# PJM Generator Interconnection

# W1-025 Mt Storm – Valley 500 kV

# Merchant Transmission SVC Project

# Feasibility Study Report

*July 2010*
*DMS #602534v1*

## 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 (TP). The Interconnected Transmission Owner (ITO) is Virginia Electric and Power Company.

## Preface

The intent of this Feasibility 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.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. IC is responsible for its right of way, real estate, and construction permit issues.

## General

Queue W1-025 is a request to interconnect a 500 kV level SVC with the Mount Storm–Valley 500 kV Line which is owned by Dominion. The requested in-service year is 2013, however the revised in-service date based on necessary permitting, attachment facility and direct connection network upgrade construction, is estimated 36 months from execution of the Interconnection Service Agreement and Interconnection Construction Service Agreement.

## Feasibility Study Summary

| Project Description | Total Cost |
|---|---|
| Attachment Facility Cost | $2,000,000 |
| Network Upgrades | $10,000,000 |
| Project Totals | $12,000,000 |

## Potential PJM Network Impacts

Queue project W1-025 was studied as a 500 MVAR dynamic reactive device (Static VAR Compensator) attaching to ITO's portion of the Mount Storm – Valley 500 kV transmission line. Project W1-025 was evaluated for compliance with reliability criteria for summer peak conditions in 2014.

Potential network impacts were as follows:

***Generator Deliverability***

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

No problems identified.

***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)*

No problems identified.

***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***

None identified.

***System Stability Analysis***

Dynamic studies are part of the System Impact Study.

**ITO Requirements**

***Attachment Facilities***

Attachment facilities include one feed from the Dominion switching station to the customer's collector station. Since the customer's arrangement is unknown at this time, the estimate for the facility study includes an overhead line estimated at 1000' from Dominion's switching station with one intermediate structure and a 500kV backbone structure at the collector station. In the switching station, the attachment line will terminate on the backside of a line backbone structure. This structure is covered under the network upgrades. Once the customer's plant layout is determined, this can be reevaluated to better determine the most cost effective attachment arrangement.

These facilities are estimated to cost $2,000,000 and take 24-36 months to construct. This construction estimate is based on the developer providing the ITO with a graded site. This estimated construction time will need to be taken into account when the developer is considering their back-feed date.

***Customer Attachment Facilities***

The Interconnection Customer will interconnect W1-025 with the PJM system by constructing a customer owned 500 kV circuit from their

facility to the future 500 kV switching station shown in Figure A. The customer is responsible for all Attachment Facilities on the Interconnection Customer side of the Point of Interconnection. ITO Attachment Facility cost estimates do not include construction of that line or bus work. Route selection, line design, right-of-way acquisition and construction of such lines will be entirely the responsibility of the Interconnection Customer. It is assumed that a fiber optic interface will be used for the protection channel between the Dominion, AP and IC station. The IC will be required to install required metering and telemetry equipment to provide revenue metering and real-time telemetry data to PJM. The requirements for this equipment are listed in Appendix 2, Section 8 of Attachment O to the PJM Tariff, as well as PJM Manuals 01 and 14D. Protective relaying and metering design and installation must comply with the Dominion and Allegheny Power Applicable Standards.

***Direct Connection Network Upgrades Required***

The cost and scope for the direct connection network upgrades includes cutting the 550 line between Mount Storm and Valley Substation and turning it into a newly constructed 500 kV switching station with a three breaker ring. Since the arrangement and exact location of the collector station is not known, an assumption had been made that property for the switching station will need to be acquired and graded and these costs are included. Once the customer's plant layout is determined, this can be reevaluated to better determine the most cost effective attachment arrangement. The current estimate is $9,500,000 and will take 36 months to complete.

***Non-Direct Connection Network Upgrades***

These costs include the necessary programs to interface the proposed SVC with Dominion's and PJM's Energy Management Systems. This is estimated to cost $500,000 dollars and will be coordinated with the completion of the project.

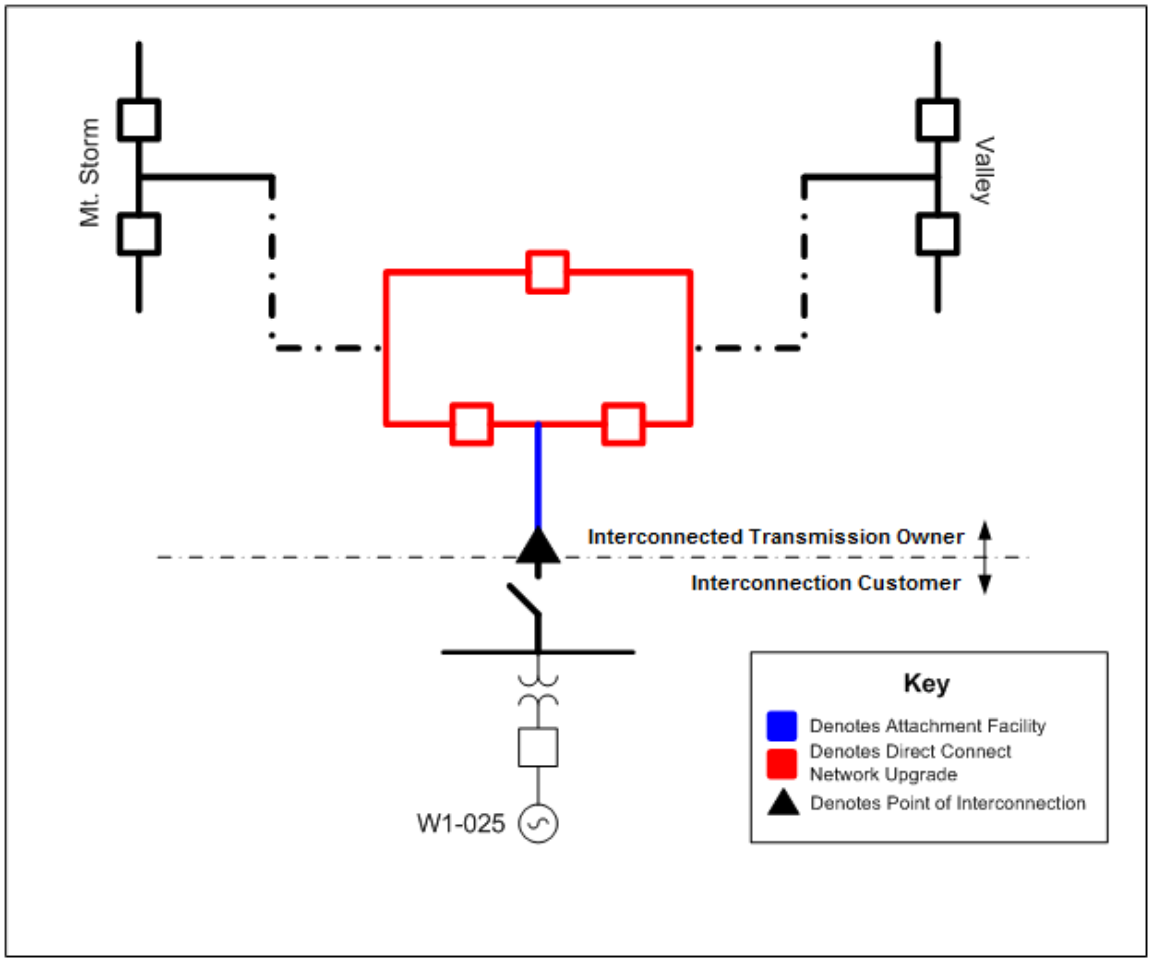


**Figure A: W1-025 Layout**