DOCKET NO. 38577

PROCEEDING TO DETERMINE WHETHER TO MODIFY THE CREZ TRANSMISSION PLAN	**§ § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

ERCOT'S RE-EVALUATION OF THE NEED FOR THE KENDALL-TO-GILLESPIE CREZ TRANSMISSION LINE AND ANALYSIS OF ALTERNATIVE SOLUTIONS

COMES NOW, Electric Reliability Council of Texas, Inc. (ERCOT) and pursuant to the Public Utility Commission's (Commission) Order Including the Kendall-to-Gillespie Project,[1] files this report on the review of the need for the Kendall-to-Gillespie Competitive Renewable Energy Zone (CREZ) transmission circuit and analysis of alternative solutions to limit curtailment of wind energy.

ERCOT's report on the review of the need for the Kendall-to-Gillespie CREZ transmission circuit and analysis of alternative solutions is attached hereto as Attachment A.

Respectfully submitted,

By: _____

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[1] *See* Order Including the Kendall-to-Gillespie Project, Docket No. 38577 (October 5, 2010); *See also* Order No. 6 Adopting Procedural Schedule (October 5, 2010).

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CERTIFICATE OF SERVICE

I certify that a copy of this document was served on all parties of record in this proceeding on October 13, 2010 in the following manner: by facsimile, hand-delivery, electronically mailed, sent by overnight delivery, or United States first-class mail.

Lori Cobos

Lori Cobos

ERCOT Re-evaluation of the CREZ Kendall to Gillespie Circuit

October 13, 2010

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ERCOT Re-evaluation of the CREZ Kendall to Gillespie Circuit

1. Introduction

On August 26, 2010, the Chairman of the Public Utility Commission of Texas (Commission, PUCT) requested that ERCOT re-evaluate the need for the McCamey D (also known as Big Hill) to Kendall and Kendall to Gillespie transmission circuits included in Scenario 2 of the CREZ Transmission Optimization (CTO) Study filed by ERCOT in PUCT Docket No. 33672. ERCOT completed its review and provided a letter-response to the Commission on September 24, 2010. Following a review of the results of the analysis in ERCOT's letter-response, the Commission added the Kendall to Gillespie circuit to the scope of Docket No. 38577, Proceeding to Determine Whether to Modify the CREZ Transmission Plan, and requested that ERCOT provide a summary and brief discussion of the re-evaluation of the need for the Kendall to Gillespie circuit and the analysis of the alternative solutions needed to limit curtailment of wind energy.[1] This report provides the requested information, including the methodology and results of the analysis.

2. Methodology

Consistent with the analysis conducted to determine the continued need for the Gillespie to Newton circuit, this study assumed the incorporation of all transmission projects, both planned and completed, in the ERCOT transmission system. In addition, all transmission projects designated as part of the CREZ Transmission Plan (CTP) were included in the model representations of the ERCOT transmission system for this study, with the exception of the Gillespie to Newton circuit. Because ERCOT identified cost-effective alternatives to the Gillespie to Newton circuit in the CTP, these alternative projects were included in the model representations, rather than the Gillespie to Newton circuit.[2]

In the development of the CTP, transmission alternatives were considered to be acceptable if they provided sufficient transmission capacity such that no more than approximately 2% of the expected wind generation in a year was undeliverable, i.e., curtailed due to transmission constraints. The amount of wind generation curtailed is determined using a program that simulates future system operations through security-constrained unit commitment and economic dispatch of all generation in ERCOT to serve hourly system load. This model simulates the operation of the generation units in ERCOT in a manner consistent with market conditions while adhering to the limitations of the ERCOT transmission system and applicable North American Electric Reliability Corporation (NERC) and ERCOT reliability requirements. Units are committed and

[1] *See* Order Including Kendall-to-Gillespie Project, Docket No. 38577 (October 5, 2010).

[2] These alternative projects include:

- Reconductoring or reconstruction of the circuits from Killeen (bus 3423) to Killeen Elm (bus 3618), approximately 7 miles of circuits, to achieve a rate B of 400 MVA; and,
- Reconductoring or reconstruction of the circuits from Kendall (bus 7152) to Miller Creek (bus 7479), approximately 40 miles of circuits, to achieve a rate B of 440 MVA, and the circuits from Miller Creek (bus 7479) to Paleface (bus 7476), approximately 17 miles of circuits, to achieve a rate B of 220 MVA.

dispatched based on variable costs – i.e., startup costs, fuel costs, variable operations and maintenance costs, and emissions costs across all hours of the year. Representative wind patterns (developed through meteorological modeling of typical hourly wind patterns throughout Texas), average weather year load patterns (by weather zone) and generation unit efficiencies and operational constraints (such as minimum up times, minimum down times, startup costs, etc.) are inputs into this model, which is designed to determine the lowest-cost combination of generating units to serve load while maintaining transmission grid reliability. Wind generation, modeled as having $0 variable cost, is utilized by the model to the extent possible, given transmission and system operational limitations.

Even with no transmission constraints, approximately 0.5% of the available wind energy is curtailed by the system operations simulation model due to other operational constraints. As a result, transmission alternatives in the CTO Study were considered sufficient if the model results indicated no more than 2.5% of wind generation curtailment.

The continued need for the Kendall to Gillespie circuit, or an equally effective alternative set of projects, was determined by removing the Kendall to Gillespie circuit from the modeled transmission system and calculating the overall annual wind generation curtailment. With this circuit removed, wind generation curtailment increased by 1.73% (from 2.59% to 4.32%), a reduction of approximately 1,149 GWh of wind generation per year. As this increased level of wind generation curtailment did not meet the criteria established in the CTO Study, alternative projects were evaluated to determine if there existed cost-effective alternatives to the Kendall to Gillespie circuit.

Alternative solutions were submitted to ERCOT by various stakeholders through the Regional Planning Group (RPG) process, and additional options were developed by ERCOT staff. Proposed system upgrades were evaluated for effectiveness at reducing overall wind generation curtailment; planning-level cost estimates were developed for options that met the CTO Study criteria. Cost-effective solutions were evaluated for voltage violations using AC contingency analysis and for stability following transient events using dynamic stability databases developed as part of the CREZ Reactive Study conducted by ABB, Inc. (ABB). Without conducting dynamic analysis, it cannot be determined if an alternative that is significantly different from the original CTP represents an effective, stable solution. Through this analysis, the lowest-cost acceptable alternative to the Kendall to Gillespie circuit was identified and validated.

3. Alternatives

Potential alternative solutions evaluated as part of this study included conductor upgrades of existing transmission infrastructure and new 345-kV circuits. A transmission-line map of the study area is provided as Figure 1. Much of this analysis was informed by the results of the study of the need for the Gillespie to Newton circuit.

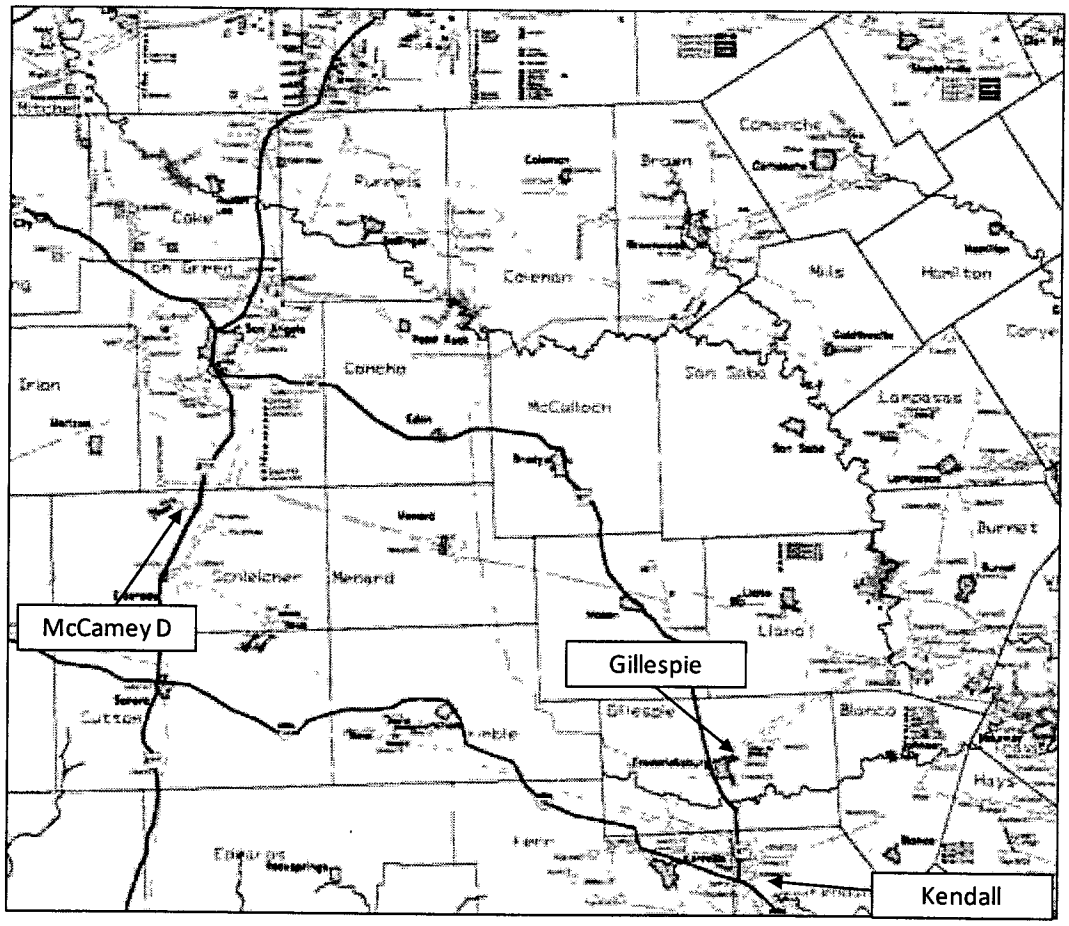

Figure 1: Transmission Map of the Study Area (Dashed red lines are CREZ circuits)

4. Results

The analysis conducted as part of the re-evaluation of the Gillespie to Newton circuit identified a potential cost-effective alternative to the Kendall to Gillespie circuit. Case 20 in the Gillespie to Newton analysis included the removal of the Gillespie to Newton and Kendall to Gillespie circuits, the addition of the 138-kV upgrades identified as a cost-effective alternative to the Gillespie to Newton circuit, and an additional 478-MVA 345-kV/138-kV autotransformer at the Kendall substation (connecting buses 7046 and 7152). Wind generation curtailment in this case was 2.58%. The additional autotransformer at Kendall is estimated to cost $8 million, compared to the estimated $54 million cost of the Kendall to Gillespie circuit in the CTO Study (which is the sum of the cost of the circuit from Kendall to Gillespie; a 345-kV substation at Gillespie; a 345-kV/138-kV autotransformer at Gillespie; and a shunt reactor at Gillespie). Further analysis indicates that two 800-MVA autotransformers at Kendall are equally effective to the three autotransformers initially modeled in the CTO Study (one 800 MVA and two 478 MVA autotransformers).

Following the completion of the Gillespie to Newton analysis, the transmission system was evaluated with these alternatives to the Kendall to Gillespie and Gillespie to Newton circuits for thermal overloads and voltage violations under 2015 peak load conditions using steady-state AC contingency analysis and for stability following transient events to ensure the reliability of the transmission system was maintained.

5. Stability Analysis

Stability analysis was performed on the case described in Section 4 (i.e., Case 20 from the Gillespie to Newton analysis). In this simulation, the Gillespie to Newton and Kendall to Gillespie circuits were removed from the modeled transmission system, and the 138-kV upgrades near the Killeen and Kendall substations and the additional autotransformer at the Kendall substation were added to the modeled transmission system. This analysis was conducted using transient stability cases provided by ABB as part of their work analyzing the reactive requirements for the CTP. The system response, following simulated 6-cycle three-phase faults, was analyzed for 12 significant contingencies located near the Kendall and Newton substations. Contingencies were selected based on the results of steady-state Power/Voltage analysis. Model results were considered acceptable if the overall system response was well-damped and voltages recovered to post-contingency levels before the end of a ten-second simulation period. Post-contingency voltage criteria vary by transmission service provider (TSP) but are typically around 0.9 pu. This analysis indicated that the system, as described above, was stable for the contingencies evaluated.

6. Conclusion

Based on the results of this study, ERCOT has found a cost-effective alternative to the Kendall to Gillespie circuit specified in the CTP. Analytical results based on planning information available at this time indicate that an additional autotransformer at the Kendall substation (connecting buses 7046 and 7152) will provide sufficient transmission capacity to allow the overall CTP to function in a manner that meets the criteria established as part of the CTO Study. The effectiveness of this alternative is contingent on the completion of the 138-kV upgrades identified in the previous ERCOT analysis of the Gillespie to Newton circuit, namely:

- Reconductoring or reconstruction of the circuits from Killeen (bus 3423) to Killeen Elm (bus 3618), approximately 7 miles of circuits, to achieve a rate B of 400 MVA; and,
- Reconductoring or reconstruction of the circuits from Kendall (bus 7152) to Miller Creek (bus 7479), approximately 40 miles of circuits, to achieve a rate B of 440 MVA, and the circuits from Miller Creek (bus 7479) to Paleface (bus 7476), approximately 17 miles of circuits, to achieve a rate B of 220 MVA..