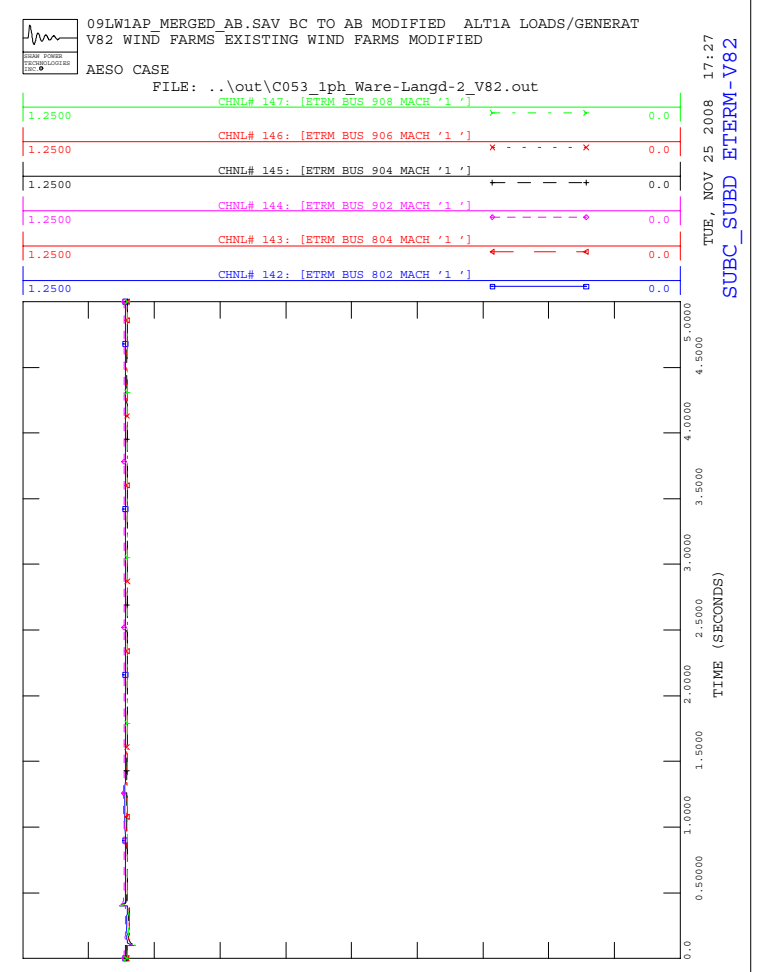
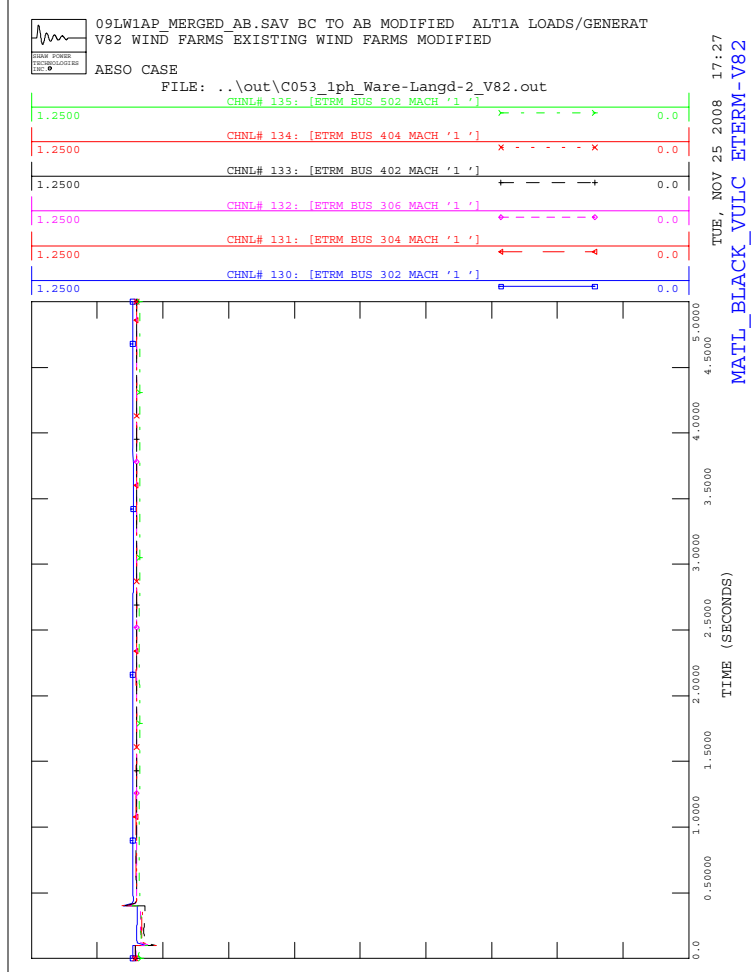
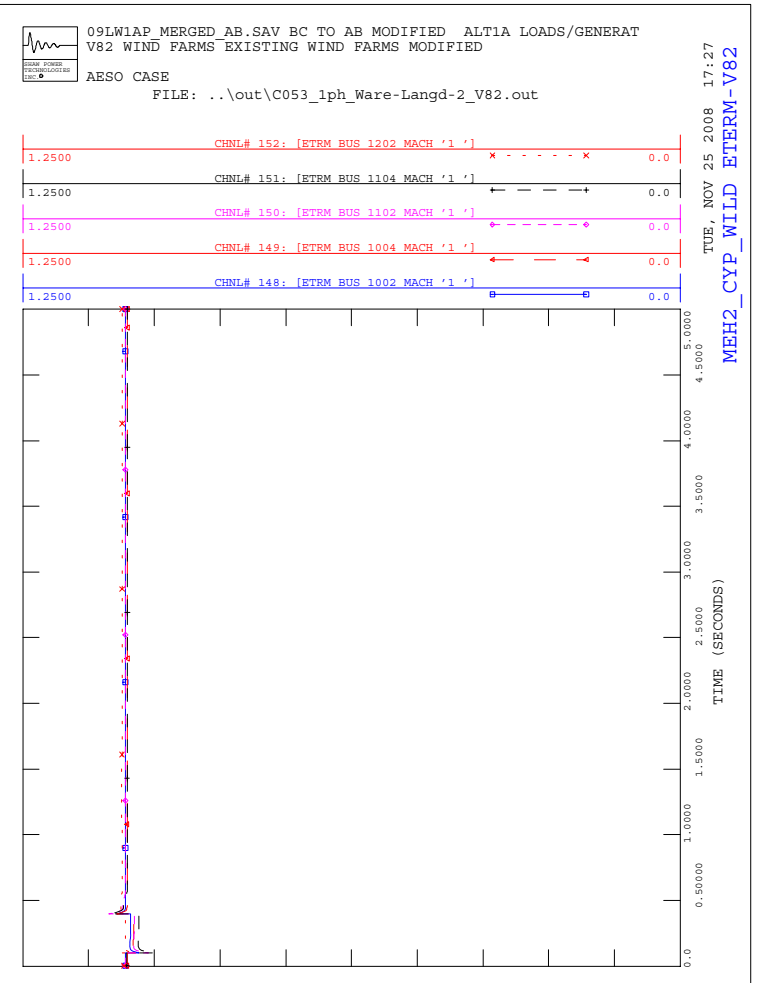
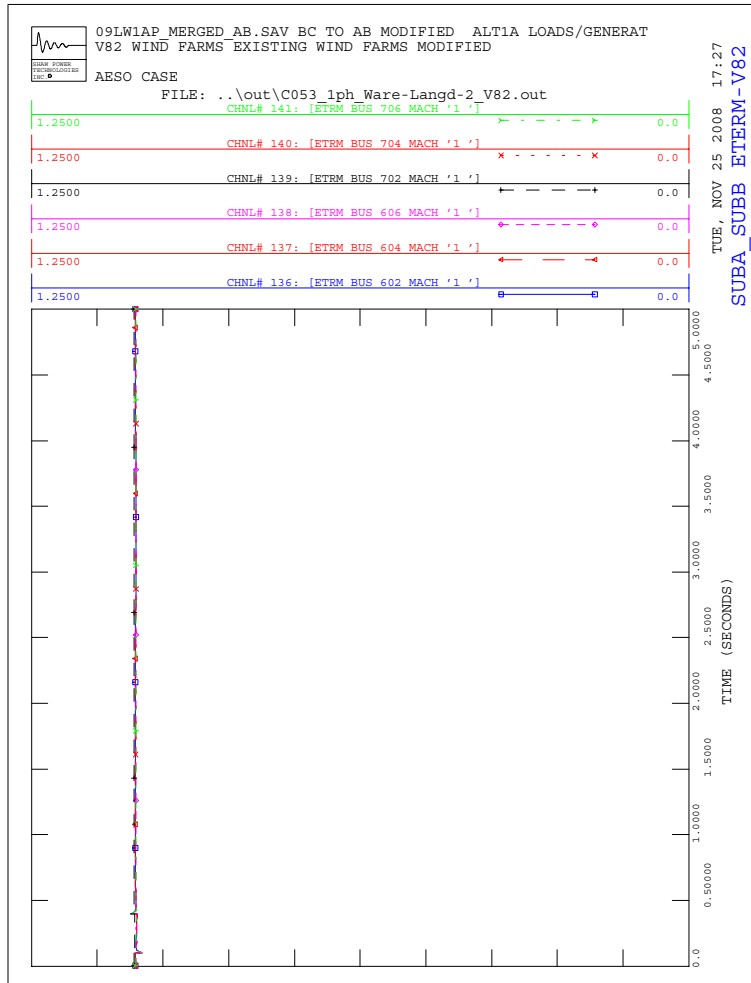
TUE, NOV 25 2008 17:27
 SUBA_SUBD SPEED-V82

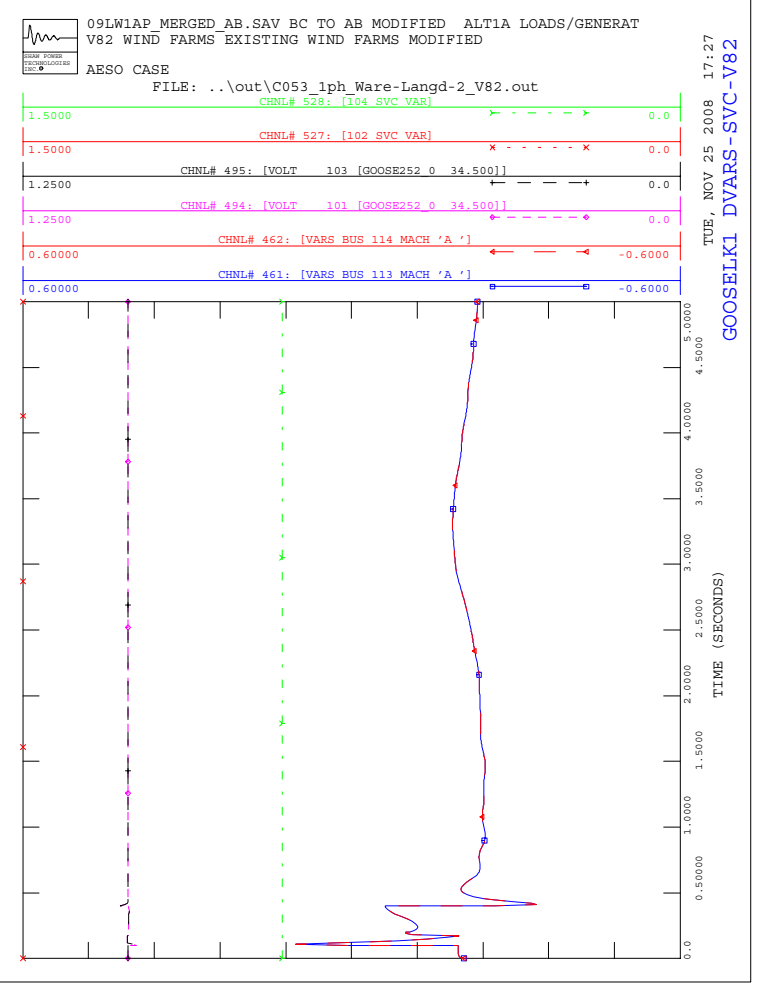
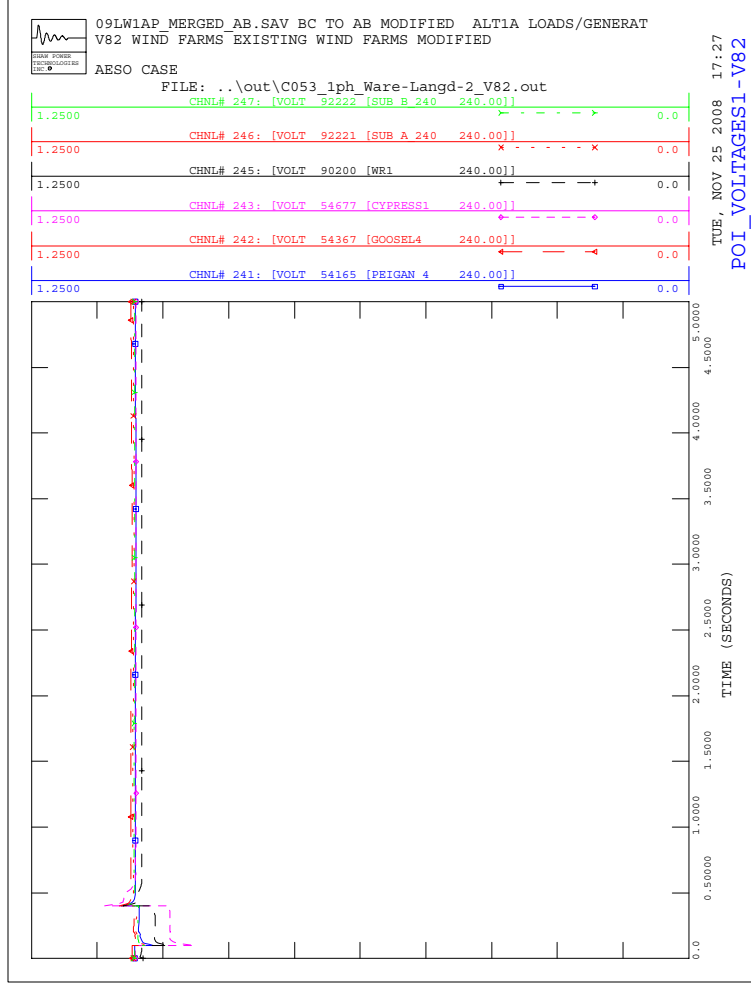
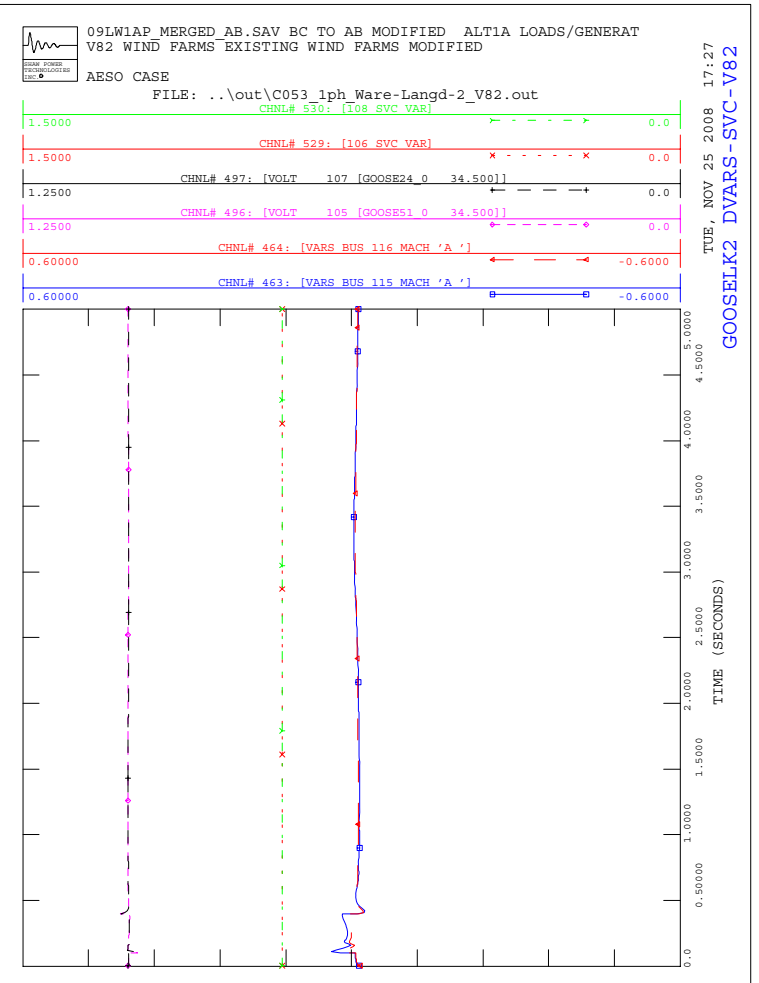
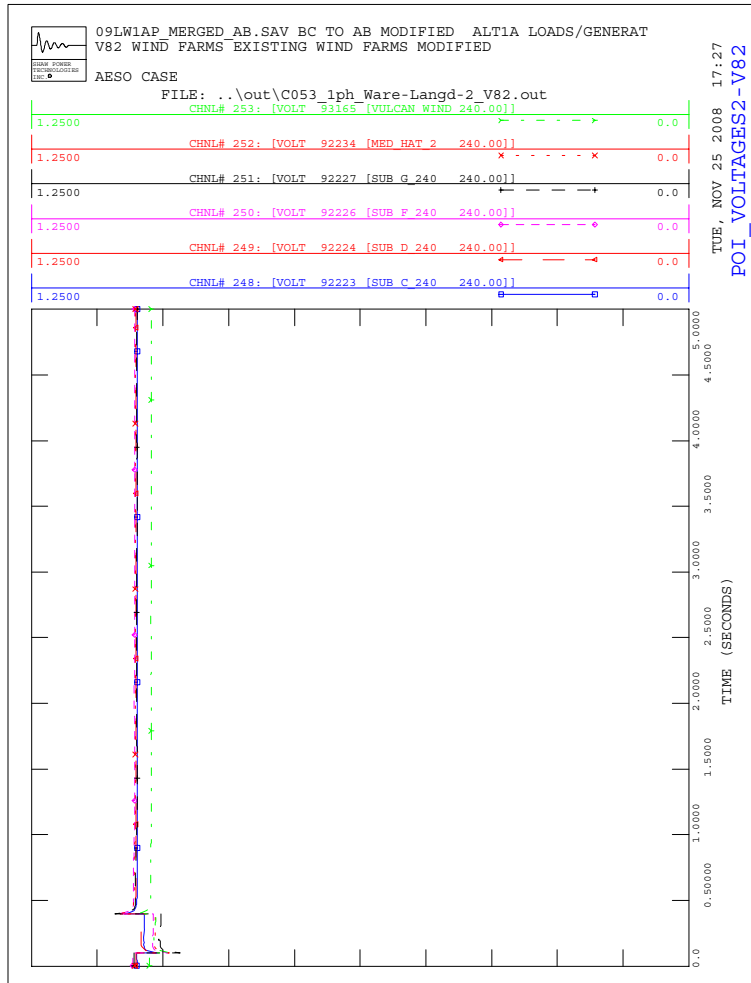
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

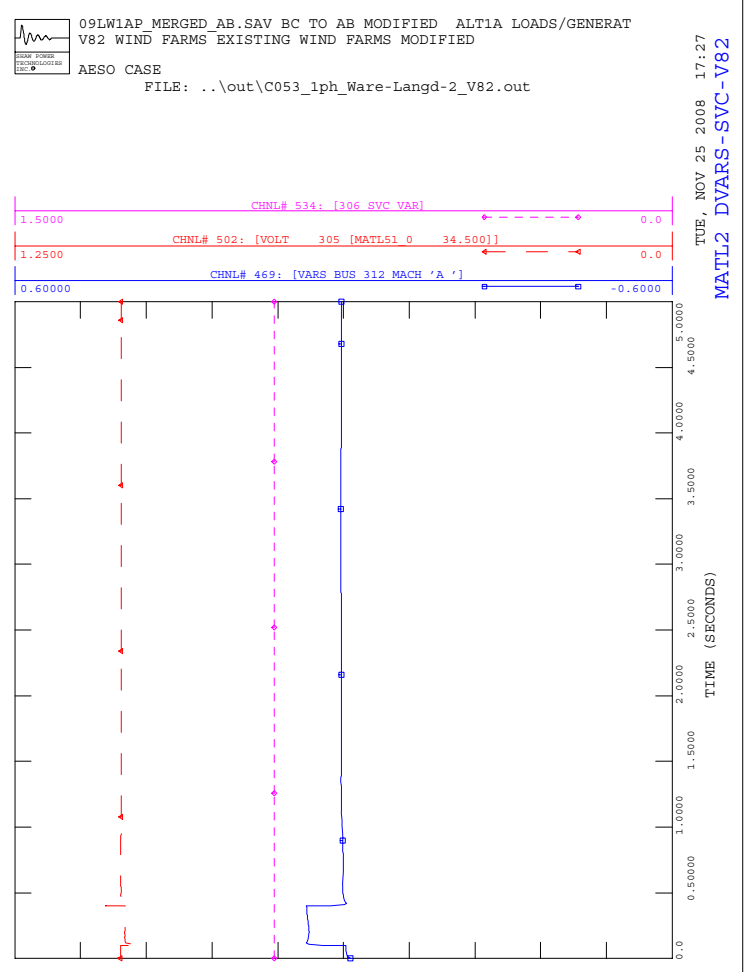
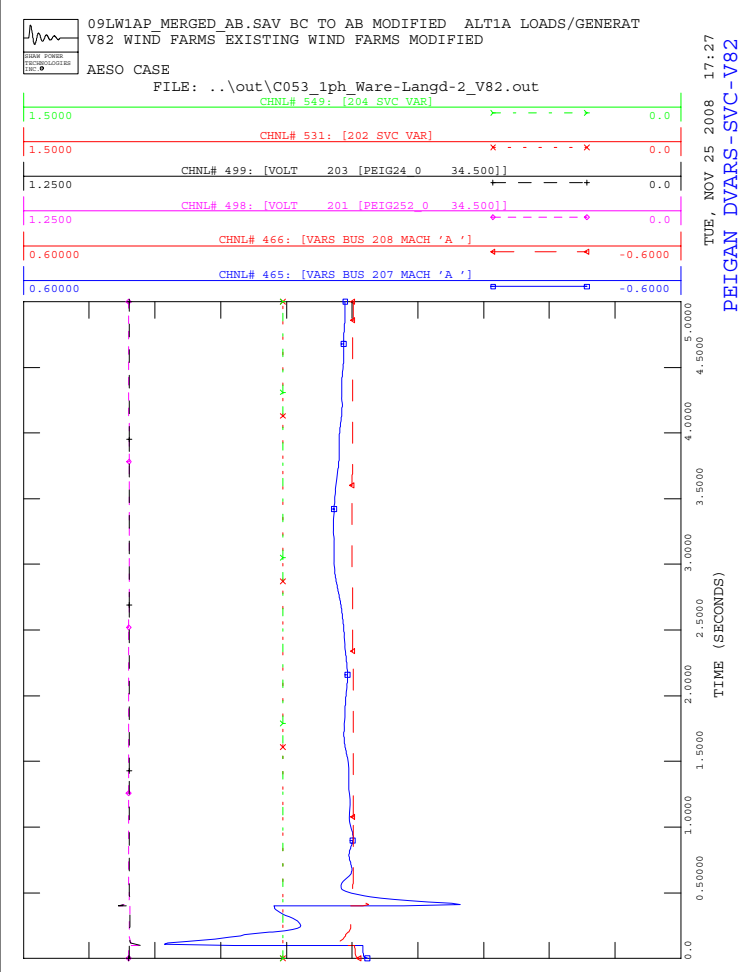
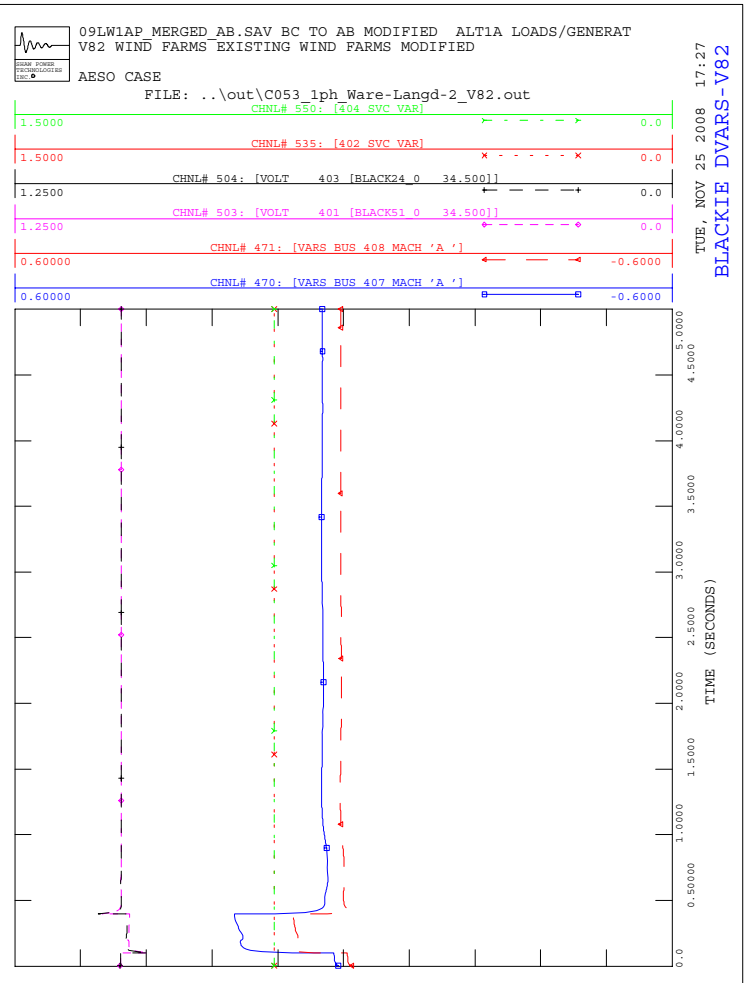
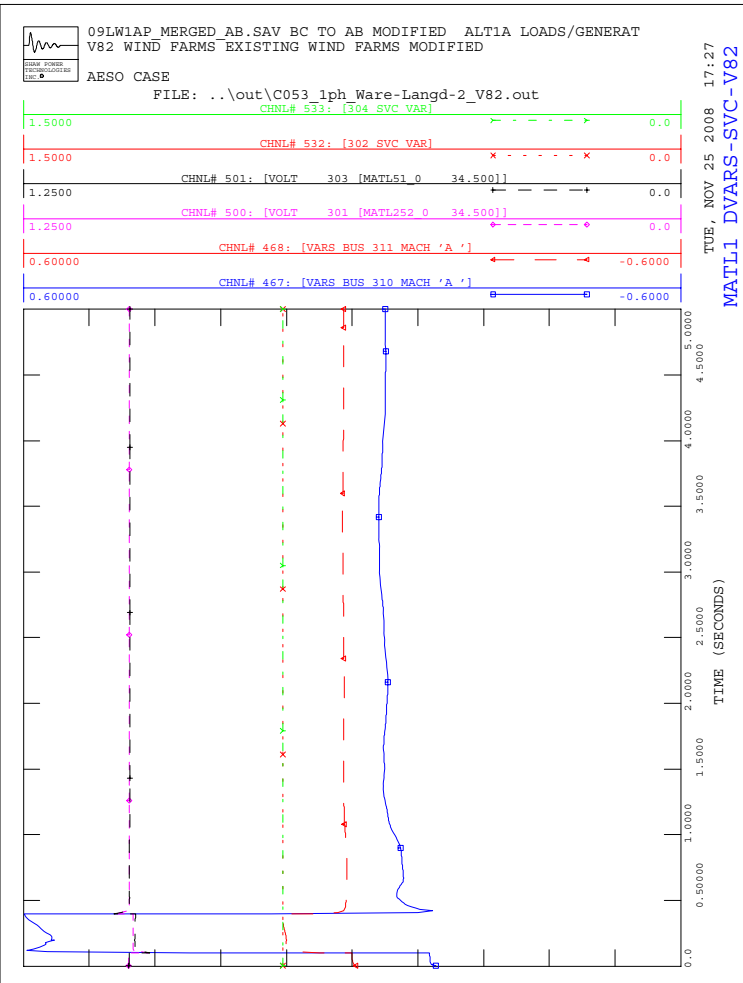
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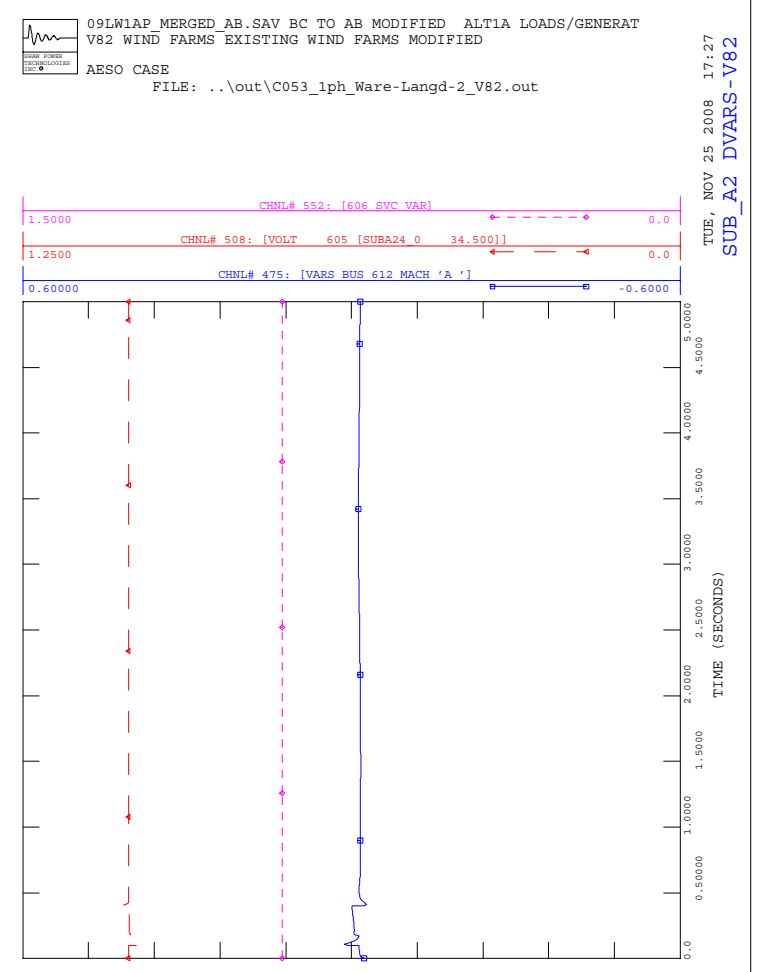
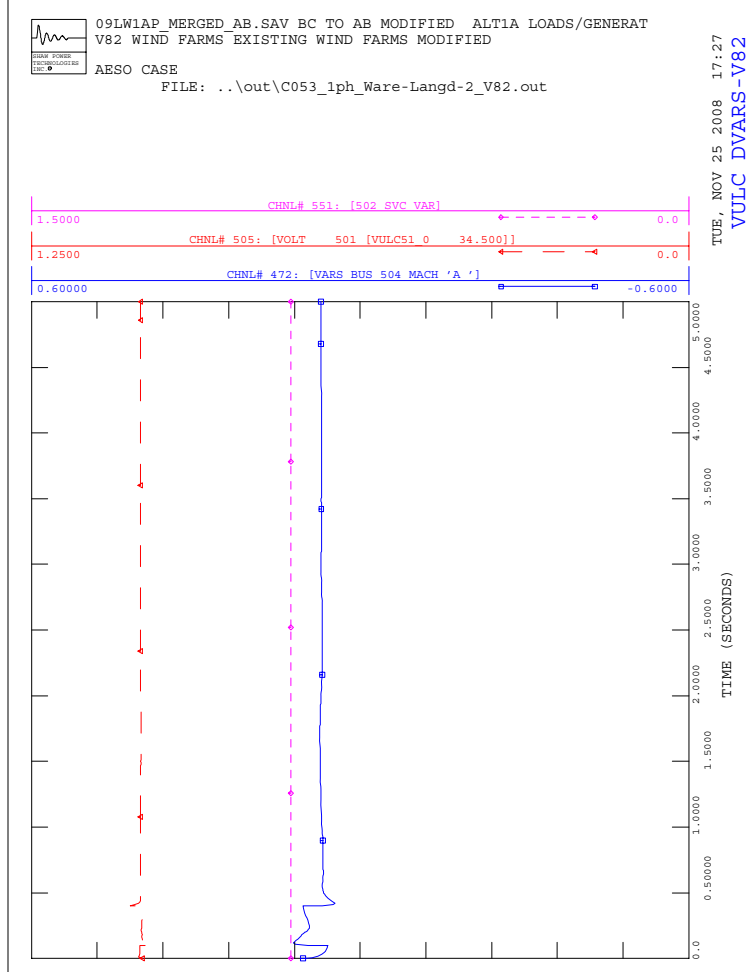
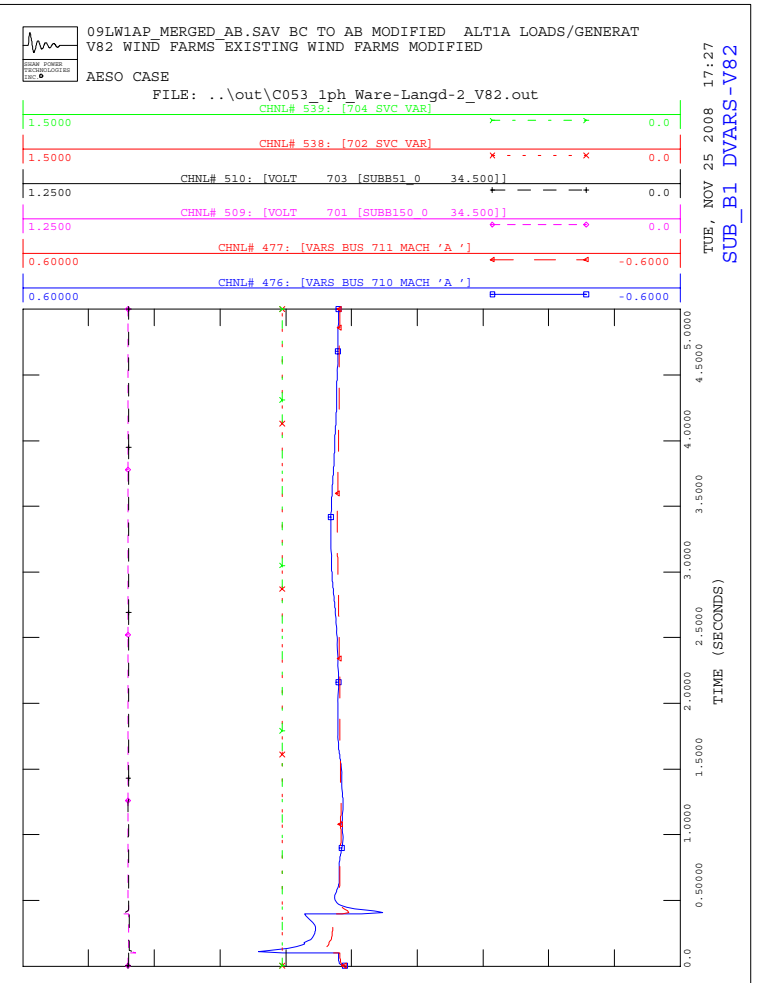
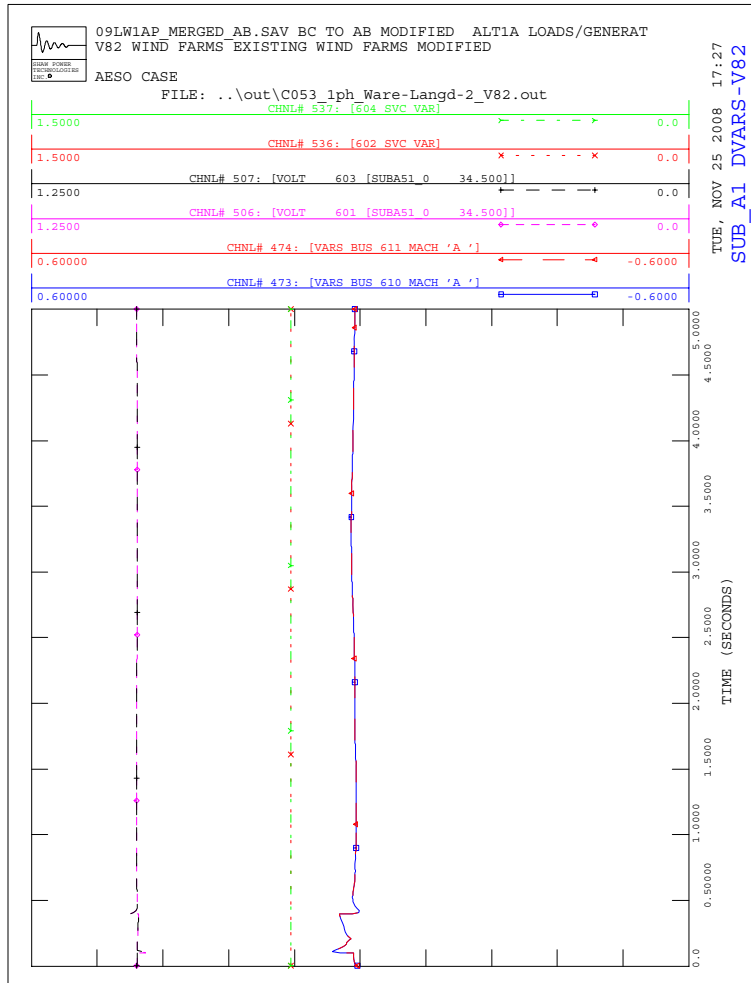


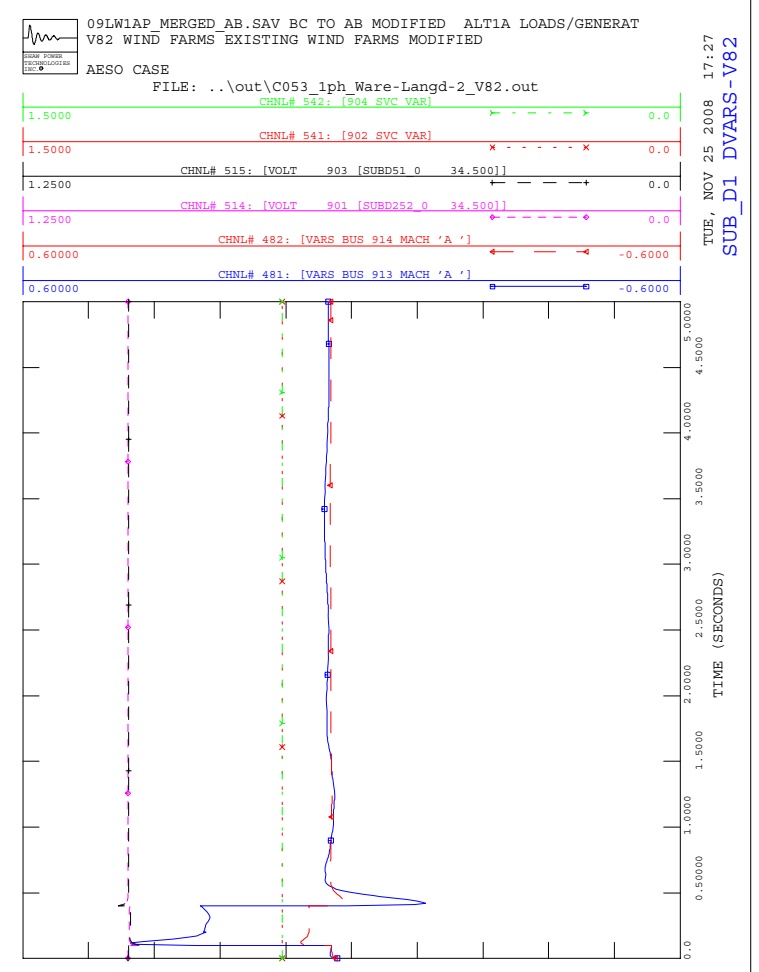
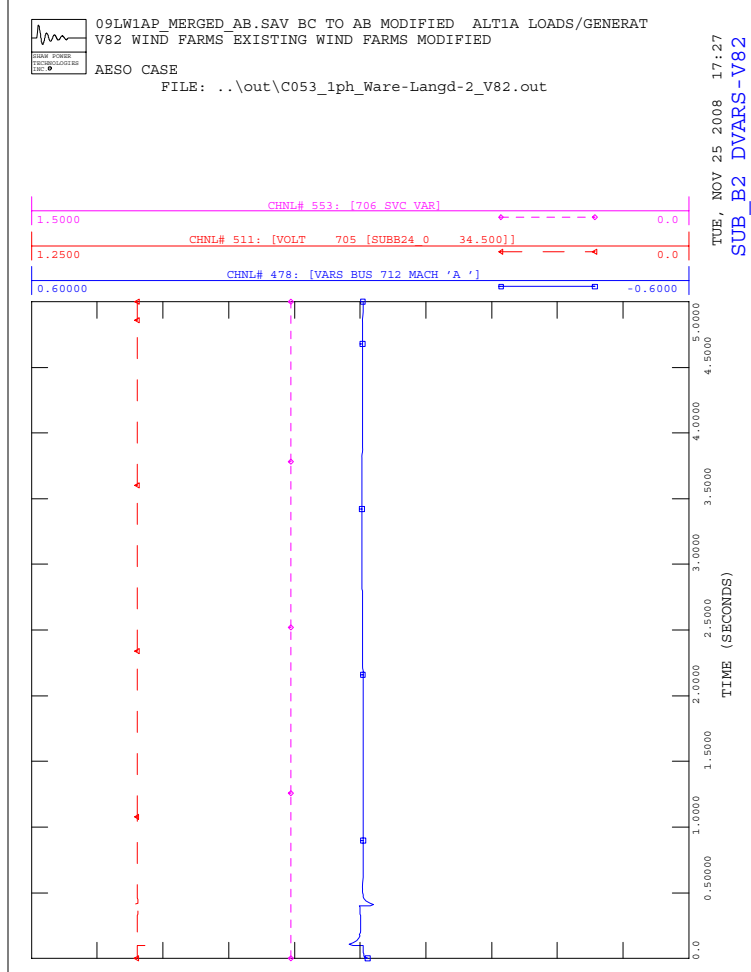
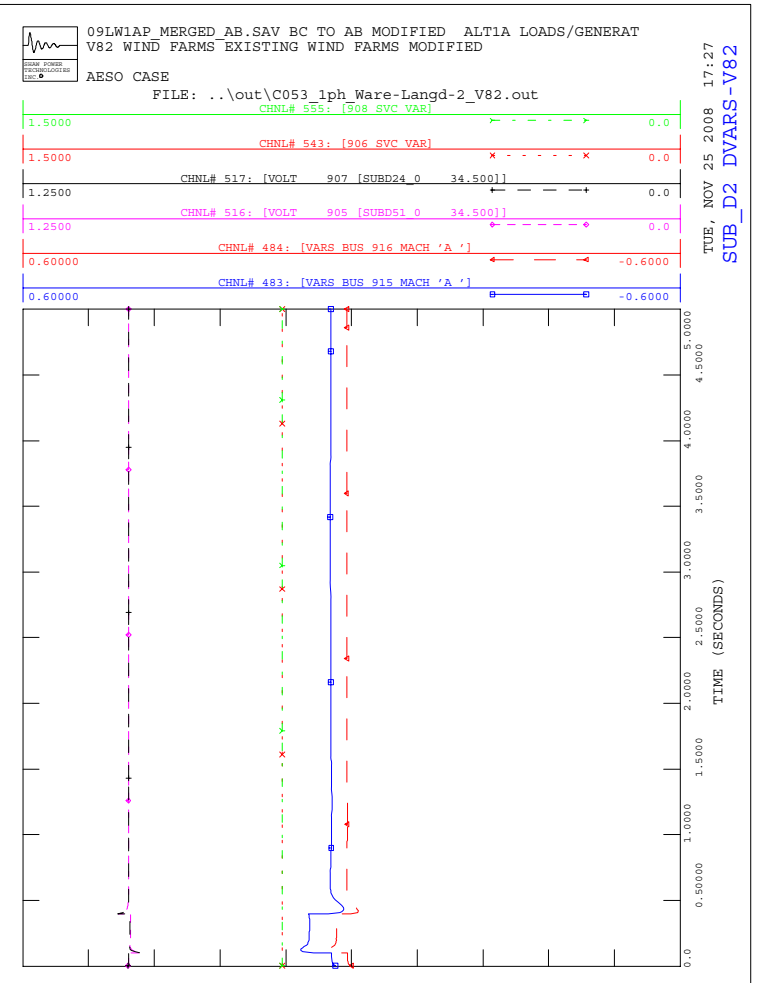
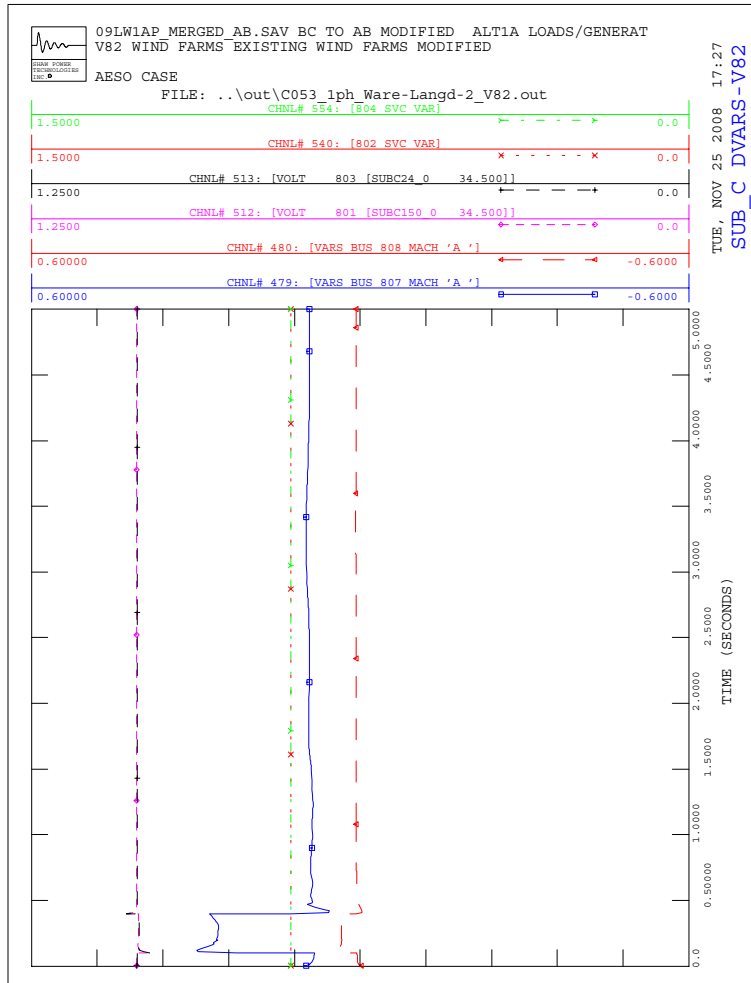
TUE, NOV 25 2008 17:27
 MEH2_CYP_WILD SPEED-V82

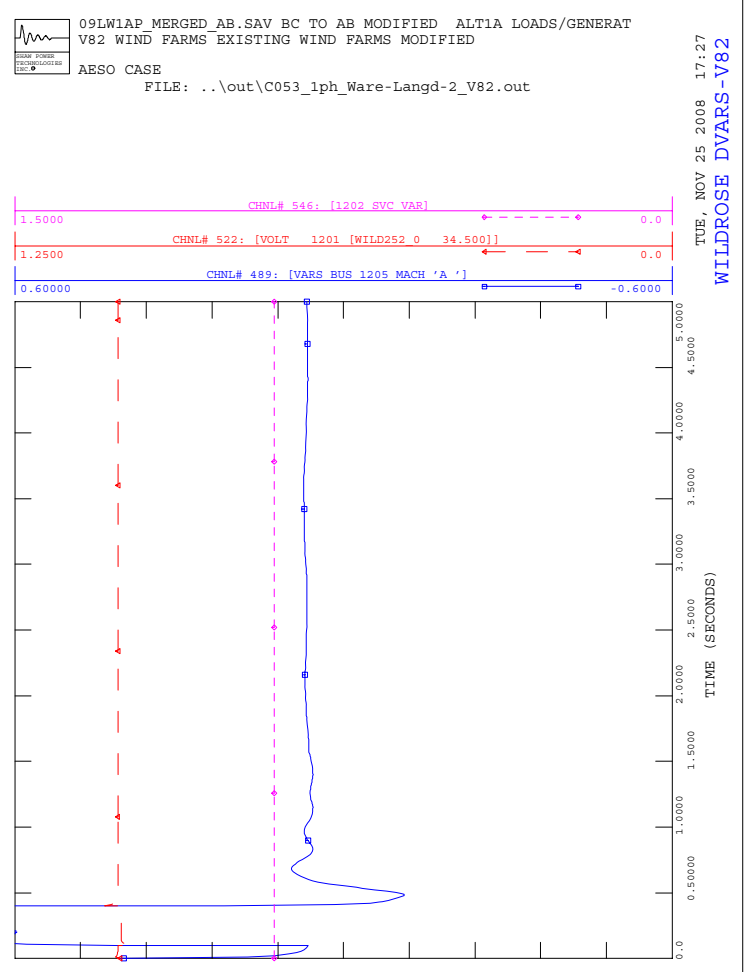
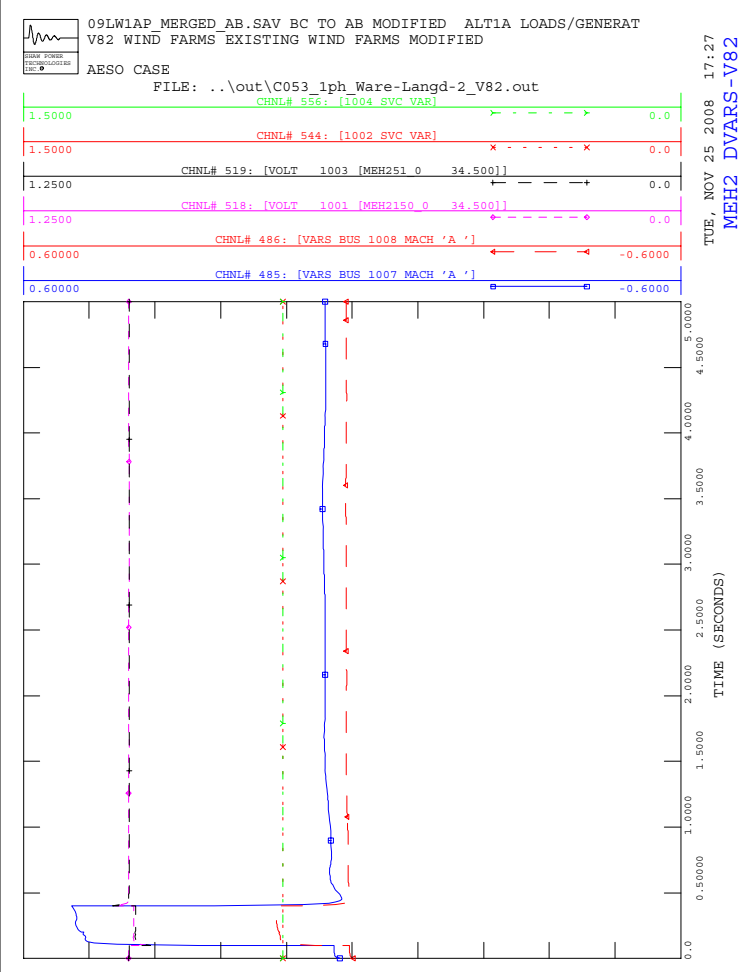
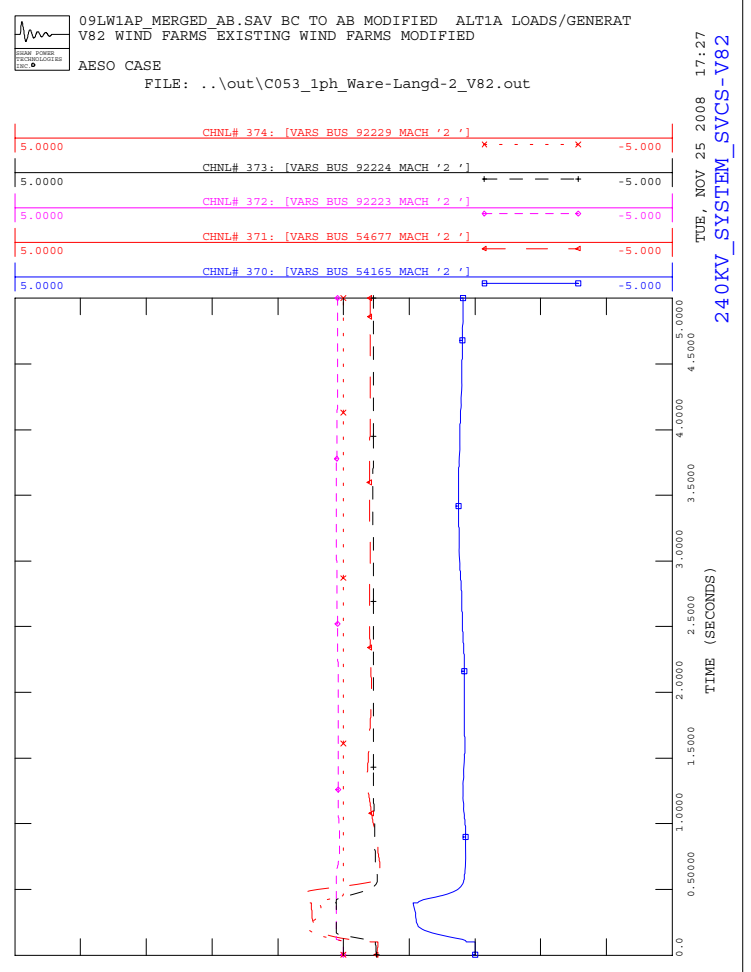
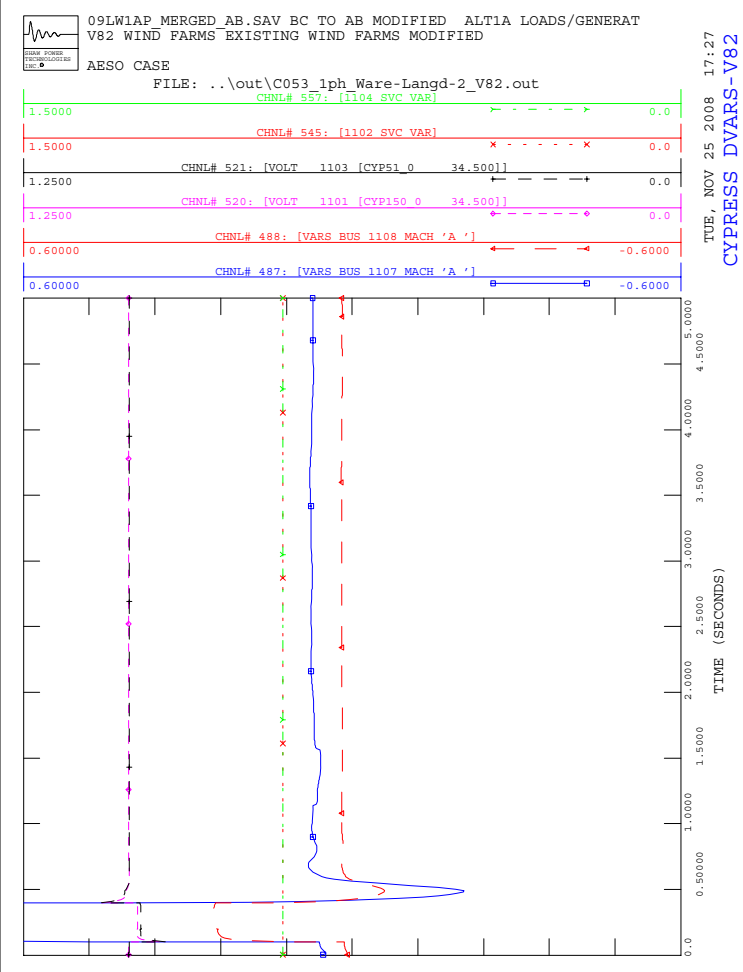








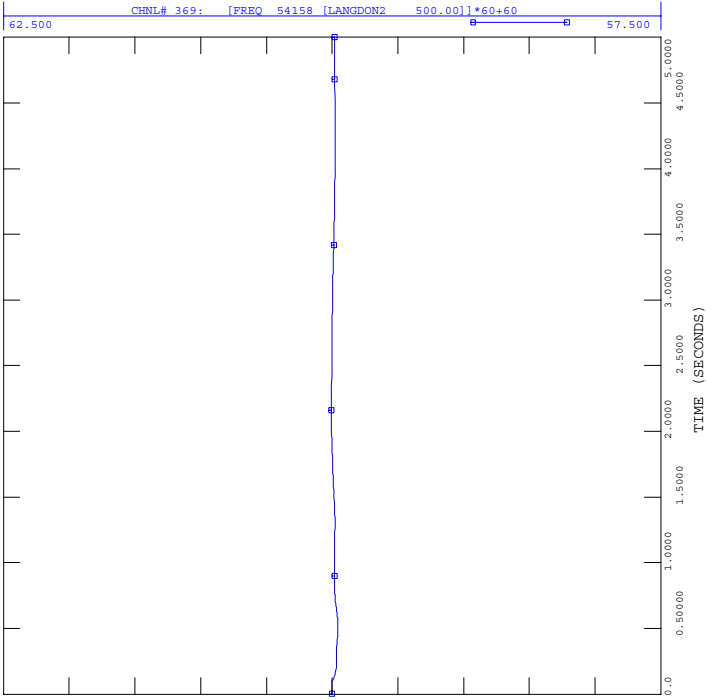






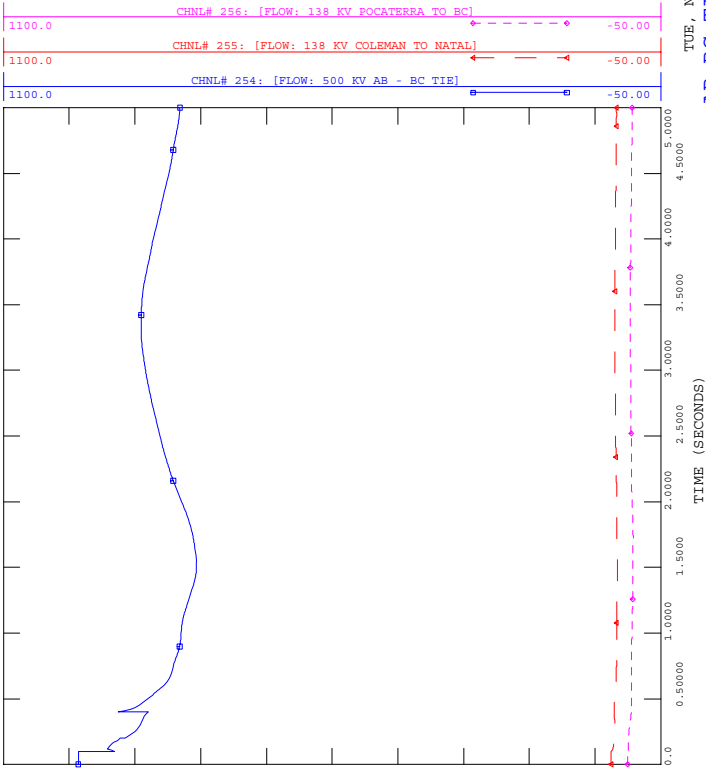
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C053_1ph_Ware-Langd-2_V82.out

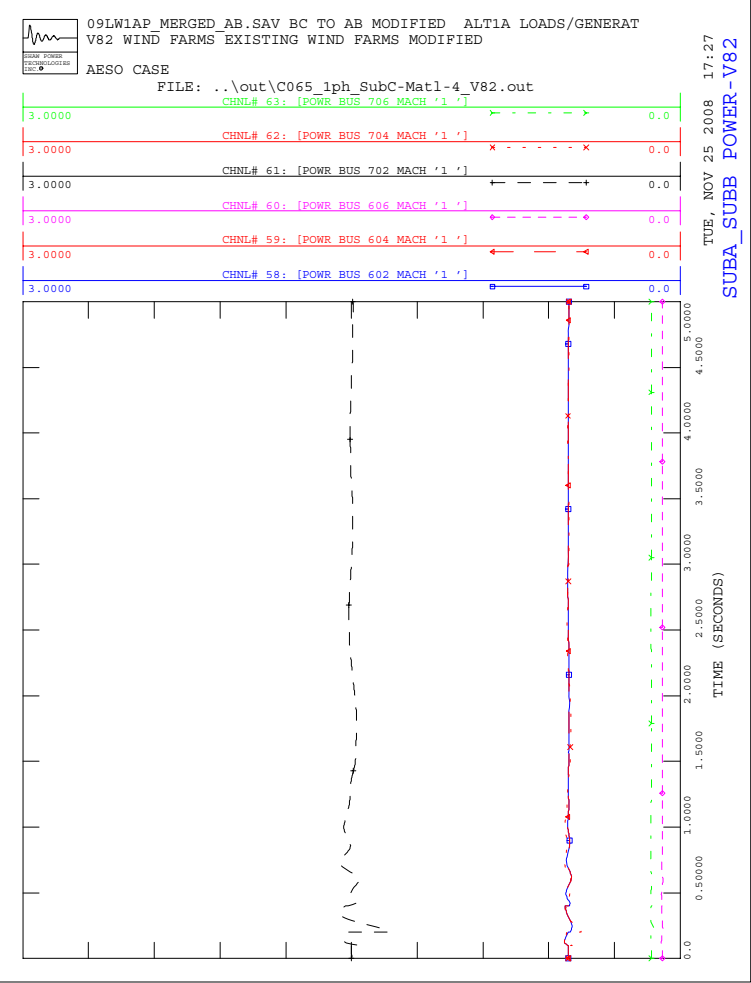
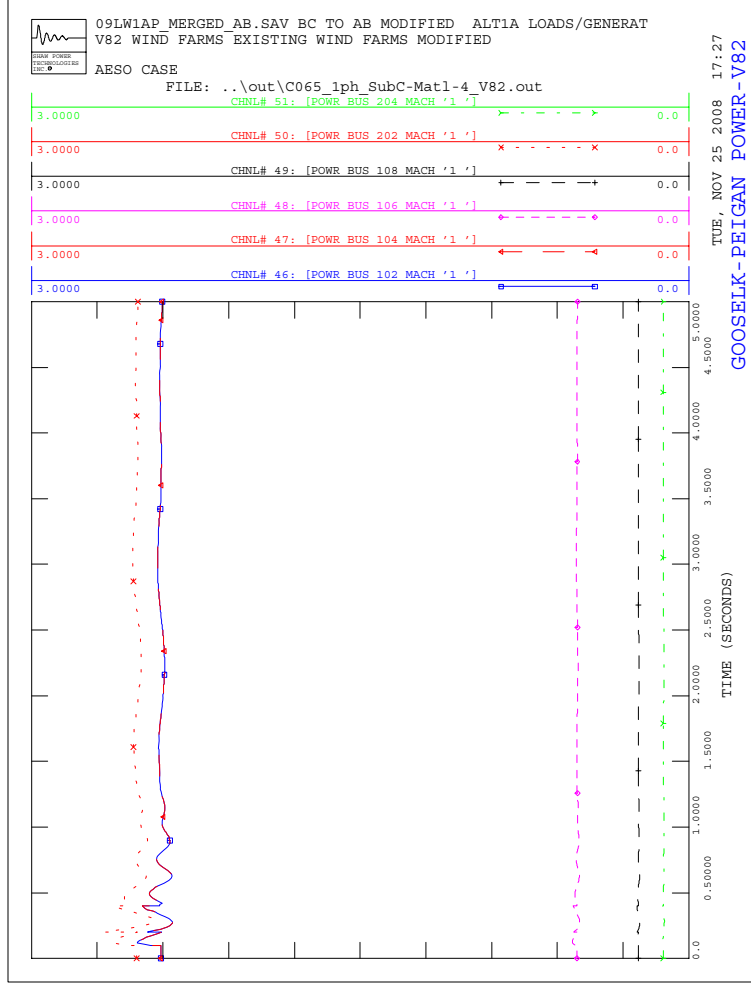
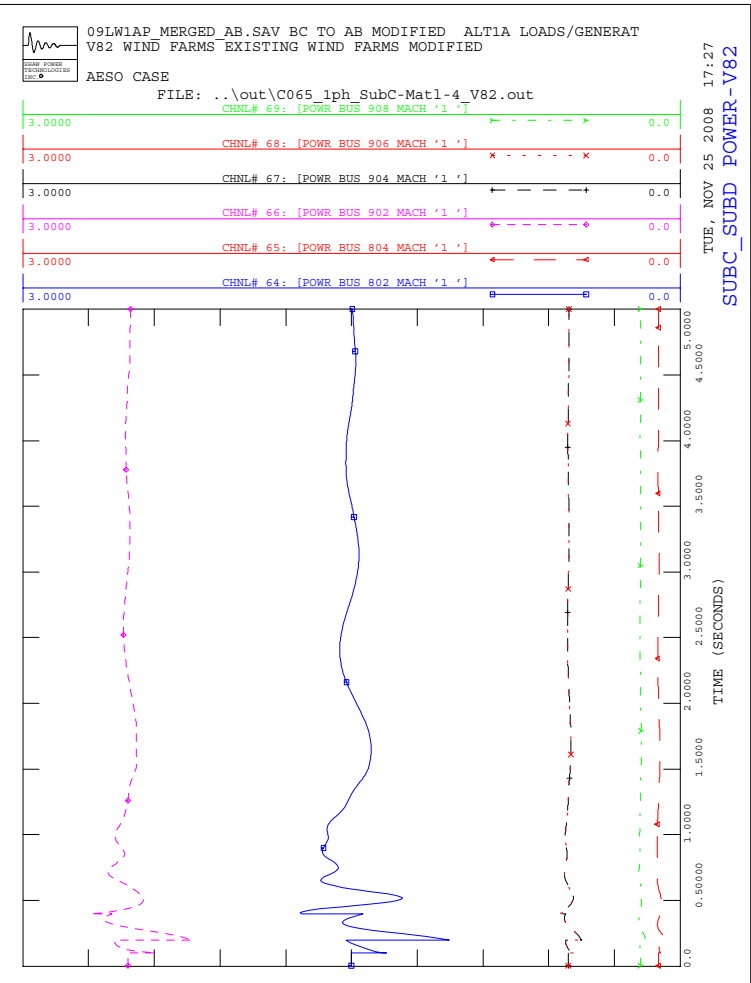
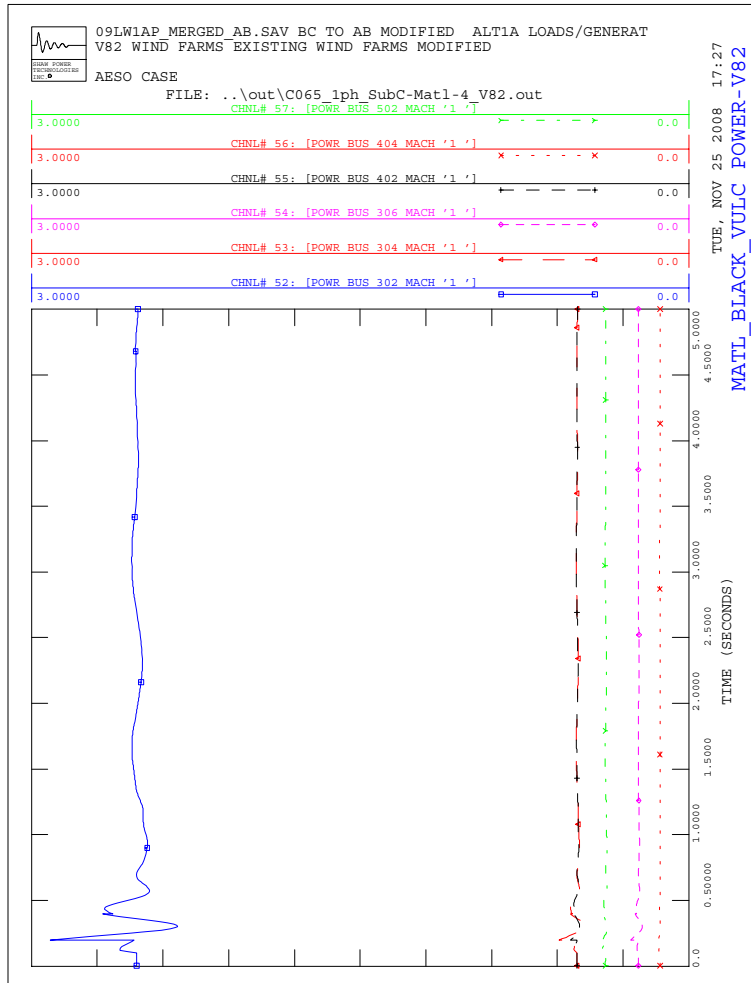
TUE, NOV 25 2008 17:27
LANGDON_FRQ-V82

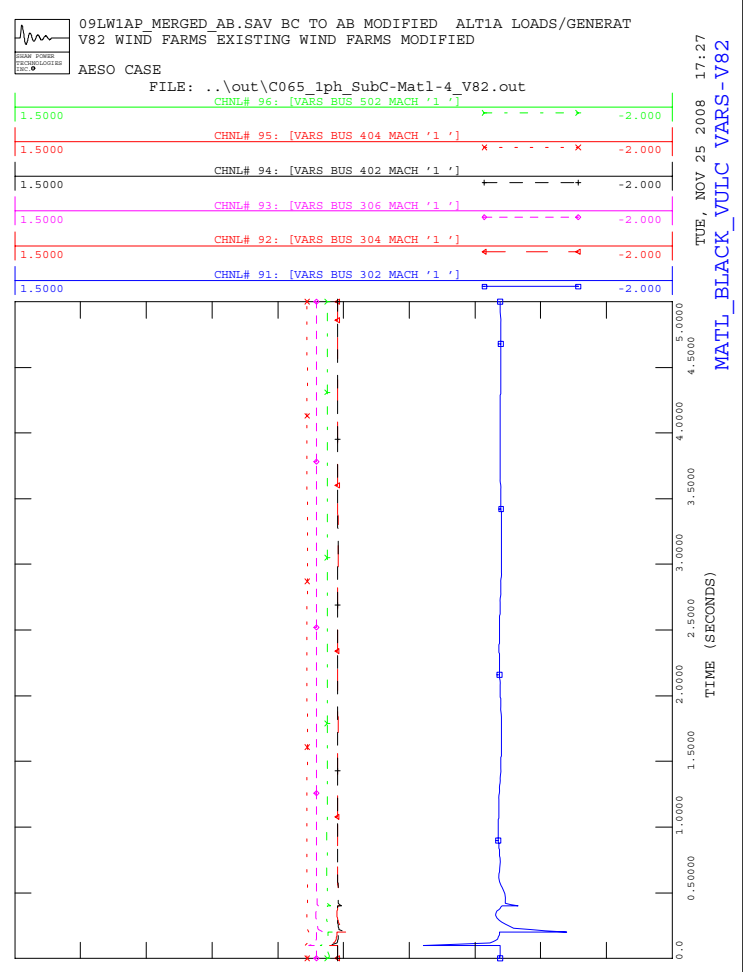
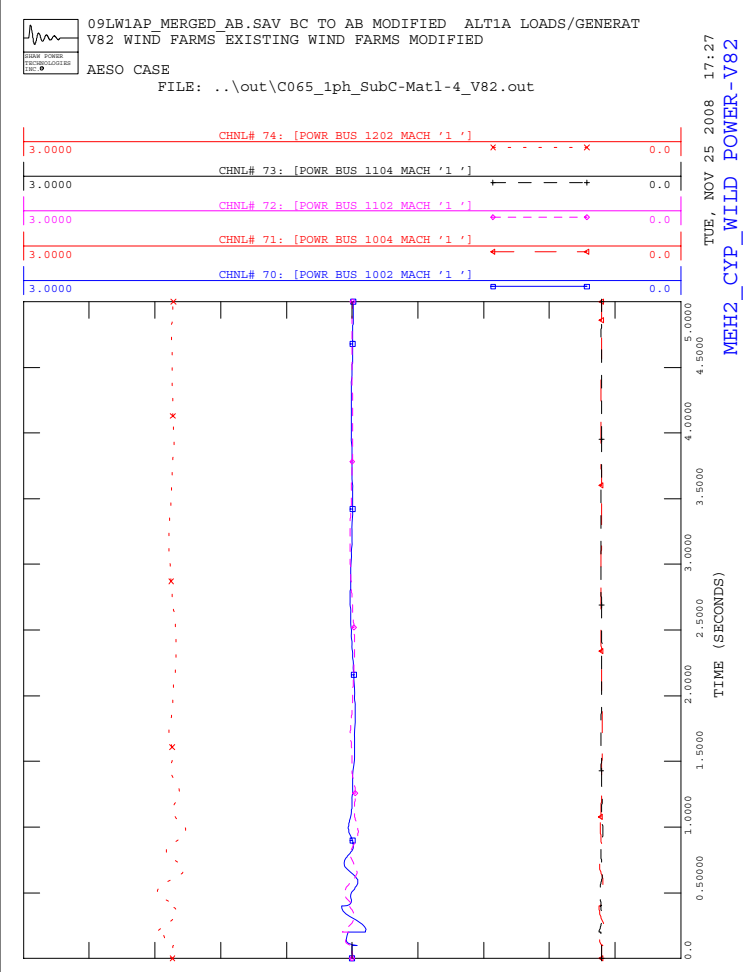
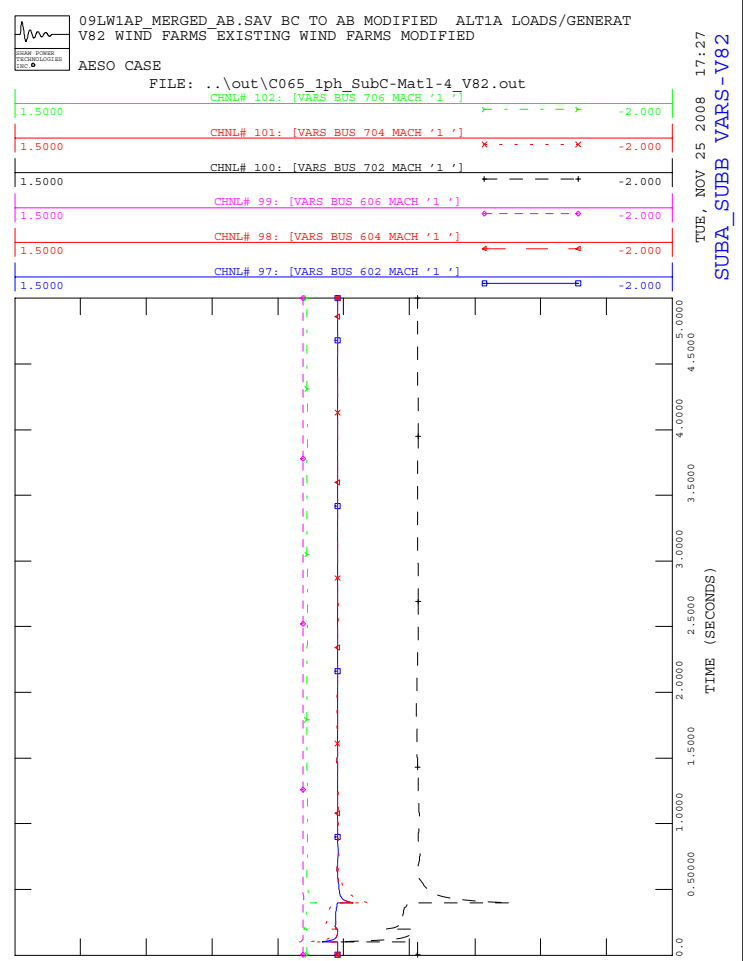
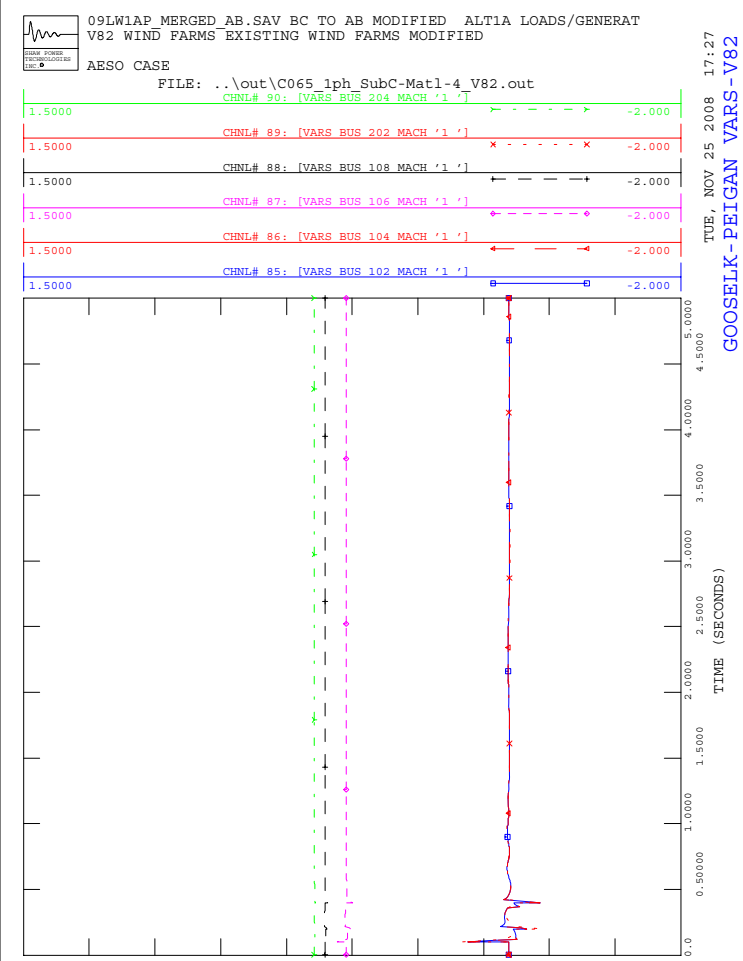


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C053_1ph_Ware-Langd-2_V82.out

TUE, NOV 25 2008 17:27
AB_BC_TIE_FLOWS-V82

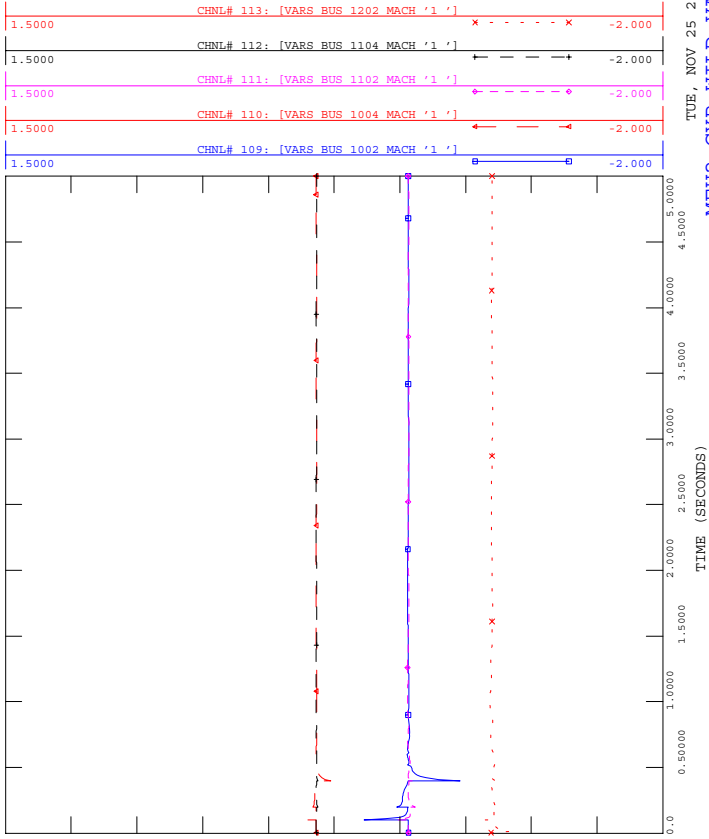






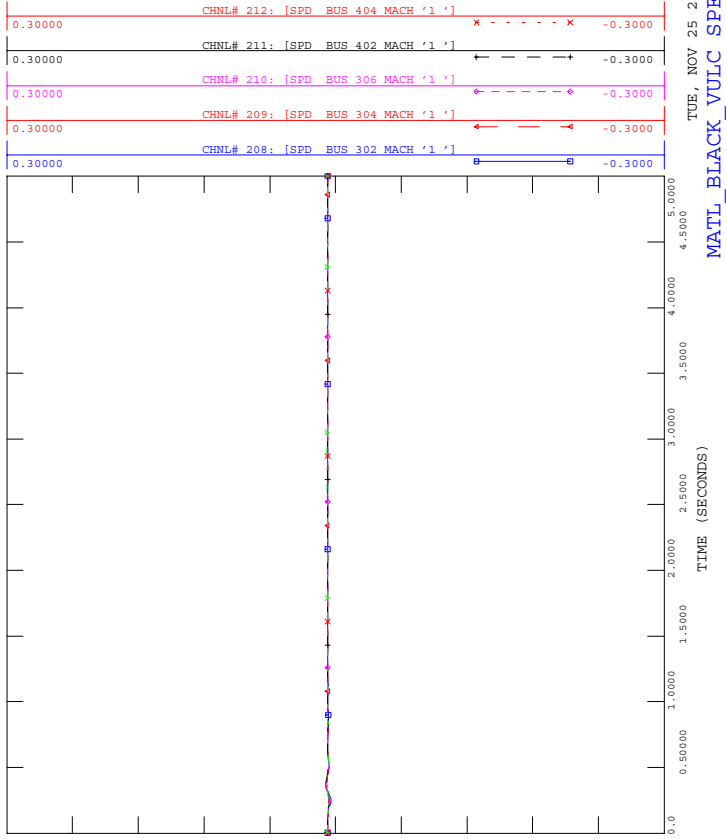
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\C065_1ph_SubC-Mat1-4_V82.out



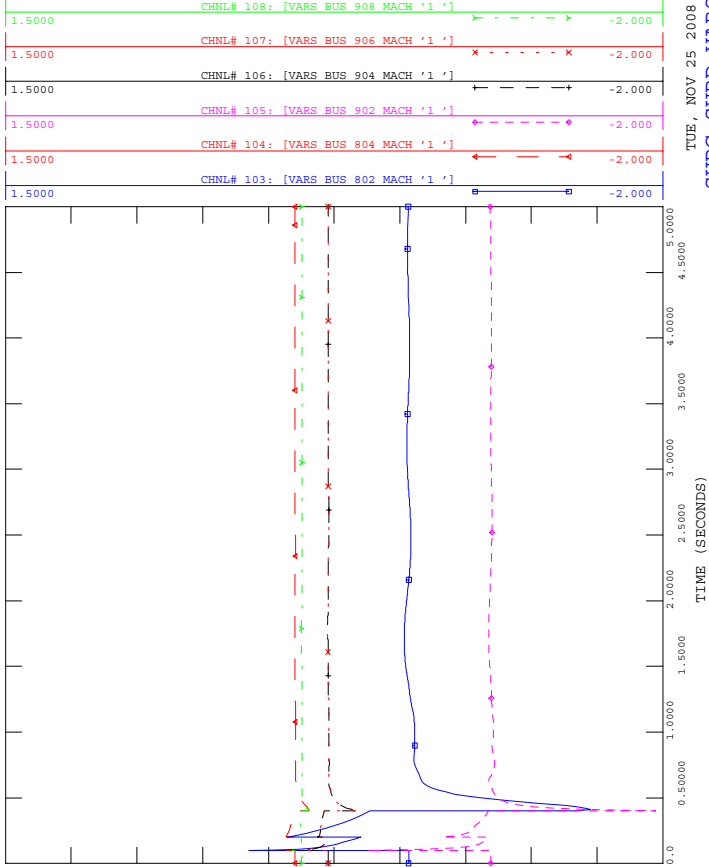
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\C065_1ph_SubC-Mat1-4_V82.out



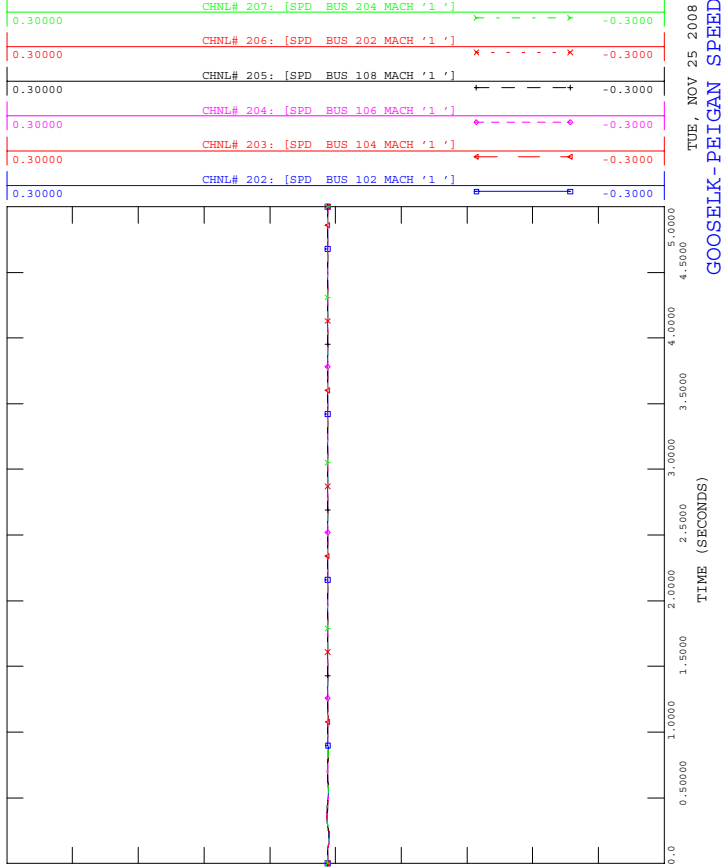
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

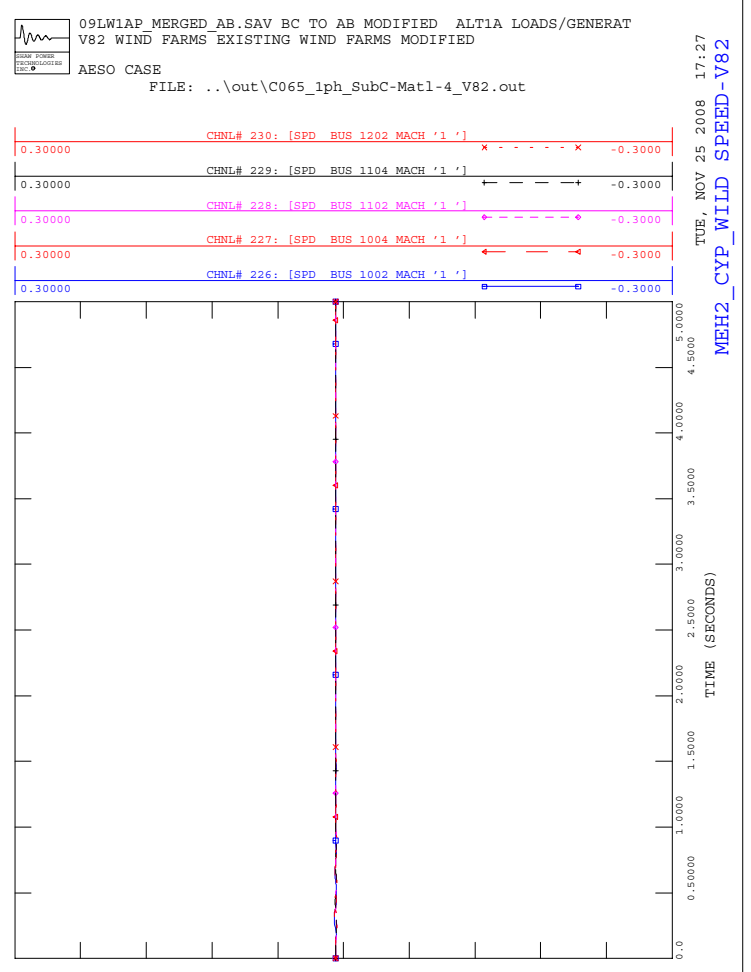
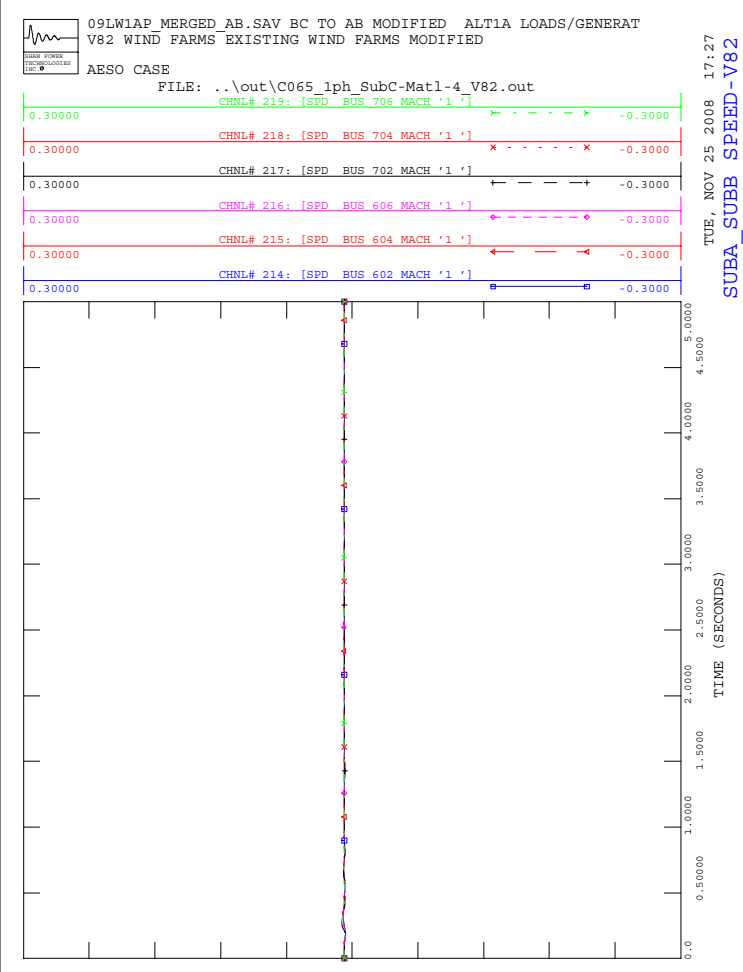
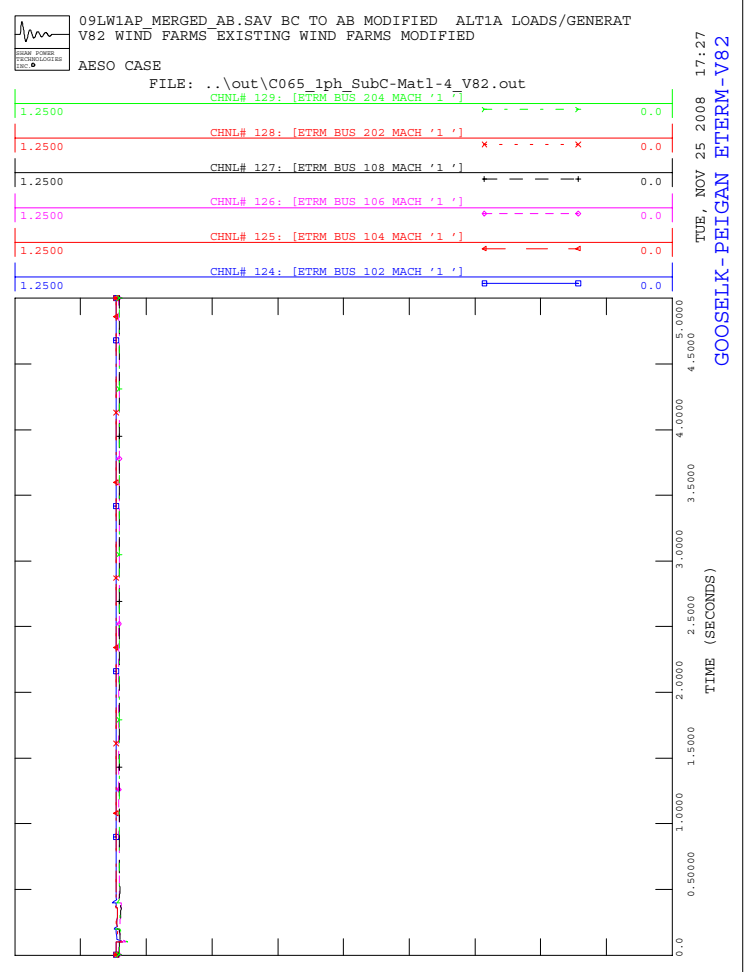
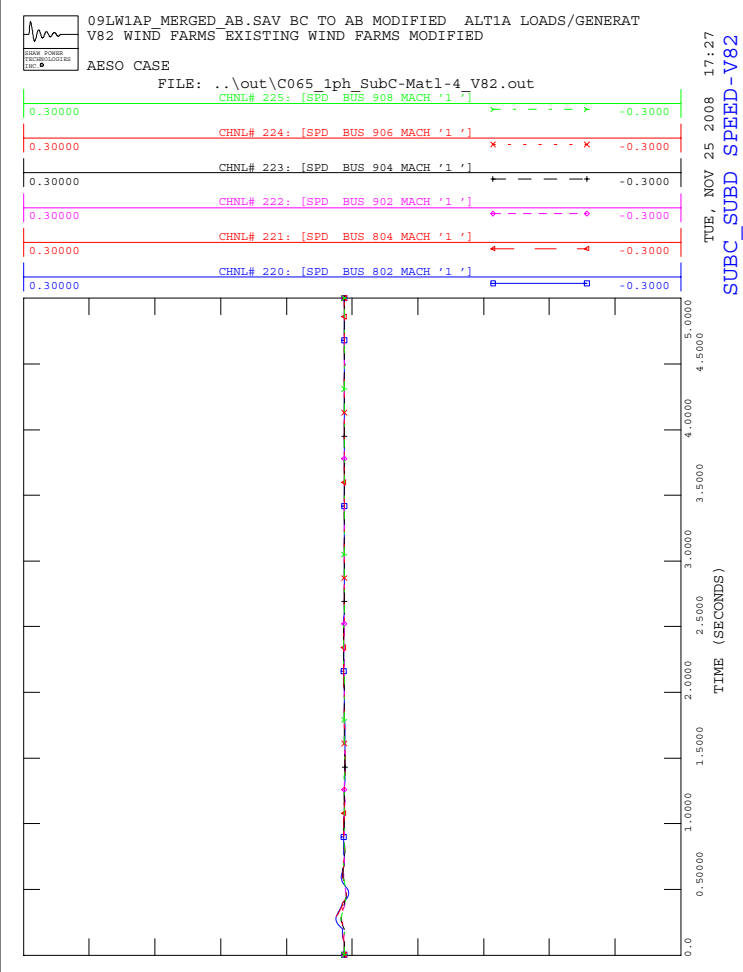
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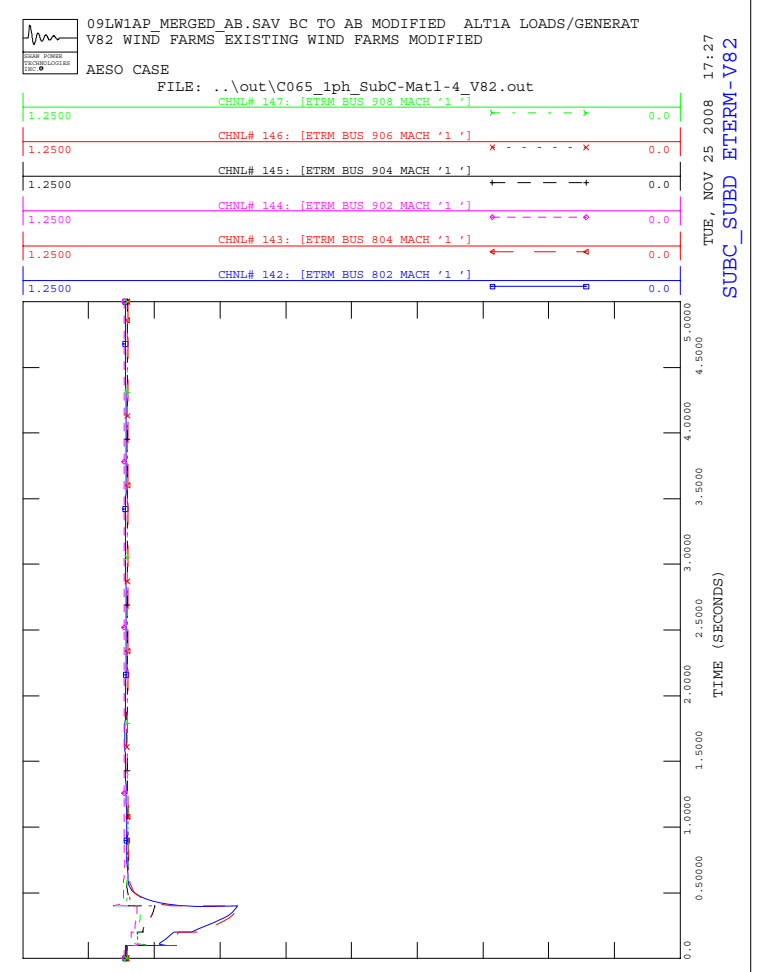
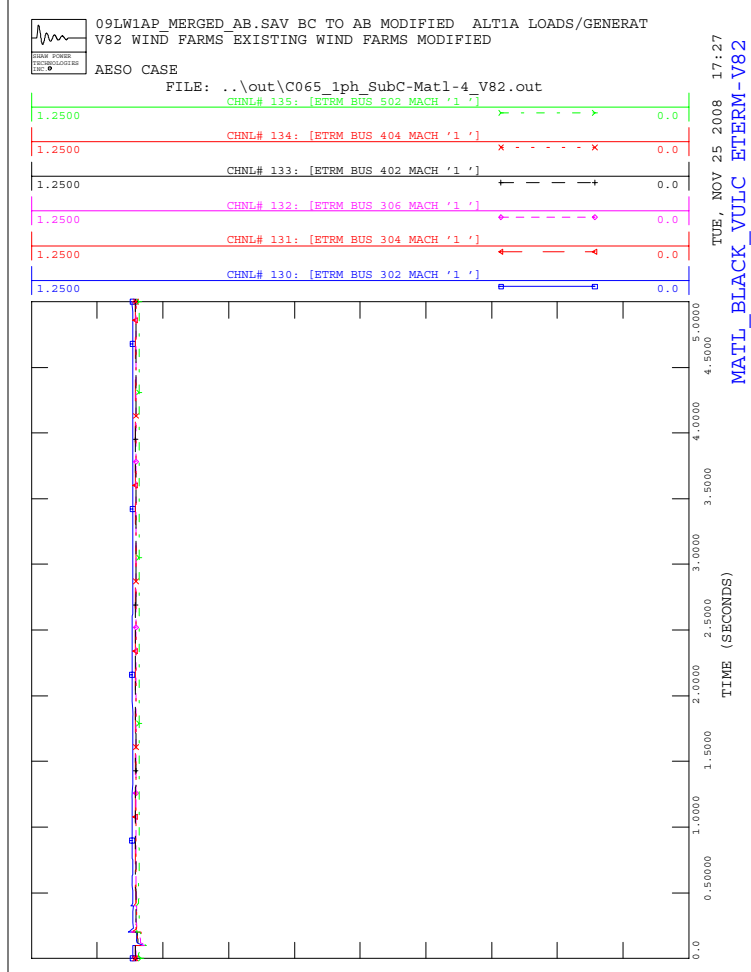
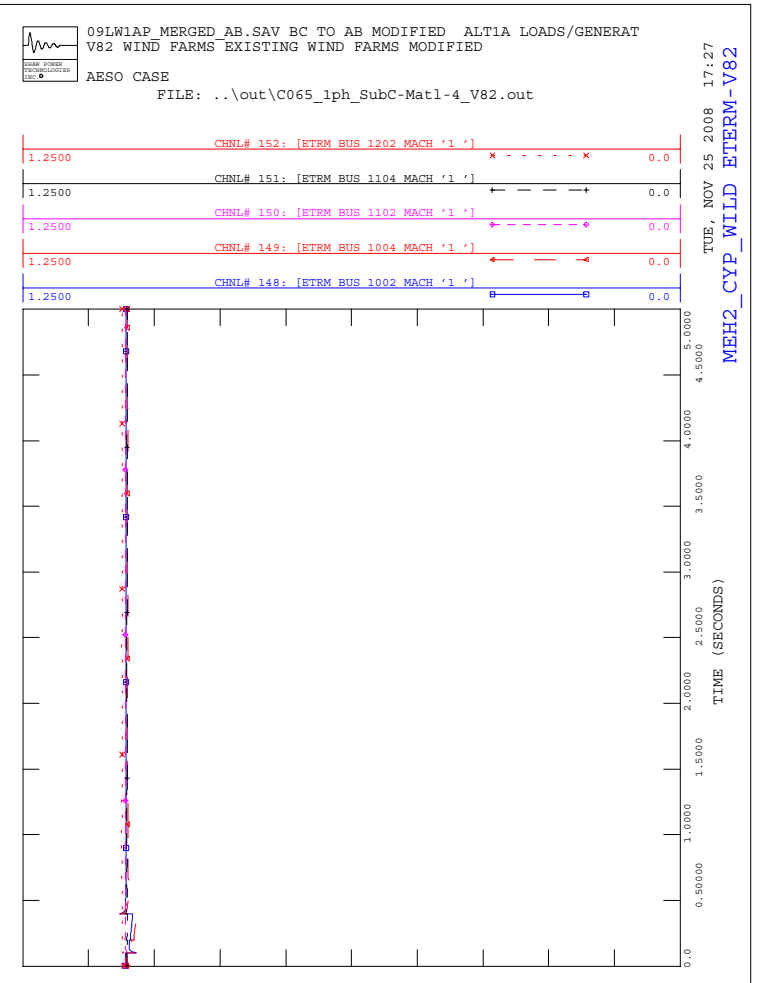
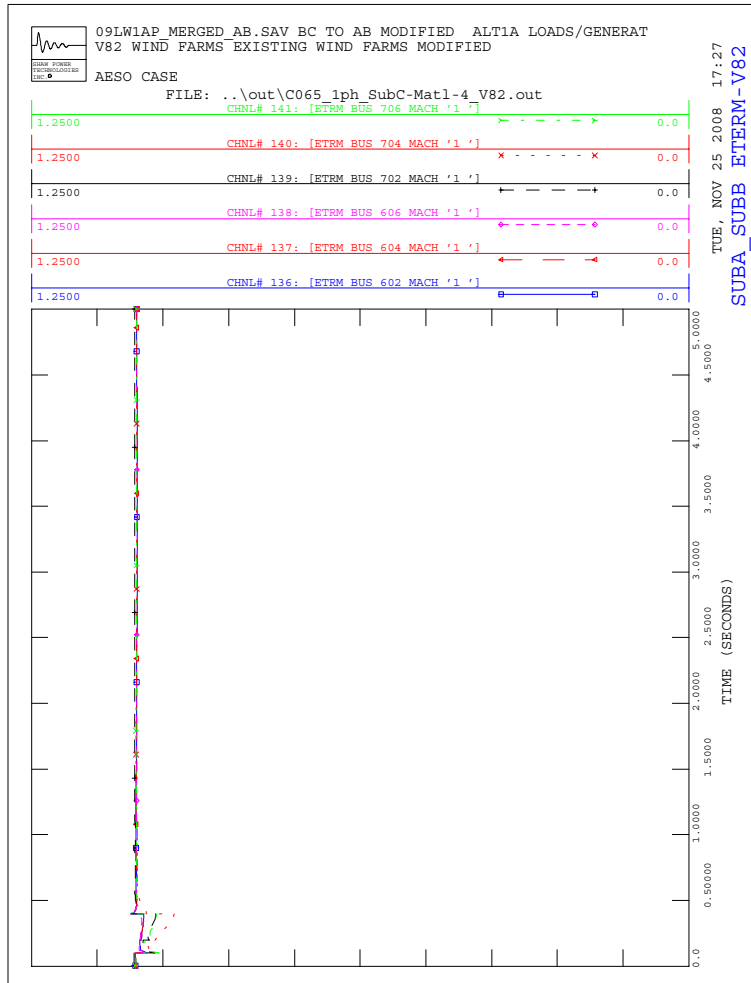


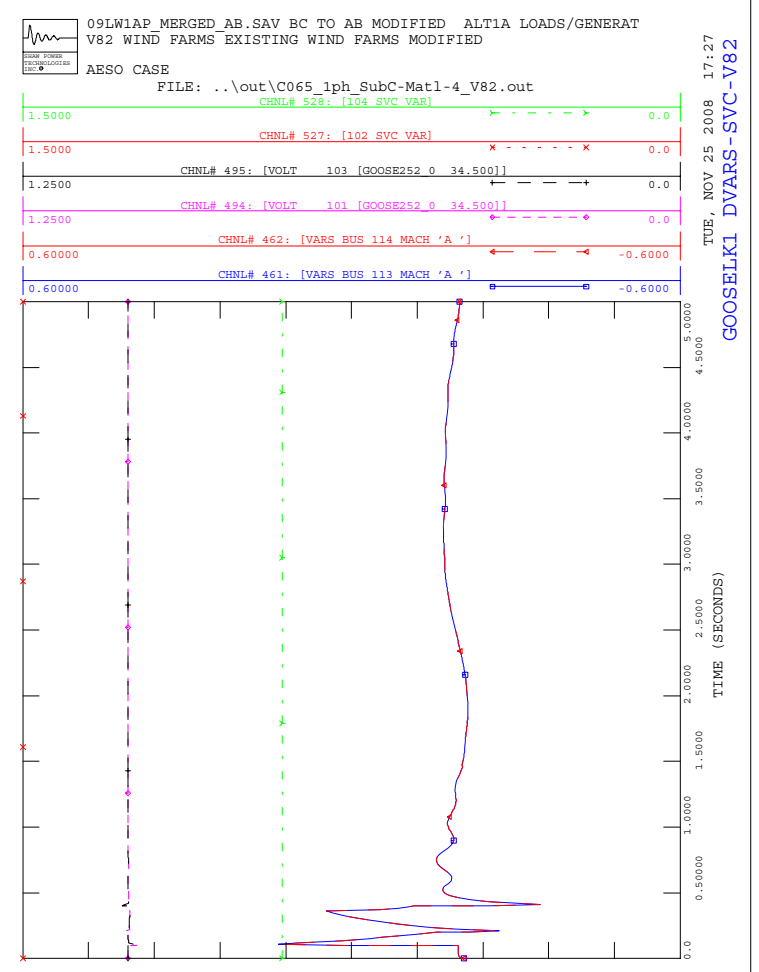
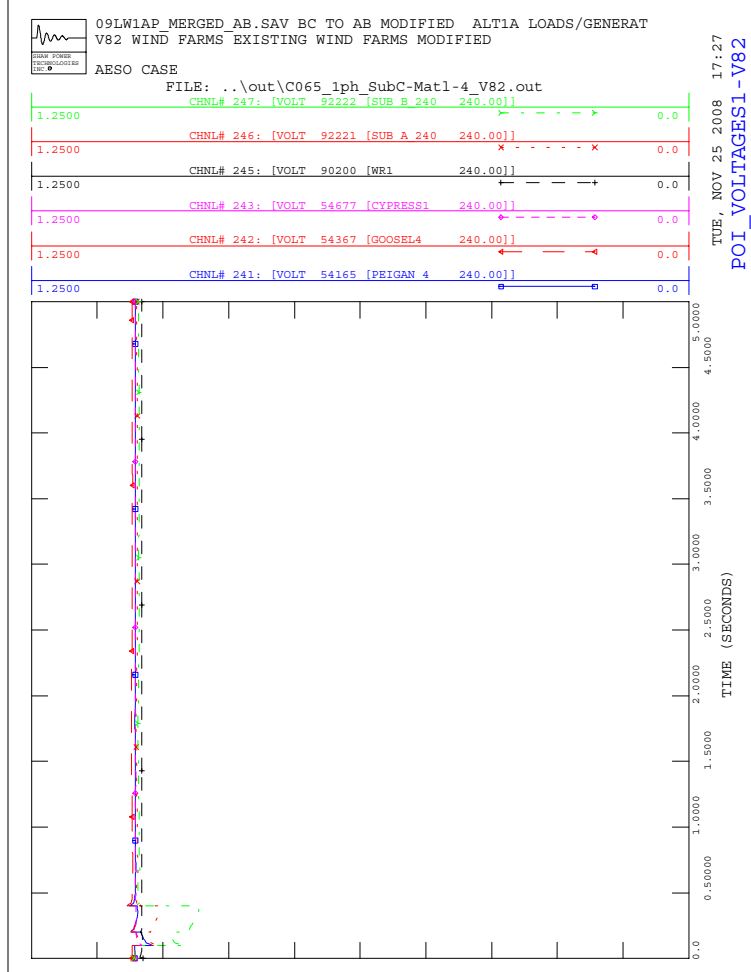
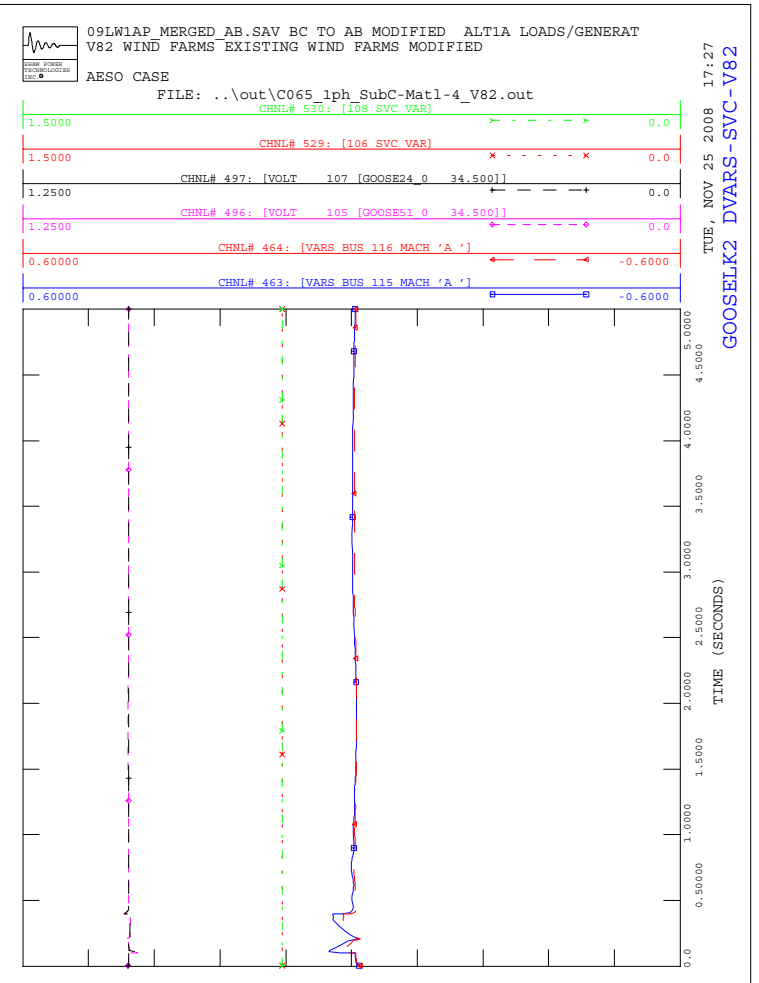
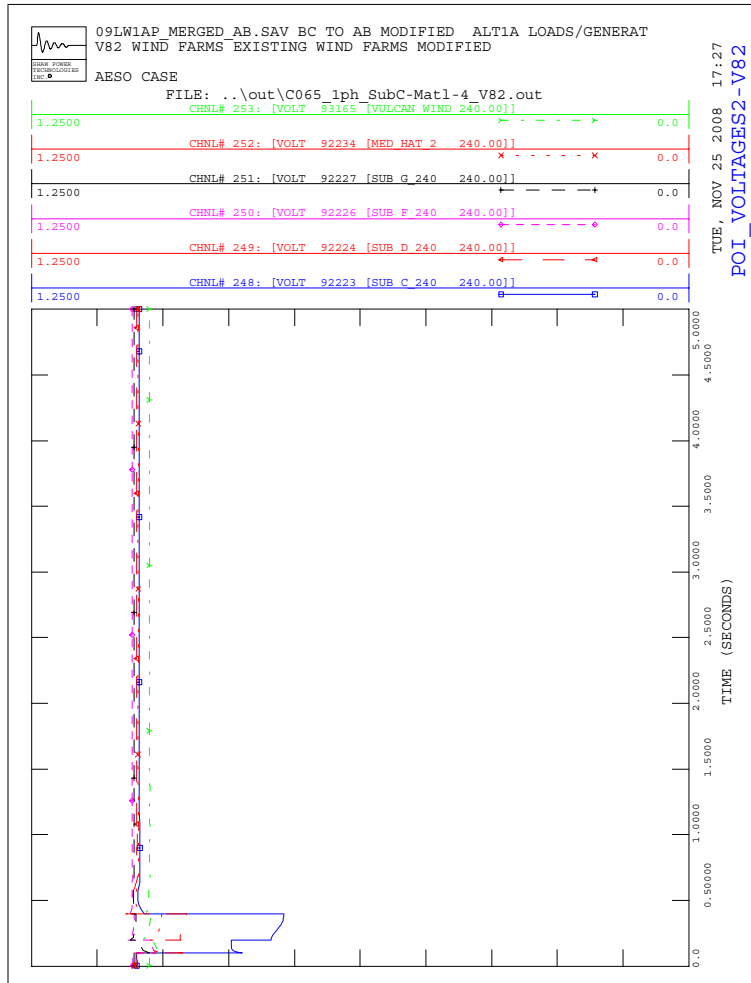
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\C065_1ph_SubC-Mat1-4_V82.out



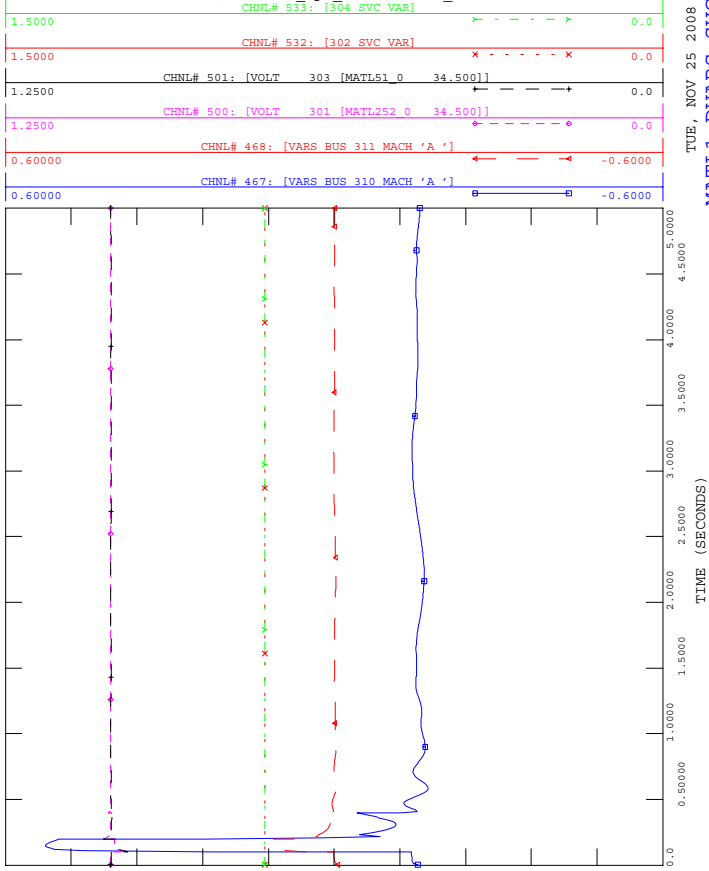






09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

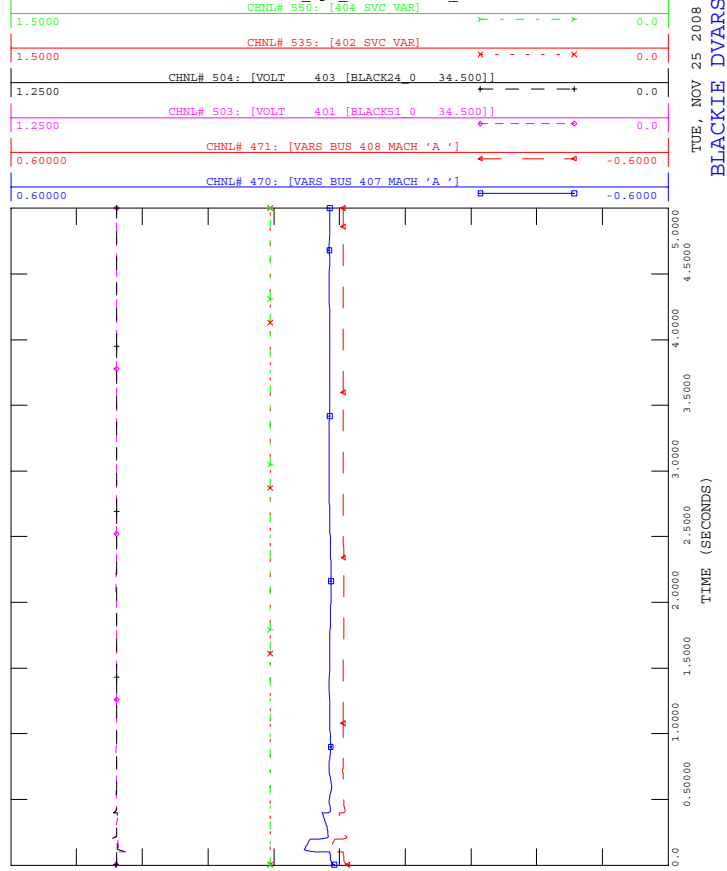
FILE: ..\out\C065_1ph_SubC-Mat1-4_V82.out



TUE, NOV 25 2008 17:27
 MATL1 DVARS-SVC-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

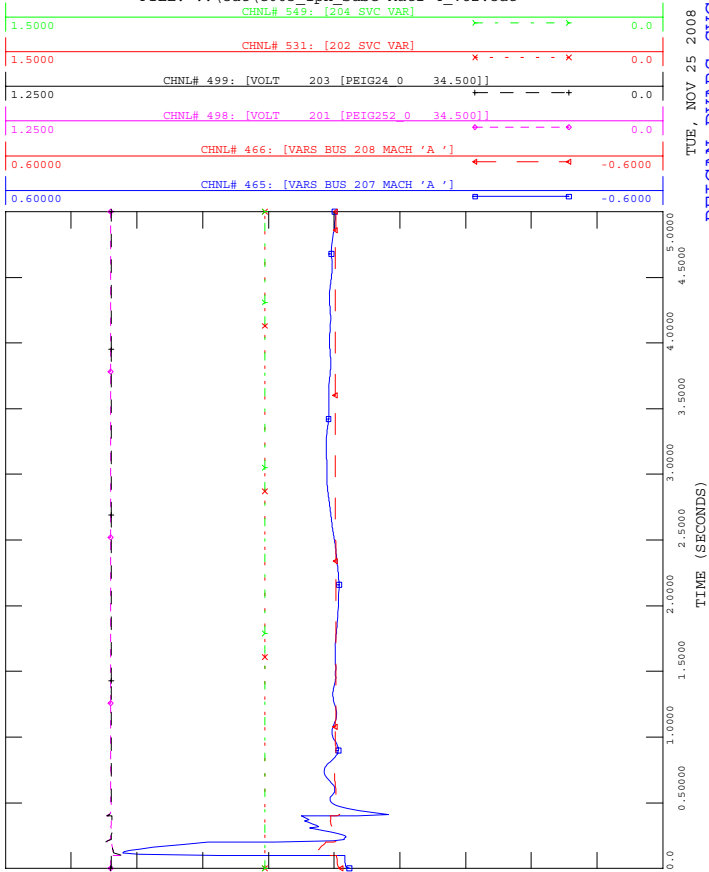
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TUE, NOV 25 2008 17:27
 BLACKIE DVARS-V82

09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

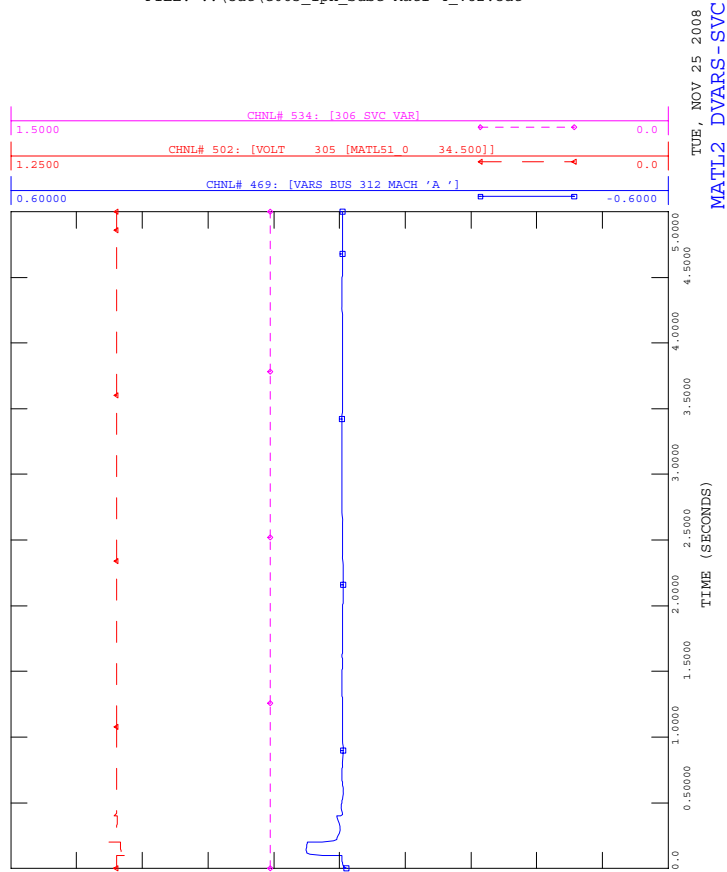
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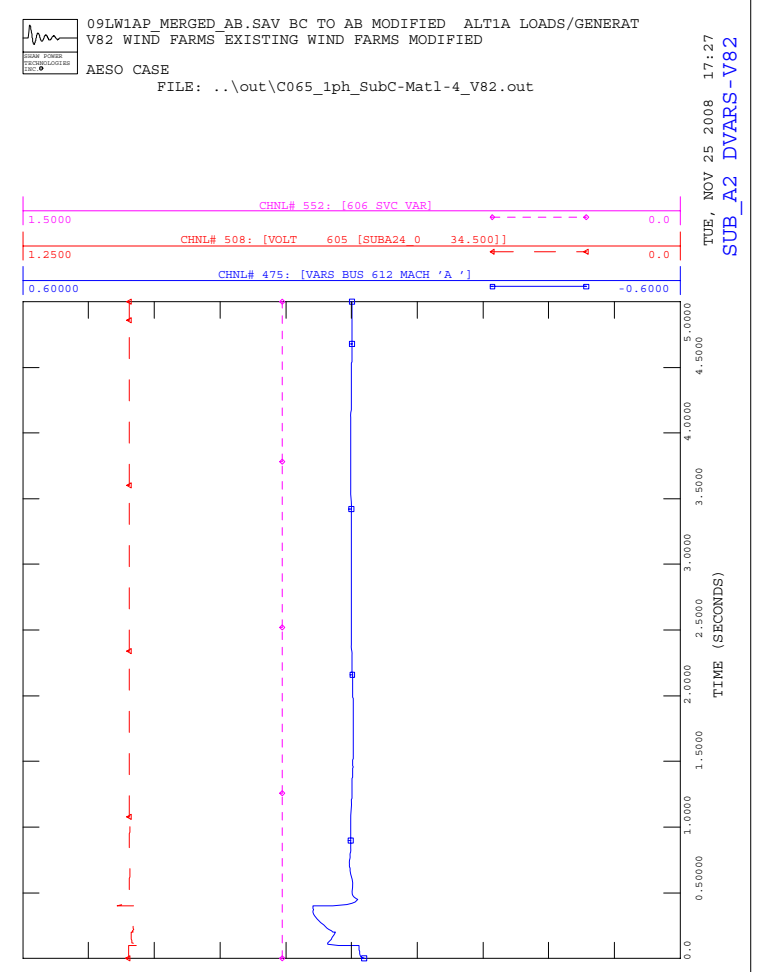
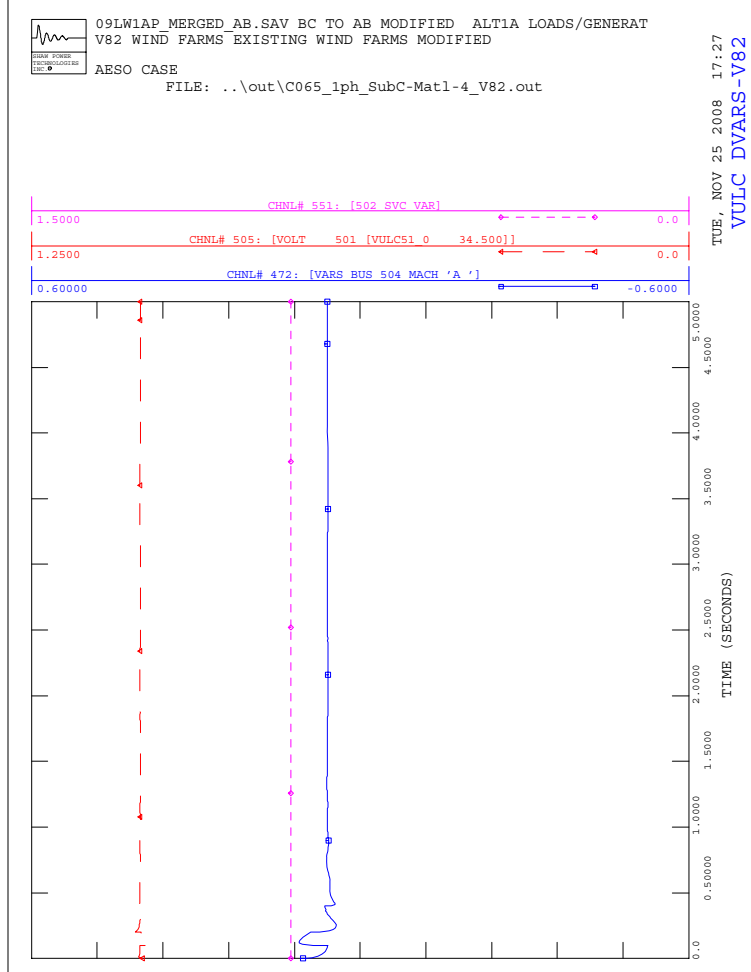
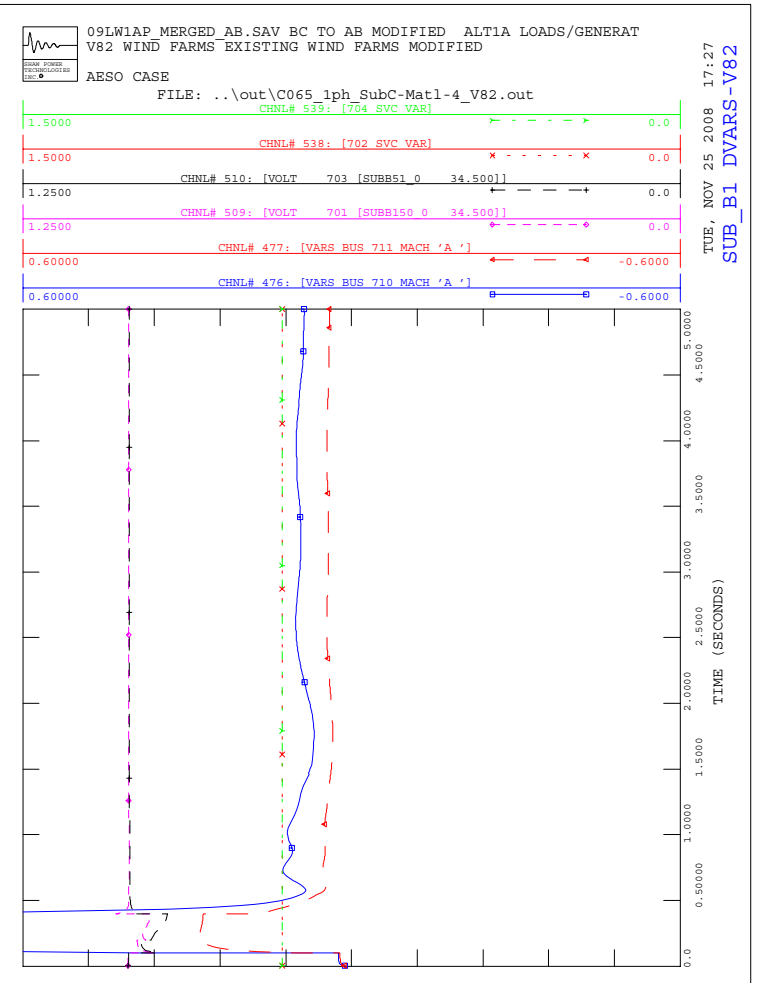
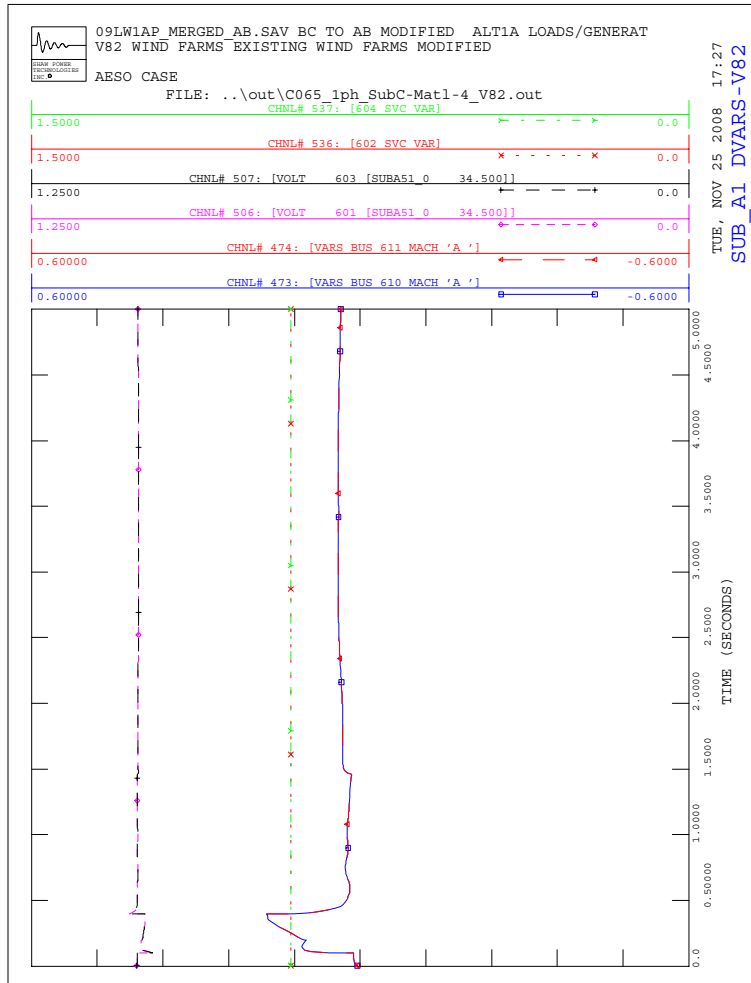
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 PEIGAN DVARS-SVC-V82

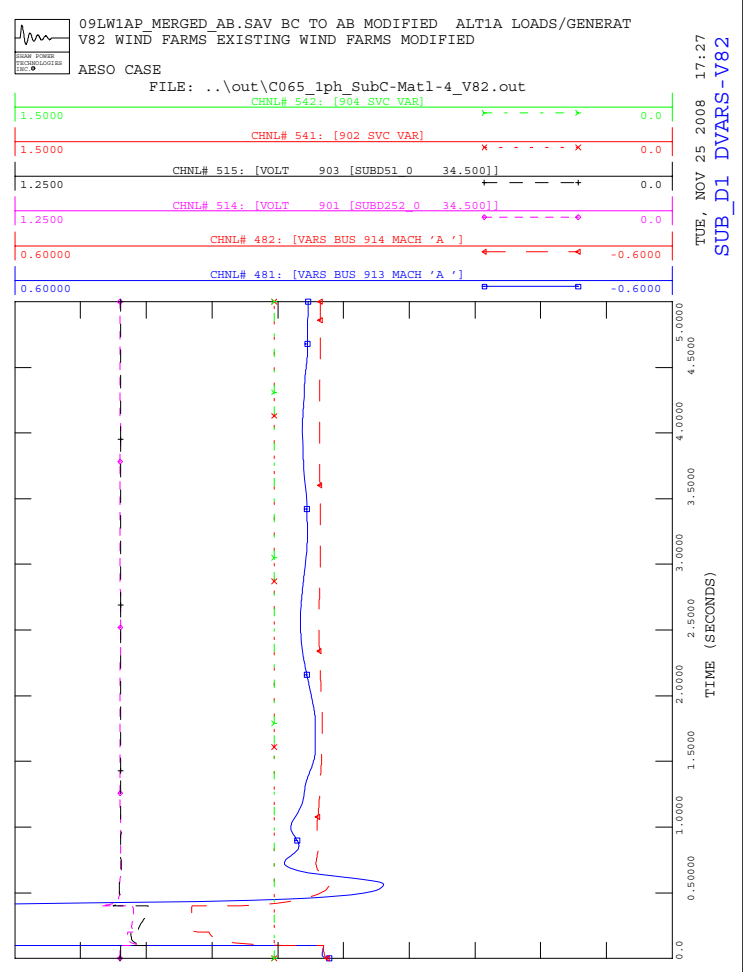
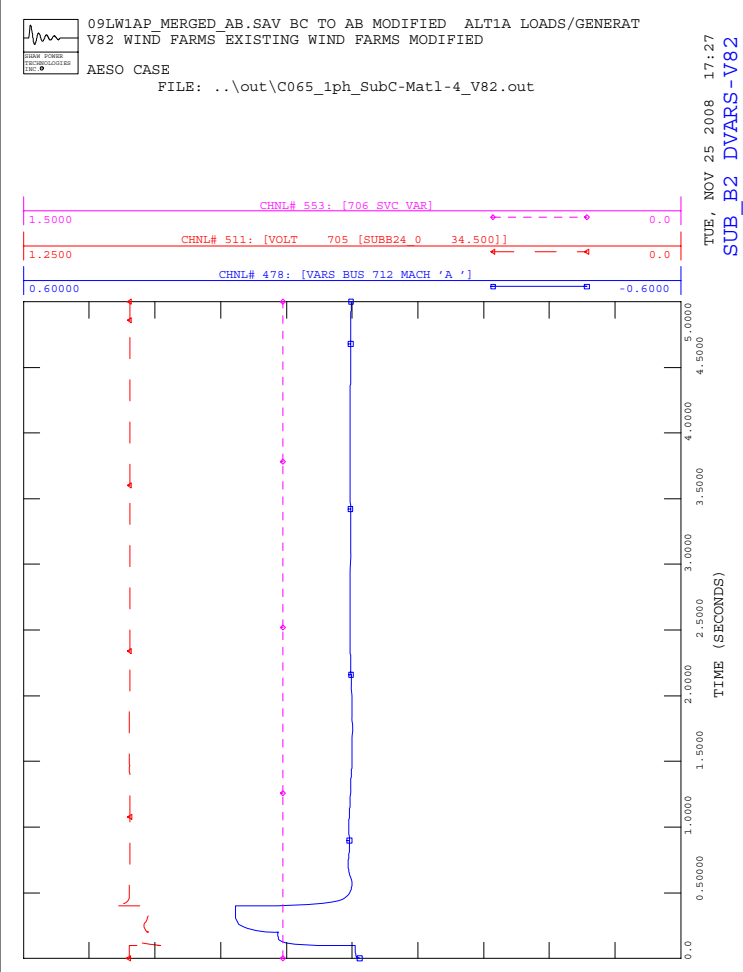
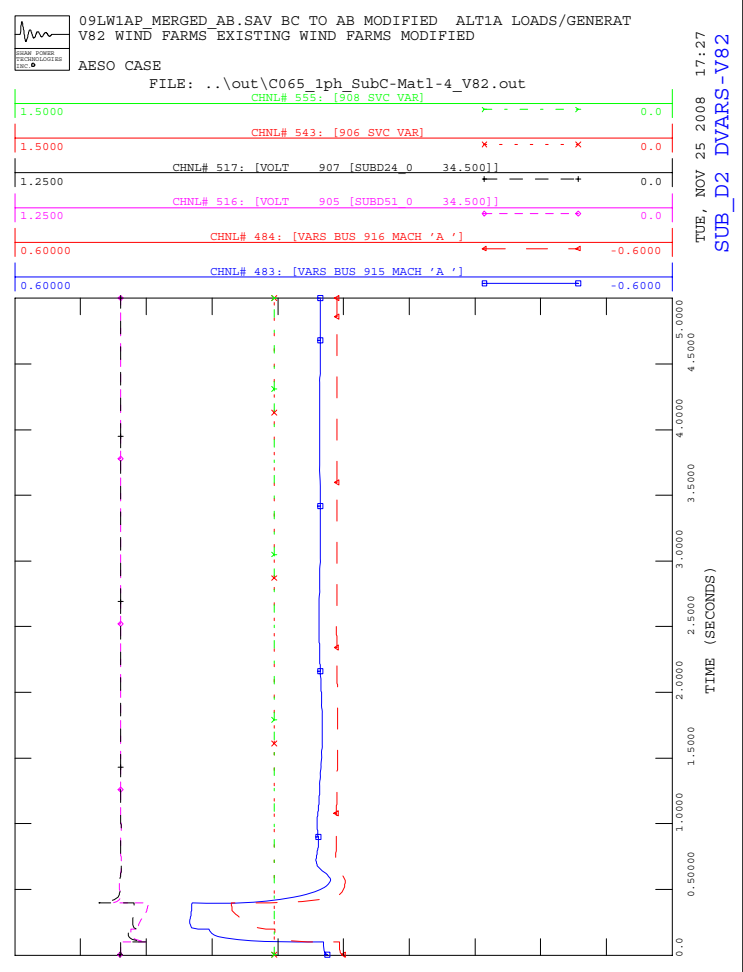
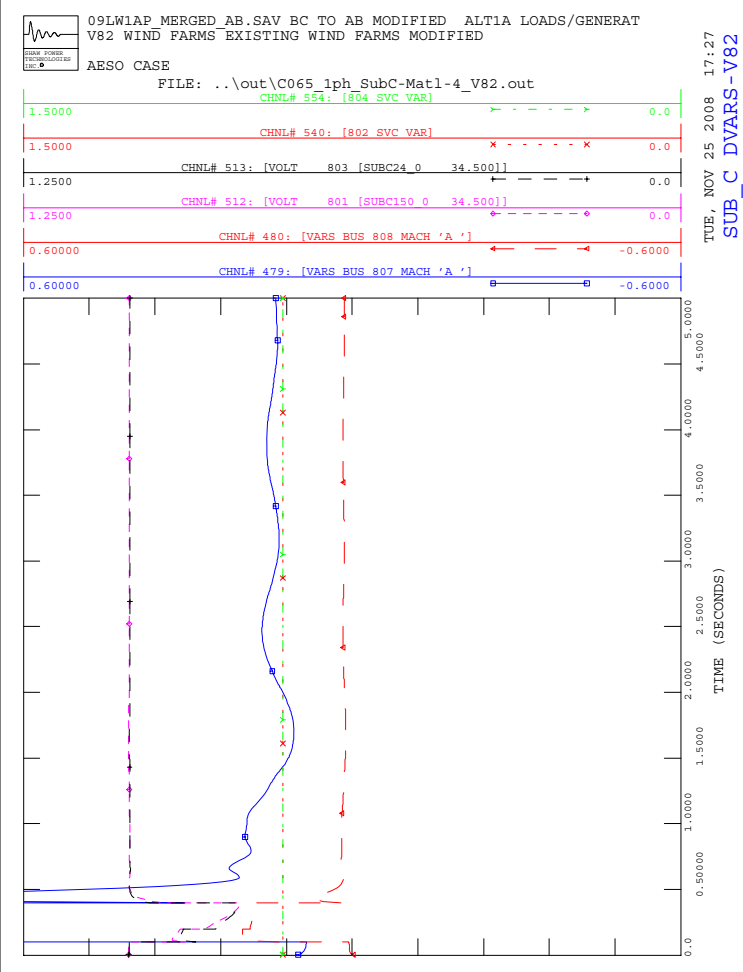
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 AESO CASE

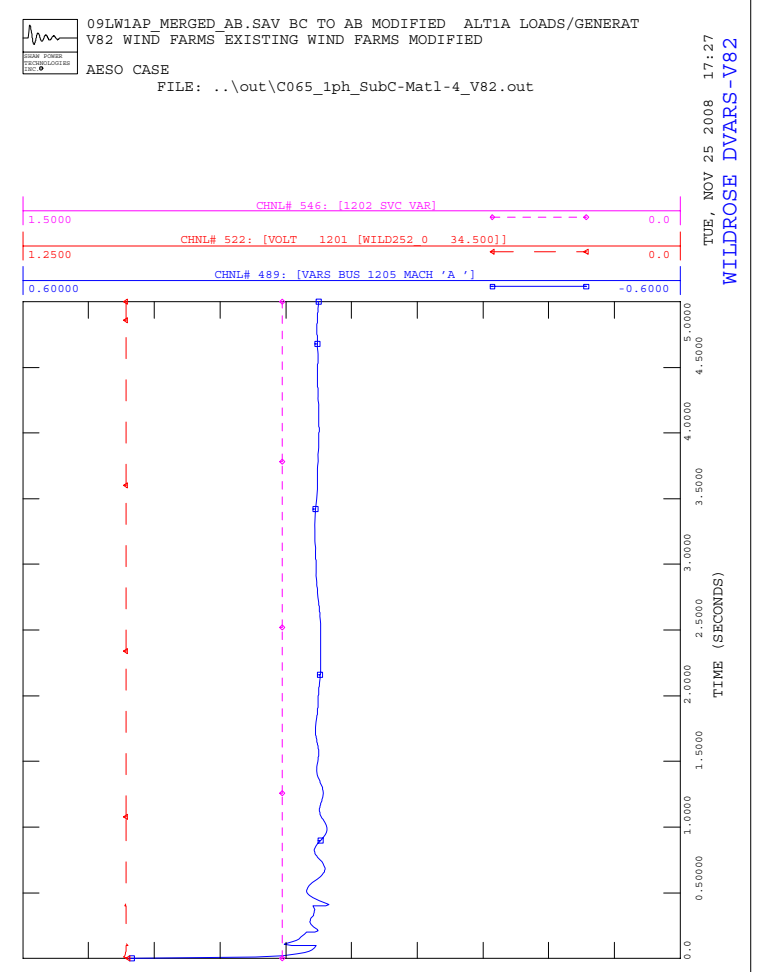
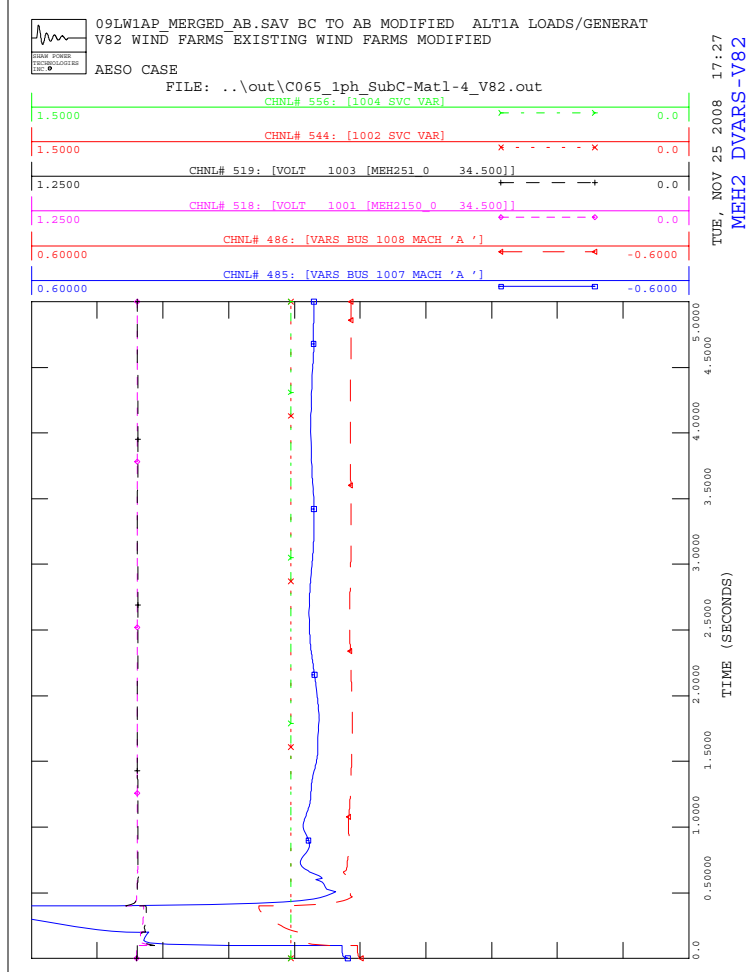
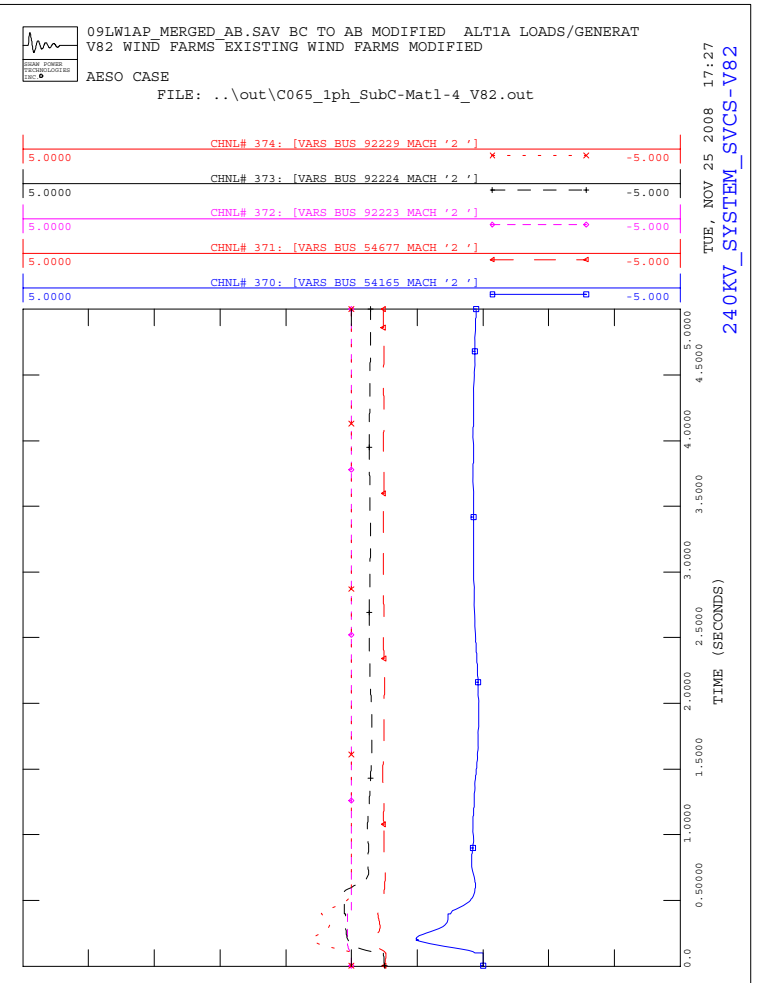
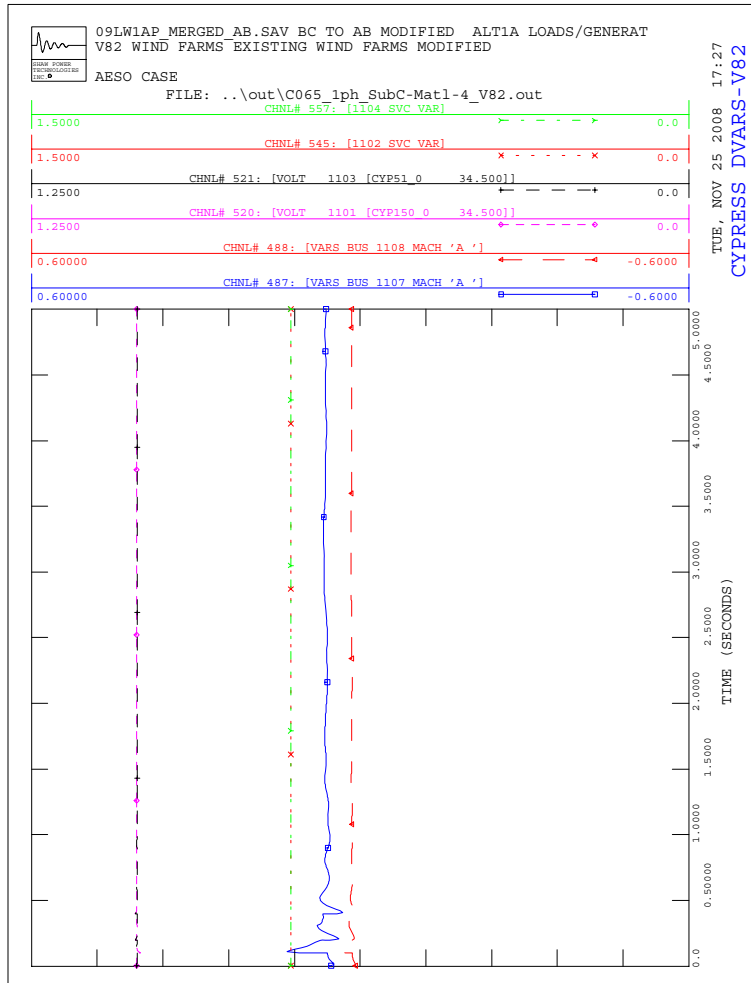
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TUE, NOV 25 2008 17:27
 MATL2 DVARS-SVC-V82



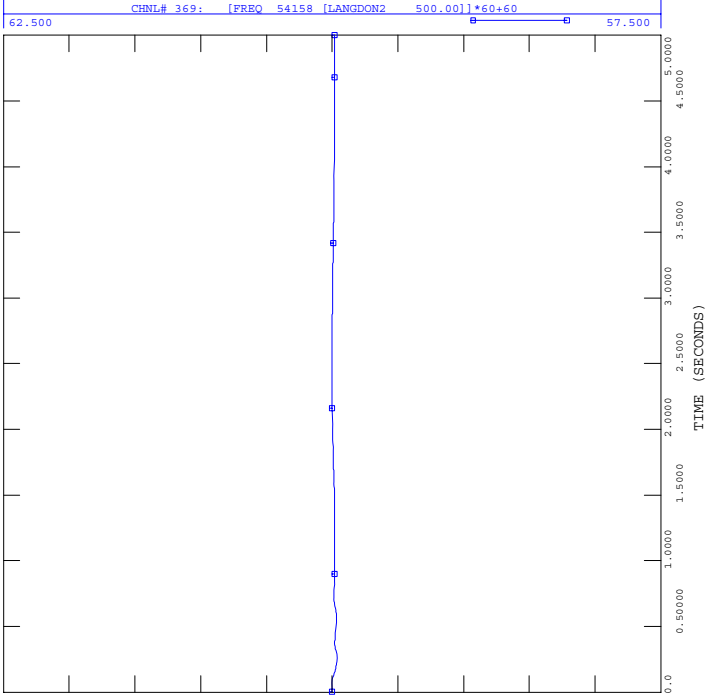






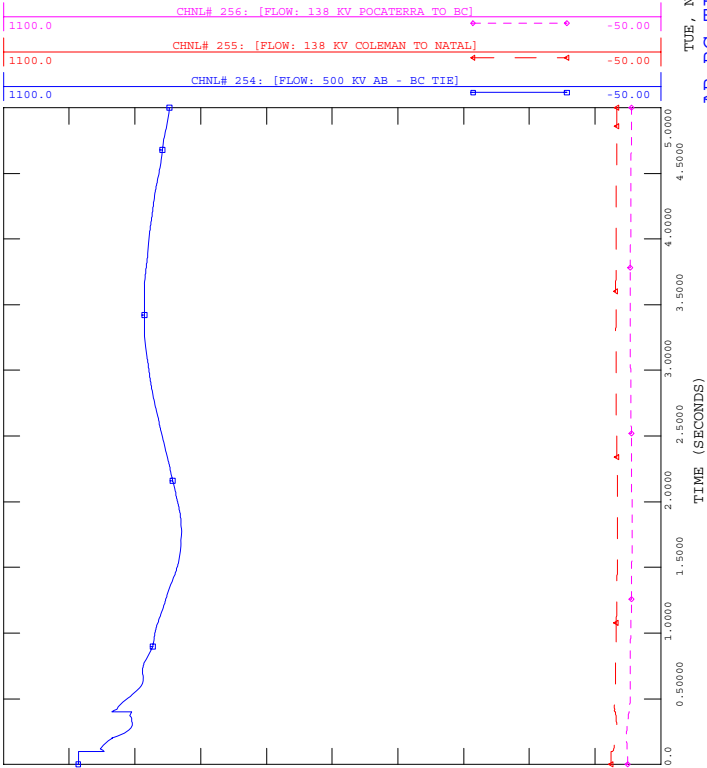
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ABSO CASE
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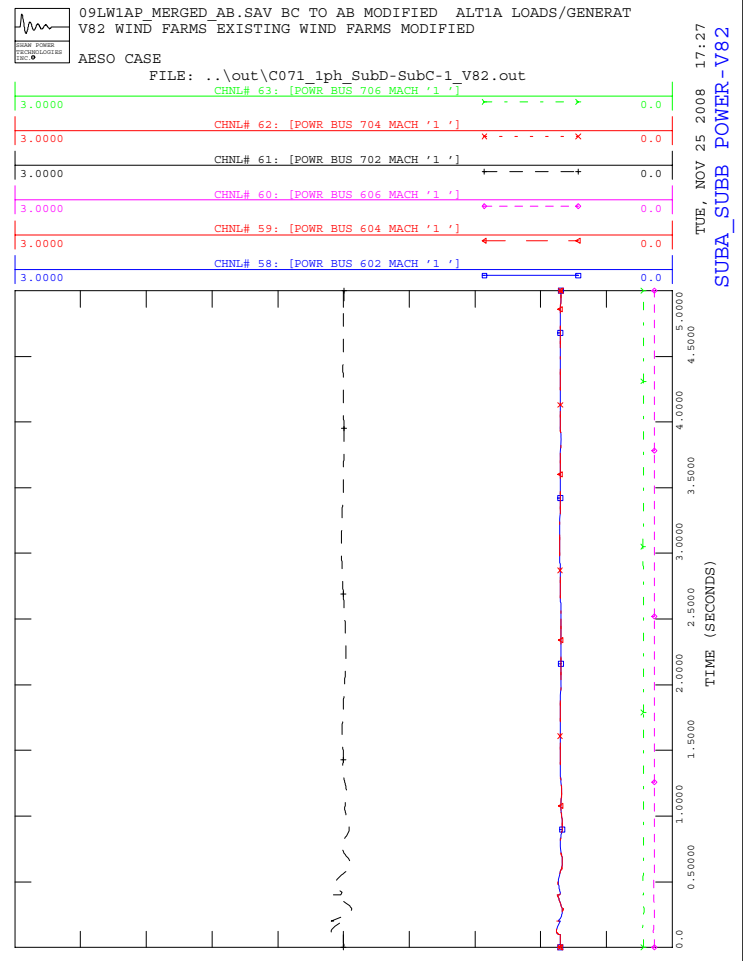
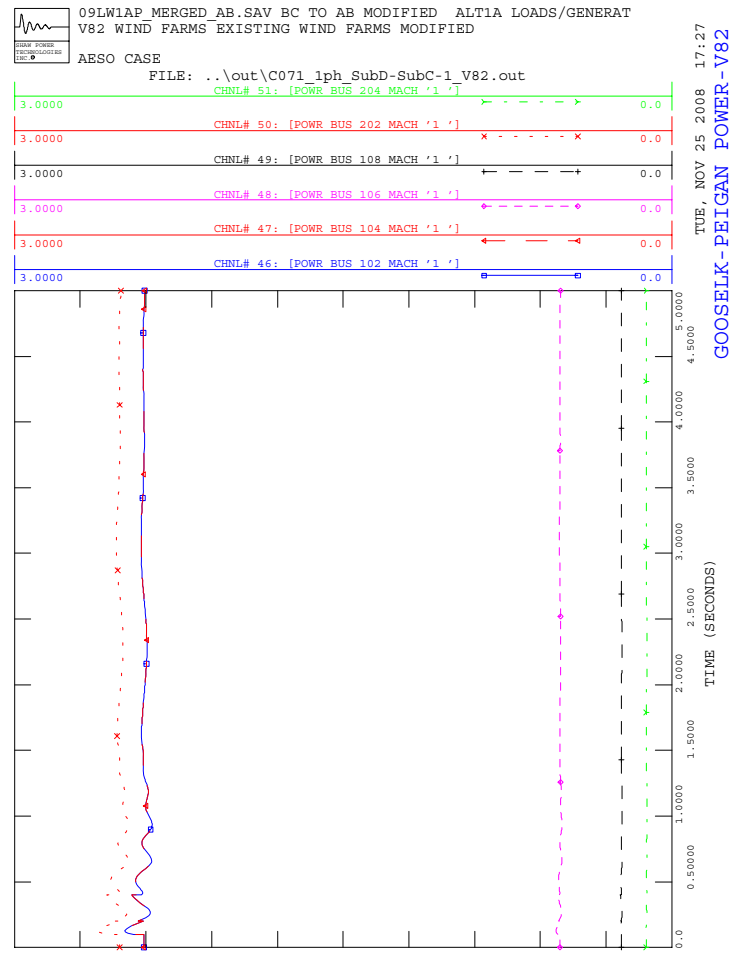
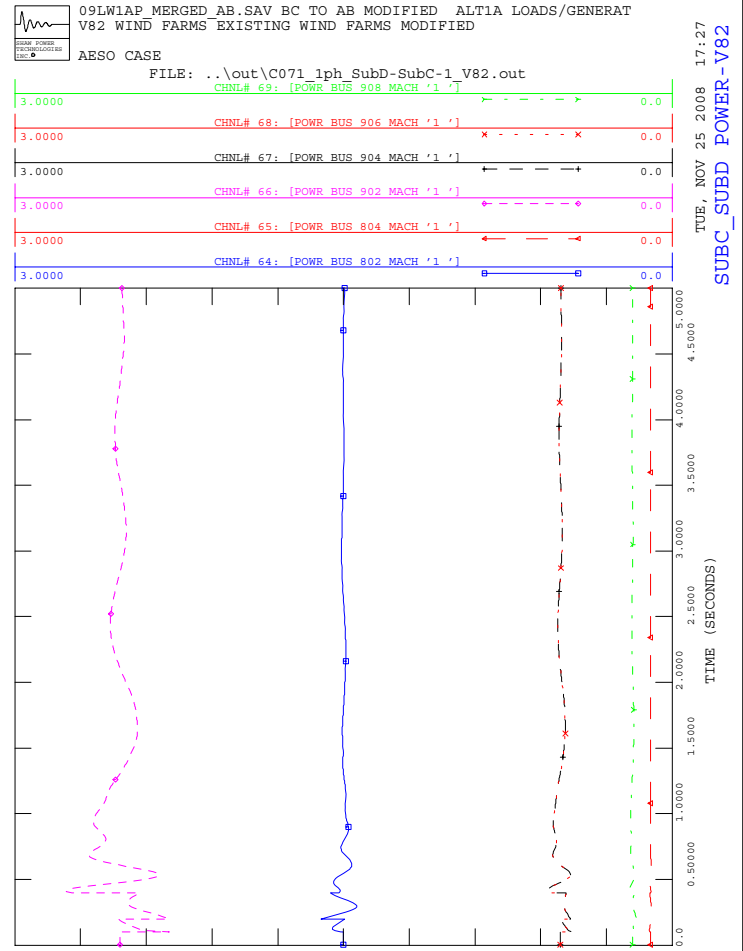
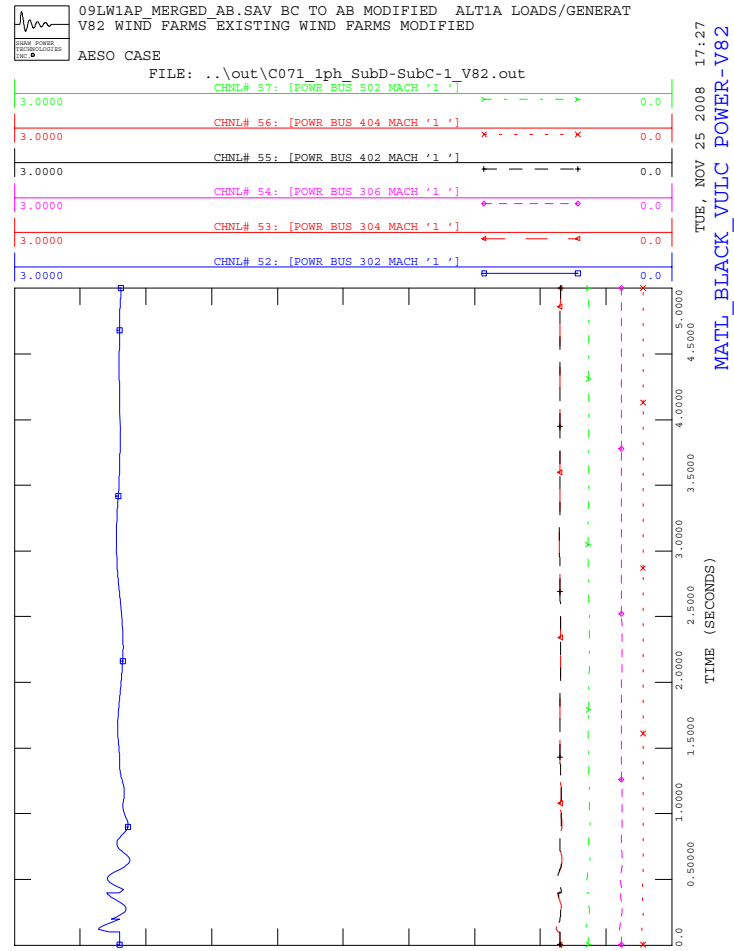
TUE, NOV 25 2008 17:27
LANGDON_FRQ-V82

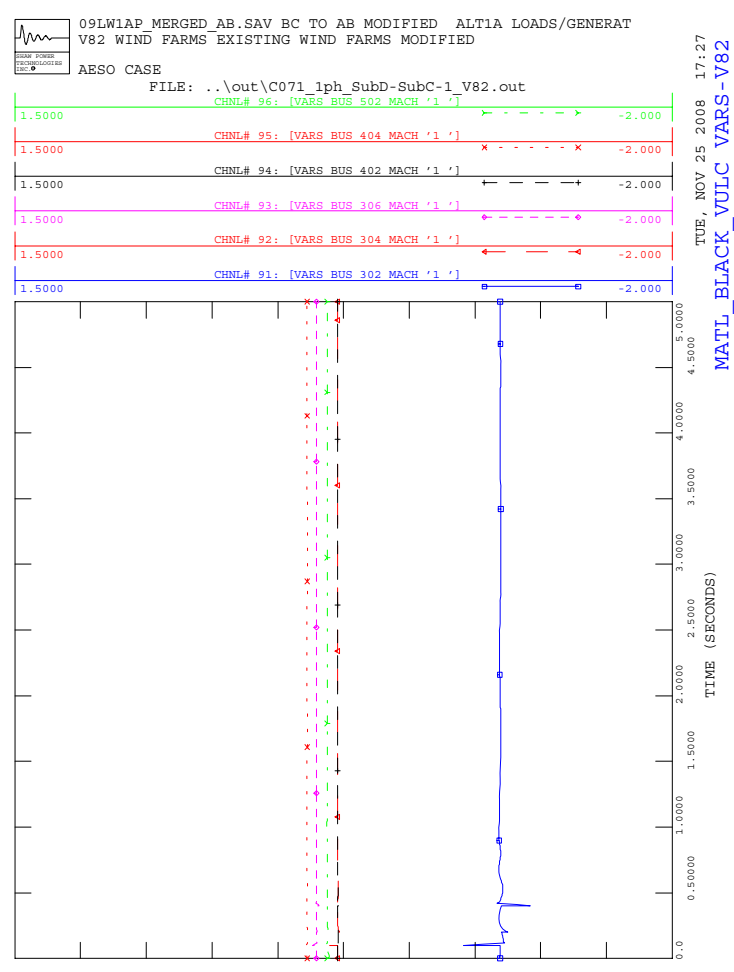
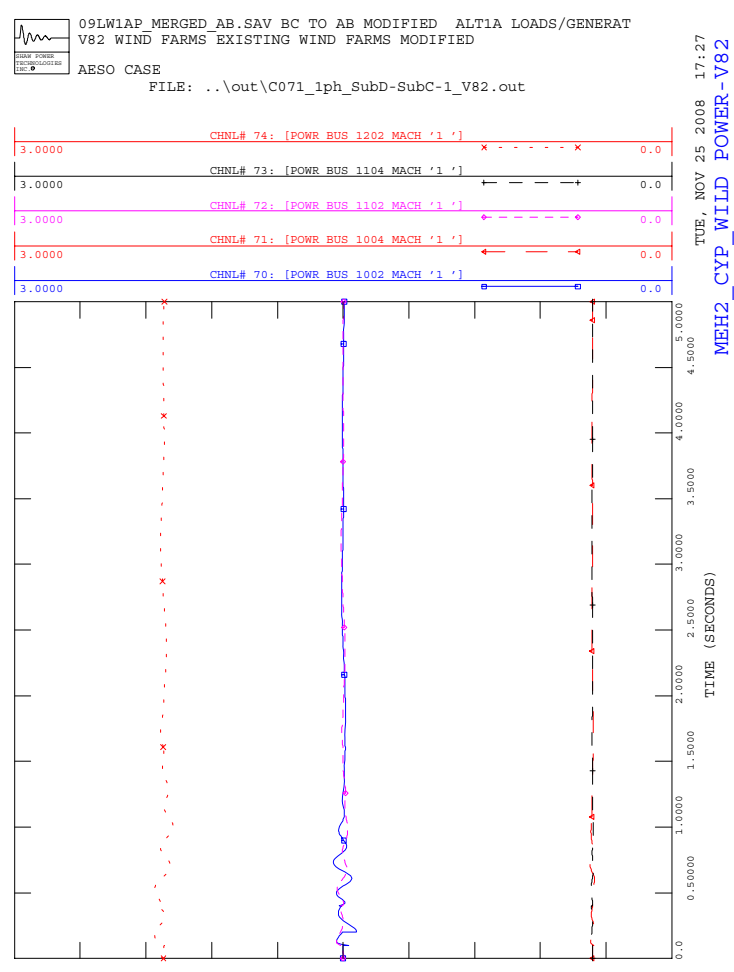
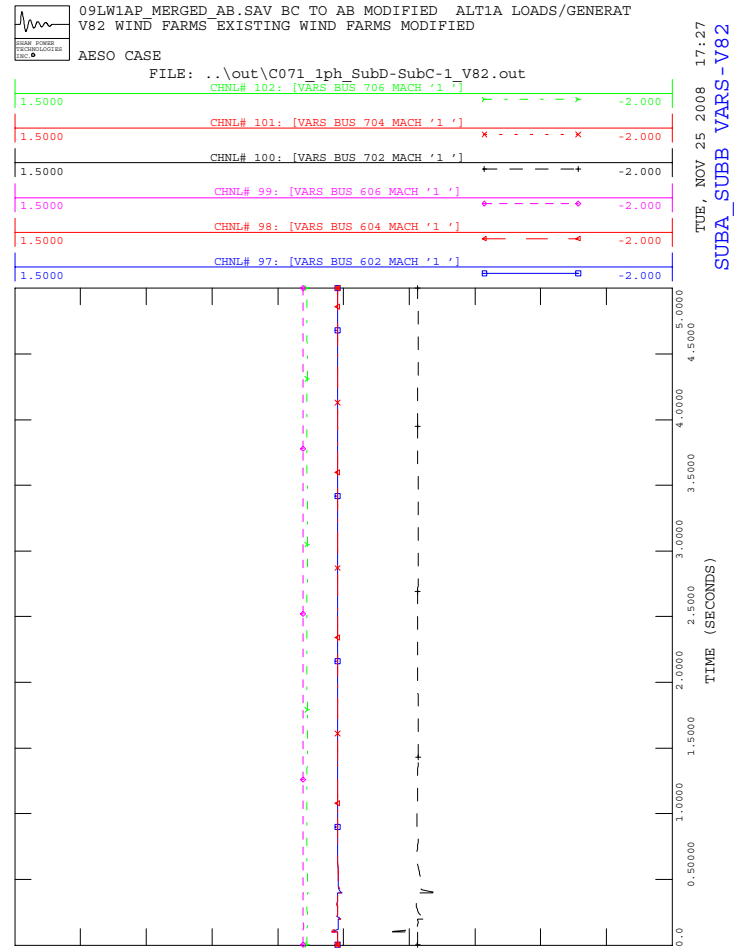
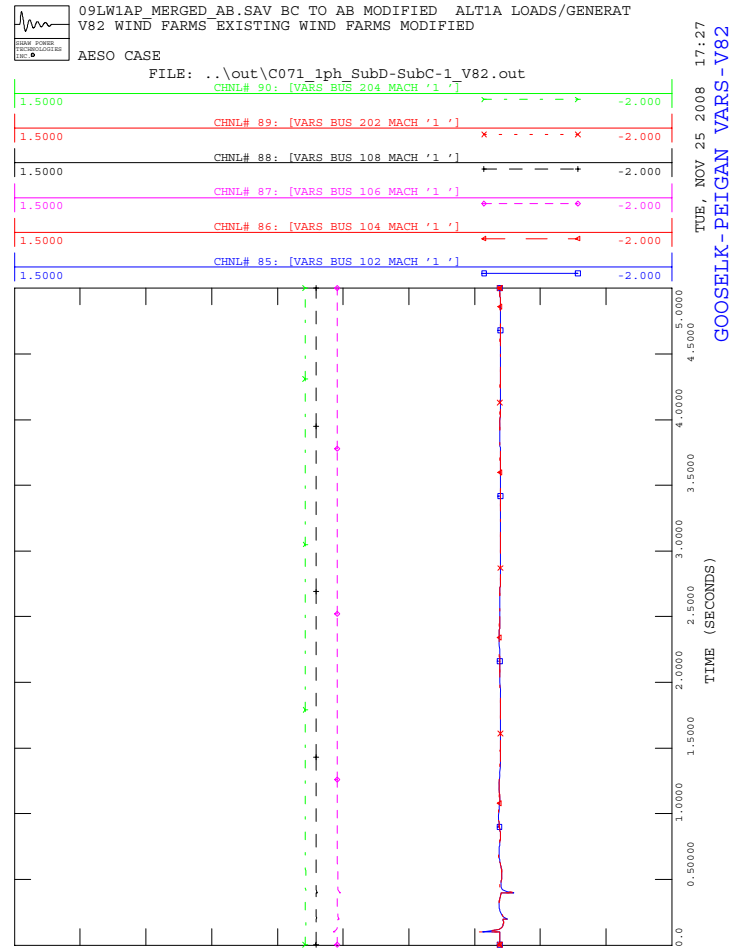


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
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ABSO CASE
FILE: ..\out\C065_1ph_SubC-Mat1-4_V82.out

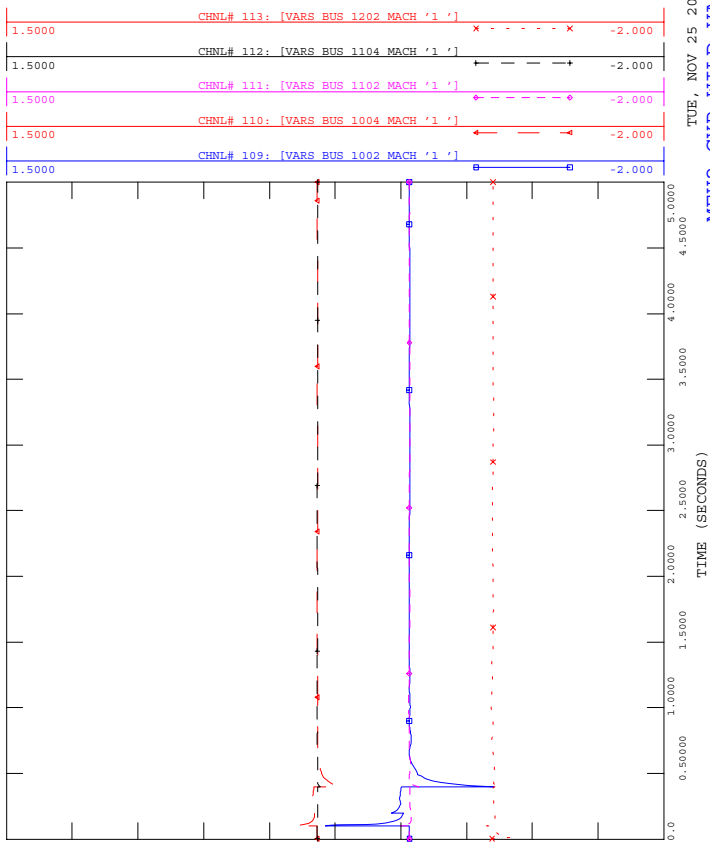
TUE, NOV 25 2008 17:27
AB_BC_TIE_FLOWS-V82





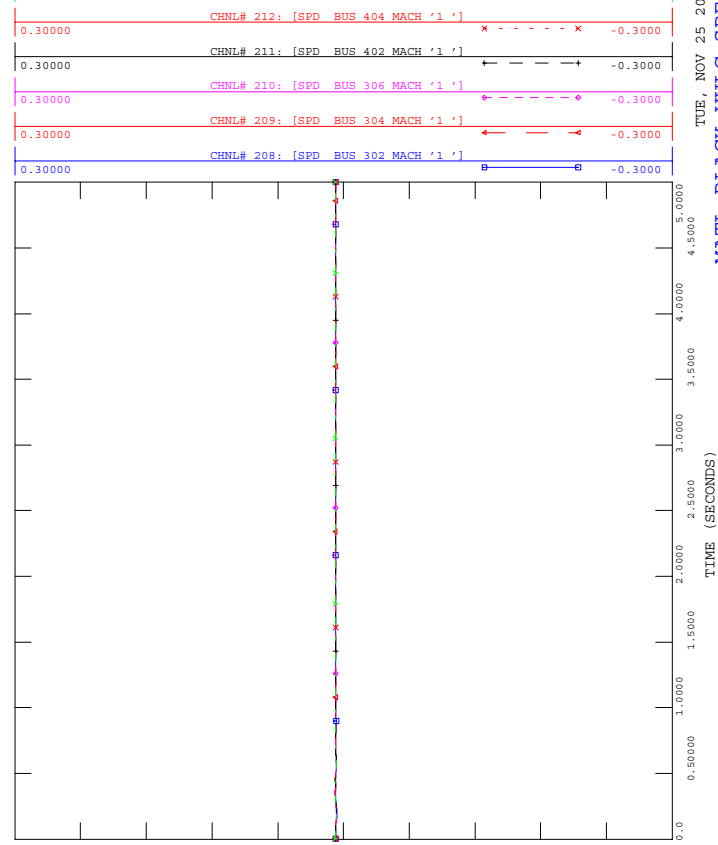


09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTIA LOADS/GENERAT
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 AESO CASE
 FILE: ..\out\C071_1ph_SubD-SubC-1_V82.out



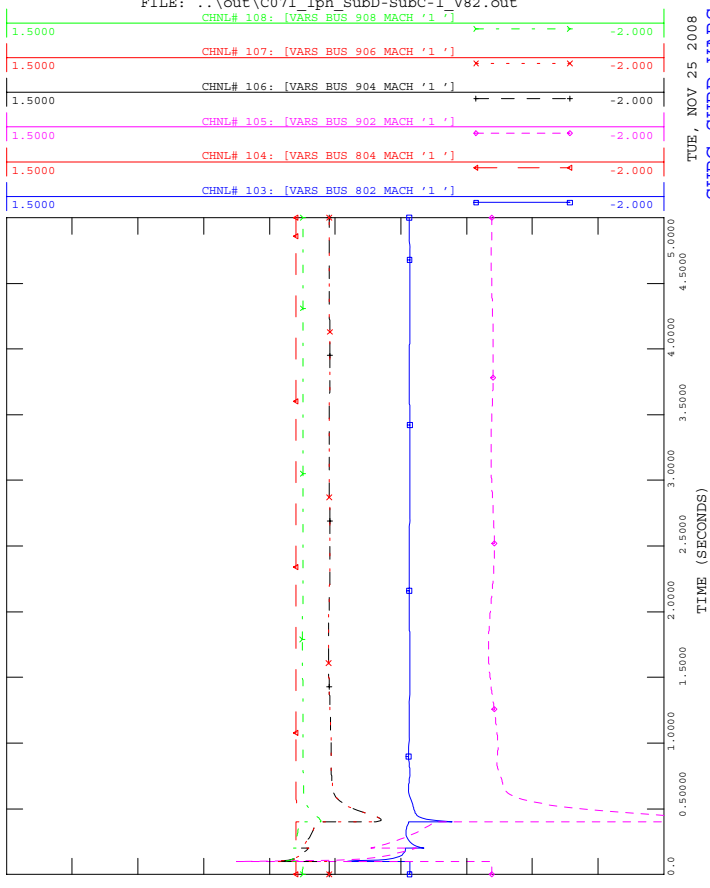
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 MEH2_CYP_WILD_VARS-V82

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 AESO CASE
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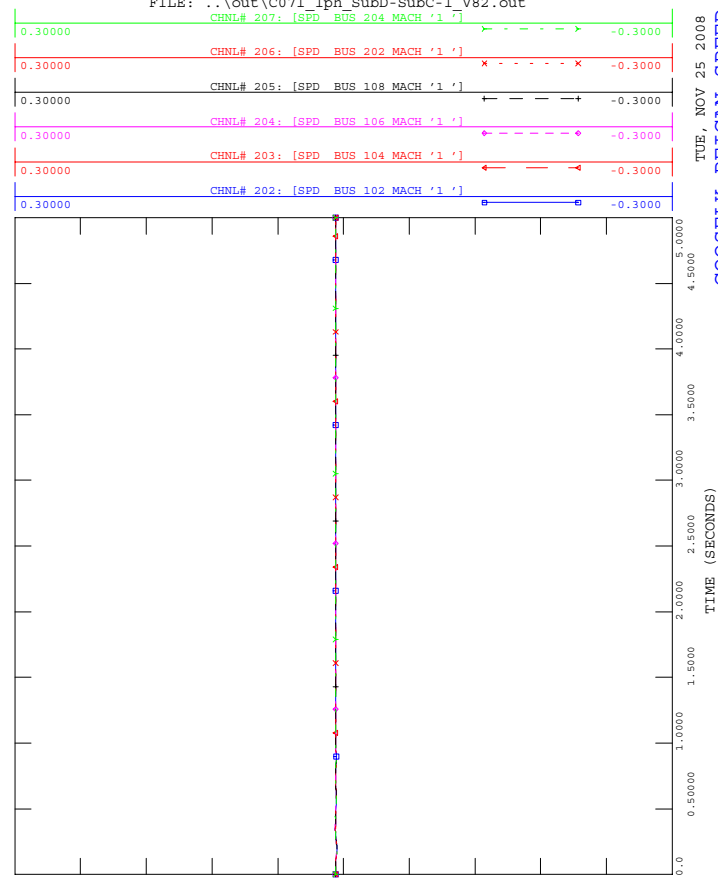
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 MAIL_BLACK_VULC_SPEED-V82

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 AESO CASE
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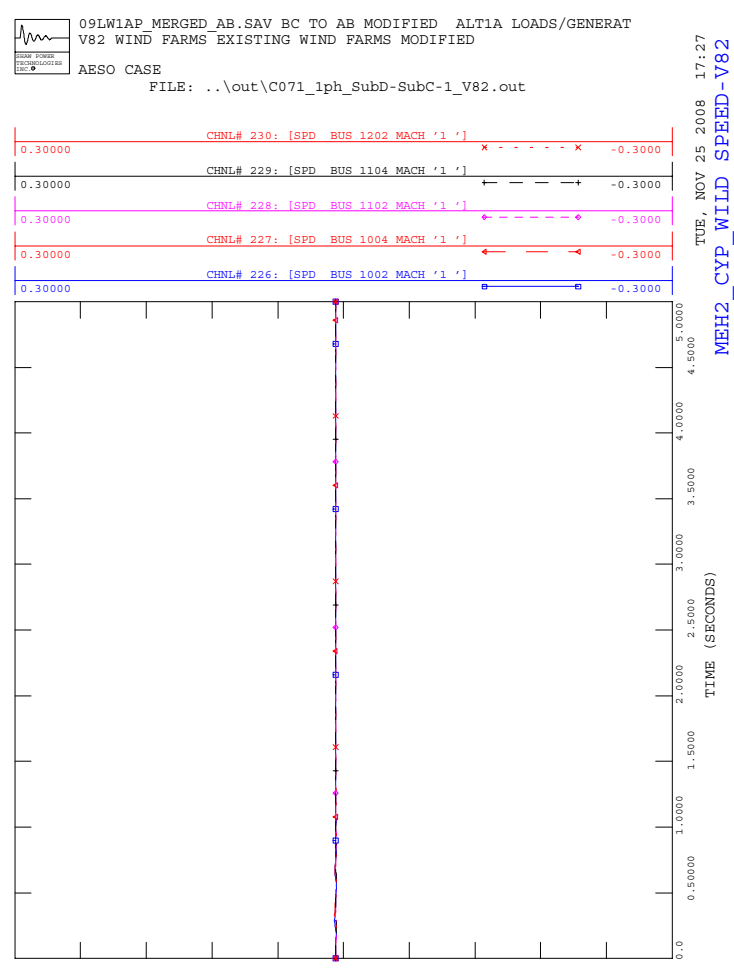
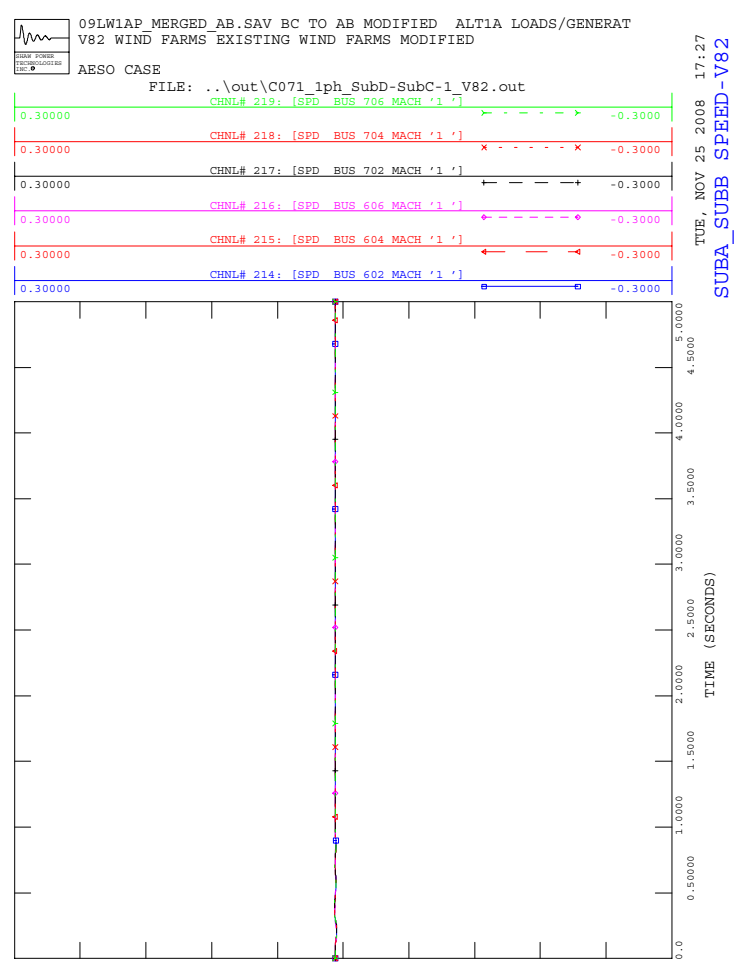
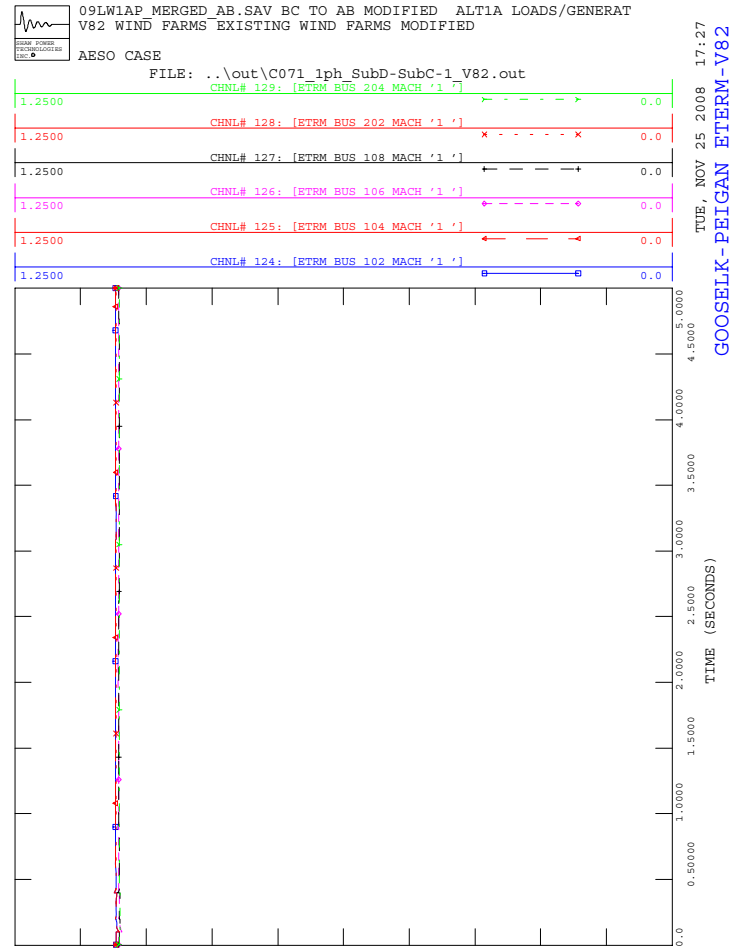
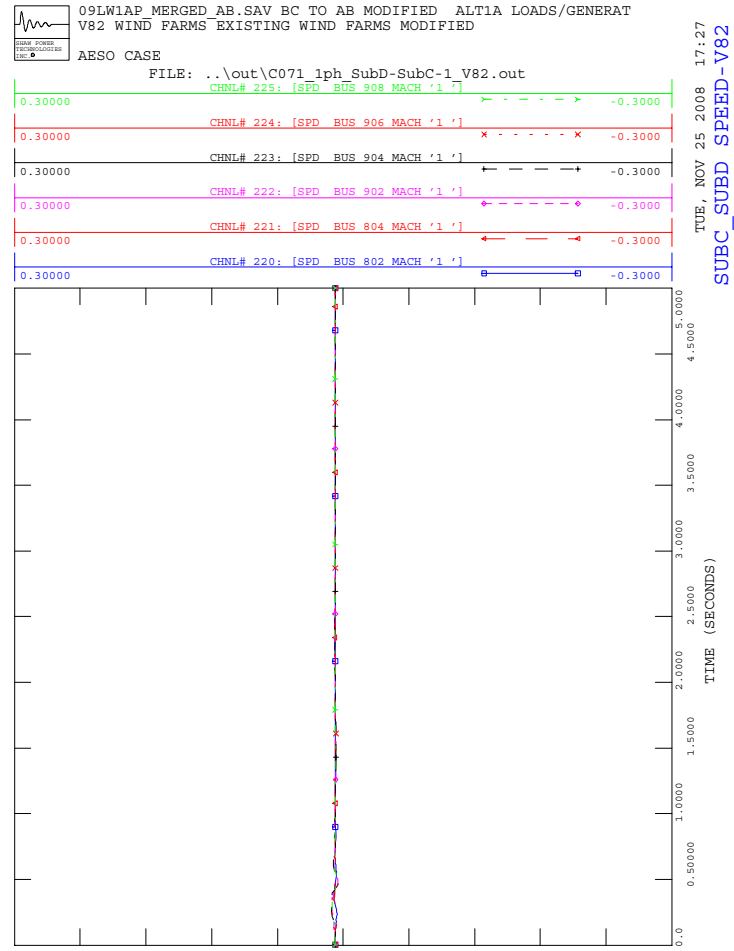


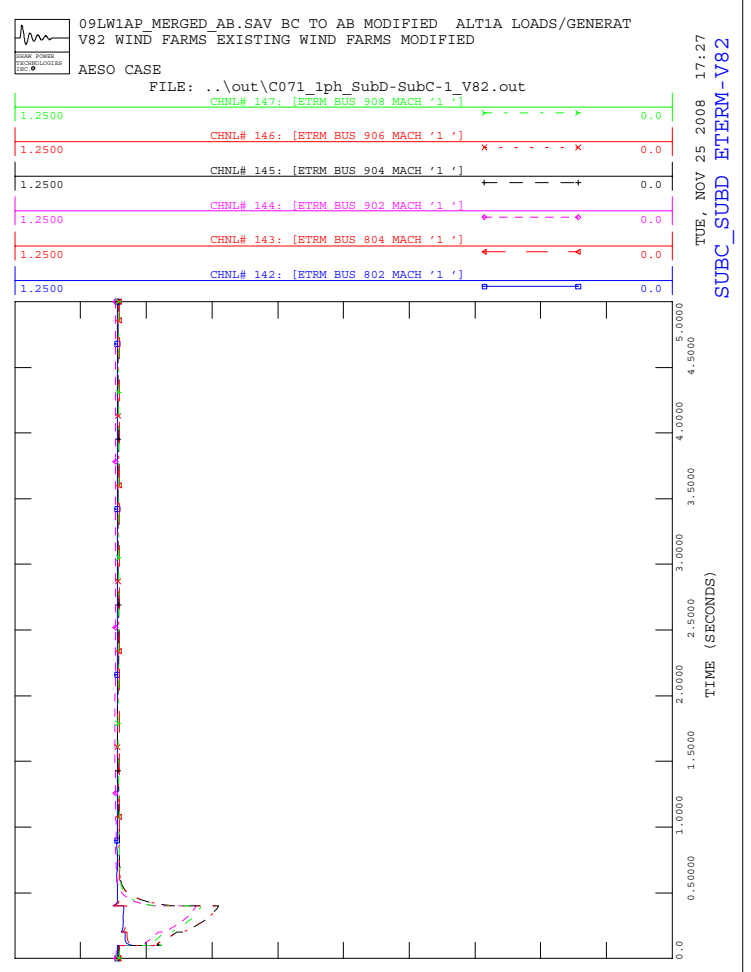
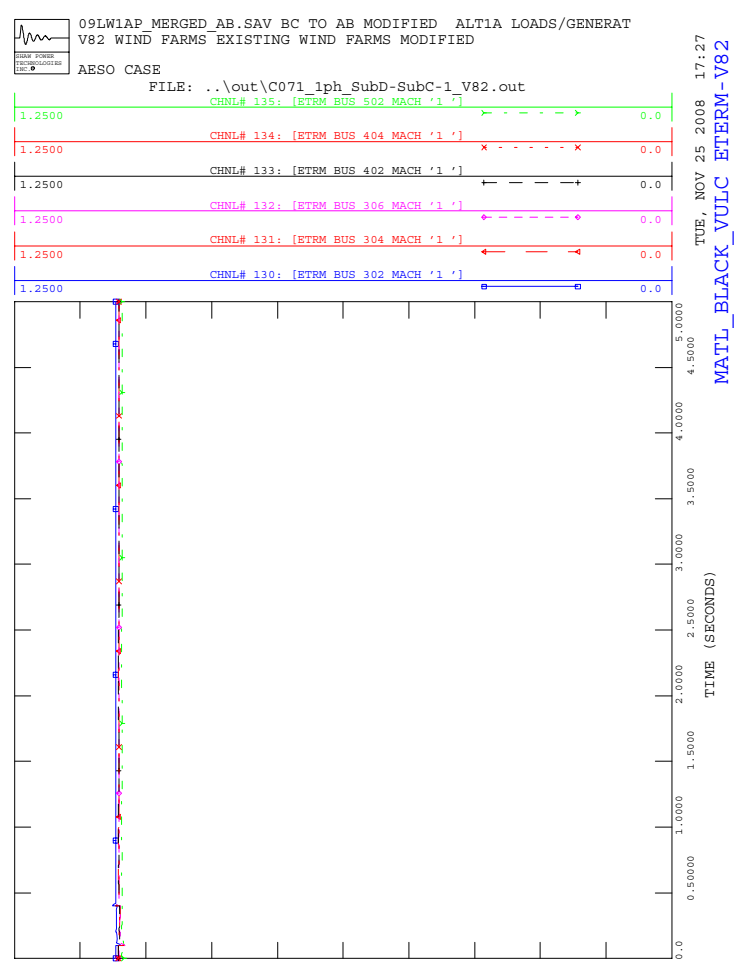
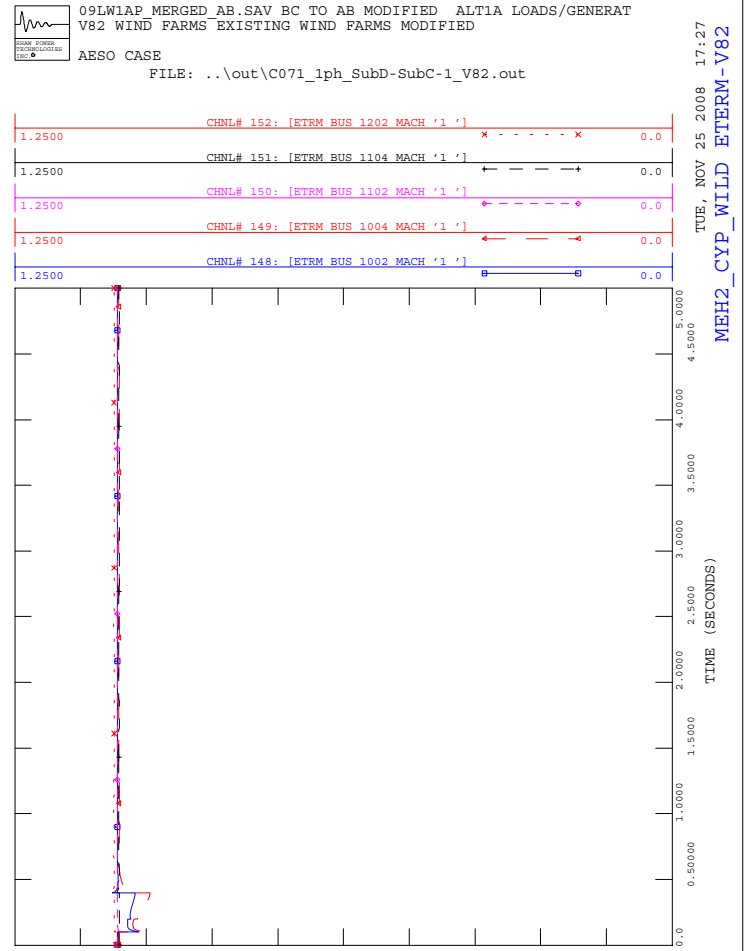
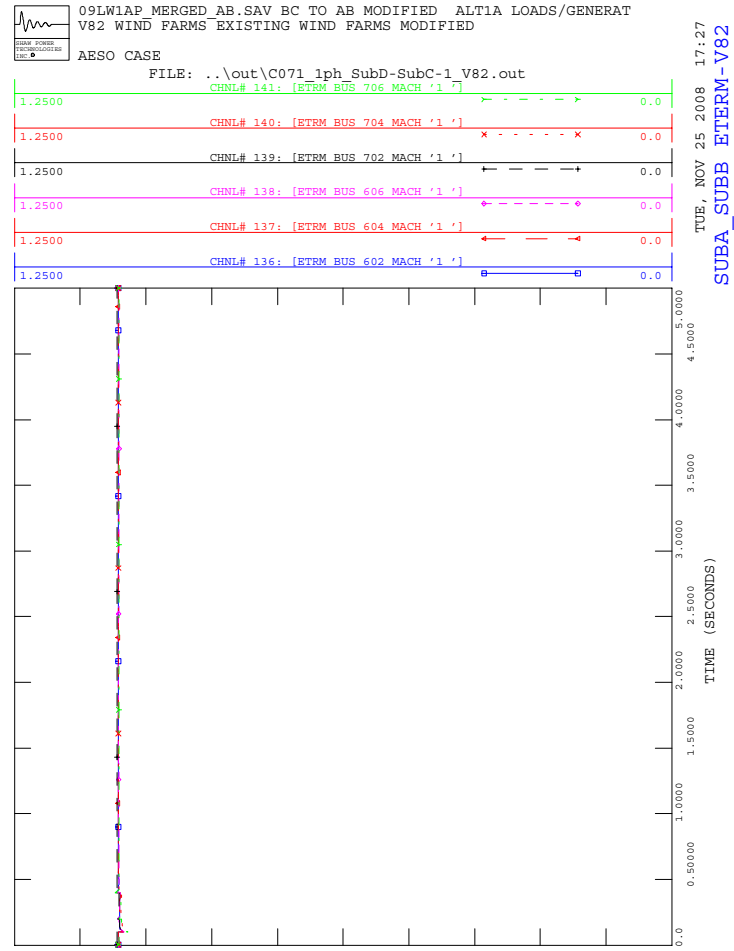
TUE, NOV 25 2008 17:27
 SUBC_SUBD_VARS-V82

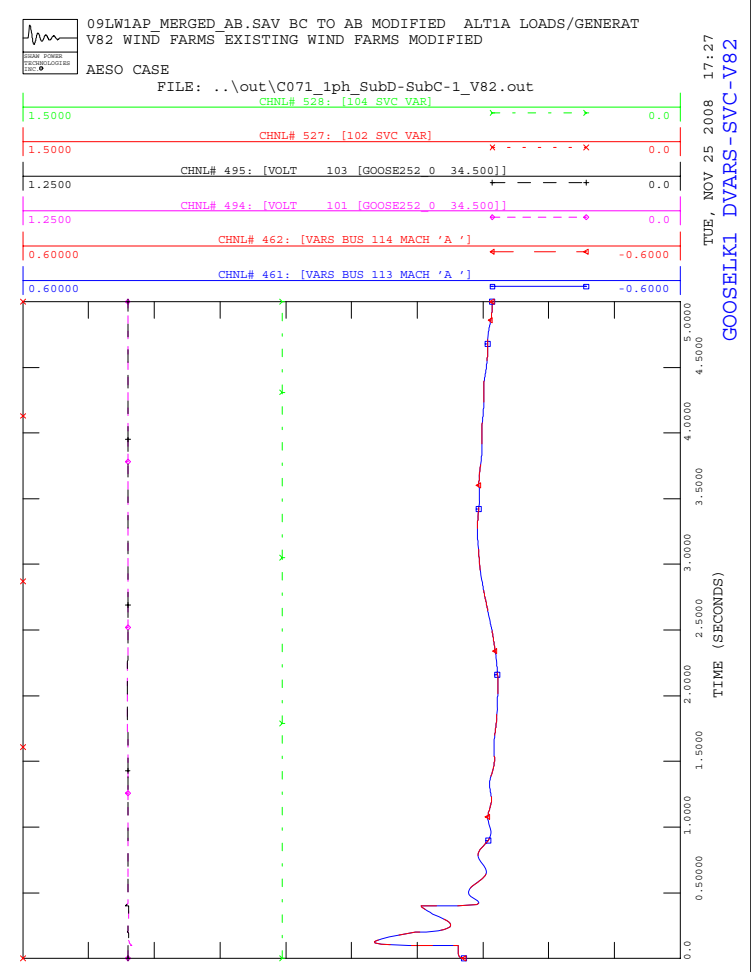
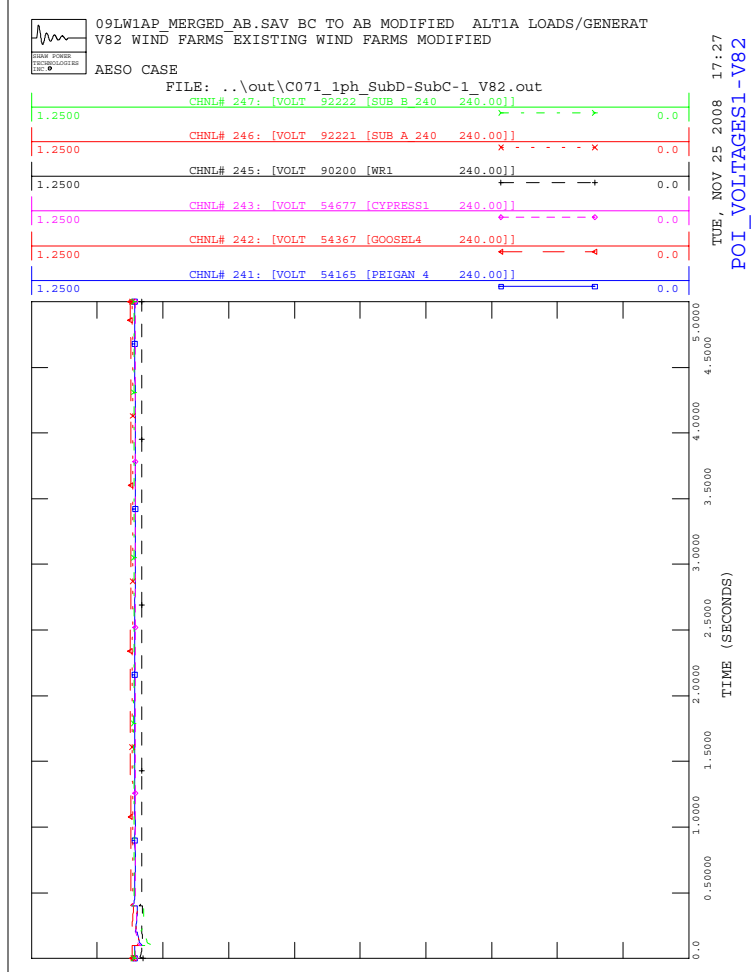
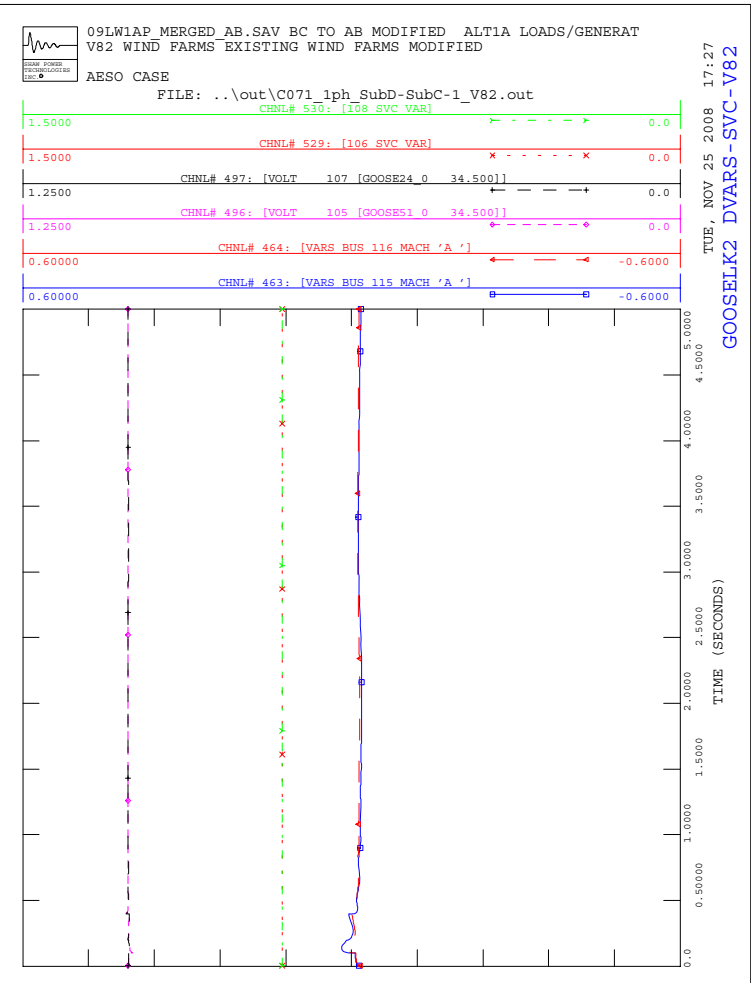
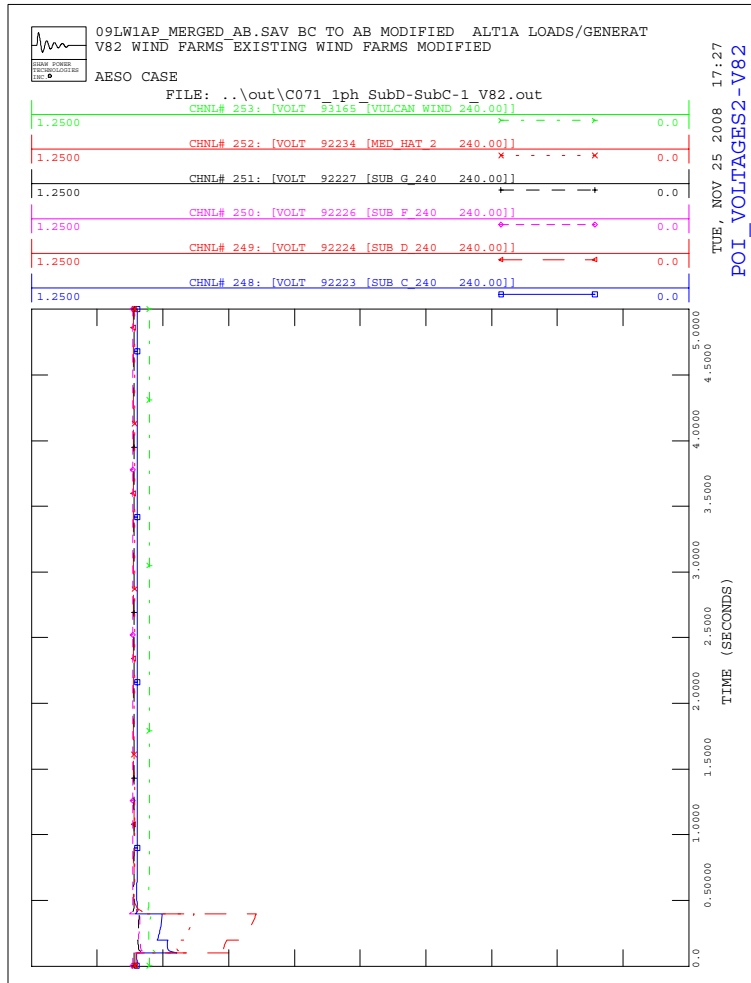
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE
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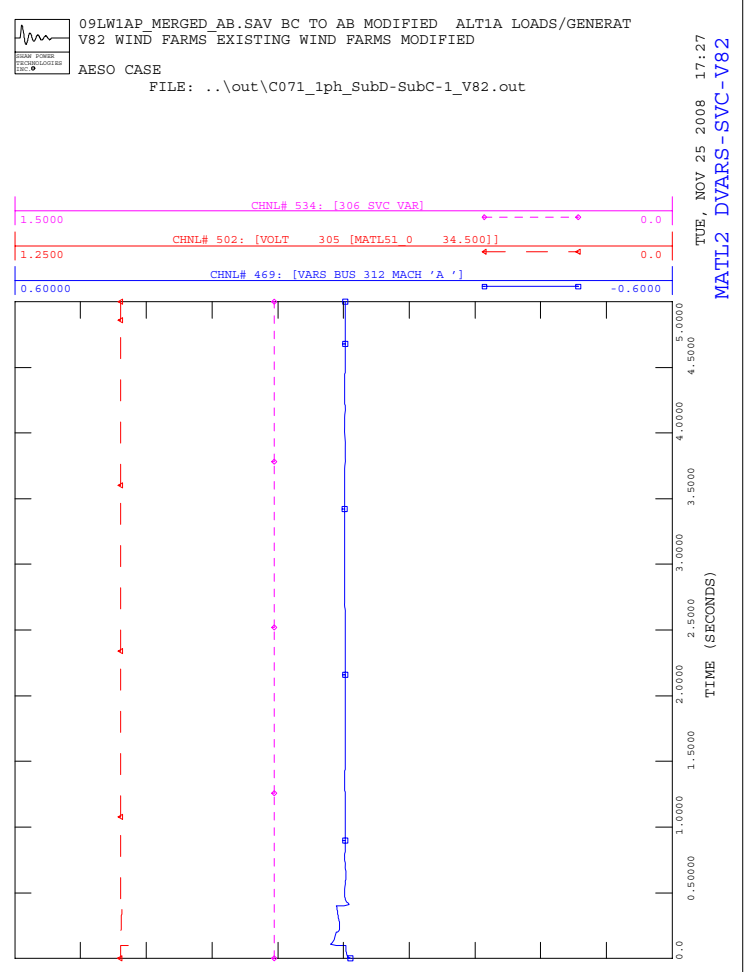
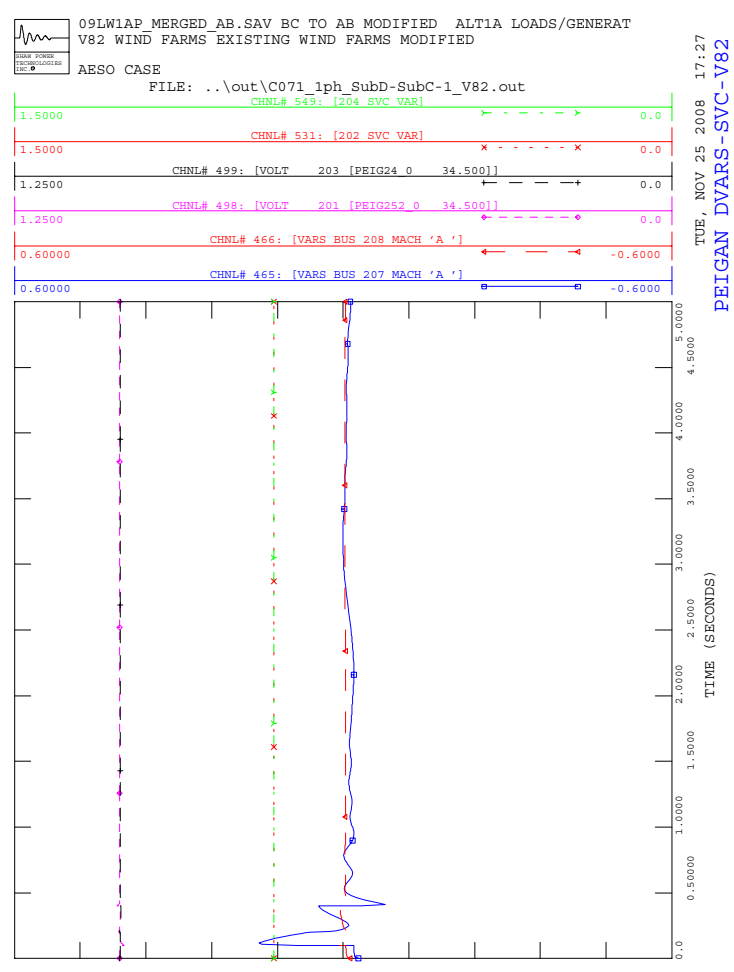
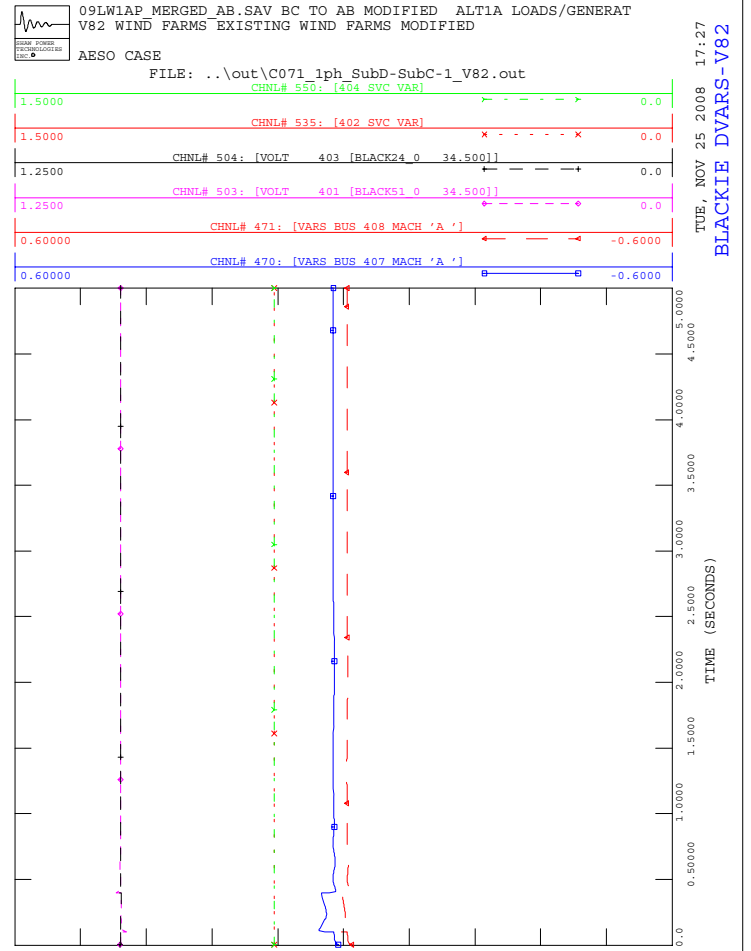
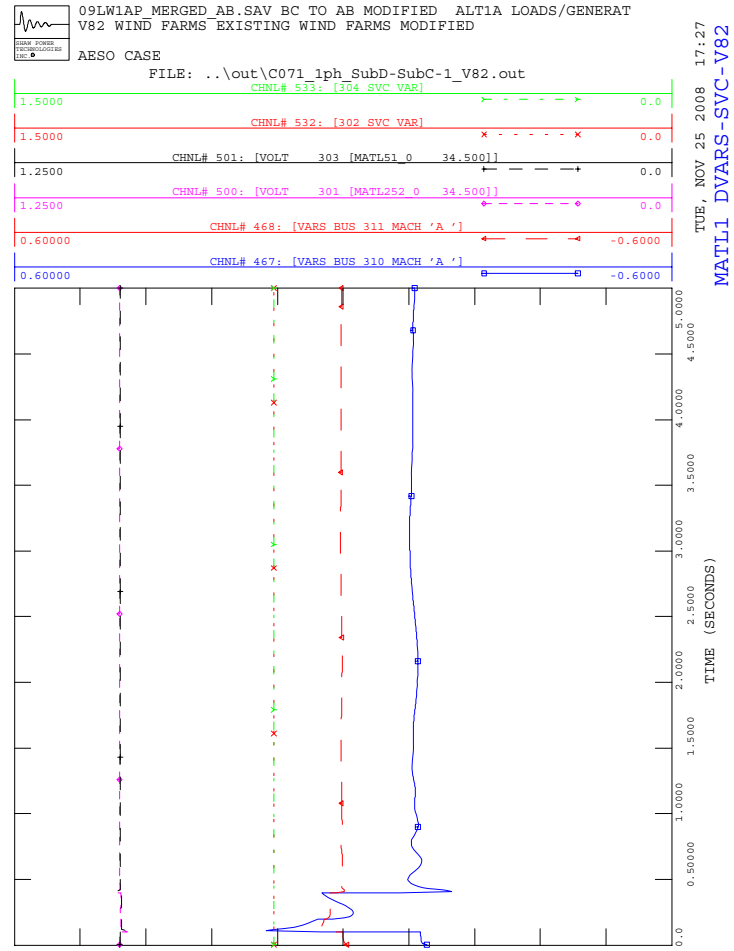


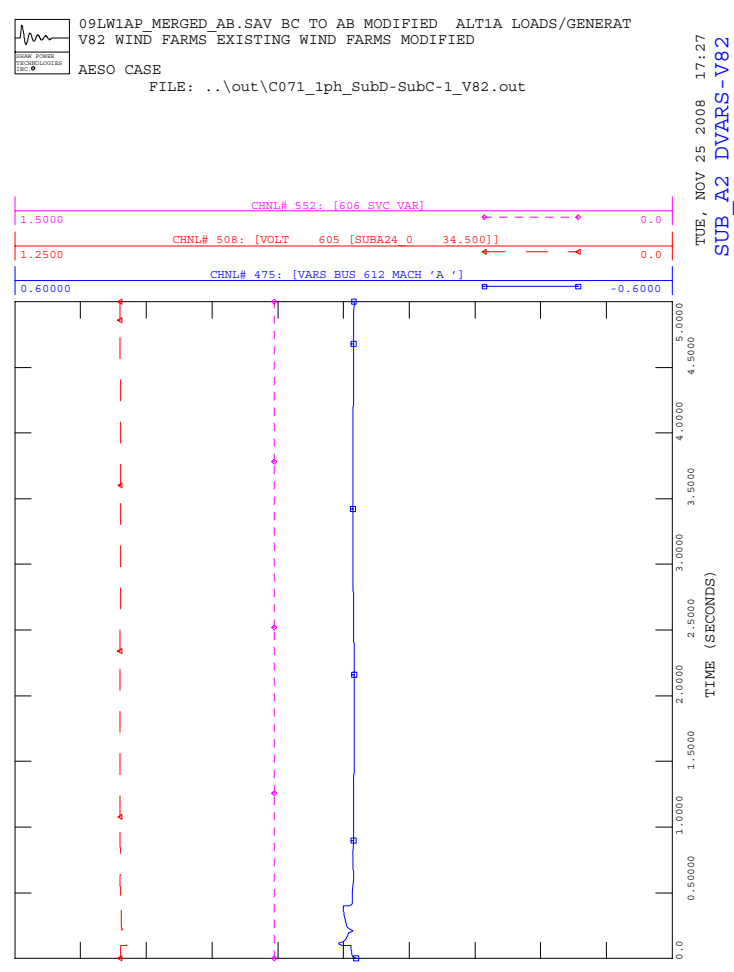
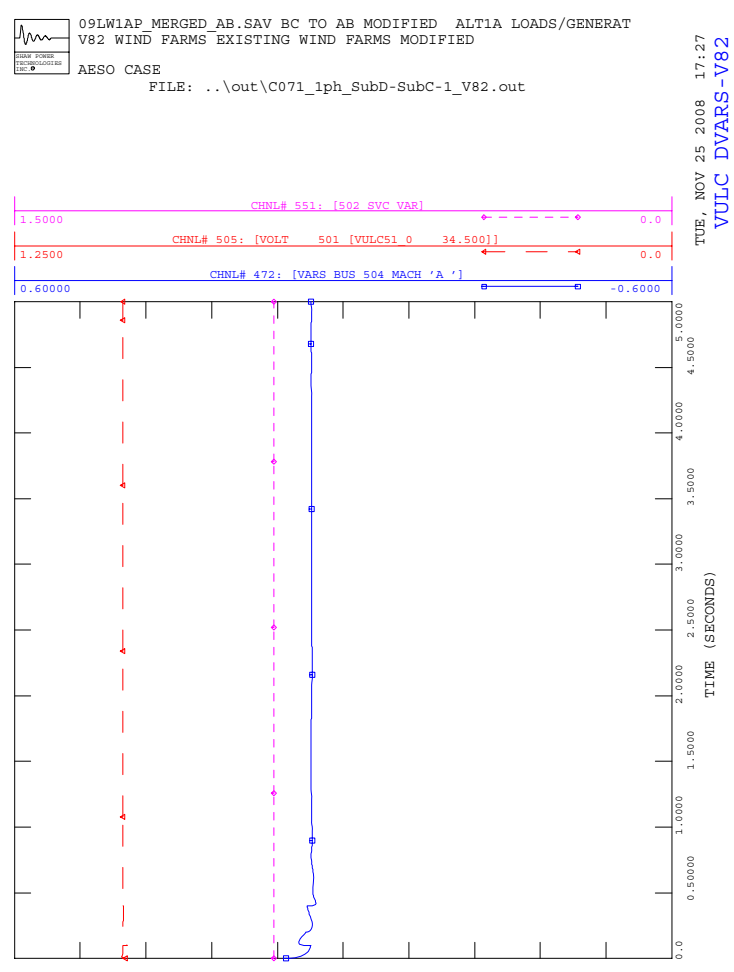
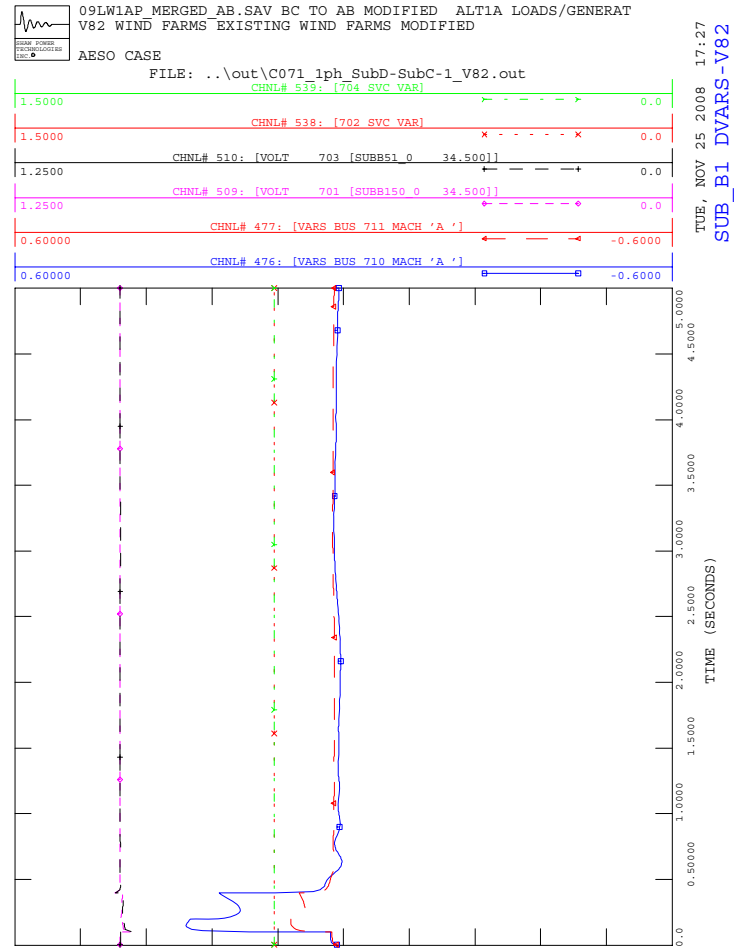
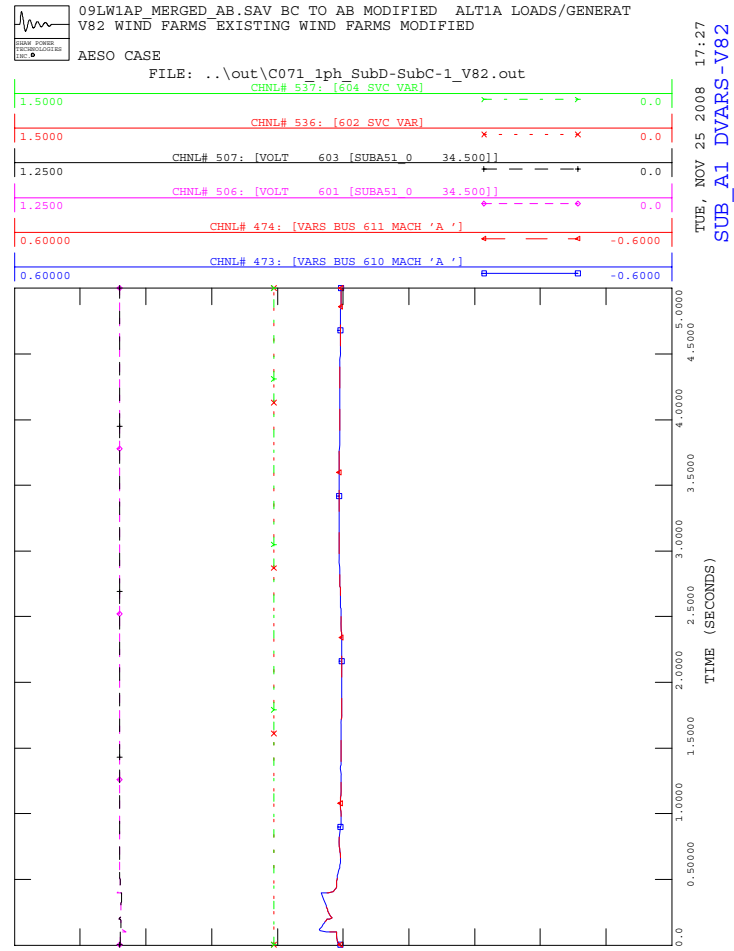
TUE, NOV 25 2008 17:27
 GOOSELK-PEIGAN_SPEED-V82

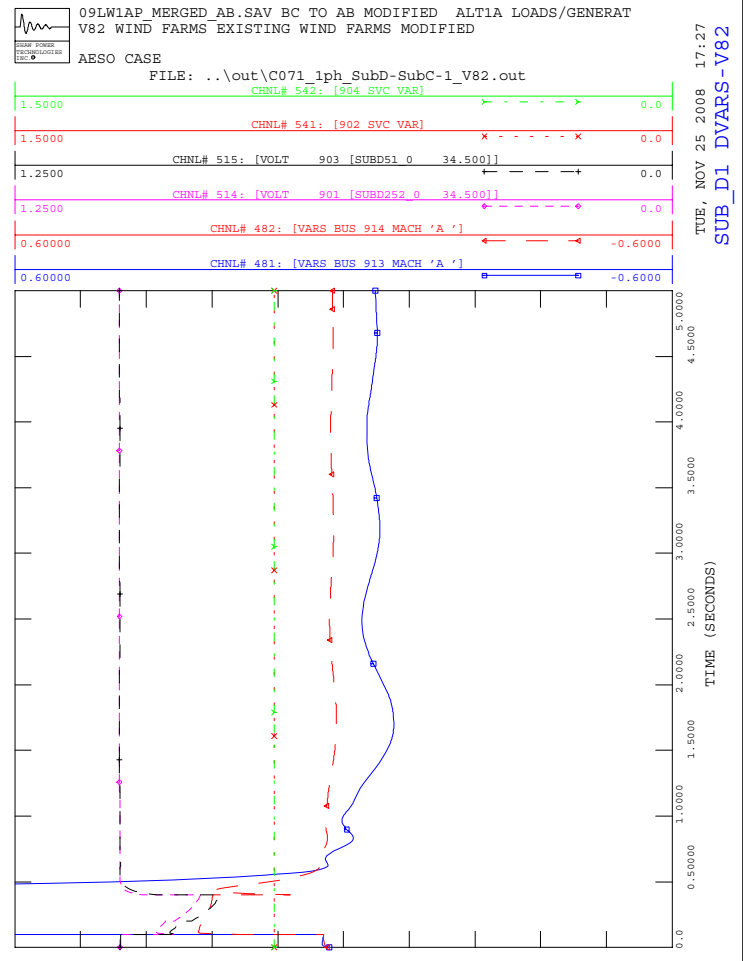
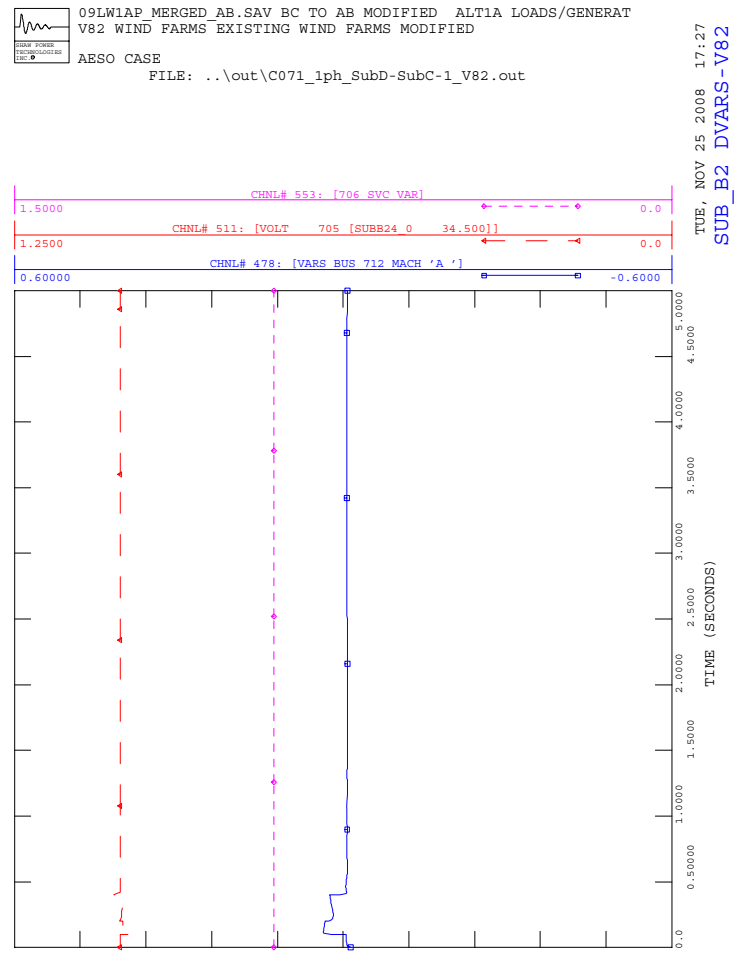
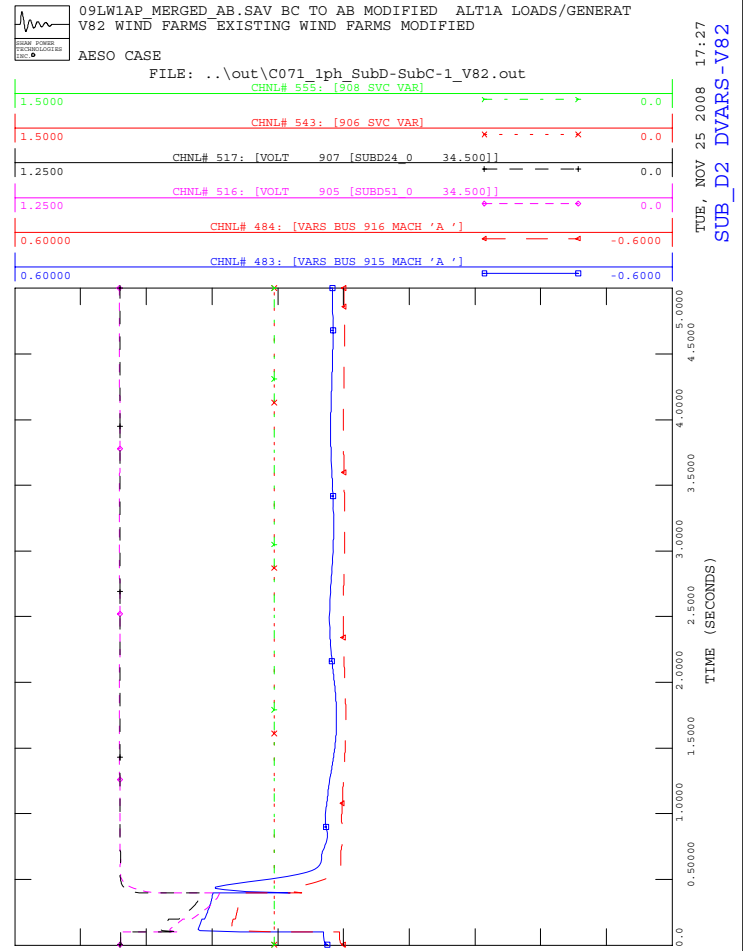
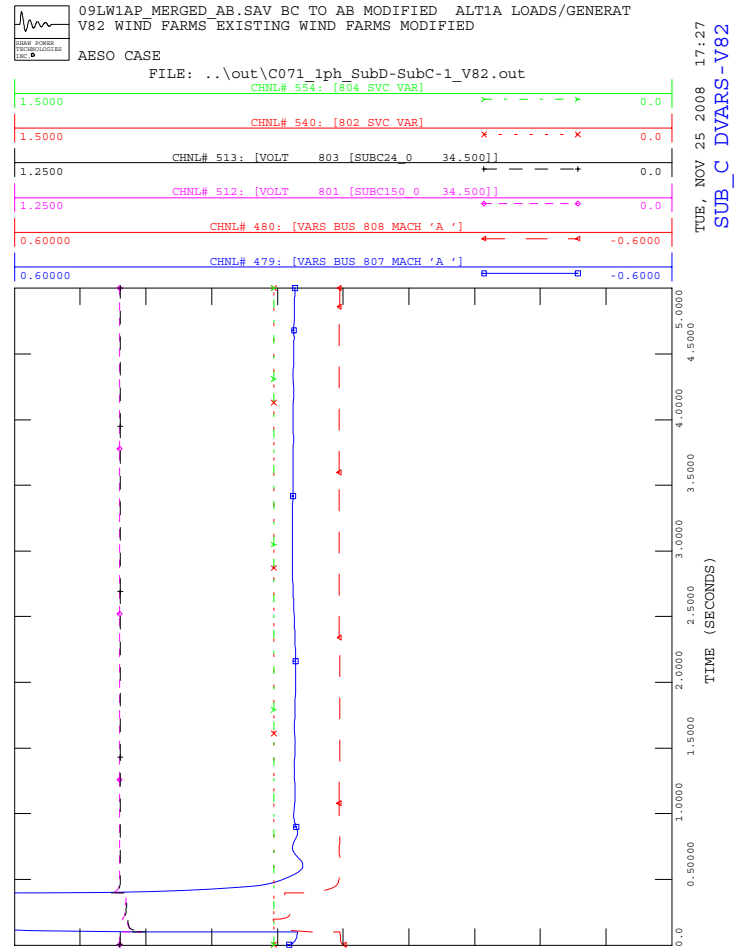


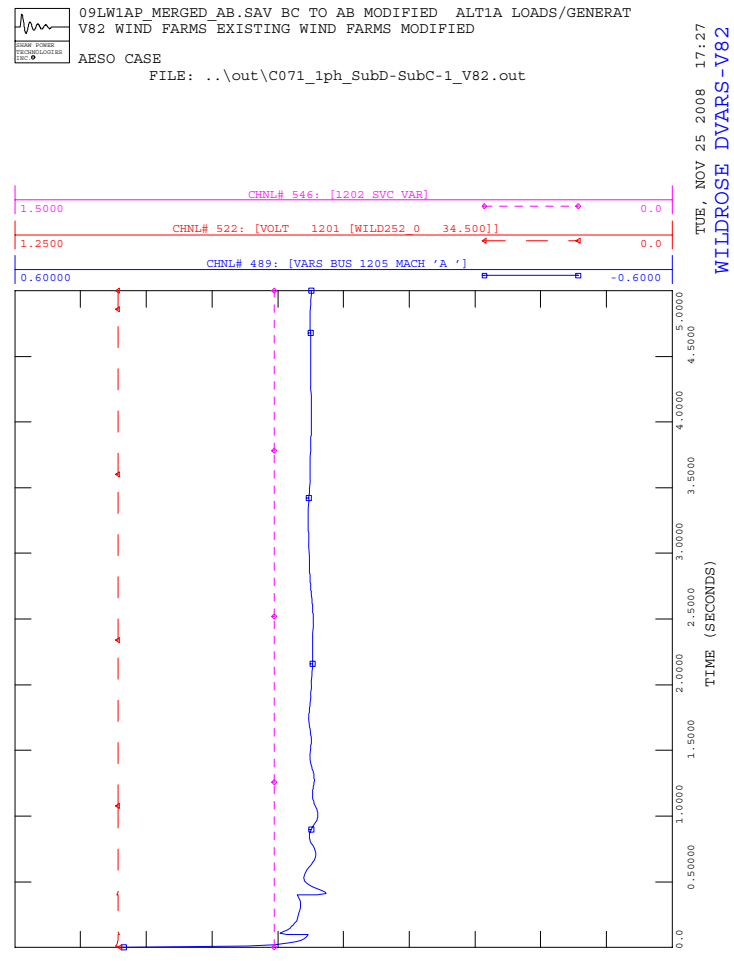
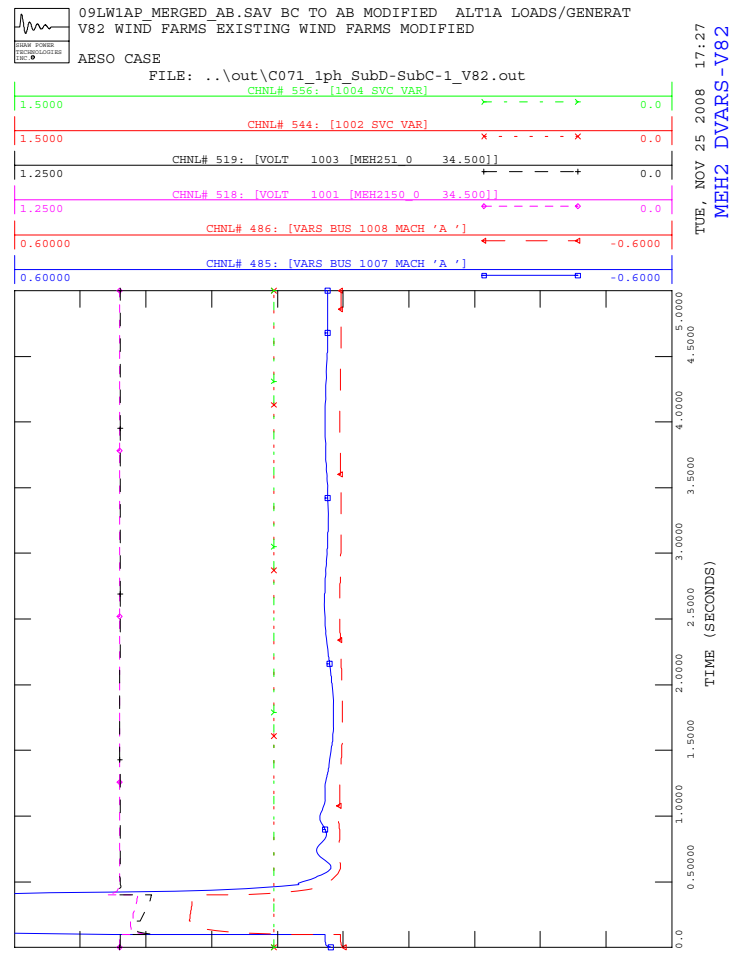
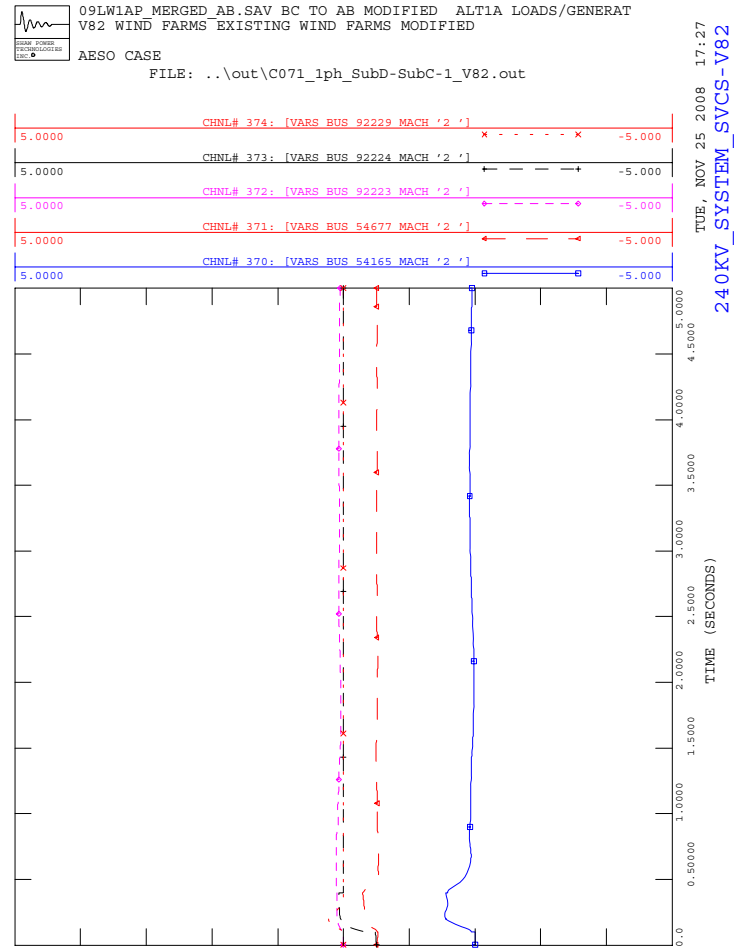
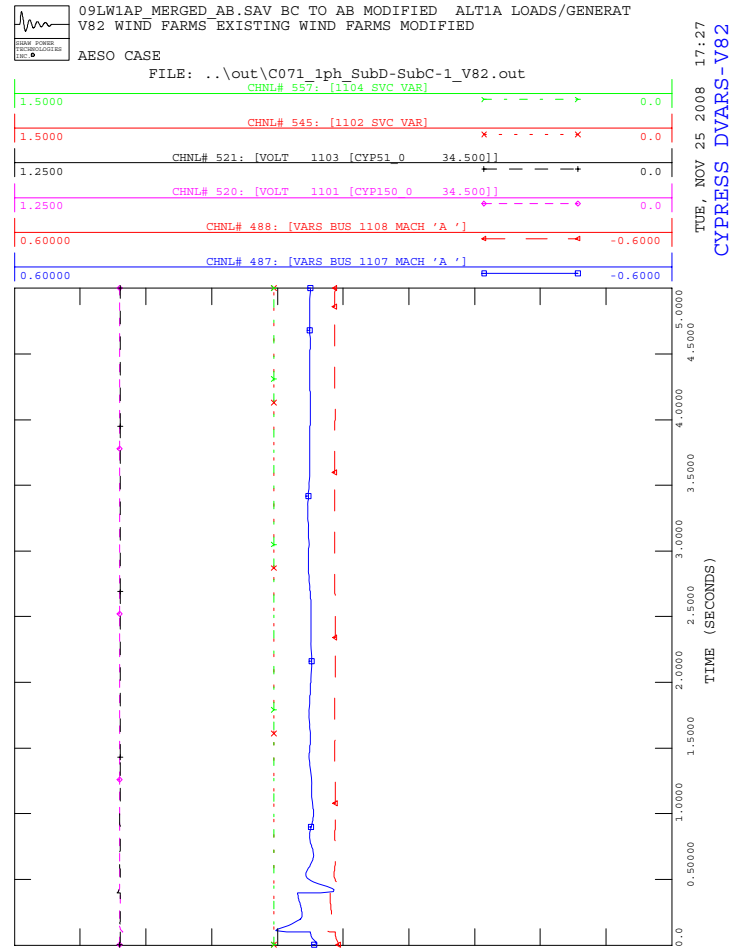








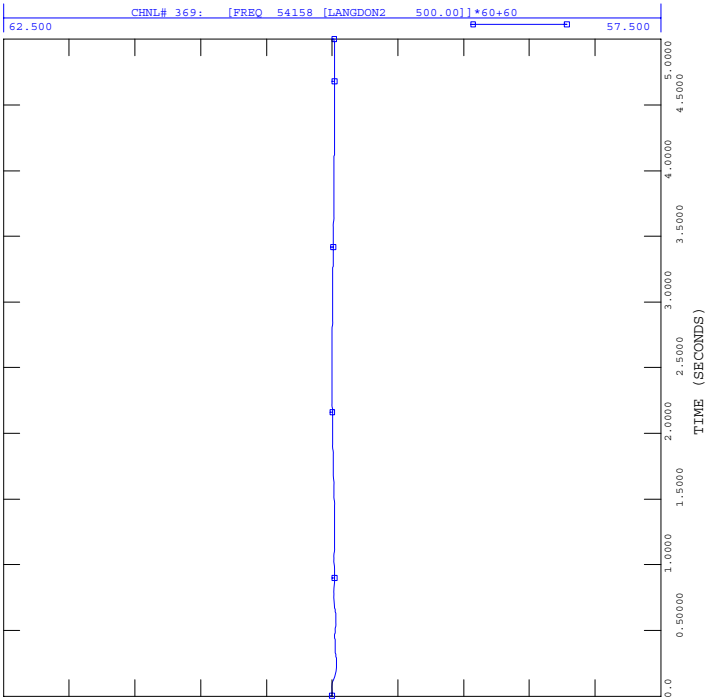






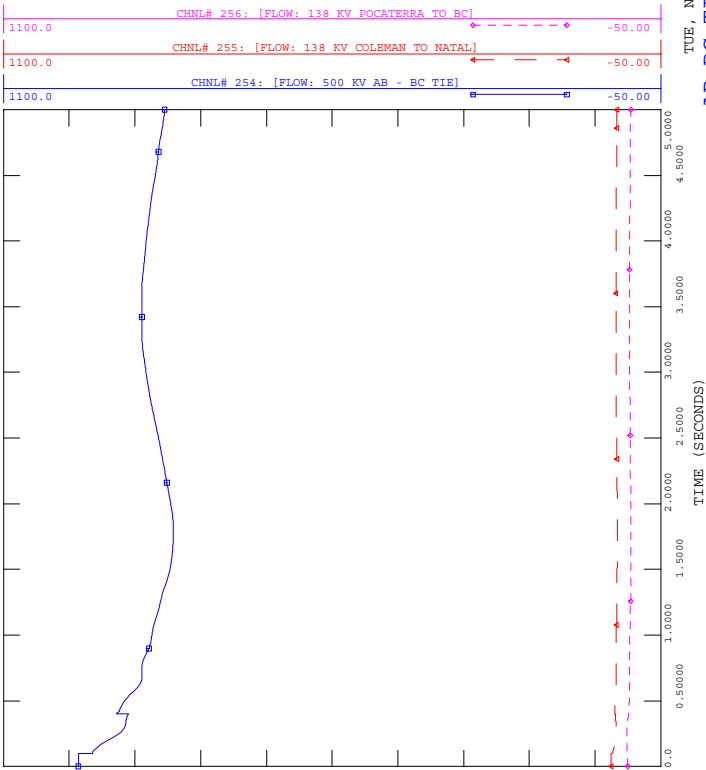
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C071_1ph_SubD-SubC-1_V82.out

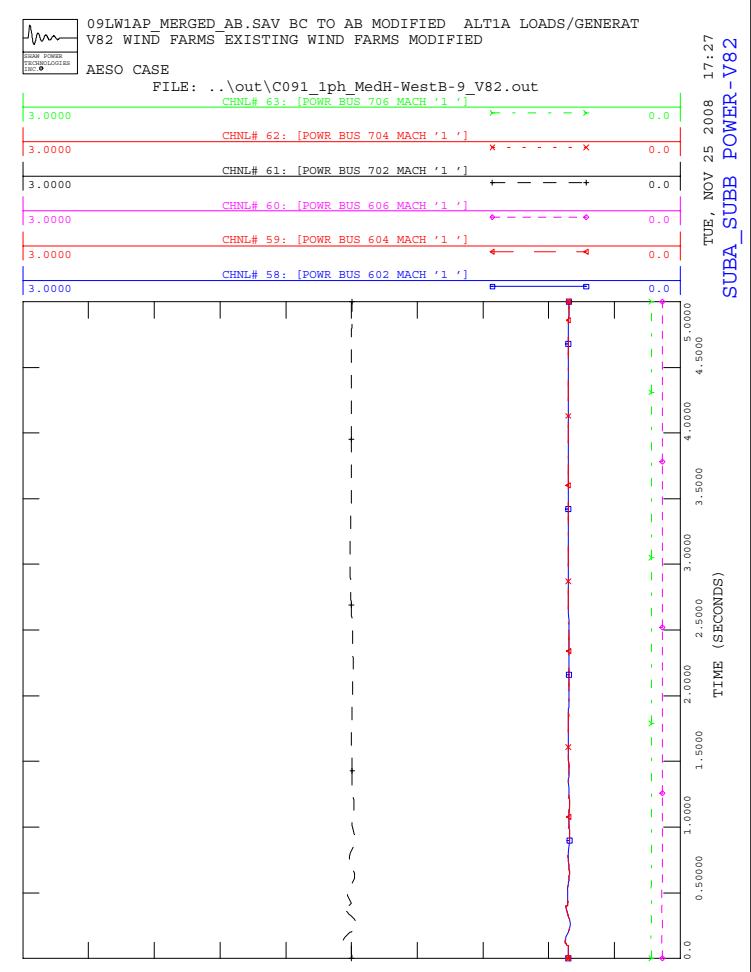
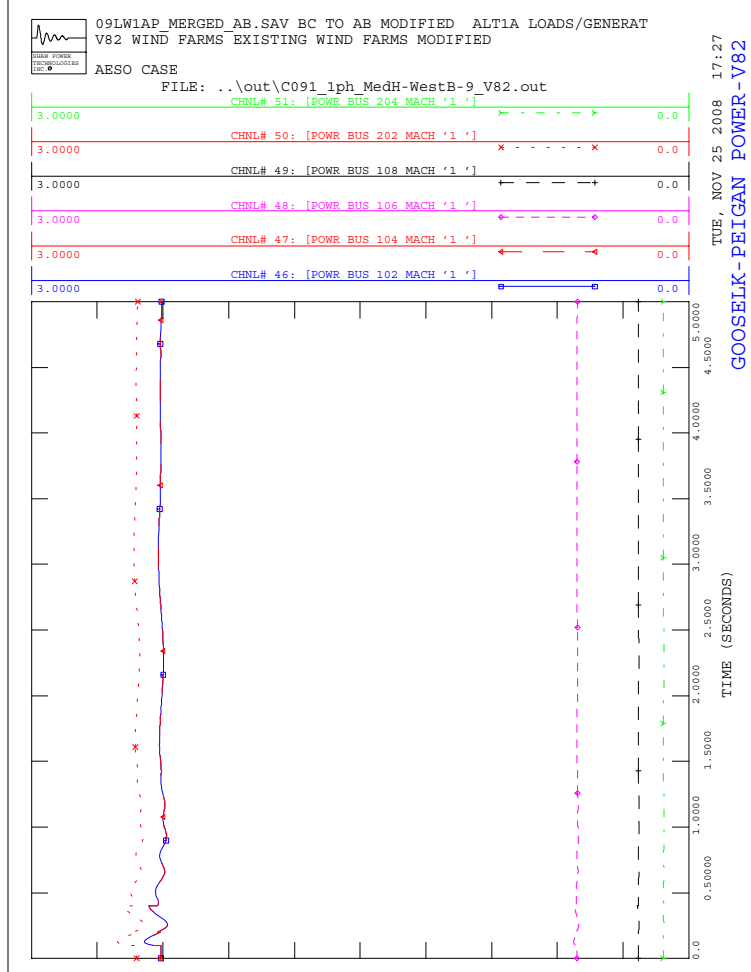
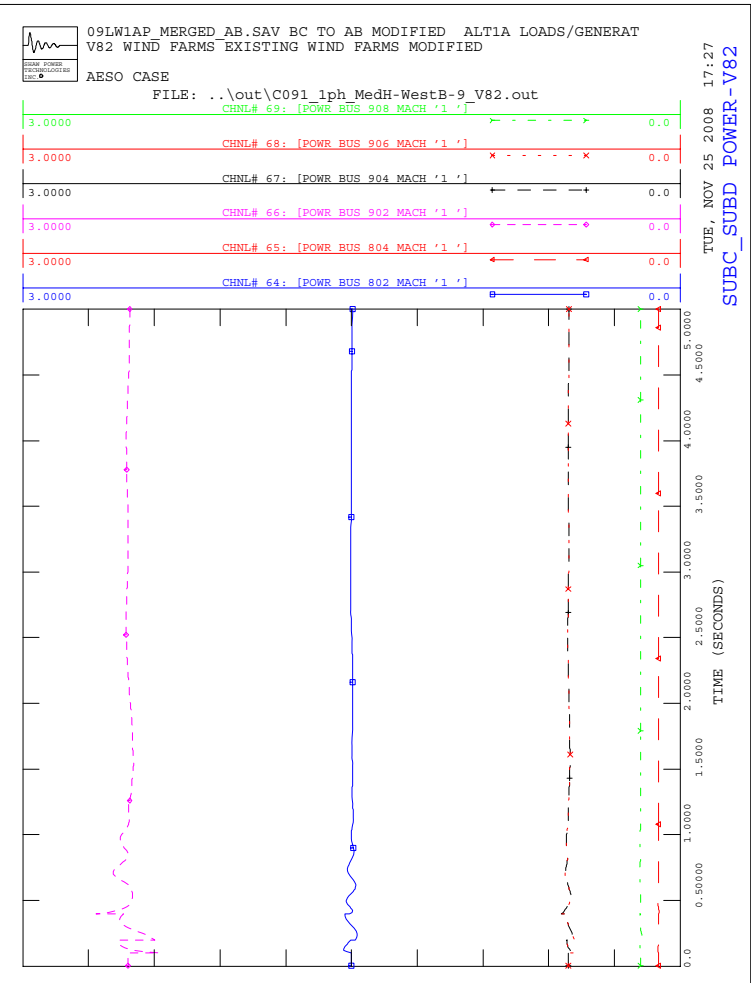
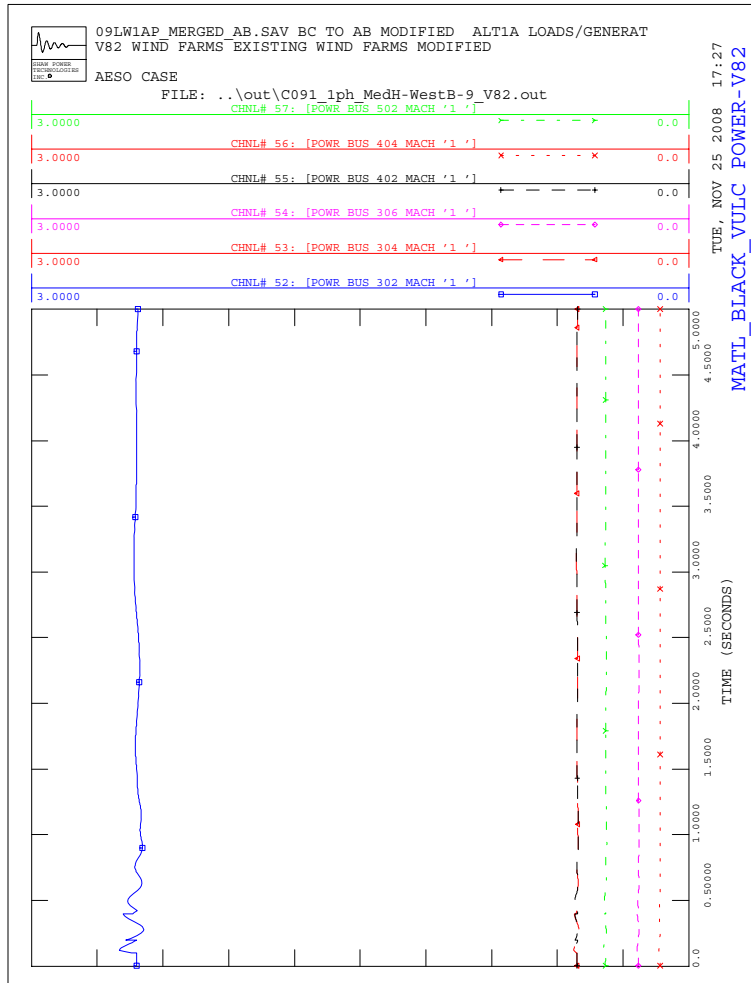
TUE, NOV 25 2008 17:27
LANGDON_FRQ-V82



09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
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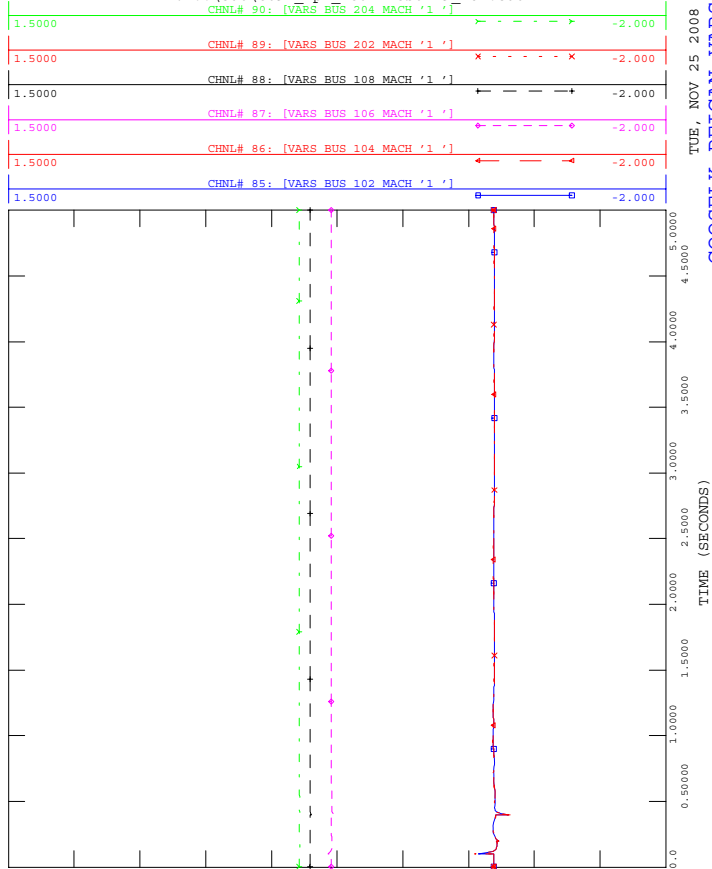
TUE, NOV 25 2008 17:27
AB_BC_TIE_FLOWS-V82





09LWIAP MERGED AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

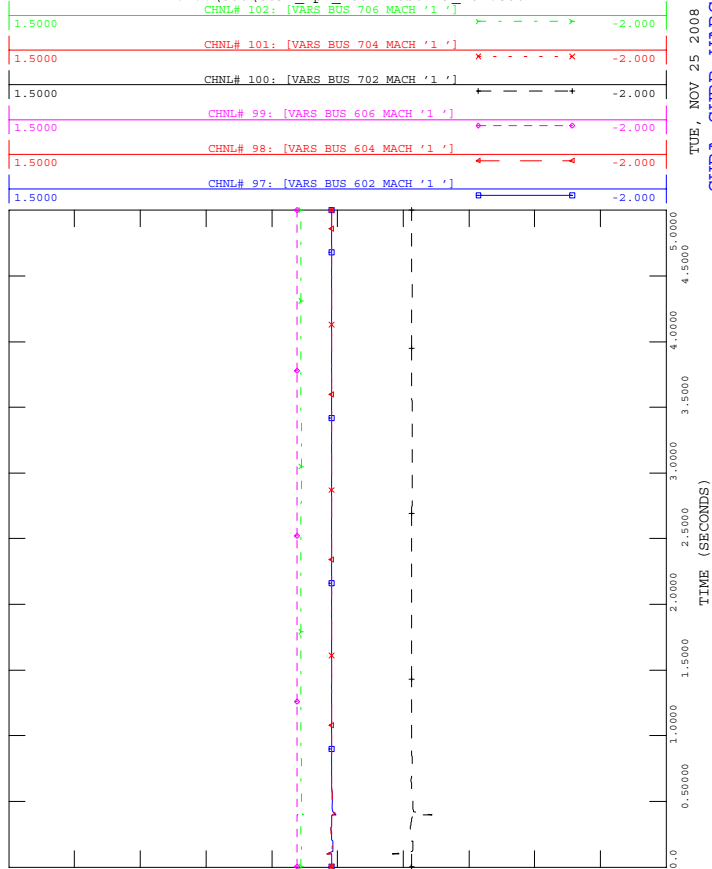
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TUE, NOV 25 2008 17:27
GOOSELK-PEIGAN VARS-V82

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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

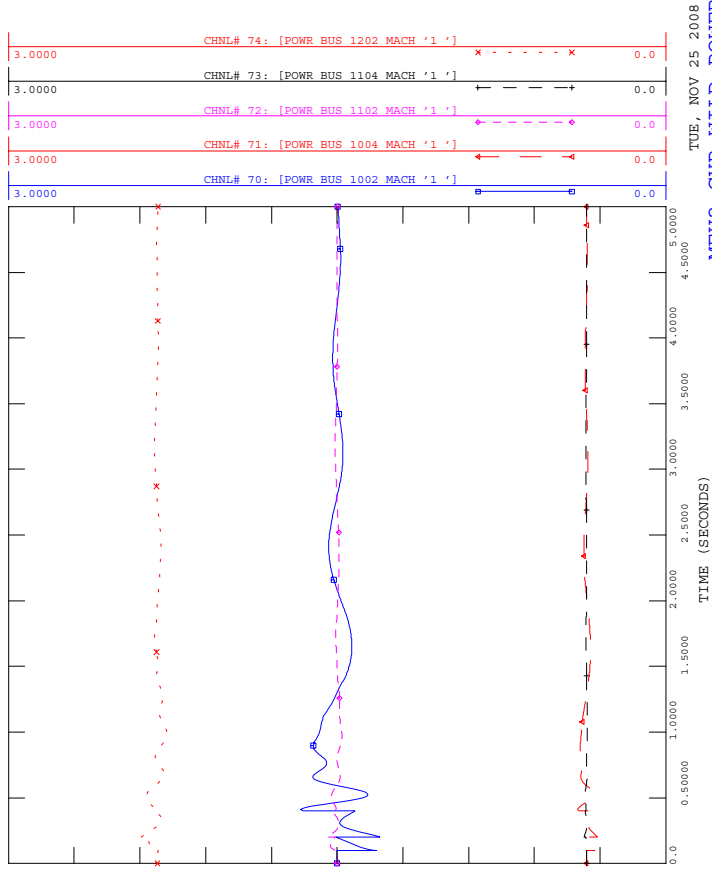
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TUE, NOV 25 2008 17:27
SUBA_SUBB VARS-V82

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AESO CASE

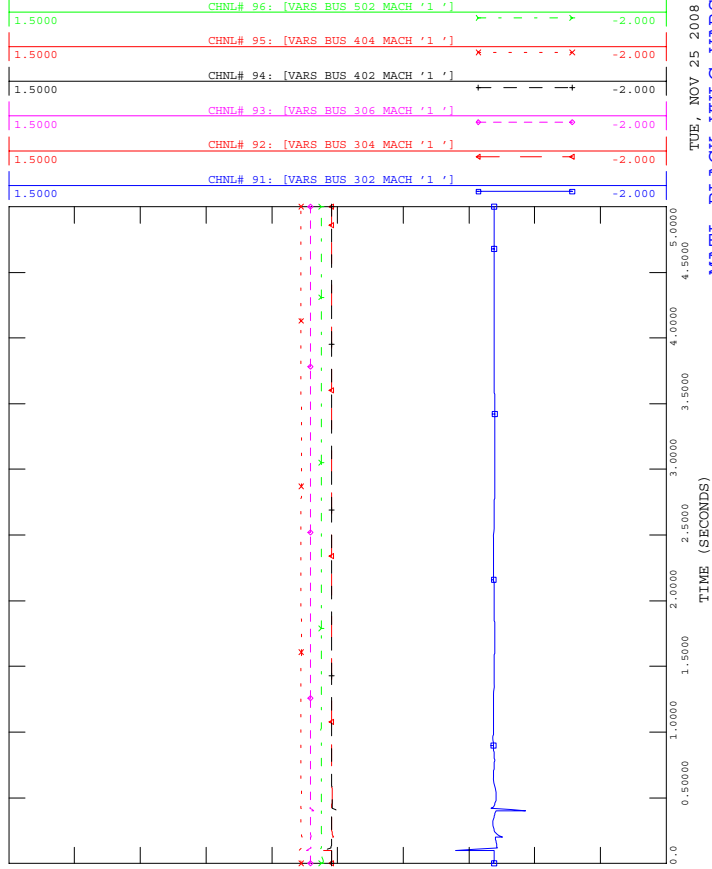
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TUE, NOV 25 2008 17:27
MEH2_CYP_WILD_POWER-V82

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AESO CASE

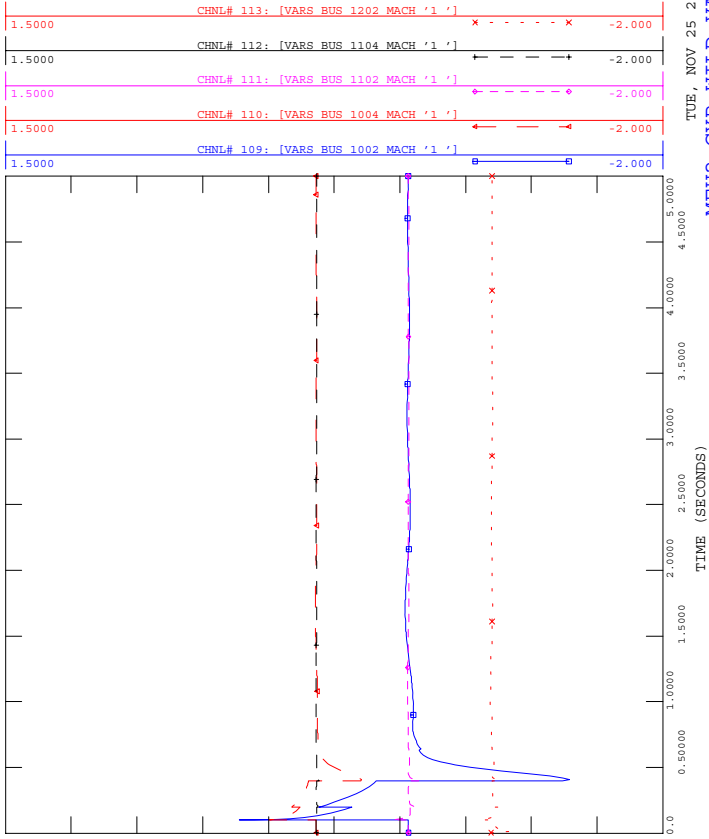
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TUE, NOV 25 2008 17:27
MATL_BLACK_VULC VARS-V82

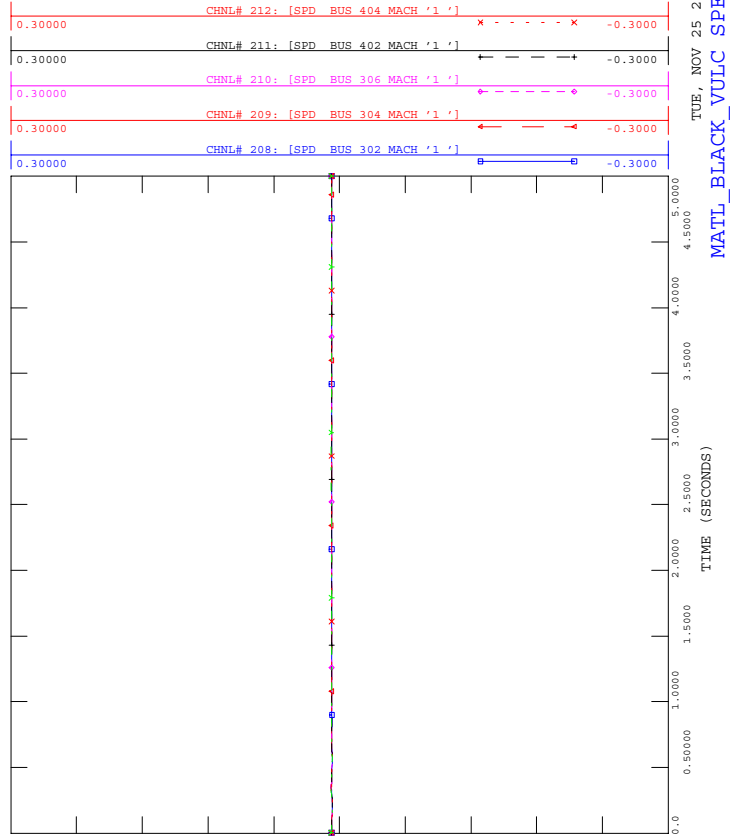
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

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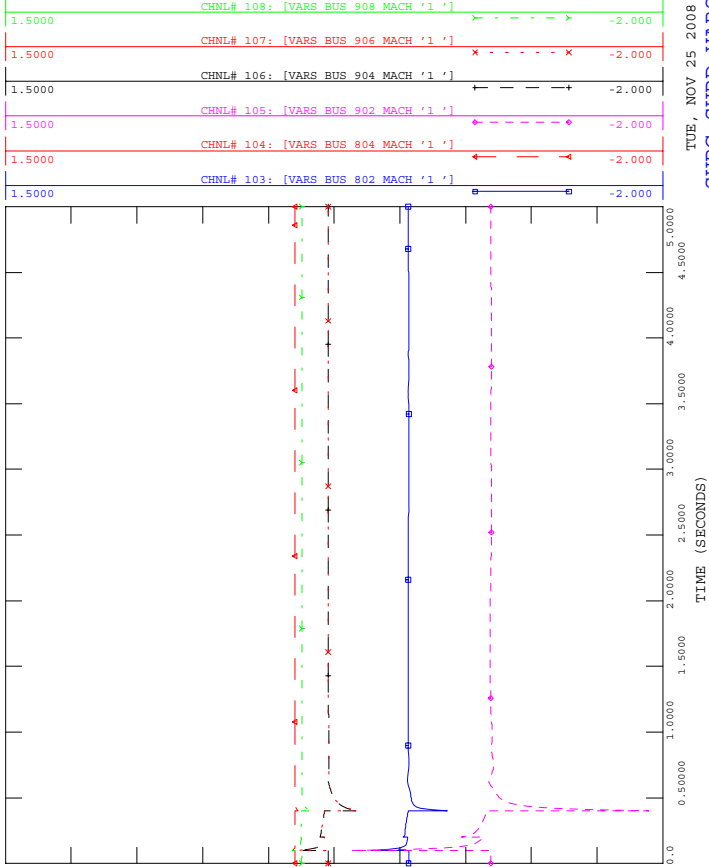
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AESO CASE

FILE: ..\out\C091_1ph_MedH-WestB-9_V82.out



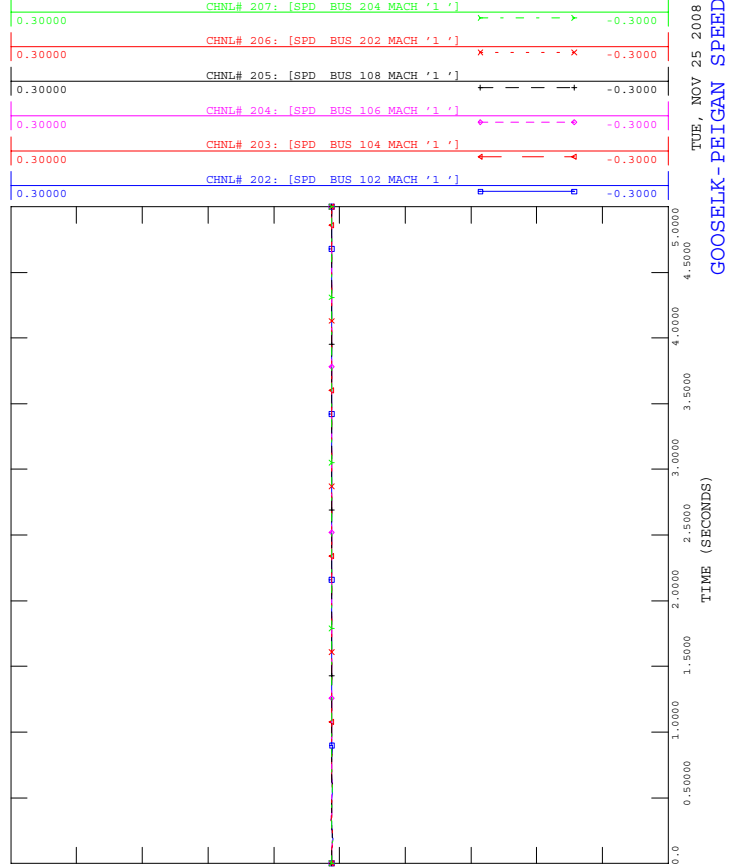
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

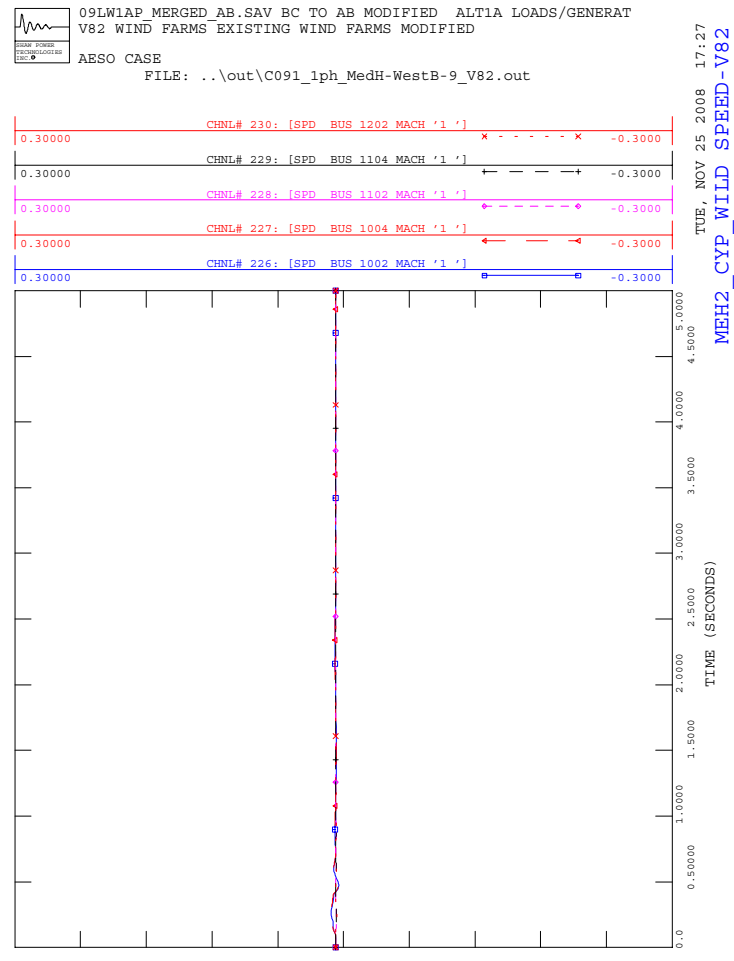
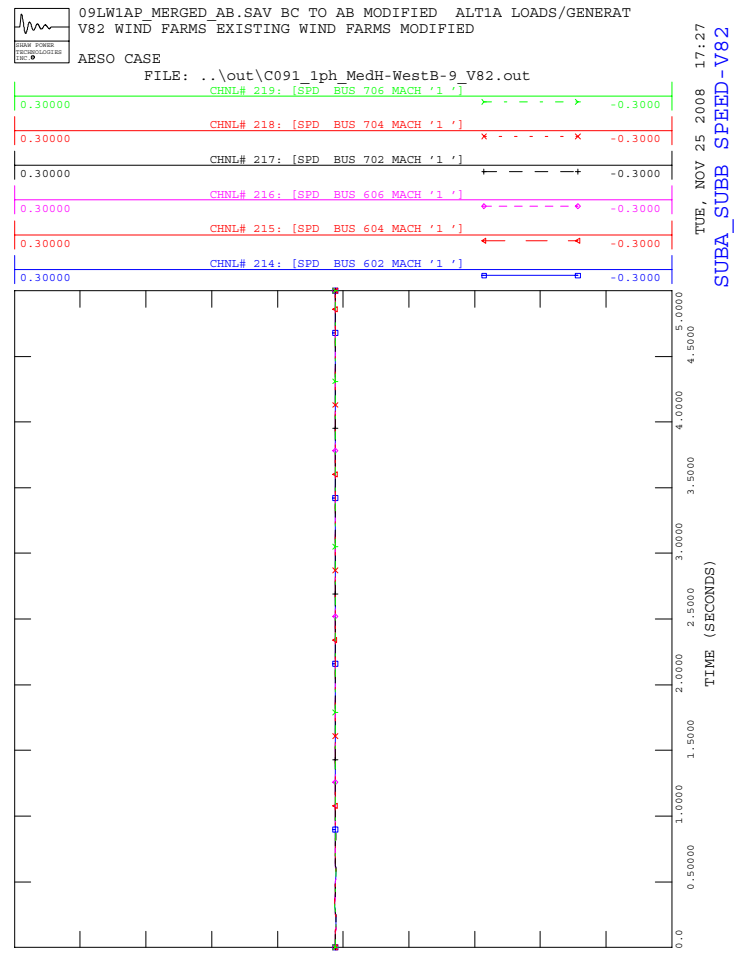
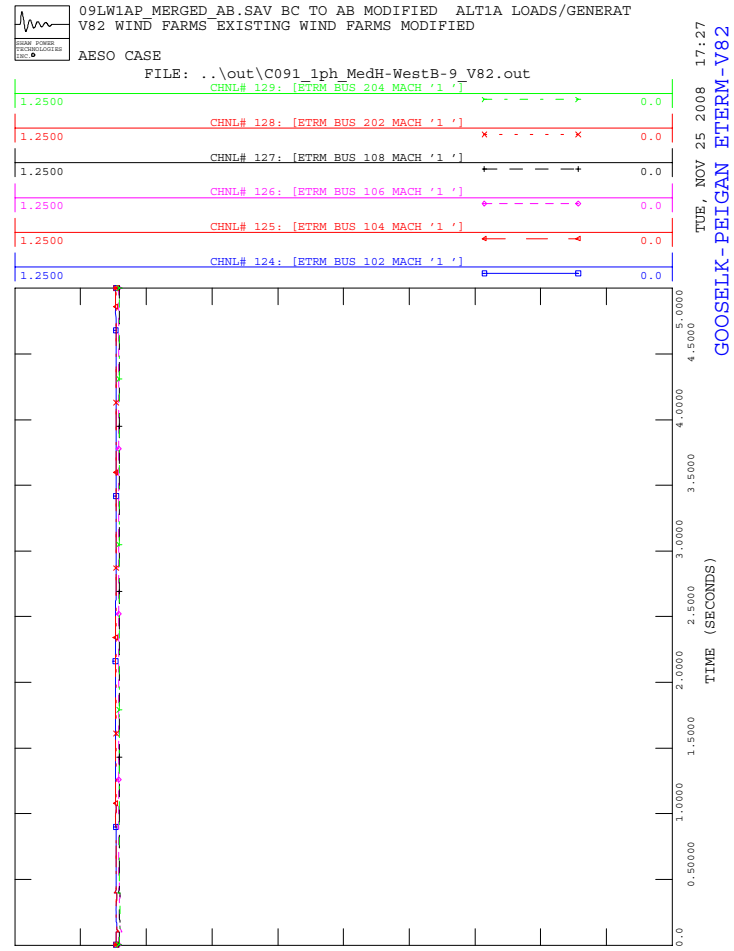
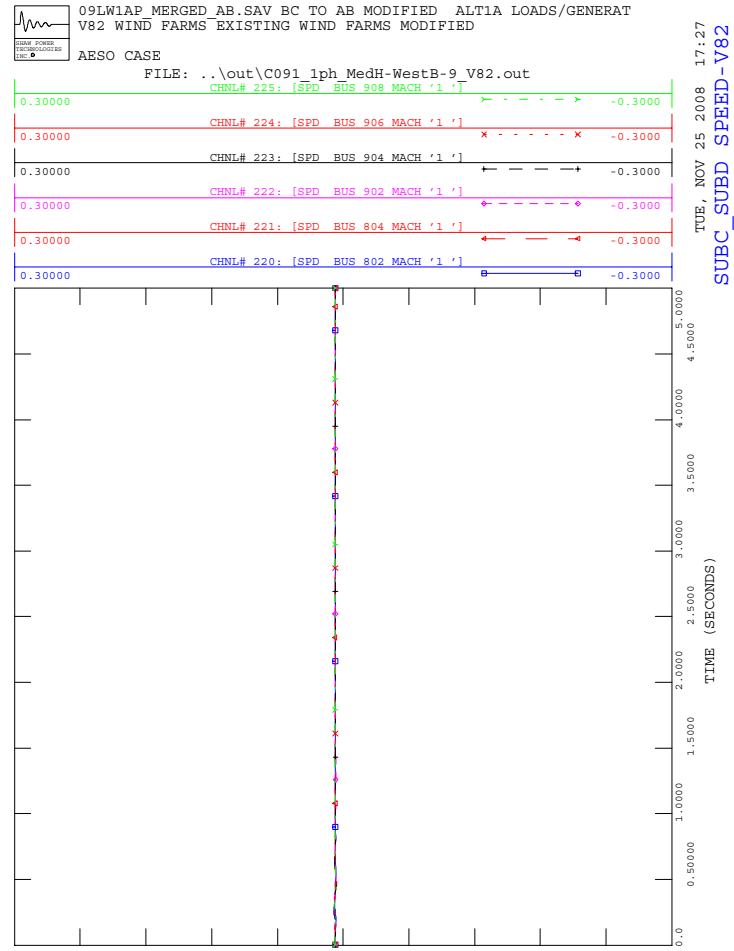
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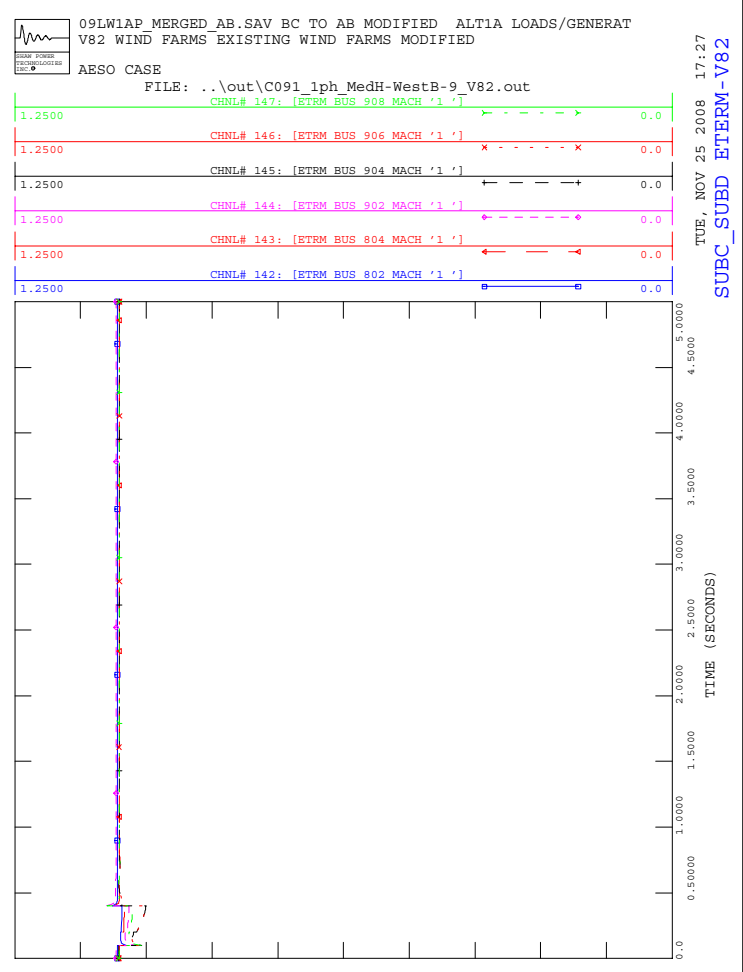
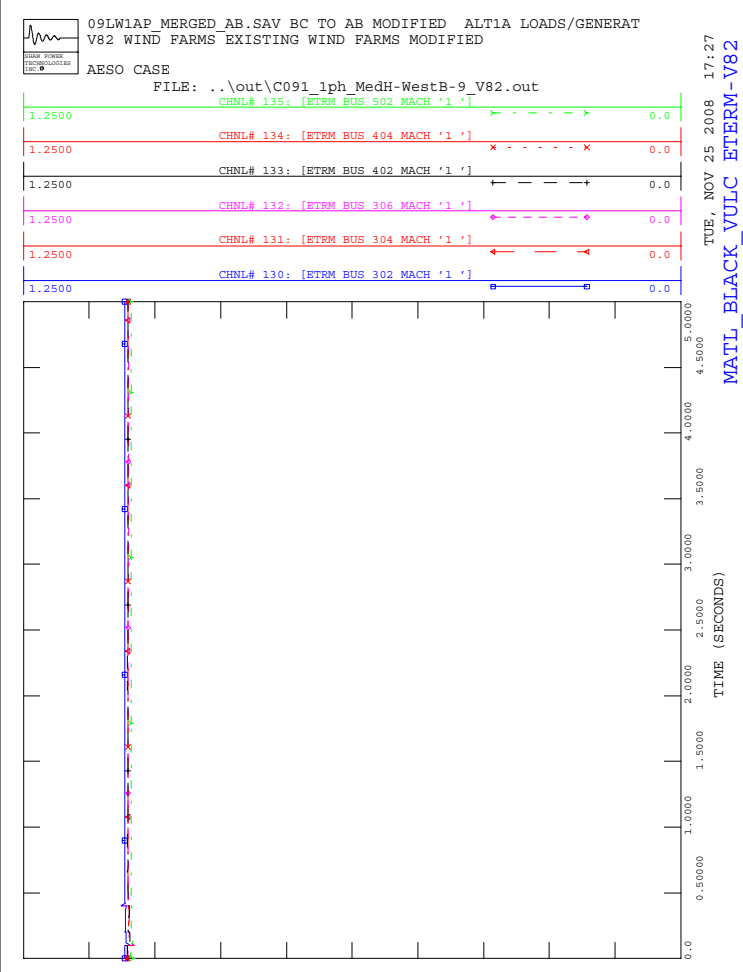
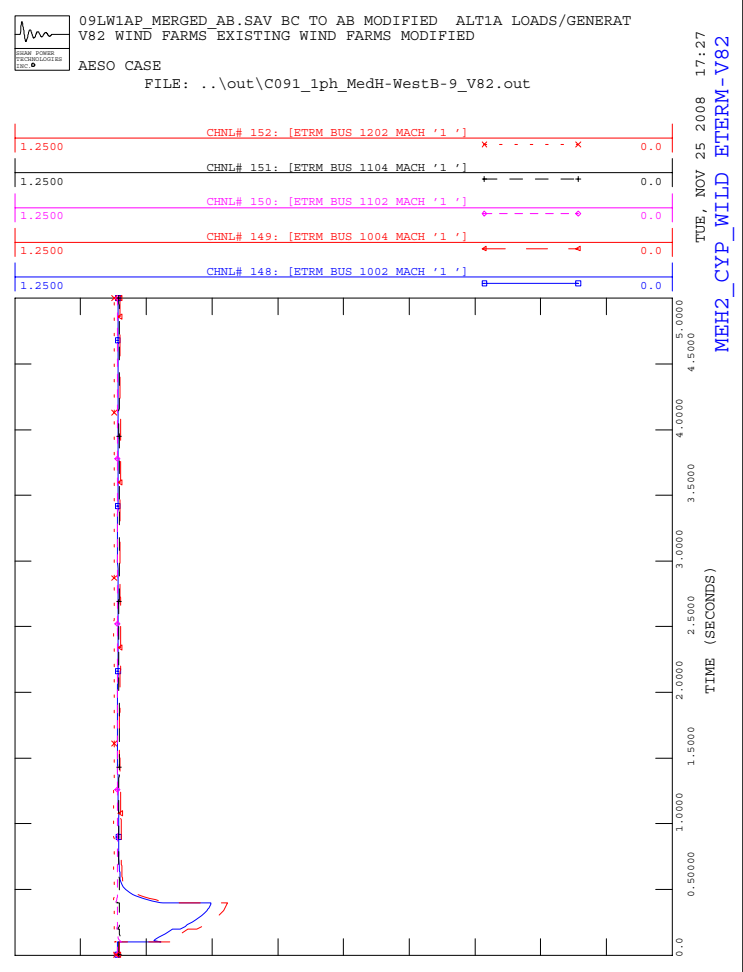
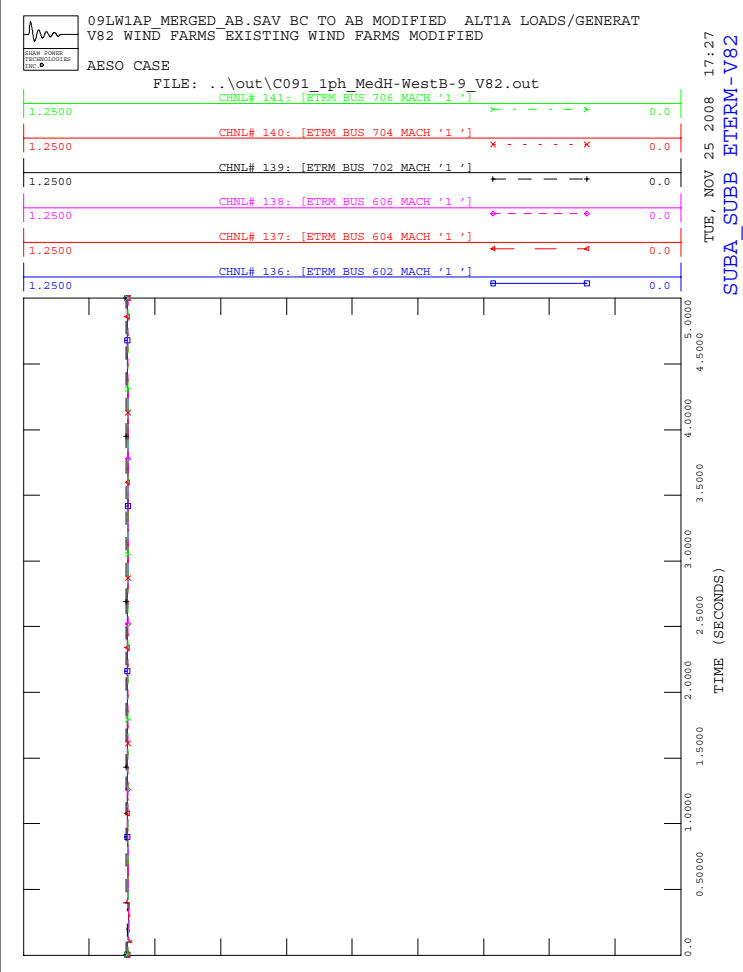


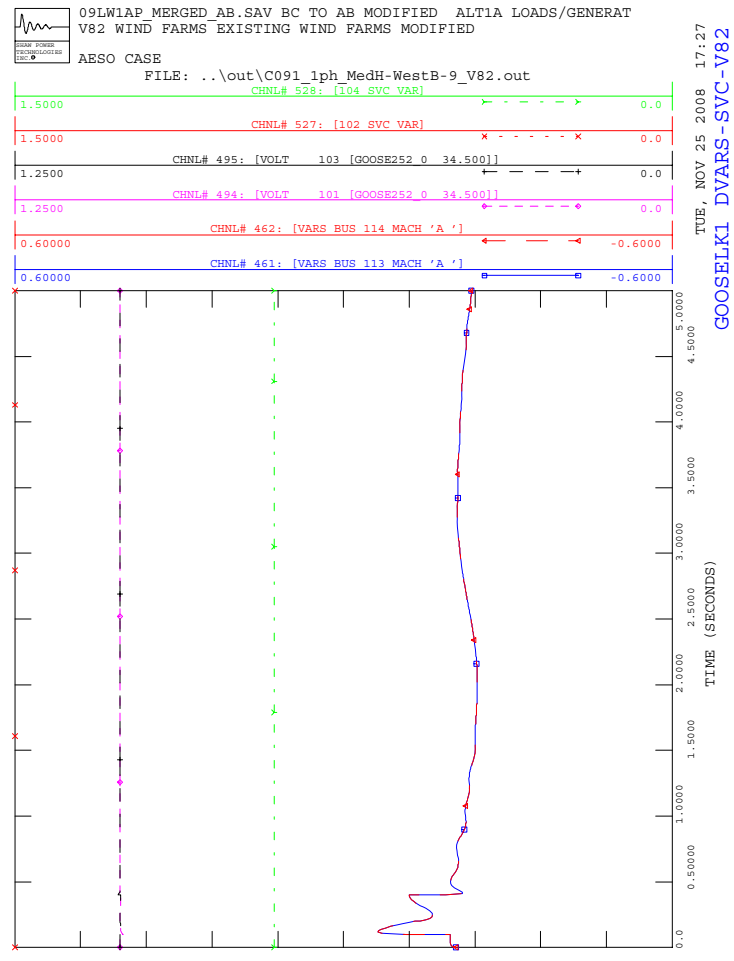
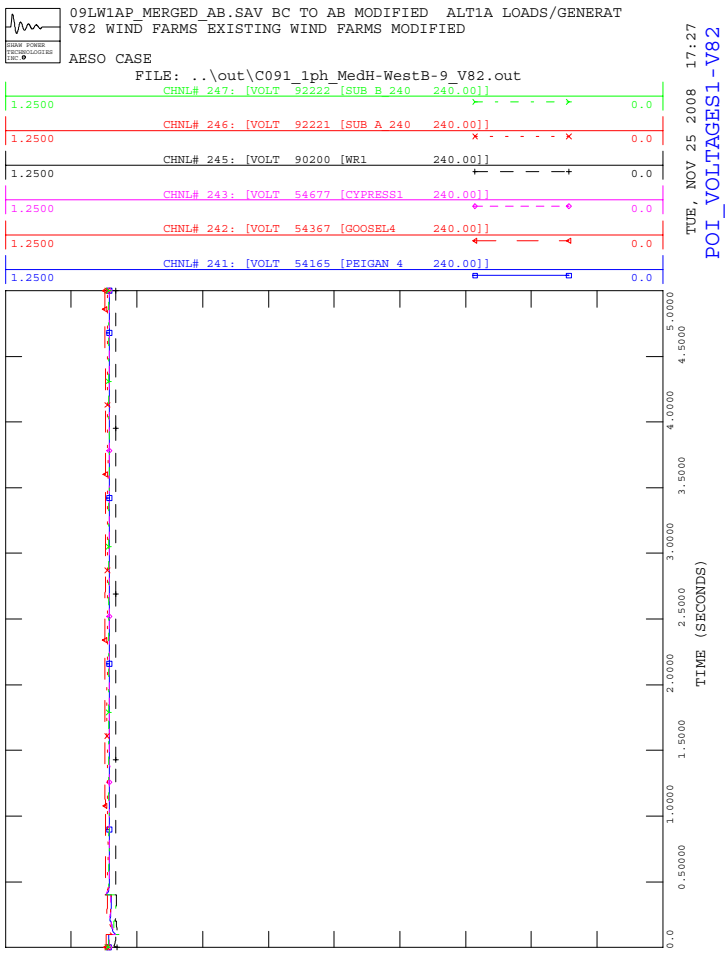
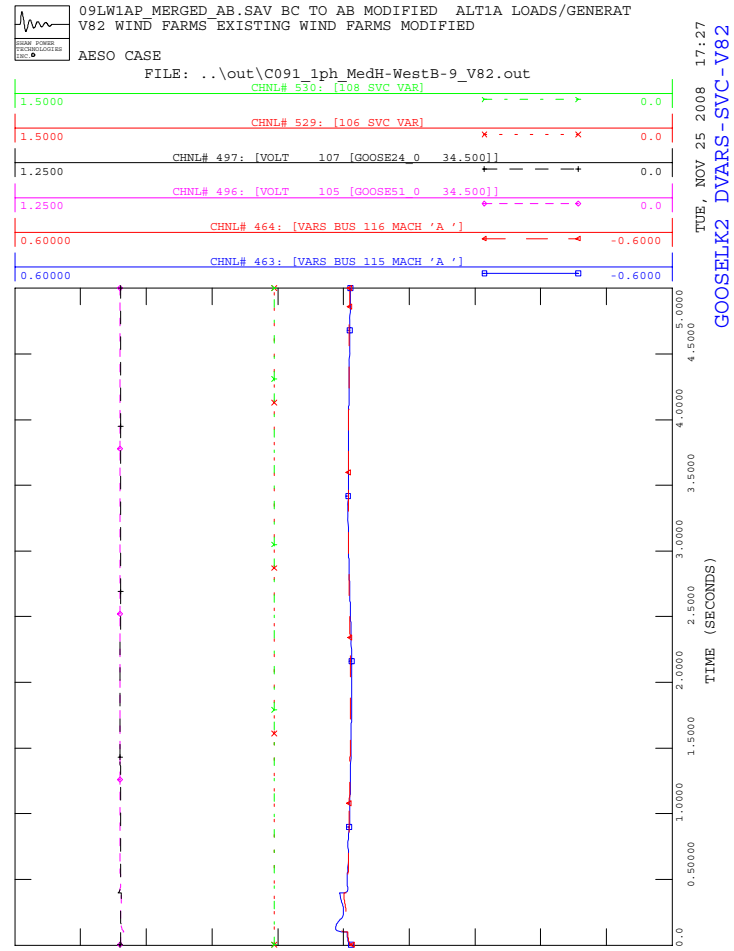
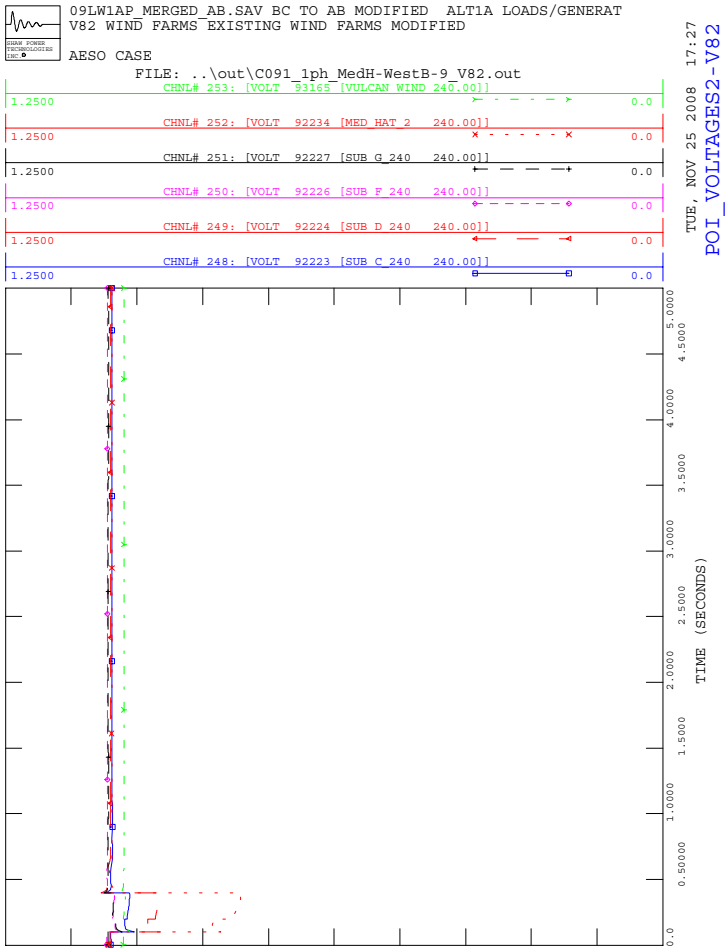
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\C091_1ph_MedH-WestB-9_V82.out



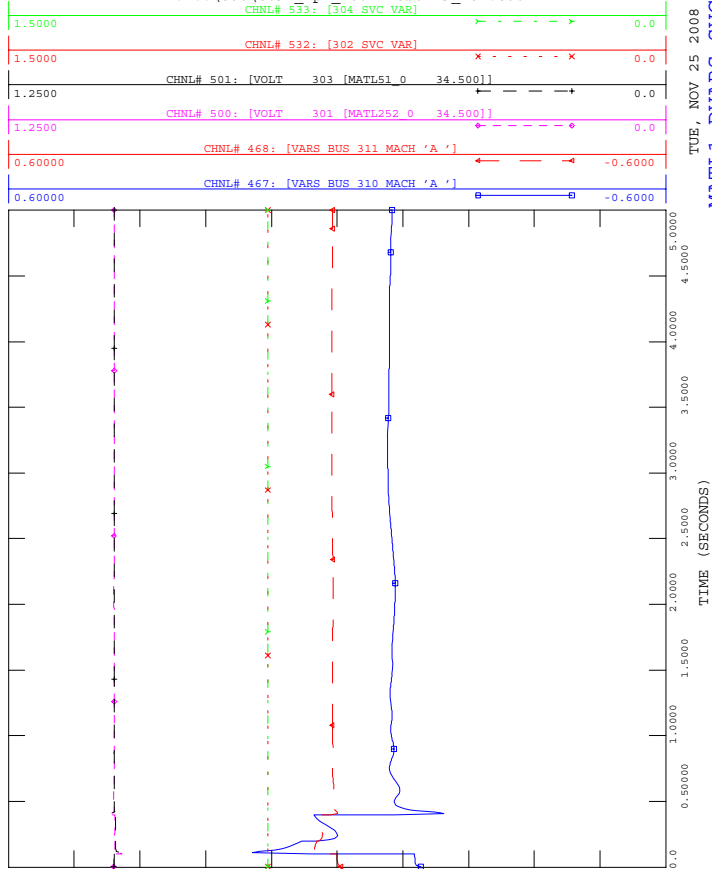






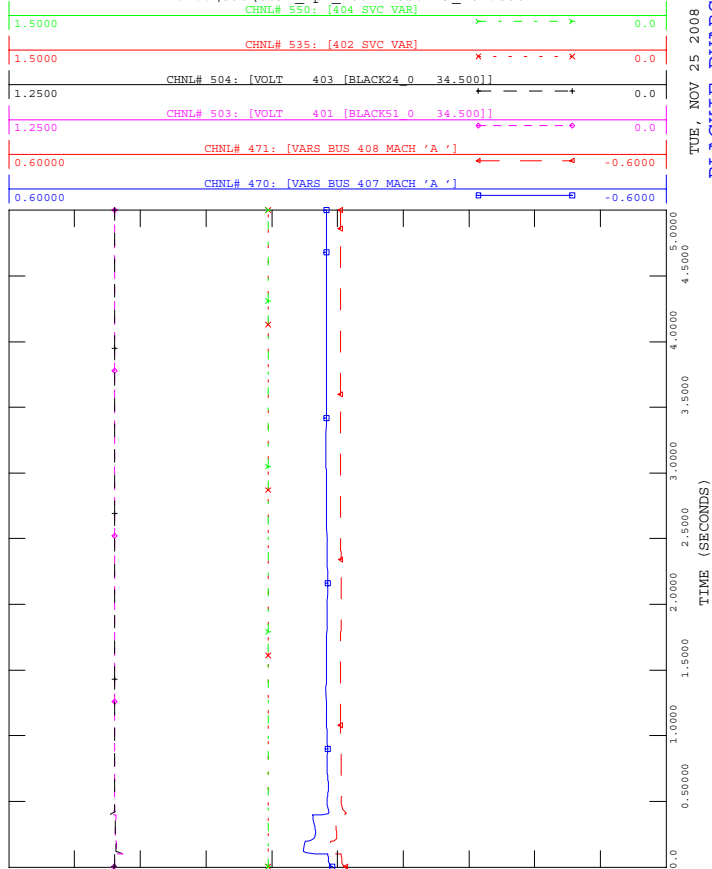
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\C091_1ph_MedH-WestB-9_V82.out



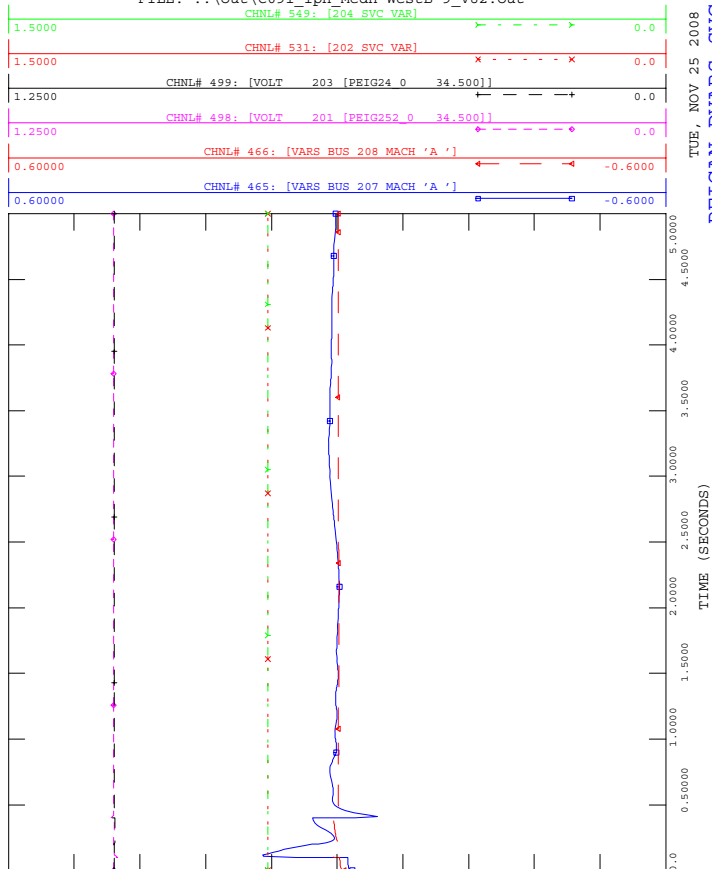
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\C091_1ph_MedH-WestB-9_V82.out



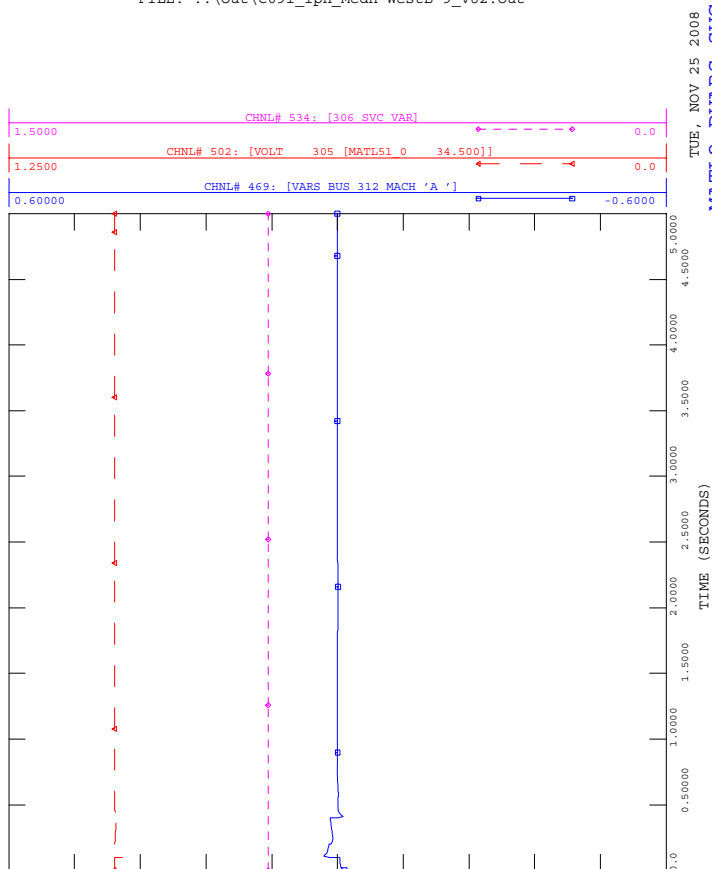
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

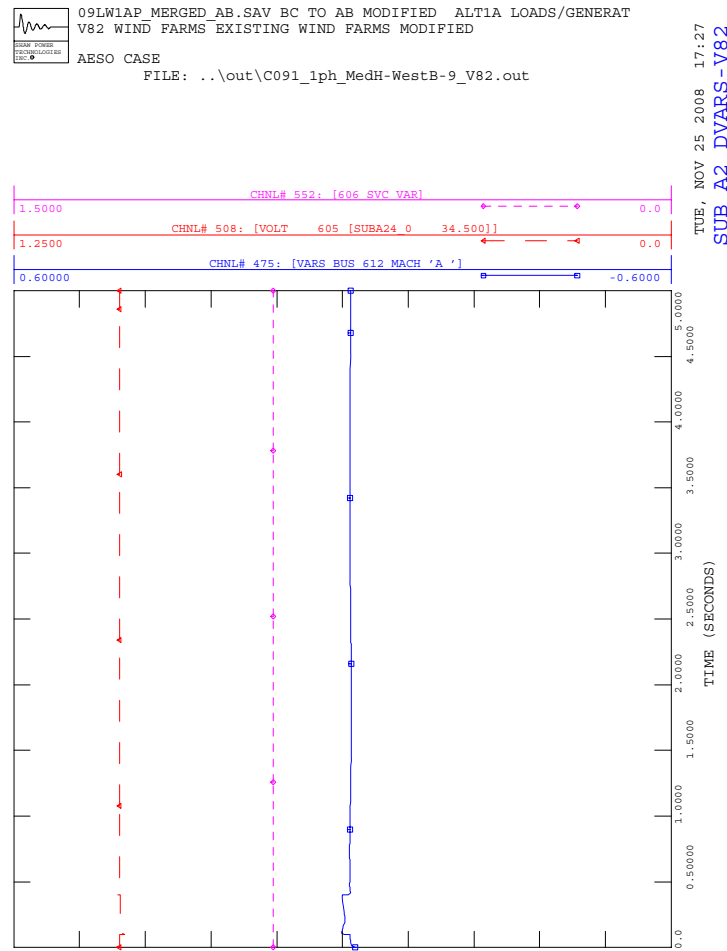
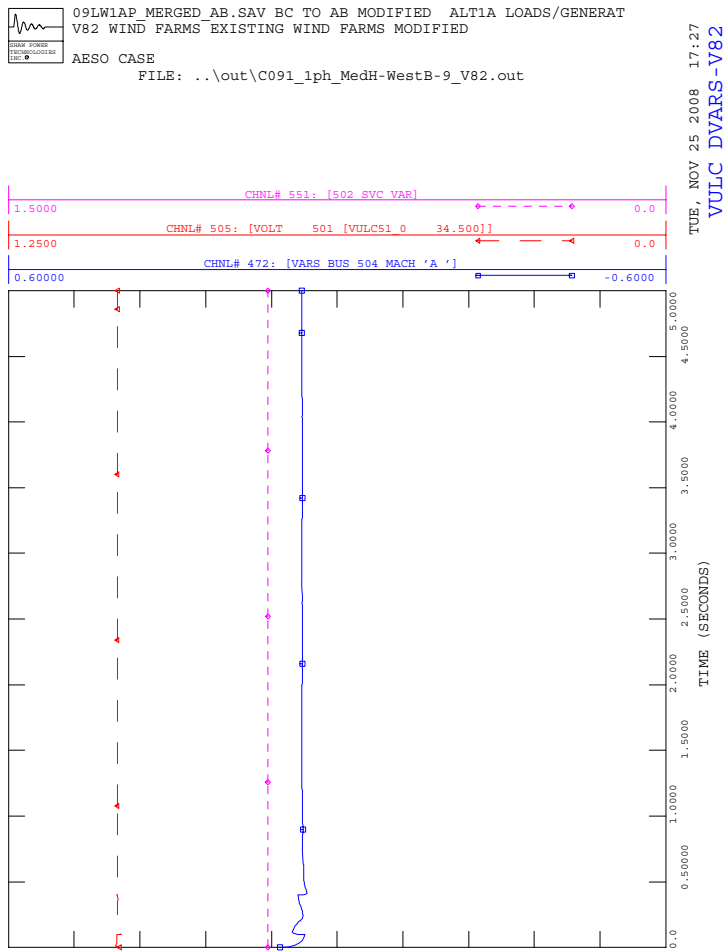
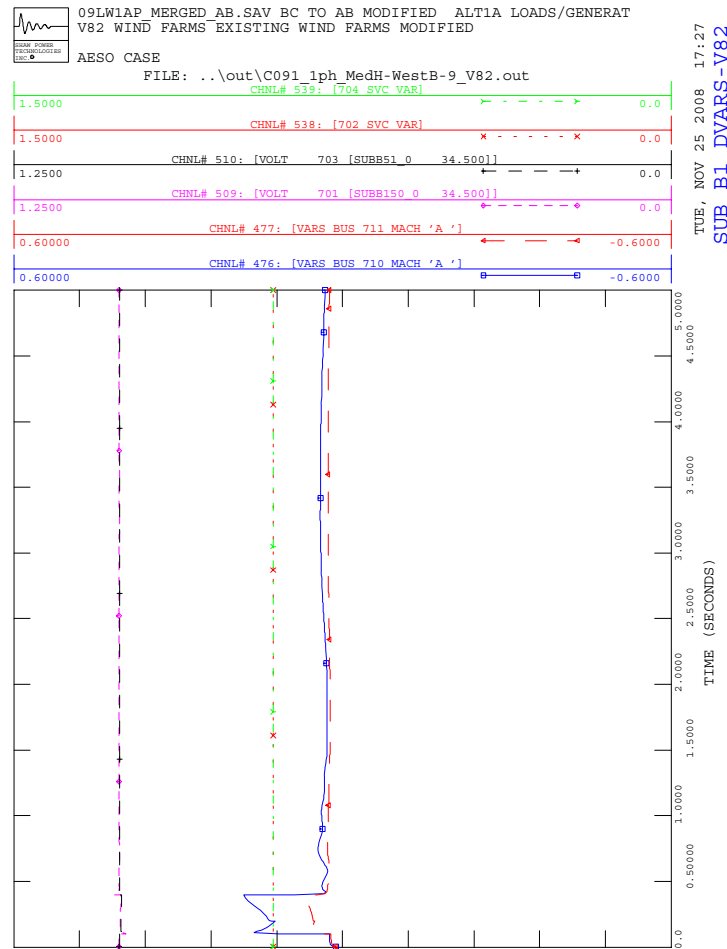
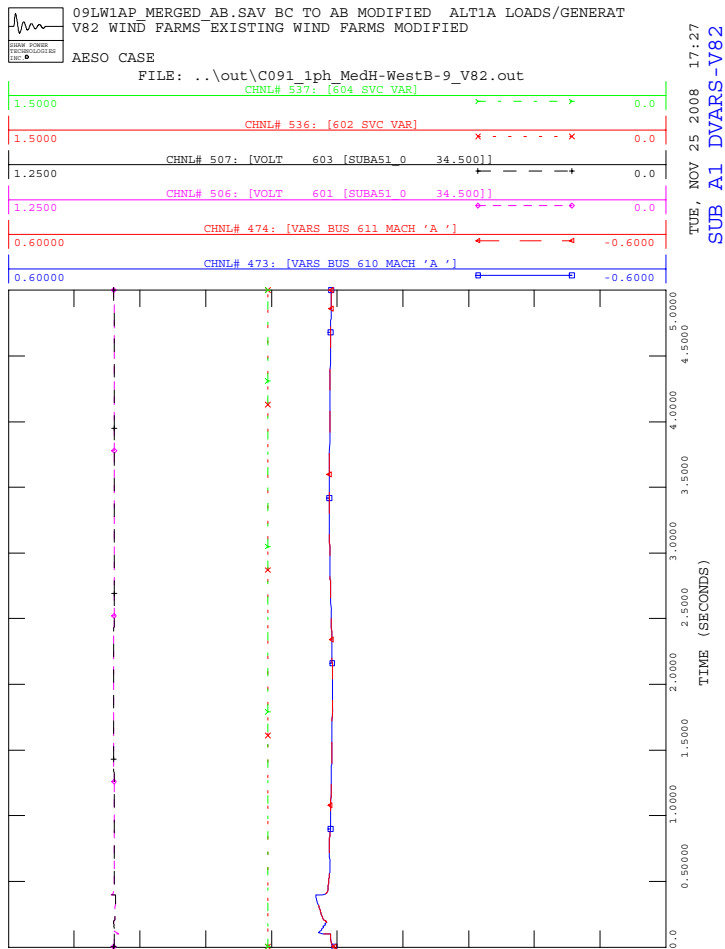
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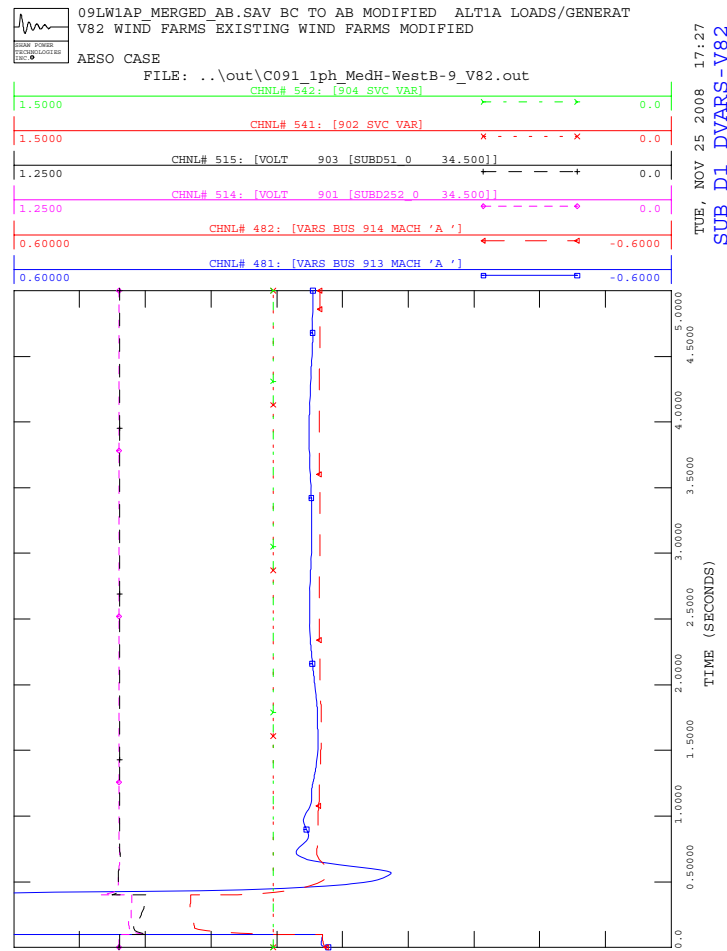
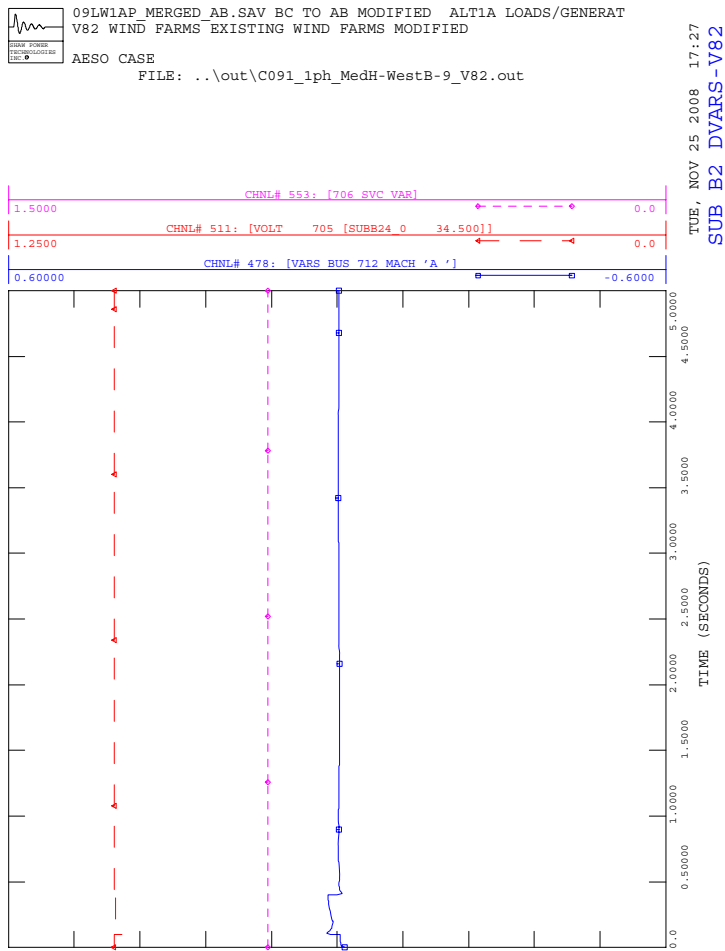
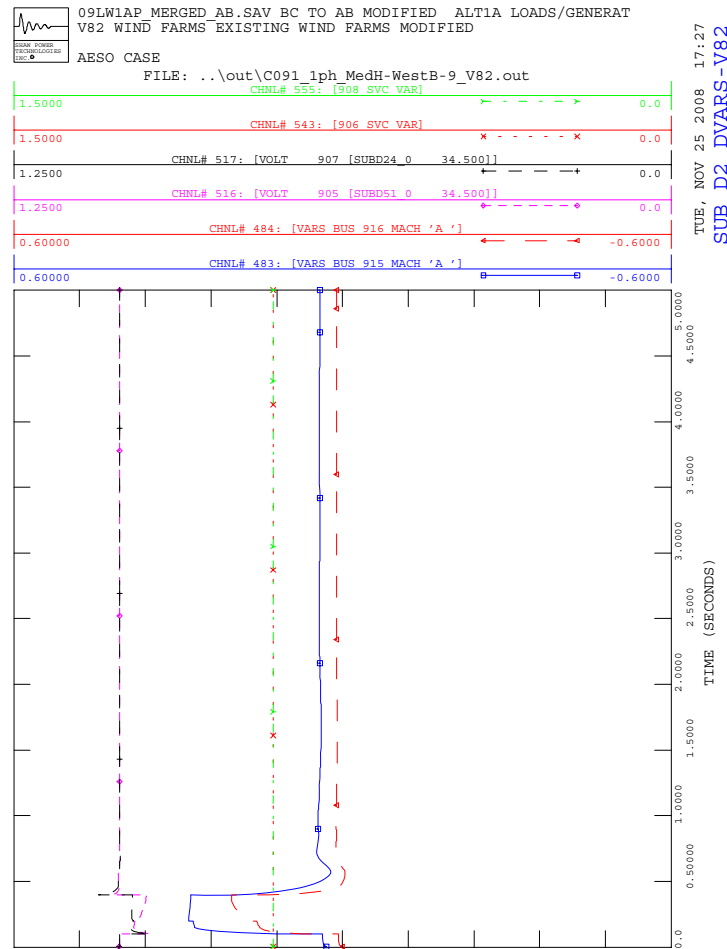
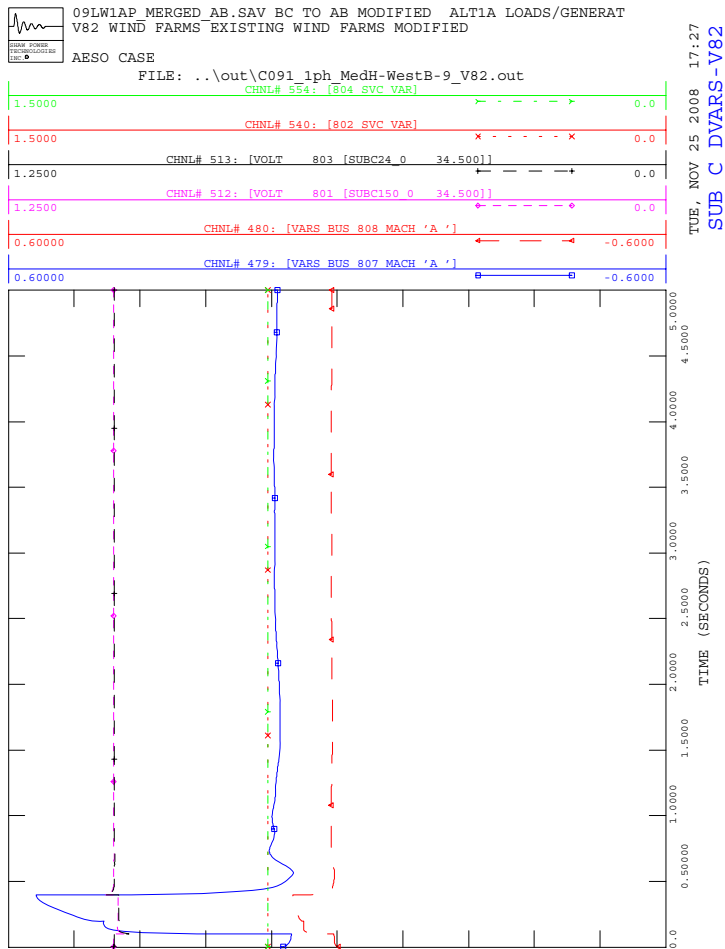


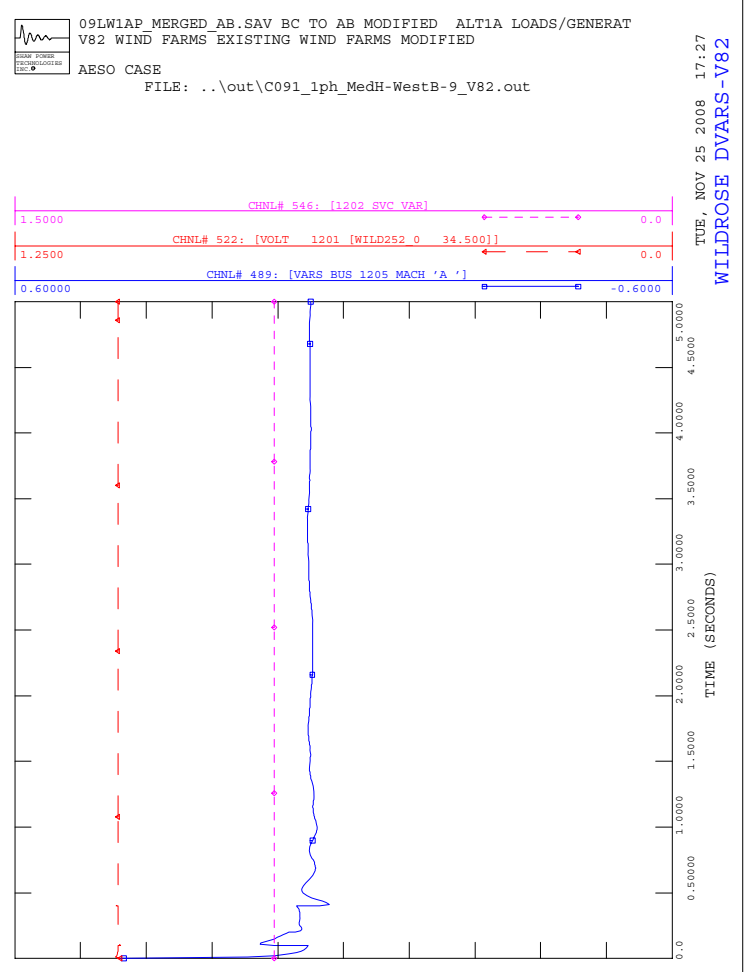
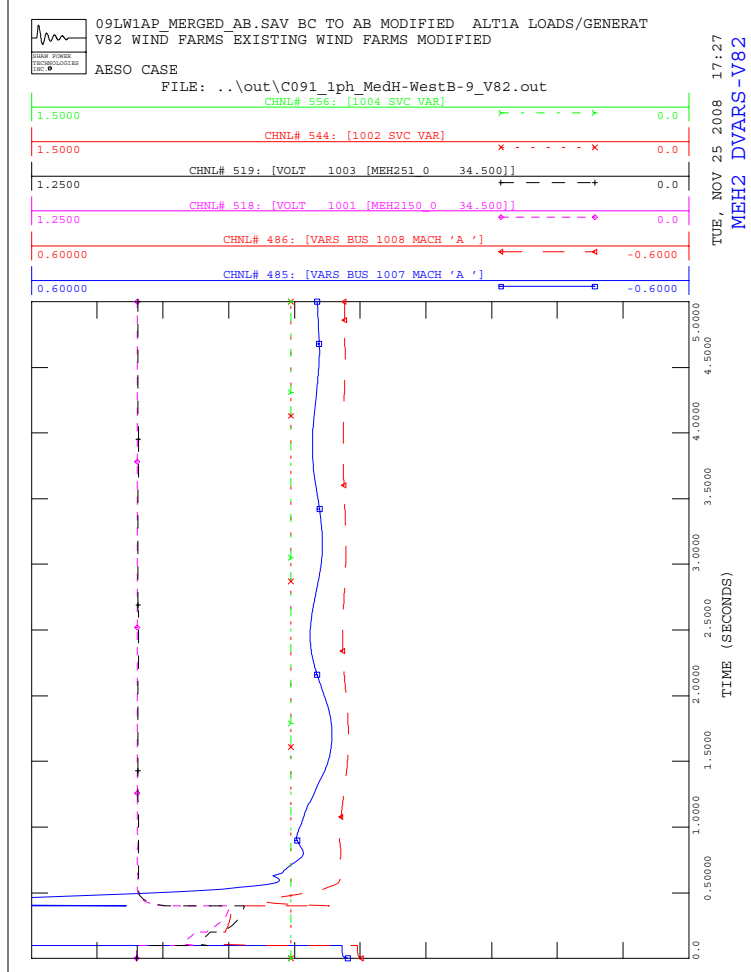
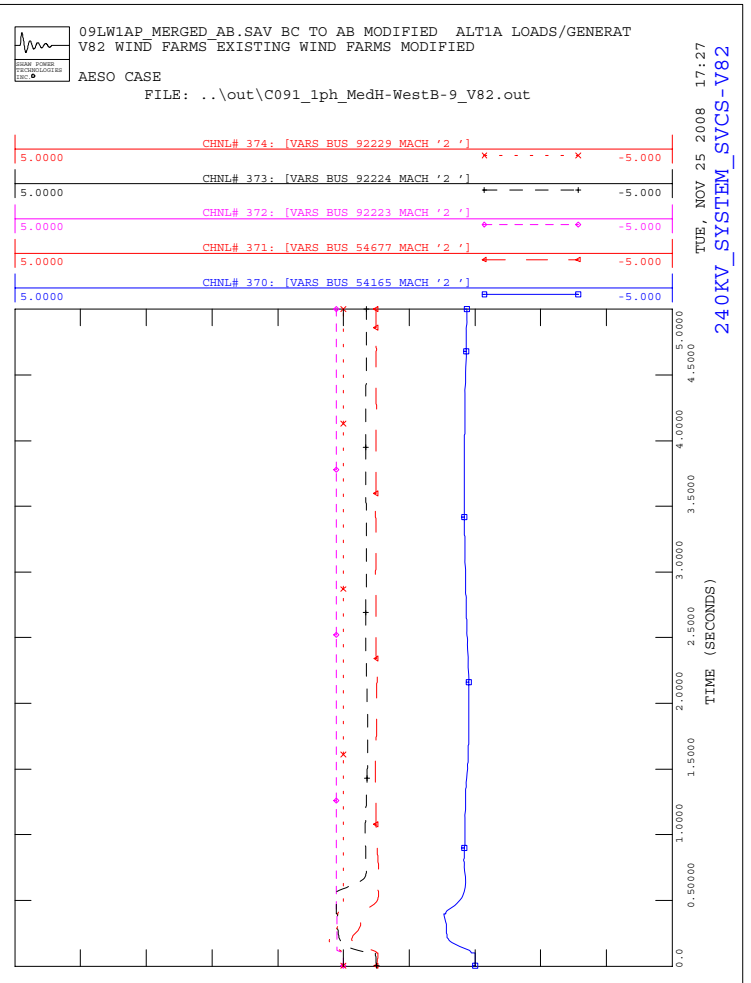
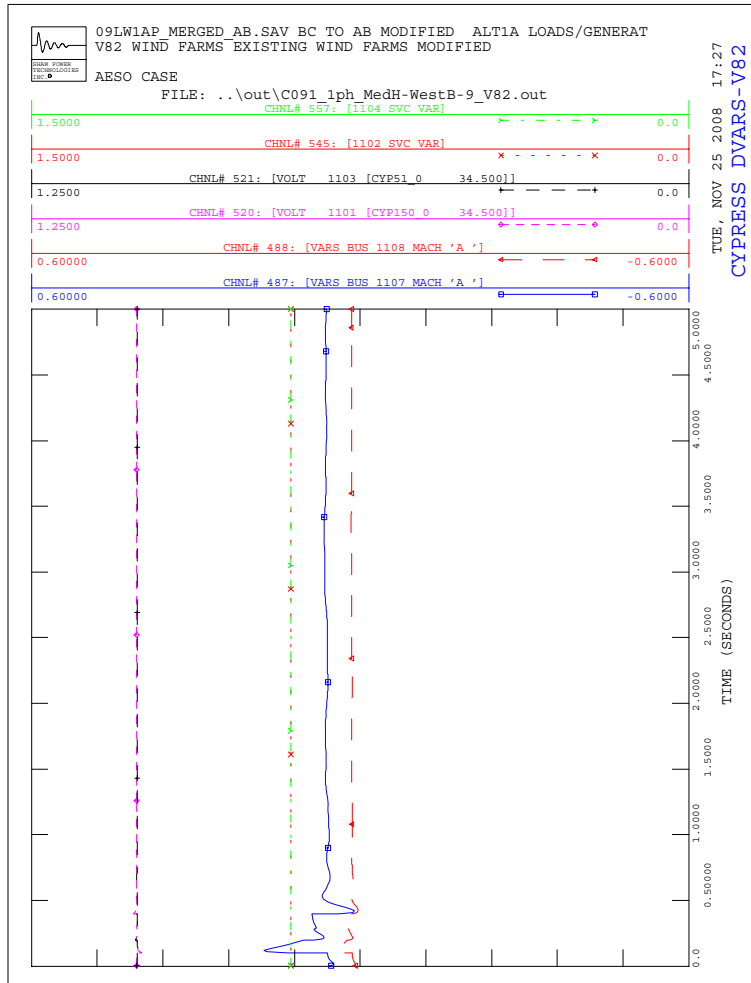
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\C091_1ph_MedH-WestB-9_V82.out





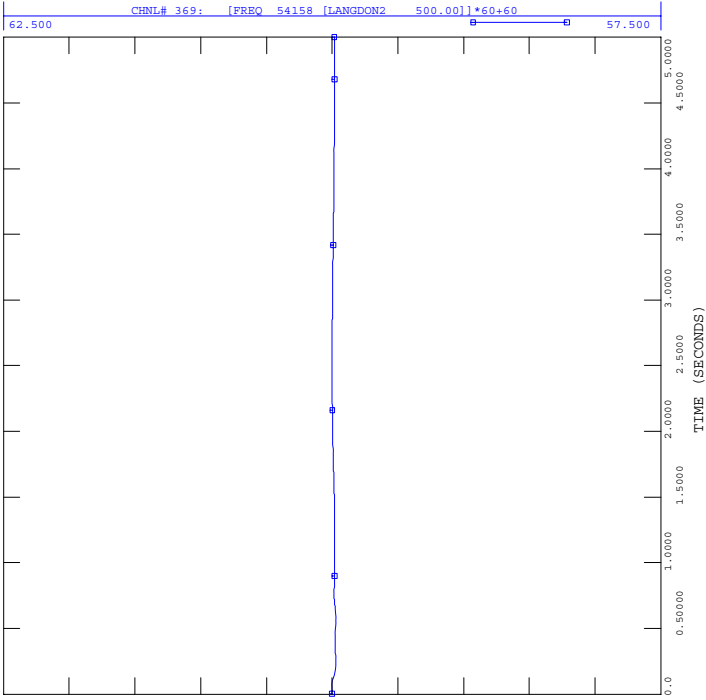






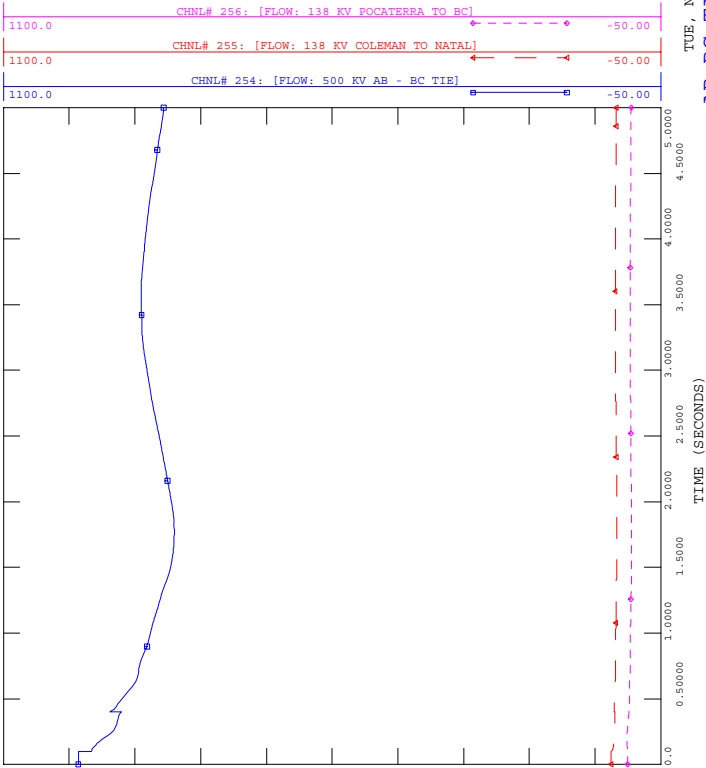
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C091_1ph_MedH-WestB-9_V82.out

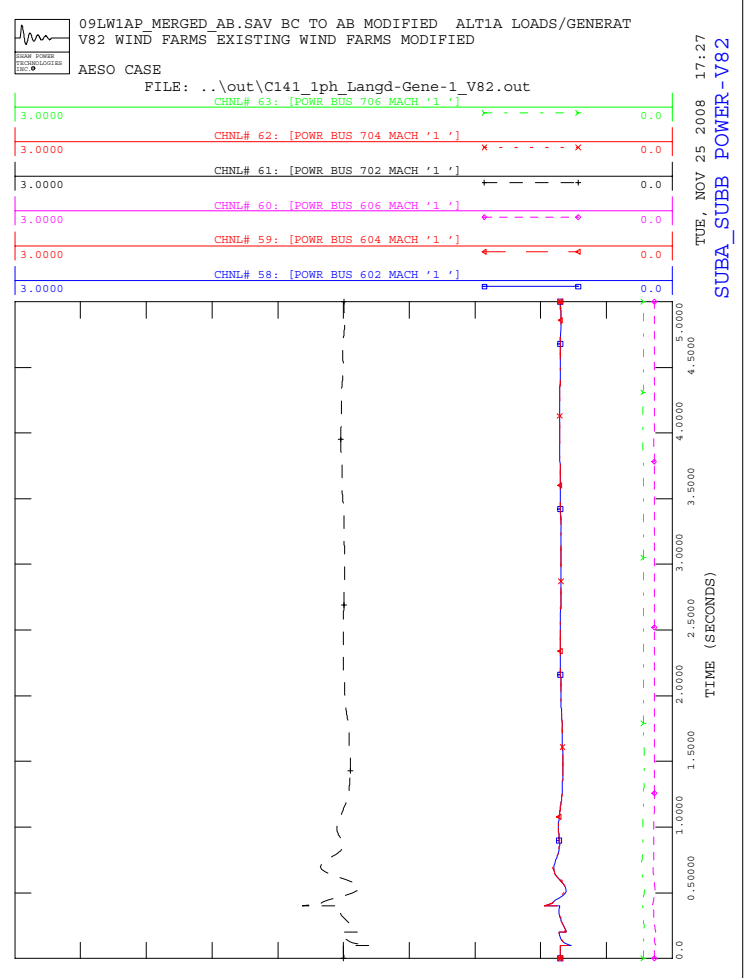
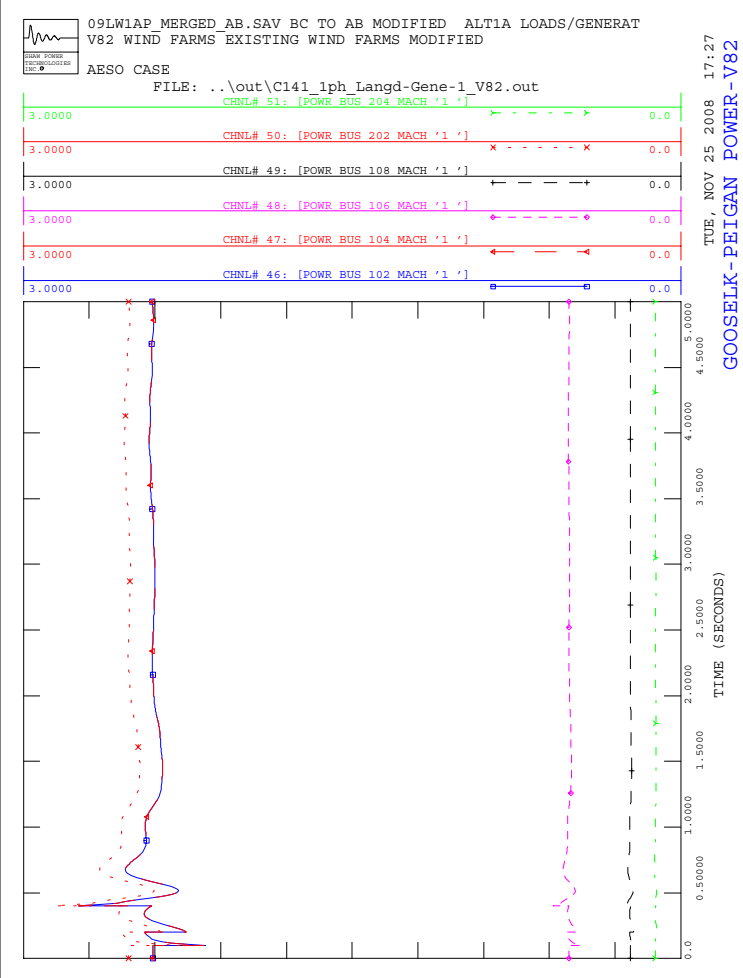
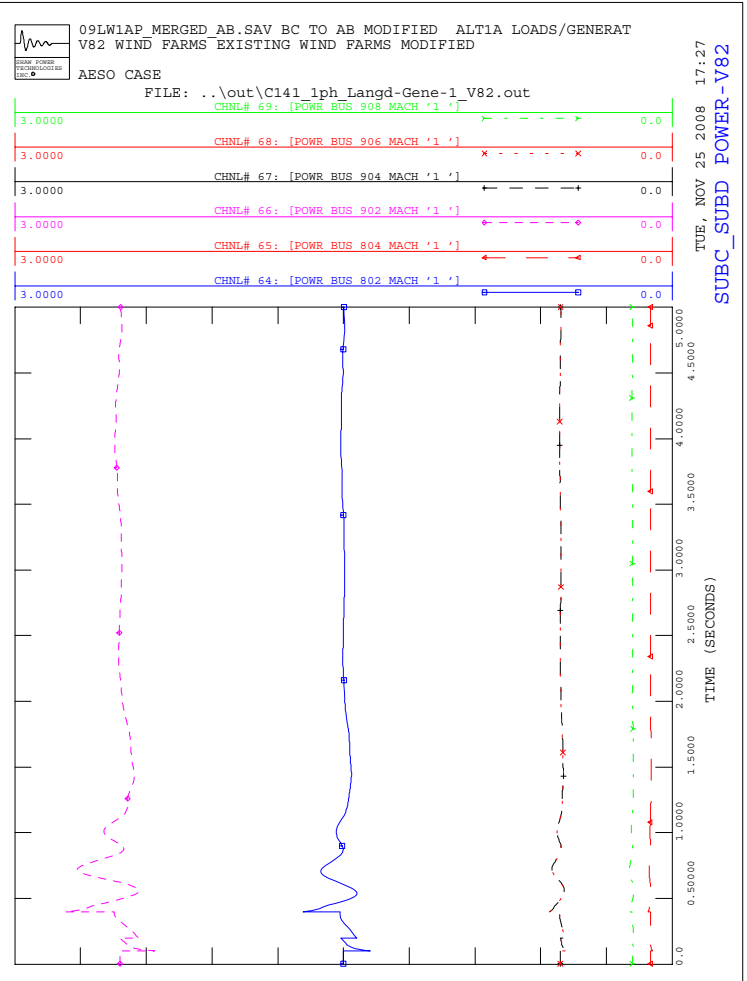
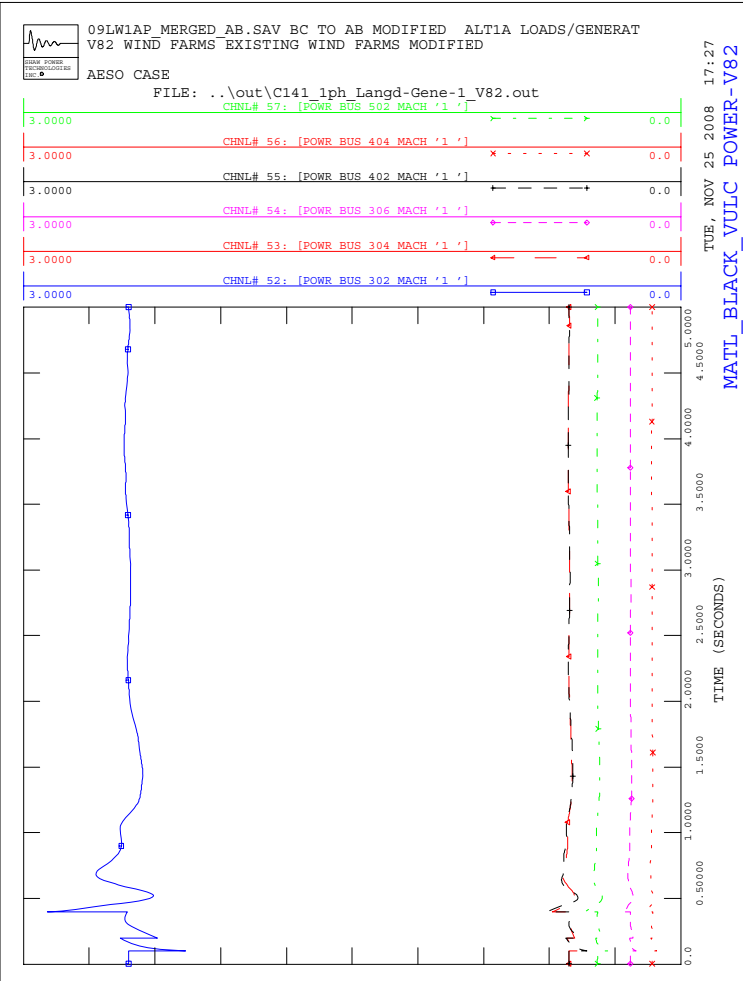
TUE, NOV 25 2008 17:27
LANGDON_FRQ-V82

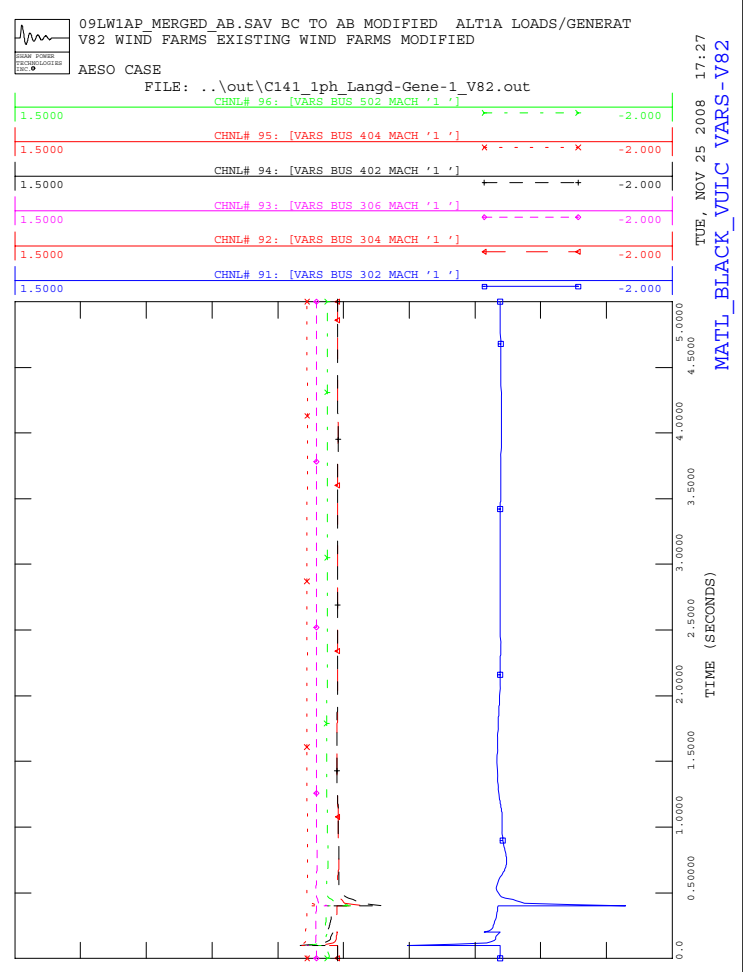
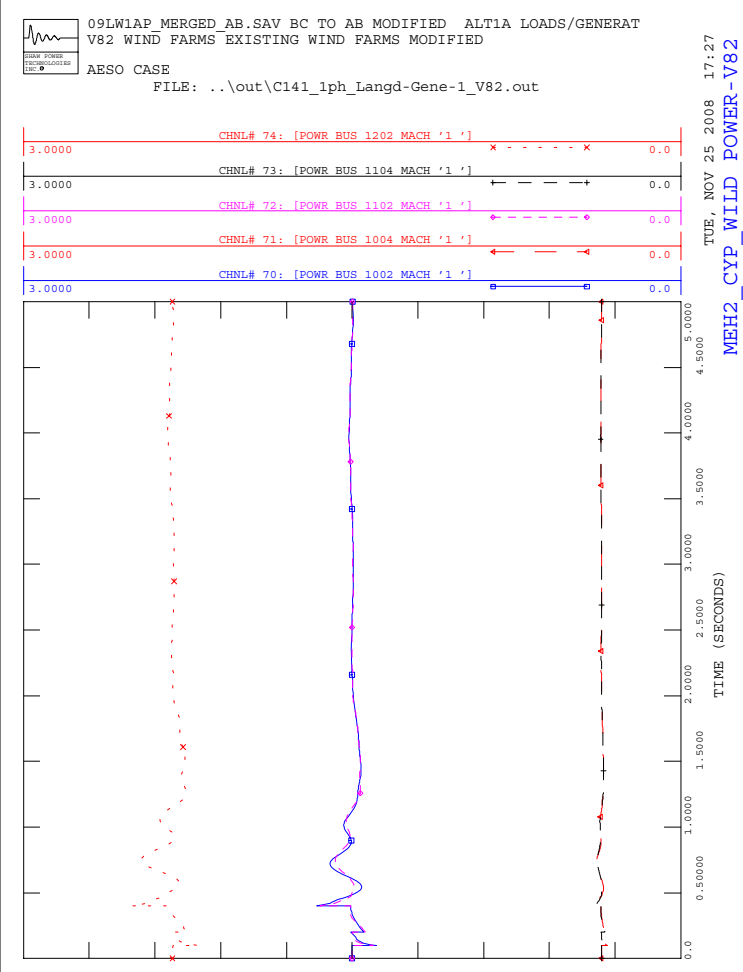
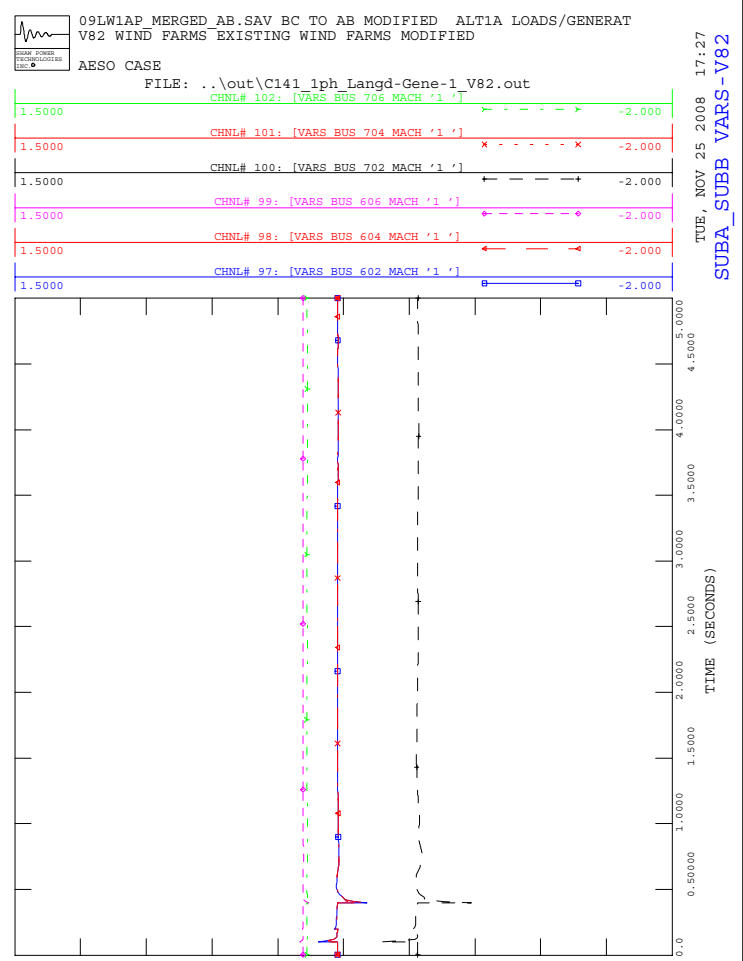
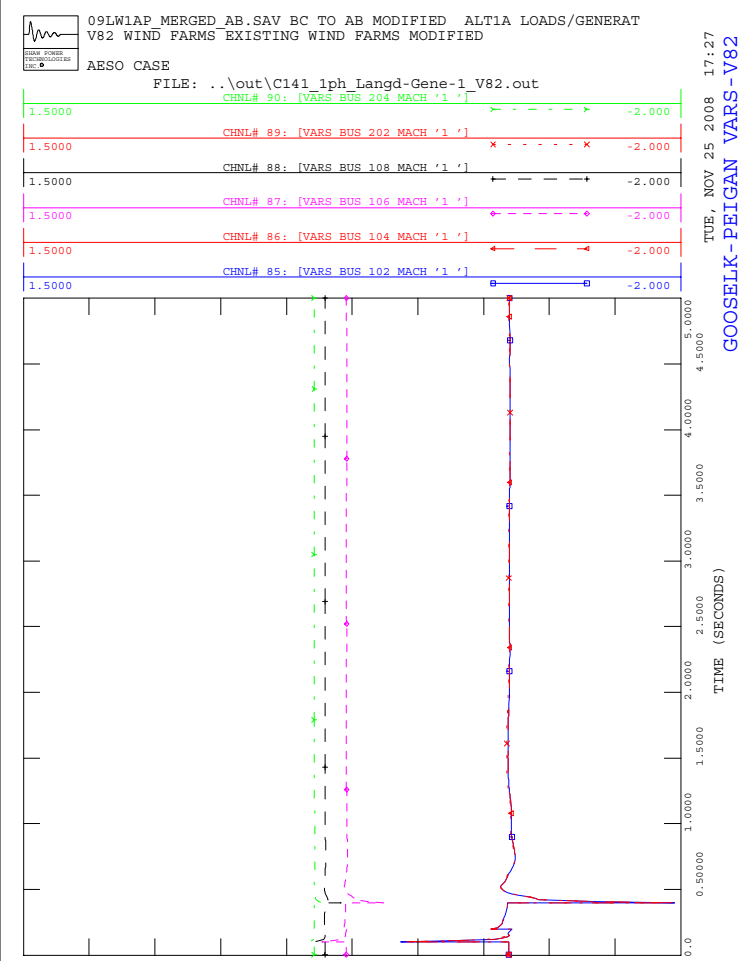


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C091_1ph_MedH-WestB-9_V82.out

TUE, NOV 25 2008 17:27
AB_BC_TIE_FLOWS-V82

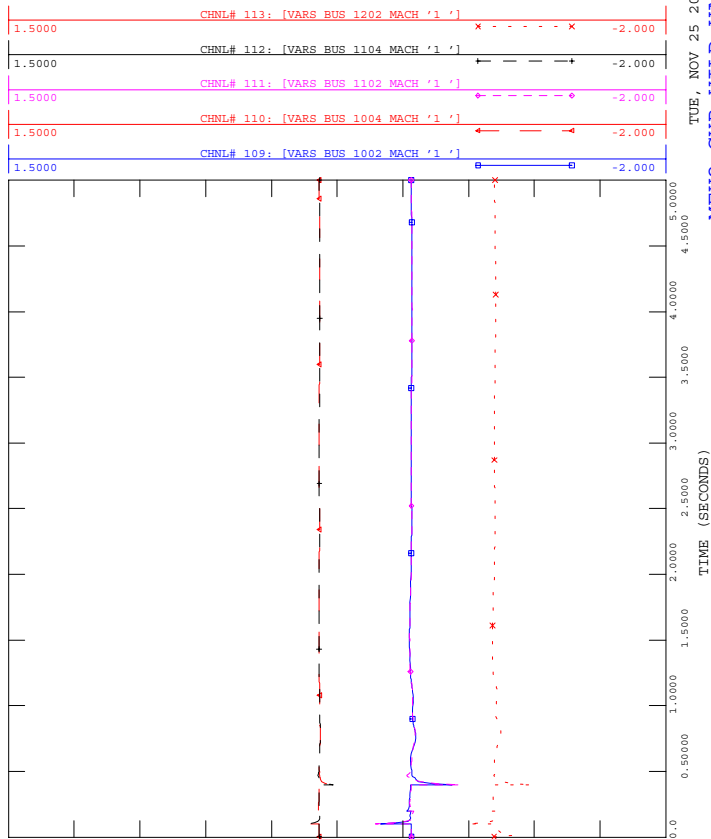






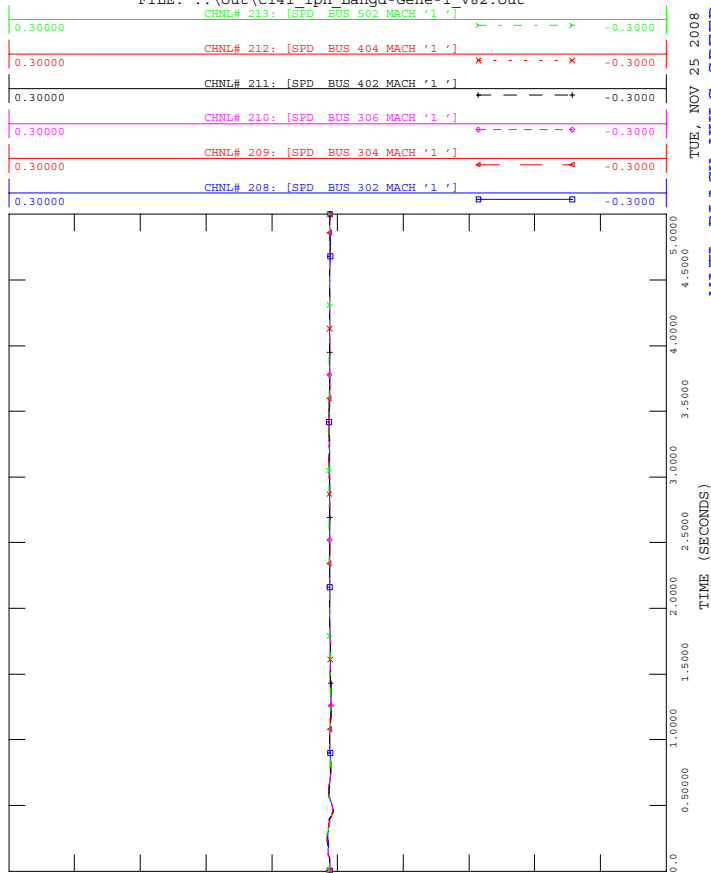
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\C141_1ph_Langd-Gen-1_V82.out



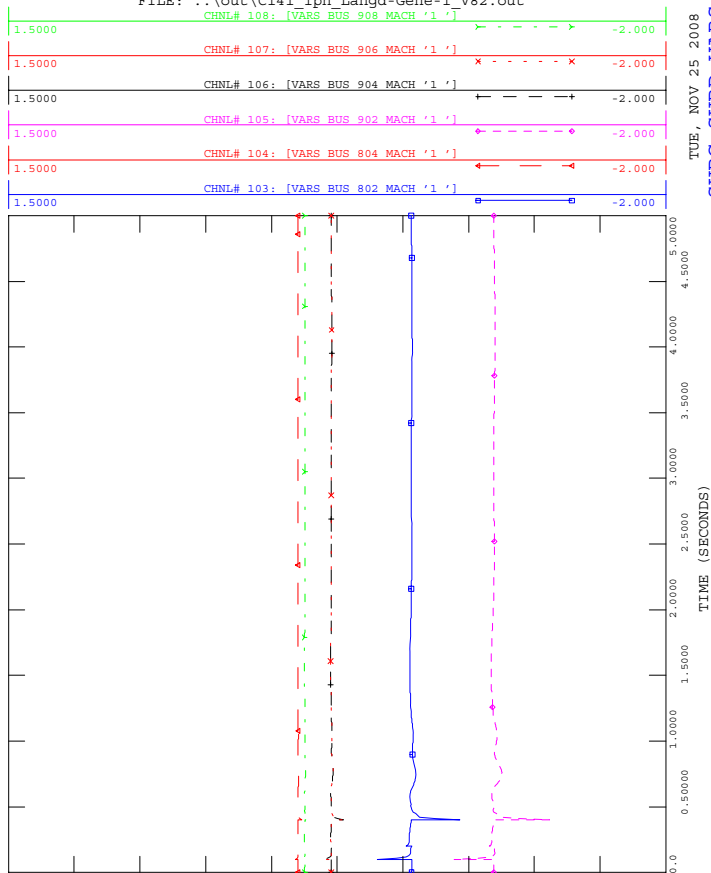
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

FILE: ..\out\C141_1ph_Langd-Gen-1_V82.out



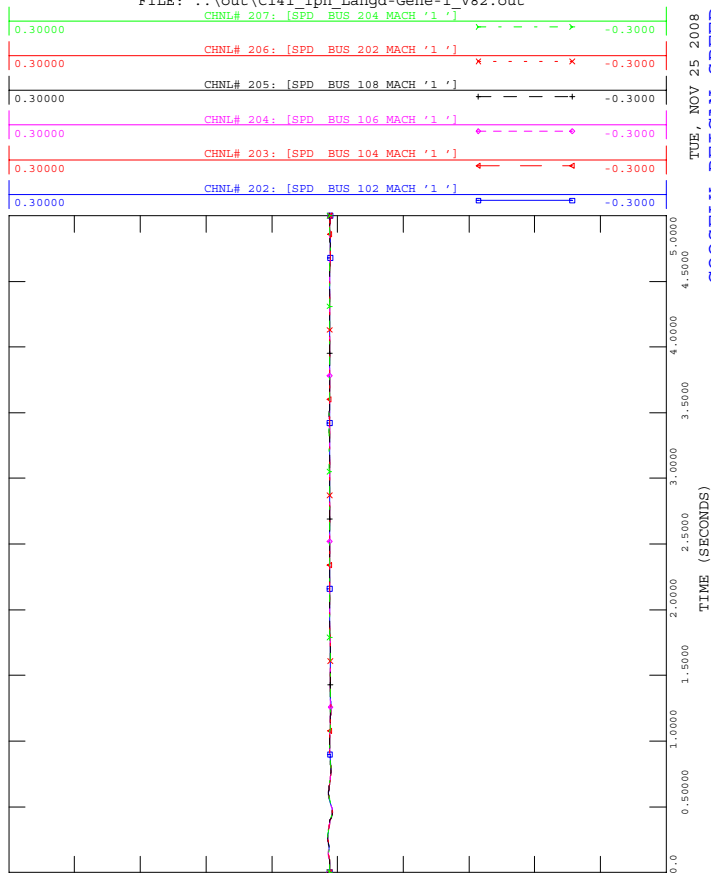
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V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

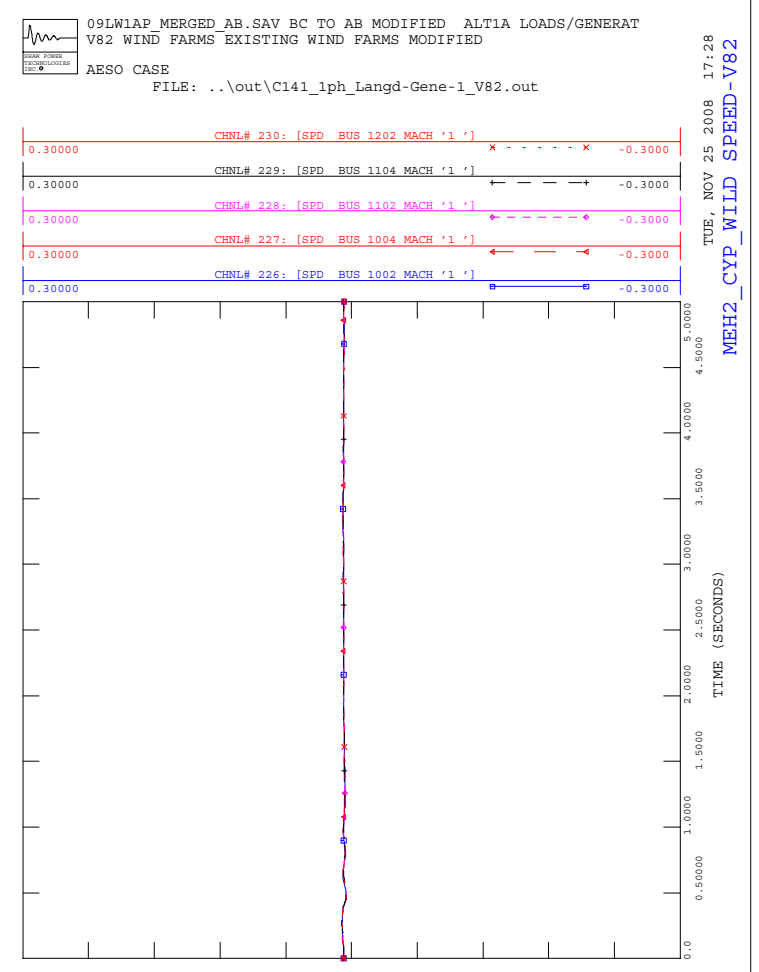
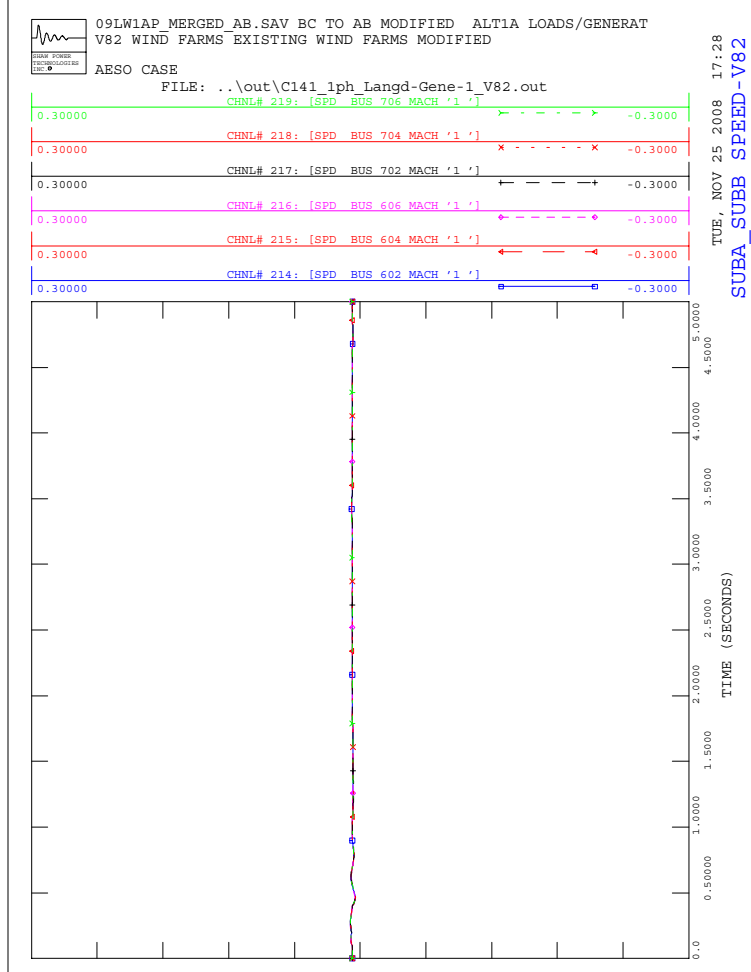
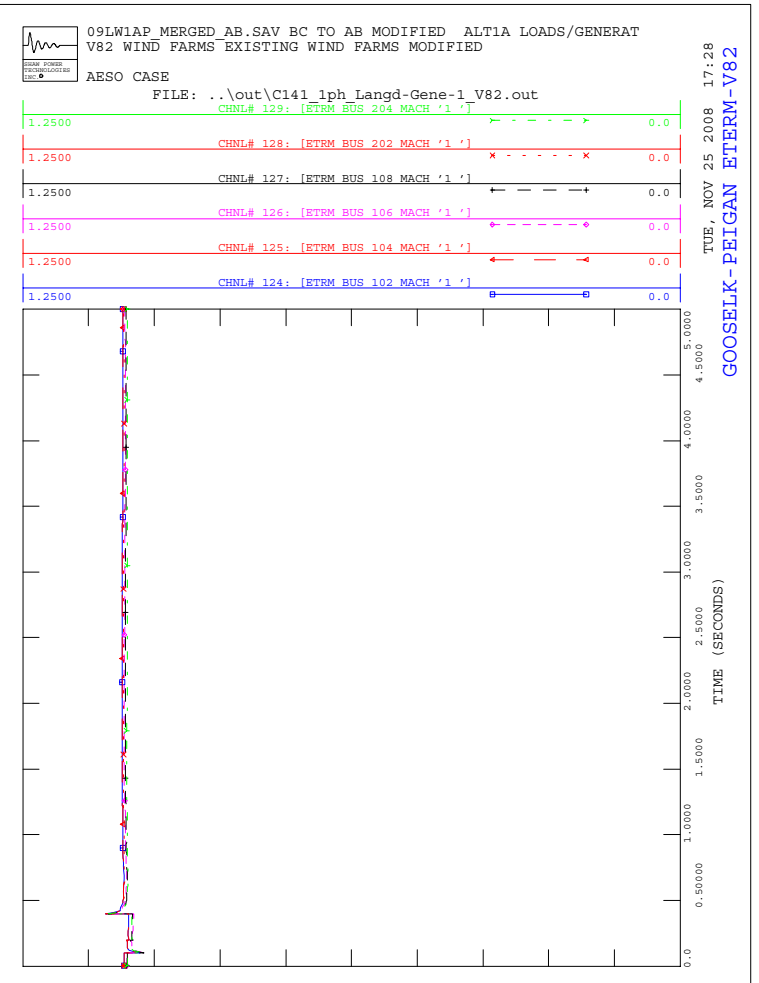
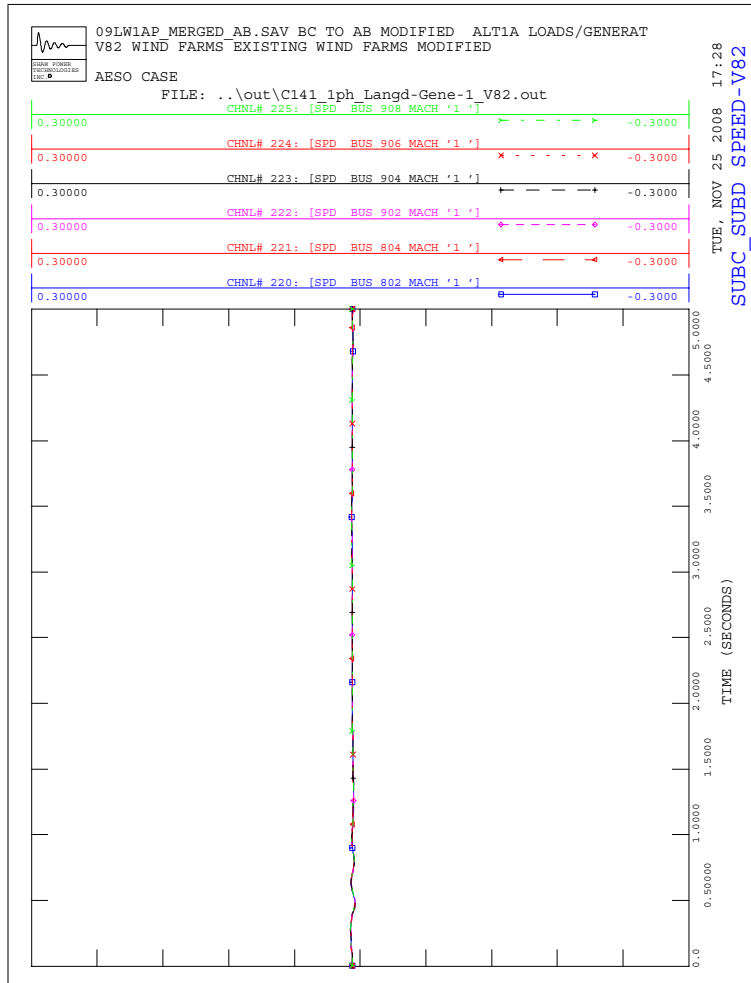
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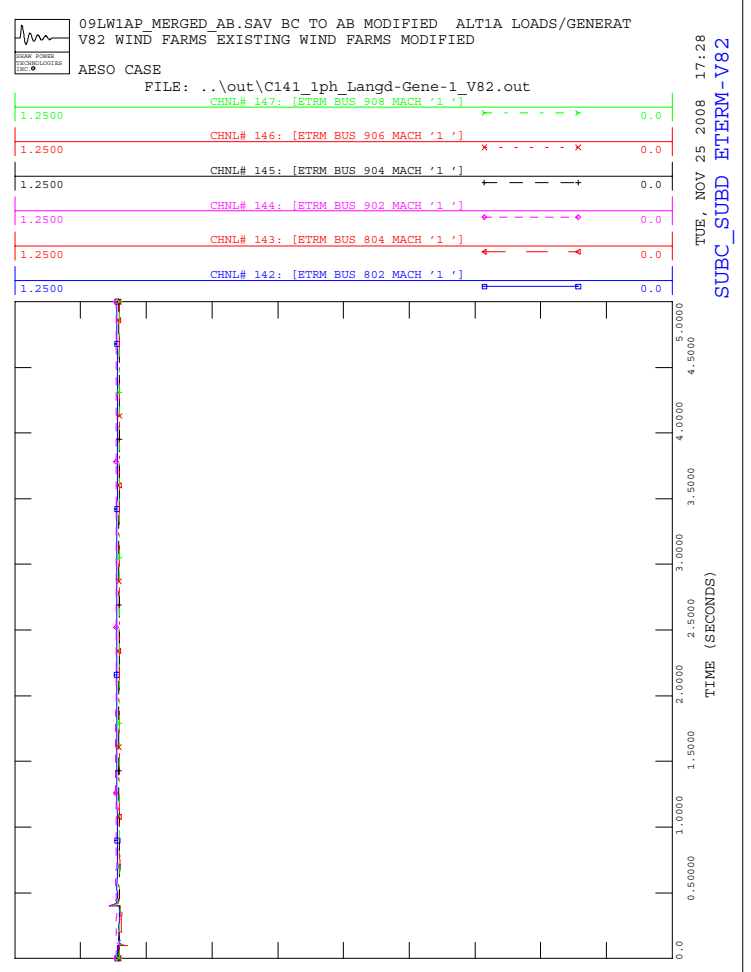
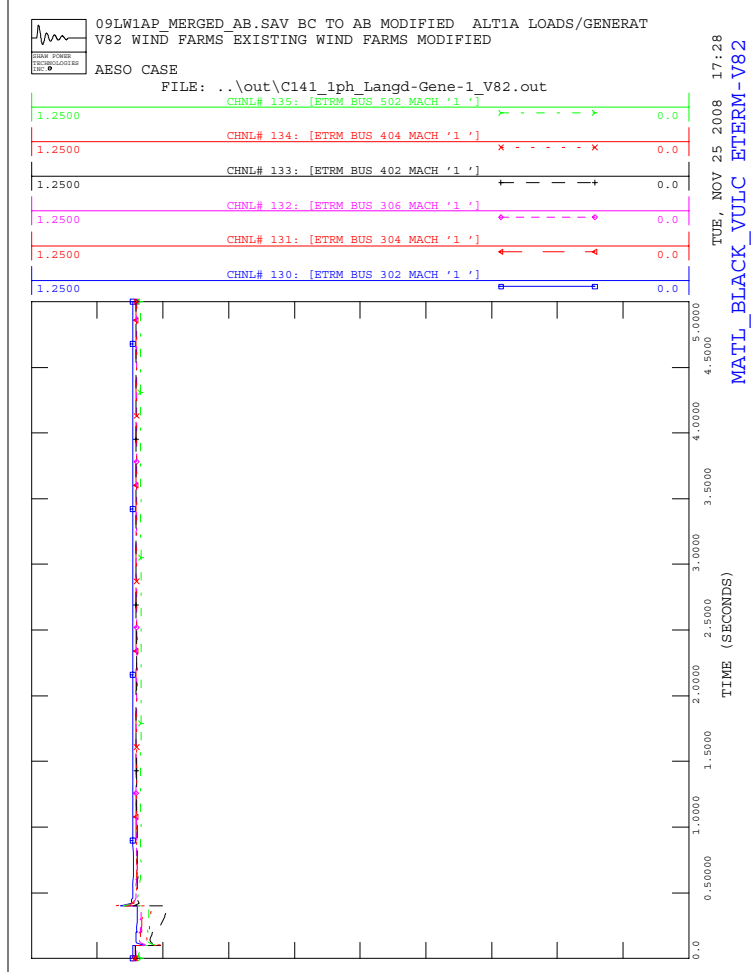
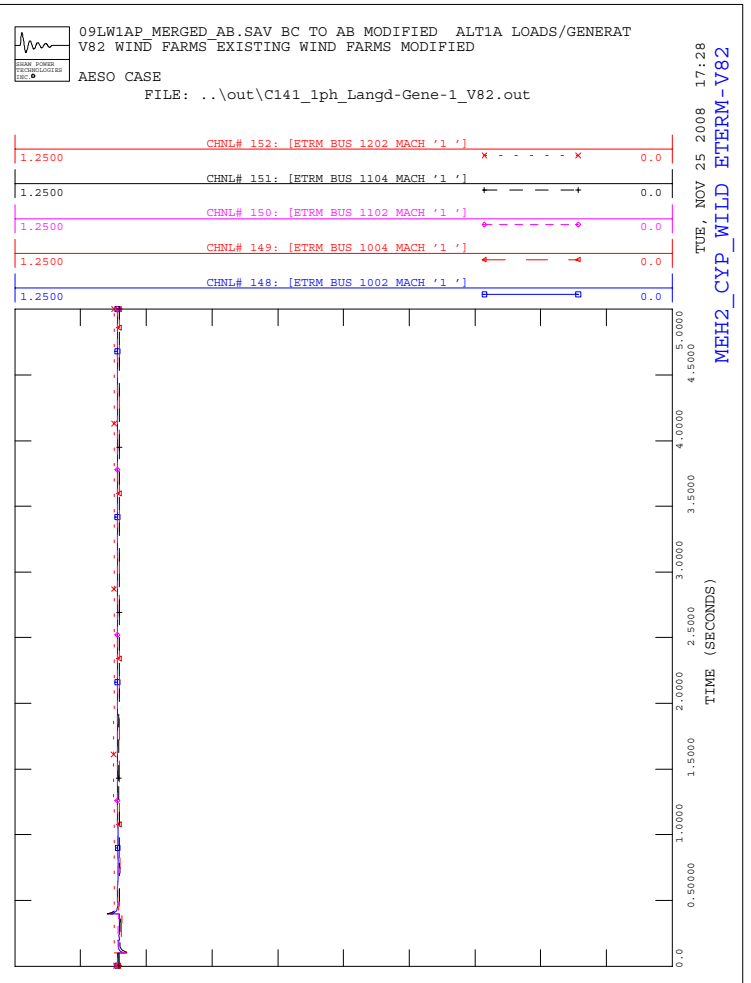
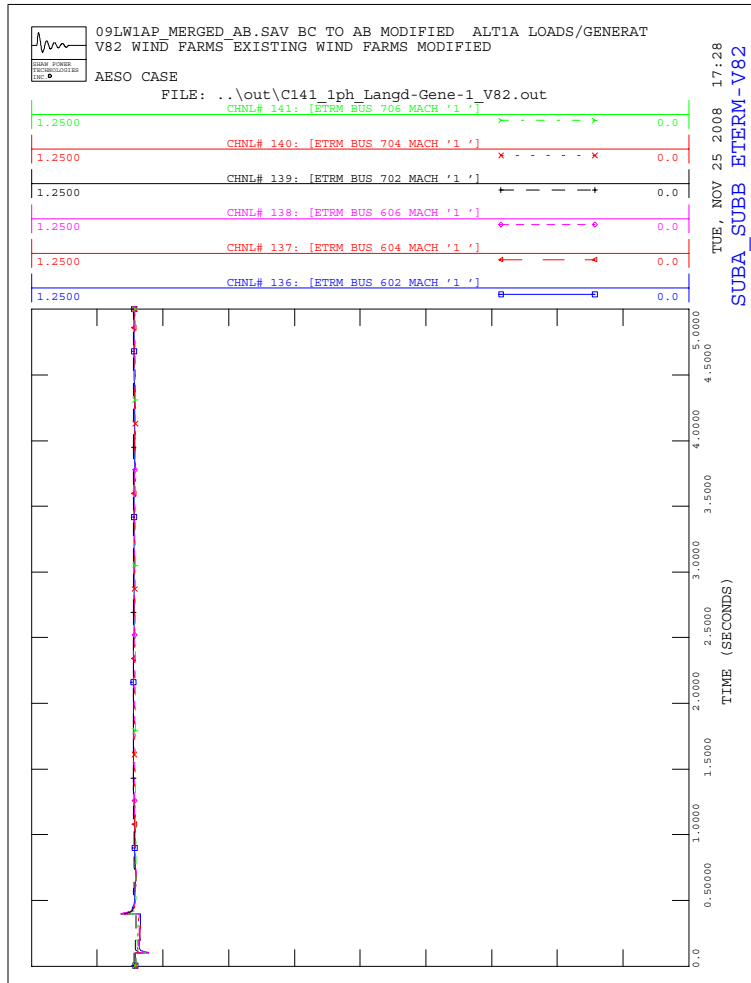


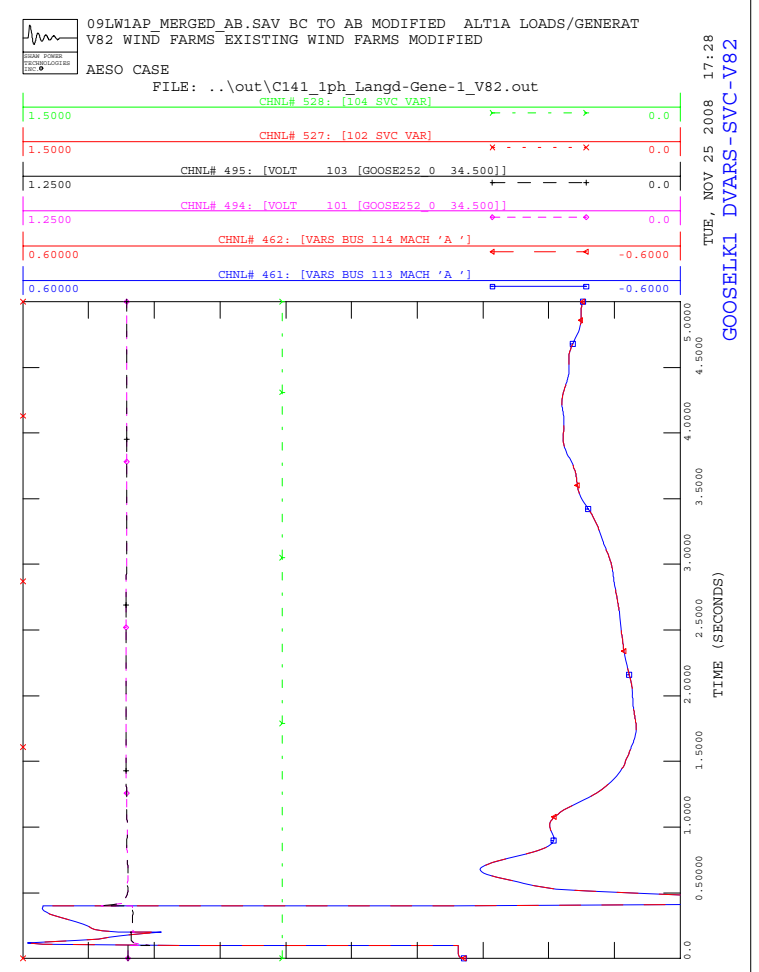
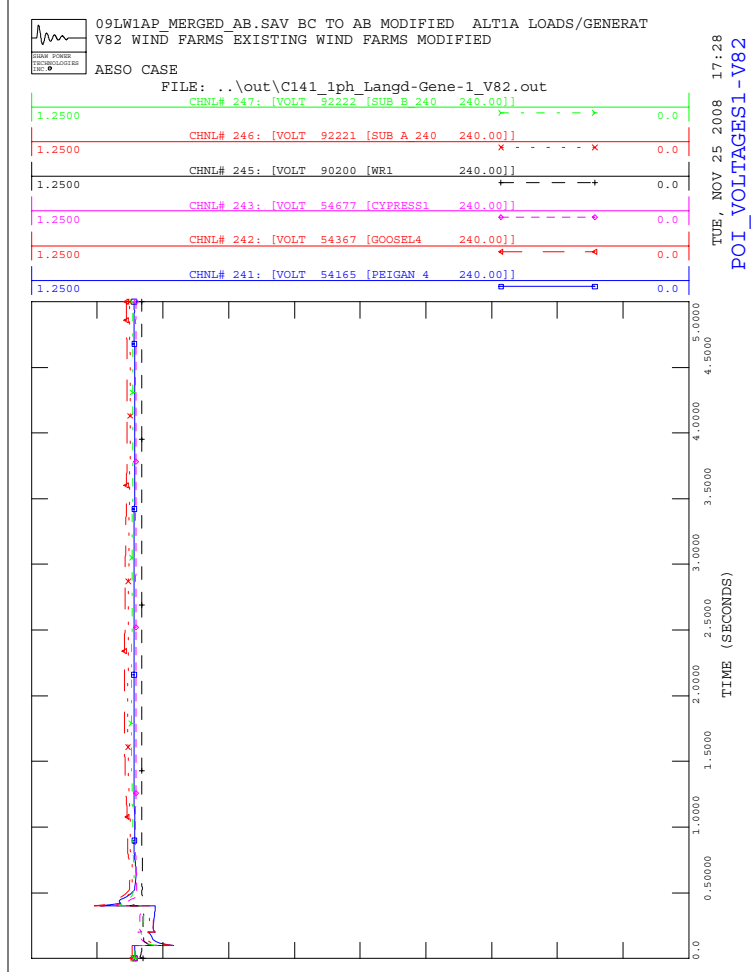
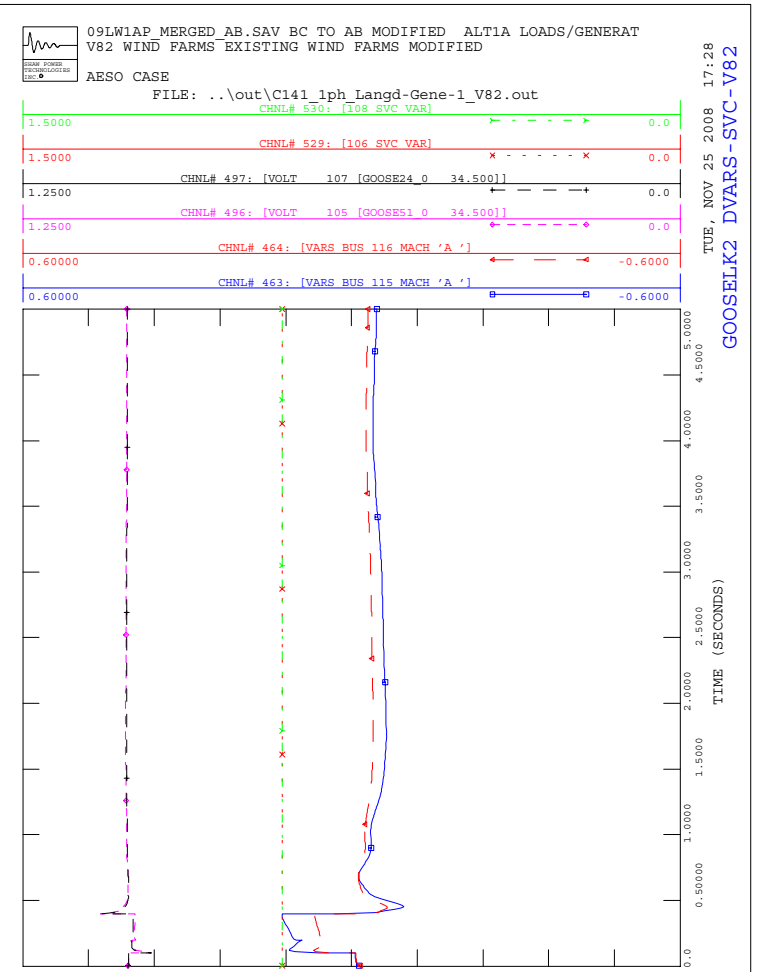
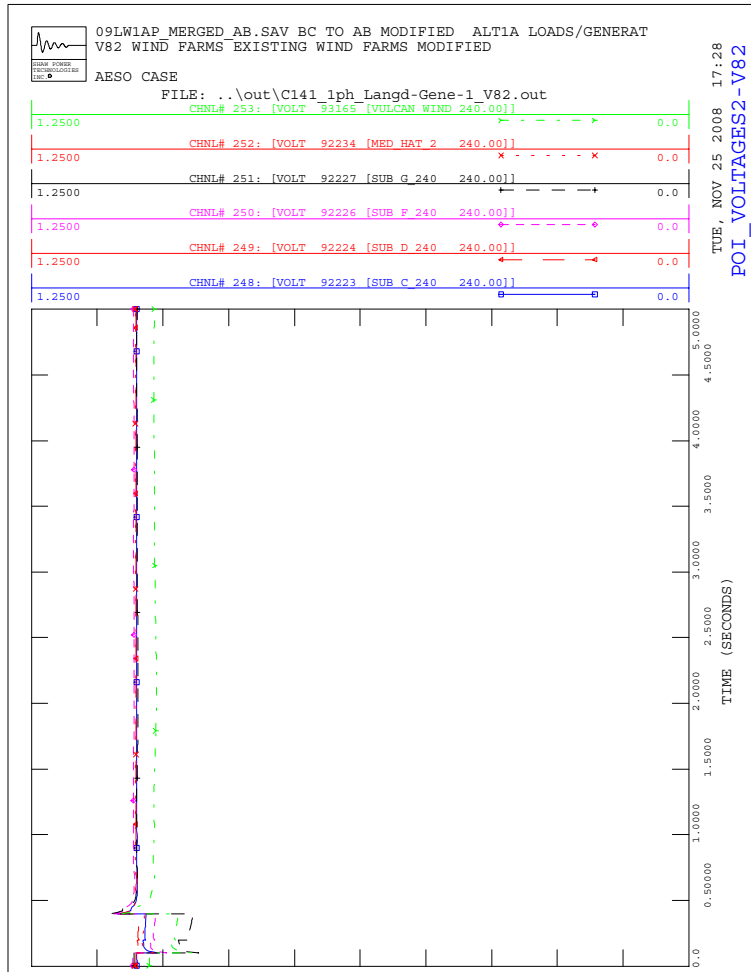
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
AESO CASE

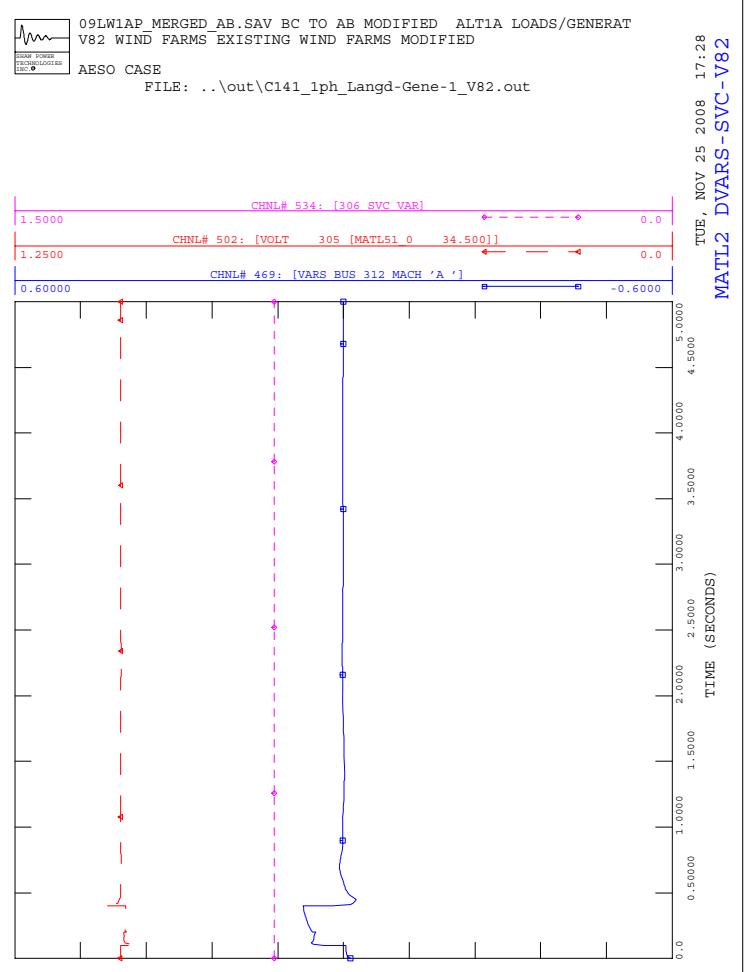
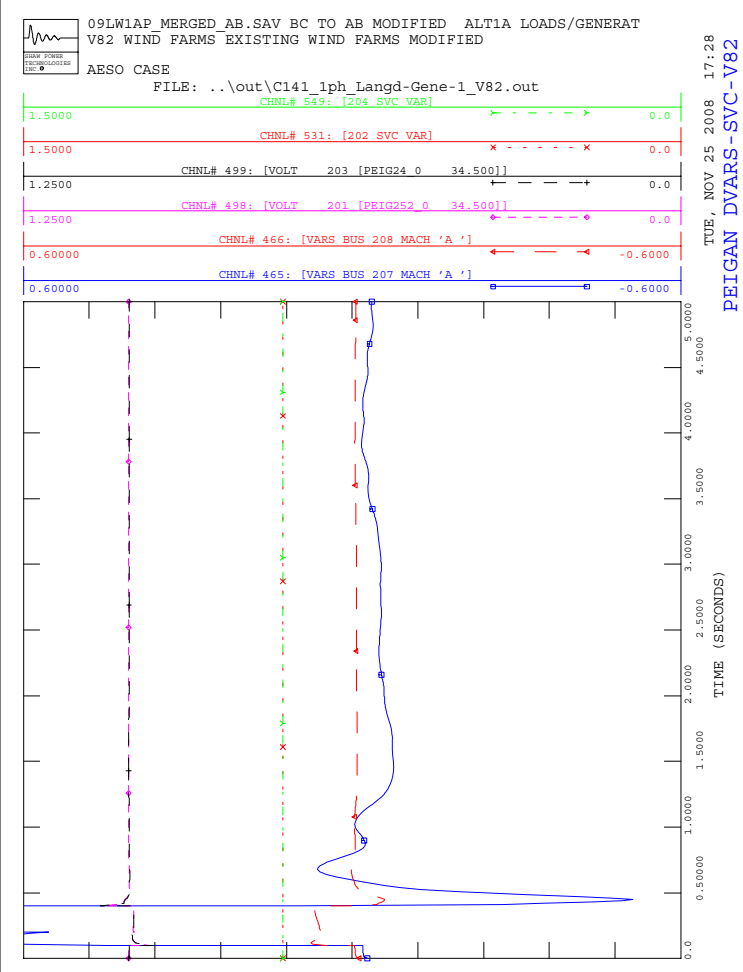
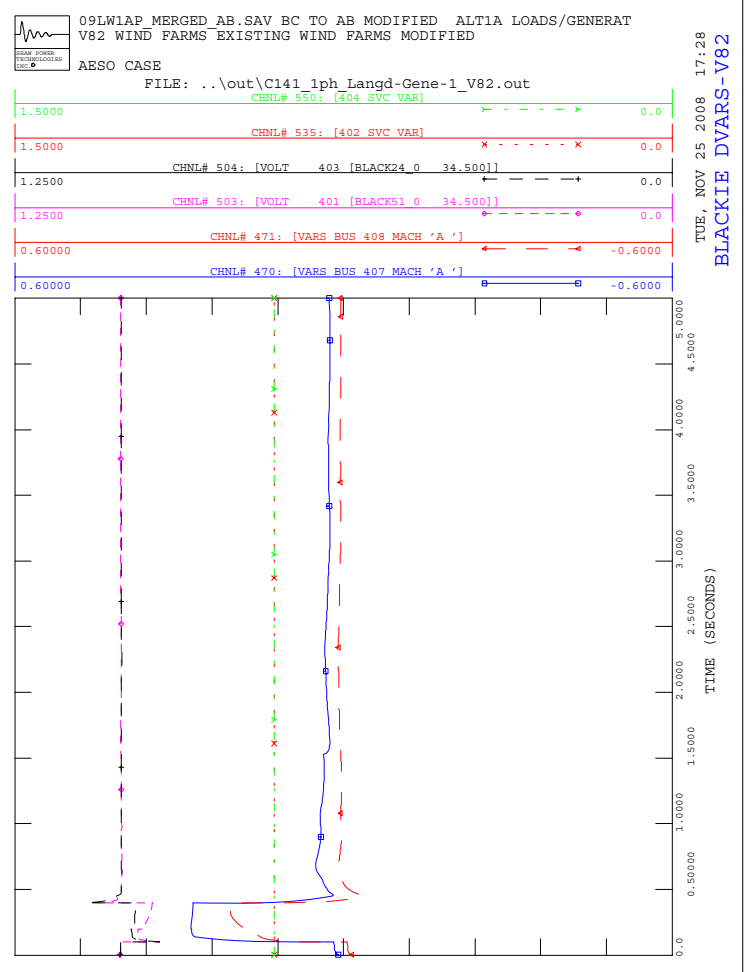
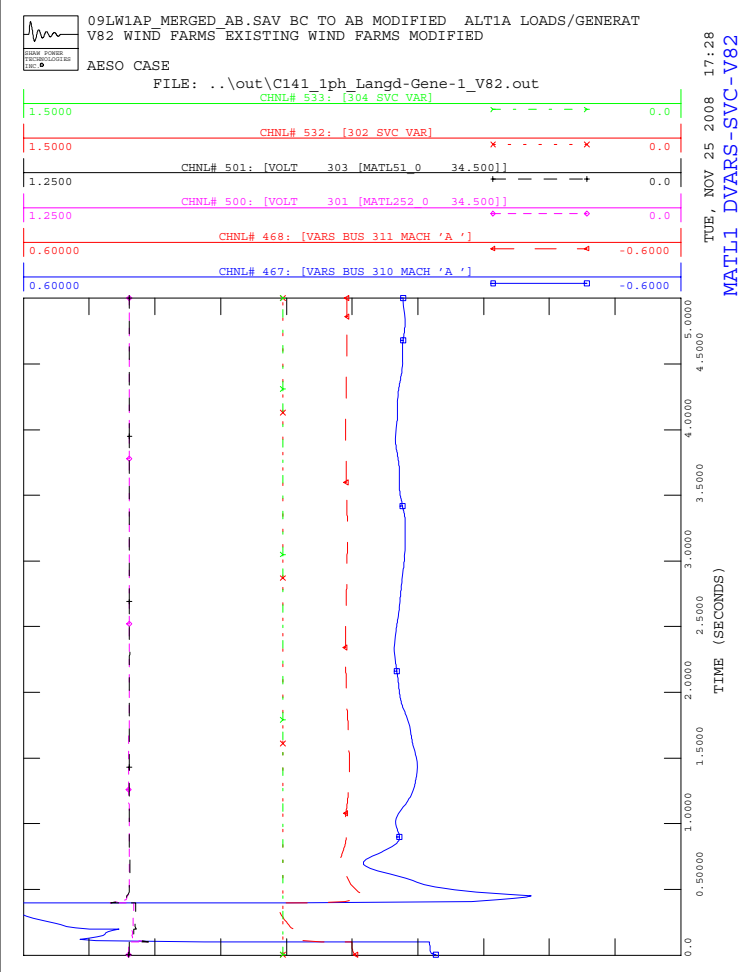
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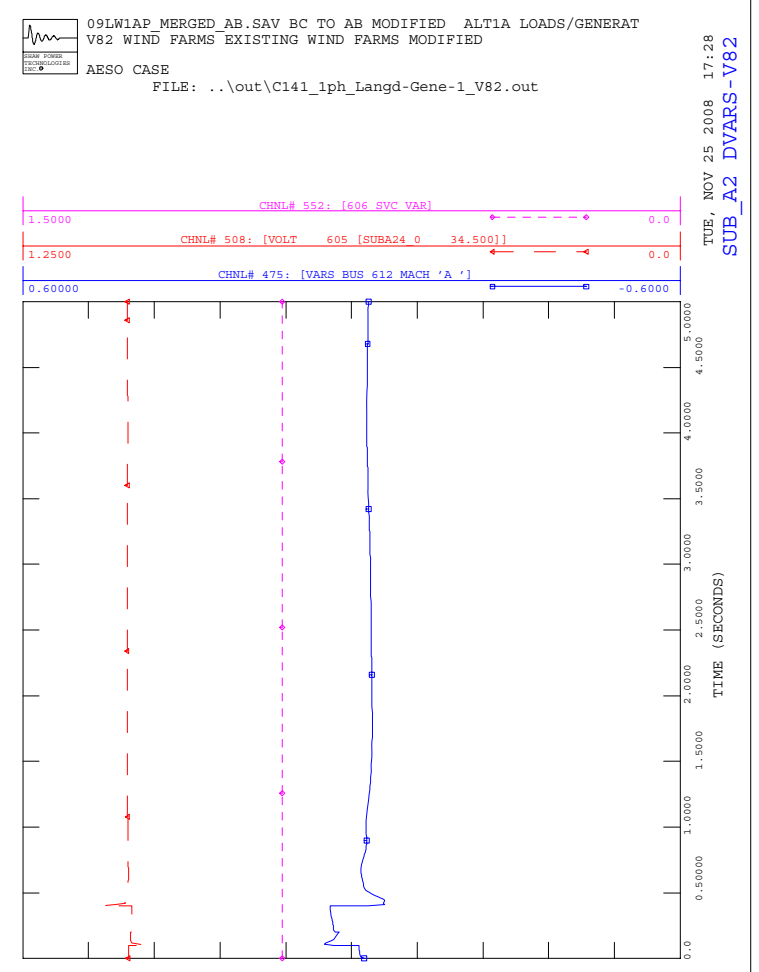
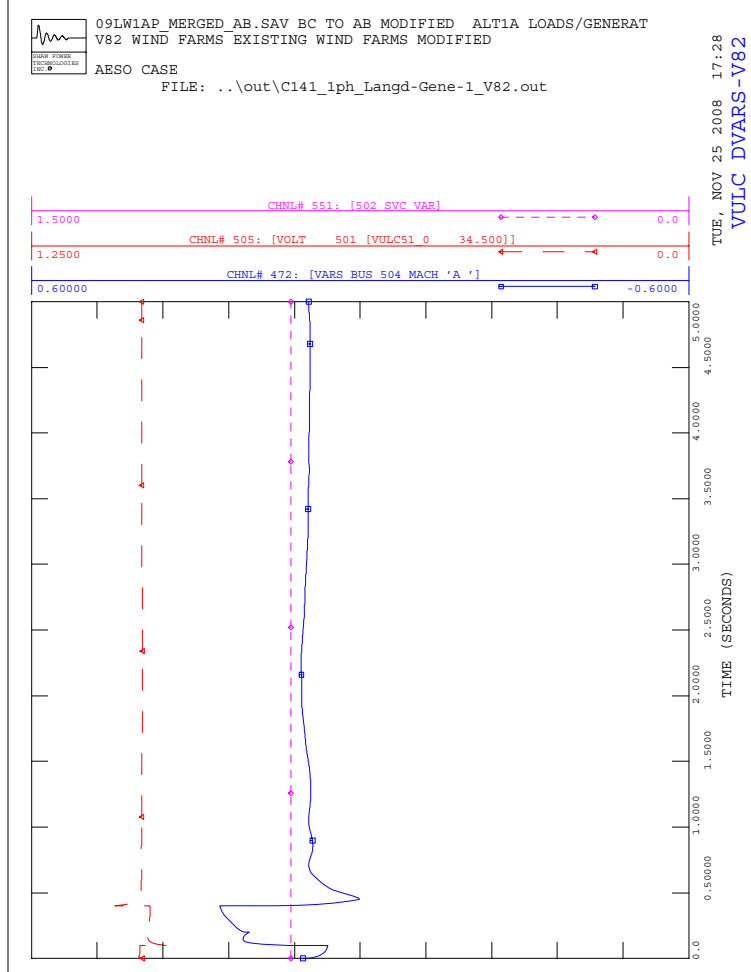
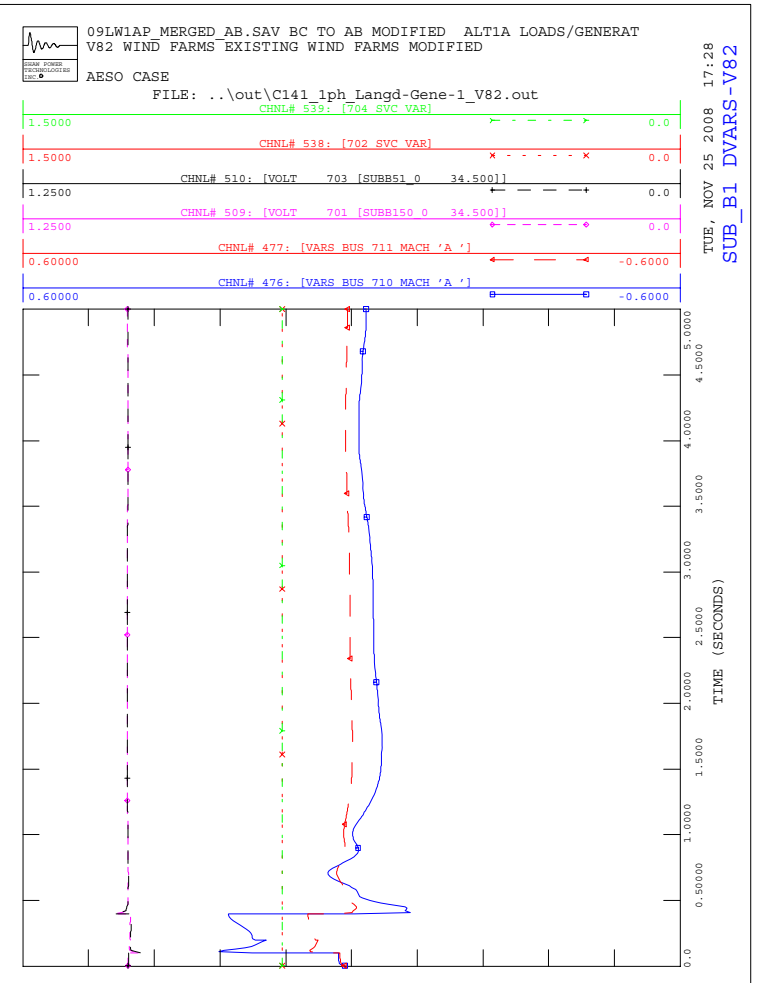
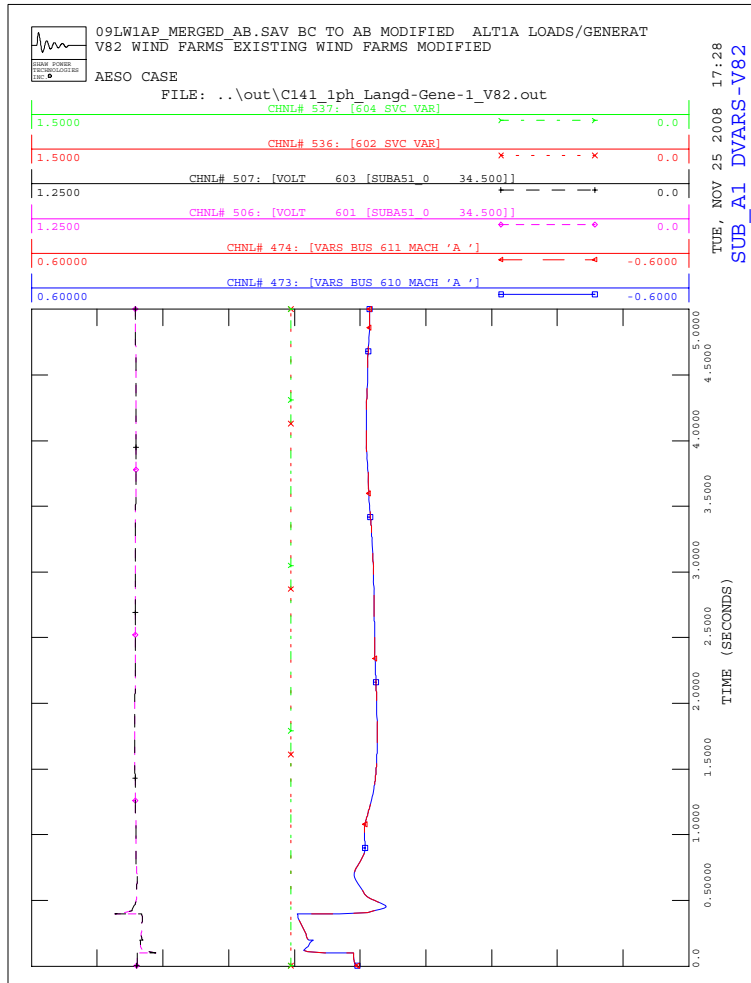


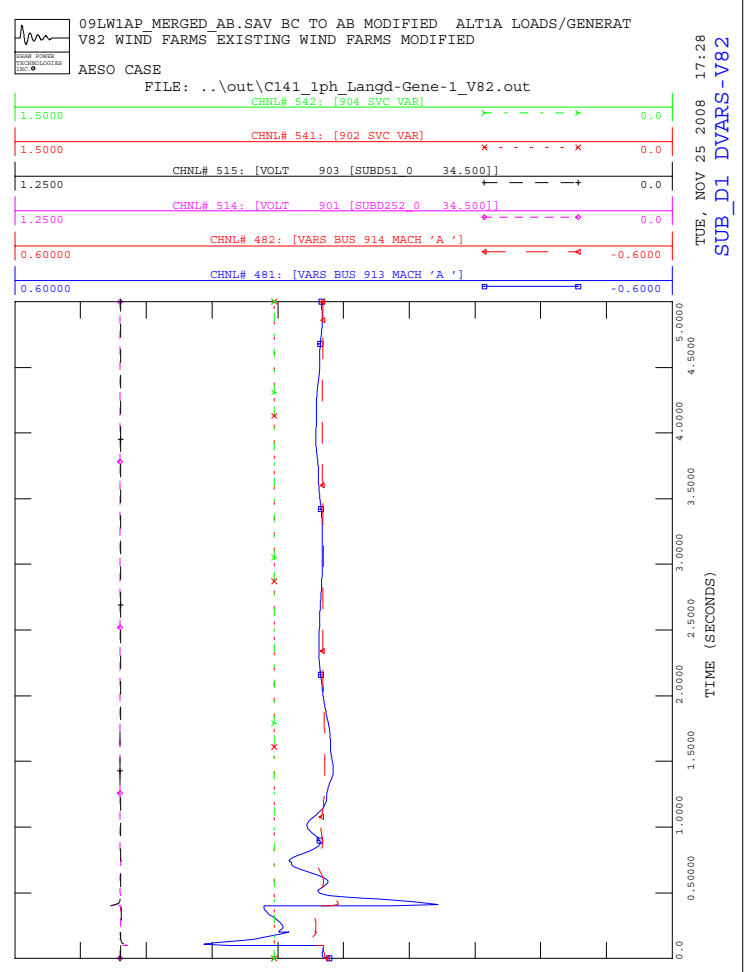
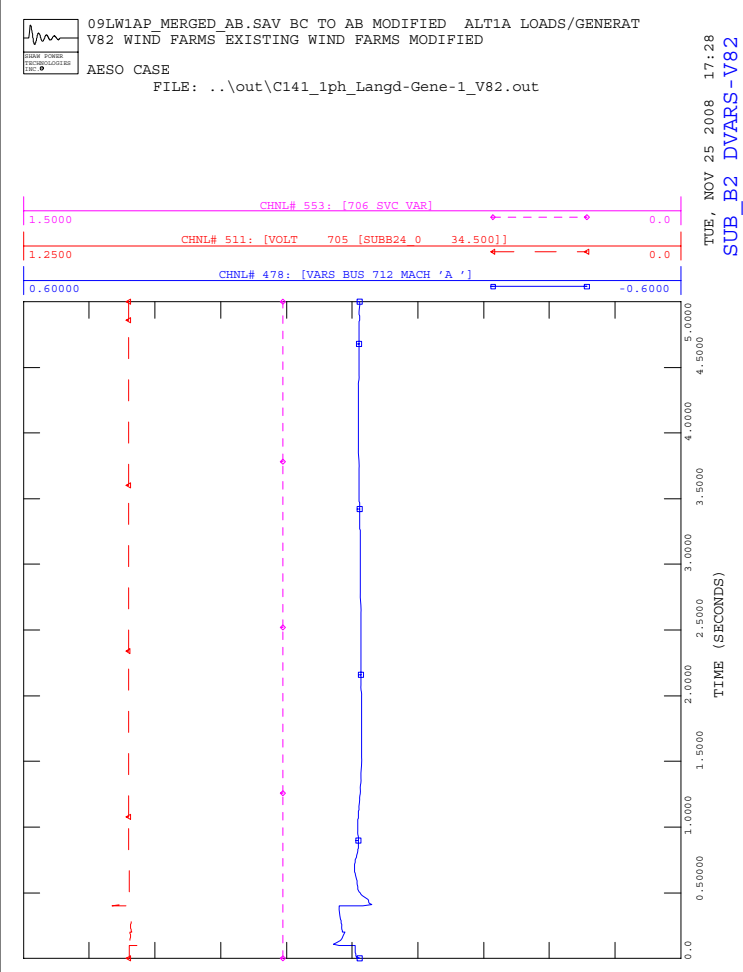
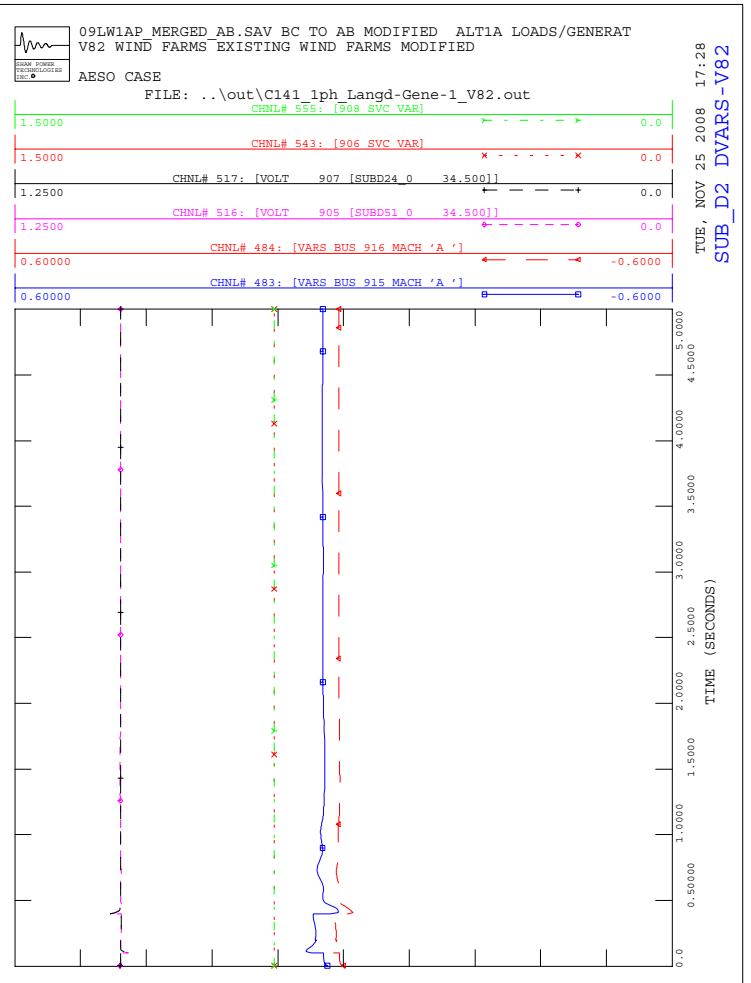
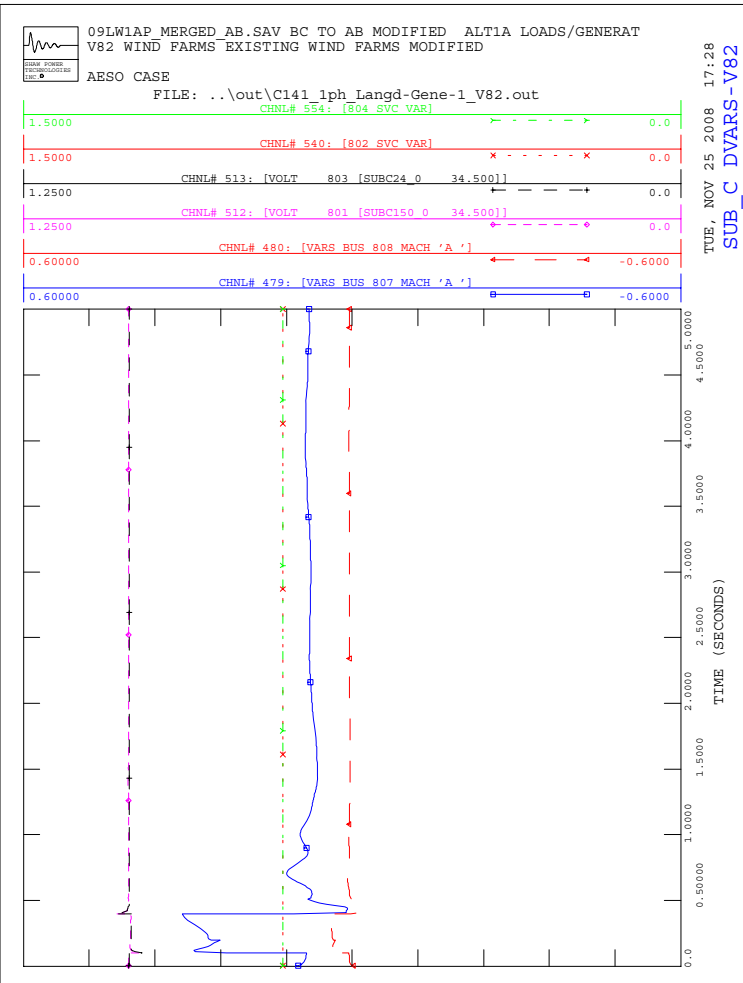


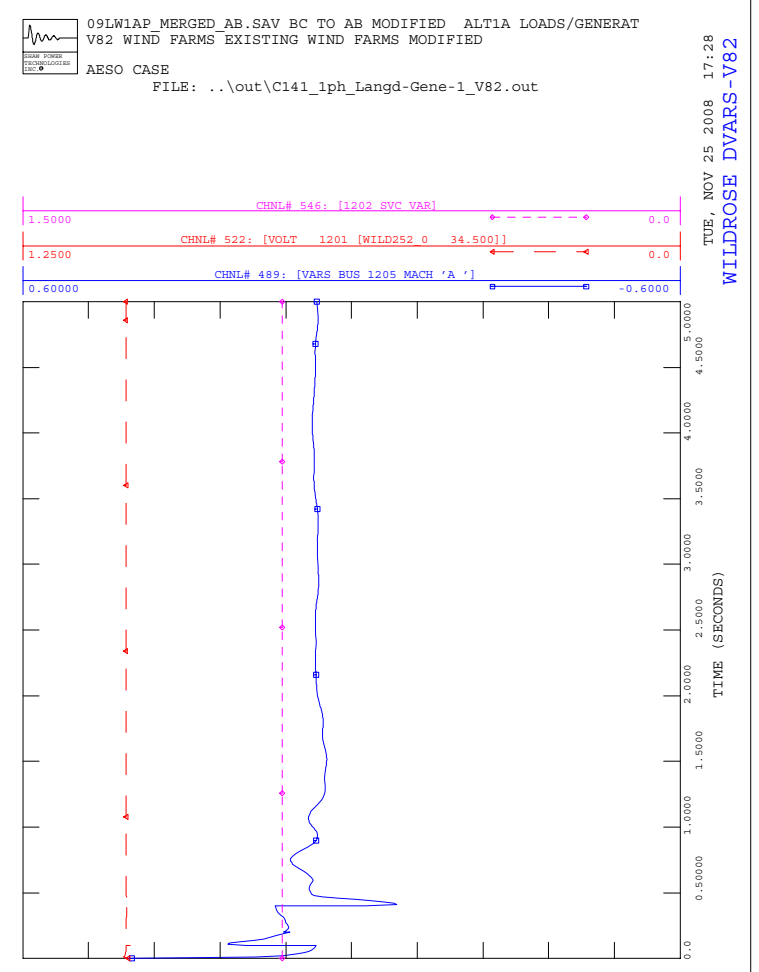
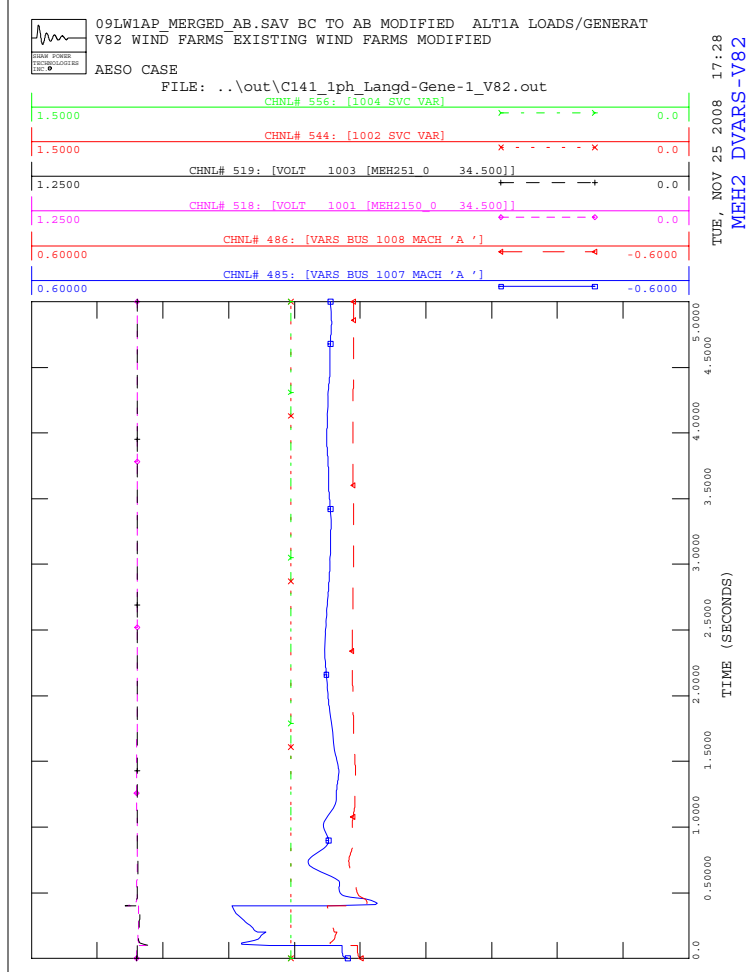
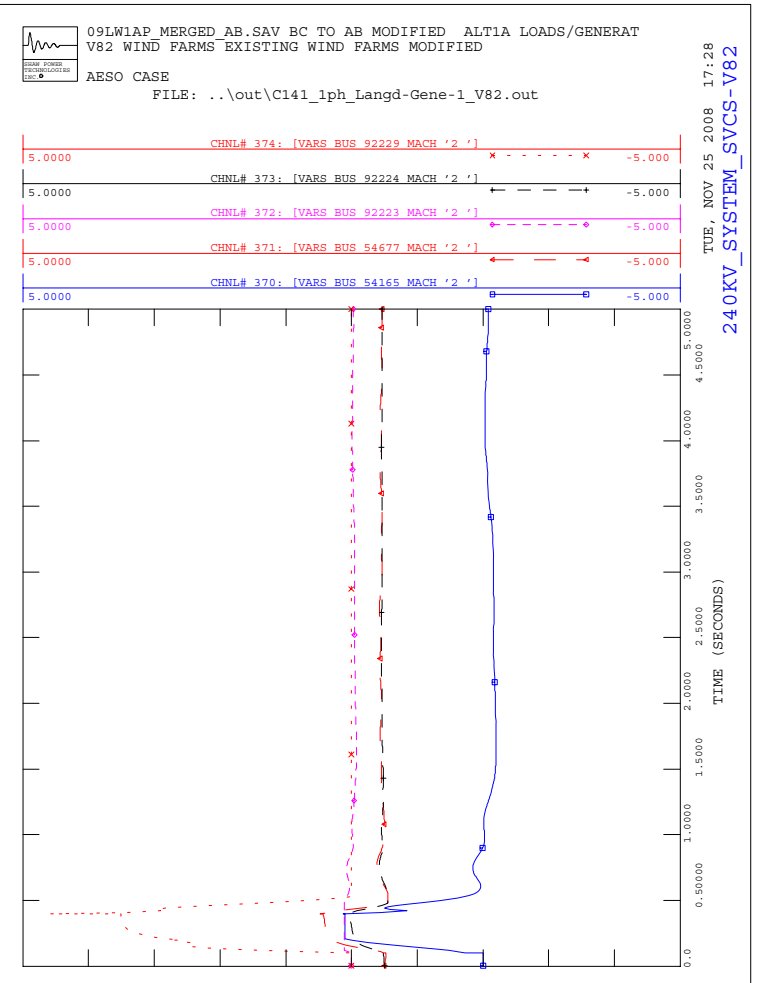
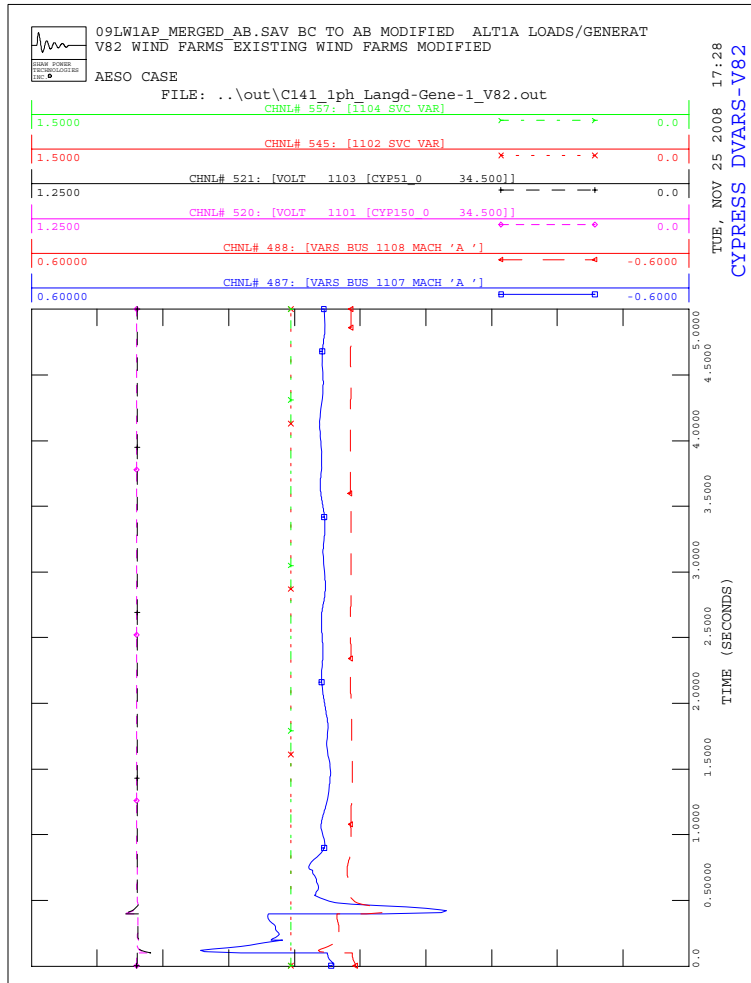








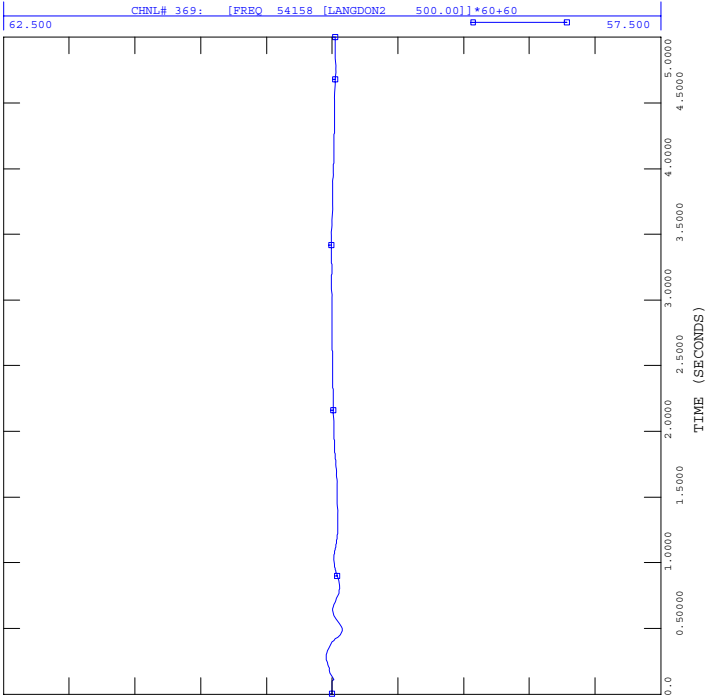






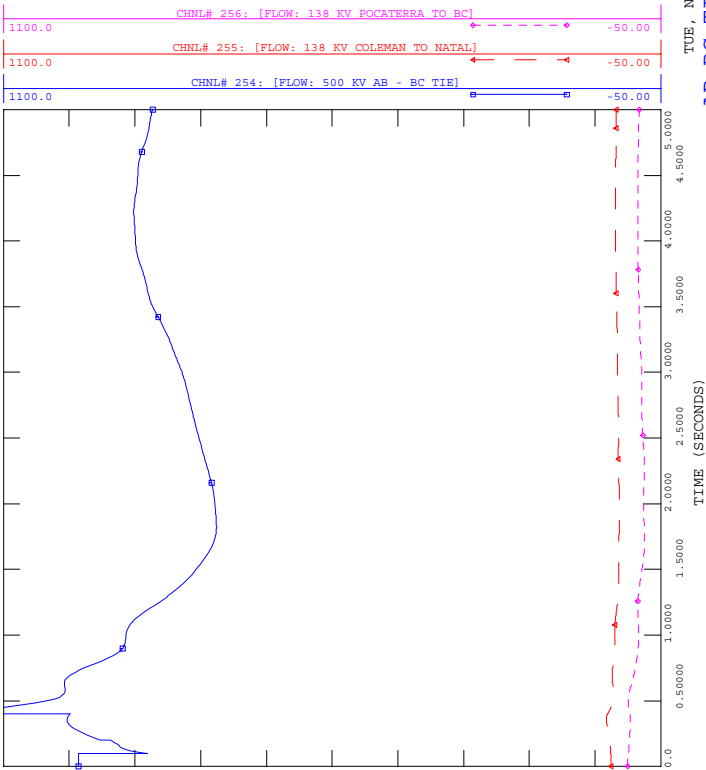
09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C141_1ph_Langd-Gen-1_V82.out

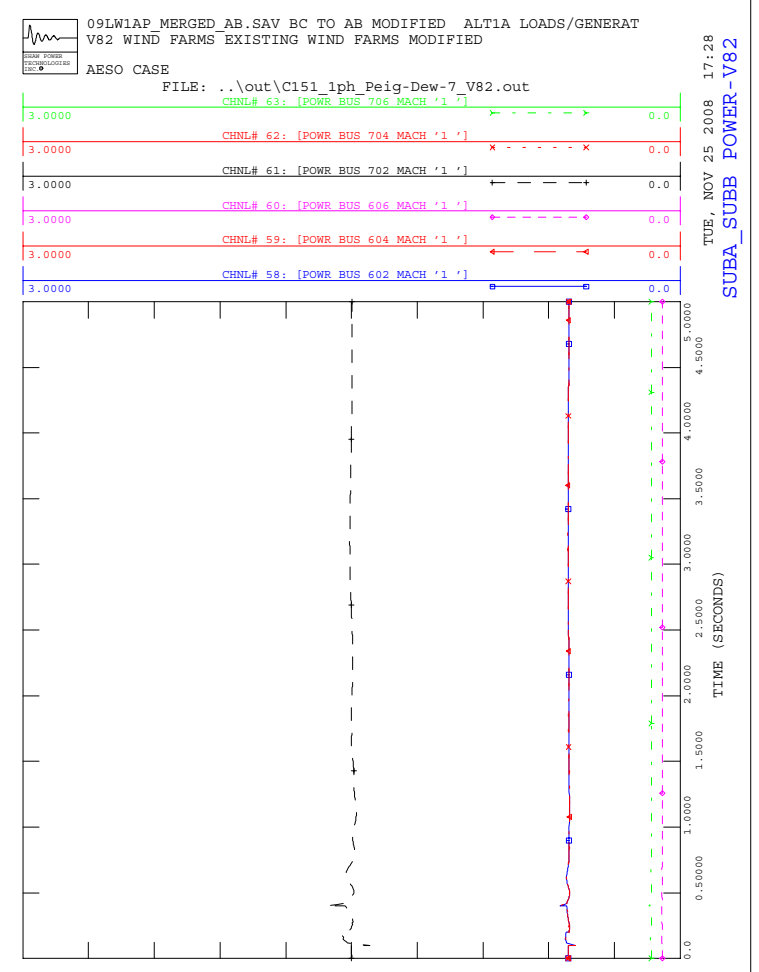
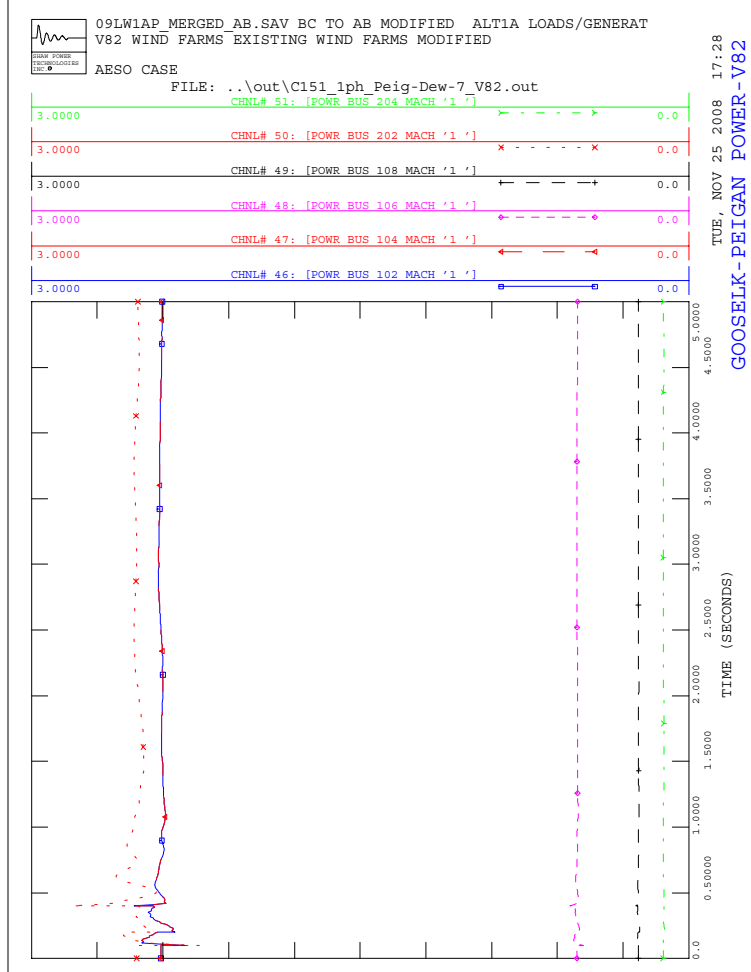
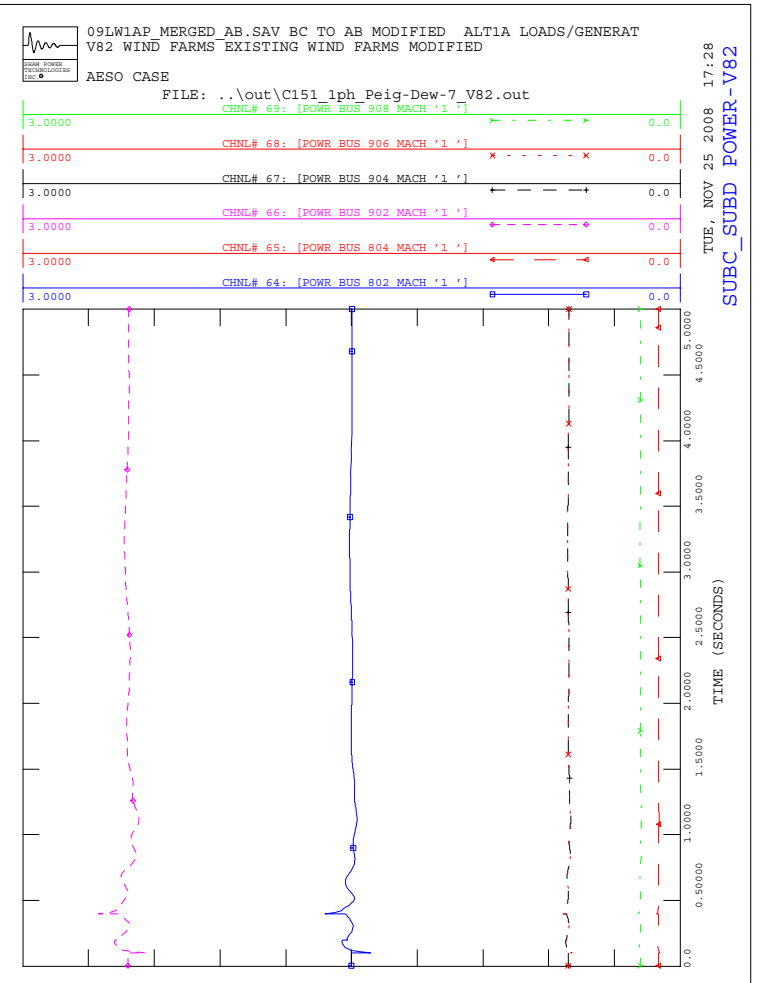
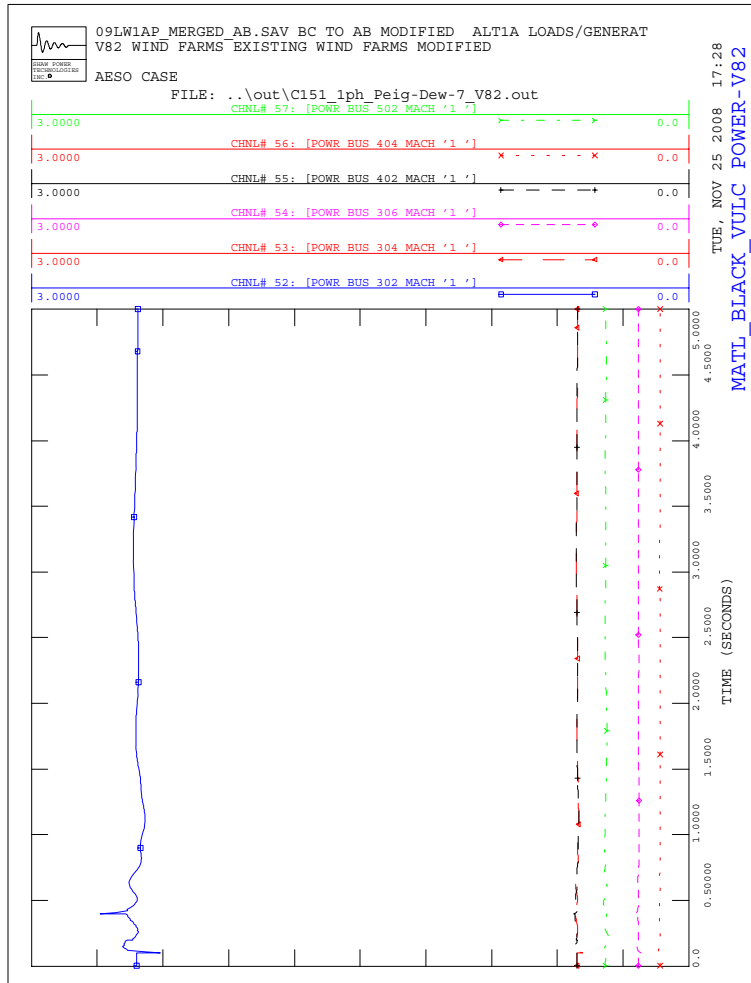
TUE, NOV 25 2008 17:28
LANGDON_FRQ-V82

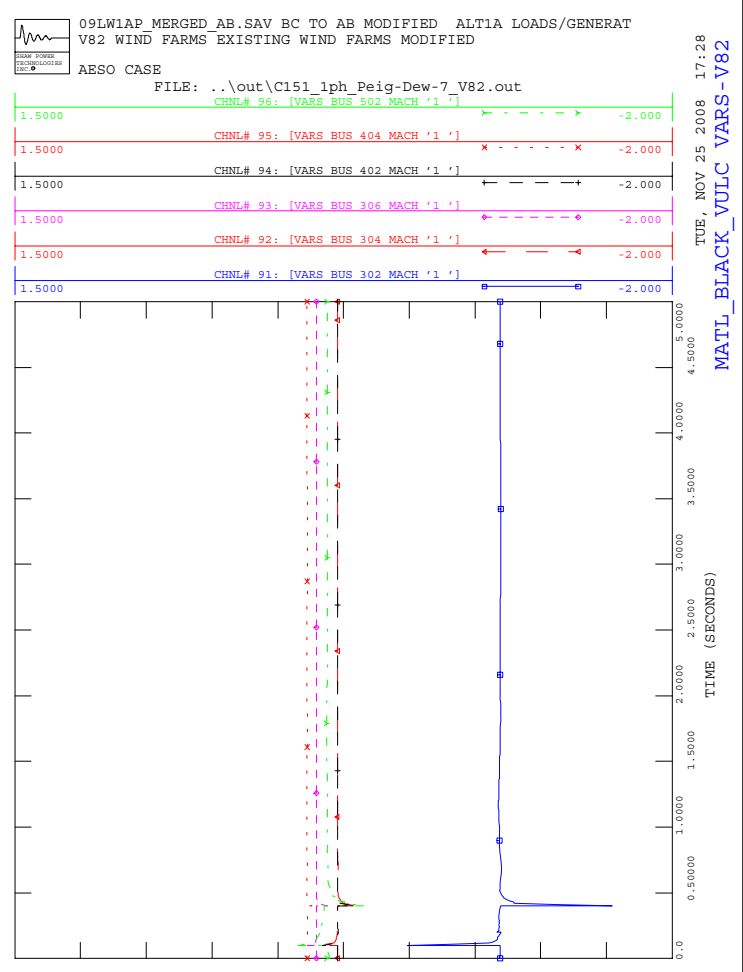
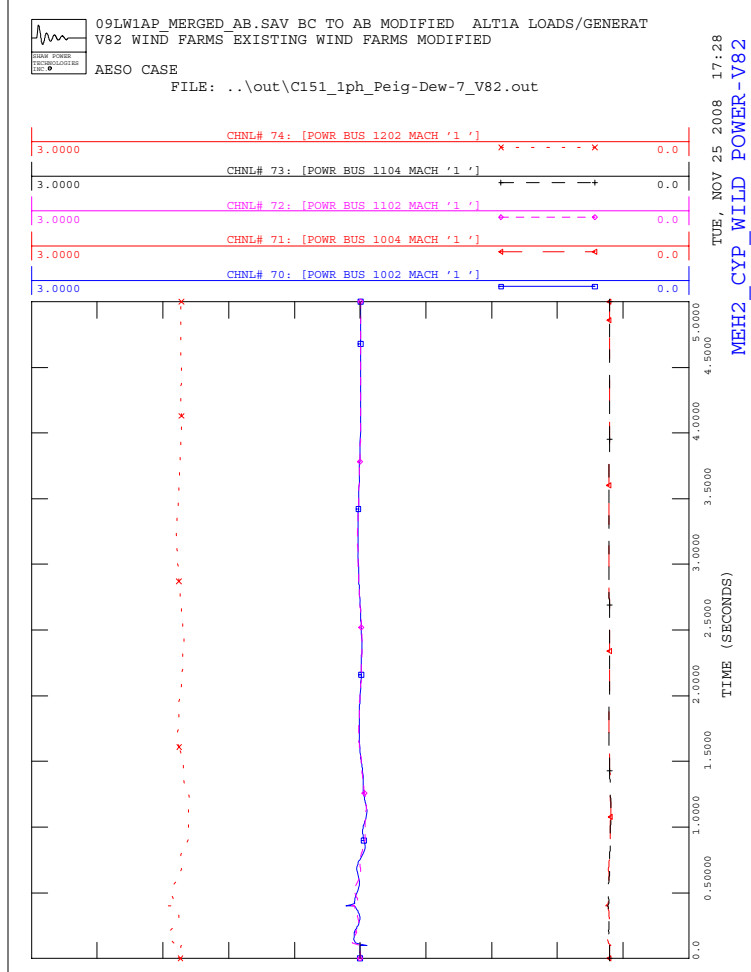
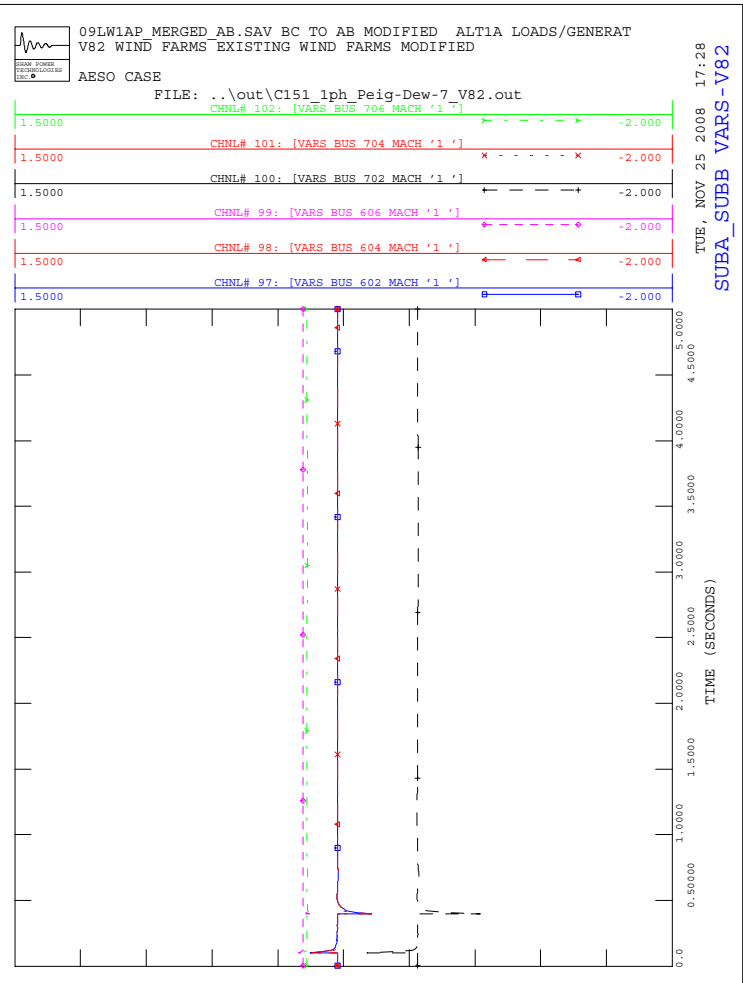
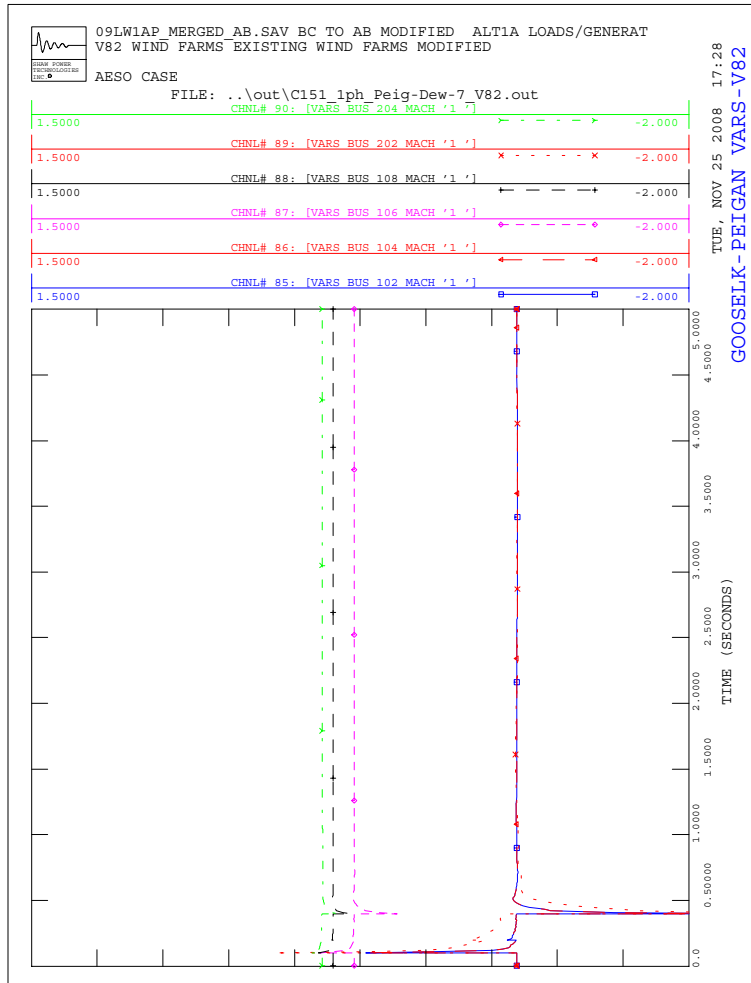


09LW1AP_MERGED_AB.SAV BC TO AB MODIFIED ALT1A LOADS/GENERAT
V82 WIND FARMS EXISTING WIND FARMS MODIFIED
ABSO CASE
FILE: ..\out\C141_1ph_Langd-Gen-1_V82.out

TUE, NOV 25 2008 17:28
AB_BC_TIE_FLOWS-V82

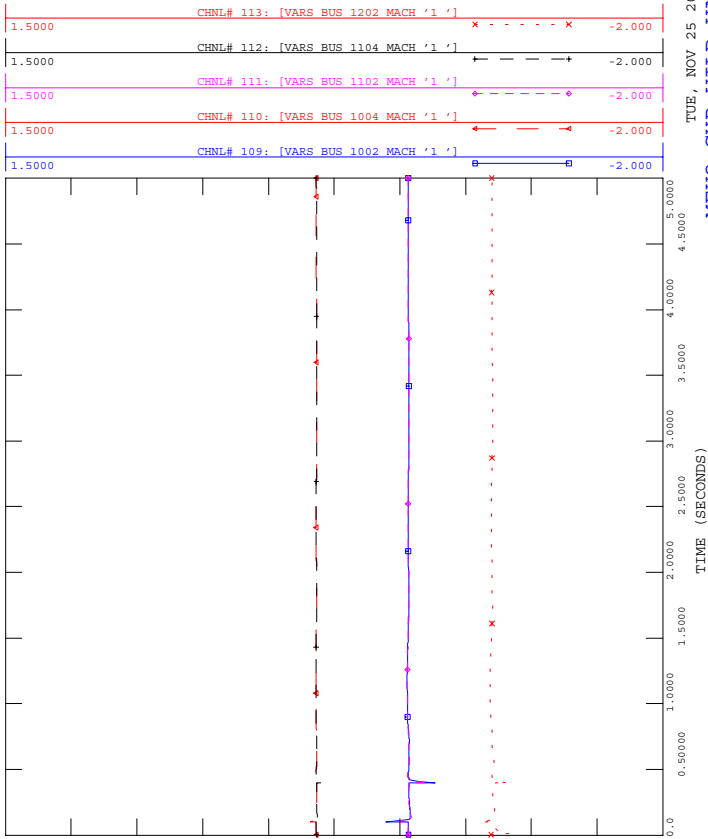






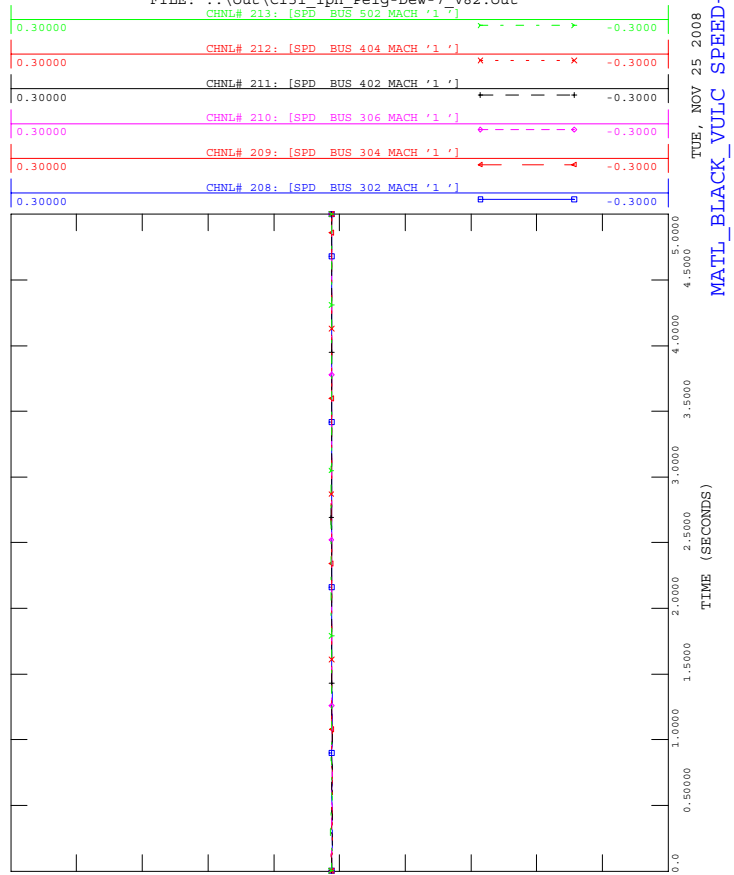
09LWIAP_MERGED_AB.SAV BC TO AB MODIFIED ALTI1A LOADS/GENERAT
 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

FILE: ..\out\C151_1ph_Peig-Dew-7_V82.out



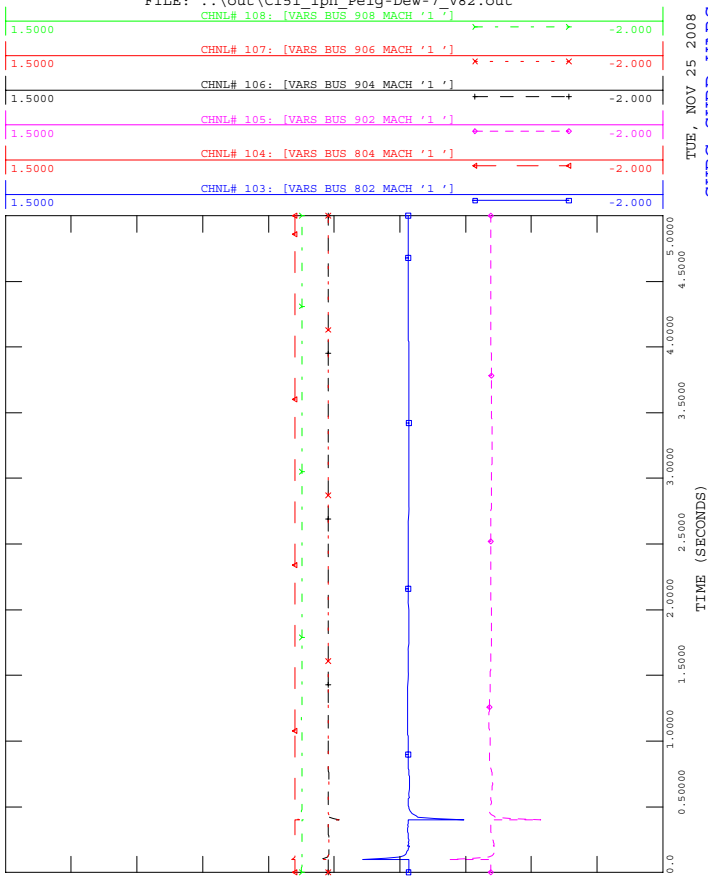
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 AESO CASE

FILE: ..\out\C151_1ph_Peig-Dew-7_V82.out



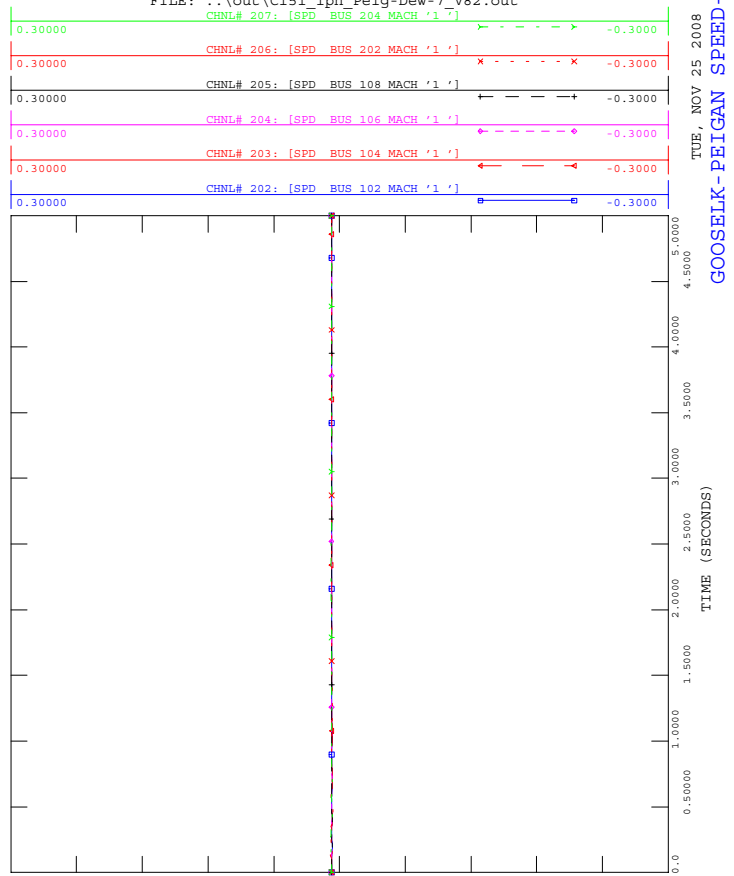
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

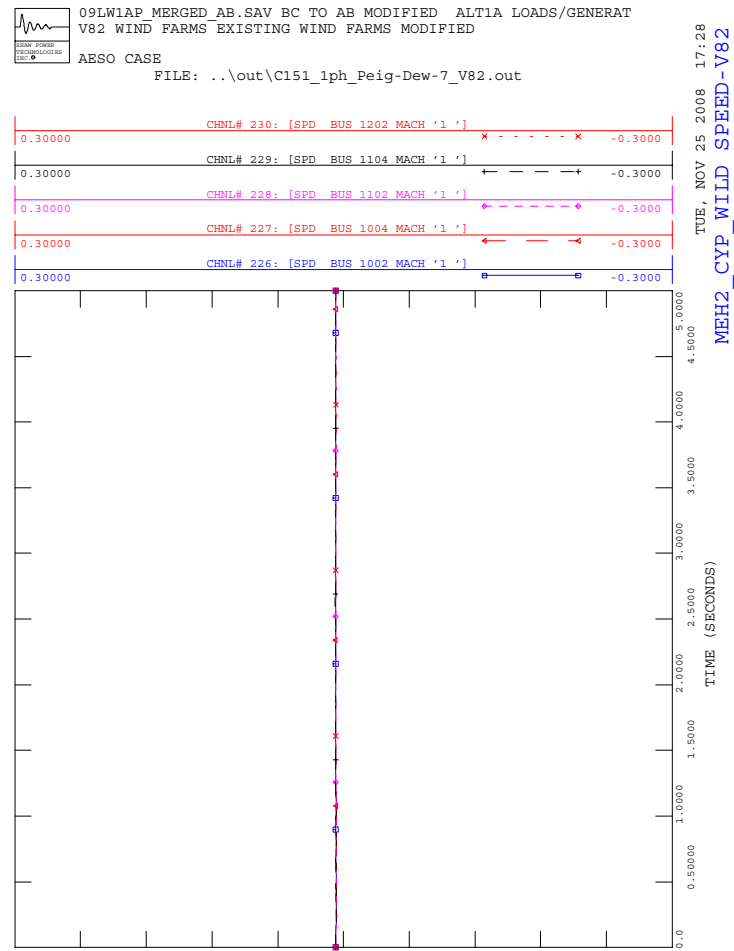
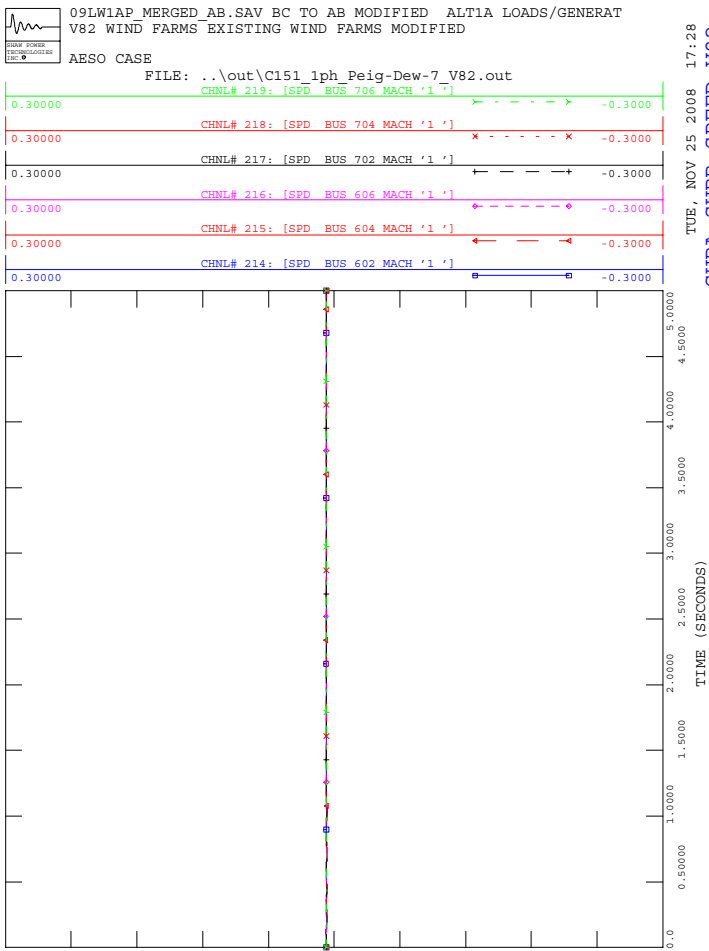
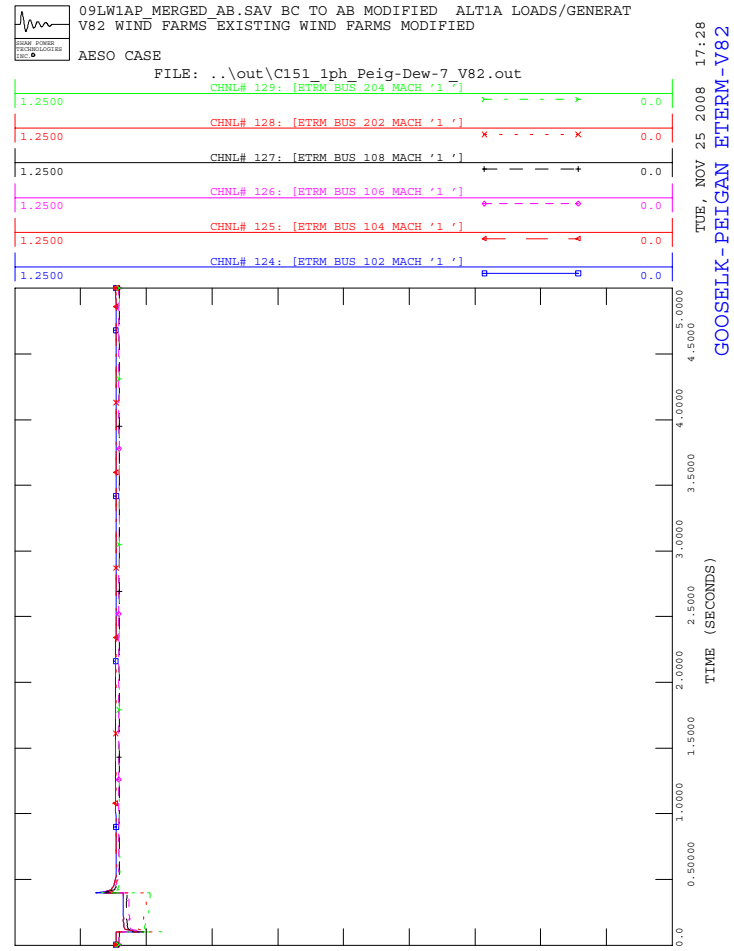
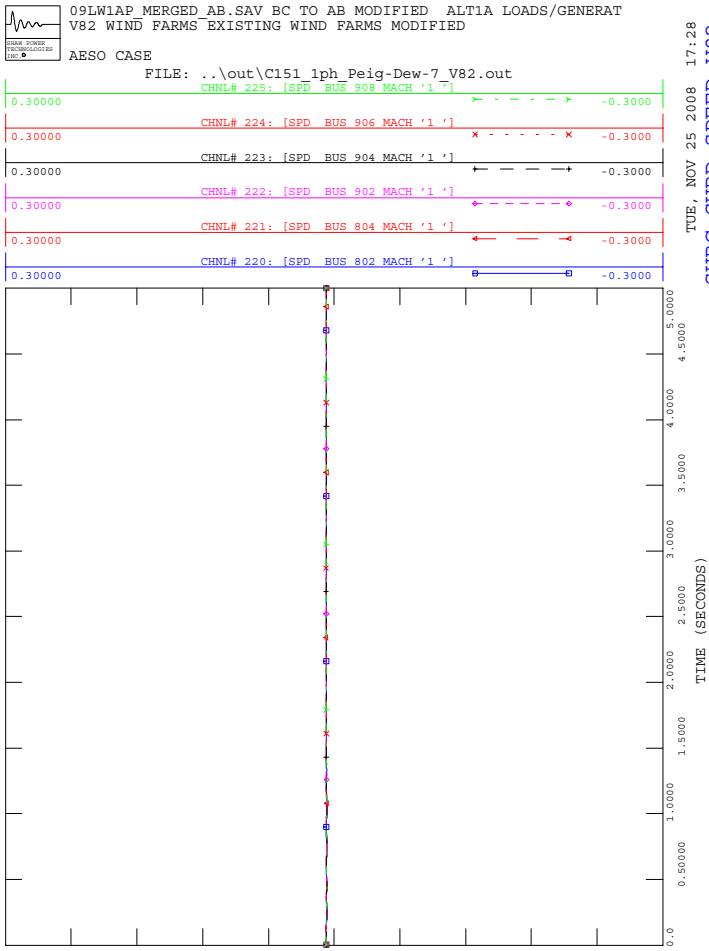
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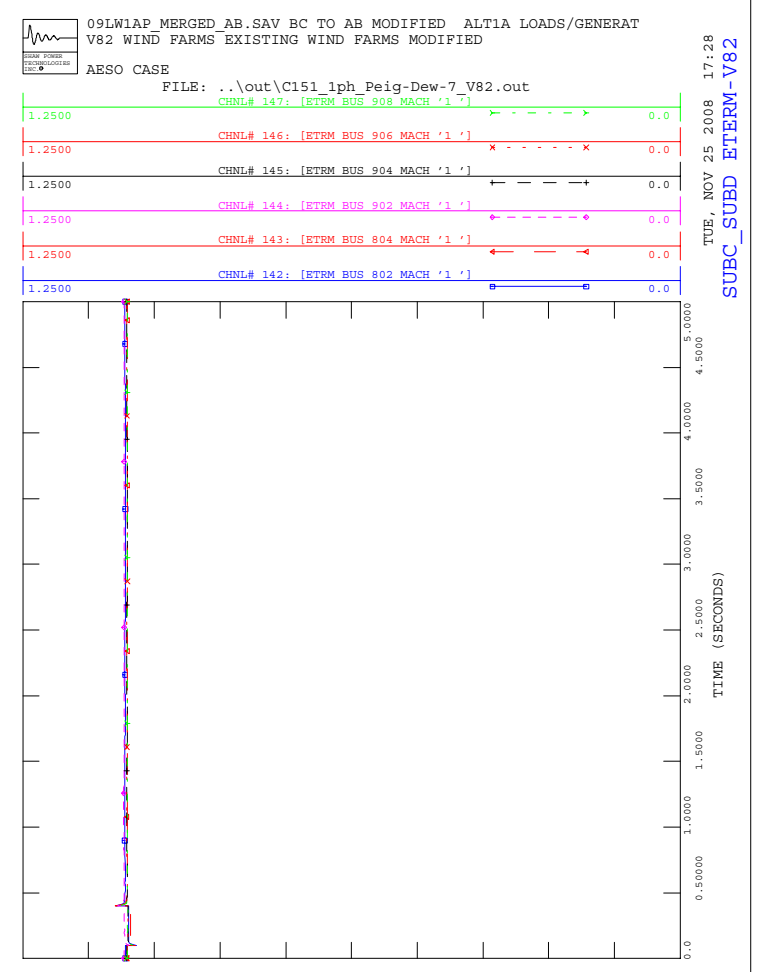
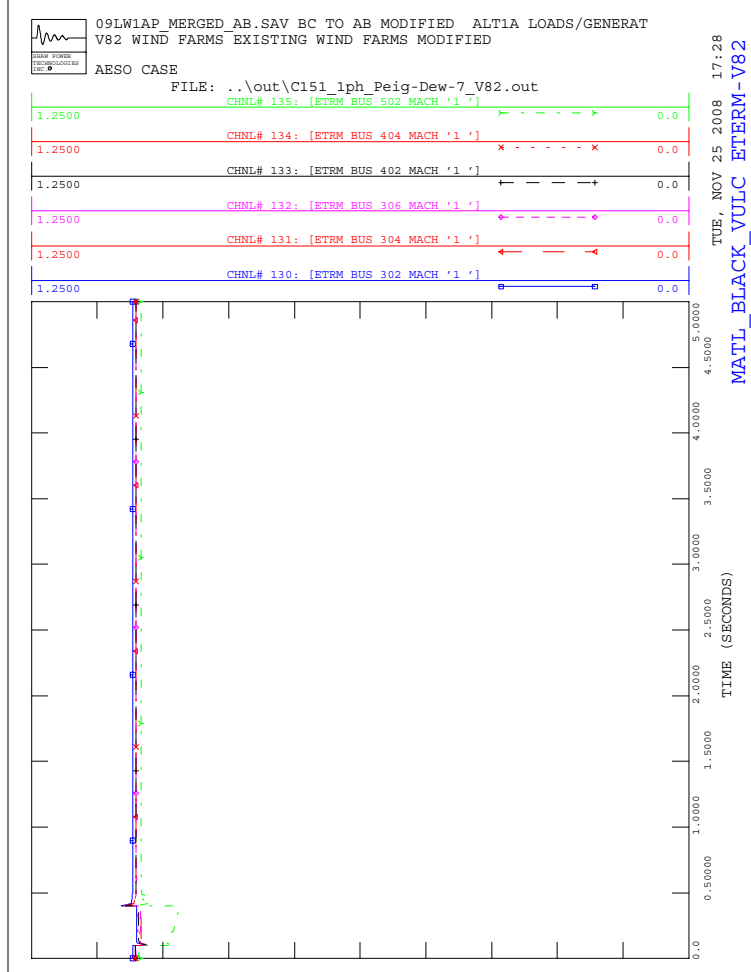
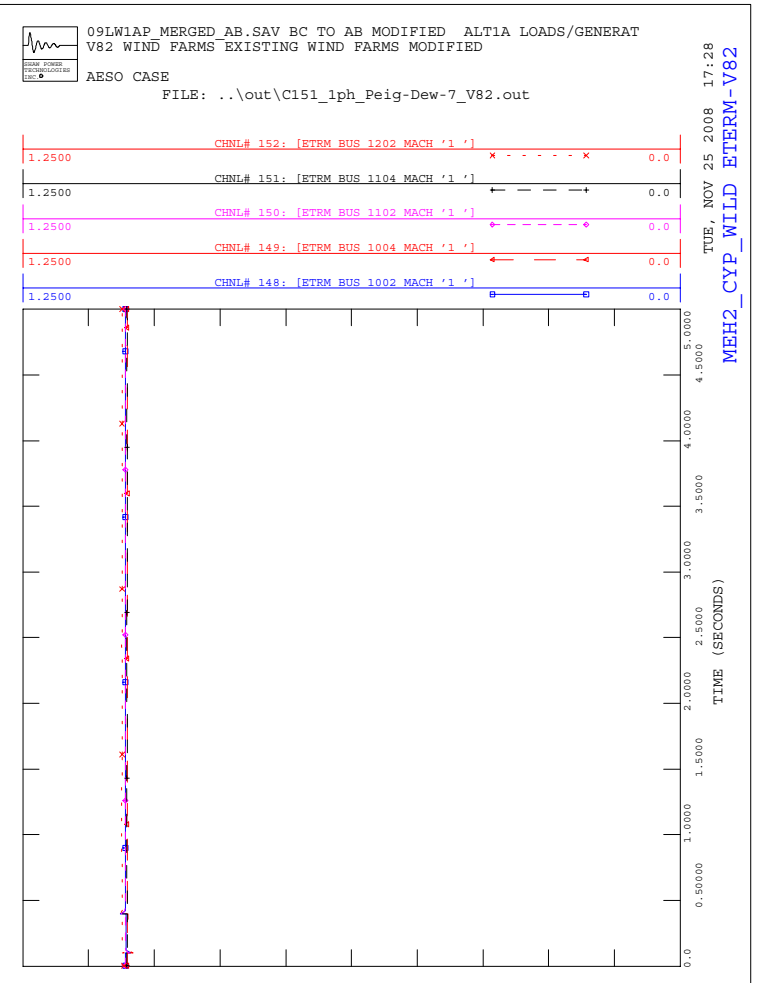
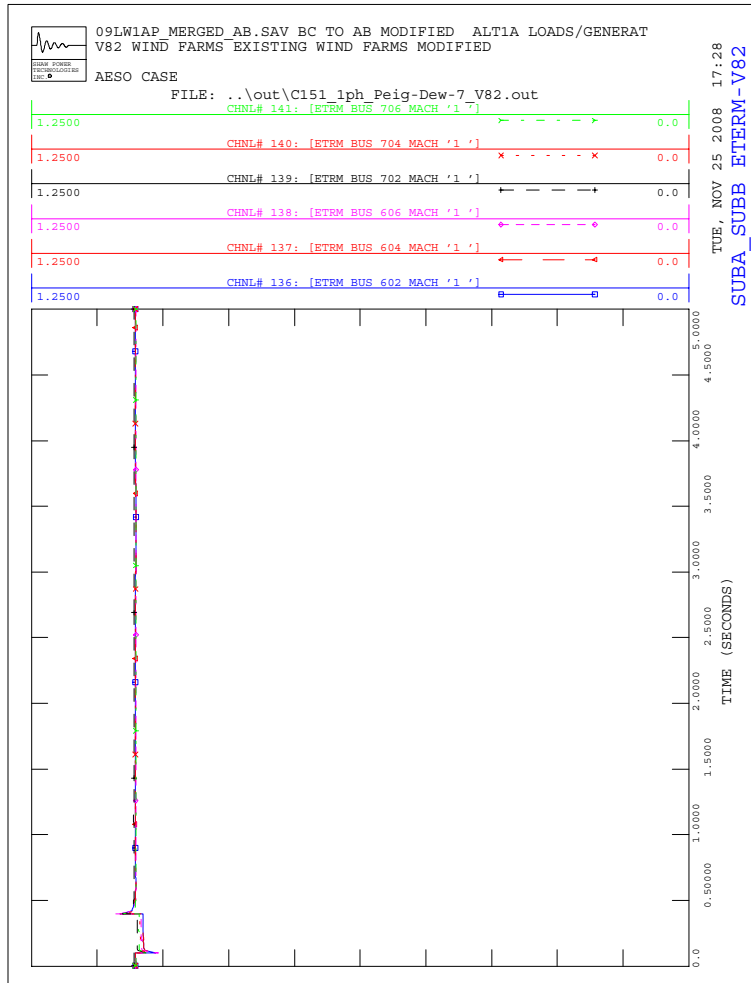


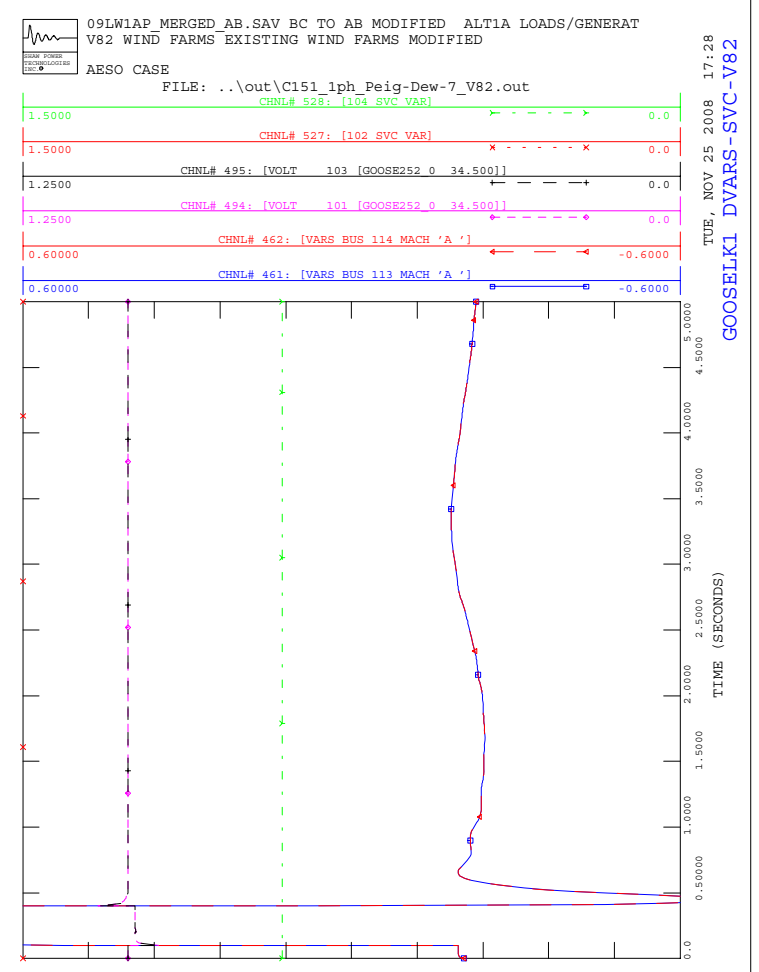
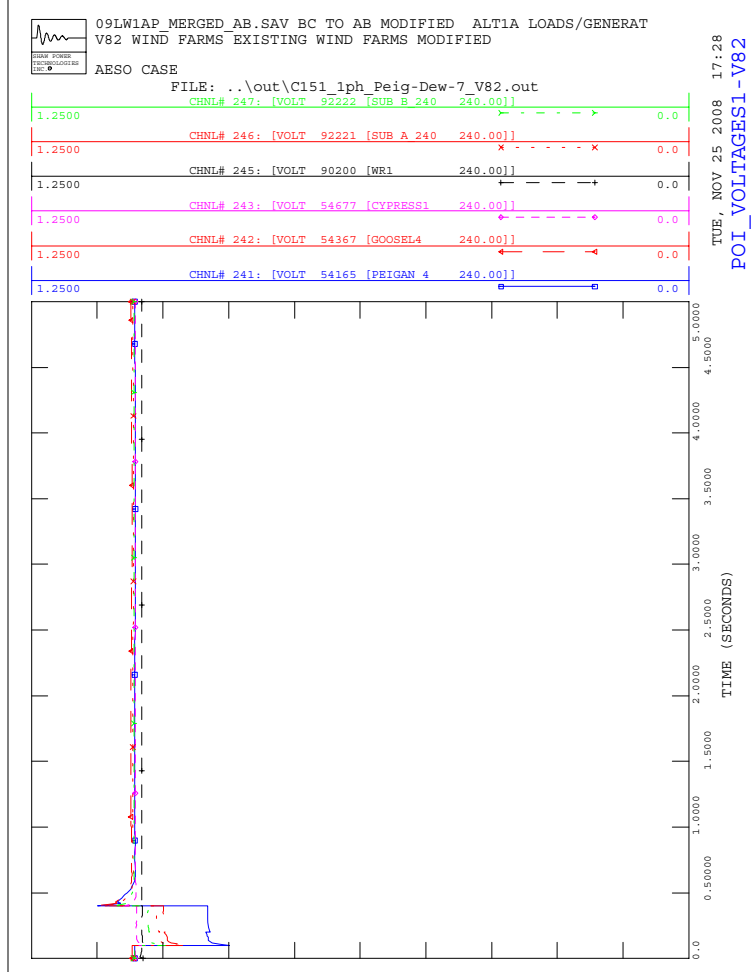
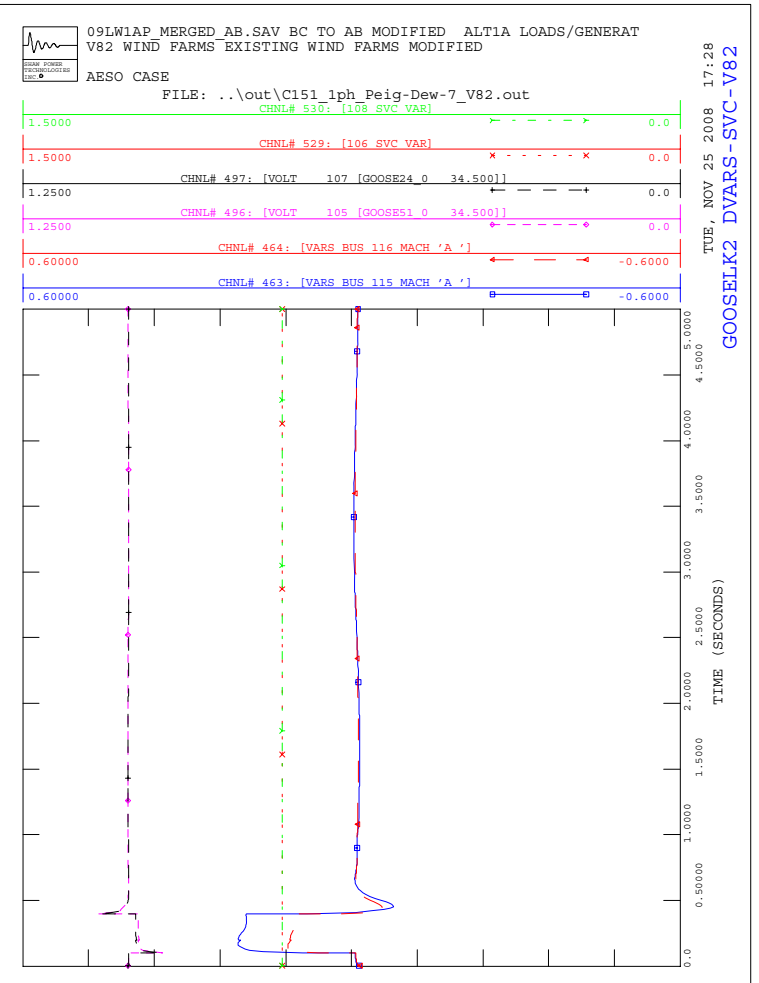
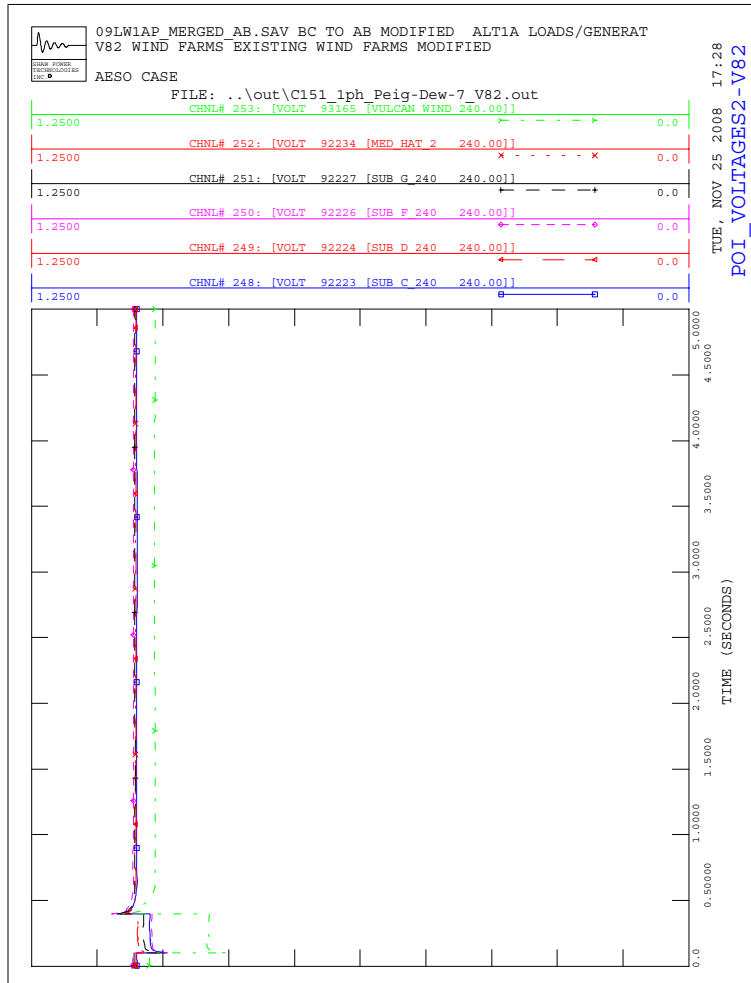
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 V82 WIND FARMS EXISTING WIND FARMS MODIFIED
 AESO CASE

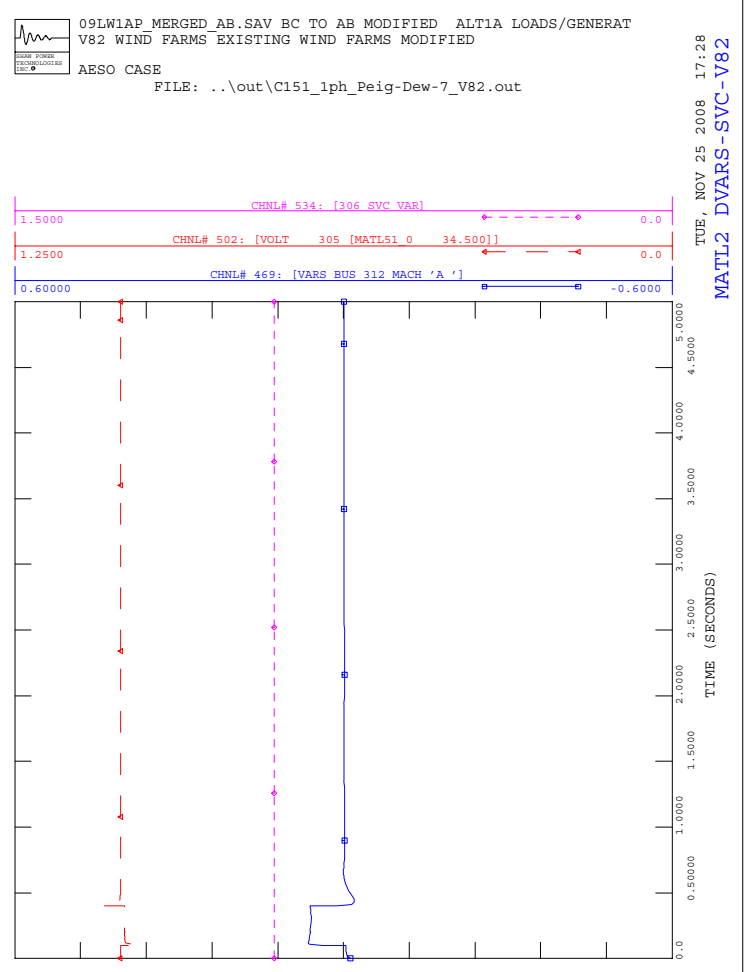
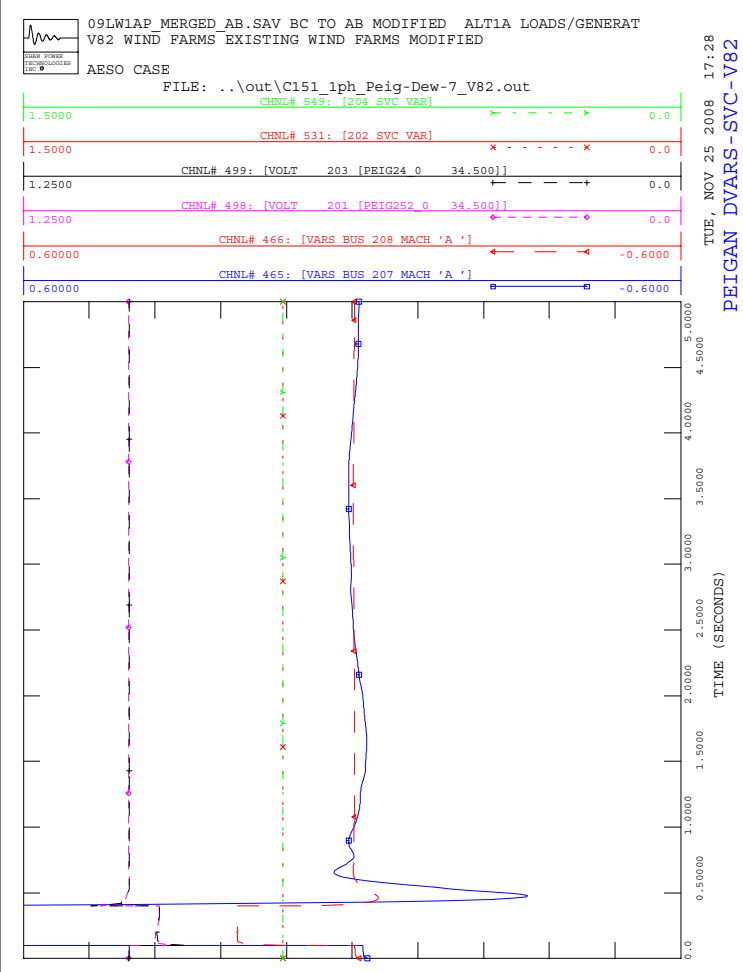
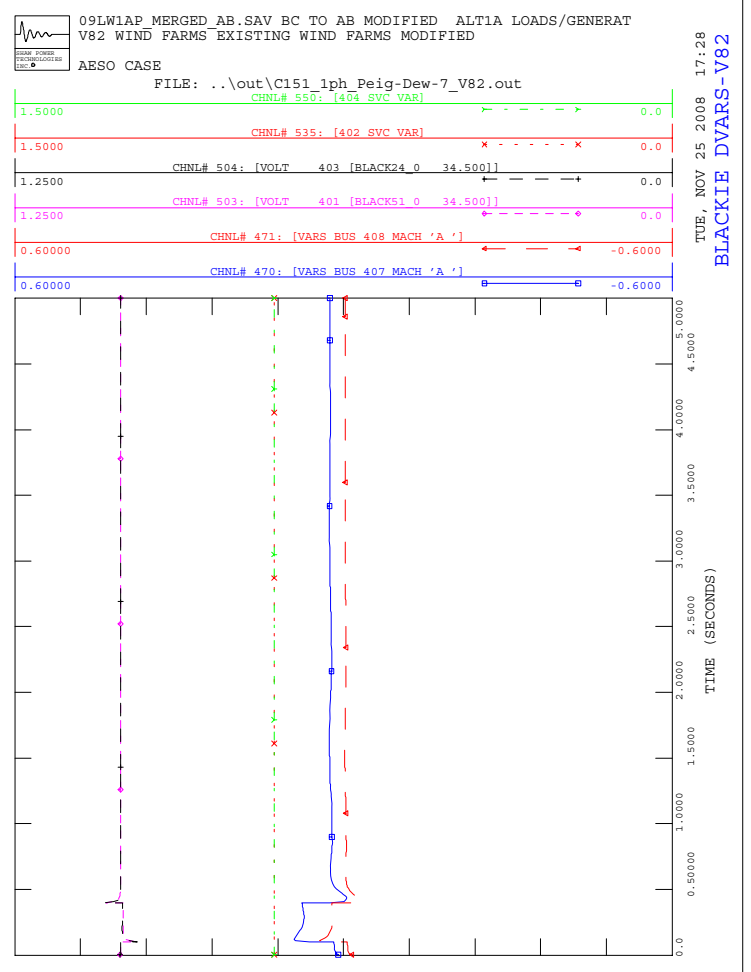
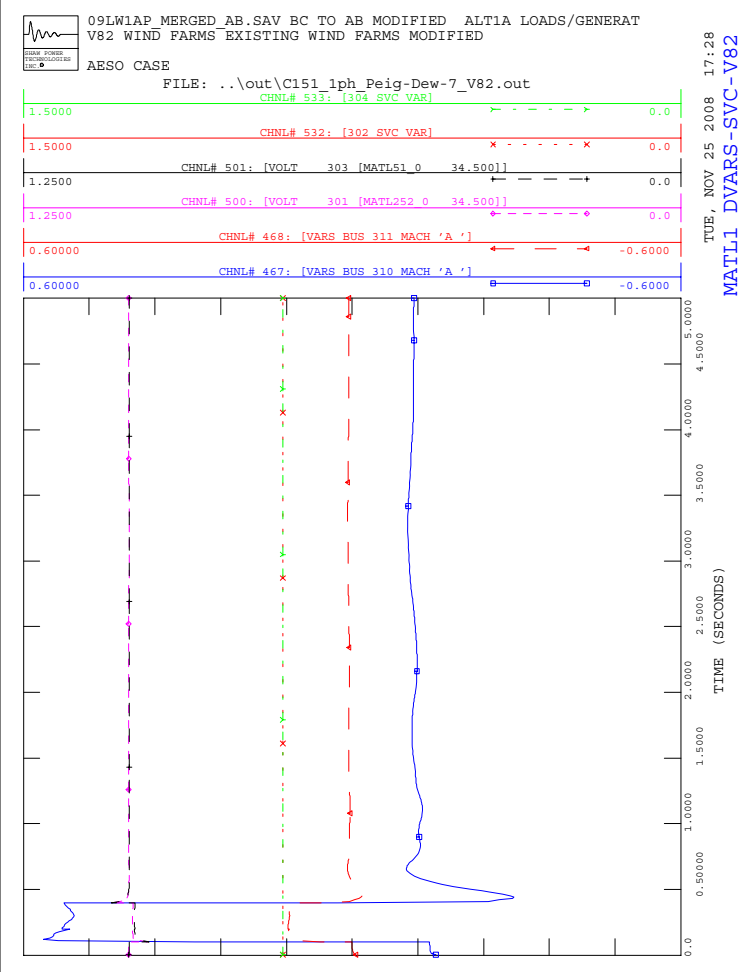
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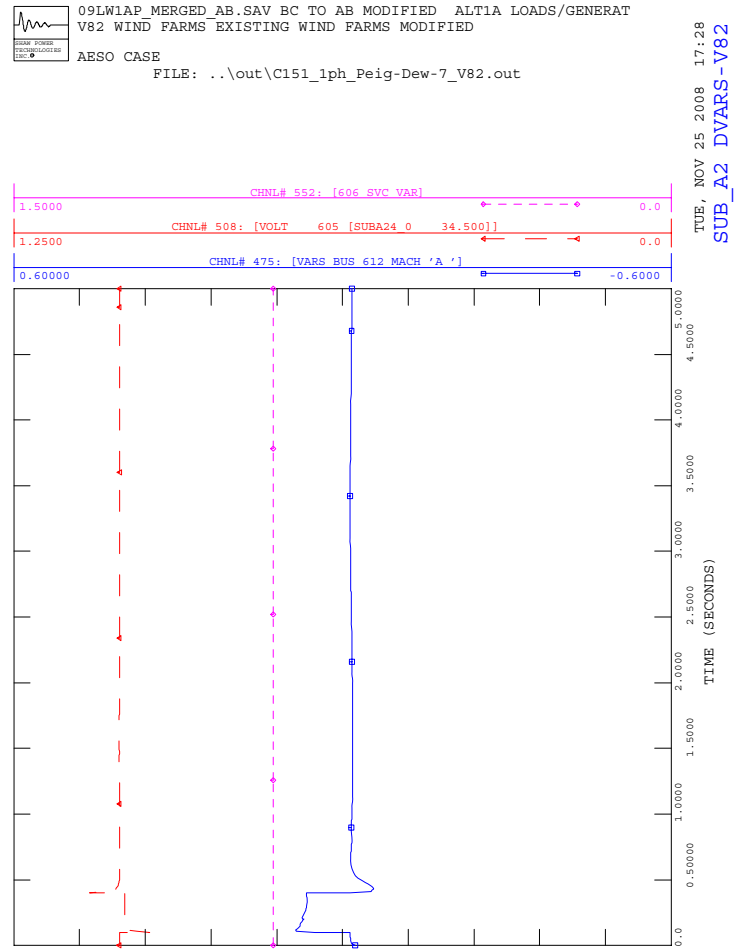
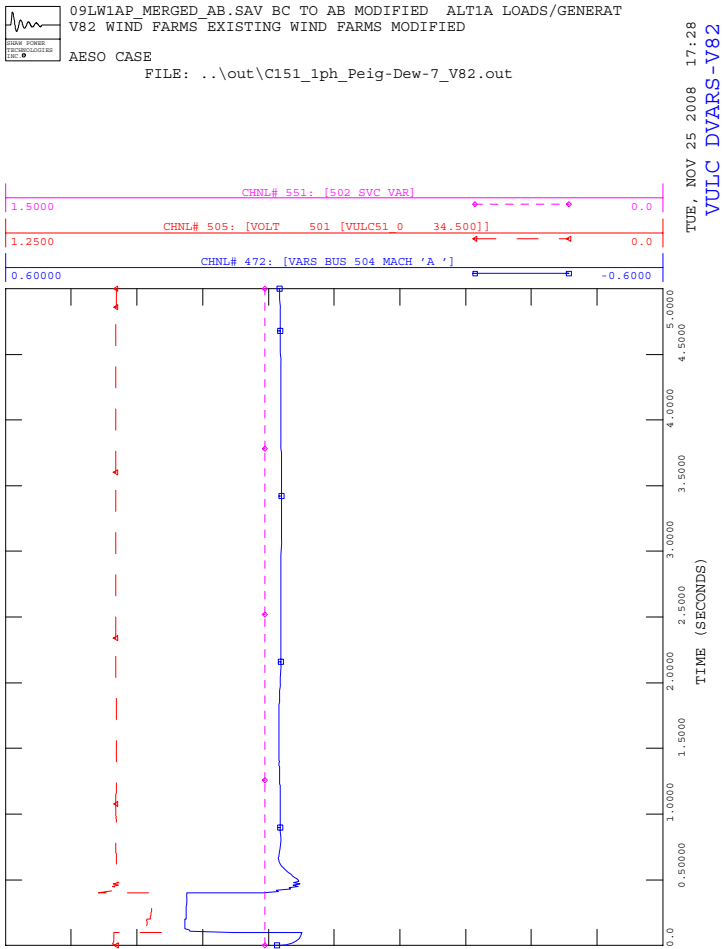
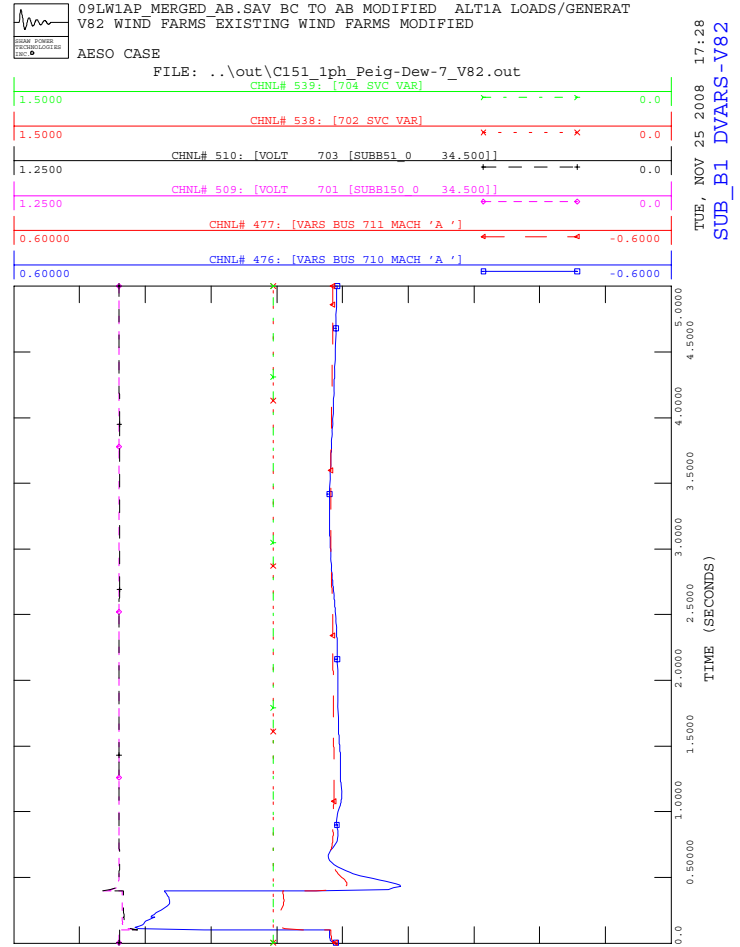
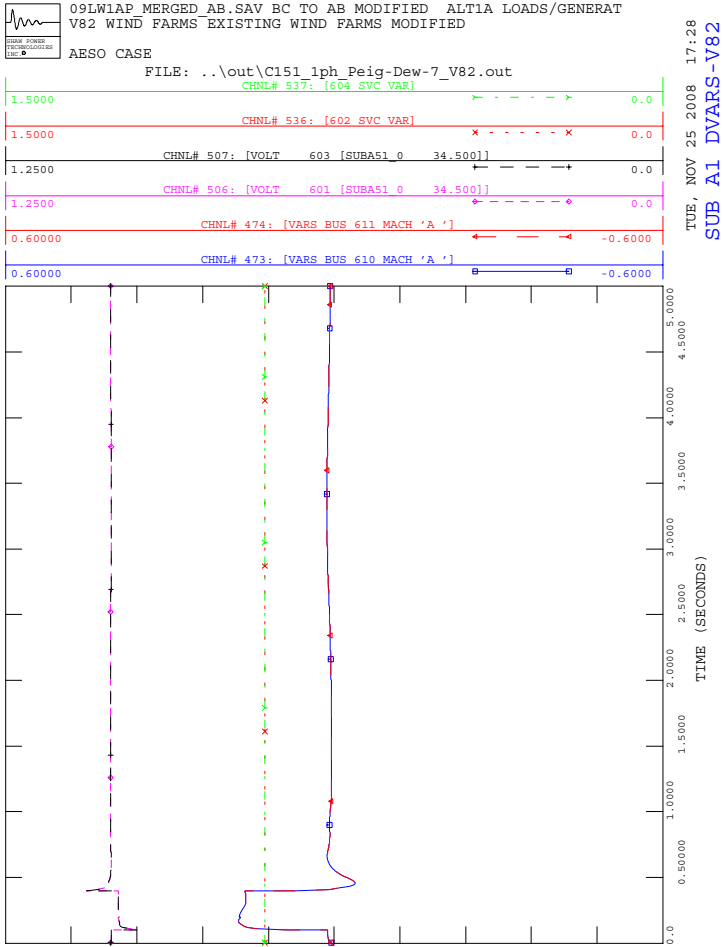


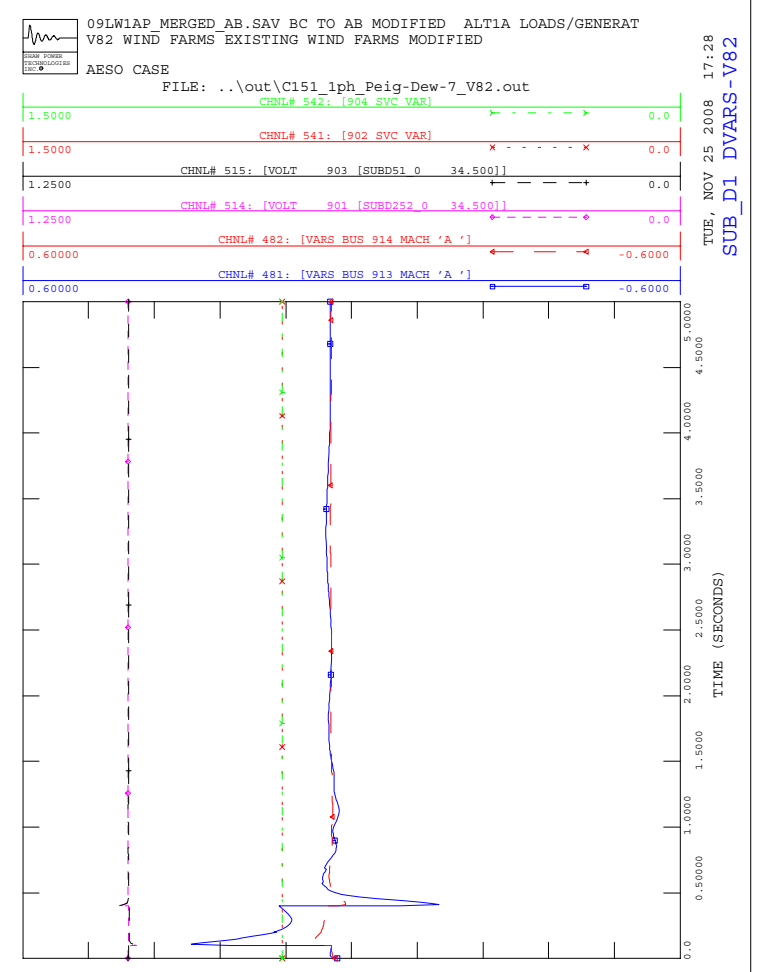
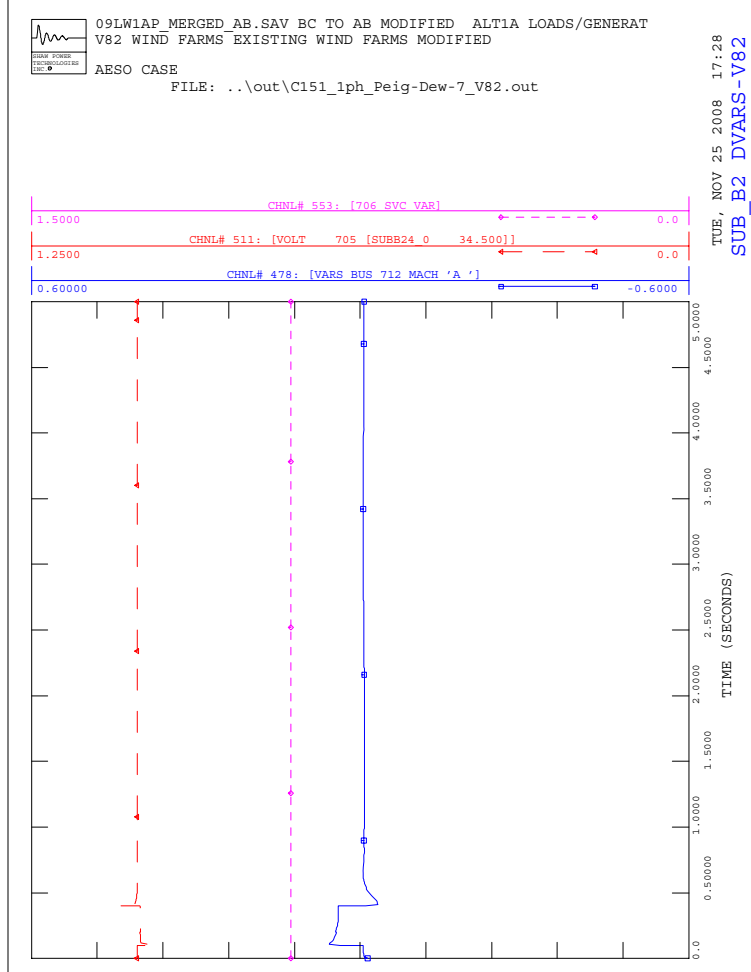
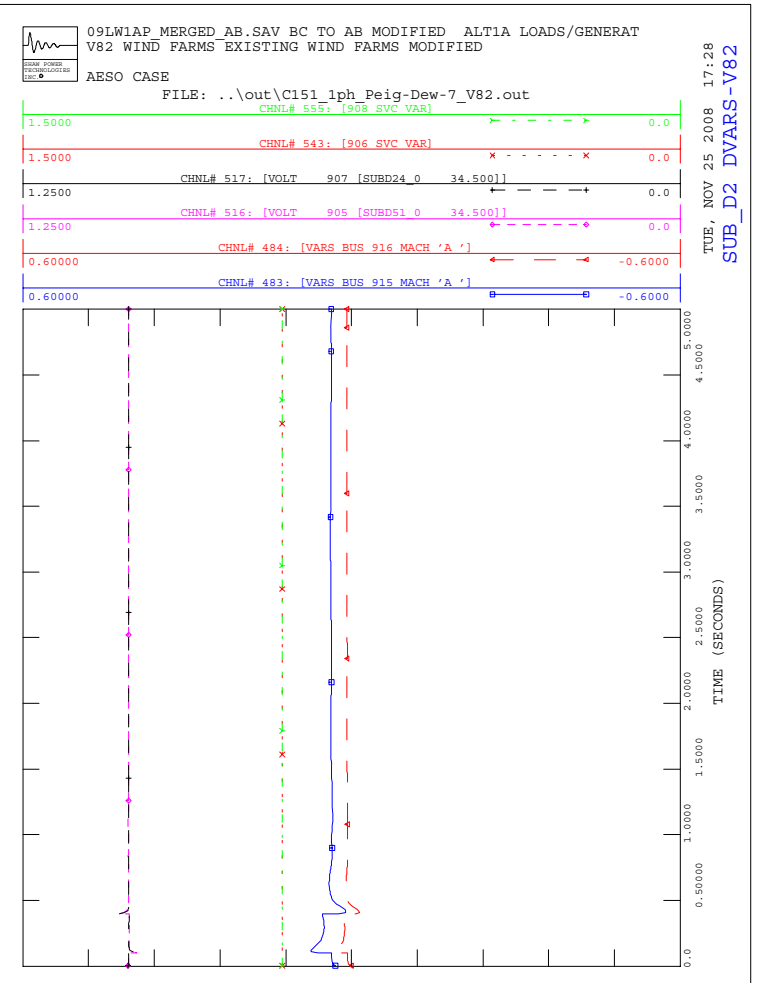
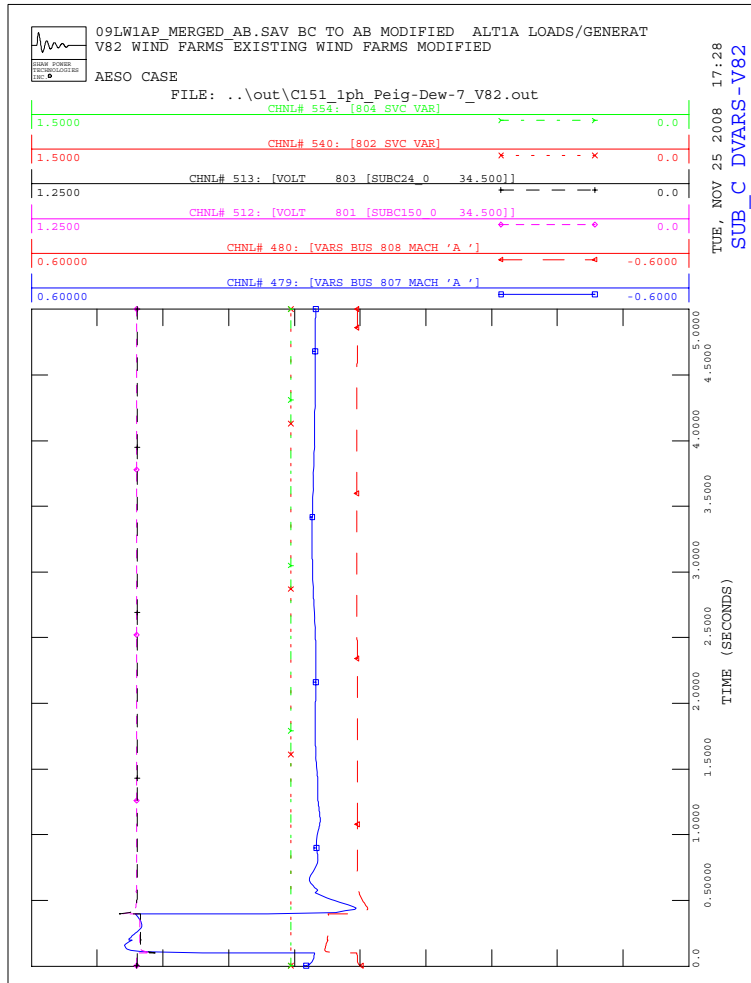


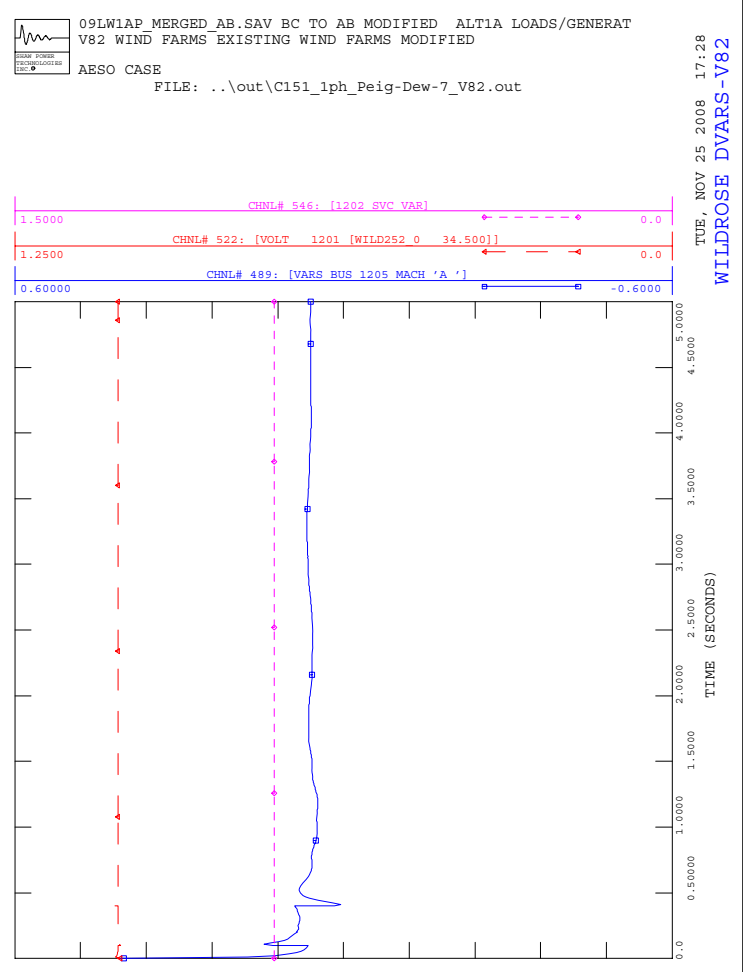
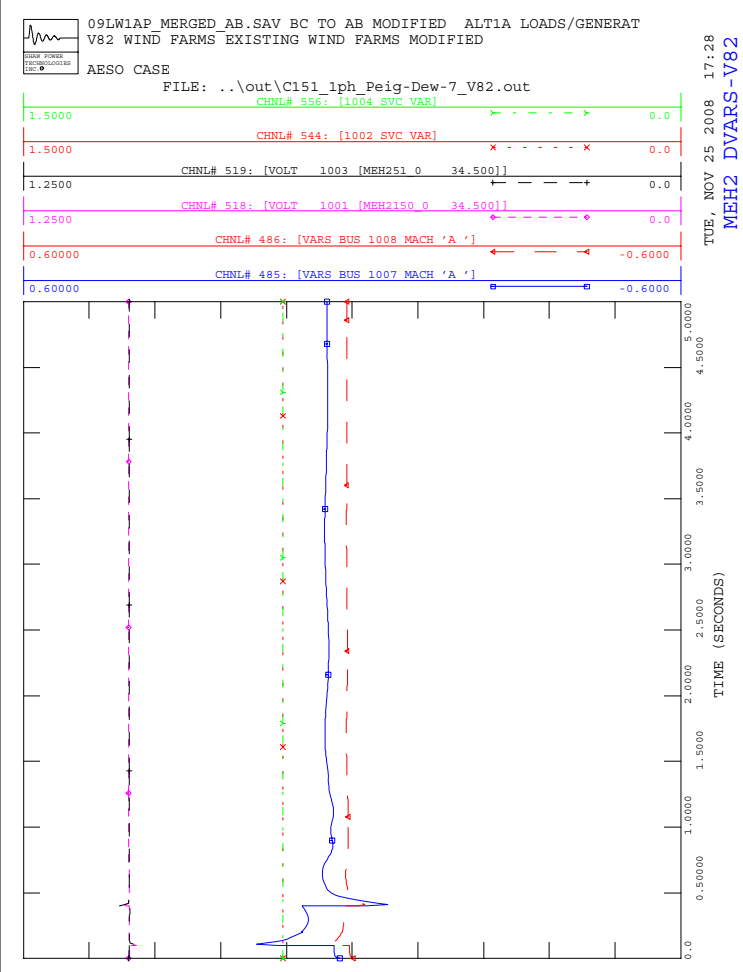
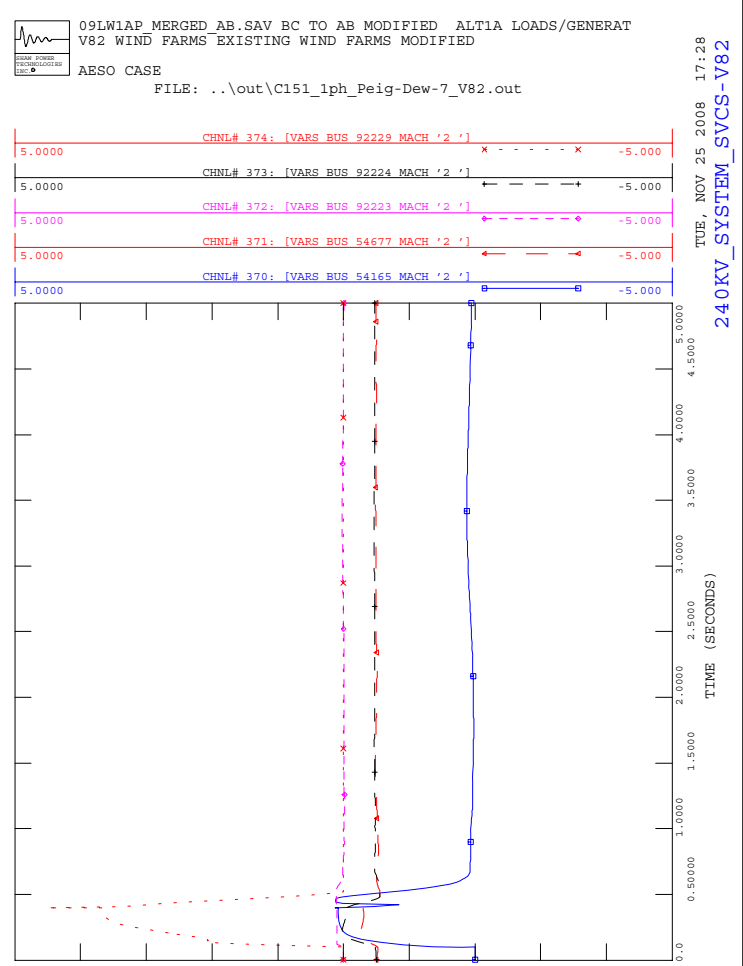
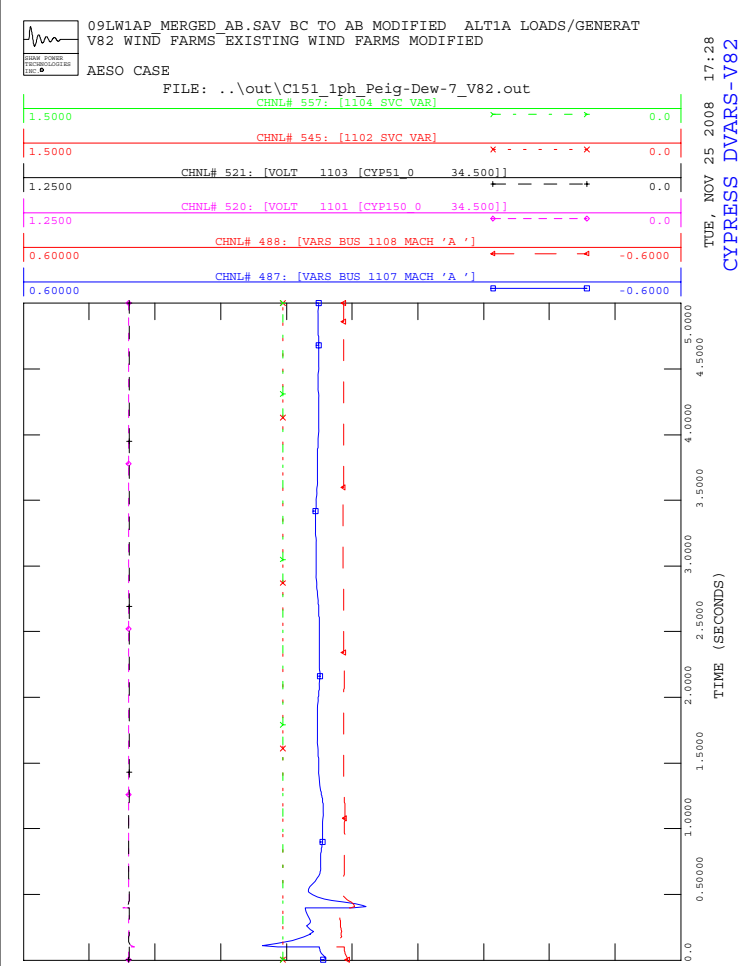








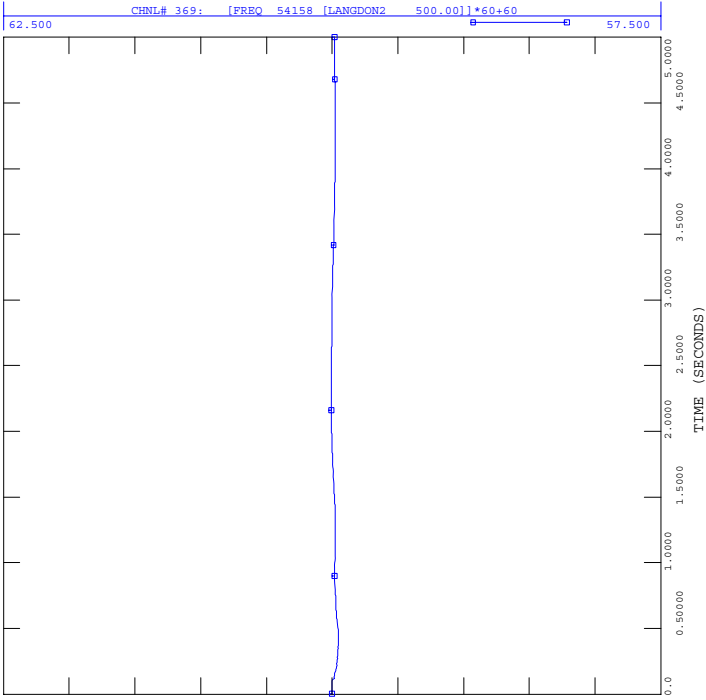






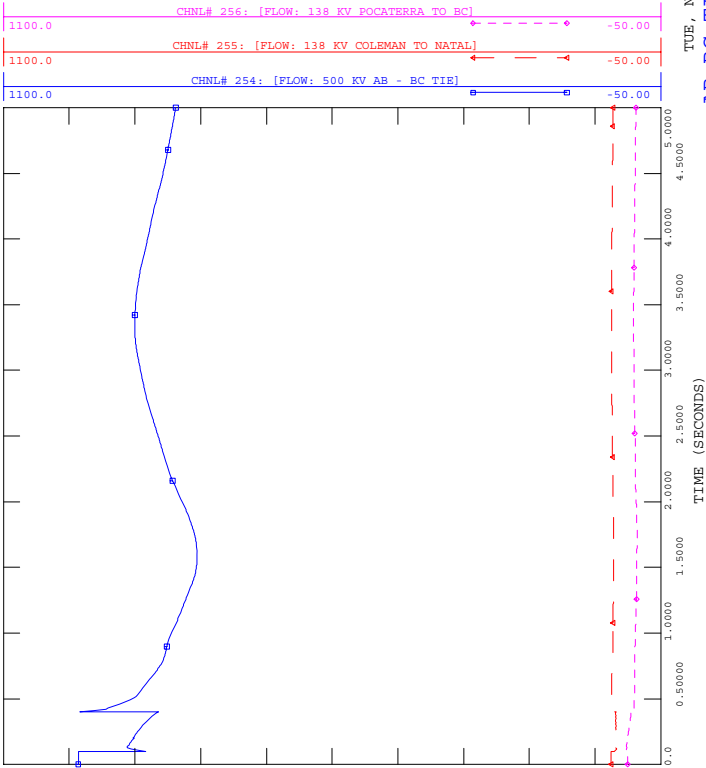
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LANGDON_FRQ-V82



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AB_BC_TIE_FLOWS-V82



Type 1 (Vestas V82) 241 MW Wind Farm Dynamic Data

Vestas V82 Induction Generator Model

102 'USRMDL' '1' 'CIMTSS' 1 1 1 13 6 3 0 1.26196 0.00000 0.80408 4.01336 0.15811 0.00000
0.08727 1.0 0.06 1.2 0.15 0.0 0.0

Vestas V82 Dynamic Reactive Compensation Control

0 'USRMDL' 'V82BPF' 8 1 8 10 0 210 101 101 54367 0 0 0 1 1 3658.0 22.7 83036.6 0.0 1.2 1.1
1.08 0.9 0.8 0.6

Vestas V82 Fixed Capacitor Control

0 'USRMDL' 'V82BFC' 8 1 3 1 0 9 102 1 1 125031.6

Vestas V82 Wind Gust and Ramp

0 'USRMDL' 'V82BWD' 8 0 4 7 0 4 102 '1' 153 1 25.0 999.0 0.0 0.0 999.0 999.0 0.0

Vestas V82 Two-Mass Shaft

0 'USRMDL' 'V82BSH' 8 0 5 0 2 3 102 '1' 0 1 1

Vestas V82 Wind Turbine Aerodynamics

0 'USRMDL' 'V82BAE' 8 0 5 0 1 4 102 '1' 0 1 1

Vestas V82 Pitch Control

0 'USRMDL' 'V82BPC' 8 0 7 4 7 420 102 '1' 0 0 153 1 1 61.0 62.0 1.0 0.0

Vestas V82 Undervoltage/Overvoltage Generator Bus Disconnection Relay Model

0 'USRMDL' 'VTGDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 0.15 5.0 0.625 0.08
0 'USRMDL' 'VTGDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 0.4 5.0 1.45 0.08
0 'USRMDL' 'VTGDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 0.6 5.0 2.05 0.08
0 'USRMDL' 'VTGDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 0.9 5.0 3.0 0.08
0 'USRMDL' 'VTGDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 0.0 1.1 1.0 0.08
0 'USRMDL' 'VTGDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 0.0 1.15 0.1 0.08
0 'USRMDL' 'VTGDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 0.0 1.3 0.02 0.08

Vestas V82 Underfrequency/Overfrequency Generator Bus Disconnection Relay Model

0 'USRMDL' 'FRQDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 57.0 66.0 0.1 0.075
0 'USRMDL' 'FRQDCN' 0 2 6 4 0 1 102 102 '1' 0 0 0 54.0 61.0 0.1 0.075

Overcurrent Protection Model

102 'TIOCR1' 0 '1' 1 1 0 0 102 0 '1' 0 0 0 0 0 0.9 0.01 0.9 18.0 4.0 1.0 4.0 0.06 5.0 0.06 25.0
0.06 0.0 0.0

Static Condenser (STATCON) Model (DVAR)

113 'CSTAT' A 1 1 1 1 150 0.010 999 -999 2.67 2.67 0.2 1.2 0.070 0.5 D-VAR MODEL

Type 3 (GE1.5) 241 MW Wind Farm Dynamic Data

GE1.5 Wind Turbine Doubly-Fed (Wound Rotor) Induction Generator

102 'USRMDL' 1 'GEDFA' 1 1 1 13 5 22 0 0.8 0.1714 2.904 0.005 0.1563 0.558 0.0 0.2 0.02 0.02
30.0 0.1 -0.1

GE1.5 Turbine Generator Control Model

102 'USRMDL' 1 'GECNA' 4 0 4 26 10 10 102 0 0 0 0.15 18.0 5.0 0.0 0.0 0.05 2.7 0.54 1.01 0.09
0.296 -0.436 1.11 0.05 0.4 -0.4 5.0 0.0 0.9 1.1 40.0 -0.5 0.4 0.05 0.05 1.0

GE1.5 Wind Gust and Ramp

0 'USRMDL' 0 'WGUSTA' 8 0 2 7 0 3 102 '1' 11.7 9999.0 5.0 30.0 9999.0 9999.0 30.0

GE1.5 Two Mass Shaft

0 'USRMDL' 0 'W2MSFA' 8 0 3 5 2 3 102 '1' 0 1.35 1.0 7.784 3 72.0

GE1.5 Wind Turbine Aerodynamics

0 'USRMDL' 0 'GEAERA' 8 0 3 12 1 4 102 '1' 0 11.7 20.0 0.0 27.0 -4.0 0.0 1.225 35.25 72.0
1200.0 1500.0 1.667

GE1.5 Pitch Control

0 'USRMDL' 0 'GEPCHA' 8 0 3 10 3 3 102 '1' 0 0.3 150.0 25.0 3.0 30.0 -4.0 27.0 -10.0 10.0 0.91

GE1.5 Undervoltage/Overvoltage Generator Bus Disconnection Relay Model

0 'USRMDL' 0 'VTGTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 0.15 5.0 0.625 0.08
0 'USRMDL' 0 'VTGTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 0.4 5.0 1.45 0.08
0 'USRMDL' 0 'VTGTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 0.6 5.0 2.05 0.08
0 'USRMDL' 0 'VTGTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 0.9 5.0 3.0 0.08
0 'USRMDL' 0 'VTGTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 0.0 1.1 1.0 0.08
0 'USRMDL' 0 'VTGTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 0.0 1.15 0.1 0.08
0 'USRMDL' 0 'VTGTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 0.0 1.3 0.02 0.08

GE1.5 Underfrequency/Overfrequency Generator Bus Disconnection Relay Model

0 'USRMDL' 0 'FRQTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 56.5 66.0 0.02 0.08
0 'USRMDL' 0 'FRQTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 57.5 66.0 10.0 0.08
0 'USRMDL' 0 'FRQTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 54.0 61.5 30.0 0.08
0 'USRMDL' 0 'FRQTPA' 0 2 6 4 0 1 54367 102 '1' 0 0 0 54.0 62.5 0.02 0.08

APPENDIX F LAND IMPACT ASSESSMENT



**Land Impact Assessment
for the
Southern Alberta Transmission
Development
(SATD)**

**Presented to the
Alberta Electric System Operator (“AESO”)
in Support of the AESO Needs Identification
Document**

Date: November 25, 2008

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Appendix A – Discussion of Using Roads For High Voltage Power Transmission Line Routes

1 EXECUTIVE SUMMARY

The intent of the Land Impact Assessment (LIA) is for transmission facility owner (TFO) AltaLink Management Ltd. (AltaLink) to provide the AESO with the land-impact information it requires for the Needs Identification Document (NID).

This was achieved by conducting a comparative assessment of the AESO's Southern Alberta Transmission Development (SATD) system development plans, using measurable indicators (e.g., amount of native grassland) to quantify the various concerns associated with the major aspects of the NID (Section 6.1 NID12 of the AUC Rule 007), with the exclusion of cost and electrical aspects from a power system perspective, as a focus for collecting measurable land-impact data.

To further facilitate a comparative assessment at this stage of the Project development, representative routing scenarios based on, among other items, the location of individual components proposed for the project were used for each alternative in order to establish a baseline of information. However, no specific routing scenarios are being recommended at this time.

In addition, AltaLink conducted and developed the LIA using the following direction from the AESO:

- The LIA is to focus exclusively on land impact
- Cost is out of scope and not included
- All Six system development plans are to be assessed
- Electrical consideration assessments are to be limited to land-related impacts

1.1 LIA Findings

All of the Alternatives start with Stage 1 components A&J. The potential impacts for Stage 1 will occur for all Alternatives. Only stages 2 through 4 were used in a comparison of the Alternatives.

All of the Alternatives are viable from a land impact perspective, and none have potential impacts that would cause any to be rejected.

Comparisons between metrics were done in relation to alternative 1B, which was about the middle of the three 240kV looped Alternatives (1A, 1B & 1C). Metrics that were at least 20% lower potential impact are colored green, and metrics that are at least 20% higher potential impact are colored red.

When comparing the Alternatives considered for the Southern Alberta Transmission Development (SATD) what is most apparent is that the length of the line is the largest

driver for most of the impacts. The HVDC Alternative 4 has the shortest overall length. Alternative 4 has the most metrics that are 20% lower potential impact. Similarly, the 500kV Alternative 3 has the longest line length, and the most number of metrics that are 20% higher potential impact, except notably for some of the more significant metrics, such as residences within 150m, potential to parallel transmission lines, and amount of irrigated parcels crossed.

The potential to construct paralleling lines does provide the opportunity to reduce the minimum impacts. The incremental difference can not be estimated until more detailed routing and consultation is completed. For example the environmental impacts within 800m of two lines together would be lower than the impacts within 800m of lines that are separated. This report does not incorporate any reductions that could be realized due to paralleling.

The 240kV Alternatives, Alternatives 1A, 1B, 1C and 2 are all relatively similar.

Agricultural

- Alternative 2 has the least potential impact
- Alternative 3 has the highest potential impact
- Alternatives 3, and 4 have the least potential impact to irrigated parcels

Residential

- Alternatives 3, and 4 have the least potential impact to residences within 150m
- Alternative 4 has the least potential impact to residences within 800m
- Alternative 1C has the highest potential impact to residences within 800m

Environment

- Alternative 1C has the least potential impact
- Alternative 3 has the highest potential impact

Electrical Considerations

- Alternative 3 has the highest potential for paralleling new facilities

Visual Impacts

- Alternatives 3, and 4 have the least potential impact to residences within 150m
- Alternative 3 potentially impacts the most Protected or Designated Areas.

Special Constraints

- Alternative 4 has the least potential impact
- Alternative 3 has the highest potential impact on Historical resources

The table of comparative metrics can be found on the next page.

Major Aspects and Considerations November 19, 2008		South Alberta Transmission Development SATD LIA													
		Common		Phase 2 - 4		Phase 2 - 4		Phase 2 - 4		Phase 2 - 4					
Line Parameters		IA		1B		1C		240KV Radial II		500KV III		HVDC IV			
R-O-W Length (km)		190 - 291		768-795		793-841		808-852		774-819		1113-1206		748-778	
Agricultural Impact		39 - 98		258 - 319		265 - 330		294 - 369		142 - 176		443 - 571		279 - 366	
Amount of Agricultural Land Crossed (km)		7 - 14		40 - 89		40 - 89		25 - 71		34 - 65		30 - 104		16 - 65	
Cultivated Forage Land		51 - 110		322 - 382		334 - 389		344 - 415		182 - 235		529 - 619		327 - 399	
Total		0 - 0		0 - 0		0 - 0		0 - 0		0 - 0		0 - 0		0 - 0	
Dominant Land Suitability Class Distribution - Distance Crossed (km)		1		11 - 52		33 - 40		51 - 59		46 - 69		39 - 80		31 - 56	
Classes 1 - 3 are good agricultural land		79 - 115		243 - 289		253 - 316		285 - 316		164 - 214		421 - 489		229 - 285	
Classes 4 - 7 require more and more work to be productive		31 - 89		249 - 300		248 - 300		257 - 300		238 - 285		384 - 520		257 - 349	
		9 - 56		86 - 118		84 - 118		93 - 122		127 - 166		114 - 148		78 - 106	
		0 - 0		30 - 37		30 - 37		37 - 39		48 - 54		30 - 34		28 - 35	
		0 - 0		66 - 70		66 - 70		62 - 66		104 - 104		35 - 42		31 - 40	
Irrigated Parcels Crossed (km)		0 - 12		74 - 127		74 - 127		60 - 110		69 - 98		43 - 123		29 - 85	
Residential Impacts		20 - 40		40 - 90		40 - 90		40 - 80		40 - 90		30 - 70		20 - 50	
Total Residents within 150 m of centreline / #		180 - 400		270 - 420		290 - 430		370 - 550		280 - 400		310 - 450		200 - 330	
Total Residents within 0 - 800 m of R-O-W edge (#)		214 - 468		1543 - 2091		1597 - 2147		1522 - 2344		1690 - 2353		2102 - 2838		1186 - 2000	
Environmental Impacts		24 - 85		258 - 280		272 - 303		257 - 277		402 - 434		323 - 378		231 - 265	
Surface Water (ha) in or within 800m of R-O-W edge		36 - 1081		1597 - 1986		1607 - 1996		455 - 797		1637 - 2051		693 - 1973		317 - 1723	
Native Grassland Crossed (km)		8 - 20		14 - 15		14 - 15		16 - 18		16 - 16		28 - 33		14 - 16	
Sensitive Wetland Areas (ha) in or within 800 m of R-O-W edge (ha)															
Proximity to Protected or Designated Areas in or within 800 m of R-O-W edge (ha)															
Cost - Cost Information and comparisons are provided in other sections of the Need application															
Electrical Considerations		76 - 148		7 - 7		7 - 7		4 - 13		7 - 7		59 - 78		7 - 82	
Paralleling Existing Transmission Lines greater than or equal to 240 kv (km)		0 - 1		1 - 2		1 - 2		3 - 6		1 - 2		1 - 2		1 - 5	
Crossing Existing Transmission Lines greater than or equal to 240 kv (#)		0 - 59		3 - 3		0 - 0		8 - 31		251 - 256		368 - 397		3 - 3	
Potential to Parallel Future Transmission Lines greater than or equal to 240 kv (km)															
Visual Impacts		20 - 40		40 - 90		40 - 90		40 - 80		40 - 90		30 - 70		20 - 50	
Total Residents within 150 m of centreline (#)		113 - 335		385 - 473		408 - 522		388 - 507		434 - 559		650 - 837		379 - 458	
Proximity to Protected or Designated Areas in or within 800 m of R-O-W edge (#)		7 - 11		7 - 12		7 - 12		11 - 22		8 - 12		16 - 27		10 - 22	
Special Constraints		0 - 3		0 - 0		0 - 0		1 - 1		0 - 0		0 - 1		0 - 0	
Proximity to Historical Resources in or within 800 m of R-O-W (#)															
Major River Crossings (#)															
Minor Airports in or within 1.6/3.2 km of R-O-W (#)															

Notes: Phase 1 is common to all alternatives, and not included in the metrics used for comparison. Colored comparisons in relation of Alternative 1B, which was about the middle of the looped 240KV alternatives.

Green represents at least 20% LESS potential impact.

Red represents at least 20% MORE potential impact.

Agricultural suitability class 4 through 7 were not compared because they are poor soils.

Treed areas not on table as they were all zero.

No major airports within 6km of any of the representative routes.

The Alberta Electric System Operator (AESO) requested AltaLink to provide a Land Impact Assessment (LIA) for a proposed Southern Alberta Transmission Development (SATD) to be used by the AESO for a future Needs Identification Document (NID).

The LIA is a comparative assessment of the AESO's six potential system development Alternatives.

Each system development alternative is comprised of several components (such as a new transmission line, substation, or modification to an existing facility) which are listed in the following section.

The LIA uses the major aspects (with the exception of cost and certain electrical factors) identified in AUC Rule 007 (Section 6.1 NID12) for direction in identifying potential impacts. These include:

1. Agricultural Impact
2. Residential Impact
3. Environmental Impact
4. Electrical Considerations
5. Visual Impact
6. Special Constraints

Typical representative routes were determined for each of the six system development alternatives to assess the potential impacts. The representative routes were used for high-level assessments only, with no determination made on the specific route location, such as which side of a paralleled transmission line a new line could be sited.

The LIA was created using the best available information including, but not limited to: land-use and land-base classification data; hydrology, wildlife, parks and protected areas data, aerial-photo and satellite imagery analysis; reconnaissance flights and field visits; knowledge and experience of AltaLink siting transmission lines in the areas traversed, and knowledge of the existing and proposed 240kV and 500 kV lines transmission lines currently being planned in Alberta.

Public and agency consultation, environmental fieldwork, visual assessments, historical and archaeological-impact assessments, a land-titles search, and other activities will help determine specific routing scenarios during the Facilities Application processes that would occur in the future.

1.2 Document Structure

This document is organized to provide the AESO and other readers with an understanding of:

- The plans being considered;
- The limitations of assessing the plans;

-
- The assumptions, criteria, information;
 - The factors that influence proponents' and stakeholders' decisions; and;
 - The rationale for how the findings were reached.

The LIA findings and an executive summary are provided in Section 1. Specific details and maps for each of the Six alternatives are found in section 2. The development of representative routes for each alternative and the considerations behind using an existing road or transmission line for routing are also discussed in this section.

Section 3 provides insight into the major aspects of transmission line impacts and how measurable indicators are used to gauge these concerns for each alternative. The measurable indicators are used to conduct a broad comparison and establish potential differences between each proposed system-development alternative. Other considerations such as limitations of the assessment are also discussed.

Sections 4 through 8 describe additional details regarding data sources, abbreviations used in the report and a general glossary. The appendix contains a listing of formally designated environmentally sensitive areas within the study area.

2 LIA ASSESSMENT PROCESS

The NID Land Impact Assessment (LIA) process allows the AESO to do a comparative assessment of the potential impacts for a variety of potential transmission system development alternatives.

To ensure consistent data for all alternatives, the assessment process was driven by common criteria. The AUC’s major aspects for land assessments, with the appropriate measurable indicators and concerns were regarded for all alternatives. All alternatives required representative routing to generate the measurable indicators, as well as consistent technical assumptions (such as using a 65m R/W)

This section offers a detailed look at the criteria used in the LIA process, providing an understanding of how the LIA was conducted and developed, and how findings were reached.

The LIA evaluated the relative Land Impacts of six potential SATD system alternatives.

The six system development alternatives include the components as listed below:

Stage	Alt 1A 240 kV Looped	Alt 1B 240 kV Looped	Alt 1C 240kV Looped	Alt 2 240 kV Radial	Alt 3 500 kV	Alt 4 HVDC
I	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J) Milo (new station) Crowsnest to Goose Lake (Path A)
II	Sub D – W. Brooks (Path G)	Sub D – W. Brooks (Paths G)	Sub D – W. Brooks (Path G)	Sub D – W. Brooks Three Circuits (Path Gx2)	Sub H - Milo (Path Y) Sub H - MH2 (Path F)	Sub H - MH2 (Path F)
III	G. Lake - Sub C (Path C1) Sub C – Sub D (Path E) Sub C - MATL (Path D)	Peigan - Sub C (Path C2) Sub C – Sub D (Path E) Sub C - MATL (Path D)	G. Lake - Sub C (Path C1) Sub C - Sub D (Path E) Sub C - MATL (Path D)	Sub A – Peigan (Path B) Sub C - MATL (Path D)	G. Lake - Sub C (Path C1) Sub C – Sub H (Path E)	Sub H - Langdon (HVDC Option) G. Lake - Sub C (Path C1) Sub C – Sub H (Path E)

Stage	Alt 1A 240 kV Looped	Alt 1B 240 kV Looped	Alt 1C 240kV Looped	Alt 2 240 kV Radial	Alt 3 500 kV	Alt 4 HVDC
IV	Ware Jn - Langdon (Path H)	Ware Jn - Langdon (Path H)	W. Brooks - Sub I - DeWin (Path K)	Ware Jn - Langdon (Path H)	Sub H - Crows (Path X) Milo - Langdon (Path Z)	

Description of Each Component:

Component/ Path	Description	Start Location	Finish Location	Approximate Length (km)	Comments
A	240 kV Goose Lake 103S to Crowsnest	Existing 103S Goose Lake Sub	Sec 4- 8-3W5M	43-59	Connection to 1201 Line
B	240 kV Peigan 59S to Sub A	Existing Peigan 59S Sub	Sec 1- 3-28-W4M	77-102	Radial Option
C1	240 kV Goose Lake 103S to Sub C	Existing 103S Goose Lake Sub	Sec 38 -8-16-W4	247-251	
C2	240 kV Peigan 59S to Sub C	Existing Peigan 59S Sub	Sec 38- 8-16-W4M	272-297	
D	240 kV Sub E (MATL) to Sub C	Sec 14- 10-21-W4M	Sec 38- 8-16-W4M	63-69	
E	240 kV Sub C to Sub D (H/HVDC A)	Sec 35- 8-16-W4M	Sec 6- 9-8-W4M	75-84	Assumed Sub D is same location as Sub H/HVDC A
F	240 kV Sub D to Medicine Hat (MH2)	Sec 6- 9-8-W4M	Sec 29- 13-5-W4M	106-111	
G	240 kV West Brooks 28S to Sub D	Existing West Brooks 28S (LSD13-28- 18-15W4M)	Sec 6- 9-8-W4M	251-256	Must pass east of Medicine Hat
H	240 kV Ware Junction 132S to Langdon 102S	Existing Ware Junction 132S (12-17-22- 14W4)	Existing Langdon 102S (NW16- 23-27W4)	132-135	
J	240 kV Peigan 59S to DeWinton	Existing Peigan 59S Sub	SW31- 21-29W4	147-232	Potential to parallel existing 911L or 1201L line

Component/ Path	Description	Start Location	Finish Location	Approximate Length (km)	Comments
K	240 kV West Brooks to Sub I to DeWinton	Existing West Brooks 28S (LSD13-28-18-15W4M)	SW31-21-29W4	172-192	Potential to Parallel Existing Line. Must pass through Sub I at Sec 14-19-17-W4M
X	500 kV Crowsnest to Sub H (D/HVDC A)	Sec 4-8-3W5M	Sec 6-9-8W4M	203-210	Assumed Sub H is same location as Sub D/HVDC A
Y	500 kV Milo Jct to Sub H	NW-13-18-21W4M	Sec6-9-8W4M	117-155	
Z	500 kV Milo Jct to Langdon 102S	NW-13-18-21W4M	Existing Langdon 102S (NW16-23-27W4)	99	
HVDC	HVDC Langdon 102S to HVDC A (D/H)	Existing Langdon 102S (NW16-23-27W4)		320-332	Assumed HVDC A is same location as Sub D/H

2.1 Substations

The LIA does not include metrics for the substations. We offer the following comments for the AESO's consideration. At existing substation sites there would need to be expansion. For this LIA it is assumed that the expansions have little effect in the context of the entire system alternative developments.

The site for new substations were arbitrarily chosen for the sake of this LIA. The substations could all move by several miles along transmission line routes to be located in the best location based on consultation, environmental and technical considerations, cost, and availability of land. The substations would be located along the final line routes, and so some of the metrics already encompass new substation sites. The additional incremental impact will have little effect in the context of the entire system alternative developments.

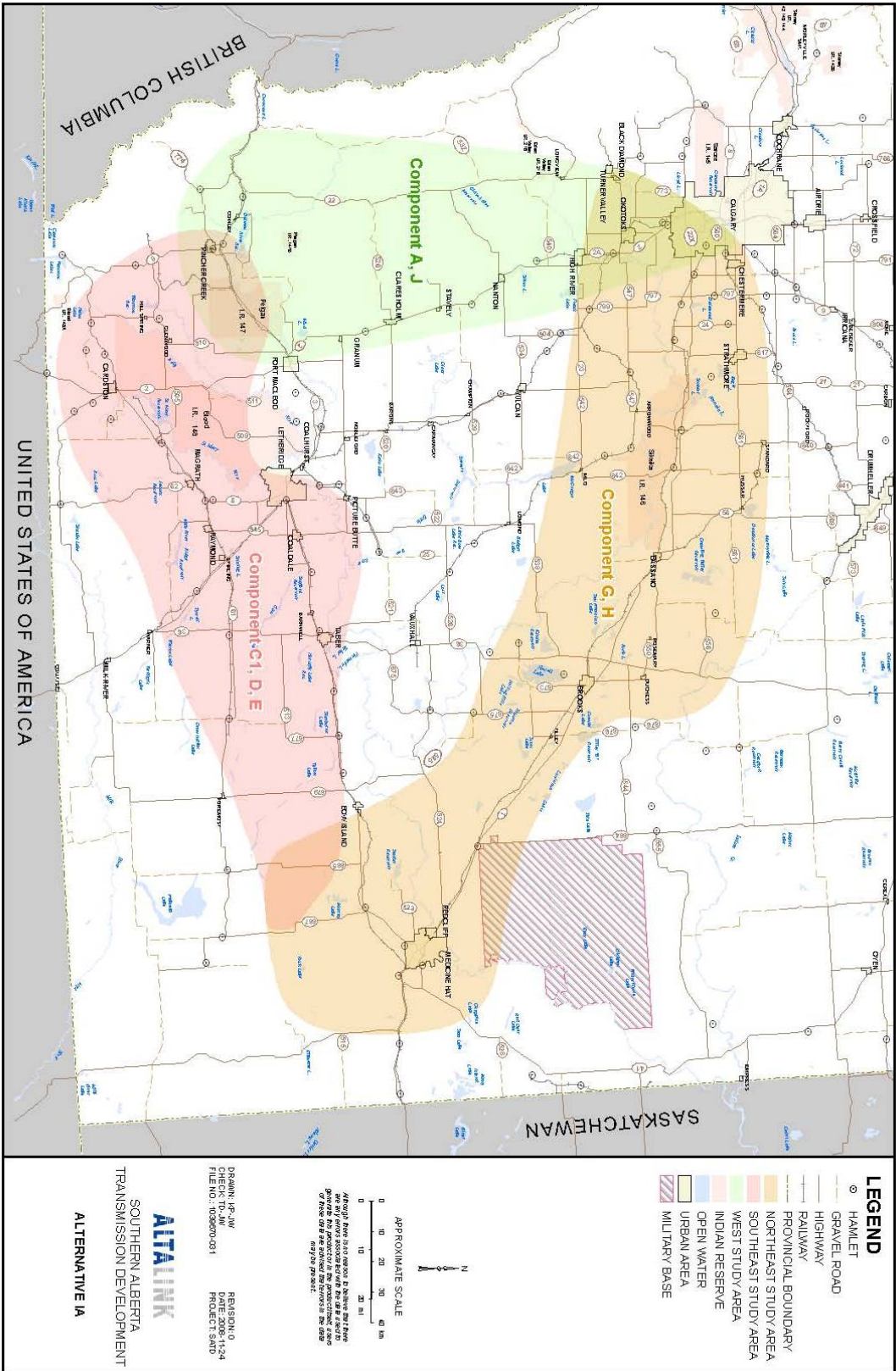
2.2 Study Area

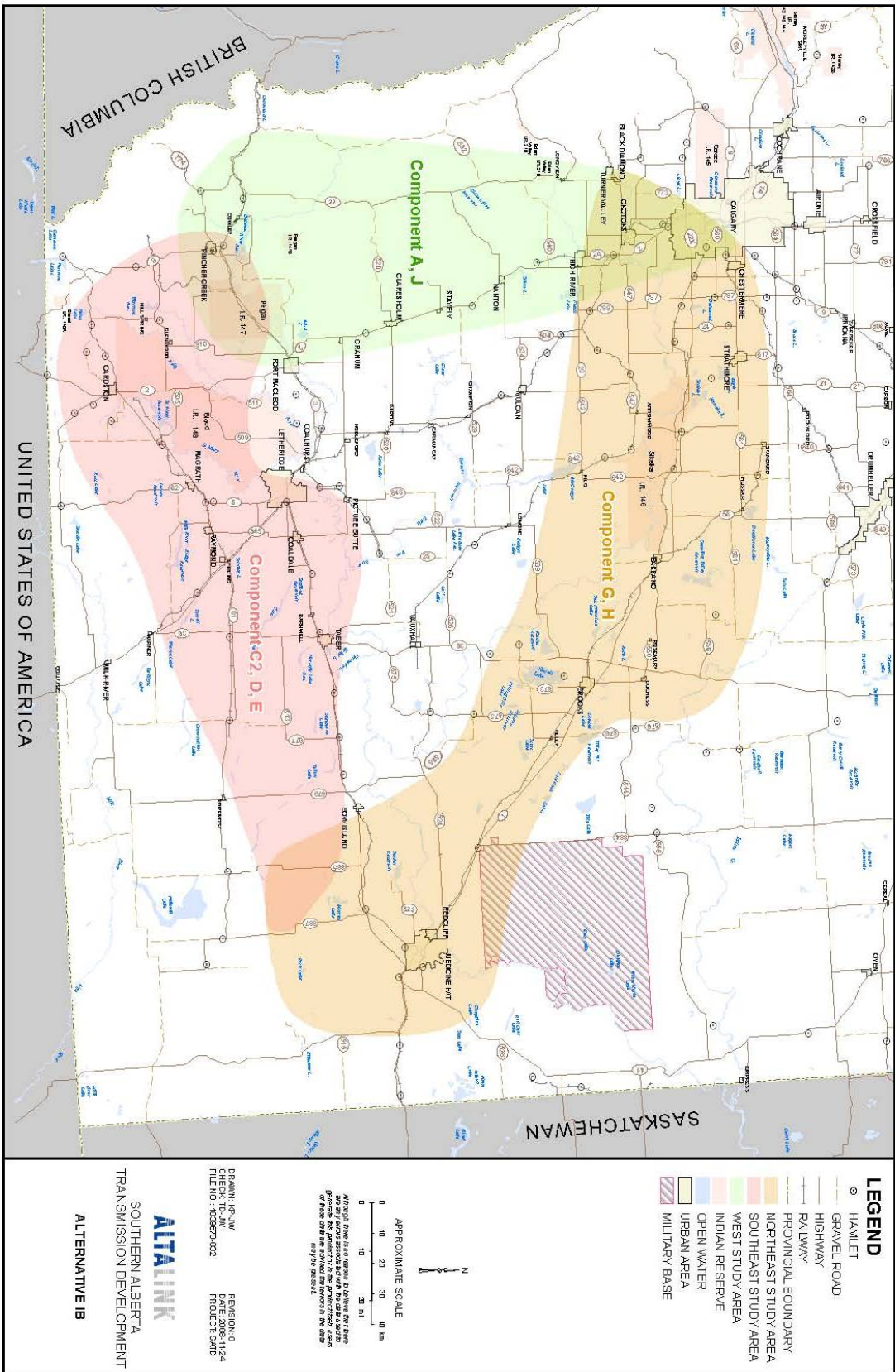
The study area was defined in relation to the system development components identified by AESO.

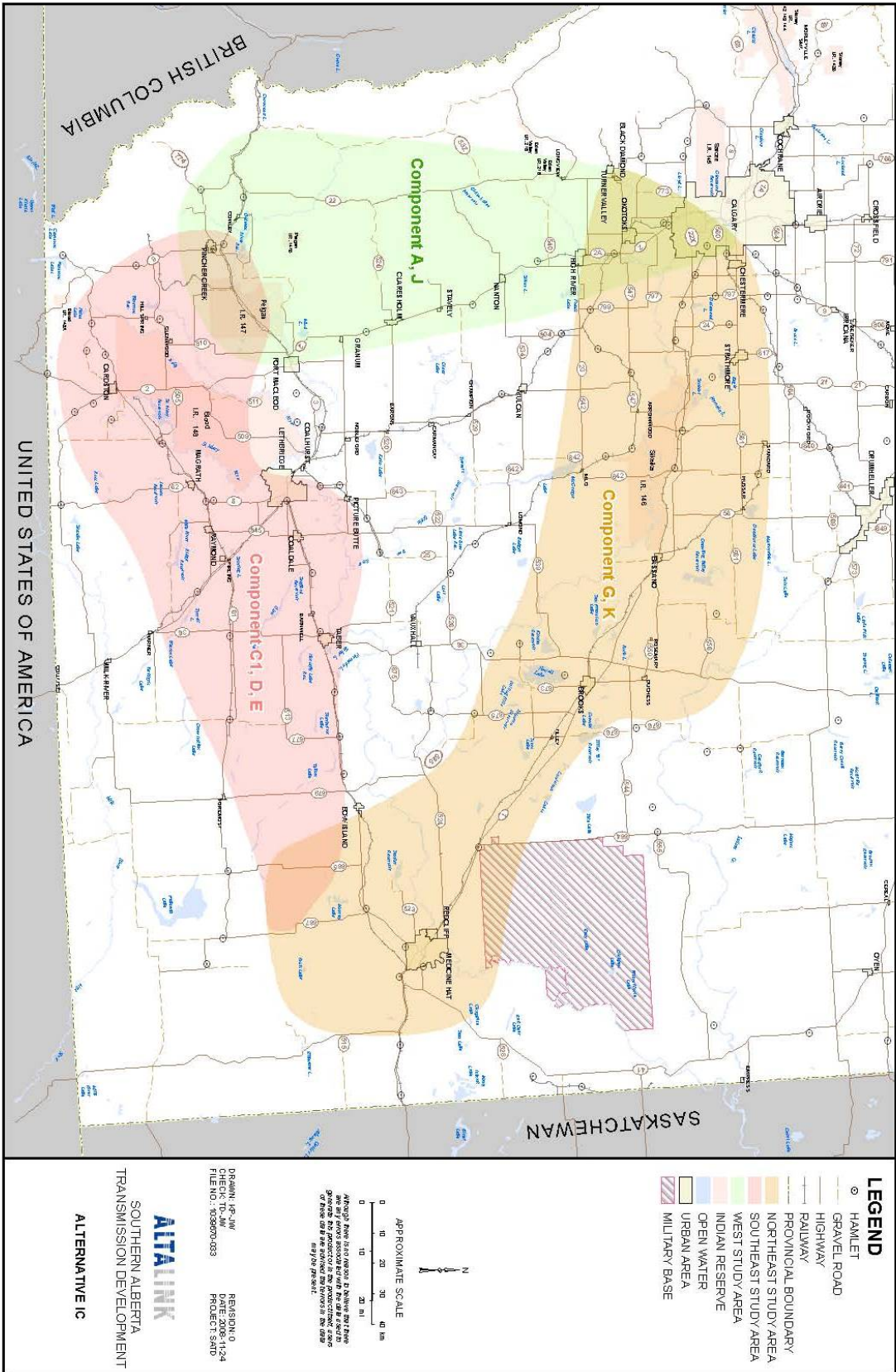
The geographical location of system components generally encompass the southern region of Alberta

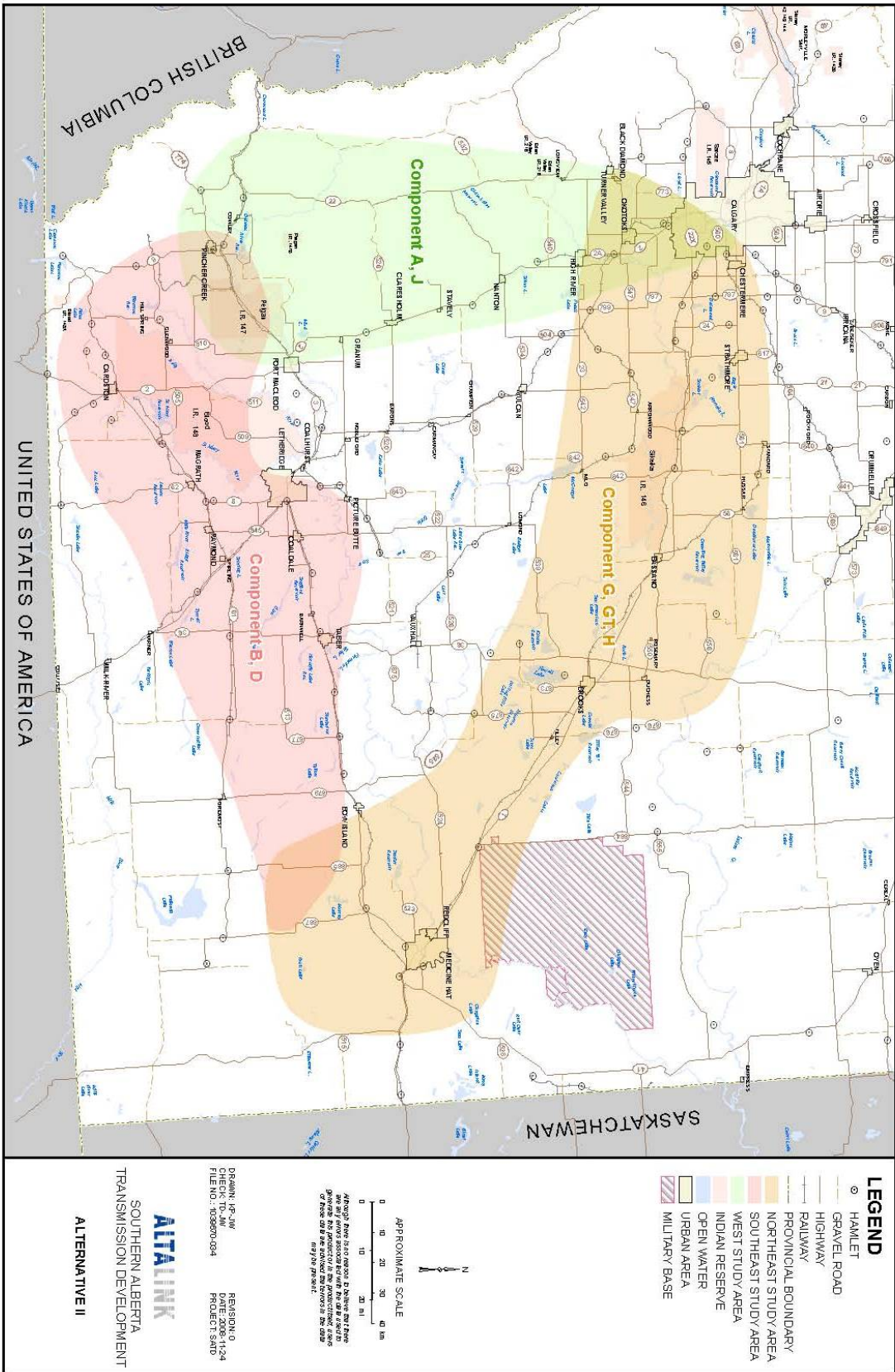
- A reasonable northern limit was formed by Calgary east to the Saskatchewan border.
- The eastern boundary of the study area is the Saskatchewan border
- The western limit of the study area are the foothills
- The southern boundary is the Montana border
- Excluded, or “no-go areas” are the many populated areas within the study area such as Lethbridge, Medicine Hat and Suffield Armed Forces Base.
- Excluded, or “no-go areas” are environmental features such as major lakes like Lake Newell Recreation Area, and historical resource areas like Head Smashed In buffalo jump.

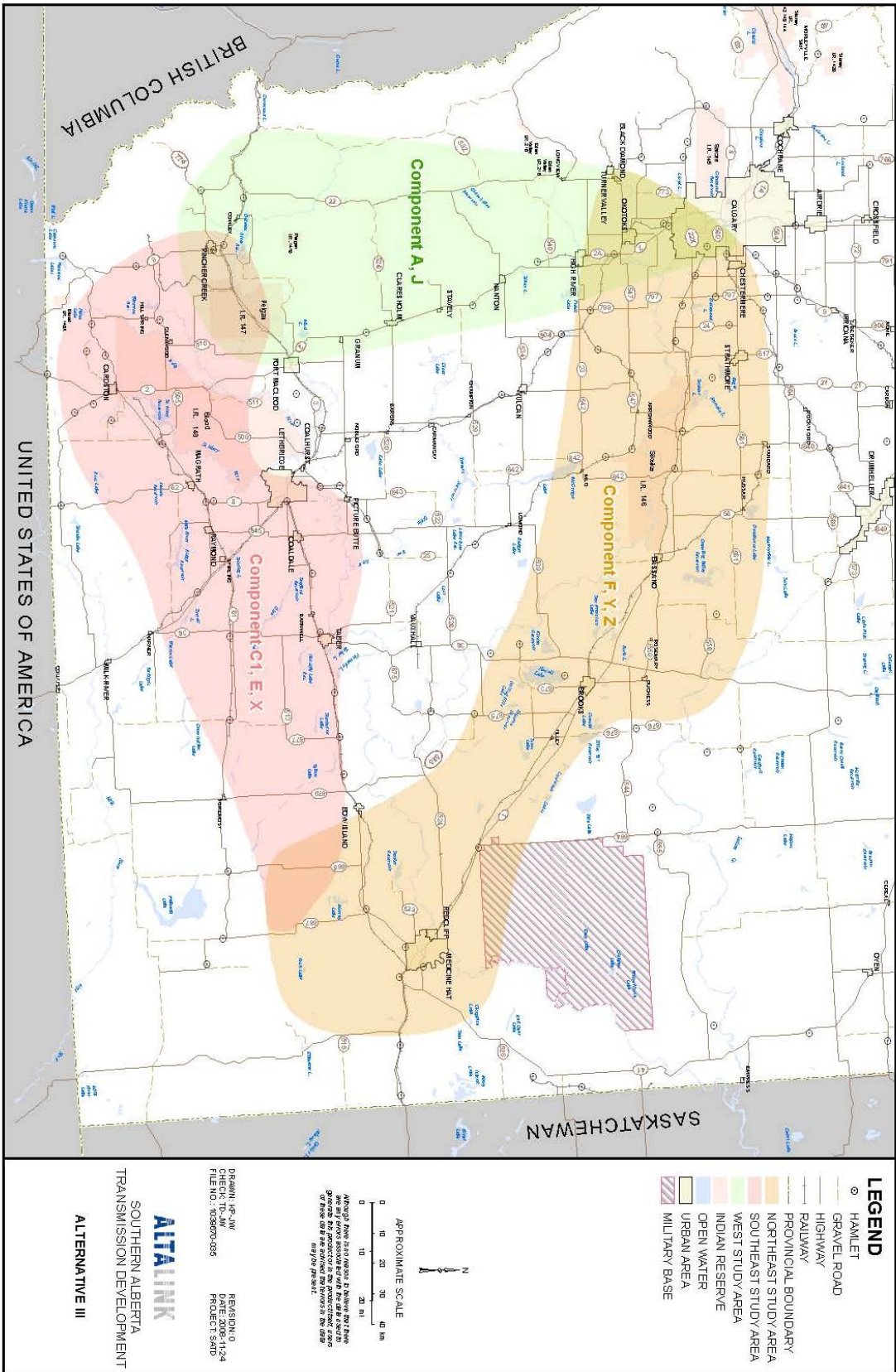
Representative routes were then developed, as described in Section 2.3. Representative Routes Maps of the overall study area, and individual SATD development alternatives are included on the following six pages. (Representative routes were determined within each individual study area depending on which potential system development alternative was being considered).

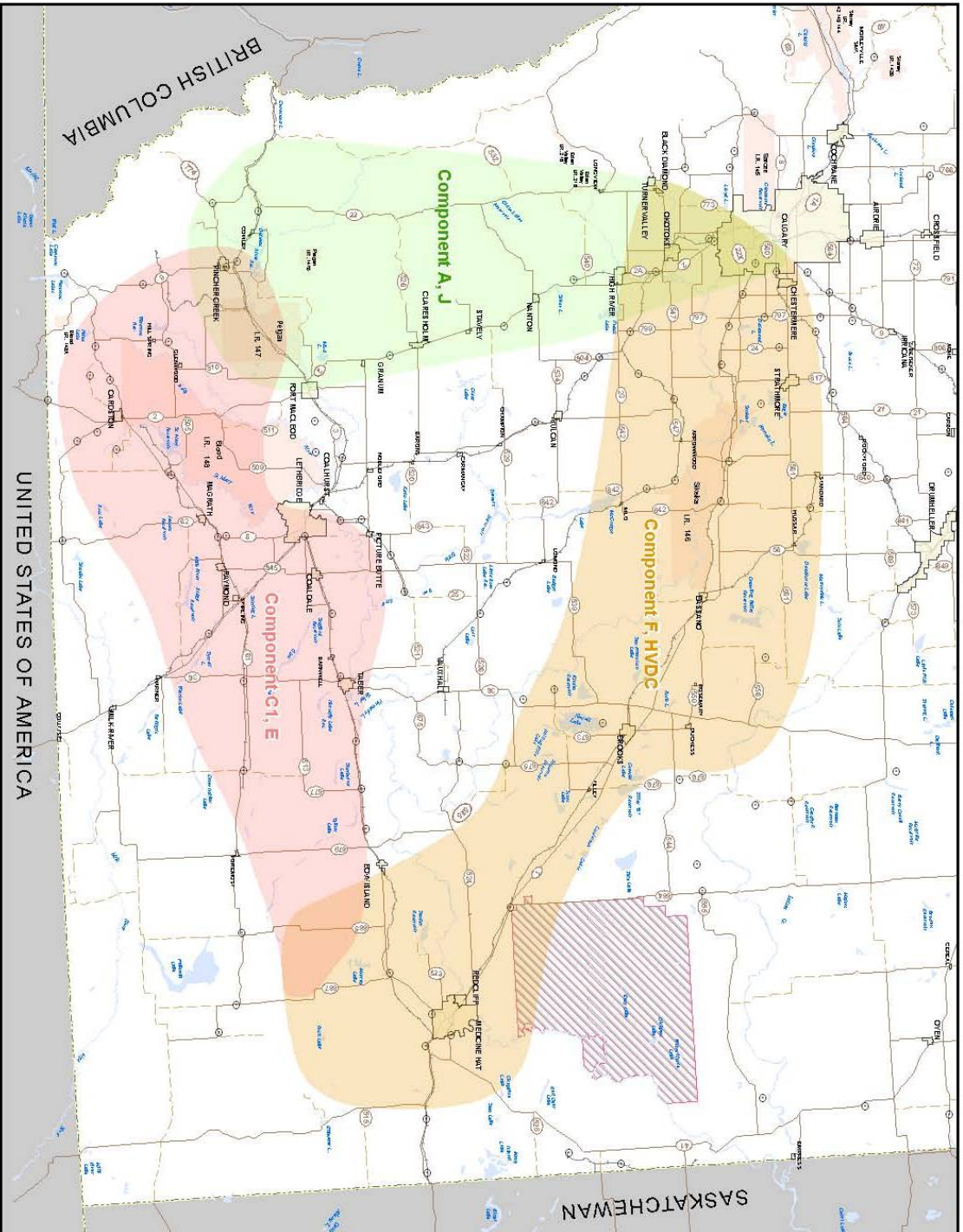












BRITISH COLUMBIA

UNITED STATES OF AMERICA

SASKATCHEWAN

- LEGEND**
- HAMLET
 - GRAVEL ROAD
 - HIGHWAY
 - RAILWAY
 - PROVINCIAL BOUNDARY
 - NORTHEAST STUDY AREA
 - SOUTHEAST STUDY AREA
 - WEST STUDY AREA
 - INDIAN RESERVE
 - OPEN WATER
 - URBAN AREA
 - MILITARY BASE



APPROXIMATE SCALE

0 10 20 30 40 km

0 10 20 30 40 mi

Although every effort is made to ensure the accuracy of the data shown on this map, the user should not rely on the information shown on this map for any purpose. The user should verify the information shown on this map with the appropriate authorities.

DRAWN: RP-JW
 CHECK: TD-JW
 FILE NO.: 105890.036
 REVISION: 0
 DATE: 2008.11.24
 PROJECT: SAND

ATLANTIC
 SOUTHERN ALBERTA
 TRANSMISSION DEVELOPMENT
 ALTERNATIVE IV

2.3 Representative Routes

Representative routes were required in order to provide for the collection of land-impact data. However, no specific routing is being recommended at this time.

To identify representative routes, potentially viable transmission line route segments were delineated by right-of-way planners using siting techniques consistent with those employed in other transmission line projects. Representative routes were developed, with consideration for environmental features, populated areas, and paths which impacted lower numbers of individual residences.

In siting representative routes with the intent to minimize potential impacts, several factors are considered. These factors include, but are not limited to:

1. Minimize impact on residences
2. Minimize number of landowners directly impacted
3. Minimize impact on existing, approved, and planned developments
4. Parallel existing transmission lines (*Alberta Environment's Guide for Transmission Lines*, Nov., 1994, and *Alberta Transmission Regulations Section 15*, AR255/2007 s7)
5. Follow ¼ lines where there is less development
6. Address the seven aspects in AUC Rule 007
7. Follow the considerations in *Alberta Environment's Guide for Transmission Lines*, Nov., 1994
8. Follow the considerations in the Alberta Transmission Regulations (Section 15, AR255/2007 s7)

Using the above factors, representative routes were identified for each of the Six system-development alternatives.

The level of assessment presented in this document only focuses on the landscape and general criteria as they can be applied to the representative routing concepts associated with the six system-development alternatives being considered. More site-specific work will be done in the context of preparing Facility Applications that may occur in the future. At that time it is possible to make a detailed assessment of the route and site-specific impacts associated with transmission line routing in order to determine specific, preferred routes, alternate routes or rejected routes. This more detailed work would include the following:

- Route specific public and agency notification and consultation;
- A historical, archaeological and cultural overview;
- Environmental field work;
- Field reconnaissance by helicopter and on the ground;
- A determination of access to private lands; and
- A determination on technical solutions.

2.3.1 Paralleling Roads with 500kV Transmission lines

A report to the AESO was provided to address the use of roads for 500kV transmission lines for the Calgary to Edmonton 500kV. This report was done to address the suggestion provided to the AESO in their Open Houses that the route should follow Highway 2 or other road allowances.

In general, roads are not a good location for a new 240 kV or 500 kV transmission line to be developed for the following reasons:

- the number of residences impacted is typically higher beside roads,
- impacts to the number of facilities and commercial buildings and businesses is higher,
- traffic safety concerns, and the impacts to road use are increased and,
- the risk of having to re-locate the transmission line due to future road widening is considerable.

The report, without the specific analysis of the Highway 2 route possibility for the NS500kV, is in Appendix A.

2.4 Right of Way width and tower footprint

It should be noted that the right-of-way width used and the proposed transmission towers are general assumptions at this preliminary planning stage. The numbers used may change during the more detailed Facility Application stage, when additional information specific to local areas is determined. This may include things such as topography, local weather history, major crossings, and other factors.

Because the purpose of the LIA report is to provide information that can be used by the AESO to compare the Six system development alternatives, and the exact size of the right-of-way and tower footprint will have very little impact on the metrics at this stage, a right-of-way width and tower footprint size was chosen that will cover all the tower types and right-of-way widths being considered for the system development alternatives.

The right-of-way width used for the metrics in this report is 65 m, and the tower footprint used is 10 m x 10 m.

2.5 Paralleling Existing Transmission Lines

The Transmission regulation outlines the requirement for siting transmission lines as follows:

15.1(1) In preparing plans and making arrangements for new transmission facilities or for enhancements or upgrades to existing transmission facilities, the ISO must take into consideration geographic separation for the purposes of ensuring reliability of the transmission system.

(2) When considering the location of new transmission facilities or of enhancements or upgrades to existing transmission facilities, the ISO must consider

(a) wires solutions that reduce or mitigate the right of way, corridor or other route required, and

(b) maximizing the efficient use of rights of way, corridors or other routes that already contain or provide for utility or energy infrastructure.

(3) The ISO must consider the measures described in subsections (1) and (2) notwithstanding that those measures may result in additional costs.

(4) In subsection (2)(a), “wires solutions” includes, without limitation,

(a) providing new, higher capacity transmission facilities in combination with the salvage of lower capacity transmission facilities, or

(b) providing staged transmission capacity increases that reduce the need to access rights of way for subsequent capacity increases.

In developing representative routes the TFO’s included route segments that paralleled existing 240kV transmission lines where possible. During the detailed route selection stage in preparation for a Facilities Application, opportunities to parallel, or replace existing transmission lines would be explored. Discussion with the AESO would occur to explore the ability to salvage transmission lines either before or after construction of new transmission lines. For example, a common component to all the system alternatives is the Peigan to DeWinton line, which could replace existing single circuit 911L. In any of these scenarios the final result is little to no incremental impact on the landscape.

3 MAJOR ASPECTS AND MEASURABLE INDICATORS

All of the major aspects, with the exception of cost, identified in the AUC Rule 007 – section 6.1 (AESO Needs Identification Document Applications) were considered for each of the representative routes and system-development alternatives. In addition, all of the major aspects have associated measurable indicators and specific concerns that were evaluated based on experience routing transmission lines in Alberta.

The following provides a definition of the measurable indicators and concerns related to the major aspects identified in AUC Rule 007, and how these can be used to provide land-impact information, as well as the overall impact on the project and suggestions on how they can be mitigated.

The major aspects under Rule 007 are Agricultural Impact, Residential impact, Environmental Impact, Cost, Electrical Considerations, Visual Impact, and Special Constraints. Under each aspect in Rule 007 are a list of concerns; a), b) etc., which are discussed in the following sections.

3.1 Agricultural Impact

Agricultural impacts generally refer to agricultural activities associated with rural lands, which may include cultivation of crops, livestock, and other commercial operations associated with individual landowners.

Agricultural impacts will likely be a factor in this project, as the study area is located in what is known as the “White Area¹” of the province. The White Area contains most of the land suitable for cultivating. Although much of this land is privately owned, the provincial government has retained a few parcels for environmental reasons or natural resources management. A wide range of uses is allowed on this land (e.g., agriculture, oil/gas/coalbed methane exploration and development, surface materials development, commercial ventures such as hotels and trail riding operations, and recreation).

3.1.1 Specific Agricultural Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with agricultural impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Loss of Crops - This includes short-term loss caused by construction; longer-term losses possible from soil erosion, rutting, drainage, disturbance, and soil mixing; and permanent loss of crop under or adjacent to the tower base

Short-term crop loss during construction is kept to a minimum with appropriate mitigation and construction practices. Such short-term losses are compensated through

¹ The White Area and Green Area are defined in the *Public Lands Operational Handbook December 2004*, published by Alberta Sustainable Resource Development.

damage payments to landowners. Permanent loss of crop under or adjacent to the tower base is mitigated through working with specific landowners during the Facility Application consultation, routing of the centerline relative to legal boundaries such as ¼ lines, and compensated for by annual tower payments. The vast majority of the right-of-way can still be used by the landowner for crop production. Potential impacts may be further reduced by landowner input on tower placement. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact, with cropland being the most significant indicator.

b.) Short-term disruption of farming and livestock grazing resulting from construction

These potential impacts are mitigated through appropriate construction practices and working with specific landowners to minimize any disruption. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact.

c.) Reduced efficiency of field operations

This potential impact is mitigated by determining tower placement that minimizes impact. Long-term impacts are considered when determining annual structure payments for towers. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact, with cropland being the most significant indicator.

d.) Restrictions on use of aircraft and high-pressure irrigation systems

The presence of a transmission line can potentially impact use of aircraft for agricultural operations, such as crop spraying. This is very landowner and route specific, and aerial spraying is being used less often as high-wheel crop sprayers are becoming more common. The impact on the operation of irrigation equipment can usually be minimized through consultation with affected landowners around the placement of towers and centerlines. Any unavoidable impacts are considered when determining compensation payments for mitigations (changes to irrigation systems) or impacts.

e.) Risk of collision with tower; damage to equipment, lost time, liability for damage to tower and secondary liabilities

A landowner will not be held liable for tower damage unless it was deliberately caused by the landowner or his agents. If the transmission line is taken out of service by the damage, it is typically restored to service within 24 to 48 hours, so any disruption to farming activities due to repairs of the line and tower is short in duration. The potential of collision with a transmission tower is considered very low.

f.) Reduction in yield adjacent to towers due to overlapping farming operations and added soil compaction

Permanent loss of crop under or adjacent to the tower base is mitigated through working with specific stakeholders during the Facility Application consultation. The total area under the towers is always relatively small for overhead transmission lines. It is addressed and compensated for through annual tower payments. Potential impacts are further reduced by landowner input to tower placement. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact with cropland being the most significant indicator.

g.) Added cost and inconvenience of weed control under towers

The added cost and inconvenience of weed control is compensated as part of the annual structure payments to landowners.

h.) Impact of height restrictions on equipment during field operations

All transmission lines in Alberta provide clearance for equipment 4.3 metres high on agricultural land. 500 kV power lines provide clearance for equipment 6.1 m high on agricultural land.

i.) Psychological impact of line

This is a subjective impact involving factors such as visual impact, electric and magnetic fields (EMF), land values and other issues, all of which are incorporated in the LIA and will be addressed in the Facility Application. Provision of unbiased information around EMF research from national and international health and scientific agencies often helps address some people's concerns.

j.) Loss of shelter belts

Impacts to shelter belts can be mitigated through routing offsets relative to legal boundaries such as ¼ lines along which shelter belts may exist. In some cases only trimming may be required. Compensation for re-establishment of a shelter belt is also a possibility. All of these are site specific and determined in consultation with the potentially affected landowner at the Facility Application stage.

k.) Shared use with other utilities and transmission lines

Utilization of existing linear disturbances is a factor in the final determination of routing during the Facility Application stage, as per the Alberta Environment's Transmission Planning Guidelines, and Alberta Transmission Regulations. At this conceptual planning stage, potential opportunities have been identified in the representative routings that could parallel existing transmission lines. Section 2.5 **Paralleling Existing Transmission Lines** discusses this further.

l.) Interference with citizen band radios

This is becoming less of an issue as Citizen Band (CB) radios are being replaced with newer technologies. However, CB radios operate at frequencies close to that of AM radios, neither of which are designed to be immune to power-line interference. The interference produced by power lines diminishes with distance from the power lines, making interference highly localized. All facilities will comply with federal guidelines related to radio interference.

3.1.2 Measurable Indicators for Agricultural Concerns

There are several high-level indicators that can be assessed at the Need Identification stage that can be measured for each of the representative routes in each of the six system alternatives. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the alternatives. These measurable indicators may

relate to one or more of the specific concerns identified in the AUC Rule 007 with respect to agricultural impact. The measurable indicators developed for agricultural impacts are:

1. Amount of Cultivated Land Crossed – Using existing land-cover type data, the approximate amount of affected agricultural land (cropland lands) can be determined. This can then be directly related to potential impacts on agricultural activities and associated concerns. **The most significant indicator for potential agricultural impact is amount of cultivated land crossed.**

2. Total Amount of Agricultural Land Crossed – This includes the cultivated land crossed plus forage lands which includes pasture. Using existing land-cover type data, the approximate amount of affected agricultural land (forage lands) can be determined. This can then be added to the cultivated lands and directly related to potential impacts on agricultural activities and associated concerns.

3. Agricultural Land Suitability Crossed – This measures the suitability of the lands from an agricultural perspective. Class 1 through 3 lands are good for cultivation, and classes 4 through 7 are lands that require increasingly intensive work for them to be productive.

4. Irrigated lands Crossed – This measures the potential impacts to irrigated lands from each of the alternatives

3.2 Residential Impact

Minimizing residential impact is an important consideration in the routing of transmission lines. There are sources of existing information such as County maps, air photographs and satellite images that can be used to provide an indication of the potential residential impacts associated with the proposed system-development plans.

Residential impact of new transmission lines is a significant factor for both rural and urban residents. Some portions of the LIA study area are highly settled when compared to other areas in the province. This includes areas near or in the cities of Lethbridge and Medicine Hat, as well as several surrounding cities, towns and smaller communities. As is typical with major urban centres, the majority of the population growth and residential development is occurring along the perimeter of Lethbridge, Medicine Hat and nearby communities where many residents commute to the city. In addition to the growth in urban areas, there is a considerable amount of country residential subdivisions present, under construction, and in the planning stages in the surrounding rural areas.

3.2.1 Specific Residential Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with residential impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Decrease of property values

This is a very site-specific impact. A preliminary determination of potential residences within 150m has been completed and applied to representative routes to provide an indication of potential number of residences that may be affected.

b.) Loss of developable lands and constraints on development

Development tends to happen in proximity to existing developed (urban) areas, i.e., residential density is a measure of potential impact. Therefore, minimizing routing in areas of existing residential density may help avoid areas with the highest development potential.

c.) Relocation or removal of residences

A preliminary determination of potential residences within 150 m of the representative routes can be used as a general indicator of the potential level of impact. However, it is difficult to assess the specific risk at this preliminary stage, as specific routes are not determined until the future Facility Application stage.

d.) Psychological impact of the line

This is a subjective impact involving factors such as visual impact, EMF, land values and other issues, all of which are incorporated in the LIA and will be addressed in the Facility Application. Provision of unbiased information around EMF research from national and international health and scientific agencies often helps address some people's concerns.

e.) Noise and TV interference

TV reception problems related to high-voltage transmission lines are unlikely. If interference does occur, it can often be resolved by relocating the TV or changing the antennae. The transmission lines are designed to meet allowable audible noise and TV interference. Where individual landowners are concerned, measurements will be taken before and after construction so signal interference beyond allowable levels can be identified and mitigated. There are sometimes increased levels of TV interference and audible noise immediately after construction until small imperfections on the conductors are naturally removed. As these types of concerns tend to be associated with residences, the number of residences within 150m can be used as an indicator of the potential level of impact.

f.) Windbreak and other vegetation removal

This is an issue where the removal or trimming of trees or other vegetation may be required when establishing a new right-of-way. It is also important to note that the overall impact is considered in making compensation payments for towers and land rights. This is site-specific and determined in consultation with the potentially affected landowner at the more detailed future Facility Application stage.

g.) Conflict with recreational use of land holdings

The proximity of known recreational areas, such as parks and natural areas can be determined in relation to representative routes. This can be used as a preliminary indicator of potential impacts.

h.) Public versus private land

The use of public land is generally viewed by landowners as a preferable alternative to using private lands. Existing data sources can provide a general indication of the amount of public (“Crown”) versus private land, which can be used as an indicator of the potential level of impact. This project is in the White Area on almost exclusively private land. Large areas of public land (such as Federal or Provincial Parks) was identified in the mapping and avoided by the representative routes. Determination of small pieces of other public land would be done in the future during the more detailed route evaluations and land title searches in preparation for Facilities Applications.

3.2.2 Measurable Indicators for Residential Concerns

There are several high-level indicators that can be measured for each of the proposed plans and components and be assessed at this preliminary stage. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the plans. These measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007 with respect to residential impact. The measurable indicators developed for residential impacts are:

1. Number of residences – It is assumed that the closer residences are to a transmission line and the higher the number of residences, the more residents will feel they are impacted. The categories are:

- Within 150 m of the centerline
- 0 – 800 m of the right-of-way, total residences

For the purpose of this assessment, it is assumed that there is a greater potential for residential impact on those residing within 150 m of the centerline. This is the distance established through landowner consultation during the route selection on the previous NS500kV facilities application. **The most significant indicator for potential residential impact is the total number of residences within 150 m**

3.3 Environmental Impacts

Existing environmental information was used to define areas in which potential representative routes may occur. Use of this data provided a general indication of environmental issues and relative impacts having potential to occur along representative routes associated with each of the system-development plans. These impacts will continue to be assessed as the project moves forward and additional information becomes available.

The potential environmental impacts from transmission lines are a concern for a variety of stakeholders and efforts to minimize such environmental impacts is a consideration when assessing the routing and the technologies associated with transmission lines. With respect to this project, portions of the study area are highly settled when compared to other areas in the province, resulting in existing levels of landscape fragmentation.

Several parks, natural areas, and other environmentally sensitive areas existing within the study area have been considered during evaluation of the plans.

One thing to note is that all of the proposed system-development plans can be built almost anywhere within the study area and pose some level of environmental impact. While some will have a lower or higher potential level when compared to others, almost all identified environmental impacts can be mitigated using various planning, routing and construction techniques to either eliminate or lower the potential impact.

3.3.1 Specific Environmental Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with environmental impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Increased public accessibility to wildlife areas

Typically this is an issue for treed/forested areas where there is currently little access. Access along the right-of-way on private land is managed in consultation with the landowner. One method of controlling access involves using locked gates. The proximity of representative routes to known wetlands and large treed areas can be determined using existing data sources, and can provide a general indication of the potential for an increase in the level of public access.

b.) Alteration of natural areas and interference with outdoor educational opportunities

The number of protected or designated areas that could be crossed by each alternative can be determined using existing data sources. This can provide a general indication of the potential level of this impact.

c.) Use of Restricted Development Area (TUC)

Currently none of the developed representative routing utilizes any part of an established TUC.

d.) Effect on erosion

AltaLink will attempt to avoid areas that pose potential erosion problems. If they cannot be avoided, then the intent is to work with associated regulatory agencies and landowners to develop appropriate mitigations and construction practices to minimize potential impacts. The amount of potential disturbance near water associated with each of the six system-development alternatives can provide a general indication of the potential level of impact.

e.) Unique ecological areas

There are some general indicators that can be used to identify unique ecological areas and the potential impact on these areas. Such indicators of unique ecological areas include the number of water crossings, the amount of designated sensitive areas that could be

crossed, and areas of native vegetation (including treed areas and grassland). Existing data sources can be used to understand and mitigate the level of impact associated with representative routes during construction, operation, and maintenance of the facilities.

f.) Impact to Waterfowl and Other Birds

One potential concern related to transmission lines is bird collisions with overhead wires crossing over or adjacent to wetlands and water bodies. Data layers representing the amount of wetland and open surface water areas can be used to determine which representative routes could have a higher magnitude of bird collisions.

3.3.2 Measurable Indicators for Environmental Concerns

There are several high-level indicators that can be assessed at this preliminary stage that can be measured for each of the six proposed alternatives. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the plans. These measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007 with respect to environmental impact. The measurable indicators developed for environmental impacts include:

1. Surface Water Within 800 m of the Right-of-Way Edge – This includes measuring the amount of surface water within 800 m of the right-of-way. This measure is an indication of the proximity to nearby water sources such as drainages, lakes and other identified wetlands within a representative route of a proposed routing concept. Because this represents areas with potential for bird impacts, **this is one of the four most useful metrics for potential environmental impact.**

2. Amount of Native Grassland – Using existing data, which identifies existing land-cover types, the approximate amount of affected native grassland can be determined for representative routes. Because native grassland is a sensitive and diminishing resource, **this is one of the four most useful metrics for potential environmental impact.**

3. Sensitive Wetland Areas – Wetland data can be referenced to determine the presence of sensitive wetland areas in relation to potential routing. This metric represents areas that are known to be used by waterfowl. In this area of the province impacts to larger areas is typically avoided through route selection and to small areas by tower placement. Because this represents areas of highest potential for bird collisions, **this is one of the four most useful metrics for potential environmental impact.**

4. Crossing Treed Areas – Existing data can be referenced to determine the presence of relatively large, contiguous treed areas (>100 ha) that may be impacted by potential routing. Because contiguous treed areas are diminishing in central Alberta, **this is one of the four most useful metrics for potential environmental impact.**

5. Protected or Designated Areas Crossed – Using federal and provincial data-sets, the number of parks, natural areas, environmentally sensitive areas (ESAs) or other designated sensitive areas that may be crossed by the various system-development plans

and associated components. Environmentally Sensitive Areas (ESAs) are areas identified by municipal, provincial or federal governments that have a recognized significance (local, provincial, national) and have been subsequently designated as areas requiring additional consideration. In the study area, there have been several ESAs identified.

3.4 Cost

The information and findings in the LIA do not consider the influence of cost.

3.5 Electrical Considerations

Electrical considerations play an important role when assessing potential impacts associated with the proposed plans. While the technical considerations, such as transfer capability, system flexibility, system reliability and losses are considered by the AESO separately, some land impacts related to electrical considerations can be identified. Technical requirements and the other electrical considerations associated with the plans can affect the presence or level of impacts on the land. Existing sources of data can be used to estimate the potential impacts associated with the proposed plans.

3.5.1 Specific Electrical Considerations

AltaLink has considered several specific concerns, listed below, associated with electrical considerations, and have provided commentary on each of these concerns and how they may relate to the project.

a.) Ease of connections to future load areas

This relates to electrical capacity, location of the facilities and the type of technology used (overhead vs. underground). This specific concern does not have any direct land impact and will be considered by the AESO separately.

b.) Reliability and repairability of the line

The reliability and repairability of a line as it relates to the specific technology being considered does not have any impact from a land perspective. However, wet soil conditions can present difficulties for future maintenance and repair activities. Detailed identification of wet areas can be determined during the more detailed Facility Application processes that may occur in the future.

c.) Access for construction and maintenance of the line

. Paralleling major roads or existing transmission lines can reduce some of the potential access concerns associated with new facilities.

3.5.2 Measurable Indicators

There are several high-level indicators that can be measured for each of the components and their associated system-development plans being considered. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the components and their associated system-development plans. These

measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007. The measurable indicators developed for electrical considerations are:

1. *Right-of-way length* – The length of the transmission line is a key cost driver and can be used by the AESO in loss calculations.

2. *Paralleling Existing Transmission Lines*– Paralleling existing transmission lines is an effective way to reduce the amount of new linear disturbance and fragmentation. Landowners and agencies commonly request this of TFOs when they are considering establishing a new transmission line in an area.

3. *240kV Circuits Crossed* – Crossing 240kV circuits introduces points of vulnerability to the 240kV / 500kV transmission system. The crossings cost about \$3M each, and have a significant footprint.

3.6 Visual Impact

Visual impacts are generally considered a social impact that depends on an individual stakeholder's opinions. There are existing sources of data that can be used to estimate the potential impacts associated with the proposed plans. These impacts will continue to be assessed as the project moves forward and additional information becomes available.

Visual impacts are closely related to residential impacts as they are typically influenced by similar factors. However, additional impacts may be experienced by other groups, such as recreational users (hikers, fishermen, hunters, etc.), recreational installations, roads and others.

There are some general assumptions that can be made for all overhead transmission lines:

- The closer the line is to a residence, the more likely a visual impact will be perceived.
- The higher the residential density, the more likely a visual impact will be perceived.
- Paralleling similar, existing transmission facilities has a lower visual impact than a greenfield route where there is no existing line.
- Close proximity to parks, natural areas and other recreational areas can be viewed as creating a higher degree of visual impact than in other areas.
- Avoiding the tops of hills, ridges and other topographic heights of land reduces the potential level of visual impact.
- Significant clearing of mature-treed areas increases the potential level of visual impact by removing what is generally considered an aesthetically pleasing feature on the landscape and potential screening of the transmission line.

3.6.1 Specific Visual Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with visual impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Visual impact of tree removal as seen from roads and recreational installations

Many stakeholders view the removal of trees as a visual impact. While the study area is primarily cleared land, an approximate amount of treed lands can be determined for representative routes that can be related to the level of potential tree removal and subsequent impact levels.

b.) Visual impact on dispersed recreational users such as hikers, fishermen, hunters, scenic viewers, and cross-country skiers

Areas commonly used by recreational users can be identified using existing data sources. These can then be compared with the various routes associated with each of the plans to provide a general indication of the potential level of impact.

c.) Visual impact of towers and lines as seen from residences, farms, roads, and recreational installations

The number and type of residences and landowners near representative routes can provide an indication of the potential visual impact. The type of tower being proposed can also impact the potential level of visual impact.

3.6.2 Measurable Indicators for Visual Concerns

There are several high-level indicators that can be measured for each of the components and associated system-development plans being considered. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the system-development plans. These measurable indicators may relate to one or more of the specific concerns identified in AUC Rule 007. The measurable indicators developed for visual impacts are:

1. Number of residences within 150m – For routing assessment purposes, it is assumed that the closer residences are to a transmission line and the higher the number of residences within the line-of-sight, the more residents will feel they are impacted.

For the purpose of this assessment, it is assumed that there is a greater potential for visual impact on those residing within 150 m of the centerline. **The most significant indicator for potential visual impacts is the total residences within 150m**, because they are the most significant receptor.

2. Proximity to Protected and Designated Areas – Using data from Alberta Sustainable Resource Development (ASRD), the number of parks, natural areas, and environmentally sensitive areas within 800 m of representative routes can be determined.

3.7 Special Constraints

Special constraints are issues or factors that may impact potential routing options unique to the specific study area being assessed. Using existing sources of available data, there are several special constraints that have been identified and incorporated for the project study area.

3.7.1 Specific Special Constraints

AltaLink has considered the one specific concern in AUC Rule 007 that can be associated with special constraints, as well as identified several additional special constraints that may relate to the project.

a.) Electrical interference with radio transmitting stations, and other telecommunication equipment – (from AUC 007)

There is the potential for transmission facilities to impact radio and other telecommunication equipment, and several telecommunications facilities have been identified within the study area. The intent is to work with affected facility owners to ensure appropriate routing and mitigation methods are employed to minimize or eliminate any potential impact. Following the construction of the proposed facilities, radio frequency interference (RFI) measurements will be taken to ensure that federal guidelines are not exceeded. Any interference problems caused by the new facilities will be mitigated by AltaLink.

b.) Major River Crossings

Major river crossings can present potential constraints related to technical design, environmental implications, timing restrictions and associated cost implications. Potential impacts on major river crossings are minimized by crossing overhead and complying with setbacks to the normal high-water marks for the crossing structures. Riparian vegetation can be selectively removed to minimize impacts. While an accurate determination of major river crossings cannot be determined until the more detailed Facilities Application stage, representative routes can be used to determine the potential for major river crossings. This in turn can provide a general indication of the level of impact.

c.) Proximity to Historical Resources – Historical resources are specific sites that have been identified within the province that hold particular archaeological significance. The province maintains a registry of known locations and, depending on the significance of a particular site, there may be constraints placed on nearby planned development or disturbance. This is particularly true for subsurface disturbances.

d.) Proximity to Major and Minor Airports – The presence of Airports, airstrip, and aerodromes present a challenge to routing each with a specific setbacks. The potential conflicts range from collision hazards to interference with radio and navigational equipment. Transport Canada maintains a list of all registered Airports, airstrip, and aerodromes.

3.7.2 Measurable Indicators for Special Constraints

There are several high-level indicators that can be measured for each of the plans being considered. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the plans. These measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007. The measurable indicators developed for special constraints are:

1. Proximity to Historical Resources – This utilizes data provided by Alberta Culture and Community Spirit to determine the presence of any identified historical resources within 800 m of the representative routes for the system-development plans and components.

2. Major River Crossings – This is the number of major river crossings that a representative route within a proposed routing concept crosses. (e.g., Red Deer River)

3. Proximity to Airports – The number of Airports, airstrip, and aerodromes utilizes the data provided by Transport Canada as well as a review of the aerial photography adjacent to the representative routing. Mitigation of conflicts will take place at the facility application stage.

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5 ACRONYMS

AESO - Alberta Electric System Operator

AltaLink – AltaLink Management Ltd.

ASRD - Alberta Sustainable Resource Development

ATCO – ATCO Electric Ltd.

AUC - Alberta Utilities Commission

DC - Direct Current

DND - Department of National Defence

ESA - Environmentally Sensitive Area

ha – Hectare

m - Metre

NID - Need Identification Document

R-O-W – Right-of-Way

TFO - Transmission Facility Owner

TUC - Transportation and Utility Corridor (around Lethbridge), also sometimes known as a restricted development area (RDA)

6 GLOSSARY

Aspect	The seven major aspects that the AESO must have regard for in determining technical options.
Facility Application	The Facility Application is developed and submitted by the TFO to the AEUB once final route and site selections have been made. These final selections are based on the direction provided by the AESO. It also involves an extensive public consultation program, detailed field surveys and other work.
Right-Of-Way	The right-of-way refers to the land required to build a proposed transmission line. The width considers several factors to ensure the safe and reliable operation of the line, which includes adequate clearance distances, access for maintenance and other factors.
Study Area	The study area refers to the general area in which the proposed developments could be located. This is the area that is considered for potential routing scenarios and the subsequent land impact assessment.
Need Identification Document	The need identification document is developed and submitted by the AESO to the AEUB once a technical solution has been recommended.

Appendix A

**Discussion of Using Roads For High Voltage
Power Transmission Line Routes**

Discussion of Using Roads For High Voltage Power Transmission Line Routes

Introduction

The AESO has asked for a report examining the possibility of using or paralleling roads or highways for routing high voltage transmission lines. This was a question that was posed at several of the AESO Open Houses.

This short report comments on; the recent MATL decision on this topic, road widening, impacts of road routes vs. $\frac{1}{4}$ line alignments, and routing in the White Zone vs. the Green Zone.

Roads and other linear facilities are evaluated by TFO's when looking for routes, and typically roads are one of the higher impact alignments.

MATL Decision Report

On page 23/24 of the EUB MATL January 2008 Decision Report 2008-006 the topic of road allowances for 240 kV transmission lines was discussed as follows:

“...the Board ... is not aware of any places in Alberta where a 230-kV transmission line is located on a rural road allowance. The general practice in rural Alberta for 230-kV transmission lines is to place them on private land well in from any road allowance due to the size of the structures and the ROW needed to contain the swing of conductors.

In addition to the impacts on residences ... the Board sees a safety impact of putting the MATL line along a road allowance. The Board is aware that the movement of large machinery is very common on rural roads and also the transportation of houses, granaries, and other large structures is not an uncommon site. It appears to the Board that standard road allowances, being only 20 m wide, would basically be half the ROW of a 230-kV transmission line. The Board, therefore, foresees that were it to approve either alternative route that would essentially sterilize, or at the very least greatly reduce the usability of those road allowances for the movement of large equipment or the transportation of structures that extend well beyond the actual road surface.

The Board, noting the impacts on the residences along the road allowances ... rejects Alternatives C and D for the routing of MATL's 230-kV transmission line.”

Road Widening

Paralleling roads has the risk of having to relocate sections of the route when the road authority decides that the road will be widened. This is a common occurrence for 138 kV transmission lines on road allowances, and is an acceptable cost and inconvenience

when compared to locating 138 kV on private lands. For major transmission lines, such as 500 kV the inconvenience and cost and potential system impacts of relocating for a road widening are considerable.

Road Allowances/Highways or ¼ Lines

It is the experience of AltaLink that the least impact location for a cross country lattice steel transmission line is along ¼ lines. The towers can either straddle the ¼ line, so each landowner has ½ a tower or the towers can be placed on one side of the ¼ line thus being at the edge of the field. Both locations reduce agricultural impacts. There are far fewer residences along ¼ lines as residences are typically located beside road allowances for access. Municipalities have setback requirements for facilities located on private land adjacent to roads, resulting in the towers potentially being located well onto the landowner's land. Paralleling road allowances will typically result in impacts to more residences and businesses. Road allowances and highways are also the preferred locations for distribution and lower voltage transmission power lines, telephone lines, fibre optic lines and low pressure gas pipelines.

White Area or Green Area

The NS 500 kV would be located within the White Area² of Alberta. In the white area, there is typically considerable development along roads. Most of the discussion in this paper would not apply to the Green Area of Northern Alberta as there is typically less development. In the Green Area, paralleling roads can result in opportunities to follow existing linear disturbance which could result in less tree clearing and provide access for improved construction and operation.

² The White Area and Green Area are defined in the *Public Lands Operational Handbook December 2004*, published by Alberta Sustainable Resource Development:

GREEN AREA

Public land in Alberta is divided into two broad land use designations referred to as the Green Area and White Area. The Green Area contains forested lands that are not available for agricultural development other than grazing. Most of this area is located in northern Alberta, with the remainder in the mountains and foothills along the western boundary of the province. Public land in the Green Area is generally not available for sale or settlement.

Depending on the location, a number of uses may be permitted (e.g., timber production, oil and gas exploration and development, mineral and surface materials exploration and development, commercial ventures such as trail riding operations, and recreation). Natural gas in coal, which is also called coalbed methane (CBM) is treated in a similar fashion to conventional natural gas and development may be permitted in some areas. Specific land management guidelines have been developed for the Green Area to ensure proper use of the land and resources.

WHITE AREA

The White Area contains most of the land suitable for cultivating. Although much of this land is privately owned, the provincial government has retained a few parcels for environmental reasons or natural resources management. A wide range of uses is allowed on this land (e.g., agriculture, oil/gas/coalbed methane exploration and development, surface materials development, commercial ventures such as hotels and trail riding operations, and recreation). Specific land management guidelines have been developed for multiple use of this land base.

|

Summary

In general, roads are not a good location for a 240 kV or 500 kV transmission line because the number of residence impacts is typically higher, impacts to number of businesses is higher, impacts to facilities and commercial buildings adjacent to roads, safety, impacts to road use is increased, and the risk of future impacts from road widening are considerable.

APPENDIX G COST ESTIMATES

Facility Substations	Description	Revised Alternatives					
		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
A	Switching sub, South of Peigan 59S: Line B termination 2-240kV line terminals				9.8		
C	Switching sub, South of Taber 83S: Lines C1(C2), D & E termination 4-240kV line terminals, 50 MVAR reactor, 0 to -100MVAR SVC	59.3	59.3	59.3			
	Line D2 termination 2-240kV line terminals				11.2		
	Lines C1 & E termination 2-240kV line terminals					10.3	
	Lines C1, D & E termination 5-240kV line terminals 50 MVAR reactor, 0 to -100MVAR SVC						56.85
D	Switching sub, South of Bullshead 523S: Line E, F & G termination. 3-240kV line terminals. 25 MVAR reactor, 0 to -100MVAR SVC	58.4	58.4	58.4			
	Line G2 termination 2-240kV line terminals				10.1		

Facility	Description	Revised Alternatives					
Substation		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
Matl 120S Substation	Proposed MATL Sub 4x240kV line terminal,4-CB	7.3	7.3	7.3			
	4x240kV line terminal, 8-CB 50 MVAR reactor, 0 to -100MVAR SVC				64.4		
H	500/240kV, 2-3x400MVA sub, south of Bullshead 523S. Lines E & F1 Termination: 2-500kV line terminals Lines X & Y termination: 2-240kV line terminals					147.4	
DeWinton	New Calgary Area Plan 240/138kV sub south of Calgary Line J termination, 2-CBs	4.6	4.6		4.6	4.6	4.6
	Line j & K termination, 5-CBs			12.9			

Facility	Description	Revised Alternatives					
		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
Peigan 59S	2x200MVA TX, line J termination, reactor + SVC 240kV Switchyard equipment Upgrading	81.6		81.6			81.6
	2x200MVA TX, line J & C2 terminations, reactor + SVC 240kV Switchyard equipment Upgrading		85.2				
	2x200MVA TX, Line J termination 240kV Switchyard equipment Upgrading					34.2	
	2x200MVA TX, line J & B terminations, reactor + SVC 240kV Switchyard equipment Upgrading				86.9		
Milo Jct	Switching sub west of West Brooks Line 923,924,927&935 terminations 6x240kV line terminals, 9-CBs	24.6	24.6	24.6	24.6		24.6
	500/240kV, 2x1200MVA sub west of W. Brooks Line 923, 924, 927, 935, Y, Z 6x240kV line terminals, 9-CBs 2x500kV line terminals, 3-CBs					161.1	

Facility	Description	Revised Alternatives					
Substations		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
Crowsnest	500/240kV, 2x1200MVA sub Close to Coleman 799S Line A & 1201L termination 2x500kV line terminals, 4-CBs 2x240kV line terminals, 4-CBs	132.7	132.7	132.7	132.7		132.7
	Lines A, X & 1201L termination 3x500kV line terminals, 6-CBs 2x240kV line terminals, 4-CB					147.8	
Ware Jct	Includes upgrade of the ampacity of some existing 240 kV components. Line H & W. Brooks-Anderson termination 4x240kV line terminals, 6-CBs	24.6	24.6		24.6		24.6
	W. Brooks-Anderson termination 2x240kV line terminals, 3-CBs			10.3		10.3	
Goose Lake	Includes upgrade of the ampacity of some existing 240 kV components. Lines C1 & A1 terminations 3x240kV Line terminals, 6-CBs	16.6		16.6		16.6	16.6
	Includes upgrade of the ampacity of some existing 240 kV components. Line A termination 2x240kV Line terminals, 5-CBs		15.9		15.9		

Facility	Description	Revised Alternatives					
Substations		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
W. Brooks	Includes upgrade of the ampacity of some existing 240 kV components. Line G4 Terminations 2-240kV Line terminal, 4-CBs	21.9	21.9				
	Lines G4, K, W. Brooks-Anderson 4-240kV Line terminal, 6-CBs			26.2			
	Line G4 terminations 2-240kV Line terminal, 6-CBs 50 MVAR reactor, 0 to -300MVAR SVC				87.7		
Langdon	Line H terminations 3-240kV Line terminal, 3-CBs 240kV Switchyard equipment Upgrading	18.2	18.2		18.2		
	Line Z termination 1-500kV Line terminal, 2-CBs 500/240kV, 1-3x400MVA					31.7	
Cypress	240kV CB addition, +25/-50MVAR SVC Addition	31.1	31.1	31.1	31.1		31.1

Facility	Description	Revised Alternatives					
		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
Med. Hat 2	240/138kV, 400 MVA sub 2 x 200 MVA LTC transformers 240 kV and 138 kV Switchyard 4x240kV line terminal, 6-240 kV CBs 8x138kV line terminations Split 138 kV bus	40.3	40.3	40.3	40.3		
	240/138kV, 400 MVA sub 2 x 200 MVA LTC transformers 240 kV and 138 kV Switchyard 2x240kV line terminal, 4-240 kV CBs 8x138kV line terminations Split 138 kV bus					35.9	35.9
Coleman	138kV/138kV, 120 MVA Phase-shifting Transformer	13.3	13.3	13.3	13.3	13.3	13.3

Facility	Description	Revised Alternatives					
		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
A1	240kV, 4 km, D/C, 2x1033, Goose Lake 103S to Highway 785 WF	9.0	9.0	9.0		9.0	9.0
	240kV, 4 km, D/C, 2x477 ACSS, Goose Lake 103S to Highway 785 WF				8.06		
A3	240kV, 43.2 km, D/C, 2x1033, Highway 785 WF to Crowsnest	60.0	60.0	60.0		60.0	60.0
	240kV, 43.2 km, D/C, 2x477 ACSS, Highway 785 WF to Crowsnest				49.9		
B	240kV, 71 km, D/C, 2x477 ACSS From Peigan 59S to Sub A				96.6		
C1	240kV, 220 km, D/C 1-strg, 2x795, Goose Lake to Sub C	186.5		186.5		186.5	186.5

Facility	Description	Revised Alternatives					
		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
C2	240kV, 240 km, D/C 1-strg, 2x795, Peigan to Sub C		220				
D	240kV, 64 km, D/C 1-strg, 2x795, Sub E (MATL) to Sub C	61.7	61.7	61.7			
	240kV, 64 km, D/C, 2x795, Sub E (MATL) to Sub C						
D2	240kV, 64 km, D/C 1-strg, 2x477 ACSS, Sub E (MATL) to Sub C				88.7		
E	240kV, 73 km, D/C, 2x795, Sub C to D	75.5	75.5	75.5			
	240kV, 73 km, D/C, 1-strg 2x795, Sub C to D					64.3	64.3
G3	240kV, 102 km, D/C, 2x1033, Sub D to Med. Hat 2	138.9	138.9	138.9			
	240kV, 102 km, D/C, 2x477 ACSS, Sub D to Med. Hat 2				116.5		
	240kV, 102 km, D/C, 2x795, Sub D to Med. Hat 2					100.3	100.3

Facility	Description	Revised Alternatives					
		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
G4	240kV, 117 km, D/C, 2x1033, Med. Hat 2 to W. Brooks	160.8	160.8	160.8			
	240kV, 117 km, D/C, 2x477 ACSS, Med. Hat 2 to W. Brooks				135.0		
G5	240kV, 203 km, D/C, 2x477 ACSS, Sub D to W. Brooks				129		
H	240kV, 137 km, D/C, 2x1033, 50% SC @ midpoint, Ware Jct 132S to Langdon 102S	246.5	246.5				
	240kV, 137 km, D/C, 2x477 ACSS, 50% @ SC midpoint, Ware Jct 132S to Langdon 102S				211.3		
J	240kV, 150 km, D/C, 2x1033, 50% SC @ midpoint, Peigan 59S to DeWinton	265.5	265.5	265.5		265.5	265.5
	240kV, 150 km, D/C, 2x477 ACSS, 50% SC @ midpoint, Peigan to DeWinton				226.7		

Facility	Description	Revised Alternatives					
Lines		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
K	240kV, 147 km, D/C, 2x1033, 50% SC @ midpoint, West Brooks 28S to DeWinton			260.0			
X	500kV, 275 km, S/C, 3x1590, Crownsnest to Sub H					415.6	
Y	500kV, 221 km, S/C, 3x1590, Milo Jct to Sub H					330.2	
Z	500kV, 113 km, S/C, 3x1590, Milo Jct to Langdon 102S					174.9	

Facility	Description	Revised Alternatives					
Lines		1A (2008\$M)	1B (2008\$M)	1C (2008\$M)	2 (2008\$M)	3 (2008\$M)	4 (2008\$M)
HVDV	+/-500kV, 335 km, S/C bipolar, 2000 MW, Langdon 102S to HVDC A sub.						1266.9
	HVDC “A” : Switching sub close to Burdett & connected to converter station A 2-240kV line terminals, 3-CB						
	Converter Station A: DC/AC converter station for HVDC Line & connected to HVDC A sub						
	Langdon: +/- 500kV HVDC converter station						
911L(Salvage)	Salvage existing 240kV 911L from Peigan to Janet, ~161km	18.8	18.8	18.8	18.8	18.8	18.8
Blackie Area 138kV Reconfiguration	Reconfiguration Lines in the Blackie-Queenstown area.	18.1	18.1	18.1	18.1	18.1	18.1
Med. Hat 138kV Reconfiguration	Reconfiguration Lines in the Medicine Hat area.	50.3	50.3	50.3	50.3	50.3	50.3
Total Estimated Cost 2008\$ M, No Escalation nor AFUDC		1826.4	1862.7	1819.9	1724.6	2307	2461.6

- **Need Identification Documents and
Interconnection Single Line Diagrams (Substations) -**

Estimate Summary for Need Identification Document (NID)

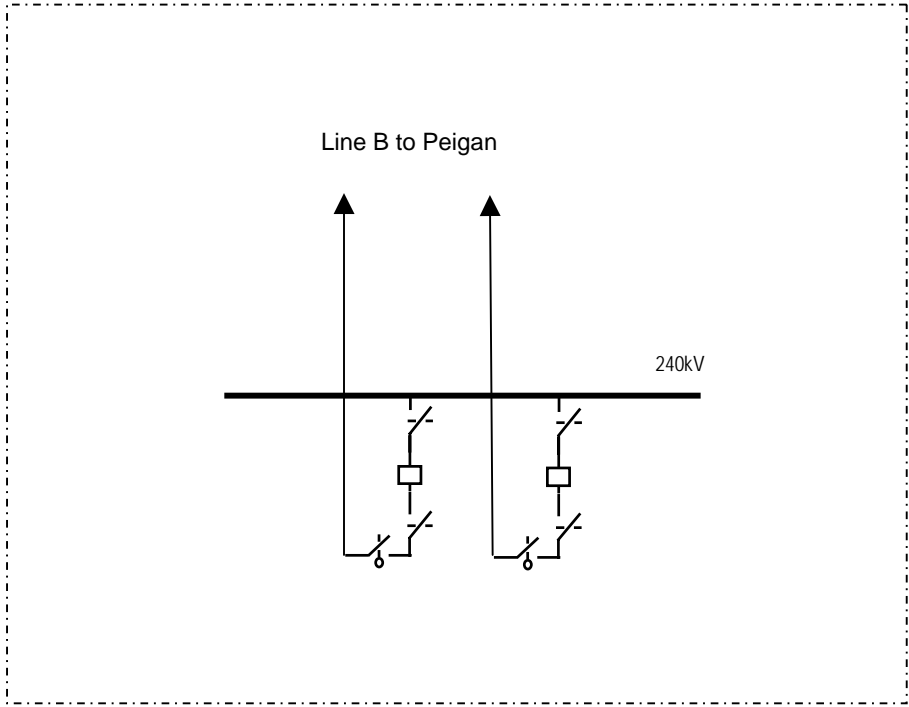


Project: SATD - New 240kV Substation A
 (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ -	\$ -	\$ -	\$ -
Substation Facilities	\$ 6,403,676	\$ -	\$ 6,403,676	\$ -
Telecommunication	\$ 324,032	\$ -	\$ 324,032	\$ -
Total Facility Costs	\$ 6,727,707	\$ -	\$ 6,727,707	\$ -
Owners Costs	\$ 135,000	\$ -	\$ 135,000	\$ -
Distributed Costs	\$ 2,250,137	\$ -	\$ 2,250,137	\$ -
Total Owners and Dist. Costs	\$ 2,385,137	\$ -	\$ 2,385,137	\$ -
Total Direct Costs	\$ 9,112,844	\$ -	\$ 9,112,844	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 729,028	\$ -	\$ 729,028	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 729,028	\$ -	\$ 729,028	\$ -
TOTAL PROJECT COSTS	\$ 9,841,872	\$ -	\$ 9,841,872	\$ -

Assumptions and Risks

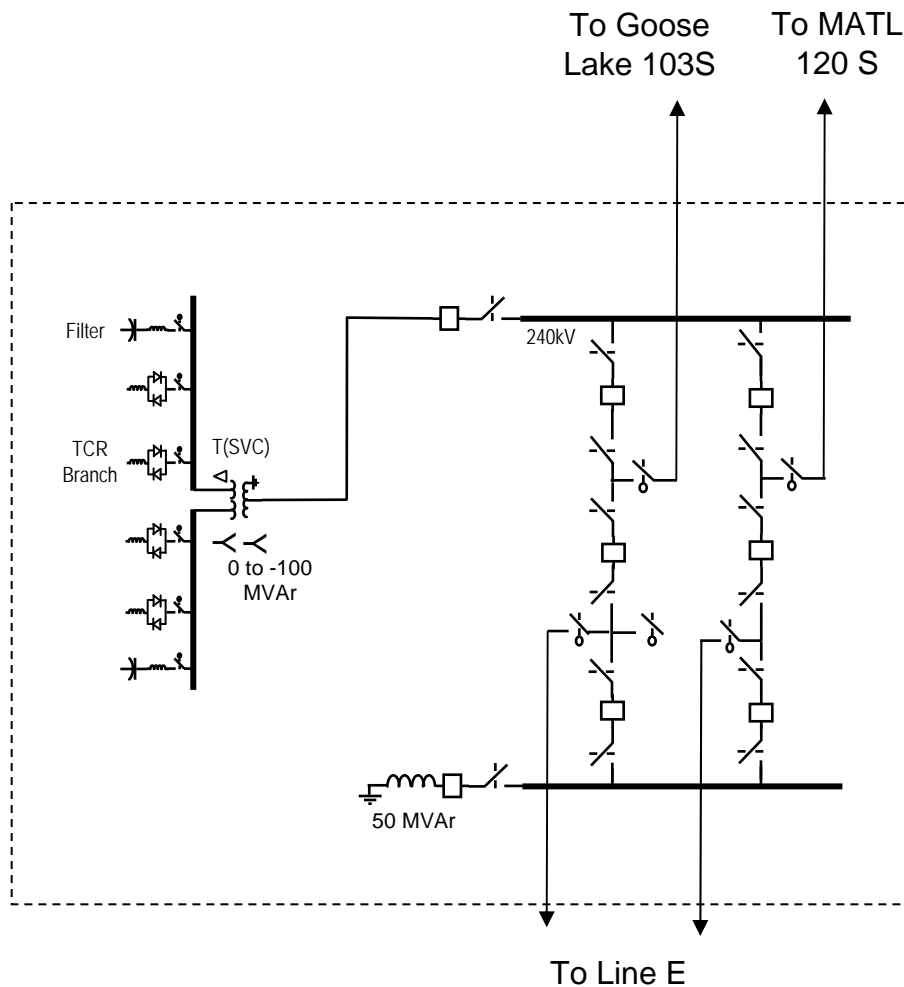
Site development for a typical 240/138kV source sub (150x110m) - Land available in the area
 OPGW with MUX / LAN for a 240kV substation - SCADA system for a new 240kV Sub.
 Standard "A" & "B" line protection
 Typical control building for a 240/138kV source sub
 Construction proceeds in a continuous fashion



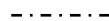
LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Fuse
- Disconnect Switch
- Provisions for Future development

ALTALINK		
Substation A –Alt 2.		
DATE 06-18 - 2008	BY RG	SLD NO. 08-159



LEGEND:



Substation Fence



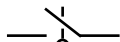
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



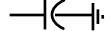
Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break with arcing horn

..... Proposed Development

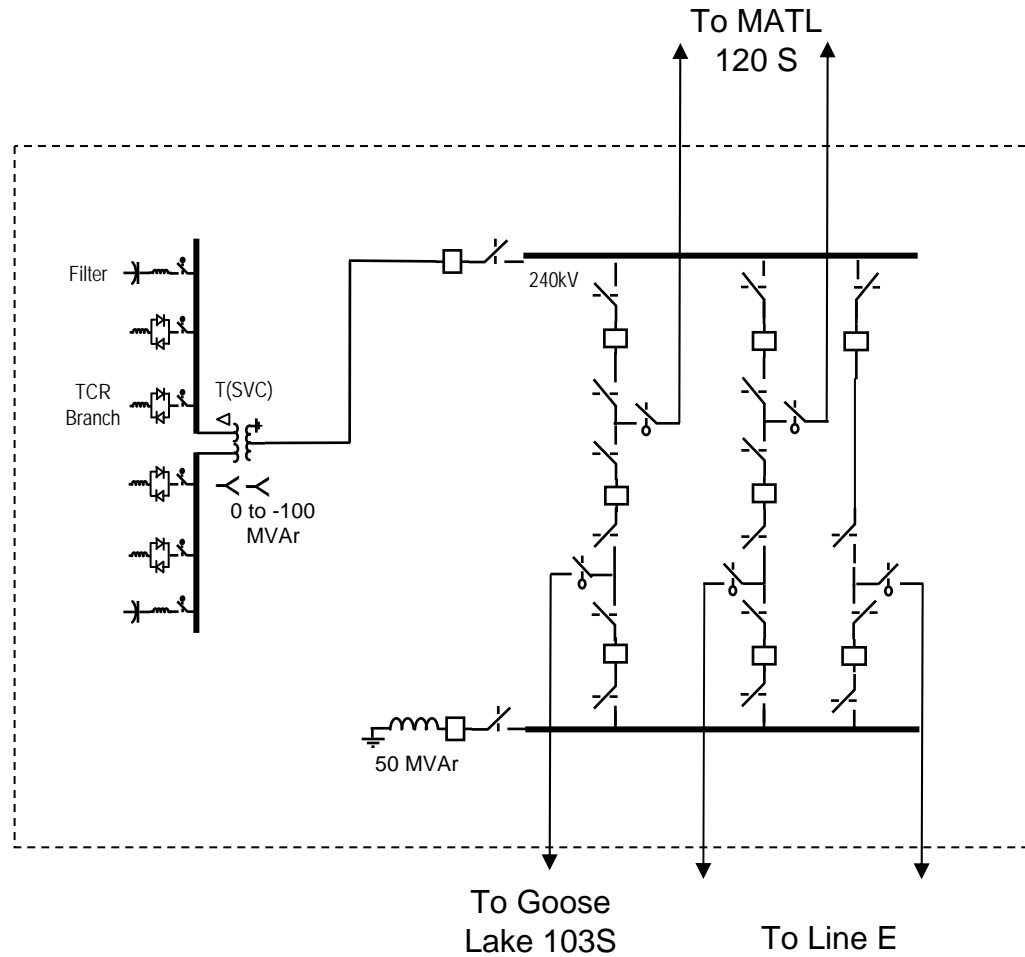
ALTALINK

Sub C – Rev. Alts 1A, 1B & 1C

DATE
2008-09-24

BY
RG

SLD NO.
08-307



LEGEND:

----- Substation Fence



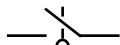
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



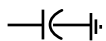
Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break with arcing horn

..... Proposed Development

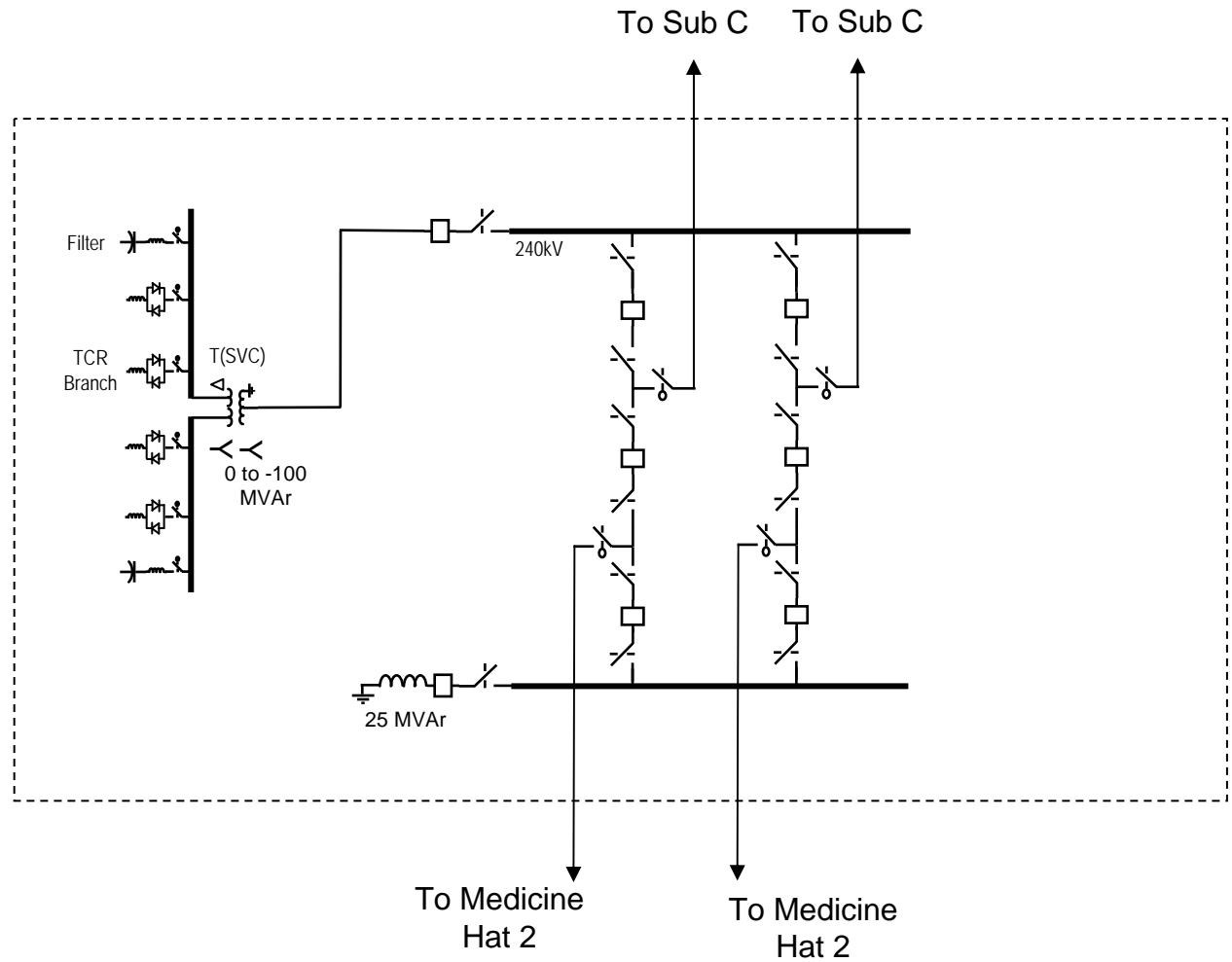
ALTALINK

Sub C – East Wind Scenario

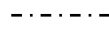



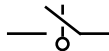



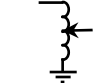



DATE
2008-09-16

BY
RG

SLD NO.
08-272



LEGEND:

- | | | | | | | | |
|--|---------------------|---|-----------------|---|--------------------------------------|---|----------------------|
|  | Substation Fence |  | Faulting Switch |  | Transformer |  | Fuse |
|  | Motorized Air Break |  | Circuit Breaker |  | Generation |  | Disconnect Switch |
|  | AutoTransformer |  | Capacitor Bank |  | Motorized air break with arcing horn |  | Proposed Development |

ALTALINK

Sub D - Alternative 1A, 1B, 1C

DATE
2008- Sep - 25

BY
GR

SLD NO.
08 - 311

Estimate Summary for Need Identification Document (NID)

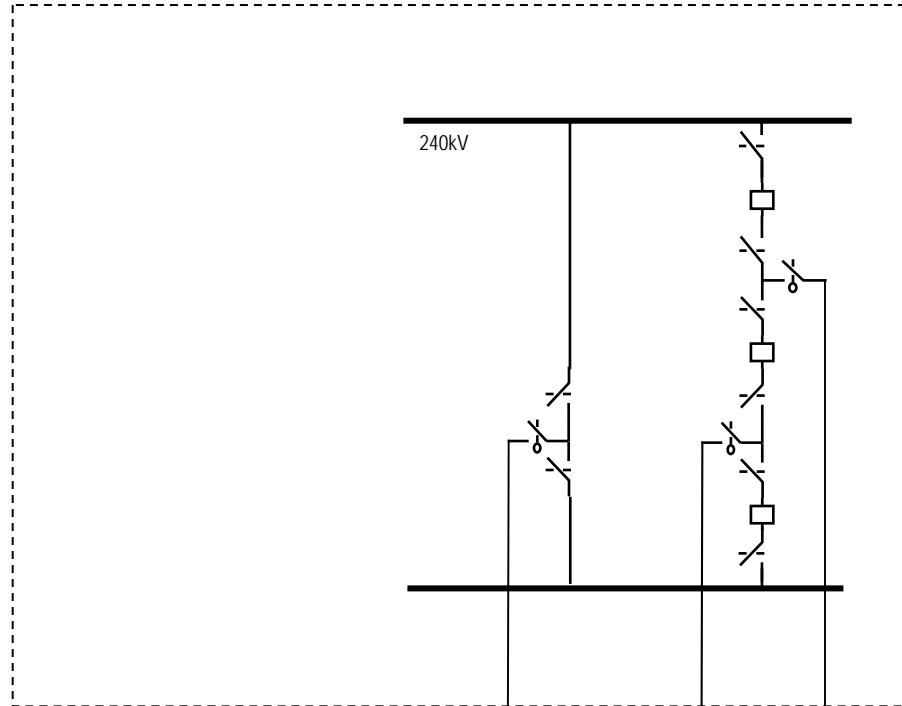


Project: SATD - New 240kV Sub D
 Alt. 2
TFO: AltaLink
Prepared by: A.Rothbauer + G.Rahimi
Date: September 25, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ -	\$ -	\$ -	\$ -
Substation Facilities	\$ 6,741,115	\$ -	\$ 6,741,115	\$ -
Telecommunication	\$ 424,832	\$ -	\$ 424,832	\$ -
Total Facility Costs	\$ 7,165,947	\$ -	\$ 7,165,947	\$ -
Owners Costs	\$ 160,000	\$ -	\$ 160,000	\$ -
Distributed Costs	\$ 2,054,987	\$ -	\$ 2,054,987	\$ -
Total Owners and Dist. Costs	\$ 2,214,987	\$ -	\$ 2,214,987	\$ -
Total Direct Costs	\$ 9,380,934	\$ -	\$ 9,380,934	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 750,475	\$ -	\$ 750,475	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 750,475	\$ -	\$ 750,475	\$ -
TOTAL PROJECT COSTS	\$ 10,131,409	\$ -	\$ 10,131,409	\$ -

Assumptions and Risks

Land for site will be available in the area proposed
 Outages will be available when required and when scheduled. Construction will proceed in a continuous fashion.
 There are no unusual site development requirements. Geo-technical studies will be required.



To Medicine
Hat 2

To West
Brooks 28S

To Medicine
Hat 2

LEGEND:

----- Substation Fence



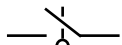
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break
with arcing horn

..... Proposed Development

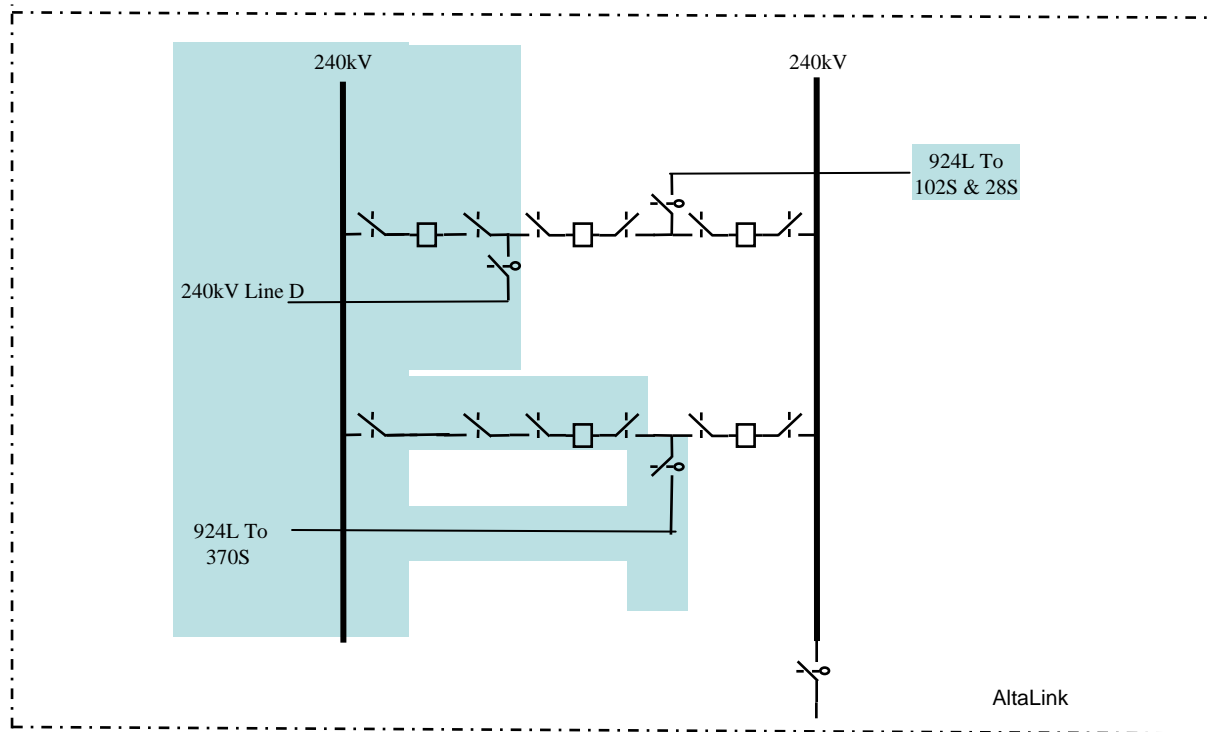
ALTALINK

Sub D - Alternative 2

DATE
2008- Sep - 25

BY
GR

SLD NO.
08 - 312



To Montana Alberta Tie Ltd. Montana Alberta Tie Ltd.
Phase Shifting Transformer and Capacitors

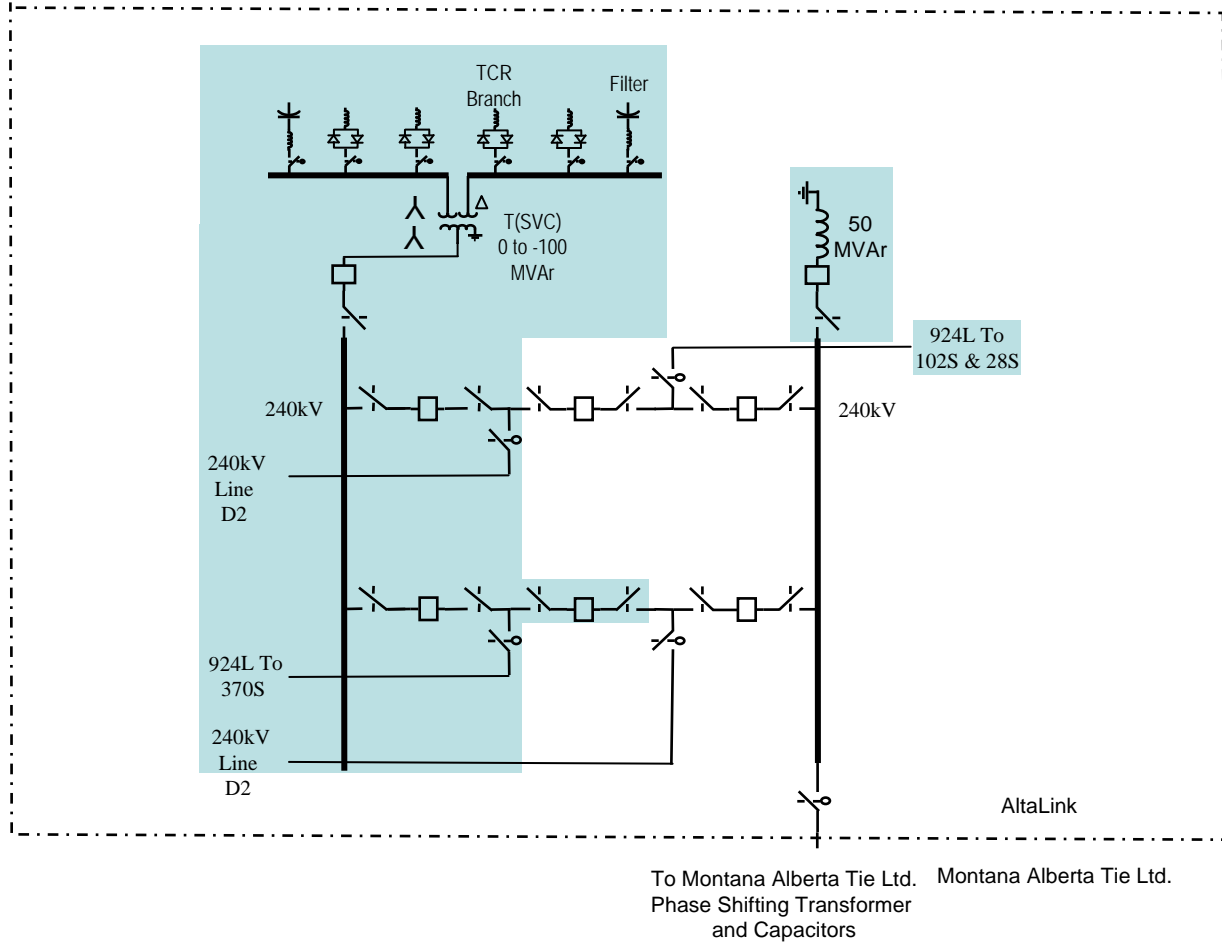
LEGEND:

- Substation Fence
- Phase Shifting Transformer
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTA LINK

MATL 120S Alternatives 1A, 1B, & 1C
(one Line from Milo)

DATE 2008 - 11 - 21	BY RG	SLD NO. 08 - 369
------------------------	----------	---------------------



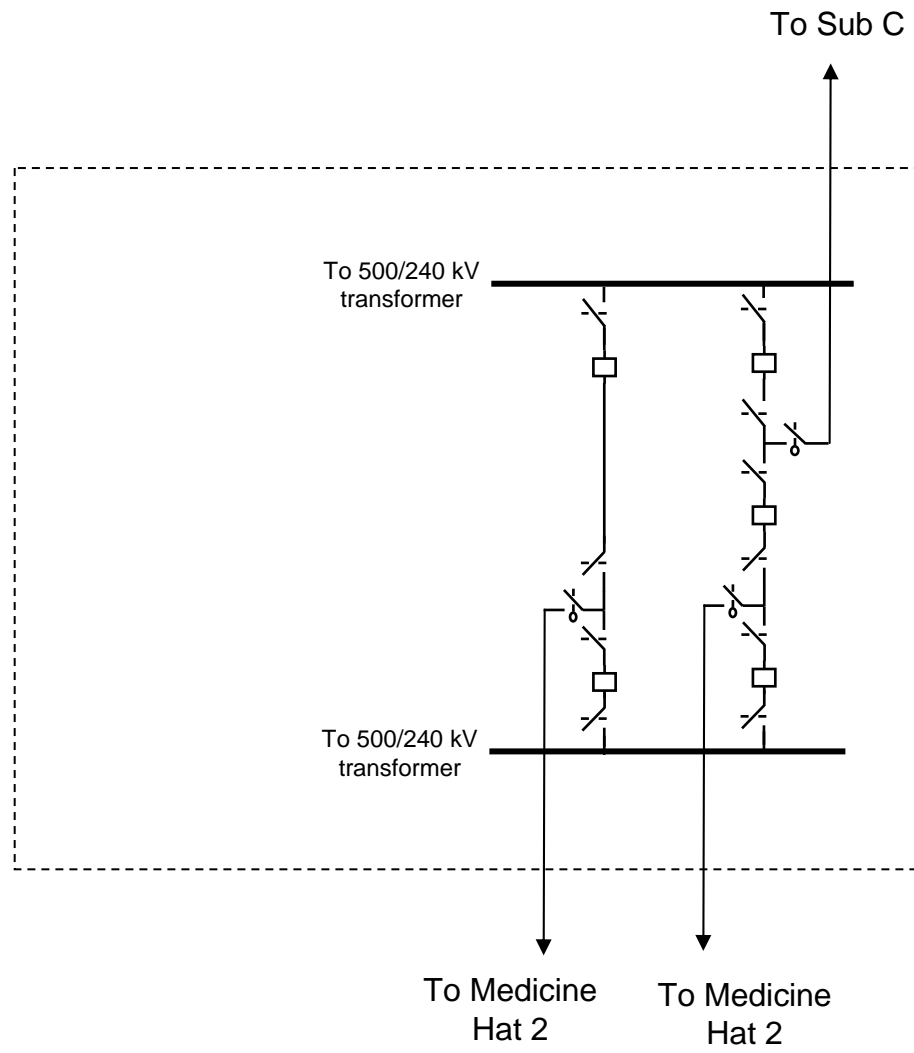
LEGEND:

- | | | | | | | | |
|--|---------------------|--|----------------------------|--|--------------------------------------|--|----------------------|
| | Substation Fence | | Phase Shifting Transformer | | Transformer | | Fuse |
| | Motorized Air Break | | Circuit Breaker | | Generation | | Disconnect Switch |
| | AutoTransformer | | Capacitor Bank | | Motorized air break with arcing horn | | Proposed Development |

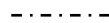
ALTALINK

MATL 120S Alternative 2
(One Line from Milo)

DATE 2008 -116 - 21	BY RG	SLD NO. 08 - 370
-------------------------------	-----------------	----------------------------



LEGEND:



Substation Fence



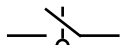
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break with arcing horn



Proposed Development

ALTALINK

Sub H - Alternative 3 - 240kV section

DATE
2008- Sep - 25

BY
GR

SLD NO.
08 - 313

Estimate Summary for Need Identification Document (NID)

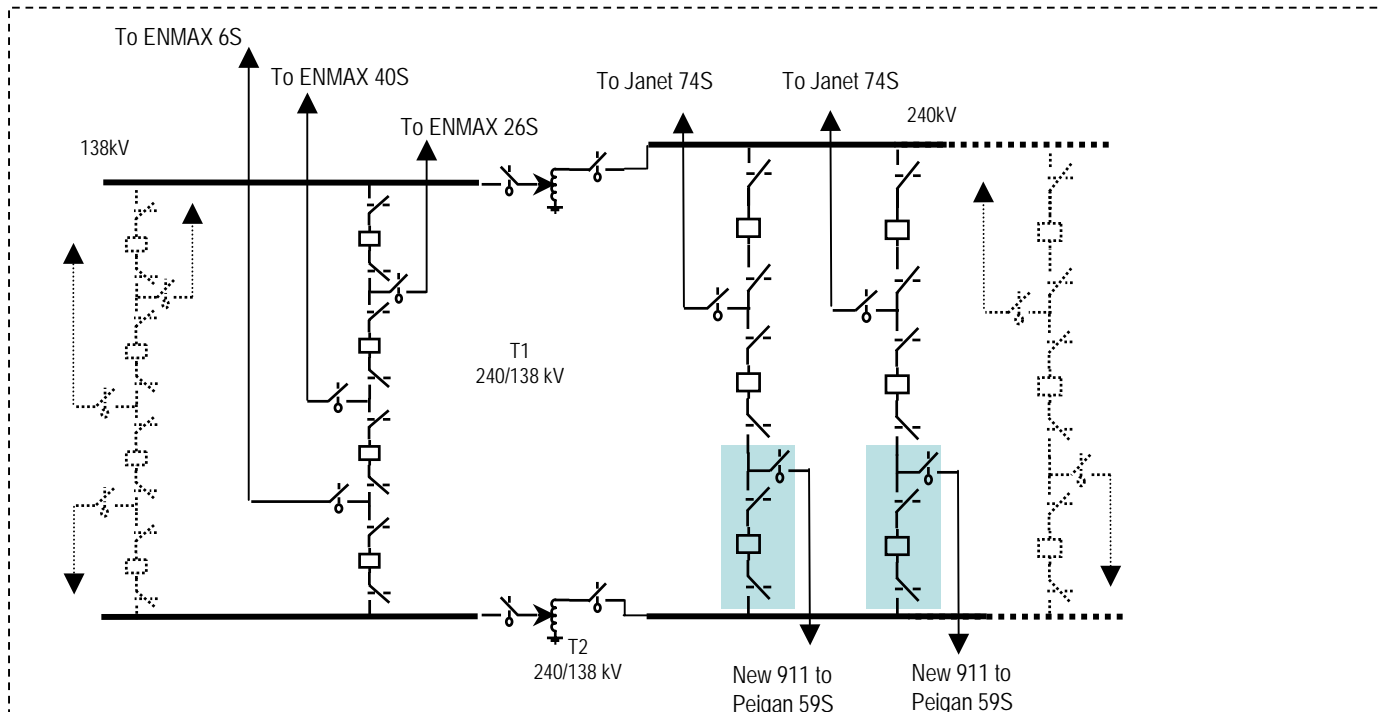


Project: SATD - New 240kV Line J Termination at DeWinton
 (Alts 1A, 1B, 2, 3, 4)
TFO: AltaLink
Prepared by: Rafael Guzmán
Date: June 24, 2008
Accuracy: +30%/-15%





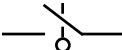



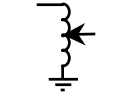



	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ -	\$ -	\$ -	\$ -
Substation Facilities	\$ 2,911,854	\$ -	\$ 2,911,854	\$ -
Telecommunication	\$ 50,400	\$ -	\$ 50,400	\$ -
Total Facility Costs	\$ 2,962,254	\$ -	\$ 2,962,254	\$ -
Owners Costs	\$ 95,000	\$ -	\$ 95,000	\$ -
Distributed Costs	\$ 1,196,774	\$ -	\$ 1,196,774	\$ -
Total Owners and Dist. Costs	\$ 1,291,774	\$ -	\$ 1,291,774	\$ -
Total Direct Costs	\$ 4,254,028	\$ -	\$ 4,254,028	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 340,322	\$ -	\$ 340,322	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 340,322	\$ -	\$ 340,322	\$ -
TOTAL PROJECT COSTS	\$ 4,594,350	\$ -	\$ 4,594,350	\$ -

Assumptions and Risks

DeWinton is in service before line J is built
 DeWinton is assumed to have an 1 1/2 breaker configuration with two 240kV diameters with 2-240kV CBs each
 DeWinton will have a OPGW MUX / LAN equipment and SCADA System
 No site development is required, no expansion nor land required. Strd Line / bus protection
 Construction proceeds in a continuous manner. Outages available as required.



LEGEND:

	Substation Fence		Faulting Switch		Transformer		Proposed Development
	Motorized Air Break		Circuit Breaker		Generation		Disconnect Switch
	AutoTransformer		Capacitor Bank		Motorized air break with arcing horn		Provisions for Future Development

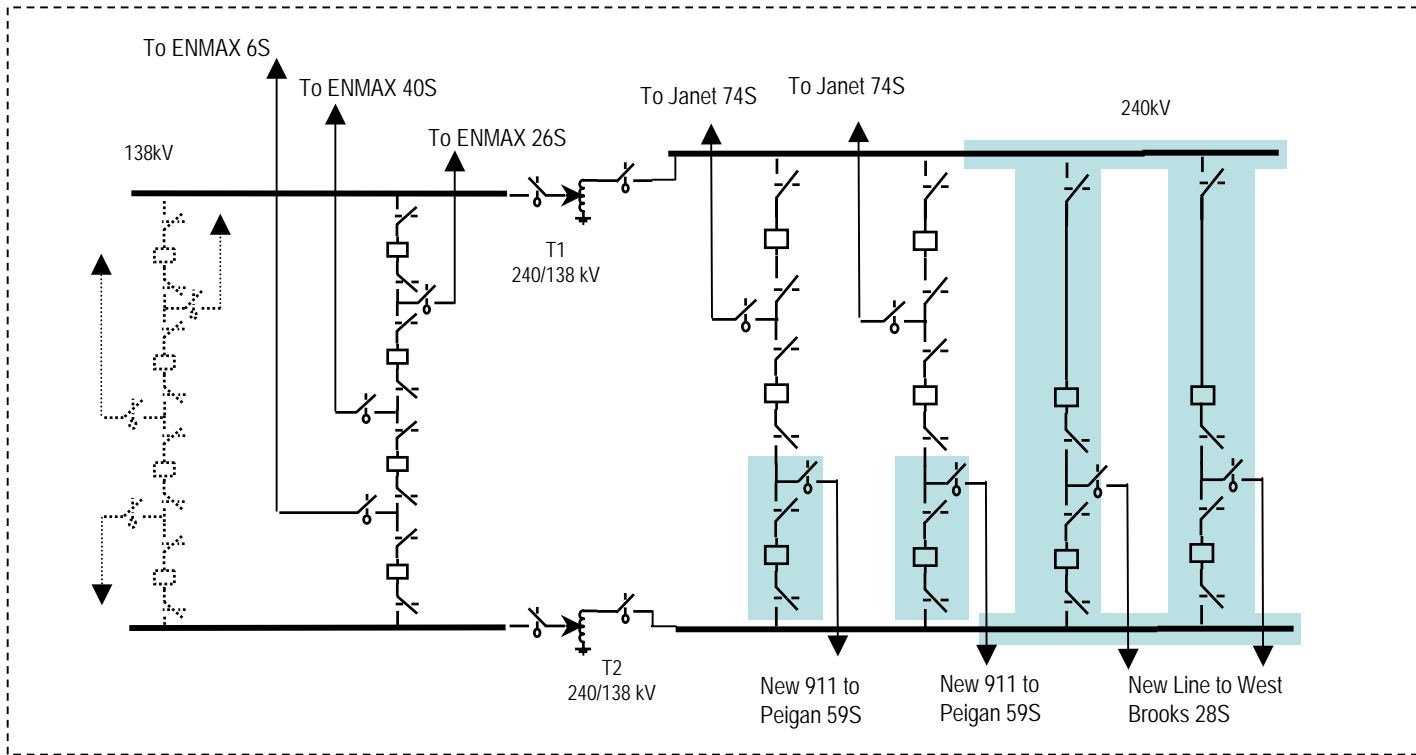
ALTALINK

Sub DeWinton 224S – Alts 1A, 1B, 2, 3, 4

DATE
2008 - 06 - 23

BY
RG

SLD NO.
08-164



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Proposed Development
- Disconnect Switch
- Provisions for future development

ALTALINK

Sub DeWinton 224S - Alt 1C

DATE
2008 - 06 - 28

BY
RG

SLD NO.
08-165

Estimate Summary for Need Identification Document (NID)

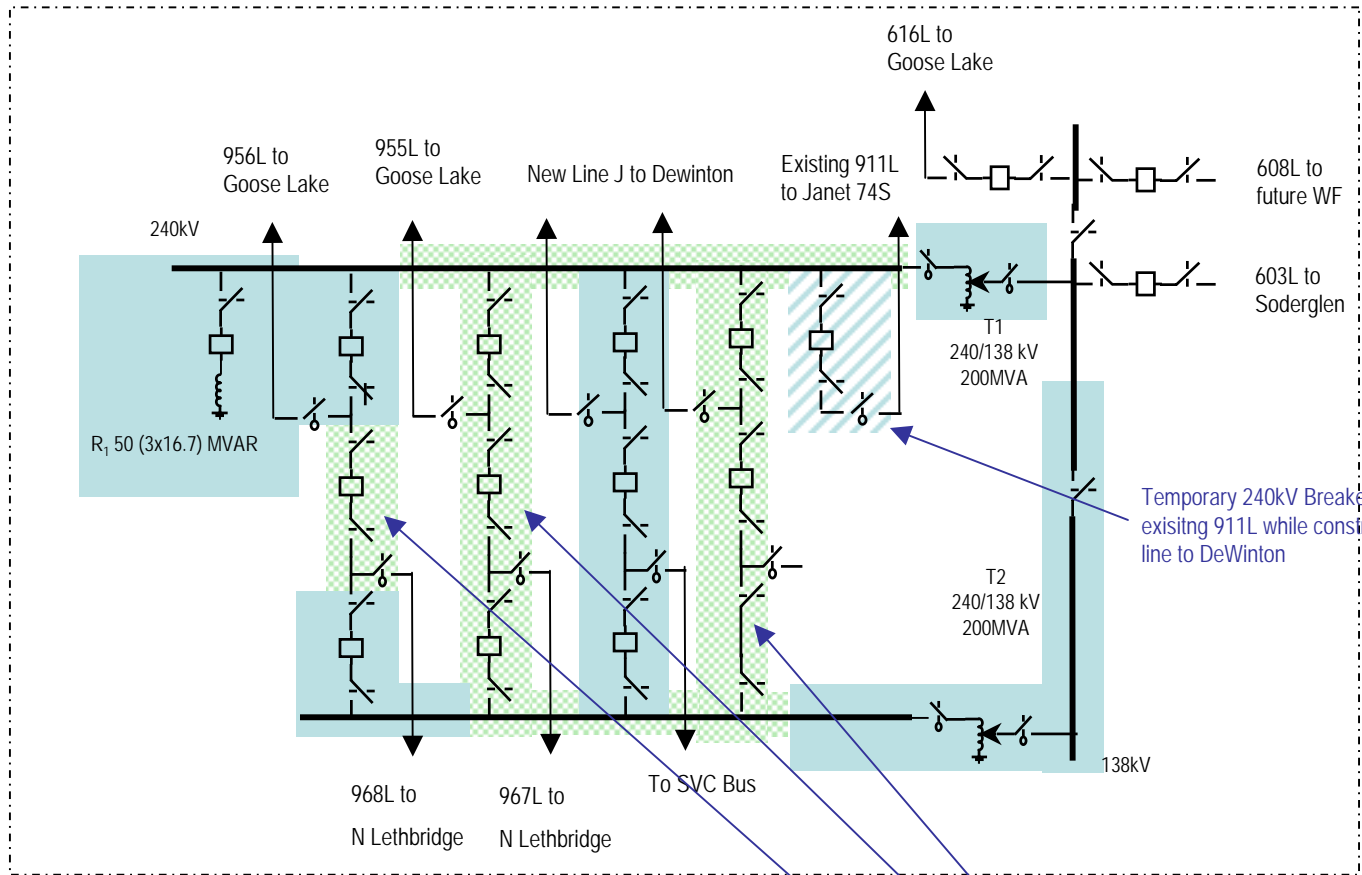


Project: SATD - Peigan 59S
 (Alts. 1A, 1C & 4)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 2,257,762	\$ -	\$ 2,257,762	\$ -
Substation Facilities	\$ 54,536,778	\$ -	\$ 54,536,778	\$ -
Telecommunication	\$ 109,917	\$ -	\$ 109,917	\$ -
Total Facility Costs	\$ 56,904,457	\$ -	\$ 56,904,457	\$ -
Owners Costs	\$ 380,000	\$ -	\$ 380,000	\$ -
Distributed Costs	\$ 18,303,106	\$ -	\$ 18,303,106	\$ -
Total Owners and Dist. Costs	\$ 18,683,106	\$ -	\$ 18,683,106	\$ -
Total Direct Costs	\$ 75,587,563	\$ -	\$ 75,587,563	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 6,047,005	\$ -	\$ 6,047,005	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 6,047,005	\$ -	\$ 6,047,005	\$ -
TOTAL PROJECT COSTS	\$ 81,634,568	\$ -	\$ 81,634,568	\$ -

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. outages available
 Breakers, Manual and motorized air breaks, CT's Bus post SW need to be replaced
 Structures and spacing after SW Dev. adequate to take higher capacity equipment
 Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included
 Delivery time for SVC and reactors is about 20-24m



Facilities constructed for SW Dev. project need to be replaced /rebuild as will not be adequate to accommodate addition of high capacity line J.

LEGEND:

	Substation Fence		Faulting Switch		Transformer		Proposed Development
	Motorized Air Break		Circuit Breaker		Motorized air break with arcing horn		Proposed Rebuilding / Replacement
	AutoTransformer		Capacitor Bank		Disconnect Switch		Provisions for future development

ALTALINK

SATD - Sub Peigan 59S - Alts 1A, 1C & 4

DATE
2008-05-26

BY
RG

SLD NO.
08-141

Estimate Summary for Need Identification Document (NID)

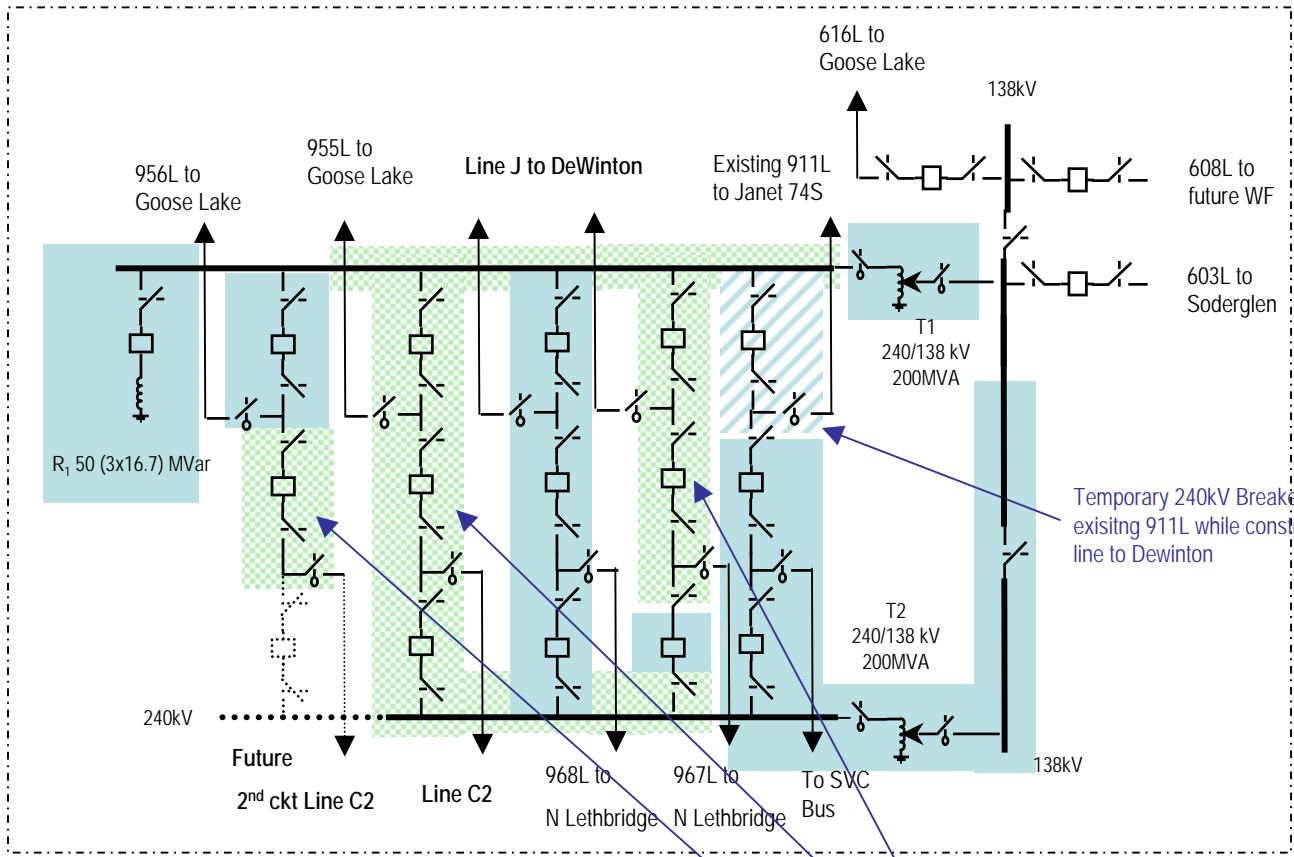


Project: SATD - Peigan 59S
 (Alt. 1B)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 3,190,583	\$ -	\$ 3,190,583	\$ -
Substation Facilities	\$ 55,791,322	\$ -	\$ 55,791,322	\$ -
Telecommunication	\$ 109,917	\$ -	\$ 109,917	\$ -
Total Facility Costs	\$ 59,091,822	\$ -	\$ 59,091,822	\$ -
Owners Costs	\$ 410,000	\$ -	\$ 410,000	\$ -
Distributed Costs	\$ 19,393,006	\$ -	\$ 19,393,006	\$ -
Total Owners and Dist. Costs	\$ 19,803,006	\$ -	\$ 19,803,006	\$ -
Total Direct Costs	\$ 78,894,828	\$ -	\$ 78,894,828	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 6,311,586	\$ -	\$ 6,311,586	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 6,311,586	\$ -	\$ 6,311,586	\$ -
TOTAL PROJECT COSTS	\$ 85,206,415	\$ -	\$ 85,206,415	\$ -

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. Outages available as required.
 Breakers, Manual and motorized air breaks, CT's, bus post SW need to be replaced.
 Structures and spacing after SW Dev. adequate to take higher capacity equipment.
 Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included.
 Delivery time for SVC and reactor is about 20-24m.



Facilities constructed for SW Dev. project need to be replaced /rebuild as will not be adequate to accommodate addition of high capacity line J.

LEGEND:			
	Substation Fence		Faulting Switch
	Motorized Air Break		Circuit Breaker
	AutoTransformer		Disconnect Switch
	Capacitor Bank		Motorized air break with arcing horn
	Transformer		Proposed Development
	Proposed Rebuilding / Replacement		Provisions for future development

ALTALINK		
SATD - Sub Peigan 59S- Alt 1B		
DATE 2008-06-13	BY RG	SLD NO. 08-138

Estimate Summary for Need Identification Document (NID)

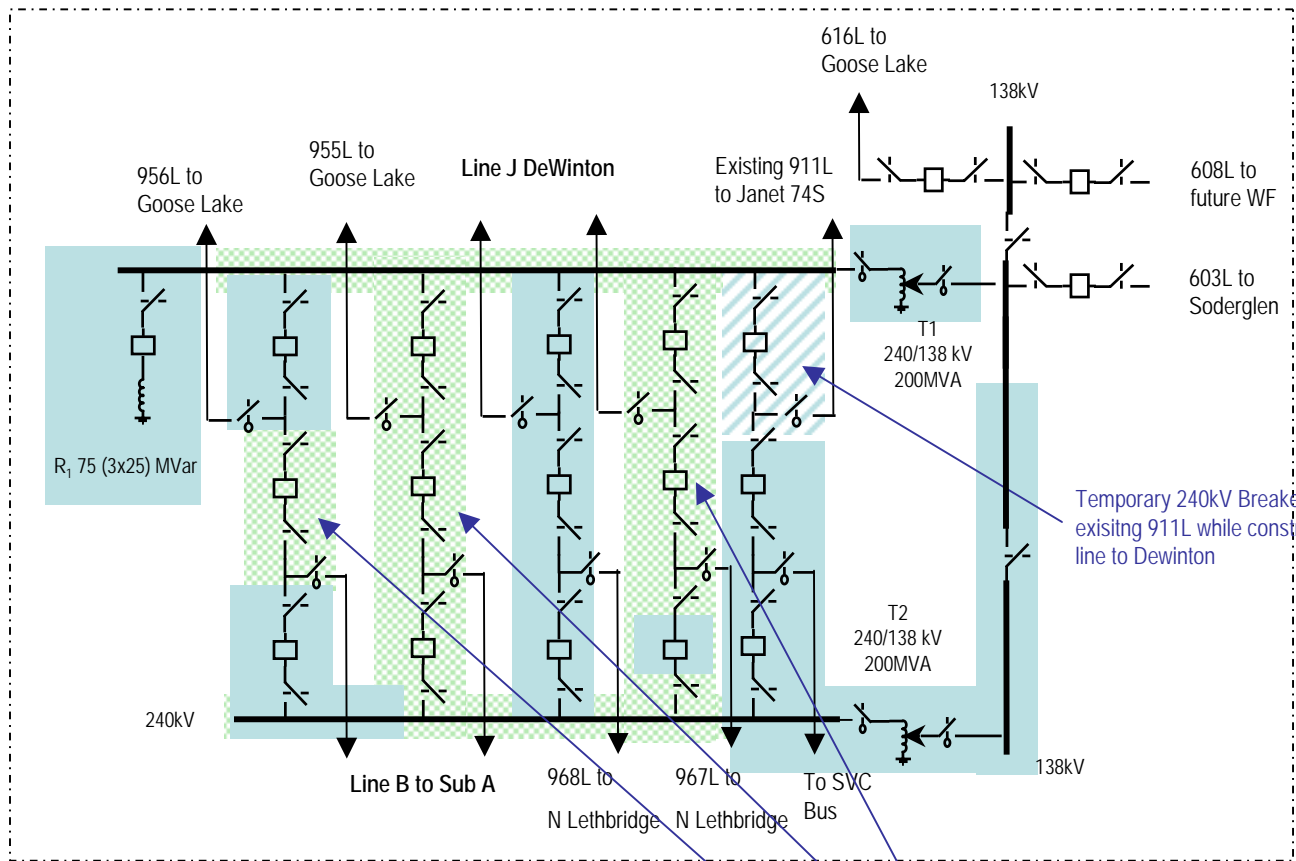


Project: SATD - Peigan 59S
 (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 3,190,583	\$ -	\$ 3,190,583	\$ -
Substation Facilities	\$ 57,044,183	\$ -	\$ 57,044,183	\$ -
Telecommunication	\$ 109,917	\$ -	\$ 109,917	\$ -
Total Facility Costs	\$ 60,344,684	\$ -	\$ 60,344,684	\$ -
Owners Costs	\$ 410,000	\$ -	\$ 410,000	\$ -
Distributed Costs	\$ 19,703,716	\$ -	\$ 19,703,716	\$ -
Total Owners and Dist. Costs	\$ 20,113,716	\$ -	\$ 20,113,716	\$ -
Total Direct Costs	\$ 80,458,399	\$ -	\$ 80,458,399	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 6,436,672	\$ -	\$ 6,436,672	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 6,436,672	\$ -	\$ 6,436,672	\$ -
TOTAL PROJECT COSTS	\$ 86,895,071	\$ -	\$ 86,895,071	\$ -

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. Outages available as required.
 Breakers, manual and motorized air breaks, CT's, bus post SW need to be replaced.
 Structures and spacing after SW Dev. adequate to take higher capacity equipment
 Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included
 Delivery time for SVC and reactors is about 20-24m



Facilities constructed for SW Dev. project need to be replaced /rebuild as will not be adequate to accommodate addition of high capacity line J.

LEGEND:

	Substation Fence		Faulting Switch		Transformer		Proposed Development
	Motorized Air Break		Circuit Breaker		Disconnect Switch		Proposed Rebuilding / Replacement
	AutoTransformer		Capacitor Bank		Motorized air break with arcing horn		Provisions for future development

ALTALINK

SATD - Sub Peigan 59S - Alt 2

DATE
2008-06-13

BY
RG

SLD NO.
08-139

Estimate Summary for Need Identification Document (NID)

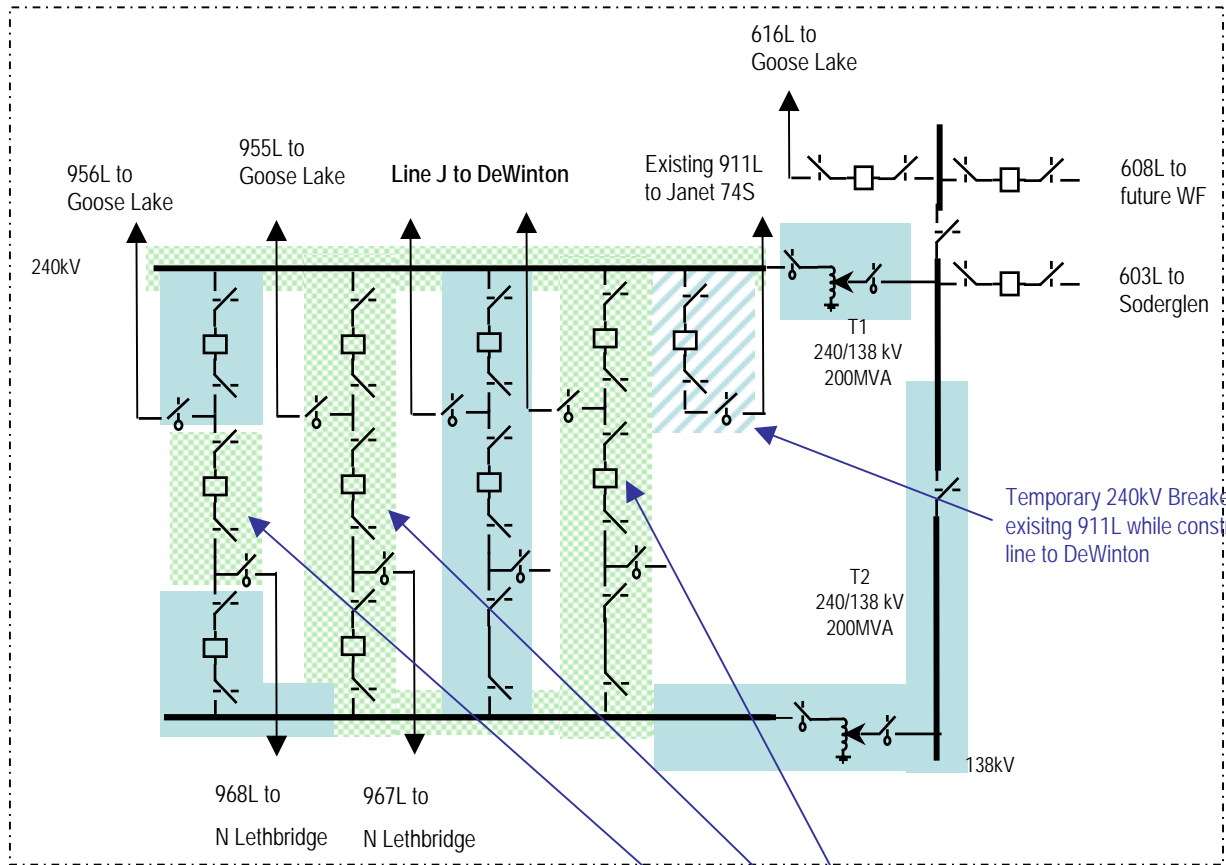


Project: SATD - Peigan 59S
 (Alt. 3)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 1,170,100	\$ -	\$ 1,170,100	\$ -
Substation Facilities	\$ 20,696,961	\$ -	\$ 20,696,961	\$ -
Telecommunication	\$ 109,917	\$ -	\$ 109,917	\$ -
Total Facility Costs	\$ 21,976,978	\$ -	\$ 21,976,978	\$ -
Owners Costs	\$ 180,000	\$ -	\$ 180,000	\$ -
Distributed Costs	\$ 9,532,380	\$ -	\$ 9,532,380	\$ -
Total Owners and Dist. Costs	\$ 9,712,380	\$ -	\$ 9,712,380	\$ -
Total Direct Costs	\$ 31,689,358	\$ -	\$ 31,689,358	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 2,535,149	\$ -	\$ 2,535,149	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 2,535,149	\$ -	\$ 2,535,149	\$ -
TOTAL PROJECT COSTS	\$ 34,224,506	\$ -	\$ 34,224,506	\$ -

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. Outages available as required.
 Breakers, Manual and motorized air breaks, CT's, bus post SW need to be replaced.
 Structures and spacing after SW Dev. adequate to take higher capacity equipment.
 Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included.
 Construction proceeds in a continuous manner



Temporary 240kV Breaker to terminate existing 911L while constructing new line to DeWinton

Facilities constructed for SW Dev. project need to be replaced /rebuild as will not be adequate to accommodate addition of high capacity line J.

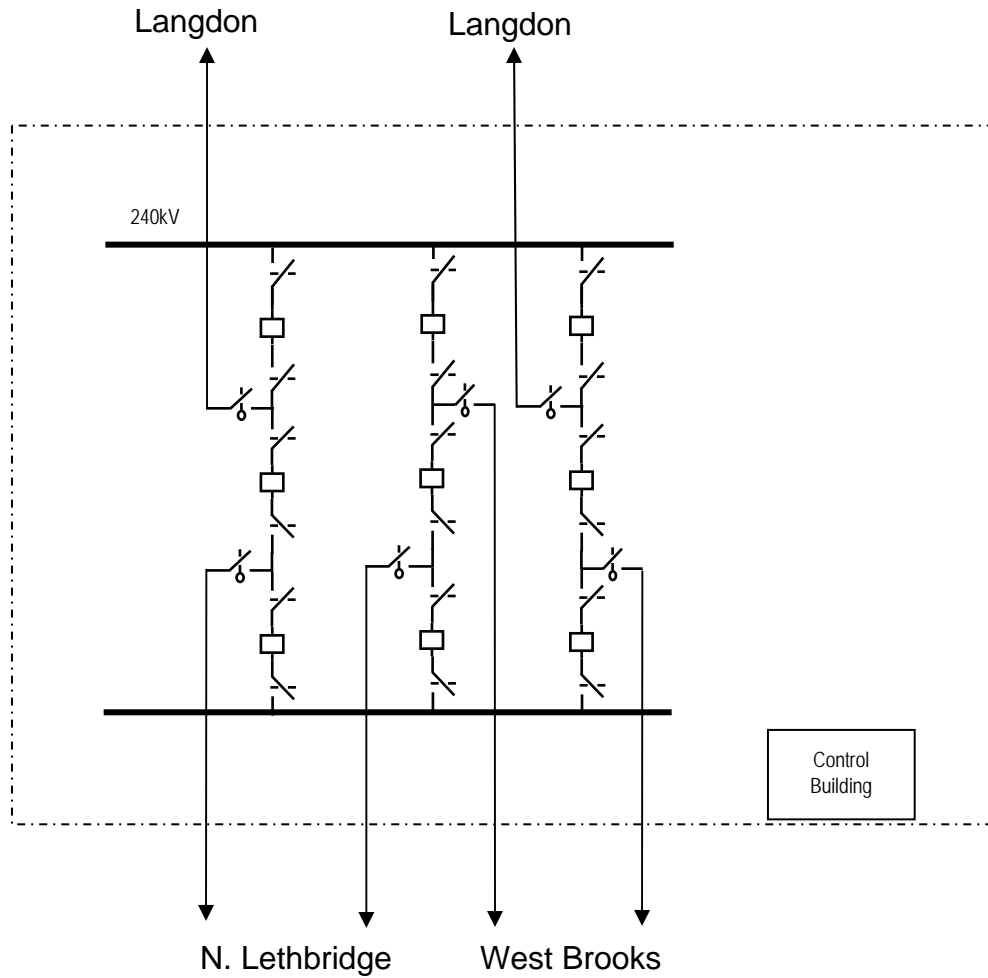
LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Disconnect Switch
- Motorized air break with arcing horn
- Proposed Development
- Proposed Rebuilding / Replacement
- Provisions for future development

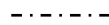
ALTALINK

SATD - Sub Peigan 59S - Alt 3

DATE	BY	SLD NO.
2008-05-26	RG	08-137



LEGEND:



Substation Fence



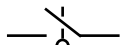
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break with arcing horn



Proposed Development

ALTALINK

Milo Junction-Alt 1A, Alt 1B, Alt 1C, Alt 2, Alt 4

DATE
2008- May-15

BY
GR

SLD NO.
08 - 121

Estimate Summary for Need Identification Document (NID)

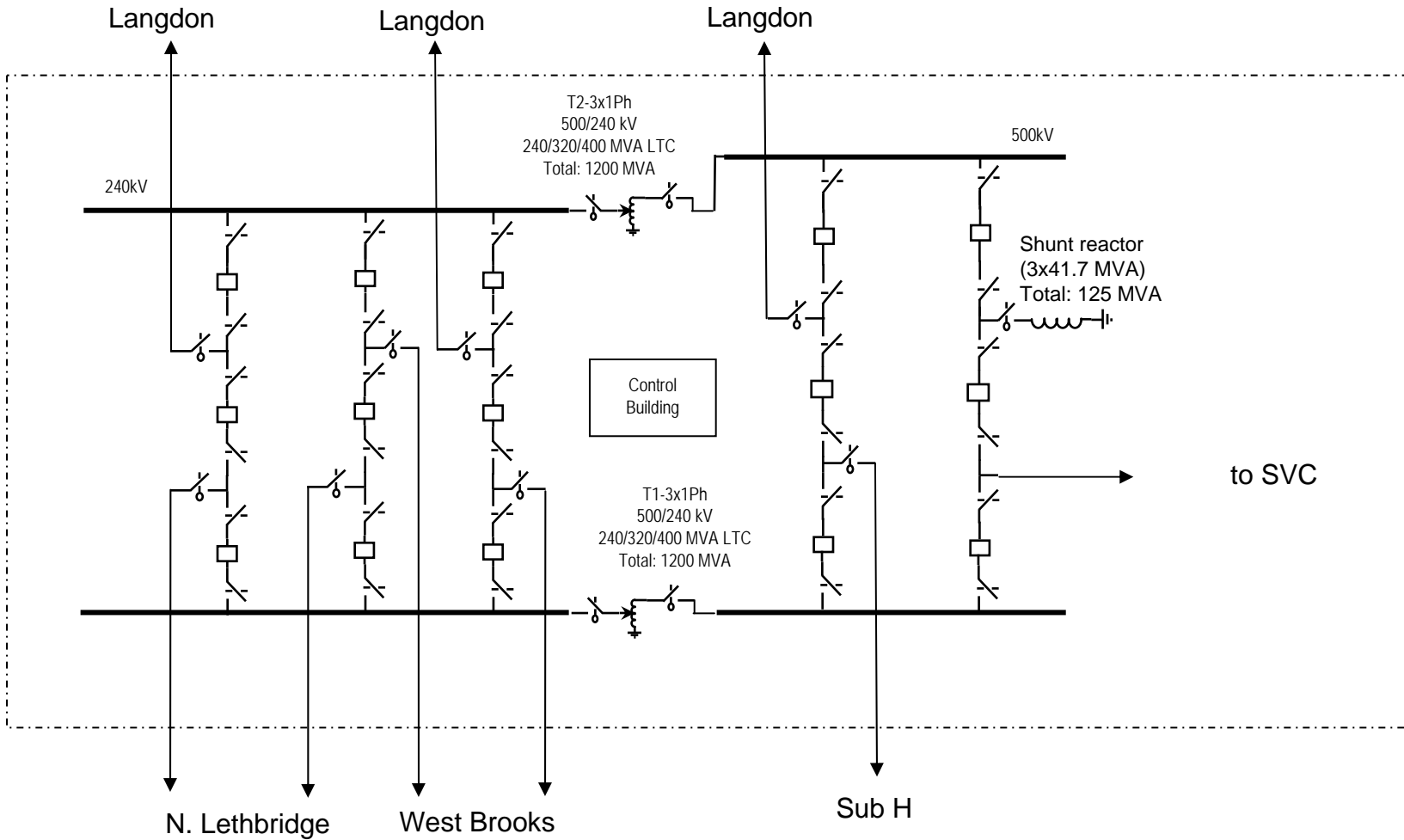


Project: SATD - Milo substation
 Alt 3
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17, 2008
Accuracy: +30%/-15%

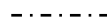



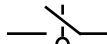



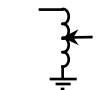



	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 3,885,908	\$ -	\$ 3,885,908	\$ -
Substation Facilities	\$ 110,797,149	\$ -	\$ 110,797,149	\$ -
Telecommunication	\$ 804,888	\$ -	\$ 804,888	\$ -
Total Facility Costs	\$ 115,487,946	\$ -	\$ 115,487,946	\$ -
Owners Costs	\$ 643,000	\$ -	\$ 643,000	\$ -
Distributed Costs	\$ 33,076,634	\$ -	\$ 33,076,634	\$ -
Total Owners and Dist. Costs	\$ 33,719,634	\$ -	\$ 33,719,634	\$ -
Total Direct Costs	\$ 149,207,580	\$ -	\$ 149,207,580	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 11,936,606	\$ -	\$ 11,936,606	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 11,936,606	\$ -	\$ 11,936,606	\$ -
TOTAL PROJECT COSTS	\$ 161,144,186	\$ -	\$ 161,144,186	\$ -

Assumptions and Risks

- 1) Live line work has been included.
 - 2) Lines terminating at Milo junction are an important part of 240kV looped system and the line relocation sequence to the new substation shall be carefully studied.
 - 3) Line renumbering is not included.
 - 4) Only one circuit may be taken out at a time
 - 5) SVC and reactor delivery time is 20 to 24 months.
- NID Estimating Summary



LEGEND:

- | | | | | | | | |
|--|---------------------|---|-----------------|---|--------------------------------------|---|----------------------|
|  | Substation Fence |  | Faulting Switch |  | Transformer |  | Fuse |
|  | Motorized Air Break |  | Circuit Breaker |  | Generation |  | Disconnect Switch |
|  | AutoTransformer |  | Capacitor Bank |  | Motorized air break with arcing horn |  | Proposed Development |

ALTALINK

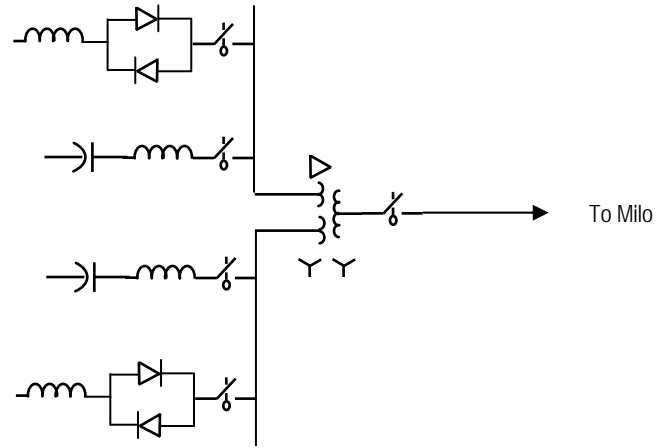
Milo Junction-Alt 3

DATE
2008- May-15

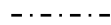
BY
GR

SLD NO.
08 - 154

Dynamic range of SVC: 0 to -400 MVAR



LEGEND:



Substation Fence



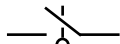
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break with arcing horn



Proposed Development

ALTALINK

Milo -SVC configuration - Alt 3

DATE
2008- June-16

BY
GR

SLD NO.
08 - 155

Estimate Summary for Need Identification Document (NID)

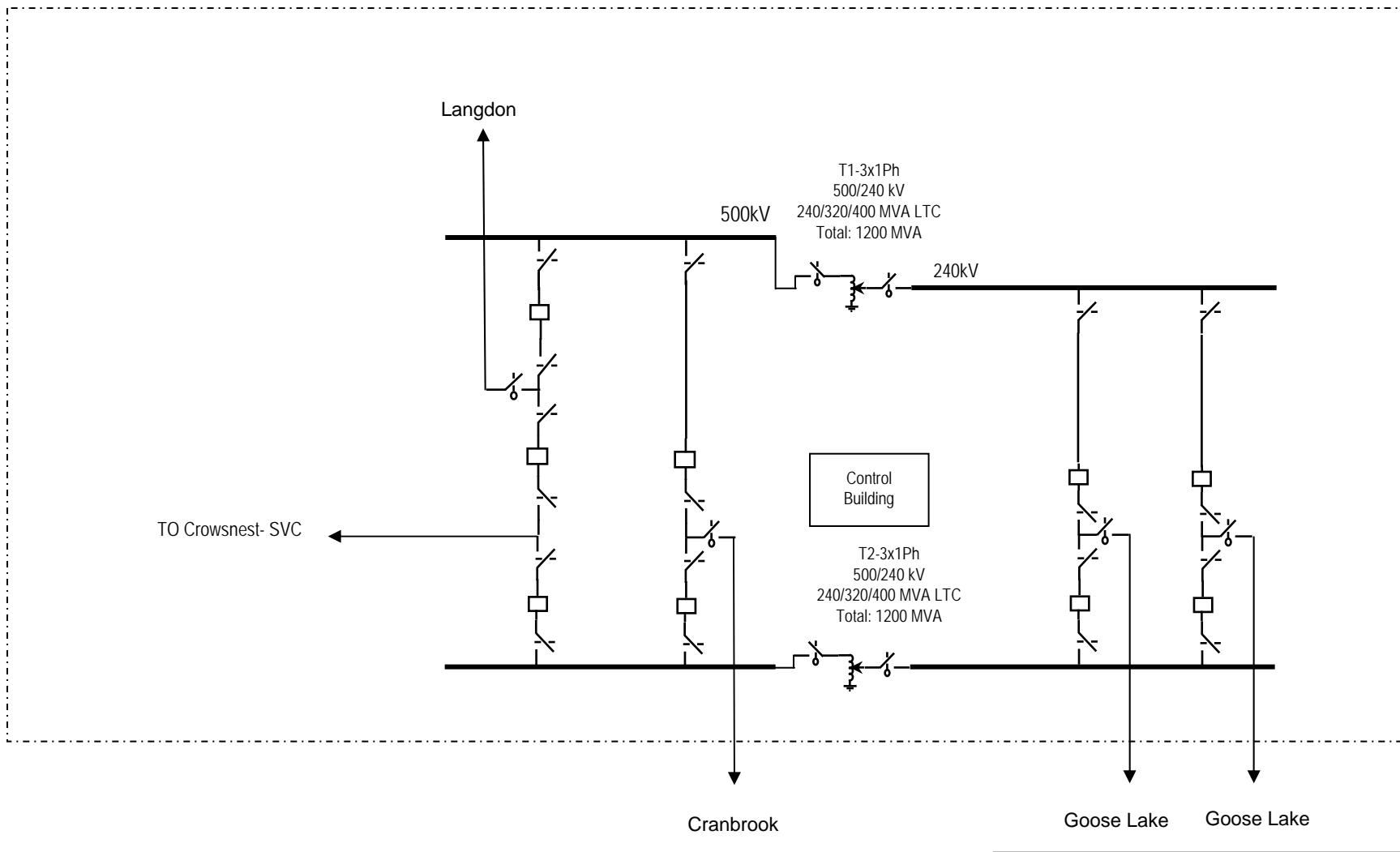


Project: SATD- Crowsnest substation (500kV/240kV)
 (Alts. 1A,1B,1C, 2 & 4)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: 18 July, 2008
Accuracy: +30%/-15%

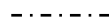



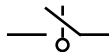



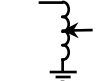



	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 3,072,849	\$ -	\$ 3,072,849	\$ -
Substation Facilities	\$ 91,590,147	\$ -	\$ 91,590,147	\$ -
Telecommunication	\$ 933,718	\$ -	\$ 933,718	\$ -
Total Facility Costs	\$ 95,596,715	\$ -	\$ 95,596,715	\$ -
Owners Costs	\$ 550,000	\$ -	\$ 550,000	\$ -
Distributed Costs	\$ 26,685,157	\$ -	\$ 26,685,157	\$ -
Total Owners and Dist. Costs	\$ 27,235,157	\$ -	\$ 27,235,157	\$ -
Total Direct Costs	\$ 122,831,871	\$ -	\$ 122,831,871	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 9,826,550	\$ -	\$ 9,826,550	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 9,826,550	\$ -	\$ 9,826,550	\$ -
TOTAL PROJECT COSTS	\$ 132,658,421	\$ -	\$ 132,658,421	\$ -

Assumptions and Risks

- 1) No tower upgrade included for Beavais Lake 9232.
- 2) It's assumed enough land is available at the proposed location for the new substation construction.
- 3) Site preparation considered for a normal site. No abnormal filling included.
- 4) Outages will be available when required.
- 5) SVC and reactor delivery time is 20 to 24 months.



LEGEND:

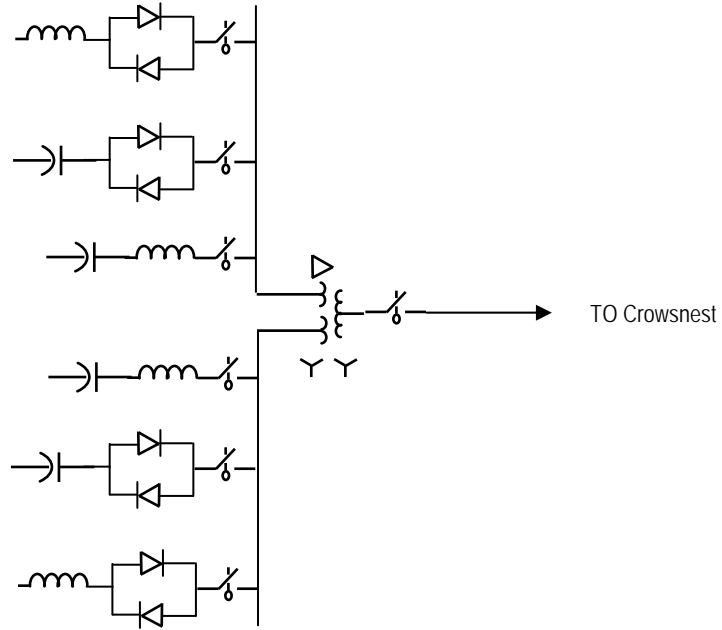
- | | | | | | | | |
|--|---------------------|---|-----------------|---|--------------------------------------|---|----------------------|
|  | Substation Fence |  | Faulting Switch |  | Transformer |  | Fuse |
|  | Motorized Air Break |  | Circuit Breaker |  | Generation |  | Disconnect Switch |
|  | AutoTransformer |  | Capacitor Bank |  | Motorized air break with arcing horn |  | Proposed Development |

ALTALINK

Crowsnest with SVC - Alt 1A, Alt 1B, Alt 1C, Alt 2, Alt 4

DATE	BY	SLD NO.
2008- June-16	GR	08 - 147

Dynamic range of SVC: 0 to +400 MVAR



LEGEND:

----- Substation Fence



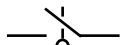
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break
with arcing horn

..... Proposed Development

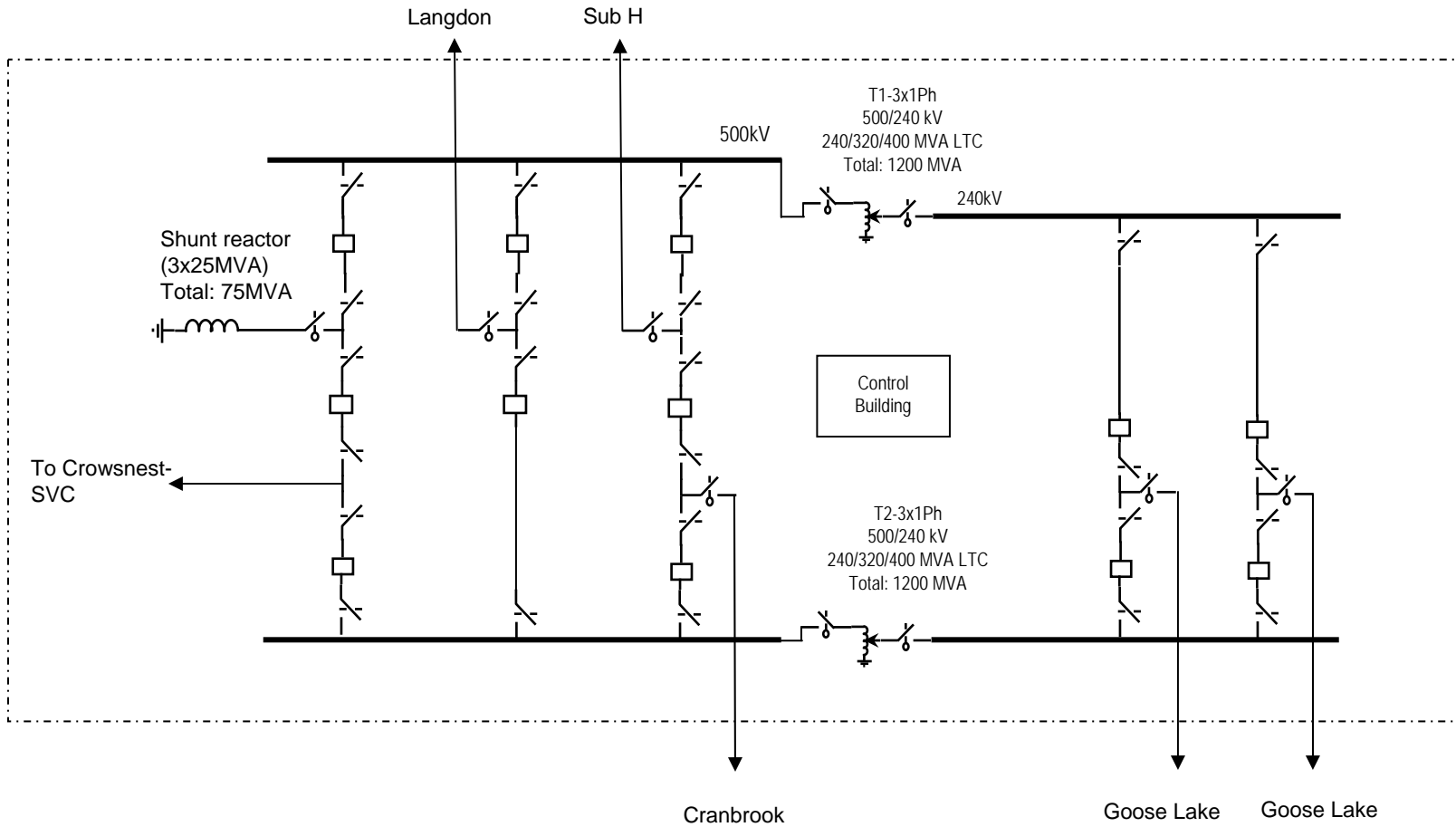
ALTALINK

Crowsnest - SVC configuration -
Alt 1A, Alt 1B, Alt 1C, Alt 2, Alt 4

DATE
2008- June-16

BY
GR

SLD NO.
08 - 148



LEGEND:

- | | | | | | | | |
|--|---------------------|--|-----------------|--|--------------------------------------|--|----------------------|
| | Substation Fence | | Faulting Switch | | Transformer | | Fuse |
| | Motorized Air Break | | Circuit Breaker | | Generation | | Disconnect Switch |
| | AutoTransformer | | Capacitor Bank | | Motorized air break with arcing horn | | Proposed Development |

ALTALINK

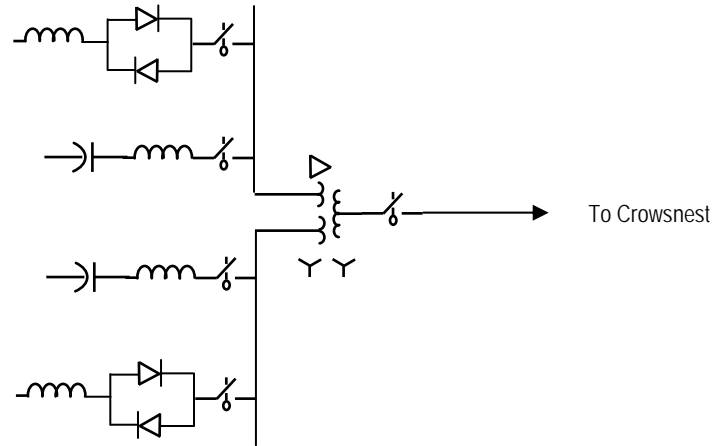
Crowsnest with SVC and Reactor - Alt 3

DATE
2008- June-16

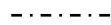
BY
GR

SLD NO.
08 - 149

Dynamic range of SVC: 0 to -300 MVAR



LEGEND:



Substation Fence



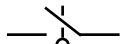
Faulting Switch



Transformer



Fuse



Motorized Air Break



Circuit Breaker



Generation



Disconnect Switch



AutoTransformer



Capacitor Bank



Motorized air break
with arcing horn



Proposed Development

ALTALINK

Crowsnest-SVC configuration - Alt 3

DATE
2008- June-16

BY
GR

SLD NO.
08 - 150



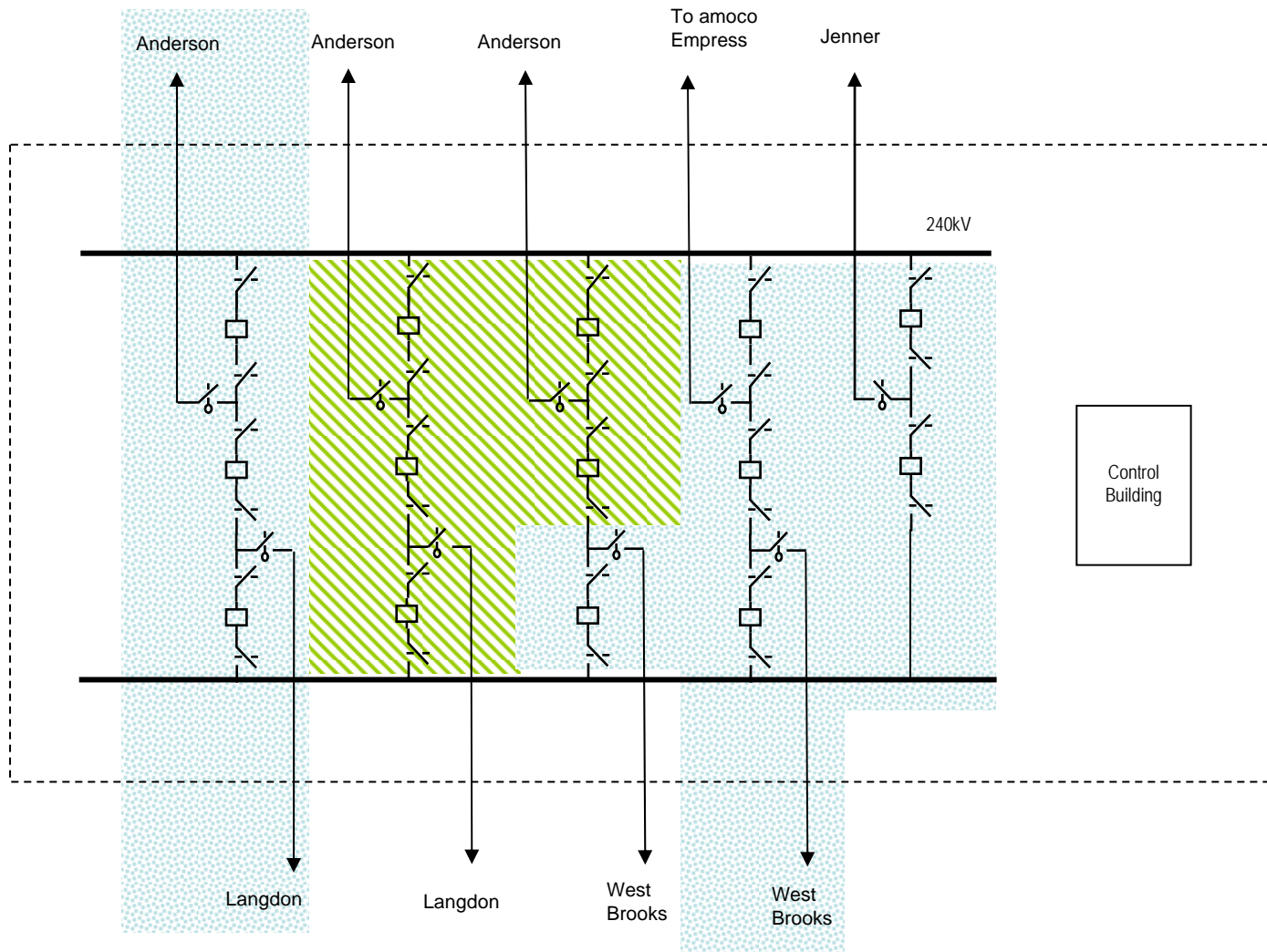
Estimate Summary for Need Identification Document (NID)

Project: SATD- Ware Junction (132S) substation upgrade
 (Alts. 1A, 1B, 2 & 4)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17,2008
Accuracy: +30%/-15%

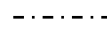



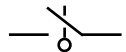



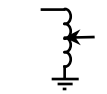



	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 673,120	\$ -	\$ 673,120	\$ -
Substation Facilities	\$ 14,873,600	\$ -	\$ 14,873,600	\$ -
Telecommunication	\$ 347,200	\$ -	\$ 347,200	\$ -
Total Facility Costs	\$ 15,893,920	\$ -	\$ 15,893,920	\$ -
Owners Costs	\$ 100,000	\$ -	\$ 100,000	\$ -
Distributed Costs	\$ 6,803,877	\$ -	\$ 6,803,877	\$ -
Total Owners and Dist. Costs	\$ 6,903,877	\$ -	\$ 6,903,877	\$ -
Total Direct Costs	\$ 22,797,797	\$ -	\$ 22,797,797	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 1,823,824	\$ -	\$ 1,823,824	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 1,823,824	\$ -	\$ 1,823,824	\$ -
TOTAL PROJECT COSTS	\$ 24,621,621	\$ -	\$ 24,621,621	\$ -

Assumptions and Risks

- 1) Existing equipment ratings such as CBs, CTs and switches are not adequate with the new lines coming into the substation.
- 2) Sufficient room available in the control building to accommodate new racks and modules.
- 3) Outages will be availed when required.
- 4) Only one circuit may be taken out at a time



LEGEND:

- | | | | | | | | |
|--|---------------------|---|-----------------|---|-------------|---|----------------------|
|  | Substation Fence |  | Faulting Switch |  | Transformer |  | Fuse |
|  | Motorized Air Break |  | Circuit Breaker |  | Addition |  | Disconnect Switch |
|  | AutoTransformer |  | Capacitor Bank |  | Replacement |  | Proposed Development |

ALTALINK

Ware Junction- Alt 1A, Alt 1B, Alt 2,Alt 4

DATE
2008-06-23

BY
GR

SLD NO.
08 - 166

Estimate Summary for Need Identification Document (NID)

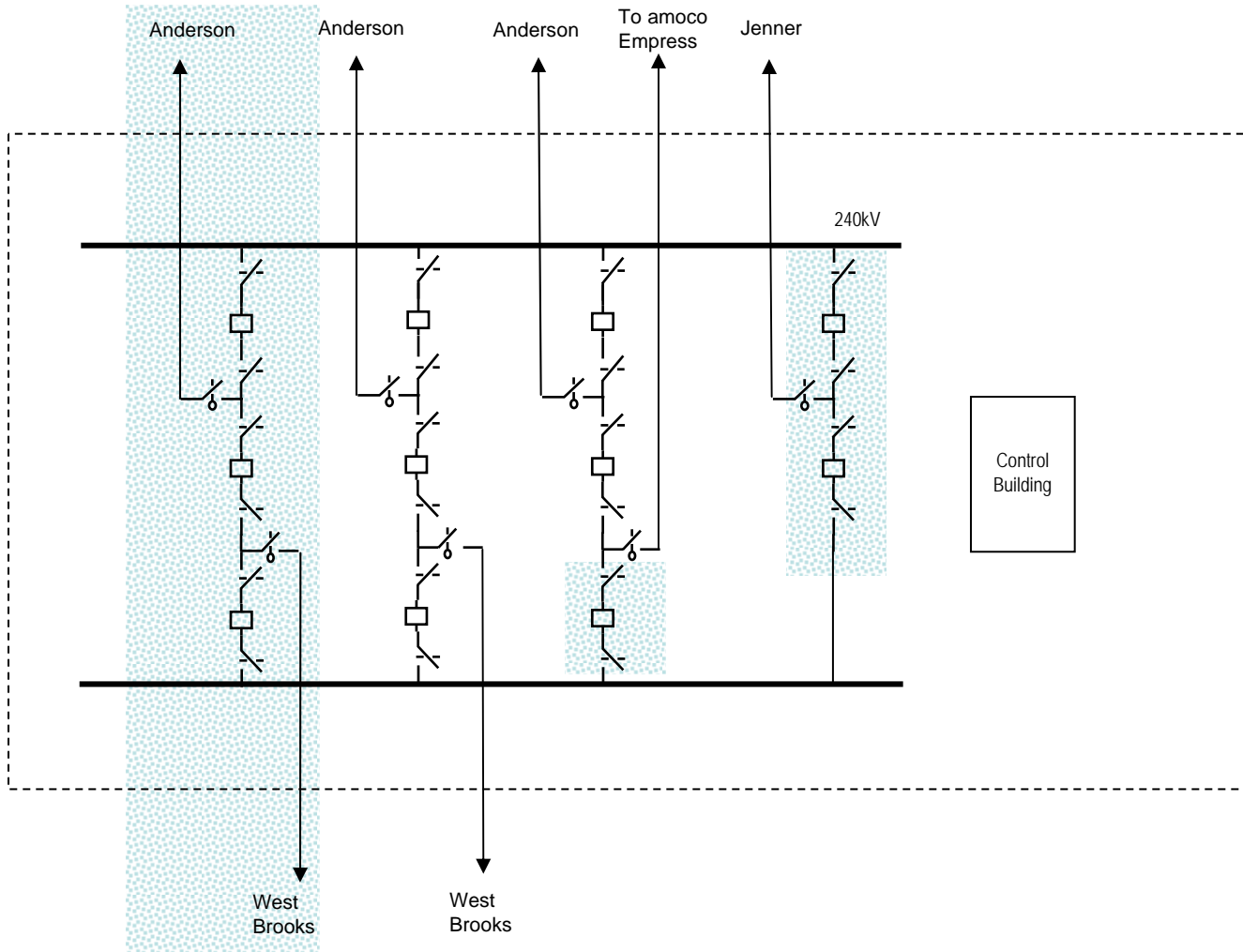


Project: SATD- Ware Junction (132S) substation upgrade
 (Alts 1C & 3)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17,2008
Accuracy: +30%/-15%

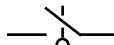
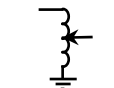








	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 225,120	\$ -	\$ 225,120	\$ -
Substation Facilities	\$ 6,171,585	\$ -	\$ 6,171,585	\$ -
Telecommunication	\$ 50,400	\$ -	\$ 50,400	\$ -
Total Facility Costs	\$ 6,447,105	\$ -	\$ 6,447,105	\$ -
Owners Costs	\$ 80,000	\$ -	\$ 80,000	\$ -
Distributed Costs	\$ 3,004,660	\$ -	\$ 3,004,660	\$ -
Total Owners and Dist. Costs	\$ 3,084,660	\$ -	\$ 3,084,660	\$ -
Total Direct Costs	\$ 9,531,765	\$ -	\$ 9,531,765	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 762,541	\$ -	\$ 762,541	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 762,541	\$ -	\$ 762,541	\$ -
TOTAL PROJECT COSTS	\$ 10,294,307	\$ -	\$ 10,294,307	\$ -

Assumptions and Risks

- 1) Existing equipment ratings such as CBs, CTs and switches are not adequate with the new lines coming into the substation.
- 2) Sufficient room available in the control building to accommodate new racks and modules.
- 3) Outages will be availed when required.
- 4) Only one circuit may be taken out at a time



LEGEND:

- Substation Fence
-  Motorized Air Break
-  AutoTransformer
-  Faulting Switch
-  Circuit Breaker
-  Capacitor Bank
-  Transformer
-  Addition
-  Replacement
-  Fuse
-  Disconnect Switch
- Proposed Development

ATALINK

Ware Junction- Alt 1C, Alt 3

DATE
2008-06-23

BY
GR

SLD NO.
08 -167



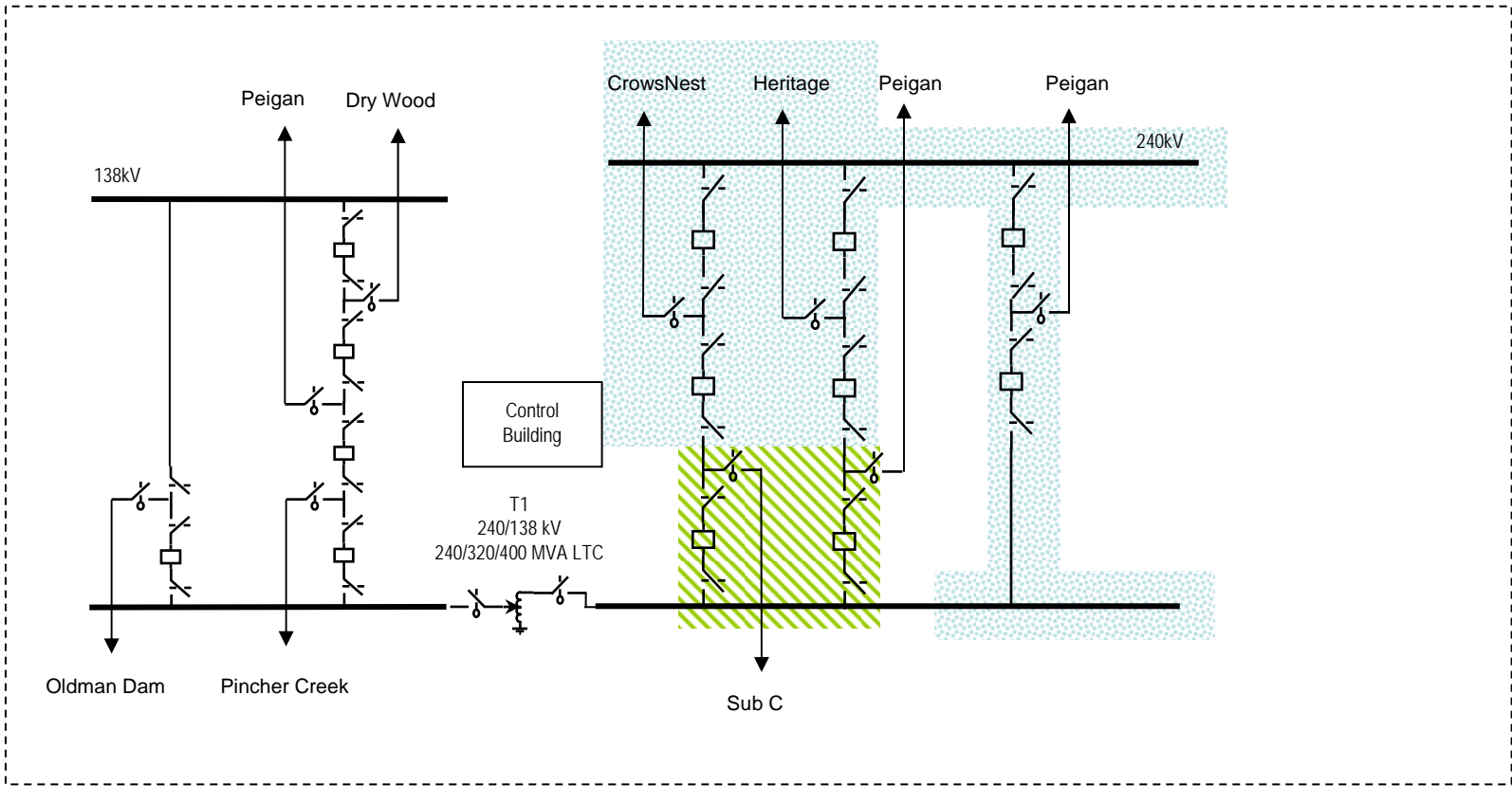
Estimate Summary for Need Identification Document (NID)

Project: SATD - Goose Lake (103S) substation upgrade
 (Alts 1A, 1C, 3 & 4)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17, 2008
Accuracy: +30%/-15%

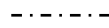



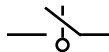



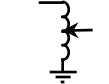



	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 616,000	\$ -	\$ 616,000	\$ -
Substation Facilities	\$ 9,523,996	\$ -	\$ 9,523,996	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 10,139,996	\$ -	\$ 10,139,996	\$ -
Owners Costs	\$ 80,000	\$ -	\$ 80,000	\$ -
Distributed Costs	\$ 5,169,481	\$ -	\$ 5,169,481	\$ -
Total Owners and Dist. Costs	\$ 5,249,481	\$ -	\$ 5,249,481	\$ -
Total Direct Costs	\$ 15,389,477	\$ -	\$ 15,389,477	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 1,231,158	\$ -	\$ 1,231,158	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 1,231,158	\$ -	\$ 1,231,158	\$ -
TOTAL PROJECT COSTS	\$ 16,620,635	\$ -	\$ 16,620,635	\$ -

Assumptions and Risks

- 1) It's been assumed that SW project has been completed at the time of this project.
- 2) Existing equipment ratings such as CBs and switches are not adequate with the new lines coming into the substation.
- 3) Sufficient room available in the control building to accommodate new racks and modules.
- 4) Only one circuit may be taken out at a time. Outages will be available as required.



LEGEND:

	Substation Fence		Faulting Switch		Transformer		Fuse
	Motorized Air Break		Circuit Breaker		Addition		Disconnect Switch
	AutoTransformer		Capacitor Bank		Replacement		Proposed Development

ALTALINK

Goose Lake-Alt 1A, Alt 1C, Alt 3, Alt 4

DATE
2008-June-25

BY
GR

SLD NO.
08 - 168



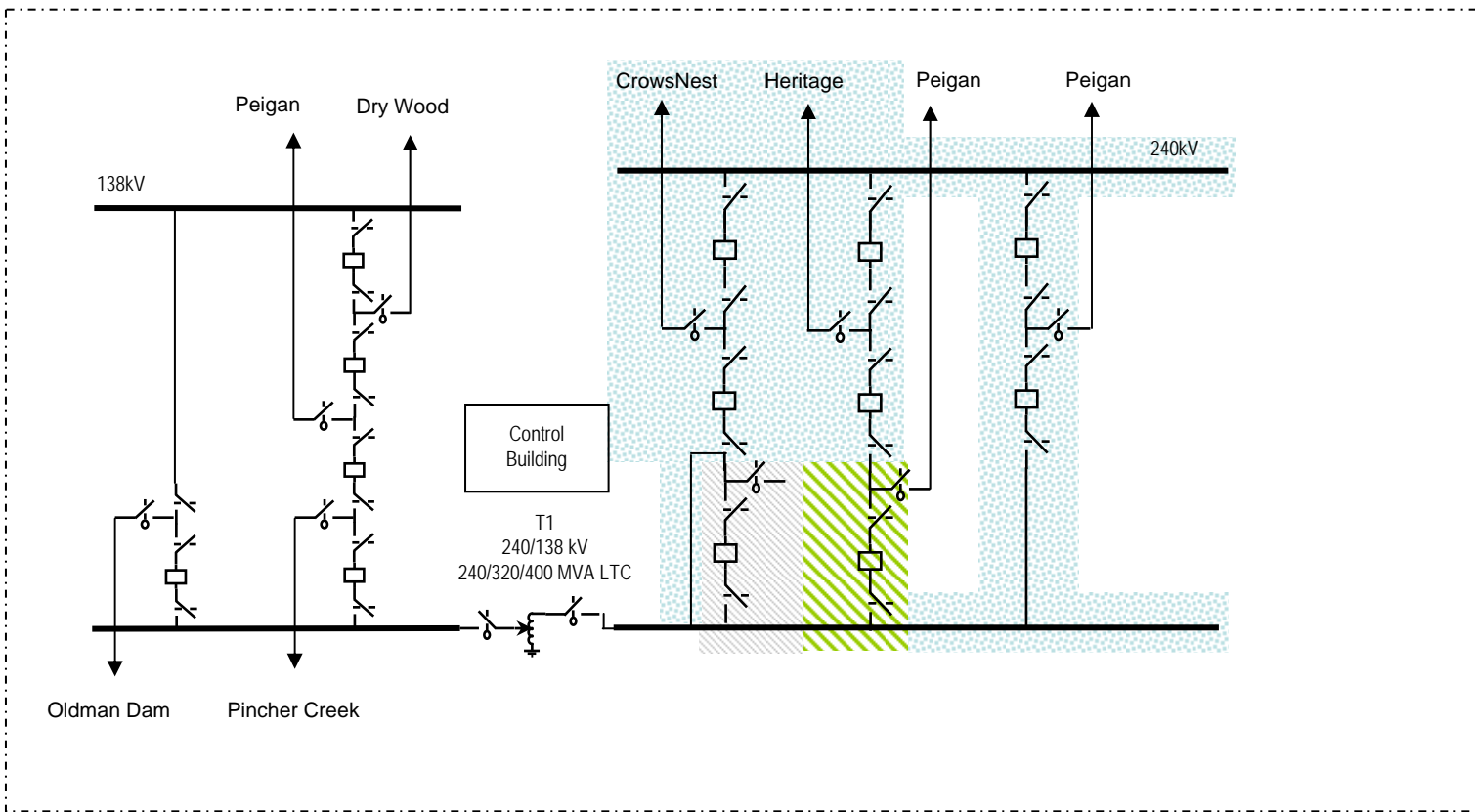
Estimate Summary for Need Identification Document (NID)

Project: SATD - Goose Lake (103S) substation upgrade (Alts. 1B & 2)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17, 2008
Accuracy: +30%/-15%

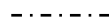



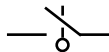



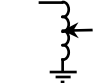



	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 616,000	\$ -	\$ 616,000	\$ -
Substation Facilities	\$ 8,992,727	\$ -	\$ 8,992,727	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 9,608,727	\$ -	\$ 9,608,727	\$ -
Owners Costs				
Owners Costs	\$ 90,000	\$ -	\$ 90,000	\$ -
Distributed Costs	\$ 5,026,370	\$ -	\$ 5,026,370	\$ -
Total Owners and Dist. Costs	\$ 5,116,370	\$ -	\$ 5,116,370	\$ -
Total Direct Costs				
Total Direct Costs	\$ 14,725,097	\$ -	\$ 14,725,097	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 1,178,008	\$ -	\$ 1,178,008	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 1,178,008	\$ -	\$ 1,178,008	\$ -
TOTAL PROJECT COSTS				
TOTAL PROJECT COSTS	\$ 15,903,105	\$ -	\$ 15,903,105	\$ -

Assumptions and Risks

- 1) It's been assumed that SW project has been completed at the time of this project.
- 2) Existing equipment ratings such as CBs and switches are not adequate with the new lines coming into the substation.
- 3) Sufficient room available in the control building to accommodate new racks and modules.
- 4) Only one circuit may be taken out at a time. Outages will be available when required.



LEGEND:

- | | | | | | | | |
|--|-----------------------|---|-----------------|---|-------------|---|----------------------|
|  | Substation Fence |  | Faulting Switch |  | Transformer |  | Salvage |
|  | Motorized Air Breaker |  | Circuit Breaker |  | Addition |  | Disconnect Switch |
|  | AutoTransformer |  | Capacitor Bank |  | Replacement |  | Proposed Development |

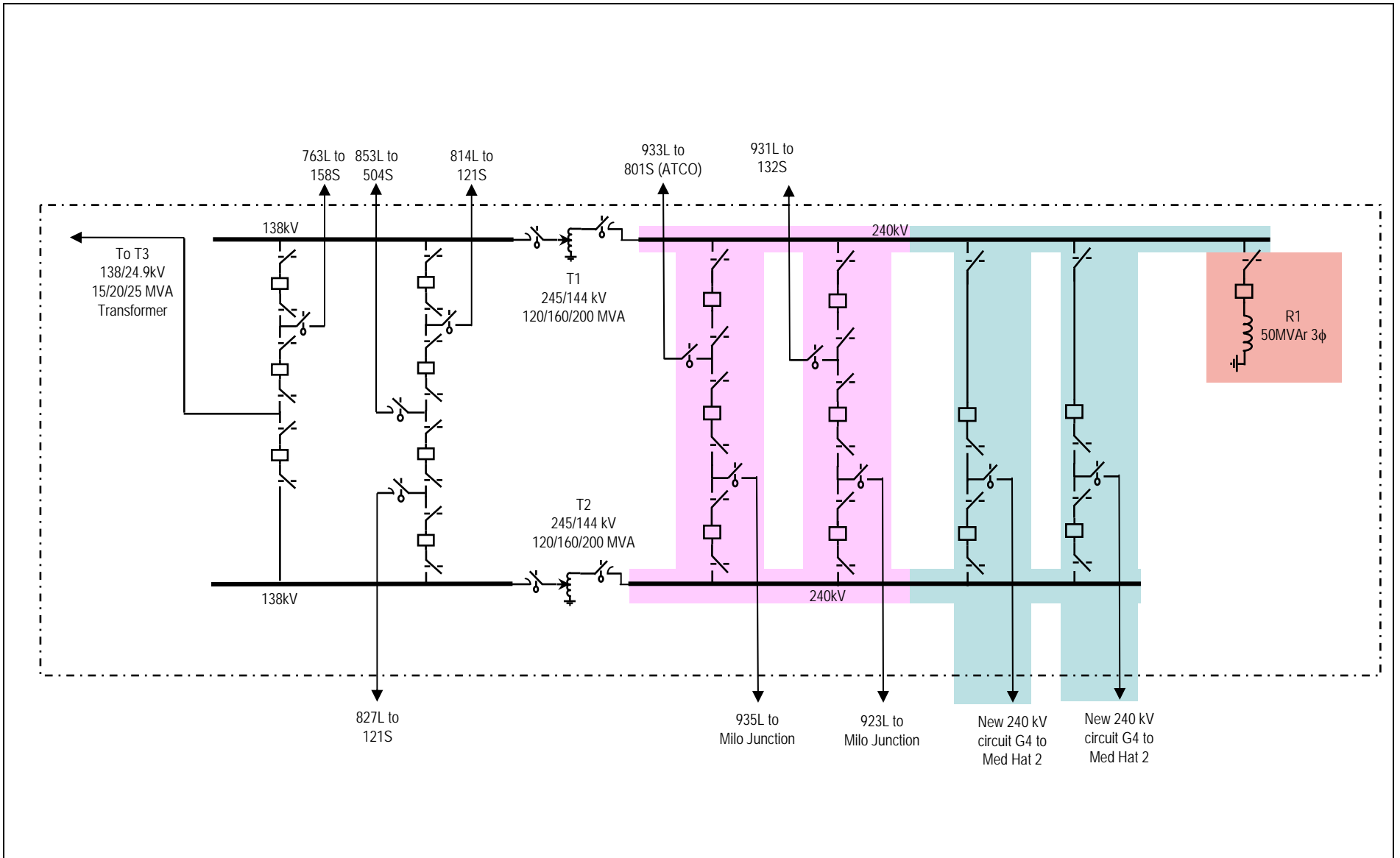
ALTALINK

Goose Lake - Alt 1B, Alt 2

DATE
2008-June-25

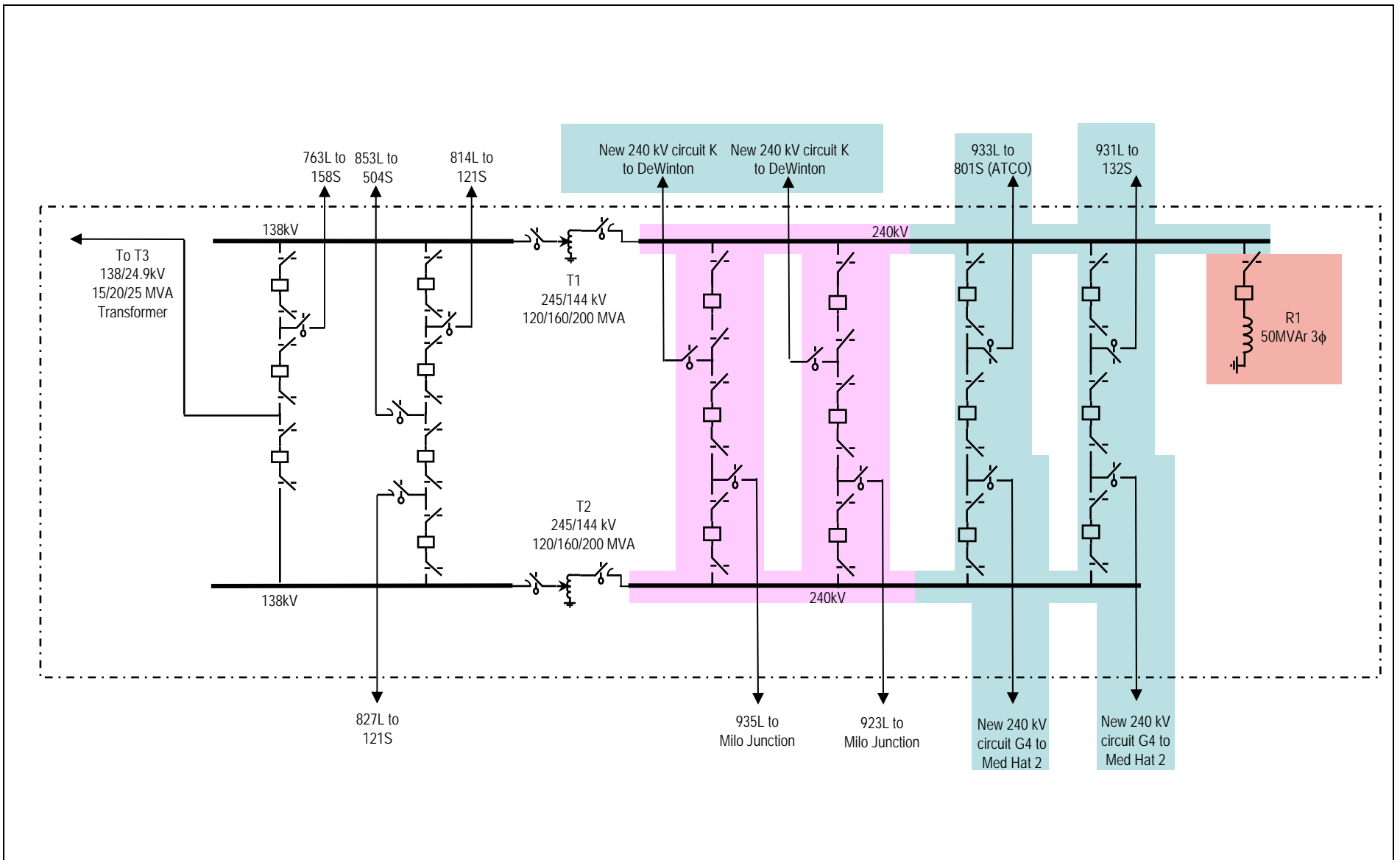
BY
GR

SLD NO.
08 -169



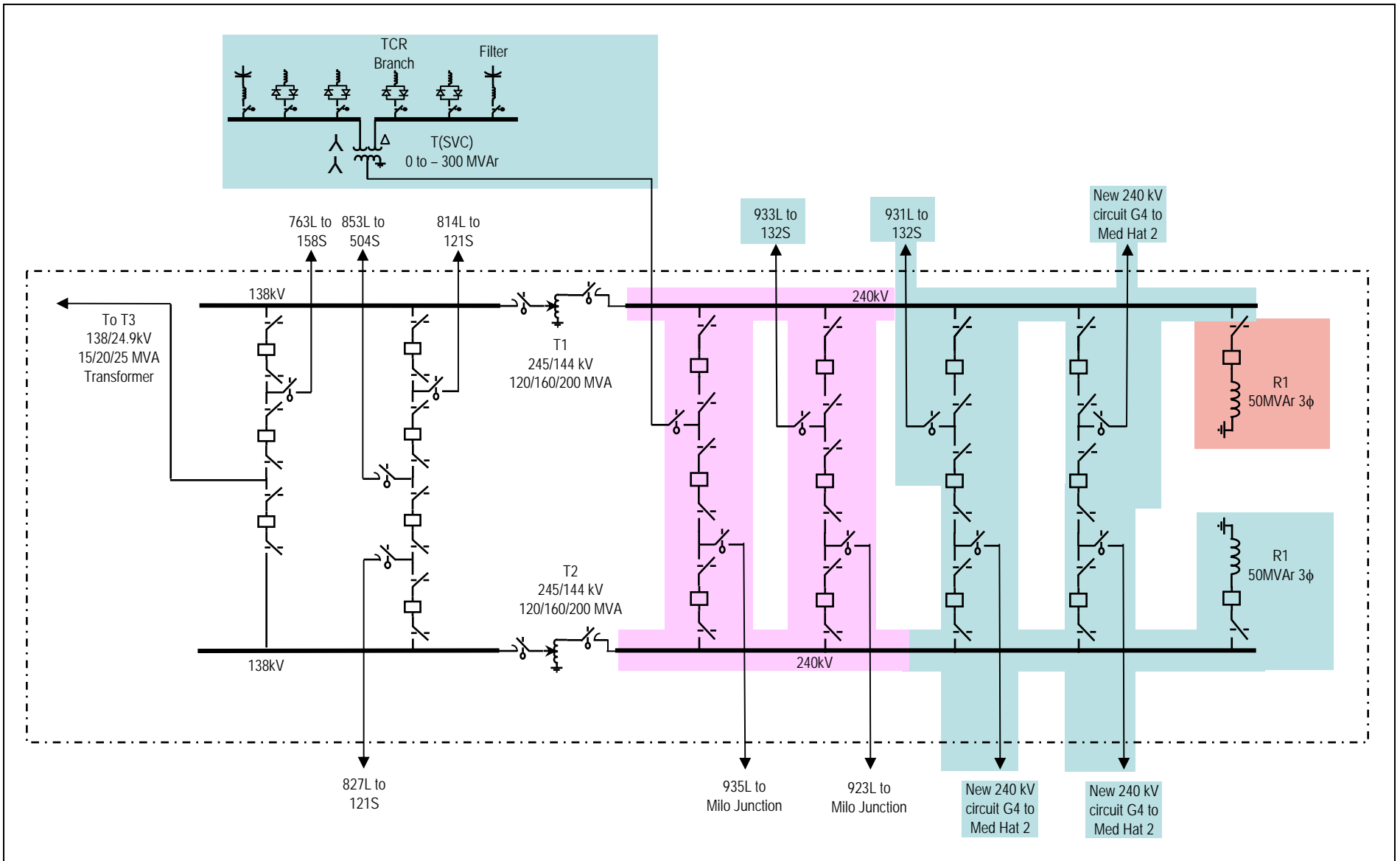
LEGEND:	
	Substation Fence
	Motorized Air Break
	AutoTransformer
	Faulting Switch
	Circuit Breaker
	Capacitor Bank
	Transformer
	Generation
	Motorized air break with arcing horn
	Proposed Replacement
	Disconnect Switch
	Underground
	Relocated Equipment
	Proposed Development
	Regulator

ALTALINK		
West Brooks 28S with Line G4 Alternatives 1A and 1B		
DATE	BY	SLD NO.
2008 - 09 - 25	ALR	08 - 304



LEGEND:	
	Substation Fence
	Motorized Air Break
	AutoTransformer
	Faulting Switch
	Circuit Breaker
	Capacitor Bank
	Transformer
	Generation
	Motorized air break with arcing horn
	Proposed Replacement
	Disconnect Switch
	Underground
	Relocated Equipment
	Proposed Development
	Regulator

ALTALINK		
West Brooks 28S with Line G4 Alternative 1C		
DATE	BY	SLD NO.
2008 - 09 - 25	ALR	08 - 306



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Proposed Replacement
- Regulator
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- Relocated Equipment
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Underground
- Proposed Development

ALTALINK

West Brooks 28S with Line G4
Alternative 2

DATE	BY	SLD NO.
2008 - 09 - 25	ALR	08 - 305

Estimate Summary for Need Identification Document (NID)

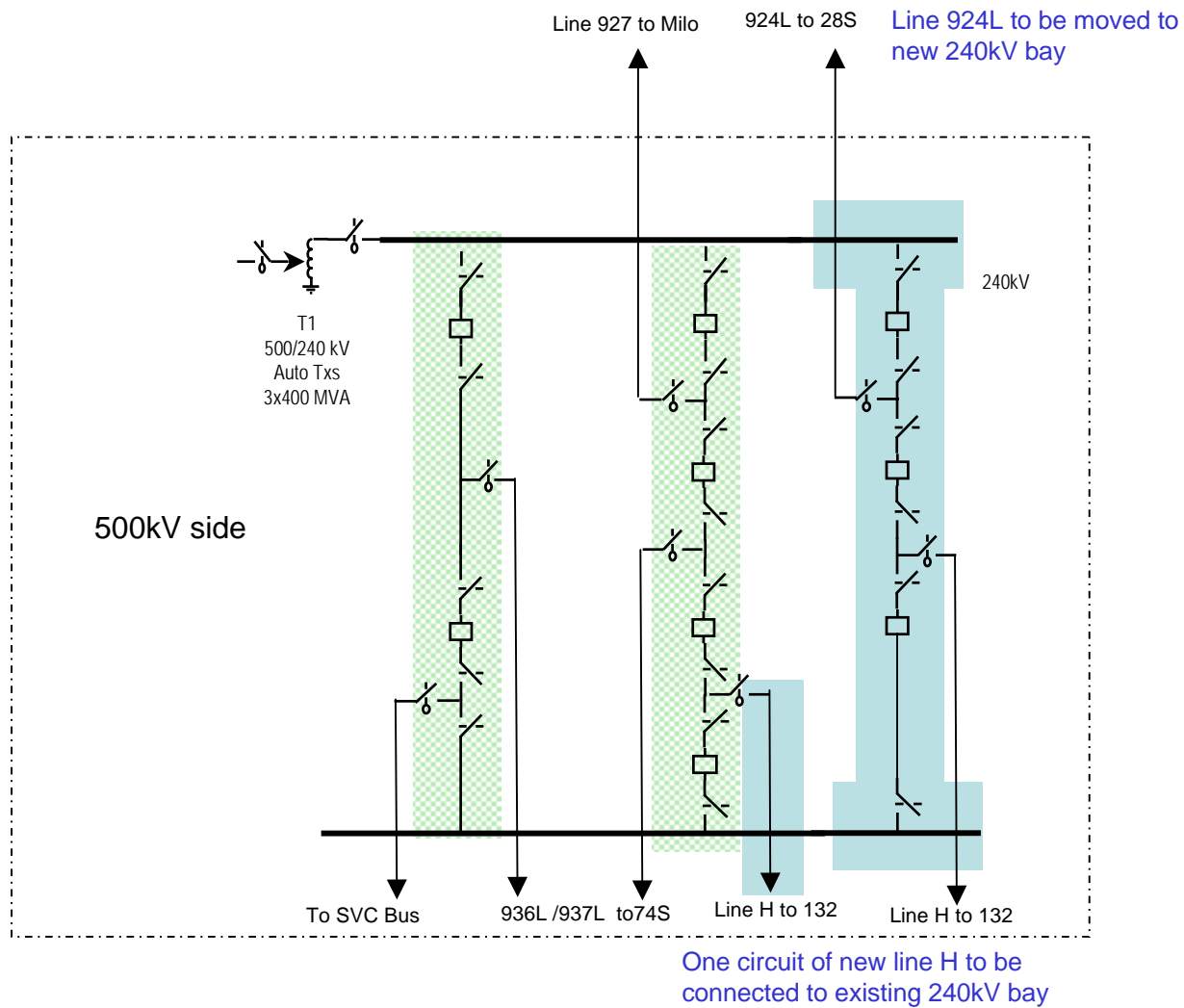


Project: SATD - 240kV Line H Termination at Langdon
 (Alts 1A, 1B, 2)
TFO: AltaLink
Prepared by: Rafael Guzmán
Date: June 23, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ -	\$ -	\$ -	\$ -
Substation Facilities	\$ 10,934,787	\$ -	\$ 10,934,787	\$ -
Telecommunication	\$ 324,032	\$ -	\$ 324,032	\$ -
Total Facility Costs	\$ 11,258,819	\$ -	\$ 11,258,819	\$ -
Owners Costs	\$ 95,000	\$ -	\$ 95,000	\$ -
Distributed Costs	\$ 5,550,095	\$ -	\$ 5,550,095	\$ -
Total Owners and Dist. Costs	\$ 5,645,095	\$ -	\$ 5,645,095	\$ -
Total Direct Costs	\$ 16,903,914	\$ -	\$ 16,903,914	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 1,352,313	\$ -	\$ 1,352,313	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 1,352,313	\$ -	\$ 1,352,313	\$ -
TOTAL PROJECT COSTS	\$ 18,256,227	\$ -	\$ 18,256,227	\$ -

Assumptions and Risks

No land required. Sub expansion (130x30m Approx). Standard 240kV site preparation. Outages available when required
 Existing SCADA system, only point addition. OPGW MUX/LAN required to fiber link Langdon and Ware Junction
 Line 924 re-terminated in new 240kV bay
 Existing 240kV breakers, air breaks, motorized air breaks, CTs need to be replaced due to higher ampacity requirements
 Bus rating assumed to be sufficient for connection of new high capacity line H



LEGEND:

	Substation Fence		Faulting Switch		Transformer		Proposed Development
	Motorized Air Break		Circuit Breaker		Disconnect Switch		Proposed Rebuilding / Replacement
	AutoTransformer		Capacitor Bank		Motorized air break with arcing horn		Future Development

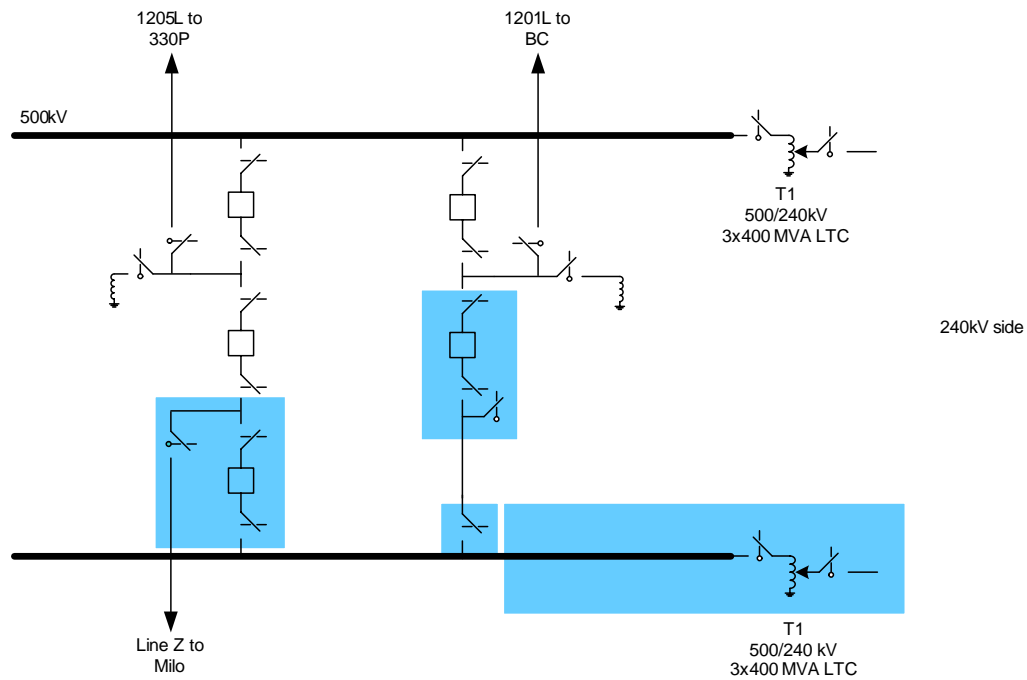
ALTALINK

Langdon 240kV – Alts 1A, 1B, 2

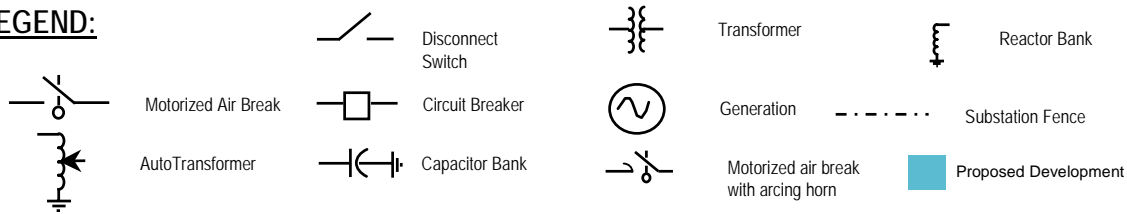
DATE
2008- June-20

BY
RG

SLD NO.
08-161



LEGEND:



ALTALINK

Langdon 102S
500kV – Alternative 3

Date:
2008-07-28

By:

SLD No.
08-189

Estimate Summary for Need Identification Document (NID)

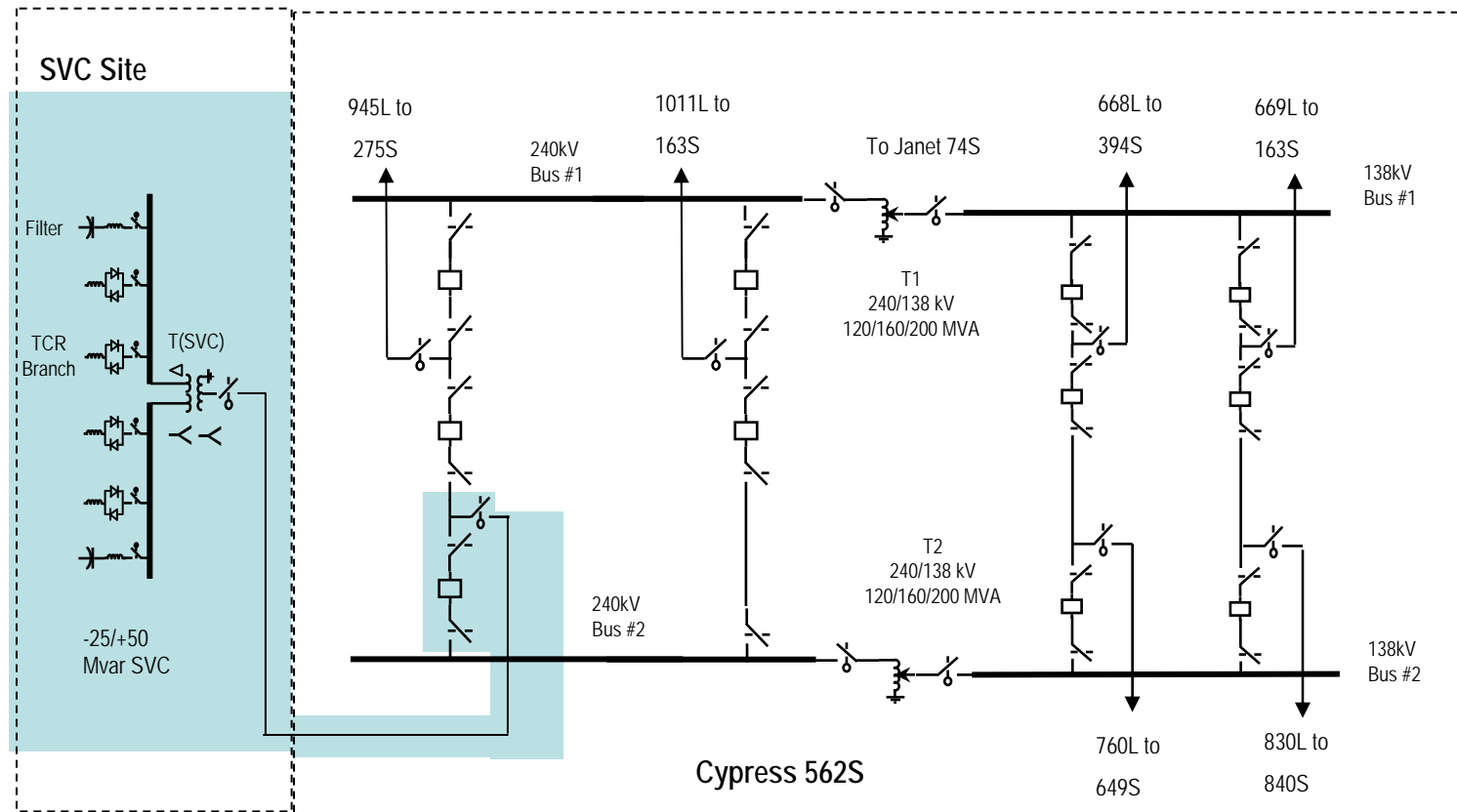


Project: SATD - Cypress 562 - SVC Addition
 (Alts 1A, 1B, 1C, 2, & 4)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: September 22, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 716,120	\$ -	\$ 716,120	\$ -
Substation Facilities	\$ 21,367,382	\$ -	\$ 21,367,382	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 22,083,503	\$ -	\$ 22,083,503	\$ -
Owners Costs	\$ 110,000	\$ -	\$ 110,000	\$ -
Distributed Costs	\$ 6,593,779	\$ -	\$ 6,593,779	\$ -
Total Owners and Dist. Costs	\$ 6,703,779	\$ -	\$ 6,703,779	\$ -
Total Direct Costs	\$ 28,787,281	\$ -	\$ 28,787,281	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 2,302,982	\$ -	\$ 2,302,982	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 2,302,982	\$ -	\$ 2,302,982	\$ -
TOTAL PROJECT COSTS	\$ 31,090,264	\$ -	\$ 31,090,264	\$ -

Assumptions and Risks

Initial Cypress 562S configuration for SE Development is assumed.
 Crown Land is available adjacent to Cypress Substation.
 Turn-key project. Delivery time for SVC is about 20-24m.



LEGEND:

- | | | | | | | | |
|--|---------------------|--|-----------------|--|--------------------------------------|--|-----------------------------------|
| | Substation Fence | | Faulting Switch | | Transformer | | Proposed Development |
| | Motorized Air Break | | Circuit Breaker | | Generation | | Disconnect Switch |
| | AutoTransformer | | Capacitor Bank | | Motorized air break with arcing horn | | Provisions for Future Development |

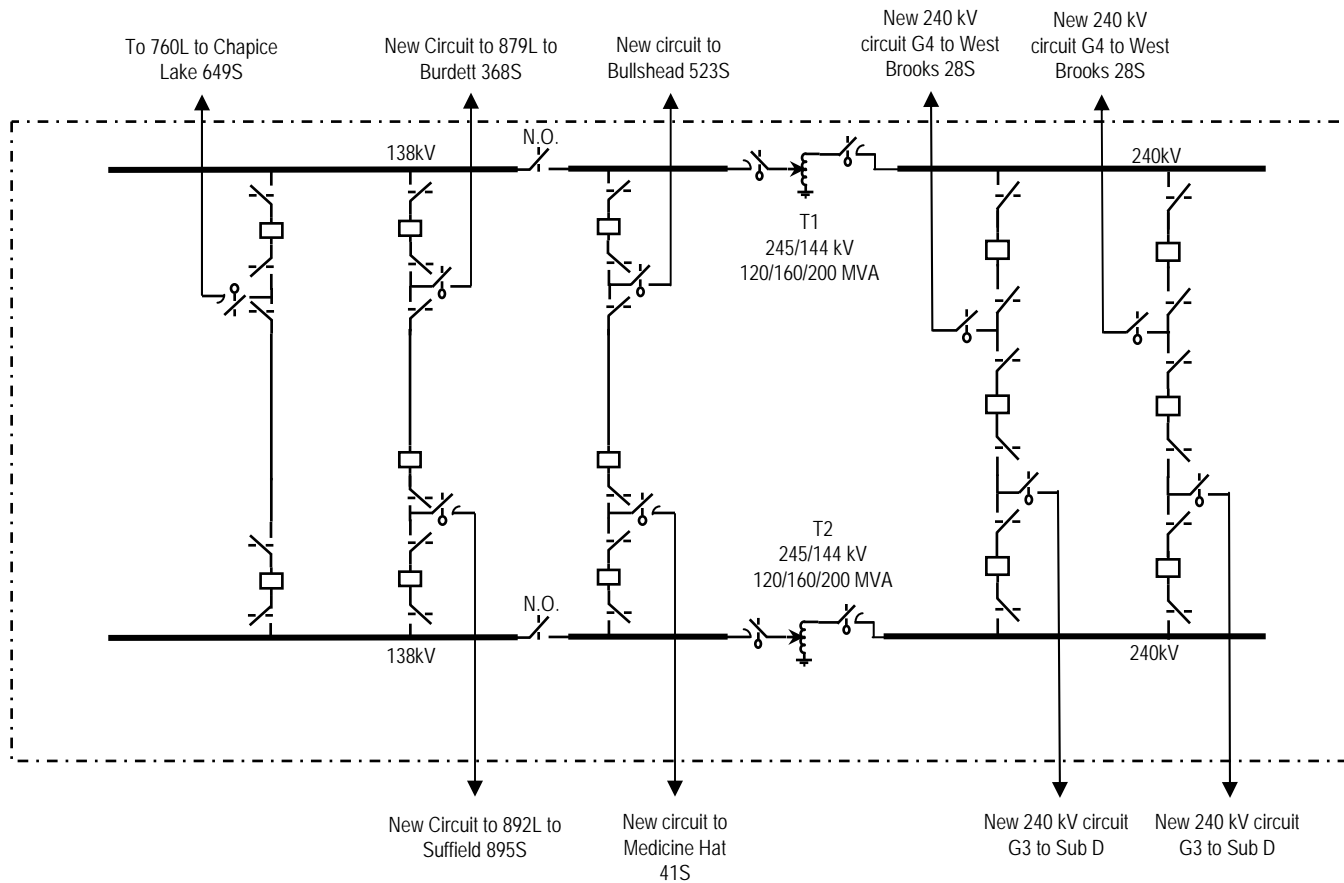
ALTALINK

Sub Cypress 562S -SVC Addition
 Alts 1A, 1B, 1C, 2, & 4

DATE
 2008 - 09 - 23

BY
 RG

SLD NO.
 08-299



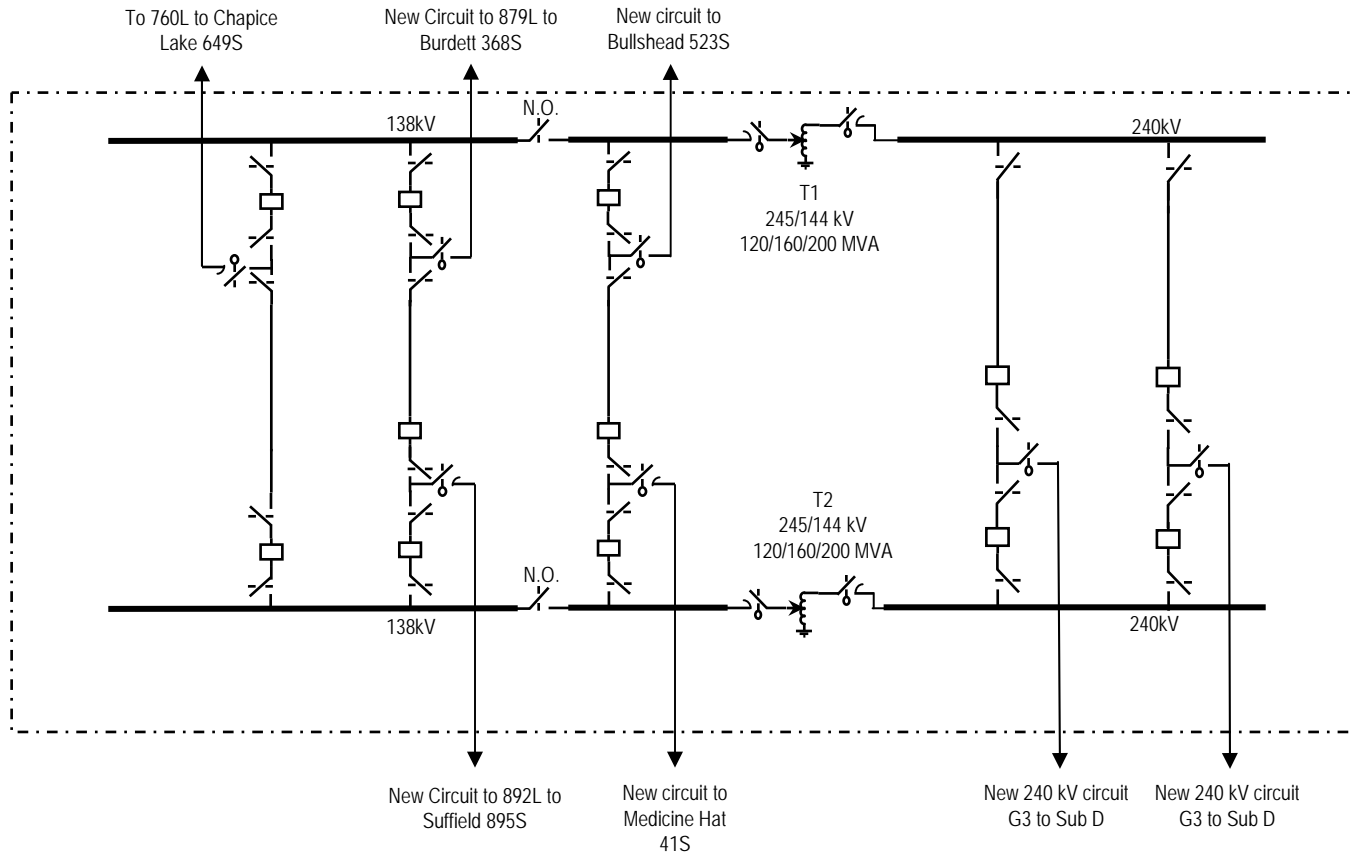
LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Proposed Replacement
- Regulator
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- Relocated Equipment
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Underground
- Proposed Development

ALTALINK

**Medicine Hat 2 (MED HAT 2) Substation
Alternatives 1A, 1B, 1C and 2**

DATE	BY	SLD NO.
2008 - 09 - 15	ALR	08 - 261



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Proposed Replacement
- Regulator
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- Relocated Equipment
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Underground
- Proposed Development

ALTALINK

**Medicine Hat 2 (MED HAT 2) Substation
Alternatives 3 and 4**

DATE 2008 - 09 - 24	BY ALR	SLD NO. 08 - 303
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Estimate Summary for Need Identification Document (NID)

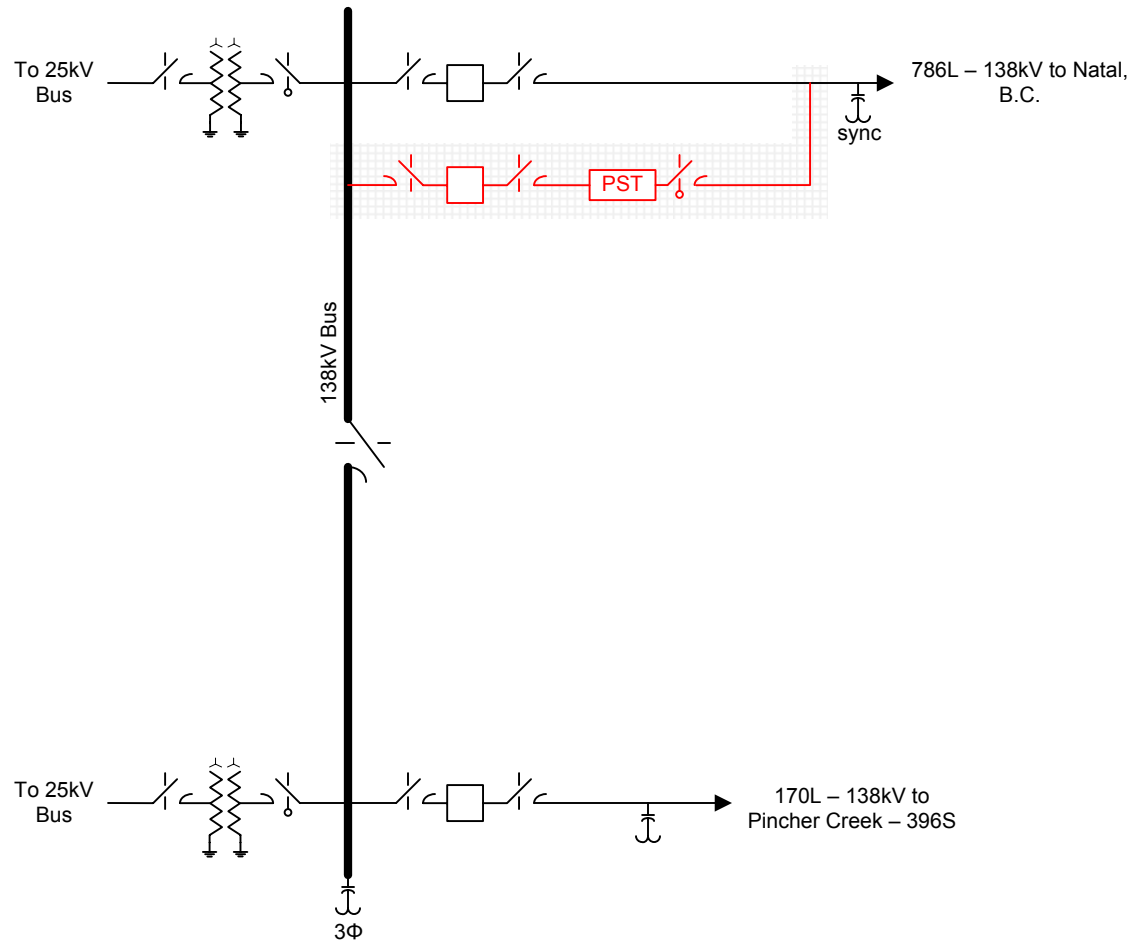


Project: SATD - Coleman 799S Phase-Shifting Transformer
 All Alternatives
TFO: AltaLink
Prepared by: Teshmont
Date: September 22, 2008
Accuracy: +30%/-15%




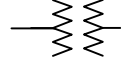

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ -	\$ -	\$ -	\$ -
Substation Facilities	\$ 8,375,606	\$ -	\$ 8,375,606	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 8,375,606	\$ -	\$ 8,375,606	\$ -
Owners Costs	\$ 120,000	\$ -	\$ 120,000	\$ -
Distributed Costs	\$ 3,795,080	\$ -	\$ 3,795,080	\$ -
Total Owners and Dist. Costs	\$ 3,915,080	\$ -	\$ 3,915,080	\$ -
Total Direct Costs	\$ 12,290,687	\$ -	\$ 12,290,687	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 983,255	\$ -	\$ 983,255	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 983,255	\$ -	\$ 983,255	\$ -
TOTAL PROJECT COSTS	\$ 13,273,942	\$ -	\$ 13,273,942	\$ -

Assumptions and Risks

Phase-Shifting Transformer (PST) assumed to be 138/138kV, 120 MVA, +/- 60 Degrees
 PST Forward and reverse Power Capability
 Space provision at the control building is adequate
 Outages available as required. Land available for expansion.
 PST Delivery lead time of 24-28 months ARO



Legend

-  Circuit Breaker
-  Ganged Air-Switch (Motor Operated)
-  Ganged Air-Switch (Manual Operated)
-  OCTC Transformer
-  UG Cable

ALTALINK

Coleman Station 799S – New Phase Shifting Transformer

Date:
2008-09-18

By:


SLD No.
08-281

Estimate Summary for Need Identification Document (NID)



Project: SATD- Line A1 (From Goose Lake sub to HWY 785 WF)
 Alt 1A, 1B, 1C, 3, 4(240kV, D/C, Bundle of 1033 Curlew- ACSR)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 5,955,161	\$ -	\$ 5,955,161	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 5,955,161	\$ -	\$ 5,955,161	\$ -
Owners Costs	\$ 660,837	\$ -	\$ 660,837	\$ -
Distributed Costs	\$ 1,719,988	\$ -	\$ 1,719,988	\$ -
Total Owners and Dist. Costs	\$ 2,380,825	\$ -	\$ 2,380,825	\$ -
Total Direct Costs	\$ 8,335,986	\$ -	\$ 8,335,986	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 666,879	\$ -	\$ 666,879	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 666,879	\$ -	\$ 666,879	\$ -
TOTAL PROJECT COSTS	\$ 9,002,865	\$ -	\$ 9,002,865	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
- 4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD- Line A1 (From Goose Lake sub to HWY 785 WF)
 Alt 2 (240kV, D/C, Bundle of 477 Hawk- ACSS)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 27, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 5,199,871	\$ -	\$ 5,199,871	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 5,199,871	\$ -	\$ 5,199,871	\$ -
Owners Costs				
Owners Costs	\$ 660,838	\$ -	\$ 660,838	\$ -
Distributed Costs	\$ 1,598,764	\$ -	\$ 1,598,764	\$ -
Total Owners and Dist. Costs	\$ 2,259,602	\$ -	\$ 2,259,602	\$ -
Total Direct Costs				
Total Direct Costs	\$ 7,459,473	\$ -	\$ 7,459,473	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 596,758	\$ -	\$ 596,758	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 596,758	\$ -	\$ 596,758	\$ -
TOTAL PROJECT COSTS				
TOTAL PROJECT COSTS	\$ 8,056,231	\$ -	\$ 8,056,231	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
- 4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD- Line A2 (From Heritage sub to HWY 785 WF)
 Alt 1A, 1B, 1C, 3, 4(240kV, D/C, Bundle of 1033 Curlew- ACSR)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 10,325,926	\$ -	\$ 10,325,926	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 10,325,926	\$ -	\$ 10,325,926	\$ -
Owners Costs	\$ 1,000,758	\$ -	\$ 1,000,758	\$ -
Distributed Costs	\$ 2,717,030	\$ -	\$ 2,717,030	\$ -
Total Owners and Dist. Costs	\$ 3,717,788	\$ -	\$ 3,717,788	\$ -
Total Direct Costs	\$ 14,043,715	\$ -	\$ 14,043,715	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 1,123,497	\$ -	\$ 1,123,497	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 1,123,497	\$ -	\$ 1,123,497	\$ -
TOTAL PROJECT COSTS	\$ 15,167,212	\$ -	\$ 15,167,212	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
- 4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD- Line A3 (From Crowsnest to HWY 785 WF)
 Alt 1A, 1B, 1C, 3, 4 (240kV, D/C, Bundle of 1033 Curlew- ACSR)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 43,155,813	\$ -	\$ 43,155,813	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 43,155,813	\$ -	\$ 43,155,813	\$ -
Owners Costs	\$ 3,311,566	\$ -	\$ 3,311,566	\$ -
Distributed Costs	\$ 9,059,603	\$ -	\$ 9,059,603	\$ -
Total Owners and Dist. Costs	\$ 12,371,169	\$ -	\$ 12,371,169	\$ -
Total Direct Costs	\$ 55,526,982	\$ -	\$ 55,526,982	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 4,442,159	\$ -	\$ 4,442,159	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 4,442,159	\$ -	\$ 4,442,159	\$ -
TOTAL PROJECT COSTS	\$ 59,969,141	\$ -	\$ 59,969,141	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
 - 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
 - 3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
 - 4) Induction study on other facilities not included, nor are the mitigation of induction effects.
 - 5) Dead end structures as a provision for future interconnection of wind farms has been included.
 - 6) A hearing is highly likely
- NID Estimating Summary

Estimate Summary for Need Identification Document (NID)



Project: SATD - 240kV Line B from Peigan to Sub A
 (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 18, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 61,278,907	\$ -	\$ 61,278,907	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 61,278,907	\$ -	\$ 61,278,907	\$ -
Owners Costs	\$ 6,238,000	\$ -	\$ 6,238,000	\$ -
Distributed Costs	\$ 21,923,137	\$ -	\$ 21,923,137	\$ -
Total Owners and Dist. Costs	\$ 28,161,137	\$ -	\$ 28,161,137	\$ -
Total Direct Costs	\$ 89,440,045	\$ -	\$ 89,440,045	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 7,155,204	\$ -	\$ 7,155,204	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 7,155,204	\$ -	\$ 7,155,204	\$ -
TOTAL PROJECT COSTS	\$ 96,595,248	\$ -	\$ 96,595,248	\$ -

Assumptions and Risks

2x477 Kcmil ACSS conductor, OHSW 5/16, OPGW to accommodate communication and protection circuits.
 Lattice tower D/C. Existing tower family assumed as per SW Dev. Average span 330m.
 Normal soil, concrete spread footing foundation. Geotechnical studies will be completed as required.
 Pipeline and railroad induce voltage studies and mitigation plans are not included.
 Routing is as proposed. ROW available as planned. Construction will proceed in a continuous manner with access suitable to all structures.



Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line C1 from Goose Lake to Sub C
 (Alts 1A, 1C, 3 & 4)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 2, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 124,421,405	\$ -	\$ 124,421,405	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 124,421,405	\$ -	\$ 124,421,405	\$ -
Owners Costs	\$ 15,738,791	\$ -	\$ 15,738,791	\$ -
Distributed Costs	\$ 32,552,153	\$ -	\$ 32,552,153	\$ -
Total Owners and Dist. Costs	\$ 48,290,944	\$ -	\$ 48,290,944	\$ -
Total Direct Costs	\$ 172,712,349	\$ -	\$ 172,712,349	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 13,816,988	\$ -	\$ 13,816,988	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 13,816,988	\$ -	\$ 13,816,988	\$ -
TOTAL PROJECT COSTS	\$ 186,529,337	\$ -	\$ 186,529,337	\$ -

Assumptions and Risks

2x795 Kcmil ACSR conductor, OHSW 5/16, OPGW to accommodate communication and protection circuits.
 Lattice tower D/C. Existing tower family assumed as per SW Dev. Average span 330m.
 Normal soil, concrete spread footing foundation. Geotechnical studies will be completed as required.
 Pipeline and railroad induce voltage studies and mitigation plans are not included.
 Routing is as proposed. ROW available as planned. Construction will proceed in a continuous manner with access suitable to all structures.



Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line C2 from Peigan to Sub C
 (Alt. 1B)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 2, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 135,732,442	\$ -	\$ 135,732,442	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 135,732,442	\$ -	\$ 135,732,442	\$ -
Owners Costs	\$ 15,673,950	\$ -	\$ 15,673,950	\$ -
Distributed Costs	\$ 52,269,018	\$ -	\$ 52,269,018	\$ -
Total Owners and Dist. Costs	\$ 67,942,968	\$ -	\$ 67,942,968	\$ -
Total Direct Costs	\$ 203,675,410	\$ -	\$ 203,675,410	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 16,294,033	\$ -	\$ 16,294,033	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 16,294,033	\$ -	\$ 16,294,033	\$ -
TOTAL PROJECT COSTS	\$ 219,969,442	\$ -	\$ 219,969,442	\$ -

Assumptions and Risks

2x795 Kcmil ACSS conductor, OHSW 5/16, OPGW to accommodate communication and protection circuits.
 Lattice tower D/C. Existing tower family assumed as per SW Dev. Average span 330m.
 Normal soil, concrete spread footing foundation. Geotechnical studies will be completed as required.
 Pipeline and railroad induce voltage studies and mitigation plans are not included.
 Routing is as proposed. ROW available as planned. Construction will proceed in a continuous manner with access suitable to all structures.



Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line E From Proposed Sub C to Sub D
 Alts 1A, 1B and 1C
TFO: AltaLink
Prepared by: A.Rothbauer + G.Rahimi
Date: September 23, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 51,319,855	\$ -	\$ 51,319,855	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 51,319,855	\$ -	\$ 51,319,855	\$ -
Owners Costs	\$ 5,708,555	\$ -	\$ 5,708,555	\$ -
Distributed Costs	\$ 12,930,657	\$ -	\$ 12,930,657	\$ -
Total Owners and Dist. Costs	\$ 18,639,212	\$ -	\$ 18,639,212	\$ -
Total Direct Costs	\$ 69,959,067	\$ -	\$ 69,959,067	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 5,596,725	\$ -	\$ 5,596,725	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 5,596,725	\$ -	\$ 5,596,725	\$ -
TOTAL PROJECT COSTS	\$ 75,555,793	\$ -	\$ 75,555,793	\$ -

Assumptions and Risks

Routing is as proposed. ROW is available as planned.
 No unusual soil conditions are encountered
 Standard structures. Less than 8% are angle structures. Medium wind and ice loading.
 For energized circuits, only one circuit may be taken out at a time
 A hearing is highly likely



Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Line E From Proposed Sub C to Sub D
 (Alts 3 & 4)
TFO: AltaLink
Prepared by: A. Rothbauer
Date: July 8, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 42,591,975	\$ -	\$ 42,591,975	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 42,591,975	\$ -	\$ 42,591,975	\$ -
Owners Costs	\$ 5,708,555	\$ -	\$ 5,708,555	\$ -
Distributed Costs	\$ 11,214,623	\$ -	\$ 11,214,623	\$ -
Total Owners and Dist. Costs	\$ 16,923,178	\$ -	\$ 16,923,178	\$ -
Total Direct Costs	\$ 59,515,153	\$ -	\$ 59,515,153	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 4,761,212	\$ -	\$ 4,761,212	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 4,761,212	\$ -	\$ 4,761,212	\$ -
TOTAL PROJECT COSTS	\$ 64,276,365	\$ -	\$ 64,276,365	\$ -

Assumptions and Risks

Routing is as proposed. ROW is available as planned.
 No unusual soil conditions are encountered
 Standard structures. Less than 8% are angle structures. Medium wind and ice loading.
 For energized circuits, only one circuit may be taken out at a time
 A hearing is highly likely

Estimate Summary for Need Identification Document (NID)



Project: SATD - Line G3 (From sub D to Med Hat 2)
 Alts. 1A,1B and 1C (240kV, D/C, 2x1033 Curlew - ACSR)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 100,308,320	\$ -	\$ 100,308,320	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 100,308,320	\$ -	\$ 100,308,320	\$ -
Owners Costs	\$ 5,717,000	\$ -	\$ 5,717,000	\$ -
Distributed Costs	\$ 22,626,338	\$ -	\$ 22,626,338	\$ -
Total Owners and Dist. Costs	\$ 28,343,338	\$ -	\$ 28,343,338	\$ -
Total Direct Costs	\$ 128,651,658	\$ -	\$ 128,651,658	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 10,292,133	\$ -	\$ 10,292,133	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 10,292,133	\$ -	\$ 10,292,133	\$ -
TOTAL PROJECT COSTS	\$ 138,943,791	\$ -	\$ 138,943,791	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
- 4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD - Line G3 (From sub D to Med Hat 2)
 Alt 2 (240kV, D/C, 2x477 Hawk - ACSS)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 82,835,200	\$ -	\$ 82,835,200	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 82,835,200	\$ -	\$ 82,835,200	\$ -
Owners Costs	\$ 5,717,000	\$ -	\$ 5,717,000	\$ -
Distributed Costs	\$ 19,361,197	\$ -	\$ 19,361,197	\$ -
Total Owners and Dist. Costs	\$ 25,078,197	\$ -	\$ 25,078,197	\$ -
Total Direct Costs	\$ 107,913,397	\$ -	\$ 107,913,397	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 8,633,072	\$ -	\$ 8,633,072	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 8,633,072	\$ -	\$ 8,633,072	\$ -
TOTAL PROJECT COSTS	\$ 116,546,469	\$ -	\$ 116,546,469	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD - Line G3 (From sub D to Med Hat 2)
 Alts. 3 and 4 (240kV, D/C, 2x795 Drake - ACSR)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 69,881,408	\$ -	\$ 69,881,408	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 69,881,408	\$ -	\$ 69,881,408	\$ -
Owners Costs	\$ 5,717,000	\$ -	\$ 5,717,000	\$ -
Distributed Costs	\$ 17,262,577	\$ 6,509,111	\$ 23,771,688	\$ -
Total Owners and Dist. Costs	\$ 22,979,577	\$ 6,509,111	\$ 29,488,688	\$ -
Total Direct Costs	\$ 92,860,985	\$ 6,509,111	\$ 99,370,096	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 7,428,879	\$ 520,729	\$ 7,949,608	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 7,428,879	\$ 520,729	\$ 7,949,608	\$ -
TOTAL PROJECT COSTS	\$ 100,289,864	\$ 7,029,840	\$ 107,319,704	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD - Line G4 (From Med Hat 2 to West Brooks)
 Alts. 1A,1B and 1C (240kV, D/C, 2x1033 Curlew - ACSR)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 115,060,331	\$ -	\$ 115,060,331	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 115,060,331	\$ -	\$ 115,060,331	\$ -
Owners Costs	\$ 7,688,000	\$ -	\$ 7,688,000	\$ -
Distributed Costs	\$ 26,117,348	\$ -	\$ 26,117,348	\$ -
Total Owners and Dist. Costs	\$ 33,805,348	\$ -	\$ 33,805,348	\$ -
Total Direct Costs	\$ 148,865,679	\$ -	\$ 148,865,679	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 11,909,254	\$ -	\$ 11,909,254	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 11,909,254	\$ -	\$ 11,909,254	\$ -
TOTAL PROJECT COSTS	\$ 160,774,933	\$ -	\$ 160,774,933	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
- 4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD - Line G4 (From Med Hat 2 to West Brooks)
 Alt 2 (240kV, D/C, 2x477 Hawk - ACSS)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 95,015,372	\$ -	\$ 95,015,372	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 95,015,372	\$ -	\$ 95,015,372	\$ -
Owners Costs	\$ 7,688,000	\$ -	\$ 7,688,000	\$ -
Distributed Costs	\$ 22,271,340	\$ -	\$ 22,271,340	\$ -
Total Owners and Dist. Costs	\$ 29,959,340	\$ -	\$ 29,959,340	\$ -
Total Direct Costs	\$ 124,974,713	\$ -	\$ 124,974,713	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 9,997,977	\$ -	\$ 9,997,977	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 9,997,977	\$ -	\$ 9,997,977	\$ -
TOTAL PROJECT COSTS	\$ 134,972,690	\$ -	\$ 134,972,690	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)



Project: SATD - Line G5 (From sub D to West Brooks)
 Alt 2 (240kV, S/C, 2x477 Hawk - ACSS)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 88,924,640	\$ -	\$ 88,924,640	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 88,924,640	\$ -	\$ 88,924,640	\$ -
Owners Costs	\$ 9,399,900	\$ -	\$ 9,399,900	\$ -
Distributed Costs	\$ 21,160,146	\$ -	\$ 21,160,146	\$ -
Total Owners and Dist. Costs	\$ 30,560,046	\$ -	\$ 30,560,046	\$ -
Total Direct Costs	\$ 119,484,686	\$ -	\$ 119,484,686	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 9,558,775	\$ -	\$ 9,558,775	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 9,558,775	\$ -	\$ 9,558,775	\$ -
TOTAL PROJECT COSTS	\$ 129,043,461	\$ -	\$ 129,043,461	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) Induction study on other facilities not included, nor are the mitigation of induction effects.
- 4) The route for line G5 is the same as line G3 and line G4.

Estimate Summary for Need Identification Document (NID)



Project: SATD- Line H (From Ware junction sub to Langdon sub)
 Alt 1A, 1B (240kV, D/C, Bundle of 1033 Curlew-ACSR)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 20, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 134,728,764	\$ -	\$ 134,728,764	\$ -
Substation Facilities	\$ 16,717,241	\$ -	\$ 16,717,241	\$ -
Telecommunication	\$ 226,053	\$ -	\$ 226,053	\$ -
Total Facility Costs	\$ 151,672,057	\$ -	\$ 151,672,057	\$ -
Owners Costs	\$ 22,630,000	\$ -	\$ 22,630,000	\$ -
Distributed Costs	\$ 53,987,070	\$ -	\$ 53,987,070	\$ -
Total Owners and Dist. Costs	\$ 76,617,070	\$ -	\$ 76,617,070	\$ -
Total Direct Costs	\$ 228,289,127	\$ -	\$ 228,289,127	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 18,263,130	\$ -	\$ 18,263,130	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 18,263,130	\$ -	\$ 18,263,130	\$ -
TOTAL PROJECT COSTS	\$ 246,552,258	\$ -	\$ 246,552,258	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
- 4) Induction study on other facilities not included, nor are the mitigation of induction effects.
- 5) A hearing is highly likely

Estimate Summary for Need Identification Document (NID)



Project: SATD- Line H (From Ware junction sub to Langdon sub)
 Alt 2 (240kV, D/C, Bundle of 477 Hawk- ACSS)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 20, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 108,579,074	\$ -	\$ 108,579,074	\$ -
Substation Facilities	\$ 16,717,241	\$ -	\$ 16,717,241	\$ -
Telecommunication	\$ 226,053	\$ -	\$ 226,053	\$ -
Total Facility Costs	\$ 125,522,368	\$ -	\$ 125,522,368	\$ -
Owners Costs	\$ 22,630,000	\$ -	\$ 22,630,000	\$ -
Distributed Costs	\$ 47,501,947	\$ -	\$ 47,501,947	\$ -
Total Owners and Dist. Costs	\$ 70,131,947	\$ -	\$ 70,131,947	\$ -
Total Direct Costs	\$ 195,654,315	\$ -	\$ 195,654,315	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 15,652,345	\$ -	\$ 15,652,345	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 15,652,345	\$ -	\$ 15,652,345	\$ -
TOTAL PROJECT COSTS	\$ 211,306,660	\$ -	\$ 211,306,660	\$ -

Assumptions and Risks

- 1) OPGW has been considered for one of the circuits to accommodate communication.
- 2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
- 3) Induction study on other facilities not included, nor are the mitigation of induction effects.
- 4) A hearing is highly likely

Estimate Summary for Need Identification Document (NID)



Project: SATD - 240kV Line J from Peigan to DeWinton
 (Alts. 1A, 1B, 1C, 3, 4)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 147,513,246	\$ -	\$ 147,513,246	\$ -
Substation Facilities	\$ 16,717,241	\$ -	\$ 16,717,241	\$ -
Telecommunication	\$ 226,053	\$ -	\$ 226,053	\$ -
Total Facility Costs	\$ 164,456,540	\$ -	\$ 164,456,540	\$ -
Owners Costs	\$ 23,085,604	\$ -	\$ 23,085,604	\$ -
Distributed Costs	\$ 58,316,871	\$ -	\$ 58,316,871	\$ -
Total Owners and Dist. Costs	\$ 81,402,475	\$ -	\$ 81,402,475	\$ -
Total Direct Costs	\$ 245,859,014	\$ -	\$ 245,859,014	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 19,668,721	\$ -	\$ 19,668,721	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 19,668,721	\$ -	\$ 19,668,721	\$ -
TOTAL PROJECT COSTS	\$ 265,527,735	\$ -	\$ 265,527,735	\$ -

Assumptions and Risks

DeWinton 224S in place before Line J is built. Project will proceed in a continuous manner.
 Lattice tower. New tower family is required. Cost of development new tower family included. Average span 350m.
 8-10 % angle / Dead-end structures. Normal soil. Geo-technical studies will be completed as required.
 Pipeline and railroad induced voltage studies and mitigation plans are not included.
 OHSW /OPGW will terminate on the last structure outside substation fence. Telecom equipment at SB1 for voice and data

Estimate Summary for Need Identification Document (NID)



Project: SATD - 240kV Line J from Peigan to DeWinton (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 118,882,198	\$ -	\$ 118,882,198	\$ -
Substation Facilities	\$ 16,717,241	\$ -	\$ 16,717,241	\$ -
Telecommunication	\$ 226,053	\$ -	\$ 226,053	\$ -
Total Facility Costs	\$ 135,825,492	\$ -	\$ 135,825,492	\$ -
Owners Costs	\$ 23,085,604	\$ -	\$ 23,085,604	\$ -
Distributed Costs	\$ 51,043,430	\$ -	\$ 51,043,430	\$ -
Total Owners and Dist. Costs	\$ 74,129,034	\$ -	\$ 74,129,034	\$ -
Total Direct Costs	\$ 209,954,527	\$ -	\$ 209,954,527	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 16,796,362	\$ -	\$ 16,796,362	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 16,796,362	\$ -	\$ 16,796,362	\$ -
TOTAL PROJECT COSTS	\$ 226,750,889	\$ -	\$ 226,750,889	\$ -

Assumptions and Risks

DeWinton 224S in place before Line J is built. Project will proceed in a continuous manner.
 Lattice tower. New tower family is required. Cost of development new tower family included. Average span 350m.
 8-10 % angle / Dead-end structures. Normal soil. Geo-technical studies will be completed as required.
 Pipeline and railroad induced voltage studies and mitigation plans are not included.
 OHSW /OPGW will terminate on the last structure outside substation fence. Telecom equipment at SB1 for voice and data



Estimate Summary for Need Identification Document (NID)

Project: SATD - 500kV Line X from Crowsnest sub to sub H (Alt. 3)
TFO: AltaLink
Prepared by: Teshmont
Date: July 9, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 252,547,680	\$ -	\$ 252,547,680	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 252,547,680	\$ -	\$ 252,547,680	\$ -
Owners Costs	\$ 37,395,553	\$ -	\$ 37,395,553	\$ -
Distributed Costs	\$ 94,873,922	\$ -	\$ 94,873,922	\$ -
Total Owners and Dist. Costs	\$ 132,269,475	\$ -	\$ 132,269,475	\$ -
Total Direct Costs	\$ 384,817,155	\$ -	\$ 384,817,155	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 30,785,372	\$ -	\$ 30,785,372	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 30,785,372	\$ -	\$ 30,785,372	\$ -
TOTAL PROJECT COSTS	\$ 415,602,527	\$ -	\$ 415,602,527	\$ -

Assumptions and Risks

Single circuit Transmission line. One OPGW and one OHSW. Tower configuration similar to installed 500kV towers within AML's 85/15 ratio between suspension and angle/dead structures. 400m span. Plain terrain. Sand and fluvial soil. Pre-construction activities cost and the cost of special spans, tall structures and river/lake crossings has no been considered. Construction will proceed in a continuous manner. Land available as planned. Access suitable to all structures. Pipeline /railroad induced voltage studies and mitigation plans are not included. Geo-technical studies will be completed as required.

Estimate Summary for Need Identification Document (NID)



Project: SATD - 500kV Line Y from Milo Junction sub to sub H (Alt. 3)
TFO: AltaLink
Prepared by: Teshmont
Date: July 9, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 203,819,106	\$ -	\$ 203,819,106	\$ -
Substation Facilities	\$ -	\$ -	\$ -	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 203,819,106	\$ -	\$ 203,819,106	\$ -
Owners Costs	\$ 26,410,958	\$ -	\$ 26,410,958	\$ -
Distributed Costs	\$ 75,554,976	\$ -	\$ 75,554,976	\$ -
Total Owners and Dist. Costs	\$ 101,965,934	\$ -	\$ 101,965,934	\$ -
Total Direct Costs	\$ 305,785,040	\$ -	\$ 305,785,040	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 24,462,803	\$ -	\$ 24,462,803	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 24,462,803	\$ -	\$ 24,462,803	\$ -
TOTAL PROJECT COSTS	\$ 330,247,844	\$ -	\$ 330,247,844	\$ -

Assumptions and Risks

Single circuit Transmission line. One OPGW and one OHSW. Tower configuration similar to installed 500kV towers within AML's 85/15 ratio between suspension and angle/dead structures. 400m span. Plain terrain. Sand and fluvial soil. Pre-construction activities cost and the cost of special spans, tall structures and river/lake crossings has no been considered. Construction will proceed in a continuous manner. Land available as planned. Access suitable to all structures. Pipeline /railroad induced voltage studies and mitigation plans are not included. Geo-technical studies will be completed as required.

Estimate Summary for Need Identification Document (NID)



Project: SATD - 500 kV HVDC converter stations at Langdon, New Sub A, 500 kV HVDC Line (Alt.4)
TFO: AltaLink
Prepared by: Teshmont + G.Rahimi
Date: September 25, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 290,806,460	\$ -	\$ 290,806,460	\$ -
Substation Facilities	\$ 566,775,850	\$ -	\$ 566,775,850	\$ -
Telecommunication	\$ 822,696	\$ -	\$ 822,696	\$ -
Total Facility Costs	\$ 858,405,006	\$ -	\$ 858,405,006	\$ -
Owners Costs	\$ 46,450,000	\$ -	\$ 46,450,000	\$ -
Distributed Costs	\$ 268,185,185	\$ -	\$ 268,185,185	\$ -
Total Owners and Dist. Costs	\$ 314,635,185	\$ -	\$ 314,635,185	\$ -
Total Direct Costs	\$ 1,173,040,191	\$ -	\$ 1,173,040,191	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 93,843,215	\$ -	\$ 93,843,215	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 93,843,215	\$ -	\$ 93,843,215	\$ -
TOTAL PROJECT COSTS	\$ 1,266,883,406	\$ -	\$ 1,266,883,406	\$ -

Assumptions and Risks

Bipolar dc system with a rating of 2000MW, +/-500kV, one twelve valve group per pole, ac system voltage 240kV.
 Ground and line electrodes at both substations. Rectifier and inverter assumed to be identical.
 85:15 ratio of number of suspension vs angle/dead structures. 400m span.
 No pre-construction nor special long spans, water crossing cost included.
 Pipeline/railroad induced volatge studies and mitigation plans not included.
 Land available as planned.

Estimate Summary for Need Identification Document (NID)



Project: SATD - Upgrading 138kV 760L
 From Cypress 562S to Amoco Empres 163S
 Wind Scenario
TFO: AltaLink
Prepared by: Rafael Guzmán
Date: September 11, 2008
Accuracy: +30%/-15%

East

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	\$ 1,553,006	\$ 23,583	\$ 1,576,588	\$ -
Substation Facilities	\$ 137,069	\$ -	\$ 137,069	\$ -
Telecommunication	\$ -	\$ -	\$ -	\$ -
Total Facility Costs	\$ 1,690,075	\$ 23,583	\$ 1,713,657	\$ -
Owners Costs	\$ 250,000	\$ -	\$ 250,000	\$ -
Distributed Costs	\$ 552,034	\$ 3,785	\$ 555,819	\$ -
Total Owners and Dist. Costs	\$ 802,034	\$ 3,785	\$ 805,819	\$ -
Total Direct Costs	\$ 2,492,109	\$ 27,368	\$ 2,519,476	\$ -
Salvage Costs	\$ -	\$ -	\$ -	\$ -
Other Costs				
E&S	\$ 199,369	\$ 2,189	\$ 201,558	\$ -
AFUDC	\$ -	\$ -	\$ -	\$ -
Total Indirect Costs	\$ 199,369	\$ 2,189	\$ 201,558	\$ -
TOTAL PROJECT COSTS	\$ 2,691,477	\$ 29,557	\$ 2,721,034	\$ -

Assumptions and Risks

New line is required to meet AEU new Code. Routing is as proposed. ROW is available as planned.
 No unusual soil conditions are encountered.
 Air breaker at Amoco Empress 760L termination to be replaced to match conductor size capacity
 Medium wind and ice loading.
 Salvage cost are not included

APPENDIX H PARTICIPANT INVOLVEMENT PROGRAM

1.0 PARTICIPANT INVOLVEMENT PROGRAM – OVERVIEW

The AESO conducted a Participant Involvement Program (PIP) throughout the development of its Needs Identification Document to address the need to integrate wind energy into the provincial transmission system in southern Alberta. The AESO PIP ran between October 2007 and October 2008, and was designed to notify, consult and engage a variety of stakeholders with interests in transmission development in southern Alberta. These stakeholders were identified as:

- Residents, occupants, landowners and businesses in southern Alberta;
- Elected and administrative government officials at local, municipal and provincial levels;
- Industry;
- First Nations and Métis with interests in southern Alberta; and
- Advocacy groups

The AESO used a variety of means to notify, consult and engage members of these groups about:

- 1) The need for transmission development in southern Alberta; and
- 2) Alternatives for meeting this need.

Please see Table H-1 for a complete account of the methods used by the AESO to notify, consult and engage stakeholders for this application.

Table H- 1: Communications methods used by the AESO

Communications Vehicle	Objective		
	Notification	Consultation	Engagement (Aboriginal)
Mailout	X		
Newspaper ads	X		
Media	X		
Press release	X		
Radio ads	X		
Web postings	X		
Meetings (presentations)	X	X	X
Open Houses (information sessions)	X	X	X
Correspondence (email, mail)	X	X	X
Telephone	X	X	X
Industry Sessions	X	X	X

The AESO used these communications methods to carry out a variety of PIP activities aimed at sharing information with stakeholders and gathering their feedback. Table H-2 below describes in greater detail the PIP activities that the AESO executed in support of this application.

Table H- 2: PIP activities described

PIP activity	Description	Target Audience	Number	Date (or range)
Industry information session	Presentations to industry wind integration, including transmission planning, interconnection processes, related matters	Wind developers, generators, TFOs, DFOs, others	2 sessions (approximately 85 notified of intention to attend)	October 19, 2007
Newspaper ads placed in southern Alberta newspapers	Open House advertisement	Residents, occupants, landowners and businesses	21 local papers	October-November, 2007
	Thank you ad	Residents, occupants, landowners and businesses	21 local papers	December, 2007
	Open house advertisement	Residents, occupants, landowners and businesses	21 local papers	April-May, 2008
	Thank you ad	Residents, occupants, landowners and businesses	21 local papers	June, 2008

PIP activity	Description	Target Audience	Number	Date (or range)
Media	Articles on AESO need and consultation efforts	Residents, occupants, landowners and businesses	14	November 14, 2007 to January 23, 2008
	Articles on AESO need, alternatives and consultation efforts	Residents, occupants, landowners and businesses	12	April 26 to May 26, 2008
Mailout by postal code	Need overview and Open House schedules	Residents, occupants, landowners and businesses	121,500 (pieces)	April 07, 2008
Media Release	Notice advising of Open Houses	Southern Alberta media	1	April 24, 2008
Radio ads	Notice advising of Open Houses	Residents, occupants, landowners and businesses	51 spots	November 9 – 20, 2007
Web postings	Various information documents	All stakeholders (with internet access)	22	November 1, 2007 to present
Meetings	Presentations on need	Elected and administrative government officials, First Nations, and advocacy groups	27 Meetings	October 18, 2007 and February 27, 2008
Meetings	Presentations on need and alternatives	Elected and administrative government officials, First Nations, and advocacy groups	19 Meetings	April 22 – October 9, 2008

PIP activity	Description	Target Audience	Number	Date (or range)
Open Houses (Round 1)	Sharing information on need	All stakeholders (near event locations)	9 (170 visitors self-registered)	November 14 – 28, 2007
Open Houses (Round 2)	Sharing information on need and alternatives	All stakeholders (near event locations)	12 (327 visitors self-registered)	April 28 – May 15, 2008
Mail out (addressed mail) and email	Update on round 1 Open Houses	Registered visitors to round one open houses	88	January 31, 2008
	Stakeholder mail out advising on need	MLAs; CAOs; Town, County and MD Councils; First Nations and Métis; and advocacy groups	57	February 07, 2008
	MLA mail out on second round of Open Houses and information related to need	MLAs	11	April 21, 2008
	CAO mail out on second round of Open Houses and information related to need	CAOs	13	April 22, 2008
	Report on second round of Open Houses	MLAs; CAOs; Town, County and MD Councils; First Nations; advocacy groups and other registered stakeholders (e.g., private citizens)	246	July 21, 2008

1.1 Description of Participant Involvement Program Products and Activities

AESO Need Overview on Area Reinforcement

The AESO developed a 'need overview,' a background document that describes the need for transmission reinforcement in southern Alberta. The need overview explains that the primary driver for transmission development in southern Alberta is the need to integrate wind interest. The need overview was posted to the AESO web site. A copy of the need overview has been included in APPENDIX H.

Advertising

Between November and December 2007, and between April and June 2008, the AESO advertised in local southern Alberta newspapers to notify readers of:

- The need for transmission development in southern Alberta; and
- Open House dates, locations and times

Following the Open Houses, the AESO placed newspaper advertisements to thank visitors who attended and to remind other public stakeholders that information remains available on the AESO web site. Table H-3 shows the dates and publications in which the AESO advertised the need for transmission development in southern Alberta and notice of the Open Houses.

Table H- 3: Newspaper Advertising Schedule (2007-2008)

Publication	Description of advertisement				
	Round One Open house		Thank you ad (1st)	Round Two Open House	Thank you Ad (2nd)
Lethbridge Herald	10-Nov-2007	17-Nov-2007	15-Dec-2007	22-Apr-2008	10-Jun-2008
Medicine Hat	10-Nov-2007	21-Nov-2007	15-Dec-2007	23-Apr-2008	11-Jun-2008
Bassano Times	13-Nov-2007	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Bow Island Commentator	13-Nov-2008	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Brooks & County Chronicle	12-Nov-2007	19-Nov-2007	17-Dec-2007	23-Apr-2008	9-Jun-2008
Brooks Bulletin	13-Nov-2007	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Cardston The Star (Temple City Star)	15-Nov-2007	22-Nov-2007	20-Dec-2007	24-Apr-2008	12-Jun-2008
Claresholm Local Press	14-Nov-2007		19-Dec-2007	23-Apr-2008	11-Jun-2008
Coaldale Sunny South News	13-Nov-2007	27-Nov-2007	18-Dec-2007	22-Apr-2008	11-Jun-2008
Crowsnest Pass Herald	13-Nov-2007	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Crowsnest Pass Promoter	16-Nov-2007	23-Nov-2007	21-Dec-2007	25-Apr-2008	13-Jun-2008
Fort Macleod Gazette	14-Nov-2007	28-Nov-2007	19-Dec-2007	23-Apr-2008	11-Jun-2008
High River Times	13-Nov-2007		18-Dec-2007	30-Apr-2008	11-Jun-2008

Publication	Description of advertisement				
	Round One Open house		Thank you ad (1st)	Round Two Open House	Thank you Ad (2nd)
Lethbridge Southern Times	14-Nov-2007		19-Dec-2007	23-Apr-2008	11-Jun-2008
Nanton News	14-Nov-2007		19-Dec-2007	30-Apr-2008	11-Jun-2008
Okotoks Western Wheel	14-Nov-2007		19-Dec-2007	30-Apr-2008	11-Jun-2008
Pincher Creek Echo	16-Nov-2007	23-Nov-2007	21-Dec-2007	25-Apr-2008	13-Jun-2008
Prairie post	16-Nov-2007		21-Dec-2007	25-Apr-2008	13-Jun-2008
Taber Times	14-Nov-2007		19-Dec-2007	23-Apr-2008	11-Jun-2008
Vauxhall Advance	15-Nov-2007		20-Dec-2007	22-Apr-2008	10-Jun-2008
Vulcan Advocate	15-Nov-2007		20-Dec-2007	23-Apr-2008	11-Jun-2008

The advertisements for Open Houses provided a general overview of the need, a map of the existing facilities, areas potentially affected and contact information for the AESO. The advertisements also notified readers of the dates and times of for the Open Houses. Copies of these newspaper advertisements were posted to the AESO web site. Copies of the advertisements are available in APPENDIX H.

The AESO also advertised the Open Houses in November, 2007, on local radio stations throughout southern Alberta. Table H-4 below shows the radio advertising that the AESO executed. A copy of the radio script may be found in APPENDIX H

Table H- 4: Radio advertisements, November 2007

Market	Station	Common Call	Format	Length	Start Date	Time Period	Flight Duration	Weekly Spots
<i>Claresholm</i>	CHQR	CHQR AM 770	News/Talk	:30	9-Nov-07	5a-9p	1 Day	3
<i>Nanton</i>	CHRB	AM 1140	News/Weather/ Sports	:30	9-Nov-07	6a-7p	1 Day	3
<i>Lethbridge</i>	CFRV-FM	The River	Modern Adult Contemporary	:30	12-Nov-07	6a-7p	1 Day	3
<i>Taber</i>	CJOC-FM	The Lounge	Classic Adult Contemporary	:30	12-Nov-07	6a-7p	1 Day	3
	CJRX-FM	Rock 106	Rock	:30	12-Nov-07	6a-7p	1 Day	3
	CHLB-FM	Country 95.5	Hit Country	:30	13-Nov-07	6a-7p	1 Day	3
	CJBZ-FM	B-93	Hot AC	:30	13-Nov-07	6a-7p	1 Day	3
<i>Medicine Hat</i>	CFMY-FM	My FM	Contemporary Hit	:30	14-Nov-07	6a-7p	1 Day	3

<u>Market</u>	<u>Station</u>	<u>Common Call</u>	<u>Format</u>	<u>Length</u>	<u>Start Date</u>	<u>Time Period</u>	<u>Flight Duration</u>	<u>Weekly Spots</u>
			Radio					
	CHAT-FM	New Country	Country	:30	14-Nov-07	6a-7p	1 Day	3
<i>Brooks</i>	CIBQ-AM	Q13	Country	:30	15-Nov-07	6a-7p	1 Day	3
<i>Medicine Hat</i>	CHAT-FM	The Fox	Top 40	:30	15-Nov-07	6a-7p	1 Day	3 Spots
<i>Pincher Creek</i>	CJPR-FM	Mountain Radio	Country	:30	19-Nov-07	6a-7p	1 Day	3 Spots
<i>Cardston</i>	CFRV-FM	The River	Modern Adult Contemporary	:30	19-Nov-07	6a-7p	1 Day	3 Spots
<i>Fort Macleod</i>	CJOC-FM	The Lounge	Classic Adult Contemporary	:30	19-Nov-07	6a-7p	1 Day	3 Spots
	CJRX-FM	Rock 106	Rock	:30	19-Nov-07	6a-7p	1 Day	3 Spots
	CHLB-FM	Country 95.5	Hit Country	:30	20-Nov-07	6a-7p	1 Day	3 Spots
	CJBZ-FM	B-93	Hot AC	:30	20-Nov-07	6a-7p	1 Day	3 Spots

Open Houses

Round One, (November, 2007)

The AESO hosted Open Houses in nine southern Alberta communities, between November 14 and November 28, 2007. These Open Houses attracted 170 registered visitors. Over 50 AESO employees participated in these events. Additionally, representatives from the TFO (AltaLink) and the Canadian Wind Energy Association (CanWEA) also participated.

Round Two (April – May, 2008)

In late April and early May of this year, the AESO hosted 12 Open Houses throughout southern Alberta to discuss alternatives that had been developed for meeting the need for more capacity on the transmission system. This round attracted 327 registered visitors. Over 30 AESO employees took part. Representatives from the TFO (AltaLink) and the Canadian Wind Energy Association (CanWEA) also participated in this round.

Please find copies of the poster boards displayed during each round of open houses in APPENDIX H.

Visitors attending each event were asked to register and complete surveys before leaving. These surveys allowed the AESO to gather visitors' feedback on

the need and the alternatives to meet this need. Please find copies of the surveys from each round in APPENDIX H.

Stakeholder Meetings

Throughout the development of this application, the AESO met with:

- Elected and administrative officials from Towns, Municipal Districts, Counties, Improvement Areas and First Nations organizations; and
- Advocacy groups from the electricity industry and those representing environmental concerns.

Please find a list of meeting participants in APPENDIX H. Copies of the presentations delivered during these meetings are inserted in APPENDIX H.

In addition to meetings, the AESO sent information to MLAs across southern Alberta, including:

- Banff-Cochrane, Hon. Janis Tarchuk, PC
- Medicine Hat, Hon. Rob Renner, PC
- Cardston-Taber-Warner, Broyce Jacobs, PC
- Cypress-Medicine Hat, Len Mitzel, PC
- Livingstone-Macleod, Evan Berger, PC
- Lethbridge-West, Greg Weadick, PC
- Lethbridge-East, Bridget Pastoor, Lib
- Little Bow, Barry McFarland, PC
- Highwood, George Groeneveld, PC
- Strathmore-Brooks, Arno Doerksen, PC
- Drumheller-Stettler, Hon. Jack Hayden, PC
- Foothills-Rocky View, Hon. Ted Morton, PC

Further, the AESO sent information directly to specific stakeholder groups, such as towns, municipal districts and counties, FNs and Métis, and advocacy groups. Please find a complete list of stakeholders to whom the AESO sent information directly (addressed mail) in APPENDIX H.

Postal Code Mail Out (unaddressed mail)

In April, 2008, the AESO developed a letter providing AESO application and contact information for mail out by postal code (unaddressed mail) on April 7, 2008. This letter, along with the AESO need overview explaining the need for transmission in southern Alberta, was mailed to approximately 121,500 addresses (includes residences, businesses, schools, farms and hospitals) throughout southern Alberta. This letter was also posted to the AESO web site. A copy of this letter has been included in this APPENDIX H.

Various Technical Documents

The AESO also posted various technical documents on its website. These documents described the AESO's assessment of the need, the scope of the need application and an account of how it screened alternatives. Copies of these documents may be found in APPENDIX H

Public responses to AESO PIP efforts

The AESO also received a variety of comments and inquiries from stakeholders on the need to reinforce the southern Alberta transmission system and the alternatives the AESO developed to meet this need. This feedback was included in letters, emails and phone calls received by the AESO from stakeholders.

The largest source of stakeholder feedback, however, came from visitors' surveys and informal interviews with visitors at Open Houses held by the AESO in the fall of 2007 and the spring of 2008. The AESO received 66 completed visitor surveys from the first round of Open Houses, held between November 14 and November 28; the AESO received an additional 132 surveys from the second round, held between April 28 and May 15. These surveys provided the AESO with qualitative and quantitative feedback on both visitors' Open House experience and their opinions about the need for transmission in southern Alberta and the alternatives proposed by the AESO for addressing this need. Meetings with stakeholders also afforded the AESO insights into stakeholders' preferences for transmission development in southern Alberta.

All forms of feedback provided opportunity for the AESO to learn the preferences of stakeholders.

The AESO has responded to all inquiries and concerns received as a result of PIP activities.

Ongoing Dialogue

In addition to the PIP activities described above, the AESO has additional communications tools in place to involve stakeholders in this application. These tools include a dedicated, toll-free stakeholder relations telephone line (888.866.2959) and a dedicated email address (stakeholder.relations@aesocanada.com). AESO contact information, along with the AESO's mailing address (2500, 330 5th Ave, SW, Calgary) and web site address (www.aesocanada.com), and a privacy statement that describes how the AESO honours Alberta's Personal Information Protection Act, was included on all communications materials and correspondence related to this application. Finally, the AESO published notice of various milestones and other information associated with this application in its weekly stakeholder newsletter throughout the development of this application. The AESO will continue to inform the stakeholders of ongoing application activities.

1.2 Issues and Concerns Raised

The main sources of comments, questions and concerns from the public were received by the AESO through Open Houses and also meetings attended with various stakeholders.

In the first round, Open House visitors and meeting participants:

- Requested more information on the need and possible solutions;
- Commented on the AESO's participant involvement process;
- Expressed both concern and support for transmission development and the wind development it would encourage;
- Asked questions about the regulatory process (e.g., who are the players and how does it work?); and
- Inquired about underground transmission development.

Open House visitors and meeting participants expressed they were happy with the opportunity to learn more about the need for transmission, however, they expressed a preference for discussing the project when the AESO was further along in its planning process and could provide alternatives related to geographic areas.

In the second round, Open House visitors and meeting participants responded with comments and questions related to:

- Social matters including:
 - Health, safety, environment and public preference, especially with respect to aesthetic considerations and property values;
 - Land use within the study area and the impact potential transmission development may have on multiple-use areas, wildlife and livestock; some comments advised planners to avoid certain areas;
 - Siting and the regulatory process, along with references to the location of generation;
 - Perspectives on generation fuel sources (e.g., renewables, micro generation and fossil fuels);
 - AESO consultation, including advice on whom to involve in our PIP, and PIP activities executed by other industry participants such as the AUC and TFOs such as AltaLink;
 - Regulatory matters such as other applications in the region and also rate of growth in Alberta; and
 - Policies, including those related to export, deregulation and support for renewable energy technologies;
- Technical matters, including:
 - Engineering design with respect to the need for transmission reinforcement in southern Alberta;
 - Technical requirements, such as capacity, efficiency, reliability and system impact;
 - Evaluations that address operating standards; and
 - The efficiency of generation fuel sources such as wind;

- Project cost matters including:
 - Capital costs of each alternative; and
 - Other cost factors such as line losses.

After 21 Open Houses with almost 500 visitors, and 46 meetings with stakeholders, some trends in stakeholder feedback emerged.

Visitors to Open Houses held in southeast Alberta primarily sought information on wind energy and transmission development. Development on the scale proposed by wind developers and the AESO seemed new for many southeastern stakeholders. Visitors to Open Houses held in southwestern Alberta, many of whom have been living with wind developments longer than stakeholders in the southeast, offered more particular views on the need for transmission development. Many of these stakeholders for example, advised the AESO to consider underground transmission, build big and follow existing rights-of-way.

Feedback from meetings the AESO held with stakeholders in local governments, First Nations and those belonging to industry and advocacy groups ranged widely. Below is a general high-level synopsis:

- Municipalities were interested in mainly in tax revenue generated from industry (including power generation) locating to areas with adequate transmission capacity to support operations within the jurisdictions of Counties, Municipal Districts and Towns;
- First Nations requested TFO's keep them informed of routing discussions and some expressed interest in wind power generation;
- Stakeholders in industry emphasized costs of transmission developments as the key factor in determining preferred alternatives; others noted that carbon offsets were a key advantage of industrial wind development;
- Stakeholders from environmental advocacy groups suggested environmental concerns should be a deciding factor in the AESO's determination of a preferred option; and
- Wind developers suggested adequate transmission must be built in a timely way.

The AESO's review of stakeholder feedback reveals the need for bulk system transmission development in southern Alberta is recognized and accepted.

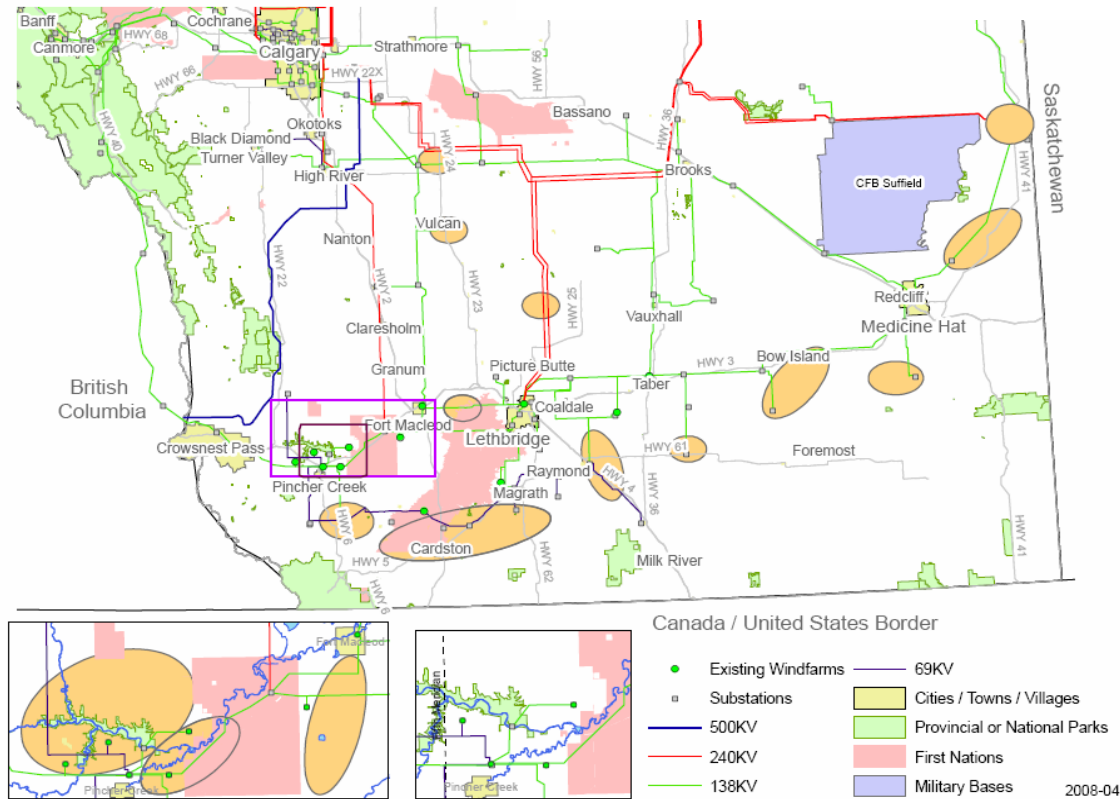
Southern Alberta Transmission Reinforcement

For more information please contact the AESO at 1.888.866.2959,
www.aeso.ca or stakeholder.relations@aeso.ca

Who is the AESO?

The Alberta Interconnected Electric System (AIES), our province's transmission system or "grid," is planned and operated by the Alberta Electric System Operator (AESO). This network of higher-voltage transmission lines, towers and equipment carries ("transmits") electricity from generators to large industrial customers as well as lower-voltage systems that distribute it to cities, towns and rural areas. Our job is to maintain safe, reliable and economic operations on the provincial transmission grid.

Southern Alberta Wind Interest Map



The map above shows areas, in orange, where wind power developments have been proposed; these areas are otherwise known as planning zones.

Why Transmission system reinforcement is needed for Southern Alberta?

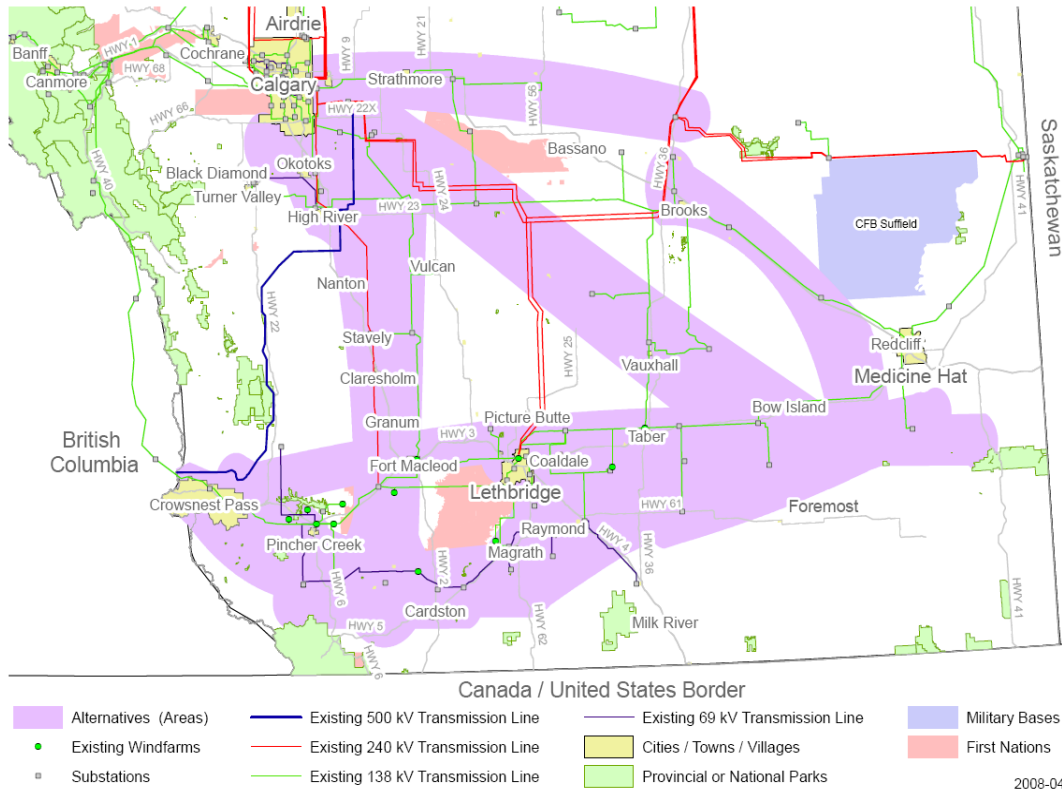
Interest in wind development in southern Alberta is increasing. We are now planning the transmission system to interconnect new wind farms; however, since the existing transmission system in the south is at capacity (i.e., the system cannot carry additional electricity), system reinforcement is needed to move new wind generated power to areas that need it.

What's happening right now?

The AESO has received applications for wind power development of over 10,000 mega-watts (MW) in Alberta, with more than 7,000 MW distributed across southern Alberta. The AESO, however, anticipates the total wind generation that will likely develop as ranging between 2000 MW to 3900 MW over the next 10 years. (This range includes 523 MW of wind generation currently installed.) The existing transmission system in southern Alberta has very little capacity to connect new wind generation. Therefore, the AESO has developed transmission development alternatives to integrate the anticipated wind generation development in southern Alberta. These alternatives consist of 240 kV AC (2 alternatives), 500 kV AC and HVDC transmission systems. These transmission system alternatives were developed to not only interconnect new generation but also to provide additional, reliable bulk system capacity from the generation sites to the areas where power is needed.

(over)

Consultation with stakeholders will help the AESO determine what alternatives are best suited for southern Alberta.



The map above shows a shaded area where the AESO has identified four alternatives for transmission system reinforcement.

Where will the new lines be proposed?

So far, our planning study has produced four main alternatives to address the challenges facing the transmission system in southern Alberta. After gathering stakeholder insights on our alternatives, our study will identify areas where transmission lines and other related facilities could be added to improve the system.

Consultation with stakeholders will identify a preferred solution for strengthening the system; the preferred solution will form part of our Need Information Document (NID) which we will submit to the Alberta Utilities Commission (AUC) later this year. We will also submit individual Abbreviated Needs Information Documents (ANIDs) to the AUC to connect wind projects that successfully meet AESO interconnection milestones.

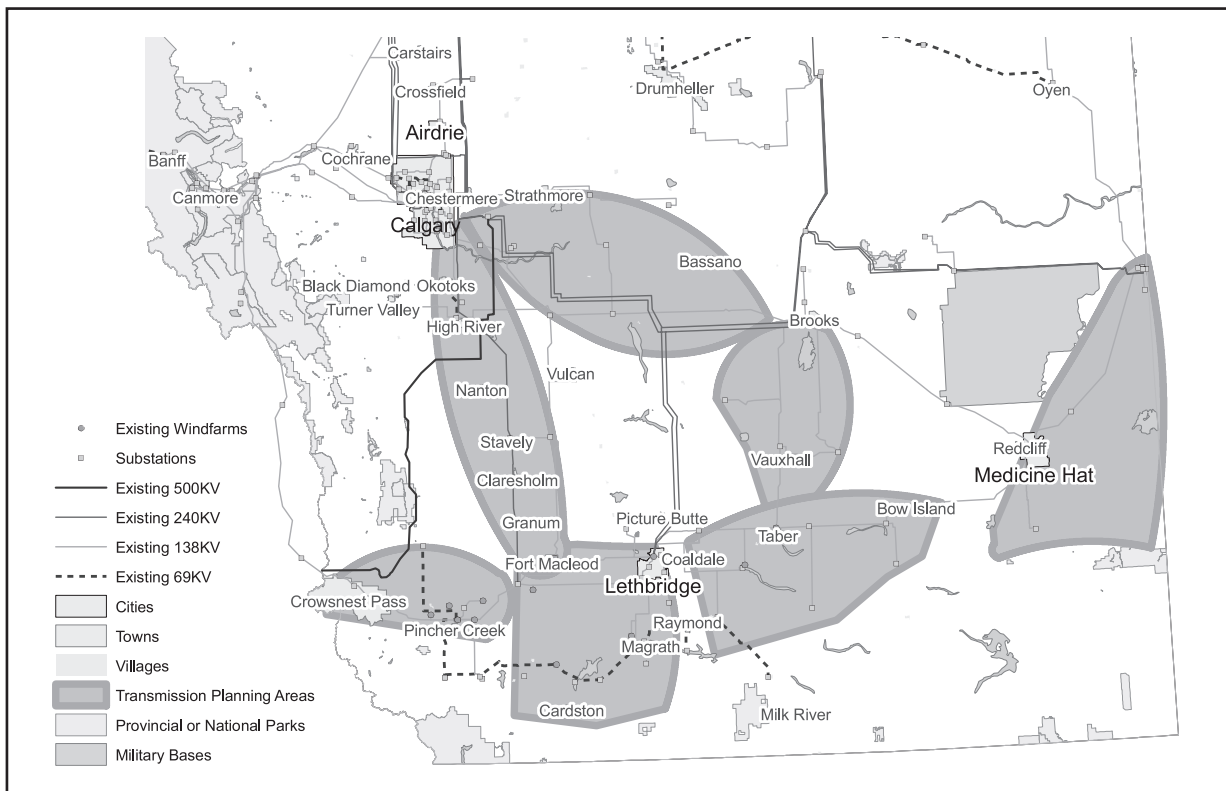
Should the AUC approve our Need applications, we will assign the larger system reinforcement and each new interconnection to Transmission Facility Owner AltaLink, to build the additional transmission facilities required. Before AltaLink can begin constructing these facilities, it must develop a Facilities application and submit this document to the AUC for approval. Further consultation with stakeholders will form a crucial component of this application process.

The AESO is committed to protecting your personal privacy in accordance with Alberta's Personal Information Protection Act. Any personal information collected by the AESO with regard to this project may be used to provide you with further information about the project, may be disclosed to the Alberta Utilities Commission (and as a result, may become public), and may also be disclosed to the eligible Transmission Facility Owner(s). If you have any questions about how the AESO will use and disclose your personal information collected with regard to this project, please contact us at 888.866.2959 or at stakeholder.relations@aeso.ca

Public Information Sessions

Potential System Reinforcement in Southern Alberta to support Additional Wind Development

<p>Claresholm Wednesday, Nov. 14 4pm – 8pm Claresholm Community Centre</p>	<p>Nanton Thursday, Nov. 15 4pm – 8pm Memorial Centre (Upper hall)</p>	<p>Lethbridge Monday, Nov. 19 4pm – 8pm Fraternal Order of Eagles (Lower hall)</p>	<p>Taber Tuesday, Nov. 20 4pm – 8pm Royal Cdn. Legion (Billy Williams Hall)</p>	<p>Medicine Hat Wednesday, Nov. 21 4pm – 8pm Moose Lodge</p>
<p>Brooks Thursday, Nov. 22 4pm – 8pm Heritage Inn</p>	<p>Pincher Creek Monday, Nov. 26 4pm – 8pm Pincher Creek Community Hall</p>	<p>Cardston Tuesday, Nov. 27 4pm – 8pm Civic Centre</p>	<p>Fort Macleod Wednesday, Nov. 28 4pm – 8pm District Community Hall</p>	



The AESO invites you to an Open House to discuss the need for transmission development in Southern Alberta

The Alberta Electric System Operator (AESO) has identified the potential for a significant increase in power generation projects throughout southern Alberta, including substantial wind power development.

In its role of planning the transmission system for all Albertans, the AESO is currently investigating the need to reinforce the transmission system so these generation projects can be connected reliably to the provincial grid. Connecting these projects helps meet demand for electricity in other areas of the province. Work is underway to determine how much additional transmission development will be required.

The map above illustrates, in general, potential areas that may require additional transmission capacity in order to carry more electricity.

Please note: The map does not identify potential line routes. Line routes are developed with public consultation later in

the regulatory process governing transmission development in Alberta.

Line routes are developed after the need for transmission development has been determined.

The AESO is holding its first series of Open Houses in southern Alberta to provide opportunities at this early stage in the planning process to discuss the issues facing the transmission system and to review the process for reinforcing the transmission system. Detailed alternatives will only be developed and presented for further discussion once the input from these Open Houses has been incorporated into the planning process.

Please join us to learn more and provide your feedback at our Open Houses on the need for transmission development in Southern Alberta. AESO staff will be on hand discuss this need, answer your questions and record your comments.

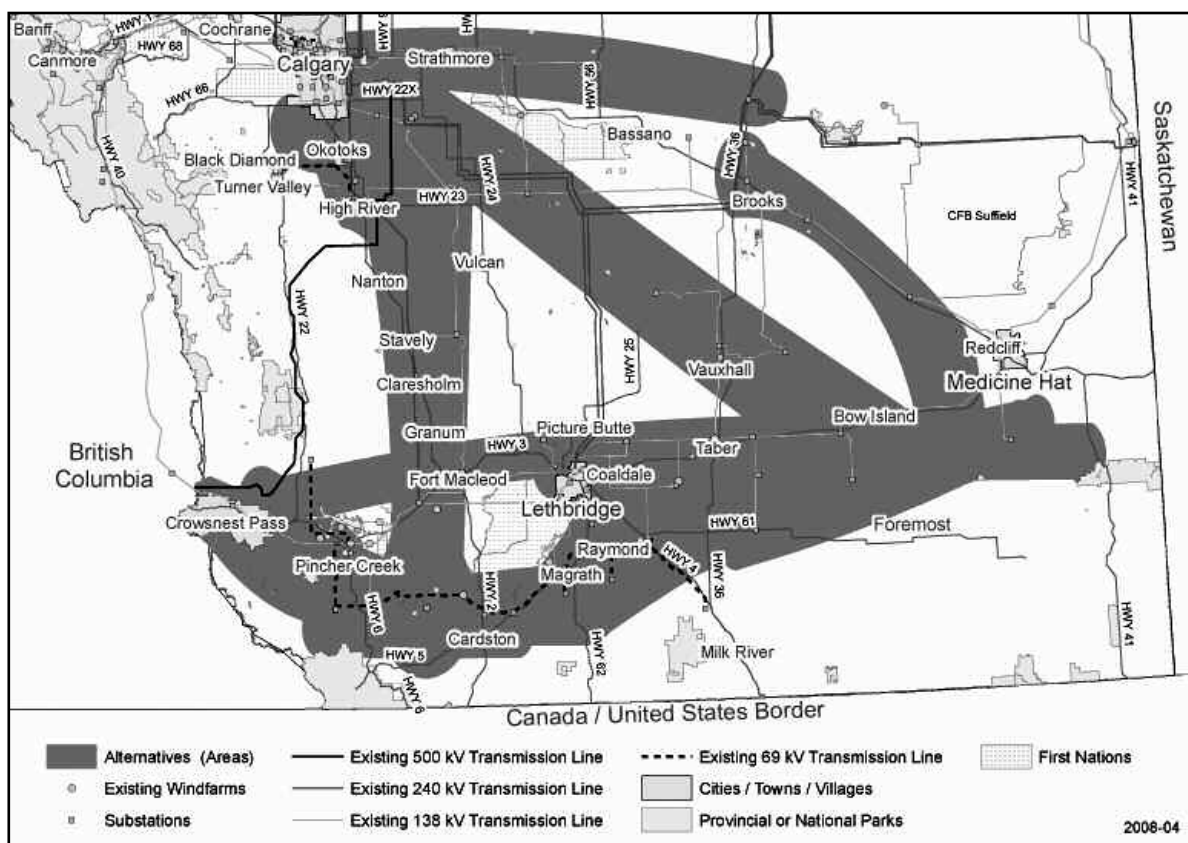
Please visit our web site, www.aeso.ca for more information or call the AESO at 1.888.866.2959.

 <small>Integrated Marketing Communications</small>
Artist:
Production Only
Docket: 103005
Date: Nov 1, 2007
Size: 7.48"
Proof: 3
<p style="text-align: center;">1 of 1</p>
Publication(s):

Public Information Sessions

Potential system reinforcement in southern Alberta to support additional wind development

<p>Foremost Monday, April 28 4pm – 8pm Foremost Community Hall</p>	<p>Bow Island Tuesday, April 29 4pm – 8pm Bow Island Legion Hall</p>	<p>Medicine Hat Wednesday, April 30 4pm – 8pm Moose Lodge</p>	<p>Brooks Thursday, May 1 4pm – 8pm Heritage Inn</p>
<p>Taber Monday, May 5 4pm – 8pm Royal Canadian Legion Taber Branch</p>	<p>Lethbridge Tuesday, May 6 4pm – 8pm Fraternal Order of Eagles (Lower hall)</p>	<p>Cardston Wednesday, May 7 4pm – 8pm Tanner Centre</p>	<p>Pincher Creek Thursday, May 8 4pm – 8pm Heritage Inn</p>
<p>Fort Macleod Monday, May 12 4pm – 8pm District Community Hall</p>	<p>Claresholm Tuesday, May 13 4pm – 8pm Claresholm Community Centre</p>	<p>Nanton Wednesday, May 14 4pm – 8pm Memorial Centre (Upper hall)</p>	<p>Strathmore Thursday, May 15 4pm – 8pm Strathmore Civic Centre</p>



The AESO invites you to an Open House to discuss the need for transmission development in southern Alberta

The Alberta Electric System Operator (AESO) has identified the potential for an increase in power generation projects throughout southern Alberta, including substantial wind power development.

In our role as planner of the transmission system for all Albertans, we are currently investigating the need to reinforce the transmission system so these generation projects can be connected reliably to the provincial grid.

Connecting these projects helps meet demand for electricity both locally and in other areas of the province. We are working to determine how much additional transmission development will be required.

The AESO is holding a series of Open Houses throughout southern Alberta to provide opportunities for residents to discuss the need to improve the transmission system and to provide a better understanding of where transmission development may take place. AESO planners have developed four possibilities for improving the transmission system; these Open House events will provide visitors with information about these alternatives and help AESO staff gather visitors' comments.

The map above illustrates general areas where potential transmission development might occur; after presenting alternatives for improving the transmission system to southern Alberta residents and other stakeholders, and gathering the insights of these stakeholders, the AESO will make an

informed recommendation about how to improve the transmission system in southern Alberta. We invite southern Alberta residents living within the shaded area or near it to visit us at one of our events.

Please note: The map does not identify potential line routes. Line routes are developed with public consultation later in the regulatory process governing transmission development in Alberta.

Please join us at our Open Houses to learn more and to provide your insights on the need for transmission development in southern Alberta. AESO staff will be on hand discuss this need, answer your questions and record your comments.

Please visit our web site, www.aeso.ca for more information, or contact the AESO at 1-888-866-2959 or stakeholder.relations@aeso.ca.

The AESO is committed to protecting your personal privacy in accordance with Alberta's Personal Information Protection Act. Any personal information collected by the AESO with regard to this project may be used to provide you with further information about the project, may be disclosed to the Alberta Utilities Commission (and as a result, may become public), and may also be disclosed to the eligible Transmission Facility Operator(s). If you have any questions about how the AESO will use and disclose your personal information collected with regard to this project, please contact us at 1-888-866-2959 or at stakeholder.relations@aeso.ca.

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Docket:	103019
Date:	April 8, 2008
Size:	7.75"
Proof:	4
1 of 3	
Publication(s):	8 colum

Southern Alberta System Reinforcement

Thank you.

We held open houses in communities throughout Southern Alberta in November to talk with community members about the need to strengthen the transmission system in order to connect new sources of electricity generation such as wind energy.

The comments we received during our open houses will inform our planning studies and will help us identify a range of alternatives to address transmission planning challenges in Southern Alberta.


After we identify and test these alternatives, we will return to Southern Alberta communities to present these alternatives and to gather more of your insights. We plan to hold a second round of Open Houses next spring (2008).

Your insights are critical to help us plan a transmission system that all Albertans can rely on. We are committed to a consultation process that values local perspectives.

For more information on our activities, or to provide your feedback, please visit our website at www.aeso.ca, email us at stakeholder.relations@aeso.ca or call toll-free at 1.888.866.2959.

Thank you for your continuing interest in our work.



 **ump.worldwide**

Branding Marketing Communications

Artist:

2N

Production Only

Docket: 103010

Date: Dec 11, 2007

Size: 6.75"

Proof: 2

2 of 3

Publication(s):

Various

Southern Alberta System Reinforcement

Thank you.

Between April 28th and May 15th, we held open houses in communities throughout Southern Alberta to talk with residents about the need to strengthen the transmission system in this region. Thank you for participating.

With a dual mandate to both plan the transmission system so that generators can get their product to consumers and to connect new electricity generation facilities such as proposed wind farms to the grid, the AESO presented some conceptual alternatives that would address the need for more capacity on the transmission system in Southern Alberta.

The comments we received from you during our open houses will help in assessing the merits of the various alternatives to address the lack of transmission capacity in Southern Alberta.

Your insights are critical to help us plan a transmission system that all Albertans can rely on. We are committed to a consultation process that values local perspectives.

For more information on our activities, or to provide feedback, please visit our website at www.aeso.ca, email us at stakeholder.relations@aeso.ca or call toll-free at 1.888.866.2959.

Thank you for your continuing interest in our work.



Artist:

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Production Only

Docket: 103026

Date: May 27, 2008

Size: 4.56"

Proof: 2

1 of 3

Publication(s):

LH
MH

SASR Radio script November, 2007

The Alberta Electric System Operator is planning for potential transmission development throughout southern Alberta and would like your input.

Throughout November a series of Open Houses will be held in various communities to outline the need for transmission reinforcement and to gather public feedback as part of the planning process.

Please check your local newspaper for information on dates, times and locations or contact the AESO toll free at 1.888.866.2959 or www.aeso.ca.

Southern Alberta Transmission Development

27 February 2008

Reliable **Power**

Reliable **Markets**

Reliable **People**

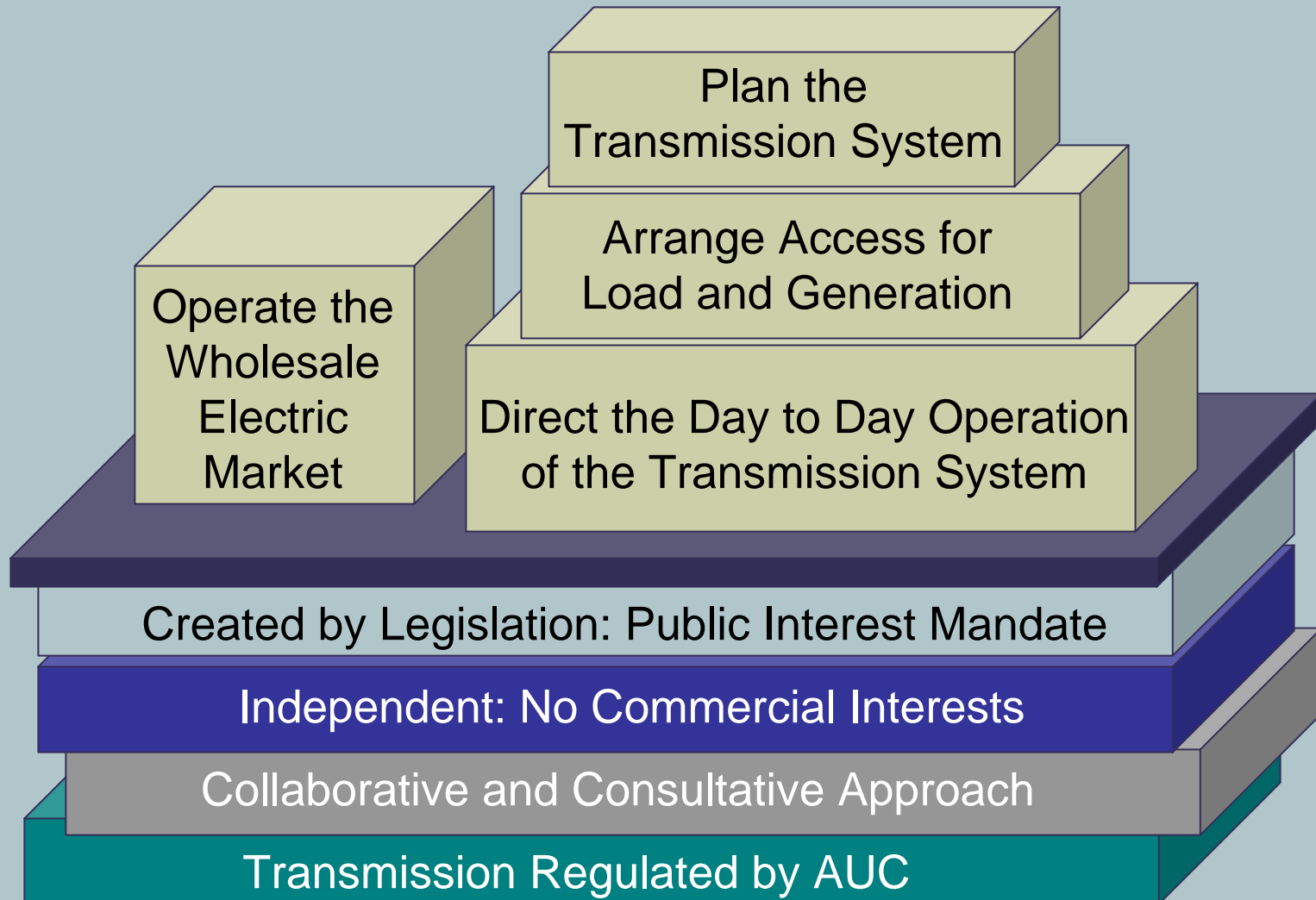


Topics to be presented

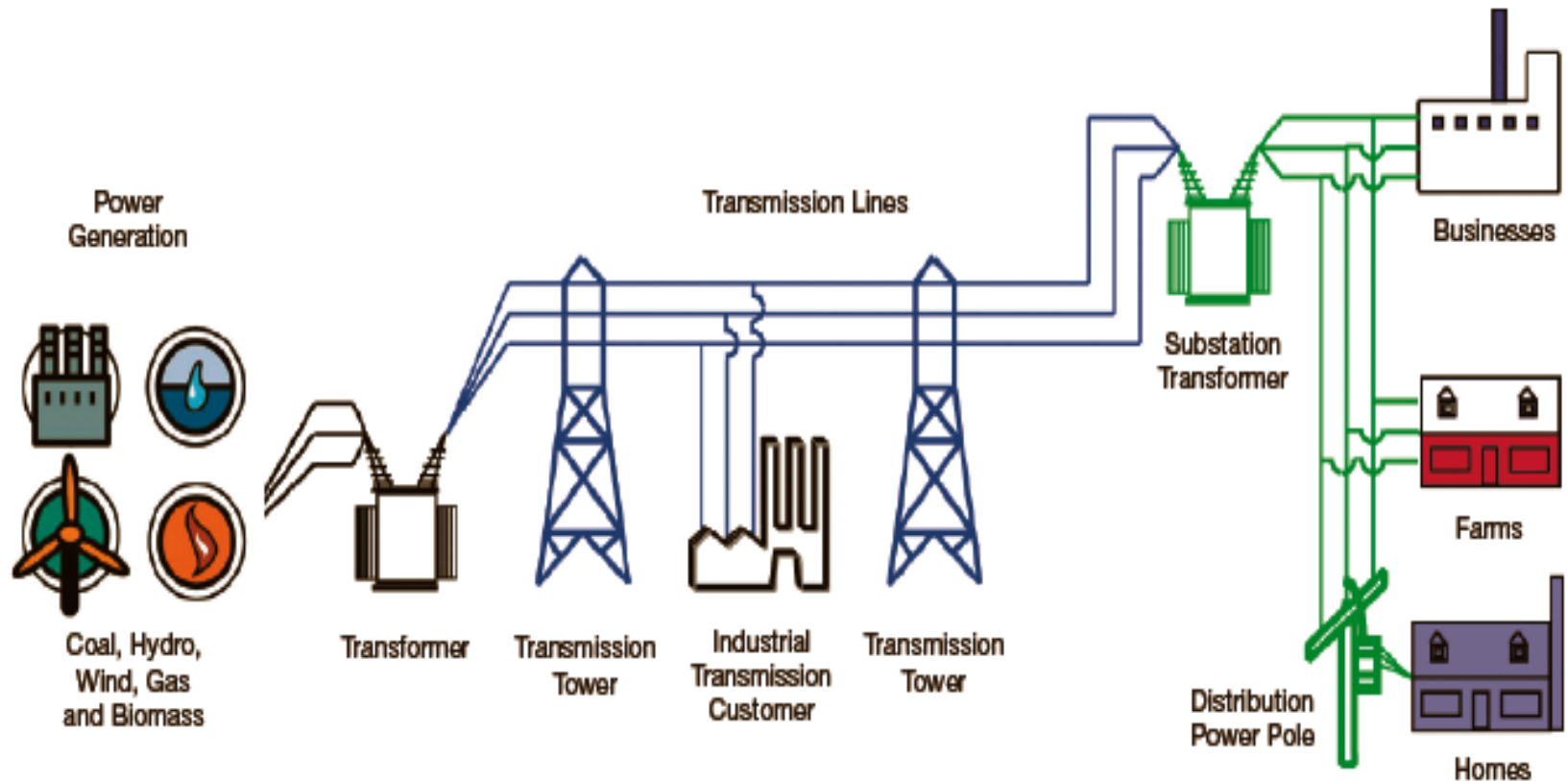


- Overview of the AESO
- Transmission System Planning
- Need for reinforcement in Southern Alberta
- Stakeholder engagement process
- Next steps

AESO: Our role and context



The Flow of Power



There are three distinct functions involved in moving power from its source to consumers; each plays a different role in a complete electric system.

Transmission Planning

A two-stage process



- AESO
 - identify the need for transmission development
 - submit a **Needs Identification Document**, to the Alberta Utilities Commission (AUC) which will include a recommendation for transmission reinforcement in the area
- Transmission Facility Owner (TFO)
 - detailed routing and specific siting
 - detailed engineering
 - separate consultation process
 - submit a **Facilities Application**, which will include a specific route proposal, with the Alberta Utilities Commission

Present work underway



- Southwest Transmission Development
 - Will address load growth and some wind generation development
 - TFO in Facility Application Stage
- Southeast Transmission Development
 - Will address load growth and some wind generation development
 - Need Application Submitted in September

The Situation Today

The AESO Wind Integration Process



- Temporary wind capacity threshold of 900 MW implemented in 2006
 - in response to a substantial increase in interest in wind development and technical studies, completed in 2005/2006, which indicated wind power poses system reliability concerns as wind penetration increases in the absence of corresponding mitigation measures
- In March, 2007, consultative work began on a Market Operational Framework to define mitigation measures and determine associated cost allocations
- On September 26, 2007 the DoE, AESO and CanWEA announced the 900 MW threshold has been removed and replaced by the Market Operational Framework, effective immediately

What is causing the need for system reinforcement?



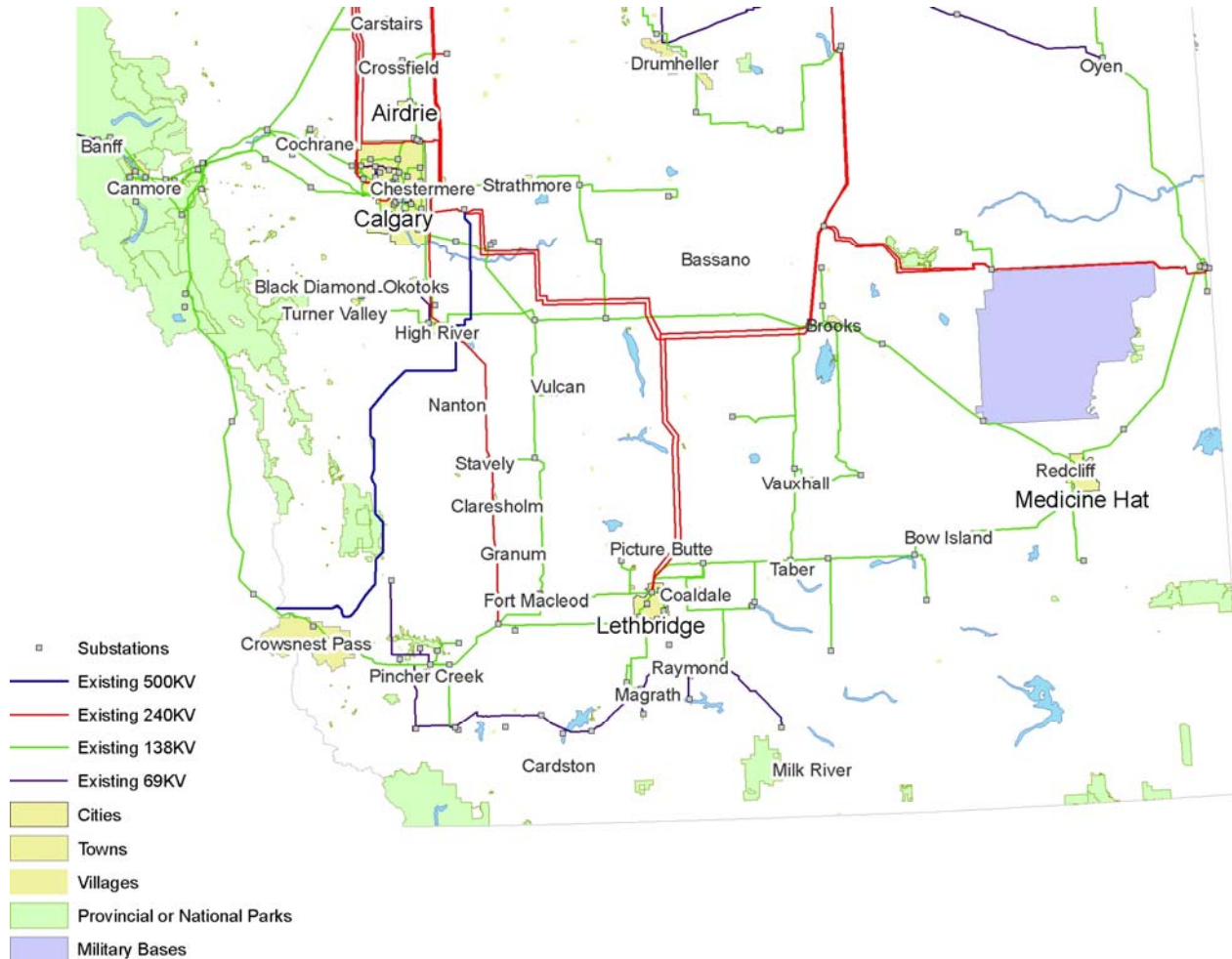
- Approximately 50 potential Wind Farm's totaling over 6000 MW – but not all will likely develop
- Wind Generation Scenarios forecast 1600 MW to 3400 MW of additional wind capacity in the next 10 Years
- Wind farms have the potential to serve an energy demand of 2X the City of Calgary
- Existing infrastructure does not have the capability to handle additional generation of the magnitude expected (not all 6000 MW)
- AESO worked with CanWea to develop reasonable forecast of additional wind generation for the next ten years

How will the Wind Farms connect to the grid?

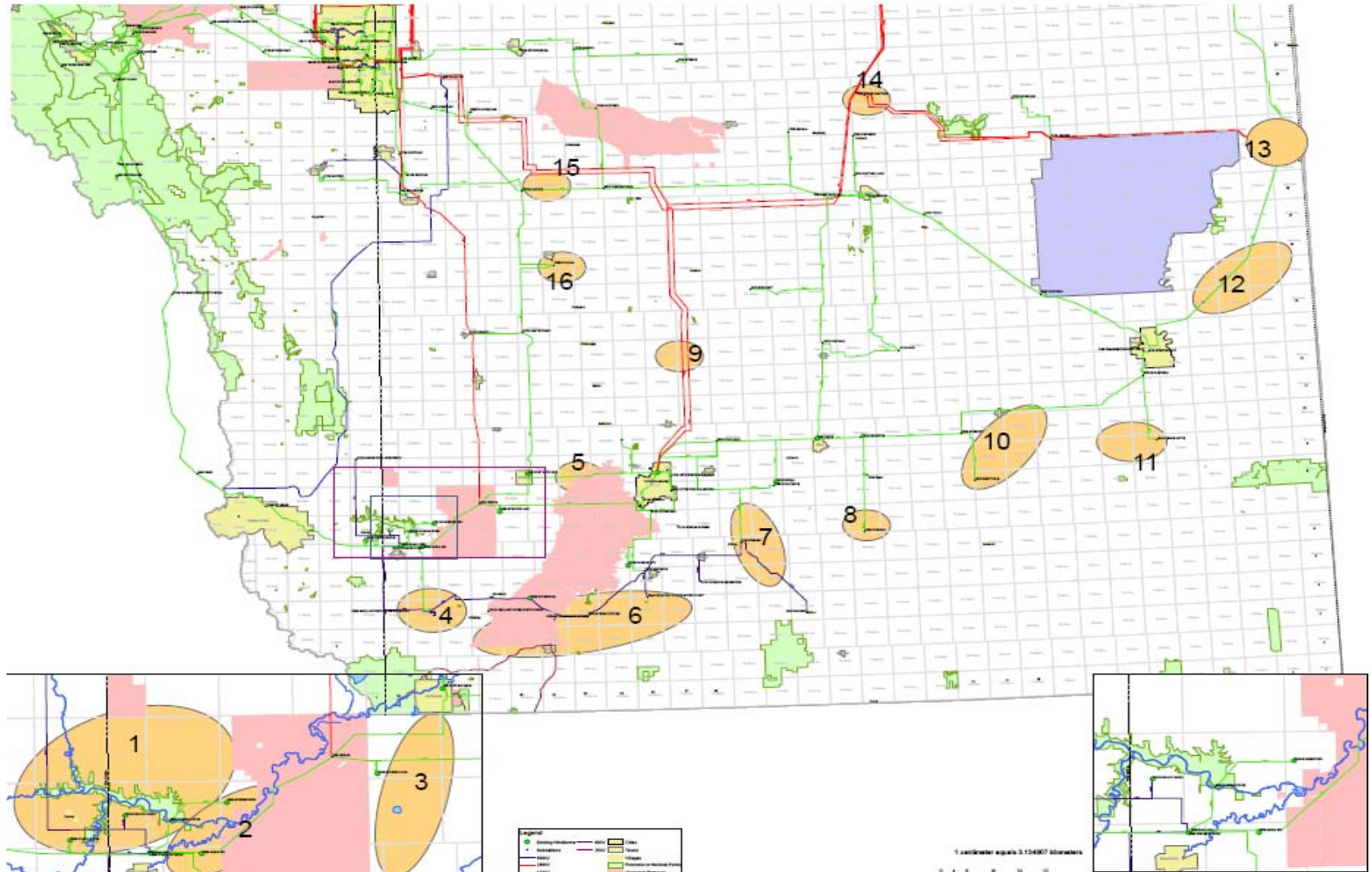


- In addition to the transmission system reinforcement, each individual wind power development will need to be connected to the system

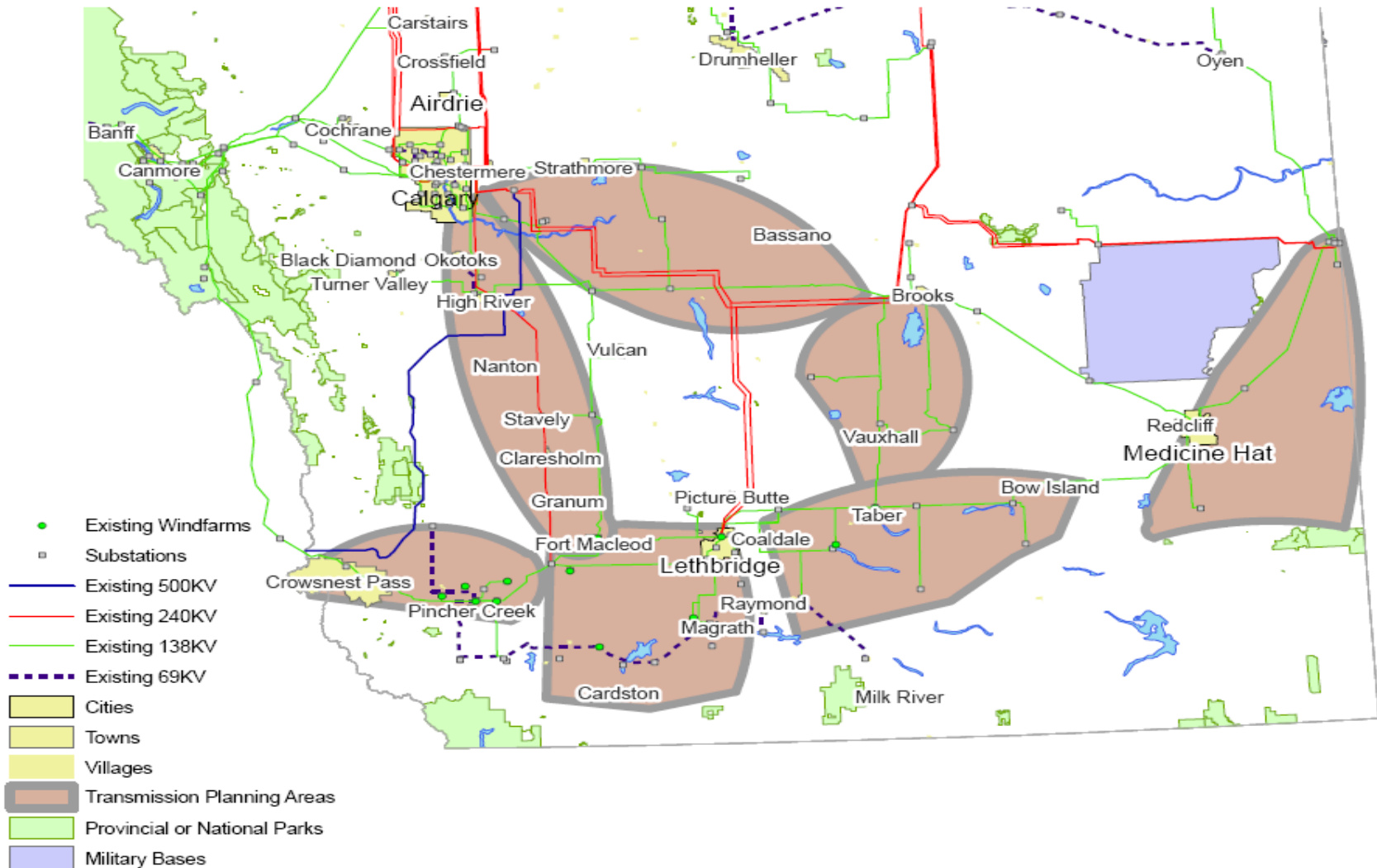
Southern Alberta existing transmission system



Wind Farm Zone Planning Map



Potential Transmission Development in Southern Alberta



Technical alternatives



- 500 kV (e.g., BC intertie)
- 240 kV
- 138 kV (to connect wind farms)
- HVDC and HVDC Light
- Overhead and underground

Planning Considerations



- Assess alternatives based on a balance of:
 - Impacts:
 - Social/Landowner
 - Environmental
 - Land Use
 - Technical performance including reliability and future flexibility
 - Cost

Stakeholder Engagement Process



Consultation with:

- Southern Alberta Residents
 - Open Houses – November 2007 and April 2008
 - Information provided via AESO web site
 - Newspaper advertisements
 - Radio advertisements
 - Transmission projects phone line - 1-888-866-2959
 - Follow up
- Southern Alberta Government representatives (municipal and provincial)
- Area First Nations
- Industry stakeholders

- System Development
 - Ongoing stakeholder discussions by both AESO and TFOs
 - Open houses – April 2008
 - File Need Application May 2008
- Wind Power Interconnections
 - Ongoing discussions with individual customers
 - Separate stakeholder engagement process for each individual wind power development
 - Abbreviated Need Identification Documents filed with the AUC as they are completed

Contact us



- General AESO Enquiries
 - at our web site, <http://www.aeso.ca>
 - via email to stakeholder.relations@aeso.ca

- Southern Alberta Transmission Development:
 - Via email to stakeholder.relations@aeso.ca
 - Via telephone at 1-888-866-2959
 - At our web site, <http://www.aeso.ca/transmission/9837.html>

aeso

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Southern Alberta System Reinforcement - Planning Update -

Ata Rehman, P. Eng.
Manager, South System Planning

19 June 2008

Reliable **Power**

Reliable **Markets**

Reliable **People**



South System Planning - Update



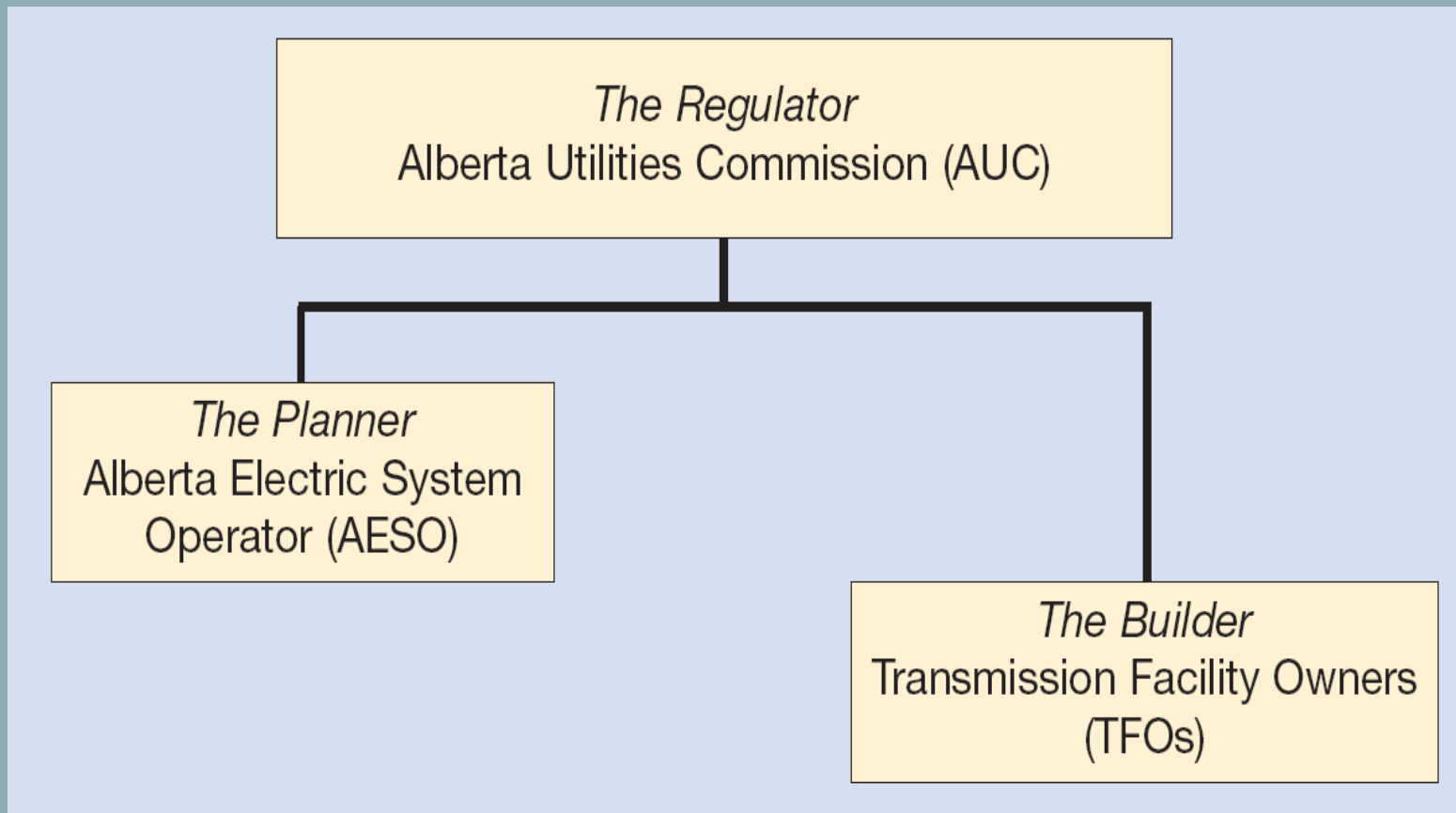
- Overview of the Need
- Basis and Planning Assumptions
- Transmission Development Alternatives
- Next Steps
- Timelines

AESO Vision



The AESO will be seen as a key contributor to the development of Alberta and the quality of life for Albertans, through our leadership role in the facilitation of fair, efficient and openly competitive electricity markets and the reliable operation and development of the Alberta Interconnected Electric System (AIES).

Regulatory Process: The Players



Regulatory process: The Process

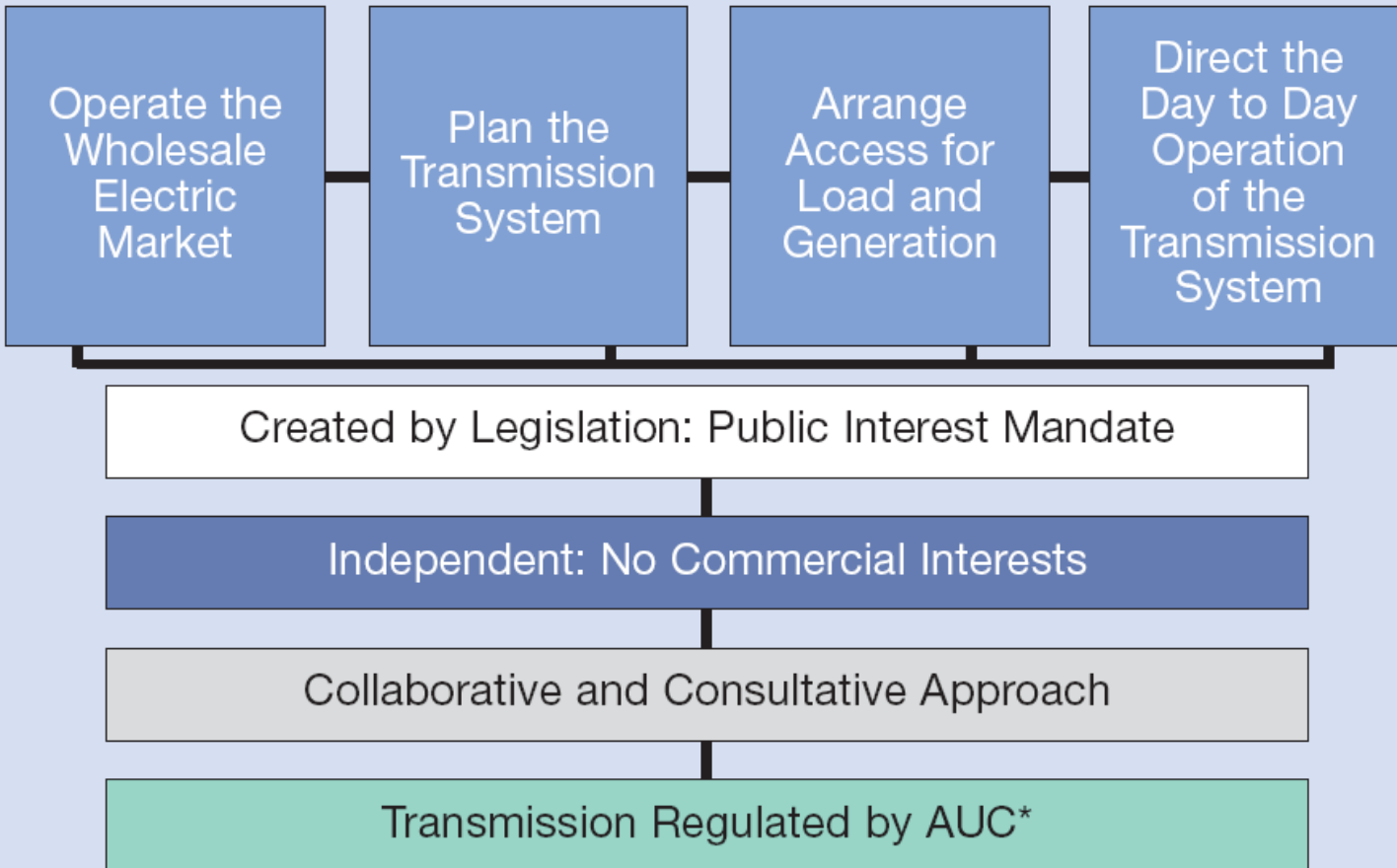


The Process (two parts)

1. The Need: The AESO studies the need for transmission development and applies to the AUC for approval.
2. The Facilities (lines, towers and substations): To meet the need, the TFO applies to the AUC for approval to construct facilities.

In southern Alberta the TFO is AltaLink.

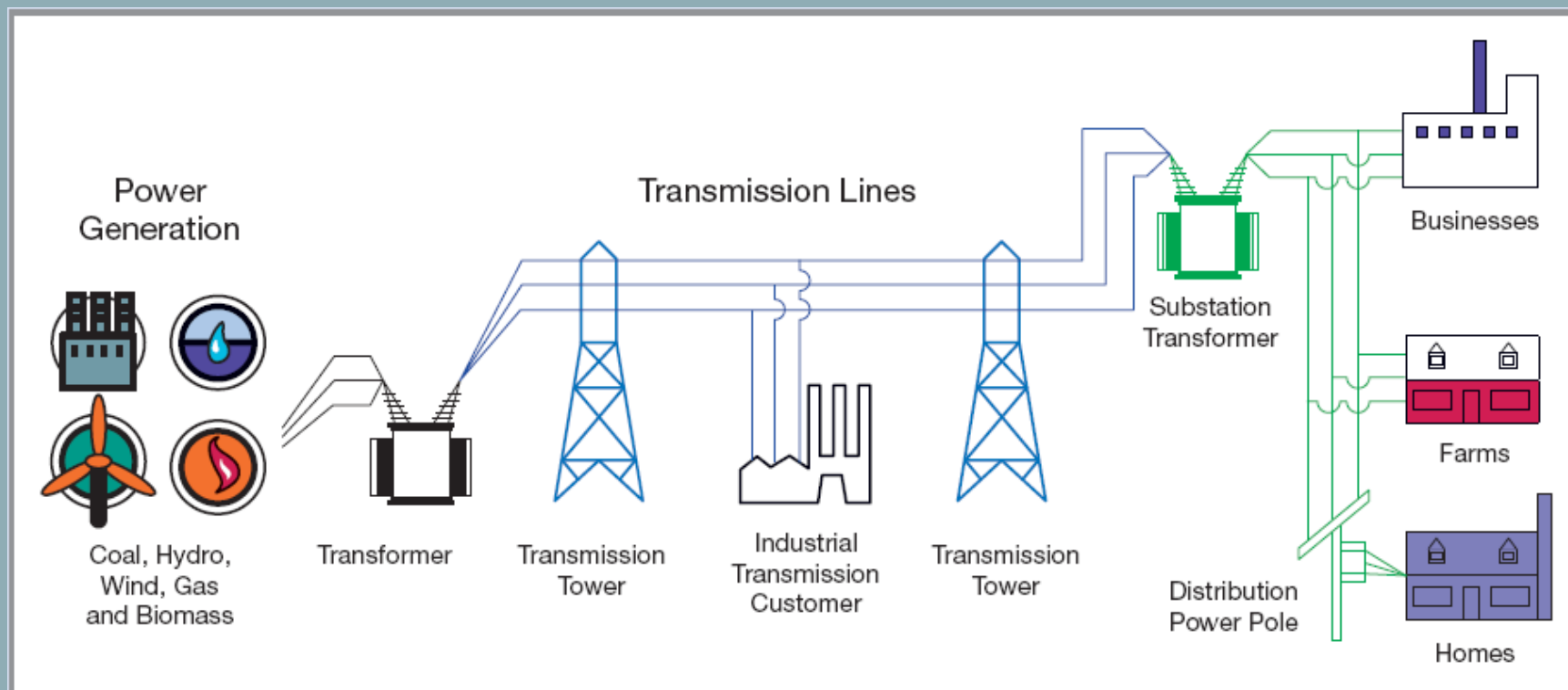
AESO – Our role



*Alberta Utilities Commission






The Big Picture

The flow of power



The Big Picture (cont'd)

Alberta's Electricity Generation

	Coal-Fired Plants	5,893 MW
	Natural Gas-Fired Plants	4,669 MW
	Hydro Power	869 MW
	Green Power	523 MW
	Wind Power	
	Green Power	234 MW
	Other Renewables	

Total Installed Generating Capacity 12,188 MW

Transmission Interconnections

British Columbia Import: 0-780 MW;
Export 0-800 MW

Saskatchewan Import: 0-150 MW;
Export 0-60 MW

Figures as of April 2008

The Big Picture (cont'd)



Alberta's Electric System

- More than 21,000 km of transmission lines
- Interties B.C. (up to 780 MW) & Saskatchewan (up to 150 MW)
- Over 280 generating units
- 9,701 MW system peak demand
- About 200 market participants
- 12,188 MW total maximum generating capacity

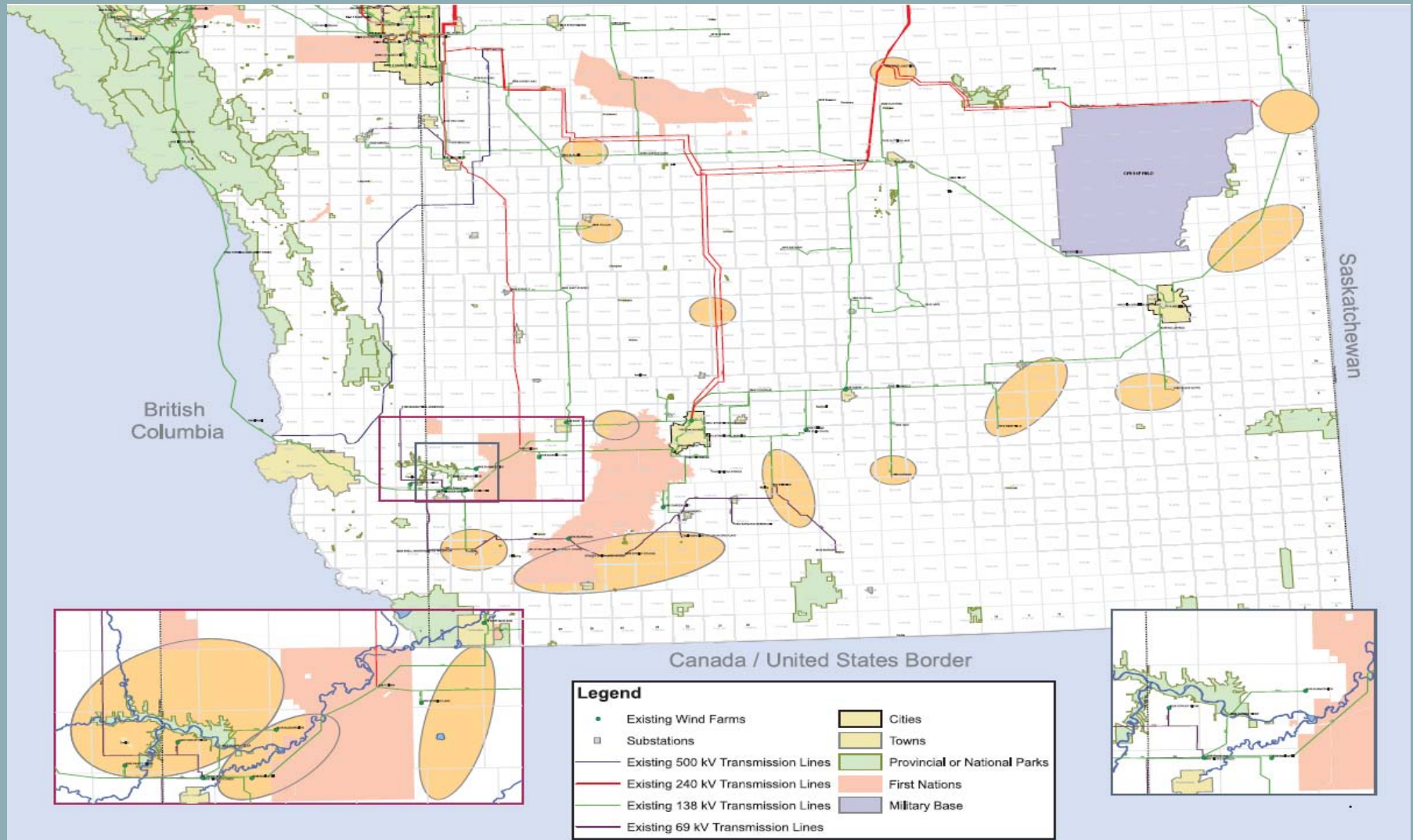
Planning for need



Planning considerations:

- Social
- Technical
- Economic

Overview of the Need – Wind Interest in Southern Alberta



Overview of the Need Cont.



- Southern Region – 10 Planning Areas
- Current Total Wind Interest > 11,000 MW
- Wind Interest in South > 9,500 MW
- Wind Interest in Central Area > 1,500 MW
- Very Small Capability in the Existing South Transmission System to interconnect additional wind

Southern System Development Options



- 240 kV AC
- 500 kV AC
- 765 kV AC
- HVDC (Classic)
- HVDC (VSC)

240 kV Option



- Suitable for Interconnecting 2,700 MW of Wind Interest in Southern Alberta
- Economical Solution
- Existing Voltage in the System
- Relatively Easy to Construct – ROW
- At the Limit in Terms of Distances
- Losses Could Play Significant Role

500 kV Option

- Technically Robust
- Lower Losses
- Expandability for the 20 Year Scenario
- Higher Initial Capital Cost
- Larger Footprint
- Category C Contingencies Could be an Issue
- Could be an Overbuild

HVDC Classic



- Maximizes the Use of ROW
- Lower Footprint
- Possibly Lower Losses
- Higher Initial Capital Cost
- Reduced Flexibility for Expansion
- Still Requires “AC Collector System”

765 kV Option

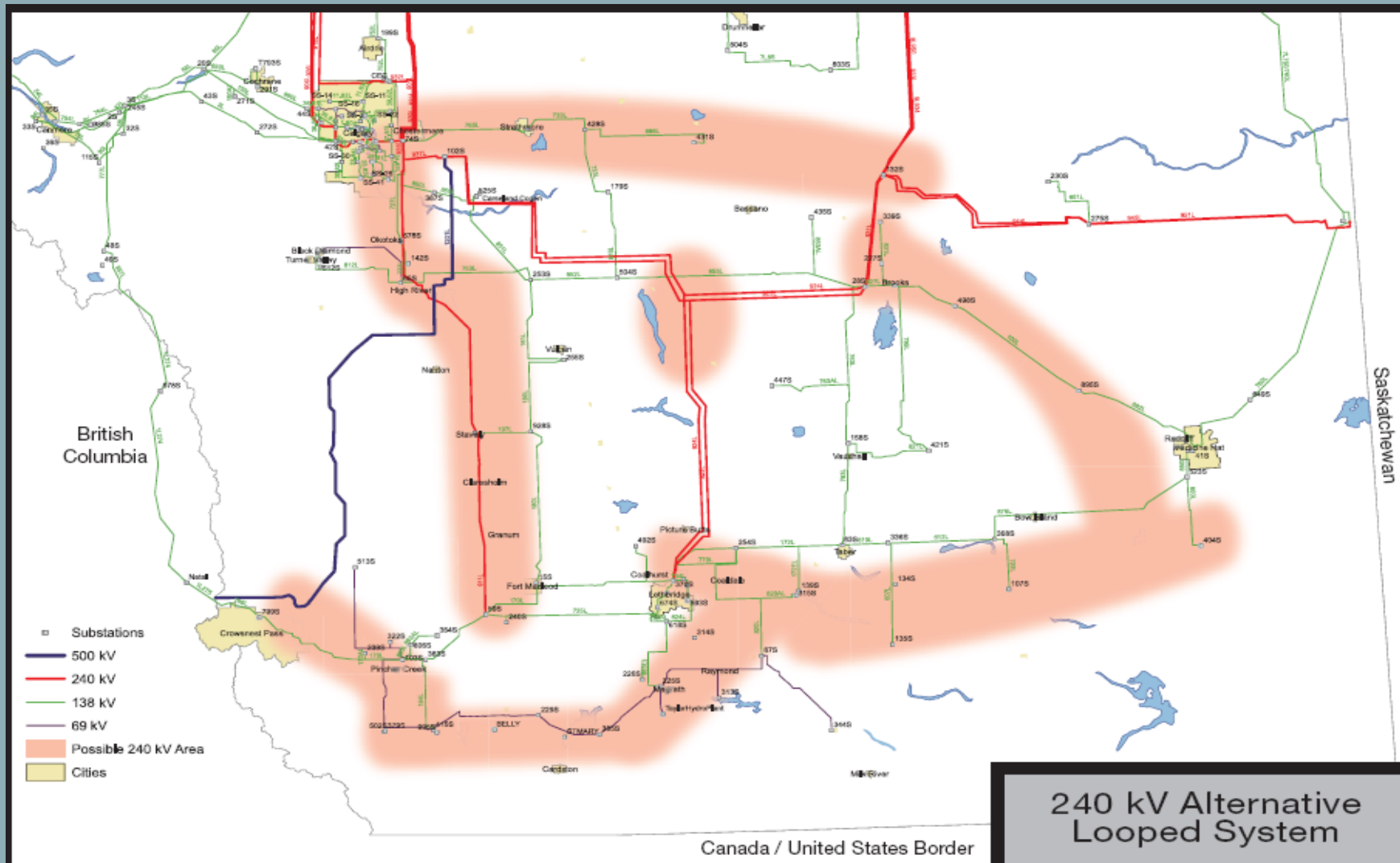
- High Capacity
- Not Suitable in Southern Alberta as Wind Interest is Spread Across
- Distances < 300 km
- New Voltage in the System
- Not Considered Further

HVDC (VSC Technology)



- Suitable for Transmitting Smaller Magnitudes of Power
- Max Size Currently in Commercial Operation < 500 MW
- High Initial Capital Cost
- Higher Losses
- Reduced Flexibility
- Not Considered Further

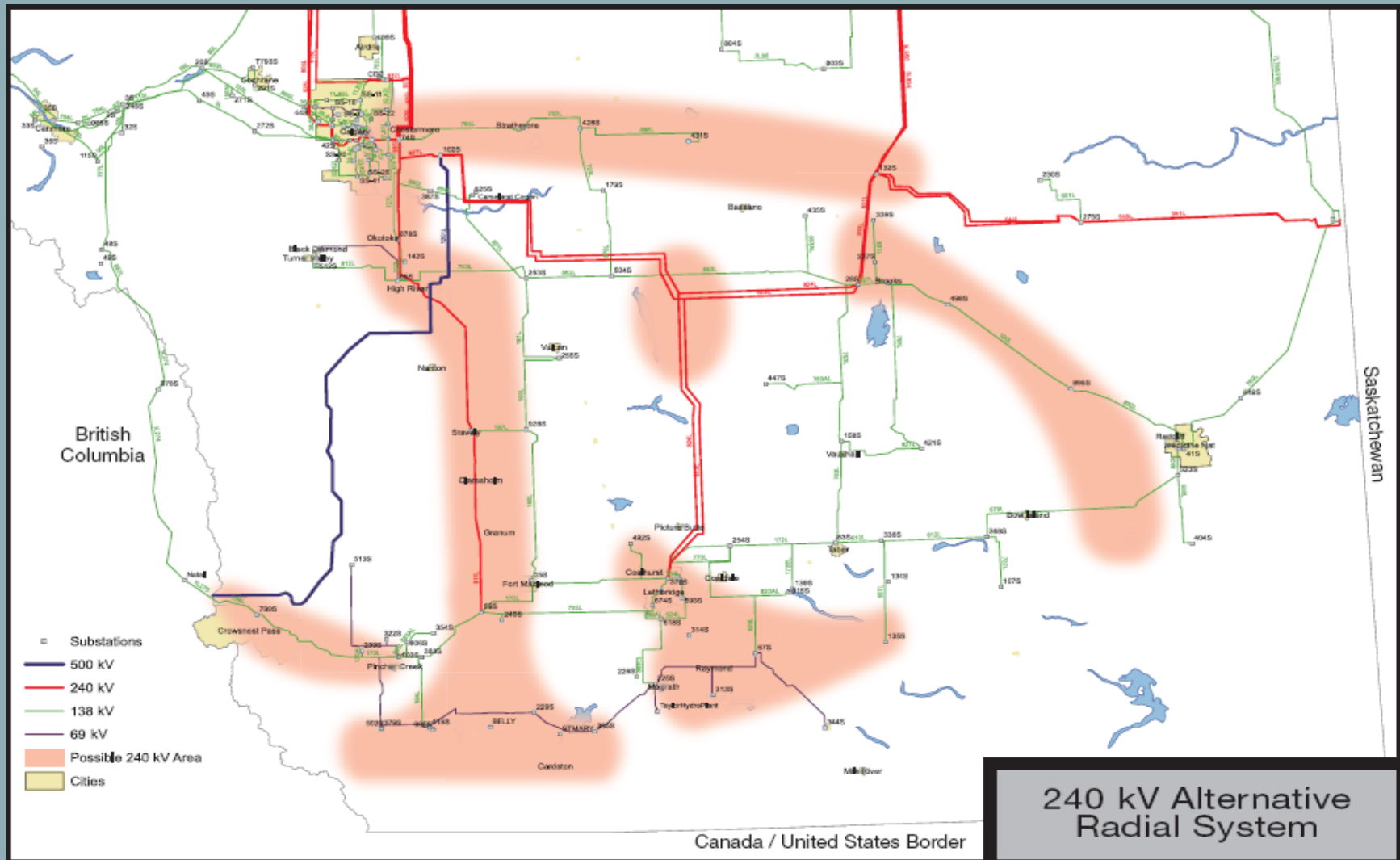
240 kV Alternative – Looped System



Canada / United States Border

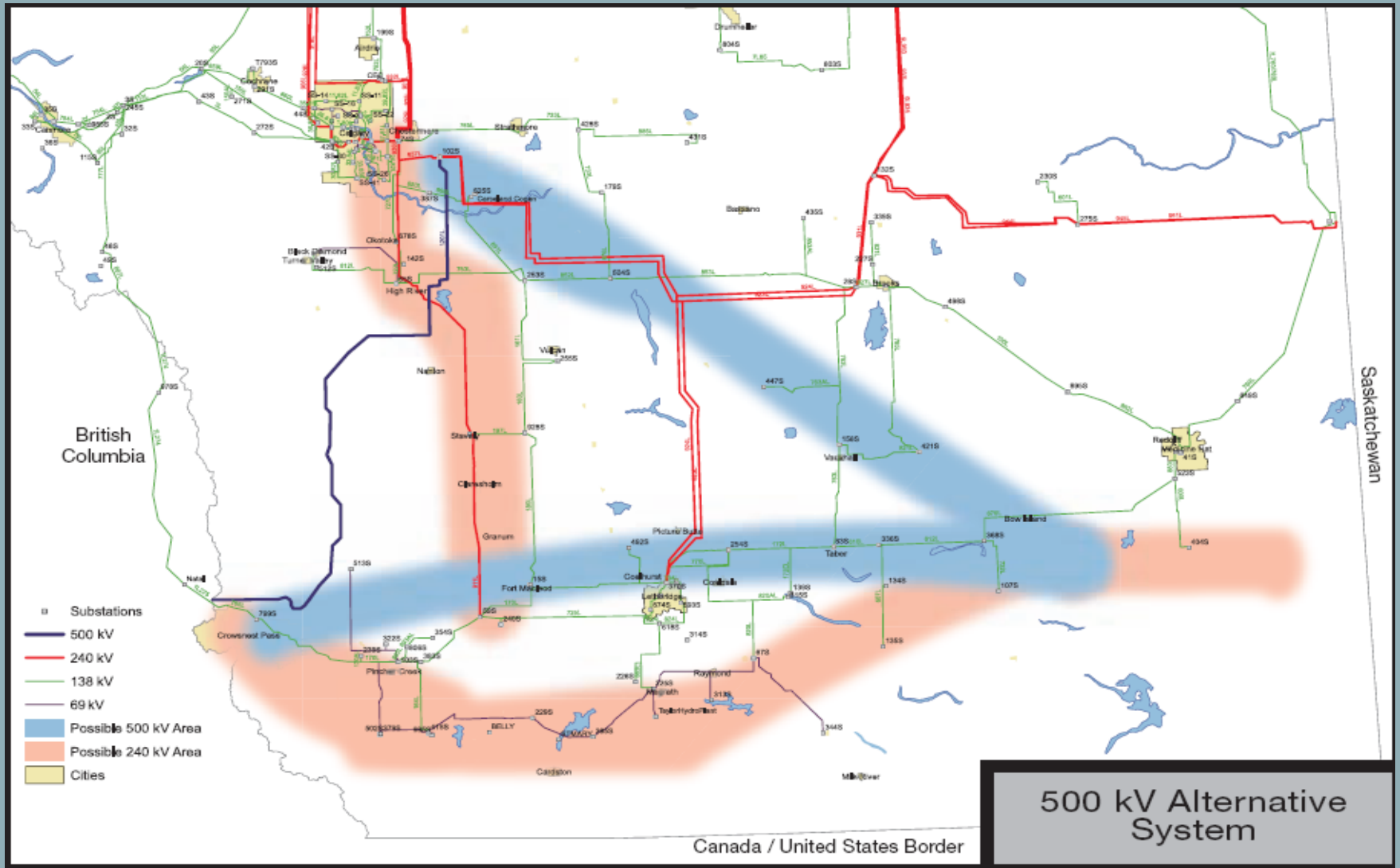
240 kV Alternative Looped System

240 kV Alternative – Radial System

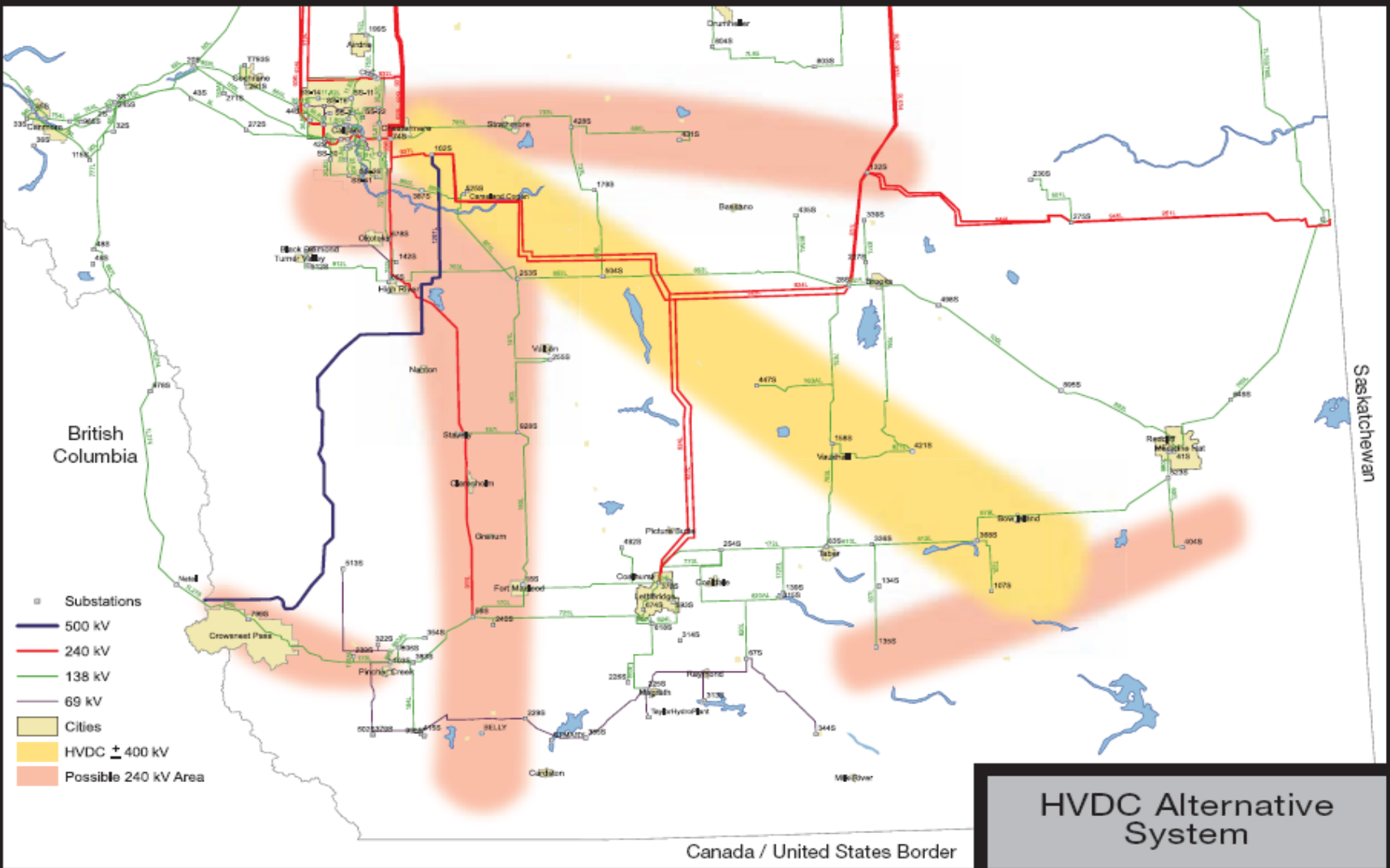


240 kV Alternative Radial System

500 kV Alternative – Looped System

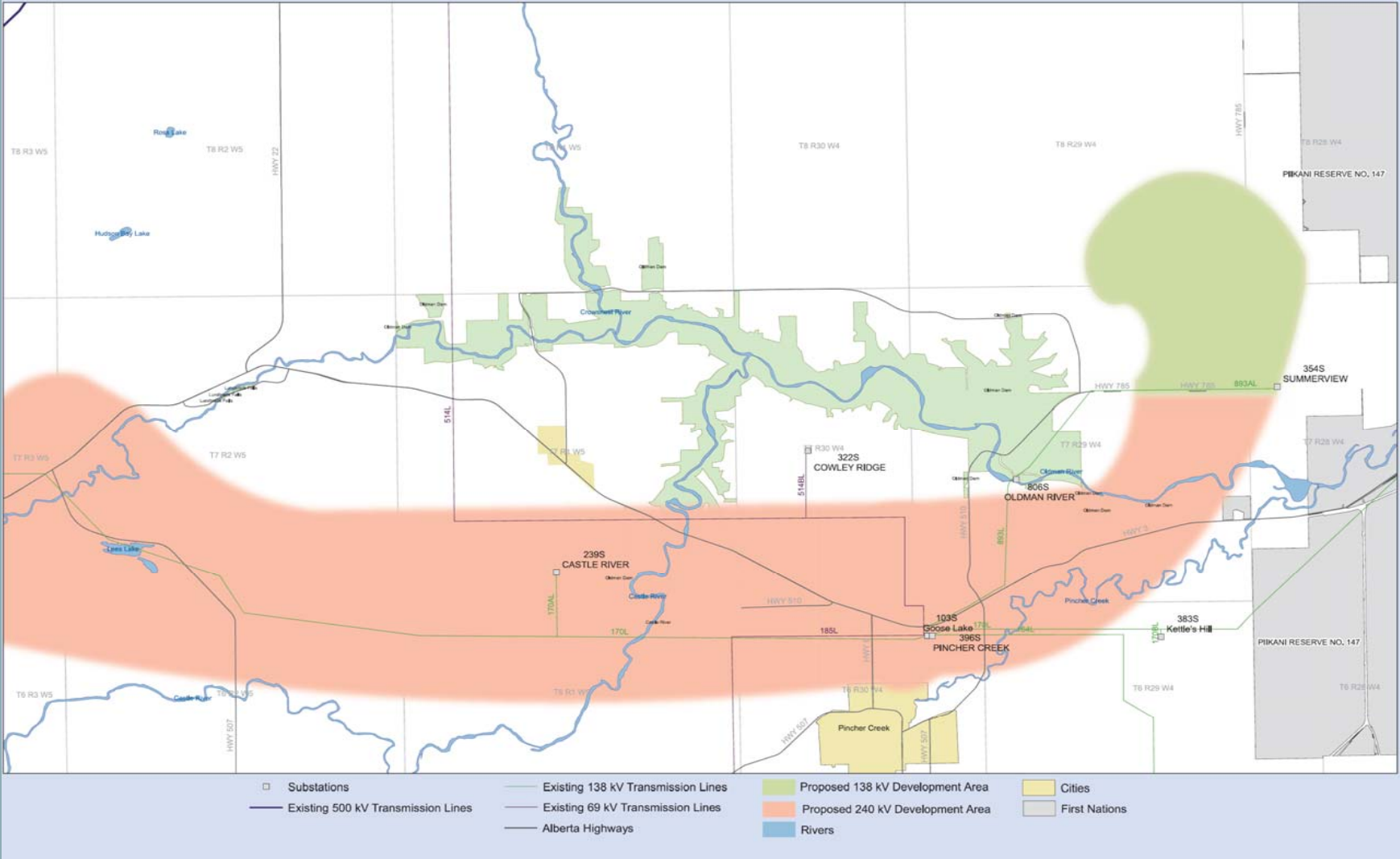


HVDC System

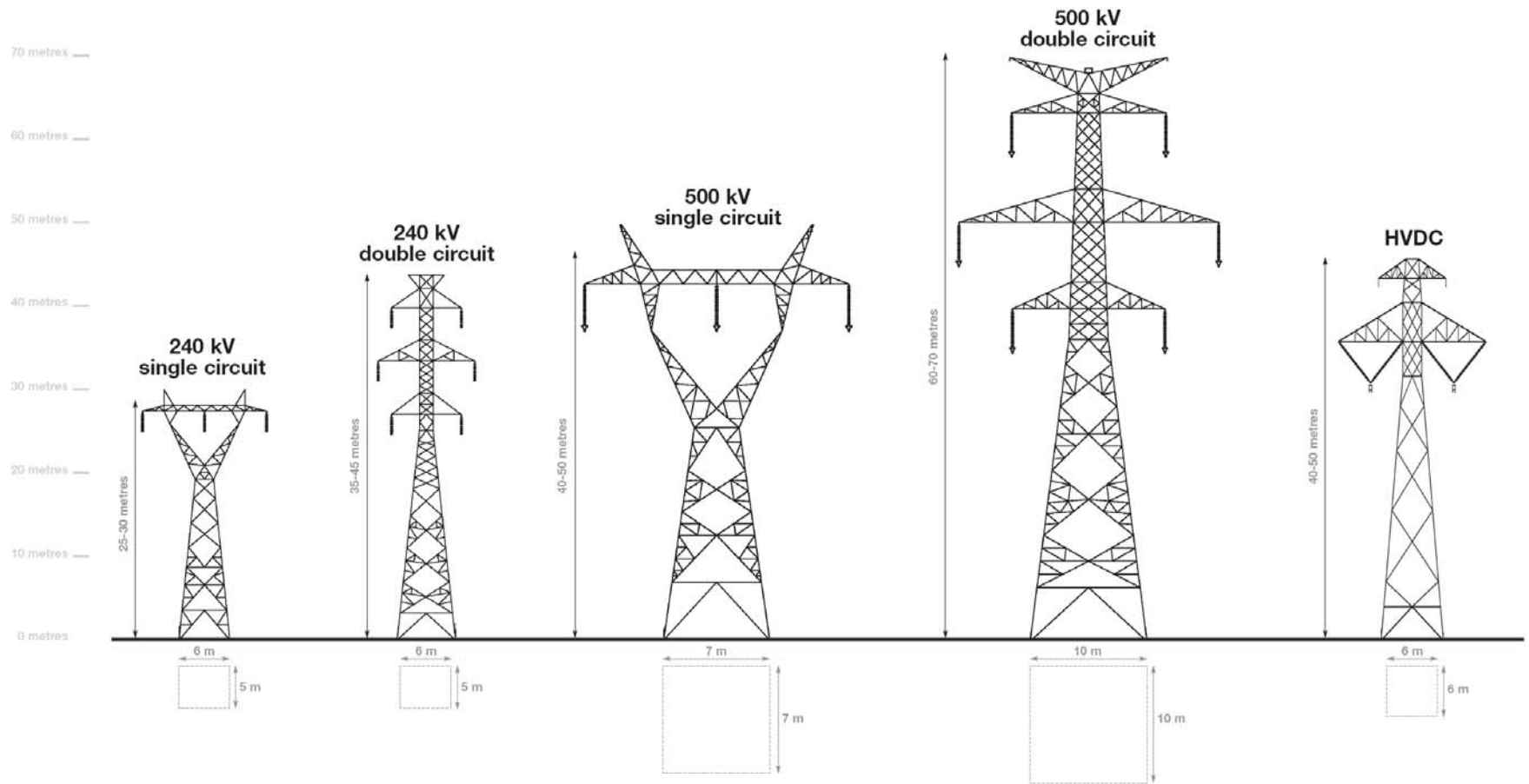


HVDC Alternative System

Possible Transmission Development in Pincher Creek Area



Types of Possible Towers



Consultation



- Participant Involvement Program

Activities:

- Open Houses
- Meetings with:
 - First Nations
 - Municipal Districts and Counties
 - Special Interest Groups
 - DOE/AUC

Need Identification Document



- Preparation of Need Application
 - Recommendation of South System Plan Based on
 - Technical
 - Economic
 - Social

Next Steps



- Request Need Level Cost Estimates from AltaLink
- Detailed Evaluation of Alternatives
- Conductor Selection Studies
- Meetings

South System Planning - Schedule



- Finalize Study Scope – Jan 25 (Completed)
- Need Assessment Report – (In Progress)
- Alternative Development and Screening Report – (In Progress)
- 2nd Round of Consultation – (open houses completed)
- Alternative Assessment and Recommendation – August
- Need Application Filing with AUC – Q3/Q4, 2008
- Targeted ISD – Starting in 2011/2012

Further Information



www.aeso.ca

Matt Gray

Adviser, Transmission

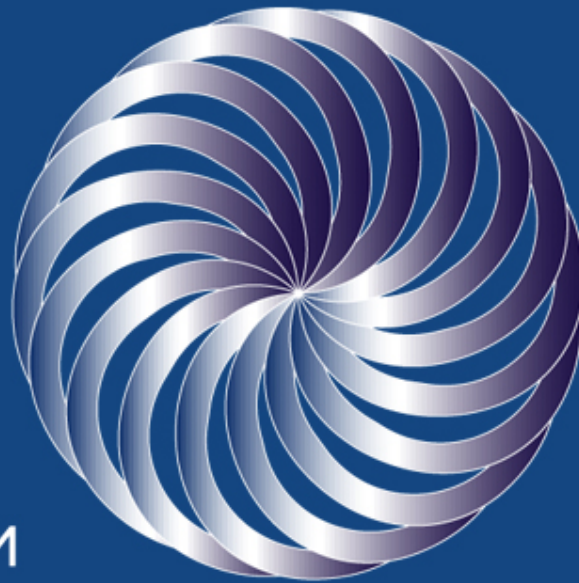
Stakeholder Relations

403 539 2656

matt.gray@aeso.ca

aeso

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SASR – Addressed Mail List

Stakeholders on the is list were sent a package of project specific information on the need for transmisison development in southern Alberta. The package was mailed in early February, 2008.

Alberta Association of Municipal Districts and Counties (AAMDC)

Alberta Direct Connect (ADC)

Alberta Environment Network

Alberta Urban Municipalities Association (AUMA)

Blood Tribe

City of Brooks

County of Newell

County of Warner

ENMAX Corporation

Fortis Alberta

Carnahan Stony Tribe

Improvement District 4 (Waterton)

Livingstone Landowner Group

MATL

Metis Nation Alberta

Medicine Hat Chamber of Commerce

Alberta Association of Municipal Districts and Counties (AAMDC)

Alberta Direct Connect (ADC)

Alberta Environment Network

Alberta Urban Municipalities Association (AUMA)

Blood Tribe

City of Brooks

County of Newell

County of Warner

ENMAX Corporation

Fortis Alberta

Carnahan Stony Tribe

Improvement District 4 (Waterton)

Livingstone Landowner Group
MATL
Metis Nation Alberta
Medicine Hat Chamber of Commerce
Medicine Hat Industrial Group (MHIG)
Municipal District of Foothills
Municipal District of Ranchland
Municipality of Crowsnest Pass
Oldman Watershed Council
The Pekisko Group
Sierra Club of Canada, Prairie Chapter
Town of Bassano
Town of Bow Island
Town of Coalhurst
Town of Granum
Town of High River
Town of Magrath
Town of Milk River
Town of Okotoks
Town of Picture Butte
Town of Raymond
Town of Stavely
Town of Vulcan
Utilities Consumer Advocate
Alberta Association of Municipal Districts and Counties (AAMDC)
Alberta Direct Connect (ADC)
Alberta Environment Network
Alberta Urban Municipalities Association (AUMA)
Blood Tribe
City of Brooks
County of Newell
County of Warner
ENMAX Corporation

Fortis Alberta
Carnahan Stony Tribe
Improvement District 4 (Waterton)
Livingstone Landowner Group
MATL
Metis Nation Alberta
Medicine Hat Chamber of Commerce
Medicine Hat Industrial Group (MHIG)
Municipal District of Foothills
Municipal District of Ranchland
Municipality of Crowsnest Pass
Oldman Watershed Council
The Pekisko Group
Sierra Club of Canada, Prairie Chapter
Town of Bassano
Town of Bow Island
Town of Coalhurst
Town of Granum
Town of High River
Town of Magrath
Town of Milk River
Town of Okotoks
Town of Picture Butte
Town of Raymond
Town of Stavely
Town of Vulcan
Utilities Consumer Advocate
Town of Vauxhall
Vauxhall Stock Grazing Association
Village of Arrowwood
Village of Barons
Village of Carmangay
Village of Champion

Village of Coutts
Village of Cowley
Village of Duchess
Village of Empress
Village of Foremost
Village of Glenwood
Village of Hillspring
Village of Lomond
Village of Milo
Village of Spring Hill
Village of Stirling
Village of Tilley
Village of Warner
Vulcan County
Wheatland County



07 April 2008

Dear Stakeholder:

Re: Open Houses in support of potential transmission development in southern Alberta, April 28 to May 15, 2008

The Alberta Electric System Operator (AESO) is responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System (AIES). We are currently planning to integrate proposed wind developments into the transmission system in southern Alberta. Our plan will include system reinforcements to enable new wind generated power in southern Alberta to be used locally and in other parts of the electricity system. Please find more information about our efforts enclosed.

Also, the AESO will be holding Open Houses in southern Alberta in the following communities:

Monday	April 28	Foremost	Foremost Community Hall
Tuesday	April 29	Bow Island	Bow Island Legion Hall
Wednesday	April 30	Medicine Hat	Moose Lodge
Thursday	May 1	Brooks	Heritage Inn
Monday	May 5	Taber	Royal Canadian Legion – Taber Branch
Tuesday	May 6	Lethbridge	FOE (Fraternal Order of Eagles) Lower Hall
Wednesday	May 7	Cardston	Tanner Centre
Thursday	May 8	Pincher Creek	Heritage Inn
Monday	May 12	Fort Macleod	District Community Hall
Tuesday	May 13	Claresholm	Claresholm Community Centre
Wednesday	May 14	Nanton	Memorial Center (Upper Hall)
Thursday	May 15	Strathmore	Strathmore Civic Centre

Open houses will be held from **4 pm to 8 pm** on each day.

Should you wish to discuss our planning efforts in southern Alberta further, please direct comments and questions to:

Matt Gray
AESO – Alberta Electric System Operator
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We are committed to a consultation process founded upon principles of fairness and transparency.

Sincerely,

Ata Rehman, P. Eng.
Manager, South System Planning



Southern Alberta Transmission Reinforcement

For more information please contact the AESO at 1.888.866.2959, www.aeso.ca or stakeholder.relations@aeso.ca

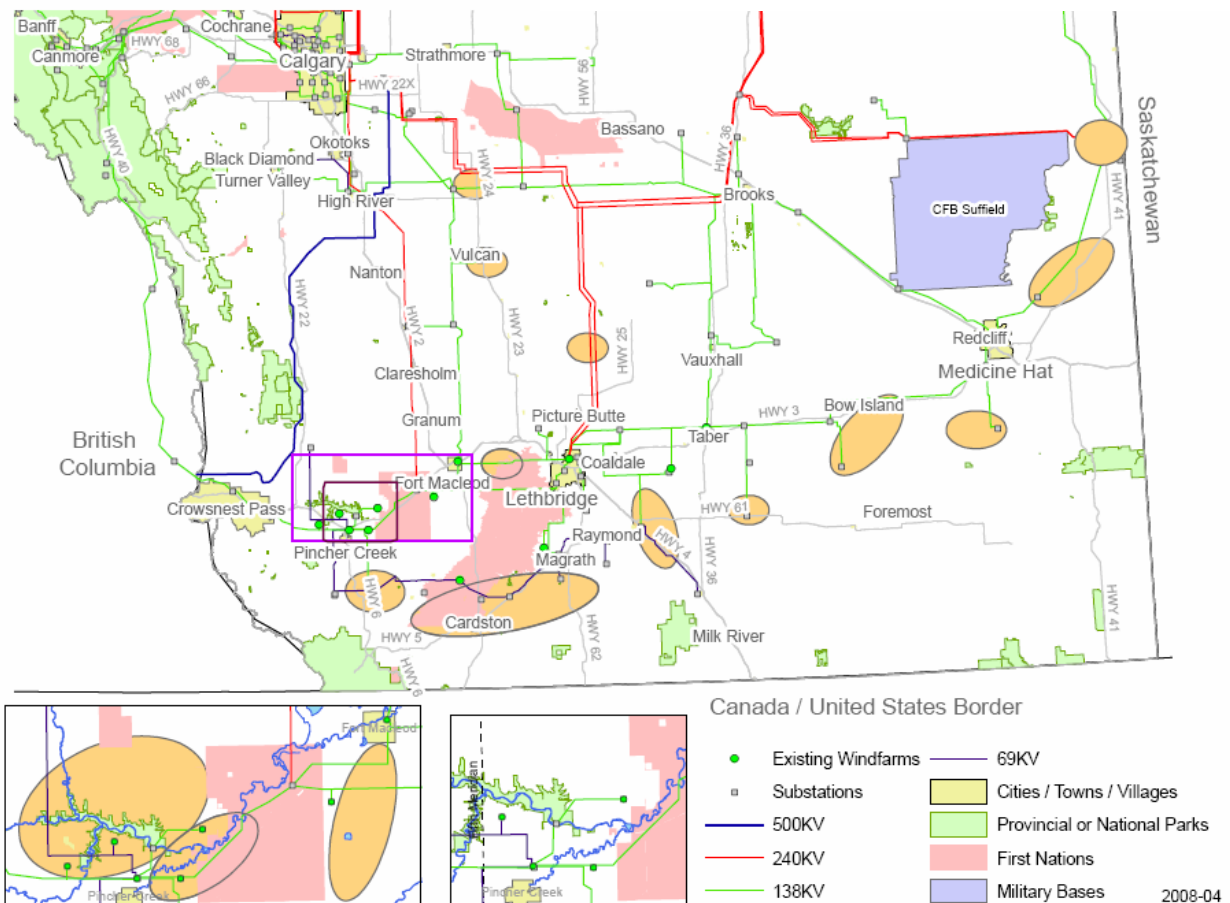
Who is the AESO?

The Alberta Interconnected Electric System (AIES), our province's transmission system or "grid," is planned and operated by the Alberta Electric System Operator (AESO). This network of higher-voltage transmission lines, towers and equipment carries ('transmits') electricity from generators to large industrial customers as well as lower-voltage systems that distribute it to cities, towns and rural areas. Our job is to maintain safe, reliable and economic operations on the provincial transmission grid.

Why Transmission system reinforcement is needed for Southern Alberta?

Interest in wind development in southern Alberta is increasing. We are now planning the transmission system to interconnect new wind farms; however, since the existing transmission system in the south is at capacity (i.e., the system cannot carry additional electricity), system reinforcement is needed to move new wind generated power to areas that need it.

Southern Alberta Wind Interest Map



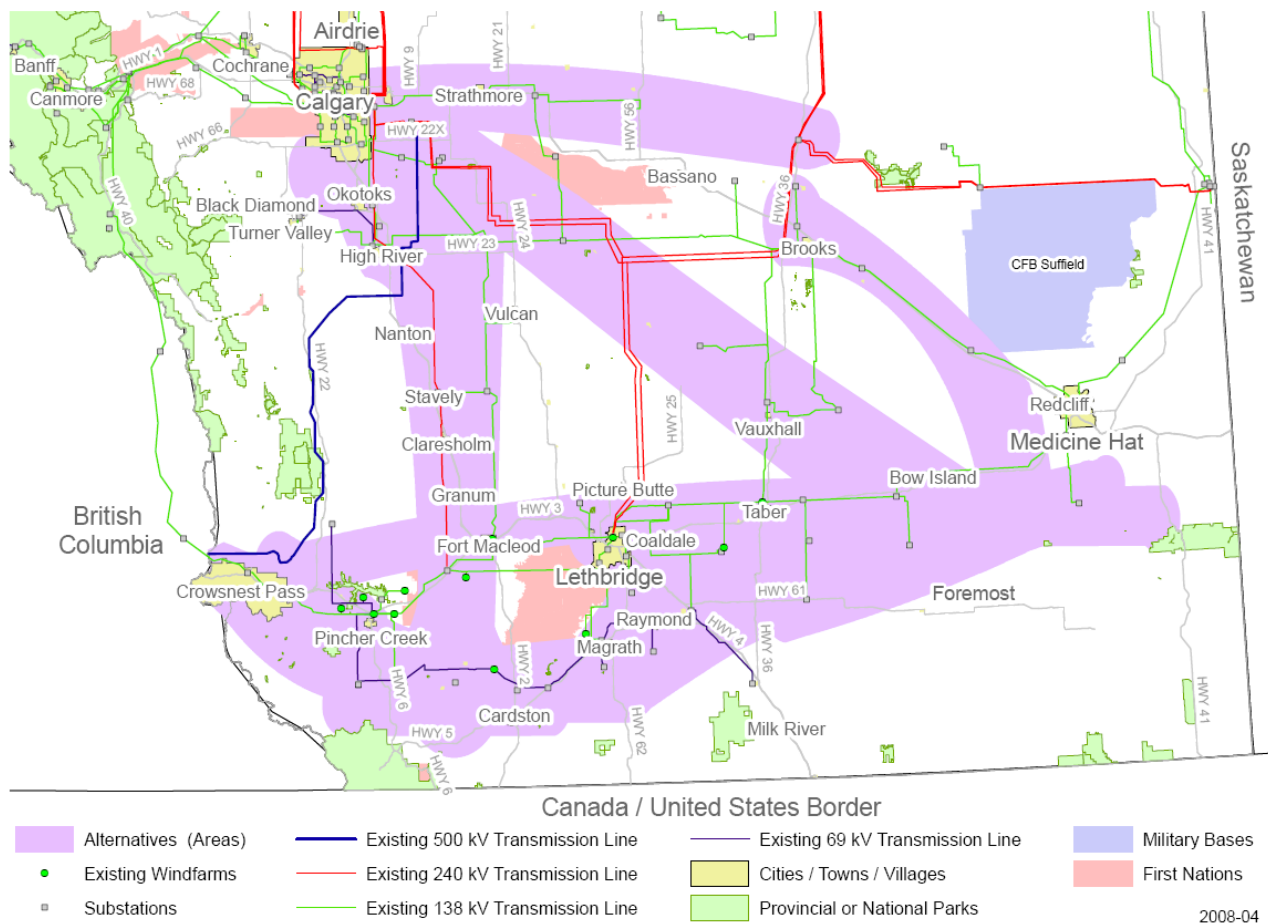
The map above shows areas, in orange, where wind power developments have been proposed; these areas are otherwise known as planning zones.

What's happening right now?

The AESO has received applications for wind power development of over 10,000 mega-watts (MW) in Alberta, with more than 7,000 MW distributed across southern Alberta. The AESO, however, anticipates the

total wind generation that will likely develop as ranging between 2000 MW to 3900 MW over the next 10 years. (This range includes 523 MW of wind generation currently installed.)

The existing transmission system in southern Alberta has very little capacity to connect new wind generation. Therefore, the AESO has developed transmission development alternatives to integrate the anticipated wind generation development in southern Alberta. These alternatives consist of 240 kV AC (2 alternatives), 500 kV AC and HVDC transmission systems. These transmission system alternatives were developed to not only interconnect new generation but also to provide additional, reliable bulk system capacity from the generation sites to the areas where power is needed. Consultation with stakeholders will help the AESO determine what alternatives are best suited for southern Alberta.



The map above shows the area where the AESO has identified alternatives for transmission system reinforcement. The shaded area represents the approximate locations of four transmission development alternatives.

Where will the new lines be proposed?

So far, our planning study has produced four main alternatives to address the challenges facing the transmission system in southern Alberta. After gathering stakeholder insights on our alternatives, our study will identify areas where transmission lines and other related facilities could be added to improve the system. (over)



Consultation with stakeholders will identify a preferred solution for strengthening the system; the preferred solution will form part of our Need Information Document (NID) which we will submit to the Alberta Utilities Commission (AUC) later this year. We will also submit individual Abbreviated Needs Information Documents (ANIDs) to the AUC to connect wind projects that successfully meet AESO interconnection milestones.

Should the AUC approve our Need applications, we will assign the larger system reinforcement and each new interconnection to Transmission Facility Owner AltaLink, to build the additional transmission facilities required. Before AltaLink can begin constructing these facilities, it must develop a Facilities application and submit this document to the AUC for approval. Further consultation with stakeholders will form a crucial component of this application process.

The AESO is committed to protecting your personal privacy in accordance with Alberta's Personal Information Protection Act. Any personal information collected by the AESO with regard to this project may be used to provide you with further information about the project, may be disclosed to the Alberta Utilities Commission (and as a result, may become public), and may also be disclosed to the eligible Transmission Facility Owner(s). If you have any questions about how the AESO will use and disclose your personal information collected with regard to this project, please contact us at 1-888-866-2959 or at stakeholder.relations@aeso.ca.