

Emergency Procedures

Operating Committee

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PJM System Operator Training

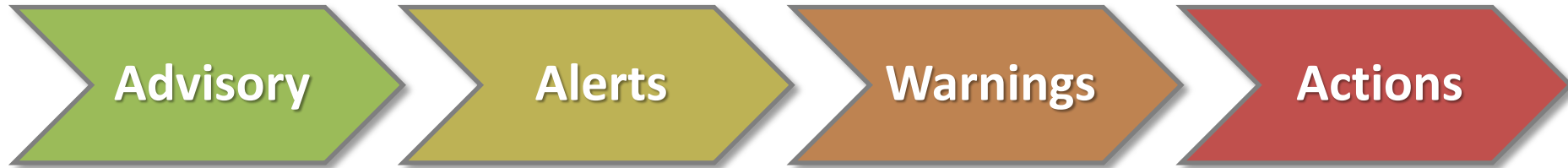
PJM Manual 13

- Manual for Emergency Operations
- Focuses on how PJM and PJM Members are expected to respond to emergency conditions
- Is the designated PJM RC, BA and TOP Operating Plan to mitigate operating Emergencies per EOP-011



Emergency Procedures Introduction

- 4 levels of emergency procedures:



- Most Advisories, Alerts, Warnings and Actions are communicated via:
 - PJM ALL-CALL
 - Posted to various PJM websites
- Advisories and Alerts are issued in advance of the operating day
- Warnings and Actions are issued during the operating day

Emergency Procedures Introduction

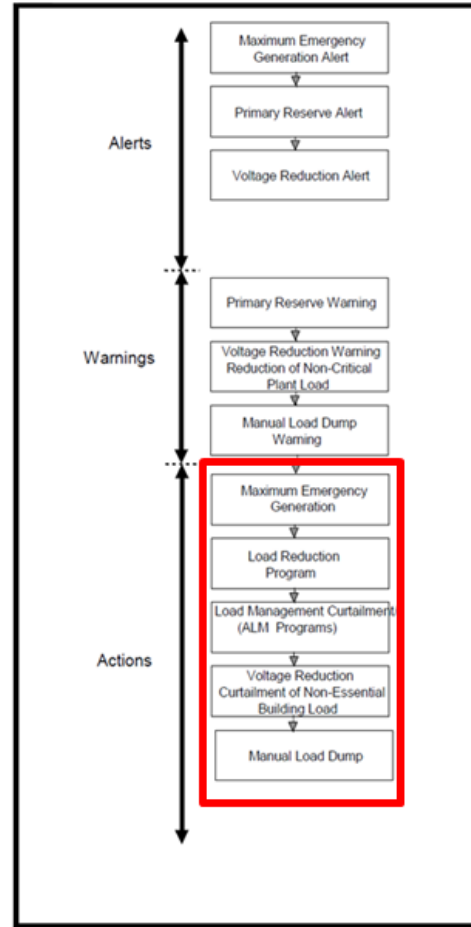
- The PJM dispatcher has the flexibility to:
 - Implement emergency procedures in whatever order is required
 - Exit the emergency procedures in a different order than they are implemented when necessary
- PJM members are expected to implement all emergency procedures immediately
 - Desired relief expected within 30 minutes, unless directed otherwise

Emergency procedure comparison

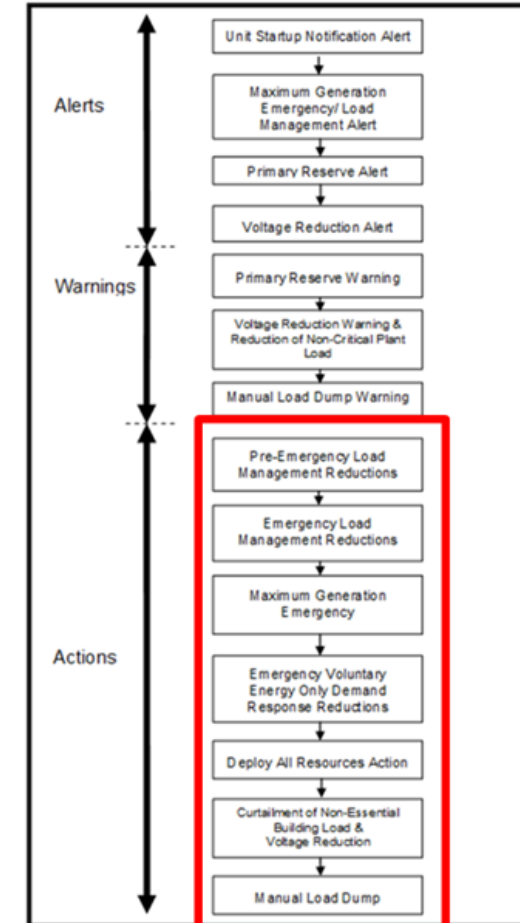
2006 vs. 2019

- Capacity related emergency procedure changes since 2006.

Manual 13 v25 2006



Manual 13 v68 2019



Performance Assessment Interval

A Capacity Performance Assessment occurs when one of eleven specific emergency procedures are initiated by PJM system operators. PJM calculates (after-the-fact) the actual performance of capacity resources evaluating real-time production versus their UCAP position, results in bonus payments or penalty charges.

“How well you’re doing versus what you’re committed to do?”

The interval means this assessment occurs every 5 minutes during the assessment period.

From M-13:

Note:

All Warnings and Actions listed in Steps 1 to 10 below will trigger a capacity **Performance Assessment Internal (PAI)** as detailed in *PJM Manual 18, PJM Capacity Market*.

Performance Assessment Interval Triggers

(Steps 1-10 in Sections 2 of Emergency Procedures Manual 13)

Pre-Emergency Load Management Reduction Action (30, 60 or 120 minute)

Emergency Load Management Reduction Action (30, 60 or 120 minute)

Primary Reserve Warning

Maximum Generation Emergency

Emergency Voluntary Energy Only Demand Response Reductions

Voltage Reduction Warning

Curtailement of Non-Essential Building Load

Deploy All Resources Action

Manual Load Dump Warning

Voltage Reduction Action

Manual Load Dump Action

Warnings

Actions

Emergencies

- Capacity Shortages
- Transmission Emergencies

Capacity Emergencies

Primary Reserve Warning

- Purpose

Warning that available Primary reserves are less than required Primary Reserve Requirement and present operations are becoming critical

- Trigger

Primary Reserve is less than Primary Reserve Requirement but greater than Synchronized Reserve Requirement

Voltage Reduction Warning

- Purpose

Warning that available Synchronized Reserves are less than required and present operations may require a voltage reduction. All secondary and primary reserve* is brought to a Synchronized Reserve status and emergency operating capacity is scheduled from adjacent systems

- Trigger

Synchronized Reserves are less than the Synchronized Reserve Requirement and present operations may require a voltage reduction

Manual Load Dump Warning & Curtailment of non-essential building load

Curtailment of Non-Essential Building Load

Purpose:

Provide additional relief, to be expedited prior to, or at the same time as the Voltage Reduction Action

Trigger:

In anticipation or activation of Voltage Reduction Action

Manual Load Dump Warning & Curtailment of non-essential building load

Manual Load Dump Warning

Purpose:

Warn Member Companies of increasingly critical system conditions that may require manually dumping load

Trigger:

When the Primary Reserve is less than the largest operating generating unit, or the loss of a transmission facility jeopardizes reliability after all possible measures have been taken to increase reserves

Pre-Emergency Load Management Reduction Action

Purpose:

To provide additional load relief by using PJM controllable load management programs (Relief is expected to be required after initiating Maximum Emergency Generation)

- Applies to any site registered in the PJM Demand Response Program as a Demand Resource (a.k.a. DR) type that needs 30, 60 or 120 minute lead time to make its reductions
- Reductions are mandatory when dispatched during the product availability window
- Minimum dispatch duration is 1 hour

Emergency Load Management Reduction Action

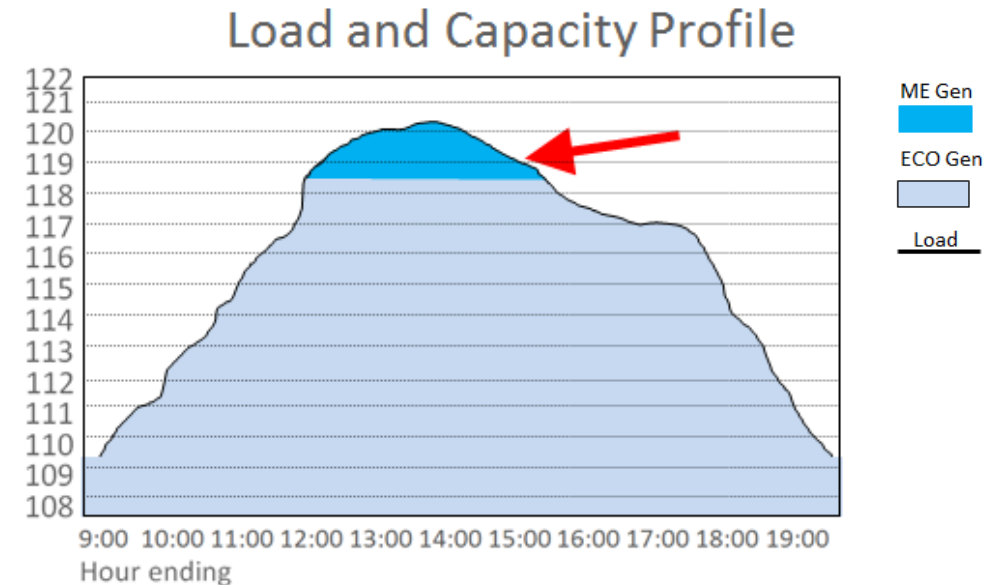
Purpose:

To provide additional load relief by using PJM controllable load management programs (Relief is expected to be required after initiating Maximum Emergency Generation)

- Applies to any site registered in the PJM Demand Response Program as a Demand Resource (a.k.a. DR) type that needs 30, 60 or 120 minute lead time to make its reductions
- Reductions are mandatory when dispatched during the product availability window
- Minimum dispatch duration is 1 hour

Maximum Generation Emergency Action

- Purpose:
To increase generation above the maximum economic level
- Trigger:
Real-time Generation is needed to meet the load demand that is greater than the highest incremental cost level



Emergency Voluntary Energy Only Demand Response Reduction Action

Purpose:

Request end-use customers who participate in the Emergency Voluntary Energy Only Demand Response program to reduce load during emergency conditions

Trigger:

Additional load relief is still needed

Program criteria:

Any site registered in the PJM Demand Response Program as an emergency energy only resource
Reductions are strictly voluntary

Deploy All Resources Action

Purpose:

To instruct members that all generation resources are needed online and at full output, and all demand resources are to be reduced immediately upon receipt of dispatch instruction

Trigger:

When unplanned events such as the loss of a transmission or generating facility have resulted in reliable operations being jeopardized

Voltage Reduction Action

Purpose:

To reduce voltage on the distribution system in order to reduce demand to provide a sufficient amount of reserve to maintain tie flow schedules and preserve limited energy sources

Trigger:

Load relief still needed to maintain ties

Voltage Reduction:

Voltage is reduced at distribution levels by 2.5% to 5% of nominal values depending on the area

Produces a 2-3% decrease in system load increasing transmission voltages

Generally not being noticed by customers (*lights dimmer, slower heating*)

Manual Load Dump Action

Purpose:

The Manual Load Dump Action is an Operating Instruction from PJM to shed firm load

Trigger:

To shed firm load When the PJM RTO cannot provide adequate capacity to meet the PJM RTO's load and tie schedules, or

Critically overloaded transmission lines or equipment cannot be relieved in any other way

Transmission Emergencies

Performance Assessment Interval Triggers

(Steps 1-10 in Sections 5.7 – Load Shed Directive - of Emergency Procedures Manual 13)

Pre-Emergency Load Management Reduction Action (30, 60 or 120 minute)

Emergency Load Management Reduction Action (30, 60 or 120 minute)

Primary Reserve Warning

Maximum Generation Emergency

Emergency Voluntary Energy Only Demand Response Reductions

Voltage Reduction Warning

Curtailement of Non-Essential Building Load

Deploy All Resources Action

Manual Load Dump Warning

Voltage Reduction Action

Manual Load Dump Action

Warnings

Actions

Emergency Procedures - Web Site

The screenshot displays the PJM website homepage. At the top, a navigation bar includes links for 'about pjm', 'training', 'committees & groups', 'planning', 'markets & operations', and 'library'. The main banner features a photograph of a modern office interior with the text 'Working: to perfect the flow of energy.' To the right, a 'Trending Topics' section lists 'CPP Compliance Assessment', 'Resource Investment in Competitive Markets', 'Whitepaper', and 'Technical Appendix', each with a PDF icon. Below this is the 'PJM Value Proposition' logo. The lower section is divided into three columns: 'Upcoming Meetings' (listing 'General Session Meeting' and 'Underperformance Risk Management Senior Task Force Meeting'), 'Data Shortcuts' (listing 'Operational Data', 'Data Viewer Guest', 'Data Snapshot', 'Maps', 'Data Directory', and 'Emergency Procedures', with a red dashed arrow pointing to the latter), and 'Quick Links' (listing 'Learning Center', 'Manuals', 'Careers', 'Agreements', 'History Highway', 'Site Updates', 'Issue Tracking', and 'Communications').

**Emergency Procedures can be viewed from the PJM Homepage (above)
(Access also available from Data Viewer or Markets Gateway)**

Postings

- Postings
- Message Definitions
- Message Priorities
- PAH Guidance Matrix
- PAH Active Guidance
- Regions
- Emergency Bid Form

Effective From * 12/06/2017 Effective To * 12/12/2017 Regions ▾ Message Types ▾ PJM Drill Include ▾ Active Only PAH Only Reset



Last Updated: 12.12.2017 08:29:21 Filters: 12/06/2017 to 12/12/2017; Include PJM Drill

Records Per Page: 15 ▾ ⏪ ⏩ (1 of 1) ⏪ ⏩

History	Msg ID	Priority	Message Type	Effective Start Time	Regions	Emergency Message	Effective End Time
	101855	Warning	Post Contingency Local Load Relief Warning	12.11.2017 17:03	FE-PN	A Post Contingency Local Load Relief Warning has been issued to maintain WESTFALL 115 KV at 105.8 KV in the PN for Transmission Contingency Control. Additional Comments: Load -No Generation or Switching available	12.11.2017 17:06
	101854	Informational	TLR	12.10.2017 21:17	PJM-RTO	A TLR Level 0 has been issued for control of flowgate 23261, Person to Sedge Hill 230kV flo Heritage to Rawlings 500kV	12.10.2017 21:17
	101853	Warning	Post Contingency Local Load Relief Warning	12.07.2017 07:22	EKPC	A Post Contingency Local Load Relief Warning has been issued to maintain BakerLane at 127.7 KV in the EKPC for Transmission Contingency Control. Additional Comments: no Switching available at this time.	12.07.2017 07:52
	101852	Warning	Non-Market Post Contingency Local Load Relief Warn	12.06.2017 06:39	EKPC	A Non-Market Post Contingency Local Load Relief Warn has been issued to maintain W_SOMERS 69 KV at 63.5 KV in the EKPC for Transmission Contingency Control. Additional Comments: Post Contingency Switching available	12.06.2017 07:58
	101851	Warning	Non-Market Post Contingency Local Load Relief Warn	12.06.2017 05:55	EKPC	A Non-Market Post Contingency Local Load Relief Warn has been issued to maintain PARKWAY1 69 KV at 63.5 KV in the EKPC for Transmission Contingency Control. Additional Comments: Post Contingency Switching available	12.07.2017 20:57
	101850	Warning	Non-Market Post Contingency Local Load Relief Warn	12.05.2017 18:11	EKPC	A Non-Market Post Contingency Local Load Relief Warn has been issued to maintain PARKWAY1 69 KV at 63.5 KV in the EKPC for Transmission Contingency Control. Additional Comments: Load -No Generation or Switching available	12.06.2017 00:10

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All times are in EPT

Summary

- Maintain the integrity of the PJM RTO transmission systems and the Eastern Interconnection
- Several types of emergencies
- Posted to the Emergency Procedures website



Questions?