PJM Communications
Objectives

Students will be able to:

• Identify the various PJM communication tools

• Identify the various PJM communication protocols and procedures

• Evaluate the appropriate use of the PJM Communication Protocols
PJM All-Call
PJM All-Call Process

• The PJM All-Call process is a one-way communication system used to send messages to member companies.

• PJM All-Call messages are issued during both normal and emergency conditions.

• PJM Member Control Centers are required to have a dedicated line for the primary All-Call number.
Receiving PJM All-Call Messages

1. **PJM issues message** and the phone rings at TO or MOC

2. Operator must pick up and state their Name and Company to start playback of the message

3. **Listen to All-Call Message**
   - Press “1” to repeat
   - Press “2” acknowledge receipt of message

4. Question Initiator or Supervisor (for Emergency Messages)

5. Call will track to the next number
There are 3 Categories for All-Call Messages:

• Operational

• Informational

• Emergency Procedures
# Message Categories

<table>
<thead>
<tr>
<th>Operational Messages</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gen Checkout</td>
<td>Master Coordinator</td>
</tr>
<tr>
<td>Regulation Requirements</td>
<td>Master Coordinator</td>
</tr>
<tr>
<td>Instantaneous Reserve Checks</td>
<td>Generation Dispatcher</td>
</tr>
<tr>
<td>Off SCED Control</td>
<td>Generation Dispatcher</td>
</tr>
<tr>
<td>Geo-Magnetic Disturbance Information (Warning or Activity)</td>
<td>Generation Dispatcher</td>
</tr>
<tr>
<td>Initiating Time Correction</td>
<td>Generation Dispatcher</td>
</tr>
<tr>
<td>Regulation Requirements</td>
<td>Master Coordinator</td>
</tr>
</tbody>
</table>
## Message Categories

### Informational Messages

| Scheduling Information | Master Coordinator |
## Message Categories

<table>
<thead>
<tr>
<th>Emergency Messages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Alerts, Warnings, and Actions</td>
<td>GD, PD, MC or SS depending on message</td>
</tr>
<tr>
<td>Minimum Generation Alert</td>
<td>Master Coordinator</td>
</tr>
<tr>
<td>Synchronized Reserve Activations</td>
<td>Generation Dispatcher</td>
</tr>
<tr>
<td>Supplementary Status Report</td>
<td>Master Coordinator</td>
</tr>
</tbody>
</table>
Which of the following is true about All-Calls?

A. PJM All-Calls are reserved for emergency conditions

B. PJM All-Calls are only issued for normal conditions

C. It is optional to have a dedicated line for the primary All-Call number in PJM Member Control Centers

D. The PJM All-Call process is a one-way communication system used to send messages to member companies

D. The PJM All-Call process is a one-way communication system used to send messages to member companies
Is this the correct All-Call receiving Process?

- PJM issues message and the phone rings at TO or MOC
- Operator must pick up and state their Name and Company to Start playback of the message
- Question Initiator or Supervisor (for Emergency Messages)
- Listen to All-Call Message Press “1” To repeat Press “2” acknowledge receipt of message
- Call will track to the next number

A. True

B. False
Satellite Phone Testing
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
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
  – Generation Operator (GO) Control Centers must have satellite phones when one or more units total 500 MW or greater
  – Transmission Owners must have satellite phones at both their primary and back-up facilities
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
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
Why are Satellite Phones Tested?

A. To ensure the satellite phone system will be functional and reliable
B. It allows operators to become familiar with satellite phone equipment
C. The readiness level of Operators is tested
D. All of the above

✓ D. All of the above
When are Satellite Phones normally tested?

A. Every day

✓ B. Every week

C. Annually

D. Both monthly and after emergencies
PJM Communication Protocols
PJM Communication Protocols

• PJM Communication Protocols coincide with NERC Standard COM-002-4*

• Communication Protocols from PJM Manual 1*
  – Applicable to all Operators/Dispatchers who issue/receive Operating Instructions

• The purpose is to improve communications when issuing and receiving Operating Instructions

*PJM Manual-1, Section 4.5
Rev 38, Effective Date 3/31/2018
PJM Communication Protocols

• Communication protocols are based on issuance of an Operating Instruction

• The use of 3-part communication would be required when issuing or receiving an Operating Instruction

• This would apply during both normal and emergency operations

*PJM Manual-1, Section 4.5
Rev 38, Effective Date 3/31/2018
**Operating Instruction Definition**

- A command by operating personnel responsible for the Real-Time operation of the interconnected Bulk Electric System to *change or preserve the state, status, output or input* of an Element of the Bulk Electric System or Facility of the Bulk Electric System.
3-Part Communication

• “Operating Instructions” as defined in M-1 require the use of 3-Part Communication

• Internal audits are performed to verify use of 3-Part Communication

• Best practice:
  – Use of 3-Part Communication for all exchanges
3-Part Communication

- Clear and Concise
- Speak Slowly
- Restart communication process when signs of confusion are present
3-Part Communication

- Ask for clarification if necessary
- Understand information
- Repeat back information correctly and thoroughly

**Note:** Provider/Sender of information should prompt repeat of information if not done voluntarily
3-Part Communication

- Repeat message if necessary
- Correct receiver of information if repeated incorrectly
- Provide *proper* confirmation

<table>
<thead>
<tr>
<th>Acceptable</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, that is correct</td>
<td>Yeah, man</td>
</tr>
<tr>
<td>Ok, that is correct</td>
<td>OK</td>
</tr>
<tr>
<td>Correct</td>
<td>Alright, yeah, bye</td>
</tr>
</tbody>
</table>
## Operating Instruction Examples*

<table>
<thead>
<tr>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordering Transmission equipment in or out of service</td>
</tr>
<tr>
<td>Load shed instructions</td>
</tr>
<tr>
<td>Ordering generation MW/MVAR output changes</td>
</tr>
<tr>
<td>Ordering generation online or offline (real-time or in advance)</td>
</tr>
</tbody>
</table>

*Partial List*
**PJM Communication Protocols**

<table>
<thead>
<tr>
<th>Non-Operating Instruction Examples*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmation of ratings or power flows</td>
</tr>
<tr>
<td>Discussion of operational options</td>
</tr>
<tr>
<td>Discussions of generator status availability</td>
</tr>
</tbody>
</table>

*Partial List*
Additional Protocols & Requirements

- **Last name** should always be used for identification (at a minimum) along with company name

- All-Call Messages will be confirmed based on confirmation of acknowledgement of message
  - Indicated by Operators selecting “2” to acknowledgement the message
Additional Protocols & Requirements (con’t.)

• Time references should be stated in 24 hour format, using time zones when appropriate

• Phonetic alphabetic may be used to clarify information as necessary
**Equipment & Transmission Line Identification**

- **Transmission Lines** – Terminal to terminal, voltage level and line number
- **Other Equipment/Substation** – Station name, equipment number, equipment type
- **Generating Station** – Station name, unit number
What are the requirements of a Member Operator when issued an Operating Instruction?

• PJM Members who are unable to comply with an Operating Instruction should communicate this to PJM immediately

• Restrictions based on safety, loss of life, or damage to equipment would fall into this category

• If a Member Operator is unable to comply with an Operating Instruction, it is important for them to provide their reasoning as soon as possible
PJM CRM-TEM Model
Situational Awareness
  Questioning Attitude
  Shift Turnover

Planning and Decision Making
  Procedure Adherence & Use
  Decision Making

Workload Management
  Stress Management
  Task Loading

Threats
  Prepare

Errors
  Repair

US*
  Recover

*Undesired State

Reliable Operations

Monitor/Cross-Check
  Checking & Verification
  Self Checking

Communication
  Effective Listening
  PJM Communication Protocols

Leadership Effectiveness
  Conflict Resolution
  Leadership

System Event
# PJM CRM-TEM Model – Key Terms

| **Reliable Operations** | *Normal operations* – the level at which we want to be operating. An environment where Threats and Errors are identified and managed effectively.  
*Example: No operating limit violations* |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Threats**             | Prepare for what may occur which is often out of the Operator’s/Dispatcher’s control. *Prepare and identify* Threats as they take place.  
*Examples: Impending weather, equipment problems* |
| **Errors**              | When Errors cannot be prevented, they must be *identified and repaired*. Errors may fall into any one of the 6 CRM skill buckets.  
*Examples: Overtrips, switching errors* |
| **Undesired State**     | If Errors are not identified and repaired, this may lead to an Undesired State. During this stage, Operators/Dispatchers must *recover* to avoid a System Event.  
*Examples: Facility overloads, unknown operating state* |
| **System Event**        | During a System Event, emergency procedures are likely being utilized and Operators/Dispatchers must continue to *recover and repair* in order to get back to Reliable Operations.  
*Examples: Load shed, blackout* |
Situational Awareness

Questioning Attitude

Shift Turnover

Consistently and correctly assesses the current and anticipated environment; identifies and anticipates threats and errors

- Ask questions
- Stop when unsure
- Avoid situations where you hear “I think” or “I assume”
- Over-communicate

- Write it down
- “What would I want to know”
- Ask questions

PJM CRM-TEM Model

Reliable Operations

Threats

Errors

Prepare

Repair

Recover

System Event

*Undesired State

US∗
PJM CRM-TEM Model

Planning and Decision Making

Incorporates relevant information, develops operational strategies and chooses the best course of action consistent with safe, reliable, and efficient operations

- Use current version
- Appropriate for condition
- Follow in sequence
- Identify and correct deficiencies
- Resources

- Gather Recommendations
- Best idea
- State intentions
- “Bottom Lines”
- Resolve Conflicts
**PJM CRM-TEM Model**

**Workload Management**

- Prepare
- Repair
- Recover

**Stress Management**

- Task Loading

**Effectively manages tasks to optimize overall performance**

- Anticipate
- Recognize stress
- Acknowledge confusion and realign
- Communicate calmly
- Avoid if possible
- Anticipate, get help
- Write it down
- Checklists
- Memory Prompts
PJM CRM-TEM Model

Actively verifies systems and other team member actions; resolves inconsistency and uncertainty

Monitor/Cross-Check
Checking & Verification
Self Checking

- Peer Check
  - Concurrent
  - Independent
- STAR
  - Stop
  - Think
  - Act
  - Review
The exchange of ideas, information, and instructions in a clear and timely manner

Communication

Effective Listening

PJM Communication Protocols

- Ready
- Receive
- Review
- Respond

- Remember
- Operating Instruction
- 3 Part Communication

Reliable Operations

Threats

Errors

US*

System Event

Prepare

Repair

Recover

*Undesired State

PJM CRM-TEM Model
Effectively exercises responsibilities in a manner that promotes teamwork, professionalism, and mentoring

- Define Issue
- Communicate
- Use Open Tone
- Respect Expertise
- Assign Clear Roles
- Plan & Anticipate
Communications Review

“You Be The Auditor”

1. Listen to calls (re-recorded)
2. Review/follow transcripts
3. Audit each call individually
4. Answer assigned questions and discuss audit results in groups
5. Debrief
Communications Review

Debrief Questions

1. How would you rate the use of 3-Part Communication? (Consider NERC and PJM Manual 1 requirements)
2. What communication practices used in this call could be improved? How?
3. Were there any communication practices which your group members interpreted differently/scored differently?
4. What CRM-TEM skills were utilized or could have been utilized during this call?
Situational Awareness
Questioning Attitude
Shift Turnover

Planning and Decision Making
Procedure Adherence & Use
Decision Making

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Stress Management
Task Loading

*Undesired State

Monitor/Cross-Check
Checking & Verification
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Communication
Effective Listening
PJM Communication Protocols

Leadership Effectiveness
Conflict Resolution
Leadership

PJM CRM-TEM Model

Reliable Operations

Prepare

Errors

Repair

Recover

System Event

Threats
Summary

Review of PJM Communication Protocols

• Definition of Operating Instruction

• Requirements for use of Communications Protocols

• Review of 3-Part Communication Steps

• Application of PJM CRM-TEM Model
Questions?

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