ERO Enterprise Information Technology Projects Update

Stan Hoptroff, Vice President, Chief Technology Officer and Director of Information Technology

Technology and Security Committee Meeting

May 9, 2018
• Compliance Monitoring and Enforcement Program (CMEP) Technology Project
• Entity Registration/Standards
• Public-Facing Website (NERC.com)
• Southwest Power Pool, RE (SPP RE) Dissolution
• Electricity Information Sharing and Analysis Center (E-ISAC) Technology Update
• NERC Information Technology (IT) 2019 Budget – 2020-2021 Forecast
• Priorities Looking Ahead
CMEP Technology Project
Preliminary Benefits

• Single, common portal for registered entities, enabling consistency of experience
• Real-time access to information, eliminating delays, and manual communications
• Improved capability to support the Risk-Based Compliance Oversight Framework
• Enhanced quality assurance and oversight, enabling consistent application of the CMEP
• Improved analytics, including visibility into compliance and reliability risks
CMEP Technology Project
Preliminary Benefits

- Increased capability to implement audit best practices and processes
- Standardization and implementation of common business processes and workflows, enabling increased productivity
- Reduced application costs across the ERO Enterprise ($420k annual savings)
- Investment break-even within five years
Standardization and implementation of common business processes and workflows, enabling increased productivity

- Single, common portal for registered entities, enabling consistency of experience
- Improved capability to support the Risk-Based Compliance Oversight Framework
- Increased capability to implement audit best practices and processes
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Stakeholder Engagement and Communications Plans

• Certification and Compliance Committee
  ▪ Alignment Working Group
• Other Standing Committees and Subcommittees
• Regional Committees and groups
• Trade organizations and other groups
• Canadian and Mexican entities
• Process Harmonization Schedule
  ▪ Self-Report (March)
  ▪ Enforcement Processing (May)
  ▪ Mitigation Plan Creation and Tracking (July)
  ▪ Self Certifications – Periodic Data Submittals (September)
  ▪ Compliance Audit and Spot Check (October)
  ▪ Compliance Planning (November)
Expected Levels of Effort for CMEP Process Harmonization

**LEVEL OF EFFORT**

- **LOW**
  - Self Reports
  - Enforcement Processing (PNC, CE/FFT, Disposition and Settlement)
  - Mitigation Plan Creation and Tracking
  - Self-Certifications; Periodic Data Submittals; TFEs
- **MEDIUM**
  - Compliance Audits & Spot Checks; Compliance Investigations; Complaints
- **HIGH**
  - Compliance Planning (Risk, IP, IRA, ICE, COP)
• Software vendor selected, endorsed, and approved
• Software and professional services contracting underway
• Security capabilities for hosting services verification in progress
• Configuration and initial testing strategy under development
• Training matrix being developed and core team training being scheduled
Top Steering Committee Issues

- Ensuring stakeholder involvement
- International entities
- Management and conversion of historical data
- Protecting data and CEII
- Interfacing with FERC
• Discovery work to be completed in May
• Updated business case for the ERO Technology Leadership Team (TLT) - August 2018
• Standards and registration data will be integrated with new CMEP tool
• Requirements and design after TLT approval of business case
• Deployment scheduled for 2019
New “Search” and publication enabled on March 21, 2018
Latest version of Microsoft software with improved security
Improvements to “Search” includes date and file type selections
“Search” works best with multiple key words
• Discovery/Requirements effort completed (OATI and Guidance)
• Identified forty-five in-scope applications
• High-priority efforts include data and information access for MRO and SERC, NERC serving as the Compliance Enforcement Authority for the SPP RTO, and seamless transition for SPP RE registered entities
• Enhanced email notifications deployed on March 30
• User communities scheduled for June 29
• Continue to deploy and deliver enhancements to data analytics capabilities (people, data, tools)
<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019(^1)</th>
</tr>
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<tbody>
<tr>
<td><strong>ERO Enterprise</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Functionality</td>
<td>$2.6M</td>
<td>$3.8M</td>
</tr>
<tr>
<td>Applications and Infrastructure Support</td>
<td>$3.6M</td>
<td>$3.6M</td>
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<tr>
<td><strong>NERC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>$0k</td>
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<tr>
<td>Applications and Infrastructure Support</td>
<td>$2.4M</td>
<td>$2.5M</td>
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<tr>
<td><strong>E-ISAC</strong></td>
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<td></td>
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<tr>
<td>Portal</td>
<td>$350k</td>
<td>$733k</td>
</tr>
<tr>
<td>Other</td>
<td>$1.3M</td>
<td>$1.4M</td>
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\(^1\) Preliminary Draft 1 Budget
2020-2021 Technology Spend
Preliminary Projections

<table>
<thead>
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<td><strong>NERC</strong></td>
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<tr>
<td>Other</td>
<td>$1.4M</td>
<td>$1.4M</td>
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</table>

\(^1\) Forecast
Information Technology Budget 2018 - 2019 Forecast

<table>
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<tr>
<th>Information Technology Budget</th>
<th>2018</th>
<th>2019*</th>
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<tbody>
<tr>
<td>Personnel</td>
<td>$4,299</td>
<td>$4,752</td>
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<tr>
<td>Capital Expenditures (including ERO capital projects)</td>
<td>3,624</td>
<td>4,278</td>
</tr>
<tr>
<td>Contractors and Consultants</td>
<td>2,124</td>
<td>1,978</td>
</tr>
<tr>
<td>Meetings, Travel, and Conferencing</td>
<td>199</td>
<td>151</td>
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<tr>
<td>Office Costs</td>
<td>3,169</td>
<td>3,665</td>
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<td><strong>Total</strong></td>
<td>$13,415</td>
<td>$14,824</td>
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</table>

*NOTE: The 2019 Budget is not final and is subject to change until approved by the NERC Board of Trustees on August 16, 2018.
Priorities Looking Ahead

- CMEP Technology Project Business Process Harmonization
- Entity Registration and Standards business case
- Southwest Power Pool Regional Entity Dissolution – IT system modifications
- Additional functionality for the E-ISAC portal
  - Additional authentication enhancements
  - Integrations with other in-house tools such as ThreatConnect, malware analysis tools
  - Additional user interface/experience enhancements such as data visualization, correlation of posted information
- Additional analytical capabilities for the E-ISAC, with a focus on the “analyst workbench/data warehousing” RFP
Questions and Answers
E-ISAC Quarterly Update

Bill Lawrence, Director of the Electricity Information Sharing and Analysis Center
Technology and Security Committee Meeting
May 9, 2018
• Strategic Plan Framework Review
• Key Activities
Vision: To be a world class, trusted source of quality analysis and rapid sharing of electricity industry security information

Supported by:
- NERC Board of Trustees
- Electricity Subsector Coordinating Council (ESCC)
- ESCC Member Executive Committee (MEC)

E-ISAC Strategic Plan

Information Sharing
- Accelerate sharing and high priority notifications
- Enhance portal
- Improve information flow and security
- CRISP
- CYOTE
- CAISS
- Strategic Vendor Partnerships

Analysis
- Hire and develop exceptional employees
- Leverage information sharing technologies and resources to enhance analytical capability

Engagement
- Prioritize products and services
- Metrics benchmarking
- Evaluate 24x7 Operations (future)
- Build trust and show value

World Class ISAC

RESILIENCY | RELIABILITY | SECURITY
E-ISAC Critical Broadcast Program

• Launched a rapid information sharing capability of the E-ISAC on February 7; 1,208 individuals from 245 organizations joined the call
• Exercise on February 22 had over 960 individuals from 220 organizations; added CRISP information from PNNL

CRISP

• Expanding membership base – NERC, Regions, and five other companies joining
• Identifying and evaluating opportunities to lower cost of participation
• Exploring DOE funding for broader participation of DCEI utilities and support APPA and NRECA member participation
Portal Enhancements
• Improving email notification capabilities; user acceptance testing underway
• Reviewing and developing user community requirements; targeting Q2 for user acceptance testing and deployment

Industry Augmentation Program
• Completed a week with analysts from NYPA/SRP and NPPD/NYPA; ConEd next
• Attended LPPC Task Force meeting to discuss lessons learned
• Builds trust, exchanges expertise, and increases understanding of threats and response
Questions and Answers
• Submission Site
• Electric Reliability Organization (ERO) Portal
  - MIDAS is the first external-facing NERC-hosted application on the platform

MIDAS Portal

Welcome to the MIDAS portal. Users can submit, view, and manage data reported for misoperations and protection system operations in this portal. Reports provide information on submission status and various statistics that compare an entity’s misoperations rate to aggregated regional and NERC-level data.

The user guide for the MIDAS portal can be found here or on the NERC website by navigating to Program Areas & Departments > Reliability Assessment & Performance Analysis > Protection System Misoperations > MIDAS User Guide for Entities.

For questions on how to report a specific Misoperation, please email your regional contact:

<table>
<thead>
<tr>
<th></th>
<th>MRO</th>
<th>RF</th>
<th>NPCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRCC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SERC</td>
<td>SPP</td>
<td>Texas RE</td>
<td>WECC</td>
</tr>
</tbody>
</table>

For assistance with the functionality of the MIDAS portal please email MIDAS@nerc.net.
Real-time Feedback on Submissions

The form could not be submitted for the following reasons:

- Misoperation Date and Time is a required field.
- Facility Name is a required field.
- Equipment Type is a required field.
- Equipment Removed is a required field.
- Date Reported is a required field.

New Misoperation Record

<table>
<thead>
<tr>
<th>Entity</th>
<th>CAP Target Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCR55555 - Test Company 2</td>
<td>4/13/2018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>CAP Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Misoperations

From this page enter individual Misoperation records, modify existing Misoperation records, or deactivate previously submitted Misoperation records.

### Region
- FRCC
- MRO
- NPCC
- RF
- SERC
- SPP

### Category
- Failure To Trip
- Slow Trip
- Failure to Trip - During Fault
- Failure to Trip - Other than Fault
- Slow Trip - During Fault
- Slow Trip - Other than Fault

### MIDAS Record ID

### Misoperation Date
- Today
- Yesterday
- Last Seven Days
- Last 14 Days
- Last 30 Days
- Last 3 Months

### Table

<table>
<thead>
<tr>
<th>Name</th>
<th>Created On</th>
<th>MIDAS Record ID</th>
<th>Category</th>
<th>Cause</th>
<th>Misoperation Date</th>
<th>Seconds</th>
<th>Time Zone</th>
<th>Facility Name</th>
<th>Facility Voltage</th>
<th>Equipment Name</th>
<th>Equipment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRCC_NCR55555_01/17/2018_11:07:12_q_q</td>
<td>4/13/2018 11:00 AM</td>
<td>1377252</td>
<td>Failure To Trip</td>
<td>AC system</td>
<td>1/17/2018 11:00 AM</td>
<td>12</td>
<td>ADT</td>
<td>q</td>
<td>&lt;100kV (BES)</td>
<td>q</td>
<td>Line</td>
</tr>
<tr>
<td>RF_NCR55555_01/09/2018_11:09:12_q_q</td>
<td>4/13/2018 11:00 AM</td>
<td>8802463</td>
<td>Failure To Trip</td>
<td>AC system</td>
<td>1/9/2018 11:00 AM</td>
<td>12</td>
<td>ADT</td>
<td>q</td>
<td>&lt;100kV (BES)</td>
<td>q</td>
<td>Line</td>
</tr>
</tbody>
</table>
Ability to Edit Records

Fault Type

Event Description
An incorrectly wired relay caused the breaker to fail to trip.

Reporter's Phone Number
770-777-7777

Reporter's Email
jack.Norris@nerc.net

Date Reported
4/1/2018

Restoration Method

Category
Failure To Trip

Additional Contact Name

Additional Contact's Phone Number
### Ability to Create New Records

#### New Protection System Operation Record

**Operation Quarter**

- Qtr 1 (Jan 1 - Mar 31)

**Created By Portal User**

- Jack Norris5

**Operation Year**

- 2018

**Operations Count**

- 1

**Voltage Class**

- 100kV (BES)
Bulk Submissions

From this page, submit misoperations and protection system operations using the M viewed.

Note: Deactivating a Bulk Submission does not deactivate or remove processed records.

### Active Bulk Submissions

<table>
<thead>
<tr>
<th>Submission Date</th>
<th>Entity</th>
<th>Lead Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/9/2018 8:43 AM</td>
<td>Test Company 2</td>
<td>RF</td>
</tr>
<tr>
<td>2/27/2018 1:17 PM</td>
<td>Test Company 2</td>
<td>RF</td>
</tr>
<tr>
<td>2/27/2018 12:08 PM</td>
<td>Test Company 2</td>
<td>RF</td>
</tr>
<tr>
<td>1/18/2018 9:50 PM</td>
<td>Test Company 2</td>
<td>RF</td>
</tr>
<tr>
<td>1/18/2018 9:47 PM</td>
<td>Test Company 2</td>
<td>RF</td>
</tr>
<tr>
<td>11/30/2017 9:21 AM</td>
<td>Test Company 2</td>
<td>RF</td>
</tr>
<tr>
<td>11/30/2017 9:18 AM</td>
<td>Test Company 2</td>
<td>RF</td>
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</table>
Submission Status Report

Misoperation Submission Status for NCR55555

For Q1, 2018 through Q1, 2018

<table>
<thead>
<tr>
<th>NERC ID</th>
<th>Entity</th>
<th>Region Name</th>
<th>Quarter</th>
<th>Year</th>
<th>Status</th>
<th>Misoperations</th>
<th>PS Operations</th>
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<tbody>
<tr>
<td>NCR55555</td>
<td>Test Company 2</td>
<td>FRCC</td>
<td>Q1</td>
<td>2018</td>
<td>Complete</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td></td>
<td></td>
<td>RF</td>
<td>Q1</td>
<td>2018</td>
<td>Missing Submissions</td>
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<td>No</td>
</tr>
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</table>
## Entity Misoperation Rate Report for NCR55555 for Region FRCC

For Q1, 2018 through Q1, 2018

<table>
<thead>
<tr>
<th>Voltage Class</th>
<th>Entity</th>
<th>NERC ID</th>
<th>PS Ops</th>
<th>Misoperations</th>
<th>Entity</th>
<th>FRCC</th>
<th>Nerc</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100kV (BES)</td>
<td>Test Company 2</td>
<td>NCR55555</td>
<td>12</td>
<td>1</td>
<td>8.33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td></td>
<td>12</td>
<td>1</td>
<td>8.33%</td>
<td>8.33%</td>
<td>16.67%</td>
</tr>
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<table>
<thead>
<tr>
<th></th>
<th>FRCC</th>
<th>Nerc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Across Voltages</td>
<td>16.67%</td>
<td>19.23%</td>
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## Misoperation Submission Status for SERC

For Q1, 2017 through Q1, 2018

<table>
<thead>
<tr>
<th>NERC ID</th>
<th>Entity</th>
<th>Quarter</th>
<th>Year</th>
<th>Status</th>
<th>Submission</th>
<th>Opt Out</th>
<th>Submission</th>
<th>Opt Out</th>
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<tbody>
<tr>
<td>NCR01214</td>
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<td>2017</td>
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<td>No</td>
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<tr>
<td></td>
<td></td>
<td>Q2</td>
<td>2017</td>
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<td>2017</td>
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<td></td>
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<td></td>
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<td>2018</td>
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<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
• Entity user feedback almost entirely positive
  ▪ Generally feel system is different but easy to use
  ▪ Very happy they are able to view their data and reports
  ▪ Appreciate having multiple submission options and ability to edit
  ▪ Provided suggestions for improvement

• Regional Entity users
  ▪ Appreciate standardized reports while maintaining flexibility to access entity records
Portal Benefits

• Entity Users
  ▪ Improved user experience
  ▪ Ease of submission and immediate feedback
  ▪ Decreased industry burden
  ▪ Reports on submission status and operational benchmarking

• Regional Entity Users
  ▪ Improved workflow
  ▪ Regional-level version of same reports as entity users

• NERC
  ▪ Validation process improves data quality
  ▪ Improvement of on-time submissions
  ▪ Capabilities and corresponding business processes will be applied to current and future data collection processes
Questions and Answers