Generator Interconnection Request

Feasibility Study Report

**For:** Strata Solar

Cooleemee Farm, LLC

**Service Location:** 157 Docks Way Mocksville, NC 27028

**Total Output:** 30 MW

**Commercial Operation Date:** 6/2/2014

 **In-Service Date (if given):** <In-Service Date>

**Prepared By:** Deloris Duckworth, PE **Date:12/5/2012**

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# Introduction

Following are the results of the Generation Feasibility Study for the installation of **an additonal 30 MW**  of generating capacity in **Davie County, North Carolina**. This site is located near **Mocksville Main** and has an estimated Commercial Operation Date of **6/2/2014**.

# Study Assumptions and Methodology

The power flow cases used in the study were developed from the Duke internal year **2014 summer peak case**. The results of Duke’s annual screening were used as a baseline to identify the impact of the new generation. All cases were modified to include **30 MW** of additional generation at **157 Docks Way Mocksville, North Carolina**. To determine the thermal impact on Duke’s transmission system, the new generation modeled with **tap point on 44 kV Cooleemee Retail Tap line, 5 miles down the line from Mocksville Main**. The economic generation dispatch was also changed by adding the new generation and forcing it on prior to the dispatch of the remaining Duke Balancing Authority Area units. The study cases were re-dispatched, solved and saved for use.

The NRIS thermal study uses the results of Duke Energy Power Delivery’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 Duke Energy transmission system.

Fault studies are performed by modeling the new generator and previously queued generation ahead of the new generator in the interconnection queue. Any significant changes in fault duty 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.

# Thermal Study Results

## NRIS Evaluation

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) |
| 1. **Cooleemee Retail Tap 44 kV Line**
 |  **2/0 Copper** | **556 ACSR**  | **5.0**  | **$5MM**  |  **5 months** |
| CUSTOMER TOTAL COST ESTIMATE  |   |   |   |  **$5MM** |  **5 months** |

# Fault Duty Study Results

The following breakers will need to be replaced:

1. **N/A, no breakers were found to have over duty concerns with 30 MW Cooleemee PV Generator.**

Total estimated cost for breaker replacements: **N/A**

# Reactive Capability Study Results

**The Generator interconnection request was modified to evaluate the SMA SC800CP inverter at 25 and 50 degree capability instead of the SMA SC750CP-US inverter . The larger inverter will further facilitate voltage and VAR support to transmission system. The XXXXXXXX 30 MW PV generator power factor range between 0.93 lag to 0.97 lead was evaluated for the peak summer and valley cases. The level of reactive support supplied by the generator has been determined to be acceptable at this time**. Evaluation of MVAR flow and voltages in the vicinity of **Mocksville Main** indicates adequate reactive support exists in the region.

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Study completed by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Deloris J. Duckworth, PE , Duke Energy**

Reviewed by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Ben Harrison , Duke Energy**

 **Director, Transmission Planning Carolinas**