

Statement of Work for Amos – to – Kemptown HVDC Conceptual Study

1.0 Project Information

A new 765 kV AC overhead transmission circuit with 5000 MW thermal capacity is being proposed in the PJM operating territory by AEP and Allegheny Power to interconnect the Amos and Kemptown substations.

The circuit length is approximately 275 miles total with approximately 224 miles in West Virginia, 31 miles in Virginia, and 20 miles in Maryland. The transmission circuit will also interconnect into a new substation named Welton Springs which will be installed at approximately the West Virginia/Virginia interface. The transmission circuit length is approximately 224 miles from Amos-to-Welton Springs, and 51 miles from Welton Springs-to-Kemptown.

PJM has requested Black & Veatch (B&V) to perform a conceptual study to use HVDC transmission with overhead or underground cable systems as an alternate solution to the proposed 765 kV AC overhead transmission.

2.0 Schedule

The following schedule has been assumed for the work:

- Purchase Order Received to Start Work – April 22, 2009
 - Kickoff Meeting – w/c April 27, 2009*
 - Welton Springs-to-Kemptown Draft Report Submittal – June 22, 2009
 - Amos-to-Welton Springs Draft Report Submittal – July 31, 2009
 - Final Report – August 14, 2009
- * TBA by PJM

3.0 Project Scope

B&V will prepare two Draft Reports. One for the Welton Springs-to-Kemptown portion of the transmission system, and one for the Amos-to-Welton Springs portion of the transmission system, for PJM review in accordance with the Schedule. A Final Report will be submitted with PJM comments incorporated in accordance with the Schedule. The Report will generally have the following content:

1.0 Executive Summary

2.0 Introduction

3.0 HVDC Converter Station

3.1 Technology Comparison/Evaluation

3.1.1 LCC vs. VSC

3.1.2 Multi-terminal Configuration

3.1.3 Future Expansion

3.2 Conceptual Design

3.3 Maintenance Considerations

3.4 Permitting Considerations

3.5 System Impacts

3.6 Estimated Cost

4.0 HVDC Underground Cable System

4.1 Welton Springs to Kemptown

4.1.1 Technology Comparison/Evaluation

4.1.1.1 HPFF

4.1.1.2 SCFF

4.1.1.3 MI

4.1.1.4 XLPE

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4.1.1.5 GIS

4.1.2 Conceptual Design

4.1.3 Estimated Cost

5.0 HVDC Overhead Transmission System

5.1 Welton Springs-to-Kempton

5.1.1 Conceptual Design

5.1.2 Estimated Cost

5.2 Amos-to-Welton Springs

5.2.1 Conceptual Design

5.2.2 Estimated Cost

6.0 AC Overhead Transmission System

6.1 Welton Springs-to-Kempton

6.1.1 Conceptual Design

6.1.2 Estimated Cost

6.2 Amos-to-Welton Springs

6.2.1 Conceptual Design

6.2.2 Estimated Cost

7.0 Comparison Summary

7.1 AC Overhead Transmission vs. HVDC Overhead Transmission

7.1.1 Amos-to-Kempton

7.1.2 Welton Springs-to-Kempton

7.2 HVDC Overhead Transmission vs. HVDC Underground Transmission

7.2.1 Welton Springs-to-Kempton

8.0 Attachments:

- One Line Diagram for HVDC
- HVDC Converter Station Layout
- Proposed Route for Transmission
- Typical Underground Transmission Installation Cross Sections
- Typical HVDC Overhead Transmission Cross Sections
- Typical AC Overhead Transmission Cross Sections
- HVDC Converter Station Cost Estimate Summary
- HVDC Underground Transmission Cost Estimate Summary
- HVDC Overhead Transmission Cost Estimate Summary
- AC Overhead Transmission Cost Estimate Summary

4.0 Clarifications and Assumptions

1. Permitting or land acquisition costs will be estimated by others.
2. PJM will provide the route map and both the overhead and the underground transmission system will follow the same route map.
3. B&V will consult with one or more HVDC equipment and underground cable suppliers to obtain indicative costs estimates for the HVDC equipment.
4. The HVDC interconnection points have a sufficient short circuit ratio to utilize conventional Line Commutated Converter technology.
5. A Draft copy of the report will be submitted for review. After comments are received and incorporated, a Final copy of the report will be submitted.

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Engineering Fee Estimate

REDACTED

This Statement of Work is governed by PJM Interconnection L.L.C. General Terms and Conditions for Consulting or Professional Services between PJM and Black & Veatch Corporation dated 1/26/09.

ACCEPTED AND AGREED TO:

Black & Veatch Corporation

PJM Interconnection, L.L.C.

By _____

By _____

Name _____

Name _____

Title _____

Title _____

Date _____

Date _____