



# PJM RTEP – 2018 RTEP Proposal Window #1

PROBLEM STATEMENT & REQUIREMENTS

**DOCUMENT SCOPE: 2023 SUMMER RELIABILITY ANALYSIS; 2023 WINTER RELIABILITY ANALYSIS;  
2023 LIGHT LOAD RELIABILITY ANALYSIS**

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PJM Interconnection

Original Document: July 2, 2018

Version 1

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# 2018 RTEP Proposal Window #1

## PURPOSE OF PROPOSAL WINDOW

PJM seeks technical solutions, also called proposals, to resolve potential reliability criteria violations on facilities identified below in accordance with all applicable planning criteria (PJM, NERC, SERC, RFC, and Local Transmission Owner criteria).

## CRITERION APPLIED BY PJM FOR THIS PROPOSAL WINDOW:

- 2023 Summer Baseline Thermal and Voltage N-1 Contingency Analysis
- 2023 Summer Generator Deliverability and Common Mode Reliability Analysis
- 2023 Summer Load Deliverability Thermal and Voltage Analysis
- 2023 Summer N-1-1 Thermal and Voltage Analysis and Voltage Collapse
- 2023 Winter Baseline Thermal and Voltage N-1 Contingency Analysis
- 2023 Winter Generator Deliverability and Common Mode Reliability Analysis
- 2023 Winter Load Deliverability Thermal and Voltage Analysis
- 2023 Winter N-1-1 Thermal and Voltage Analysis and Voltage Collapse
- 2023 Light Load Baseline Thermal and Voltage N-1 Contingency Analysis
- 2023 Light Load Generator Deliverability and Common Mode Reliability Analysis

## TERMINOLOGY FOR PROPOSAL WINDOWS

Through the analyses listed above, PJM has compiled a list of criteria violations. The violations and the impacted facilities are identified by a table of flowgates. Descriptions of the column headings are provided below. Different analyses often use different column headings. Additional information may also be provided as needed.

Typical thermal analysis column headings:

Column Heading	Title	Description
FG #	Flowgate Number	A sequential numbering of the identified potential violations
Fr Bus	From Bus Number	PSSE model bus number corresponding to one end of line identified as a potential violation
Fr Name	From Bus Name	PSSE model bus name corresponding to one end of line identified as a potential violation
To Bus	To Bus Number	PSSE model bus number corresponding to other end of line identified as a potential violation
To Name	To Bus Name	PSSE model bus name corresponding to other end of line identified as a potential violation
Monitored Facility	Monitored Facility	The circuit on which a potential violation is occurring
Base Rate (MVA)	Base Rate (MVA)	Normal Facility Rating (Rate A)
% Overload	Percentage Overload	Percentage above Base Rate
CKT	Circuit	Circuit number of identified potential violation

KVs	Kilovolt level (A/B)	Kilovolt level of both sides of potential violation, if A does not equal B, potential violation is a transformer
Areas	Area Numbers (A/B)	Area numbers of both ends of potential violation (A=From Bus Area Number, B=To Bus Area Number) If A does not equal B, potential violation is a tie line
Rating	Line Rating	Applicable thermal rating (MVA) of line
DC Ld(%)	Direct Current Loading percentage	Percentage above Line Rating determined from DC testing
AC Ld(%)	Alternating Current Loading percentage	Percentage above Line Rating determined from AC testing
Cont Type	Contingency Type	Contingency categorization (e.g., Single, Bus, Line_FB, Tower)
Cont Name	Contingency Name	Contingency name as identified in associated contingency file or embedded in the spreadsheet
Contingency	Contingency	Contingency description
Violation Date	Violation Date	Date on which violation is expected to occur
Analysis Case	Analysis Case	Case title to use in replicating analysis

Typical voltage analysis column headings:

Column Heading	Title	Description
FG #	Flowgate Number	A sequential numbering of the identified potential violations
Bus #	Bus Number	PSSE model bus number corresponding to bus identified as a potential violation
KVs	Kilovolt level	Kilovolt level of bus identified as potential violation
Area	Area Number	Area number of bus identified as potential violation
ContVolt	Contingency Voltage (P.U.)	Per Unit Voltage at identified bus after contingency is applied
BaseVolt	Basecase Voltage (P.U.)	Per Unit Voltage at identified bus before contingency is applied
Low Limit	Low Voltage Limit(P.U.)	Threshold of Per Unit Low voltage, if ContVolt is under this limit, a potential violation is identified
Upper Limit	High Voltage Limit(P.U.)	Threshold of Per Unit High voltage, if ContVolt is over this limit, a potential violation is identified
Cont Type	Contingency Type	Contingency categorization (e.g., Single, Bus, Line_FB, Tower)
Vdrop (%)	Voltage drop	The percentage that the voltage has dropped as a result of the contingency
Contingency	Contingency	Contingency name as identified in associated contingency file
Contingency 1	First Contingency	N-1 (first) contingency identified

Contingency 2	Second Contingency	N-1-1 (second) contingency identified in N-1-1 analysis
Violation Date	Violation Date	Date on which violation is expected to occur
Analysis Case	Analysis Case	Case title to use in replicating analysis

Typical short circuit analysis column headings:

Column Heading	Title	Description
BUS_NO	Bus Number	Aspen bus number where breaker is located
BUS	Bus Name & Voltage	Aspen bus name and voltage where breaker is located
BREAKER	Breaker Name	Breaker name as given by Transmission Owner
RATINGTYPE	Type of Breaker	Symmetrical (S) or Total (T) rated type of breaker
DUTY_P	Duty Percentage	The percentage of the asymmetrical fault current divided by breaker capacity
DUTY_A	Asymmetrical Fault Current	The combination of the symmetrical component and the direct current component of the current.
BKR_CAPA	Breaker Capacity	Breaker’s derated interrupting capability, (A)
ISC	Symmetrical Fault Current	Fault currents for applied faults
X/R	X/R Ratio	ANSI X/R ratio of the applied faults
3LG_AMPS	3 Phase Fault Current	Maximum 3LG fault current at breaker bus
3LG_X/R	3 Phase X/R Ratio	ANSI X/R ratio in 3LG fault at breaker bus
1LG_AMPS	Single Phase Fault Current	Maximum 1LG fault current at breaker bus
1LG_X/R	Single Phase X/R Ratio	ANSI X/R ratio in 1LG fault at breaker bus
RATING Breaker Rating	RATING Breaker Rating	Applicable breaker capacity rating (MVA/kA) of breaker
ITRPT	Interrupting Time	The maximum permissible interval between the energization of the trip circuit at rated control voltage and rated mechanism pressure and the interruption of the current in the main circuit in all poles
PT1	Contact Parting Time One	Contact parting time setting for protective equipment group 1
PT2	Contact Parting Time Two	Contact parting time setting for protective equipment group 2
OPKV	Operating Voltage	The normal voltage for a device
MXKV	Maximum Voltage	The upper operating voltage limit for a device

K	Voltage Range Factor K	The range of voltage to which the breaker can be applied, equaling the maximum rated operating voltage divided by the minimum rated operating voltage
NACD	Non-ac-decay ratio of the breaker	The ratio of the breaker current from remote sources to the total breaker current.
RCLS	Reclosing Time	The time interval between energizing the trip circuit and making the primary arcing contacts

## ANALYSIS PROCEDURE

Participants are expected to develop solutions to the identified criteria violations and perform analysis to validate that the solutions remove these violations. RTEP analysis is documented in PJM Manual 14F, which is available here: <http://www.pjm.com/-/media/documents/manuals/m14f.ashx>

Proposed solutions must also meet Transmission Owner Planning Criteria which is available here: <http://www.pjm.com/planning/planning-criteria/to-planning-criteria.aspx>

Although PJM does its best to provide complete and accurate results, flowgates may be added or removed from consideration in the proposal window. PJM works with Transmission Owners, Generation Owners, neighboring TOs and other affected parties to verify the quality of the analysis. As a result, the list of violations under consideration may change. PJM endeavors to minimize such changes and will clearly communicate any changes to the participants.

PJM regularly updates the system model to reflect changes to the transmission system. Analyses are performed to verify that violations are still valid, new violations have not manifest and proposed solutions still address targeted violation.

PJM maintains the right to select the most effective solution to any violation.

## SCOPE OF WORK

PJM is seeking proposals to resolve identified reliability criteria violations.

As discussed in TEAC meetings, several criteria violations have been identified for facilities where the loading includes contributions from a generator which has announced its intent to retire, but has not yet retired or has been retired for less than 1 year. PJM reliability procedures maintain retired generators in system models and simulations for 1 year after their retirement in order to preserve their capacity rights. If the generator retires as planned, the loading on these facilities is anticipated to remain within the facility rating, so no criteria would be violated. Additionally, criteria violations have been identified for facilities where the loading includes a contribution from a suspended ISA generator in the PJM Generation Interconnection queue. Due to the uncertainty, PJM is not seeking competitive proposals to address these criteria violations.

Many criteria violations have been identified in the APS transmission zone for facilities impacted by announced generator deactivations. Analysis and planning for these retirements is still in progress. PJM expects that most, if not all, of these criteria violations will be resolved as part of the deactivation process. PJM is retooling the current cases to reflect the proposed system changes driven by these deactivations and will re-analyze the APS zone. The new results will be released as an addendum, if needed, to this proposal window as soon as possible. Note that the results of the N-1-1 Voltage analysis for the APS zone have not been included in the initial release of the window materials but will be included with the updated results after the case retool and re-analysis.

## OBJECTIVES

1. Develop complete solutions to identified criteria violations;
2. Develop solutions to all new criteria violations generated as a consequence of proposed solution. Solutions to these secondary violations are required for the proposal to be considered.
3. Adhere to all applicable planning criteria, including PJM, NERC, SERC, RFC and Local Transmission Owner Criteria.

## WHAT PJM PROVIDES:

The information listed below is provided to allow replication of PJM analyses. The data is designated Critical Energy Infrastructure Information (CEII) and must be handled accordingly:

1. Power Flow Base Cases. Identifies one or more system configurations to which planning criteria are applied.
2. Contingency List: Lists all contingency types (single, bus, tower, line w/ stuck breaker).
3. Subsystem Files: Identifies all subsystem zones to be considered in analysis.
4. Monitor Files: Identify specific ranges of facilities by area and kV level to be considered in analysis.
5. Facility Ratings: (if different from those included in the base cases)
6. Violations List: Lists all criteria violations with power flow results and additional technical notes (flowgates).  
The results indicate the case(s) to which the criteria violations apply.
7. Short Circuit Base Case. This case reflects the 2023 RTEP base case.
8. Breaker Change Files. Lists all over-duty breakers in a specific TO area.
9. TO Criteria Setting Files. Lists settings used for short circuit analysis for each specific TO.

### RESPONSE BACK TO PJM (DELIVERABLES)

This section describes the required elements of a complete proposal. The absence of any element renders the proposal incomplete and the proposal will not be considered for selection.

Often there are several viable solutions to a given violation. Alternate approaches should be included in separate proposals. PJM will not accept proposals with multiple options.

There are three categories of information required for a complete package and one item only required if necessary.

- Technical analysis files and documentation
- Completed proposal submittal template
- Project diagrams
- Company evaluation and operations and maintenance information (if required)

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### TECHNICAL ANALYSIS FILES AND DOCUMENTATION

Include the following technical information to provide a complete project proposal package:

1. A detailed analysis spreadsheet showing the planning analysis results for the project.
2. A set of updates to the power flow cases which model the proposed solution. File format must be compatible with PSS/E version 33. All cases must be solvable and convergent. Include an idev, or equivalent type, file so that the proposed system changes may be easily applied to other models. Assign a unique identifier when new busses are required. Provide contingencies in a single file for each contingency type. Organize the contingencies into one of three categories:
  - a. Modified Contingencies
  - b. New Contingencies
  - c. Deleted Contingencies
3. List of all proposed equipment along with relevant parameters and assumptions.
  - a. All necessary parameters, e.g., equipment ratings, impedances, line lengths, etc.
  - b. For reactive devices, settings and outputs
  - c. For synchronous machines, MW and MVAR output assumptions
4. All necessary PSS/E idev files or appropriate data to model upgrade.
5. An analysis report of proposed solution which identifies the issues being addressed.
6. Additional documentation required to verify the proposal.

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## PJM PROPOSAL SUBMITTAL FORM

The PJM proposal submittal form captures project details, such as the criteria violations or system constraints that are being targeted by the project, the overall and specific project descriptions and the details of cost commitment, if proposed. A blank template of the proposal submittal form is included with the window information.

Provide both a public and a confidential version of the PJM proposal submittal form in order for the proposal to be considered complete. The public version of the proposal form will be published on the PJM website after the close of the window. Redact only CEII and business proprietary and confidential information from the public version of the proposal submittal form. PJM reserves the right to challenge proposed redaction of information in order to ensure the appropriate level of transparency.

Redaction guidelines are being revised to better align with the current proposal submittal form. The [current guidelines](#) are posted on the PJM webpage. Revisions to the guidelines will be presented to the Planning Committee. The most current guidance, at the time writing, was presented at the June 7, 2018 PC meeting, items [11a](#) and [11b](#).

### Project Diagrams

Provide project diagrams to detail how the proposed solution will modify existing infrastructure and how new infrastructure will be configured and where new infrastructure will be sited. Project diagrams include, but are not limited to the following:

- Single line diagrams
- Substation general arrangement and station layout. If expansion of the substation is necessary, identify the following:
  - Area to be modified
  - Land ownership or acquisition plan
- Line routing diagram(s) identifying areas of new right-of-way acquisition
- Detailed project schedule. Include, at minimum, the following major work activities:
  - Engineering and Design
  - Siting and Permitting
  - ROW and Land acquisition
  - Material procurement
  - Construction
  - Testing/Commissioning

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## Company Evaluation and Operations and Maintenance Information

For proposers seeking Designated Entity status, provide additional information which will aid PJM in understanding how the proposed solution will be developed, constructed, operated and maintained. Include this information as a separate document within the proposal package.

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## TRANSMITTAL OF PROPOSALS

Utilize the PJM secure file transfer system for the submission of proposals. The address of the portal is <https://sftp.pjm.com/>.

[Submit all files required for submission of a complete proposal as a single. Submit a separate file for each proposal.](#)

## PROPOSAL FEES



Each proposal submitted to the 2018 RTEP Proposal Window 1 is subject to a fee. The fee is based on the estimated cost of the complete proposed solution. Include in the cost estimate, all elements described in the proposal, including upgrade work completed by other entities and work needed to alleviate new violations caused by the project.

The fee schedule is:

Total Project Cost	Proposal Fee
\$20M or less	No fee
Between \$20M and \$100M	\$5,000.00
\$100M or more	\$30,000.00

The proposal fee is due at the time of proposal submission.

### TIMELINE

**7/2/2018:** Opening of 2018 RTEP Proposal Window 1

**8/31/2018:** Close of 2018 RTEP Proposal Window 1 at 11:59 Eastern Daylight Time

Notes:

- Confidentiality of individual proposals will be maintained for the duration of the window.
- Proposals received after close of the proposal window will not be accepted.

### QUESTIONS

Questions about the proposal window must be submitted to the PJM [Planning Community](#). Questions involving confidential information or CEII should be submitted under the “Confidential” topic on the Planning Community. Answers will be provided to all participants in the proposal window.

Please reference 2018 RTEP Proposal Window 1 in all correspondence.

DOCUMENT REVISION HISTORY

7/2/2018 – V1 – Original Problem Statement posted to the 2018 RTEP Proposal Window 1 secure webpage.