

TAG Meeting September 12, 2016

Webinar

TAG Meeting Agenda

- 1. Administrative Items Rich Wodyka
- 2. 2016 Study Activities Update Orvane Piper
- 3. Discussion on Operating Guides Mark Byrd and Orvane Piper
- 4. Regional Studies Update Bob Pierce
- 5. 2016 TAG Work Plan Update Rich Wodyka
- 6. TAG Open Forum Rich Wodyka

2016 Study Activities Update

Orvane Piper Duke Energy Carolinas

Steps and Status of the Study Process

1. Assumptions Selected

<u>Completed</u>

- 2. Study Criteria Established
- 3. Study Methodologies Selected
- 4. Models and Cases Developed
- 5. Technical Analysis Performed
- 6. Problems Identified and Solutions Developed
- 7. Collaborative Plan Projects Selected
- 8. Study Report Prepared



Problems Identified and Solutions Developed

- Identify limitations and develop potential alternative solutions for further testing and evaluation
- Estimate project costs and schedule

Sensitivity #2

- Identification of permanent transmission upgrades to eliminate use of specific operating procedures / guides
 - Study year 2026 Summer
 - 1 DEC/DEP operating procedure
 - 4 DEP operating procedures



Projects To Replace Identified Operating Procedures / Guides							
Project	то						
Install Series Reactors on Wateree-Great Falls 100 kV	DEC						
Reconductor Rockingham-West End 230 kV	DEP						
Reconductor Marion-Dillon Tap 115 kV	DEP						

2021 (% Loading)							Overloaded Bra	nch
21S	Br1Dn	HarDn	Rob2Dn	21W	AshvDn	Comments	Name	Branch Type
96.6	93.7	94.8	92.5		107	Operating Guide	BADIN - TUCKERTOWN	100 kV Line
				110.2	106.1	Upgrade 6.3 miles	BOGER CITY BL	100 kV Line
				100	100.1	Upgrade 6.3 miles	BOGER CITY WH	100 kV Line
					91.5	N/A, outside 10 year plan	DAVIDSON RIVER BL	100 kV Line
				94.5	108.1	upgrade 4.7 miles (<\$10 M)	DAVIDSON RIVER BL	100 kV Line
					95.5	AEU	DAVIDSON RIVER WH	100 kV Line
94.5	94.7	94.7	94.7			Tarrant Rd SS (<\$10 M)	DEEP RIVER WH	100 kV Line
94.2						Upgrade 13.9 miles	DUNCAN WH N	100 kV Line
				101.7	104.4	Upgrade 11.8 miles	HARLEY BL	100 kV Line
				101.8	104.3	Upgrade 11.8 miles	HARLEY BL	100 kV Line
				109.9	115.2	Upgrade 11.8 miles	HARLEY WH	100 kV Line
108.6	105.3	106.6	104		120.3	Operating Guide	HIGH ROCK - TUCKERTOWN	100 kV Line
					91.6	N/A, outside 10 year plan	HOGBACK BL	100 kV Line
					93.2	N/A, outside 10 year plan	HOGBACK WH	100 kV Line
93.3	97.5	98.4	96.7			Upgrade 9.8 miles	LINDEN ST BL	100 kV Line
	94.8	95.7	94			Upgrade 9.8 miles	LINDEN ST WH	100 kV Line
	94.7 95	95.6 95.8	93.9 			Upgrade 3.2 miles Upgrade 9.7 miles	LINDEN ST WH PIEDMONT BL	100 kV Line 100 kV Line
 113.9	95 113.8	113.8	113.8			Operating Guide	WATEREE BL	100 kV Line
113.9	113.0	113.0	113.0			Operating Guide	WATEREE WH	100 kV Line
98.3	98.4	98.6	98.4			Springfield SS (<\$10 M)	WEDDINGTON BL	100 kV Line
98.3	98.6	98.6	98.6			Springfield SS (<\$10 M)	WEDDINGTON BL	100 kV Line
				106.1	100.3	DEP proposed project	PISGAH TIE 09	115/100 kV Transformer
				106.6	100.8	DEP proposed project	PISGAH TIE 10	115/100 kV Transformer
90.9						N/A, outside 10 year plan	FISHER BL	230 kV Line
90.9						N/A, outside 10 year plan	FISHER WH	230 kV Line
101.7	92.4	91.7	93.6			Operating Guide	LONDON CREEK BL	230 kV Line
101.7	92.4	91.7	93.6			Operating Guide	LONDON CREEK WH	230 kV Line
92.1						N/A, outside 10 year plan	SADLER BL	230 kV Line
92.1						N/A, outside 10 year plan	SADLER WH	230 kV Line
	93.2	93.6	92.7			add second 230 kV circuit (<\$10 M)	SANDY RIDGE BL	230 kV Line
				95.3		AEU	STAMEY BL	230 kV Line
95.1						AEU	ALLEN 2B	230/100 kV Transformer
93.2						N/A, outside 10 year plan	ALLEN STEAM PL 06	230/100 kV Transformer
				109.8	102.5	AEU	PISGAH TIE 01	230/100/44 kV Transformer
				107.1	100.1	AEU	PISGAH TIE 02	230/100/44 kV Transformer
104.7						add transformer (<\$10 M)	SADLER TIE 03	230/100/44 kV Transformer
109.3				98.9		add transformer (<\$10 M)	SADLER TIE 04	230/100/44 kV Transformer
94.5	90.3	90.7				AEU	STONEWATER TIE A4	230/100/44 kV Transformer
94.4	90.3	90.7				AEU	STONEWATER TIE A5	230/100/44 kV Transformer
98.9	91.9	91.8	91.7	91.5		AEU	KATOMA	500 kV Line
		91.2				N/A, outside 10 year plan	PARKWOOD TIE 05	500/230 kV Transformer

	<u>2026</u>	6 (% Loading)			<u>Overlo</u>	aded Branch
26S	26S_Br1Dn	26S_HarDn	26S_Rob2Dn	Comments	Name	Branch Type
105	99.6	101		Operating Guide	BADIN - TUCKERTOWN	100 kV Line
101.4	101.6	101.6	101.5	Tarrant Rd SS (<\$10 M)	DEEP RIVER WH	100 kV Line
113.9	112.2	111.5	113.4	Upgrade 13.9 miles	DUNCAN WH N	100 kV Line
118.1	112	113.6	110.2	Operating Guide	HIGH ROCK - TUCKERTOWN	100 kV Line
				N/A, outside 10 year plan	LINDEN ST BL	100 kV Line
114	113.9	113.9	113.9	Operating Guide	WATEREE BL	100 kV Line
114	113.9	113.9	113.9	Operating Guide	WATEREE WH	100 kV Line
106.1	106.3	106.3	106.2	Springfield SS (<\$10 M)	WEDDINGTON BL	100 kV Line
106.8	107.1	107.1	107	Springfield SS (<\$10 M)	WEDDINGTON BL	100 kV Line
				N/A, outside 10 year plan	CLAY HILL BL	230 kV Line
				N/A, outside 10 year plan	HARRISBURG BL	230 kV Line
				N/A, outside 10 year plan	HARRISBURG WH	230 kV Line
125.7	125.9	125.2	127.1	Operating Guide	LONDON CREEK BL	230 kV Line
125.7	125.9	125.2	127.1	Operating Guide	LONDON CREEK WH	230 kV Line
95.3				N/A, outside 10 year plan	RIPP BL	230 kV Line
95.3				N/A, outside 10 year plan	RIPP WH	230 kV Line
	96.3	96.7	95.7	N/A, outside 10 year plan	SANDY RIDGE BL	230 kV Line
	92.6	93	92.8	N/A, outside 10 year plan	STEELBERRY BL	230 kV Line
	92.6	93	92.8	N/A, outside 10 year plan	STEELBERRY WH	230 kV Line
	92.8	94.1	91.9	N/A, outside 10 year plan	WESTPORT WH	230 kV Line
	90	94.1	94.5	N/A, outside 10 year plan	ALLEN 2B	230/100 kV Transformer
96	90.4	90.2	90.4	N/A, outside 10 year plan	BECKERDITE TIE 02	230/100 kV Transformer
96.5	90.9	90.7	90.8	N/A, outside 10 year plan	BECKERDITE TIE 03	230/100 kV Transformer
	90.4	90.3	90.5	N/A, outside 10 year plan	BUCK TIE AT3	230/100 kV Transformer
	90.4	90.3	90.5	N/A, outside 10 year plan	BUCK TIE AT4	230/100 kV Transformer
106.4				add transformer (<\$10 M)	SADLER TIE 03	230/100/44 kV Transformer
111				add transformer (<\$10 M)	SADLER TIE 04	230/100/44 kV Transformer
102.5	98.3	98.6	97.9	AEU	STONEWATER TIE A4	230/100/44 kV Transformer
		91	90.3	N/A, outside 10 year plan	STONEWATER TIE A4	230/100/44 kV Transformer
102.4	98.2	98.6	97.9	AEU	STONEWATER TIE A5	230/100/44 kV Transformer
		91.1	90.3	N/A, outside 10 year plan	STONEWATER TIE A5	230/100/44 kV Transformer
97.3				N/A, outside 10 year plan	КАТОМА	500 kV Line
	93.5	95.8	90.8	N/A, outside 10 year plan	PARKWOOD TIE 05	500/230 kV Transformer

			6 (% Loading					Overloa	aded Branch
Brunswick	Brunswick_ HarDn	Brunswick_ Rob2Dn		OpGuides_ Br1Dn	•	_OpGuides_ Rob2Dn	Comments	Name	Branch Type
99.9	100.3		OpGuides 103		HarDn 		Operating Guide	BADIN - TUCKERTOWN	100 kV Line
101.5	100.3	97.4	101.4	97.3	97.5	97.1	Tarrant Rd SS (<\$10 M)	DEEP RIVER WH	100 kV Line
101.3	111.6	103.6	113.6	110.2	109.6	111.1	Upgrade 13.9 miles	DUNCAN WH N	100 kV Line
100.2	111.0	103.0	115.0	110.2	109.0	111.1		HIGH ROCK -	
112.3	112.8	101.6	115.8	99.1	100	97.8	Operating Guide	TUCKERTOWN	100 kV Line
100	100	101.8					Upgrade 9.8 miles	LINDEN ST BL	100 kV Line
114	113.9	114.4					Operating Guide	WATEREE BL	100 kV Line
114	113.9	114.4					Operating Guide	WATEREE WH	100 kV Line
106.4	106.4	101.7	106.1	101.3	101.4	101.2	Springfield SS (<\$10 M)	WEDDINGTON BL	100 kV Line
107.2	107.1	102.5	106.8	102	102.1	101.9	Springfield SS (<\$10 M)	WEDDINGTON BL	100 kV Line
96.6		98.8		95.7	95.7	95.7	Upgrade 24.5 miles	CLAY HILL BL	230 kV Line
		99.2					Upgrade 21.7 miles	HARRISBURG BL	230 kV Line
		99.2					Upgrade 21.7 miles	HARRISBURG WH	230 kV Line
118.9	125.3	116.3	125.4	121.6	121.1	122.6	Operating Guide	LONDON CREEK BL	230 kV Line
118.9	125.3	116.3	125.4	121.6	121.1	122.6	Operating Guide	LONDON CREEK WH	230 kV Line
			95.3				N/A, outside 10 year plan	RIPP BL	230 kV Line
			95.3				N/A, outside 10 year plan	RIPP WH	230 kV Line
98.1	96.7	99.3		95.3	95.7	94.7	N/A, outside 10 year plan	SANDY RIDGE BL	230 kV Line
96.4							N/A, outside 10 year plan	STEELBERRY BL	230 kV Line
96.4							N/A, outside 10 year plan	STEELBERRY WH	230 kV Line
							N/A, outside 10 year plan	WESTPORT WH	230 kV Line
							N/A, outside 10 year plan	ALLEN 2B	230/100 kV Transformer
			96				N/A, outside 10 year plan	BECKERDITE TIE 02	230/100 kV Transformer
			96.5				N/A, outside 10 year plan	BECKERDITE TIE 03	230/100 kV Transformer
							N/A, outside 10 year plan	BUCK TIE AT3	230/100 kV Transformer
							N/A, outside 10 year plan	BUCK TIE AT4	230/100 kV Transformer
107.2			106.4				add transformer (<\$10 M)	SADLER TIE 03	230/100/44 kV Transformer
111.8			111				add transformer (<\$10 M)	SADLER TIE 04	230/100/44 kV Transformer
104.2	98.7	95.1	102.5		94.9		AEU	STONEWATER TIE A4	230/100/44 kV Transformer
							N/A, outside 10 year plan	STONEWATER TIE A4	230/100/44 kV Transformer
104.1	98.6	95.1	102.4		94.9		AEU	STONEWATER TIE A5	230/100/44 kV Transformer
							N/A, outside 10 year plan	STONEWATER TIE A5	230/100/44 kV Transformer
95.9			97.3				N/A, outside 10 year plan	KATOMA	500 kV Line
96.2	96	95.3					N/A, outside 10 year plan	PARKWOOD TIE 05	500/230 kV Transformer

		Reliabilty Stu .oading	dy		
Base Case	se Br1DnTRM HarDnTRM Rob2DnTRM		Rob2DnTRM	Notes	Monitored Facility
	99.57			Proposed Project	PILKINGTON LIBBEY-OWENS-FORD-BUTLER TAP 115 kV LINE
	98.17			Proposed Project	MAXTON-BUTLER TAP 115 kV LINE
93.20		92.11		Beyond 10-Year Planning Horizon	VISTA-CASTLE HAYNE 115 kV LINE
			94.57	Beyond 10-Year Planning Horizon	EASTOVER-SHAW AFB TAB 115 kV LINE
			90.50	Beyond 10-Year Planning Horizon	CAMDEN TAP-CAMDEN CITY 115 KV LINE
	92.86	92.11	104.48	Operating Procedure	CAMDEN-CAMDEN TAP 115 kV LINE
	90.70		101.71	Operating Procedure	CAMDEN-INDUSTRIAL CUSTOMER 115 kV LINE

21/22W Base Reliability %Loading			
Base Case	AshvCT1DnTRM	Notes	Monitored Facility
90.98	116.04	Operating Procedure	PISGAH-CRADLE OF FORESTRY 115 kV LINE
	96.97	Operating Procedure	CANTON-CRADLE OF FORESTRY 115 kV LINE
97.79	N/A	Proposed Project	MAXTON-BUTLER TAP 115 kV LINE

26S	Base Reliab	ilty Study %	Loading		
Base					
Case	Br1DnTRM	HarDnTRM	Rob2DnTRI	M Notes	Monitored Facility
				Beyond 10-Year Planning Horizon	SUTTON-CASTLE HAYNE 230 kV LINE
	90.33			Beyond 10-Year Planning Horizon	SUTTON-WILMINGTON NINTH & ORANGE 230 kV LINE
				Beyond 10-Year Planning Horizon	WEATHERSPOON-WEST LUMBERTON 115 kV LINE
				Beyond 10-Year Planning Horizon	CAPE FEAR SOUTH-LILLINGTON 115 kV LINE
				Beyond 10-Year Planning Horizon	DARLINGTON COUNTY-S BETHUNE 230 kV LINE
				Beyond 10-Year Planning Horizon	RALEIGH BRIERS CREEK-DURHAM 230 kV LINE
94.26	94.58	95.04	94.33	Beyond 10-Year Planning Horizon	CHESTNUT HILLS-MILBURNIE 115 kV LINE
		91.05		Beyond 10-Year Planning Horizon	ROCKINGHAM-WADESBORO TAP 230 kV LINE
				*Ancillary Equipment Upgrade	CUMBERLAND-GARLAND 230 kV LINE
	98.49			Proposed Project	PILKINGTON LIBBEY-OWENS-FORD-BUTLER TAP 115 kV LINE
				Proposed Project	MAXTON-PEMBROKE 115 kV LINE
	96.99			Proposed Project	MAXTON-BUTLER TAP 115 kV LINE
97.67		96.56	92.61	Beyond 10-Year Planning Horizon	VISTA-CASTLE HAYNE 115 kV LINE
91.22		90.12		Beyond 10-Year Planning Horizon	VISTA-JONES-ONSLOW EMC HUGH BATTS 115 kV LINE
98.21	98.90	98.33	98.29	*Ancillary Equipment Upgrade & Raise 9.89 Miles	LELAND INDUSTRIAL-DELCO 115 kV LINE
				Beyond 10-Year Planning Horizon	LAKE WACCAMAW-HALLSBORO 115 kV LINE
				Beyond 10-Year Planning Horizon	HALLSBORO-WHITEVILLE TAP 115 kV LINE
				Beyond 10-Year Planning Horizon	NICHOLS-MULLINS 115 kV LINE
				*Reconductor 8.65 Miles w/3-1590	MULLINS-MARION 115 kV LINE
				Operating Procedure	MARION-DILLON TAP 115 kV LINE
				Beyond 10-Year Planning Horizon	SUMTER-SUMTER GOLD KIST TAP 115 kV LINE
				Beyond 10-Year Planning Horizon	KINGS HIGHWAY-SUMTER GOLD KIST TAP 115 kV LINE
				Beyond 10-Year Planning Horizon	KINGS HIGHWAY-SHAW AFB TAP 115 kV LINE
				*Coordinate w/SCEG - Reconductor 7.37 Miles w/3	
			94.42	795	EASTOVER-SHAW AFB TAP 115 kV LINE
				Beyond 10-Year Planning Horizon	SUMTER-WATEREE 230 kV LINE
			91.53	Operating Procedure	CAMDEN TAP-CAMDEN CITY 115 kV LINE
	94.67	93.91	106.36	Operating Procedure	CAMDEN-CAMDEN TAP 115 kV LINE
	92.42	91.69	103.49	Operating Procedure	CAMDEN-INDUSTRIAL CUSTOMER 115 kV LINE
				Beyond 10-Year Planning Horizon	INDUSTRIAL CUSTOMER-ELGIN TAP 115 kV LINE
					Bus Differential Relay Failure (P-5)
98.85	N/A	N/A	N/A	Beyond 10-Year Planning Horizon	WEATHERSPOON-WEST LUMBERTON 115 kV LINE
96.21	N/A	N/A	N/A	Beyond 10-Year Planning Horizon	SUTTON-WILMINGTON PCS 115 kV LINE
					Internal Breaker Fault (P-2)
96.33	N/A	N/A	N/A	Beyond 10-Year Planning Horizon	SUTTON-WILMINGTON PCS 115 kV LINE
				*Hypothetical Projects	
					10

Base International Base Base International Base Base Base International Base Base Base Base Base Base Base Base	<u>26S_</u> I	Br1&2Dn Study	/ %Loading	<u>26S</u>	_Operating G	uides Study	%Loading		
92.08 Beyond 10-Year Planning Horizon SUTTON-CASTLE HAYNE 230 VL LINE 91.3 00.68 Beyond 10 Year Planning Horizon SUTTON-WILLINNGTON NINTH & ORANGE 230 VL LINE 91.77 Beyond 10 Year Planning Horizon CAPE FEAR SOUTH-LILLINGTON 115 VL LINE 91.84 Beyond 10 Year Planning Horizon CAPE FEAR SOUTH-LILLINGTON 115 VL LINE 91.84 91.42 91.42 Beyond 10 Year Planning Horizon CAPE FEAR SOUTH-LILLINGTON COMPLAM 220 VL LINE 92.77 Beyond 10 Year Planning Horizon CREAD VL LINE 92.78 Beyond 10 Year Planning Horizon CREAD VL LINE 94.81 95.74 101.10 Beyond 10 Year Planning Horizon ROCKINGHAM-WADESBORD TAP 230 KV LINE 94.31 99.74 101.00 Beyond 10 Year Planning Horizon ROCKINGHAM-WADESBORD TAP 230 KV LINE 94.81 105.40		HarDnTRM	Roh2DoTRM		Br1DpTRM	HarDoTRM	Roh2DnTPA	A Notes	Monitored Facility
Beyond 10-Year Planning Hotizon SUTTON-WILLININGTON INITH & ORANGE 230 kV LINE 91.13 90.88 Beyond 10-Year Planning Hotizon CME FEAR SOUTH-LINITON 115 kV LINE									
9113 90.68 Bayend 10-Year Planning Horizon WEATHERSPOON-WEST LUMBERTON 115 kV LINE 98.84 Bayend 10-Year Planning Horizon CAPE FEAR SOUTH-LLLINGTON 115 kV LINE 98.84 Bayend 10-Year Planning Horizon CAPE FEAR SOUTH-LLINGTON 115 kV LINE 98.84 96.47 94.37 94.28 94.38 99.39 91.27 Bayend 10-Year Planning Horizon RALLIGH BRIERS CREEE-DURHAM 230 kV LINE 92.27 Bayend 10-Year Planning Horizon ROCKINGHAM-WADESBORD TAP 230 kV LINE 94.31 99.74 101.10 Bayend 10-Year Planning Horizon ROCKINGHAM-WADESBORD TAP 230 kV LINE 94.31 99.74 101.10 Bayend 10-Year Planning Horizon NUXINON FEMBROKE 115 kV LINE 94.31 99.75 100.47 99.26 Bayend 10-Year Planning Horizon NUXINON FEMBROKE 115 kV LINE 116.25 114.57 109.78 90.20 23.25 Bayend 10-Year Planning Horizon NUSTA-CASTE HAVNE 115 kV LINE					90.29			, ,	
Image 93.77 Image Image <th< td=""><td></td><td>91 13</td><td>90.68</td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		91 13	90.68						
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94.81 95.84 94.97 94.26 94.48 94.27 Beyond 10-Year Planning Horizon CCHESTNUT HILLS-MILBURNIE 115 KV LINE 92.52 Beyond 10-Year Planning Horizon ROCKINGHAM-WADESBORD TAP 20 kV LINE 94.31 99.74 101.10 Beyond 10-Year Planning Horizon ROCKINGHAM-WADESBORD TAP 20 kV LINE 100.25 111.28 97.82 Beyond 10-Year Planning Horizon PLKINCTON LIBBEY-OWENS-FORD-BUTLER TAP 115 kV LINE 100.75 114.75 109.78 96.12 Beyond 10-Year Planning Horizon VISTA-CASTLE HAVINE 115 kV LINE Beyond 10-Year Planning Horizon VISTA-CASTLE HAVINE 115 kV LINE Beyond 10-Year Planning Horizon VISTA-CASTLE HAVINE 115 kV LINE									
92.52 Begond 10-Year Planning Horizon ROCKINGHAM-WADESBORD TAP 230 kV LINE 94.31 99.74 101.10 Analitary Equipment Upgrade CUMBERLAND-GARLAND 230 kV LINE 94.31 99.74 Analitary Equipment Upgrade CUMBERLAND-GARLAND 230 kV LINE 98.63 104.07 99.26 Planoid Planoid MAXTON-PEMBROKE 115 kV LINE 98.63 114.57 100.78 95.63 Planoid Planoid MAXTON-PEMBROKE 115 kV LINE 98.75 110.66 100.07 98.62 Boyond 10-Year Planning Horizon VISTA-JONES-ONSLOW EMC HUGH BATTS 115 kV LINE 99.75 100.46 100.07 98.22 98.87 09.33 98.30 Maxilian Res Mide Lick XV LINE NUENC 99.75 100.46 100.07 98.21 98.30 10-Year Planning Horizon NICHOLSMULLINE NO KV LINE 99.75 100.76				94 26	94 48	94 93			
99.74 101.10 Ancillary Equipment Upgrade CUMBERLAND-GARLAND 230 kV LINE 110.25 116.08 111.29 97.82 Proposel Propert PLIXINGTON LIBBEY-OWENS-PROP-DUTLER TAP 115 kV LINE 108.75 114.57 109.78 96.32 Proposel Propert MAXTON-PEMBRCKE 115 kV LINE 108.75 114.57 109.78 96.41 92.58 Beyond 10-Year Planning Horizon VISTA-CASTLE HAYNE 115 kV LINE 108.75 100.46 100.07 98.22 98.31 98.01 10-Year Planning Horizon VISTA-CASTLE HAYNE 115 kV LINE 99.75 100.46 100.07 98.22 98.31 98.03 Ancillary Equipment Upgrade X Reise 9.89 Miles LELAND INDUSTRIAL-DELOO 115 kV LINE 99.75 100.46 100.07 98.27 98.31 98.03 Ancillary Equipment Upgrade X Reise 9.89 Miles LELAND INDUSTRIAL-DELOO 115 kV LINE 91.62 Beyond 10-Year Planning Horizon LIAKE WACCAMAW-HALLSBORO.015 kV LINE 91.62 Beyond 10-Year Planning Horizon MIXHON 215 kV LIN								, ,	
110.25 116.08 111.29 97.82 Proprint Project PILKINGTON LIBBEY-OWENS-FORD-BUTLER TAP 115 kV LINE 96.05 104.07 99.26 Proprint Project MAXTON-PEMERCKE 115 kV LINE 108.75 114.57 109.76 96.32 Proprint Project MAXTON-PEMERCKE 115 kV LINE 97.63 96.41 92.58 Beyond 10-Year Planning Horizon VISTA-CASTLE HAYNE 115 kV LINE 91.62 Beyond 10-Year Planning Horizon VISTA-CASTLE HAYNE 115 kV LINE 99.75 100.46 100.07 98.21 98.91 98.90 Anadiay Equationant Upgrade & Raise 388 Miles LELAND INDUSTRAL-DECO 115 kV LINE 91.62 Beyond 10-Year Planning Horizon LAKE WACCAMAW-HALLSBORO 115 kV LINE 93.37 105.90 96.05 Beyond 10-Year Planning Horizon MULLINS-MARION 115 kV LINE 93.37 105.90 96.05 Depending Procedure MARION-DILLON TAP 115 kV LINE									
98.63 104.07 99.28 Proposed Project MAXTON-PEMBROKE 115 kV LINE 108.75 114.57 109.78 96.12 Proposed Project MAXTON-PEMBROKE 115 kV LINE Proposed Project MAXTON-PEMBROKE 115 kV LINE MAXTON-PEMBROKE 115 kV LINE Proposed Project MAXTON-PEMBROKE 115 kV LINE Proposed Project MAXTON-PEMBROKE 115 kV LINE Proposed Project MAXTON-PEMBROKE 115 kV LINE Peoped 10-Year Planning Horizon VISTA-JONES-ONSLOW EMC HUGH BATTS 115 kV LINE 99.75 100.46 100.07 98.21 98.30 Project Planning Horizon LELAND INDUSTRIA-DELCO 115 kV LINE 91.62 Beyond 10-Year Planning Horizon NICHOS-MULLINS 115 kV LINE 91.62 Beyond 10-Year Planning Horizon NICHOS-MULLINS 115 kV LINE 91.62 Beyond 10-Year Planning Horizon NICHOS-MULINA									
108.75 114.57 109.78 96.32 Deposed Phylicit MAXTON-BUTLER TAP 115 kV LINE 97.63 97.61 92.53 Beyond 10-Year Planning Horizon VISTA-CASTLE HAYNE 115 kV LINE Beyond 10-Year Planning Horizon VISTA-JONES-ONSLOW EMC HUGH BATTS 115 kV LINE 91.62 Beyond 10-Year Planning Horizon LAKE WACCAMAW-HALLSBORO 115 kV LINE 91.62 Beyond 10-Year Planning Horizon LAKE WACCAMAW-HALLSBORO 115 kV LINE 91.62 Beyond 10-Year Planning Horizon NICHOLS-MULLET AP 115 kV LINE 91.02 Beyond 10-Year Planning Horizon NICHOLS-MULLINS 115 kV LINE 93.37 105.90 96.05 Beyond 10-Year Planning Horizon MULLINS-MARINA 115 kV LINE 90.07 Beyond 10-Year Planning Horizon MULLINS 115 kV LINE 90.49 Beyond 10-Year Planning Horizon SUMTER-SUDLING TAP 115 kV LINE					57.02				
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*Hypothetical Projects								*Hypothetical Projects	



Collaborative Plan Projects Selected

Compare alternatives and select preferred solutions

Study Report Prepared

Prepare draft report and distribute to TAG for review and comment





Discussion of Operating Guides

Mark Byrd - DEP Orvane Piper - DEC



Discussion of Operating Guides

- > What is an Operating Guide?
- Categories of Operating Guides
- Possible Reasons for using an Operating Guide

Possible Reasons for using an Operating Guide (for a P0 – P3 Contingency)

- If project mitigation is very expensive and provides little network value
- Can provide a temporary fix until permanent mitigation can be completed for unforeseen load or generation addition
- Sometimes transmission projects can be very difficult to construct due to public opposition or environmental issues
- Other miscellaneous

Example Operating Guides

- Rockingham West End 230 kV West
- Weatherspoon Plant Marion 115 kV
- Wateree Great Falls 100 kV

Example Operating Guides (continued)



McGuire - Riverbend 230 kV

➢ Future

Riverview - Peach Valley 230 kV







Regional Studies Reports

Bob Pierce Duke Energy Carolinas







2016 TAG Work Plan Update

Rich Wodyka Administrator



2016 NCTPC Overview Schedule

Reliability Planning Process



- > Evaluate current reliability problems and transmission upgrade plans
 - > Perform analysis, identify problems, and develop solutions
 - Review Reliability Study Results

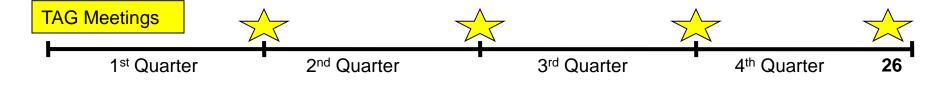
Local Economic Planning Process

No Local Economic Studies or Public Policy Studies were proposed by Stakeholders

Perform Additional Sensitivities Studies



- Reliability Study Results
 - OSC publishes DRAFT Plan
 - TAG review and comment



2016 TAG Work Plan

January – February - March

- > 2016 Study Finalize Study Scope of Work
 - Receive final 2016 Reliability Study Scope for comment
 - Review and provide comments to the OSC on the final 2016 Study Scope – Provide Comments by March 31st
 - Receive request from OSC to provide input on proposed Local Economic Study scenarios and interfaces for study
 - Provide input to the OSC on proposed Local Economic Study scenarios and interfaces for study No Requests
 - Receive request from OSC to provide input in identifying any
 - Provide input to the OSC in identifying any public policies that are driving the need for local transmission for study – No Requests



January – February - March

First Quarter TAG Meeting – March 14th Webinar

> 2016 Study Update

- Receive a progress report on the Reliability Planning study activities and 2016 Study Scope
- ✓ Provide comments on the final 2016 Study Scope to Rich Wodyka at <u>rawodyka@aol.com</u> by March 31st.

April - May - June

<u>Second Quarter TAG Meeting – Delayed until July 19th</u>

> 2016 Study Update

- Receive a progress report on the Reliability Planning study activities
- Receive update status of the upgrades in the 2015 Collaborative Plan

July – August – September

- > 2016 Study Update
 - Receive a progress report on the Reliability Planning study activities and preliminary results
 - ✓ TAG will be requested to provide input to the OSC and PWG on the technical analysis performed, the problems identified as well as proposing alternative solutions to the problems identified

July – August – September

<u>Third Quarter TAG Meeting – September 12th</u>

- > 2016 Study Update
 - Receive a progress report on the Reliability Planning study activities and preliminary results
 - TAG is requested to provide input on any proposed alternative solutions to Rich Wodyka at <u>rawodyka@aol.com</u> by October 7th.

October - November - December

- > 2016 Selection of Solutions
 - TAG will receive feedback from the OSC on any alternative solutions that were proposed by TAG members by the end of October.
- > 2016 Study Update
 - Receive and comment on final draft of the 2016
 Collaborative Transmission Plan report
 - Discuss potential study scope for 2017 studies

October - November - December

Fourth Quarter TAG Meeting – December 13th

- > 2016 Study Update
 - Receive presentation on the final draft report of 2016
 Collaborative Transmission Plan
 - Discuss potential study scope for 2017 studies





TAG Open Forum Discussion

Comments or Questions ?