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Blue Highlight signifies not necessary for inclusion in manual; covered more appropriately in OATT

Green Highlight signifies new language to accommodate reliability backstop process

Welcome to the *Black Start Generation Procurement* section of the *PJM Manual for Generator Operational Requirements*. In this section you will find the following information:

- Description of the PJM black start selection process.
- Description of the PJM incremental black start RFP process.

Description of the PJM Reliability Backstop process

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10.1 Black Start Selection Process

The following section outlines the PJM black start selection process.

10.1.1 Frequency

PJM will issue an RFP for black start generation every five (5) years, which would be open to all existing and potential new black start units on a voluntary basis. The first five year selection process will result in black start solutions that will be effective as of 4/1/2015. Black start solutions from subsequent five year selection processes will be effective on April 1 each five years thereafter.

10.1.2 Selection Process

The following steps A-H outline the various selection process phases to be implemented prior to the effective date for each five year selection process. The timeframes indicated represent time estimates (in calendar days or months) for each major phase (or multiple overlapping phases). Based on the aggregate of timeframes indicated, the selection process will be initiated no later than 24 months prior to each five year selection process effective date.

A. Validate Critical Load

PJM will send critical load data to generation owners and Transmission Owners ("TOs") GO/TO for validation. Critical Load requirements will be in accordance with Manual M36 Attachment A. PJM to work with generation owners and TOs -GO/TO to reconcile differences and update accordingly.

Targeted time: 30 days

B. Develop Technical Requirements for Request for Proposal ("RFP")

PJM will coordinate technical requirements for RFP with TOs, including MW requirements, MVAR capability, and geographic details.

Targeted time: 30 days

C. Issue RFP for resources interested in supplying new Black Start

PJM will post the black start Request for Proposal (RFP) on the PJM website with notifications to the appropriate stakeholder groups. Interested bidders should review the guidelines posted on the PJM Black Start Services RFP page titled "General Guidance: Black Start RFP Response Content" for guidelines on content of proposals.

The RFP notification will also advise that all bids submitted for black start resources must be cost-based bids consistent with Schedule 6A of the PJM OATT. Details of the required cost components for each prospective black start replacement bid are provided in Manual M27.

Prospective RFP proposals:

Existing black start units would offer at the current rate. Existing compensated black start units do not need to respond to the RFP - the assumption is that they will continue to provide black start service at the current rate (Formula Rate or Cost Recovery Rate), but are not guaranteed to be selected to provide black start going forward, if reductions in critical load indicate that the black start service is no longer needed.

If existing units are not interested in supplying black start service going forward, they would need to submit a black start termination notice in accordance with the [Schedule 6A of the OATT black start incremental RFP process](#).

~~If existing units want to change their rate utilized for cost recovery, they would need to terminate their current agreement and submit a proposal for consideration as an RFP response.~~

New black start resources in Generation Interconnection Queue would be eligible to respond to the RFP.

Existing units that would require upgrades to provide black start service would be eligible to respond to the RFP

~~Market Submission Window~~ for RFP bids to be submitted: 90 days

D. RFP Proposal Evaluation

PJM will work with the TOs to evaluate proposals and select viable black start solutions based on the basis of [critical load requirements identified pursuant to M36](#), location, cost and operational considerations (amount, start time, etc.).

Units on a cost recovery rate would automatically be selected for the length of the recovery period. Units on bilateral contracts with TOs would be automatically selected for use in those zones.

PJM will work in collaboration with TOs to select black start solutions for each zone based on the following criteria (black start units do not need to be located in the same physical zone [as the TO zone in which they will support](#)).

Required criteria shall include:

1. Meet critical load requirements in accordance with Manual M36 [Attachment AC](#).
2. Minimum of two black start units allocated to each zone with a critical load requirement.
3. Ability to supply critical loads within targeted timeframes ([i.e.e.g.](#) - nuclear loads with 4 hours).
4. Technical Feasibility:
 - a. Maintain voltages along cranking path within [established voltage](#) limits.
 - b. Maintain transmission flows along cranking path within thermal limits.

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c. Maintain dynamic stability along cranking path.

Preferred options considered:

1. Operational Considerations:

- a. Length of cranking path.
- b. Geographic diversity.
- c. Redundancy.

2. Electrical proximity to critical loads.

3. Timing requirements to serve critical load.

4. Test history and performance history of black start resource.

5. Diversity and firmness of fuel source.

6. Complexity considerations (i.e., amount of switching to establish cranking path).

7. Black Start costs.

8. Timing of black start resource availability.

Opportunity for cross zonal coordination:

PJM will work with the TOs to identify areas to identify cross-zonal opportunities in as detailed in Manual M36 Section 9. Potential cross-zonal options include:

Level 1 – Allow black start from outside TO zone to meet critical load.

Level 2 – Allow critical load and customer load pockets to be restored across TO zones.

Level 3 – Identify opportunities to fully aggregate TO restoration plans.

E. Verify Feasibility of Black Start Units Selected

PJM, with TO input, will identify black start cranking paths and black start units to source Critical Loads.

PJM, with TO input, will perform dynamic simulations and reactive/voltage studies on cranking paths, and if issues are identified on cranking paths which would prevent a potential black start unit from performing in accordance with Manual M36, other black start units will be considered.

F. Review of Cost Recovery components

PJM will perform cost evaluation for each option and review cost recovery components provided for proposed black start solutions in accordance with OATT Schedule 6A.

Length of commitment would remain a minimum of 2 years (or longer based on capital recover time). Compensation for units not electing to recover black start capital costs is based on the PJM OATT Schedule 6A formula rate. Compensation for units electing to recover black start capital costs would be based on the PJMOATT Schedule 6A Capital Recovery rate based on the age of the unit. Black Start unit owners may also choose to file for recovery of actual costs directly with FERC.

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IMM will verify cost data during selection process and verify annual revenue requirement (actual cost).

G. Review Selection Process Results with TOs

If reliability criteria are met, PJM will discuss any localized reliability issues, or any other special considerations with TOs, and address accordingly.

If reliability criteria are not met, proceed to **Reliability Backstop Option Black Start Incremental RFP Process, detailed in PJM Manual M36 Attachment A.1.3 Section 10.2**

If reliability criteria are met, but there is disagreement on units selected, PJM will work with TOs to resolve differences. If differences cannot be resolved the Dispute Resolution Process may be initiated **under the Operating Agreement and PJM Manual M33.**

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TO may elect to procure additional black start outside of PJM OATT and Selection Process.

PJM will inform State Commissions about the results of selection process (general results, not unit specific)

Targeted time for Steps D through G: 6 months

H. Implementation of Black Start Solutions

PJM will notify new black start **units that were selected through the process described in this Manual. solutions resulting from the selection process. This Notification** will include authorizing construction work to proceed as required for any new black start resources selected.

TOs will incorporate the use of black start generation and cranking paths into their restoration plans and submit revised restoration plans to PJM.

PJM and TO will add cranking paths to internal PJM tools

PJM will provide current black start units that are not selected with a one year termination notice.

Targeted time for Step H: 13 months

10.2 Black Start Incremental RFP Process

The **Incremental RFP process shall be triggered by one or more of the following events:**
Triggering events business process is defined for

- (1) Notification of termination by the black start unit owner (whether termination is due to deactivation of the black start unit or that the black start unit owner no longer seeks to provide black start service) in accordance with Schedule 6A of the PJM OATT**
- (2) Identification by Transmission Owner (TO) or PJM of new or changed black start needs as a result of a review of its restoration plan**
- (3) Procurement of black start resources in the event that the Black Start Selection Process described in Section 10.1 of this Manual fails to procure adequate black start resources to meet reliability criteria for procuring black start as provided for in Manual M36.**

procurement of black start resources in the event that the RFP process described in Section 10.1 of this Manual fails to procure adequate black start resources to meet reliability criteria for procuring black start as provided for in Manual M36;

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notification of termination by the black start unit owner (whether termination is due to deactivation of the black start unit or that the black start unit owner no longer seeks to provide black start service) replacement of critical black start units in PJM when a Black Start Generator Owner (GO) that terminates its commitment to provide black start service in accordance with Schedule 6A of the PJM OATT; and Portions of this Black Start Incremental RFP Process may also be initiated to request new black start resources due to any of the following events

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11 identification by Transmission Owner (TO) or PJM of new or changed black start needs. The Transmission Owner identifies new or changed black start needs as a result of a review of its restoration plan.

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The Transmission Owner (TO) exercises its right to terminate the two-year commitment to a black start resource by providing notice of termination one year before the date the commitment period ends, in accordance with Schedule 6A of the PJM OATT.

PJM terminates a Black Start Unit's designation as critical (e.g., due to reliability concerns, performance issues, or due to changes to its restoration plan) by providing two years prior notice of such termination in accordance with Schedule 6A of the PJM OATT.

10.2.1 Initial Black Start Commitment

Generators commit initially for at least two years to provide black start service from the black start service implementation date, with an annual right to terminate by each party (the generator owner and the transmission owner) with one year's notice. In the event that neither the Black Start Generator Owner (GO) nor the Transmission Owner (TO) exercises its right to terminate by providing a one-year notice of termination, the commitment to provide Black Start Service automatically will be extended for an additional year to maintain a rolling two-year commitment. In the event that a Black Start Unit fails to fulfill or chooses to deactivate or withdraw from black start service prior to its two-year rolling commitment to provide Black Start Service, the Black Start Unit owner shall forfeit the received monthly Black Start Service revenues for the period of its non-performance not to exceed revenues for a maximum of one year.

10.2.2 Incremental RFP Process Step 1

Upon the occurrence of any of the triggering events listed in Section 10.2 above, receiving a request from a GO to deactivate a black start unit or otherwise withdraw from providing black start service, PJM will begin discussions with the TO notify the TO:

Timeline: Within 5 business days from receipt of the termination request.

10.2.3 Incremental RFP Process Step 2

PJM will discuss with the TO to identify whether black start resources are needed in light of the existence of one of the triggering events.

feasible sites that meet the location and capability requirements for replacing the black start resource.

Timeline: Within 15 business days of receiving the termination.

A. 10.2.4 Incremental RFP Process Step 3

- A. If PJM and the TO determine that there is sufficient redundancy of black start resources in the region, consistent with the minimum critical black start requirement defined in Attachment A of PJM Manual M-36 on System Restoration, such that there is no need to replace the ~~terminating withdrawing or deactivating~~ black start unit in the restoration plan, PJM will initiate a final review and approval through the SOS-T committee of the TO's restoration plan and advise the TO whether such plan is adequate without a replacement black start unit.

In the event that PJM and the TO do not agree on whether there is a need to replace the ~~terminating withdrawing or deactivating~~ black start unit in the restoration plan, PJM will initiate a review with SOS-T for additional technical assessment, and if after the SOS evaluation, an agreement is not yet achieved, the PJM Dispute Resolution process will be employed. Please refer to Section 5 of the *PJM Manual for Administrative Services for the PJM Interconnection Agreement (M33)* for more details about the PJM Dispute Resolution process.

~~Timeline: Within 30 calendar days of receiving the termination request.~~

10.2.5 Incremental RFP Process Step 4

- B. If PJM and the TO determine that there is a need to procure black start resources due to a triggering event black start termination/deactivation or a change in black start need, PJM shall proceed with the process defined in Section 10.2.1 to Step 2, replace the withdrawing or deactivating black start resource, PJM will seek for replacement of the retiring black start resource using the process in Step 2 below.
- C. If PJM and the TO determine that there is a need to procure black start resources due to failure of an RTO Wide Black Start RFP, PJM shall proceed with the process defined in Section 10.2.2 to address the black start resource need.

Timeline: Within 30 calendar days of receiving the termination request.

10.2.1 First Incremental RFP Process

A. After PJM and the TO determine that there is a need to procure black start resources based on one or more of the triggering events, replace the deactivating or withdrawing black start resource in order to meet the defined minimum critical black start zonal requirement, and also determine the location and capability requirements, PJM will post online a notification about the need for a new black start resource along with the location and capability requirements. Please refer to Attachment A of the *PJM Manual for System Restoration (M36)* for more details on the selection criteria for replacement black start resources. This notification will also advise that all bids submitted for the replacement black start resource must be cost-based bids consistent with Schedule 6A of the PJM OATT. Details of the required cost components for each prospective black start replacement bid are provided in *PJM Manual for Open Access Transmission Tariff Accounting (M27)* and *Schedule 6A of the PJM OATT*.

B. This posting should be made within 30 calendar days of a triggering event, receiving a request to terminate the existing black start resource, and will mark the beginning of the First Incremental RFP a "Market Window" which will last 90 calendar days from the date of the notification. The

posting will also advise that PJM will be reviewing pending generator interconnection projects and other projects that are received within the Market Window.

C. PJM will review each Generation Interconnection Request pending under Part IV of the PJM Tariff at the time a Market Window is opened (as described above) and each response by black start units, request from Black Start Units and each Interconnection Request it receives during ~~such the First Incremental RFP~~ Market Window, to evaluate whether the project proposed in the request could meet the black start ~~replacement~~ criteria for which the First Incremental RFP Market Window was ~~issued~~ established.

D. The TO will also have the option of negotiating a cost based bi-lateral contract in accordance with the existing process outlined in Schedule 6A of the PJM OATT with a generator owner for black start services. The TO may provide the alternative as one of the bids for the black start replacement that will be evaluated by PJM in step 4E pending FERC approval of the bilateral contract.

E. If PJM and the TO determines that more than one of the proposed projects within the First Incremental RFP the 90 day market window meets the black start replacement criteria, the most cost-effective resource for the black start replacement will be chosen, provided the identified resource accepts and maintains designation as a black start unit under Schedule 6A of the OATT market solution under Sections 36A or 41A of the PJM Tariff and executes the agreement(s) required thereunder. Submitted projects costs must be consistent with Schedule 6A of the PJM OATT.

F. Any black start resources identified as a result of the First Incremental RFP will be notified by PJM, and PJM and the TO will coordinate with the black start unit owner for its acceptance under the PJM tariff as a black start unit.

10.2.2 Second Incremental RFP Process

If the First Incremental RFP, or RTO Wide RFP, fails to procure adequate black start resources to meet the reliability criteria, no projects are received during the 90 day market window, PJM will initiate a Second Incremental RFP process to obtain black start resources. and The Second Incremental RFP will follow the process described in Section 10.2.1, but the TO will revisit step 4A, and PJM and the TO may modify the location and capability requirements for the replacement black start resource, as well as the market window, if necessary, to allow more resources to become viable as replacements, even if sub-optimal. At this point, the TO will be notified of the first failed First Incremental RFP, or RTO Wide RFP, to allow them to begin preparation of a Black Start solution should the Reliability Backstop in Section 10.3 be necessary

Any black start resources identified as a result of the Second Incremental RFP will be notified by PJM, and PJM and the TO will coordinate with the black start unit owner for its acceptance under the PJM tariff as a black start unit.

If no projects are identified under the Second Incremental RFP, after the modified search criteria and market window (Second Incremental RFP), PJM and the TO will investigate the cause for the absence of bids, and recommend corrective action in accordance with the existing cost-based service process outlined in Schedule 6A of the PJM OATT, or address other barriers to entry identified by such investigation within the bounds of the existing tariff. In the process of this investigation, PJM will also identify limits for adjusting the cost of entry and other corrective actions within the bounds of Schedule 6A of the PJM OATT, beyond which PJM will discontinue

efforts to incent a replacement black start unit. Implementation of the Reliability Backstop as described in Section 10.3.

F. After PJM and the TO have identified the most cost-effective replacement resource, PJM and the TO will coordinate with the GO for the GO's acceptance under the PJM tariff as a black start unit.

The replacement black start unit will be compensated for provision of the black start service in accordance with the existing process outlined in the PJM OATT. Schedule 6A of the PJM tariff sets forth a formula for payments to generators for black start service and the collection of such costs from transmission customers. The annual black start service revenue requirements of each generator are determined pursuant to this formula. The Schedule 6A formula includes allocation factors for fixed and variable generation costs, which are to be used "unless another value is supported by the documentation of costs." The generator owner may choose compensation under the formulaic rate by submitting the formulaic black start costs to PJM as filing for recovery of actual costs, with accompanying documentation, to the FERC.

10.2.36 Implications for Terminating Black Start Units Incremental RFP Process Step 5

This section applies to black start units procured during the First or Second Incremental RFP for the purpose of replacing a black start unit(s) that is terminating. If it is determined that a black replacement start resource procured under either the First or Second Incremental RFP will not be available prior to the proposed termination deactivation date of the black start unit or the proposed date of withdrawal of a black start unit from providing black start service, PJM, in accordance with the PJM Deactivation procedures (see Section 8 of this manual), will use the following process.

A. PJM will identify whether there is a need to request that the generator continue to provide black start service beyond the planned termination date, deactivation date or withdrawal date of the black start unit, pending procurement of black start resources during the Incremental RFP process the upgrading of the transmission system in the form of replacement black start capability. Within 30 days of the black start unit owner's GO's notification of the proposed deactivation or withdrawal of the black start unit from providing black start service, PJM will notify the GO whether there is a need for the black start unit proposed for deactivation or withdrawal to continue operating beyond its proposed deactivation date or withdrawal date.

B. In the event that such notice requests that a black start unit proposed for withdrawal from providing black start service (but which is not deactivating) continue operating, the notice shall request that such unit voluntarily fulfill its two-year rolling commitment period to provide black start service.

C. In the event that the notice requests that a black start unit proposed for deactivation continue operating, the notice shall provide an estimate of the time period that the black start unit is needed to operate beyond its proposed deactivation date.

D. Within 30 calendar days of such notice by PJM, the black start unit owner GO shall notify PJM whether the black start unit will continue operating beyond its proposed deactivation date or withdrawal date.

E. A black start unit proposed for deactivation that operates beyond its deactivation date shall be compensated pursuant to the deactivation procedures set in Section 8 of this Manual, forth below and in Part V of the PJM Tariff.

F. A black start unit proposing to withdraw from providing black start service (but which is not deactivating) that continues providing black start service for its entire rolling two-year

commitment period shall receive black start service revenues pursuant to Schedule 6A of the PJM Tariff but will not be eligible for compensation pursuant to Part V of the PJM OATT-Tariff.

G. In the event that, through the First or Second Incremental RFP market window process described above, a replacement black start resource is identified, and so long as any other mitigation measures identified by PJM under Part V of the PJM OATT are in place, PJM, as soon as practicable, shall notify the black start unit owner GO of such replacement, that its black start unit no longer will be needed for reliability, and the date the black start unit may withdraw from providing black start service or deactivate without affecting reliability.

10.3 Black Start Reliability Backstop RFP Process

10.3.1 Reliability Backstop Process Step 1

PJM and TO discuss the Black Start shortage and the possibility of triggering the Reliability Backstop RFP

The triggers for the Reliability Backstop process are

- 1) A Black Start generation shortage in a TO zone, AND
- 2) Two failed RFPs (no technically viable solutions to address the Black Start shortage are identified or cost recovery terms that do not conform to the PJM OATT), are identified during the Incremental RFP process in Section 10.2; AND
 - a. Two failed Incremental RFPs, or
 - b. Failed RTO Wide RFP and one failed Incremental RFP, AND
- 3) No cross-zonal solutions available, AND
- 4) no RTEP transmission solutions available (e.g., operational performance baseline upgrade)

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Targeted Timeline: Within 5 days of determination of failed Second Incremental RFP

10.3.2 Reliability Backstop Process Step 2

PJM, TO and affected State(s) will discuss the Black Start shortage situation including the benefits and costs of the TO proposal and the implications of the shortage of Black Start to the restoration plan. Considering these discussions, PJM will determine whether to issue Reliability Backstop RFP. If Reliability Backstop RFP is not issued, PJM will actively monitor the Black Start shortage.

In the event that PJM and the TO do not agree on the decision concerning the Reliability Backstop RFP, PJM will initiate a review with the SOS-T for additional technical assessment and if after the SOS-T evaluation, an agreement is not yet achieved, the PJM Dispute Resolution process will be employed. Please refer to Section 5 of the PJM Manual for Administrative Services for the PJM Interconnection Agreement (M33) for more details about the PJM Dispute Resolution process.

Targeted Timeline: Within 10 days of determination of failed 2nd RFP

10.3.3 Reliability Backstop Process Step 3

Once PJM determines that the Reliability Backstop Process is required, it will issue the Reliability Backstop RFP. As part of this online notification, the TO solution will be made public

(except for information that is Critical Energy Infrastructure Information). The TO solution may be owned by the TO, by a generation owning affiliate or contracting for by the TO with a generation owning third party. The TO has the obligation to submit a solution proposal into the Reliability Backstop RFP. The RFP will indicate that any proposed Black Start unit, whether it is a TO proposed unit, or a GO proposed unit, will be used for Black Start purposes only. The unit will NOT participate in the capacity market, energy market or other ancillary service markets except Black Start. The unit will run for Black Start and Black Start testing purposes only.

The Reliability Backstop RFP will be conducted on an accelerated schedule of 30 days.

Targeted Timeline: Within 15 days of determination of failed 2nd RFP

10.3.4 Reliability Backstop Process Step 4

PJM will evaluate any responses from the Reliability Backstop RFP in comparison with the TO solution. If the TO solution is the only option received (or the best option received), it will be implemented.

It will be the responsibility of the TO to submit a filing with FERC under the Federal Power Act as necessary, to recover costs (capital costs, ongoing O&M costs, depreciation and/or fuel) as Transmission Assets. Such costs recovery this would be in Attachment H for TO owned generation, or such other revenue requirement filed with and accepted by FERC, or as contracted for outside of OATT Schedule 6A. For GO owned BS, recover through Schedule 6A of OATT, or FERC filing.

Any Black Start generation acquired in the Reliability Backstop RFP (regardless of ownership or cost recovery method) must adhere to all Black Start testing and performance requirements as described in OATT Schedule 6A and the PJM Manuals.

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10.3.5 Reliability Backstop Process Flow Chart

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