



# North Carolina Transmission Planning Collaborative

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## 2007 NCTPC Study Scope Document

### Purpose of Study

The purpose of this study is to assess the Progress Energy Carolinas (“Progress”) and Duke Energy Carolinas (“Duke”) transmission systems’ reliability and develop a single collaborative transmission plan for North Carolina that ensures reliability of service in accordance with NERC, SERC, Progress and Duke requirements. In addition, the study will also assess enhanced access option scenarios provided by the Transmission Advisory Group (TAG) and approved for study by the Oversight Steering Committee (OSC). The Planning Working Group (PWG) will perform the technical analysis outlined in this study scope under the guidance and direction of the OSC.

### Overview of the Study Process Scope

The scope of the proposed study process will include the following steps:

#### 1. Assumptions

- Study assumptions selected

#### 2. Study Criteria

- Establish the criteria by which the study results will be measured

#### 3. Case Development

- Develop the models needed to perform the study
- Determine the different resource supply scenarios to evaluate

#### 4. Methodology

- Determine the methodologies that will be used to carry out the study

#### 5. Technical Analysis and Study Results

- Perform the study analysis (thermal, voltage, stability and short circuit) and produce the results

#### 6. Assessment and Problem Identification

- Evaluate the results to identify problems / issues

#### 7. Solution Development

- Identify potential solutions to the problems / issues



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- Test the effectiveness of the potential solutions through additional studies (thermal, voltage, stability and short circuit) and modify the solutions as necessary such that all reliability criteria are met
- Perform financial analysis and rough scheduling estimate for each of the proposed solutions (e.g., cost, cash flow, present value)

## **8. Selection of a Recommended Collaborative Transmission Plan**

- Compare alternatives and select the preferred solution alternatives – balancing cost / benefit / risk
- Select a preferred set of transmission improvements that provide a reliable transmission system to customers most cost effectively while prudently managing the associated risks

## **9. Report on the Study Results**

- Prepare a report on the recommended Collaborative Transmission Plan
- Include study results for the enhanced access scenarios, if applicable

Each of these study steps is described in more specific detail below.

## **Assumptions**

The specific assumptions selected for this study are:

- The years to be studied (study year) will be 2012 Summer and 2011/2012 Winter (winter as needed) for a near term reliability analysis and 2016 for a longer term reliability analysis.
- Each Load Serving Entity (LSE) will provide a list of resource supply assumptions and include the resource dispatch order for each of its Designated Network Resources in the Progress and Duke control areas. Generation will be dispatched for each LSE in the cases to meet that LSE's peak load in accordance with the designated dispatch order. LSEs will also include generation down scenarios for their resources, if applicable (e.g., generation outage with description of how generation will be replaced, such as by that LSE's dispatch orders).
- PSS/E and/or MUST will be used for the study.
- Load growth assumptions will be in accordance with each LSE's practice.
- Generation, interchange and other assumptions will be coordinated between Participants as needed.



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- For a variety of reasons (such as load growth, generation retirements, or power purchase agreements expiring), some LSEs may wish to evaluate other resource supply options to meet future load demand. In this case, the PWG will solicit input from the Participants for different scenarios on where to include other supply resources to meet their load demand forecasts in the study. These resource supply options can be either in the form of transactions or some “fictitious” generators which are added to meet the resource adequacy requirements for this study. The PWG will use the 2016 longer term reliability case to analyze the proposed interchange transactions and/or the location of the fictitious generators to determine if those transactions or generators create any reliability criteria violations. Based on this longer term reliability analysis, the PWG will provide feedback to the Participants on the viability of the proposed interchange transactions or fictitious generator locations for meeting future load requirements. The results of this analysis will be included in the 2007 Collaborative Plan Report.
- Enhanced access scenarios provided by the TAG and approved by the OSC will be incorporated into the study process in a similar manner as the Participants proposed resource supply option scenarios. The results of this analysis will be included in the 2007 Collaborative Plan Report for use by all stakeholders in developing resource supply plans for the future.

## Study Criteria

The study criteria with which results will be evaluated will be established, promoting consistency in the planning criteria used across the systems of the Participants, while recognizing differences between individual systems. The study criteria will include the following reliability elements:

- NERC Reliability Standards
- SERC requirements
- Individual company criteria (voltage, thermal, stability, short circuit and phase angle)

## Case Development

- The most current MMWG or VSTE model will be used for the systems external to Duke and Progress as a starting point for the Base Case to be used by both Progress and Duke in their analyses.
- The Base Case will include the detailed internal models for Progress and Duke and will include current transmission additions planned to be in-service for the given year (i.e. in-service by summer 2012 for 2012S cases and in-service by the winter for 2011/2012 for 2011/2012W cases as well as in-service by summer 2016 for 2016S cases).



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- An “All Firm Transmission” Case(s) will be developed which will include all confirmed long term firm transmission reservations with roll-over rights applicable to the study year.
- Duke and Progress will each create their respective generation down cases from the common Base Case and share the relevant cases with each other.
- Additional cases will be developed as required for different scenarios to evaluate other options to meet load demand forecasts in the study.
- Other additional cases will be developed as required and approved by the OSC to evaluate the enhanced access scenarios submitted by the TAG.

## Methodology

- Initially, power flow analyses will be performed based on the assumption that thermal limits will be the controlling limit for the reliability plan. Voltage, stability, short circuit and phase angle studies may be performed if circumstances warrant.
- Progress and Duke will exchange contingency and monitored element files so that each can test the impact of the other company’s contingencies on its transmission system.

## Technical Analysis and Study Results

The technical analysis will be performed in accordance with the study methodology. Results from the technical analysis will be reported throughout the study area to identify transmission elements approaching their limits such that all Participants are aware of potential issues and appropriate steps can be identified to correct these issues, including the potential of identifying previously undetected problems.

Progress and Duke will report results throughout the study area based on:

- Thermal loadings greater than 90%.
- Voltages less than 100% for 500 kV and less than 95% for 230 kV buses; pre- to post-contingency voltage drops of 5% or more; voltages outside of requirements at nuclear facilities.
- Post-contingency phase angle difference of Richmond-Newport 500 kV Line or other selected facilities.

## Assessment and Problem Identification

Duke and Progress will each run their own assessments. Duke reliability criteria will be used for Duke’s transmission facilities, and Progress reliability criteria will be used for Progress’s transmission facilities. Duke and Progress will each document the reliability problems resulting from their assessments.



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## **Solution Development**

- The PWG will develop potential solution alternatives to the identified reliability problems.
- Duke and Progress will test the solution alternatives using the same cases, methodologies, assumptions and criteria described above to test the effectiveness of the potential solutions.
- Duke and Progress will develop rough, planning level cost estimates and construction schedules for the solution alternatives.

## **Selection of a Recommended Collaborative Transmission Plan**

- The PWG will compare alternatives and select the preferred solution alternatives, balancing cost / benefit / risk.
- The PWG will select a preferred set of transmission improvements that provide a reliable and the most cost effective transmission solution to meet customers' needs while prudently managing the associated risks.

## **Report on the Study Results**

The PWG will compile all the study results and prepare a recommended collaborative plan for the OSC review and approval. The report would include a comprehensive summary of all the study activities as well as the recommended transmission improvements including estimates of costs and construction schedules. The report would include study results and information related to any enhanced access scenarios that were included as part of the 2007 study analysis.