

Cromby Units 1 and 2 and Eddystone Units 1 and 2

Deactivation Study

Original Posting Date: March 2, 2010

Updated May 10, 2010

Updated June 7, 2010

General

PJM received notice from Exelon Generation Company LLC (“Exelon”) of its intent to deactivate through retirement Units 1 and 2 at the Cromby Generating Station and Units 1 and 2 at the Eddystone Generating Station, effective May 31, 2011. Cromby Unit 1 has a net capacity of 144 MW, Cromby Unit 2 201 MW, Eddystone Unit 1 279 MW, and Eddystone Unit 2 309 MW.

PECO has provided updated expected completion dates for certain upgrades. This has affected the projected deactivation date for Cromby Unit 2 and Eddystone Unit 2. (May 10, 2010 update.)

After completing the engineering review of Eddystone circuit breakers #35 and #45, it has been determined by Exelon Generation and PJM that these circuit breakers were previously upgraded and their current short circuit ratings meet the required PJM planning criteria. Thus circuit breakers #35 and #45 have been removed from the list of required upgrades. (June 7, 2010 update.)

Reliability Analysis Results

PJM Transmission Planning and PECO performed an analysis of the 2011 transmission system with Cromby Unit 1 and Unit 2 and Eddystone Unit 1 and Unit 2 unavailable. Multiple reliability impacts were identified with all four units deactivated, including N-1-1 Thermal Violations, Generation Deliverability Violations, Common Mode N-1 Contingency Thermal Study Violations, Common Mode N-1 Contingency Voltage Study Violations, CETO Voltage Study Violations, N-1-1 Voltage Study Violations, and Short Circuit violations.

With the completion of the transmission system upgrades identified below as scheduled (Nos. 1 through 9), Cromby Unit 1 and Eddystone Unit 1 will not be needed for reliability and can be deactivated on the proposed date of May 31, 2011.

2011 PJM - PECO Load and Generator Deliverability, Short Circuit, Common Mode N-1, and N-1-1 Violations

1. Overload of North Wales – Hartman 230 kV line for loss of Jarrett-Whitpain 230 kV line +Basecase [N-1-1]

Solution:

Reconductor North Wales – Hartman 230 kV line

Cost Estimate: \$2.2 Million

Projected In-Service Date: Complete and in-service as of January 2010

2. Overload of Eddystone – Saville 138 kV line for loss of Macdade-Ridley-Morton 230 kV line + loss of Island Road-Eddystone 230 kV line [N-1-1]

Solution:

Replace terminal equipment at both Eddystone and Saville substations and replace underground cable portion of line

Cost Estimate: \$3.94 Million

Projected In-Service Date: May 27, 2011

3. Overload of Chichester – Linwood 230 kV line #1 for loss of Linwood-Chichester ‘220-43’ 230 kV line and Philips Island generation units [Generation Deliverability - single]

Solution:

Replace terminal equipment at Chichester substation

Cost Estimate: \$0.475 Million

Projected In-Service Date: May 27, 2011

4. Overload of Chichester – Linwood 230 kV line #2 for loss of Linwood-Chichester ‘220-39’ 230 kV line and Philips Island generation units [Generation Deliverability - single]

Solution:

Replace terminal equipment at Chichester substation

Cost Estimate: \$0.475 Million

Projected In-Service Date: May 27, 2011

5. Overload of Tunnel – Parrish 230 kV line for loss of New Freedom-East Windsor 500 kV line [Generation Deliverability - single]

Solution:

Replace terminal equipment at Parrish substation
Cost Estimate: \$0.15 Million
Projected In-Service Date: May 27, 2011

6. Overdutied circuit breaker #365 in Eddystone substation [short circuit]

Solution:

Upgrade 230 kV circuit breaker #365 in Eddystone substation
Cost Estimate: \$0.125 Million
Projected In-Service Date: May 31, 2011

7. Overdutied circuit breaker #785 in Eddystone substation [short circuit]

Solution:

Upgrade 230 kV circuit breaker #785 in Eddystone substation
Cost Estimate: \$0.125 Million
Projected In-Service Date: May 31, 2011

8. Removed requirement for upgrading circuit breaker #45 in Eddystone substation [short circuit]. Circuit breaker was already upgraded.
9. Removed requirement for upgrading circuit breaker #35 in Eddystone substation [short circuit]. Circuit breaker was already upgraded.

Since the completion of the next group of transmission system upgrades identified below (Nos. 10 through 15) will not occur until after May 31, 2011, Cromby Unit 2 will need to be operated for reliability reasons until these required upgrades are complete. Based upon the schedule for completion of these upgrades, it is expected that Cromby Unit 2 will be allowed to deactivate on December 31, 2011.

2011 PJM - PECO Load and Generator Deliverability, Short Circuit, Common Mode N-1, and N-1-1 Violations

10. Overload of Whitpain - Jarrett 230 kV line for loss of North Wales-Hartman 230 kV line + Basecase [N-1-1]

Solution:

Replace terminal equipment at Whitpain and Jarrett substations
Cost Estimate: \$0.175 Million
Projected In-Service Date: May 27, 2011

11. Overload of Hartman – Warrington 230 kV line for loss of Emilie-Neshaminy 138 kV line + loss of Jarrett-Whitpain 230 kV line [N-1-1]

Solution:

Replace terminal equipment at Hartman and Warrington substations
Cost Estimate: \$0.375 Million
Projected In-Service Date: May 27, 2011

12. Voltage violations at Perkiomen substation for various contingencies [N-1, N-1-1]

Solution:

Add circuit breakers to the Perkiomen – North Wales 138 kV line and Perkiomen – Cromby 138 kV line. Add 35 MVAR 138 kV capacitor bank at Perkiomen substation.
Cost Estimate: \$3.9 Million
Projected In-Service Date: August 01, 2011

13. Voltage violations at Heaton substation for various contingencies [N-1, N-1-1]

Solution:

Add second 230 / 138 kV transformer at Heaton substation. Add circuit breaker on the Heaton – North Wales 138 kV line. Add 35 MVAR 138 kV capacitor bank at Heaton substation.
Cost Estimate: \$7.754 Million
Projected In-Service Date: December 16, 2011

14. Voltage violations at Cromby substation for various contingencies [N-1, N-1-1]

Solution:

Replace 230 / 69 kV transformer #6 at Cromby substation with new higher – rated transformer. Add two 50 MVAR 230 capacitor banks at Cromby substation.

Cost Estimate: \$6.142 Million

Projected In-Service Date: December 31, 2011

15. Overload of Heaton – Jarrett 230 kV line for various contingencies [N-1, N-1-1]

Solution:

Replace terminal equipment at Heaton and Jarrett substations.

Cost Estimate: \$0.525 Million

Projected In-Service Date: May 27, 2011

Since the completion of the next group of transmission system upgrades identified below (Nos. 16 through 18) will not occur until after May 31, 2011, Eddystone Unit 2 will need to be operated for reliability reasons until these required upgrades are complete. Based upon the schedule for completion of these upgrades, it is expected that Eddystone Unit 2 will be allowed to deactivate on December 31, 2012.

2011 PJM - PECO Load and Generator Deliverability, Short Circuit, Common Mode N-1, and N-1-1 Violations

16. Overload on Chichester 230/138 kV transformer for loss of / loss of Macdade – Ridley – Morton 230 kV line + loss of Island Road – Eddystone 230 kV line [N-1-1]

Solution:

Add second 230 / 138 kV transformer in parallel with existing transformer at Chichester substation. Add 138 kV inductor in series with transformer pair.

Cost Estimate: \$5.908 Million

Projected In-Service Date: December 16, 2011

17. Overload on Chichester – Saville 138 kV line for loss of Macdade-Ridley-Morton 230 kV line + loss of Island Road-Eddystone 230 kV line [N-1-1, Generation Deliverability - single]

Solution:

Reconductor Chichester – Saville 138 kV line and replace terminal equipment at Chichester and Saville substations.

Cost Estimate: \$8.5 Million

Projected In-Service Date: December 31, 2012

18. Voltage violations at Eddystone 138 kV substation for various contingencies [N-1-1]

Solution:

Install 230 / 138 kV transformer in same position as former Eddystone #8 transformer, for use when Eddystone Unit 1 and Unit 2 are out of service.

Cost Estimate: \$3.6 Million

Projected In-Service Date: June 1, 2011