

**TRANSMISSION SYSTEM REVIEW**  
**VOLUME II**

**KENTUCKY PIONEER ENERGY**  
**CASE NO. 2002-00312**

Prepared for:

**Kentucky State Board  
on Electric Generation  
and Transmission Siting**

Prepared by:

**CAI** Commonwealth Associates, Inc.  
engineers • consultants • construction managers

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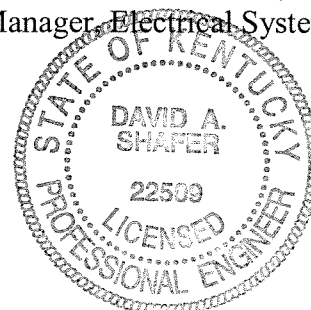
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**APPENDIX**  
**POWER FLOW DATA AND RESULTS**



## **STUDY METHODOLOGY**

The power flow study was conducted using CAI's TRANSMISSION 2000<sup>®</sup> Power Flow (PFLOW) program and its associated Contingency Processor (CP). CP is an automated tool that controls the power flow contingency calculation and summarizes the results. Normal system and first contingency analyses were performed using CP. The contingency list is generated automatically and includes a total of 230 contingencies and 203 buses. Contingencies (outages) were evaluated for all power flow study cases. The monitored region includes 321 buses and covers six utility areas. The Area and Zone report identifies the number of contingent and monitored buses for the four areas included in this study. A Contingency List and Area and Zone report are contained within the detailed power flow results.

Reports for each case are contained in the detailed power flow results as follows:

- Case Comparison Reports
- Overload Summary Report – all overloaded facilities and the number of times overloaded
- Normal System Overload Summary Report
- Undervoltage Summary Report
- Overvoltage Summary Report
- Contingency Summary Report – each contingency and all overloads it causes
- Contingency List
- Various other summary reports

The results of the Phase II study cases (Cases 200 and 210) and the cases that include CT #4 and #5 with EA Gilbert and KPE (Cases 300, 310 and 410) are compared against the results of the Phase I study Case 101. These Case Comparison Summary Reports are included in the detailed power flow results.

### **Planning Criteria**

The following planning criteria are used to evaluate the power system:

- Normal System Conditions (NS)
  - Loading on transmission lines and transformers should be less than 100 percent of their normal ratings
  - Bus voltages should be no less than 95 percent or greater than 105 percent of nominal
- Single Contingency Conditions
  - Loading on transmission lines and transformers should be less than 100 percent of their emergency ratings
  - Bus voltages should be no less than 90 percent or greater than 105 percent of nominal (EKPC planning criterion for bus voltages was no less than 92.5 percent)

Single contingency conditions are defined as the outage of any single transmission facility. The contingencies used to study the system include outages of the bulk power transmission lines and transformers in a wide neighborhood around the new generation site.

## CASE COMPARISON CHARTS

To provide an efficient means for evaluating comparable cases, overloaded facilities are grouped in these exhibits in order of worst overloads at the top of Group 1, to less significant overloads at the bottom of Group 2. These groups are described as follows:

*Group 1 - New Overloads (new generation caused an overload)*

Group 1 facilities are those that are overloaded in one or more of the Phase II and EA Gilbert study cases but were not overloaded in the Phase I cases. The overloads on these facilities are attributed to the additions made in the study cases (i.e., adding the 268 MW Gilbert generator and/or the 540 MW KPE generators).

*Group 2 - Pre-existing overloads with increased overloading caused by the new generation*

Group 2 facilities are those that are overloaded in both the Phase I cases and the study cases but showed an increased overloading in the study cases. Depending upon the magnitude of the change and the number of contingencies that cause these facilities to overload, these facilities may or may not require mitigation.

*Group 2E - Nearly Equal (+2.5 percent, Part of Group 2)*

One of two subgroups. Group 2E facilities are those that are overloaded in the Phase I cases and the study cases, but the increase is less than 2.5 percent. Typically, we consider a change of less than 2.5 percent as not sufficient to attribute the problem to the additions made in the study cases. Therefore, these facilities are not further evaluated in this analysis.

*Group 3 - Pre-existing overloads with decreased overloading caused by the new generation*

The Group 3 facilities are those that are overloaded in both the Phase I cases and the study cases but the study cases showed overloads that were the same as or less than the overloads in the Phase I case. These facilities demonstrate pre-existing overloads that were either unchanged or improved by the additions made in the study cases and, therefore, are not a consequence of the changes in the study cases and not subject to further consideration in this analysis.

*Group 3E - Nearly Equal (-2.5 percent, Part of Group 3)*

Group 3E facilities are those that are overloaded in both the Phase I cases and the study cases and were either unchanged or reduced by less than 2.5 percent in the study cases. Typically, we consider a change of less than 2.5 percent as not significant and, therefore, consider that the reduced loading is not attributed to the new facilities. However, since the overload is a pre-existing condition, it is not further considered in this analysis.

*Group 4 - Pre-existing overloads with overloading eliminated by the new generation*

Group 4 facilities are those where the overloads in the Phase I cases were corrected by the changes or additions made in the study cases. The facilities in this group were improved and benefit from the additions made in the study cases.

**Transmission Facility Data for Power Flow Studies  
Generation Added at JK Smith: CT's #4 and #5 (142 MW) and Kentucky Pioneer (540 MW)  
and Spurlock: EA Gilbert Unit 3 (268 MW)**

Transmission Lines		Base kV	%R	%X	%B	Length (mi)	Conductor Size	Rating (MVA)	
Item	Number							Normal	Emergency
	1.1	138	0.01	0.05	0.02		259	287	287
	1.1	138	0.01	0.05	0.02		259	287	287
	1.2 / 3.2	138				12			
	JK Smith - Union City	138	0.62	4.07	1.11	10.5	954 MCM ACSR	251	311
	Union City - Lake Reba Tap	138	0.08	0.53	0.14	1.5	954 MCM ACSR	251	303
	1.4	138	0.17	1.08	0.31	2.75	477 MCM ACSR	252	252
	2.8	69				0.77			
	LGEE Clark County - Parker Seal	69	0.145**	0.73**	0.016**	0.54**	795 MCM ACSR	75**	90**
	Clark County - Sylvania	69	0.062**	0.329**	0.007**	0.23**	795 MCM ACSR	112**	138**
	Sylvania - Parker Seal								

Transformers		Base kV	%R	%X	Tap Ratio	Rating (MVA)	
Item	Number					Normal	Emergency
	1.3	161 / 138	0.10	2.92	1.0	202	223
	2.6	138 / 69	0.3**	8.71**	0.975**	72**	79**
	2.6	138 / 69	0.20	8.90	0.975	90	104
	2.7	138 / 69	0.00	14.30	0.975	40	48
	Farmers Substation						
	New Transformers						
	2.1 / 3.1	345 / 138	0.039**	2.126**	1**	434**	580**

New Transmission Lines		Base kV	%R	%X	%B	Length (mi)	Conductor Size	Rating (MVA)	
Item	Number							Normal	Emergency
	2.2	138	0.023*	0.201*	0.134*	0.8	2-954 MCM ACSR	425*	640*
	2.3 / 3.3	138	0.99**	6.5**	1.8**	12	954 MCM ACSR	251**	311**
	2.4 / 3.4	345	0.08**	0.86**	14.87**	17	2-954 MCM ACSR	717**	717**
	KPE - Avon								
	New Transmission Lines for Loop-in to Spurlock (EA Gilbert Unit No. 3)								
	3.5	345	0.15**	1.65**	25.51**	8.9 added	2-954 MCM ACSR	1195**	1315**
	Spurlock - Zimmer (Double Circuit)								
	3.5	345	0.04**	0.49**	7.87**	8.9 added	2-954 MCM ACSR	1195**	1315**
	Spurlock - Stuart (Double Circuit)								

Notes: 1. Facilities shown highlighted have been changed from Case 100s04  
2. Second Fawkes 138 kV Tie is identical to circuit 1.  
3. \* = Line impedances and ratings were calculated by CAI  
4. \*\* = Impedances and ratings were taken from 2009 Summer NERC/MMWG case

## Case Comparison Summaries

# Case Comparison Summary

## Case101s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - with CT 4 & CT 5  
Includes All Phase I Transmission  
2/12/2003

M:\PROJ\Kypsc\267003\300\_Calculations\301\_PFlow\_Results\Case101s04.cft

## Case200s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - CT4&5 Add KPE  
All Phase II Transmission and Spurlock2/  
2/12/2003

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### **Contingency**

230 contingencies used from existing Contingency Tables

### **Overload Criteria**

Rating Number 2 >= 100%

Skip Group 5 (Heavy Load)

### **Monitored Set**

monitor  
301 buses and 492 lines

monitor  
311 buses and 506 lines

## Statistics

### ***By Impact Summary***

- 1 New Overloads in Case200s04 not in Case101s04 = 9 violations
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case200s04 = 2
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case200s04 = 4
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case200s04 = 0
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case200s04 = 1

### ***By Cause Summary***

- 1 New Overloads in Case200s04 not in Case101s04 = 17 violations on 9 branches
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case200s04 = 3 on 3 branches
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case200s04 = 7 on 5 branches
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case200s04 = 0 on 0 branches
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case200s04 = 5 on 2 branches

### ***Total Overloads***

- In Case101s04 = 15 violations on 10 branches
- In Case200s04 = 27 violations on 17 branches

**TRANSMISSION 2000 Contingency Processor** **Overload Comparison of Case 101s04 with Case200s04**  
By Impact

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

2004 Summer - with CT 4 CT 5 2004 Summer - CT45 Add KPE

Includes All Phase I Transmission All Phase II Transmission and Spurlock2/

2/12/2003 2/12/2003

Branches Exceeding 100% of Emergency Rating										Case101s04				Case200s04			
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings Norm Emer	Cont ID	2004 Summer - with CT 4		2004 Summer - CT45 Add KPE		2004 Summer - with CT 4		2004 Summer - CT45 Add KPE			
								System%	Norm% Emer%	System%	Norm% Emer%	System%	Norm% Emer%	System%	Norm% Emer%		
<b>Group 1 New Overloads</b>																	
27358 11SALT L	27383 11SPENC	1	69	211	211	22	115	10.3	---	---	0/0	59.4	121.7	121.7	1/2		
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72	422	27.9	112.4	90.9	0/0	71	142.5	115.6	2/1		
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	95	62.5	---	---	0/0	96	130.6	106.3	3/0		
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	157	73.4	116.6	97.5	0/0	77.3	122.6	102.6	0/2		
27220 11LK REB	27231 11LR TAP	1	138	211	211	149	125	72.7	111.5	97.1	0/0	76.5	117.3	102.2	0/1		
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	465	23.8	94.8	94.8	0/0	20.2	101.9	101.9	0/2		
27220 11LK REB	27221 11LK REB	1	138-69	211	211	149	125	72.5	110.9	96.7	0/0	76.3	116.7	101.7	0/1		
27382 11SPENC	27383 11SPENC	1	138-69	211	211	56	180	48	---	---	0/0	63.7	110.9	101.1	0/1		
27030 11CAVE R	27358 11SALT L	1	69	211	211	22	115	14.5	---	---	0/0	43.6	100.2	100.2	0/1		
<b>Group 2 Pre-existing Overload in Case1 with Increased Overloading in Case2</b>																	
27221 11LK REB	27340 11RICHMO	1	69	211	211	56	125	28	105.5	105.5	1/0	32.4	113.8	113.8	1/0		
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	175	92.1	141.1	116.4	5/0	77.1	145.4	120.0	1/0		
<b>Group 3 Pre-existing Overload in Case1 with Decreased Overloading in Case2</b>																	
E 29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	417	28.8	122.4	101.1	0/2	32.1	122.4	101.1	0/2		
E 27117 11FAWKES	27339 11RICH S	1	69	211	211	72	200	63.2	139.9	139.9	1/2	61.7	139.8	139.8	1/2		
E 26986 11BEREA	27221 11LK REB	1	69	211	211	72	247	71.7	138.5	138.5	1/1	73.2	138.4	138.4	2/0		
E 27117 11FAWKES	27272 11N.MADS	1	69	211	211	56	260	27.6	128.8	128.8	1/0	41.4	128.4	128.4	1/0		
<b>Group 4 Pre-existing Overload in Case1 with Overloading Eliminated in Case2</b>																	
27451 11WINC S	27452 11WINCHS	1	69	211	211	73	97	73.7	114.8	104.8	0/1	53.1	97.8	89.3	0/0		

**Notes:**

- '---' = Less than the Minimum Reporting Level of 85%
- '\*\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
- E = Pre-existing overload that was changed by less than 2.5% in the new case
- Overloads are based on 100% of Rating 2
- Count of Contingencies Causing Overloads (A/B Stats)  
A = Serious Overload > 105%  
B = Overloaded Facility between 100% and 105% of Rated Capability

2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

2004 Summer - CT45 Add KPE

Includes All Phase I Transmission

All Phase II Transmission and Spurlock2/

2/12/2003

2/12/2003

Branches Exceeding 100% of Emergency Rating																	
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Cont	Case101s04			Case200s04					
						Norm	Emer		2004 Summer - with CT 4	CT 5	2004 Summer - CT45 Add KPE	Normal	System%	First Contingency	Norm%	Emer%	A/B
<b>Group 1 New Overloads</b>																	
Not Overloaded																	
27358	11SALT L	27383	11SPENC	1	69	211	22	22	115	10.3	---	---	0/0	59.4	121.7	121.7	1/2
27037	11CLARK	27397	11SYLVAN	1	69	211	72	89	422	27.9	112.4	90.9	0/0	71.0	142.5	115.6	2/1
26959	11AOSMTH	27383	11SPENC	1	69	211	48	59	95	62.5	---	---	0/0	96.0	130.6	106.3	3/0
27116	11FAWKES	27117	11FAWKES	1	138-69	211	143	171	160	73.4	116.6	97.5	0/0	77.3	122.6	102.6	0/2
27220	11LK REB	27231	11LR TAP	1	138	211	149	171	125	72.7	111.5	97.1	0/0	76.5	117.3	102.2	0/1
27115	11FAWK T	27231	11LR TAP	1	138	211	163	163	465	23.8	94.8	94.8	0/0	20.2	101.9	101.9	0/2
27220	11LK REB	27221	11LK REB	1	138-69	211	149	171	125	72.5	110.9	96.7	0/0	76.3	116.7	101.7	0/1
27382	11SPENC	27383	11SPENC	1	138-69	211	56	64	180	48.0	---	---	0/0	63.7	110.9	101.1	0/1
27030	11CAVER	27358	11SALT L	1	69	211	22	22	115	14.5	---	---	0/0	43.6	100.2	100.2	0/1
<b>Group 2 Pre-existing, Increased Loading</b>																	
Overload 1 <less than<																	
27221	11LK REB	27340	11RICHMO	1	69	211	56	56	125	28.0	105.5	105.5	1/0	32.4	113.8	113.8	1/0
27347	11RODBRN	27348	11RODBRN	1	138-69	211	33	40	242	92.1	138.4	114.2	1/0	77.1	145.4	120.0	1/0
26986	11BEREA	27221	11LK REB	1	69	211	72	72	125	71.7	102.7	102.7	0/1	73.2	105.9	105.9	1/0
E	27117	11FAWKES	27339	11RICH S	69	211	72	72	157	63.2	103.7	103.7	0/2	61.7	104.2	104.2	0/2
<b>Group 3 Pre-existing, Decreased Loading</b>																	
Overload 1 >=greater than or equal to>= Overload 2																	
E	29203	20BKR LN	29360	20HOLLWJ	69	220	57	69	417	28.8	122.4	101.1	0/2	32.1	122.4	101.1	0/2
E	27117	11FAWKES	27339	11RICH S	69	211	72	72	200	63.2	139.9	139.9	1/0	61.7	139.8	139.8	1/0
E	26986	11BEREA	27221	11LK REB	69	211	72	72	247	71.7	138.5	138.5	1/0	73.2	138.4	138.4	1/0
E	27117	11FAWKES	27272	11N.MADS	69	211	56	56	260	27.6	128.8	128.8	1/0	41.4	128.4	128.4	1/0
<b>Group 4 Pre-existing, Eliminated Overloading</b>																	
Overloaded																	
Not Overloaded																	
27451	11WING S	27452	11WINCHS	1	69	211	73	80	97	73.7	114.8	104.8	0/1	53.1	---	---	0/0
27347	11RODBRN	27348	11RODBRN	1	138-69	211	33	40	117	92.1	132.9	109.6	4/0	77.1	117.7	97.1	0/0

Branches Exceeding 100% of Emergency Rating														
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Cont	Case101s04					
						Norm	Emer		2004 Summer - with CT 4 CT 5		Case200s04			
								ID	System%	Norm%	Emer%	System%	Norm%	Emer%

**Notes:**

- '---' = Less than the Minimum Reporting Level of 85%
- '\*\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
- E = Pre-existing overload that was changed by less than 2.5% in the new case
- Overloads are based on 100% of Rating 2
- Count of Contingencies Causing Overloads (A/B Stats)  
 A = Serious Overload > 105%  
 B = Overloaded Facility between 100% and 105% of Rated Capability



# Case Comparison Summary

## Case101s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
 2004 Summer - with CT 4 & CT 5  
 Includes All Phase I Transmission  
 2/12/2003

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 01\_PFlow\_Results\Case101s04.cft

## case210s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
 2004 Summer - CT4&5 Add KPE  
 All Phase II Transmission and Spurlock2/  
 2/12/2003

M:\PROJ\Kypsc\267003\300\_Calculations\3  
 01\_PFlow\_Results\case210s04.cft

### Contingency

230 contingencies used from existing Contingency Tables

### Overload Criteria

Rating Number 2 >= 100%

Skip Group 5 (Heavy Load)

### Monitored Set

monitor  
 301 buses and 492 lines

monitor  
 311 buses and 506 lines

## Statistics

### *By Impact Summary*

- 1 New Overloads in case210s04 not in Case101s04 = 15 violations
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in case210s04 = 2
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in case210s04 = 4
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in case210s04 = 0
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in case210s04 = 1

### *By Cause Summary*

- 1 New Overloads in case210s04 not in Case101s04 = 25 violations on 15 branches
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in case210s04 = 5 on 3 branches
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in case210s04 = 7 on 5 branches
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in case210s04 = 0 on 0 branches
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in case210s04 = 3 on 2 branches

### *Total Overloads*

- In Case101s04 = 15 violations on 10 branches
- In case210s04 = 37 violations on 23 branches

**TRANSMISSION 2000 Contingency Processor** **Overload Comparison of Case101s04 with case210s04**  
By Impact

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

2004 Summer - with CT 4 CT 5  
2004 Summer - CT45 Add KPE

Includes All Phase I Transmission  
All Phase II Transmission and Spurlock2/

2/12/2003

Branches Exceeding 100% of Emergency Rating										Case101s04				case210s04							
From Bus	To Bus	Ckt	Base kV	Area	Zone	Norm	Emer	Cont ID	Rating	2004 Summer - with CT 4	CT 5	2004 Summer - CT45 Add KPE	Normal	System%	First Contingency	Emer%	Normal	System%	First Contingency	Emer%	
<b>Group 1 New Overloads</b>																					
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72	89	422		27.9	112.4	90.9	0/0	76.1	150.9	122.4	3/0				
27113 11FARMER	27264 11MORH W	1	69	211	211	48	48	172		41.2	85.6	85.6	0/0	72.9	119.9	119.9	1/0				
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	465		23.8	94.8	94.8	0/0	21.6	114.9	114.9	2/0				
27358 11SALT L	27383 11SPENC	1	69	211	211	22	22	115		10.3	---	---	0/0	58.3	113.9	113.9	3/0				
29230 20BOONST	29282 20DALE	1	138	220	220	252	252	340		36.3	---	---	0/0	56.7	113.0	113.0	1/0				
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	95		62.5	---	---	0/0	101.3	136.8	111.3	***				
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	157		73.4	116.6	97.5	0/0	82.1	129.7	108.5	2/0				
27220 11LK REB	27231 11LR TAP	1	138	211	211	149	171	125		72.7	111.5	97.1	0/0	80.3	123.6	107.7	1/0				
27220 11LK REB	27221 11LK REB	1	138-69	211	211	149	171	125		72.5	110.9	96.7	0/0	80.1	122.9	107.1	1/0				
27229 11LOUDON	27228 11LOUD B	1	138-69	211	211	112	129	162		76.1	114.2	99.2	0/0	80.9	121.3	105.3	1/0				
27112 11FARMER	27113 11FARMER	1	138-69	211	211	40	48	172		66.6	110.9	92.4	0/0	77.1	125.5	104.6	0/1				
27330 11PRKRSE	27452 11WINCHS	1	69	211	211	72	79	422		10.2	---	---	0/0	39.8	114.6	104.4	0/2				
27345 11ROCKWE	27452 11WINCHS	1	69	211	211	63	63	322		27.3	---	---	0/0	68.8	103.8	103.8	0/1				
27382 11SPENC	27383 11SPENC	1	138-69	211	211	56	64	180		48	---	---	0/0	65.1	113.4	103.3	0/1				
27194 11KENTON	29575 20SPURLK	2	138	220	220	227	280	607		57.6	110.6	89.7	0/0	65.6	125.5	101.8	0/1				
<b>Group 2 Pre-existing Overload in Case1 with Increased Overloading in Case2</b>																					
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	175		92.1	141.1	116.4	5/0	100.8	178.4	147.2	***				
27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	125		28	105.5	105.5	1/0	34.5	120.7	120.7	1/0				
<b>Group 3 Pre-existing Overload in Case1 with Decreased Overloading in Case2</b>																					
E	29203 20BKR LN	1	69	220	220	57	69	417		28.8	122.4	101.1	0/2	16.9	122.4	101.1	0/2				
E	27117 11FAWKES	1	69	211	211	72	72	200		63.2	139.9	139.9	1/2	61.3	139.8	139.8	3/0				
E	26986 11BEREA	1	69	211	211	72	72	247		71.7	138.5	138.5	1/1	73.7	138.4	138.4	2/0				
E	27117 11FAWKES	1	69	211	211	56	56	260		27.6	128.8	128.8	1/0	52.2	128.5	128.5	1/0				
<b>Group 4 Pre-existing Overload in Case1 with Overloading Eliminated in Case2</b>																					
27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	97		73.7	114.8	104.8	0/1	59.2	106.9	97.5	0/0				

Branches Exceeding 100% of Emergency Rating													
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings Norm Emer	Cont ID	Case101s04			case210s04		
								2004 Summer Normal System%	First Contingency Norm% Emer%	CT 4 A/B	CT 5 A/B	2004 Summer - Normal System%	First Contingency Norm% Emer%

**Notes:**

1. '---' = Less than the Minimum Reporting Level of 85%
2. '\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. E = Pre-existing overload that was changed by less than 2.5% in the new case
4. Overloads are based on 100% of Rating 2
5. Count of Contingencies Causing Overloads (A/B Stats)  
 A = Serious Overload > 105%  
 B = Overloaded Facility between 100% and 105% of Rated Capability

**TRANSMISSION 2000 Contingency Processor** **Overload Comparison of Case101s04 with case210s04**  
Summary By Cause

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**  
 2004 Summer - with CT 4 CT 5  
 2004 Summer - CT45 Add KPE  
 All Phase II Transmission and Spurlock2/  
 2/12/2003

Branches Exceeding 100% of Emergency Rating										Case101s04				case210s04			
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Cont ID	2004 Summer - with CT 4 CT 5		2004 Summer - CT45 Add KPE		First Contingency				
						Norm	Emer		Normal System%	First Contingency Norm%	Emer% A/B	Normal System%	First Contingency Norm%	Emer% A/B			
<b>Group 1 New Overloads</b>																	
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72	89	595	27.9	112.4	90.9	0/0	76.1	150.9	122.4	3/0	
27113 11FARMER	27264 11MORH W	1	69	211	211	48	48	172	41.2	85.6	85.6	0/0	72.9	119.9	119.9	1/0	
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	465	23.8	94.8	94.8	0/0	21.6	114.9	114.9	2/0	
27358 11SALT L	27383 11SPENC	1	69	211	211	22	22	115	10.3	---	---	0/0	58.3	113.9	113.9	3/0	
29230 20BOONST	29282 20DALE	1	138	220	220	252	252	340	36.3	---	---	0/0	56.7	113.0	113.0	1/0	
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	95	62.5	---	---	0/0	101.3	136.8	111.3	***	
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	160	73.4	116.6	97.5	0/0	82.1	129.7	108.5	2/0	
27220 11LK REB	27231 11LR TAP	1	138	211	211	149	171	125	72.7	111.5	97.1	0/0	80.3	123.6	107.7	1/0	
27220 11LK REB	27221 11LK REB	1	138-69	211	211	149	171	125	72.5	110.9	96.7	0/0	80.1	122.9	107.1	1/0	
27229 11LOUDON	27228 11LOUD B	1	138-69	211	211	112	129	162	76.1	114.2	99.2	0/0	80.9	121.3	105.3	1/0	
27112 11FARMER	27113 11FARMER	1	138-69	211	211	40	48	172	66.6	110.9	92.4	0/0	77.1	125.5	104.6	0/1	
27330 11PRKRSE	27452 11WINCHS	1	69	211	211	72	79	595	10.2	---	---	0/0	39.8	114.6	104.4	0/2	
27345 11ROCKWE	27452 11WINCHS	1	69	211	211	63	63	322	27.3	---	---	0/0	68.8	103.8	103.8	0/1	
27382 11SPENC	27383 11SPENC	1	138-69	211	211	56	64	180	48.0	---	---	0/0	65.1	113.4	103.3	0/1	
27194 11KENTON	29575 20SPURLK	2	138	220	220	227	280	607	57.6	110.6	89.7	0/0	65.6	125.5	101.8	0/1	
<b>Group 2 Pre-existing, Increased Loading</b>																	
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	242	92.1	138.4	114.2	3/0	100.8	178.4	147.2	***	
27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	125	28.0	105.5	105.5	1/0	34.5	120.7	120.7	1/0	
26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	125	71.7	102.7	102.7	0/1	73.7	108.5	108.5	1/0	
E	27117 11FAWKES	27339 11RICH S	69	211	211	72	72	157	63.2	103.7	103.7	0/2	61.3	105.6	105.6	2/0	
<b>Group 3 Pre-existing, Decreased Loading</b>																	
E	29203 20BKR LN	29360 20HOLLWJ	69	220	220	57	69	445	28.8	122.4	101.1	0/2	16.9	122.4	101.1	0/2	
E	27117 11FAWKES	27339 11RICH S	69	211	211	72	72	200	63.2	139.9	139.9	1/0	61.3	139.8	139.8	1/0	
E	26986 11BEREA	27221 11LK REB	69	211	211	72	72	247	71.7	138.5	138.5	1/0	73.7	138.4	138.4	1/0	
E	27117 11FAWKES	27272 11N.MADS	69	211	211	56	56	260	27.6	128.8	128.8	1/0	52.2	128.5	128.5	1/0	
<b>Group 4 Pre-existing, Eliminated Overloading</b>																	
27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	97	73.7	114.8	104.8	0/1	59.2	---	---	0/0	
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	112	92.1	133.3	110.0	2/0	100.8	---	---	***	

Branches Exceeding 100% of Emergency Rating																
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings	Cont	Case101s04			case210s04					
								Norm	System%	First Contingency	Norm	System%	First Contingency			
						Norm	Emer	ID	2004 Summer - with CT 4	CT 5	Normal	System%	First Contingency	Norm%	Emer%	A/B

**Notes:**

1. '---' = Less than the Minimum Reporting Level of 85%
2. '\*\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. E = Pre-existing overload that was changed by less than 2.5% in the new case
4. Overloads are based on 100% of Rating 2
5. Count of Contingencies Causing Overloads (A/B Stats)  
 A = Serious Overload > 105%  
 B = Overloaded Facility between 100% and 105% of Rated Capability

# Case Comparison Summary

## Case101s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - with CT 4 & CT 5  
Includes All Phase I Transmission  
2/12/2003

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## Case300s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - CT4&5 & Gilbert  
New Transmission and Cooper2/Love Off-Line  
2/12/2003

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### **Contingency**

230 contingencies used from existing Contingency Tables

### **Monitored Set**

monitor  
301 buses and 492 lines

### **Overload Criteria**

Rating Number 2 >= 100%

Skip Group 5 (Heavy Load)

monitor  
321 buses and 524 lines

## **Statistics**

### ***By Impact Summary***

- 1 New Overloads in Case300s04 not in Case101s04 = 10 violations
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case300s04 = 1
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case300s04 = 4
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case300s04 = 0
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case300s04 = 1

### ***By Cause Summary***

- 1 New Overloads in Case300s04 not in Case101s04 = 17 violations on 10 branches
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case300s04 = 4 on 2 branches
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case300s04 = 8 on 6 branches
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case300s04 = 0 on 0 branches
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case300s04 = 3 on 2 branches

### ***Total Overloads***

- In Case101s04 = 15 violations on 10 branches
- In Case300s04 = 29 violations on 18 branches

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**  
 2004 Summer - with CT 4 CT 5  
 Includes All Phase I Transmission  
 2/12/2003

New Transmission and Cooper2/Love Off-Line  
 2/12/2003

Branches Exceeding 100% of Emergency Rating										Case101s04				Case300s04			
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings Norm Emer	Cont ID	2004 Summer - with CT 4 CT 5		2004 Summer - CT45 Gilbert		2004 Summer - CT45 Gilbert		2004 Summer - CT45 Gilbert			
								First Contingency Norm% Emer% A/B	First Contingency Emer% A/B	Normal System%	First Contingency Norm% Emer% A/B	Normal System%	First Contingency Norm% Emer% A/B	Normal System%	First Contingency Norm% Emer% A/B		
<b>Group 1 New Overloads</b>																	
27194 11KENTON	29575 20SPURLK	2	138	220	220	227 280	607	57.6	110.6	89.7	0/0	73.9	139.6	113.2	1/0		
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72 89	422	27.9	112.4	90.9	0/0	64.4	137.7	111.7	2/1		
27113 11FARMER	27264 11MORHW	1	69	211	211	48 48	172	41.2	85.6	85.6	0/0	60	109.8	109.8	1/0		
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163 163	465	23.8	94.8	94.8	0/0	33.2	108.1	108.1	2/0		
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48 59	422	62.5	---	---	0/0	97.6	131.0	106.6	2/2		
27112 11FARMER	27113 11FARMER	1	138-69	211	211	40 48	172	66.6	110.9	92.4	0/0	75.6	125.4	104.5	0/1		
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143 171	157	73.4	116.6	97.5	0/0	78.8	123.3	103.1	0/2		
27229 11LOUDON	27228 11LOUD B	1	138-69	211	211	112 129	162	76.1	114.2	99.2	0/0	79	118.4	102.8	0/1		
27220 11LK REB	27231 11LR TAP	1	138	211	211	149 171	125	72.7	111.5	97.1	0/0	75	116.6	101.6	0/1		
27220 11LK REB	27221 11LK REB	1	138-69	211	211	149 171	125	72.5	110.9	96.7	0/0	74.7	116.0	101.0	0/1		
<b>Group 2 Pre-existing Overload in Case1 with Increased Overloading in Case2</b>																	
27221 11LK REB	27340 11RICHMO	1	69	211	211	56 56	125	28	105.5	105.5	1/0	27.2	110.1	110.1	1/0		
<b>Group 3 Pre-existing Overload in Case1 with Decreased Overloading in Case2</b>																	
E 26986 11BEREA	27221 11LK REB	1	69	211	211	72 72	247	71.7	138.5	138.5	1/1	71.1	138.5	138.5	1/1		
E 27117 11FAWKES	27272 11N.MADS	1	69	211	211	56 56	260	27.6	128.8	128.8	1/0	33.5	128.8	128.8	1/0		
E 27117 11FAWKES	27339 11RICH S	1	69	211	211	72 72	200	63.2	139.9	139.9	1/2	63.8	139.9	139.9	3/0		
E 29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57 69	417	28.8	122.4	101.1	0/2	19.7	122.4	101.1	0/2		
<b>Group 4 Pre-existing Overload in Case1 with Overloading Eliminated in Case2</b>																	
27451 11WINC S	27452 11WINCHS	1	69	211	211	73 80	97	73.7	114.8	104.8	0/1	55.2	95.7	87.4	0/0		

**Notes:**

- '---' = Less than the Minimum Reporting Level of 85%
- '\*\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
- E = Pre-existing overload that was changed by less than 2.5% in the new case
- Overloads are based on 100% of Rating 2
- Count of Contingencies Causing Overloads (A/B Stats)  
 A = Serious Overload > 105%  
 B = Overloaded Facility between 100% and 105% of Rated Capability

**TRANSMISSION 2000 Contingency Processor** **Overload Comparison of Case101s04 with Case300s04**  
Summary By Cause

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

2004 Summer - with CT 4 CT 5  
Includes All Phase I Transmission  
2/12/2003

2004 Summer - CT45 Gilbert  
New Transmission and Cooper2/Love Off-Line  
2/12/2003

Branches Exceeding 100% of Emergency Rating										Case101s04				Case300s04			
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Cont ID	2004 Summer - with CT 4 CT 5		2004 Summer - CT45		Gilbert				
						Norm	Emer		Normal System%	First Contingency Emer%	A/B	Normal System%	First Contingency Emer%	A/B			
<b>Group 1 New Overloads</b>																	
27194 11KENTON	29575 20SPURLK	2	138	220	220	227	280	607	57.6	110.6	89.7	0/0	73.9	139.6	113.2	1/0	
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72	89	422	27.9	112.4	90.9	0/0	64.4	137.7	111.7	2/1	
27113 11FARMER	27264 11MORH W	1	69	211	211	48	48	172	41.2	85.6	85.6	0/0	60.0	109.8	109.8	1/0	
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	465	23.8	94.8	94.8	0/0	33.2	108.1	108.1	2/0	
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	595	62.5	---	---	0/0	97.6	131.0	106.6	2/2	
27112 11FARMER	27113 11FARMER	1	138-69	211	211	40	48	172	66.6	110.9	92.4	0/0	75.6	125.4	104.5	0/1	
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	160	73.4	116.6	97.5	0/0	78.8	123.3	103.1	0/2	
27229 11LOUDON	27228 11LOUD B	1	138-69	211	211	112	129	162	76.1	114.2	99.2	0/0	79.0	118.4	102.8	0/1	
27220 11LK REB	27231 11LR TAP	1	138	211	211	149	171	125	72.7	111.5	97.1	0/0	75.0	116.6	101.6	0/1	
27220 11LK REB	27221 11LK REB	1	138-69	211	211	149	171	125	72.5	110.9	96.7	0/0	74.7	116.0	101.0	0/1	
<b>Group 2 Pre-existing, Increased Loading</b>																	
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	242	92.1	138.4	114.2	3/0	104.5	169.5	139.8	***	
27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	125	28.0	105.5	105.5	1/0	27.2	110.1	110.1	1/0	
E	26986 11BEREA	27221 11LK REB	69	211	211	72	72	125	71.7	102.7	102.7	0/1	71.1	104.5	104.5	0/1	
E	27117 11FAWKES	27339 11RICH S	69	211	211	72	72	160	63.2	103.7	103.7	0/2	63.8	105.4	105.4	2/0	
<b>Group 3 Pre-existing, Decreased Loading</b>																	
E	26986 11BEREA	27221 11LK REB	69	211	211	72	72	247	71.7	138.5	138.5	1/0	71.1	138.5	138.5	1/0	
E	27117 11FAWKES	27272 11N.MADS	69	211	211	56	56	260	27.6	128.8	128.8	1/0	33.5	128.8	128.8	1/0	
E	27117 11FAWKES	27339 11RICH S	69	211	211	72	72	200	63.2	139.9	139.9	1/0	63.8	139.9	139.9	1/0	
E	29203 20BKRLN	29360 20HOLLWJ	69	220	220	57	69	417	28.8	122.4	101.1	0/2	19.7	122.4	101.1	0/2	
<b>Group 4 Pre-existing, Eliminated Overloading</b>																	
27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	97	73.7	114.8	104.8	0/1	55.2	---	---	0/0	
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	112	92.1	133.3	110.0	2/0	104.5	114.1	94.1	***	



Branches Exceeding 100% of Emergency Rating												
		Case101s04				Case300s04						
		2004 Summer - with CT 4		CT 5		2004 Summer - CT45		Gilbert				
From Bus	To Bus	Ckt	Base kV	Area	Zone	Norm	Emer	Normal System%	First Contingency Emer%	Normal System%	First Contingency Emer%	A/B
						Cont ID						

**Notes:**

1. '-' = Less than the Minimum Reporting Level of 85%
2. '\*\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. E = Pre-existing overload that was changed by less than 2.5% in the new case
4. Overloads are based on 100% of Rating 2
5. Count of Contingencies Causing Overloads (A/B Stats)
  - A = Serious Overload > 105%
  - B = Overloaded Facility between 100% and 105% of Rated Capability

# Case Comparison Summary

## Case101s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - with CT 4 & CT 5  
Includes All Phase I Transmission  
2/12/2003

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## Case310s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - CT4&5 & Gilbert  
External Dispatch and Gilbert/268MW  
2/12/2003

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### **Contingency**

230 contingencies used from existing Contingency Tables

### **Monitored Set**

monitor  
301 buses and 492 lines

### **Overload Criteria**

Rating Number 2 >= 100%

Skip Group 5 (Heavy Load)

monitor  
321 buses and 524 lines

## **Statistics**

### ***By Impact Summary***

- 1 New Overloads in Case310s04 not in Case101s04 = 9 violations
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case310s04 = 2
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case310s04 = 3
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case310s04 = 0
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case310s04 = 1

### ***By Cause Summary***

- 1 New Overloads in Case310s04 not in Case101s04 = 16 violations on 9 branches
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case310s04 = 4 on 2 branches
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case310s04 = 8 on 6 branches
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case310s04 = 0 on 0 branches
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case310s04 = 3 on 2 branches

### ***Total Overloads***

- In Case101s04 = 15 violations on 10 branches
- In Case310s04 = 28 violations on 17 branches

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**  
2004 Summer - with CT 4 CT 5  
External Dispatch and Gilbert/268MW  
2/12/2003

Branches Exceeding 100% of Emergency Rating		Ratings		Case101s04		Case310s04									
From Bus	To Bus	Ckt	Base kV	Area	Zone	Norm	Emer	2004 Summer - with CT 4 CT 5	2004 Summer - CT45 Gilbert						
								Normal	First Contingency	Normal	First Contingency				
								System%	Norm% Emer%	System%	Norm% Emer%				
								A/B	A/B	A/B	A/B				
<b>Group 1 New Overloads</b>															
Not Overloaded															
27037	11CLARK	27397	11SYLVAN	1	69	211	211	27.9	112.4	90.9	0/0	64.6	137.9	111.9	2/1
27194	11KENTON	29575	20SPURLK	2	138	220	220	57.6	110.6	89.7	0/0	72.9	137.6	111.6	1/0
27113	11FARMER	27264	11MORH W	1	69	211	211	41.2	85.6	85.6	0/0	60.2	109.2	109.2	1/0
26959	11AOSMTH	27383	11SPENC	1	69	211	211	62.5	---	---	0/0	97	130.5	106.2	2/2
27115	11FAWK T	27231	11LR TAP	1	138	211	211	23.8	94.8	94.8	0/0	31.3	103.8	103.8	0/2
27112	11FARMER	27113	11FARMER	1	138-69	211	211	66.6	110.9	92.4	0/0	75	124.1	103.5	0/1
27229	11LOUDON	27228	11LOUD B	1	138-69	211	211	76.1	114.2	99.2	0/0	78.6	117.8	102.2	0/1
27116	11FAWKES	27117	11FAWKES	1	138-69	211	211	73.4	116.6	97.5	0/0	77.6	121.5	101.6	0/2
27220	11LK REB	27231	11LR TAP	1	138	211	211	72.7	111.5	97.1	0/0	74.1	115.0	100.2	0/1
<b>Group 2 Pre-existing Overload in Case1 with Increased Overloading in Case2</b>															
Overload 1 <less than< Overload 2															
27347	11RODBRN	27348	11RODBRN	1	138-69	211	211	92.1	141.1	116.4	5/0	103.1	168.0	138.6	***
27221	11LK REB	27340	11RICHMO	1	69	211	211	28	105.5	105.5	1/0	27.6	109.3	109.3	1/0
<b>Group 3 Pre-existing Overload in Case1 with Decreased Overloading in Case2</b>															
Overload 1 >=greater than or equal to=> Overload 2															
E	26986	11BEREA	27221	11LK REB	1	69	211	71.7	138.5	138.5	1/1	71.3	138.5	138.5	1/1
E	27117	11FAWKES	27339	11RICH S	1	69	211	63.2	139.9	139.9	1/2	63.6	139.8	139.8	1/2
E	27117	11FAWKES	27272	11N.MADS	1	69	211	27.6	128.8	128.8	1/0	34.8	128.6	128.6	1/0
<b>Group 4 Pre-existing Overload in Case1 with Overloading Eliminated in Case2</b>															
Overloaded															
27451	11WINC S	27452	11WINCHS	1	69	211	211	73.7	114.8	104.8	0/1	55.3	95.9	87.6	0/0

**Notes:**

- '...' = Less than the Minimum Reporting Level of 85%
- \*\*\*\* = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
- E = Pre-existing overload that was changed by less than 2.5% in the new case
- Overloads are based on 100% of Rating 2
- Count of Contingencies Causing Overloads (A/B Stats)  
A = Serious Overload > 105%  
B = Overloaded Facility between 100% and 105% of Rated Capability

2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

External Dispatch and Gilbert/268MW

Includes All Phase I Transmission  
2/12/2003

Branches Exceeding 100% of Emergency Rating										Case101s04				Case310s04			
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Cont ID	2004 Summer - with CT 4 CT 5		2004 Summer - CT45		Gilbert				
						Norm	Emer		Normal System%	First Contingency Emer%	A/B	Normal System%	First Contingency Emer%	A/B			
<b>Group 1 New Overloads</b>																	
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72	89	422	27.9	112.4	90.9	0/0	64.6	137.9	111.9	2/1	
27194 11KENTON	29575 20SPURLK	2	138	220	220	227	280	607	57.6	110.6	89.7	0/0	72.9	137.6	111.6	1/0	
27113 11FARMER	27264 11MORH W	1	69	211	211	48	48	172	41.2	85.6	85.6	0/0	60.2	109.2	109.2	1/0	
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	595	62.5	---	---	0/0	97.0	130.5	106.2	2/2	
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	465	23.8	94.8	94.8	0/0	31.3	103.8	103.8	0/2	
27112 11FARMER	27113 11FARMER	1	138-69	211	211	40	48	172	66.6	110.9	92.4	0/0	75.0	124.1	103.5	0/1	
27229 11LOUDON	27228 11LOUD B	1	138-69	211	211	112	129	162	76.1	114.2	99.2	0/0	78.6	117.8	102.2	0/1	
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	157	73.4	116.6	97.5	0/0	77.6	121.5	101.6	0/2	
27220 11LK REB	27231 11LR TAP	1	138	211	211	149	171	125	72.7	111.5	97.1	0/0	74.1	115.0	100.2	0/1	
<b>Group 2 Pre-existing, Increased Loading</b>																	
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	242	92.1	138.4	114.2	3/0	103.1	168.0	138.6	***	
27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	125	28.0	105.5	105.5	1/0	27.6	109.3	109.3	1/0	
E	26986 11BEREA	27221 11LK REB	69	211	211	72	72	125	71.7	102.7	102.7	0/1	71.3	104.1	104.1	0/1	
E	27117 11FAWKES	27339 11RICH S	69	211	211	72	72	160	63.2	103.7	103.7	0/2	63.6	104.8	104.8	0/2	
<b>Group 3 Pre-existing, Decreased Loading</b>																	
E	26986 11BEREA	27221 11LK REB	69	211	211	72	72	247	71.7	138.5	138.5	1/0	71.3	138.5	138.5	1/0	
E	29203 20BKR LN	29360 20HOLLWJ	69	220	220	57	69	417	28.8	122.4	101.1	0/2	20.2	122.4	101.1	0/2	
E	27117 11FAWKES	27339 11RICH S	69	211	211	72	72	200	63.2	139.9	139.9	1/0	63.6	139.8	139.8	1/0	
E	27117 11FAWKES	27272 11N.MADS	69	211	211	56	56	260	27.6	128.8	128.8	1/0	34.8	128.6	128.6	1/0	
<b>Group 4 Pre-existing, Eliminated Overloading</b>																	
27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	97	73.7	114.8	104.8	0/1	55.3	---	---	0/0	
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	112	92.1	133.3	110.0	2/0	103.1	110.2	90.9	***	

Branches Exceeding 100% of Emergency Rating											
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Case101s04		Case310s04	
						Norm	Emer	2004 Summer - with CT 4	CT 5	2004 Summer - CT45	Gilbert
								System%	First Contingency	Normal System%	First Contingency Emer%

**Notes:**

- '-' = Less than the Minimum Reporting Level of 85%
- '\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
- E = Pre-existing overload that was changed by less than 2.5% in the new case
- Overloads are based on 100% of Rating 2
- Count of Contingencies Causing Overloads (A/B Stats)  
 A = Serious Overload > 105%  
 B = Overloaded Facility between 100% and 105% of Rated Capability

# Case Comparison Summary

## Case101s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - with CT 4 & CT 5  
Includes All Phase I Transmission  
2/12/2003

M:\PROJ\Kypsc\267003\300\_Calculations\3  
01\_PFlow\_Results\Case101s04.cft

## Case410s04

2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
2004 Summer - CT4&5 & Gilbert  
New Transmission-Gilbert/268 MW, KPE/540 MW  
2/13/2003

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01\_PFlow\_Results\Case410s04.cft

### **Contingency**

230 contingencies used from existing Contingency Tables

### **Overload Criteria**

Rating Number 2 >= 100%

Skip Group 5 (Heavy Load)

### **Monitored Set**

monitor  
301 buses and 492 lines

monitor  
321 buses and 524 lines

## **Statistics**

### ***By Impact Summary***

- 1 New Overloads in Case410s04 not in Case101s04 = 18 violations
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case410s04 = 2
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case410s04 = 4
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case410s04 = 0
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case410s04 = 1

### ***By Cause Summary***

- 1 New Overloads in Case410s04 not in Case101s04 = 32 violations on 18 branches
- 2 Pre-existing Overload in Case101s04 with Increased Overloading in Case410s04 = 5 on 3 branches
- E Pre-existing Overload in Case101s04 with negligible change (2.5%) in Case410s04 = 7 on 5 branches
- 3 Pre-existing Overload in Case101s04 with Equal or Decreased Overloading in Case410s04 = 0 on 0 branches
- 4 Pre-existing Overload in Case101s04 with Overloading Eliminated in Case410s04 = 3 on 2 branches

### ***Total Overloads***

- In Case101s04 = 15 violations on 10 branches
- In Case410s04 = 44 violations on 26 branches

2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5  
Includes All Phase I Transmission  
2/12/2003

2004 Summer - CT45 Gilbert  
New Transmission-Gilbert/268 MW, KPE/540 MW  
2/13/2003

Branches Exceeding 100% of Emergency Rating										Case101s04				Case410s04			
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Cont ID	2004 Summer - with CT 4 CT 5		2004 Summer - CT45		First Contingency		First Contingency		
						Norm	Emer		Normal System%	First Contingency Norm%	A/B	Emer%	A/B	Normal System%	Emer%	A/B	
<b>Group 1 New Overloads</b>																	
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72	89	422	27.9	112.4	90.9	0/0	77.2	152.5	123.7	3/0	
27113 11FARMER	27264 11MORH W	1	69	211	211	48	48	172	41.2	85.6	85.6	0/0	74.7	123.7	123.7	1/0	
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	465	23.8	94.8	94.8	0/0	21.9	117.5	117.5	2/0	
29230 20BOONST	29282 20DALE	1	138	220	220	252	252	340	36.3	---	---	0/0	55	112.5	112.5	1/0	
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	95	62.5	---	---	0/0	102.4	138.1	112.4	***	
27358 11SALT L	27383 11SPENC	1	69	211	211	22	22	110	10.3	---	---	0/0	57.8	112.1	112.1	3/0	
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	157	73.4	116.6	97.5	0/0	83.1	131.1	109.7	2/0	
27194 11KENTON	29575 20SPURLK	2	138	220	220	227	280	607	57.6	110.6	89.7	0/0	71.4	134.8	109.3	1/0	
27220 11LK REB	27231 11LR TAP	1	138	211	211	149	171	125	72.7	111.5	97.1	0/0	81.2	124.9	108.8	1/0	
27220 11LK REB	27221 11LK REB	1	138-69	211	211	149	171	125	72.5	110.9	96.7	0/0	80.9	124.2	108.2	1/0	
27112 11FARMER	27113 11FARMER	1	138-69	211	211	40	48	172	66.6	110.9	92.4	0/0	79.4	129.8	108.1	1/0	
27229 11LOUDON	27228 11LOUD B	1	138-69	211	211	112	129	162	76.1	114.2	99.2	0/0	82.7	124.0	107.6	1/0	
27330 11PRKRSE	27452 11WINCHS	1	69	211	211	72	79	422	10.2	---	---	0/0	41	116.2	105.9	2/0	
27345 11ROCKWE	27452 11WINCHS	1	69	211	211	63	63	322	27.3	---	---	0/0	71.4	105.4	105.4	1/0	
27382 11SPENC	27383 11SPENC	1	138-69	211	211	56	64	180	48	---	---	0/0	65.4	113.9	103.8	0/1	
27229 11LOUDON	29202 20AVON	1	138	211-220	211-220	287	302	472	59.6	---	---	0/0	96.2	108.3	103.0	0/4	
27271 11N.CORB	27396 11SWEETH	1	69	211	211	72	72	277	45.4	95.5	95.5	0/0	38.1	100.5	100.5	0/1	
27338 11RICE T	27429 11WACO	1	69	211	211	47	47	32	22.6	---	---	0/0	38.8	100.5	100.5	0/2	
<b>Group 2 Pre-existing Overload in Case1 with Increased Overloading in Case2</b>																	
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	175	92.1	141.1	116.4	5/0	105.6	184.7	152.4	***	
27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	125	28	105.5	105.5	1/0	34.8	122.0	122.0	1/0	
<b>Group 3 Pre-existing Overload in Case1 with Decreased Overloading in Case2</b>																	
E 29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	69	417	28.8	122.4	101.1	0/2	16.3	122.4	101.1	0/2	
E 27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	200	63.2	139.9	139.9	1/2	61.2	139.8	139.8	3/0	
E 26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	247	71.7	138.5	138.5	1/1	73.8	138.4	138.4	2/0	
E 27117 11FAWKES	27272 11N.MADS	1	69	211	211	56	56	260	27.6	128.8	128.8	1/0	54.1	128.5	128.5	1/0	
<b>Group 4 Pre-existing Overload in Case1 with Overloading Eliminated in Case2</b>																	
27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	97	73.7	114.8	104.8	0/1	60.3	108.6	99.1	0/0	

Branches Exceeding 100% of Emergency Rating													
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings	Cont ID	Case101s04			Case410s04		
								2004 Summer - with CT 4	CT 5	Normal System%	First Contingency Emer%	A/B	2004 Summer - CT45

**Notes:**

1. '...' = Less than the Minimum Reporting Level of 100%
2. '\*\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. E = Pre-existing overload that was changed by less than 2.5% in the new case
4. Overloads are based on 100% of Rating 2
5. Count of Contingencies Causing Overloads (A/B Stats)  
 A = Serious Overload > 105%  
 B = Overloaded Facility between 100% and 105% of Rated Capability



**TRANSMISSION 2000 Contingency Processor** **Overload Comparison of Case 101s04 with Case410s04**  
Summary By Cause

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

2004 Summer - with CT 4 CT 5  
Includes All Phase I Transmission  
New Transmission-Gilbert/268 MW, KPE/540 MW  
2/12/2003  
2/13/2003

Branches Exceeding 100% of Emergency Rating																
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings		Cont	Case101s04				Case410s04			
						Norm	Emer		2004 Summer - with CT 4	CT 5	2004 Summer - CT45	Gilbert	Normal System%	First Contingency	Normal System%	First Contingency
<b>Group 1 New Overloads</b>																
27037 11CLARK	27397 11SYLVAN	1	69	211	211	72	89	595	27.9	112.4	90.9	0/0	77.2	152.5	123.7	3/0
27113 11FARMER	27264 11MORHW	1	69	211	211	48	48	172	41.2	85.6	85.6	0/0	74.7	123.7	123.7	1/0
27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	465	23.8	94.8	94.8	0/0	21.9	117.5	117.5	2/0
29230 20BOONST	29282 20DALE	1	138	220	220	252	252	340	36.3	---	---	0/0	55.0	112.5	112.5	1/0
26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	95	62.5	---	---	0/0	102.4	138.1	112.4	***
27358 11SALT L	27383 11SPENC	1	69	211	211	22	22	117	10.3	---	---	0/0	57.8	112.1	112.1	3/0
27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	160	73.4	116.6	97.5	0/0	83.1	131.1	109.7	2/0
27194 11KENTON	29575 20SPURLK	2	138	220	220	227	280	607	57.6	110.6	89.7	0/0	71.4	134.8	109.3	1/0
27220 11LK REB	27231 11LR TAP	1	138	211	211	149	171	125	72.7	111.5	97.1	0/0	81.2	124.9	108.8	1/0
27220 11LK REB	27221 11LK REB	1	138-69	211	211	149	171	125	72.5	110.9	96.7	0/0	80.9	124.2	108.2	1/0
27112 11FARMER	27113 11FARMER	1	138-69	211	211	40	48	172	66.6	110.9	92.4	0/0	79.4	129.8	108.1	1/0
27229 11LOUDON	27228 11LOUD B	1	138-69	211	211	112	129	162	76.1	114.2	99.2	0/0	82.7	124.0	107.6	1/0
27330 11PRKRSE	27452 11WINCHS	1	69	211	211	72	79	595	10.2	---	---	0/0	41.0	116.2	105.9	2/0
27345 11ROCKWE	27452 11WINCHS	1	69	211	211	63	63	322	27.3	---	---	0/0	71.4	105.4	105.4	1/0
27382 11SPENC	27383 11SPENC	1	138-69	211	211	56	64	180	48.0	---	---	0/0	65.4	113.9	103.8	0/1
27229 11LOUDON	29202 20AVON	1	138	211-220	211-220	287	302	472	59.6	---	---	0/0	96.2	108.3	103.0	0/4
27271 11N.CORB	27396 11SWEETH	1	69	211	211	72	72	277	45.4	95.5	95.5	0/0	38.1	100.5	100.5	0/1
27338 11RICE T	27429 11WACO	1	69	211	211	47	47	32	22.6	---	---	0/0	38.8	100.5	100.5	0/2
<b>Group 2 Pre-existing, Increased Loading</b>																
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	242	92.1	138.4	114.2	3/0	105.6	184.7	152.4	***
27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	125	28.0	105.5	105.5	1/0	34.8	122.0	122.0	1/0
26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	125	71.7	102.7	102.7	0/1	73.8	108.9	108.9	1/0
E	27117 11FAWKES	1	69	211	211	72	72	160	63.2	103.7	103.7	0/2	61.2	105.9	105.9	2/0
<b>Group 3 Pre-existing, Decreased Loading</b>																
E	29203 20BKR LN	1	69	220	220	57	69	445	28.8	122.4	101.1	0/2	16.3	122.4	101.1	0/2
E	27117 11FAWKES	1	69	211	211	72	72	200	63.2	139.9	139.9	1/0	61.2	139.8	139.8	1/0
E	26986 11BEREA	1	69	211	211	72	72	247	71.7	138.5	138.5	1/0	73.8	138.4	138.4	1/0
E	27117 11FAWKES	1	69	211	211	56	56	260	27.6	128.8	128.8	1/0	54.1	128.5	128.5	1/0
<b>Group 4 Pre-existing, Eliminated Overloading</b>																
27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	97	73.7	114.8	104.8	0/1	60.3	---	---	0/0
27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	112	92.1	133.3	110.0	2/0	105.6	---	---	***

Branches Exceeding 100% of Emergency Rating											
From Bus	To Bus	Ckt	Base kV	Area	Zone	Ratings			Cont ID		
						Norm	Emer	Emer			
					Case101s04			Case410s04			
					2004 Summer - with CT 4 CT 5			2004 Summer - CT45 Gilbert			
					Normal	First Contingency	Norm%	Emer%	Norm%	Emer%	
					System%	Norm%	Emer%	A/B	System%	Norm%	Emer%

**Notes:**

1. '---' = Less than the Minimum Reporting Level of 100%
2. '\*\*\*\*' = Normal System Flow (ie - with No Outages) exceeds the Overload Criteria
3. E = Pre-existing overload that was changed by less than 2.5% in the new case
4. Overloads are based on 100% of Rating 2
5. Count of Contingencies Causing Overloads (A/B Stats)  
 A = Serious Overload > 105%  
 B = Overloaded Facility between 100% and 105% of Rated Capability

**Phase I Case 100s04**

# Case Summary

# Case100s04

*Project Name*            2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
*Title1*                    2004 Summer - with CT 4 & CT 5  
*Title2*                    Includes Phase I Transmission (less 2nd Fawkes 138 kV)  
*Case Date*                2/13/2003

*Power Flow File*        M:\PROJ\Kypsc\267003\300\_Calculations\301\_PFlow\_Results\Case100s04.cft

## Power Flow Controls

<i>Area Control</i>	<input type="checkbox"/>	<i>SmoothStep</i>	<input checked="" type="checkbox"/>
<i>Remote Control</i>	<input checked="" type="checkbox"/>	<i>XfrmVcon</i>	<input type="checkbox"/>
<i>GenVar Control</i>	<input checked="" type="checkbox"/>	<i>XfrmFcon</i>	<input type="checkbox"/>
<i>Solve Method</i>	NSOLVE		

## Case Settings

<i>Overload</i>	<input checked="" type="checkbox"/>	<i>VlimMin</i>	0.9	<i>RateFactor</i>	1
<i>VLimit</i>	<input checked="" type="checkbox"/>	<i>VlimMax</i>	1.05	<i>AmpFactor</i>	1
<i>VChange</i>	<input checked="" type="checkbox"/>	<i>VlimChange</i>	0.05	<i>RatingNumber</i>	2
<i>Monitored Set</i>	monitor	295 Buses			

## Contingency

<i>Contingencies loaded from file M:\PROJ\Kypsc\267003\300_Calculations\301_PFlow_Results\Case300s</i>	
<i>230 contingencies</i>	

Area	Area Name	Zone	Zone Name	Contingency Buses	Monitored Buses
147	TVA	167	TVA_EAST	0	1
				0	1
208	CIN	280	CGE	1	0
				1	0
209	DPL	209	DPL	1	0
				1	0
211	LGEE	211	LGEE	109	163
				109	163
220	EKPC	220	EKPC	90	131
				90	131
				201	295

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

**Normal System**

2004 Summer - with CT 4 CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

Overloaded Facility	Overloads
No Normal System Overload Violations	

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4\_CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

Overloaded Facility									Normal System			Overloads	
From	Name	To	Name	Circuit	Base kV	Area	Zone	Ratings	MVA	Norm (%)	Count	Max (%)	
								Norm Emer			A / B		
27117	11FAWKES	27339	11RICH S	1	69	211	211	72 72	45.5	63	1 / 2	140	
26986	11BEREA	27221	11LK REB	1	69	211	211	72 72	51.6	72	1 / 1	139	
27117	11FAWKES	27272	11N.MADS	1	69	211	211	56 56	15.4	28	1 / 0	129	
27347	11RODBRN	27348	11RODBRN	1	138-69	211	211	33 40	30.4	92	5 / 0	116	
27221	11LK REB	27340	11RICHMO	1	69	211	211	56 56	15.7	28	1 / 0	106	
27451	11WINC S	27452	11WINCHS	1	69	211	211	73 80	53.8	74	0 / 1	105	
29203	20BKR LN	29360	20HOLLWJ	1	69	220	220	57 69	16.4	29	0 / 2	101	
											9 / 6	140	

**Notes:**

- Overloads are based on 100% of Rating 2
- NS = Normal System Conditions (No Outages)
- Minimum Reporting Level is 100%
- Statistical Information (A/B Stats and Maximum Overload)
  - A = Serious Overload > 105%
  - B = Overloaded Facility between 100% and 105% of Rated Capability

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

Undervoltage		Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
Bus	Name					A / B	Min (pu)
27449	11WIL D2	69	211	211	1.0006	1 / 0	0.8368
29212	20BTYV D	69	220	220	0.9926	1 / 0	0.8468
29478	20OAKD J	69	220	220	0.9852	1 / 0	0.8565
29232	20BOONVJ	69	220	220	0.9825	1 / 0	0.8679
29313	20FAYETT	138	220	220	0.9957	1 / 0	0.8689
27210	11LEBN I	69	211	211	0.9787	1 / 0	0.8693
29468	20NEWBY1	69	220	220	1.0060	1 / 0	0.8766
29315	20FAYETT	69	220	220	1.0086	0 / 2	0.8912
29406	20LNCSTR	69	220	220	0.9949	0 / 1	0.8926
29327	20GARRCO	69	220	220	0.9924	0 / 1	0.8935
29537	20S FORK	69	220	220	0.9832	0 / 1	0.8946
29205	20BALLRD	69	220	220	0.9750	0 / 3	0.8971
29237	20BOURNE	69	220	220	0.9856	0 / 2	0.8980
29596	20TGOOCH	69	220	220	0.9795	0 / 1	0.8984
27067	11DANVIL	138	211	211	0.9942	0 / 1	0.8993
29325	20FRNCHB	69	220	220	0.9748	0 / 1	0.8995
						7 / 13	0.8368
<b>Notes:</b>							
1. Minimum Voltage Limit 0.90 (pu)							
2. NS = Normal System Conditions (No Outages)							
3. Maximum Reporting Level is 90%							
4. Statistical Information (A/B Stats and Minimum Voltage)							
A = Serious Undervoltage < 0.88 (pu)							
B = Low Voltages between 0.88 and 0.90 (pu)							



**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

2004 Summer - with CT 4 CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

<b>Overvoltage</b>					<b>Normal System</b>	<b>Voltage Violations</b>	
<b>Bus Name</b>	<b>Base kV</b>	<b>Area</b>	<b>Zone</b>		<b>Voltage (pu)</b>	<b>A / B</b>	<b>Max (pu)</b>
29406	20LNCSTR	69	220	220	0.9949	0 / 1	1.0528
29540	20S OAKH	161	220	220	1.0339	0 / 1	1.0504
						0 / 2	1.0528
<b>Notes:</b>							
1. Maximum Voltage Limit is 1.05 (pu)							
2. NS = Normal System Conditions (No Outages)							
3. Minimum Reporting Level for Over Voltages is 105%							
4. Statistical Information (A/B Stats and Maximum Voltage)							
A = Serious Overvoltage > 1.07 (pu)							
B = High Voltages between 1.05 and 1.07 (pu)							

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

VChange Bus Name	Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
					A / B	Max (pu)
27449 11WIL D2	69	211	211	1.0006	1 / 0	-0.1638
29212 20BTYV D	69	220	220	0.9926	1 / 0	-0.1458
29468 20NEWBY1	69	220	220	1.0060	1 / 0	-0.1294
29478 20OAKD J	69	220	220	0.9852	1 / 0	-0.1287
29313 20FAYETT	138	220	220	0.9957	1 / 0	-0.1268
29315 20FAYETT	69	220	220	1.0086	2 / 0	-0.1174
29232 20BOONVJ	69	220	220	0.9825	1 / 0	-0.1146
29233 20BOONSB	138	220	220	1.0171	1 / 0	-0.1127
27016 11BUENA	69	211	211	1.0262	1 / 0	-0.1099
27210 11LEBN I	69	211	211	0.9787	1 / 0	-0.1094
29470 20NEWBY2	69	220	220	1.0082	1 / 0	-0.1080
27076 11DIXDAM	69	211	211	1.0369	1 / 0	-0.1039
29406 20LNCSTR	69	220	220	0.9949	1 / 0	-0.1023
26999 11BOONSB	69	211	211	1.0280	2 / 0	-0.1004
29327 20GARRCO	69	220	220	0.9924	1 / 0	-0.0989
27067 11DANVIL	138	211	211	0.9942	1 / 0	-0.0949
29291 20DAVIS	69	220	220	0.9968	2 / 0	-0.0944
27016 11BUENA	69	211	211	1.0262	1 / 0	-0.0941
27136 11GARRD	69	211	211	1.0080	1 / 0	-0.0894
29537 20S FORK	69	220	220	0.9832	1 / 0	-0.0886
29237 20BOURNE	69	220	220	0.9856	1 / 0	-0.0876
29237 20BOURNE	69	220	220	0.9856	1 / 0	-0.0857
29596 20TGOOCH	69	220	220	0.9795	1 / 0	-0.0811
29580 20STANTN	69	220	220	0.9984	1 / 0	-0.0801
27068 11DANVIL	69	211	211	1.0006	2 / 0	-0.0782
29205 20BALLRD	69	220	220	0.9750	1 / 0	-0.0779
29205 20BALLRD	69	220	220	0.9750	1 / 0	-0.0771
27136 11GARRD	69	211	211	1.0080	1 / 0	-0.0755
29205 20BALLRD	69	220	220	0.9750	1 / 0	-0.0754
29325 20FRNCHB	69	220	220	0.9748	1 / 0	-0.0753
26972 11ATOKA	69	211	211	0.9992	1 / 0	-0.0747
26972 11ATOKA	69	211	211	0.9992	1 / 0	-0.0746
29436 20MARIBJ	69	220	220	0.9757	1 / 0	-0.0733
27450 11WILMOR	69	211	211	1.0082	1 / 0	-0.0729
27000 11BOYLE	69	211	211	0.9985	2 / 0	-0.0727
27220 11LK REB	138	211	211	1.0013	0 / 1	-0.0690
27065 11DANV 1	69	211	211	0.9980	0 / 2	-0.0671
29260 20CLAYCJ	69	220	220	0.9959	0 / 1	-0.0669
27451 11WINC S	69	211	211	1.0005	0 / 2	-0.0667
27167 11HARR T	69	211	211	1.0082	0 / 1	-0.0659
27168 11HARRDS	69	211	211	1.0082	0 / 1	-0.0659
27450 11WILMOR	69	211	211	1.0082	0 / 1	-0.0659
29203 20BKR LN	69	220	220	0.9886	0 / 1	-0.0659
29411 20LAURLD	161	220	220	1.0041	0 / 1	-0.0654
29327 20GARRCO	69	220	220	0.9924	0 / 1	-0.0651
29407 20LAURHY	13.8	220	220	0.9851	0 / 1	-0.0641
27247 11MERC R	138	211	211	1.0074	0 / 1	-0.0638
29623 20WBAREA	138	220	220	0.9998	0 / 1	-0.0633
27055 11CRAB O	69	211	211	0.9886	0 / 1	-0.0622
29368 20HUNTFJ	69	220	220	0.9690	0 / 1	-0.0622
29510 20POWELL	69	220	220	0.9987	0 / 1	-0.0621
29580 20STANTN	69	220	220	0.9984	0 / 1	-0.0619
29347 20HARGTJ	69	220	220	0.9978	0 / 1	-0.0617

VChange Bus Name	Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
					A / B	Max (pu)
29368 20HUNTFJ	69	220	220	0.9690	0 / 1	-0.0615
29288 20DALE4	13.8	220	220	1.0441	0 / 1	-0.0605
27452 11WINCHS	69	211	211	0.9972	0 / 2	-0.0603
29368 20HUNTFJ	69	220	220	0.9690	0 / 1	-0.0602
29360 20HOLLWJ	69	220	220	0.9851	0 / 1	-0.0596
29515 20PULASK	161	220	220	1.0139	0 / 1	-0.0585
29377 20JEFFVL	69	220	220	0.9850	0 / 1	-0.0578
29625 20WBEREA	69	220	220	0.9936	0 / 1	-0.0571
27330 11PRKRSE	69	211	211	0.9969	0 / 2	-0.0569
29625 20WBEREA	69	220	220	0.9936	0 / 1	-0.0568
27067 11DANVIL	138	211	211	0.9942	0 / 1	-0.0557
27397 11SYLVAN	69	211	211	0.9971	0 / 2	-0.0556
26986 11BEREA	69	211	211	0.9935	0 / 1	-0.0553
29626 20WBER J	69	220	220	0.9933	0 / 1	-0.0553
29626 20WBER J	69	220	220	0.9933	0 / 1	-0.0551
29238 20BOWEN	69	220	220	0.9992	0 / 1	-0.0550
29195 20ALCAN	69	220	220	0.9913	0 / 1	-0.0543
29195 20ALCAN	69	220	220	0.9913	0 / 1	-0.0541
27221 11LK REB	69	211	211	1.0100	0 / 2	-0.0538
29260 20CLAYCJ	69	220	220	0.9959	0 / 1	-0.0530
27272 11N.MADS	69	211	211	1.0044	0 / 1	-0.0529
27451 11WINC S	69	211	211	1.0005	0 / 1	-0.0527
29512 20PPG J	69	220	220	0.9908	0 / 1	-0.0526
27037 11CLARK	69	211	211	0.9980	0 / 2	-0.0524
27368 11SHAKRT	69	211	211	1.0282	0 / 1	-0.0524
29511 20PPG	69	220	220	0.9907	0 / 1	-0.0524
29512 20PPG J	69	220	220	0.9908	0 / 1	-0.0524
29596 20TGOOCH	69	220	220	0.9795	0 / 1	-0.0523
29511 20PPG	69	220	220	0.9907	0 / 1	-0.0522
29408 20LAURLC	161	220	220	0.9885	0 / 1	-0.0521
27339 11RICH S	69	211	211	0.9983	0 / 1	-0.0519
27055 11CRAB O	69	211	211	0.9886	0 / 1	-0.0517
29605 20THLNKJ	69	220	220	0.9930	0 / 1	-0.0511
27345 11ROCKWE	69	211	211	0.9929	0 / 2	-0.0509
29605 20THLNKJ	69	220	220	0.9930	0 / 1	-0.0509
29516 20PULASK	69	220	220	1.0061	0 / 1	-0.0507
29607 20TRAPP	69	220	220	1.0041	0 / 1	-0.0502
29408 20LAURLC	161	220	220	0.9885	0 / 1	-0.0501
29406 20LNCSTR	69	220	220	0.9949	0 / 1	0.0579

40 / 65 -0.1638

**Notes:**

1. Voltage Change Limit is 0.05 (pu)
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 5%
4. Statistical Information (A/B Stats and Maximum Voltage Change)
  - A = Serious Voltage Change > 0.07 (pu)
  - B = Excessive Voltage Change between 0.05 and 0.07 (pu)

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

Contingency	Overloaded Facility										Overloads		
	From Name	To Name	Ckt	Base kV	Area	Zone	Ratings		MVA	Norm (%)	Emer (%)		
							Norm	Emer					
97	outage of 27036 11CLARK to 27116 11FAWKES		1	138	211	211							
	27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	83.8	115	105		
110	outage of 27111 11FARM T to 27112 11FARMER		1	138	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	43.8	133	110		
112	outage of 27111 11FARM T to 27369 11SHARKE		1	138	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	44.0	133	110		
117	outage of 27112 11FARMER to 27113 11FARMER		1	138-69	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	43.8	133	110		
125	outage of 27116 11FAWKES to 27117 11FAWKES		1	138-69	211	211							
	27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	59.1	105	106		
	26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	74.0	103	103		
132	outage of 27172 11HIGBY to 27170 11HIGB A		1	138-69	211	211							
	26956 NONAME	27304 11PICADO	1	69	211	211	95	95	101.0	106	106		
157	outage of 27220 11LK REB to 27221 11LK REB		1	138-69	211	211							
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	74.6	104	104		
160	outage of 27220 11LK REB to 27231 11LR TAP		1	138	211	211							
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	74.6	104	104		
175	outage of 27347 11RODBRN to 27369 11SHARKE		1	138	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	46.6	141	116		
200	outage of 26986 11BEREA to 27221 11LK REB		1	69	211	211							
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	100.7	140	140		
242	outage of 27113 11FARMER to 27264 11MORH W		1	69	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	45.7	138	114		
247	outage of 27117 11FAWKES to 27339 11RICH S		1	69	211	211							
	26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	99.7	138	139		
260	outage of 27170 11HIGB A to 27449 11WIL D2		1	69	211	211							
	27117 11FAWKES	27272 11N.MADS	1	69	211	211	56	56	72.1	129	129		
322	outage of 27229 11LOUDON to 29202 20AVON		1	138	211-220	211-220							
	27075 NONAME	27300 11PARIS	1	69	211	211	56	56	57.0	102	102		
417	outage of 29202 20AVON to 29313 20FAYETT		1	138	220	220							
	29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	69	69.8	122	101		
445	outage of 29313 20FAYETT to 29315 20FAYETT		1	138-69	220	220							
	29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	69	69.8	122	101		

**Notes:**

- Overloads are based on 100% of Rating 2

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4\_CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

Overloaded Facility	Contingency									Overloads						
	From	Name	To	Name	Circuit	Base kV	Area	Zone	Ratings Norm Emer	Norm MVA	Emer (%)	Emer (%)				
27117 11FAWKES	27339	11RICH S	1	69	211	211	72	72	NS	45	63	63				
	200 outage of 26986 11BEREA to 27221 11LK REB									1	69	211	211	101	140	140
	160 outage of 27220 11LK REB to 27231 11LR TAP									1	138	211	211	75	104	104
	157 outage of 27220 11LK REB to 27221 11LK REB									1	138-69	211	211	75	104	104
														1 / 2	140	
26986 11BEREA	27221	11LK REB	1	69	211	211	72	72	NS	52	72	72				
	247 outage of 27117 11FAWKES to 27339 11RICH S									1	69	211	211	100	138	139
	125 outage of 27116 11FAWKES to 27117 11FAWKE									1	138-69	211	211	74	103	103
														1 / 1	139	
27117 11FAWKES	27272	11N.MADS	1	69	211	211	56	56	NS	15	28	28				
	260 outage of 27170 11HIGB A to 27449 11WIL D2									1	69	211	211	72	129	129
														1 / 0	129	
27347 11RODBRN	27348	11RODBRN	1	138-69	211	211	33	40	NS	30	92	76				
	175 outage of 27347 11RODBRN to 27369 11SHARK									1	138	211	211	47	141	116
	242 outage of 27113 11FARMER to 27264 11MORH									1	69	211	211	46	138	114
	112 outage of 27111 11FARM T to 27369 11SHARKE									1	138	211	211	44	133	110
	110 outage of 27111 11FARM T to 27112 11FARMER									1	138	211	211	44	133	110
	117 outage of 27112 11FARMER to 27113 11FARME									1	138-69	211	211	44	133	110
														5 / 0	116	
27221 11LK REB	27340	11RICHMO	1	69	211	211	56	56	NS	16	28	28				
	125 outage of 27116 11FAWKES to 27117 11FAWKE									1	138-69	211	211	59	105	106
														1 / 0	106	
27451 11WINC S	27452	11WINCHS	1	69	211	211	73	80	NS	54	74	67				
	97 outage of 27036 11CLARK to 27116 11FAWKES									1	138	211	211	84	115	105
														0 / 1	105	
29203 20BKR LN	29360	20HOLLWJ	1	69	220	220	57	69	NS	16	29	24				
	417 outage of 29202 20AVON to 29313 20FAYETT									1	138	220	220	70	122	101
	445 outage of 29313 20FAYETT to 29315 20FAYETT									1	138-69	220	220	70	122	101
														0 / 2	101	
														9 / 6	139.9	

**Notes:**

- Overloads are based on 100% of Rating 2
- NS = Normal System Conditions (No Outages)
- Minimum Reporting Level is 100%
- Statistical Information (A/B Stats and Maximum Overload)
  - A = Serious Overload > 105%
  - B = Overloaded Facility between 100% and 105% of Rated Capability

2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

Contingency

Description	Ckt	kV	Zone	Area	Over load	Voltage Violations			Not Solved
						UnderV	OverV	Change	
82 outage of 27010 11BRWN P to 27247 11MERCRCR	1	138	211	211	0	0	0	2	
97 outage of 27036 11CLARK to 27116 11FAWKES	1	138	211	211	1	0	0	0	
105 outage of 27067 11DANVIL to 27068 11DANVIL	1	138-69	211	211	0	0	0	4	
107 outage of 27067 11DANVIL to 27247 11MERCRCR	1	138	211	211	0	1	0	5	
110 outage of 27111 11FARM T to 27112 11FARMER	1	138	211	211	1	0	0	0	
112 outage of 27111 11FARM T to 27369 11SHARKE	1	138	211	211	1	0	0	0	
117 outage of 27112 11FARMER to 27113 11FARMER	1	138-69	211	211	1	0	0	0	
125 outage of 27116 11FAWKES to 27117 11FAWKES	1	138-69	211	211	2	0	0	0	
132 outage of 27172 11HIGBY to 27170 11HIGB A	1	138-69	211	211	1	0	0	0	
157 outage of 27220 11LK REB to 27221 11LK REB	1	138-69	211	211	1	0	0	1	
160 outage of 27220 11LK REB to 27231 11LR TAP	1	138	211	211	1	0	0	2	
175 outage of 27347 11RODBRN to 27369 11SHARKE	1	138	211	211	1	0	0	0	
200 outage of 26986 11BEREA to 27221 11LK REB	1	69	211	211	1	0	0	1	
205 outage of 26999 11BOONSB to 27451 11WINC S	EQ	69	211	211	0	0	0	1	
207 outage of 27016 11BUENA to 27076 11DIXDAM	1	69	211	211	0	0	0	3	
232 outage of 27076 11DIXDAM to 27436 11WC-DD	1	69	211	211	0	0	0	5	
235 outage of 27076 11DIXDAM to 27450 11WILMOR	1	69	211	211	0	0	0	1	
242 outage of 27113 11FARMER to 27264 11MORH W	1	69	211	211	1	0	0	0	
247 outage of 27117 11FAWKES to 27339 11RICH S	1	69	211	211	1	0	0	1	
255 outage of 27167 11HARR T to 27420 11W CLIF	1	69	211	211	0	0	0	2	
260 outage of 27170 11HIGB A to 27449 11WIL D2	1	69	211	211	1	1	0	2	
267 outage of 27210 11LEBN I to 27213 11LEBNON	1	69	211	211	0	1	0	1	
297 outage of 27368 11SHAKRT to 27420 11W CLIF	1	69	211	211	0	0	0	1	
312 outage of 26990 11BKR LN to 29203 20BKR LN	1	138-69	211-220	211-220	0	0	0	2	
320 outage of 27116 11FAWKES to 29312 20FAWKES	2	138	211-220	211-220	0	0	0	0	F
322 outage of 27229 11LOUDON to 29202 20AVON	1	138	211-220	211-220	1	0	0	0	
345 outage of 29201 20AVON to 29651 20KPE345	1	345	220	220	0	0	0	0	F
355 outage of 29651 20KPE345 to 29652 20KPE138	1	345-138	220	220	0	0	0	0	F
372 outage of 29271 20COOPER to 29411 20LAURLD	1	161	220	220	0	0	0	3	
377 outage of 29271 20COOPER to 29540 20S OAKH	1	161	220	220	0	0	3	0	
392 outage of 29408 20LAURLC to 29411 20LAURLD	1	161	220	220	0	0	0	1	
407 outage of 29515 20PULASK to 29517 20PULASJ	1	161	220	220	0	0	0	2	
410 outage of 29528 20RUSSEL to 29540 20S OAKH	1	161	220	220	0	0	1	0	
417 outage of 29202 20AVON to 29313 20FAYETT	1	138	220	220	1	2	0	3	
422 outage of 29230 20BOONST to 29233 20BOONSB	1	138	220	220	0	0	0	8	
425 outage of 29230 20BOONST to 29282 20DALE	1	138	220	220	0	0	0	1	
442 outage of 29312 20FAWKES to 29623 20WBEREA	1	138	220	220	0	0	0	7	
445 outage of 29313 20FAYETT to 29315 20FAYETT	1	138-69	220	220	1	1	0	2	

**Contingency**

Description	Ckt	kV	Zone	Area	Over load	Voltage Violations			Not Solved
						UnderV	OverV	Change	
467 outage of 29397 20JKSMIT to 29652 20KPE138	1	138	220	220	0	0	0	0	F
470 outage of 29397 20JKSMIT to 29652 20KPE138	2	138	220	220	0	0	0	0	F
475 outage of 29508 20POWELL to 29510 20POWELL	1	138-69	220	220	0	0	0	4	
477 outage of 29623 20WBBERA to 29625 20WBBERE	1	138-69	220	220	0	0	0	6	
487 outage of 29205 20BALLRD to 29237 20BOURNE	1	69	220	220	0	1	0	2	
490 outage of 29212 20BTYV D to 29215 20BEATTY	1	69	220	220	0	4	0	4	
497 outage of 29237 20BOURNE to 29470 20NEWBY2	1	69	220	220	0	2	0	3	
532 outage of 29283 20DALE to 29468 20NEWBY1	1	69	220	220	0	4	0	4	
535 outage of 29283 20DALE to 29470 20NEWBY2	1	69	220	220	0	2	0	4	
537 outage of 29325 20FRNCHB to 29361 20HOPE	1	69	220	220	0	1	0	2	
540 outage of 29327 20GARRCO to 29406 20LNCSTR	1	69	220	220	0	0	1	3	
555 outage of 29377 20JEFFVL to 29510 20POWELL	1	69	220	220	0	0	0	1	
580 outage of 29510 20POWELL to 29580 20STANTN	1	69	220	220	0	0	0	4	
595 outage of 29233 20BOONSB to 26999 11BOONSB	1	138-69	220-211	220-211	0	0	0	7	
597 outage of 29397 20JKSMIT to 27382 11SPENC	1	138	220-211	220-211	0	0	0	0	F
602 outage of 26648 09STUART to 29573 20SPURLK	1	345	209-220	209-220	0	0	0	0	F
605 outage of 26367 08ZIMER to 29573 20SPURLK	1	345	280-220	208-220	0	0	0	0	F
<b>Totals:</b>					17	20	5	105	8

**Notes:**

1. Overloads are based on 100% of Rating 2
2. Undervoltage Limit is 0.90 (pu)
3. Overvoltage Limit is 1.05 (pu)
4. Voltage Change Limit is 0.05 (pu)

**Not Solved Codes:**

- D - Diverged
- I - Interrupted
- F - Failed, One or More Contingency  
Commands Failed in PFlow

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes Phase I Transmission (less 2nd Fawkes 138 kV Tie)

2/13/2003

No.	Contingency	Ckt	Base kV	Area	Zone
10	outage of 26950 11ALCALD to 27008 11BRWN N	1	345	211	211
12	outage of 27008 11BRWN N to 27009 11BRWN N	1	345-138	211	211
15	outage of 27008 11BRWN N to 27162 11HARDN	1	345	211	211
17	outage of 27008 11BRWN N to 27427 11W LEXN	1	345	211	211
20	outage of 26951 11ALCALD to 27095 11ELIHU	1	161	211	211
22	outage of 26962 11ARNOLD to 27074 11DELVIN	1	161	211	211
25	outage of 27074 11DELVIN to 27444 11WI TAP	1	161	211	211
27	outage of 27095 11ELIHU to 27096 11ELIHU	1	161-69	211	211
30	outage of 27095 11ELIHU to 27096 11ELIHU	2	161-69	211	211
32	outage of 27230 11LR TAP to 27231 11LR TAP	1	161-138	211	211
35	outage of 27230 11LR TAP to 27444 11WI TAP	1	161	211	211
37	outage of 27425 11W IRVI to 27444 11WI TAP	1	161	211	211
40	outage of 26947 11ADAMS to 27412 11TYRONE	1	138	211	211
42	outage of 26977 11BARDST to 26978 11BARDST	1	138-69	211	211
45	outage of 26977 11BARDST to 27011 11BRWNCT	1	138	211	211
47	outage of 26977 11BARDST to 27276 11NELSON	1	138	211	211
50	outage of 26990 11BKR LN to 27009 11BRWN N	1	138	211	211
52	outage of 26990 11BKR LN to 27172 11HIGBY	1	138	211	211
55	outage of 26998 11BONNIE to 27211 11LEBN W	1	138	211	211
57	outage of 27009 11BRWN N to 27011 11BRWNCT	1	138	211	211
60	outage of 27009 11BRWN N to 27012 11BRWNT1	1	138	211	211
62	outage of 27009 11BRWN N to 27013 11BRWNT2	1	138	211	211
65	outage of 27009 11BRWN N to 27040 11CLAYSM	1	138	211	211
67	outage of 27009 11BRWN N to 27172 11HIGBY	1	138	211	211
70	outage of 27009 11BRWN N to 27312 11PISGAH	1	138	211	211
72	outage of 27009 11BRWN N to 27412 11TYRONE	1	138	211	211
75	outage of 27010 11BRWN P to 27012 11BRWNT1	1	138	211	211
77	outage of 27010 11BRWN P to 27013 11BRWNT2	1	138	211	211
80	outage of 27010 11BRWN P to 27116 11FAWKES	1	138	211	211
82	outage of 27010 11BRWN P to 27247 11MERCRCR	1	138	211	211
85	outage of 27010 11BRWN P to 27419 11W CLIF	1	138	211	211
87	outage of 27010 11BRWN P to 27419 11W CLIF	2	138	211	211
90	outage of 27011 11BRWNCT to 27012 11BRWNT1	1	138	211	211
92	outage of 27011 11BRWNCT to 27013 11BRWNT2	1	138	211	211
95	outage of 27036 11CLARK to 27037 11CLARK	1	138-69	211	211
97	outage of 27036 11CLARK to 27116 11FAWKES	1	138	211	211
100	outage of 27036 11CLARK to 27382 11SPENC	1	138	211	211
102	outage of 27040 11CLAYSM to 27172 11HIGBY	1	138	211	211
105	outage of 27067 11DANVIL to 27068 11DANVIL	1	138-69	211	211
107	outage of 27067 11DANVIL to 27247 11MERCRCR	1	138	211	211
110	outage of 27111 11FARM T to 27112 11FARMER	1	138	211	211



No.	Contingency	Ckt	Base kV	Area	Zone
112	outage of 27111 11FARM T to 27369 11SHARKE	1	138	211	211
115	outage of 27111 11FARM T to 27382 11SPENC	1	138	211	211
117	outage of 27112 11FARMER to 27113 11FARMER	1	138-69	211	211
120	outage of 27115 11FAWK T to 27116 11FAWKES	1	138	211	211
122	outage of 27115 11FAWK T to 27231 11LR TAP	1	138	211	211
125	outage of 27116 11FAWKES to 27117 11FAWKES	1	138-69	211	211
127	outage of 27122 11FFRT E to 27412 11TYRONE	1	138	211	211
130	outage of 27141 11GODDRD to 27347 11RODBRN	1	138	211	211
132	outage of 27172 11HIGBY to 27170 11HIGB A	1	138-69	211	211
135	outage of 27172 11HIGBY to 27171 11HIGB B	1	138-69	211	211
137	outage of 27172 11HIGBY to 27207 11LANSDW	1	138	211	211
140	outage of 27172 11HIGBY to 27337 11REYNOL	1	138	211	211
142	outage of 27186 11IBM N to 27229 11LOUDON	1	138	211	211
145	outage of 27211 11LEBN W to 27212 11LEBNON	1	138	211	211
147	outage of 27212 11LEBNON to 27213 11LEBNON	1	138-69	211	211
150	outage of 27212 11LEBNON to 27213 11LEBNON	2	138-69	211	211
152	outage of 27212 11LEBNON to 27243 11MARION	1	138	211	211
155	outage of 27212 11LEBNON to 27247 11MERCER	1	138	211	211
157	outage of 27220 11LK REB to 27221 11LK REB	1	138-69	211	211
160	outage of 27220 11LK REB to 27231 11LR TAP	1	138	211	211
162	outage of 27229 11LOUDON to 27227 11LOUD A	1	138-69	211	211
165	outage of 27229 11LOUDON to 27228 11LOUD B	1	138-69	211	211
167	outage of 27312 11PISGAH to 27313 11PISGAH	1	138-69	211	211
170	outage of 27312 11PISGAH to 27428 11W LEXN	1	138	211	211
172	outage of 27347 11RODBRN to 27348 11RODBRN	1	138-69	211	211
175	outage of 27347 11RODBRN to 27369 11SHARKE	1	138	211	211
177	outage of 27382 11SPENC to 27383 11SPENC	1	138-69	211	211
180	outage of 27382 11SPENC to 27383 11SPENC	2	138-69	211	211
182	outage of 27412 11TYRONE to 27413 11TYRONE	1	138-69	211	211
185	outage of 27419 11W CLIF to 27420 11W CLIF	1	138-69	211	211
187	outage of 27419 11W CLIF to 27420 11W CLIF	2	138-69	211	211
190	outage of 27419 11W CLIF to 27436 11WC-DD	1	138-69	211	211
192	outage of 26959 11AOSMTH to 27129 11FOGG P	EQ	69	211	211
195	outage of 26959 11AOSMTH to 27383 11SPENC	1	69	211	211
197	outage of 26972 11ATOKA to 27068 11DANVIL	1	69	211	211
200	outage of 26986 11BEREA to 27221 11LK REB	1	69	211	211
202	outage of 26986 11BEREA to 27339 11RICH S	EQ	69	211	211
205	outage of 26999 11BOONSB to 27451 11WINC S	EQ	69	211	211
207	outage of 27016 11BUENA to 27076 11DIXDAM	1	69	211	211
210	outage of 27026 11CARON to 27225 11LONDON	1	69	211	211
212	outage of 27030 11CAVE R to 27113 11FARMER	1	69	211	211
215	outage of 27030 11CAVE R to 27358 11SALT L	1	69	211	211
217	outage of 27037 11CLARK to 27129 11FOGG P	1	69	211	211
220	outage of 27037 11CLARK to 27397 11SYLVAN	1	69	211	211
222	outage of 27046 11CMPGEK to 27225 11LONDON	1	69	211	211

No.	Contingency	Ckt	Base kV	Area	Zone
225	outage of 27050 11CORBIN to 27396 11SWEETH	1	69	211	211
227	outage of 27065 11DANV 1 to 27203 11KYSTHO	EQ	69	211	211
230	outage of 27068 11DANVIL to 27168 11HARRDS	1	69	211	211
232	outage of 27076 11DIXDAM to 27436 11WC-DD	1	69	211	211
235	outage of 27076 11DIXDAM to 27450 11WILMOR	1	69	211	211
237	outage of 27082 11E BERN to 27306 11PINEHL	1	69	211	211
240	outage of 27082 11E BERN to 27314 11PITTSB	1	69	211	211
242	outage of 27113 11FARMER to 27264 11MORH W	1	69	211	211
245	outage of 27117 11FAWKES to 27272 11N.MADS	1	69	211	211
247	outage of 27117 11FAWKES to 27339 11RICH S	1	69	211	211
250	outage of 27117 11FAWKES to 27340 11RICHMO	1	69	211	211
252	outage of 27167 11HARR T to 27168 11HARRDS	1	69	211	211
255	outage of 27167 11HARR T to 27420 11W CLIF	1	69	211	211
257	outage of 27170 11HIGB A to 27391 11STONWL	1	69	211	211
260	outage of 27170 11HIGB A to 27449 11WIL D2	1	69	211	211
262	outage of 27178 11HOPEWL to 27396 11SWEETH	1	69	211	211
265	outage of 27203 11KYSTHO to 27420 11W CLIF	1	69	211	211
267	outage of 27210 11LEBN I to 27213 11LEBNON	1	69	211	211
270	outage of 27213 11LEBNON to 27385 11SPRNGF	1	69	211	211
272	outage of 27221 11LK REB to 27340 11RICHMO	1	69	211	211
275	outage of 27221 11LK REB to 27429 11WACO	1	69	211	211
277	outage of 27225 11LONDON to 27314 11PITTSB	1	69	211	211
280	outage of 27271 11N.CORB to 27396 11SWEETH	1	69	211	211
282	outage of 27272 11N.MADS to 27449 11WIL D2	EQ	69	211	211
285	outage of 27330 11PRKRSE to 27397 11SYLVAN	1	69	211	211
287	outage of 27330 11PRKRSE to 27452 11WINCHS	1	69	211	211
290	outage of 27338 11RICE T to 27429 11WACO	1	69	211	211
292	outage of 27358 11SALT L to 27383 11SPENC	1	69	211	211
295	outage of 27359 11SALVIS to 27368 11SHAKRT	1	69	211	211
297	outage of 27368 11SHAKRT to 27420 11W CLIF	1	69	211	211
300	outage of 27420 11W CLIF to 27436 11WC-DD	1	69	211	211
302	outage of 27074 11DELVIN to 29213 20BTYVL	1	161	211-220	211-220
305	outage of 27074 11DELVIN to 29346 20GRNHLJ	1	161	211-220	211-220
307	outage of 27095 11ELIHU to 29271 20COOPER	1	161	211-220	211-220
310	outage of 27243 11MARION to 29437 20MARION	1	138-161	211-220	211-220
312	outage of 26990 11BKR LN to 29203 20BKR LN	1	138-69	211-220	211-220
315	outage of 27115 11FAWK T to 29312 20FAWKES	1	138	211-220	211-220
317	outage of 27116 11FAWKES to 29312 20FAWKES	1	138	211-220	211-220
320	outage of 27116 11FAWKES to 29312 20FAWKES	2	138	211-220	211-220
322	outage of 27229 11LOUDON to 29202 20AVON	1	138	211-220	211-220
325	outage of 27231 11LR TAP to 29616 20UN CTY	1	138	211-220	211-220
327	outage of 26982 11BEATTY to 29215 20BEATTY	1	69	211-220	211-220
330	outage of 27082 11E BERN to 29300 20EBRNST	1	69	211-220	211-220
332	outage of 27110 11FARLEY to 29536 20SCORBN	1	69	211-220	211-220
335	outage of 27117 11FAWKES to 29280 20CROOKJ	1	69	211-220	211-220

No.	Contingency	Ckt	Base kV	Area	Zone
337	outage of 27178 11HOPEWL to 29410 20LAURLC	1	69	211-220	211-220
340	outage of 29201 20AVON to 29202 20AVON	1	345-138	220	220
342	outage of 29201 20AVON to 29573 20SPURLK	1	345	220	220
345	outage of 29201 20AVON to 29651 20KPE345	1	345	220	220
350	outage of 29573 20SPURLK to 29575 20SPURLK	2	345-138	220	220
352	outage of 29575 20SPURLK to 29573 20SPURLK	1	138-345	220	220
355	outage of 29651 20KPE345 to 29652 20KPE138	1	345-138	220	220
357	outage of 29213 20BTYVL to 29215 20BEATTY	1	161-69	220	220
360	outage of 29213 20BTYVL to 29507 20POWELL	1	161	220	220
362	outage of 29271 20COOPER to 29272 20COOPER	1	161-69	220	220
370	outage of 29271 20COOPER to 29292 20DENNY	1	161	220	220
372	outage of 29271 20COOPER to 29411 20LAURLD	1	161	220	220
375	outage of 29271 20COOPER to 29517 20PULASJ	1	161	220	220
377	outage of 29271 20COOPER to 29540 20S OAKH	1	161	220	220
380	outage of 29292 20DENNY to 29293 20DENNY	1	161-69	220	220
382	outage of 29308 20FALLRK to 29310 20FALLRK	1	161-69	220	220
385	outage of 29308 20FALLRK to 29613 20TYNER	1	161	220	220
387	outage of 29346 20GRNHLJ to 29613 20TYNER	1	161	220	220
390	outage of 29408 20LAURLC to 29410 20LAURLC	1	161-69	220	220
392	outage of 29408 20LAURLC to 29411 20LAURLD	1	161	220	220
395	outage of 29408 20LAURLC to 29503 20PITTSB	1	161	220	220
400	outage of 29418 20LIBERT to 29517 20PULASJ	1	161	220	220
402	outage of 29503 20PITTSB to 29613 20TYNER	1	161	220	220
405	outage of 29507 20POWELL to 29508 20POWELL	1	161-138	220	220
407	outage of 29515 20PULASK to 29517 20PULASJ	1	161	220	220
410	outage of 29528 20RUSSEL to 29540 20S OAKH	1	161	220	220
412	outage of 29613 20TYNER to 29615 20TYNER	1	161-69	220	220
415	outage of 29202 20AVON to 29230 20BOONST	1	138	220	220
417	outage of 29202 20AVON to 29313 20FAYETT	1	138	220	220
420	outage of 29202 20AVON to 29490 20PARISJ	1	138	220	220
422	outage of 29230 20BOONST to 29233 20BOONSB	1	138	220	220
425	outage of 29230 20BOONST to 29282 20DALE	1	138	220	220
430	outage of 29282 20DALE to 29397 20JKSMIT	1	138	220	220
432	outage of 29282 20DALE to 29603 20TFJ	1	138	220	220
435	outage of 29283 20DALE to 29282 20DALE	1	69-138	220	220
437	outage of 29312 20FAWKES to 29397 20JKSMIT	1	138	220	220
440	outage of 29312 20FAWKES to 29603 20TFJ	1	138	220	220
442	outage of 29312 20FAWKES to 29623 20WBBEREA	1	138	220	220
445	outage of 29313 20FAYETT to 29315 20FAYETT	1	138-69	220	220
447	outage of 29375 20JACKVJ to 29490 20PARISJ	1	138	220	220
462	outage of 29397 20JKSMIT to 29508 20POWELL	1	138	220	220
465	outage of 29397 20JKSMIT to 29616 20UN CTY	1	138	220	220
467	outage of 29397 20JKSMIT to 29652 20KPE138	1	138	220	220
470	outage of 29397 20JKSMIT to 29652 20KPE138	2	138	220	220
472	outage of 29488 20PARIS to 29490 20PARISJ	1	138	220	220

No.	Contingency	Ckt	Base kV	Area	Zone
475	outage of 29508 20POWELL to 29510 20POWELL	1	138-69	220	220
477	outage of 29623 20WBBEREA to 29625 20WBBEREA	1	138-69	220	220
480	outage of 29195 20ALCAN to 29512 20PPG J	1	69	220	220
482	outage of 29195 20ALCAN to 29625 20WBBEREA	1	69	220	220
485	outage of 29196 20ANNVLJ to 29615 20TYNER	1	69	220	220
487	outage of 29205 20BALLRD to 29237 20BOURNE	1	69	220	220
490	outage of 29212 20BTYV D to 29215 20BEATTY	1	69	220	220
492	outage of 29215 20BEATTY to 29648 20ZACHAR	1	69	220	220
495	outage of 29222 20BLEV T to 29361 20HOPE	1	69	220	220
497	outage of 29237 20BOURNE to 29470 20NEWBY2	1	69	220	220
500	outage of 29238 20BOWEN to 29355 20HIGHHRK	1	69	220	220
502	outage of 29238 20BOWEN to 29510 20POWELL	1	69	220	220
505	outage of 29243 20BRONSJ to 29272 20COOPER	1	69	220	220
507	outage of 29260 20CLAYCJ to 29347 20HARGTJ	1	69	220	220
510	outage of 29260 20CLAYCJ to 29580 20STANTN	1	69	220	220
512	outage of 29272 20COOPER to 29566 20SOMERS	1	69	220	220
515	outage of 29272 20COOPER to 29566 20SOMERS	2	69	220	220
517	outage of 29280 20CROOKJ to 29352 20HICK P	1	69	220	220
527	outage of 29283 20DALE to 29366 20HUNT1	1	69	220	220
530	outage of 29283 20DALE to 29367 20HUNT2	1	69	220	220
532	outage of 29283 20DALE to 29468 20NEWBY1	1	69	220	220
535	outage of 29283 20DALE to 29470 20NEWBY2	1	69	220	220
537	outage of 29325 20FRNCHB to 29361 20HOPE	1	69	220	220
540	outage of 29327 20GARRCO to 29406 20LNCSTR	1	69	220	220
542	outage of 29352 20HICK P to 29511 20PPG	1	69	220	220
545	outage of 29355 20HIGHHRK to 29547 20SANDLK	1	69	220	220
547	outage of 29361 20HOPE to 29377 20JEFFVL	1	69	220	220
550	outage of 29366 20HUNT1 to 29556 20SIDEV	1	69	220	220
552	outage of 29367 20HUNT2 to 29398 20JKSMIT	1	69	220	220
555	outage of 29377 20JEFFVL to 29510 20POWELL	1	69	220	220
557	outage of 29398 20JKSMIT to 29607 20TRAPP	1	69	220	220
560	outage of 29401 20KEAVY to 29403 20KEAVJ2	1	69	220	220
562	outage of 29402 20KEAVJ1 to 29410 20LAURLC	1	69	220	220
565	outage of 29402 20KEAVJ1 to 29501 20PINEGJ	1	69	220	220
567	outage of 29403 20KEAVJ2 to 29410 20LAURLC	1	69	220	220
570	outage of 29403 20KEAVJ2 to 29536 20SCORBN	1	69	220	220
572	outage of 29406 20LNCSTR to 29468 20NEWBY1	1	69	220	220
575	outage of 29446 20MCKEE to 29615 20TYNER	1	69	220	220
577	outage of 29501 20PINEGJ to 29631 20W LOND	1	69	220	220
580	outage of 29510 20POWELL to 29580 20STANTN	1	69	220	220
582	outage of 29511 20PPG to 29512 20PPG J	1	69	220	220
585	outage of 29537 20S FORK to 29615 20TYNER	1	69	220	220
587	outage of 29605 20THLNKJ to 29626 20WBBER J	1	69	220	220
590	outage of 29625 20WBBEREA to 29626 20WBBER J	1	69	220	220
592	outage of 29503 20PITTSB to 27314 11PITTSB	1	161-69	220-211	220-211

No.	Contingency	Ckt	Base kV	Area	Zone
595	outage of 29233 20BOONSB to 26999 11BOONSB	1	138-69	220-211	220-211
597	outage of 29397 20JKSMIT to 27382 11SPENC	1	138	220-211	220-211
602	outage of 26648 09STUART to 29573 20SPURLK	1	345	209-220	209-220
605	outage of 26367 08ZIMER to 29573 20SPURLK	1	345	208-220	280-220
607	outage of 27197 11KENTON to 29575 20SPURLK	1	138	211-220	211-220
610	outage of 29372 20INLAND to 29575 20SPURLK	1	138	220	220
612	outage of 29440 20MAYSJV to 29575 20SPURLK	1	138	220	220
615	outage of 29521 20RENAKR to 29575 20SPURLK	1	138	220	220
617	outage of 29575 20SPURLK to 29585 20S PARK	1	138	220	220

**Phase I Case 101s04**

# Case Summary

# Case101s04

*Project Name*            2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
*Title1*                    2004 Summer - with CT 4 & CT 5  
*Title2*                    Includes All Phase I Transmission  
*Case Date*              2/12/2003

*Power Flow File*        M:\PROJKypsc\267003\300\_Calculations\301\_PFlow\_Results\Case101s04.cft

### Power Flow Controls

<i>Area Control</i>	<input type="checkbox"/>	<i>SmoothStep</i>	<input checked="" type="checkbox"/>
<i>Remote Control</i>	<input checked="" type="checkbox"/>	<i>XfrmVcon</i>	<input type="checkbox"/>
<i>GenVar Control</i>	<input checked="" type="checkbox"/>	<i>XfrmFcon</i>	<input type="checkbox"/>
<i>Solve Method</i>	NSOLVE		

### Case Settings

<i>Overload</i>	<input checked="" type="checkbox"/>	<i>VlimMin</i>	0.9	<i>RateFactor</i>	1
<i>VLimit</i>	<input checked="" type="checkbox"/>	<i>VlimMax</i>	1.05	<i>AmpFactor</i>	1
<i>VChange</i>	<input checked="" type="checkbox"/>	<i>VlimChange</i>	0.05	<i>RatingNumber</i>	2
<i>Monitored Set</i>	monitor		295 Buses		

### Contingency

<i>Use Existing Contingencies from Tables</i>	201 Buses
230 contingencies	

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

*Normal System*

2004 Summer - with CT 4 CT 5

Includes All Phase I Transmission

2/12/2003

Overloaded Facility	Overloads
No Normal System Overload Violations	



## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4\_CT 5

Includes All Phase I Transmission

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Overloaded Facility								Normal System				Overloads	
From	Name	To	Name	Circuit	Base kV	Area	Zone	Ratings		MVA	Norm (%)	Count	Max
								Norm	Emer			A / B	(%)
27117	11FAWKES	27339	11RICH S	1	69	211	211	72	72	45.5	63	1 / 2	140
26986	11BEREA	27221	11LK REB	1	69	211	211	72	72	51.6	72	1 / 1	139
27117	11FAWKES	27272	11N.MADS	1	69	211	211	56	56	15.5	28	1 / 0	129
27347	11RODBRN	27348	11RODBRN	1	138-69	211	211	33	40	30.4	92	5 / 0	116
27221	11LK REB	27340	11RICHMO	1	69	211	211	56	56	15.7	28	1 / 0	106
27451	11WINC S	27452	11WINCHS	1	69	211	211	73	80	53.8	74	0 / 1	105
29203	20BKR LN	29360	20HOLLWJ	1	69	220	220	57	69	16.4	29	0 / 2	101
												9 / 6	140

**Notes:**

- Overloads are based on 100% of Rating 2
- NS = Normal System Conditions (No Outages)
- Minimum Reporting Level is 100%
- Statistical Information (A/B Stats and Maximum Overload)
  - A = Serious Overload > 105%
  - B = Overloaded Facility between 100% and 105% of Rated Capability

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes All Phase I Transmission

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Undervoltage		Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
Bus	Name					A / B	Min (pu)
27449	11WIL D2	69	211	211	1.0006	1 / 0	0.8368
29212	20BTYV D	69	220	220	0.9926	1 / 0	0.8468
29478	20OAKD J	69	220	220	0.9852	1 / 0	0.8565
29232	20BOONVJ	69	220	220	0.9825	1 / 0	0.8679
29313	20FAYETT	138	220	220	0.9957	1 / 0	0.8689
27210	11LEBN I	69	211	211	0.9787	1 / 0	0.8693
29468	20NEWBY1	69	220	220	1.0060	1 / 0	0.8766
29315	20FAYETT	69	220	220	1.0086	0 / 2	0.8912
29406	20LNCSTR	69	220	220	0.9948	0 / 1	0.8926
29327	20GARRCO	69	220	220	0.9924	0 / 1	0.8935
29537	20S FORK	69	220	220	0.9832	0 / 1	0.8946
29205	20BALLRD	69	220	220	0.9750	0 / 3	0.8971
29237	20BOURNE	69	220	220	0.9856	0 / 2	0.8980
29596	20TGOOCH	69	220	220	0.9795	0 / 1	0.8984
27067	11DANVIL	138	211	211	0.9942	0 / 1	0.8993
29325	20FRNCHB	69	220	220	0.9748	0 / 1	0.8995
						7 / 13	0.8368
<b>Notes:</b>							
1. Minimum Voltage Limit 0.90 (pu)							
2. NS = Normal System Conditions (No Outages)							
3. Maximum Reporting Level is 90%							
4. Statistical Information (A/B Stats and Minimum Voltage)							
A = Serious Undervoltage < 0.88 (pu)							
B = Low Voltages between 0.88 and 0.90 (pu)							

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes All Phase I Transmission

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<b>Overvoltage</b>					<b>Normal System</b>	<b>Voltage Violations</b>	
<b>Bus</b>	<b>Name</b>	<b>Base kV</b>	<b>Area</b>	<b>Zone</b>	<b>Voltage (pu)</b>	<b>A</b>	<b>B Max (pu)</b>
29406	20LNCSTR	69	220	220	0.9948	0 / 1	1.0528
29540	20S OAKH	161	220	220	1.0339	0 / 1	1.0504
						0 / 2	1.0528
<b>Notes:</b>							
1. Maximum Voltage Limit is 1.05 (pu)							
2. NS = Normal System Conditions (No Outages)							
3. Minimum Reporting Level for Over Voltages is 105%							
4. Statistical Information (A/B Stats and Maximum Voltage)							
A = Serious Overvoltage > 1.07 (pu)							
B = High Voltages between 1.05 and 1.07 (pu)							

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes All Phase I Transmission

2/12/2003

VChange Bus Name	Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
					A / B	Max (pu)
27449 11WIL D2	69	211	211	1.0006	1 / 0	-0.1638
29212 20BTYV D	69	220	220	0.9926	1 / 0	-0.1458
29468 20NEWBY1	69	220	220	1.0060	1 / 0	-0.1294
29478 20OAKD J	69	220	220	0.9852	1 / 0	-0.1287
29313 20FAYETT	138	220	220	0.9957	1 / 0	-0.1268
29315 20FAYETT	69	220	220	1.0086	2 / 0	-0.1174
29232 20BOONVJ	69	220	220	0.9825	1 / 0	-0.1146
29233 20BOONSB	138	220	220	1.0171	1 / 0	-0.1127
27016 11BUENA	69	211	211	1.0262	1 / 0	-0.1099
27210 11LEBN I	69	211	211	0.9787	1 / 0	-0.1094
29470 20NEWBY2	69	220	220	1.0082	1 / 0	-0.1080
27076 11DIXDAM	69	211	211	1.0369	1 / 0	-0.1039
29406 20LNCSTR	69	220	220	0.9948	1 / 0	-0.1023
26999 11BOONSB	69	211	211	1.0280	2 / 0	-0.1004
29327 20GARRCO	69	220	220	0.9924	1 / 0	-0.0989
27067 11DANVIL	138	211	211	0.9942	1 / 0	-0.0949
29291 20DAVIS	69	220	220	0.9968	2 / 0	-0.0944
27016 11BUENA	69	211	211	1.0262	1 / 0	-0.0941
27136 11GARRD	69	211	211	1.0080	1 / 0	-0.0894
29537 20S FORK	69	220	220	0.9832	1 / 0	-0.0886
29237 20BOURNE	69	220	220	0.9856	1 / 0	-0.0876
29237 20BOURNE	69	220	220	0.9856	1 / 0	-0.0857
29596 20TGOOCH	69	220	220	0.9795	1 / 0	-0.0811
29580 20STANTN	69	220	220	0.9984	1 / 0	-0.0801
27068 11DANVIL	69	211	211	1.0006	2 / 0	-0.0782
29205 20BALLRD	69	220	220	0.9750	1 / 0	-0.0779
29205 20BALLRD	69	220	220	0.9750	1 / 0	-0.0771
27136 11GARRD	69	211	211	1.0080	1 / 0	-0.0755
29205 20BALLRD	69	220	220	0.9750	1 / 0	-0.0754
29325 20FRNCHB	69	220	220	0.9748	1 / 0	-0.0753
26972 11ATOKA	69	211	211	0.9992	1 / 0	-0.0747
26972 11ATOKA	69	211	211	0.9992	1 / 0	-0.0746
29436 20MARIBJ	69	220	220	0.9757	1 / 0	-0.0733
27450 11WILMOR	69	211	211	1.0082	1 / 0	-0.0729
27000 11BOYLE	69	211	211	0.9985	2 / 0	-0.0727
27220 11LK REB	138	211	211	1.0013	0 / 1	-0.0690
27065 11DANV 1	69	211	211	0.9980	0 / 2	-0.0671
29260 20CLAYCJ	69	220	220	0.9959	0 / 1	-0.0669
27451 11WINC S	69	211	211	1.0005	0 / 2	-0.0667
27167 11HARR T	69	211	211	1.0082	0 / 1	-0.0659
27168 11HARRDS	69	211	211	1.0082	0 / 1	-0.0659
27450 11WILMOR	69	211	211	1.0082	0 / 1	-0.0659
29203 20BKR LN	69	220	220	0.9886	0 / 1	-0.0659
29411 20LAURLD	161	220	220	1.0041	0 / 1	-0.0654
29327 20GARRCO	69	220	220	0.9924	0 / 1	-0.0651
29407 20LAURHY	13.8	220	220	0.9851	0 / 1	-0.0641
27247 11MERC R	138	211	211	1.0074	0 / 1	-0.0638
29623 20WBBEREA	138	220	220	0.9998	0 / 1	-0.0632
27055 11CRAB O	69	211	211	0.9886	0 / 1	-0.0622
29368 20HUNTFJ	69	220	220	0.9690	0 / 1	-0.0622
29510 20POWELL	69	220	220	0.9987	0 / 1	-0.0621
29580 20STANTN	69	220	220	0.9984	0 / 1	-0.0619
29347 20HARGTJ	69	220	220	0.9978	0 / 1	-0.0617

VChange Bus Name	Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
					A / B	Max (pu)
29368 20HUNTFJ	69	220	220	0.9690	0 / 1	-0.0615
29288 20DALE4	13.8	220	220	1.0441	0 / 1	-0.0605
27452 11WINCHS	69	211	211	0.9972	0 / 2	-0.0603
29368 20HUNTFJ	69	220	220	0.9690	0 / 1	-0.0602
29360 20HOLLWJ	69	220	220	0.9851	0 / 1	-0.0596
29515 20PULASK	161	220	220	1.0139	0 / 1	-0.0585
29377 20JEFFVL	69	220	220	0.9850	0 / 1	-0.0578
29625 20WBBERA	69	220	220	0.9936	0 / 1	-0.0570
27330 11PRKRSE	69	211	211	0.9969	0 / 2	-0.0569
29625 20WBBERA	69	220	220	0.9936	0 / 1	-0.0568
27067 11DANVIL	138	211	211	0.9942	0 / 1	-0.0557
27397 11SYLVAN	69	211	211	0.9971	0 / 2	-0.0556
26986 11BEREA	69	211	211	0.9935	0 / 1	-0.0552
29626 20WBBER J	69	220	220	0.9933	0 / 1	-0.0552
29238 20BOWEN	69	220	220	0.9992	0 / 1	-0.0550
29626 20WBBER J	69	220	220	0.9933	0 / 1	-0.0550
29195 20ALCAN	69	220	220	0.9913	0 / 1	-0.0543
29195 20ALCAN	69	220	220	0.9913	0 / 1	-0.0540
27221 11LK REB	69	211	211	1.0100	0 / 2	-0.0538
29260 20CLAYCJ	69	220	220	0.9959	0 / 1	-0.0530
27272 11N.MADS	69	211	211	1.0044	0 / 1	-0.0528
27451 11WINC S	69	211	211	1.0005	0 / 1	-0.0527
29512 20PPG J	69	220	220	0.9908	0 / 1	-0.0526
27037 11CLARK	69	211	211	0.9980	0 / 2	-0.0524
27368 11SHAKRT	69	211	211	1.0282	0 / 1	-0.0524
29511 20PPG	69	220	220	0.9907	0 / 1	-0.0524
29512 20PPG J	69	220	220	0.9908	0 / 1	-0.0523
29596 20TGOOCH	69	220	220	0.9795	0 / 1	-0.0523
29408 20LAURLC	161	220	220	0.9885	0 / 1	-0.0521
29511 20PPG	69	220	220	0.9907	0 / 1	-0.0521
27339 11RICH S	69	211	211	0.9983	0 / 1	-0.0519
27055 11CRAB O	69	211	211	0.9886	0 / 1	-0.0517
29605 20THLNKJ	69	220	220	0.9930	0 / 1	-0.0511
27345 11ROCKWE	69	211	211	0.9929	0 / 2	-0.0509
29605 20THLNKJ	69	220	220	0.9930	0 / 1	-0.0509
29516 20PULASK	69	220	220	1.0061	0 / 1	-0.0507
29607 20TRAPP	69	220	220	1.0041	0 / 1	-0.0502
29408 20LAURLC	161	220	220	0.9885	0 / 1	-0.0501
29406 20LNCSTR	69	220	220	0.9948	0 / 1	0.0579

40 / 65 -0.1638

**Notes:**

1. Voltage Change Limit is 0.05 (pu)
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 5%
4. Statistical Information (A/B Stats and Maximum Voltage Change)
  - A = Serious Voltage Change > 0.07 (pu)
  - B = Excessive Voltage Change between 0.05 and 0.07 (pu)

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes All Phase I Transmission

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Contingency	Overloaded Facility										Overloads		
	From Name	To Name	Ckt	Base kV	Area	Zone	Ratings		MVA	Norm (%)	Emer (%)		
97	outage of 27036 11CLARK to 27116 11FAWKES		1	138	211	211							
	27451 11WINC S	27452 11WINCHS	1	69	211	211	73	80	83.8	115	105		
110	outage of 27111 11FARM T to 27112 11FARMER		1	138	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	43.8	133	110		
112	outage of 27111 11FARM T to 27369 11SHARKE		1	138	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	44.0	133	110		
117	outage of 27112 11FARMER to 27113 11FARMER		1	138-69	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	43.8	133	110		
125	outage of 27116 11FAWKES to 27117 11FAWKES		1	138-69	211	211							
	27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	59.1	105	106		
	26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	74.0	103	103		
132	outage of 27172 11HIGBY to 27170 11HIGB A		1	138-69	211	211							
	26956 NONAME	27304 11PICADO	1	69	211	211	95	95	101.0	106	106		
157	outage of 27220 11LK REB to 27221 11LK REB		1	138-69	211	211							
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	74.6	104	104		
160	outage of 27220 11LK REB to 27231 11LR TAP		1	138	211	211							
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	74.6	104	104		
175	outage of 27347 11RODBRN to 27369 11SHARKE		1	138	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	46.6	141	116		
200	outage of 26986 11BEREA to 27221 11LK REB		1	69	211	211							
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	100.7	140	140		
242	outage of 27113 11FARMER to 27264 11MORH W		1	69	211	211							
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	45.7	138	114		
247	outage of 27117 11FAWKES to 27339 11RICH S		1	69	211	211							
	26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	99.7	138	139		
260	outage of 27170 11HIGB A to 27449 11WIL D2		1	69	211	211							
	27117 11FAWKES	27272 11N.MADS	1	69	211	211	56	56	72.1	129	129		
322	outage of 27229 11LOUDON to 29202 20AVON		1	138	211-220	211-220							
	27075 NONAME	27300 11PARIS	1	69	211	211	56	56	57.0	102	102		
417	outage of 29202 20AVON to 29313 20FAYETT		1	138	220	220							
	29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	69	69.8	122	101		
445	outage of 29313 20FAYETT to 29315 20FAYETT		1	138-69	220	220							
	29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	69	69.8	122	101		

**Notes:**

- Overloads are based on 100% of Rating 2

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4\_CT 5

Includes All Phase I Transmission

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Overloaded Facility	Contingency									Overloads			
	From	Name	To	Name	Circuit	Base kV	Area	Zone	Ratings Norm Emer	NS	Norm MVA	Emer (%)	Emer (%)
	27117	11FAWKES	27339	11RICH S	1	69	211	211	72 72	NS	45	63	63
		200 outage of 26986 11BEREA to 27221 11LK REB			1	69	211	211			101	140	140
		160 outage of 27220 11LK REB to 27231 11LR TAP			1	138	211	211			75	104	104
		157 outage of 27220 11LK REB to 27221 11LK REB			1	138-69	211	211			75	104	104
											1 / 2		140
	26986	11BEREA	27221	11LK REB	1	69	211	211	72 72	NS	52	72	72
		247 outage of 27117 11FAWKES to 27339 11RICH S			1	69	211	211			100	138	139
		125 outage of 27116 11FAWKES to 27117 11FAWKE			1	138-69	211	211			74	103	103
											1 / 1		139
	27117	11FAWKES	27272	11N.MADS	1	69	211	211	56 56	NS	15	28	28
		260 outage of 27170 11HIGB A to 27449 11WIL D2			1	69	211	211			72	129	129
											1 / 0		129
	27347	11RODBRN	27348	11RODBRN	1	138-69	211	211	33 40	NS	30	92	76
		175 outage of 27347 11RODBRN to 27369 11SHARK			1	138	211	211			47	141	116
		242 outage of 27113 11FARMER to 27264 11MORH			1	69	211	211			46	138	114
		112 outage of 27111 11FARM T to 27369 11SHARKE			1	138	211	211			44	133	110
		110 outage of 27111 11FARM T to 27112 11FARMER			1	138	211	211			44	133	110
		117 outage of 27112 11FARMER to 27113 11FARME			1	138-69	211	211			44	133	110
											5 / 0		116
	27221	11LK REB	27340	11RICHMO	1	69	211	211	56 56	NS	16	28	28
		125 outage of 27116 11FAWKES to 27117 11FAWKE			1	138-69	211	211			59	105	106
											1 / 0		106
	27451	11WINC S	27452	11WINCHS	1	69	211	211	73 80	NS	54	74	67
		97 outage of 27036 11CLARK to 27116 11FAWKES			1	138	211	211			84	115	105
											0 / 1		105
	29203	20BKR LN	29360	20HOLLWJ	1	69	220	220	57 69	NS	16	29	24
		417 outage of 29202 20AVON to 29313 20FAYETT			1	138	220	220			70	122	101
		445 outage of 29313 20FAYETT to 29315 20FAYETT			1	138-69	220	220			70	122	101
											0 / 2		101
											9 / 6		139.9

**Notes:**

- Overloads are based on 100% of Rating 2
- NS = Normal System Conditions (No Outages)
- Minimum Reporting Level is 100%
- Statistical Information (A/B Stats and Maximum Overload)
  - A = Serious Overload > 105%
  - B = Overloaded Facility between 100% and 105% of Rated Capability

2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes All Phase I Transmission

2/12/2003

Contingency

Description	Ckt	kV	Zone	Area	Voltage Violations				Not Solved
					Over load	UnderV	OverV	Change	
82 outage of 27010 11BRWN P to 27247 11MERCRCR	1	138	211	211	0	0	0	2	
97 outage of 27036 11CLARK to 27116 11FAWKES	1	138	211	211	1	0	0	0	
105 outage of 27067 11DANVIL to 27068 11DANVIL	1	138-69	211	211	0	0	0	4	
107 outage of 27067 11DANVIL to 27247 11MERCRCR	1	138	211	211	0	1	0	5	
110 outage of 27111 11FARM T to 27112 11FARMER	1	138	211	211	1	0	0	0	
112 outage of 27111 11FARM T to 27369 11SHARKE	1	138	211	211	1	0	0	0	
117 outage of 27112 11FARMER to 27113 11FARMER	1	138-69	211	211	1	0	0	0	
125 outage of 27116 11FAWKES to 27117 11FAWKES	1	138-69	211	211	2	0	0	0	
132 outage of 27172 11HIGBY to 27170 11HIGB A	1	138-69	211	211	1	0	0	0	
157 outage of 27220 11LK REB to 27221 11LK REB	1	138-69	211	211	1	0	0	1	
160 outage of 27220 11LK REB to 27231 11LR TAP	1	138	211	211	1	0	0	2	
175 outage of 27347 11RODBRN to 27369 11SHARKE	1	138	211	211	1	0	0	0	
200 outage of 26986 11BEREA to 27221 11LK REB	1	69	211	211	1	0	0	1	
205 outage of 26999 11BOONSB to 27451 11WINC S	EQ	69	211	211	0	0	0	1	
207 outage of 27016 11BUENA to 27076 11DIXDAM	1	69	211	211	0	0	0	3	
232 outage of 27076 11DIXDAM to 27436 11WC-DD	1	69	211	211	0	0	0	5	
235 outage of 27076 11DIXDAM to 27450 11WILMOR	1	69	211	211	0	0	0	1	
242 outage of 27113 11FARMER to 27264 11MORH W	1	69	211	211	1	0	0	0	
247 outage of 27117 11FAWKES to 27339 11RICH S	1	69	211	211	1	0	0	1	
255 outage of 27167 11HARR T to 27420 11W CLIF	1	69	211	211	0	0	0	2	
260 outage of 27170 11HIGB A to 27449 11WIL D2	1	69	211	211	1	1	0	2	
267 outage of 27210 11LEBN I to 27213 11LEBNON	1	69	211	211	0	1	0	1	
297 outage of 27368 11SHAKRT to 27420 11W CLIF	1	69	211	211	0	0	0	1	
312 outage of 26990 11BKR LN to 29203 20BKR LN	1	138-69	211-220	211-220	0	0	0	2	
322 outage of 27229 11LOUDON to 29202 20AVON	1	138	211-220	211-220	1	0	0	0	
345 outage of 29201 20AVON to 29651 20KPE345	1	345	220	220	0	0	0	0	F
355 outage of 29651 20KPE345 to 29652 20KPE138	1	345-138	220	220	0	0	0	0	F
372 outage of 29271 20COOPER to 29411 20LAURLD	1	161	220	220	0	0	0	3	
377 outage of 29271 20COOPER to 29540 20S OAKH	1	161	220	220	0	0	3	0	
392 outage of 29408 20LAURLC to 29411 20LAURLD	1	161	220	220	0	0	0	1	
407 outage of 29515 20PULASK to 29517 20PULASJ	1	161	220	220	0	0	0	2	
410 outage of 29528 20RUSSEL to 29540 20S OAKH	1	161	220	220	0	0	1	0	
417 outage of 29202 20AVON to 29313 20FAYETT	1	138	220	220	1	2	0	3	
422 outage of 29230 20BOONST to 29233 20BOONSB	1	138	220	220	0	0	0	8	
425 outage of 29230 20BOONST to 29282 20DALE	1	138	220	220	0	0	0	1	
442 outage of 29312 20FAWKES to 29623 20WBBEREA	1	138	220	220	0	0	0	7	
445 outage of 29313 20FAYETT to 29315 20FAYETT	1	138-69	220	220	1	1	0	2	
467 outage of 29397 20JKSMIT to 29652 20KPE138	1	138	220	220	0	0	0	0	F



**Contingency**

Description	Ckt	kV	Zone	Area	Over load	Voltage Violations			Not Solved
						UnderV	OverV	Change	
470 outage of 29397 20JKSMIT to 29652 20KPE138	2	138	220	220	0	0	0	0	F
475 outage of 29508 20POWELL to 29510 20POWELL	1	138-69	220	220	0	0	0	4	
477 outage of 29623 20WBEREA to 29625 20WBERE	1	138-69	220	220	0	0	0	6	
487 outage of 29205 20BALLRD to 29237 20BOURNE	1	69	220	220	0	1	0	2	
490 outage of 29212 20BTYV D to 29215 20BEATTY	1	69	220	220	0	4	0	4	
497 outage of 29237 20BOURNE to 29470 20NEWBY2	1	69	220	220	0	2	0	3	
532 outage of 29283 20DALE to 29468 20NEWBY1	1	69	220	220	0	4	0	4	
535 outage of 29283 20DALE to 29470 20NEWBY2	1	69	220	220	0	2	0	4	
537 outage of 29325 20FRNCHB to 29361 20HOPE	1	69	220	220	0	1	0	2	
540 outage of 29327 20GARRCO to 29406 20LNCSTR	1	69	220	220	0	0	1	3	
555 outage of 29377 20JEFFVL to 29510 20POWELL	1	69	220	220	0	0	0	1	
580 outage of 29510 20POWELL to 29580 20STANTN	1	69	220	220	0	0	0	4	
595 outage of 29233 20BOONSB to 26999 11BOONSB	1	138-69	220-211	220-211	0	0	0	7	
597 outage of 29397 20JKSMIT to 27382 11SPENC	1	138	220-211	220-211	0	0	0	0	F
602 outage of 26648 09STUART to 29573 20SPURLK	1	345	209-220	209-220	0	0	0	0	F
605 outage of 26367 08ZIMER to 29573 20SPURLK	1	345	280-220	208-220	0	0	0	0	F
<b>Totals:</b>					17	20	5	105	7

**Notes:**

1. Overloads are based on 100% of Rating 2
2. Undervoltage Limit is 0.90 (pu)
3. Overvoltage Limit is 1.05 (pu)
4. Voltage Change Limit is 0.05 (pu)

**Not Solved Codes:**

- D - Diverged  
I - Interrupted  
F - Failed, One or More Contingency Commands Failed in PFlow

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - with CT 4 CT 5

Includes All Phase I Transmission

2/12/2003

No.	Contingency	Ckt	Base kV	Area	Zone
10	outage of 26950 11ALCALD to 27008 11BRWN N	1	345	211	211
12	outage of 27008 11BRWN N to 27009 11BRWN N	1	345-138	211	211
15	outage of 27008 11BRWN N to 27162 11HARDN	1	345	211	211
17	outage of 27008 11BRWN N to 27427 11W LEXN	1	345	211	211
20	outage of 26951 11ALCALD to 27095 11ELIHU	1	161	211	211
22	outage of 26962 11ARNOLD to 27074 11DELVIN	1	161	211	211
25	outage of 27074 11DELVIN to 27444 11WI TAP	1	161	211	211
27	outage of 27095 11ELIHU to 27096 11ELIHU	1	161-69	211	211
30	outage of 27095 11ELIHU to 27096 11ELIHU	2	161-69	211	211
32	outage of 27230 11LR TAP to 27231 11LR TAP	1	161-138	211	211
35	outage of 27230 11LR TAP to 27444 11WI TAP	1	161	211	211
37	outage of 27425 11W IRVI to 27444 11WI TAP	1	161	211	211
40	outage of 26947 11ADAMS to 27412 11TYRONE	1	138	211	211
42	outage of 26977 11BARDST to 26978 11BARDST	1	138-69	211	211
45	outage of 26977 11BARDST to 27011 11BRWNCT	1	138	211	211
47	outage of 26977 11BARDST to 27276 11NELSON	1	138	211	211
50	outage of 26990 11BKR LN to 27009 11BRWN N	1	138	211	211
52	outage of 26990 11BKR LN to 27172 11HIGBY	1	138	211	211
55	outage of 26998 11BONNIE to 27211 11LEBN W	1	138	211	211
57	outage of 27009 11BRWN N to 27011 11BRWNCT	1	138	211	211
60	outage of 27009 11BRWN N to 27012 11BRWNT1	1	138	211	211
62	outage of 27009 11BRWN N to 27013 11BRWNT2	1	138	211	211
65	outage of 27009 11BRWN N to 27040 11CLAYSM	1	138	211	211
67	outage of 27009 11BRWN N to 27172 11HIGBY	1	138	211	211
70	outage of 27009 11BRWN N to 27312 11PISGAH	1	138	211	211
72	outage of 27009 11BRWN N to 27412 11TYRONE	1	138	211	211
75	outage of 27010 11BRWN P to 27012 11BRWNT1	1	138	211	211
77	outage of 27010 11BRWN P to 27013 11BRWNT2	1	138	211	211
80	outage of 27010 11BRWN P to 27116 11FAWKES	1	138	211	211
82	outage of 27010 11BRWN P to 27247 11MERCRCR	1	138	211	211
85	outage of 27010 11BRWN P to 27419 11W CLIF	1	138	211	211
87	outage of 27010 11BRWN P to 27419 11W CLIF	2	138	211	211
90	outage of 27011 11BRWNCT to 27012 11BRWNT1	1	138	211	211
92	outage of 27011 11BRWNCT to 27013 11BRWNT2	1	138	211	211
95	outage of 27036 11CLARK to 27037 11CLARK	1	138-69	211	211
97	outage of 27036 11CLARK to 27116 11FAWKES	1	138	211	211
100	outage of 27036 11CLARK to 27382 11SPENC	1	138	211	211
102	outage of 27040 11CLAYSM to 27172 11HIGBY	1	138	211	211
105	outage of 27067 11DANVIL to 27068 11DANVIL	1	138-69	211	211
107	outage of 27067 11DANVIL to 27247 11MERCRCR	1	138	211	211
110	outage of 27111 11FARM T to 27112 11FARMER	1	138	211	211

No.	Contingency	Ckt	Base kV	Area	Zone
112	outage of 27111 11FARM T to 27369 11SHARKE	1	138	211	211
115	outage of 27111 11FARM T to 27382 11SPENC	1	138	211	211
117	outage of 27112 11FARMER to 27113 11FARMER	1	138-69	211	211
120	outage of 27115 11FAWK T to 27116 11FAWKES	1	138	211	211
122	outage of 27115 11FAWK T to 27231 11LR TAP	1	138	211	211
125	outage of 27116 11FAWKES to 27117 11FAWKES	1	138-69	211	211
127	outage of 27122 11FFRT E to 27412 11TYRONE	1	138	211	211
130	outage of 27141 11GODDRD to 27347 11RODBRN	1	138	211	211
132	outage of 27172 11HIGBY to 27170 11HIGB A	1	138-69	211	211
135	outage of 27172 11HIGBY to 27171 11HIGB B	1	138-69	211	211
137	outage of 27172 11HIGBY to 27207 11LANSDW	1	138	211	211
140	outage of 27172 11HIGBY to 27337 11REYNOL	1	138	211	211
142	outage of 27186 11IBM N to 27229 11LOUDON	1	138	211	211
145	outage of 27211 11LEBN W to 27212 11LEBNON	1	138	211	211
147	outage of 27212 11LEBNON to 27213 11LEBNON	1	138-69	211	211
150	outage of 27212 11LEBNON to 27213 11LEBNON	2	138-69	211	211
152	outage of 27212 11LEBNON to 27243 11MARION	1	138	211	211
155	outage of 27212 11LEBNON to 27247 11MERCER	1	138	211	211
157	outage of 27220 11LK REB to 27221 11LK REB	1	138-69	211	211
160	outage of 27220 11LK REB to 27231 11LR TAP	1	138	211	211
162	outage of 27229 11LOUDON to 27227 11LOUD A	1	138-69	211	211
165	outage of 27229 11LOUDON to 27228 11LOUD B	1	138-69	211	211
167	outage of 27312 11PISGAH to 27313 11PISGAH	1	138-69	211	211
170	outage of 27312 11PISGAH to 27428 11W LEXN	1	138	211	211
172	outage of 27347 11RODBRN to 27348 11RODBRN	1	138-69	211	211
175	outage of 27347 11RODBRN to 27369 11SHARKE	1	138	211	211
177	outage of 27382 11SPENC to 27383 11SPENC	1	138-69	211	211
180	outage of 27382 11SPENC to 27383 11SPENC	2	138-69	211	211
182	outage of 27412 11TYRONE to 27413 11TYRONE	1	138-69	211	211
185	outage of 27419 11W CLIF to 27420 11W CLIF	1	138-69	211	211
187	outage of 27419 11W CLIF to 27420 11W CLIF	2	138-69	211	211
190	outage of 27419 11W CLIF to 27436 11WC-DD	1	138-69	211	211
192	outage of 26959 11AOSMTH to 27129 11FOGG P	EQ	69	211	211
195	outage of 26959 11AOSMTH to 27383 11SPENC	1	69	211	211
197	outage of 26972 11ATOKA to 27068 11DANVIL	1	69	211	211
200	outage of 26986 11BEREA to 27221 11LK REB	1	69	211	211
202	outage of 26986 11BEREA to 27339 11RICH S	EQ	69	211	211
205	outage of 26999 11BOONSB to 27451 11WINC S	EQ	69	211	211
207	outage of 27016 11BUENA to 27076 11DIXDAM	1	69	211	211
210	outage of 27026 11CARON to 27225 11LONDON	1	69	211	211
212	outage of 27030 11CAVE R to 27113 11FARMER	1	69	211	211
215	outage of 27030 11CAVE R to 27358 11SALT L	1	69	211	211
217	outage of 27037 11CLARK to 27129 11FOGG P	1	69	211	211
220	outage of 27037 11CLARK to 27397 11SYLVAN	1	69	211	211
222	outage of 27046 11CMPGEK to 27225 11LONDON	1	69	211	211

No.	Contingency	Ckt	Base kV	Area	Zone
225	outage of 27050 11CORBIN to 27396 11SWEETH	1	69	211	211
227	outage of 27065 11DANV 1 to 27203 11KYSTHO	EQ	69	211	211
230	outage of 27068 11DANVIL to 27168 11HARRDS	1	69	211	211
232	outage of 27076 11DIXDAM to 27436 11WC-DD	1	69	211	211
235	outage of 27076 11DIXDAM to 27450 11WILMOR	1	69	211	211
237	outage of 27082 11E BERN to 27306 11PINEHL	1	69	211	211
240	outage of 27082 11E BERN to 27314 11PITTSB	1	69	211	211
242	outage of 27113 11FARMER to 27264 11MORH W	1	69	211	211
245	outage of 27117 11FAWKES to 27272 11N.MADS	1	69	211	211
247	outage of 27117 11FAWKES to 27339 11RICH S	1	69	211	211
250	outage of 27117 11FAWKES to 27340 11RICHMO	1	69	211	211
252	outage of 27167 11HARR T to 27168 11HARRDS	1	69	211	211
255	outage of 27167 11HARR T to 27420 11W CLIF	1	69	211	211
257	outage of 27170 11HIGB A to 27391 11STONWL	1	69	211	211
260	outage of 27170 11HIGB A to 27449 11WIL D2	1	69	211	211
262	outage of 27178 11HOPEWL to 27396 11SWEETH	1	69	211	211
265	outage of 27203 11KYSTHO to 27420 11W CLIF	1	69	211	211
267	outage of 27210 11LEBN I to 27213 11LEBNON	1	69	211	211
270	outage of 27213 11LEBNON to 27385 11SPRNGF	1	69	211	211
272	outage of 27221 11LK REB to 27340 11RICHMO	1	69	211	211
275	outage of 27221 11LK REB to 27429 11WACO	1	69	211	211
277	outage of 27225 11LONDON to 27314 11PITTSB	1	69	211	211
280	outage of 27271 11N.CORB to 27396 11SWEETH	1	69	211	211
282	outage of 27272 11N.MADS to 27449 11WIL D2	EQ	69	211	211
285	outage of 27330 11PRKRSE to 27397 11SYLVAN	1	69	211	211
287	outage of 27330 11PRKRSE to 27452 11WINCHS	1	69	211	211
290	outage of 27338 11RICE T to 27429 11WACO	1	69	211	211
292	outage of 27358 11SALT L to 27383 11SPENC	1	69	211	211
295	outage of 27359 11SALVIS to 27368 11SHAKRT	1	69	211	211
297	outage of 27368 11SHAKRT to 27420 11W CLIF	1	69	211	211
300	outage of 27420 11W CLIF to 27436 11WC-DD	1	69	211	211
302	outage of 27074 11DELVIN to 29213 20BTYVL	1	161	211-220	211-220
305	outage of 27074 11DELVIN to 29346 20GRNHLJ	1	161	211-220	211-220
307	outage of 27095 11ELIHU to 29271 20COOPER	1	161	211-220	211-220
310	outage of 27243 11MARION to 29437 20MARION	1	138-161	211-220	211-220
312	outage of 26990 11BKR LN to 29203 20BKR LN	1	138-69	211-220	211-220
315	outage of 27115 11FAWK T to 29312 20FAWKES	1	138	211-220	211-220
317	outage of 27116 11FAWKES to 29312 20FAWKES	1	138	211-220	211-220
320	outage of 27116 11FAWKES to 29312 20FAWKES	2	138	211-220	211-220
322	outage of 27229 11LOUDON to 29202 20AVON	1	138	211-220	211-220
325	outage of 27231 11LR TAP to 29616 20UN CTY	1	138	211-220	211-220
327	outage of 26982 11BEATTY to 29215 20BEATTY	1	69	211-220	211-220
330	outage of 27082 11E BERN to 29300 20EBRNST	1	69	211-220	211-220
332	outage of 27110 11FARLEY to 29536 20SCORBN	1	69	211-220	211-220
335	outage of 27117 11FAWKES to 29280 20CROOKJ	1	69	211-220	211-220

No.	Contingency	Ckt	Base kV	Area	Zone
337	outage of 27178 11HOPEWL to 29410 20LAURLC	1	69	211-220	211-220
340	outage of 29201 20AVON to 29202 20AVON	1	345-138	220	220
342	outage of 29201 20AVON to 29573 20SPURLK	1	345	220	220
345	outage of 29201 20AVON to 29651 20KPE345	1	345	220	220
350	outage of 29573 20SPURLK to 29575 20SPURLK	2	345-138	220	220
352	outage of 29575 20SPURLK to 29573 20SPURLK	1	138-345	220	220
355	outage of 29651 20KPE345 to 29652 20KPE138	1	345-138	220	220
357	outage of 29213 20BTYVL to 29215 20BEATTY	1	161-69	220	220
360	outage of 29213 20BTYVL to 29507 20POWELL	1	161	220	220
362	outage of 29271 20COOPER to 29272 20COOPER	1	161-69	220	220
370	outage of 29271 20COOPER to 29292 20DENNY	1	161	220	220
372	outage of 29271 20COOPER to 29411 20LAURLD	1	161	220	220
375	outage of 29271 20COOPER to 29517 20PULASJ	1	161	220	220
377	outage of 29271 20COOPER to 29540 20S OAKH	1	161	220	220
380	outage of 29292 20DENNY to 29293 20DENNY	1	161-69	220	220
382	outage of 29308 20FALLRK to 29310 20FALLRK	1	161-69	220	220
385	outage of 29308 20FALLRK to 29613 20TYNER	1	161	220	220
387	outage of 29346 20GRNHLJ to 29613 20TYNER	1	161	220	220
390	outage of 29408 20LAURLC to 29410 20LAURLC	1	161-69	220	220
392	outage of 29408 20LAURLC to 29411 20LAURLD	1	161	220	220
395	outage of 29408 20LAURLC to 29503 20PITTSB	1	161	220	220
400	outage of 29418 20LIBERT to 29517 20PULASJ	1	161	220	220
402	outage of 29503 20PITTSB to 29613 20TYNER	1	161	220	220
405	outage of 29507 20POWELL to 29508 20POWELL	1	161-138	220	220
407	outage of 29515 20PULASK to 29517 20PULASJ	1	161	220	220
410	outage of 29528 20RUSSEL to 29540 20S OAKH	1	161	220	220
412	outage of 29613 20TYNER to 29615 20TYNER	1	161-69	220	220
415	outage of 29202 20AVON to 29230 20BOONST	1	138	220	220
417	outage of 29202 20AVON to 29313 20FAYETT	1	138	220	220
420	outage of 29202 20AVON to 29490 20PARISJ	1	138	220	220
422	outage of 29230 20BOONST to 29233 20BOONSB	1	138	220	220
425	outage of 29230 20BOONST to 29282 20DALE	1	138	220	220
430	outage of 29282 20DALE to 29397 20JKSMIT	1	138	220	220
432	outage of 29282 20DALE to 29603 20TFJ	1	138	220	220
435	outage of 29283 20DALE to 29282 20DALE	1	69-138	220	220
437	outage of 29312 20FAWKES to 29397 20JKSMIT	1	138	220	220
440	outage of 29312 20FAWKES to 29603 20TFJ	1	138	220	220
442	outage of 29312 20FAWKES to 29623 20WBBEREA	1	138	220	220
445	outage of 29313 20FAYETT to 29315 20FAYETT	1	138-69	220	220
447	outage of 29375 20JACKVJ to 29490 20PARISJ	1	138	220	220
462	outage of 29397 20JKSMIT to 29508 20POWELL	1	138	220	220
465	outage of 29397 20JKSMIT to 29616 20UN CTY	1	138	220	220
467	outage of 29397 20JKSMIT to 29652 20KPE138	1	138	220	220
470	outage of 29397 20JKSMIT to 29652 20KPE138	2	138	220	220
472	outage of 29488 20PARIS to 29490 20PARISJ	1	138	220	220

No.	Contingency	Ckt	Base kV	Area	Zone
475	outage of 29508 20POWELL to 29510 20POWELL	1	138-69	220	220
477	outage of 29623 20WBBEREA to 29625 20WBBEREA	1	138-69	220	220
480	outage of 29195 20ALCAN to 29512 20PPG J	1	69	220	220
482	outage of 29195 20ALCAN to 29625 20WBBEREA	1	69	220	220
485	outage of 29196 20ANNVLJ to 29615 20TYNER	1	69	220	220
487	outage of 29205 20BALLRD to 29237 20BOURNE	1	69	220	220
490	outage of 29212 20BTYV D to 29215 20BEATTY	1	69	220	220
492	outage of 29215 20BEATTY to 29648 20ZACHAR	1	69	220	220
495	outage of 29222 20BLEV T to 29361 20HOPE	1	69	220	220
497	outage of 29237 20BOURNE to 29470 20NEWBY2	1	69	220	220
500	outage of 29238 20BOWEN to 29355 20HIGHHRK	1	69	220	220
502	outage of 29238 20BOWEN to 29510 20POWELL	1	69	220	220
505	outage of 29243 20BRONSJ to 29272 20COOPER	1	69	220	220
507	outage of 29260 20CLAYCJ to 29347 20HARGTJ	1	69	220	220
510	outage of 29260 20CLAYCJ to 29580 20STANTN	1	69	220	220
512	outage of 29272 20COOPER to 29566 20SOMERS	1	69	220	220
515	outage of 29272 20COOPER to 29566 20SOMERS	2	69	220	220
517	outage of 29280 20CROOKJ to 29352 20HICK P	1	69	220	220
527	outage of 29283 20DALE to 29366 20HUNT1	1	69	220	220
530	outage of 29283 20DALE to 29367 20HUNT2	1	69	220	220
532	outage of 29283 20DALE to 29468 20NEWBY1	1	69	220	220
535	outage of 29283 20DALE to 29470 20NEWBY2	1	69	220	220
537	outage of 29325 20FRNCHB to 29361 20HOPE	1	69	220	220
540	outage of 29327 20GARRCO to 29406 20LNCSTR	1	69	220	220
542	outage of 29352 20HICK P to 29511 20PPG	1	69	220	220
545	outage of 29355 20HIGHHRK to 29547 20SANDLK	1	69	220	220
547	outage of 29361 20HOPE to 29377 20JEFFVL	1	69	220	220
550	outage of 29366 20HUNT1 to 29556 20SIDEV	1	69	220	220
552	outage of 29367 20HUNT2 to 29398 20JKSMIT	1	69	220	220
555	outage of 29377 20JEFFVL to 29510 20POWELL	1	69	220	220
557	outage of 29398 20JKSMIT to 29607 20TRAPP	1	69	220	220
560	outage of 29401 20KEAVY to 29403 20KEAVJ2	1	69	220	220
562	outage of 29402 20KEAVJ1 to 29410 20LAURLC	1	69	220	220
565	outage of 29402 20KEAVJ1 to 29501 20PINEGJ	1	69	220	220
567	outage of 29403 20KEAVJ2 to 29410 20LAURLC	1	69	220	220
570	outage of 29403 20KEAVJ2 to 29536 20SCORBN	1	69	220	220
572	outage of 29406 20LNCSTR to 29468 20NEWBY1	1	69	220	220
575	outage of 29446 20MCKEE to 29615 20TYNER	1	69	220	220
577	outage of 29501 20PINEGJ to 29631 20W LOND	1	69	220	220
580	outage of 29510 20POWELL to 29580 20STANTN	1	69	220	220
582	outage of 29511 20PPG to 29512 20PPG J	1	69	220	220
585	outage of 29537 20S FORK to 29615 20TYNER	1	69	220	220
587	outage of 29605 20THLNKJ to 29626 20WBER J	1	69	220	220
590	outage of 29625 20WBBEREA to 29626 20WBER J	1	69	220	220
592	outage of 29503 20PITTSB to 27314 11PITTSB	1	161-69	220-211	220-211

<b>No.</b>	<b>Contingency</b>	<b>Ckt</b>	<b>Base kV</b>	<b>Area</b>	<b>Zone</b>
595	outage of 29233 20BOONSB to 26999 11BOONSB	1	138-69	220-211	220-211
597	outage of 29397 20JKSMIT to 27382 11SPENC	1	138	220-211	220-211
602	outage of 26648 09STUART to 29573 20SPURLK	1	345	209-220	209-220
605	outage of 26367 08ZIMER to 29573 20SPURLK	1	345	208-220	280-220
607	outage of 27197 11KENTON to 29575 20SPURLK	1	138	211-220	211-220
610	outage of 29372 20INLAND to 29575 20SPURLK	1	138	220	220
612	outage of 29440 20MAYSJV to 29575 20SPURLK	1	138	220	220
615	outage of 29521 20RENAKR to 29575 20SPURLK	1	138	220	220
617	outage of 29575 20SPURLK to 29585 20S PARK	1	138	220	220

**Phase II Case 200s04**



# Case Summary

# Case200s04

*Project Name* 2002 SERIES, NERC/MMWG BASE CASE LIBRARY  
*Title1* 2004 Summer - CT4&5 Add KPE  
*Title2* All Phase II Transmission and Spurlock2/Dale1 Off-Lin  
*Case Date* 2/12/2003

*Power Flow File* M:\PROJKypsc\267003\300\_Calculations\301\_PFlow\_Results\Case200s04.cft

## Power Flow Controls

<i>Area Control</i>	<input type="checkbox"/>	<i>SmoothStep</i>	<input checked="" type="checkbox"/>
<i>Remote Control</i>	<input checked="" type="checkbox"/>	<i>XfrmVcon</i>	<input type="checkbox"/>
<i>GenVar Control</i>	<input checked="" type="checkbox"/>	<i>XfrmFcon</i>	<input type="checkbox"/>
<i>Solve Method</i>	NSOLVE		

## Case Settings

<i>Overload</i>	<input checked="" type="checkbox"/>	<i>VlimMin</i>	0.9	<i>RateFactor</i>	1
<i>VLimit</i>	<input checked="" type="checkbox"/>	<i>VlimMax</i>	1.05	<i>AmpFactor</i>	1
<i>VChange</i>	<input checked="" type="checkbox"/>	<i>VlimChange</i>	0.05	<i>RatingNumber</i>	2
<i>Monitored Set</i>	monitor		309 Buses		

## Contingency

<i>Use Existing Contingencies from Tables</i>	203 Buses
230 contingencies	

Area	Area Name	Zone	Zone Name	Contingency Buses	Monitored Buses
147	TVA	167	TVA_EAST	0	1
				0	1
205	AEP	254	AEP-KP	0	1
				0	1
208	CIN	280	CGE	1	0
				1	0
209	DPL	209	DPL	1	0
				1	0
211	LGEE	211	LGEE	109	166
				109	166
220	EKPC	220	EKPC	92	141
				92	141
				203	309

**2002 SERIES, NERC/MMWG BASE CASE LIBRARY**

**Normal System**

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

2/12/2003

Overloaded Facility	Overloads
No Normal System Overload Violations	

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

2/12/2003

Overloaded Facility								Normal System				Overloads	
From	Name	To	Name	Circuit	Base kV	Area	Zone	Ratings		MVA	Norm (%)	Count	Max
								Norm	Emer			A / B	(%)
27117	11FAWKES	27339	11RICH S	1	69	211	211	72	72	44.5	62	1 / 2	140
26986	11BEREA	27221	11LK REB	1	69	211	211	72	72	52.7	73	2 / 0	138
27117	11FAWKES	27272	11N.MADS	1	69	211	211	56	56	23.2	41	1 / 0	128
27358	11SALT L	27383	11SPENC	1	69	211	211	22	22	13.1	59	1 / 2	122
27347	11RODBRN	27348	11RODBRN	1	138-69	211	211	33	40	25.4	77	1 / 0	120
27037	11CLARK	27397	11SYLVAN	1	69	211	211	73	90	51.8	71	2 / 1	116
27221	11LK REB	27340	11RICHMO	1	69	211	211	56	56	18.2	32	1 / 0	114
26959	11AOSMTH	27383	11SPENC	1	69	211	211	48	59	46.1	96	3 / 0	106
27116	11FAWKES	27117	11FAWKES	1	138-69	211	211	143	171	110.5	77	0 / 2	103
27220	11LK REB	27231	11LR TAP	1	138	211	211	149	171	114.0	77	0 / 1	102
27115	11FAWK T	27231	11LR TAP	1	138	211	211	163	163	33.0	20	0 / 2	102
27220	11LK REB	27221	11LK REB	1	138-69	211	211	149	171	113.7	76	0 / 1	102
27382	11SPENC	27383	11SPENC	1	138-69	211	211	72	79	45.8	64	0 / 1	101
29203	20BKR LN	29360	20HOLLWJ	1	69	220	220	57	69	18.3	32	0 / 2	101
27030	11CAVE R	27358	11SALT L	1	69	211	211	22	22	9.6	44	0 / 1	100
												12 / 15	140

**Notes:**

- Overloads are based on 100% of Rating 2
- NS = Normal System Conditions (No Outages)
- Minimum Reporting Level is 100%
- Statistical Information (A/B Stats and Maximum Overload)
  - A = Serious Overload > 105%
  - B = Overloaded Facility between 100% and 105% of Rated Capability

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

2/12/2003

Undervoltage		Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
Bus	Name					A / B	Min (pu)
27449	11WIL D2	69	211	211	1.0020	1 / 0	0.8459
29212	20BTYV D	69	220	220	0.9946	1 / 0	0.8482
29478	20OAKD J	69	220	220	0.9870	1 / 0	0.8579
29232	20BOONVJ	69	220	220	0.9841	1 / 0	0.8693
29313	20FAYETT	138	220	220	0.9985	1 / 0	0.8696
27210	11LEBN I	69	211	211	0.9787	1 / 0	0.8699
29468	20NEWBY1	69	220	220	0.9991	1 / 0	0.8773
29315	20FAYETT	69	220	220	1.0109	0 / 2	0.8919
29406	20LNCSTR	69	220	220	0.9893	0 / 1	0.8932
29327	20GARRCO	69	220	220	0.9871	0 / 1	0.8941
29537	20S FORK	69	220	220	0.9845	0 / 1	0.8960
29205	20BALLRD	69	220	220	0.9701	0 / 2	0.8977
29237	20BOURNE	69	220	220	0.9800	0 / 1	0.8986
29596	20TGOOCH	69	220	220	0.9752	0 / 1	0.8990
27067	11DANVIL	138	211	211	0.9944	0 / 1	0.8997
						7 / 10	0.8459

**Notes:**

1. Minimum Voltage Limit 0.90 (pu)
2. NS = Normal System Conditions (No Outages)
3. Maximum Reporting Level is 90%
4. Statistical Information (A/B Stats and Minimum Voltage)
  - A = Serious Undervoltage < 0.88 (pu)
  - B = Low Voltages between 0.88 and 0.90 (pu)

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

2/12/2003

<b>Overvoltage</b>					<b>Normal System</b>	<b>Voltage Violations</b>		
<b>Bus Name</b>	<b>Base kV</b>	<b>Area</b>	<b>Zone</b>		<b>Voltage (pu)</b>	<b>A / B</b>	<b>Max (pu)</b>	
29540	20S OAKH	161	220	220	1.0344	0 / 1	1.0508	
<b>Notes:</b>							0 / 1	1.0508
<ol style="list-style-type: none"> <li>1. Maximum Voltage Limit is 1.05 (pu)</li> <li>2. NS = Normal System Conditions (No Outages)</li> <li>3. Minimum Reporting Level for Over Voltages is 105%</li> <li>4. Statistical Information (A/B Stats and Maximum Voltage) <ul style="list-style-type: none"> <li>A = Serious Overvoltage &gt; 1.07 (pu)</li> <li>B = High Voltages between 1.05 and 1.07 (pu)</li> </ul> </li> </ol>								

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

2/12/2003

VChange Bus Name	Base kV	Area	Zone	Normal System	Voltage Violations	
				Voltage (pu)	A / B	Max (pu)
27449 11WIL D2	69	211	211	1.0020	1 / 0	-0.1561
29212 20BTYV D	69	220	220	0.9946	1 / 0	-0.1464
29478 20OAKD J	69	220	220	0.9870	1 / 0	-0.1291
29313 20FAYETT	138	220	220	0.9985	1 / 0	-0.1289
29468 20NEWBY1	69	220	220	0.9991	1 / 0	-0.1218
29315 20FAYETT	69	220	220	1.0109	1 / 0	-0.1190
29315 20FAYETT	69	220	220	1.0109	1 / 0	-0.1189
29232 20BOONVJ	69	220	220	0.9841	1 / 0	-0.1148
27016 11BUENA	69	211	211	1.0266	1 / 0	-0.1089
27210 11LEBN I	69	211	211	0.9787	1 / 0	-0.1088
27076 11DIXDAM	69	211	211	1.0372	1 / 0	-0.1026
29470 20NEWBY2	69	220	220	1.0013	1 / 0	-0.1006
29406 20LNCSTR	69	220	220	0.9893	1 / 0	-0.0961
29291 20DAVIS	69	220	220	0.9991	2 / 0	-0.0960
27067 11DANVIL	138	211	211	0.9944	1 / 0	-0.0947
29580 20STANTN	69	220	220	1.0022	1 / 0	-0.0945
29327 20GARRCO	69	220	220	0.9871	1 / 0	-0.0930
27016 11BUENA	69	211	211	1.0266	1 / 0	-0.0929
27136 11GARRD	69	211	211	1.0086	1 / 0	-0.0886
29537 20S FORK	69	220	220	0.9845	1 / 0	-0.0885
29233 20BOONSB	138	220	220	1.0217	1 / 0	-0.0814
29237 20BOURNE	69	220	220	0.9800	1 / 0	-0.0814
29237 20BOURNE	69	220	220	0.9800	1 / 0	-0.0795
29260 20CLAYCJ	69	220	220	0.9976	1 / 0	-0.0791
27068 11DANVIL	69	211	211	1.0008	2 / 0	-0.0780
29596 20TGOOCH	69	220	220	0.9752	1 / 0	-0.0762
27136 11GARRD	69	211	211	1.0086	1 / 0	-0.0748
26972 11ATOKA	69	211	211	0.9994	2 / 0	-0.0744
29347 20HARGTJ	69	220	220	0.9987	1 / 0	-0.0730
27000 11BOYLE	69	211	211	0.9987	2 / 0	-0.0724
29205 20BALLRD	69	220	220	0.9701	1 / 0	-0.0724
26999 11BOONSB	69	211	211	1.0367	2 / 0	-0.0723
27450 11WILMOR	69	211	211	1.0088	1 / 0	-0.0718
29205 20BALLRD	69	220	220	0.9701	1 / 0	-0.0716
29205 20BALLRD	69	220	220	0.9701	0 / 1	-0.0699
29325 20FRNCHB	69	220	220	0.9828	0 / 1	-0.0688
27220 11LK REB	138	211	211	1.0056	0 / 1	-0.0676
29436 20MARIBJ	69	220	220	0.9841	0 / 1	-0.0673
27065 11DANV 1	69	211	211	0.9982	0 / 1	-0.0669
27065 11DANV 1	69	211	211	0.9982	0 / 1	-0.0668
27167 11HARR T	69	211	211	1.0085	0 / 1	-0.0660
27168 11HARRDS	69	211	211	1.0084	0 / 1	-0.0659
29510 20POWELL	69	220	220	1.0025	0 / 1	-0.0651
27450 11WILMOR	69	211	211	1.0088	0 / 1	-0.0649
29580 20STANTN	69	220	220	1.0022	0 / 1	-0.0649
29411 20LAURLD	161	220	220	1.0052	0 / 1	-0.0647
29623 20WBEREA	138	220	220	1.0053	0 / 1	-0.0641
27247 11MERCRCR	138	211	211	1.0075	0 / 1	-0.0637
29203 20BKR LN	69	220	220	0.9906	0 / 1	-0.0637
29407 20LAURHY	13.8	220	220	0.9862	0 / 1	-0.0636
27055 11CRAB O	69	211	211	0.9894	0 / 1	-0.0618
29607 20TRAPP	69	220	220	1.0031	0 / 1	-0.0594
29327 20GARRCO	69	220	220	0.9871	0 / 1	-0.0590

VChange		Base kV	Area	Zone	Normal System Voltage (pu)	Voltage Violations	
Bus	Name					A / B	Max (pu)
29625	20WBBEREA	69	220	220	0.9996	0 / 1	-0.0584
29238	20BOWEN	69	220	220	1.0028	0 / 1	-0.0583
29288	20DALE4	13.8	220	220	1.0470	0 / 1	-0.0582
29625	20WBBEREA	69	220	220	0.9996	0 / 1	-0.0582
29515	20PULASK	161	220	220	1.0141	0 / 1	-0.0581
29368	20HUNTFJ	69	220	220	0.9652	0 / 1	-0.0578
29360	20HOLLWJ	69	220	220	0.9871	0 / 1	-0.0574
29368	20HUNTFJ	69	220	220	0.9652	0 / 1	-0.0571
29626	20WBBER J	69	220	220	0.9992	0 / 1	-0.0565
29626	20WBBER J	69	220	220	0.9992	0 / 1	-0.0563
26959	11AOSMTH	69	211	211	1.0227	0 / 1	-0.0558
29260	20CLAYCJ	69	220	220	0.9976	0 / 1	-0.0558
29368	20HUNTFJ	69	220	220	0.9652	0 / 1	-0.0558
27067	11DANVIL	138	211	211	0.9944	0 / 1	-0.0557
29195	20ALCAN	69	220	220	0.9972	0 / 1	-0.0556
29195	20ALCAN	69	220	220	0.9972	0 / 1	-0.0554
26986	11BEREA	69	211	211	0.9990	0 / 1	-0.0545
29512	20PPG J	69	220	220	0.9967	0 / 1	-0.0539
29511	20PPG	69	220	220	0.9967	0 / 1	-0.0538
29512	20PPG J	69	220	220	0.9967	0 / 1	-0.0536
29511	20PPG	69	220	220	0.9967	0 / 1	-0.0535
27221	11LK REB	69	211	211	1.0154	0 / 1	-0.0534
27221	11LK REB	69	211	211	1.0154	0 / 1	-0.0533
27368	11SHAKRT	69	211	211	1.0284	0 / 1	-0.0526
29398	20JKSMIT	69	220	220	1.0061	0 / 1	-0.0523
29605	20THLNKJ	69	220	220	0.9989	0 / 1	-0.0522
29347	20HARGTJ	69	220	220	0.9987	0 / 1	-0.0520
29605	20THLNKJ	69	220	220	0.9989	0 / 1	-0.0520
27339	11RICH S	69	211	211	1.0040	0 / 1	-0.0517
27055	11CRAB O	69	211	211	0.9894	0 / 1	-0.0514
29355	20HIGHRK	69	220	220	1.0001	0 / 1	-0.0513
29408	20LAURLC	161	220	220	0.9895	0 / 1	-0.0513
29510	20POWELL	69	220	220	1.0025	0 / 1	-0.0513
29580	20STANTN	69	220	220	1.0022	0 / 1	-0.0512
29377	20JEFFVL	69	220	220	0.9903	0 / 1	-0.0510
29360	20HOLLWJ	69	220	220	0.9871	0 / 2	-0.0506
27272	11N.MADS	69	211	211	1.0093	0 / 1	-0.0502
29516	20PULASK	69	220	220	1.0062	0 / 1	-0.0502
29406	20LNCSTR	69	220	220	0.9893	0 / 1	0.0542

39 / 59 -0.1561

**Notes:**

1. Voltage Change Limit is 0.05 (pu)
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 5%
4. Statistical Information (A/B Stats and Maximum Voltage Change)
  - A = Serious Voltage Change > 0.07 (pu)
  - B = Excessive Voltage Change between 0.05 and 0.07 (pu)



## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

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Contingency	Overloaded Facility								Overloads		
	From Name	To Name	Ckt	Base kV	Area	Zone	Norm	Emer	MVA	Norm (%)	Emer (%)
95	outage of 27036 11CLARK to 27037 11CLARK		1	138-69	211	211					
	26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	62.7	131	106
110	outage of 27111 11FARM T to 27112 11FARMER		1	138	211	211					
	27358 11SALT L	27383 11SPENC	1	69	211	211	22	22	22.8	104	104
115	outage of 27111 11FARM T to 27382 11SPENC		1	138	211	211					
	27358 11SALT L	27383 11SPENC	1	69	211	211	22	22	26.8	122	122
	27030 11CAVE R	27358 11SALT L	1	69	211	211	22	22	22.0	100	100
117	outage of 27112 11FARMER to 27113 11FARMER		1	138-69	211	211					
	27358 11SALT L	27383 11SPENC	1	69	211	211	22	22	22.8	104	104
125	outage of 27116 11FAWKES to 27117 11FAWKES		1	138-69	211	211					
	27221 11LK REB	27340 11RICHMO	1	69	211	211	56	56	63.7	114	114
	26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	76.2	106	106
	27220 11LK REB	27231 11LR TAP	1	138	211	211	149	171	174.8	117	102
	27220 11LK REB	27221 11LK REB	1	138-69	211	211	149	171	173.9	117	102
157	outage of 27220 11LK REB to 27221 11LK REB		1	138-69	211	211					
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	75.0	104	104
	27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	175.4	123	103
160	outage of 27220 11LK REB to 27231 11LR TAP		1	138	211	211					
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	75.0	104	104
	27116 11FAWKES	27117 11FAWKES	1	138-69	211	211	143	171	175.4	123	103
180	outage of 27382 11SPENC to 27383 11SPENC		2	138-69	211	211					
	27382 11SPENC	27383 11SPENC	1	138-69	211	211	72	79	79.9	111	101
200	outage of 26986 11BEREA to 27221 11LK REB		1	69	211	211					
	27117 11FAWKES	27339 11RICH S	1	69	211	211	72	72	100.6	140	140
205	outage of 26999 11BOONSB to 27451 11WINC S		EQ	69	211	211					
	27037 11CLARK	27397 11SYLVAN	1	69	211	211	73	90	93.9	129	104
242	outage of 27113 11FARMER to 27264 11MORH W		1	69	211	211					
	27347 11RODBRN	27348 11RODBRN	1	138-69	211	211	33	40	48.0	145	120
247	outage of 27117 11FAWKES to 27339 11RICH S		1	69	211	211					
	26986 11BEREA	27221 11LK REB	1	69	211	211	72	72	99.6	138	138
260	outage of 27170 11HIGB A to 27449 11WIL D2		1	69	211	211					
	27117 11FAWKES	27272 11N.MADS	1	69	211	211	56	56	71.9	128	128
325	outage of 27231 11LR TAP to 29616 20UN CTY		1	138	211-220	211-220					
	27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	163.9	101	101
417	outage of 29202 20AVON to 29313 20FAYETT		1	138	220	220					
	29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	69	69.8	122	101
422	outage of 29230 20BOONST to 29233 20BOONSB		1	138	220	220					
	27037 11CLARK	27397 11SYLVAN	1	69	211	211	73	90	104.0	143	116
	26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	61.9	129	105
445	outage of 29313 20FAYETT to 29315 20FAYETT		1	138-69	220	220					
	29203 20BKR LN	29360 20HOLLWJ	1	69	220	220	57	69	69.8	122	101
465	outage of 29397 20JKSMIT to 29616 20UN CTY		1	138	220	220					
	27115 11FAWK T	27231 11LR TAP	1	138	211	211	163	163	166.1	102	102
595	outage of 29233 20BOONSB to 26999 11BOONSB		1	138-69	220-211	220-211					
	27037 11CLARK	27397 11SYLVAN	1	69	211	211	73	90	104.0	143	116
	26959 11AOSMTH	27383 11SPENC	1	69	211	211	48	59	61.9	129	105

Contingency	Overloaded Facility								Overloads		
	From Name	To Name	Ckt	Base kV	Area	Zone	Ratings		MVA	Norm (%)	Emer (%)
							Norm	Emer			

**Notes:**

1. Overloads are based on 100% of Rating 2

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

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Overloaded Facility	Contingency									Overloads		
	From	Name	To	Name	Circuit	Base kV	Area	Zone	Ratings Norm Emer	Norm MVA	Emer (%)	Emer (%)
	27117	11FAWKES	27339	11RICH S	1	69	211	211	72 72	NS	44	62 62
		200 outage of 26986 11BEREA to 27221 11LK REB			1	69	211	211			101	140 140
		157 outage of 27220 11LK REB to 27221 11LK REB			1	138-69	211	211			75	104 104
		160 outage of 27220 11LK REB to 27231 11LR TAP			1	138	211	211			75	104 104
											1 / 2	140
	26986	11BEREA	27221	11LK REB	1	69	211	211	72 72	NS	53	73 73
		247 outage of 27117 11FAWKES to 27339 11RICH S			1	69	211	211			100	138 138
		125 outage of 27116 11FAWKES to 27117 11FAWKE			1	138-69	211	211			76	106 106
											2 / 0	138
	27117	11FAWKES	27272	11N.MADS	1	69	211	211	56 56	NS	23	41 41
		260 outage of 27170 11HIGB A to 27449 11WIL D2			1	69	211	211			72	128 128
											1 / 0	128
	27358	11SALT L	27383	11SPENC	1	69	211	211	22 22	NS	13	59 59
		115 outage of 27111 11FARM T to 27382 11SPENC			1	138	211	211			27	122 122
		117 outage of 27112 11FARMER to 27113 11FARME			1	138-69	211	211			23	104 104
		110 outage of 27111 11FARM T to 27112 11FARMER			1	138	211	211			23	104 104
											1 / 2	122
	27347	11RODBRN	27348	11RODBRN	1	138-69	211	211	33 40	NS	25	77 64
		242 outage of 27113 11FARMER to 27264 11MORH			1	69	211	211			48	145 120
											1 / 0	120
	27037	11CLARK	27397	11SYLVAN	1	69	211	211	73 90	NS	52	71 58
		595 outage of 29233 20BOONSB to 26999 11BOONS			1	138-69	220-211	220-211			104	143 116
		422 outage of 29230 20BOONST to 29233 20BOONS			1	138	220	220			104	143 116
		205 outage of 26999 11BOONSB to 27451 11WINC S EQ			1	69	211	211			94	129 104
											2 / 1	116
	27221	11LK REB	27340	11RICHMO	1	69	211	211	56 56	NS	18	32 32
		125 outage of 27116 11FAWKES to 27117 11FAWKE			1	138-69	211	211			64	114 114
											1 / 0	114
	26959	11AOSMTH	27383	11SPENC	1	69	211	211	48 59	NS	46	96 78
		95 outage of 27036 11CLARK to 27037 11CLARK			1	138-69	211	211			63	131 106
		595 outage of 29233 20BOONSB to 26999 11BOONS			1	138-69	220-211	220-211			62	129 105
		422 outage of 29230 20BOONST to 29233 20BOONS			1	138	220	220			62	129 105
											3 / 0	106
	27116	11FAWKES	27117	11FAWKES	1	138-69	211	211	143 171	NS	111	77 65
		157 outage of 27220 11LK REB to 27221 11LK REB			1	138-69	211	211			175	123 103
		160 outage of 27220 11LK REB to 27231 11LR TAP			1	138	211	211			175	123 103
											0 / 2	103
	27220	11LK REB	27231	11LR TAP	1	138	211	211	149 171	NS	114	77 67
		125 outage of 27116 11FAWKES to 27117 11FAWKE			1	138-69	211	211			175	117 102
											0 / 1	102

Overloaded Facility	Contingency										Overloads			
	From	Name	To	Name	Circuit	Base kV	Area	Zone	Ratings		NS	MVA	Norm (%)	Emer (%)
									Norm	Emer				
27115	11FAWK T	27231	11LR TAP		1	138	211	211	163	163	NS	33	20	20
	465 outage of 29397 20JKSMIT to 29616 20UN CTY				1	138	220	220				166	102	102
	325 outage of 27231 11LR TAP to 29616 20UN CTY				1	138	211-220	211-220				164	101	101
												0 / 2	102	
27220	11LK REB	27221	11LK REB		1	138-69	211	211	149	171	NS	114	76	66
	125 outage of 27116 11FAWKES to 27117 11FAWKE				1	138-69	211	211				174	117	102
												0 / 1	102	
27382	11SPENC	27383	11SPENC		1	138-69	211	211	72	79	NS	46	64	58
	180 outage of 27382 11SPENC to 27383 11SPENC				2	138-69	211	211				80	111	101
												0 / 1	101	
29203	20BKR LN	29360	20HOLLWJ		1	69	220	220	57	69	NS	18	32	27
	445 outage of 29313 20FAYETT to 29315 20FAYETT				1	138-69	220	220				70	122	101
	417 outage of 29202 20AVON to 29313 20FAYETT				1	138	220	220				70	122	101
												0 / 2	101	
27030	11CAVE R	27358	11SALT L		1	69	211	211	22	22	NS	10	44	44
	115 outage of 27111 11FARM T to 27382 11SPENC				1	138	211	211				22	100	100
												0 / 1	100	
												12 / 15	139.8	

**Notes:**

1. Overloads are based on 100% of Rating 2
2. NS = Normal System Conditions (No Outages)
3. Minimum Reporting Level is 100%
4. Statistical Information (A/B Stats and Maximum Overload)
  - A = Serious Overload > 105%
  - B = Overloaded Facility between 100% and 105% of Rated Capability

2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

2/12/2003

Contingency

Description	Ckt	kV	Zone	Area	Over load	Voltage Violations			Not Solved
						UnderV	OverV	Change	
82 outage of 27010 11BRWN P to 27247 11MERCRCR	1	138	211	211	0	0	0	2	
95 outage of 27036 11CLARK to 27037 11CLARK	1	138-69	211	211	1	0	0	0	
105 outage of 27067 11DANVIL to 27068 11DANVIL	1	138-69	211	211	0	0	0	4	
107 outage of 27067 11DANVIL to 27247 11MERCRCR	1	138	211	211	0	1	0	5	
110 outage of 27111 11FARM T to 27112 11FARMER	1	138	211	211	1	0	0	0	
115 outage of 27111 11FARM T to 27382 11SPENC	1	138	211	211	2	0	0	0	
117 outage of 27112 11FARMER to 27113 11FARMER	1	138-69	211	211	1	0	0	0	
125 outage of 27116 11FAWKES to 27117 11FAWKES	1	138-69	211	211	4	0	0	0	
157 outage of 27220 11LK REB to 27221 11LK REB	1	138-69	211	211	2	0	0	1	
160 outage of 27220 11LK REB to 27231 11LR TAP	1	138	211	211	2	0	0	2	
180 outage of 27382 11SPENC to 27383 11SPENC	2	138-69	211	211	1	0	0	0	
195 outage of 26959 11AOSMTH to 27383 11SPENC	1	69	211	211	0	0	0	1	
200 outage of 26986 11BEREA to 27221 11LK REB	1	69	211	211	1	0	0	1	
205 outage of 26999 11BOONSB to 27451 11WINC S	EQ	69	211	211	1	0	0	0	
207 outage of 27016 11BUENA to 27076 11DIXDAM	1	69	211	211	0	0	0	3	
232 outage of 27076 11DIXDAM to 27436 11WC-DD	1	69	211	211	0	0	0	5	
235 outage of 27076 11DIXDAM to 27450 11WILMOR	1	69	211	211	0	0	0	1	
242 outage of 27113 11FARMER to 27264 11MORH W	1	69	211	211	1	0	0	0	
247 outage of 27117 11FAWKES to 27339 11RICH S	1	69	211	211	1	0	0	1	
255 outage of 27167 11HARR T to 27420 11W CLIF	1	69	211	211	0	0	0	2	
260 outage of 27170 11HIGB A to 27449 11WIL D2	1	69	211	211	1	1	0	2	
267 outage of 27210 11LEBN I to 27213 11LEBNON	1	69	211	211	0	1	0	1	
297 outage of 27368 11SHAKRT to 27420 11W CLIF	1	69	211	211	0	0	0	1	
312 outage of 26990 11BKR LN to 29203 20BKR LN	1	138-69	211-220	211-220	0	0	0	2	
325 outage of 27231 11LR TAP to 29616 20UN CTY	1	138	211-220	211-220	1	0	0	0	
372 outage of 29271 20COOPER to 29411 20LAURLD	1	161	220	220	0	0	0	2	
377 outage of 29271 20COOPER to 29540 20S OAKH	1	161	220	220	0	0	3	0	
392 outage of 29408 20LAURLC to 29411 20LAURLD	1	161	220	220	0	0	0	1	
407 outage of 29515 20PULASK to 29517 20PULASJ	1	161	220	220	0	0	0	2	
410 outage of 29528 20RUSSEL to 29540 20S OAKH	1	161	220	220	0	0	2	0	
417 outage of 29202 20AVON to 29313 20FAYETT	1	138	220	220	1	2	0	4	
422 outage of 29230 20BOONST to 29233 20BOONSB	1	138	220	220	2	0	0	2	
425 outage of 29230 20BOONST to 29282 20DALE	1	138	220	220	0	0	0	1	
442 outage of 29312 20FAWKES to 29623 20WBBEREA	1	138	220	220	0	0	0	7	
445 outage of 29313 20FAYETT to 29315 20FAYETT	1	138-69	220	220	1	1	0	3	
462 outage of 29397 20JKSMIT to 29508 20POWELL	1	138	220	220	0	0	0	2	
465 outage of 29397 20JKSMIT to 29616 20UN CTY	1	138	220	220	1	0	0	0	
475 outage of 29508 20POWELL to 29510 20POWELL	1	138-69	220	220	0	0	0	7	

**Contingency**

Description	Ckt	kV	Zone	Area	Over load	Voltage Violations			Not Solved
						UnderV	OverV	Change	
477 outage of 29623 20WBEREA to 29625 20WBERE	1	138-69	220	220	0	0	0	6	
487 outage of 29205 20BALLRD to 29237 20BOURNE	1	69	220	220	0	1	0	2	
490 outage of 29212 20BTYV D to 29215 20BEATTY	1	69	220	220	0	4	0	4	
497 outage of 29237 20BOURNE to 29470 20NEWBY2	1	69	220	220	0	2	0	3	
532 outage of 29283 20DALE to 29468 20NEWBY1	1	69	220	220	0	4	0	4	
535 outage of 29283 20DALE to 29470 20NEWBY2	1	69	220	220	0	0	0	4	
537 outage of 29325 20FRNCHB to 29361 20HOPE	1	69	220	220	0	0	0	2	
540 outage of 29327 20GARRCO to 29406 20LNCSTR	1	69	220	220	0	0	0	2	
580 outage of 29510 20POWELL to 29580 20STANTN	1	69	220	220	0	0	0	5	
595 outage of 29233 20BOONSB to 26999 11BOONSB	1	138-69	220-211	220-211	2	0	0	1	
602 outage of 26648 09STUART to 29573 20SPURLK	1	345	209-220	209-220	0	0	0	0	F
605 outage of 26367 08ZIMER to 29573 20SPURLK	1	345	280-220	208-220	0	0	0	0	F
<b>Totals:</b>					27	17	5	98	2

**Notes:**

1. Overloads are based on 100% of Rating 2
2. Undervoltage Limit is 0.90 (pu)
3. Overvoltage Limit is 1.05 (pu)
4. Voltage Change Limit is 0.05 (pu)

**Not Solved Codes:**

- D - Diverged  
I - Interrupted  
F - Failed, One or More Contingency  
Commands Failed in PFlow

## 2002 SERIES, NERC/MMWG BASE CASE LIBRARY

2004 Summer - CT45 Add KPE

All Phase II Transmission and Spurlock2/Dale1 Off-Line

2/12/2003

No.	Contingency	Ckt	Base kV	Area	Zone
10	outage of 26950 11ALCALD to 27008 11BRWN N	1	345	211	211
12	outage of 27008 11BRWN N to 27009 11BRWN N	1	345-138	211	211
15	outage of 27008 11BRWN N to 27162 11HARDN	1	345	211	211
17	outage of 27008 11BRWN N to 27427 11W LEXN	1	345	211	211
20	outage of 26951 11ALCALD to 27095 11ELIHU	1	161	211	211
22	outage of 26962 11ARNOLD to 27074 11DELVIN	1	161	211	211
25	outage of 27074 11DELVIN to 27444 11WI TAP	1	161	211	211
27	outage of 27095 11ELIHU to 27096 11ELIHU	1	161-69	211	211
30	outage of 27095 11ELIHU to 27096 11ELIHU	2	161-69	211	211
32	outage of 27230 11LR TAP to 27231 11LR TAP	1	161-138	211	211
35	outage of 27230 11LR TAP to 27444 11WI TAP	1	161	211	211
37	outage of 27425 11W IRVI to 27444 11WI TAP	1	161	211	211
40	outage of 26947 11ADAMS to 27412 11TYRONE	1	138	211	211
42	outage of 26977 11BARDST to 26978 11BARDST	1	138-69	211	211
45	outage of 26977 11BARDST to 27011 11BRWNCT	1	138	211	211
47	outage of 26977 11BARDST to 27276 11NELSON	1	138	211	211
50	outage of 26990 11BKR LN to 27009 11BRWN N	1	138	211	211
52	outage of 26990 11BKR LN to 27172 11HIGBY	1	138	211	211
55	outage of 26998 11BONNIE to 27211 11LEBN W	1	138	211	211
57	outage of 27009 11BRWN N to 27011 11BRWNCT	1	138	211	211
60	outage of 27009 11BRWN N to 27012 11BRWNT1	1	138	211	211
62	outage of 27009 11BRWN N to 27013 11BRWNT2	1	138	211	211
65	outage of 27009 11BRWN N to 27040 11CLAYSM	1	138	211	211
67	outage of 27009 11BRWN N to 27172 11HIGBY	1	138	211	211
70	outage of 27009 11BRWN N to 27312 11PISGAH	1	138	211	211
72	outage of 27009 11BRWN N to 27412 11TYRONE	1	138	211	211
75	outage of 27010 11BRWN P to 27012 11BRWNT1	1	138	211	211
77	outage of 27010 11BRWN P to 27013 11BRWNT2	1	138	211	211
80	outage of 27010 11BRWN P to 27116 11FAWKES	1	138	211	211
82	outage of 27010 11BRWN P to 27247 11MERCER	1	138	211	211
85	outage of 27010 11BRWN P to 27419 11W CLIF	1	138	211	211
87	outage of 27010 11BRWN P to 27419 11W CLIF	2	138	211	211
90	outage of 27011 11BRWNCT to 27012 11BRWNT1	1	138	211	211
92	outage of 27011 11BRWNCT to 27013 11BRWNT2	1	138	211	211
95	outage of 27036 11CLARK to 27037 11CLARK	1	138-69	211	211
97	outage of 27036 11CLARK to 27116 11FAWKES	1	138	211	211
100	outage of 27036 11CLARK to 27382 11SPENC	1	138	211	211
102	outage of 27040 11CLAYSM to 27172 11HIGBY	1	138	211	211
105	outage of 27067 11DANVIL to 27068 11DANVIL	1	138-69	211	211
107	outage of 27067 11DANVIL to 27247 11MERCER	1	138	211	211
110	outage of 27111 11FARM T to 27112 11FARMER	1	138	211	211

No.	Contingency	Ckt	Base kV	Area	Zone
112	outage of 27111 11FARM T to 27369 11SHARKE	1	138	211	211
115	outage of 27111 11FARM T to 27382 11SPENC	1	138	211	211
117	outage of 27112 11FARMER to 27113 11FARMER	1	138-69	211	211
120	outage of 27115 11FAWK T to 27116 11FAWKES	1	138	211	211
122	outage of 27115 11FAWK T to 27231 11LR TAP	1	138	211	211
125	outage of 27116 11FAWKES to 27117 11FAWKES	1	138-69	211	211
127	outage of 27122 11FFRT E to 27412 11TYRONE	1	138	211	211
130	outage of 27141 11GODDRD to 27347 11RODBRN	1	138	211	211
132	outage of 27172 11HIGBY to 27170 11HIGB A	1	138-69	211	211
135	outage of 27172 11HIGBY to 27171 11HIGB B	1	138-69	211	211
137	outage of 27172 11HIGBY to 27207 11LANSDW	1	138	211	211
140	outage of 27172 11HIGBY to 27337 11REYNOL	1	138	211	211
142	outage of 27186 11IBM N to 27229 11LOUDON	1	138	211	211
145	outage of 27211 11LEBN W to 27212 11LEBNON	1	138	211	211
147	outage of 27212 11LEBNON to 27213 11LEBNON	1	138-69	211	211
150	outage of 27212 11LEBNON to 27213 11LEBNON	2	138-69	211	211
152	outage of 27212 11LEBNON to 27243 11MARION	1	138	211	211
155	outage of 27212 11LEBNON to 27247 11MERCRCR	1	138	211	211
157	outage of 27220 11LK REB to 27221 11LK REB	1	138-69	211	211
160	outage of 27220 11LK REB to 27231 11LR TAP	1	138	211	211
162	outage of 27229 11LOUDON to 27227 11LOUD A	1	138-69	211	211
165	outage of 27229 11LOUDON to 27228 11LOUD B	1	138-69	211	211
167	outage of 27312 11PISGAH to 27313 11PISGAH	1	138-69	211	211
170	outage of 27312 11PISGAH to 27428 11W LEXN	1	138	211	211
172	outage of 27347 11RODBRN to 27348 11RODBRN	1	138-69	211	211
175	outage of 27347 11RODBRN to 27369 11SHARKE	1	138	211	211
177	outage of 27382 11SPENC to 27383 11SPENC	1	138-69	211	211
180	outage of 27382 11SPENC to 27383 11SPENC	2	138-69	211	211
182	outage of 27412 11TYRONE to 27413 11TYRONE	1	138-69	211	211
185	outage of 27419 11W CLIF to 27420 11W CLIF	1	138-69	211	211
187	outage of 27419 11W CLIF to 27420 11W CLIF	2	138-69	211	211
190	outage of 27419 11W CLIF to 27436 11WC-DD	1	138-69	211	211
192	outage of 26959 11AOSMTH to 27129 11FOGG P	EQ	69	211	211
195	outage of 26959 11AOSMTH to 27383 11SPENC	1	69	211	211
197	outage of 26972 11ATOKA to 27068 11DANVIL	1	69	211	211
200	outage of 26986 11BEREA to 27221 11LK REB	1	69	211	211
202	outage of 26986 11BEREA to 27339 11RICH S	EQ	69	211	211
205	outage of 26999 11BOONSB to 27451 11WINC S	EQ	69	211	211
207	outage of 27016 11BUENA to 27076 11DIXDAM	1	69	211	211
210	outage of 27026 11CARON to 27225 11LONDON	1	69	211	211
212	outage of 27030 11CAVE R to 27113 11FARMER	1	69	211	211
215	outage of 27030 11CAVE R to 27358 11SALT L	1	69	211	211
217	outage of 27037 11CLARK to 27129 11FOGG P	1	69	211	211
220	outage of 27037 11CLARK to 27397 11SYLVAN	1	69	211	211
222	outage of 27046 11CMPGEK to 27225 11LONDON	1	69	211	211



No.	Contingency	Ckt	Base kV	Area	Zone
225	outage of 27050 11CORBIN to 27396 11SWEETH	1	69	211	211
227	outage of 27065 11DANV 1 to 27203 11KYSTHO	EQ	69	211	211
230	outage of 27068 11DANVIL to 27168 11HARRDS	1	69	211	211
232	outage of 27076 11DIXDAM to 27436 11WC-DD	1	69	211	211
235	outage of 27076 11DIXDAM to 27450 11WILMOR	1	69	211	211
237	outage of 27082 11E BERN to 27306 11PINEHL	1	69	211	211
240	outage of 27082 11E BERN to 27314 11PITTSB	1	69	211	211
242	outage of 27113 11FARMER to 27264 11MORH W	1	69	211	211
245	outage of 27117 11FAWKES to 27272 11N.MADS	1	69	211	211
247	outage of 27117 11FAWKES to 27339 11RICH S	1	69	211	211
250	outage of 27117 11FAWKES to 27340 11RICHMO	1	69	211	211
252	outage of 27167 11HARR T to 27168 11HARRDS	1	69	211	211
255	outage of 27167 11HARR T to 27420 11W CLIF	1	69	211	211
257	outage of 27170 11HIGB A to 27391 11STONWL	1	69	211	211
260	outage of 27170 11HIGB A to 27449 11WIL D2	1	69	211	211
262	outage of 27178 11HOPEWL to 27396 11SWEETH	1	69	211	211
265	outage of 27203 11KYSTHO to 27420 11W CLIF	1	69	211	211
267	outage of 27210 11LEBN I to 27213 11LEBNON	1	69	211	211
270	outage of 27213 11LEBNON to 27385 11SPRNGF	1	69	211	211
272	outage of 27221 11LK REB to 27340 11RICHMO	1	69	211	211
275	outage of 27221 11LK REB to 27429 11WACO	1	69	211	211
277	outage of 27225 11LONDON to 27314 11PITTSB	1	69	211	211
280	outage of 27271 11N.CORB to 27396 11SWEETH	1	69	211	211
282	outage of 27272 11N.MADS to 27449 11WIL D2	EQ	69	211	211
285	outage of 27330 11PRKRSE to 27397 11SYLVAN	1	69	211	211
287	outage of 27330 11PRKRSE to 27452 11WINCHS	1	69	211	211
290	outage of 27338 11RICE T to 27429 11WACO	1	69	211	211
292	outage of 27358 11SALT L to 27383 11SPENC	1	69	211	211
295	outage of 27359 11SALVIS to 27368 11SHAKRT	1	69	211	211
297	outage of 27368 11SHAKRT to 27420 11W CLIF	1	69	211	211
300	outage of 27420 11W CLIF to 27436 11WC-DD	1	69	211	211
302	outage of 27074 11DELVIN to 29213 20BTYVL	1	161	211-220	211-220
305	outage of 27074 11DELVIN to 29346 20GRNHLJ	1	161	211-220	211-220
307	outage of 27095 11ELIHU to 29271 20COOPER	1	161	211-220	211-220
310	outage of 27243 11MARION to 29437 20MARION	1	138-161	211-220	211-220
312	outage of 26990 11BKR LN to 29203 20BKR LN	1	138-69	211-220	211-220
315	outage of 27115 11FAWK T to 29312 20FAWKES	1	138	211-220	211-220
317	outage of 27116 11FAWKES to 29312 20FAWKES	1	138	211-220	211-220
320	outage of 27116 11FAWKES to 29312 20FAWKES	2	138	211-220	211-220
322	outage of 27229 11LOUDON to 29202 20AVON	1	138	211-220	211-220
325	outage of 27231 11LR TAP to 29616 20UN CTY	1	138	211-220	211-220
327	outage of 26982 11BEATTY to 29215 20BEATTY	1	69	211-220	211-220
330	outage of 27082 11E BERN to 29300 20EBRNST	1	69	211-220	211-220
332	outage of 27110 11FARLEY to 29536 20SCORBN	1	69	211-220	211-220
335	outage of 27117 11FAWKES to 29280 20CROOKJ	1	69	211-220	211-220

No.	Contingency	Ckt	Base kV	Area	Zone
337	outage of 27178 11HOPEWL to 29410 20LAURLC	1	69	211-220	211-220
340	outage of 29201 20AVON to 29202 20AVON	1	345-138	220	220
342	outage of 29201 20AVON to 29573 20SPURLK	1	345	220	220
345	outage of 29201 20AVON to 29651 20KPE345	1	345	220	220
350	outage of 29573 20SPURLK to 29575 20SPURLK	2	345-138	220	220
352	outage of 29575 20SPURLK to 29573 20SPURLK	1	138-345	220	220
355	outage of 29651 20KPE345 to 29652 20KPE138	1	345-138	220	220
357	outage of 29213 20BTYVL to 29215 20BEATTY	1	161-69	220	220
360	outage of 29213 20BTYVL to 29507 20POWELL	1	161	220	220
362	outage of 29271 20COOPER to 29272 20COOPER	1	161-69	220	220
370	outage of 29271 20COOPER to 29292 20DENNY	1	161	220	220
372	outage of 29271 20COOPER to 29411 20LAURLD	1	161	220	220
375	outage of 29271 20COOPER to 29517 20PULASJ	1	161	220	220
377	outage of 29271 20COOPER to 29540 20S OAKH	1	161	220	220
380	outage of 29292 20DENNY to 29293 20DENNY	1	161-69	220	220
382	outage of 29308 20FALLRK to 29310 20FALLRK	1	161-69	220	220
385	outage of 29308 20FALLRK to 29613 20TYNER	1	161	220	220
387	outage of 29346 20GRNHLJ to 29613 20TYNER	1	161	220	220
390	outage of 29408 20LAURLC to 29410 20LAURLC	1	161-69	220	220
392	outage of 29408 20LAURLC to 29411 20LAURLD	1	161	220	220
395	outage of 29408 20LAURLC to 29503 20PITTSB	1	161	220	220
400	outage of 29418 20LIBERT to 29517 20PULASJ	1	161	220	220
402	outage of 29503 20PITTSB to 29613 20TYNER	1	161	220	220
405	outage of 29507 20POWELL to 29508 20POWELL	1	161-138	220	220
407	outage of 29515 20PULASK to 29517 20PULASJ	1	161	220	220
410	outage of 29528 20RUSSEL to 29540 20S OAKH	1	161	220	220
412	outage of 29613 20TYNER to 29615 20TYNER	1	161-69	220	220
415	outage of 29202 20AVON to 29230 20BOONST	1	138	220	220
417	outage of 29202 20AVON to 29313 20FAYETT	1	138	220	220
420	outage of 29202 20AVON to 29490 20PARISJ	1	138	220	220
422	outage of 29230 20BOONST to 29233 20BOONSB	1	138	220	220
425	outage of 29230 20BOONST to 29282 20DALE	1	138	220	220
430	outage of 29282 20DALE to 29397 20JKSMIT	1	138	220	220
432	outage of 29282 20DALE to 29603 20TFJ	1	138	220	220
435	outage of 29283 20DALE to 29282 20DALE	1	69-138	220	220
437	outage of 29312 20FAWKES to 29397 20JKSMIT	1	138	220	220
440	outage of 29312 20FAWKES to 29603 20TFJ	1	138	220	220
442	outage of 29312 20FAWKES to 29623 20WBBEREA	1	138	220	220
445	outage of 29313 20FAYETT to 29315 20FAYETT	1	138-69	220	220
447	outage of 29375 20JACKVJ to 29490 20PARISJ	1	138	220	220
462	outage of 29397 20JKSMIT to 29508 20POWELL	1	138	220	220
465	outage of 29397 20JKSMIT to 29616 20UN CTY	1	138	220	220
467	outage of 29397 20JKSMIT to 29652 20KPE138	1	138	220	220
470	outage of 29397 20JKSMIT to 29652 20KPE138	2	138	220	220
472	outage of 29488 20PARIS to 29490 20PARISJ	1	138	220	220

No.	Contingency	Ckt	Base kV	Area	Zone
475	outage of 29508 20POWELL to 29510 20POWELL	1	138-69	220	220
477	outage of 29623 20WBBEREA to 29625 20WBBEREA	1	138-69	220	220
480	outage of 29195 20ALCAN to 29512 20PPG J	1	69	220	220
482	outage of 29195 20ALCAN to 29625 20WBBEREA	1	69	220	220
485	outage of 29196 20ANNVLJ to 29615 20TYNER	1	69	220	220
487	outage of 29205 20BALLRD to 29237 20BOURNE	1	69	220	220
490	outage of 29212 20BTYV D to 29215 20BEATTY	1	69	220	220
492	outage of 29215 20BEATTY to 29648 20ZACHAR	1	69	220	220
495	outage of 29222 20BLEV T to 29361 20HOPE	1	69	220	220
497	outage of 29237 20BOURNE to 29470 20NEWBY2	1	69	220	220
500	outage of 29238 20BOWEN to 29355 20HIGHHRK	1	69	220	220
502	outage of 29238 20BOWEN to 29510 20POWELL	1	69	220	220
505	outage of 29243 20BRONSJ to 29272 20COOPER	1	69	220	220
507	outage of 29260 20CLAYCJ to 29347 20HARGTJ	1	69	220	220
510	outage of 29260 20CLAYCJ to 29580 20STANTN	1	69	220	220
512	outage of 29272 20COOPER to 29566 20SOMERS	1	69	220	220
515	outage of 29272 20COOPER to 29566 20SOMERS	2	69	220	220
517	outage of 29280 20CROOKJ to 29352 20HICK P	1	69	220	220
527	outage of 29283 20DALE to 29366 20HUNT1	1	69	220	220
530	outage of 29283 20DALE to 29367 20HUNT2	1	69	220	220
532	outage of 29283 20DALE to 29468 20NEWBY1	1	69	220	220
535	outage of 29283 20DALE to 29470 20NEWBY2	1	69	220	220
537	outage of 29325 20FRNCHB to 29361 20HOPE	1	69	220	220
540	outage of 29327 20GARRCO to 29406 20LNCSTR	1	69	220	220
542	outage of 29352 20HICK P to 29511 20PPG	1	69	220	220
545	outage of 29355 20HIGHHRK to 29547 20SANDLK	1	69	220	220
547	outage of 29361 20HOPE to 29377 20JEFFVL	1	69	220	220
550	outage of 29366 20HUNT1 to 29556 20SIDEV	1	69	220	220
552	outage of 29367 20HUNT2 to 29398 20JKSMIT	1	69	220	220
555	outage of 29377 20JEFFVL to 29510 20POWELL	1	69	220	220
557	outage of 29398 20JKSMIT to 29607 20TRAPP	1	69	220	220
560	outage of 29401 20KEAVY to 29403 20KEAVJ2	1	69	220	220
562	outage of 29402 20KEAVJ1 to 29410 20LAURLC	1	69	220	220
565	outage of 29402 20KEAVJ1 to 29501 20PINEGJ	1	69	220	220
567	outage of 29403 20KEAVJ2 to 29410 20LAURLC	1	69	220	220
570	outage of 29403 20KEAVJ2 to 29536 20SCORBN	1	69	220	220
572	outage of 29406 20LNCSTR to 29468 20NEWBY1	1	69	220	220
575	outage of 29446 20MCKEE to 29615 20TYNER	1	69	220	220
577	outage of 29501 20PINEGJ to 29631 20W LOND	1	69	220	220
580	outage of 29510 20POWELL to 29580 20STANTN	1	69	220	220
582	outage of 29511 20PPG to 29512 20PPG J	1	69	220	220
585	outage of 29537 20S FORK to 29615 20TYNER	1	69	220	220
587	outage of 29605 20THLNKJ to 29626 20WBER J	1	69	220	220
590	outage of 29625 20WBBEREA to 29626 20WBER J	1	69	220	220
592	outage of 29503 20PITTSB to 27314 11PITTSB	1	161-69	220-211	220-211

No.	Contingency	Ckt	Base kV	Area	Zone
595	outage of 29233 20BOONSB to 26999 11BOONSB	1	138-69	220-211	220-211
597	outage of 29397 20JKSMIT to 27382 11SPENC	1	138	220-211	220-211
602	outage of 26648 09STUART to 29573 20SPURLK	1	345	209-220	209-220
605	outage of 26367 08ZIMER to 29573 20SPURLK	1	345	208-220	280-220
607	outage of 27197 11KENTON to 29575 20SPURLK	1	138	211-220	211-220
610	outage of 29372 20INLAND to 29575 20SPURLK	1	138	220	220
612	outage of 29440 20MAYSJV to 29575 20SPURLK	1	138	220	220
615	outage of 29521 20RENAKR to 29575 20SPURLK	1	138	220	220
617	outage of 29575 20SPURLK to 29585 20S PARK	1	138	220	220