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October 12, 2020

Ms. Lynn Jarvis
Chief Clerk
North Carolina Utilities Commission
430 N. Salisbury Street
Raleigh, NC 27603

***Re:*** ***NTE CAROLINAS II, LLC***
***Suppelemental Testimony of Michael C. Green, Exhibit 2***
***Docket No. EMP-92, SUB 0***

Dear Ms. Jarvis:

On behalf of NTE Carolinas II, LLC ("NTE"), we are herewith electronically submitting separately EXHIBIT 2, Feasibility Study Report, to the Supplemental Direct Testimony of Michael C. Green on behalf of NTE Carolinas II, LLC in Support of Motion to Renew CPCN and to Respond to Additional EMP Questions in Docket No. EMP-92, Sub 0.

If you have any questions or comments regarding this filing, please do not hesitate to call me. Thank you in advance for your assistance.

Very truly yours,

***/s/M. Gray Styers, Jr.***

Gray Styers

MGS:clj

Enclosure

cc: NC Public Staff
All parties of record

DUKE ENERGY. CAROLINAS

# Feasibility Study Report

**For:** NTE Energy ("Customer")

**Queue #:** 42432-01

**Service Location:** Rockingham County, NC

**Total Output:** 477 MW (summer) / 540 MW (winter)

**Commercial Operation Date:** 12/1/2020

**Prepared by:**
Orvane Piper, Duke Energy Carolinas

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**Date:** 6/22/2016

## 1.0 Introduction

Following are the results of the Generation Feasibility Study for the installation of 477 MW of generating capacity in Rockingham County, NC. This site is located near Ernest Switching Station and has an estimated Commercial Operation Date of 12/1/2020. This study includes Network Resource Interconnection Service (NRIS).

## 2.0 Study Assumptions and Methodology

The power flow cases used in the study were developed from the Duke Energy Carolinas (DEC) internal year 2020 winter peak and 2021 summer peak cases. The results of DEC's annual screening were used as a baseline to identify the impact of the new generation. All cases were modified to include 477 MW (540 MW in the winter) of additional generation at the Customer's facility. To determine the thermal impact on DEC's transmission system, the new generation was modeled as a new interconnection at Ernest Switching Station. The economic generation dispatch was also changed by adding the new generation and forcing it on prior to the dispatch of the remaining DEC Balancing Authority Area units. The study cases were re-dispatched, solved and saved for use. The impacts of changes in the Generator Interconnection Queue were not evaluated, because it was determined that no earlier queued generators would have a significant impact on the study results.

The NRIS thermal study uses the results of DEC Transmission Planning's annual internal screening as a baseline to determine the impact of new generation. The annual internal screening identifies violations of the Duke Energy Power Transmission System Planning Guidelines and this information is used to develop the transmission asset expansion plan. The annual screening provides branch loading for postulated transmission line or transformer contingencies under various generation dispatches. The thermal study results following the inclusion of the new generation were obtained by the same methods, and are therefore comparable to the annual screening. The results are compared to identify significant impacts to the DEC transmission system.

Short circuit analysis is performed by modeling the new generator and earlier queued generation ahead of the new generator in the interconnection queue. Any significant changes in short circuit current resulting from the new generator's installation are identified. Various faults are placed on the system and their impact versus equipment rating is evaluated.

Reactive Capability is evaluated by modeling a facility's generators and step-up transformers (GSUs) at various taps and system voltage conditions. The reactive capability of the facility can be affected by many factors including generator capability limits, excitation limits, and bus voltage limits. The evaluation determines whether sufficient reactive support will be available at the Connection Point.

## 3.0 Thermal Study Results

### 3.1 NRIS Evaluation

No earlier queued projects were deemed to have a material impact on the results of the study. The following network upgrades were identified as being attributable to the studied generating facility:

| Facility Name/Upgrade | Existing Size/Type | Proposed Size/Type | Mileage | Estimated Cost | Lead Time (months) |
|---|---|---|---|---|---|
| A. Interconnection Cost | [redacted] | | | $3.5 MM | 36 |
| B. Upgrade Jacobs 230 kV Lines (Belews Creek-Ernest) | 1272 ACSR | 1533 ACSS/TW | 13.71 | $30.4 MM | 42 |
| C. Add 3% Reactors on Sadler 230 kV Lines | N/A | 3% | N/A | $6 MM | 36 |
| D. Add 230/100 kV Transformer at North Greensboro | N/A | 448 MVA | N/A | $5.9 MM | 36 |
| NRIS CUSTOMER COST ESTIMATE (THERMAL) | | | | $45.8 MM | 42 |

## 4.0 Short Circuit Analysis Study Results

No earlier queued projects were deemed to have a material impact on the results of the study. The following breakers will need to be replaced:

1. At North Greensboro Tie the following eight 100 kV breakers: Dan River Bl & Wh, Graham Bl & Wh, Guilford Bl & Wh, Page Bl & Wh
2. At Belews Creek Steam Station the following ten 230 kV breakers: PCB 5, PCB 10, PCB 11, PCB 12, PCB 13, PCB 14, PCB 15, PCB 24, PCB 25, PCB 27

Total estimated cost for breaker replacements: $8.3 MM

**Date:** **6/22/2016**

## 5.0 Reactive Capability Study Results

With the proposed addition, the level of reactive support supplied by the units has been determined to be acceptable at this time. Evaluation of MVAR flow and voltages in the vicinity of Ernest Switching Station indicates adequate reactive support exists in the region. The recommended tap setting at the high side of the GSU is 241.5 kV.

Study completed by: _____
Orvane Piper, Duke Energy Carolinas

Reviewed by: _____
Edgar Bell, Duke Energy Carolinas
Director, Transmission Planning Carolinas

Date: 6/22/2016