PJM RTEP -2015 Window 1:

Herlan-Blue Racer 138kV

A proposal to PJM Interconnection, Submitted July, 20, 2015

Submitted by

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A. Executive Summary

American Electric Power ("AEP") submits this proposal (the "Proposal") to PJM Interconnection, LLC ("PJM") in response to the PJM RTEP 2015 Project Proposal Window 1 (2020 Baseline N-1 Thermal & Voltage; 2020 Generator Deliverability and Common Mode Outage; 2020 Loa Deliverability Thermal and Voltage; 2020 N-1-1 Thermal and Voltage). This Proposal details a proposed solution to one or more potential violations on facilities referenced in the Problem Statement & Requirements Document, date posted June 19, 2015. AEP seeks to be considered the Designated Entity for the project described within this Proposal.

As the Designated Entity AEP is proposing to construct, own, operate, and maintain the proposed 138 kV line and station assets.

AEP submits the "Herlan-Blue Racer 138kV" proposal to address thermal overloads on the South Caldwell-Muskingum branch of the Muskingum-Steamtown circuit under N-1-1 contingency conditions as well as various nearby voltage magnitude and voltage drop violations under N-1-1 contingency conditions. AEP proposes to construct Herlan Switch station between Summerfield station and Somerton Tap and a new 3.2 mile 138kV line between Herlan Switch and Blue Racer station. The existing Summerfield-Natrium 138kV circuit and the existing Muskingum-Somerton-Natrium 138kV circuit will be cut into and tied together at Herlan Switch. The proposed Herlan-Blue Racer 138kV line will loop the existing Summerfield-Blue Racer 138kV radial circuit. The existing Summerfield-Berne 138kV line (including the Summerfield-Blue Racer 138kV circuit) will be rebuilt with higher ratings.

Total project cost is estimated to be at $25,825,900 with an in-service date of 2nd quarter 2020. Further information pertaining to project cost and schedule is provided in Section C-2 and C-3 respectively.

The project proposes to address following Thermal and Voltage violations identified by PJM:

N-1-1 Thermal

Flow Gate Number	Overloaded Branch	Rating (MVA)	AC Ld (%)	Contingency Definition #1	Contingency Definition #2
N2-T16	05SCALDW (243091)-05MUSKGBUS1B (247371)	205	107.53	'624_B3_05NATRIU 138-2_WOMOAB' Loss of Natrium 138/69kV T2	'BASE CASE'
N2-T17	05SCALDW (243091)-05MUSKGBUS1B (247371)	205	107.98	'8893_B2_TOR778A_MOAB' Loss of Natrium-Switzer branch	'BASE CASE'

N-1-1 Voltage Magnitude

Flow Gate Number	Bus	Name	Cont. Volt	Base Volt	Contingency Definition #1	Contingency Definition #2
N2-VM70	243096	05SCUMBL	0.9152	0.9842	557_B2_TOR861_WOMOAB	5717_B2_TOR728A_MOAB
N2-VM71	243096	05SCUMBL	0.9185	0.9778	555_B2_TOR860_WOMOAB	5717_B2_TOR728A_MOAB
N2-VM72	243091	05SCALDW	0.9058	0.9795	5719_B2_TOR729_WOMOAB	5717_B2_TOR728A_MOAB
N2-VM73	243096	05SCUMBL	0.8997	0.9704	5719_B2_TOR729_WOMOAB	5717_B2_TOR728A_MOAB
N2-VM74	243118	05SUMMER	0.9128	0.9778	5719_B2_TOR729_WOMOAB	5717_B2_TOR728A_MOAB

N2-VM75	247156	05STEAMT	0.9123	0.9783	5719_B2_TOR729_WOMOAB	5717_B2_TOR728A_MOAB
N2-VM76	243118	05SUMMER	0.9154	0.9778	5719_B2_TOR729_WOMOAB	8419_B2_TOR728_WOMOAB

N-1-1 Voltage Deviation

Flow Gate Number	Bus	Name	Cont. Volt	Base Volt	Vdrop (%)	Contingency Definition #1	Contingency Definition #2
N2-VD73	243091	05SCALDW	0.8954	0.9795	8.41	5719_B2_TOR729_WOMOAB	5717_B2_TOR728A_MOAB
N2-VD74	243096	05SCUMBL	0.8886	0.9704	8.18	5719_B2_TOR729_WOMOAB	5717_B2_TOR728A_MOAB

B. Company Evaluation Information

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C. Proposed Project Constructability Information

1. Component Scope

Scope of the project will include constructing a new switching station named "Herlan Switch Station", constructing a new 3.2 mile 138kV line between the new Herlan Switch Station and the existing Blue Racer Station, constructing a new 138kV line exit with circuit breaker (CB) at Blue Racer, rebuilding the existing Summerfield – Berne 138kV line, and providing new ties between the new Herlan Switch Station and the existing 138kV double circuit Summerfield – Natrium 138kV line.

a. Greenfield Transmission Line Element Detail

AEP proposes to establish Herlan – Blue Racer 138kV circuit by constructing a Greenfield single circuit 138kV line between Blue Racer station and the new Herlan Switch Station, located near Summerfield, OH. The new line shall be constructed utilizing galvanized steel H-Frames in [redacted] of way (ROW). The steel pole structures will be direct embedded, and will utilize guyed construction for Dead Ends and Running Angle structures. [redacted]

The proposed route is approximately 3.2 miles in length. Terrain along the route is rural and hilly. New ROW to be acquired would be 100 feet wide.

Geographic map with proposed transmission line study area, and the conceptual tabletop route is shown in Figure C.1.

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Figure C.1: Herlan – Blue Racer 138kV Proposed Line Route

Drawing of a typical 138 kV transmission line structure that AEP has used in the past for similar projects is shown in Figure C.2.

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Figure C.2: Typical 138 kV Transmission Line Structure

The study area is located in Monroe County, OH, east of Summerfield. The area is predominately rolling hilly terrain. Land use is predominately pasture land and timber production. The area has been highly affected by recent shale gas activity.

b. Greenfield Substation/ Switchyard Facility Element Detail

The new 138kV switching substation will consist of circuit breakers, switches, coupling capacitor voltage transformers (CCVTs), capacitor banks, cap switchers, line traps, surge arresters, and bus. [redacted] Circuit breakers rated 170kV, 3,000A, 40kA with associated 3,000A disconnect switches will be utilized in all 4 breaker strings. Each main bus will have a 138kV, 28.8MVAR capacitor bank with associated 3,000A disconnect switch and 145kV 650A cap switcher.

[redacted]

c. Transmission Facilities Relocation/Modifications

c.1. Transmission Line Modifications

Transmission line modifications will need to be made on the Summerfield – Natrium 138kV line. Summerfield – Natrium is a double circuit AC line, consisting of the Natrium – Summerfield 138kV circuit, and the Muskingum River – Natrium 138kV circuit. Each of these circuits will require in and out tap structures for the new Herlan Switch Station. Also, existing tower #5 will be removed after the installation of the proposed tap structures.

Additionally, this proposal includes a complete rebuild of the existing Summerfield – Blue Racer 138kV circuit to allow for conductor with additional capacity [redacted]

c.2. Substation Expansion or Modification

Installation of a circuit breaker, disconnect switches, capacitor voltage transformers (CCVTs), and surge arrestors will be required at Blue Racer station. New equipment to be installed at Blue Racer station would have a continuous current rating of at least 3,000 A.

Removal of existing 600A motor operated air break (MOAB) switch and installation of a 3,000A MOAB switch will be required at Summerfield station.

[redacted]

Herlan Switch station, Blue Racer station, and Summerfield station simplified oneline diagrams are shown in Figure C.3, Figure C.4, and Figure C.5 respectively.

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Figure C.3: Herlan Switch Station Proposed Simplified Oneline Diagram

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Figure C.4: Blue Racer Station Proposed Simplified Oneline Diagram

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Figure C.5: Summerfield Station Simplified Oneline Diagram

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Figure C.6: Herlan Switch Station Geographic Map with Superimposed Oneline

d. Environmental, Permitting and Land Acquisition

Assessment of environmental impacts related to all facilities is shown in Table C.1. The following analysis is from readily-available public data.

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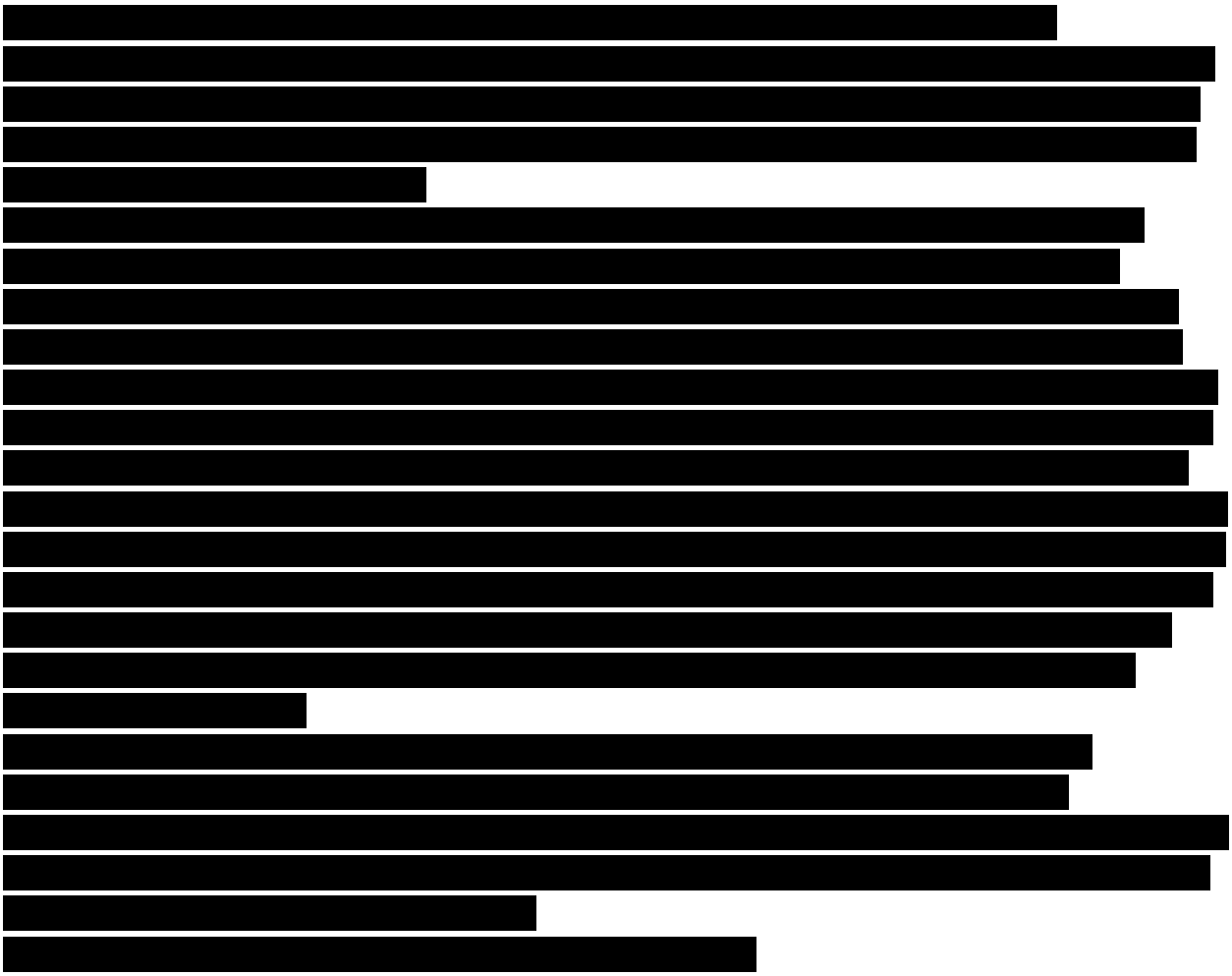
Table C.1: Project Environmental Impacts



2. Project Component Cost Estimates

Project cost estimate breakdown are shown below.

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3. Schedule

Preliminary project schedule is provided below.

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4. On-going Transmission Facility Items

a. Operational Plan

Upon placing the Project into service, the new facilities will be operated using AEP's experienced resources and successful practices. AEP's Transmission Operations ("TOps") organization will provide control center operations for the facilities from AEP's state-of-the-art System Control Center ("SCC") located in New Albany, Ohio. AEP's Transmission Field Services ("TFS") organization will provide field switching for the equipment from the AEP's service locations in Marietta, OH. Please refer to the 'Company Evaluation Information' section of this Proposal for details about AEP's operational capabilities.

b. Maintenance Plan

Upon placing the Project into service, the new facilities will be maintained using AEP's experienced resources and successful practices. AEP's Transmission Field Services ("TFS") organization will provide preventive and corrective maintenance, first responder call out services and emergency service restoration for the equipment from the AEP's service locations in Marietta, OH.

5. Assumptions

Project assumptions broken down by line, station and ROW are provided below.

Transmission Line Assumptions:

[redacted]

ROW Assumptions:

[redacted]

Substation Assumptions:

[redacted]

[redacted]