Thoroughbred Energy Campus

Comparison of Base Case to Worst of Case Studies
Thoroughbred Interconnection I - Thoroughbred/750 MW and Thoroughbred/1500 MW
Loss of Green River Unit # 4 (104 MW)

Branches Exceeding 100% of Emergency Rating										BC05s21					C121s05r1					C221s05r1				
								Ratings		Loss of Green River - 2005 Summer					Thbred/750 MW & Loss of Green Rvr					Thbred/1500 MW & Loss of Green Rvr				
	From	Name	To	Name	Ckt	Base kV	Area	Zone	Norm	Emer	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	First Contingency A / B	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	First Contingency A / B	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	First Contingency A / B
Group 1	New Overloads										Not Overloaded					Overload 2					Worst of		Overload 3		
1	26857	10NEWTVL	27552	14COLE 5	1	161	210-214	210-214	265	265	---	34	---	---	0 / 0	1685	82	153	153	4 / 1	1685	86	157	157	5 / 0
	26855	10NEWTVL	26857	10NEWTVL	1	138-161	210	210	168	176	---	56	95	90	0 / 0	1685	91	155	148	6 / 1	1685	91	155	148	7 / 1
	27028	11GR RV	27553	14WILSO5	1	161	211-214	211-214	530	558	---	62	---	---	0 / 0	1732	115	150	142	***	1732	114	149	141	***
	27028	11GR RV	27095	11GR RVR	2	161-138	211	211	100	120	---	63	---	---	0 / 0	1303	109	158	131	***	1303	116	166	139	***
	27028	11GR RV	27095	11GR RVR	3	161-138	211	211	100	120	---	63	---	---	0 / 0	1302	109	158	131	***	1302	116	166	139	***
	27028	11GR RV	27095	11GR RVR	1	161-138	211	211	100	120	---	63	---	---	0 / 0	1302	109	157	131	***	1302	115	166	138	***
	27561	14WILSO7	27563	14COLE 7	1	345	214	214	956	956	---	20	---	---	0 / 0	1685	76	132	132	1 / 0	===	===	===	===	===
	27552	14COLE 5	27564	14NATAL5	1	161	214	214	265	265	---	34	---	---	0 / 0	1685	73	129	129	1 / 1	1685	71	126	126	1 / 1
	27558	14SKILM5	27564	14NATAL5	1	161	214	214	265	265	---	30	---	---	0 / 0	1685	69	124	124	1 / 0	1685	67	122	122	1 / 0
	27551	14REID 5	27559	14DAVIS5	1	161	214	214	265	265	1752	50	90	90	0 / 0	1732	58	120	120	1 / 0	1732	59	122	122	1 / 0
	27551	14REID 5	27619	14HOPCO5	1	161	214	214	265	265	---	19	---	---	0 / 0	1685	60	116	116	1 / 0	1685	56	112	112	1 / 0
	27558	14SKILM5	27616	14N.HAR5	1	161	214	214	265	265	---	24	---	---	0 / 0	1685	61	115	115	1 / 0	1685	59	112	112	1 / 0
	18450	5WILSNTN	18914	5GLADV T	1	161	147	166	151	151	---	21	---	---	0 / 0	4370	21	103	103	0 / 1	4370	29	110	110	1 / 0
	18711	5GALLATI	18890	5LASCASS	1	161	147	166	206	206	115	80	93	93	0 / 0	4260	82	110	110	1 / 0	4260	84	109	109	1 / 0
	18743	5SMYRNA	19527	5BLCKMNT	1	161	147	166	235	235	---	54	---	---	0 / 0	===	===	===	===	===	4367	65	109	109	1 / 0
	18711	5GALLATI	19154	5HARTSVI	1	161	147	166	206	206	342	77	90	90	0 / 0	4260	71	101	101	0 / 1	4357	79	108	108	2 / 0
	18708	5LEBANON	18914	5GLADV T	1	161	147	166	151	151	---	19	---	---	0 / 0	===	===	===	===	===	4370	26	104	104	0 / 1
	18744	5MURFREE	19527	5BLCKMNT	1	161	147	166	235	235	---	51	---	---	0 / 0	===	===	===	===	===	4367	61	104	104	0 / 1
	18684	5INTERCH	19083	5HURRICA	1	161	147	166	320	320	---	57	---	---	0 / 0	===	===	===	===	===	4452	62	104	104	0 / 1
	18427	8PARADIS	18428	8MONTGO	1	500	147	166	1732	1732	---	59	---	---	0 / 0	===	===	===	===	===	65	102	103	103	***
	18026	5BARKLEY	27619	14HOPCO5	1	161	147-214	166-214	265	265	---	6	---	---	0 / 0	1685	46	102	102	0 / 1	===	===	===	===	===
	18705	5CENTER	18756	5SMTH TN	1	161	147	166	151	151	75	82	87	87	0 / 0	===	===	===	===	===	4367	90	101	101	0 / 1
	27094	11GR STL	27095	11GR RVR	1	138	211	211	143	179	---	28	---	---	0 / 0	===	===	===	===	===	1732	77	126	100	0 / 1
	99798	5BATEVL	99808	5CUSHMN	1	161	151	159	148	148	30	95	97	97	0 / 0	===	===	===	===	===	30	98	100	100	0 / 1
Group 2	Pre-existing Overload in Case1 with Increased Overloading in Case2										Overload 1				< Less Than <	Overload 2				Worst of			Overload 3	
2	26886	10NEWTVL	26855	10NEWTVL	2	69-138	210	210	60	63	1162	124	214	203	***	1162	133	226	215	***	1162	135	229	218	***
	26886	10NEWTVL	26855	10NEWTVL	1	69-138	210	210	67	70	1165	111	191	183	***	1165	119	203	194	***	1165	121	205	197	***
	18691	5BOWL GR	18880	5RUSS.SS	1	161	147	166	180	180	160	53	100	100	0 / 1	160	55	103	103	0 / 1	160	58	108	108	1 / 0
	18724	5PIN HOO	18738	5CANE RI	1	161	147	166	271	271	80	62	101	101	0 / 1	===	===	===	===	===	80	67	107	107	1 / 0

1. --- =Less than the Minimum Reporting Level of 85%
2. *** = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. === = Facility did not overload
4. Count of Contingencies Causing Overloads (A/B Stats)
   A = Serious Overload > 105%
   B = Overloaded Faclity between 100% and 105% of Rated Capability

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Thoroughbred Energy Campus

Comparison of Base Case to Worst of Case Studies
Thoroughbred Interconnection II - Thoroughbred Connected to Wilson, Green River and Paradise @ 161 kV
All Base Case Generators in Service

Branches Exceeding 100% of Emergency Rating										BC05s01 Base Case 01 - 2005 Summer					C141s05 Thoroughbred/1-750 MW @ 161 kV					C241s05 Thbred/1-750MW@161kV & 1-750MW@500kV				
								Ratings		Cont	Normal	First Contingency			Cont	Normal	First Contingency			Cont	Normal	First Contingency		
	From	Name	To	Name	Ckt	Base kV	Area	Zone	Norm	Emer	ID	System%	Norm %	Emer %	A / B	ID	System%	Norm %	Emer %	A / B	ID	System%	Norm %	Emer %	A / B
Group 1	New Overloads										Not Overloaded					Overload 2					Overload 3				
1	27094	11GR STL	27095	11GR RVR	1	138	211	211	143	179	3600	41	114	91	0 / 0	3600	73	154	123	1 / 0	3600	81	160	128	1 / 0
	18012	5PARADIS	18880	5RUSS.SS	1	161	147	166	350	350	160	70	90	90	0 / 0	160	91	114	114	3 / 2	160	88	110	110	1 / 2
	18743	5SMYRNA	19527	5BLCKMNT	1	161	147	166	235	235	4367	54	97	97	0 / 0	4367	57	101	101	0 / 1	4367	66	111	111	1 / 0
	27094	11GR STL	27215	11GR STL	1	138-69	211	211	93	107	---	35	---	---	0 / 0	3510	35	121	105	0 / 1	3510	35	126	109	1 / 0
	27551	14REID 5	27559	14DAVIS5	1	161	214	214	265	265	3110	50	97	97	0 / 0	3110	52	105	105	0 / 1	3110	53	109	109	1 / 0
	18744	5MURFREE	19527	5BLCKMNT	1	161	147	166	235	235	4367	51	92	92	0 / 0	4367	54	97	97	0 / 0	4367	62	106	106	1 / 0
	18708	5LEBANON	18914	5GLADV T	1	161	147	166	151	151	4370	19	96	96	0 / 0	4370	34	99	99	0 / 0	4370	25	106	106	1 / 0
	18012	5PARADIS	18926	5ABERD T	1	161	147	166	350	350	160	62	86	86	0 / 0	160	78	105	105	1 / 0	160	78	105	105	1 / 0
	18684	5INTERCH	19083	5HURRICA	1	161	147	166	320	320	4452	57	97	97	0 / 0	4452	58	98	98	0 / 0	4452	62	105	105	0 / 1
	18427	8PARADIS	18428	8MONTGO	1	500	147	166	1732	1732	---	59	---	---	0 / 0	---	59	---	---	0 / 0	65	102	103	103	***
	18705	5CENTER	18756	5SMTH TN	1	161	147	166	151	151	4367	82	92	92	0 / 0	4367	87	97	97	0 / 0	4367	92	103	103	0 / 2
	18692	5E BOWL	18926	5ABERD T	1	161	147	166	350	350	---	62	---	---	0 / 0	160	77	102	102	0 / 1	160	77	102	102	0 / 1
	99798	5BATEVL	99808	5CUSHMN	1	161	151	159	148	148	30	95	98	98	0 / 0	30	97	99	99	0 / 0	27	99	101	101	0 / 11
Group 2	Pre-existing Overload in Case1 with Increased Overloading in Case2										Overload 1				< Less Than <	Overload 2					Overload 3				
2	18691	5BOWL GR	18880	5RUSS.SS	1	161	147	166	180	180	160	53	101	101	0 / 1	160	59	115	115	1 / 0	160	62	118	118	1 / 0
	18450	5WILSNTN	18914	5GLADV T	1	161	147	166	151	151	4370	21	102	102	0 / 1	4370	21	105	105	1 / 0	4370	29	112	112	1 / 0
	26886	10NEWTVL	26855	10NEWTVL	2	69-138	210	210	60	63	1162	125	215	205	***	1162	130	222	211	***	1162	128	218	208	***
	26886	10NEWTVL	26855	10NEWTVL	1	69-138	210	210	67	70	1165	112	193	184	***	1165	116	199	190	***	1165	114	195	187	***
	18711	5GALLATI	18890	5LASCASS	1	161	147	166	206	206	4260	81	108	108	1 / 0	4260	84	113	113	1 / 0	4260	86	112	112	1 / 0
	18724	5PIN HOO	18738	5CANE RI	1	161	147	166	271	271	80	62	101	101	0 / 1	80	61	99	99	0 / 0	80	66	106	106	1 / 0

1. --- =Less than the Minimum Reporting Level of 85%
2. *** = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. === = Facility did not overload
4. Count of Contingencies Causing Overloads (A/B Stats)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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Thoroughbred Energy Campus

Comparison of Base Case to Worst of Case Studies
Thoroughbred Interconnection II - Thoroughbred Connected to Wilson, Green River and Paradise @ 161 kV
Loss of Brown N Unit # 3 (441 MW)

	Branches Exceeding 100% of Emergency Rating								Ratings		BC05s11 Base Case 01 - 2005 Summer					C151s05 Thoroughbred/1-750 MW @ 161 kV					C251s05 Thbred/1-750MW@161kV & 1-750MW@500kV				
	From	Name	To	Name	Ckt	Base kV	Area	Zone	Norm	Emer	Cont ID	Normal System%	First Contingency Norm %	Emer %	A / B	Cont ID	Normal System%	First Contingency Norm %	Emer %	A / B	Cont ID	Normal System%	First Contingency Norm %	Emer %	A / B
Group 1	New Overloads										Not Overloaded					Overload 2					Overload 3				
1	18012	5PARADIS	18880	5RUSS.SS	1	161	147	166	350	350	160	70	90	90	0 / 0	160	90	112	112	1 / 2	160	87	109	109	1 / 2
	18743	5SMYRNA	19527	5BLCKMNT	1	161	147	166	235	235	4367	55	97	97	0 / 0	4367	60	103	103	0 / 1	4367	66	111	111	1 / 0
	18744	5MURFREE	19527	5BLCKMNT	1	161	147	166	235	235	4367	51	92	92	0 / 0	4367	56	99	99	0 / 0	4367	63	106	106	1 / 0
	18012	5PARADIS	18926	5ABERD T	1	161	147	166	350	350	160	63	87	87	0 / 0	160	78	105	105	1 / 0	160	79	106	106	1 / 0
	18708	5LEBANON	18914	5GLADV T	1	161	147	166	151	151	4370	19	96	96	0 / 0	4370	20	99	99	0 / 0	4370	26	106	106	1 / 0
	18684	5INTERCH	19083	5HURRICA	1	161	147	166	320	320	4452	57	97	97	0 / 0	4452	60	101	101	0 / 1	4452	62	105	105	1 / 0
	18427	8PARADIS	18428	8MONTGO	1	500	147	166	1732	1732	---	59	---	---	0 / 0	---	59	---	---	0 / 0	65	102	103	103	***
	18692	5E BOWL	18926	5ABERD T	1	161	147	166	350	350	160	63	85	85	0 / 0	160	77	102	102	0 / 1	160	78	103	103	0 / 1
	26855	10NEWTVL	26857	10NEWTVL	1	138-161	210	210	168	176	1070	58	99	94	0 / 0	1070	66	107	102	0 / 1	1070	67	108	103	0 / 1
	27028	11GR RV	27095	11GR RVR	2	161-138	211	211	100	120	---	53	---	---	0 / 0	1303	82	97	97	0 / 0	1303	87	124	103	0 / 2
	27028	11GR RV	27095	11GR RVR	3	161-138	211	211	100	120	---	53	---	---	0 / 0	1302	82	97	97	0 / 0	1302	87	124	103	0 / 2
	18705	5CENTER	18756	5SMTH TN	1	161	147	166	151	151	4367	82	92	92	0 / 0	4367	86	97	97	0 / 0	4367	92	103	103	0 / 2
	27028	11GR RV	27095	11GR RVR	1	161-138	211	211	100	120	---	53	---	---	0 / 0	1302	82	97	97	0 / 0	1302	87	123	103	0 / 2
	99798	5BATEVL	99808	5CUSHMN	1	161	151	159	148	148	30	94	97	97	0 / 0	30	95	98	98	0 / 0	30	98	100	100	0 / 2
Group 2	Pre-existing Overload in Case1 with Increased Overloading in Case2										Overload 1				< Less Than <	Overload 2					Overload 3				
2	18691	5BOWL GR	18880	5RUSS.SS	1	161	147	166	180	180	160	55	103	103	0 / 1	160	60	116	116	1 / 0	160	64	119	119	1 / 0
	18450	5WILSNTN	18914	5GLADV T	1	161	147	166	151	151	4370	22	102	102	0 / 1	4370	22	105	105	1 / 0	4370	29	112	112	1 / 0
	26886	10NEWTVL	26855	10NEWTVL	2	69-138	210	210	60	63	1162	124	213	203	***	1162	128	220	209	***	1162	128	219	208	***
	26886	10NEWTVL	26855	10NEWTVL	1	69-138	210	210	67	70	1165	111	191	183	***	1165	115	197	188	***	1165	115	196	188	***
	18724	5PIN HOO	18738	5CANE RI	1	161	147	166	271	271	80	61	101	101	0 / 1	80	69	105	105	1 / 0	80	66	106	106	1 / 0
	18711	5GALLATI	18890	5LASCASS	1	161	147	166	206	206	4260	80	106	106	1 / 0	4260	83	111	111	1 / 0	4260	85	111	111	1 / 0

1. --- =Less than the Minimum Reporting Level of 85%
2. *** = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. === = Facility did not overload
4. Count of Contingencies Causing Overloads (A/B Stats)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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Thoroughbred Energy Campus

Comparison of Base Case to Worst of Case Studies
Thoroughbred Interconnection II - Thoroughbred Connected to Wilson, Green River and Paradise @ 161 kV
Loss of Green River Unit # 4 (104 MW)

Branches Exceeding 100% of Emergency Rating										BC05s21					C161s05					C261s05				
								Ratings		Base Case 01 - 2005 Summer					Thoroughbred/1-750 MW @ 161 kV					Thbred/1-750MW@161kV & 1-750MW@500kV				
	From	Name	To	Name	Ckt	Base kV	Area	Zone	Norm	Emer	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	A / B	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	A / B	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	A / B
Group 1	New Overloads										Not Overloaded					Overload 2					Overload 3				
1	27028	11GR RV	27095	11GR RVR	2	161-138	211	211	100	120	---	63	---	---	0 / 0	1303	97	140	117	2 / 1	1303	105	150	125	***
	27028	11GR RV	27095	11GR RVR	3	161-138	211	211	100	120	---	63	---	---	0 / 0	1302	97	140	117	2 / 1	1302	105	150	125	***
	27028	11GR RV	27095	11GR RVR	1	161-138	211	211	100	120	---	63	---	---	0 / 0	1302	97	139	116	2 / 0	1302	105	149	124	***
	18012	5PARADIS	18880	5RUSS.SS	1	161	147	166	350	350	160	70	90	90	0 / 0	160	89	111	111	1 / 2	160	86	107	107	1 / 0
	18743	5SMYRNA	19527	5BLCKMNT	1	161	147	166	235	235	4367	54	96	96	0 / 0	4367	59	103	103	0 / 1	4367	66	110	110	1 / 0
	18744	5MURFREE	19527	5BLCKMNT	1	161	147	166	235	235	4367	51	92	92	0 / 0	4367	56	98	98	0 / 0	4367	62	106	106	1 / 0
	18708	5LEBANON	18914	5GLADV T	1	161	147	166	151	151	4370	19	96	96	0 / 0	4370	19	99	99	0 / 0	4370	26	106	106	1 / 0
	18684	5INTERCH	19083	5HURRICA	1	161	147	166	320	320	4452	57	97	97	0 / 0	4452	59	100	100	0 / 1	4452	62	105	105	0 / 1
	18012	5PARADIS	18926	5ABERD T	1	161	147	166	350	350	160	62	86	86	0 / 0	160	76	102	102	0 / 1	160	77	103	103	0 / 1
	18427	8PARADIS	18428	8MONTGO	1	500	147	166	1732	1732	---	59	---	---	0 / 0	---	59	---	---	0 / 0	65	102	103	103	***
	18705	5CENTER	18756	5SMTH TN	1	161	147	166	151	151	4367	82	92	92	0 / 0	4367	86	96	96	0 / 0	4367	92	103	103	0 / 2
	99798	5BATEVL	99808	5CUSHMN	1	161	151	159	148	148	30	95	97	97	0 / 0	30	96	98	98	0 / 0	30	99	101	101	0 / 3
	18692	5E BOWL	18926	5ABERD T	1	161	147	166	350	350	---	61	---	---	0 / 0	160	75	100	100	0 / 0	160	76	100	100	0 / 1
Group 2	Pre-existing Overload in Case1 with Increased Overloading in Case2										Overload 1				< Less Than <										
2	18691	5BOWL GR	18880	5RUSS.SS	1	161	147	166	180	180	160	53	100	100	0 / 1	160	58	113	113	1 / 0	160	62	116	116	1 / 0
	18450	5WILSNTN	18914	5GLADV T	1	161	147	166	151	151	4370	21	102	102	0 / 1	4370	22	105	105	1 / 0	4370	29	112	112	1 / 0
	18724	5PIN HOO	18738	5CANE RI	1	161	147	166	271	271	80	62	101	101	0 / 1	80	69	106	106	1 / 0	80	66	106	106	1 / 0
	18711	5GALLATI	18890	5LASCASS	1	161	147	166	206	206	4260	80	107	107	1 / 0	4260	83	112	112	1 / 0	4260	85	111	111	1 / 0
	26886	10NEWTVL	26855	10NEWTVL	2	69-138	210	210	60	63	1162	124	214	203	***	1162	127	218	208	***	1162	128	218	208	***
	26886	10NEWTVL	26855	10NEWTVL	1	69-138	210	210	67	70	1165	111	191	183	***	1165	114	195	187	***	1165	114	195	187	***

1. --- =Less than the Minimum Reporting Level of 85%
2. *** = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. === = Facility did not overload
4. Count of Contingencies Causing Overloads (A/B Stats)
   A = Serious Overload > 105%
   B = Overloaded Faclity between 100% and 105% of Rated Capability

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Exhibit A28

Thoroughbred Energy Campus

Comparison of Base Case to Worst of Case Studies

Thoroughbred Interconnection III - Thoroughbred Connected to Wilson @ 345 kV Looped to Smith and Coleman with a 161 kV Circuit from Wilson to Paradise

All Base Case Generators in Service

Branches Exceeding 100% of Emergency Rating										BC05s01					C171s05					C271s05				
								Ratings		Base Case 01 - 2005 Summer					Thoroughbred/1-750 MW @ 345 kV					Thbred/1-750MW@345kV & 1-750MW@500kV				
										Cont	Normal	First Contingency			Cont	Normal	First Contingency			Cont	Normal	First Contingency		
	From	Name	To	Name	Ckt	Base kV	Area	Zone	Norm	Emer	ID	System%	Norm %	Emer %	A / B	ID	System%	Norm %	Emer %	A / B	ID	System%	Norm %	Emer %	A / B
Group 1	New Overloads										Not Overloaded					Overload 2					Overload 3				
1	18743	5SMYRNA	19527	5BLCKMNT	1	161	147	166	235	235	4367	54.3	96.5	96.5	0 / 0	4367	56.2	99.9	99.9	0 / 0	4367	65.0	109.6	109.6	1 / 0
	18012	5PARADIS	18880	5RUSS.SS	1	161	147	166	350	350	160	70.1	90.3	90.3	0 / 0	160	84.3	105.1	105.1	1 / 0	160	80.8	101.7	101.7	0 / 1
	18708	5LEBANON	18914	5GLADV T	1	161	147	166	151	151	4370	18.7	95.7	95.7	0 / 0	4370	18.3	98.1	98.1	0 / 0	4370	25.3	104.9	104.9	0 / 1
	18744	5MURFREE	19527	5BLCKMNT	1	161	147	166	235	235	4367	51.0	92.3	92.3	0 / 0	4367	52.9	95.6	95.6	0 / 0	4367	61.4	104.9	104.9	0 / 1
	18684	5INTERCH	19083	5HURRICA	1	161	147	166	320	320	4452	57.0	96.5	96.5	0 / 0	4452	57.8	97.8	97.8	0 / 0	4452	61.6	104.1	104.1	0 / 1
	27094	11GR STL	27142	11SMITH	1	138	211	211	241	241	---	25.9	---	---	0 / 0	1252	69.9	102.2	102.2	0 / 1	1252	69.6	103.6	103.6	0 / 1
	18427	8PARADIS	18428	8MONTGO	1	500	147	166	1732	1732	---	58.6	---	---	0 / 0	---	58.6	---	---	0 / 0	65	102.2	102.9	102.9	***
	18705	5CENTER	18756	5SMTH TN	1	161	147	166	151	151	4367	82.1	92.2	92.2	0 / 0	4367	85.4	95.9	95.9	0 / 0	4367	91.2	101.7	101.7	0 / 1
	99798	5BATEVL	99808	5CUSHMN	1	161	151	159	148	148	30	95.3	97.6	97.6	0 / 0	30	96.2	98.4	98.4	0 / 0	30	98.8	101.0	101.0	0 / 4
Group 2	Pre-existing Overload in Case1 with Increased Overloading in Case2										Overload 1				< Less Than <	Overload 2					Overload 3				
2	18691	5BOWL GR	18880	5RUSS.SS	1	161	147	166	180	180	160	53.4	100.7	100.7	0 / 1	160	55.9	108	108	1 / 0	160	59.3	111.5	111.5	1 / 0
	18450	5WILSNTN	18914	5GLADV T	1	161	147	166	151	151	4370	21.3	101.7	101.7	0 / 1	4370	21	104.1	104.1	0 / 1	4370	28.5	111.0	111.0	1 / 0
	18724	5PIN HOO	18738	5CANE RI	1	161	147	166	271	271	80	61.6	101	101	0 / 1	80	61.6	100	100	0 / 0	80	66.8	106.7	106.7	1 / 0
	18711	5GALLATI	18890	5LASCASS	1	161	147	166	206	206	4260	80.5	107.6	107.6	1 / 0	4260	83.7	112.1	112.1	1 / 0	4260	85.1	111.2	111.2	1 / 0
	26886	10NEWTVL	26855	10NEWTVL	2	69-138	210	210	60	63	1162	124.9	214.9	204.7	***	1162	127.7	219	208.6	***	1162	126.4	216.2	205.9	***
	26886	10NEWTVL	26855	10NEWTVL	1	69-138	210	210	67	70	1165	111.9	192.5	184.2	***	1165	114.4	196.1	187.7	***	1165	113.2	193.6	185.3	***

1. --- =Less than the Minimum Reporting Level of 85%
2. *** = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. === = Facility did not overload
4. Count of Contingencies Causing Overloads (A/B Stats)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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Thoroughbred Energy Campus

Comparison of Base Case to Worst of Case Studies

Thoroughbred Interconnection III - Thoroughbred Connected to Wilson @ 345 kV Looped to Smith and Coleman with a 161 kV Circuit from Wilson to Paradise

Loss of Brown N Unit # 3 (441 MW)

Branches Exceeding 100% of Emergency Rating										BC05s11 Base Case 01 - 2005 Summer					C181s05 Thoroughbred/1-750 MW @ 345 kV					C281s05 Thbred/1-750MW@345kV & 1-750MW@500kV				
								Ratings		Cont	Normal	First Contingency			Cont	Normal	First Contingency			Cont	Normal	First Contingency		
	From	Name	To	Name	Ckt	Base kV	Area	Zone	Norm	Emer	ID	System%	Norm %	Emer %	A / B	ID	System%	Norm %	Emer %	A / B	ID	System%	Norm %	Emer %	A / B
Group 1	New Overloads										Not Overloaded					Overload 2					Overload 3				
1	18743	5SMYRNA	19527	5BLCKMNT	1	161	147	166	235	235	4367	54.7	96.6	96.6	0 / 0	4367	56.6	99.9	99.9	0 / 0	4367	65.3	109.6	109.6	1 / 0
	27094	11GR STL	27142	11SMITH	1	138	211	211	241	241	---	22.5	---	---	0 / 0	1252	68.1	104.2	104.2	0 / 1	1252	68	105.8	105.8	1 / 0
	18708	5LEBANON	18914	5GLADV T	1	161	147	166	151	151	4370	18.8	95.8	95.8	0 / 0	4370	18.5	98.1	98.1	0 / 0	4370	25.6	104.9	104.9	0 / 1
	18744	5MURFREE	19527	5BLCKMNT	1	161	147	166	235	235	4367	51.4	92.4	92.4	0 / 0	4367	53.2	95.6	95.6	0 / 0	4367	61.7	104.9	104.9	0 / 1
	18684	5INTERCH	19083	5HURRICA	1	161	147	166	320	320	4452	57.2	96.8	96.8	0 / 0	4452	58	98	98	0 / 0	4452	61.8	104.3	104.3	0 / 1
	18012	5PARADIS	18880	5RUSS.SS	1	161	147	166	350	350	160	69.5	89.8	89.8	0 / 0	160	83	103.8	103.8	0 / 1	160	79.5	100.4	100.4	0 / 1
	18427	8PARADIS	18428	8MONTGO	1	500	147	166	1732	1732	---	58.6	---	---	0 / 0	---	58.6	---	---	0 / 0	65	102.2	102.9	102.9	***
	18705	5CENTER	18756	5SMTH TN	1	161	147	166	151	151	4367	82.1	92.1	92.1	0 / 0	4367	85.3	95.7	95.7	0 / 0	4367	91.1	101.5	101.5	0 / 1
Group 2	Pre-existing Overload in Case1 with Increased Overloading in Case2										Overload 1				< Less Than <	Overload 2					Overload 3				
2	18691	5BOWL GR	18880	5RUSS.SS	1	161	147	166	180	180	160	55	102.6	102.6	0 / 1	160	57.2	109.4	109.4	1 / 0	160	60.6	112.8	112.8	1 / 0
	18450	5WILSNTN	18914	5GLADV T	1	161	147	166	151	151	4370	21.7	101.7	101.7	0 / 1	4370	21.4	104.1	104.1	0 / 1	4370	29	111	111	1 / 0
	18724	5PIN HOO	18738	5CANE RI	1	161	147	166	271	271	80	61.2	100.7	100.7	0 / 1	80	61.2	99.8	99.8	0 / 0	80	66.4	106.7	106.7	1 / 0
	18711	5GALLATI	18890	5LASCASS	1	161	147	166	206	206	4260	80	106.4	106.4	1 / 0	4260	83.1	110.8	110.8	1 / 0	4260	84.4	109.8	109.8	1 / 0

1. --- =Less than the Minimum Reporting Level of 85%
2. *** = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. === = Facility did not overload
4. Count of Contingencies Causing Overloads (A/B Stats)
   A = Serious Overload > 105%
   B = Overloaded Faclity between 100% and 105% of Rated Capability

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Thoroughbred Energy Campus

Comparison of Base Case to Worst of Case Studies

Thoroughbred Interconnection III - Thoroughbred Connected to Wilson @ 345 kV Looped to Smith and Coleman with a 161 kV Circuit from Wilson to Paradise

Loss of Green River Unit # 4 (104 MW)

	Branches Exceeding 100% of Emergency Rating								Ratings		BC05s21 Base Case 01 - 2005 Summer					C191s05 Thoroughbred/1-750 MW @ 345 kV					C291s05 Thbred/1-750MW@345kV & 1-750MW@500kV				
	From	Name	To	Name	Ckt	Base kV	Area	Zone	Norm	Emer	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	A / B	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	A / B	Cont ID	Normal System%	First Contingency Norm %	First Contingency Emer %	A / B
Group 1	New Overloads										Not Overloaded					Overload 2					Overload 3				
1	18743	5SMYRNA	19527	5BLCKMNT	1	161	147	166	235	235	4367	54.2	96.3	96.3	0 / 0	4367	56.1	99.6	99.6	0 / 0	4367	64.8	109.2	109.2	1 / 0
	27094	11GR STL	27142	11SMITH	1	138	211	211	241	241	---	29.6	---	---	0 / 0	1685	72.7	107.7	107.7	1 / 1	1685	72.2	107.9	107.9	2 / 0
	18708	5LEBANON	18914	5GLADV T	1	161	147	166	151	151	4370	18.7	95.6	95.6	0 / 0	4370	18.4	97.9	97.9	0 / 0	4370	25.5	104.7	104.7	0 / 1
	18744	5MURFREE	19527	5BLCKMNT	1	161	147	166	235	235	4367	50.9	92.1	92.1	0 / 0	4367	52.7	95.3	95.3	0 / 0	4367	61.2	104.6	104.6	0 / 1
	18684	5INTERCH	19083	5HURRICA	1	161	147	166	320	320	4452	57	96.5	96.5	0 / 0	4452	57.8	97.7	97.7	0 / 0	4452	61.6	104	104	0 / 1
	18012	5PARADIS	18880	5RUSS.SS	1	161	147	166	350	350	160	69.7	89.8	89.8	0 / 0	160	82.7	103.3	103.3	0 / 1	160	79.2	99.8	99.8	0 / 0
	18427	8PARADIS	18428	8MONTGO	1	500	147	166	1732	1732	---	58.6	---	---	0 / 0	---	58.6	---	---	0 / 0	65	102.2	102.9	102.9	***
	18705	5CENTER	18756	5SMTH TN	1	161	147	166	151	151	4367	81.9	92	92	0 / 0	4367	85.1	95.6	95.6	0 / 0	4367	90.8	101.2	101.2	0 / 1
	99798	5BATEVL	99808	5CUSHMN	1	161	151	159	148	148	30	94.8	97.1	97.1	0 / 0	30	95.6	97.8	97.8	0 / 0	30	98.4	100.6	100.6	0 / 2
Group 2	Pre-existing Overload in Case1 with Increased Overloading in Case2										Overload 1				< Less Than <	Overload 2					Overload 3				
2	18691	5BOWL GR	18880	5RUSS.SS	1	161	147	166	180	180	160	53.2	100.3	100.3	0 / 1	160	55.5	107	107	1 / 0	160	58.8	110.3	110.3	1 / 0
	18450	5WILSNTN	18914	5GLADV T	1	161	147	166	151	151	4370	21.3	101.5	101.5	0 / 1	4370	21	103.8	103.8	0 / 1	4370	28.7	110.8	110.8	1 / 0
	18724	5PIN HOO	18738	5CANE RI	1	161	147	166	271	271	80	61.6	101.1	101.1	0 / 1	80	61.6	100.2	100.2	0 / 1	80	66.8	107	107	1 / 0
	18711	5GALLATI	18890	5LASCASS	1	161	147	166	206	206	4260	80.4	107.4	107.4	1 / 0	4260	83.4	111.7	111.7	1 / 0	4260	84.7	110.7	110.7	1 / 0
	26886	10NEWTVL	26855	10NEWTVL	2	69-138	210	210	60	63	1162	124	213.5	203.3	***	1162	126.4	216.8	206.5	***	1162	126.4	216.2	205.9	***
	26886	10NEWTVL	26855	10NEWTVL	1	69-138	210	210	67	70	1165	111	191.2	183	***	1165	113.2	194.1	185.8	***	1165	113.2	193.6	185.3	***

1. --- =Less than the Minimum Reporting Level of 85%
2. *** = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. === = Facility did not overload
4. Count of Contingencies Causing Overloads (A/B Stats)
   A = Serious Overload > 105%
   B = Overloaded Facility between 100% and 105% of Rated Capability

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EXHIBIT A31

Thoroughbred Energy Campus

Area Losses for Preliminary Power Flow Studies (Megawatts)

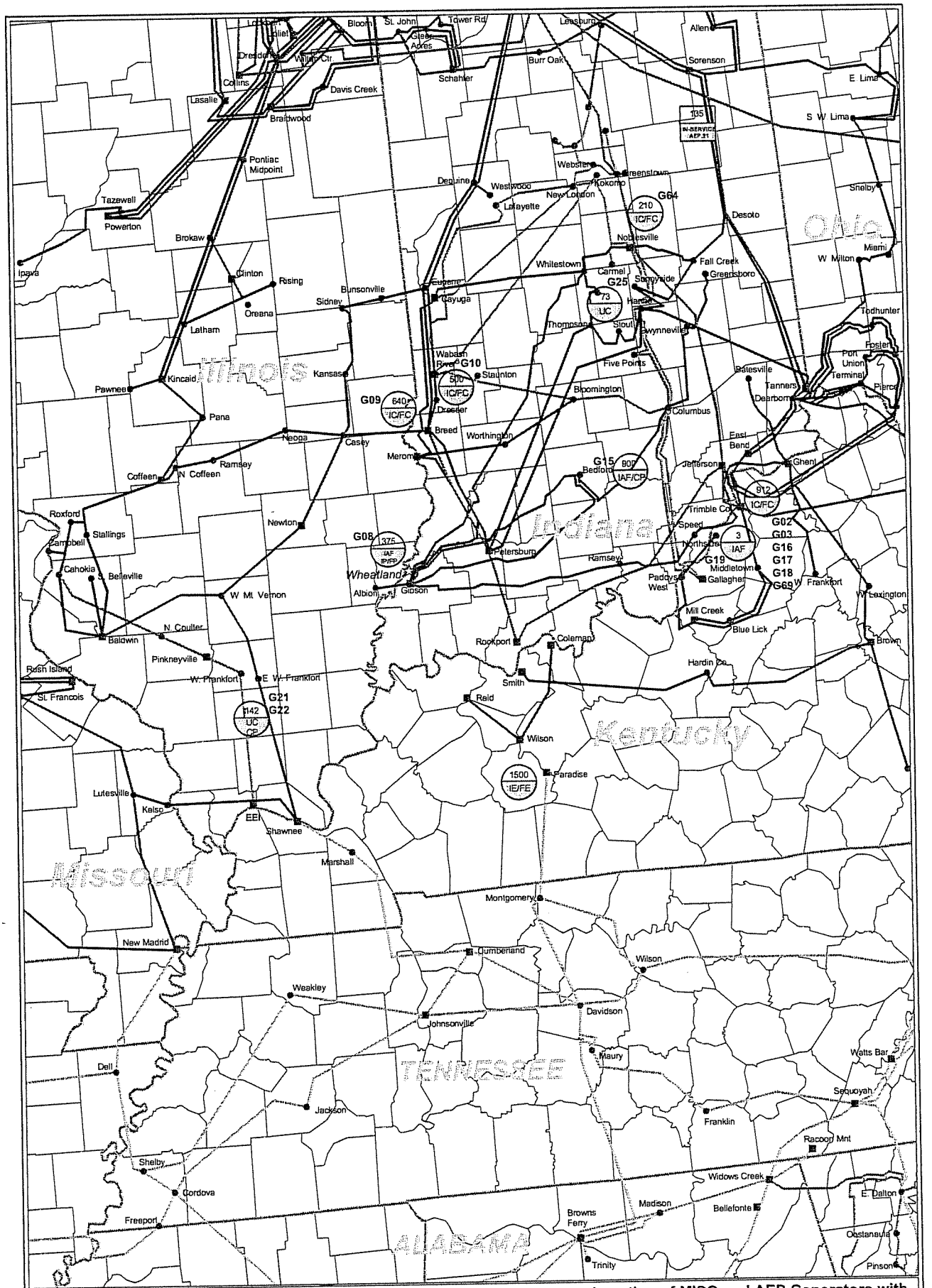
Case ID	TVA MW	Change from BC05s01
C251	629	53
C241	626	51
C261	623	47
C281	615	39
C211	615	39
C271	613	37
C201	611	36
C291	611	36
C221	610	35
C151	600	25
C141	597	21
C161	594	19
C181	586	11
C111	585	10
C171	584	9
C101	583	7
C191	582	7
C121	582	6
BC11	579	3
BC01	575	0
BC21	575	-1

Case ID	LGEE MW	Change from BC05s01
C101	184	26
C201	184	25
C111	180	22
C211	179	21
C121	178	19
C221	176	18
C241	173	14
C141	171	12
C251	170	11
C261	169	11
C271	169	10
C151	168	10
C161	168	9
C171	168	9
C291	165	7
C191	165	6
C281	163	4
C181	162	3
BC01	159	0
BC21	157	-2
BC11	156	-3

Case ID	BREC MW	Change from BC05s
C101	31	22
C111	31	22
C121	30	21
C201	30	21
C211	29	21
C221	29	20
C271	20	11
C171	20	11
C181	20	11
C281	20	11
C191	19	11
C291	19	11
C251	14	5
C241	13	5
C261	13	4
C151	13	4
C141	12	4
C161	12	3
BC11	9	1
BC21	9	0
BC01	9	0

APPENDIX B

DRAWINGS



765 kV Transmission Line
500 kV Transmission Line
345 kV Transmission Line
230 kV Transmission Line

Power Station
Substation
174 — MW
IC/FC — Study Status

G21— Generator Interconnect Queue Number

N
W E
S

Scale: 1" = 30 Miles (1:1,900,800)

0 10 20 30 40 50 60
Miles

Map Source: Environmental Systems Research Institute (ESRI) & North American Electric Reliability Council (NERC), January 1, 1997.

Location of MISO and AEP Generators with Signed Interconnection Agreements (IA)

Big Rivers Electric Corporation
Thoroughbred Energy Campus
November 26, 2002

CAI Commonwealth Associates, Inc.

DRAWING B1

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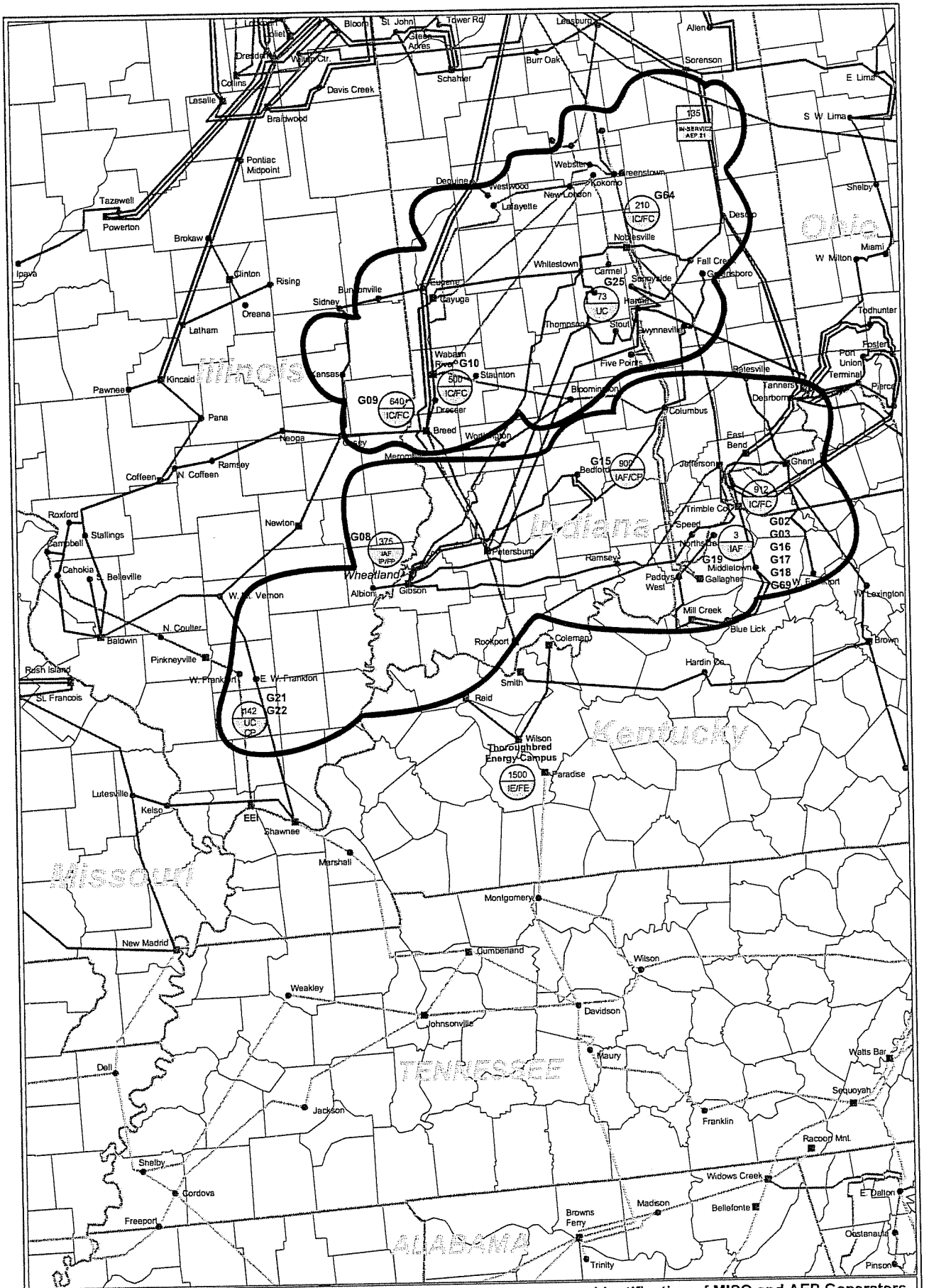

765 kV Transmission Line
500 kV Transmission Line
345 kV Transmission Line
230 kV Transmission Line

Power Station
Substation
174 MW
IC/FC Study Status

G21— Generator Interconnect Queue Number

N
W E
S

Scale: 1" = 30 Miles (1:1,900,800)

0 10 20 30 40 50 60
Miles

Map Source: Environmental Systems Research Institute (ESRI) & North American Electric Reliability Council (NERC), January 1, 1997.

Identification of MISO and AEP Generators in North and South Groups

Big Rivers Electric Corporation
Thoroughbred Energy Campus
November 26, 2002

CAI Commonwealth Associates, Inc.

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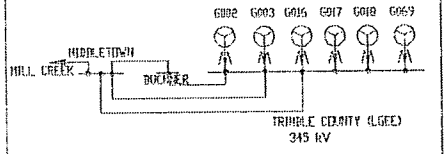
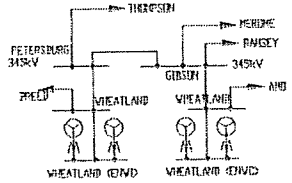
MISO and AEP IA Generator Connections
2005 Summer

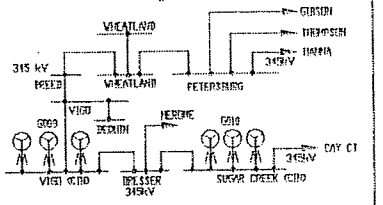
G002, G003, G016, G017, G018, G069
Generators Connected at Trimble County



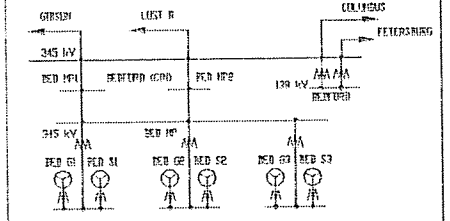
G008
Generators Connected at Wheatland



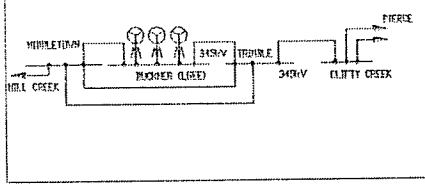
G009 and G010
Generators Connected at Vigo and Sugar Creek



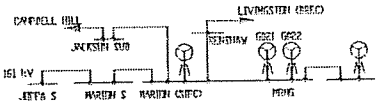
G015
Generators Connected at Bedford



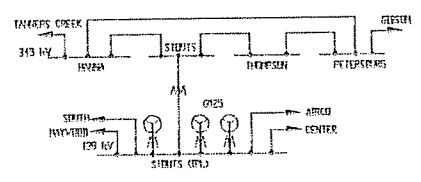
G019
Generators Connected at Buckner



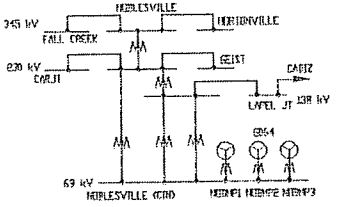
G021 and G022
Generators Connected at Marion



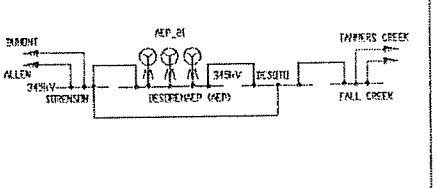
G025
Generators Connected at Stout



G064
Generators Connected at Noblesville



AEP_21
Generators Connected at AEP Between DeSoto and Sorenson



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Thoroughhbred Energy Campus
2005 Summer

	Interconnection I	Interconnection IIA	Interconnection III
1-750 MW Generator	Cases 101, 111 and 121 750 MW Interconnected to Wilson at 345 kV	Cases 141, 151 and 161 750 MW Interconnected to Wilson at 161 kV and also to Green River and Paradise	Cases 171, 181 and 191 750 MW Interconnected to Wilson at 345 kV and Looped through Smith and Colenan
2-750 MW Generators	Cases 201, 211 and 221 750 MW Interconnected to Wilson at 345 kV and 750 MW Interconnected to Paradise at 500 kV	Cases 241, 251 and 261 750 MW Interconnected to Wilson at 161kV and to Green River and Paradise and also 750 MW Interconnected to Paradise at 500 kV	Cases 271, 281 and 291 750 MW Interconnected to Wilson at 345 kV and Looped through Smith and Colenan and also 750 MW Interconnected to Paradise at 500 kV

Note: Bold facilities indicate changes to Base Case model

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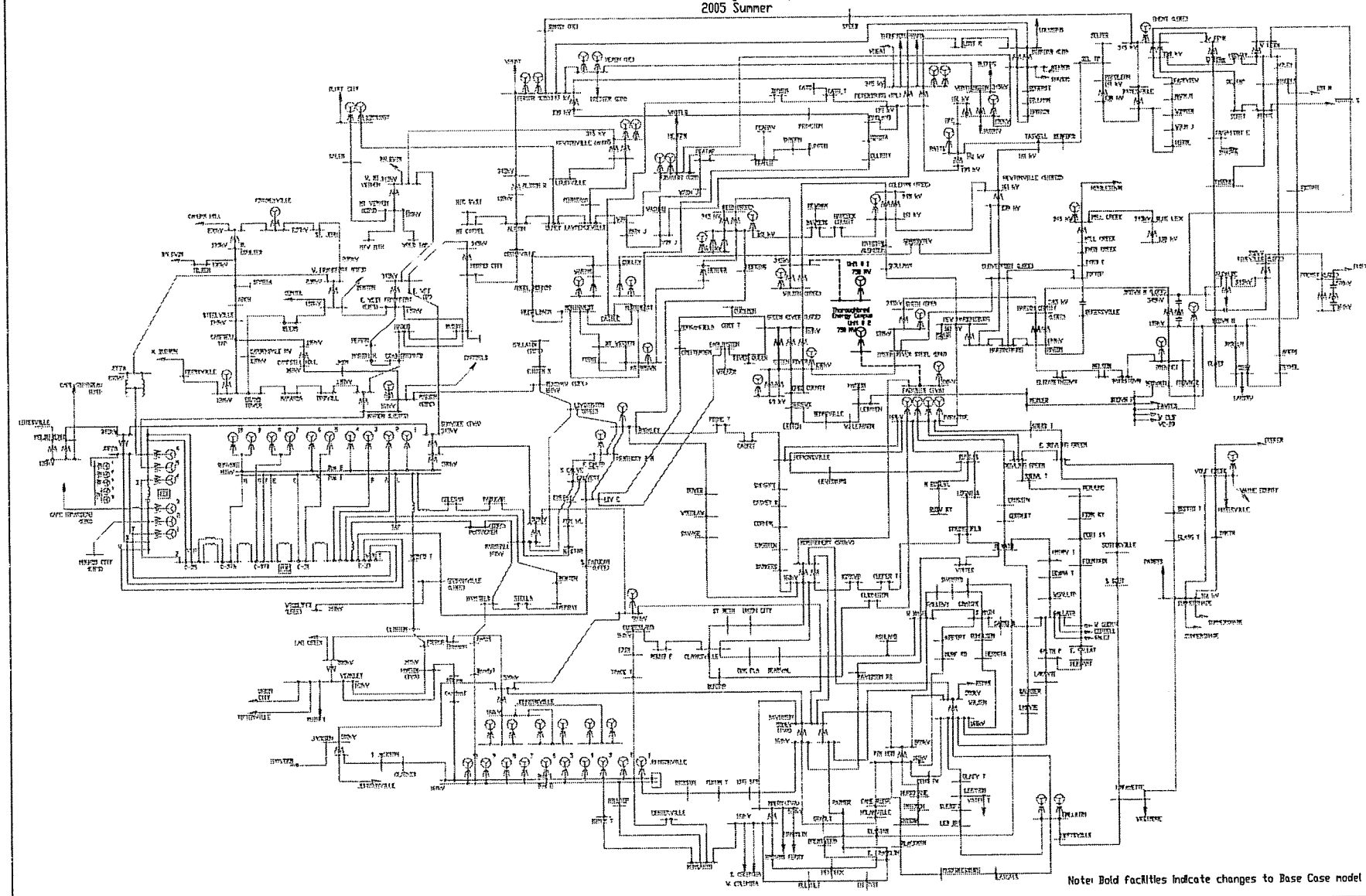
DRAWING B5

One-Line of Contingencies
Per Original Scope
2005 Summer



Note: Bold facilities indicate changes to Base Case model

DRAWING B5

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APPENDIX C

BASE CASE MODEL DEVELOPMENT

From: "Chris Bradley" <cbradley@bigrivers.com>
To: <tlorloff@cai-engr.com>
Subject: Thoroughbred Energy Campus
Date sent: Fri, 24 Aug 2001 11:32:21 -0500

Terri,

The following multiple contingencies should be added to the Thoroughbred Energy Campus contingency list (the second two outages shouldn't result in any initial problems, but may come into play during the mitigation study phase):

27561 14WILSO7 345 KV 27563 14COLE 7 345 WITH THE 155 MW 14COLE 5 UNIT 3 OUTAGED.

27553 14WILSO5 161 27028 11GR RV 161 WITH THE 250 MW 11SMITH UNIT 2 OUTAGED.

27553 14WILSO5 161 27028 11GR RV 161 WITH ONE PARADISE (TVA) 161 KV GENERATING UNIT OUTAGED.

Base Case Changes:

Since the BREC 69 kV facilities are equivalized, the loadings should be ignored (or the ratings should be significantly raised).

I may be changing the BREC generation dispatch (and interchange). I plan to discuss this with others (I will let you know early next week).

Chris Bradley
Senior Planning Engineer
Big Rivers Electric Corporation
Phone 270-827-2561 ext 2226

From:	"Marler, David E." <demarler@tva.gov>
To:	tlorloff@cai-engr.com
Copies to:	rdcook@cai-engr.com, "Gardner, John R." <jrgardner@tva.gov>
Subject:	**RE: Thoroughbred Data Request #1**
Date sent:	Fri, 24 Aug 2001 15:21:30 -0400

Terri,

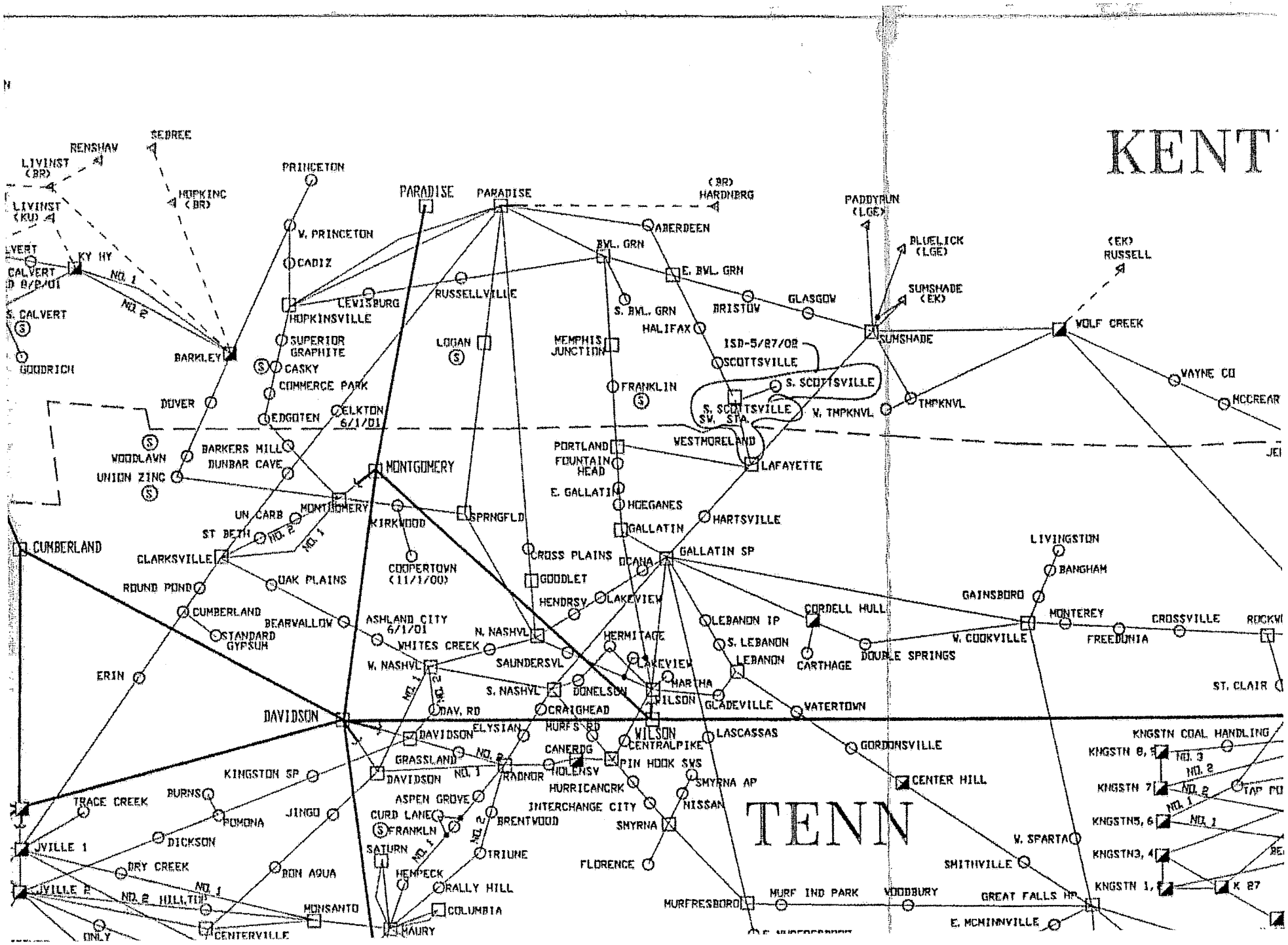
The data requested from TVA is listed below. Let me know if you need anything else or have any problem with the attached files.

B1.
1. TVA.ppt shows the TVA transmission system in the Paradise area
2. No new generation to add
3. No modifications to add
4. No special facilities to include
5. No combinations to include
6. No multiple element contingencies to include

B2.
7. Positive sequence - FA05SPF.raw Zero sequence - FA05SPF.seq
Notes: These files are in PSS/E raw data format. TVA uses 1.05pu voltages
and X"d(sat) impedances in fault cases. The threshold impedance must be set
to zero (not 0.00001) to prevent improper isolating of buses.

B3 data will be supplied later.

David E. Marler, P.E.
TVA - Transmission Planning
Phone: 423-751-7100
Fax: 423-751-3453
Email: demarler@tva.gov


KENT
TENN
RENSHAW
SEBREE
LIVINST (BR)
LIVINST (KU)
HOPKINC (BR)
PRINCETON
PARADISE
PARADISE
(BR) HARDNBRG
PADDYRUN (LGE)
BLUELICK (LGE)
(EK) RUSSELL
W. PRINCETON
CADIZ
ABERDEEN
BVL. GRN
E. BVL. GRN
SUMSHADE (EK)
LVERT
CALVERT D 8/8/01
KY HY
NO. 1
NO. 2
LEVISBURG
RUSSELLVILLE
S. BVL. GRN
BRISTOW
GLASGOW
HALIFAX
SUMSHADE
WOLF CREEK
S. CALVERT
HOPKINSVILLE
SUPERIOR GRAPHITE
LOGAN
MEMPHIS JUNCTION
ISD-5/87/02
SCOTTSVILLE
GOODRICH
BARKLEY
CASKY
COMMERCE PARK
FRANKLIN
S. SCOTTSVILLE
WAYNE CO
DOVER
EDGOTEN
ELKTON 6/1/01
S. SCOTTSVILLE SW. STA.
W. TMPKNVL
TMPKNVL
MCCREAR
WOODLAWN
BARKERS MILL
DUNBAR CAVE
PORTLAND
FOUNTAIN HEAD
WESTMORELAND
LAFAYETTE
UNION ZINC
MONTGOMERY
E. GALLATIN
HOEGANES
UN CARB
MONTGOMERY
KIRKWOOD
SPRNGFLD
GALLATIN
HARTSVILLE
ST BETH
NO. 2
NO. 1
CUMBERLAND
CLARKSVILLE
COOPERTOWN (11/1/00)
CROSS PLAINS
DCANA
GALLATIN SP
LIVINGSTON
OAK PLAINS
GOODLET
BANGHAM
ROUND POND
HENDRSV
LAKEVIEW
GAINSBORO
CUMBERLAND
LEBANON IP
CORDELL HULL
MONTEREY
CROSSVILLE
ROCKVI
BEARVALLOW
ASHLAND CITY 6/1/01
N. NASHVL
HERMITAGE
S. LEBANON
W. COOKVILLE
FREEDONIA
STANDARD GYPSUM
WHITES CREEK
LEBANON
CARTHAGE
DOUBLE SPRINGS
W. NASHVL
SAUNDERSVL
LAKEVIEW
ERIN
MARTHA
S. NASHVL
DONELSON
WILSON
GLADEVILLE
VATERTOWN
ST. CLAIR
NO. 1
NO. 2
DAV. RD
CRAIGHEAD
DAVIDSON
ELYSIAN
HURFS RD
WILSON
LASCASSAS
GORDONSVILLE
KNGSTN COAL HANDLING
DAVIDSON
CENTRALPIKE
CANERDG
GRASSLAND
NO. 2
PIN HOOK SVS
KINGSTON SP
DAVIDSON
NO. 1
RADNOR
HOLEINSV
SMYRNA AP
CENTER HILL
KNGSTN 8, 9
NO. 3
NO. 2
TRACE CREEK
BURNS
HURRICANCRK
KNGSTN 7
NO. 2
TAP PO
ASPEN GROVE
INTERCHANGE CITY
NISSAN
NO. 1
POMONA
JINGO
CURD LANE
BRENTWOOD
KNGSTN5, 6
NO. 1
DICKSON
FRANKLN
SMYRNA
W. SPARTA
VILLE 1
SATURN
NO. 1
TRIUNE
KNGSTN3, 4
DRY CREEK
RON AQUA
HEMPECK
FLORENCE
SMITHVILLE
KNGSTN 1,
K 27
VILLE 2
NO. 2
NO. 1
HILLTOP
RALLY HILL
MURF IND PARK
WOODBURY
GREAT FALLS HP
MURFRESBORO
MONSANTO
COLUMBIA
E. MCMINNVILLE
ONLY
CENTERVILLE
MAURY

From: "Robert Hunzinger" <hunzingerre@omu.org>
To: <tlorloff@cai-engr.com>
Subject: TBred Energy data request #1
Date sent: Wed, 29 Aug 2001 14:30:35 -0500
Copies to: "Jan Howard" <howardjl@omu.org>

Terri, OMU's information in response to DR #1 is as follows:

B1 - load flow modelling

1. Electrical One-Line - We will forward a CAD version of the one-line soon. The one-line will show the OMU Elmer Smith Station (ESS) switchyard, which includes the KU interconnections, and OMU's internal load serving 138 kV and 69 kV "transmission system" facilities located at the plant switchyard. Note: For purposes of the Tbred studies, the OMU system is adequately modelled in the Summer 2005 case with the representation that KU has included. Confidentially, If we need further detail as the study progresses, BREC has a more detailed model that includes the entire OMU 69 kV looped transmission system.

2. Not applicable to OMU (no new generation)
3. Not applicable to OMU (no new transmission facilities)

4. No special facilities to add to the contingency list.

5. Combination single line and single generator contingencies:

5-1. OMU ESS to KU Green River Steel 138 kV line
OMU ESS Unit #2

5-2. OMU ESS to KU Green River Steel 138 kV line
OMU ESS Unit #1

5-3. OMU ESS 138 / 345 kV Transformer (KU OMU ESS to KU Brown 345 kV line)
OMU ESS Unit #2

5-4. OMU ESS 138 / 345 kV Transformer (KU OMU ESS to KU Brown 345 kV line)
OMU ESS Unit #1

Of course we are also interested in the single facility contingency results on their own, without generation outages.

6. Multiple element contingencies
Complete loss of OMU ESS Generation (both units #1 and #2)

For the above cases, I am assuming the CAI will also review the system during light load periods. In some cases, facility loading during light load periods will be higher than during peak load periods. An example is the loading on the OMU ESS 138/345 kV transformer. We have seen actual flows high on this transformer during light load periods with OMU ESS generation full up, KU Green River Station generation full up, and likely system South to North transfer conditions.

B2 Short Circuit Modelling

7. Positive and Zero Sequence Models

Again, the KU representation of the OMU system should be adequate for the first cut review for the short circuit study. It is our understanding that KU has the positive and zero sequence impedances included in their model. We expect to see that there is x% change in available fault MVA at the OMU ESS 138 kV bus

due to the Tbred generation addition. OMU will review the magnitude of the increase for any adverse affects on our system. If significant changes occur, the BREC more detailed representation of the OMU system could be utilized to further analyze. The effects of future system improvements - such as 345 kV sources to the OMU bus may require further detail.

Please contact me if there are any questions. Thanks, Bob Hunzinger

From: "Chris Bradley" <cbradley@bigrivers.com>
To: "Terri Orloff" <tlorloff@cai-engr.com>,
"Cook, Rick" <rdcook@cai-engr.com>
Subject: **Thoroughbred: BREC dispatch for 05S**
Date sent: Thu, 30 Aug 2001 08:14:11 -0500

Rick/Terri:

Big Rivers net export should be changed from -190 to 40 MW.
A 190 MW purchase from TVA should be eliminated (ratio gen down in TVA),
a 40 MW sale to Hoosier (HE) should be added. -190 (+230 MW) = 40 MW

The Big Rivers dispatch should be:

Bus 27551 14REID 5 161 (UNIT 1:231 MW, 2: 223 MW, 3: 154 MW, 4 161 MW) = 769 MW
Bus 27552 14COLE 5 161 (UNIT 1: 150 MW, UNIT 2: 150 MW, UNIT 3: 139 MW) = 439 MW
Bus 27553 14WILSO5 161 404 MW = 404 MW
Bus 27554 14REID 69 (UNIT 1-MAY BE LISTED AS 5: 32 MW, CT 65 MW) = 97 MW

Total change in generation 270 MW

Contingencies:

Cont 3110 27561 14WILSO7 345 KV 27563 14COLE 7 345 WITH THE 155 MW 14COLE 5 UNIT 3 OUTAGED.
(pick up gen: 16 MW at Wilson, 33 MW at Reid 69 kV, balance from anywhere North to Northwest
(Cinergy? Area = 208-CIN)

Cont 3120 27553 14WILSO5 161 27028 11GR RV 161 WITH THE 250 MW 11SMITH UNIT 2 OUTAGED.
(pick up generation from the North, areas = 205-AEP, 356-AMREN, 208-CIN)

Cont 3130 27553 14WILSO5 161 27028 11GR RV 161 WITH ONE 335 MW or 358 MW PARADISE (TVA) 161 KV GENERATING UNIT OUTAGED. (GSU BUS NO'S 18257,18258,18259,18260)
(pick up generation from the North, areas = 205-AEP, 356-AMREN, 208-CIN)

Chris Bradley
Senior Planning Engineer
Big Rivers Electric Corporation
Phone 270-827-2561 ext 2226

TELEPHONE CALL FROM CHRIS REGARDING BREC DISPATCH

October 24, 2001 - 13:00:00

"Chris Bradley" <cbradley@bigrivers.com>
"Terri Orloff" <tlorloff@cai-engr.com>,
"Cook, Rick" <rdcook@cai-engr.com>
Thoroughbred: BREC dispatch for 05S
Thu, 30 Aug 2001 08:14:11 -0500

The Big Rivers dispatch to be changed
CHANGE FROM:

Bus 27551 14REID 5 161 (UNIT 1:208.4 MW, 2: 200.4 MW, 3: 131.2 MW, 4: 64 MW)	=	604 MW
Bus 27552 14COLE 5 161 (UNIT 1: 110 MW, UNIT 2: 150 MW, UNIT 3: 155 MW)	=	415 MW
Bus 27553 14WILSO5 161 420 MW	=	420 MW
Bus 27554 14REID 69 (UNIT 1-MAY BE LISTED AS 5: 0 MW, CT 0 MW)	=	0 MW

BEFORE NEW DISPATCH: Generation = 1439 MW

The Big Rivers dispatch should be changed as follows:
CHANGE TO:

Bus 27551 14REID 5 161 (UNIT 1:231 MW, 2: 223 MW, 3: 154 MW, 4 161 MW)	=	769 MW
Bus 27552 14COLE 5 161 (UNIT 1: 150 MW, UNIT 2: 150 MW, UNIT 3: 155 MW)	=	455 MW
Bus 27553 14WILSO5 161 420 MW	=	420 MW
Bus 27554 14REID 69 (UNIT 1-MAY BE LISTED AS 5: 13 MW, CT 12 MW)	=	25 MW

AFTER DISPATCH: Generation = 1669 MW

Change in Generation is 1669 MW -- 1439 MW= 230 MW

From: "Toll, Michael" <Michael.Toll@lgeenergy.com>
To: "'Diane C. Wilkie'" <dcwilkie@cai-engr.com>
Subject: RE: Thoroughbred Data Request #1
Date sent: Tue, 4 Sep 2001 13:09:08 -0400

In response to your data request:

1)Previously provided

2)add a sixth ct at 11TRIMBL 345. Capacity is 160 mw, output is zero.
Turn off units 4,5, & 6 at 11TRIMBL 345 and redispatch at 11BRWNCT 138 units 5,8 & 9

3)Make the following transmission changes:

11GR RV 161 11GR RVR 138 add third transformer (duplicate)
11HARDN 345 11HARDN 138 add second transformer (duplicate)
11ROGERS 138 11TIPTOP 138 remove circuit
11BRWN N 345 11BRWN N 138 remove second transformer
11BRWN N 345 11PINEVI 345 remove circuit
11POCK N 500 11POCK N 161 remove second transformer

4)outage all 500 and 345 kV facilities and all 138 and 161 kV facilities west of Brown Plant.

5)consider two generator outages, 1) 11GR RVR 138 kV unit 4 and 2)11BRWN N 138 kV unit 3.
In both cases, purchase the generation from the north.

If you have additional questions, let me know.

Thanks,

Michael G. Toll

From: "Chris Bradley" <cbradley@bigrivers.com>
To: <tlorloff@cai-engr.com>
Subject: Thoroughbred Energy Campus Contingency List
Date sent: Fri, 19 Oct 2001 15:31:06 -0500

Terri,

I have reviewed the contingency list and have a few changes to propose.

Contingencies 1727, 1737, and 1742 are each part of two parallel transformers. Since another contingencies covers the loss of one transformer, these contingencies can be eliminated (no need to separately outaged each of two parallel transformers).

Contingencies 1757, 1760, and 1762 involve 69 kV facilities. These contingencies can be removed.

Chris Bradley
Senior Planning Engineer
Big Rivers Electric Corporation
Phone 270-827-2561 ext 2226

Forwarded by: "Diane C. Wilkie" <dcwilkie@cai-engr.com>
Forwarded to: rdcook@cai-engr.com, tlorloff@cai-engr.com
Date forwarded: Mon, 5 Nov 2001 08:15:38 -0500
From: "Adams, Darrin" <darrin.adams@lgeenergy.com>
To: "Toll, Michael" <Michael.Toll@lgeenergy.com>, "'dcwilkie@cai-engr.com'" <dcwilkie@cai-engr.com>, "'cbradley@bigrivers.com'" <cbradley@bigrivers.com>
Subject: **Thoroughbred Overload Comparisons - New Ratings**
Date sent: Mon, 5 Nov 2001 08:08:13 -0500

As discussed in our conference call on Friday, several facilities Identified as overloaded in the study are limited by terminal facilities and/or phase-to-ground clearance. While there will be some cost associated with upgrading these limits, for the purposes of this study we will assume these transmission lines are limited by the conductor ratings at maximum ground clearance and that these transformers are limited by the maximum ratings based on nameplate ratings. Then, the appropriate ratings for these facilities are:

			Summer Normal	Summer Emergency
11GR RVR	11RQ TAP	69	89	110
10NEWTVL	11CLVRPR	138	162	199
11GR STL	11GR STL	138-69	93	107
11GR RVR	11OHIO C	138 (circuit 1)	179	220
11GR RVR	11OHIO C	138 (circuit 2)	179	220
11LEITCH	11LEITCH	138-69	93	107
11EASTVW	20STEPHN	69	56	68
11OHIO C	11SHREWS	138	179	220
11LEITCH	11SHREWS	138	179	220
11EARL N	11RQ TAP	161	209	257
11ETOWN	20THARP	69	90	111
11GR STL	11OMU	69	146	181
11BKR LN	11BRWN N	138	224	277
11ADAMS	11TYRONE	138	179	220
20STEPHN	20UPTONJ	69	45	54

Please let Mike or I know if you have any questions about these changes.
Darrin Adams
Group Leader, Transmission Planning
(859) 367-1153
darrin.adams@lgeenergy.com

From: "Chris Bradley" <cbradley@bigrivers.com>
To: "Terri L. Orloff" <tlorloff@cai-engr.com>, <rdcook@cai-engr.com>
Subject: Thoroughbred and Paducah
Date sent: Wed, 7 Nov 2001 11:42:59 -0600

Rick/Terri,

Thoroughbred:

The rating on the Wilson to Coleman 345 kV circuit can be increased from 598 MVA to 956 MVA (normal and emergency) with minor terminal modifications (if it becomes necessary, we can go even higher with more significant terminal improvements).

Paducah:

I went back through my Calpine file and found previously supplied generator data (over 1 year ago). I asked Bryan Schueler if the data was still accurate. He is supposed to be checking on it. I will let you know as soon as Bryan responds.

Chris Bradley
Senior Planning Engineer
Big Rivers Electric Corporation
Phone 270-827-2561 ext 2226

From: "Adams, Darrin" <darrin.adams@lgeenergy.com>
To: "'Terri L. Orloff'" <tlorloff@cai-engr.com>
Subject: Smith-Hardin County 345 kV Line Rating
Date sent: Tue, 12 Mar 2002 17:29:47 -0500
Copies to: rdcook@cai-engr.com, cbradley@bigrivers.com, "Toll, Michael" <Michael.Toll@lgeenergy.com>, "Adams, Darrin" <darrin.adams@lgeenergy.com>, howardjl@omu.org, hunzingerre@omu.org, demarler@tva.gov, jrgardner@tva.gov

The ratings for the Smith (OMU) to Hardin County 345 kV line are 1195 MVA normal and 1315 MVA emergency. These ratings can be updated in the Thoroughbred Energy Study.

Thanks,

Darrin Adams
Group Leader, Transmission Planning
LG&E Energy
(859) 367-1153
darrin.adams@lgeenergy.com

From:"Scott Yaeger" <ScottYaeger@peabodyenergy.com>
To: "Chris Bradley" <cbradley@bigrivers.com>
Subject: MISO Involvement in BREC Interconnection Study
Date sent: Wed, 3 Apr 2002 10:03:22 -0600
Copies to: michael.toll@lgeenergy.com, darrin.adams@lgeenergy.com, "Jacob Williams" <JWilliams@PeabodyEnergy.com>, rdcook@cai-engr.com, tlorloff@cai-engr.com

Chris,
I got your voice mail late yesterday regarding MISOs involvement in the BREC Interconnection Study and I wanted to drop you a note on the subject.

We have no issues with BREC or others sharing results or allowing MISO to start participating from here on out, in fact, it makes sense for them to be involved.

However, as you are aware this interconnection process has been well underway for some time and I do not think that we should be subject to a third party independent review/approval that would add additional delays into the schedule at this time. We are seeking interconnection from BREC (option III), who is not a MISO member to my knowledge. Other parties are involved as a result of the residual impacts on adjoining systems identified in BREC initial study. LGE may want MISO to represent them and that is fine as long as it does not delay the process.

MISO has very specific rules on how the interconnection process is to transition (posted Dec '01 and Jan '02). As I read the policy, studies underway will be completed and if and when subsequent studies/agreements are needed (ie-facility study or interconnection agreement with MISO members) then MISO will take on a more direct role. I am looking for LGE to provide direct and certain guidance on if and when Peabody needs to deal with MISO instead of LGE. I will wait to get a response from LGE.

Also, any luck at getting the model to import? LGE's request for an additional two week review period to look at the impacts on their 345Kv system will not start until they get the model. Nearly two weeks has passed since our conference call and a phone mail message yesterday indicated that they still did not have access to the model. Let me know when you get the model to work out and LGEs review begins.

Scott Yaeger
Peabody Energy
314-342-7858

From:"Adams, Darrin" <darrin.adams@lgeenergy.com>
To: "'Terri L. Orloff'" <tlorloff@cai-engr.com>, Jerome Fohey <JFohey@midwestiso.org>
Subject: RE: Thoroughbred Energy Campus - Interconnection III, Case 271
Date sent: Fri, 5 Apr 2002 14:23:36 -0500
Copies to: "Adams, Darrin" <darrin.adams@lgeenergy.com>

Based upon discussions Mike and I have had with members of Transmission Planning at the Midwest ISO, we feel it is appropriate to include representatives from the MISO in this study from this point forward. LG&E Energy is required to submit to the MISO for review any plans for new interconnections above 100 kV, so we would need to discuss this with them ultimately. Although the interconnection option being considered (Option III) does not connect the IPP directly to LGEE's system, an interconnection is required between LGEE's system and Big Rivers' system in order to facilitate the generator. Additionally, this generation may have impacts on other MISO members' systems that MISO may need to evaluate.

So we ask that Rick or Terri send the results of the study to this point to Jerry Fohey at the MISO. Also, I think providing the base cases to Jerry would be helpful. I believe he is using PTI's PSS/E powerflow package, but you can confirm this with him. His email address is jfohey@midwestiso.org and his telephone number is (317) 249-5759. We would like Jerry and possibly other representatives from the MISO participate in future discussions regarding this study, and to be involved in the review of results. While we are not indicating that the MISO will take over our role in this study, we do feel that MISO representatives should be actively involved.

Please let me know if there are any comments or concerns.

Darrin Adams
Group Leader, Transmission Planning
LG&E Energy
(859) 367-1153
darrin.adams@lgeenergy.com

From:"Chris Bradley" <cbradley@bigrivers.com>
To: "Terri L. Orloff" <tlorloff@cai-engr.com>
Subject: Light Load Case
Date sent: Thu, 2 May 2002 08:42:33 -0500

Terri,

If it is not too late, I would like to change the Big Rivers generation dispatch and net export on the light load case. I would like to remove a 47 MW purchase from SIGECO (Vectren) and add 50 MW export to TVA. The net interchange should be 150 MW (up from 53 MW).

Add the generation to the Reid 161 kV bus (27551).

Thank You,

Chris Bradley
Senior Planning Engineer
Big Rivers Electric Corporation
Phone 270-827-2561 ext 2226

Signed IA generators in case:

Cinergy

- G008→250 MW each modeled as areas 221 and 222.
- G009→Bus 90033 08VIGO 345 modeled as cut into 08DRESSR 345 and 05VIGO 345
- G010→Bus 31 03SCRK M 345 modeled between 08DRESSR 345 and 08CAY CT 345
- G015→Buses 90066 thru 90067 (08BED XX VV.V), along with all the 900xx buses that start with 08BED
- G064→Buses 90051, 90052, 90053 (NOB MP X 13.8) (X = 1, 2, or 3) plus branches to connect to 08NOBLSV 69

IPL

- G025→Check the number of machines at Stout, I'm pretty sure that's the one here.

LGEE

- G002,3,16,17,18,69→ Machines 5-10 at 27013 11TRIMBL 345
- G004→ Withdrawn, don't worry about it
- G019→27338 11BUCKNR 345

SIPC

- G021,22→33389 1MRNG5 20

αβχδ Power

D		17.05.2002	Bombar						
C		13.03.2002	Bombar						
B		27.09. 01	Bombar						
A		18.09.01	Bombar						
Rev	AM or DM	Date	Name	Visa	Name	Visa	Name	Visa	
MODIFICATIONS			MODIFIED		CHECKED		APPROVED		

Contract N° :	Customer filing				
		Approved :	N.A.	N.A.	
		Checked :	10/07/01	A. TREMEL	
		Draw/Redr.	10/07/01	J. REIS	
reference name :		QA :	DATE	NAME	VISA
THOROUGHBRED			**GME 6 996 101**		
Title : IEEE TRANSFER DIAGRAM		Orginal No :N° 54-652 132			
STATIC EXCITATION		ALSTOM Power Electrical and Control Systems		Folios 1 / 6	
		Rev			

SUIVI DES MODIFICATIONS / *REVISION RECORDS*		
REV	DATE	DESCRIPTION
B	27.09.2001	Table for generator filled
C	12.03.2002	Precalculated value according to the rating 828.36 MW changed
D	17.05.2002	Generator rating has been changed therefore new Precalculated value

CONTENTS

For simulation use, Generator Voltage Ust, Voltage Reference and Field Voltage are defined in per unit values according to : IEEE TRANSACTIONS ON P.A.S., Vol. PAS-100, n°2,February 1981 A.V.R. Generator voltage is defined in relation to the rated voltage, Field values are defined in relation to the no load excitation sizes. Parameters are calculated in accordance with these per unit values and shown in small letters. In the A.V.R. itself they appear related to the physical values and shown in capital letters.

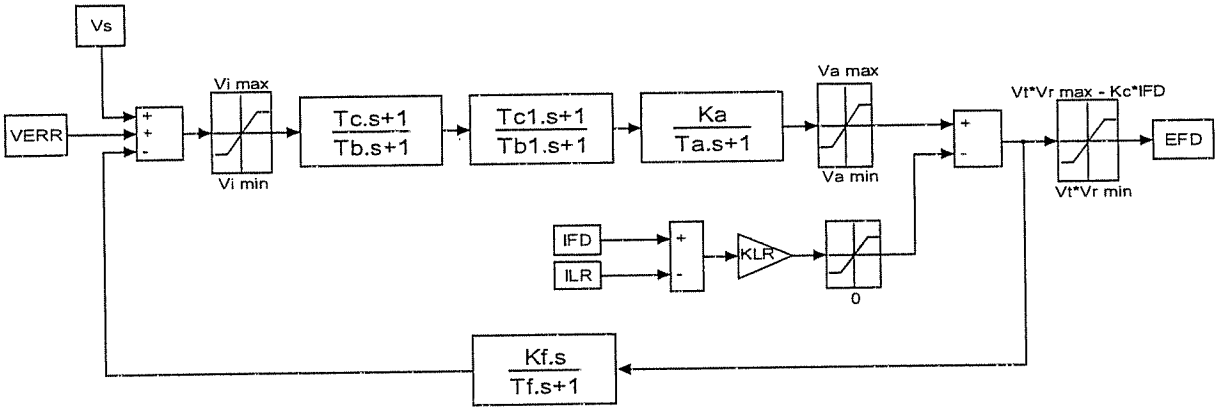
$\alpha\beta\chi\delta$

AUTOMATIC VOLTAGE REGULATOR

This diagram is drawn to fit with IEEE representation for simulation needs linked to the software used.

This is deteriorated representation of the actual equipment.

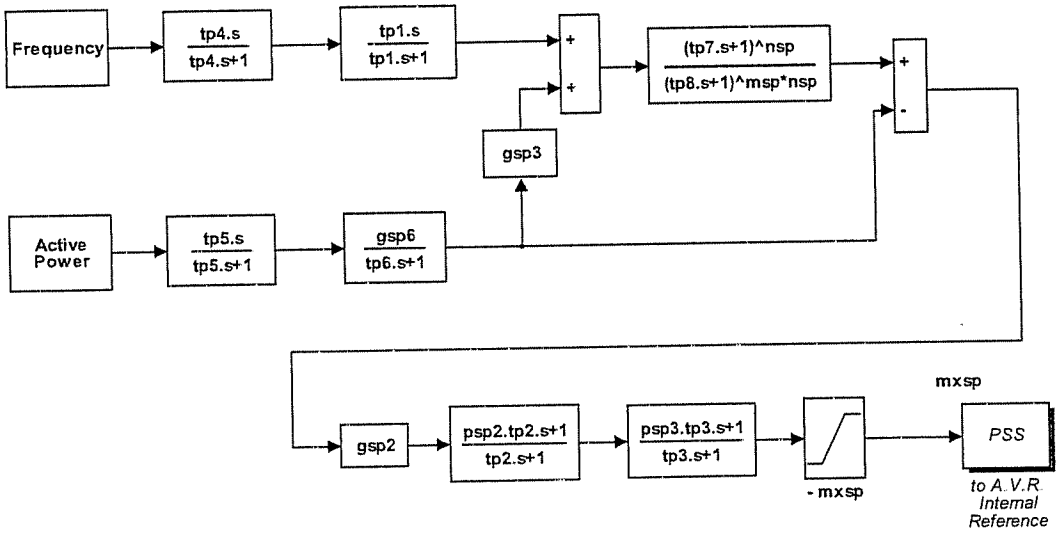
IEEE Type ST1A



PARAMETERS	Precalculated VALUE
Vi max (pu)	0.18
Vi min (pu)	-0.18
Tc (s)	5
Tb (s)	167
Tc1 (s)	1
Tb1 (s)	1
Ka (pu)	1000
Ta (s)	0.01
Va max (pu)	7.26
Va min (pu)	-5.56
Vr max (pu)	7,26
Vr min (pu)	-5.56
Kc (pu)	0
Kf (pu)	0
Tf (s)	1
KLR (pu)	0
ILR (pu)	1

For simulation use, Generator Voltage Ust, Voltage Reference and Field Voltage are defined in per unit values according to : IEEE TRANSACTIONS ON P.A.S., Vol. PAS-100, n°2,February 1981 A.V.R. Generator voltage is defined in relation to the rated voltage, Field values are defined in relation to the no load excitation sizes. Parameters are calculated in accordance with these per unit values and shown in small letters. In the A.V.R. itself they appear related to the physical values and shown in capital letters.

PSS 2A



POWER SYSTEM STABILISER acc. IEEE

PSS 2A			
Parameter	**Value**	**Unit**	**Description**
Gsp3	0 ... 100	pu	Power channel gain
Tp4	1 ... 50	s	Speed channel wash-out time constant
Tp5	1 ... 50	s	Power channel wash-out time constant
Gsp6	0 ... 100	pu	Power channel gain
Tp6	0.01 ... 50	s	Power channel time constant
Tp8	0.1 ... 10	s	Ramp track filter numerator time constant
Tp9	0.1 ... 10	s	Ramp track filter denominator time constant
Msp	1 ... 5	Integer	Ramp track filter parameter
Nsp	1 ...4	Integer	Ramp track filter parameter
Gsp2	0 ... 300	pu	PSS Gain
Tp1	1... 50	s	High pass filter time constant (Wash-out filter)
Psp2	0 ... 10	–	Phase lead/lag filter high frequency gain
Tp2	0.1 ... 10	s	Phase lead/lag filter time constant
Psp3	0 ... 10	–	Phase lead/lag filter high frequency gain
Tp3	0.1 ... 10	s	Phase lead/lag filter time constant
Mxsp	0 ... 0.2	pu	Correction signal limitation

For simulation use, Generator Voltage Ust, Voltage Reference and Field Voltage are defined in per unit values according to : IEEE TRANSACTIONS ON P.A.S., Vol. PAS-100, n°2,February 1981 A.V.R. Generator voltage is defined in relation to the rated voltage, Field values are defined in relation to the no load excitation sizes. Parameters are calculated in accordance with these per unit values and shown in small letters. In the A.V.R. itself they appear related to the physical values and shown in capital letters.

QUESTIONNAIRE PSS2A acc. IEEE 421.5 1992

These values must be known for the calculation:

- **Generator**

	VALUE ALSTOM POWER	**UNIT**
X_d	1.97	p.u.
x_{as}	0.177	p.u.
T'_{d0}	4.671	s
T'_d	0.637	s
f_n	60	Hz
H (generator only)	0.843	s
I	11470	kg * m^2
GD^2	450082	kp * m^2
Turbo or Salient Pole	Turbo	

- **Main transformer data:**

	VALUE CUSTOMER	**UNIT**
$S_{transfo}$		MVA
u_k		%

- **3-pole subtransient short circuit power of the line:**

	VALUE CUSTOMER	**UNIT**
$S_k''min$		GVA
$S_k''max$		GVA

For simulation use, Generator Voltage Ust, Voltage Reference and Field Voltage are defined in per unit values according to : IEEE TRANSACTIONS ON P.A.S., Vol. PAS-100, n°2,February 1981 A.V.R. Generator voltage is defined in relation to the rated voltage, Field values are defined in relation to the no load excitation sizes. Parameters are calculated in accordance with these per unit values and shown in small letters. In the A.V.R. itself they appear related to the physical values and shown in capital letters.

- **Adjustment of the AVR**

	VALUE **TO DETERMINE BY** ALSTOM POWER OR BY CUSTOMER	**UNIT**
V_0		p.u.
V_p		p.u.
V_∞		p.u.
T_a		s
T_b		s

- **Is the oscillation frequency known? (natural frequency of the system).**

	VALUE CUSTOMER	**UNIT**
F_{nat}		Hz

If the value is not known, the measurement is done at the commissining of the PSS.

For simulation use, Generator Voltage Ust, Voltage Reference and Field Voltage are defined in per unit values according to : IEEE TRANSACTIONS ON P.A.S., Vol. PAS-100, n°2,February 1981 A.V.R. Generator voltage is defined in relation to the rated voltage, Field values are defined in relation to the no load excitation sizes. Parameters are calculated in accordance with these per unit values and shown in small letters. In the A.V.R. itself they appear related to the physical values and shown in capital letters.

Big Rivers Electric Corporation

Memorandum

Feasibility Study for Peabody Thoroughbred Energy Campus 6/08/01 Progress Report

On March 30, 2001, Peabody Group (Peabody) requested the completion of a Feasibility Study. This executed Interconnection Study Letter Agreement specified a potential generation addition (one or two 750 MW units) in Muhlenberg County near Central City, Kentucky.

The initial focus of the Feasibility Study was to determine the connection requirements for one or both unit additions. This study includes power flow analyses with normal and single contingency conditions (one transmission line or transformer outaged with the outage of one generating unit). Cost estimates were not prepared as part of this initial evaluation.

The impact that the generation addition may have on the available transmission capacity (ATC) has not yet been analyzed (this includes any impact on Big Rivers' ability to meet existing ATC commitments as well as any ATC which may be available for the new generation). An ATC analysis would require an indication of the desired transmission service (OASIS request including type of service, amount, path, etc.).

750 MW Generation Addition Options Summary:

The purpose of this analysis was to identify any system problems which might result from the connection of one 750 MW generating unit to the Big Rivers transmission system. Various interconnection scenarios were studied. Each scenario and the study results are described below:

Base Case (no additional generation) To begin the study, the Big Rivers transmission system (with no Peabody generating units added) was studied. These study results were used as a benchmark for comparison with each scenario. These studies indicated that the existing Big Rivers transmission system is well matched to its generation and load levels (little or no excess transmission capacity above that already sold is available).

750 MW Connected to Wilson with no Transmission Improvements As expected, these studies showed multiple overloads with normal and contingency conditions. The overloaded facilities included the 58.9 mile 161 kV circuit from Reid to Hopkins County to Barkley (140%), the 30.7 mile 161 kV circuit from Coleman EHV to National Aluminum to Skillman to New Hardinsburg (146%), the 8 mile 161 kV circuit from Wilson to Green River (155%), and the 6.4 mile 161 kV circuit from Coleman to Newtonville (163%).

750 MW Connected to Paradise with no Transmission Improvements This scenario was run to

determine the expected impact of a 750 MW generation addition tied only to the Paradise 500 kV bus. No modifications of the Big Rivers system were modeled. These studies showed no significant impact to the Big Rivers transmission system.

750 MW Connected to Wilson and Paradise This scenario included the proposed generator connected to both the Wilson 345 kV bus and the Paradise 500 kV bus. The preliminary study results showed overloads during an outage of the Paradise to Montgomery 500 kV line as well as during an outage of the Peabody to Paradise connection. The other contingencies studied showed acceptable Big Rivers system conditions.

The overloaded facilities included the 58.9 mile 161 kV circuit from Reid to Hopkins County to Barkley (146%), the 30.7 mile 161 kV circuit from Coleman EHV to National Aluminum to Skillman to New Hardinsburg (137%), the 8 mile 161 kV circuit from Wilson to Green River (194%), and the 6.4 mile 161 kV circuit from Coleman to Newtonville (164%). In addition, the line loadings in the Green River plant area (Kentucky Utilities) should be analyzed.

750 MW Connected to Wilson with the addition of a Coleman EHV to Rockport Interconnection This scenario included the proposed generator connected to the Wilson 345 kV bus with no Paradise connection. In addition, a 345 kV interconnection from Coleman EHV to AEP's Rockport plant was modeled (345/765 kV transformer required at Rockport). These studies showed multiple overloads with normal and contingency conditions.

The overloaded facilities included the 22.2 mile 161 kV circuit from Reid to Hopkins County (105%), the 30.7 mile 161 kV circuit from Coleman EHV to National Aluminum to Skillman to New Hardinsburg (123%), the 8 mile 161 kV circuit from Wilson to Green River (150%), and the 6.4 mile 161 kV circuit from Coleman to Newtonville (137%). In addition, the line loadings in the Green River plant area (Kentucky Utilities) should be analyzed.

750 MW Connected to Wilson and Paradise with a Coleman EHV to Rockport Interconnection This scenario included the proposed generator connected to both the Wilson 345 kV bus and the Paradise 500 kV bus. In addition, a 345 kV interconnection from Coleman EHV to AEP's Rockport plant was modeled (345/765 kV transformer required at Rockport). The preliminary study results showed overloads during an outage of the Paradise to Montgomery 500 kV line, the Peabody to Paradise connection, and the Rockport to Jefferson 765 kV line. The other contingencies studied showed acceptable Big Rivers system conditions.

The overloaded facilities included the 22.2 mile 161 kV circuit from Reid to Hopkins County (114%), the 2.7 mile 161 kV circuit from Coleman EHV to National Aluminum (102%), the 8 mile 161 kV circuit from Wilson to Green River (160%), the 6.4 mile 161 kV circuit from Coleman to Newtonville (109%), and the 39.1 mile 345 kV circuit from Wilson to Coleman EHV (113% overload of terminal equipment). In addition, the line loadings in the Green River plant area (Kentucky Utilities) should be analyzed.

Because of the impact the generation addition may have on the regional transmission system, study results and generation addition plans should be shared with neighboring utilities. Through the sharing of study results, other contingencies or scenarios that impact the Big Rivers system may be identified. The evaluation of any additional scenarios identified (as well as the actual sharing of the results), will be completed in the next study phase (Detailed Interconnection Study). Short-circuit studies and stability studies will also be prepared as part of the Detailed Interconnection Study.

1500 MW Generation Addition Options Summary:

The purpose of this analysis was to identify any system problems which might result from the connection of two 750 MW generators to the Big Rivers and TVA transmission systems. Two interconnection scenarios were studied. Each scenario and the study results are described below:

750 MW Connected to Wilson, 750 MW Connected to Paradise with a Coleman EHV to Rockport Interconnection With this scenario, one generating unit was connected to the 345 kV Wilson bus and one generating unit was separately connected to the Paradise 500 kV bus (the units were not connected to each other). In addition, a 345 kV interconnection from Coleman EHV to AEP's Rockport plant was modeled (345/765 kV transformer required at Rockport). These studies showed multiple overloads with normal and contingency conditions.

The overloaded facilities included the 22.2 mile 161 kV circuit from Reid to Hopkins County (105%), the 30.7 mile 161 kV circuit from Coleman EHV to National Aluminum to Skillman to New Hardinsburg (123%), the 8 mile 161 kV circuit from Wilson to Green River (150%), and the 6.4 mile 161 kV circuit from Coleman to Newtonville (137%). In addition, the line loadings in the Green River plant area (Kentucky Utilities) should be analyzed.

(2) 750 MW Units Connected to Wilson and Paradise with a Coleman EHV to Rockport Interconnection With this scenario, one generating unit was connected to the 345 kV Wilson bus and one generating unit was connected to the Paradise 500 kV bus. The two units were also connected to each other creating a Wilson to Peabody to Paradise circuit. In addition, a 345 kV interconnection from Coleman EHV to AEP's Rockport plant was modeled (345/765 kV transformer required at Rockport). These studies showed multiple overloads with normal and contingency conditions.

The overloaded facilities included the 58.9 mile 161 kV circuit from Reid to Hopkins County to Barkley (140%), the 30.7 mile 161 kV circuit from Coleman EHV to National Aluminum to Skillman to New Hardinsburg (110%), the 8 mile 161 kV circuit from Wilson to Green River (192%), the 6.4 mile 161 kV circuit from Coleman to Newtonville (123%) and the 39.1 mile 345 kV circuit from Wilson to Coleman EHV (157% overload of terminal equipment). In addition, the line loadings in the Green River plant area (Kentucky Utilities) should be analyzed.

750 MW Connected to Wilson 345 kV, 750 MW Connected to Paradise 500 kV, a 345 kV OMU Interconnection and a 161 kV Wilson to Paradise Interconnection With this scenario, one generating unit was connected to the 345 kV Wilson bus and one generating unit was separately connected to the Paradise 500 kV bus (the units were not connected to each other). The Wilson to Coleman EHV 345 kV line was looped through the Owensboro Municipal Utilities (OMU) 345 kV Elmer Smith Station. In addition, two 161 kV Peabody to Paradise Interconnections were modeled (both tied to the Wilson connected Peabody unit).

The only Big Rivers overload identified was on the Wilson to Coleman EHV 345 kV line (Wilson to Smith portion). This limitation is due to terminal equipment (not a conductor limitation). Improvements necessary to eliminate this limitation should be reasonable. However, an overload of the Smith to Hardin (KU) 345 kV line was seen. In addition, heavy loadings were seen on the Wilson to Green River 161 kV interconnection (97%) during an outage of Wilson to Smith 345 kV circuit. This may result in overloads of the 138 kV and 161 kV systems in the Green River area.

Conclusion:

The last option (OMU 345 kV interconnection and Paradise 161 kV interconnections) seems to be the most promising alternative with respect to the Big Rivers system. Beginning the Detailed Interconnection Study with this interconnection option seems to be a reasonable next step. This detailed study will be completed by a consultant and should include input from OMU and LGE (KU). The Detailed Interconnection Study should include additional power flow studies (to more fully evaluate the alternative and its impact on other systems), stability studies, and short-circuit studies. Additional alternatives not included in the Feasibility Study may also be analyzed as part of the Detailed Interconnection Study.