Appendix C

Collaborative Transmission Plan Major Project Descriptions

January 25, 2007

Project ID and Name: **0001 - Marion-Whiteville 230 kV Line, Operate at 115 kV**

Project Description
This project consists of constructing approximately 21 miles of new 230 kV line and tied to an existing line currently operated at 115 kV but built for 230 kV. The line will be initially operated at 115 kV until 6/1/2009 when it will be then operated at 230 kV.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2007
Estimated Time to Complete	0.5 years
Estimated Cost	$11 M

Narrative Description of the Need for this Project
With a Brunswick unit down an outage of the Cumberland terminal of the Cumberland-Whiteville 230 kV line will cause the Marion-Whiteville 115 kV line to exceed its rating.

Transmission Solutions Considered
Rebuild, reconductor.

Why this Project was Selected as the Preferred Solution
Cost and feasibility.

Project ID and Name: 0002 - Lee Sub-Wommack 230 kV South Line

Project Description
This project consists of re-conductring approximately 30 miles of the existing Lee-Wommack 230 kV South line.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	5/1/2008
Estimated Time to Complete	1.5 years
Estimated Cost	$13 M

Narrative Description of the Need for this Project
With a Brunswick unit down an outage of the Lee-Wommack 230 kV North line will cause the Lee-Wommack 230 kV South line to exceed its rating.

Transmission Solutions Considered
New line.

Why this Project was Selected as the Preferred Solution
Cost and feasibility.

Project ID and Name: 0003 - Durham 500 kV Substation

Project Description
This project consists of establishing 500 kV at the existing Durham 230 kV Substation by looping in the Mayo-Wake 500 kV line and installing 1-500/230 kV transformer bank.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2008
Estimated Time to Complete	1.5 years
Estimated Cost	$31 M

Narrative Description of the Need for this Project
With a Harris unit down an outage of either of the Wake 500/230 kV banks at Wake 500 kV Substation will cause the remaining bank to exceed its rating.

Transmission Solutions Considered
New 500/230 kV banks with higher rating.

Why this Project was Selected as the Preferred Solution
Cost, feasibility and improved area voltage.

Project ID and Name: 0004 - Clinton-Lee 230 kV Line

Project Description
This project consists of construction 29 miles of new 230 kV line between Lee and Clinton.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2009
Estimated Time to Complete	2.5 years
Estimated Cost	$21 M

Narrative Description of the Need for this Project
With an outage of the Erwin terminal of the Erwin-Clinton 230 kV line or an outage of the Clinton terminal of the Clinton-Wallace 230 kV line will cause several area 115 kV line to exceed their rating.

Transmission Solutions Considered
Rebuild, reconductor.

Why this Project was Selected as the Preferred Solution
Cost, feasibility and improved area voltage.

Project ID and Name: 0005 - Rockingham-West End 230 kV Line, Wadesboro Bowman School Tap

Project Description
This project consist of construction 12 miles of new 230 kV to establish a new tap off of the Rockingham-West End 230 kV Line to serve two 115 kV deliveries to be converted to 230 kV. Also a section of the Rockingham-West End 230 kV Line will be uprated to its full conductor rating between Rockingham and the new tap.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2009
Estimated Time to Complete	2.5 years
Estimated Cost	$13 M

Narrative Description of the Need for this Project
With a Harris unit down an outage of the Rockingham terminal of the Rockingham-Biscoe 230 kV line will cause the Rockingham-Blewett-Tillery 115 kV corridor to exceed its rating.

Transmission Solutions Considered
Rebuild, reconductor.

Why this Project was Selected as the Preferred Solution
Cost and feasibility.

Project ID and Name: 0006 - Cape Fear-Siler City 230 kV Line

Project Description
This project consists of constructing 30 miles of new 230 kV line between Cape Fear 230 kV and Siler City 230 kV Substations.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2010
Estimated Time to Complete	2.0 years
Estimated Cost	$19 M

Narrative Description of the Need for this Project
An outage of the Harris terminal of the Harris-Asheboro 230 kV line will cause unacceptable voltage in the Asheboro/Ramseur/Siler City area.

Transmission Solutions Considered
Additional area capacitors.

Why this Project was Selected as the Preferred Solution
Cost, feasibility, and lasting resolution to voltage issues.

Project ID and Name: 0007 - Richmond 500 kV Series Reactor

Project Description
This project consists of installing a 500 kV series reactor at the Richmond 500 kV Substation. The reactor will be in series with the Richmond-Newport 500 kV line.

Status	Planned
Transmission Owner	Progress
Planned In-Service Date	6/1/2010
Estimated Time to Complete	3.5 years
Estimated Cost	$15 M

Narrative Description of the Need for this Project
To permit closing of the Newport-Richmond 500 kV line at times of high import flow mitigating issues with large post contingency phase angle.

Transmission Solutions Considered
Intermediate 500 kV substation. Additional 500 kV transmission line.

Why this Project was Selected as the Preferred Solution
Cost and feasibility.

Project ID and Name: 0008 - Greenville-Kinston DuPont 230 kV Line

Project Description
This project consists of constructing 30 miles of 230 kV line between Greenville and Kinston DuPont 230 kV Substations.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2011
Estimated Time to Complete	4.0 years
Estimated Cost	$18 M

Narrative Description of the Need for this Project
With a Brunswick unit down an outage of the Wilson-Greenville 230 kV line will cause the Greenville-(DVP) Everetts 230 kV line to exceed its rating.

Transmission Solutions Considered
Rebuild, reconductor.

Why this Project was Selected as the Preferred Solution
Cost and feasibility.

Project ID and Name: 0009 - Henderson-Kerr Dam 115 kV Line, Warrenton 115 kV Tap

Project Description
This project consists of constructing a parallel 12 mile new 115 kV line to Warrenton from the Henderson-(DVP) Kerr Dam 115 kV line.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2011
Estimated Time to Complete	4.0 years
Estimated Cost	$10 M

Narrative Description of the Need for this Project
With a Harris unit down an outage of the (DVP) Kerr Dam 115 kV terminal of the Henderson-(DVP) Kerr Dam 115 kV line will result in unacceptable voltage in the Warrenton area.

Transmission Solutions Considered
Rebuild.

Why this Project was Selected as the Preferred Solution
Cost, feasibility and alternate feed to Warrenton.

Project ID and Name: 0010 - Rockingham-West End 230 kV East Line

Project Description
This project consists of constructing 38 miles of new 230 kV line between Rockingham and West End 230 kV Substations.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2011
Estimated Time to Complete	4.5 years
Estimated Cost	$33 M

Narrative Description of the Need for this Project
With a Harris unit down an outage of the Richmond-Cumberland 500 kV line will cause the existing Rockingham-West End 230 kV line to exceed its rating.

Transmission Solutions Considered
Rebuild, reconductor existing line.

Why this Project was Selected as the Preferred Solution
Cost and feasibility.

Project ID and Name: 0011 - Asheville-Enka 230 kV Line

Project Description
This project consists of constructing 11 miles of new 230 kV line between Asheville 230 kV and Enka 115 kV Substations and installing 1-230/115 kV transformer at Enka.

Status	Planned
Transmission Owner	Progress
Planned In-Service Date	12/1/2011
Estimated Time to Complete	5.0 years
Estimated Cost	$15 M

Narrative Description of the Need for this Project
With an Asheville unit down an outage of one 230/115 kV transformer at Asheville 230 kV will cause the remaining transformer to exceed its rating.

Transmission Solutions Considered
Install larger transformers.

Why this Project was Selected as the Preferred Solution
More effective solution.

Project ID and Name: 0012 - Buck-Asheboro 230 kV Line

Project Description
This project consists of constructing 40 miles of new 230 kV line between Duke's Buck Steam Plant and Progress' Asheboro 230 kV Substation.

Status	Planned
Transmission Owner	Progress & Duke
Planned In-Service Date	6/1/2014
Estimated Time to Complete	4.5 years
Estimated Cost	$40 M

Narrative Description of the Need for this Project
Address loadings on Progress' Badin-Tillery-Biscoe-Asheboro 115 kV corridor and Rockingham-Lilesville 230 kV Lines. Also delays Progress' need for Cape Fear-Siler City 230 kV line and Harris-Durham 230 kV line. Project is neutral to loadings issues on the Duke system. Net thermal loading impact appears to be neutral to the Duke system with no significant difference in overall cost to Duke. More comprehensive joint study to be conducted.

Transmission Solutions Considered
A new Badin-Asheboro East 115 kV line and other miscellaneous 115 kV reconductors.

Why this Project was Selected as the Preferred Solution
More effective solution to reliability issues and added benefit to transfer capability.

Project ID and Name: 0013 - Antioch 500/230 kV transformers

Project Description
The project consists of replacing the existing 840 MVA 500/230 kV transformers with 1680 MVA transformers.

Status	Planned
Transmission Owner	Duke
Planned In-Service Date	6/1/2014
Estimated Time to Complete	5.0 years
Estimated Cost	$30 M for replacement

Narrative Description of the Need for this Project
The Antioch banks will achieve 100% of their present rating (840 MVA) in the 2011-2014 timeframe. Loss of the parallel bank when there is a generation deficiency in Duke's northern region causes the highest loading. North to south transfers into the Duke control area increase bank loading and further decrease import capability.

Transmission Solutions Considered
Perform testing/analysis to eliminate the stray flux heating concern and allow re-rating of the banks closer to their original design. Based on outcome of testing/analysis, replace the banks with higher capacity banks, if necessary.

Why this Project was Selected as the Preferred Solution
The banks have an ~ 7% Outage Transfer Distribution Factor ("OTDF"). For each incremental increase in the rating by 7 MVA, there will be an increase in transfer capability of ~ 100 MW. Evaluation of the stray flux issue may lead to a significant delay in when replacement of the banks may be necessary.

Project ID and Name: 0014 - London Creek 230 kV Lines

Project Description
The project consists of reconductoring 20 miles of the existing 795 ACSR conductor with bundled 795 ACSR conductor.

Status	Planned
Transmission Owner	Duke
Planned In-Service Date	6/1/2015
Estimated Time to Complete	3.0 years
Estimated Cost	$25 M

Narrative Description of the Need for this Project
The London Creek Lines will achieve 100% of their conductor rating in the 2015-2016 timeframe. The lines are most heavily loaded when there is an Oconee unit outage for the loss of the parallel line. The line is sensitive to south to north transfers. Increased import from SOCO lowers loading on the London Creek lines and can delay the need for upgrade.

Transmission Solutions Considered
Bundle the line. Reactors.

Why this Project was Selected as the Preferred Solution
Duke does not routinely use reactors to redistribute flows on the system. Reactors would increase losses and cause increased flow on the underlying 100 kV system. Bundling of the line will alleviate the loading concern and reduce system losses.

Project ID and Name: 0015 - Harris-Durham 230 kV Line

Project Description
This project consists of some conversion of existing115 kV transmission and construction of new 230 kV transmission between Harris and Durham 230 kV Substations.

Status	Underway
Transmission Owner	Progress
Planned In-Service Date	6/1/2016
Estimated Time to Complete	4.5 years
Estimated Cost	$88 M

Narrative Description of the Need for this Project
With a Harris unit down an outage of the common tower Method-East Durham 230 kV line and Method-Durham 230 kV line causes the Cary Regency Park-Durham 230 kV line to exceed its rating.

Transmission Solutions Considered
Reconductor existing line.

Why this Project was Selected as the Preferred Solution
More effective solution to reliability and added benefit to transfer capability.

Project ID and Name: 0016 - Wake 500/230 kV Bank #3

Project Description
This project consists of installing a third 500/230 kV 1000MVA transformer bank at Wake 500 kV Substation.

Status	Planned
Transmission Owner	Progress
Planned In-Service Date	6/1/2016
Estimated Time to Complete	4.0 years
Estimated Cost	$21 M

Narrative Description of the Need for this Project
With a Harris unit down an outage of one of the existing two Wake 500/230 kV banks causes the remaining bank to exceed its rating.

Transmission Solutions Considered
Higher rated banks.

Why this Project was Selected as the Preferred Solution
Cost, feasibility and provides benefits to transfer capability.