



**Southwest Power Pool  
REGIONAL ENTITY TRUSTEES MEETING**

**July 25, 2016**

**Rushmore Plaza Holiday Inn**

**Rapid City, South Dakota**

**A G E N D A**

**7:30 a.m. – 12:00 p.m. MST**

1. Call to Order/Introductions ..... Dave Christiano
2. Antitrust Guidelines ..... Dave Christiano
3. Approval of Meeting Minutes – June 13, 2016 ..... Dave Christiano
4. New SPP RE Trustees ..... Dave Christiano
5. Long Term Reliability Assessment .....Lanny Nickell  
*Action Requested: SPP RE Trustees accept LTRA*
6. 2Q Events Report and Facility Ratings Alert Update ..... Alan Wahlstrom
7. CIP Update.....Ron Ciesiel
8. Enforcement Report .....Joe Gertsch
9. General Manager’s & Compliance Report .....Ron Ciesiel
10. Outreach Activity ..... Emily Pennel
11. Financial Report/Year-to-Date Financial Statement .....Debbie Currie
12. Staff Goals and Metrics .....Ron Ciesiel
13. NERC CIPC Report.....Eric Ervin
14. NERC Committee Representative Written Reports - Comments or Questions
  - 14a. Planning Committee Report .....Noman Williams
  - 14b. Compliance and Certification Committee Report.....Jennifer Flandermeyer
  - 14c. NERC Operating Committee Report ..... Jim Usledinger
  - 14d. System Protection and Control Report ..... Open
15. New Action Items ..... Emily Pennel
16. Future Meetings ..... Dave Christiano

*Relationship-Based • Member-Driven • Independence Through Diversity  
Evolutionary vs. Revolutionary • Reliability & Economics Inseparable*



October 24, 2016 – Little Rock  
January 30, 2017 – Dallas  
April 24, 2017 – Tulsa  
July 24, 2017 – Denver  
Oct. 30, 2017 – Little Rock

*Relationship-Based • Member-Driven • Independence Through Diversity  
Evolutionary vs. Revolutionary • Reliability & Economics Inseparable*

# SPP Regional Entity Antitrust Guidelines

**It is SPP RE's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or which might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition.**



**REGIONAL ENTITY TRUSTEES MEETING**

**JUNE 13, 2016**

**SPP Corporate Center, Little Rock**

**A G E N D A**

**9:00 a.m. – 12:00 p.m.**

**Meeting Materials**

- 1. **Call to Order/Introductions.....Dave Christiano**  
Dave Christiano called the meeting to order at 9:00.
- 2. **Antitrust Guidelines .....Dave Christiano**  
Emily Pennel reviewed the guidelines.
- 3. **Approval of Meeting Minutes – April 25, 2016 .....Dave Christiano**  
The Trustees approved the minutes.

- 4. **2017 SPP RE Business Plan and Budget .....Debbie Currie**  
The 2017 SPP RE Business Plan and Budget is \$10.9 million, an increase of ~8% or \$0.77 million from 2016. While the majority of the budget increase is driven by inflationary costs and the 2017 audit schedule (including moving four CIP audits from 2016 to 2017 due to the delay in the CIP V5 effective date), SPP RE is also budgeting for a fourth Trustee and an increase in the use of SPP Engineering shared staff that support the Reliability Assessments and other NERC special studies. The budget reduced funds allocated for Standard Drafting Team reimbursement. Any penalty money received between now and June 30 will be credited to the budget.

The expenses have not changed from the preliminary budget that was reviewed at the April SPP RE Trustees meeting. We did not receive any stakeholder comments on the budget.

The final budget is due to NERC July 6. NERC posts all regional budgets for comment July 15. On August 11, NERC will present the NERC and regional budgets to the NERC Board of Trustees. NERC will submit the budget to FERC on August 24.

The Trustees approved SPP RE 2017 Business Plan & Budget, subject to adjustment for violation penalty payments received prior to July 1, 2016, plus other non-substantive changes required for filing with NERC.

- 5. **2016 State of Reliability Report.....Mike Hughes**  
The State of Reliability Report is prepared annually by NERC’s Performance Analysis Subcommittee, with the assistance of the Operating and Planning Committees. The report provides an objective view of historic reliability performance and identifies trends and risks to reliability. Data is used to develop 18 Adequate Level of Reliability



Metrics. The report includes seven key findings, along with numerous metrics to help the Electric Reliability Organization improve reliability.

- 6. SPP RE Trustees and Staff ..... Dave Christiano**  
Monica Evans will join SPP RE as Administrative Assistant on July 1, Alison Hayes will return June 16 as a Compliance Attorney, and Law Clerk Chris Bills has been promoted to Attorney.

The Trustees worked with a search firm to review 21 candidates for two new SPP RE Trustee positions. Eight candidates were interviewed. The Trustees selected two candidates for nomination as the new Trustees: Steve Whitley and Mark Maher. Mr. Whitley retired as CEO of New York ISO and Mr. Maher retired as CEO of WECC. The election will be held at the July Members Committee meeting.

- 7. New Action Items..... Ron Ciesiel**  
We will roll out an expanded misoperations chart at the July MOPC meeting.

- 8. Future Meetings..... Dave Christiano**

July 25, 2016: Rapid City  
October 24, 2016: Little Rock

Chairman Christiano adjourned the meeting at 10:43 a.m.

Respectfully submitted,  
Emily Pennel  
SPP RE Trustees Secretary



# 2016 Long Term Reliability Assessment

July 25, 2017

**Lanny Nickell**

**Vice President, Engineering**

# Assessment Staff

- **Chris Haley, Engineer Associate III (RTO)**
  - [chaley@spp.org](mailto:chaley@spp.org)
  - 501-614-3583
- **Alan Wahlstrom, Lead Engineer (SPP RE)**

# Long Term Reliability Assessment

- **Widely-read continent-wide publication**
- **Projected 10-year long-term outlook (2017-2026) for SPP Planning Coordinator assessment area**
  - Demand growth
  - Capacity adequacy
  - Operational reliability
- **Primary objectives:**
  - Qualitative outlook of region's reliability
  - Make recommendations for mitigations/actions as needed



# Assessment Process

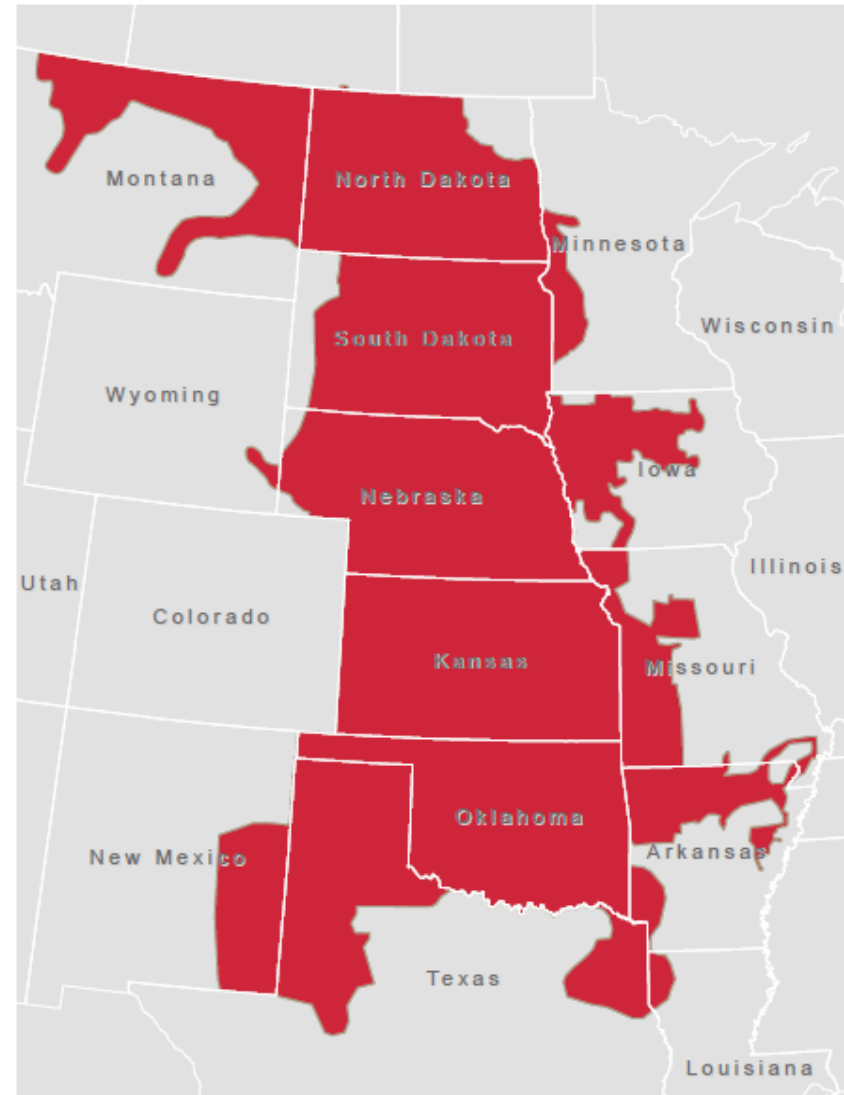
- **Created with data/information submitted by SPP Reporting Entities**
- **SPP staff validates and cross-checks data to verify consistency**
- **SPP staff and stakeholders have the opportunity to provide input**
- **Assessment undergoes peer review process at NERC prior to finalization**
- **SPP staff annually presents the assessments to the SPP RE Trustees and the Midwest Reliability Organization (MRO) Planning Committee**

# SPP Planning Reserve Margin

- **Capacity Margin Task Force (CMTF) approved a reduction of SPP's Planning Reserve Margin (PRM) requirement from 13.6% to 12.0% on Feb 16, 2016**
  - **22 votes cast**
  - **Unanimous approval with 2 abstentions**
- **MOPC approved with one no vote and 5 abstentions**
- **SPP Board of Directors approved**
- **New PRM Requirement is expected to be effective starting June 1<sup>st</sup>, 2017**

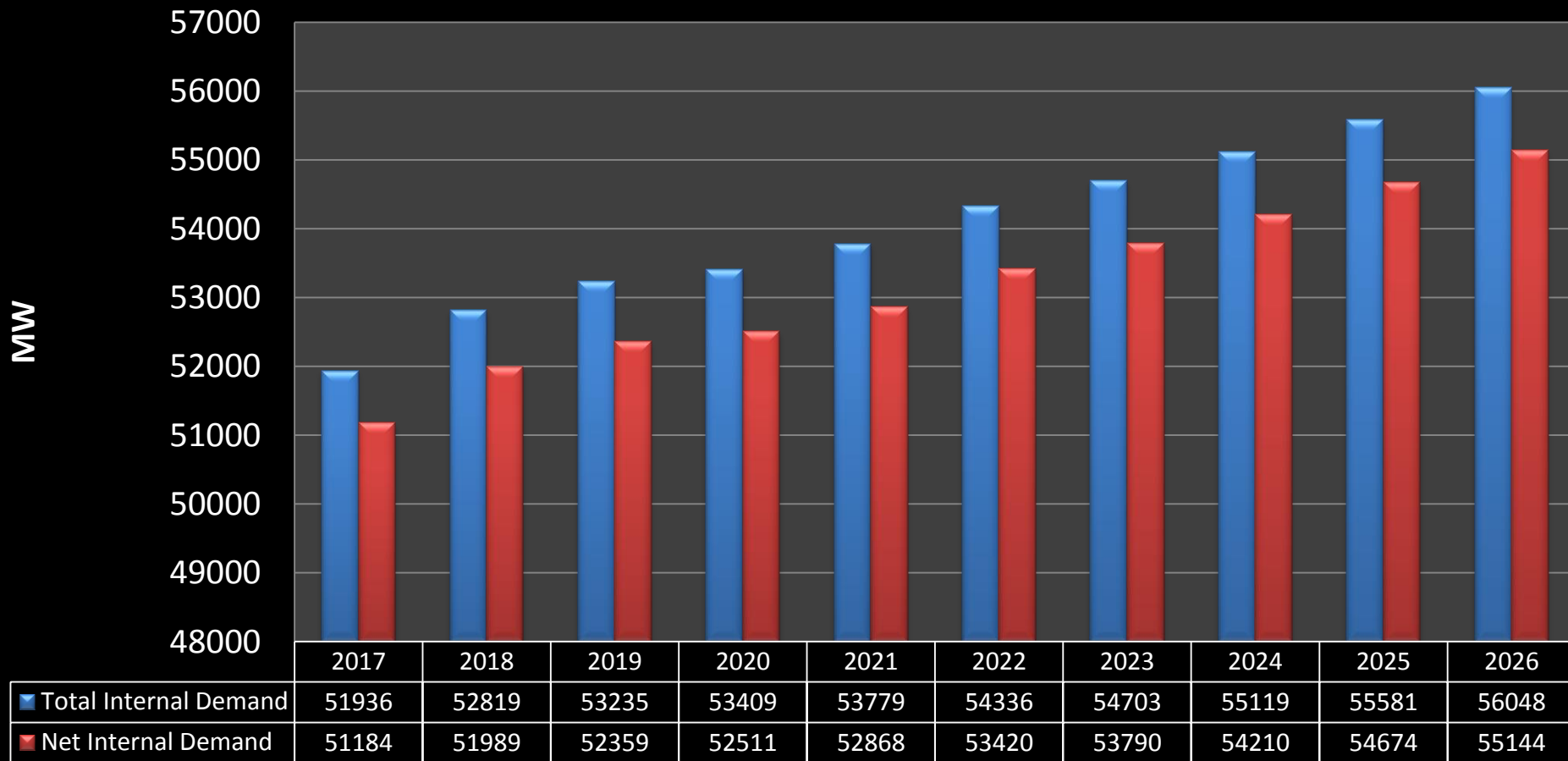
# Assessment Area

The Long Term Reliability Assessment (LTRA) includes the Integrated System (IS). This is the first LTRA that SPP has performed with the IS included, since becoming a member of the Planning Coordinator (PC) in October 2015



# Non-Coincident Peak Demand

- Annual load growth of 1% projected over next 10 years
- **Net Internal Demand = Total Internal Demand – Demand Response**



# Demand Side Management

- The following factors impact load forecasts:
  - Demand Response (DR) consists of Controllable and Dispatchable programs
    - ~ 752 MW in 2017
    - ~ 904 MW in 2026
  - Energy Efficiency (Included in Total Internal Demand forecast)
    - ~ 396 MW in 2017
    - ~ 1,362 MW in 2026
  - Distributed Generation (Included in Total Internal Demand forecast)
    - ~ 115 MW in 2017
    - ~ 96 MW in 2026

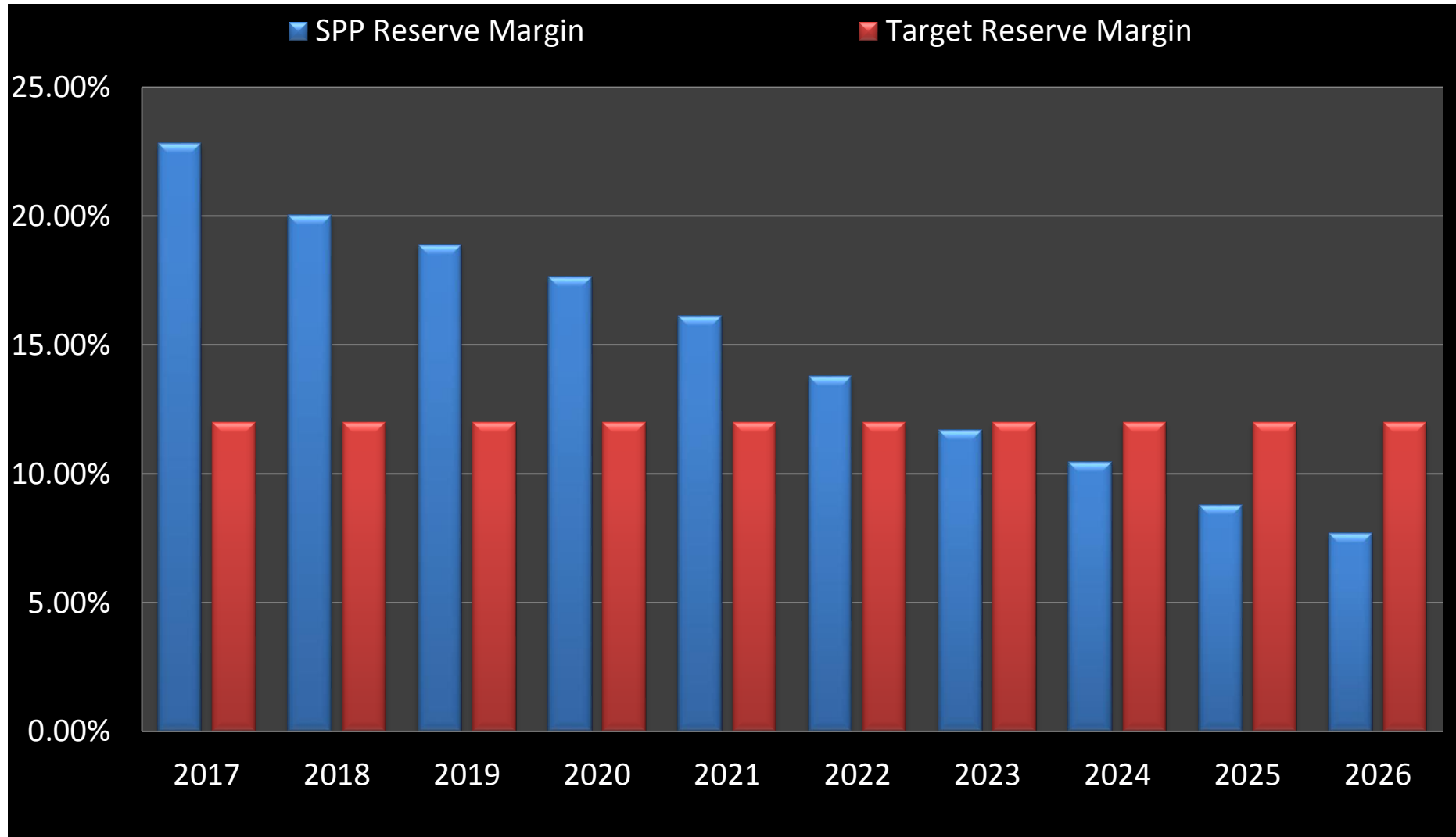
# Generation

- **~ 3,438 MW confirmed nameplate generation expected to be retired 2017-2026**
- **~ 1,150 MW unconfirmed nameplate generation could potentially be retired in the 2017-2026 timeframe**
  - **The potential retirement of unconfirmed generation is not considered in the Available and Anticipated reserve margin calculations**
- **~ 9,800 MW of new nameplate “Tier 1” generation projected coming into service 2017-2026**
  - **~ 7,800 MW of “Tier 1” generation is wind**
  - **Tier 1 generation is new generation that is either under construction or has a signed generation interconnection agreement that is not under suspension**

# Available Capacity

- **~62,862 MWs Existing Certain Capacity in 2017**
- **~59,386 MWs Existing Certain Capacity in 2026**
  - **Planning Reserve Margin deficiency beginning in 2023**
  - **Existing Certain generation available (Net Capability)**
  - **Includes Net Firm Transfers**
  - **Includes reported summer scheduled outages**
  - **Decrease in capacity due to retirements**
  - **Reserve margin based on expected Existing Certain generation and Net Firm Transfers**

# Available Capacity Reserve Margin



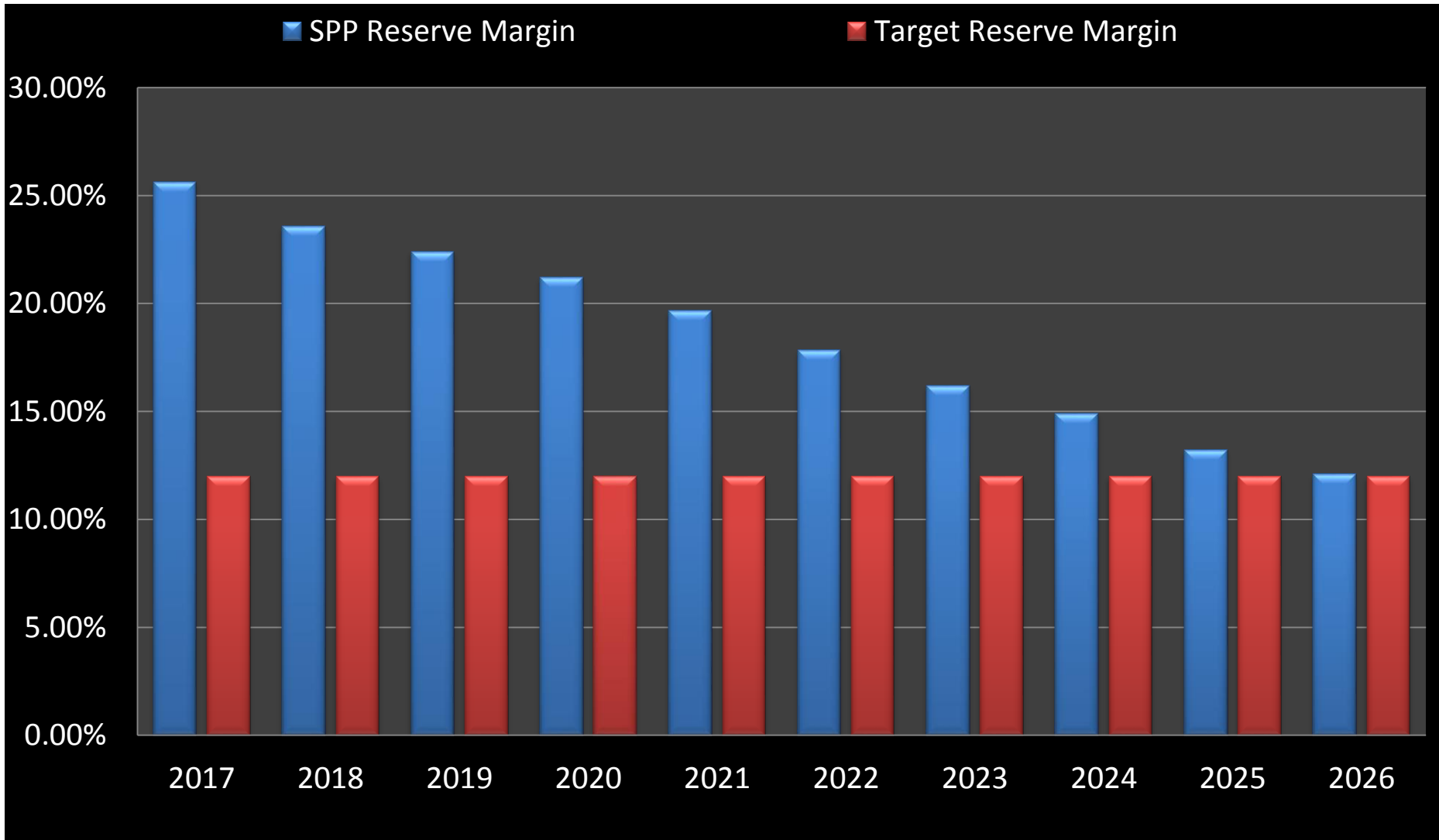
Calculated using the Net Internal Demand



# Anticipated Capacity

- **~64,300 MWs Anticipated Capacity in 2017**
- **~61,813 MWs Anticipated Capacity in 2026**
  - **Planning Reserve Margin is maintained above 12% for the assessment period**
  - **Includes Existing Certain and Planned “Tier 1” anticipated capacity**
  - **Reserve margin based on expected Existing Certain, Net Firm Transfers, and Planned “Tier 1” anticipated capacity**

# Anticipated Capacity Reserve Margin



Calculated using the Net Internal Demand

# Reserve Margins Re-Cap

- **SPP Load Responsible Entity (LRE) members will be required to maintain a 12% Planning Reserve Margin**
- **Forecasted anticipated reserve margin is ~26% in 2017, decreasing to ~12% in 2026**
  - **SPP maintains the Planning Reserve Margin requirement for the assessment period**
  - **Some entities are projected to fall below the approved reserve margin requirements during the 5-year near-term**

# Transmission

- **~1,594 miles of new 100+ kV transmission expected to be constructed over 10-year assessment period**



# Long-Term Reliability Issues

- **Wind will continue to cause operational challenges**
  - **During off-peak periods, high wind penetration levels will cause increased congestion**
  - **Early 2016, nearly 50% of SPP's load was served by wind generation at certain points, setting numerous wind penetration records**
    - **SPP has been able to reliably accommodate this kind of growth so far due to its ability to anticipate it in planning efforts**
  - **SPP continues to plan transmission to meet renewable portfolio standards within the SPP Assessment Area**

# Long-Term Reliability Issues

- **Early 2016, SPP kicked off a Variable Generation Integration Study with an objective to perform the following:**
  - **Study system response under operating conditions**
  - **Transient stability analysis on 45% and 60% wind penetration**
  - **Voltage analysis on identified load pockets**
  - **Frequency response analysis using 30%, 45%, and 60% wind penetration**
  - **Future Ramping Outlook**

# Emerging Reliability Issues

- **Plant Retirements over the assessment period**
  - **Uncertainty of potential policy changes**
- **With renewable resources being added to the SPP system:**
  - **Will eventually reach a point at which SPP can no longer reliably utilize this generation for SPP's own internal demand needs, even with additional transmission infrastructure**
  - **Will increase the need for future renewables to be delivered to other regions**



# System Events & Facility Ratings Alert Update

**Alan Wahlstrom**  
**Lead Engineer**

**July 25, 2016**

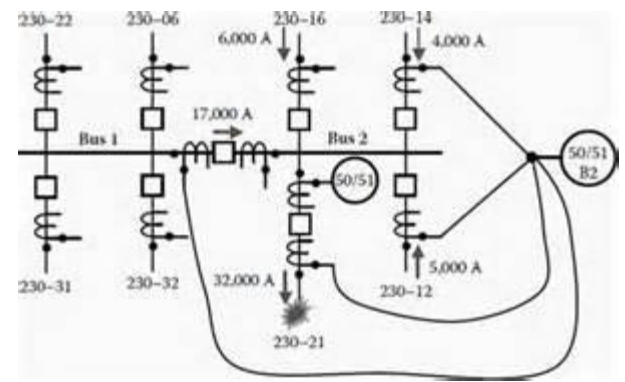


# SPP Regional Events (April 1–June 30)

- 5 events occurred in the SPP region during second quarter of 2016, compared to 3 in 2Q 2015
- All events were in lowest assignable risk category
  - One category 1a. *Loss of three or more elements*
  - One category 1h. *Partial loss of monitoring and control*

# 1. Transmission Lost – Event Category 1a

- Insulator failure on middle phase
- One breaker failed to operate, causing back-up breakers to initiate
- Relaying at adjacent company tripped 3 generating units (by design )
- 7 circuits tripped



## 2. Loss of Monitoring - Event Category 1a

- System Operator was advised Energy Management System (EMS) system would be down for only 5 minutes for maintenance
- IT support staff said unexpected problems were found and EMS would be down longer than expected
- System Operator in communication with RTO to monitor system
- 90 minute outage



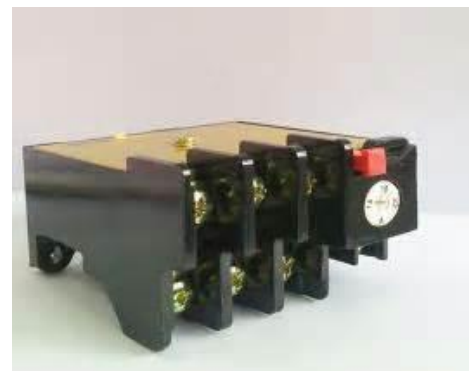
# NERC LESSONS LEARNED

# Control Center Loss of SCADA Control and Monitoring Capability

- An EMS Supervisory Control and Data Acquisition (SCADA) group-control command was initiated to disable instantaneous relay trip settings for ~300 distribution feeder circuit breakers
- This caused SCADA application to abort and not restart, rendering SCADA unavailable for 67 minutes

# Lesson Learned

- Invalid key information caused EMS system to abort
- Future testing of SCADA controls will provide any additional reviews necessary to accommodate scale of required task
- When implementing new functions, the scale of operations to be performed should be considered - not just the operation itself



## Transmission Relaying – Relay Setting Issue

- **Line relay protecting a 230 kV line misoperated for a fault on a 115 kV line**
- **Misoperation occurred due to Registered Entity utilizing manufacturer's automatic setting method based on line parameters**
- **Manufacturer then recommended not using the automatic setting method based on line parameters**
  - **Instead, manufacturer recommended specific settings for the forward and reverse values**

# Lesson Learned

- To ensure settings are applicable to the specific application, Registered Entities must understand manufacturer's automatic setting methods and algorithms before applying them





# SCADA Failover Event

- While initiating a failover process between Registered Entity's primary and secondary data source, the system came up in a pause state, causing loss of Generating Management System
- SCADA\_VALIDATE command was not completed before initiating the failover process
- Changed timing of SCADA\_VALIDATE command

# Lesson Learned

- **When performing a failover between primary and alternate sites, wait 10 minutes after performing a SCADA\_VALIDATE to ensure SCADA has had time to pause, validate, and restart prior to the failover**

# Loss of Monitoring Capabilities Due to FEP Hardware Malfunction

- Registered Entity experienced loss of monitoring capabilities at primary and backup control centers due to front-end processor (FEP) hardware malfunction

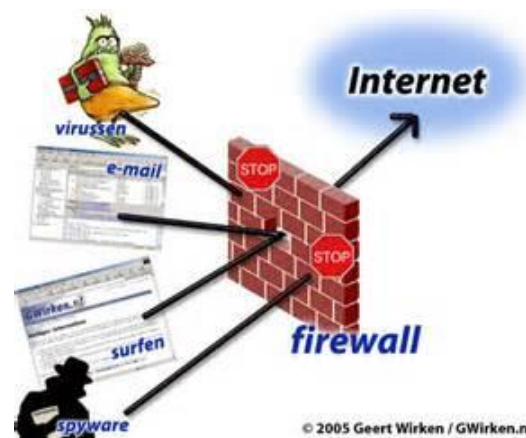


# Lesson Learned

- **Registered Entity's Electrical Support Services department should always:**
  - **Have adequate spare parts in inventory**
  - **Conduct periodic failover testing**

# ICCP Communication Failure Due to Firewall Patch Update

- During a regularly scheduled firewall patch installation, the Registered Entity experienced multiple inter-control center communications protocol (ICCP) communication failures with external Registered Entities



# Lesson Learned

- **Network/IT work plans and priorities should be identified with enough time to fully vet concerns**
- **Early communication of all work being conducted - even low or no risk – should be shared between departments**
- **Identify worst case scenario(s) that could occur from patch update processes**

# Addendum for Events with Failed Station Equipment

- In December 2013, NERC Planning and Operating Committees formed AC Substation Equipment Task Force (ACSETF) to investigate substation equipment failures
- ACSETF recommended the NERC Event Analysis process collect information on station equipment failures going forward

# Addendum for Events with Failed Station Equipment

## Equipment Types

1. Power Transformers
1. Instrument Transformers
1. Circuit Breakers
1. Relays

### Power Transformers

1. Manufacturer
1. Date of manufacture
1. Transformer type
  - a. Autotransformer
  - a. 2 winding
  - a. 3 winding
  - a. Shell form
  - a. Core form
  - a. Other – please explain
1. Winding configuration
  - i. delta-wye
  - i. wye-wye
  - i. wye-delta
  - i. delta-delta



# NERC Facility Ratings Alert – SPP Region as of March 2016

- **100% High priority line discrepancies complete**
- **94.4% Medium priority line discrepancies complete**
- **90.5% Low priority line discrepancies complete**



# Links

- [SPP RE Event Analysis](#)
- [Event Analysis Process Documents](#)
- [NERC Lessons Learned](#)



# CIP Update

July 25, 2016

**Ron Ciesiel**

**SPP RE General Manager**

# CIP Update

- **CIP V5 Revisions (V6) became effective 7/1/16 for High and Medium Impact BES Cyber Systems**
  - **Certain recurring Requirement Parts have delayed “first occurrence” enforcement dates per CIP V5 and CIP V5 Revisions Implementation Plans**
    - **May be excluded from audit depending on timing**
  - **Compliance auditing has resumed for Registered Entities with High and/or Medium Impact BES Cyber Systems**
    - **Audits primarily focused on CIP-002-5.1, CIP-005-5, CIP-006-6, CIP-007-6, and CIP-010-2**
    - **Other Requirements may be included, depending on past compliance history**

# CIP Update

- **CIP Compliance Audit Schedule**
  - **Four CIP compliance audits scheduled for this year**
  - **Three additional audits pushed into 2017 due to delayed effective date of Revised CIP V5 Standards**
    - **No word yet on any FERC-led CIP compliance audits**
  - **Will resume auditing non-BA, non-TOP Registered Entities with only Low Impact BES Cyber Systems beginning 2Q 2017**
    - **Will pick up cancelled 2014 – 2016 audits**
  - **Non-BA, non-TOP Registered Entities with High or Medium Impact BES Cyber Systems will be shifted to a three-year cycle**

# CIP Update

- **CIP-014-2 Self Certification/Data Request completed 5/2/2016**
  - Summary report provided to NERC on 5/17/2016
  - Will follow up with three Registered Entities to seek additional information
- **CIP-002-5.1 Self Certification/ Data Request due 7/15/2016**
  - Following up with four late submitters
  - Summarizing individual submittals to provide to NERC

# CIP Update

- **CIP-014-2 Compliance Audits**
  - Including CIP-014-2 with CIP V6 compliance audits
  - Have to perform all field work on-site
    - Language of CIP-014-2 expressly prohibits removal of any evidence from the Registered Entity's site
    - Prohibition extends to RSAWs and work papers if identifying details about the identification of critical assets is included
    - Evidence and work papers will be retained by the Registered Entity for the full regulatory retention period
- **Order 802 Standards Drafting Team working actively working on additional revisions**



# Enforcement Update

July 25, 2016

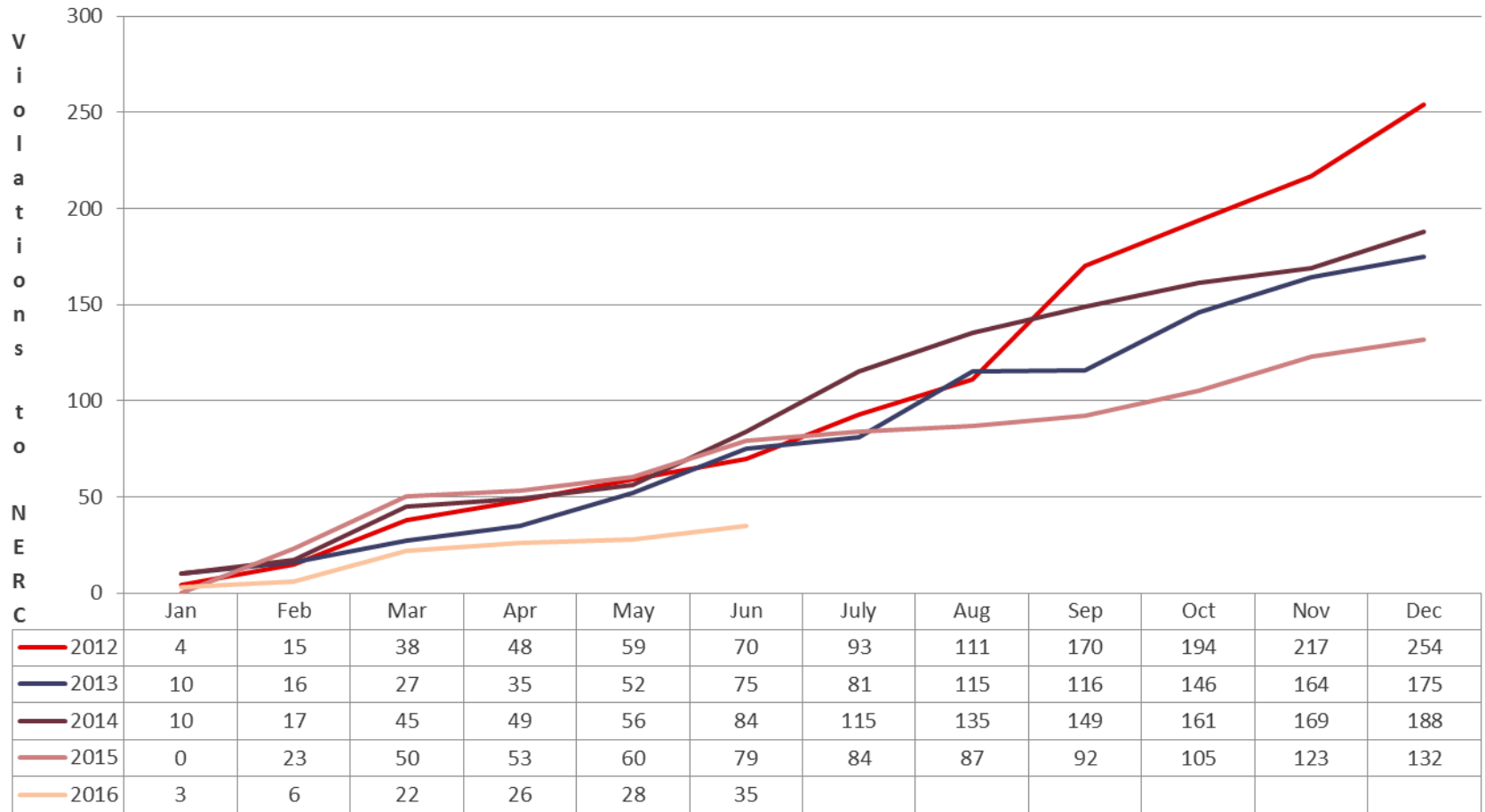
**Joe Gertsch**  
**Manager of Enforcement**



<b>SPP RE Enforcement Activities June 30, 2016</b>	2007	2008	2009	2010	2011	2012	2013	2014	2015	First Quarter	April	May	June	Total 2016
<b>Notice of Preliminary Screen Issued</b>	-	-	-	-	-	-	-	121	89	10	8	10	10	38
<b>Notice of Possible Violations Issued</b>	6	56	132	254	239	173	189	107	71	6	7	6	2	21
<b>Notice of Alleged Violation (NAVAPS)</b>														
NAVAPS Issued	6	45	10	7	0	2	1	6	0	0	0	0	0	0
<b>Notice of Confirmed Violation (NOCV)</b>														
NOCV Sent to Entity/NERC	0	8	25	15	4	1	0	1	0	0	0	0	0	0
NOCV BOTCC Approved	0	7	11	29	4	1	0	1	0	0	0	0	0	0
<b>Settlements / Full Notice of Penalty</b>														
To NERC for Approval	0	0	0	89	118	52	5	15	28	0	0	0	0	0
BOTCC Approved	0	0	0	50	81	103	14	30	24	0	4	0	0	4
<b>Settlements / Spreadsheet NOP</b>														
To NERC for Approval	0	0	0	16	22	49	43	59	8	0	0	0	0	0
BOTCC Approved	0	0	0	0	38	49	65	46	8	0	0	0	0	0
<b>Find, Fix, Track</b>														
To NERC for Approval	-	-	-	-	43	78	86	62	13	1	0	0	1	2
BOTCC Approval	-	-	-	-	36	74	95	61	14	1	0	0	0	1
<b>Compliance Exception</b>	-	-	-	-	-	-	-	1	69	20	3	1	5	29
<b>Dismissals</b>														
To NERC/SPP RE SRT for Approval	0	0	1	16	75	43	41	44	14	1	1	1	1	4
NERC/SPP RE SRT Approved		0	1	16	75	43	41	44	14	1	1	1	1	4
<b>Notice of Penalty</b>														
Approved by FERC	0	5	13	57	180	184	141	118	15	16	0	4	0	20
<b>Violations Awaiting NERC Approval</b>													5	
<b>Active Violations - Caseload</b>													68/91	
<b>Caseload Index (months)*</b>													12.5	

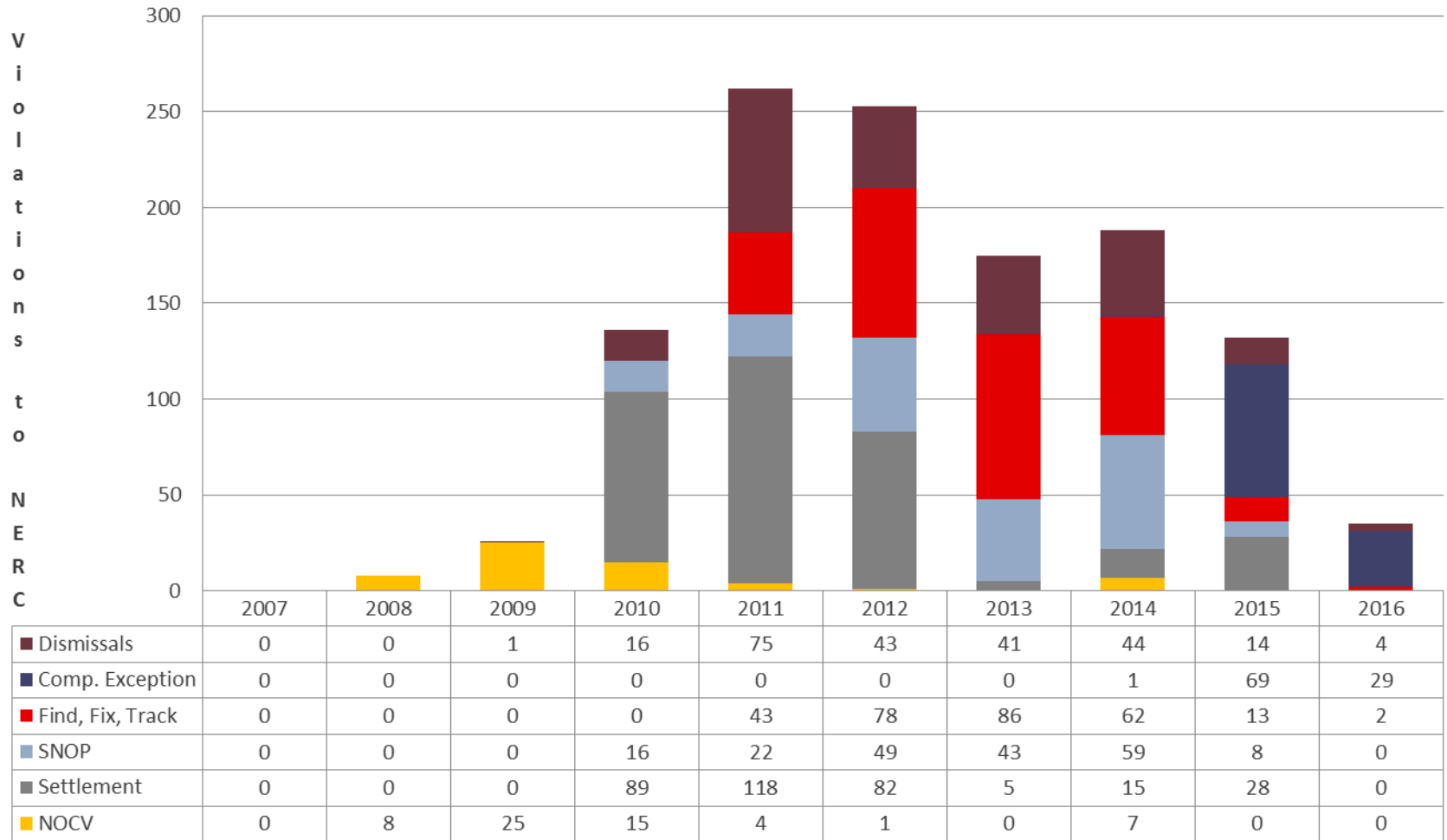
\* Based on previous 12 months processing (65)

# Enforcement Monthly Violation Processing



Running Total Violations

# Enforcement Processing Methods



# SPP RE Caseload – June 30, 2016

- **91 - Active SPP RE Violations**
  - 19 - Settlement
  - 49 - Settlement Not Requested (NAVAPS/NOCV)
  - 38 – Multi Region Registered Entity (MRRE) - SPP RE Lead on 15
- **43 - 693 Violations**
- **48 - CIP Violations**
- **3 - High Impact Violations**
- **Discovery Method**
  - 40 - Audit
  - 43 - Self Report
  - 3 - Self Certification
  - 5 - Log

# Caseload Aging

- **SPP RE – 68 violations**

- **Average age - 298 days**

<u>Age (days)</u>	<u>Violations</u>
> 300	30
201 – 300	10
101 – 200	6
51 – 100	12
1 - 50	10

- **Pre-2015 violations: 14**

- **MRRE: 23 violations, average age - 448 days**

# High Impact Violation Summary

- **3 – Open High Impact Violations**
  - 1 - Settlement
  - 1 – MRRE
  - 1 – Non Settlement
- **Open High Impact Violations Mitigation Status**
  - 1 – Completion Verified
  - 1 – Dismissal / Transfer
  - 1 – Initiated

# SPP RE 2016 Violation Dismissals

Consolidation with another violation .....	2
NERC V3 – V5 Guidance (approach 2) .....	1
Self-Report wrong standard and/or requirement.....	0
Provided exculpatory evidence .....	0
Incorrect Interpretation of Standard .....	<u>1</u>
<b>Total</b>	<b>4</b>

# June Mitigation Plan Summary

- **Mitigation Plan Status (month/year)**

Submitted	10/11
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Accepted	9/12
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Certified Complete	3/12
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Completion Verified	3/24
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Mitigating Activity Completed	1/15
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- **Active Violations with no Mitigation Plans**

Initiated	39
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Rejected	0
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**SPP** *Southwest  
Power Pool  
Regional Entity*

**Joe Gertsch**  
Manager of Enforcement  
[jgertsch.re@spp.org](mailto:jgertsch.re@spp.org)  
501-688-1672



# General Manager's Report

July 25, 2016

Rapid City, South Dakota

**Ron Ciesiel**  
**SPP RE General Manager**

# Inherent Risk Assessment (IRA)

- **NERC's goal is for each Regional Entity to complete an IRA for all BAs, TOPs and RCs**
- **SPP RE's goal is to complete an IRA for each SPP RE Registered Entity by the end of 2016**
  - **Completed 35 and submitted Summary Report to NERC**
  - **IRA to be completed:**
    - **3 TOPs**
    - **59 GOs, GOPs, DPs or TOs**

# Internal Control Evaluation (ICE)

- **SPP RE has conducted 4 ICE**
  - **Results to Registered Entities' oversight**
    - **Removed requirements from review**
    - **Reduced sample size**
    - **Feedback to Registered Entities on improvement of controls**

# Compliance Monitoring

- **O&P scheduled 4 on-site audits and has completed 3**
  - Reviewed 131 requirements; 7 findings of non-compliance
- **O&P scheduled 14 off-site audits**
  - IRAs reduced 3 off-site audits to Spot-Checks
  - 5 off-site audits completed; reviewed 67 requirements
  - 3 Spot-Checks completed; reviewed 18 requirements
- **CIP scheduled 4 on-site audits to begin in July**

# Coordinated Oversight Program

- **187 Multiple Regional Registered Entities (MRRE) are participating in Coordinated Oversight Program**
- **40 parent groups for the MRREs**
- **SPP RE is the Lead Region Entity for 5 groups with 15 MRREs**
- **Coordinated Oversight Task Force is conducting a survey for the Coordinated Oversight Entities in the program**

# Most Violated Standards

Based on rolling 12 months through 6/30/16 [Represents ~ 78% of total violations]

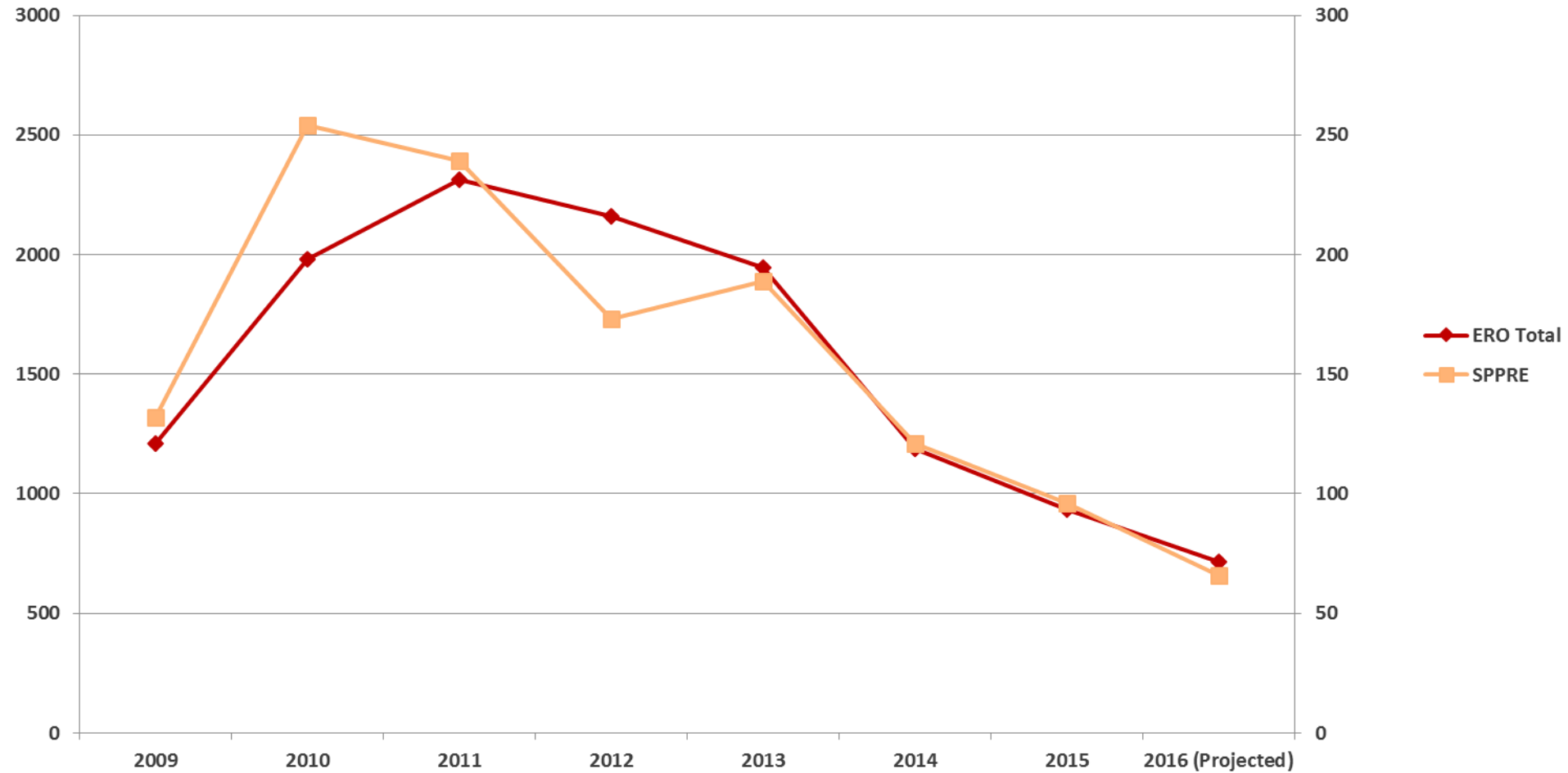
SPP RE Rank	Standard	Description	Violations Current Period	Violations Previous Period	Δ	Risk Factor
1*	PRC-005	Protection System Maintenance	16	4	+12	High/Med.
2*	CIP-007	Systems Security Management	7	22	-15	Med./Lower
3*	CIP-006	Physical Security - Cyber Assets	5	11	-6	Med./Lower
4*	FAC-008	Facility Ratings	5	4	+1	Med./Lower
5	PRC-006	Automatic UFLS	4	0	+4	High/Lower
6*	VAR-002	Network Voltage Schedules	3	5	-2	Med./Lower
7	EOP-004	Event Reporting	3	0	+3	Med./Lower
8	CIP-005	Electronic Security Perimeters	2	13	-11	Med./Lower
9*	CIP-004	Personnel & Training	2	6	-4	Med./Lower
10	PRC-023	Transmission Relay Loadability	2	1	+1	High/Lower
	All	SPP RE Top 10 Total Incoming	49	66	-17	

The current period is the most recent 12 months.

The previous period is the previous 12 month period.

\* 2016 NERC Top 10

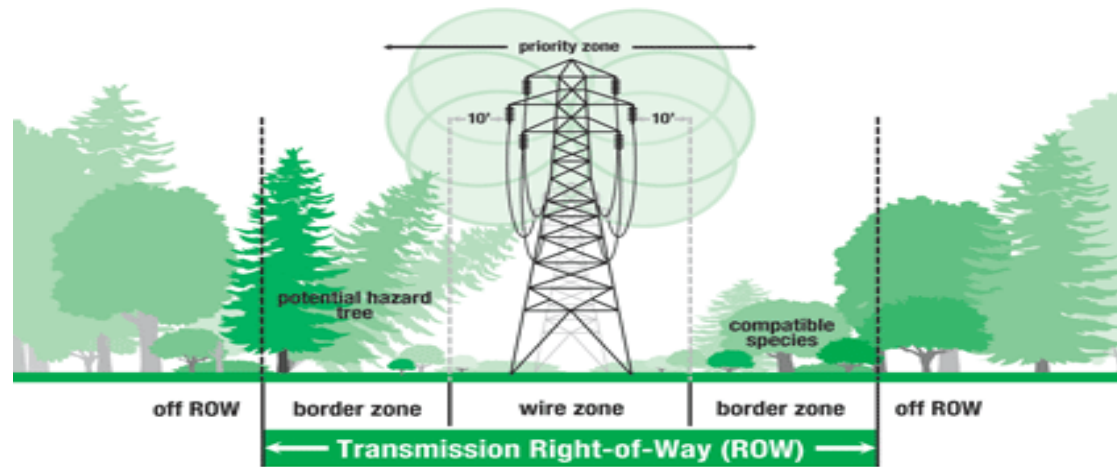
# Violations by Year



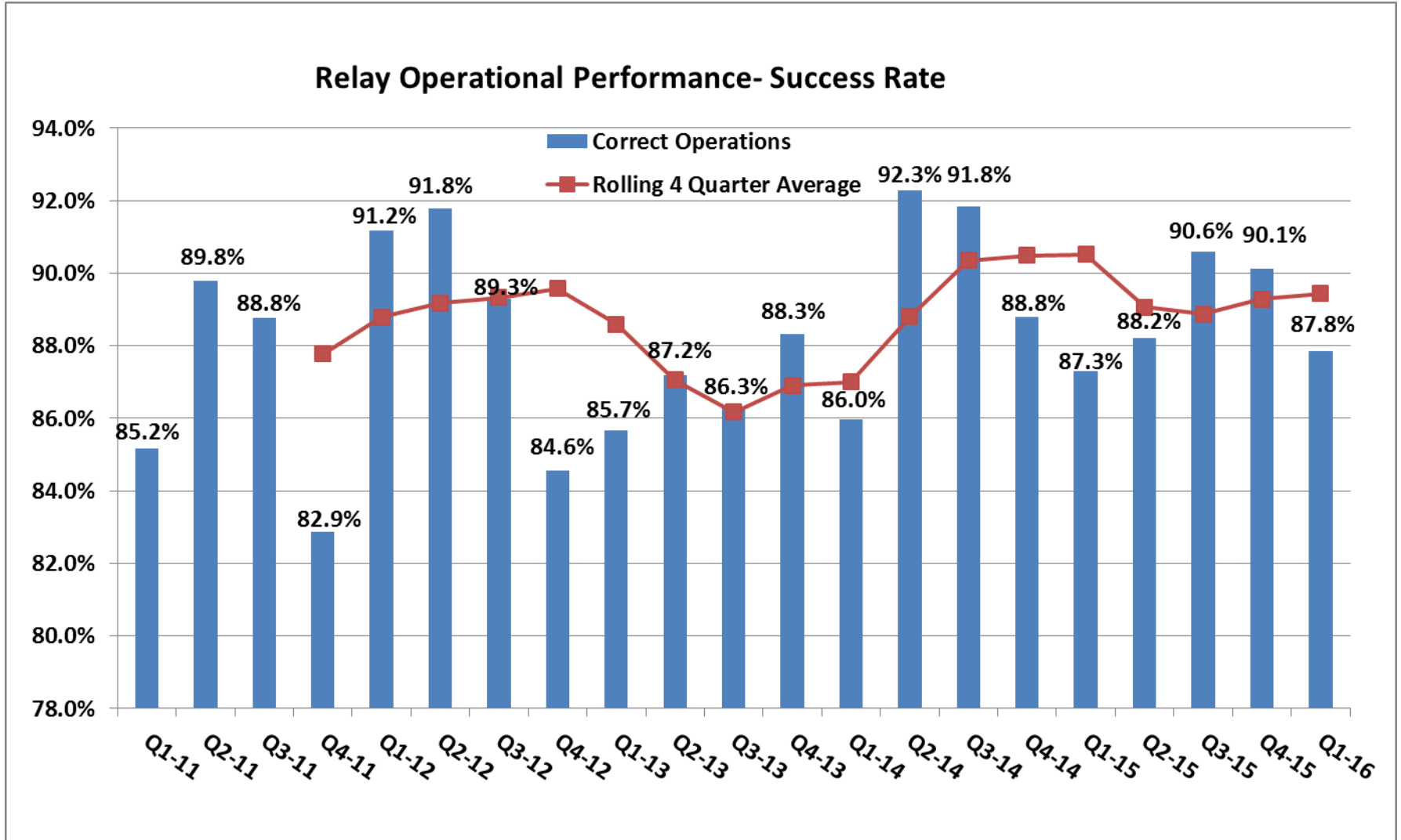


# VEGETATION CONTACTS

	<u>REPORTABLE</u>	<u>ACTIONABLE</u>
<b>NERC</b> (Q1-16 LAST OFFICIAL REPORT)	<b>Q1-16</b>	<b>Q3-15</b>
<b>SPP RE</b> (Q1-16 LAST OFFICIAL REPORT)	<b>Q4-15</b>	<b>Q3-10</b>

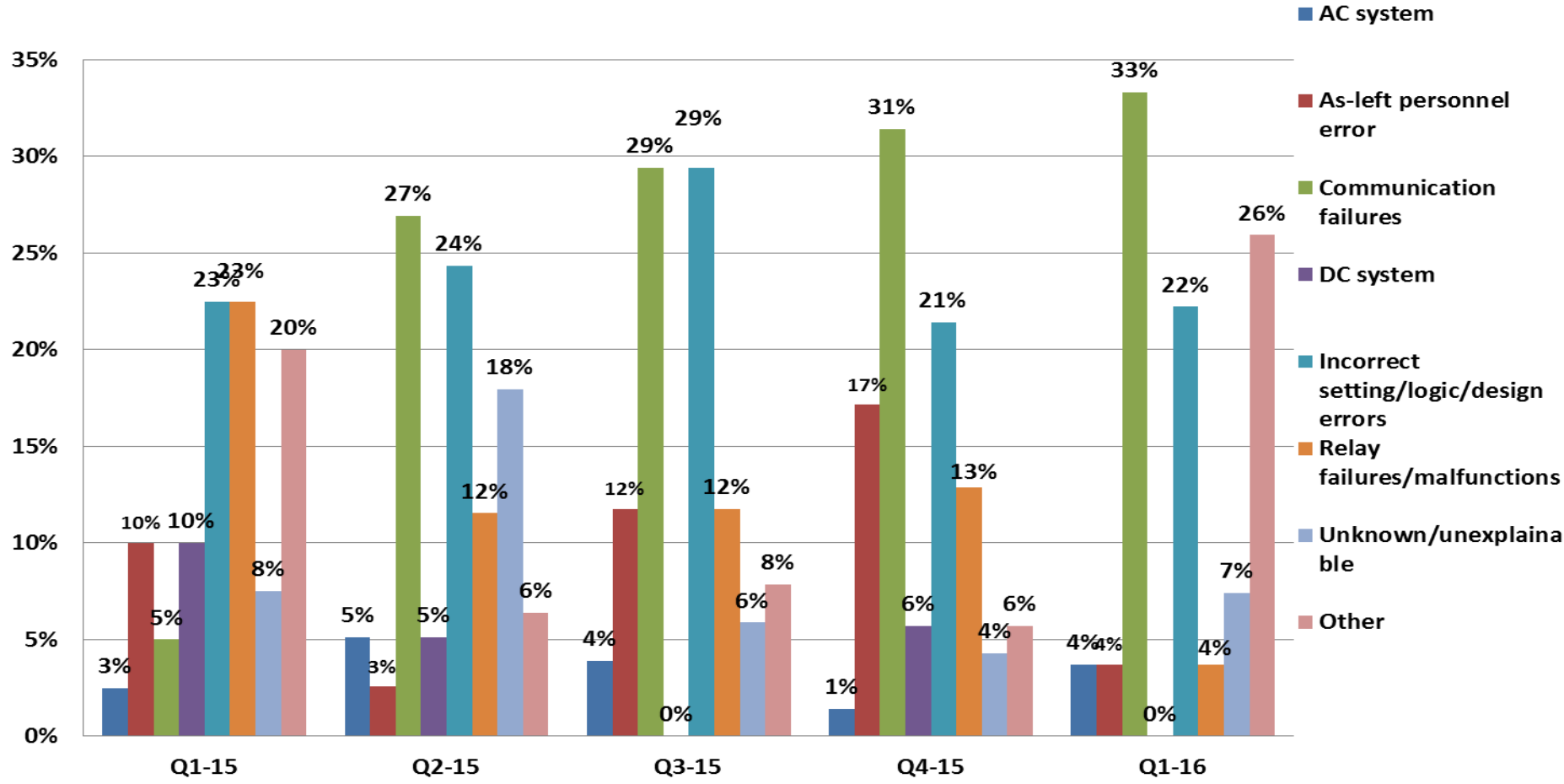


# SPP RE Misoperation Report as of Q1-16



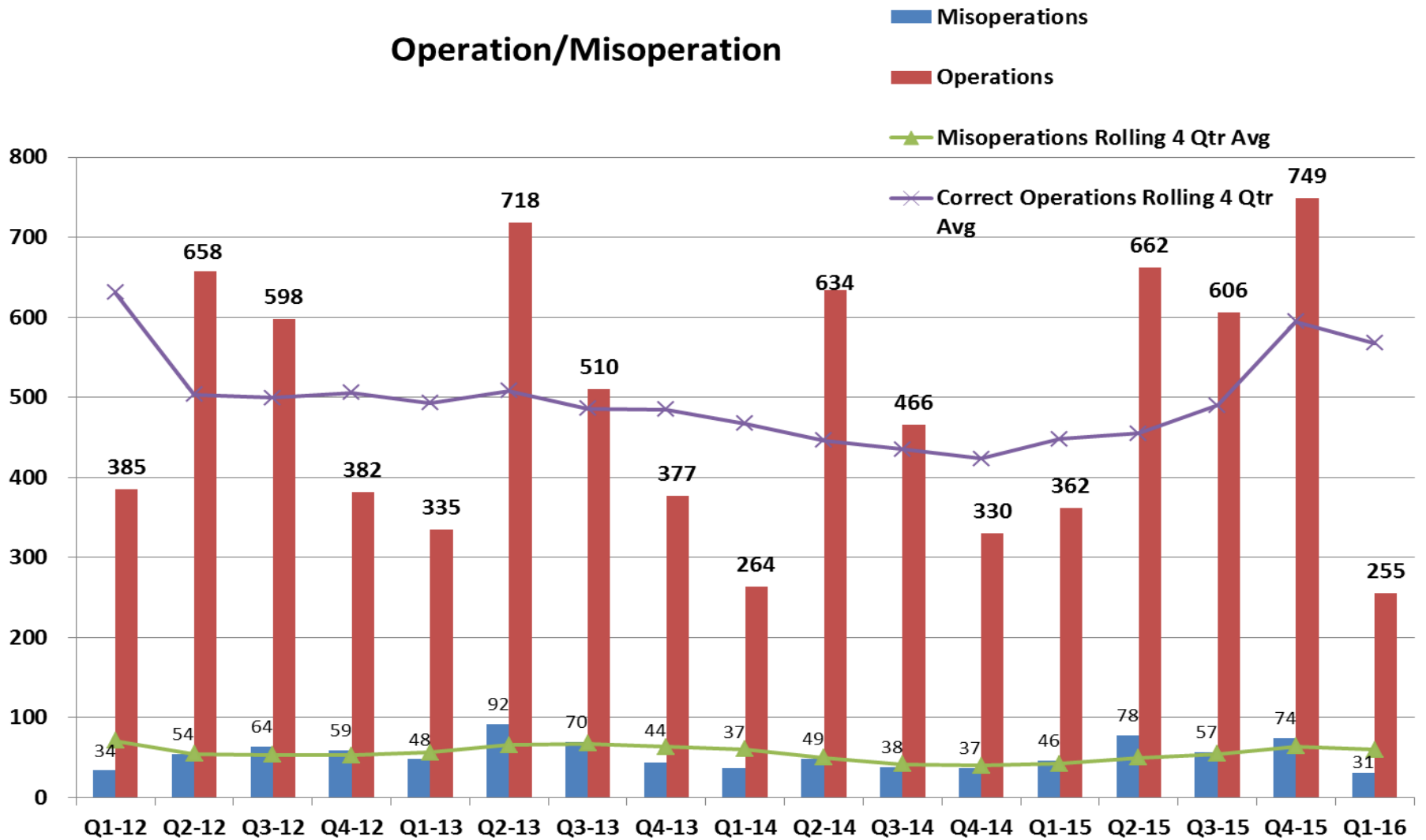
# Causes of Misoperations as a percentage Q1-15 to Q1-16

Cause(s) of Misoperations as a Percentage

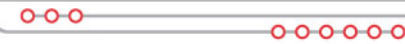


# Operation/Misoperation Comparison

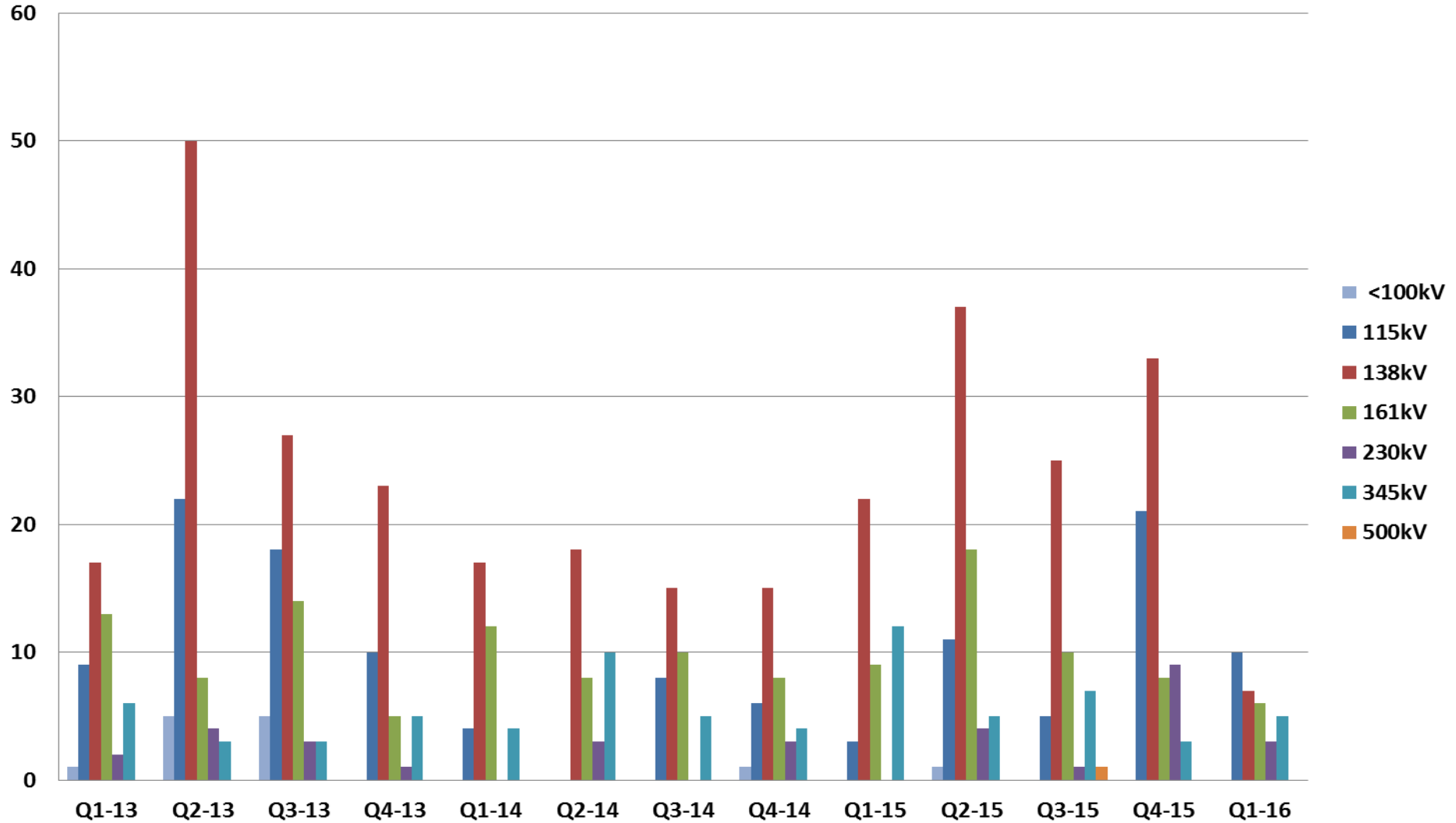
Operation/Misoperation



# Misoperations by Voltage

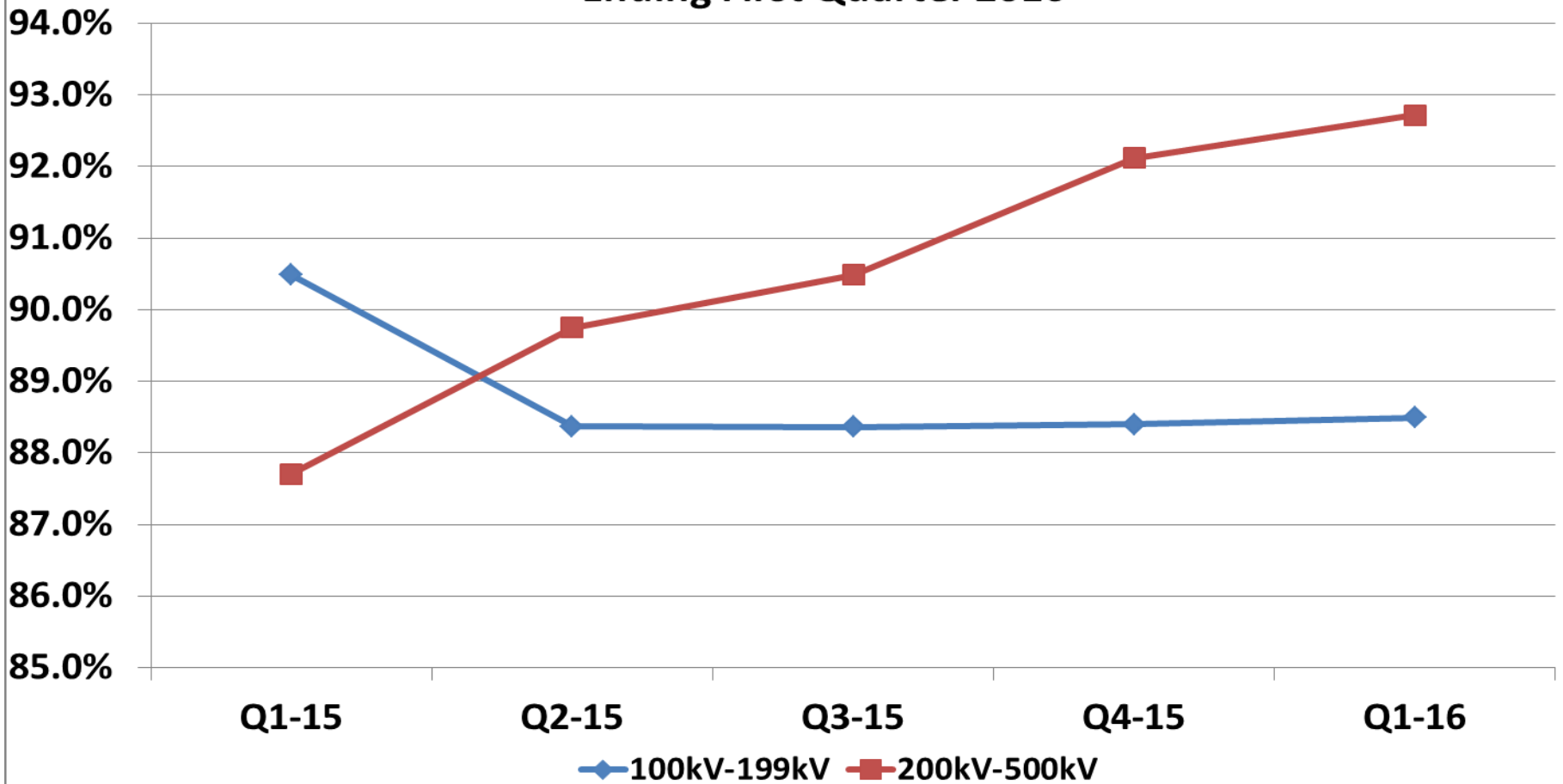


Voltage



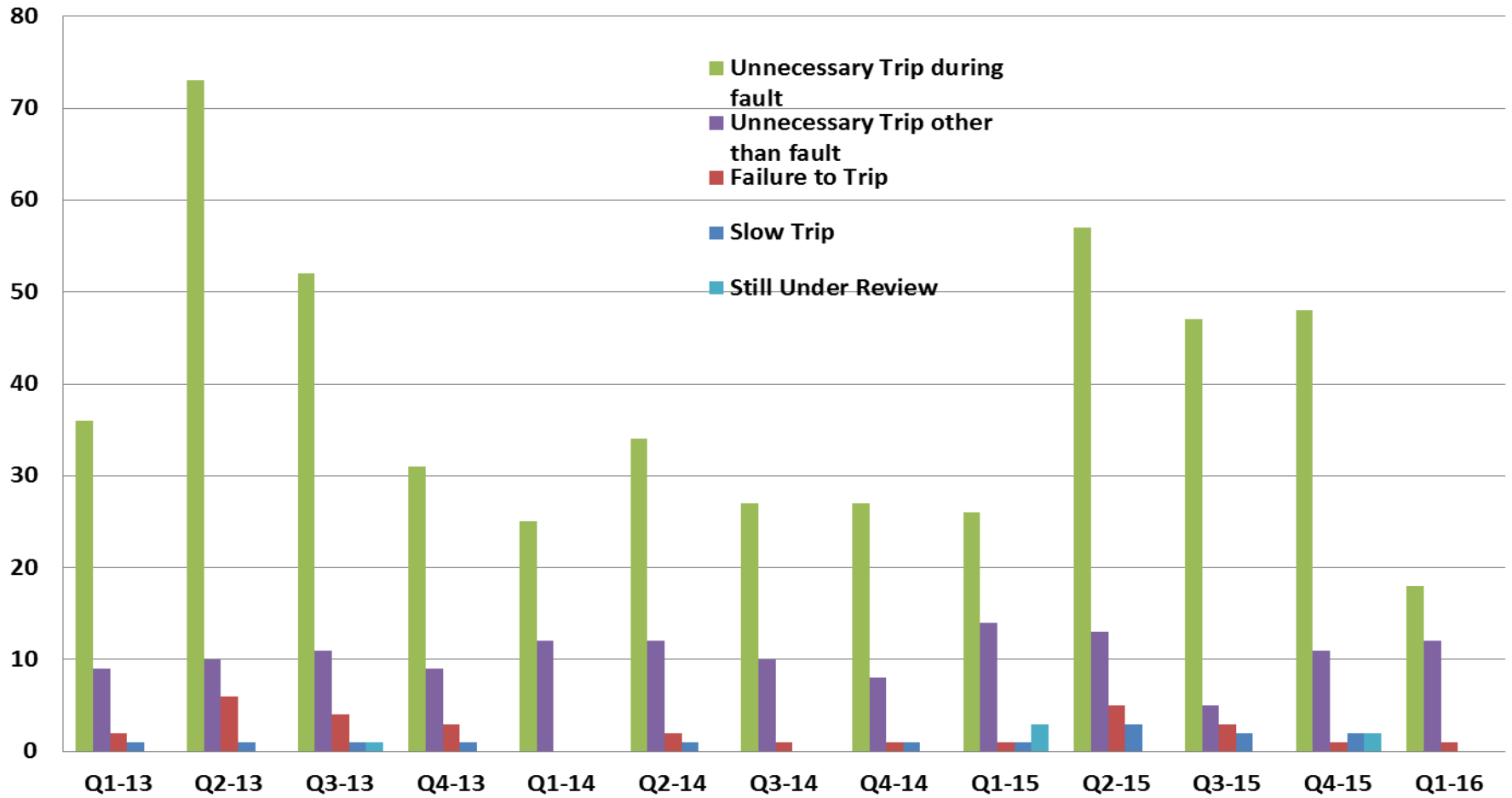
# Success Rate by Voltage Category

Rolling 4 Quarter Operation Success Rate by Voltage Category  
SPP RE  
Ending First Quarter 2016



# Misoperations by Type

### Misoperation Category





# Outreach Report

July 25, 2016

Rapid City, South Dakota

**Emily Pennel**

**SPP RE Outreach Coordinator and Trustees Secretary**



# Outreach

- 205 in-person/webinar attendees at May CIP workshop
- Fall Workshop, Sept. 20-21, Oklahoma City/webinar  
[Registration](#)
- Topics include:
  - *Synchrophasor Pilot*, SPP RTO and OGE
  - *Five-Year Compliance Strategy*, AEP
  - *Local Internal Control Evaluation Strategy*, Cleco
  - *O&P Audit Success and Lessons Learned*, WFEC
  - *E-Learning the Applied Fiction Way*, MetaMythic
  - *TOP-001-3, TOP-002-4, TOP-003-3*, SPP RE
  - *EOP-011-1, IRO-017-1, IRO-010-2, PRC-026-1*, SPP RE
  - *Recent Violation Review*, SPP RE
  - *Root Cause and Mitigation*, SPP RE
- Trustee Meeting [October 24, 2016](#), Little Rock
- 14 new videos posted to [video training library](#)

# 2016 Fall Workshop

## Tuesday, September 20

8:00-8:30	Welcome and Intro Remarks	Emily Pennel and SPP RE Trustee
8:30-9:30	<b>1 - Synchrophasor Pilot</b>	Jay Caspary, SPP & Austin White, OGE
9:30-9:40	BREAK	
9:40-10:30	<b>2 - Never Underestimate the Power of the E-Side: E-Learning the Applied Fiction Way</b>	Chris Lazarro & Charlie Evans, MetaMythic
10:30-11:00	NETWORKING BREAK	
11:00-11:30	<b>3 - Cleco's Local Internal Control Evaluation Strategy</b>	Betty Deans, Cleco
11:30-Noon	<b>4 - AEP's Five Year Compliance Strategy</b>	Mike Deloach, AEP
12:00-1:00	LUNCH	
1:00-1:40	<b>5 - NERC's State of Reliability Report</b>	Mike Hughes, SPP RE
1:40-2:10	<b>6 - O&amp;P Audit Success and Lessons Learned</b>	Matt Caves, Western Farmers
2:10-2:20	BREAK	
2:20-3:30	<b>7 - TOP-001-3, TOP-002-4, TOP-003-3</b>	SPP RE & Allen Klassen, Westar
3:30- 4:00	NETWORKING BREAK	
4:00-5:00	<b>8 - CIP Update</b>	Shon Austin, SPP RE

## Wednesday, September 21

8:00-9:05	<b>9 - EOP-011-1, IRO-017-1, IRO-010-2, PRC-026-1</b>	Jeff Rooker, SPP RE Thomas Teafatiller, SPP RE
9:05-9:20	BREAK	
9:20-10:10	<b>10 - Recent Violation Review</b>	Jim Williams & Jeremy Withers
10:10-10:40	NETWORKING BREAK	
10:40-11:30	<b>11 - Root Cause and Risk Mitigation</b>	Chris Bills, SPP RE
11:30-12:00	<b>12 - General Manager Update &amp; Closing</b>	Ron Ciesiel, SPP RE
12:00	BOX LUNCHES	

The workshop is followed by the RTO Compliance Forum for members and Registered Entities, which requires separate registration.





# SPP RE 2<sup>nd</sup> Quarter Financial Report

July 25, 2016

**Debbie Currie**

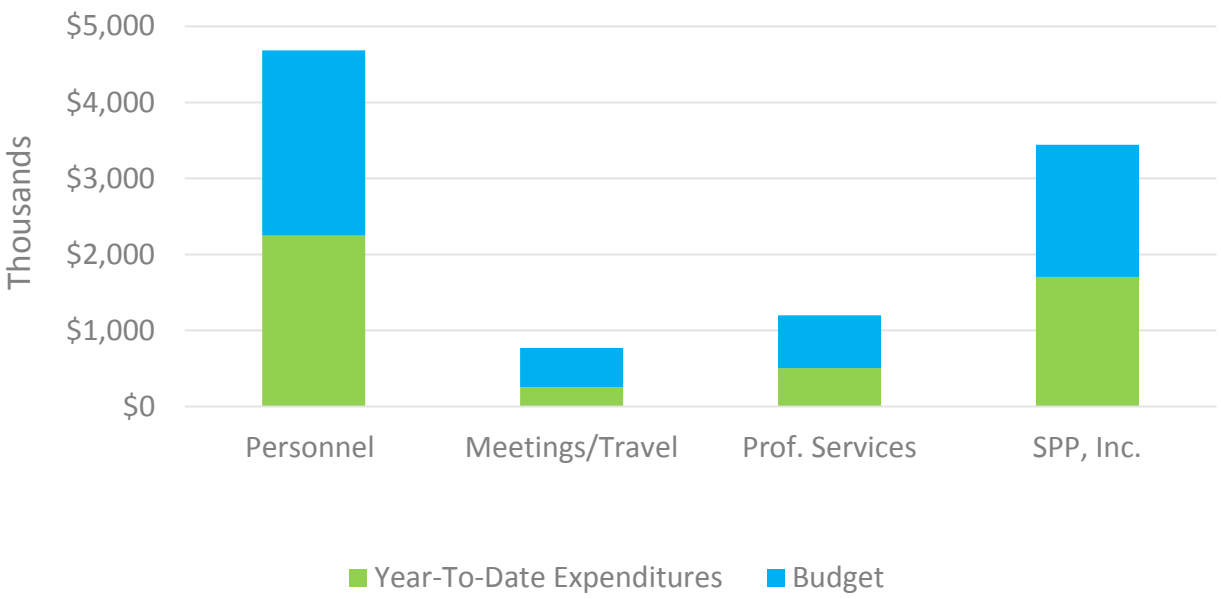
**RE Manager of Regulatory Interface  
and Process Improvement**

# 2017 Budget Update

- **\$10.9M Budget approved by Trustees 6/13/16**
  - Increase of \$770k or 7.6%
  - Assessment increase of \$466k or 5.4% from \$8.6M to \$9.1M
- **Budget submitted to NERC 7/5/16**
- **NERC posted RE Budgets 7/15/16**
- **Expect NERC Board approval 8/11/16**
- **NERC makes budget filing at FERC on 8/24/16**

# 2016 2<sup>nd</sup> Quarter Actuals vs. Budget

- Total expenses ~\$339k under budget
  - Personnel Expenses ~\$95k under budget
  - Meeting/Travel Expenses ~\$133k under budget
  - Professional Services ~\$97k under budget
  - SPP, Inc. Overhead Charge ~\$14k under budget



# Overview

- **SPP RE has three open staff positions:**
  - **Compliance Director – Open at end of 2015; not seeking candidates**
  - **Law Clerk – Open Q2; not seeking candidates**
  - **CIP Auditor – Open via attrition Q2; currently seeking replacement**
- **Open positions drive a large percentage of actual-to-budget variance; impacts personnel and travel expenses**

# Overview, cont.

- **Contractor/Consultant/Professional Service costs below budget**
  - **CIP V5 Implementation Delay**
    - 4 Audits Scheduled for 2016 moved to 2017
  - **Increasing staff experience**
    - Pre-audit work, including Inherent Risk Assessment activities, leading to reduced time onsite or reduction in audit team size
  - **Engineering Data Validation Tool**
    - Development halted Q1; need for tool still exists
    - New vendor selected; work to begin late 2016
    - Project completion expected in 2017



# Year-End Projection

- **At the end of Q2, SPP RE projects to be under budget by \$450k**
  - **2016 Budget consistent with 2015 Actuals**
  - **Change in SPP, Inc. charge will reduce previous year variances**
  - **Personnel expenses ~\$100k under budget**
  - **Meeting/travel expenses ~\$150k under budget**
  - **Professional services ~\$200k under budget**

**SOUTHWEST POWER POOL REGIONAL ENTITY**  
STATEMENT OF ACTIVITIES  
2016 JUNE YTD DRAFT (UNAUDITED)

<i>(In Whole Dollars)</i>	2016 JUNE YTD ACTUAL	2016 JUNE YTD BUDGET	VARIANCE	2016 FULL YEAR PROJECTION	2016 FULL YEAR BUDGET	VARIANCE
<b>Funding</b>						
ERO Funding	4,313,376	4,313,376	-	8,626,751	8,626,751	-
Penalty Sanctions	96,500	96,500	-	193,000	193,000	-
<b>Total SPP RE Funding</b>	<b>4,409,876</b>	<b>4,409,876</b>	<b>-</b>	<b>8,819,751</b>	<b>8,819,751</b>	<b>-</b>
Testing Fees	-	-	-	-	-	-
Workshops	-	-	-	-	-	-
Interest	2,137	-	2,137	2,137	-	2,137
Miscellaneous	-	-	-	-	-	-
<b>Total Funding (A)</b>	<b>4,412,013</b>	<b>4,409,876</b>	<b>2,137</b>	<b>8,821,888</b>	<b>8,819,751</b>	<b>2,137</b>
<b>Expenses</b>						
<b>Personnel Expenses</b>						
Salaries	1,805,667	1,948,246	(142,579)	3,745,755	3,896,492	(150,737)
Payroll Taxes	113,432	149,041	(35,609)	260,436	298,082	(37,646)
Benefits	246,681	166,782	79,899	418,034	333,564	84,470
Retirement Costs	81,631	77,930	3,701	159,773	155,860	3,913
<b>Total Personnel Expenses</b>	<b>2,247,411</b>	<b>2,341,999</b>	<b>(94,588)</b>	<b>4,583,997</b>	<b>4,683,997</b>	<b>(100,000)</b>
<b>Meeting Expenses</b>						
Meetings	40,818	45,000	(4,182)	85,290	90,000	(4,710)
Travel	211,104	340,100	(128,996)	534,910	680,200	(145,290)
Conference Calls	-	-	-	-	-	-
<b>Total Meeting Expenses</b>	<b>251,922</b>	<b>385,100</b>	<b>(133,178)</b>	<b>620,200</b>	<b>770,200</b>	<b>(150,000)</b>
<b>Operating Expenses</b>						
Contracts & Consultants	157,041	482,521	(325,480)	294,714	965,042	(670,328)
Office Rent	-	-	-	-	-	-
Office Costs	3,873	4,000	(127)	7,739	8,000	(261)
Administrative Costs	-	-	-	-	-	-
Professional Services	342,444	76,725	265,719	700,699	153,450	547,249
Computer Purchase & Maint.	-	-	-	-	-	-
Depreciation	-	-	-	-	-	-
Miscellaneous/ Contingency	-	37,223	(37,223)	(2,215)	74,445	(76,660)
<b>Total Operating Expenses</b>	<b>503,358</b>	<b>600,469</b>	<b>(97,111)</b>	<b>1,000,937</b>	<b>1,200,937</b>	<b>(200,000)</b>
<b>Total Direct Expenses</b>	<b>3,002,691</b>	<b>3,327,568</b>	<b>(324,877)</b>	<b>6,205,134</b>	<b>6,655,134</b>	<b>(450,000)</b>
SPP Inc. Indirect Expenses	1,706,202	1,720,342.50	(14,141)	3,440,685	3,440,685	-
SPP RE Indirect Expenses	-	-	-	-	-	-
<b>Total Indirect Costs</b>	<b>1,706,202</b>	<b>1,720,343</b>	<b>(14,141)</b>	<b>3,440,685</b>	<b>3,440,685</b>	<b>-</b>
<b>Total Expenses (B)</b>	<b>4,708,893</b>	<b>5,047,910</b>	<b>(339,017)</b>	<b>9,645,819</b>	<b>10,095,819</b>	<b>(450,000)</b>
<b>Net Change in Assets (A-B)</b>	<b>(296,880)</b>	<b>(638,035)</b>	<b>341,154</b>	<b>(823,931)</b>	<b>(1,276,068)</b>	<b>452,137</b>
<b>Fixed Assets</b>						
Depreciation	-	-	-	-	-	-
Computer & Software CapEx	-	-	-	-	-	-
Furniture & Fixtures CapEx	-	-	-	-	-	-
Equipment CapEx	-	-	-	-	-	-
Leasehold Improvements	-	-	-	-	-	-
<b>Increase/(Decrease) in Fixed Assets (C)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total Budget (Expenses plus Incr (Dec) in Fixed Assets (B+C))</b>	<b>4,708,893</b>	<b>5,047,910</b>	<b>(339,017)</b>	<b>9,645,819</b>	<b>10,095,819</b>	<b>(450,000)</b>
<b>Change in Working Capital (Total Funding less Total Budget) (A-B-C)</b>	<b>(296,880)</b>	<b>(638,035)</b>	<b>341,154</b>	<b>(823,931)</b>	<b>(1,276,068)</b>	<b>452,137</b>
<b>FTEs*</b>	<b>28.8</b>	<b>32.5</b>	<b>(4)</b>	<b>32.5</b>	<b>32.5</b>	<b>-</b>
Beginning WC - 01/01/2016	3,324,959	1,276,068	2,048,891	3,324,959	1,276,068	2,048,891
Change to WC - 2016 YTD	(296,880)	(638,035)	341,154	(823,931)	(1,276,068)	452,137
<b>Working Capital as of 6/30/16</b>	<b>3,028,078</b>	<b>638,034</b>	<b>2,390,045</b>	<b>2,501,028</b>	<b>-</b>	<b>2,501,028</b>

\*Headcount (RE direct staff count as of 6/30/2016 and shared staff YTD billed hours/1880).

# SPP RE Metrics Reporting as of June 30, 2016

w/in Target

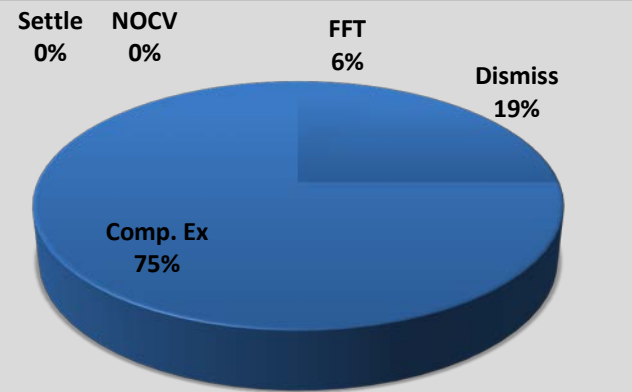
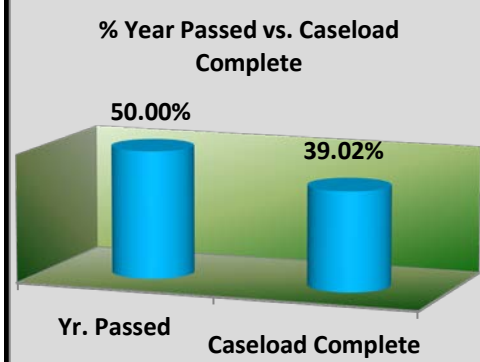
Outside Target but w/in Allotted Range

Outside Allotted Range

## 1. Maintain Caseload

Maintain a one year caseload

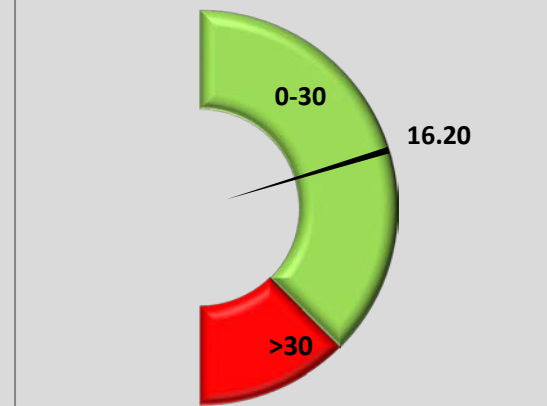
FFT	Settle	Dismiss	NOCV	Comp. Ex	Total:	Yr. Passed	50.00%
2	0	6	0	24	32	Caseload Complete	39.02%



## 2. Mit. Accept/Reject

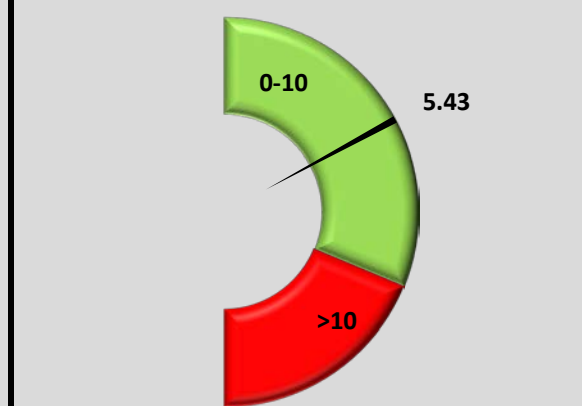
Accept/Reject Mit Plans w/in 30 days

Current Avg. Days :	16.20
Metric Eligibility :	75%



Accept/Reject Resubmitted Mit Plans w/in 10 days

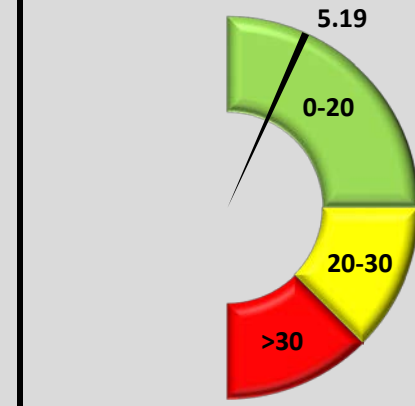
Current Avg. Days :	5.43
Metric Eligibility :	75%



## 3. Mit. Plan Completion

Complete Mitigation reviews <= 20 days

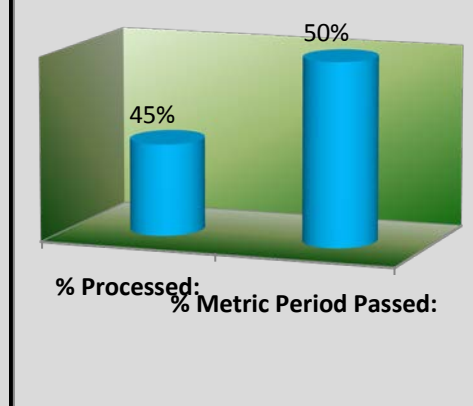
Current Avg. Days :	5.19
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## 4. Process Pre-2015 Violations

Process 100% of Pre-2015 Caseload

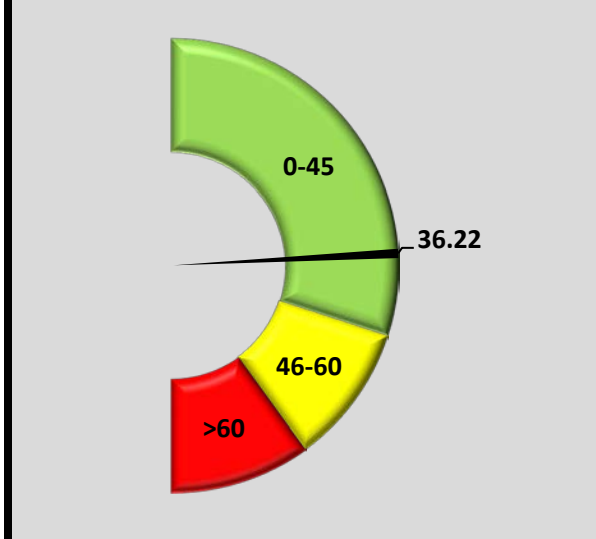
% Processed:	45%
% Metric Period Passed:	50%



## 5. 45 Day Triage

Complete Incoming Compliance Issue Triage in <= 45 days

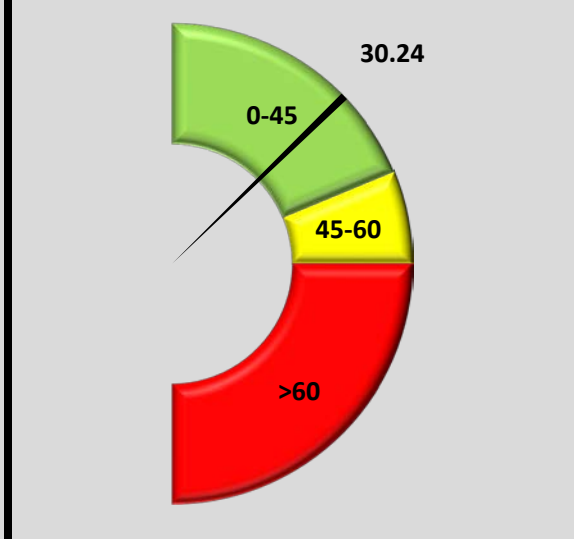
Current Triage Avg. :	36.22
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## 6. Records Close Out

Average Days to Close Out Violation Record

# of Violations closed out	85
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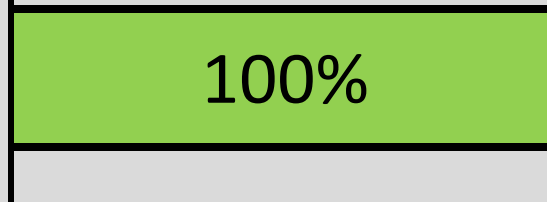
## 7. Publish Off-Site Audit

Publish Off-site w/in 45 days

# Published YTD:	1
# of Reports Published in more than 45 Days	0

Average Publishing Time <=45 Days	0
Average Publishing Time 45-50 Days	0
Average Publishing Time >=50 Days	0

Average Days to Publish	27
% Published Reports <=45 Days	100%



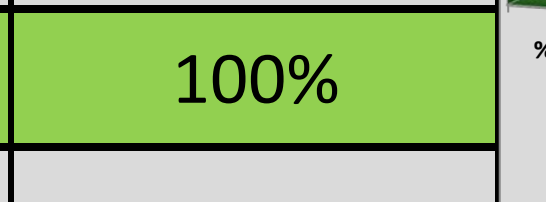
## 8. Publish On-Site Audit

Publish On-site w/in 65 days

# Published YTD:	2
# of Reports Published in more than 65 Days	0

Average Publishing Time <=65 Days	0
Average Publishing Time 65-75 Days	0
Average Publishing Time >=75 Days	0

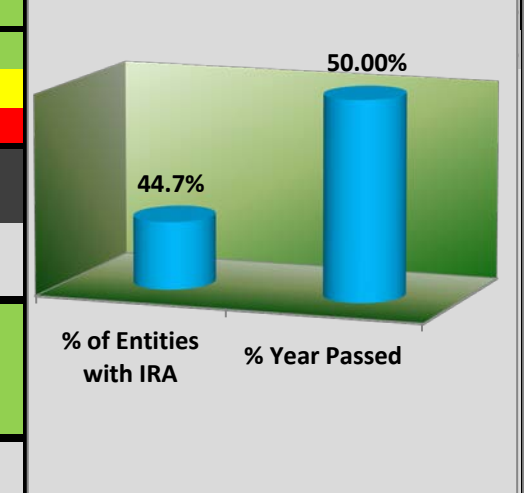
Average Days to Publish	38
% Published Reports <=65 Days	100%



## 9. IRAs Completed

Complete an IRA on 100% of Registered Entities

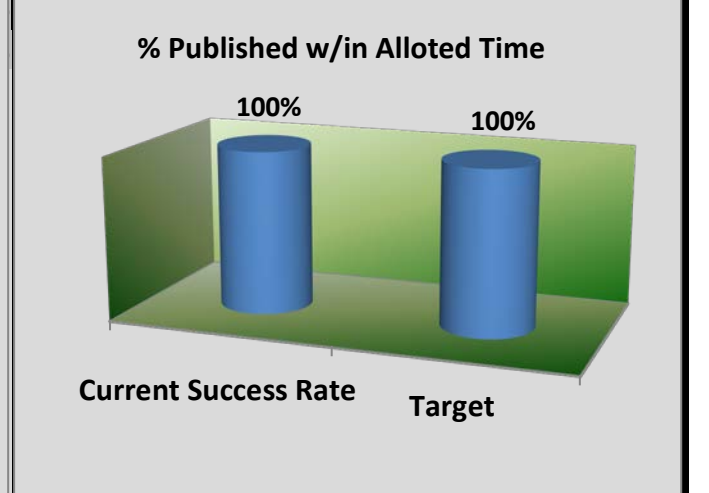
# of IRAs Completed	38
Target	85



## 10. Publish: Excep., PDS, Self-cert

Publish reports w/in allotted timeframe 100% of time or greater

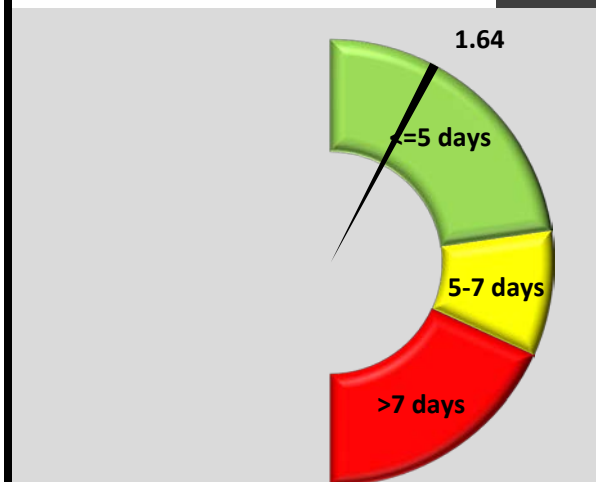
Current Success Rate	100%
Target	100%



## 11. Incoming Processing

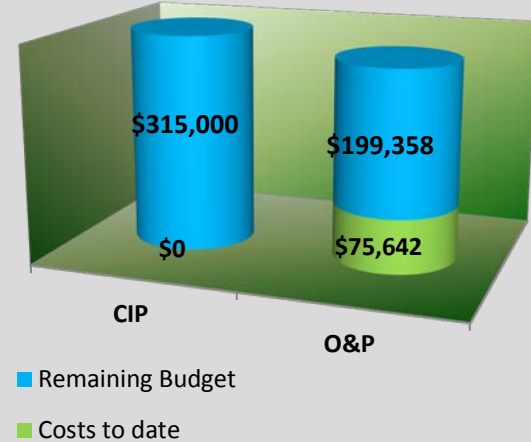
Notify NERC of new violations w/in 5 business days

Current Average Days :	1.64
------------------------	------



## 12. Cost Control

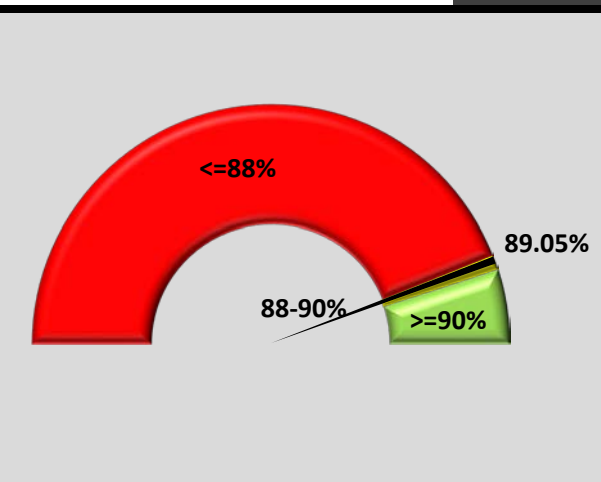
Maintain Costs at or below 2015 Expenditures



## 13. Maintain/Increase Misop Success

90 % success rate or greater over rolling 4 quarter avg.

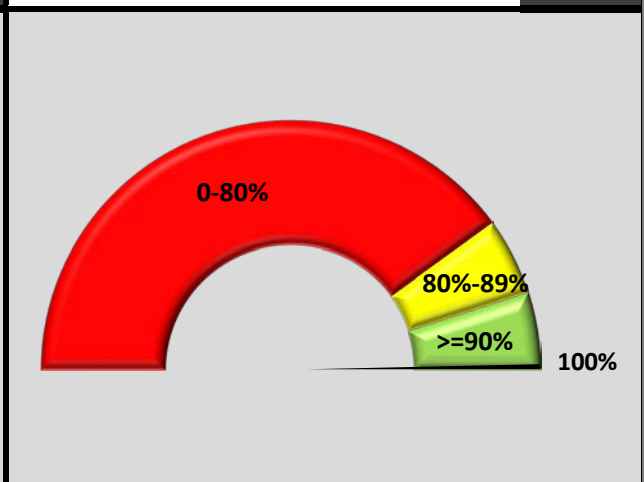
Current Success Rate:	89.05%
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## 14. Cause Code Success Rate

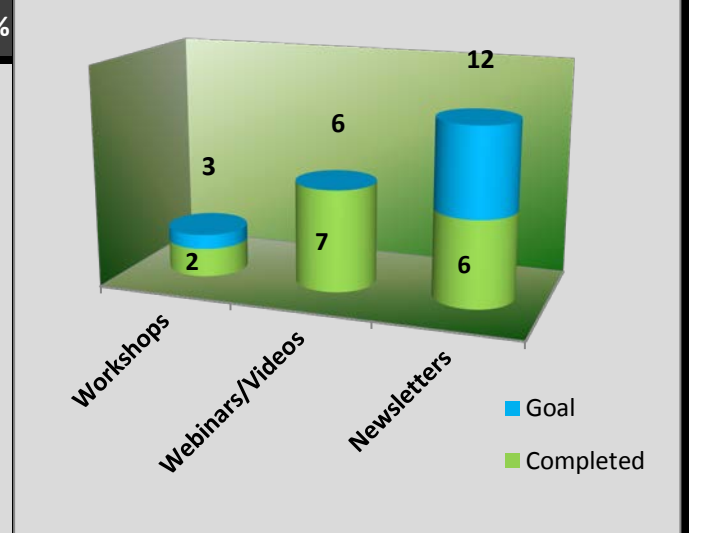
Achieve 100% success rate in Cause Coding Events

Current Success Rate:	100%
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## 15. Outreach

Conduct 3 Workshops, 6 Webinars/Videos, and 12 Newsletter in '16





JULY 25TH SPP REGIONAL ENTITY TRUSTEES MEETING

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# NERC CIPC Report

Eric Ervin  
Director, Corporate Security  
SPP CIPWG Chair  
Westar Energy



# NERC CIPC Report

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- ***CIPC Security Workshops***
  - Dual tracks offered each quarter prior to the start of the CIPC Meeting - well attended and informative sessions
  - Physical Security
    - Physical Security Programs (Q1)
    - Design Basis Threat (Q2)
  - Cybersecurity
    - Malware Primer and E-ISAC Portal Training (Q1)
    - An Overview of EnergySec's Cybersecurity Workforce Initiatives (Q2)
- ***NERC CIPC Calendar of Events***
  - Next CIPC Meetings:
    - Sept 20-21: Albuquerque, NM
    - Dec 13-14: Atlanta, GA
  - Grid Security Conference Oct 18-21 – Quebec City, QC
  - Energy Sector Classified Briefing Dec 13 – Atlanta, GA

# NERC CIPC Report

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- **2016 E-ISAC Update – Mr. Marc Sachs, E-ISAC**
  - ESCC Member Executive Committee approved Work Plan for 2016
    - Publish a “How-To” Guide (“Understanding Your E-ISAC”)
    - Develop E-ISAC Products and Services List
    - Define E-ISAC Role in Classified Briefings
    - Establish User Communities
      - Q1 Summary: 286 E-ISAC staff posts to the portal, 47 member responses, 40 additional posts, 10 calls, and 641 new accounts
    - Develop Strawmen for E-ISAC Reports
    - Pilot Automated Information Sharing (Platform)
    - Initiate Improvements to the Portal
    - Develop Plan to Evaluate 24/7 Watch and Notification Capability
    - Conduct Site Penetration Testing
  - All items on track (“green”) at end of Q1

# NERC CIPC Report

- **2016 Enhanced Background Screening – Mr. Travis Moran, E-ISAC**
  - Pre-employment background checks continue to be a concern. E-ISAC is currently assessing the Nuclear Sector vs. Electric Sector.
    1. FBI has criminal history repository via CJIS/NCIC
    2. NRC has established procedures and requirements (10 CFR 73.57)
    3. Fingerprints required for NRC applicants for unescorted access to FBI/CJIS
    4. NRC licensee (entity) receives results and makes employment and access/denial decisions
    5. NRC Backgrounds are authorized by legislation
    6. Electric sector may require separate authorizing legislation
    7. Legislation needs to be crafted by industry and tailored to industry's needs
    8. Will require a collaborative legislative effort

# NERC CIPC Report

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- ***CIP Standards and Compliance Update - Mr. Scott Mix, NERC***
  - Goals of 2016 Approach:
    - Understand program effectiveness and support transition
    - Registered Entity approaches, program and general controls discussion, and limited testing for effectiveness based on risk
    - Identify success and challenges
    - Communicate areas of concern to Registered Entities
  - 2016 Areas of Emphasis:
    - CIP-002 R1 and R2
    - CIP-005 R1 and R2
    - CIP-006 R1, R2, and R3
    - CIP-007 R1, R2, R3, and R5
  - NERC conducting a comprehensive study that identifies the strength of the CIP V5 remote access controls, the risks posed by remote access-related threats and vulnerabilities; and the appropriate mitigation controls



# NERC CIPC Report

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- ***Physical Security Advisory Group - Mr. Bob Canada, E-ISAC (retired)***
  - Electricity Sector Design Basis Threat (February 2016) available on the E-ISAC Portal
    - The PSAG developed this reference document to provide instruction on using a design basis threat (DBT) for the physical infrastructure of the Bulk Electric System (BES).
    - Used to determine the level of appropriate and cost effective physical protection measures require to protect. Answers “what are we protecting against?”
    - The PSAG considered potential emerging threat vectors from unmanned aircraft systems (UASs), or drones, and vehicle-borne improvised explosive devices (VBIEDs), and will continue to monitor and address threats as necessary in the annual review of the DBT.

“Protect pencils like pencils; gold like gold”

# NERC CIPC Report

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- ***Physical Security Subcommittee – Ross Johnson, Capital Power***
  - Security Management in the North American Electricity Sub-Sector (Draft June 2016) available on the E-ISAC Portal
    - NERC, E-ISAC, PSAG, and the Canadian Electricity Association’s Security Committee developed this guideline to share and enhance industry practices that help to maintain Bulk Electric System reliability.
    - The purpose of this guideline is to provide a framework for comprehensive security protection of the electricity sub-sector in North America.
    - The three main goals are:
      1. Where possible, identify and deny access to potential threat actors
      2. Deny unauthorized access to the facility for weapons, explosives, and dangerous chemicals
      3. Deter unwanted behavior and mitigate the actions of both hazards and threats

# NERC CIPC Report

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- **Grid Exercise Working Group (GEWG) – Tim Conway, SANS Institute**
  - GridEx III Initial Post-Exercise Observations
    - 208 active organizations; 161 observing organizations
    - 59 lessons-learned from NERC
    - ESCC CEOs were engaged on a call, DoE, White House National Security Council, DHS, FEMA, DoD, NSA, US Cyber Command, FBI
    - 8 strategic goals and 22 recommendations forthcoming. Unity of messaging, unity of effort, and extraordinary measures.
  - GridEx IV November 2017
    - 39+ members for the planning committee; 50% are returning planning members comprising expertise in cyber, physical, operations, RC-to-RC, and training
    - Currently establishing the scope then on to developing the narrative and MSEL development
    - Going to begin the exercise during the eradication and recovery phases

### **2016 Summer Reliability Assessment Approval**

- The PC accepted the 2016 Summer Reliability Assessment Report.
- Key Findings:
  - Anticipated Reserve Margin forecasted to be above the Reference Margin Level for all Assessment Areas and Regions
  - Aliso Canyon Gas Storage Facility Outages remains a concern
    - CAISO is working with relevant entities to ensure the expected days of load shedding are minimized

### **Short-Term Special Assessment (STSA)**

- Electric/Gas coordination continues to be concern
  - Historically winter was the major time period of concern but with the dash to gas summer is now also a concern
  - Aliso Canyon is a local concern in the LA basin with the potential for outage and load curtailment
- Key Findings/Recommendations
  - Duel fuel and/or firm gas delivery is an issue that needs addressing to lessen curtailment impact
    - This risk is also in the summer (not just a winter issue)
  - Expand level and amount of gas-electric coordination
    - Operational coordination between gas/electric decrease likelihood of wide spread outages.
  - Gas peak generation continues to grow on an annual basis
    - Assessment summary
      - Generation availability risk
      - Peak periods summer 2016, 2017 and winter 2016/17 and 2017/18
    - Short term challenge due to gas infrastructure
- Future studies
  - NERC with ERO-RAPA are in the process of identifying an assessment topic
  - PC and OC are invited to suggest issues for the assessments
    - Any ideas you wish to share?

### **Reliability Guideline for Initial Review: Reactive Power Planning and Operations**

- Guideline provides guidance and direction related to modeling, study, and placement of reactive power resources to support robust voltage profiles.
  - NERC's mission of improved reliability through sharing industry practices for planning and operating the BPS
  - Guideline applies primarily to:
    - Planning Coordinators
    - Transmission Planners
    - Transmission Operators
    - Generator Operators
    - Generator Owners

- Reliability Coordinators
- Guideline is in two parts 1) Technical Document, 2) Appendices and References
  - First part includes:
    - Background on reactive planning and operations; Summary of Relevant NERC standards; TPL-001; VAR-001; VAR-002; TOP-004; Technical discussion regarding reactive power analysis and Strategies center around the need for static and dynamic reactive power resource planning and operational planning
  - 2ndpart of guideline includes:
    - Appendix A –Industry Reactive Power Planning Practices & Procedures; Analysis tools, techniques, planning horizons, and relevant reference materials from an array of entities across North America and, How the information contained in the first part of the guideline is applied in operations and planning
    - Appendix B –Transient Voltage Response Criteria Practices; Response criteria as per NERC Reliability Standard TPL-001-4 Requirement R5 and a description of the criteria developed.
- PC approved posting the guideline document for industry comment

**Reliability Guideline for Initial Review: Power Plant Model Verification using PMUs**

- Provide technical guidance and direction for performing disturbance-based verification using PMUs as one option for model verification
- Provide guidance for MOD-026 and -027
- Applicability:
  - Transmission Planners
  - Planning Coordinators
  - Transmission Owners
  - Generator Owners
- Document Covers:
  - Fundamental need for representative models
  - Power Plant Model Verification (PPMV)
  - Offline Baseline Testing for pro forma Model
  - Online Performance Monitoring
  - Process for Model Validation
  - Value Proposition for Disturbance-Based Verification
  - Related NERC Reliability Standards
  - Performing PMU-Based Model Verification
    - Procedure Overview
    - Measurement & Modeling Considerations
    - Event Selection
  - Disturbance-Based Verification Examples Library
  - Appendix –Software Tools Guidelines

- The PC approved posting the guideline for industry comment.

### **Phase Angle Monitoring Technical Report**

- Develop Technical Report on Phase Angle Monitoring and Alarming practices and experiences, and provide recommendations for future practices
- Topics:
  - Phase Angle Fundamentals
  - Finding & Recommendation 27
  - Synchro check Relay Situational Awareness
  - EMS and PMU Application
  - Mitigation Strategies
  - Identifying Key Angle Differences & Correlating to System Conditions
  - Tying Phase Angles to Oscillations & System Studies
  - Phase Angle Monitoring Utility Practices in the West
- Mitigation Strategies
  - Generation redispatch
    - Reducing generation on the sending end of the angle difference path
    - Increasing generation on the receiving end of the path
  - Use of phase-shifting transformers to reduce power flow (if available)
  - Reconfiguration of system topology to reduce power flow (if possible)
  - Curtailment of interruptible load, if necessary
  - Firm load shedding, if necessary
  - Point-to-point transmission service curtailment
  - Reconfiguration of in-series capacitors/reactors for compensation of transmission circuits
- Recommendations
  - Monitoring synchro check contingency of interest
  - Line-based angle difference monitoring and comparison with synchro check relay settings can be achieved with SCADA-and/or PMU-based applications
  - Real-time comparison of angle differences for EHV circuits and synchro check relay limits should be monitored using SE results.
  - Real-time comparison of angle differences for EHV circuits and synchro check relay limits should be monitored using SE results.
  - Phase angle differences for potential contingency conditions should be monitored in real-time and compared against synchro check relay settings for all EHV circuits using RTCA tools.
  - The contingency risk of interest is the outage of a transmission circuit and the phase angle difference across the out-of-service terminals of that line exceeding synchro check relay limits. Post-contingency angle differences should be monitored in real-time. The Planning Coordinator and/or Reliability Coordinator should identify key transmission circuits for which this monitoring is required. It is recommended that awareness of synchro check

- relay limit exceedances be provided to system operators for EHV transmission circuits, where applicable, with nominal voltage greater than or equal to 345 kV.
- Wide-area angle differences provide supervisory layer of situational awareness. Can be based on transient stability, voltage stability, small signal stability, or thermal violations. Supplemental limit to conventional MW flow limits.
- Line-based phase angle difference monitoring and comparison against known synchro check limits is not presently a universally adopted operating practice. It is recommended that the NERC Synchronized Measurement Subcommittee (SMS), in coordination with the NERC Operating Committee (OC), explore how this practice could be used or more widely adopted by the industry.
- In the West, phase angle difference is correlated to oscillatory stability issues, particularly during high transfer conditions. Tools such as Mode Meter, Oscillation Detection, and Phase Angle Difference (PAD) should continue to be pursued for advanced situational awareness and Defense in Depth.
- The PC approved the report.

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NERC Compliance and Certification Committee Meeting Notes  
June 15 - 16, 2016  
Submitted by Jennifer Flandermeyer, SPP RE Representative  
Senior Manager, Reliability Strategy, Kansas City Power & Light

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The North American Electric Reliability Corporation (NERC) Compliance and Certification Committee (CCC) convened their quarterly meetings on June 15-16, 2016. The following are the most significant highlights from those meetings. The agenda package for that meeting was posted as follows:

[http://www.nerc.com/comm/CCC/Agenda%20Highlights%20and%20Minutes%202013/CCC\\_Agenda\\_Package\\_June\\_15-16\\_2016.pdf](http://www.nerc.com/comm/CCC/Agenda%20Highlights%20and%20Minutes%202013/CCC_Agenda_Package_June_15-16_2016.pdf)

Minutes and additional background materials should be posted in the next few weeks. A complete record, actions not reflected below, CCC administrative business and NERC Staff updates can be found in the minutes when posted.

#### **Independent Audit of NERC CMEP and ORCP**

Mr. Gibbons presented on the status of the CMEP and ORCP audit since the last CCC meeting. Ms. Metro stated that the audit report would likely be transmitted to the EWRC by its August meeting but will not be publicly posted until all mitigation is complete. Ms. Metro commented that future audits of NERC will continue to focus on a more risk-based approach. Ms. Metro asked that CCC members let her know if they would like to be involved as observers in the next audit, which will be on the Standard Processes Manual, by the next meeting in September.

#### **Compliance Guidance Update**

As outlined in NERC December CCC report, the Compliance Guidance Policy paper approved by the NERC Board of Trustees (BOT) in November was assigned to the NERC CCC and Standards Committee to complete actions in the first quarter of 2016. To complete these activities, the CCC formed a Compliance Guidance Task Force (CGTF) chaired by Scott Tomashefsky. In March 2016, Mr. Tomashefsky reviewed the purpose of the task force and presented the concluding deliverables for CCC approval and endorsement prior to BOT submission. In response to the BOT assignment, the CCC created a new procedure for Board approval. Those elements were endorsed or approved by the BOT in May 2016.

In June 2016, Mr. Goldberg, Ms. Metro, and Ms. Hecht presented on the status of implementation of the Compliance Guidance Policy. Mr. Goldberg noted that there have been some reviews of Reliability Standard Audit Worksheets (RSAWs) as part of this project. There was discussion that RSAWs provide a valuable tool for auditors and industry but are not necessarily implementation guidance. Ms. Metro noted she would take the content of this discussion back to the Board to request more clarity on the task to review RSAWs and measures. In addition, the 2017 CCC Work Plan will include a



periodic review of Implementation Guidance by industry to ensure that the guidance stays current and is presented in an organized manner.

### **CCC Nominations**

The CCC will be submitting a nomination solicitation period to fill the vacancies in the Transmission Dependent Utility and Canada Federal.

### **ERO Stakeholder Perception Survey Update**

The ERO Monitoring Subcommittee (EROMS) reported that the survey closed on June 8, and EROMS is waiting to perform analysis on the results. The goal is to complete the report by the September CCC meeting. The CCC discussed if analyzing the survey data gathered from the primary compliance contact (PCC) alone was reflective of all responses as some companies consolidated answers through a single recipient that may not have been the PCC. EROMS will discuss and respond with a path forward.

### **CCCPP-010 Revision Update**

It was reported that the Compliance Processes and Procedures Subcommittee (CPPS) is streamlining the criteria and revisiting criteria regarding the Coordinated Oversight Program of Multi-Region Registered Entities. In addition, CPPS drafted a list of criteria for NERC and standards drafting teams to consider during quality reviews. Lastly, CPPS is revising criteria for successful implementation of the Risk-Based CMEP, which is a CCC Procedure. There was excellent involvement by Regional Entity staff to develop the criteria and discussions for this annual exercise which was recognized and greatly appreciated. Special thanks to SPP RE for their active role and support.

### **Focused Member Feedback on the Implementation with Suggested Improvements on Risk-based CMEP – Round Table Discussion**

A background document was provided for the discussion and noted that the intent is to share positive observations and identify opportunities for improvement. The Chair clarified the roundtable background document included in the agenda package was meant to facilitate discussion and was not meant to interpret, conflict with, or alter any ERO Enterprise documents. The Vice-Chair recalled the conversation from the March CCC meeting on how to quantify the benefits of the risk-based CMEP, and she noted that this discussion may inform the work plan.

The Chair opened up the discussion for CCC members to share their experiences with the IRA process, ICE process, self-logging, and other risk-based CMEP activities, while NERC staff captured notes. NERC staff took an action item to capture discussion notes and consolidate the notes into a summary report to be shared and discussed with the CCC executive team, and eventually the CCC at the September meetings.

NERC summarized preliminary takeaways from the discussion as follows:

- Continued outreach on risk-based CMEP;
- More clarification and transparency on Regional Entity processes;
- Consistency in tools and processes; and
- More focus on internal controls and how they fit in risk-based CMEP.

### **Future Meetings**

- September 13-14, 2016: Little Rock, AR (SPP offices)
- November 29-30, 2016: Arlington, VA (NRECA)
- March 15-16, 2017
  - *Atlanta, GA*
  - *Wednesday, 8AM – 5PM and Thursday, 8AM – 12PM*
- May 17–18, 2017
  - *Salt Lake City, UT (Hosted by WECC)*
  - *Wednesday, 8AM – 5PM and Thursday, 8AM – 12PM*
  - *Week following NERC Board meetings*
- September 13–14, 2017
  - *Atlanta, GA*
  - *Wednesday, 8AM – 5PM and Thursday, 8AM – 12PM*
- November 29-30, 2017
  - *West Palm Beach, FL (Hosted by FPL)*
  - *Wednesday, 8AM – 5PM and Thursday, 8AM – 12PM*

## NERC Operating Committee

### Report to the SPP Regional Entity Trustee

July 25, 2016

Jim Useldinger, South Central MCN

#### Activity Update

A regular meeting of the NERC Operating Committee (OC) was held on June 7-8, 2016 in St. Louis, MO.

OC meeting highlights:

- **Essential Reliability Services Working Group (ERSWG)**

The ERSTF Framework report and the ERSTF Abstract report were accepted by the NERC BOT in December, 2015. The Framework Report presents three broad areas for further analysis: Frequency Response, Voltage Support and System Modeling. The 2016 deliverables for the ERSWG include 1) a whitepaper on the methodology for the ERS Measures Sufficiency Guidelines and the final Distributed Energy Resources TF report.

- **Distributed Energy Resources Task Force (DERTF)**

The DERTF was established in response to Recommendation #5 of the Essential Reliability Services Task Force Measures Framework Report – while beyond the formal scope of the ERSWG, the Distributed Energy Resources (DERs) will increasingly affect the net distribution load that is observed by the BPS. The DERTF reports to the ERSWG.

The DERTF activities include:

- Examine existing practices for incorporating DERs in to planning models and studies
- Identify and thoroughly explain any existing operational impacts in localized areas with high penetration of non-controllable resources
- Facilitate data collection efforts and propose recommendations for improved data collection efforts in NERC
- Identify potential reliability metrics, and recommend as needed, with regards to DERs
- Provide a recommendation for consistently modeling and assessing the reliability and/or operational impact of DERs in NERC's Long-Term Reliability Assessment (LTRA) and other assessments
- Review existing NERC Reliability Standards and coordinate with IEEE 1547 related efforts
- Review the NERC Functional Model against the definitions for Behind the Meter Generation, Distributed Generation, and other related terms to provide clear distinctions between each category and or treatment within NERC
- Consider the development of a Reliability Guideline and/or SAR that provides recommended requirements Distribution Providers should consider for their DER-type interconnections

- **CPS1 Data and BAAL Exceedances Information**

The Reliability Subcommittee reminded everyone that BAL-001-2 (Real Power Balancing Control Performance) becomes effective on July 1, 2016. Therefore, CPS data will no longer be required to be

provided unless a compliance violation has occurred. However, the OC requested that the same CPS 1 % data and additionally, BAAL exceedances, be provided to allow the Reliability Subcommittee to continue to monitor and analyze individual BA performance as the performance Standards and requirements change and also to assist BAs as needed. This data request is not to be considered compliance related but is very important and needed to assist the industry and support and monitor Interconnection performance. A new process has been developed for BAs to provide this information on a secured NERC SharePoint website referred to as the balancing authority submittal site (BASS). Secure ID information is required to access the BASS site and access will be limited to a BA only seeing its information.

- **Time Monitoring Reference Document, Version 4**

The Reliability Subcommittee and Operating Reliability Subcommittee was directed by the OC to work together to develop a reliability guideline or procedure to document the process for manual time error corrections with the retirement of BAL-004. Some non-industry stakeholders believe that time control is a commercial power quality service that provides benefits.

The OC approved posting the *Time Monitoring Reference Document*, Version 4 to the OC for comments and the RS and ORS will work with the BAL-004 drafting team to incorporate the comments.

- **Gas-Electric Interdependency Special Short-Term Assessment**

NERC staff provided an overview of their natural gas – electric interdependency Short-Term Special Assessment. Key findings and recommendations presented in the special assessment include:

1. Electric and natural gas industries should consider mitigation measures (e.g. use of dual-fuel generators and firm natural gas delivery contracts).
2. There are risks to natural gas generation during the summer season – not just a winter problem.
3. Expand gas-electric planning and coordination.
4. Operational coordination between gas and electric industries decreases the likelihood of wide-spread outage.

NERC Staff also presented an overview of the potential reliability impacts to the Los Angeles area bulk electric system due to the current operational state of Aliso Canyon natural gas storage facility.

- **Functional Model Advisory Group (FMAG)**

The proposed revisions to the Functional Model (FM) were presented to the OC for discussion and feedback. The purpose of the FM is to provide a framework for development of reliability standards and to describe each function and relationships between entities responsible for performing tasks required for each function. The FMAG reports to the Standards Committee and consults with and submits all revisions to the FM and its associated Technical Document to the Critical Infrastructure Protection Committee, the OC, and the PC for endorsement. The FMAG would present its final product to the technical committees at their September 2016 meetings for endorsement.

Among the proposed revisions to the FM is adding a TOP task related to performing switching operations. This proposed revision raised questions related to:

1. Coordinated functional registration process
2. Certification of TOs and GOs to operate the BES
3. Rules of Procedure, the FM and the Standards should all align, which they do not at this point. Therefore, gaps are created
4. What is the definition of a switching function?
5. FM is an abstract or conceptual model. It is guidance to the industry and not the end-all in how the industry plans and operates the BES
6. This specific change makes things more unclear and should be dropped

- **Eastern Interconnection Unaccounted Inadvertent Interchange**

Unaccounted for Inadvertent Interchange true-up is the result of Inadvertent Interchange in the Eastern Interconnection accumulating to a non-zero amount. This happened due to a number of errors that have occurred over many years and, at this point, can no longer be traced back to their origins. The unaccounted for Inadvertent Interchange balances are the following:

On-Peak: 45,410 MWHrs

Off-Peak: -100,647 MWHrs

Total: -55,239 MWHrs

In order to achieve an Interconnection net zero Inadvertent Interchange balance, the Resources Subcommittee asked BAs if they would like to participate in an Inadvertent Interchange true-up. The true-up will consist of allocating Inadvertent amongst the participating BAs in the opposite direction of the above balances. The unaccounted for Inadvertent Interchange balances will be spread among the interested BAs based on their individual biases.

Each BA has the opportunity to participate in the true-up to a MWhr amount specified in the BA participation survey. Allocations will be made on individual biases and not exceeding the values listed in the survey per the BA. The NERC RS will communicate further information once all the BA surveys have been received.

- **Reliability Guideline: Situational Awareness for the System Operator**

A task team lead by the Chair of the Personnel Subcommittee presented a draft reliability guideline that addresses system operator situational awareness. Comments from the OC have been requested by July 31, 2016 and the team expects to return to the September 2016 OC meeting with a request for approval to post the draft reliability guideline for a 45-day public comment period.

- **Roundtable Discussion – EPA Clean Power Plan and Its Potential Impacts on BES Reliability**

The EPA issued the proposed CPP rule in June 2014, intended to reduce carbon emissions from existing fossil-fueled electric generating units. The CPP rulemaking received over 4.3 million comments. The final CPP was signed on August 3, 2015 and was published in the Federal Register on October 23, 2015. Full compliance with the CPP is set for 2030. The CPP relied on three basic tenets or building blocks: 1) heat rate improvement of coal-fired plants, 2) re-dispatch of natural gas combined cycle power plants

and 3) increased use of new renewable energy. State Implementation Plans (SIPS) must be submitted by September 6, 2016, however, states can request an extension to September 2018. The EPS has up to one year to approve a SIP. If a SIP is not approved, the EPS can impose upon the state that it follow the Federal Plan. The EPA plans to finalize the Federal Plan in the summer of 2016. FERC staff developed a white paper on *Guidance Principles for Clean Power Plan Modeling* (Docket No. AD16-14-000). Potential reliability impacts of implementing the CPP include: 1) early retirement of generating units, 2) changing resource mix and unit dispatch and 3) unit cycling due to environmental constraints.

- **Revised PJM RTO Reliability Plan**

The OC approved the NERC Operating Reliability Subcommittee recommendation to endorse the PJM Reliability Plan, which now includes the International Transmission Company (ITC) in the PJM balancing authority area effective June 1, 2016. All Regional Entity approvals were obtained.

- **Archive the NERC Backup Control Center – A Reference Document**

The OC approved archiving this reference document based on the content being dated since the time it was issued. Since 1993, business continuity has taken a much more prominent place in daily operations and justification of a backup control center is no longer an issue for registered entities. In addition, the current standard EOP-008 (Loss of Control Center Functionality) adequately covers the appropriate requirements.

- **Committee and Subcommittee Items**

- Operating Reliability Subcommittee (ORS)
  - Reviewed the revised PJM RTO Reliability Plan
  - Engaging in the planning of the GridEx IV grid security exercise
  - Interface with the ERSWG related to the impact of distributed resource on system restoration plans
  - Informed the OC that the requirement for reliability coordinators to have a reliability plan is being removed from IRO-001 effective April 1, 2017. The ORS will further review the need for reliability plans in light of the new requirements stated in IRO-014 and to report its recommendation to the OC at its September 2016 meeting.
- Resources Subcommittee (RS)
  - Development of Version 4 of the Time Monitoring Reference Document
  - NERC and the RS will conduct two webinars related to BAL-003 and the requirements for balancing authorities to completed Form 1 and Form 2
  - Continued efforts to revise the ACE Diversity Interchange reliability guideline, which will likely be presented to the OC at its September 2016 meeting
  - Continued efforts to develop, in conjunction with the standard drafting team, the Inadvertent Interchange and Reporting ACE reliability guidelines
- Event Analysis Subcommittee (EAS)
  - 4<sup>th</sup> annual Monitoring and Situational Awareness Technical Conference planned for September 27-28, 2016
  - Reviewed two recent Lessons Learned
- Personnel Subcommittee (PS)

- Has started a major project to draft Version 4.4 of the Continuing Education Program Manual
- Developed draft Reliability Guideline: Situational Awareness for the System Operator

**Next Meeting**

The next meeting of the Operating Committee will be on September 13-14, 2016 in Phoenix, Arizona.