Summary of M-13 Rev. 66 Changes

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SOS-Joint meeting

September 6th, 2018

M-13, Rev. 66 Changes

Overview of Changes:

- Cover to Cover Periodic Review
- Section 3.2 added “Production System Freeze Change” to Conservative Ops
- Section 3.3 corrected formatting for Day-Ahead commitment instructions
- New Section 3.5 added for “Long Duration Extreme Weather”
  - Old Sections 3.5, 3.6, 3.7, and 3.8 renumbered accordingly
- Section 3.6 added language for disabling auto-reclose
- Section 4.1 deleted Exhibit 4 table
  - Former Exhibit 4 content reformatted and inserted into existing section 4.1 and new sections 4.3 and 4.4
- New section 4.3 for PJM operational procedure for physical threats
- New section 4.4 for PJM operational procedure for cyber threats against PJM
  - New section 4.4.1 for loss of ICCP or EMS capabilities operational procedure
  - New section 4.4.2 for loss of internet operational procedure
  - New section 4.4.3 for loss of all telecommunications operational procedure
- New section 4.5 for PJM operational procedure for cyber threats against member company
- New section 4.6 for PJM operational procedure for High-Altitude Electromagnetic Pulse
- Section 6.4 added language to adjust “Resource Limited Unit” reporting time-frame and minimum run time requirements to place additional Fuel Limited Resources into the Maximum Emergency Category during long duration extreme weather events.

M-13 Rev. 66 - Next Steps

- Contact Dean Manno (dean.manno@pjm.com) with questions
- Continue first reads at September OC and MRC meetings
- Second read (and request for endorsement) scheduled for October SOS-Joint meeting

- Reviewing operator training impacts of Manual changes

Appendix

M-13, Rev. 66 Changes

- Section 3.2 added “Production System Freeze Change” to Conservative Ops

- PJM issues a Production System Change Freeze: PJM will refrain from updating any business application systems, programs, data, systems software, hardware and any other aspect of the information-processing environment at PJM

Note:
A Production System Change Freeze is a procedure that is implemented to ensure a stable production environment over a defined period of time.

The production change freeze has two objectives. First, it is designed to ensure staff is available for critical activities, should the need arise. Second, it is designed to help ensure a stable technical environment to support PJM's business and reliability functions.

The change freeze announcement will identify start date/time and the predicted duration or end date/time of the freeze period. At any point during the change freeze window, system conditions will be evaluated and an announcement regarding the lifting or extension of the change freeze will be made.

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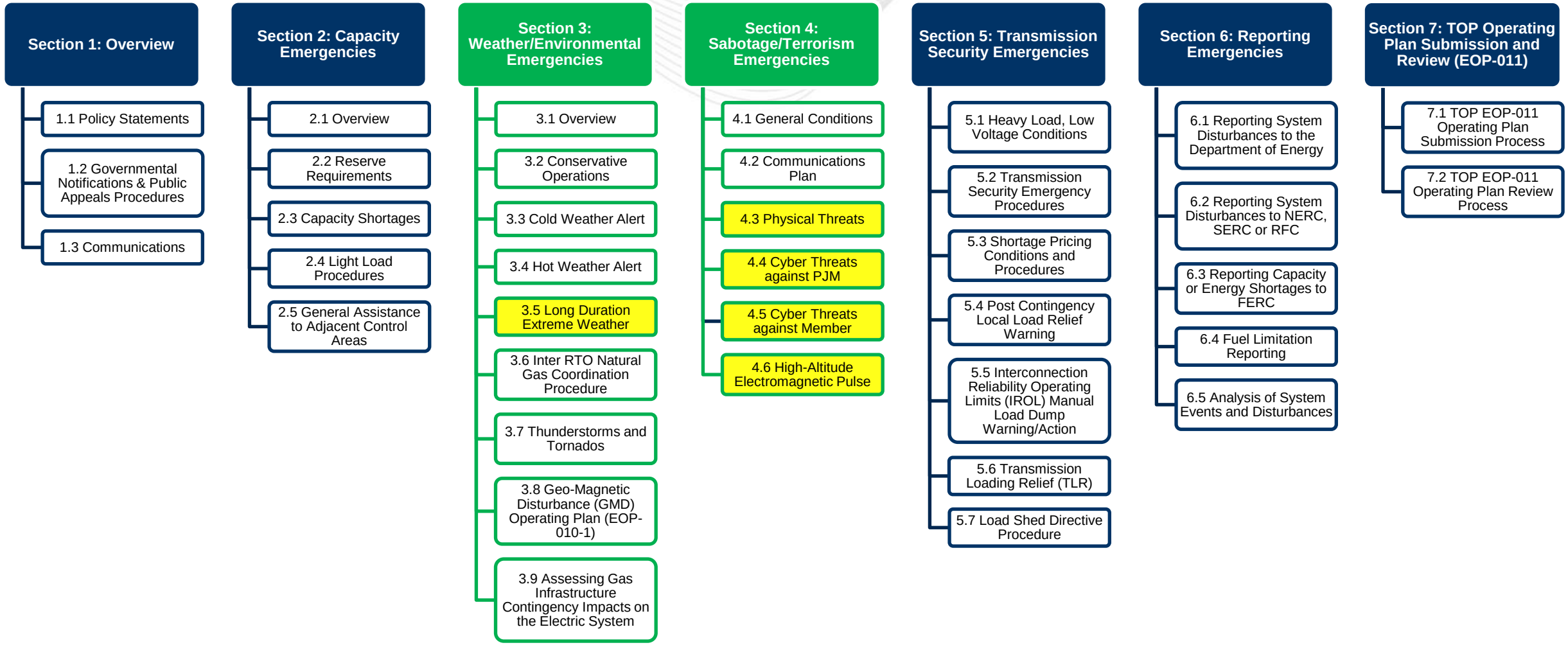
- Section 3.6 added language for disabling auto-reclose

- Transmission dispatchers place reclosers in service.
  - Transmission dispatchers may elect to manually disable recloser on certain lines that experience multiple re-close attempts during storms or other times during increased likelihood of “non-self-clearing” faults.
  - Transmission dispatchers may disable auto-reclose at their own discretion. However, Transmission dispatchers are required to inform PJM when they disable auto-reclose on any transmission facilities.

PJM Manual 13: Emergency Operations
New proposed sections



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- New Section 3.5 added for “Long Duration Extreme Weather”

3.5 Long Duration Extreme Weather

To prepare for and operate through Extreme Weather events expected to last more than 72 hours, during which wide-scale fuel disruptions are expected, PJM may extend the “Resource Limited Unit” reporting requirement for generators to evaluate a timeframe beyond 72 hours, as needed. PJM may also change the minimum run time requirements for Fuel Limited Resources to be placed into the Maximum Emergency Category. Examples of long-duration Extreme Weather with the potential to cause wide-scale fuel disruptions include, but are not limited to:

- Extended Cold Weather
- Long-Duration Blizzard and/or Icing Conditions
- Wide-Area Flooding
- Impacts of Extreme Weather (i.e Hurricane Damage) expected to last more than 72 hours

As the Extreme Weather event progresses, PJM dispatchers will continuously evaluate the weather conditions, assess system damage, and gauge the severity of fuel disruption. As conditions change, PJM will update “Resource Limited Unit” reporting time-frame and minimum run time requirements for units in the Maximum Emergency Category. For Fuel Limitation Reporting requirements please refer to Section 6.4 of this manual.

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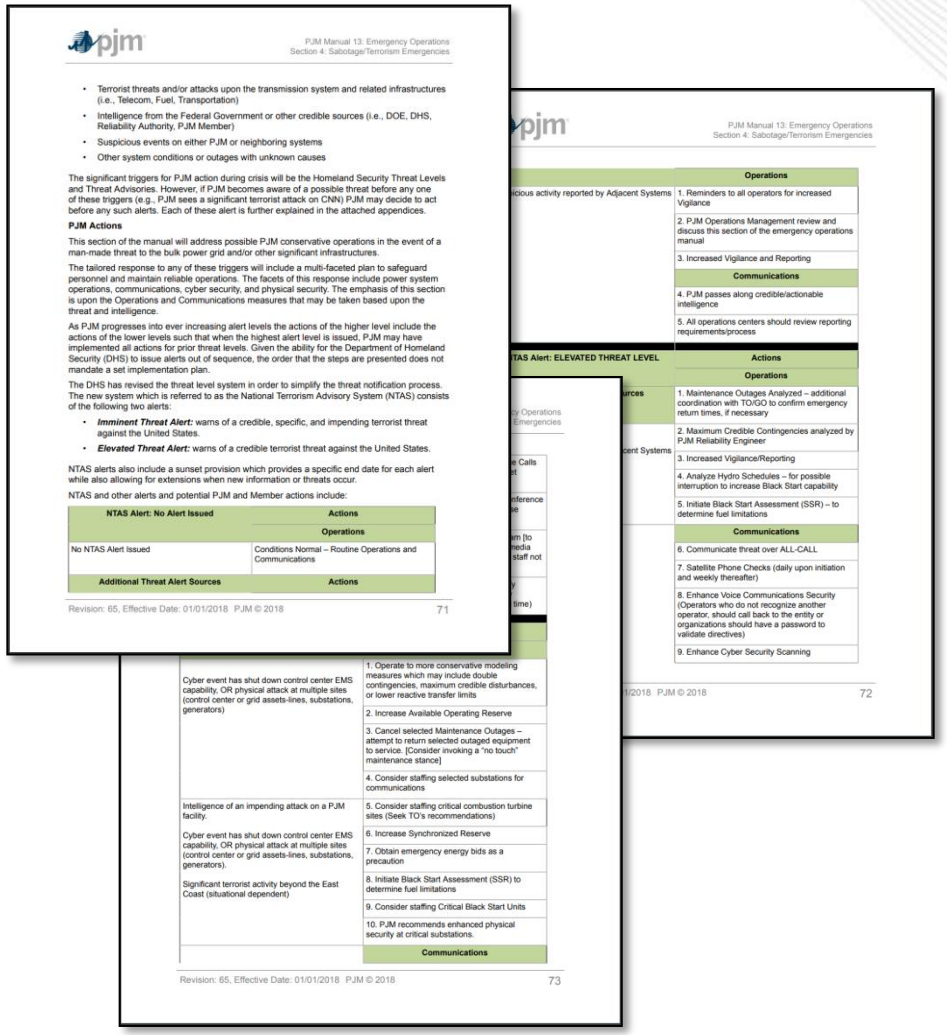
- Section 6.4 added language to adjust “Resource Limited Unit” reporting time-frame and minimum run time requirements to place additional Fuel Limited Resources into the Maximum Emergency Category during long duration extreme weather events. Aligns with new section 3.5 requirements

  - For long-duration extreme weather conditions expected to cause wide-scale fuel disruptions, as outlined in Section 3.5, PJM may adjust “Resource Limited Unit” reporting time-frame and minimum run time requirements to place additional Fuel Limited Resources into the Maximum Emergency Category.

Section 4: Sabotage/Terrorism Emergencies
Physical Attacks Vs Cyber Attacks



- Re-format – remove table and present actions in "PJM Actions" / "Member Actions" format to match rest of manual
- Subsection for Physical Attack
- Subsection for Cyber Attack against PJM
  - Loss of ICCP/EMS
  - Loss of internet
  - Loss of telecommunications
- New Subsection for Cyber Attack against member company (GO/TO)
- New Subsection for HEMP attack

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- Section 4.1 deleted Exhibit 4 table
  - Former Exhibits 5 through 14 renumbered accordingly
  - Former Exhibit 4 content regarding “Elevated Threat Alert” reformatted in section 4.1 as a list of “PJM Actions” and “PJM Member Actions”
  - Former Exhibit 4 content regarding “Imminent Threat Alerts”, “Intelligence of an impending attack on a PJM facility”, “physical attack at multiple sites”, or “Significant terrorist activity beyond the East Coast” moved to section 4.3 as a list of “PJM Actions” and “PJM Member Actions”
  - Former Exhibit 4 content regarding “Cyber event has shut down control center EMS capability” moved to section 4.4 as a list of “PJM Actions” and “PJM Member Actions”
- New section 4.3 for PJM operational procedure for physical threats
  - Created from Former Exhibit 4 content regarding “Imminent Threat Alerts”, “Intelligence of an impending attack on a PJM facility”, “physical attack at multiple sites”, or “Significant terrorist activity beyond the East Coast” as a list of “PJM Actions” and “PJM Member Actions”
  - Updated “Operating Reserves” language to “30-Minute Reserves”
  - Added requirement for PJM to alert PJM’s Operations Emergency Response Team (OERT)

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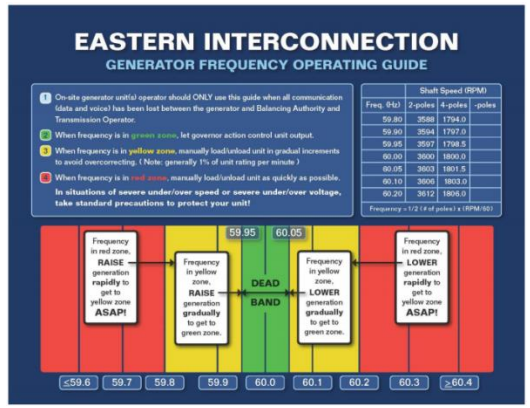
- New section 4.4 for PJM operational procedure for cyber threats against PJM
  - New section 4.4.1 for loss of ICCP or EMS capabilities operational procedure
    - Created from Former Exhibit 4 content regarding “Imminent Threat Alerts”, “Intelligence of an impending attack on a PJM facility”, “physical attack at multiple sites”, or “Significant terrorist activity beyond the East Coast” as a list of “PJM Actions” and “PJM Member Actions”
    - Updated “Operating Reserves” language to “30-Minute Reserves”
    - Added language to initiate “Manual Dispatch”
  - New section 4.4.2 for loss of internet operational procedure
  - New section 4.4.3 for loss of all telecommunications operational procedure
- New section 4.5 for PJM operational procedure for cyber threats against member company
- New section 4.6 for PJM operational procedure for High-Altitude Electromagnetic Pulse

Cyber Attack against PJM

- PJM performs constant cyber security monitoring. If the Security Monitoring Team determines there is a credible cyber threat that could impact operations:
  - PJM Incident Response Team (IRT) will meet to determine which systems are impacted.
  - IRT will contact Dispatch Shift Supervisor with impacts to operations.
  - Conservative Operations will be triggered by PJM Shift Supervisor as necessary.
  - PJM will notify members of impacted systems and necessary actions via the All-Call.

Cyber Attack against PJM: Telecommunication Disruptions

- For telecommunications disruptions, PJM will alert Incident Response Team (IRT) to begin internal recovery process. Additional actions will be as follows:
  - Loss of ICCP/EMS capabilities
    - Direct PJM dispatchers and Members to begin Manual Dispatch: directions in Manual 1, section 3.8.2
    - Additional PJM dispatchers and/or support staff may be required
  - Loss of Internet
    - Loss of Internet plans require TOs and GOs to call in with manual updates for internet based applications
    - Additional PJM dispatchers and/or support staff may be required
  - PJM has multiple levels of redundancy for verbal communication
  - Loss of all telecommunications
    - PJM will constantly attempt to establish communication to Transmission Owners and Generation Owners via all means of verbal communication
    - Reliability Guideline: Generating Unit Operations During Complete Loss of Communications v2.0



Cyberattack against PJM member (GO or TO)

- Consistent Bad data or “Altered” data
  - Put company in ‘View Mode’ until data quality can be restored
  - Alert PJM Incident Response Team (IRT) to work with TO to resolve problem
- If a TO has an asset operated remotely by an unauthorized entity:
  - Alert Operations Emergency Response Team to determine best operational strategy
    - PJM shift supervisors will initiate Conservative Operations as necessary.
  - Call SOS-T conference to alert other Transmission Owners
  - Alert PJM IRT
  - Post to RCIS
  - Send All-Call
- Affected member company will verify protective relay settings of tariff facilities