

Transmission ITP

Telecommunications

PJM State & Member Training Dept.

Objectives



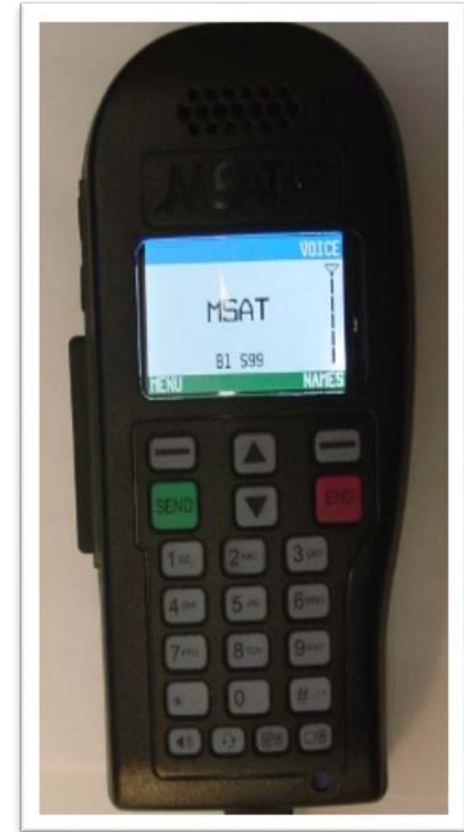
The student will be able to:

- Explain the back-up satellite phone testing requirements
- Explain how to coordinate outages of telemetry and communication equipment with PJM (RTUs, datalinks, etc.)
- Identify the requirements of Member companies to have a plan for loss of Control Center Functionality

Satellite Phone Testing Process

Satellite Phone Review

- Tests are conducted to verify that all equipment is working correctly and proper communication protocols are being used
- Two tests are conducted including the use of the Push-to-Talk (PTT) and Two-way Point-to-Point systems



Satellite Phone Review

When Does Testing Take Place?

- Test are normally conducted on weekly basis
 - Target test day is *Saturday at 12:30 hrs*
- Tests may need to take place more frequently depending on current security level
- Satellite phones are also tested during a PJM sponsored emergency procedures drills

Satellite Phone Review

Who Participates In The Testing?

- All Member Companies with satellite phone systems participate in the tests
- Transmission Owners must have satellite phones at both their primary and back-up facilities
- Generation Operator (GO) Control Centers must have satellite phones when one or more units total 500 MW or greater

Satellite Phone Review

What Are The Main Purposes of Testing?

- The testing ensures proper functionality and reliability of the satellite phone system at both PJM & Member Company locations
- Allows the opportunity to test readiness level of Operators
- Operators have the opportunity to become familiar with the satellite phone equipment



Satellite Phone Review

Communication Protocols & Testing

- Testing ensures proper communication protocols are being followed when using the satellite phone system
 - Speak clearly, slowly and be mindful of pronunciations
- Use proper “code words” when communicating
 - “Over” when message/statement complete
 - “Out” when terminating transmissions (Initiator)
- Always identify your company and your name

Coordinating Telemetry and Equipment Outages

Data Outages

Miscellaneous Reportable Outages

- Email coordination notice 24 business hours in advance of significant system changes that could affect ICCP data link communications or the data exchange with PJM
 - Data Set Switches (this does not include database updates, editing data exchange lists, etc. unless they include an outage)
 - Significant Software Enhancements

Data Outages

Miscellaneous Reportable Outages

- Communication line outages
- Backup center testing
- Failovers to alternate sites
- ICCP server failovers
- Network and Firewall maintenance
- RTU outages or changes to RTU data sent to PJM for RTUs connected to EHV (345kv and above) facilities
 - 1 day notice required

Data Outages

Miscellaneous Reportable Outages

- The PJM EMS Networking group will coordinate any technical details, additional support, etc. with the member company
- Members providing notification should send it to the following email address (outage@pjm.com). In an emergency, call the PJM Support Center at 610-666-8886 or the Dispatch Supervisor at 610-666-8806

Data Outages

Miscellaneous Reportable Outages

- The notification should include:
 - The action being taken by the member company
 - Planned length and expected time of the outage
 - Potential impact to PJM
 - Member contact information
- Member Company System Operator should coordinate final outage with the PJM Dispatch Supervisor 15 minutes prior to the event

Data Outages

Scheduling Data Outages

- PJM staff has the authority to:
 - Reschedule or cancel a member company scheduled planned outage based on system conditions
 - Reschedule or cancel a member company scheduled planned outage based on existing ICCP data link outages
 - Deny a request for a member company planned outage if requested time has been previously scheduled

Data Outages

Scheduling Data Outages (con't)

- During Peak Load Operations, to the extent possible, emergency changes should occur:
 - During Summer operations - prior to 11:00 EPT
 - During Winter operations - between 10:30 – 14:30 EPT
 - Weekly routine maintenance should be canceled or rescheduled to days when emergency procedures are not anticipated

Data Outages

Unscheduled Data Outages - Considerations/Actions:

- **MOC or Generator Owner/Operator**
 - Contact PJM Dispatch to report/discuss problem
 - Recognize prior SCED approved base-point is stale while ICCP problems exist
 - Resolve communications issue (support staff)
 - Manually dispatch directions to plants verbally if problem is not resolved within 10 minutes
 - Log manual dispatch directions
 - Provide a contact person to PJM Dispatch to enhance operations during reliability issues

Data Outages

Unscheduled Data Outages - Considerations/Actions:

- **TO or Merchant Transmission**

- Contact PJM Dispatch to report/discuss problem
- Resolve communications issue (support staff)
- Contact PJM Dispatch regarding transmission constraints
- Verbally communicate critical data to PJM Dispatch as needed
- Provide a contact person to PJM Dispatch to enhance operations during reliability issues

Data Outages

Unscheduled Data Outages - Considerations/Actions:

- **PJM Actions:**

- Contact MOC/TO to discuss communication issues
- Resolve communication issue
- Recognize prior SCED approved base-point as stale while ICCP link is down
- Communicate zonal cost if communication issues are not resolved within 10 minutes

Data Outages

Unscheduled Data Outages - Considerations/Actions:

- **PJM Actions: (con't)**

- Communicate targeted generation dispatch if transmission constraints arise
- Log manual dispatch/reassign regulation as necessary
- Communicate impact on ability to monitor transmission system
- Elevate communication to Shift Supervisor if reliability issues arise

Data Outages

- Outages of any equipment which handles telemetry 345 kV or higher and tie data sent to PJM must be reported
 - Includes remote terminal units (RTU), data links, etc., which telemetry 345 kV and higher voltage facilities and tie line values, megawatt flows, megavar flows, and voltage

Data Outages

- For ICCP or DNP3 outages data to PJM shall be communicated using one of the following:
 - Email DispatchData@pjm.com
 - Message should include:
 - Equipment name, measurement description, object ID (if applicable), measured value and timestamp
 - Emails should be sent every 30 minutes, or more frequently if requested by PJM
 - If email is not possible or impractical, fax or phone PJM control room to communicate the measurements verbally

Data Outages

- For RTU outages data to PJM shall be communicated using one of the following:
 - Manually replace values EMS, which should be transmitted to PJM EMS via the existing ICCP/DNP3 communication.
 - Update the manually, ***replace values as needed***
 - If manually replacing is not possible, email DispatchData@pjm.com
 - Message should include:
 - equipment name, measurement description, object ID (if applicable), measured value and timestamp. Emails should be sent every 30 min or more frequently if requested by PJM
 - If above two methods are not possible or impractical, fax or phone PJM control room to communicate the measurements verbally

Data Outages

- Data to be updated:
 - MW flows for 345 kV and higher equipment and all tie lines
 - If MWs cannot be given, provide best data available
 - Tie line values called out if using email method
 - Bus voltages for all 345 kV or higher stations
 - MVAR values for 345 kV or higher line, if requested
- Must be updated
 - At least every 30 minutes or more frequently if requested
 - After loss of major generator or transmission line
 - When value has a change of 100 MW or more for 500 kV and above, 50 MW for 345 kV and below
 - Whenever 500/345/230 kV tap changes occur, or 345 kV or higher breaker positions change

Loss of Control Center Functionality Requirements

Member Back-Up Control Center Requirements

- PJM Members are required to construct and man Control Centers
 - Subject to the criteria outlined in Manual 01 – “Member Control Center Requirements”
- In addition, Manual 01 specifies that each Member TO must have a plan for loss of control center functionality, which includes
 - Procedures and responsibilities for providing annual training
 - Ensure that operating personnel are able to implement the plans

Member Back-Up Control Center Requirements

- All PJM Members shall develop a backup recovery plan to cover various contingencies,
 - Including maintaining an off-site storage location for updated copies of all software and data files necessary to restore control center functions
- The backup recovery plan is subject to review by PJM

Summary

- Satellite phones must be tested periodically to ensure operation and familiarity
- Data outages also have an impact on system operations and need to be coordinated with PJM
- Members need to have plans and procedures in place for loss of Control Room functionality

Contact Information

PJM Client Management & Services

Telephone: (610) 666-8980

Toll Free Telephone: (866) 400-8980

Website: www.pjm.com



The Member Community is PJM's self-service portal for members to search for answers to their questions or to track and/or open cases with Client Management & Services

Resources and References

- PJM. (2017). *PJM Manual 1: Control Center & Data Exchange Requirements (Rev 35)*. Retrieved from <http://www.pjm.com/~media/documents/manuals/m01.ashx>
- NERC. (2007). *Standard COM-002-4 – Operating Personnel Communications Protocols*. Retrieved from <http://www.nerc.com/ layouts/PrintStandard.aspx?standardnumber=COM-002-4&title=Operating Personnel Communications Protocols&jurisdiction=United States>