Missouri Public Service Commission
Data Request

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| **Data Request No.**: | 0043 |
| **Company Name**: | Grain Belt Express, LLC-Investor (Electric) |
| **Case/Tracking No.**: | EA-2023-0017 |
| **Date Requested**: | 2/27/2023 |
| **Issue**: | General Information & Miscellaneous - RTO Issues |
| **Requested From**: | Andrew Schulte |
| **Requested By**: | Kevin Thompson |
| **Brief Description**: | Black Start Resource |

**Description:** Refer to Page 11, lines 16-19 of Anthony Petti's Direct Testimony discussing the Voltage Source Converter type HVDC converters and the potential for use as a black-start resource. Please describe and document the process for designating the Project as a system restoration tool for SPP, AECI, MISO, and PJM. Please address each system separately. Requested by: Claire Eubanks (Claire.Eubanks@psc.mo.gov)

**Due Date**: 3/19/2023

**RESPONSE:**

In order for the Project to be designated a blackstart resource it must be integrated into a Transmission Operator's (TO) system restoration plan and approved by its Reliability Coordinator. Each respective TO develops a system restoration plan in accordance with the requirements set forth in the North American Electric Reliability Corporation (NERC) Emergency and Preparedness and Operations (EOP) Standard 005-3. The purpose of a TO's system restoration plan is to restore service following a disturbance(s) to the Bulk Electric System (BES) and the use of blackstart resources is required to restore a shutdown area.[1] EOP-005-3 outlines universal requirements, measures, and compliance standards to be included in the restoration plans of TO's located within the territories of SPP, AECI, MISO and PJM. The scope of the Project as proposed meets NERC's definition of BES asset (100kV or greater) and the integration of the Project into the SPP, AECI, MISO and PJM systems will prompt regional TOs to consider the impacts of the Project with respect to the following sections of EOP-005-3:

(1) Requirement 3: Each Transmission Operator shall review its restoration plan and submit it to its Reliability Coordinator annually on a mutually agreed, predetermined schedule

(2) Requirement 4.2: Each Transmission Operator shall submit its revised restoration plan to its Reliability Coordinator for approval, when the revision would change its ability to implement its restoration plan. . . prior to implementing a planned permanent BES modification subject to its Reliability Coordinator approval requirements per EOP-006.

[1] NERC EOP-005-3. https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-005-3.pdf

These mandated annual system restoration plan reviews require TOs to take planned BES modifications, including the Project, into account and determine if the modification will impact (either positively or negatively) the ability to implement an existing system restoration plan. If this annual review does identify the Project as having system restoration value, operating processes and criteria would be developed through formal engineering studies and a blackstart resource agreement or arrangement would be established. With respect to engineering studies, each TO would need to perform steady state and dynamic simulations (documented with power flow outputs) to verify the Project is capable of closing to a dead bus and meets all three requirements of section R6 of EOP-005-03.

6.1 Capability of Blackstart Resources to meet the Real and Reactive Power requirements of the Cranking Paths and the dynamic capability to supply initial Loads.
6.2 The location and magnitude of Loads required to control voltages and frequency within acceptable operating limits.
6.3 The capability of generating resources required to control voltages and frequency within acceptable operating limits.

Assuming the engineering studies confirm the Project's system restoration value and recommend that the Project's planned VSC HVDC converter stations be incorporated into a revised restoration plan, the next step in the process of designating the Project as a system restoration resource is to for the Project owner to enter into a blackstart resource agreement with the respective TO which would include terms of service including, but not limited to, testing requirements, operations protocols, and training programs.

Notwithstanding the above, several systems have adopted unique system restoration and blackstart conditions as part of their respective tariffs. Any unique system specific blackstart process requirements would also be applicable to the Project in order for it to be designated as a system restoration resource. These system specific requirements are summarized in Table 1. If met, the Project would be designated a blackstart resource and added to a system(s) emergency operations plan.

Table 1: Blackstart Requirements and Conditions by ISO/RTO

| System | Requirement, Measure or Compliance Standard |
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| **SPP**[2] [3] | No specific blackstart requirements, measures or compliance standards beyond mentions in Emergency Operating Plans and GIA/GIP proforma agreements which note that "System restoration and black start shall be considered Emergency Conditions; provided, that Interconnection Customer is not obligated by the Interim Generator Interconnection Agreement, to possess black start capability." |
| **AECI**[4] | No specific blackstart requirements, measures or compliance standards publicly published by AECI. However, a proforma Generator Interconnection Agreement and Generator Interconnection Procedures indicate that generators are not obligated to provide blackstart service but should assist if available. |
| **MISO**[5] | Meet Blackstart Service requirements outlined in MISO Business Practice Manual (BPM) 022 – Blackstart Service which include, but are not limited to:<br>• Blackstart unit must meet requirements of Schedule 33 of MISO Tariff which include meeting NERC blackstart criteria (EOP-005-03), inclusion into a TO system restoration plan, execute a minimum 3 year blackstart agreement term and perform maintain periodic testing.<br>• A Blackstart Unit Owner must be a Tariff Customer in order to qualify for payments under the Tariff<br>• Per Schedule 33, file to establish or revise its annual cost-based revenue requirement for the provision of Blackstart Service |
| **PJM**[6] | The Project must meet Black Start Service requirements outlined in PJM Open Access Transmission Tariff (OATT) Business Practice Manual (BPM) 022 – Blackstart Service which include, but are not limited to:<br>• "Black Start Service" shall mean the capability of generating units to start without an outside electrical supply or the demonstrated ability of a generating unit with a high operating factor (subject to Transmission |

[2] SPP Emergency Operations Plan, September 27, 2022. https://www.spp.org/documents/67848/spp%20ba%20emergency%20operating%20plan%20v8.1.pdsf

[3] SPP Attachment V. GENERATOR INTERCONNECTION PROCEDURES (GIP) including GENERATOR INTERCONNECTION AGREEMENT (GIA). December 1 2020. https://opsportal.spp.org/documents/studies/SPP%20Tariff%20Attachment%20V%20Generator%20Interconnection%20Procedures.pdf

[4] AECI GIP. February 2 2009. http://www.oatioasis.com/AECI/AECIdocs/AECI_Generation_Interconnection_Procedure_(2009-06-08).pdf

[5] MISO BPM 022. *Blackstart Service.* March 07, 2023.

[6] PJM OATT. https://agreements.pjm.com/oatt/4406. Schedule 6A.

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| | Provider concurrence) to automatically remain operating at reduced levels when disconnected from the grid.<br>• Black Start Unit must be capable of maintaining frequency and voltage under varying load.<br>• Black Start Unit must be able to maintain rated output for a period of time identified by each Transmission Owner's system restoration requirements, in conjunction with the Transmission Provider.<br>• Requests for new Black Start Service revenue requirements must be submitted to the Market Monitoring Unit for review and analysis, with supporting data and documentation, pursuant to Tariff, Attachment M–Appendix, section III and the PJM Manuals |

VERIFICATION OF RESPONSE

The response provided to the foregoing Data Request has been collected from various sources at Grain Belt Express, LLC and affiliated companies, and are true and accurate to the best of my knowledge and belief.

Signed: */s/ Anthony Petti*
Anthony Petti
Guidehouse, Inc.