

# 5.4 Post Contingency Local Load Relief Warning

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## **Post Contingency Local Load Relief Warning**

### **Non-Market Post Contingency Local Load Relief Warning**

The purpose of the Post Contingency Local Load Relief Warning (PCLLRW) is to provide advance notice to a Transmission Owner(s) (TOs) of the potential for load shed in their area(s). It is issued after all other means of transmission constraint control have been exhausted or until sufficient generation is on-line to control the constraint within designated limits and timelines as identified in the PJM Manual for [Transmission Operations](#) (M-03), Section 2 – Thermal Operating Guidelines.

For facilities which are not Monitored Priority 1 “Reliability and Markets” facilities, PJM will issue a corresponding Non-Market Post Contingency Local Load Relief Warning. For the purposes of this procedure, the steps and actions listed in this section apply to both Market and Non-Market PCLLRWs.

A Post Contingency Local Load Relief Warning is to be communicated to the applicable TO(s) and posted via the Emergency Procedures Posting Application and is not communicated via the PJM ALL-CALL). The PCLLRW is not considered a standing Directive to the TO for load shed. If the contingency for which the PCLLRW was issued occurs, PJM will evaluate the system conditions and then, if needed, issue a Load Shed Directive. The Load Shed Directive will be posted via the Emergency Procedures Posting Application. This procedure is distinct and separate from the MANUAL LOAD DUMP WARNING (Use “ALL-CALL”). Refer to Manual Load Dump Warning procedure for Capacity Shortages, Interface Reactive Constraint Management or Multi Area Transmission Constraint Management.

Except for the single area “Post Contingency Local Load Relief Warning”, the Manual Load Dump Warning is unchanged. This change should preserve the sense of urgency appropriate for both. Post-Contingency Local Load Relief Warnings are intended to relieve localized constraints, generally 230kV and below. A Manual Load Dump Warning should still be used for Capacity Shortage conditions which result in Interface Reactive Constraint or Multi Area Transmission Constraint Management.

[Attachment I](#), Local Post-Contingency Operating Guide, contains planning guidelines to identify and document known contingency pairs where post-contingency load shed would be acceptable in lieu of transmission reinforcements. These guidelines do not impact how PJM Dispatch implements Post-Contingency Local Load Relief Warnings.

PJM Dispatch operates more conservative for designated Interconnection Reliability Operating Limits (IROL).

PCLLRW should be implemented as post-contingency violations approach 60 minutes in duration. PCLLRW can be issued sooner at the request of the Transmission Owner or at the discretion of the PJM dispatcher if it anticipates that generator startup + notification exceed 60 minutes.

## PJM Actions

- PJM and TO dispatcher(s) review contingency flows / limits and discuss off-cost operations/switching solutions prior to implementation of a Post-Contingency Local Load Relief Warning, system conditions and time permitting.
- PJM and TO dispatcher(s) review and implement acceptable pre-contingency switching, load transfer, and generation redispatch options. If post-contingency actions are required, PJM will issue a Post-Contingency Local Load Relief Warning.

If post contingency flows exceed the Load Dump rating, PJM will direct the Transmission Owner to implement any available switching solutions, provided they do not create any additional actual overloads in exceedance of their normal rating or post-contingency overloads.

- PJM Dispatch commits/de-commits effective generation consistent with Manual 12 – [Dispatch Operations](#), Attachment B – Transmission Constraint Control Guidelines, including adjusting hydro/pumping schedules, curtailing interchange transactions, and/or committing quick-start generation to control flows within acceptable limits, as appropriate. The market to market redispatch must be implemented where applicable.

As indicated in M-12, for “Reliability Only” facilities (i.e. facilities not under PJM Congestion Management) the Transmission Owners have the option to pay for generation redispatch on a pre-contingency basis or accept a PCLLRW. However, if a “Reliability Only” facility exceeds its Load Dump rating, PJM will manually dispatch generation to maintain flows below the Load Dump rating. Transmission Owners will be responsible for financial impacts of generation that is redispatched to alleviate an overloaded facility above its Load Dump Rating.

- PJM Dispatch implements 100% Synchronized Reserves (refer to [PJM Manual M-12: Section 4.1.2 “Loading Reserves”](#) for member actions) and/or declares a Local Maximum Generation Emergency Event, as appropriate.
- PJM Dispatch issues the Post-Contingency Local Load Relief Warning to the TO dispatcher of the overloaded equipment, stating that enough load must be shed to maintain flows on the monitored facility below the Emergency Rating or an agreed upon level. If the TO does not have sufficient load to shed or sufficient time to shed the load to comply, the TO will inform PJM. PJM will then review the PCLLRW to include neighboring TO loads if applicable or develop an alternative plan to control.

If all of the load to be shed is in the non-owning Transmission Owner’s territory, PJM may issue the PCLLRW to the Transmission Owner with the load and not the Transmission Owner of the limiting equipment. However, PJM will inform/coordinate the post contingency load shed plan with the Transmission Owner of the equipment.

- PJM Dispatch provides the load distribution factor report to the impacted TO dispatcher(s) via the PCLLRW eTool application and via e-mail. Load Distribution Factor reports should be redistributed as changes to system reconfiguration warrant. Any post contingency switching solutions or post contingency generation redispatch will be documented in the PCLLRW application.
- [PJM will include the Transmission Owner verified Behind the Meter Generation \(BtMG\) information in the Post Contingency Local Load Relief Warning \(“PCLLRW”\) tool or other](#)

as applicable. PJM dispatch will NOT instruct the TO to schedule BtMG. This information is provided for awareness only.

- PCLLRW eTool application link: <https://pjmpcllrw.pjm.com/>
- PJM Dispatch issues a Post-Contingency Local Load Relief Warning via Emergency Procedure Posting Application to the PJM web-site, detailing any post-contingency switching, quantity of generation reduction, procedure or load-transfer solution, providing additional information regarding the firmness of anticipated post-contingency load shed.
- PJM and TO dispatcher (s) periodically review and monitor approved post-contingency switching options.
- PJM Dispatch reviews acceptable post-contingency switching options. Post-contingency switching, generator reduction, or load transfer options should be implemented prior to implementing a Load Shed Directive.
- PJM and TO Dispatcher(s) should review potential post-contingency manual generation trip schemes. Manual generation trip schemes should be identified and agreed to in advance.
- PJM and TO dispatch (s) should agree upon post-contingency load transfer options. Transmission owner dispatch(s) would need to periodically re-evaluate the load transfer solution.
- PJM Dispatch establishes a mutual awareness with the appropriate TO dispatcher(s) of the need to address the occurrence of a serious contingency with minimum delay.
- PJM Dispatch examines area bulk power bus voltages and alerts the appropriate TO dispatcher(s) of the situation.
- PJM Dispatch shall be prepared to implement a Load Shed Directive if post-contingency switching, generator reduction, or load transfer options fail and the contingency occurs. The Load Shed Directive will be posted via the Emergency Procedures Posting Application.
- PJM Dispatch cancels the warning, when appropriate.

[A Load Shed Directive will be issued in accordance with the Load Shed Directive Operating Procedure as outlined in the Section 5.7](#)

#### **PJM Member Actions**

- PJM and the TO dispatcher(s) discuss the amount of load to be curtailed to return flows below emergency ratings and the effective location(s). The TO dispatcher(s) shall utilize the PCLLRW eTool application to notify PJM when the load to shed has been identified. The TO dispatcher(s) will also notify PJM if there is not sufficient load to shed, or sufficient time to implement the load shed, to reduce the post contingency flows below the emergency rating.
- TO dispatcher(s) shall identify facility loading concerns which would necessitate additional load shed to reduce post-contingency flows below emergency rating.
- TO dispatcher(s) continues to monitor expected post-contingency flows and adjusts their load shed strategy as appropriate in the PCLLRW eTool application.
- TO dispatcher(s) advise appropriate station/stations and key personnel.

- TO dispatcher(s)/DPs review local procedures and prepare to shed load in the amount requested.
- TO dispatcher(s)/DPs reinforce internal communications so load shed can occur with minimum delay.
- TO dispatcher(s) shall be prepared to implement post-contingency switching options, manual generation trip schemes or load transfer via SCADA with minimum delay.
- TO dispatcher(s) shall be prepared to implement a Load Shed Directive if post-contingency switching, generator reduction, or load transfer options fail.
- TO dispatcher(s) man substations as necessary if SCADA control is unavailable or insufficient.
- TO dispatcher (s) shall notify PJM Dispatch if post-contingency flows fall below Emergency Ratings and the PCLLRW has not been canceled.
- Generator Operators to reduce/trip generation if instructed by PJM.

#### **5.4.1 Post-Contingency Load Dump Limit Exceedance Analysis**

As indicated in section 5.4, a PCLLRW is issued after all other means of transmission constraint control have been exhausted or until sufficient generation is on-line to control the constraint within designated limits and timelines as identified in PJM Manual 03, Transmission Operations, Section 2 – Thermal Operating Guidelines. However, if post-contingency flow were to exceed the 15-minute Load Dump rating, there is a concern that the facility may trip before actions could be implemented to reduce the flow within limits. To prepare for this potential N-2 (initial contingency plus the overloaded facility) and prevent a cascade, PJM will perform up to an N-5 analysis on facilities over 115% of their 15-minute Load Dump rating.

As indicated in PRC-023 R1.2 and R1.11, transmission line relays and transformer overload protection relays are set so they do not operate at or below 115% of the facility’s highest emergency rating. For PJM facilities, the highest rating is the Load Dump rating. Therefore, PJM will perform the following analysis for any facility that reaches or exceeds 115% of its Load Dump limit:

In the event the post contingency load dump exceedance was caused by the sudden loss of a generating resource or transmission element, the PJM dispatcher will immediately take action to mitigate the overload. The cascade analysis will be performed if it is determined there is not sufficient controlling actions to mitigate the initial overload below 115% of the load dump rating within 30-minutes of its identification.

#### **PJM Actions**

- If a facility approaches 115% of its Load Dump limit, the PJM Operator will study the loss of the contingency element and the overloaded facility.
  - If the study results indicate no additional facilities will be overloaded over 115% of their Load Dump limit, this is determined to be a localized event and no additional pre-contingency actions will be taken.
  - If the study results in an additional facility(s) over 115% of its Load Dump rating, the operator will continue the analysis to also trip the additional circuits. This analysis will be performed tripping a maximum of 5 facilities. If the study indicates

either a non-converged case OR continues to show facilities exceeding 115% of their Load Dump limits, this will be considered a potential cascade situation. The PJM operator will review the results with the Transmission Owner and direct pre-contingency Load Shed.

If both PJM and the impacted TO(s) operators agree the non-convergence is the result of an unsupportable radial load pocket (i.e. local voltage collapse) or the overloaded facility is serving radial load, this will be considered a local event and pre-contingency load shed will NOT be instructed by PJM.

Load Shed will be directed in the amount needed to maintain the post contingency flow below 115% of the Load Dump limit on the original contingency within 30-minutes of detection of the potential cascade situation.