

PJM Generator Interconnection
U2-081 Chalk Point 230-kV
600 MW Capacity
Feasibility Study

October 2008
DMS #509958v1

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 the 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 the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer 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 system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications for the appropriate transmission owner.

In some instances an interconnection customer may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection or merchant transmission upgrade, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

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. 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.

Potential Network Impacts

PJM Queue Project U2-081 was studied as a 600MW Capacity injection at Chalk Point 230 kV substation in the PEPCO area (Figure 1 or Figure 2). Project U2-081 was evaluated for compliance with reliability criteria for summer peak conditions in 2012. Potential network impacts were as follows:

Generator Deliverability

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

1. **(PEPCO/PEPCO)** The CHALK230-OAKGV230 230kV line loads from 88.6% to 100.6% (DC power flow) of its normal rating (559MVA) for non-contingency condition. This project contributes approximately 67.2MW to cause this thermal violation.
2. **(PEPCO/PEPCO)** The CHALK230-OAKGV230 230kV line loads from 88.6% to 100.6% (DC power flow) of its normal rating (559MVA) for non-

contingency condition. This project contributes approximately 67.2MW to cause this thermal violation.

3. **(PEPCO/PEPCO)** The CHALK230-OAKGV230 230kV line loads from 100.10% to 111.54% (DC power flow) of its emergency rating (680MVA) for the single line contingency outage (PJM1D). This project contributes approximately 77.8MW to the thermal violation.
4. **(PEPCO/PEPCO)** The CHALK230-OAKGV230 230kV line loads from 100.10% to 111.54% (DC power flow) of its emergency rating (680MVA) for the single line contingency outage (PJM1D). This project contributes approximately 77.8MW to the thermal violation.

Multiple Facility Contingency

(Double Circuit Tower Line, Line with Failed Breaker and Bus Fault contingencies for the full energy output)

5. **(PEPCO/PEPCO)** The OAKGV054-BOWIE044 230kV line loads from 96.85% to 107.09% (DC power flow) of its emergency rating (730MVA) for the tower line outage (7PEPCO_WITH_T133A). This project contributes approximately 74.8MW to cause this thermal violation.
6. **(PEPCO/PEPCO)** The OAKGV053-BOWIE043 230kV line loads from 96.68% to 106.91% (DC power flow) of its emergency rating (730MVA) for the tower line outage (5PEPCO_WITH_T133A). This project contributes approximately 74.7MW to cause this thermal violation.
7. **(PEPCO/PEPCO)** The OAKGV230-BOWIE045 230kV line loads from 97.83% to 105.64% (DC power flow) of its emergency rating (730MVA) for the tower line outage (5PEPCO_WITH_T133B). This project contributes approximately 57.0MW to cause this thermal violation.
8. **(PEPCO/PEPCO)** The BOWIE045-BURT2314 230kV line loads from 97.73% to 105.54% (DC power flow) of its emergency rating (730MVA) for the tower line outage (5PEPCO_WITH_T133B). This project contributes approximately 57.0MW to cause this thermal violation.
9. **(PEPCO/PEPCO)** The BOWIE042-BURT2334 230kV line loads from 97.64% to 105.47% (DC power flow) of its emergency rating (730MVA) for the tower line outage (7PEPCO_WITH_T133B). This project contributes approximately 57.1MW to cause this thermal violation.

Short Circuit

(Summary form of Cost allocation for breakers will be inserted here if any)

The following table shows the percentage overduty contribution from U2-081 at each affected substation. The percentage increase at Oak Grove is below the PJM threshold of 3%.

Project	Chalk Point	Oak Grove	Morgantown
Pre-Project	106.0%	110.7%	99.5%
U2-081	+20.0%	+2.3%	+1.3%

10. This project causes overduty conditions on the Morgantown Substation F 230kV breakers (16).
11. This project contributes significantly to the existing overduty condition on the 230kV breakers at Chalk Point Substation E (23).

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.

New System Reinforcements

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

1. Upgrade two Chalk Point - Bowie 230kV circuits with ACCR feeder wire at approximately \$47M (\$23.5M per circuit; 33.5 miles). Construction time period approximately 2 years.
2. Same as 1.
3. Upgrade two Chalk Point – Oak Grove 230kV circuits with ACCR feeder wire at approximately \$30M (\$15M per circuit, 22 miles). Construction time period approximately 2 years
4. Same as 3.
5. Upgrade three Oak Grove - Bowie 230kV circuits using ACCR conductor: \$24M (\$8M for each circuit, approximately 11.5 miles); estimated time to construct is approximately 2 years.
6. Same as 5.
7. Same as 5.

8. Upgrade two Bowie - Burtonsville 230kV circuits using ACCR conductor: \$16M (\$8M for each circuit, approximately 11 miles); estimated time to construct is approximately 2 years.
9. Same as 8.
10. Replace (16) 230kV breakers at the Morgantown 230kV substation with 63 ka breakers for a cost of approximately \$24M. Please note that this cost does not include changes to the bus structures, insulators, disconnect switches and ground grid that maybe required from replacing the 50 ka breakers to 63 ka breakers. In conjunction with the breakers at Chalk Point (11 below), this will take 4-5 years to be completed.

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)
(Summary form of Cost allocation for transmission lines and transformers will be inserted here if any)*

Short circuit analysis indicates that U2-081 contributes to the overduty of a total of twenty-three PEPCO 230 kV breakers:

11. Twenty-three (23) breakers at Chalk Point 230 kV substation are overdutied and will require replacement by 80 kA breakers (Network Upgrade numbers n0772 to n0794). Four of the 230 kV breakers at Chalk Point are owned by Mirant. The cost to replace each of the 23 breakers at Chalk Point (Network Upgrade numbers n0772 to n0794) to 80 ka breakers is \$2.0 million. The total cost the breakers is \$46,000,000.

With Pepco's present capabilities, Pepco estimates the number of breakers that can be changed out in one year is approximately eight. (Work in Spring and Fall only), therefore the replacement of 36 breakers will take approximately 4-5 years.

Figure 1

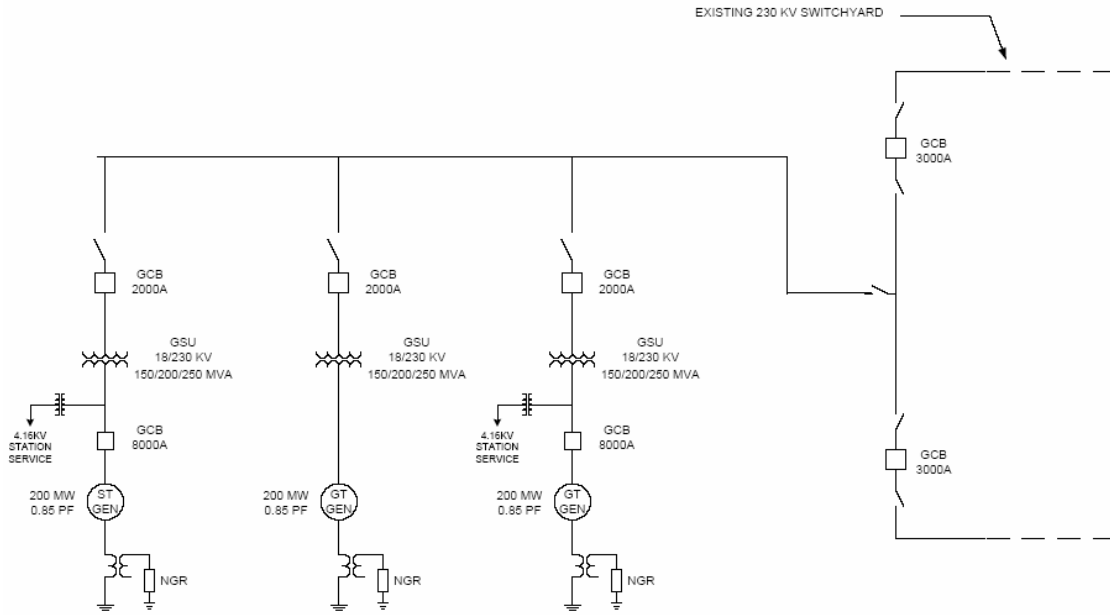


Figure2

