Program 68 Overview

Instrumentation, Controls and Automation
Interest Group Meeting

Neva Fox
Senior Project Manager
Generation - Instrumentation, Controls and Automation
Instrumentation, Controls & Automation (68)

*Improve reliability through more effective equipment monitoring, optimization of current control strategies and development of new technologies*

- Strategically implement process changes to improve operational flexibility
- Attend Peer interest groups to collaborate and apply other’s learnings
- Reduce cost through greater automation of process controls
- Improve reliability through advance anomaly detection, diagnostics and prognostics.
- Identify control improvements that can help lower unplanned maintenance costs

Provide instrumentation and controls solutions to enhance processes, technologies, operations and maintenance.
2012 Program Structure – Program 68
Instrumentation, Controls, and Automation

• P68.001: Technology Development & Demonstrations
  – Cyber Security Recommendations for I&C Systems
  – Impact of Pulverizer Performance
  – Integrated I&C Solutions for Enhanced Cycling and Turndown
  – 2 Shared Projects – Cyber Security Procurement and Flow Measurement

• P68.002: Technology Transfer
  – I&C Guideline: 2012 Topical Update
  – Fleet-Wide Monitoring Interest Group Meetings
  – Instrumentation, Controls and Automation Interest Group Meetings
Cyber Security Recommendations for I&C Systems

• Project Manager: Neva Fox

• Product Type/ Deliverable Date: Webinar and Technical Update (Dec 2012)

• Scope and Key Objectives
  – Facilities not required by NERC-CIP
  – Determine the security practices for protecting I&C systems currently being utilized in a sample of generating facilities.
  – Recommend “prudent” or “good” security practices for protecting I&C systems.
  – Recommend “advanced” or “better” security practices for protecting the I&C systems

“You don’t have to be target to be a victim”
Cyber Security Recommendations for I&C Systems

Phase 1 Define Current Practices
- Finalize Work Plan, Select & Schedule Facility Reviews
- Conduct Plant Facility Review / Implementation Issues
- Compile Plant Facility Review Results

Task 1
Task 2
Task 3

Phase 2 Develop Recommendations
- Develop Security Practice Recommendations
- Synthesize Recommendations with Current Practices and Existing Standards
- Review Findings, Recommendations, and Comparisons with EPRI

Task 4
Task 5
Task 6

Phase 3 Prepare Final Reports and Presentations
- Develop Final Report Documenting Findings, Recommendations and Comparisons

Task 7

9 Utility Volunteers to Date
Impact of Pulverizer Performance

- **Project Manager**: Lam Bui
- **Product Type/ Deliverable Date**: Technical Update (Nov. 2012)

**Scope and Key Objectives**
- The objective is to identify a mechanism to monitor and test pulverizer operation online to determine its responsiveness (or change in responsiveness).
- Results will be used to determine if the pulverizer needs maintenance or if the control system needs repair or tuning.
- Host Plant – Miller, Southern Company

“It’s not always mechanical”
Integrated I&C Solutions for Enhanced Cycling and Turndown

• **Project Manager:** Neva Fox

• **Product Type/ Deliverable Date:**
  Technical Update (Dec. 2012)

• **Scope and Key Objectives**
  - **Phase 1** (2012 work) – Develop Roadmap
    - Research and industry survey to develop a Roadmap
    - Identify where I&C solutions can mitigate the effects of cycling while improving operational flexibility through optimized ramp rates and lowered sustainable minimum load requirements.
  - **Phase 2** (yearly update) – Develop Integrated Solutions
    - Solutions for specific equipment, processes and systems prioritized based on industry need.
    - Collaboration between Program 68 and other programs to coordinate effective and viable solutions for each set of topics with the industry experts in both instrumentation and controls and the specific topical areas.
Flow Measurement
(Shared with P71)

• Project Manager: Sam Korellis
• Product Type/ Deliverable Date: Technical Update (Dec 2012)
• Scope and Key Objectives
  – Multi-year project focusing on continuous measurement of flow for the most important flow rates in the power plant.
  – **Task 1** – Develop and Issue and industry survey on the measurement of feedwater flow in fossil fueled power plants and Compile the results received
  – **Task 2** – Conduct an on-site evaluation of one or more power plant feedwater flow measurement systems, typical of those commonly used today
  – **Task 3** – Analyze Alternative Feedwater Flow Measurement Techniques

Surveys have been distributed
Cyber Security Procurement
(Shared Cross Section – Fossil/Nuclear and PDU)

Phase 1 – Benchmark Study
• Any existing guidance/specs?
• Any under development?

Phase 2 – Methodology
• Method for creating specs
• Worked example

Phase 3 – Guidance & Specification
• Specification language

Phase 4 – Computer-Based Training
• Utility module; Vendor module

Phase 1 – Report Published – 1023502
I&C Guideline: 2012 Topical Update

• **Project Manager:** Lam Bui

• **Product Type/ Deliverable Date:** Technical Update (Dec. 2012)

• **Project Description:**
  – Volume 2 – different PID controller algorithms and tuning techniques.
  – Volume 3 – factors that affect the control loop performance, as
  – Volume 4 – several tuning techniques
  – Volume 5 – Job Cards

• The control loop tuners will be able to apply the knowledge gained in past Volumes, with hands on instructions and guidance from Volume 5 to perform each task.

**Putting knowledge to use**
Instrumentation, Controls & Automation Interest Group

• Project Manager: Neva Fox
• Product Type/ Deliverable Date:
  Technical Resource (throughout the year)

• Project Description:
  – EPRI’s Instrumentation, Controls & Automation Interest Group (ICA IG) provides a forum where utilities can share I&C experiences in a peer-to-peer setting.

  June 6 – 7, 2012
  Austin, TX

Collaboration with the DOE
Cyber Security Solutions for I&C Systems
Supplemental Project

Objectives and Scope
• Explore and document specific strategies for securing control systems
• Prioritize and address top topics based on input from Project Members
• Assess field applications both in and out of the Utility Industry

Process and Deliverables
• Topical Area Deep Dive:
  • Conduct research to focus on technology gaps and new developments
  • Conduct Site Visits that have applied strategies and technologies to gather real-world experience
  • WEBCAST to promptly get solutions to the end user
  • Technical Update Report

10 Project Funders to Date
Next Topical Areas

Remote Access in progress – completion June 14
HRSG Damage Reduction Through Improved Controls

Objectives and Scope

• Document existing controls and their performance
• Identify I&C improvements
• Perform detailed design of identified improvements
• Implement identified improvements
• Testing and evaluation of benefits

Value

• Improve system performance, heat rate and thermodynamic efficiency
• Prevent HRSG damage and cracking

7 Project Funders to Date
Questions/Comments
Together…Shaping the Future of Electricity
## 2012 Meeting Schedule

<table>
<thead>
<tr>
<th>UPCOMING MEETINGS/EVENTS</th>
<th>DATE</th>
<th>LOCATION</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td>Spring Advisory Meeting</td>
<td>February 21, 2012</td>
<td>Scottsdale, AZ</td>
<td>COMPLETE</td>
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<tr>
<td><strong>Spring FWMIG</strong></td>
<td>May 9 – 10, 2012</td>
<td>Charlotte, NC</td>
<td>COMPLETE</td>
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<tr>
<td><strong>ISA POWID</strong></td>
<td>June 4 – 8, 2012</td>
<td>Austin, TX</td>
<td>COMPLETE</td>
</tr>
<tr>
<td><strong>ICA IG Meeting</strong></td>
<td>June 6 – 7, 2012</td>
<td>Austin, TX</td>
<td><strong>You Are Here</strong></td>
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<tr>
<td><strong>Fall Advisory Meeting</strong></td>
<td>October 2, 2012</td>
<td>Nashville, TN</td>
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<tr>
<td><strong>Fall FWMIG</strong></td>
<td>October 22 – 24, 2012</td>
<td>Dallas, TX</td>
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<tr>
<td><strong>Fall IG Meeting</strong></td>
<td>Week of October 22</td>
<td>Tentative</td>
<td>Based on funding</td>
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# 2012 Member Update Schedule

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<tr>
<th>PROGRAM 68 UPDATES</th>
<th>DATE</th>
<th>COMMUNICATION</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td><strong>1Q12 Update</strong></td>
<td>March</td>
<td>Email</td>
<td>(status and overview) COMPLETE</td>
</tr>
<tr>
<td>Cyber Security Project Kickoff Meeting</td>
<td>April 4</td>
<td>Webcast</td>
<td>COMPLETE</td>
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<tr>
<td><strong>2Q12 Update</strong></td>
<td>June 20</td>
<td>Webcast</td>
<td>(technical focus)</td>
</tr>
<tr>
<td><strong>3Q12 Update</strong></td>
<td>September</td>
<td>Email</td>
<td>(status and overview)</td>
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<tr>
<td>Impact of Pulverizer Performance Technical Update</td>
<td>October</td>
<td>Webcast</td>
<td></td>
</tr>
<tr>
<td><strong>4Q12 Update</strong></td>
<td>December</td>
<td>Email</td>
<td>(status and overview)</td>
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## 2012 Deliverables

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<th>2012 DELIVERABLE</th>
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<tr>
<td>Integrated I&amp;C Solutions for Enhanced Cycling and Turndown</td>
<td>Technical Update</td>
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<tr>
<td>I&amp;C Guideline: Annual Update – Boiler Control Loop Tuning</td>
<td>Technical Update</td>
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<td>Impact of Pulverizer Performance</td>
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<td>Instrumentation, Controls and Automation Interest Group</td>
<td>Technical Resource</td>
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<td>Fleet-Wide Monitoring Interest Group</td>
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<td>Cyber Security Procurement (Shared with Nuclear &amp; PDU)</td>
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2013 Key Planned R&D Topics

Distributed Control Life Cycle Management

• Develop a life cycle management plan (LCMP) to cost-effectively avoid reliability and obsolescence issues.

• Provide an optimum maintenance plan, schedule and cost profile for a plants Distributed Control Systems.

• Evaluate how to implement security system changes into already established systems.

Interest Groups

• Fleet Wide Monitoring

• Instrumentation, Controls and Automation

I&C Guidelines – Volume 6

• Continuation of Volumes 1 – 5