PJM Generator Interconnection

Y2-076 Clover 230 kV

13.7 MW Capacity &

4 MW Maximum Facility Output Increase

Combined

Feasibility & System Impact Study Report

February 2013
DMS #740798v1A

Introduction

This Combined Feasibility & System Impact Study has been prepared in accordance with the PJM Open Access Transmission Tariff, §110, as well as the Feasibility Study Agreement between Interconnection Customer, (IC), Virginia Electric and Power Company, and PJM Interconnection, LLC (PJM), Transmission Provider (TP). The Interconnected Transmission Owner (ITO) is Virginia Electric and Power Company.

Preface

The intent of this combined 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 IC. As a requirement for interconnection, IC may be responsible for the cost of constructing Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM and the underlying system. All facilities required for interconnection of a generation interconnection project must be designed to meet ITO technical specifications.

General

The queue project Y2-076 was studied as a 13.7 MW Capacity and 4 MW Energy increase injection at the Clover 230 kV substation in the ITO area. Project Y2-076 was evaluated for compliance with reliability criteria for summer peak conditions in 2016. Potential network impacts were as follows:

Network Impacts (Primary Option):

Impactful Contingencies

(The following contingencies resulted in overloads identified below)

None identified.

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 with full energy output. Stuck Breaker and Bus Fault contingencies will be applied during the Impact Study)

None.

Contribution to Previously Identified Overloads

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

None.

Short Circuit

(Report Overdutied breakers here)

No changes to previously studied facilities; not required.

Steady-State Voltage Requirements

(Results of the steady-state voltage studies should be inserted here)

Not required; existing unit already evaluated.

Stability and Reactive Power Requirement

(Results of the dynamic studies should be inserted here)

PJM and ITO determined prior stability studies remain valid.

ITO Analysis

ITO assessed the impact of the proposed queue Y2-076 interconnection as a Capacity 13.7 MW injection into the ITO Transmission System. The system was assessed using the summer 2016 RTEP case provided to ITO by PJM, where the proposed generation capacity was injected on the 230kV transmission bus at Clover Substation.

This analysis did include the impacts of the generation capability for all higher order queue generators within the ITO Transmission System. When performing a generation analysis, ITO's main analysis will be load flow study results under single contingency, both normal and stressed system conditions, and import and export system conditions. ITO criteria consider a transmission facility overloaded if it exceeds 94% of its emergency rating under normal and stressed system conditions. For import and export studies ITO criteria consider a transmission facility overloaded if it exceeded 100% of its emergency rating. A full listing of ITO's planning criteria and interconnection requirements can be found in the ITO "Facility Connection Requirements," which are publicly available at: http://www.dom.com.

The results of these studies evaluate the system under a limited set of operating conditions and do not guarantee the full delivery of the capacity and associated energy of this proposed generation facility under all operating conditions. NERC

planning and operating reliability criteria allow for the re-dispatch of generating units to resolve projected and actual deficiencies in real time and planning studies. Specifically NERC Category C contingency conditions: bus fault, tower line, n-1-1, and stuck breaker scenarios, allow for re-dispatch of generating units to resolve potential reliability deficiencies. For ITO planning criteria the re-dispatch of generating units for these contingency conditions is allowed as long as the projected loading does not exceed 100% of a facility load dump rating.

As part of its generation impact analysis ITO routinely evaluates the impact that a proposed new generation resource will have under maximum generation conditions, stress system conditions and import and export system conditions. The results of these studies are discussed in more detail below.

1. The first being when local generation including the proposed Y2-076 Facility is operated at their maximum capability. The result of this study is shown below.

   No Problems Identified.

2. The second being a stressed system condition where the largest generator in the area is unavailable. With the Y2-076 generator geographically located in southern Virginia, Yorktown Unit #3 is considered the most critical generating unit in the area. The impact of Y2-076 was studied with the outage of Yorktown Unit #3. The result of this study is shown below.

   No Problems Identified.

3. The third being import and export conditions into and out of the ITO System. Any new facility that is interconnected with the ITO System should not significantly decrement first contingency incremental transfer capability between utilities. The results of these studies can be found in Tables A and B.

Table A: Import Study Results			
Area	**Summer 2016**	**Summer 2016 with Y2-076**	**Limiting Element**
AEP	2000+	2000+	None
APS	2000+	2000+	None
CPL	2000+	2000+	None
PJM	2000+	2000+	None

Table B: Export Study Results			
Area	**Summer 2016**	**Summer 2016 with Y2-076**	**Limiting Element**
AEP	2000+	2000+	None
APS	2000+	2000+	None
CPL	2000+	2000+	None
PJM	2000+	2000+	None

ITO's planning criteria indicate a need to have approximately 2000 MW of import and export capability. The results of these import and export studies are indicate that the proposed generation facility upgrade will not negatively impact ITO's import or export capability.

Attachment Facilities

Existing facilities are sufficient.

Direct Connection Network Upgrades

Existing facilities are sufficient.