Synchrophasor Update

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2015 PJM PMU Goals

- EIDSN Implementation
- Wide-Area Visualization
- Oscillation Detection
- Oscillation Mitigation
- Data Quality
- Integrate PMU into PJM EMS State Estimator

Q1 Q2 Q3 Q4
2015 PJM PMU Goals

EIDSN Implementation

- EIDSN Circuits & Equipment Installed
- EIDSN Testing
- EIDSN Implemented
- Retire NERC Net

Wide-Area Visualization

- Incorporate EIDSN PMU Data in RTDMS

Q1  Q2  Q3  Q4
2015 PJM PMU Goals

Oscillation Detection
- Implement & Test Algorithms within RTDMS Test Environment
- Implement within RTDMS Production

Oscillation Mitigation
- Develop Procedures & Training
- Conduct Operations Training Sessions
- Procedures in Effect

Q1
Q2
Q3
Q4
2015 PJM PMU Goals

Data Quality

Expand Data Quality tool & methods to condition real-time phasor output.

Linear State Estimation Implementation & Results Evaluation

Seek TO Approval (via PDQTF) for use of LSE in Reporting

Incorporate LSE Results into PMU Data Quality
NERC BES Reliability Operating Services (BROS)

- evaluation criteria documented in CIP002-5.1 (page 17-33):
  [URL](http://www.nerc.com/pa/Stand/Reliability%20Standards/CIP-002-5_1.pdf)

PJM Operations/Compliance staff applied the NERC BROS criteria in determination of CIP Criticality.

- Criteria: Would there be an adverse impact if a Cyber Asset that if rendered unavailable, degraded, or misused would, within 15 minutes of its required operation, misoperation, or nonoperation, adversely impact one or more Facilities, systems, or equipment, which, if destroyed, degraded, or otherwise rendered unavailable when needed, would affect the reliable operation of the Bulk Electric System.
NERC BROS Focus Areas

BES Reliability Operating Services:

- Dynamic Response,
- Balancing Load and Generation,
- Controlling Frequency (Real Power),
- Controlling Voltage (Reactive Power),
- Managing Constraints,
- Monitoring and Control,
- Restoration of BES,
- Situational Awareness,
- Inter-Entity Real-Time Coordination and Communication.
PMU technology is **not** currently CIP Critical
- Earliest possibly CIP Critical is approximately 1 year.

PMU Potentially CIP Critical when PMU data is:
- Integrated into PJM EMS State Estimator & used in the solution (~1 - 2 years).
- Becomes critical to Interconnection Reliability Operating Limit (IROL) Determination (~1 – 2 years).
- Is explicitly identified within NERC Functional Model (~2 years).
- Is utilized as part of automated control of field equipment (~3–5 years?).
- Is utilized by PJM System Operator without the need to verify measurement with asset owner (?).
• END Synchrophasor Update Slides

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