



PJM's Annual Spring RTO Restoration Drill Overview

- This presentation is intended to provide drill participants with:
 - Standards
 - Associated paperwork
 - 3 day schedule
 - Phone Test
 - SOS Conference Calls
 - Member Company expectations
 - PJM Roles
 - Logable Items

- The drill will adhere to and provide evidence for the following standards:
 - NERC
 - EOP-005 (System Restoration Plans)
 - EOP-006 (Reliability Coordination System Restoration)

- The drill will show evidence of an annual review of the restoration plan and allow for the correction of any restoration plan deficiencies found during the drill.
- The drill, along with completion of Attachment “G” of M36, will demonstrate how PJM coordinate’s activities with all participating Generation Owners and Transmission Owners. Attachment “G” & the restoration manuals are submitted through e-dart

- The phone test on day one will provide evidence for testing of the various communication tools and facilities.
- The drill attendance sheets and evaluation forms will provide evidence of training on the restoration plans.
- The drill will provide evidence of the validity of the restoration procedure through simulation.

Member company personnel should log Black Start units:

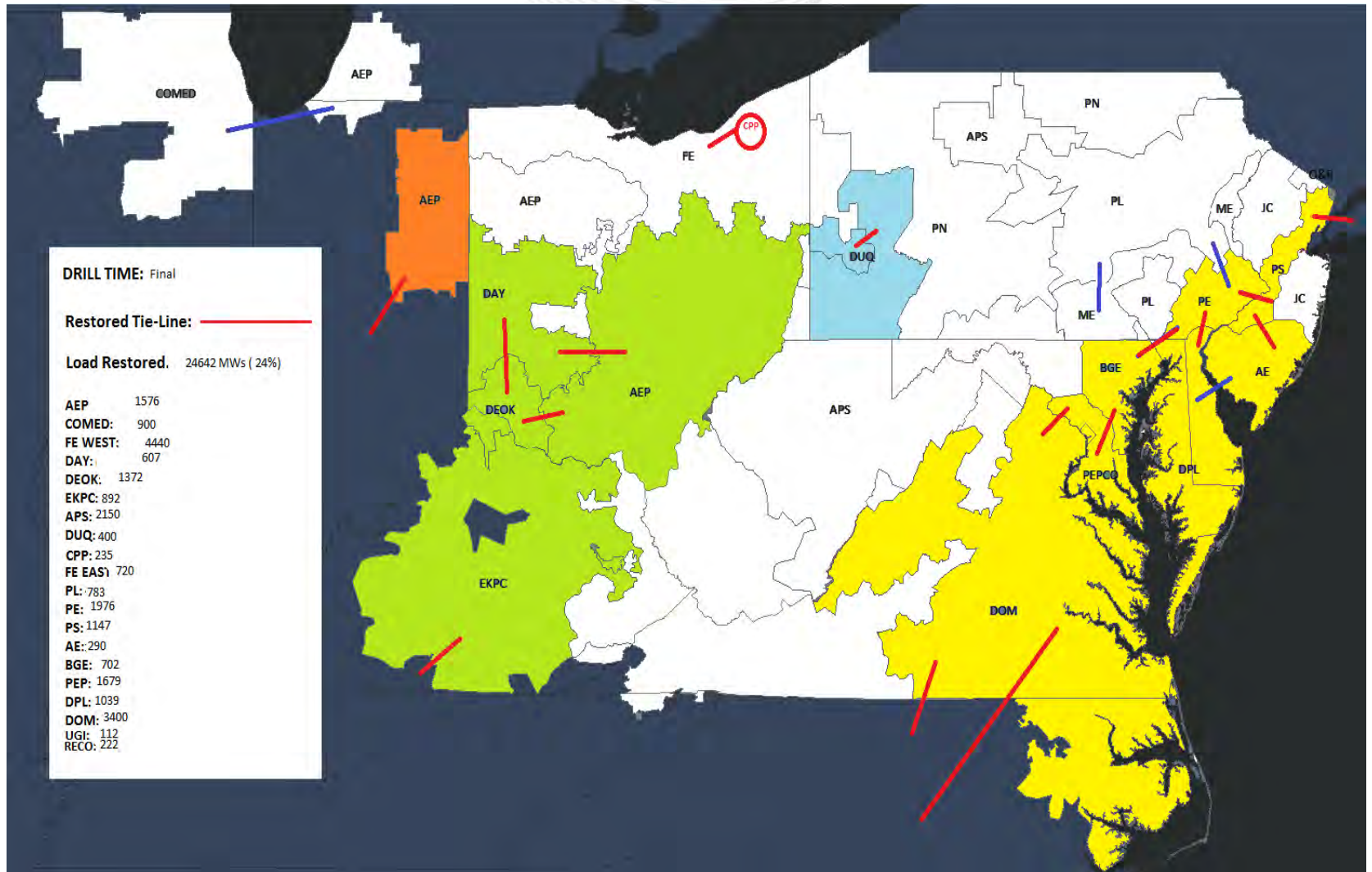
- Start Times
- Mw's
- Cranking Path

- Evidence will be specifically proven by PJM member companies attempting to provide Nuclear Stations with offsite power within 4 hours and by submitting the Nuclear Restoration Path report at the completion of the drill.

- EOP-006 addresses the Reliability Coordinators duties during the restoration process.
 - R2, R4, R5 and R6 will be proven with:
 - The submission of the various reports in PJM Manual M36, Attachment B.
 - The SOS Phone calls.
 - PJM coordinating synchronization of islands
 - PJM assuming control when requested by the Transmission Owners

- A SOS conference call is conducted at 0900 to announce the start of the Phone Test
- Member companies are expected to have personnel available to perform the following:
 - Receive PJM's call
 - Initiate call to PJM utilizing designated number

- WebEx will be utilized for the duration of the actual drill to allow members to view:
 - System status overview
 - Is intended to provide participants an overview of when Transmission Zones are connected to either the Eastern Interconnection or to another Zone
 - PJM Log
 - PJM will maintain a log that will track:
 - Changes to Islanded areas
 - Off-site power restored to Nuclear facilities
 - Energization of Tie-lines
 - Connections to the Eastern Interconnection
 - PJM assuming operational control of an Area



- SOS Conference Calls will be performed approximately every 2 hours.
- PJM will be provide a specific telephone number for each Transmission zone to allow for direct communication with the Power Director monitoring that zone.
- All reports should be forwarded to PJM:
 - Should identify their company, hour, report type and date in the email Subject line
 - Example: PECO – 1100 Hourly Transmission Report for 2/24/16

- The Hourly Reports are formatted in an Excel spreadsheet and designed to be user friendly. Direct links are in M-36
- To minimize duplicating work:
 - After submitting a report, copy the current worksheet and rename “Event + ___” indicating how many hours from the initiating event
 - Restoration Reports can be opened directly through M-36, Attachment B. There is a link associated with each report. This can also be accessed through the Drill Information Packet
 - In the “Energized Since Last Report” and “Expected in Next” columns:
 - Ensure all outdated “X” marks are removed from the new worksheet
 - Place an “X” mark in the appropriate column indicating the new / future statuses of the identified facility
 - Show example

- A SOS conference call is conducted at 0730 to discuss the start of the drill and to address any outstanding issues.
- Member companies should submit their initial reports to PJM by 0845.

- At 0930 EST a SOS conference call is conducted discussing the following:
 - Initial Report
 - Including
 - System Status
 - Islands
 - Tie Information
 - 2 hour restoration strategy
 - Issues
- A SOS conference calls will then be conducted at 1100 to review system updates and 2 hour restoration strategies

- A SOS conference call will then be conducted at 1400 to:
 - Review progression information
 - Discuss next day goals and expectations
 - Address any issues

- At 0730 EST an pre drill conference call will be held to discuss any outstanding issues and strategy. The drill will start at 08:00. There will be no all call
- At 0930 & 1100 EST SOS conference calls will be conducted to discussing the following:
 - 2 hour restoration strategy
 - Concerns
 - Overview of restoration progress

- At 1300 EST the drill will end.
- At 1300 EST a SOS conference call is conducted discussing the following:
 - Review drill completion information
 - Address any issues
 - Overall drill feedback

Drill Participation Form - <http://pjm.com/~media/training/member-trainingliaison-forms/att-d-app-4.ashx>

This form must be completed by all entities participating in the drill in order to receive CE credit. Please email to: trainingsupport@pjm.com

Drill Evaluation Form – This will be available via the PJM LMS at the conclusion of the drill for all participants on the participation form.

Company Initial Restoration Report – This form (Exhibit 12, M-36) should be completed within the first hour of the drill. Please send to Restorationdrilltransmission@pjm.com

- **Company Transmission Restoration Report** - This report (Exhibit 15, M-36) needs to be submitted every 10 lines restored or every 30 minutes. NOTE: You do not have to submit a form if you did not restore any transmission lines in the past 30 minutes. Please send to Restorationdrilltransmission@pjm.com
- **Company Hourly Generation Restoration Report** – This report (Exhibit 14, M-36) needs to be submitted on an hourly basis or sooner if more than 100 MWs were brought online since the last report was submitted. **Please call PJM as black start units are brought online.** Please send to Restorationdrillgeneration@pjm.com

- **Log Sheets** – At the conclusion of the drill, participants should submit any log sheets such as the *Company Transmission Restoration Report* with all relevant documentation including the following:
 - Cranking paths used during restoration
 - Black start units used during restoration
 - Paths and times for shut-down power to nuclear plants
 - Please send to RestorationDrill@pjm.com
- Please email this information by Friday, February 26, 2016.

- Prior to the start of the drill provide the following:
 - SOS Member Contact Information
 - Drill Phone numbers
 - A participant list
 - Transmission Zone scenario (injects)

- There will be two PJM Generation Dispatchers during the drill
- One operator will collect the hourly generation data and update the PJM report
- One operator will:
 - Control ACE (When applicable)
 - Update unit information into EMS
 - Verify Load and Generation on the EMS Dispatch Lambda page

- PJM recommends that Transmission Owners use a simulated start up time for generation
 - Example 1 hour TTS = 5 minutes

- PJM attempts to have 1 Power Director for every two Transmission Zones.
 - Approximately 15 PJM Power Directors participate
- The PJM Power Director will:
 - Use the data collected from the hourly Transmission Reports to update the PJM simulator
 - Delays in reporting generation/transmission updates have caused the PJM simulator to fail in the past
 - Suggest Ties to other TO's / Eastern Interconnection when opportunities exists

- **The PJM Shift Supervisor will:**
 - Facilitate SOS Conference Calls
 - Coordinate communication between Power Directors
 - Ensure the restoration process is performed in accordance with PJM Manual M36.

- **The Reliability Engineer will coordinate with all neighboring entities.**



PJM Restoration Drill Contact Information

- Please forward any questions or comments to

Ryan Lifer – PJM SRCS

Phone: 610 680-6535

Ryan.Lifer@pjm.com

Kevin Hatch– PJM SRCS

- Phone: 610-496-2807

- Email: Kevin.Hatch@pjm.com

Dan Restucci – PJM System Operator Training

- Phone: 610-666-8236

- Email: Daniel.Restucci@pjm.com

Anita Patel- PJM State & Member Training

- Email: Anita.Patel@pjm.com