PJM Generator Interconnection
U2-031 Kings Fork 34.5 kV
30 MW Capacity
Combined Feasibility & System Impact Study

May 2009
DMS #529362v1

Introduction

This Feasibility Study has been prepared in accordance with the PJM Open Access Transmission Tariff, §36.2, as well as the Feasibility Study Agreement between Interconnection Customer (IC) and PJM Interconnection, LLC (PJM) (Transmission Provider).

Preface

The intent of a combined Feasibility and System Impact Study is to determine a plan, with preliminary cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing Local and Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM and underlying system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications for the appropriate transmission owner.

The Feasibility and System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

General

Interconnection Customer (IC), has requested study of a 30 MW interconnection for its proposed Suffolk County, VA, CIBA Chemical facility onto Dominion Virginia Power's, the Interconnected Transmission Owner (ITO), 34.5 kV Distribution System. The requested site is located approximately ½ mile from ITO's existing 34.5 kV Kings Fork Substation Circuit 474 source near 2301 Wilroy Rd.

Potential PJM Network Impacts

PJM studied U2-031 as a 30 MW injection into the Kings Fork 34.5 kV substation in the Dominion area. The results are predicated on a 2013 system model.

Generator Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None.

Multiple Facility Contingency

(Double Circuit Tower Line contingencies only for the full energy output. Stuck breaker and bus fault contingencies will be performed for the Impact Study)

None.

Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

None.

Short Circuit

There is no impact to breaker interrupting capabilities as a result of U2-031. These results are subject to change due to changing system conditions.

System Stability Analysis

To be completed as part of the Facilities Study.

DOMINION STUDY RESULTS

Interconnection Requirements

The following provides ITO estimated cost and schedule for the Non-Direct and Direct Connection Local Upgrades and the Attachment Facilities:

Non – Direct Connection Local Upgrades

(Upgrades required to mitigate reliability criteria violations, i.e. "Network Impacts", initially caused by the addition of this project generation)

The following modifications are required to ITO's distribution system to accommodate 30 MW of generation capacity injected into ITO's existing 3-phase 34.5 kV Circuit 474 from Kings Fork Substation in the vicinity of 2301 Wilroy Rd.:

1) Replacement of 32 existing poles with taller poles on cir. 342 to accommodate new cir. 474;
2) Transfer approximately 10,000 feet of 1/0 al overhead conductor and associated hardware to the new poles; and
3) Replace four single phase transformers and three three-phase transformers.

Contribution to Previously Identified System Reinforcements

(Overloads initially caused by prior Queue positions with additional contribution to overloading by this project. This project may have a % allocation cost responsibility which will be calculated and reported for the Impact Study)

None.

Direct Connection Local Upgrades

1. Three-phase load break switch on Circuit 474.
2. Approximately 10,000 feet of three-phase overhead 477 Al conductor.

The estimated cost for Network Upgrades (Direct and Non-Direct) is $650,000.

Attachment Facilities

ITO will construct the following facilities to attach the generators to the Dominion system:

1. Electronic recloser (474RTBD) with transfer trip capability.
2. Overhead line tension disconnects.
3. Pole mounted bi-directional metering.
4. Transfer trip equipment on Kings Fork substation breaker 474, on existing reclosure 474R61 and new reclosure 474RTBD.

The estimated cost for the installation of new facilities to provide the interconnection is $150,000.

IC will be required to install the following:

In addition to ITO facilities indicated above, to provide a transfer trip circuit protection scheme, IC will be responsible for providing and maintaining communication lines between IC main generator breaker and ITO two (2) up line reclosers, and between IC's main generator breaker and ITO's Kings Fork Substation. During the combined Feasibility and System Impact Study, ITO determined that additional engineering is required for the transfer trip scheme and recommends that a Facilities Study be performed.

IC will also be responsible for providing and maintaining telephone lines to ITO metering equipment at the Point of Interconnection. IC provided 34.5 kV 3-phase circuit will interconnect overhead at the Point of Interconnection which will be the load side terminals of ITO provided pole mounted bi-directional meter. It will be IC responsibility to obtain any required right-of-way between ITO existing facilities and the Point of Interconnection.

Engineering & Construction Schedule

The estimated time for engineering, material acquisition and construction of this interconnection is approximately three months. Detailed engineering, costs, material lead times and construction time requirements will be determined as part of the Facility Study.

Figure 1

PJM QUEUE U2-31
GPC Green Energy, LLC
Diagram of Interconnection Facilities