AMERICAN TRANSMISSION COMPANY®	**Business Practice**	**Department:**	**Interconnection Services**
		Document No:	**BP-0901 v4**
Title: **EVALUATION FOR POTENTIAL BLACKSTART RESOURCES**		**Issue Date:**	**08-30-2022**
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Contents

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1 PURPOSE

This Business Practice sets forth the manner in which ATC will initially evaluate candidate blackstart-capable units (henceforth referred to as 'candidates') to identify which units will be included in the ATC Blackstart System Restoration Plan (BSRP) as Blackstart Resource units (BSRUs). This enables ATC to fulfill its obligations under the mandatory reliability standards of the North American Electric Reliability Corporation (NERC) and the applicable Regional Entities. Inclusion in the ATC BSRP as a BSRU allows for compensation to be paid by the Midcontinent Independent System Operator, Inc. (MISO) under Rate Schedule 33 or Rate Schedule 33-ATCLLC of the MISO Tariff, or other rate approved by the Federal Energy Regulatory Commission (FERC), to the BSRU Owner. [1]

2 SCOPE AND APPLICABILITY

This Business Practice applies to all candidates that are capable of providing Blackstart Resource service to ATC, per the terms and conditions in the Blackstart Resource Service Agreement of MISO Attachment NN or Attachment NN-ATCLLC, or other mutually agreed upon procedures or protocols that specify the terms and conditions of an agreement. Interested unit owners should submit the data outlined in Appendix A of this document, to ATC. Unit owners should also be prepared to submit and/or verify information described in ATC's Generating Facility Interconnection Guide, seen at https://www.atcllc.com/customer-relations/connecting-to-the-grid/.

This Business Practice establishes a ranking system that ATC will use, in conjunction with business and engineering judgment, as a guide to select candidates seeking inclusion in the ATC BSRP. The ranking system may also be used to evaluate existing BSRUs to determine if any should be removed from the BSRP. The ranking process and all studies conducted during the assessment will incorporate relevant requirements from current, applicable NERC standards.

3 ROLES AND RESPONSIBILITIES

ATC is a NERC registered Transmission Operator (TOP) and under the mandatory reliability standards has an obligation to develop and maintain a restoration plan (the ATC BSRP) to restore ATC's portion of the Bulk Electric System (BES) to a state where the choice of the next load to be restored is not driven by the need to control voltage or frequency. Under the mandatory reliability standards, ATC is required to review its BSRP annually and to coordinate its BSRP with MISO, the NERC and Regional Entity-registered Reliability Coordinator.

ATC does not own any generating capacity and is prohibited under state law from owning generation, except for certain ancillary services. Blackstart Resource service is not an ancillary service under the rules of FERC. As a result, ATC is required to obtain Blackstart Resource service from Generator Owners.

4 BLACKSTART SYSTEM RESORTATION PLAN REQUIREMENTS

4.1 MINIMUM REQUIREMENTS FOR RANKING CANDIDATE UNITS

The value of Blackstart Resource service from any candidate unit is based upon attributes that permit ATC to establish and maintain a BSRP that is capable of restoring its portion of the BES in an effective and efficient manner as described in Section 3. The following attributes are the minimum mandatory requirements for a candidate unit to be considered:

[1] Capitalized terms used in this Business Practice, unless otherwise defined have the meanings set forth in the Midcontinent Independent System Operator, Inc. (MISO) Open Access Transmission, Energy and Operating Reserve Markets Tariff (Tariff) or the mandatory reliability standards of NERC.

1. Meet or agree to meet prior to inclusion in the ATC BSRP the definition of "Blackstart Resource unit" or BSRU as set forth in the MISO Tariff (Refer to the MISO Tariff, Attachment NN, and Attachment NN-ATCLLC).
2. Meet or agree to meet the requirement of all NERC reliability standards applicable to Blackstart Resources prior to inclusion in the ATC BSRP.

4.1.1 CRITERIA FOR RANKING CANDIDATE UNITS

If a candidate unit meets the minimum requirements set forth above, it will be ranked based on the criteria below. An example application of the ranking system, including weighting factors for each criterion, is given in Appendix B.[2] Using this ranking system and the associated pre-established weighting factors, ATC will determine a numeric score for each candidate unit. The scores associated with each candidate unit, along with business and engineering judgment, will be considered by ATC when determining which units to incorporate in the ATC BSRP.

1. **Cranking Path switching.** The Cranking Path is the electrical infrastructure designated to be utilized to provide electrical power from the BSRU to one or more target generation facilities to enable start up. The electrical infrastructure on the cranking path may include transmission, distribution and generation facilities. The Cranking Path score counts the number of switching actions that are required to isolate or clear the Cranking Path and then energize the Cranking Path. The Cranking Path Switching score takes into account if the equipment to be switched is supervisory controlled by Supervisory Control and Data Acquisition (SCADA) or must be manually switched by field personnel.

2. **BSRU starting time.** Starting time ranking will be based on the expected amount of time it will take for a unit to start after a Disturbance requiring the use of a BSRU to restore the shut- down area to service. The longer the starting time, the greater impact to the energizing time of the target generation facilities.

3. **BSRU reactive power capability.** Reactive power capability of the BSRU is evaluated for the ability to control the line charging current that would be experienced when the Cranking Path or Paths are energized. The ranking calculates the ratio of charging current on Cranking Path versus the BSRU reactive power capability for each designated Cranking Path. The ranking considers the need to have multiple BSRUs online to control the charging current of the energized Cranking Path or Paths. The more BSRUs that are required to be online to control charging current of the Cranking Path or Paths, the more time it is expected to energize the target generation facilities.

4. **Number of target generation facilities.** A BSRU with a single target generation facility is at risk of being unavailable due to maintenance or forced outage if a Disturbance requiring the use of a BSRU to restore the shut-down area to service were to be experienced. Two target generation facilities are preferred; however, three or more provide the greatest level of redundancy.

5. **Number of Independent Cranking Paths to multiple target generation facilities.** A BSRU with multiple independent Cranking Paths to multiple target generation facilities provides the highest level of redundancy. Multiple independent Cranking Paths to multiple target generation facilities is preferred over multiple Cranking Paths to a single

[2] Each criterion has several factors which bear on the ability of candidate unit to perform satisfactorily. If a candidate unit is unable to meet the minimum requirements for any criterion that unit may, at ATC's election, be disqualified from inclusion in the ATC BSRP.

target generation facility, which, in turn is preferred over a single Cranking Path to a single target generation facility.

6. **Resiliency of BSRU.** There is additional benefit if the blackstart resource provides multiple generating units for blackstart. Alternatively, the blackstart resource may not contain the redundancy of units, but still be determined by ATC as a high availability facility based on its design.

   Without performing the necessary studies under the reliability standard, ATC's default desire will be one more synchronous machine BSRUs than the minimum number needed to accomplish the actions in the blackstart plan. In the case of energy storage using inverter-based technology, grid-forming inverters with blackstart capability are required. From a resiliency perspective, such a device may be considered comparable to two synchronous machine BSRUs based on various factors such as the state of charge and number of target plant restart attempts the stored energy can provide.

7. **Number of transmission transformers**. Every transformer with a base rating larger than 200 MVA needs to be evaluated for reactive power in-rush requirements prior to energizing the transformer. The reactive power in-rush requirements are evaluated to determine if online generation reactive reserves are sufficient to support energizing the transformer. The number of large transmission transformers on the Cranking Path impacts the time to energize the target generation facilities.

8. **Nuclear plants**. There is additional benefit of the BSRU if it can provide off-site power to the ATC identified Nuclear Plant.

9. **Fuel / Energy Storage.** There is additional benefit of the BSRU if the site will provide on-site fuel storage as opposed to a firm fuel supply contract. Firm contracts for fuel supply must have contracted firm capacity from source to the generating unit.

   For stand-alone inverter-based energy storage, though the minimum required stored charge may need to meet the 48-hour on-site fuel duration of Attachment A, this business practice will assume no additional benefit for stand-alone inverter-based energy storage (i.e. will be treated the same as firm fuel contracts).

4.1.2 CANDIDATE SELECTION AND INCLUSION IN THE ATC BSRP

Once all candidates have been ranked, ATC will select the candidates that, in ATC's judgment, best fulfill ATC's obligations under the mandatory NERC reliability standards. ATC will seek to enter into a Blackstart Resource Service Agreement with the owner of each selected candidate. The owner will need to complete Attachment A for inclusion in the Blackstart Resource Service Agreement. Each selected candidate with an executed Blackstart Resource Service Agreement accepted by the relevant regulatory agencies will be designated as a BSRU in the ATC BSRP. The initial agreement shall remain in full force and effective for a period of three years from the date identified in the agreement and shall continue after the initial three-year period for successive one year extension periods unless otherwise specified in the executed agreement. If any BSRU is no longer required by ATC to fulfill its obligation under the mandatory NERC reliability standards, the BSRU Owner shall be entitled to the compensation provided for under Rate Schedule 33 or Rate Schedule 33-ATCLLC of MISO, or other FERC approved rate, unless otherwise specified.

4.1.3 WITHDRAWAL FROM THE ATC BSRP

Any BSRU Owner may elect to withdraw its BSRU from the ATC BSRP after providing no less than twelve (12) months prior written notice, unless otherwise specified in the executed Blackstart Resource Service Agreement. Likewise, ATC may have reason to remove a unit as a BSRU, the timeline for notice will be governed by the executed Blackstart Resource Service Agreement.

4.1.4 RANKING CRITERIA CHANGES

ATC reserves the right to revise the criteria and associated weighting values used to rank candidates. If any BSRU is removed from the ATC BSRP due to revision of the ranking criteria and subsequent revisions to the BSRP, the BSRU Owner shall be entitled to the cost recovery provided for under MISO Rate Schedule 33 or Schedule 33-ATCLLC, or other FERC approved rate, unless otherwise specified

5 ADDITIONAL INFORMATION

The rating spreadsheet template and definition of weighting and points is included in Appendix B.

6 DOCUMENT REVIEW

This business practice will be reviewed and revised as determined necessary by ATC or no less than every five years.

7 RECORDS RETENTION

Documents are maintained per the Records Retention Schedule.
Records Management Index System (RMIS)
Records Management Policy #2002-2 Revision Information

8 REVISION INFORMATION

In this "Revision Information" section, provide a timeline summary of all documents revisions, with the most recent revision shown first.

Version	Author	Date	Section	Description
01	Paul Walter	08-11-2009	All	Updated to reflect MISO Tariff changes
02	Heather Andrew, Nate Wilke, Aaron Hanson	11-24-2014	All	New format, updated title, updated business practice and added a new formula template/rating philosophy in Appendix B
03	Shane Ehster, Mark Kosterman, Dani Hall	11-09-2020	All	Periodic review and update
04	Dave Cullum, Shane Ehster, Brad Larson, Mitchell Wojciehowski	TBD	All	Periodic review and update

9 APPENDIX A – ATTACHMENT A TO MISO ATTACHMENT NN-ATCLLC (BLACKSTART RESOURCE SERVICE AGREEMENT)

A. Blackstart Resources. The Blackstart Resource or Resources governed by this Agreement is/are identified as follows:

1. Please provide the following information about the Blackstart Resource:

   a. Name of the generating facility at which the Blackstart Resource is located.

   _____

   b. Address of the generating facility at which the Blackstart Resource is located.

   _____

   _____

   _____

   _____

   c. Identify which unit(s) at this generating facility will provide the Blackstart Resource service. Please attach a diagram of the generating facility that identifies the boundaries of the Blackstart Resource in Attachment A-2.

   _____

   _____

   _____

   d. Blackstart Resource operator and contact information.

   _____

   _____

   e. Blackstart Resource technical expert and contact information.

   _____

   _____

   _____

   _____

2. Isochronous Operation: Please answer YES or NO

   a. Can the Blackstart Resource operate in isochronous mode? _____

   b. Can the Blackstart Resource be placed in isochronous mode remotely? _____

   c. Can the Blackstart Resource be switched from isochronous mode to normal droop mode while online? _____

3. Start-up Characteristics

   a. Please indicate the Blackstart Resource staffing conditions.

      i. Entirely remotely controllable
      ii. Staffed 24 hours per day
      iii. Staffed between the hours of _____ and _____, else via call out
      iv. Staffed via call out only
      v. Other (please specify): _____

b. If the Blackstart Resource is not entirely remotely controllable and/or is not staffed 24 hours per day, please describe the Blackstart procedure and the communication methods available to dispatch personnel to the generating facility and time that it will take to get people there.

_____

_____

_____

c. Please indicate the starting method for the Blackstart Resource below:

___ Battery ___ Air ___ Propane ___ Diesel _____ Other (please specify)

d. The available amount of stored starting energy (e.g. compressed air, batteries, etc.) may limit the number of starting attempts. Other technical considerations (e.g. motor or blade temperatures, etc.) may require an amount of time to elapse between starting attempts. ATC is aware that conditions during an event may reduce the actually achievable number of starts possible. Please describe any starting limitations of the Blackstart Resource for the two scenarios listed below:

i. Initial start-up of the Blackstart Resource (before the first transmission element is energized)

_____

_____

ii. Restarting the Blackstart Resource (assuming that an issue on the transmission system caused the unit to trip)

_____

_____

e. Please describe any coping times to which the Blackstart Resource is subject.

If offline prior to event, unit must start in ____ hrs or remain offline for ____ hrs

If online prior to event, unit must start in ____ hrs or remain offline for ____ hrs

f. Assume that an event occurs. Thirty minutes after the event occurs, ATC contacts the Blackstart Resource owner and requests that the unit be brought online.

i. The Blackstart Resource was offline prior to the event

What is the expected amount of time required from the ATC request until the Blackstart Resource can energize the first transmission element?

_____ mins

ii. The Blackstart Resource was online prior to the event

What is the expected amount of time required from the ATC request until the Blackstart Resource can energize the first transmission element?

_____ mins

4. Minimum and Maximum Unit Output[3]

_____

[3] For purposes of the information provided in Section 4, the information should be based on the use of the designated Blackstart Resource fuel.

a. Please provide the maximum net output of the Blackstart Resource.

   90 degrees F _____ MW _____ MVAR

   10 degrees F _____ MW _____ MVAR

b. Please provide the minimum stable net output of the Blackstart Resource for the first thirty minutes after synchronizing to the grid. Do not include environmental restrictions.

   90 degrees F _____ MW _____ MVAR

   10 degrees F _____ MW _____ MVAR

c. Please provide the **emergency**[4] minimum stable net output for the Blackstart Resource for the first thirty minutes after synchronizing to the grid. Do not include environmental restrictions.

   90 degrees F _____ MW _____ MVAR

   10 degrees F _____ MW _____ MVAR

d. Please provide the minimum stable net output for the Blackstart Resource for each of the time periods listed below. Include any applicable environmental restrictions. Assume that the unit is synchronized to the grid at 0 minutes.

   _____ MW for 0 – 30 minutes _____ MW for 30 – 240 minutes

e. Describe any operating regimes in which the Blackstart Resource is unable to conform to the parameters provided in the section above. Consider both primary and alternate fuel sources for Blackstart Resources with dual fuel capability.

   _____

   _____

   _____

   _____

   _____

5. Unit Loading Capability

   a. What reasonable incremental load increase (largest load block) can the Blackstart Resource initially energize? _____ MW

   b. List the maximum MW/min ramp up rate in isochronous mode? _____ MW/min

   c. List the maximum MW/min ramp down rate in isochronous mode? _____ MW/min

[4] According to NERC, the emergency rating "specifies the level of electrical loading or output that a system, facility, or element can support, produce, or withstand for a finite period. The rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved."

6. Reactive Power Characteristics

   a. Please provide the maximum lagging capability of the Blackstart Resource when operating at 50% of the rated capacity.

      90 degrees F _____ MVAR

      10 degrees F _____ MVAR

   b. Please provide the maximum leading capability of the Blackstart Resource when operating at 50% of the rated capacity.

      90 degrees F _____ MVAR

      10 degrees F _____ MVAR

7. Fuel Characteristics

   a. Please identify the designated Blackstart Resource fuel.

      ____ Firm Natural Gas ____ Non-Firm Natural Gas

      ____ Fuel Oil ____ Coal _____ Other (please specify)

      ____ Inverter-Based Energy Storage

   b. Describe the onsite fuel capacity and inventory of the Blackstart Resource fuel. ATC recommends maintaining between 8 and 96 hours of Blackstart Resource designated fuel at 50% of rated output.

      If not applicable, mark "N/A" and skip 7c and 7d: _____

      Fuel capacity _____ gallons (or specify other units)

      90 degrees F Fuel inventory to operate at 50% rated output for _____ hrs

      10 degrees F Fuel inventory to operate at 50 % rated output for _____ hrs

      For inverter-based energy storage, describe the planned state of charge to ensure the device can supply blackstart services when called upon. Based on the design and planned state of charge, state the duration available to simultaneously deliver maximum MW and MVAR.

      State of charge _____ % of full charge (or specify other units)

      90 degrees F Duration of maximum MW and MVAR _____ hrs

      10 degrees F Duration of maximum MW and MVAR _____ hrs

   c. Please identify any alternate fuel type(s) that can be used by the Blackstart Resource.

      ____ Natural Gas

      ____ Fuel Oil ____ Coal _____ Other (please specify)

   d. Describe the onsite fuel capacity and inventory of any alternate fuel type(s). If the alternative fuel is stored onsite, ATC recommends maintaining between 8 and 96 hrs at 50% of rated output.

      Fuel capacity _____ gallons (or specify other units)

      90 degrees F Fuel inventory to operate at 50% rated output for _____ hrs

      10 degrees F Fuel inventory to operate at 50% rated output for _____ hrs

   e. Describe any arrangements or procedures that are in place to deliver additional fuel to the generating facility, if necessary during an extended event.

_____

_____

_____

_____

f. Describe any starting issues related to fuel type, if any exist.

_____

_____

_____

8. Please describe any other operational limitations of the Blackstart Resource to take into consideration that may adversely impact its ability to provide Blackstart Resource service following an event.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

10 APPENDIX B: EXAMPLE EXCEL SPREADSHEET FOR RANKING CALCULATION

1 Number of device operations required to clear and energize a cranking path from BSRU and Target Facility #1 on Path #A (Primary Path) --- Engineering Analysis by ATC

	Switching Score	Weight	Path #1 Actions Total	Path #1 Actions Open	Path #1 Actions Close	Bus Energization Actions Total	Bus Energization Actions Open	Bus Energization Actions Close	Path #1 + Bus Energization
Transmission----------Scada Breaker	0	1	0			0			0
Transmission----------Circuit Switcher	0	1	0			0			0
Transmission----------MOD	0	1	0			0			0
Transmission----------Dispatch Personnel	0	90	0			0			0
Distribution----------Scada Breaker	0	1	0			0			0
Distribution---------Scada Circuit Switcher	0	1	0			0			0
Distribution----------Dispatch Personnel	0	90	0			0			0
Generation----------Scada Breaker	0	1	0			0			0
Generation---Dispatch On-Site Personnel	0	15	0			0			0
Generation---Dispatch Remote Personnel	0	90	0			0			0
Switching Score Total	0		0	0	0	0	0	0	0

2 Number of device operations required to clear and energize a cranking path from BSRU and Target Facility #1 on Path B or Target Facility #2 on Path C (Secondary Path) --- Engineering Analysis by ATC

	Switching Score	Weight	Path #2 Actions Total	Path #2 Actions Open	Path #2 Actions Close	Bus Energization Actions Total	Bus Energization Actions Open	Bus Energization Actions Close	Path #2 + Bus Energization
Transmission----------Scada Breaker	0	1	0			0			0
Transmission----------Circuit Switcher	0	1	0			0			0
Transmission----------MOD	0	1	0			0			0
Transmission----------Dispatch Personnel	0	90	0			0			0
Distribution----------Scada Breaker	0	1	0			0			0
Distribution---------Scada Circuit Switcher	0	1	0			0			0
Distribution----------Dispatch Personnel	0	90	0			0			0
Generation----------Scada Breaker	0	1	0			0			0
Generation---Dispatch On-Site Personnel	0	15	0			0			0
Generation---Dispatch Remote Personnel	0	90	0			0			0
Switching Score Total	0		0	0	0	0	0	0	0

3 Number of device operations required to clear and energize a cranking path from BSRU and Target Facility #1 on Path D or Target Facility #3 on Path E (Tertiary Path) --- Engineering Analysis by ATC

	Switching Score	Weight	Path #3 Actions Total	Path #3 Actions Open	Path #3 Actions Close	Bus Energization Actions Total	Bus Energization Actions Open	Bus Energization Actions Close	Path #3 + Bus Energization
Transmission----------Scada Breaker	0	1	0			0			0
Transmission----------Circuit Switcher	0	1	0			0			0
Transmission----------MOD	0	1	0			0			0
Transmission----------Dispatch Personnel	0	90	0			0			0
Distribution----------Scada Breaker	0	1	0			0			0
Distribution---------Scada Circuit Switcher	0	1	0			0			0
Distribution----------Dispatch Personnel	0	90	0			0			0
Generation----------Scada Breaker	0	1	0			0			0
Generation---Dispatch On-Site Personnel	0	15	0			0			0
Generation---Dispatch Remote Personnel	0	90	0			0			0
Switching Score Total	0		0	0	0	0	0	0	0

4	Line charging on Path A to Target Facility #1 (Primary Path)	Engineering Analysis by ATC			
5	Line charging on Path B to Target Facility #1 or on Path C to Target Facility #2 (Secondary Path)	Engineering Analysis by ATC			
6	Line charging on Path D to Target Facility #2 or on Path E to Target Facility #3 (Tertiary Path)	Engineering Analysis by ATC			
7	Minutes to start from signal/order from TOP	Question 3f		0	BSRU Plant Score - Single Item Adder
8*	**BSRU maximum net output [MW] (Minimum of 90°F or 10°F)**	**Question 4a**			
9*	**BSRU minimum stable net output for 0 - 30 minutes**	**Question 4d**			
10*	**BSRU minimum stable net output for 30 - 240 minutes**	**Question 4d**			
11*	**BSRU maximum MW/minute ramp up rate in isochronous mode**	**Question 5b**			
12*	**BSRU maximum MW/minute ramp down rate in isochronous mode**	**Question 5c**			
13*	**BSRU maximum lagging [MVAR] capability at 50% rated capacity (Minimum of 90°F or 10°F)**	**Question 6a**			
14*	**BSRU maximum leading [MVAR] capability at 50% rated capacity (Minimum of 90°F or 10°F)**	**Question 6b**			
15	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the Primary Path	Auto Calculation = #4/#14	0.00	0	BSRU Plant Score - Single Item Adder
16	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the Secondary Path	Auto Calculation = #5/#14	0.00	0	BSRU Plant Score - Single Item Adder
17	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the Tertiary Path	Auto Calculation = #6/#14	0.00	0	BSRU Plant Score - Single Item Adder
17B	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the two lowest scoring cranking paths	Auto Calculation		0	BSRU Plant Score - Single Item Adder
18*	**Number of operating hours based on primary fuel inventory at 50% rated output**	**Question 7b**			
19	How many Target Facilities does the BSRU have the ability to energized?	Engineering Analysis by ATC		0	Score Multiplier
20	Does the BSRU have multiple independent paths to a single Target Facility? (Yes or No)	Engineering Analysis by ATC		0	Score Multiplier
21	Does the BSRU have multiple independent paths to multiple Target Facilities? (Yes or No)	Engineering Analysis by ATC		0	Score Multiplier
22	How many BSRUs exist at this Facility?	New Question		0	Score Multiplier
23*	**System MVA to Target #1**	**Engineering Analysis by ATC**			
24*	**System MVA to Target #2**	**Engineering Analysis by ATC**			
25*	**Fault current capability (kA) at the Target Facility #1 POI to auxiliary**	**Engineering Analysis by ATC**			
26*	**Fault current capability (kA) at the Target Facility #2 POI to auxiliary**	**Engineering Analysis by ATC**			
27*	**Ratio of System MVA to the fault current capability at Target Facility #1**	**Auto Calculation = #23/#25**			
28*	**Ratio of System MVA to the fault current capability at Target Facility #2**	**Auto Calculation = #24/#26**			
29	Number of transmission transformers > 200 MVA	Engineering Analysis by ATC		0	BSRU Plant Score - Single Item Adder
30	Ability to provide offsite power to nuclear plants [Yes/No]	Engineering Analysis by ATC		0	Score Multiplier

*** Value provided for this item is not used in the calculation of the BSRU Ranking.**

Switching Score Path #1	N/A		<--Path name (BSRU to target)
Switching Score Path #2	N/A		<--Path name (BSRU to target)
Switching Score Path #3	N/A		<--Path name (BSRU to target)
Score of 2 lowest point BSRU Paths	N/A		

BSRU Plant Total Score	0	<-- Sum of Plant Score Adder in items 7, 15, 16, 17, 17B and 29
Score Multiplier	1	<-- Score Multiplier is applied to the sum of the BSRU Plant Score and the Score of 2 lowest point BSRU Paths
BSRU Final Score	0	<-- Lower score indicates a preferred BSRU

Example Only

1 Number of device operations required to clear and energize a cranking path from BSRU and Target Facility #1 on Path #A (Primary Path) --- Engineering Analysis by ATC

	Switching Score	Weight	Wilkeville to Larsonburg Path #1 Actions Total	Open	Close	Wilkeville Bus Energization Actions Total	Open	Close	Path #1 + Bus Energization
Transmission----------Scada Breaker	34	1	31	23	8	3	3	0	34
Transmission----------Circuit Switcher	1	1	1	1	0	0	0	0	1
Transmission----------MOD	1	1	1	1	0	0	0	0	1
Transmission----------Dispatch Personnel	0	90	0	0	0	0	0	0	0
Distribution----------Scada Breaker	8	1	8	8	0	0	0	0	8
Distribution---------Scada Circuit Switcher	1	1	1	1	0	0	0	0	1
Distribution----------Dispatch Personnel	90	90	1	1	0	0	0	0	1
Generation----------Scada Breaker	9	1	6	4	2	3	2	1	9
Generation---Dispatch On-Site Personnel	0	15	0	0	0	0	0	0	0
Generation---Dispatch Remote Personnel	0	90	0	0	0	0	0	0	0
Switching Score Total	144		49	39	10	6	5	1	55

2 Number of device operations required to clear and energize a cranking path from BSRU and Target Facility #1 on Path B or Target Facility #2 on Path C (Secondary Path) --- Engineering Analysis by ATC

	Switching Score	Weight	Wilkeville to Giffintown Path #2 Actions Total	Open	Close	Wilkeville Bus Energization Actions Total	Open	Close	Path #2 + Bus Energization
Transmission----------Scada Breaker	54	1	51	39	12	3	3	0	54
Transmission----------Circuit Switcher	3	1	3	3	0	0	0	0	3
Transmission----------MOD	2	1	2	2	0	0	0	0	2
Transmission----------Dispatch Personnel	90	90	1	1	0	0	0	0	1
Distribution----------Scada Breaker	13	1	13	13	0	0	0	0	13
Distribution---------Scada Circuit Switcher	5	1	5	5	0	0	0	0	5
Distribution----------Dispatch Personnel	0	90	0	0	0	0	0	0	0
Generation----------Scada Breaker	11	1	8	6	2	3	2	1	11
Generation---Dispatch On-Site Personnel	0	15	0	0	0	0	0	0	0
Generation---Dispatch Remote Personnel	0	90	0	0	0	0	0	0	0
Switching Score Total	178		83	69	14	6	5	1	89

3 Number of device operations required to clear and energize a cranking path from BSRU and Target Facility #1 on Path D or Target Facility #3 on Path E (Tertiary Path) --- Engineering Analysis by ATC

	Switching Score	Weight	Wilkeville to Fleming City Path #3 Actions Total	Open	Close	Wilkeville Bus Energization Actions Total	Open	Close	Path #3 + Bus Energization
Transmission----------Scada Breaker	24	1	21	15	6	3	3	0	24
Transmission----------Circuit Switcher	2	1	2	2	0	0	0	0	2
Transmission----------MOD	1	1	1	1	0	0	0	0	1
Transmission----------Dispatch Personnel	0	90	0	0	0	0	0	0	0
Distribution----------Scada Breaker	6	1	6	6	0	0	0	0	6
Distribution---------Scada Circuit Switcher	0	1	0	0	0	0	0	0	0
Distribution----------Dispatch Personnel	0	90	0	0	0	0	0	0	0
Generation----------Scada Breaker	6	1	3	2	1	3	2	1	6
Generation---Dispatch On-Site Personnel	15	15	1	1	0	0	0	0	1
Generation---Dispatch Remote Personnel	0	90	0	0	0	0	0	0	0
Switching Score Total	54		34	27	7	6	5	1	40

Example Only

4	Line charging on Path A to Target Facility #1 (Primary Path)	Engineering Analysis by ATC	17.2		
5	Line charging on Path B to Target Facility #1 or on Path C to Target Facility #2 (Secondary Path)	Engineering Analysis by ATC	6.44		
6	Line charging on Path D to Target Facility #2 or on Path E to Target Facility #3 (Tertiary Path)	Engineering Analysis by ATC	25.44		
7	Minutes to start from signal/order from TOP	Question 3f	15	1	BSRU Plant Score - Single Item Adder
8*	**BSRU maximum net output [MW] (Minimum of 90°F or 10°F)**	**Question 4a**	100		
9*	**BSRU minimum stable net output for 0 - 30 minutes**	**Question 4d**	5		
10*	**BSRU minimum stable net output for 30 - 240 minutes**	**Question 4d**	35		
11*	**BSRU maximum MW/minute ramp up rate in isochronous mode**	**Question 5b**	5		
12*	**BSRU maximum MW/minute ramp down rate in isochronous mode**	**Question 5c**	5		
13*	**BSRU maximum lagging [MVAR] capability at 50% rated capacity (Minimum of 90°F or 10°F)**	**Question 6a**	50		
14*	**BSRU maximum leading [MVAR] capability at 50% rated capacity (Minimum of 90°F or 10°F)**	**Question 6b**	25		
15	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the Primary Path	Auto Calculation = #4/#14	0.69	10	BSRU Plant Score - Single Item Adder
16	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the Secondary Path	Auto Calculation = #5/#14	0.26	5	BSRU Plant Score - Single Item Adder
17	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the Tertiary Path	Auto Calculation = #6/#14	1.02	110	BSRU Plant Score - Single Item Adder
17B	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the two lowest scoring cranking paths	Auto Calculation		0	BSRU Plant Score - Single Item Adder
18*	**Number of operating hours based on primary fuel inventory at 50% rated output**	**Question 7b**	36		
19	How many Target Facilities does the BSRU have the ability to energized?	Engineering Analysis by ATC	3	-0.25	Score Multiplier
20	Does the BSRU have multiple independent paths to a single Target Facility? (Yes or No)	Engineering Analysis by ATC	No	0	Score Multiplier
21	Does the BSRU have multiple independent paths to multiple Target Facilities? (Yes or No)	Engineering Analysis by ATC	Yes	-0.25	Score Multiplier
22	How many BSRUs exist at this Facility?	New Question	2	0	Score Multiplier
23*	**System MVA to Target #1**	**Engineering Analysis by ATC**			
24*	**System MVA to Target #2**	**Engineering Analysis by ATC**			
25*	**Fault current capability (kA) at the Target Facility #1 POI to auxiliary**	**Engineering Analysis by ATC**			
26*	**Fault current capability (kA) at the Target Facility #2 POI to auxiliary**	**Engineering Analysis by ATC**			
27*	**Ratio of System MVA to the fault current capability at Target Facility #1**	**Auto Calculation = #23/#25**			
28*	**Ratio of System MVA to the fault current capability at Target Facility #2**	**Auto Calculation = #24/#26**			
29	Number of transmission transformers > 200 MVA	Engineering Analysis by ATC	2	10	BSRU Plant Score - Single Item Adder
30	Ability to provide offsite power to nuclear plants [Yes/No]	Engineering Analysis by ATC	No	0	Score Multiplier

*** Value provided for this item is not used in the calculation of the BSRU Ranking.**

Switching Score Path #1	144	Wilkeville to Larsonburg	<--Path name (BSRU to target)
Switching Score Path #2	178	Wilkeville to Giffintown	<--Path name (BSRU to target)
Switching Score Path #3	54	Wilkeville to Fleming City	<--Path name (BSRU to target)
Score of 2 lowest point BSRU Paths	198		

BSRU Plant Total Score	131	<-- Sum of Plant Score Adder in items 7, 15, 16, 17, 17B and 29
Score Multiplier	0.5	<-- Score Multiplier is applied to the sum of the BSRU Plant Score and the Score of 2 lowest point BSRU Paths
BSRU Final Score	164.5	<-- Lower score indicates a preferred BSRU

Switching action	Weight	Rationale
Transmission----------Scada Breaker	1	It is expected that a SCADA controlled device can be switched once per minute on average.
Transmission----------Circuit Switcher	1	It is expected that a SCADA controlled device can be switched once per minute on average.
Transmission----------MOD	1	It is expected that a SCADA controlled device can be switched once per minute on average.
Transmission----------Dispatch Personnel	90	It is expected that a device requiring the dispatch of personnel for switching will be switched once in 90 minutes, when factoring in communication, travel time and switching.
Distribution----------Scada Breaker	1	It is expected that a SCADA controlled device can be switched once per minute on average.
Distribution---------Scada Circuit Switcher	1	It is expected that a SCADA controlled device can be switched once per minute on average.
Distribution----------Dispatch Personnel	90	It is expected that a device requiring the dispatch of personnel for switching will be switched once in 90 minutes, when factoring in communication, travel time and switching.
Generation----------Scada Breaker	1	It is expected that a SCADA controlled device can be switched once per minute on average.
Generation---Dispatch On-Site Personnel	15	It is expected that a device requiring the dispatch of on-site personnel for switching will be switched once in 15 minutes, when factoring in communication, travel time and switching.
Generation---Dispatch Remote Personnel	90	It is expected that a device requiring the dispatch of personnel for switching will be switched once in 90 minutes, when factoring in communication, travel time and switching.

BSRU BPM Question #	Question	Attachemnt NN Question #	Rationale
7	Minutes to start from signal/order from TOP	Question 3f	Point Adder due to start times longer than 30min effecting the energization time to target facilities. If the start time is long, then delivery of off-site power to target facilities is delayed, which would contribute to missing the window of opportunity to restart the target facility in a reasonable amount of time to aid in recovery of the system. <30 min = 1 pt, 30 - 60 min = 10 pts, 60 to 90 pts = 100 pts, >90 min = 10,000 pts
15, 16 and 17	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the Primary, Secondary and Tertiary Paths	Auto Calculation = #4/#14, #5/#14 and #6, #14	Point Adder due to number of BSRUs available and ratio of available units to leading MVAR capability. Points are added as the cranking path approaches the unit reactive capability. Additional points are added whenever another unit start is required to control charging of the transmission system. Units start require additional time and potentially load restoration which could delay the delivery of off-site power to the target facility. Only added for the two paths with the lowest switching scores. 1 BSRU at Plant = <0.5 = 5 pts, 0.5 to 1.0 = 10 pts, >1.0 = 110,010 2 BSRUs at Plant = <0.5 = 5 pts, 0.5 to 1.0 = 10 pts, 1.0 to 2.0 = 110 pts, >2.0 = 100,010 3 BSRUs at Plant = <0.5 = 5 pts, 0.5 to 1.0 = 10 pts, 1.0 to 2.0 = 110 pts, 2.0 to 3.0 = 1,010 pts, >3.0 = 100,010 4 or more BSRUs at Plant = <0.5 = 5 pts, 0.5 to 1.0 = 10 pts, 1.0 to 2.0 = 110 pts, 2.0 to 3.0 = 1,010 pts, 3.0 to 4.0 = 5,010 pts, >4.0 = 100,010
17B	Ratio of BSRU Leading [MVAR] capability to the Line Charging on the two lowest scoring cranking paths	Auto Calculation	If the charging of the two lowest scoring cranking paths exceed the reactive capability of a single BSRU, then points are added to the total score. It is the expectation that the ATC BSRP will attempt to energize all cranking paths simultaneously. This point adder is only applied if both of the lowest scoring cranking paths have a ratio from 15, 16 or 17 below 1.0. If the sum is below 1.0 = 0 pts If the sum is >1.0 - 100 pts
19	How many Target Facilities does the BSRU have the ability to energized?	Engineering Analysis by ATC	A BSRU with 3 or more target facilities is more beneficial than a BSRU with only 2 targets which is more beneficial than a BSRU with only a single target facility. 3 or more targets reduces total score by 25% 2 targets results in a zero impact to total score. --> 2 targets is the standard expectation 1 target increases score by 25%
20	Does the BSRU have multiple independent paths to a single Target Facility? (Yes or No)	Engineering Analysis by ATC	A BSRU with multiple independent transmission paths is beneficial, but only marginally. Provides transmission flexibility for a single target facility. Multiple independent transmission paths to multiple target facilities is preferred. If "yes", total score is reduced by 5%. If "no", total score is left unchanged.
21	Does the BSRU have multiple independent paths to multiple Target Facilities? Only enter "Yes" if the 2 paths providing the lowest score are independent. (Yes or No)	Engineering Analysis by ATC	A BSRU with multiple independent transmission paths to multiple target facilities provides the greatest level of redundency. Multiplie independent transmission paths to multiple target facilities is preferred over multiple transmission paths to a single target facility. If "yes", total score is reduced by 25%. If "no", total score is left unchanged.
22	How many BSRUs exist at this Facility?	New Question	1 BSRU leaves open the possibility that the unit could be out for maintenance during a system event requiring the use of a BSRU. Thus rendering the BSRU unavailable. 2 BSRUs would allow the plant to be useful if a single unit is out for maintenance, but only leaves a single unit available to start and build an island. This is the minimum preferred number of BSRUs. 3 or more BSRUs allows a single unit to be out for maintenance and leaves 2 or more units available to start and build an island. Provides greatest level of redundancy. 1 BSRU increases total score by 25% 2 BSRUs does not impact the total score 3 or more BSRUs decreases total score by 5%.
29	Number of transmission transformers > 200 MVA (Base Rating)	Engineering Analysis by ATC	Every transformer that is larger than 200 MVA (Base Rating) needs to be evaluated for reactive power in-rush during energizing. The ATC SCO needs to take time to evaluate the island for available online generation reactive reserves. Every transformer over 200 MVA (Base Rating) to be energized increases the total score by 5 points.
30	Ability to provide offsite power to nuclear plants? (Yes or No)	Engineering Analysis by ATC	If the BSRU is able to provide off-site power to the ATC Identified Nuclear Plants, the BSRU provides an additional benefit. If "yes", total score is reduced by 10%. If "no", total score is left unchanged.
BSRU Final Score	BSRU Final Score	Engineering Analysis by ATC	If the BSRU has only a single target with a single cranking path, the BSRU Final Score is multiplied by 10. BSRU should have either multiple targets and/or multiple cranking paths to provide redundancy in the emergency situation. A BSRU should not be rewarded for avoiding a second cranking path that could have extensive switching associated with the second cranking path.