

DISCUSSION OF ██████████ (“Customer”) GENERATION FEASIBILITY STUDY RESULTS FOR THE PROPOSED GENERATING FACILITY AT LEE STEAM STATION (100 KV CONNECTION). TOTAL SUMMER PEAK OUTPUT IS EXPECTED TO BE 932 MW

REPORT DATE: August 16, 2007

Following are the results of the Generation Feasibility Study for the installation of 932 MW Summer/101 MW Winter of generating capacity in Anderson County, SC. The site is located next to Lee Steam generating station and has an estimated Commercial Operation Date of June 1, 2010.

A. Study Assumptions and Methodology

The power flow cases used in the study were developed from the Duke internal year 2010 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 932 MW of additional generation at Lee Steam Station. To determine the thermal impact on Duke’s transmission system, the new generation was modeled with a single-circuit, direct connection to the 100 kV bus at Lee Steam Station. The economic generation dispatch was also changed by adding the new generation and forcing it on prior to the dispatch of the remaining Duke Control Area units. The study cases were re-dispatched, solved and saved for use.

The thermal study uses the results of Duke Power Delivery's annual internal screening as a baseline to determine the impact of the new generation. The annual internal screening identifies violations of the Duke 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 transmission system.

Fault studies are performed by modeling the new generator and previously queued generation ahead of Lee 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 (GSU’s) 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.

B. Thermal Study Results

The following upgrades were identified in the Feasibility Study as attributable to the Lee Facility:

Facility Name/ Upgrade	Existing Size/Type	Proposed Size/Type	Mileage	Estimated Cost
1. Lee 100 kV lines (Lee to Shady Grove)	477 ACSR	B477 ACSR	11.74	\$7.6M
2. Oakvale 100 kV lines (Oakvale to Shady Grove) rebuild	B477 ACSR	B954 ACSR	4.09	\$3.7M
3. Earl 100 KV lines (Shelby to Transco Tap) rebuild (needed by 2015)	B336 ACSR	B954 ACSR	5	\$4.5M
4. Norris 100 kV (Liberty Denim retail to Easley 4 tap) upgrade (needed by 2011)	477 ACSR	B477 ACSR	4.06	\$2.6M
5. Sevier 100 kV (Laurel Creek tap to Verdae tap)	477 ACSR	B477 ACSR	1.53	\$1M
6. Beulah 100 kV lines (Stamey to EU del 18)	795 ACSR	B795 ACSR	1.09	\$0.7M

7. Piedmont 100 kV (Lee to Shady Grove)	477 ACSR	B477 ACSR	12.66	\$8.2M
8. Bainbridge 100 kV (Shady Grove to Bainbridge) upgrade (needed by 2012)	477 ACSR	B477 ACSR	4.53	\$2.9M
9. Union 100 kV (Pebble Creek retail to Greer City D3) rebuild (needed by 2015)	2/0 Cu	556 ACSR	6.4	\$3.7M
10. Norris 100 kV (Greenlawn to Easley 4 tap)	477 ACSR	B477 ACSR	0.4	\$0.2M
11. Sevier 100 kV (Verdae tap to East Greenville) upgrade (needed by 2015)	477 ACSR	B477 ACSR	7.65	\$5M
12. Bainbridge 100 kV (Bainbridge to Greenville) upgrade (needed by 2014)	477 ACSR	B477 ACSR	4.13	\$2.7M
TOTAL COST ESTIMATE				\$42.8M

C. Fault Duty Study Results

- 1) Lee Steam - all twenty-three 100kV Breakers are overdutied
- 2) Tiger Tie – the 100 kV 50 ika Tiger Black & White breakers are OD @ 50.3 kA
- 3) Greenville Main - the 43 ika Bainbridge Black & White and 44 ika Greenville Black & White breakers are OD @ 44.5 & 45.8 kA respectively
- 4) The 25 ika Estes Tap breaker off the Piedmont line is OD at 26.6kA

Total estimated cost for 100 kV breaker replacements: \$3.6M (30 breakers)

D. Reactive Capability Study Results

With the proposed Lee 932 MW facility, 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 Lee indicates adequate reactive support exists in the region. Should future studies show the need for additional support, Duke Power integrated resource planning will evaluate solutions and make appropriate changes to the system.

Study completed by: _____

Laura Lee, P.E., Duke Energy

Reviewed by: _____

**Henry E. Ernst, Jr.,
Duke Energy – Director, Transmission Planning Carolinas**