PJM Generator Interconnection

X4-007 Kelson Ridge 230 kV

0 MW Capacity / 60 MW Energy

Combined Feasibility & System Impact Study Report

May 2012
DMS #696861v2

Introduction

This Combined Feasibility & System Impact 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 Potomac Electric 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.

The combined 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

The queue project X4-007 was studied as a 60 MW (Capacity 0 MW) injection in to the ITO area; this is an increase to previously submitted project W4-044. Project X4-007 was evaluated for compliance with reliability criteria for summer peak conditions in 2015. Potential network impacts were as follows:

Primary Option

Network Impacts:

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

None.

Short Circuit

(Report Overdutied breakers here)

No new problems identified.

Primary Option Upgrades:

Attachment Facilities:

No new Attachment Facilities are required beyond those previously identified.

Direct Connection Network Upgrades:

No new Direct Connection Facilities are required beyond those previously identified.

PJM Generator Interconnection

X4-007 Kelson Ridge 230 kV

0 MW Capacity / 60 MW Energy

Feasibility Study Report

April 2012
DMS #696861v1

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 Potomac Electric Power Company.

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General

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Primary Option

The following contingencies resulted in overloads for the primary option:

Option 1 Impactful Contingencies	
Contingency Name	**File Description**
7PEPCO_A	CONTINGENCY '7PEPCO_A' /* BOWIE045 TO OAKGV23 DISCONNECT BRANCH FROM BUS 223978 TO BUS 223961 CKT 1 /* OAKGV05 TO CHALK230 DISCONNECT BRANCH FROM BUS 223982 TO BUS 223978 CKT 1 DISCONNECT BRANCH FROM BUS 224061 TO BUS 223980 CKT 1 DISCONNECT BRANCH FROM BUS 292454 TO BUS 224061 CKT 1 /BUS 223983 -> 292454 END
5PEPCO	CONTINGENCY '5PEPCO' /* CHALK230 TO BOWIE044 DISCONNECT BRANCH FROM BUS 223983 TO BUS 224600 CKT 1 /* OAKGV230 TO AQUASCO1 DISCONNECT BRANCH FROM BUS 224600 TO BUS 224060 CKT 1 /* AQUASCO1 TO BOWIE044. FEB. 17, 2009. DISCONNECT BRANCH FROM BUS 224060 TO BUS 223979 CKT 1 DISCONNECT BRANCH FROM BUS 223982 TO BUS 223977 CKT 1 DISCONNECT BRANCH FROM BUS 223977 TO BUS 223962 CKT 1 END
10PEPCO_S17	CONTINGENCY '10PEPCO_S17' DISCONNECT BRANCH FROM BUS 223988 TO BUS 223990 CKT 1 / MORGNTW230 – TALB068 DISCONNECT BRANCH FROM BUS 223990 TO BUS 223982 CKT 1 / TALB068 – OAKGV230 DISCONNECT BRANCH FROM BUS 223992 TO BUS 224078 CKT 1 / HAWK 076 230 - HAWK 69 DISCONNECT BRANCH FROM BUS 223990 TO BUS 290891 CKT 1 / TALB068 – S17TAP81230 DISCONNECT BRANCH FROM BUS 223988 TO BUS 223992 CKT 1 / MORGT230 – HAWK076 END

Network Impacts:

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.)

X4-007 Opt. 1 ###	Contingency		Affected Area	Facility Description	Bus		Circuit	Analyses Type	Loading		Rating		MW Contribution
	Type	Name			To	From			Before	After	Type	MVA	
001	DCTL	7PEPCO_A	PHI	BOWIE042-BURT2334 230 kV line	223977	223962	1	DC	106.55	107.73	NR	730	8.59
002	DCTL	7PEPCO_A	PHI	OAKGV230-BOWIE042 230 kV line	223982	223977	1	DC	106.79	107.96	NR	730	8.59
003	DCTL	5PEPCO	PHI	BOWIE045-BURT2314 230 kV line	223978	223961	1	DC	107.57	108.75	NR	730	8.64
004	DCTL	5PEPCO	PHI	OAKGV230-BOWIE045 230 kV line	223982	223978	1	DC	107.68	108.86	NR	730	8.64
005	DCTL	10PEPCO_S17	PHI	V3-017 TAP-TALB 066 230 kV line	894610	224125	1	DC	117.79	120.91	NR	680	21.24
006	DCTL	10PEPCO_S17	PHI	TALB 066-OAKGV230 230 kV line	224125	223982	1	DC	160.39	164.65	NR	680	29.00

001 Bowie – Burtonsville 230 kV circuit (23042) is approximately 8 miles. Currently this circuit is an ACSR conductor, which is rated at 730 MVA SE. Upgrading this circuit will require replacing the existing conductor to an ACCR conductor, which will be rated at 3000 amps or 1200 MVA SE. The approximate cost is $8,000,000. Estimated construction time is two years.

002 Oak Grove – Bowie 230 kV circuit (23042) is approximately 12 miles. Currently this circuit is an ACSR conductor, which is rated at 730 MVA SE. Upgrading this circuit will require replacing the existing conductor to an ACCR conductor, which will be rated at 3000 amps or 1200 MVA SE. The approximate cost is $12,000,000. Estimated construction time is two years.

003 Bowie – Burtonsville 230 kV circuit (23045) is approximately 8 miles. Currently this circuit is an ACSR conductor, which is rated at 730 MVA SE. Upgrading this circuit will require replacing the existing conductor to an ACCR conductor, which will be rated at 3000 amps or 1200 MVA SE. The approximate cost is $8,000,000. Estimated construction time is two years.

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005 & 006 V3-017Tap-Talbert-OakGrove and X2-030 TAP-Hawkins Gate 077 230 kV line: Preliminary cost to upgrade approximately 10 miles of the line is $14M. Two years of engineering and construction. Both circuits on the same tower are required to be upgraded.

Delivery of Energy Portion of Interconnection Request

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.
Only the most severely overloaded conditions are listed. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed, which will study all overload conditions associated with the overloaded element(s) identified.

X4-007 Opt. 1 ###	Contingency		Affected Area	Facility Description	Bus		Circuit	Analyses Type	Loading		Rating		MW Contribution
	Type	Name			To	From			Before	After	Type	MVA	
001	Non	Non	PHI	V3-017 TAP-TALB 068 230 kV line	894600	223990	1	DC	100.49	104	NR	608	21.38
002	N-1	PP54_V3-017A	PHI	TALB 068-OAKGV230 230 kV line	223990	223982	1	DC	118.18	119.43	NR	691	8.69
003	Non	Non	PHI	TALB 066-OAKGV230 230 kV line	224125	223982	1	DC	125.8	128.44	NR	559	14.76
004	N-1	PP54_V3-017A	PHI	V3-017 TAP-TALB 068 230 kV line	894600	223990	1	DC	138.51	142.74	NR	691	29.27

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CONTINGENCY 'PP54_V3-017A'
  OPEN BRANCH FROM BUS 223982 TO BUS 224125 CKT 1              / 223982 OAKGV230 230 224125 TALB 066 230 1
  OPEN BRANCH FROM BUS 223992 TO BUS 894610 CKT 1              / 223992 HAWK 076 230 224125 TALB 066 230 1
  OPEN BRANCH FROM BUS 223992 TO BUS 224078 CKT 1              / 223992 HAWK 076 230 224078 HAWK 69 69.0 1
  END
```

Short Circuit

(Report Overdutied breakers here)

None.

Primary Option Upgrades:

Attachment Facilities:

No new Attachment Facilities are required beyond those previously identified.

Direct Connection Network Upgrades:

No new Direct Connection Facilities are required beyond those previously identified.