



**Interconnection System Impact Study Report**

**Midwest ISO Project: G578**  
**Queue #: 38706-01**

**Shuteye Creek Wind Project**  
**Adair County, MO**  
**300 MW**

**Connecting to Ameren Facilities**  
**in the Associated Electric Cooperative Inc. Control Area**

**FINAL REPORT**

**08/07/2007**

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## **1 Executive Summary**

### **1.1 Steady State Analysis**

The Steady State Analysis identified one injection related constraint. The Thomas Hill – Moberly Tap 161 kV line is overloaded for multiple contingencies. This constraint must be mitigated prior to interconnection; a solution is provided by AECl at an estimated cost of \$10.9M.

### **1.2 Transient Stability Analysis**

The Transient Stability Analysis identified no constraints. However, the current Low Voltage Ride Through (LVRT) capability of the turbines is insufficient to stay online during various faults.

### **1.3 Short Circuit Analysis**

The Short Circuit Analysis identified no constraints.

### **1.4 Local Planning Criteria Analysis**

The Ameren Local Planning Criteria identified no constraints.

### **1.5 Deliverability Analysis**

The Deliverability Analysis found the G578 study generator to be 0 (zero) MW deliverable. This constraint occurs when monitoring Thomas Hill - Moberly Tap 161 kV for the loss of Thomas Hill - McCredie 345 kV. To fix this constraint and make G578 fully deliverable, a solution is provided by AECl at an estimated cost of \$10.9M.

### **1.6 Study Assumptions**

The results of this study are subject to change depending on the assumptions made in the study and status or outcome of higher queued generation interconnection requests which were included in the study. If these assumptions change, or if higher queued projects drop out of the queue, additional analysis may be required to determine if there are impacts on the study results.

## 2 Introduction

This report contains the System Impact Study (SIS) results for the Midwest ISO (MISO) Generation Interconnection Project G578 (Queue # 38706-01). Project G578 proposes the addition of 300 MW of wind generation to connect to the Adair Substation, in Adair County, Missouri, at 161 kV. The Adair Substation is owned by Ameren (AMRN) and located within the Associated Electric Cooperative Inc. (AECI) Control Area. The requested in-service date is October 1, 2007. The generation will be built in the southwest corner of Adair County, with a ten mile line going east to the Adair Substation, as shown in Figure 2.1 on the following page.

AMRN owns the 69 kV and 161 kV facilities at the Adair Substation as well as the 161 kV lines from Adair to Appanoose and from Adair to Thomas Hill. AECI owns the 161 kV line from Adair to Novelty. The 161 kV facilities at Adair and the lines to Novelty and Thomas Hill are located in the AECI Control Area. The line to Appanoose is located in the Alliant (ALTW) Control Area, while the 69 kV facilities at Adair are located in the AMRN Control Area.

The purpose of the study is to evaluate the impacts of the interconnection of the study generator when operating at 100% of their requested output on the transmission system. The generator is required to mitigate all injection, stability, and short circuit constraints for the Energy Resource Interconnection Service (ERIS). ERIS allows the generator to deliver its output using existing firm or non-firm capacity of the transmission system on an as-available basis. Additionally, all constraints identified in the Local Planning Criteria and Deliverability Analyses need to be mitigated for the Network Resource Interconnection Service (NRIS).

An Ad Hoc Study Group was formed from the representatives of the affected Transmission Owners and Transmission Providers in the area: AECI, ALTW, AMRN, and MEC. The group reviewed and approved the models, assumptions, and results.