Director’s Message
By Aaron Hussey

I am pleased to communicate to you that I will be the new ISA POWID Director for 2016, assuming duties immediately given our current change in leadership. Let me first say thank you to the exiting Director, Brandon Parker and previous Director, Denny Younie for serving in this role previously as well as helping with the symposium for several years. Thank you also to Cyrus Taft and Don Labbe for providing leadership during the transition. The reason I have agreed to assume the Director role is simply this – the division, ISA society, and industry are extremely important to society as a whole. Over the last two years I have seen excellent technical programming at the POWID Symposia under leadership from Neva Espinoza and Seth Olson as Program Chairs. All of the track chairs, session developers, attendees, and exhibitors have put on events that have improved my technical ability and expanded my professional network. We have an exciting opportunity – students are coming to ISAs Power Industry Division events as a way to enter into the industry (yes, they want to work in Power)! They are bringing new excitement, ideas, and peers. Thanks to Susan Maley and Sydni Credle for making this happen over the last two years. Early and mid-career scientists, engineers, and business professionals are also bringing much-needed new life to the division.

Many have gone before us and have paved the way for the division to shine. They have volunteered untold hours every year, year after year, decade after decade, to ensure successful standards, events, communications, and networking amongst power industry automation professionals. It is time for the previous generation of POWID leadership to be able to enjoy the fruits of their labor while still contributing. In order for that to happen we must stand up, lead, and dive in. On that note, Xinsheng Lou of Alstom will join me in leadership as Director-Elect. I am excited to be able to continue working with Xinsheng as he is kind, professional, and very smart! As soon as we have the 2016 POWID Symposium Planning Committee named I will communicate that to you and let them run with the ball. In the meantime, please stay tuned for further communication about upcoming teleconferences, meetings, and items that need attention by the EXCOM (such as open positions – Honors & Awards!).

The future of POWID is bright. Please join me in helping it transition to an even more diverse organization that radiates excellence. The foundation is strong, a house is built, but we need a few fin-

ishing touches. Together – the wise and the young – we can have fun and accomplish great things for the profession and society will benefit. Please do me a favor – send me a short (or long) email in response giving suggestions and feedback. That’s how we’ll design the next steps to take. Jason Makansi already put forth a valiant effort in 2013 to collect advice from young professionals, and I have that document.

The summer POWID newsletter provides you with an opportunity to consider your involvement in the division for the remainder of 2015 and into 2016 by reflecting on some of the activities that have already taken place. First, consider the strong technical content of the annual symposium which was held in Kansas City, Missouri in June. Next consider the new contacts in the industry you have made by being a part of POWID. Finally, consider how giving some of your time, personally and professionally, is mutually beneficial for society and for you. As you consider, ask yourself how your specific talents and experience could assist the division and let me or someone else you know in POWID respond with some opportunities by emailing or giving us a call.

Best Regards,
Aaron Hussey
POWID Director 2015/16
ahussey@expmicrosys.com
Upcoming POWID International Conferences

59th Annual ISA POWID Symposium
27-30 June 2016
Charlotte, North Carolina, USA

You can find information on other ISA Events at www.isa.org/events

2015 POWID SYMPOSIUM COMMITTEE

GENERAL CHAIR
Xinsheng Lou
Alstom Power
xinsheng.lou@power.alstom.com

PROGRAM CHAIR
Seth Olson
Chevron Power and Energy Management
solson@sycamore.com

NUCLEAR TRACK CHAIR
Bob Queenan
Curtiss Wright
rqueenan@curtisswright.com

FOSSIL TRACK CHAIR
Don Labbe
Schneider Electric
Donald.Labbe@schneider-electric.com

CYBERSECURITY TRACK CHAIR
James Batug
PP&L Generation
jbatug@ieee.org

HYDROELECTRIC/RENEWABLE TRACK CHAIR
Rick Meeker
Florida State University
meeker@caps.fsu.edu

ADVANCED TECHNOLOGIES FOR GENERATION TRACK CHAIR
Susan Maley
Electric Power Research Institute (EPRI)
smaley@epri.com

GENERATION TRACK CHAIR
Aaron Hussey
Expert Microsystems
ahussey@expmicrosys.com

TECHNICAL PAPER REVIEW COORDINATOR
Terri Graham
Hurst Technologies
terrig@hursttech.com

EXHIBIT COORDINATOR
Carol Schafer
ISA
cshafer@isa.org

POWER MAGAZINE CONTENT
Dr. Robert Peltier
Power Magazine
robertp@powermag.com

HONOR & AWARDS CHAIR
Mike Skoncey
First Energy Corporation
mskoncey@firstenergycorp.com

PUBLICITY
Joe Vavrek
Sargent & Lundy
joseph.m.vavrek@sargent-lundy.com

ISA PROFESSIONAL STAFF
Rodney Jones
ISA
P.O. Box 12277
Research Triangle Park, NC 27709
(919) 991-9418
rjones@isa.org

Newsletter Editor Update

By Dale Evely, P.E., Southern Company
ISA POWID Newsletter Editor

Well the winter weather is now a distant memory and extreme heat and humidity is the pattern we have settled into here in the southeastern USA. On a safety note, we had an employee at one of our generating plants this past weekend who was going to check on a part of the plant that was outdoors down by a river. As he was traveling down a set of stairs he felt something hit the back of his pants leg. He turned to find a 3 feet (1 meter) long copperhead (poisonous) snake curled up in the corner of the step he had just stepped down from. The employee was not hurt and was able to push the snake away. This is a good reminder to check step corners and under steps in areas that may have snakes or other animals hiding there.

I want to thank everyone who contributed to this edition of the POWID Newsletter; we all have regular work to do and I appreciate it when you make the extra effort to go beyond that by contributing to this newsletter. I would like to encourage all of you to consider submitting something for future editions.

Technical content that is specific to the automation side of the power industry is what provides the best benefit to our membership. We are also interested in historical items and would also welcome items of general technical interest. Please share with your colleagues any tidbits that have been beneficial to you in your job or in expanding your knowledge base. You can send your articles to dpevely@southernco.com (please limit any attachments to 5MB or my mail server may not let them through and I will never know that you tried to send them). If you e-mail an article and do not get a thank you response from me it may not have gone through. If the article was not authored by you, please provide us with a statement that you have cleared publication of the material with the author. Please keep in mind that articles need to be non-commercial in nature so don’t include a heavy sales pitch as a part of the technical content.

The goal that POWID works towards is to publish three newsletters each calendar year; with the basic schedule being publication in March or April (Spring), August or September (Summer) and December or January (Fall). All three of the newsletters are published electronically and the Spring newsletter is also published in paper format and mailed to those of you who live in the USA.

I hope 2015 has been a good one for each of you so far and that it continues to be that way. Have a great rest of the year!
58th Annual ISA Power Industry Division Symposium thanks its Champions

2015 Platinum Champion
beamex

2015 Gold Champions

EMERSON
Process Management

POWER

2015 Silver Champions

Consumers Energy
Laboratory Services
EXCEL
Honeywell
Schneider Electric

Setting the Standard for Automation™
2015 POWID Symposium Summary
By: Xinsheng Lou, POWID Conference General Chairman and ISA POWID Director Elect

The 58th ISA Power Industry Division (POWID) Symposium, held from June 7 through June 11, 2015, attracted more than 120 attendees and 11 exhibiting companies.

The Opening and Keynote Session on Monday morning featured three keynote speakers who addressed the group. Mr. Rick Roop, ISA’s 2015 President, attended and gave a welcome speech from ISA. The three keynote speakers from Black and Veatch, General Electric and US DOE NETL also addressed the group. On Tuesday morning, Mr. Michael Smith, the fourth keynote speaker, made his presentation on cyber security just prior to the technical sessions.

The panel session followed the keynote session on Monday morning. The mission with this session is to set power plant I&C, automation, M&D, analytics, telecom, mobile devices, “big data,” and all things digital within the context of the larger issues facing the power industry. Mr. Jason Makansi from Pearl Street, Inc. chaired this session. The panelists include the three keynote speakers from B&V, GE and DOE NETL, plus Mr. Leo Staple, Senior Manager of Utility Operational Compliance - OG&E, and also former ISA president.

In addition, the newly introduced Student Career Development Forum had two sessions on Monday and Tuesday evenings. Seven students participated in Monday’s discussions, among whom four came from the University of Missouri at Kansas City (UMKC), one from University of Illinois at Urbana-Champaign (UIUC), one from West Virginia University (WVU), and one from Oregon State University. On Tuesday evening, five students participated, among whom three local students came from UMKC. For each session, over five professionals participated and had close communications with the students. A LinkedIn group has been created for this POWID 2016 Student Career Development Forum. The students have been invited to register as ISA student members.

More than 60 peer-reviewed technical papers/presentations — highlighting the latest topics and innovations in instrumentation, controls, security, and business systems and automation technologies — were presented. The key issues and trends affecting all energy sectors, including fossil fuels, nuclear power, renewables, and cyber security, were discussed and examined.

The event paid particular attention to:
- Maintaining the reliability of power generation amid fluctuating load demand
- Safeguarding essential data through advanced cybersecurity
- Satisfying increasingly stringent environmental controls regulation
- Improving competitiveness and operating results — now and in the years that follow

In addition to the technical presentations and sessions, the conference delivered:
- Informative vendor exhibits by key suppliers
- The opportunity to take up to three ISA training courses:
  - Boiler Control Systems Engineering (ES15C);
  - Overview of Setpoints for Nuclear Safety-Related Instrumentation (IC68PD)
  - Introduction to Industrial Automation Security and the
- ANSI/ISA99 (IEC 62443) Standards (ICE32C)
- The chance to earn valuable Professional Development Hours (PDHs) and Continuing Education Units (CEUs)
- Participation by undergraduate and graduate students
- Numerous social and networking activities.

ISA POWID Symposium 2015 – A Spouse’s Point of View
By: Paula M. Labbe

This year’s 58th Annual ISA POWID Symposium was held at the Kansas City Marriott Hotel, in Kansas City, Missouri. I had never been to Missouri, so I was excited about this conference, and the opportunity to see and explore a state I had never visited.

As many of you know, I am the woman who has a camera permanently attached over my shoulder, and I am frequently snapping candids throughout the conference. I have been taking ISA photographs for many years, but Joe Vavrek has most of the responsibility. I just back Joe up in case one of our cameras malfunction. Joe does a fantastic job, but this year he wasn’t able to attend the symposium, so for the first time I took the conference photos solo.

They say if you love what you do, it doesn’t feel like work. Anyone who knows me knows how much I enjoy photographing. I attempted to capture the highlights of the conference, the Honor & Awards Luncheon, the Keynote Speakers, The Round Table, the Exhibitors, the Evening Socials, and most importantly the people who attend and actually make the Symposium what it is today.

While photographing, I get to speak to many people. A man attending the conference from Germany shared his thoughts with me. He said he travels all over the world to different conferences. When he returned back to Germany, he said he would be off to Spain within a few days to participate in another conference. He told me that ISA POWID is different from the other conferences that he attends, because it is not commercial. It is pure cutting edge technology from leading experts in the field. This man presented two papers, three years ago, and he presented two more papers this year. It was such a pleasure to speak with him, as he shared his opinion of the conference with me. Through ISA, I get to meet people from all over the world.

Although photographing took up most of my time in Kansas City, I did manage to free one, five hour afternoon. I decided to venture into town on a MAX, public transportation bus. It cost $3.00/day for a pass that allows you to get on and off the bus, as many times as you like. I quickly learned that riding a bus in Kansas City was very much like taking a cab in New York City! Bus drivers put the pedal to the floor, as soon as the bus door is closed. I went flying into a seat. Some people said, “She isn’t a local.” The bus driver was a woman about my age, and actually very nice. She gave me some tips on what to see, and where to pick up the bus on my return to the hotel. It is amazing what you can do in five hours, when that is all you have. My first stop was the National WWI Museum at Liberty Memorial. Shock and Awe is what comes to mind, when I think of my first impression of the museum. I was greeted by volunteer veterans’, standing on a glass floor, over 9,000 flower poppies, each representing 1,000 men and women who died during the war. I was speechless, moved, and humbled. The museum itself was amazing, but the incredible part is that the museum was built in 2006, under the original 217 foot tower that was constructed by the citizens of Kansas City back in 1926. It was President Calvin Coolidge who dedicated the tower “In honor of those who served in the World War in defense of liberty and
our country."

The tower itself was amazing! It had four Guardian Spirits, 40 feet tall, at the very top, looking out over the city. These sculptures were carved by Robert Aitken, and each one represents a virtue: Honor, Courage, Patriotism and Sacrifice.

The tower had an elevator with a metal gate. An operator allowed a few people at a time to travel up to the top, but the elevator stopped 45 steps from the outside landing. A narrow, spiral, staircase led me up to an outdoor walkway around the tower summit. The view was incredible!!! It was a clear day, and I could see the whole city from a very different perspective. Since my camera is permanently attached to my shoulder, I got some incredible Kansas City photographs! A small, push button bell, signaled the elevator operator that you wanted to go down, and this veteran arrived excited to hear your comments on the view.

From the museum, I walked to Union Station. A train station built in 1914, with 95 foot ceilings, three 3,500 pound chandeliers, and a six-foot wide clock hanging near the main entrance. The station has 850,000 square feet of beauty, and 900 rooms!!! The locals say…It is haunted!

After a quick look into a few very colorful and diverse shops, I headed back to the bus stop. The same bus driver picked me up, and this time I quickly sat down, before her pedal had a chance to hit the floor. The bus driver asked, "Well, how did you enjoy Kansas City?" We chatted on our way back to the Marriott Hotel, and I returned to the conference with a whole new perspective of the city. I love to travel, and I feel as if I learn so much when I do. The POWID Symposium gives me the opportunity to do just that. I get to explore new places, and I meet interesting people at the same time. My five hours was up. I saw and did everything I wanted to do, and I made it back in time to photograph the last social of the conference. As always, I enjoyed seeing old friends, and meeting new ones.

ISA POWID 2015 Awards Luncheon Summary

By Dale Evely
Photos by Paula Labbe

The following is a listing of the awards that were presented during the annual ISA POWID Awards Luncheon during the 2015 ISA POWID Symposium:

The 2014 Achievement Award went to Aaron Hussey.

This award was presented to Aaron in recognition of his contributions to the power industry. Some of his contributions were:

- Developed and demonstrated advanced applications of monitoring and diagnostics (M&D) for steam turbine performance diagnostics and overall plant performance of thermal power plants.
- Designed, implemented, and improved industry M&D programs to detect equipment reliability issues.
- Developed and verified a comprehensive deployment of pattern recognition models for the start-up of a new centralized Monitoring and Diagnostic (M&D) Center by the Tennessee Valley Authority (TVA) for coal, combined cycle, and hydro plants.
- Developed new guidance for utilities implementing circuit card reliability improvement programs in support of long term operation of their nuclear plants.
- Researched the applicability of using the Multivariate State Estimation Technique (MSET), developed by Argonne National Laboratory, for improved equipment condition monitoring at nuclear power plants, promoting overall efforts in predictive and condition based maintenance.
- Developed a Predictive Maintenance (PdM) program for vibration monitoring of 40,000 RPM machine tool spindles.

The 2014 Service Award went to Don Labbe. Don was recognized by POWID for his contributions to the Society and to the Division.

There was also a presentation made during the Luncheon for the 2014 ISA Standards and Practices (S&P) Department and that award was presented to Klemme Herman.
The 2014 Facilities Award went to American Electric Power Company’s John E. Amos Power Plant. The John E. Amos Plant is one of the world’s largest coal-fired generating stations. It ranks as the largest generating plant in the AEP system and in the state of West Virginia. Amos Unit 3, completed in 1973, was the first of AEP’s series of 1.3-million-kw units. The late John Amos was a West Virginia civic leader, attorney, businessman, legislator and director of American Electric Power Company. This 1300MW unit utilizes state of the art control technology, including TDLAS system in the combustion side of the 96 burner unit, and a combustion optimization system.

The Robert N. Hubby Scholarship was not awarded this year due to an insufficient number of applicants.

The three Best Technical Paper Awards given for papers from the 2014 POWID Symposium were as follows:

- **Transient Analysis of a Solar Receiver Steam Generator (SRSG) in a Solar Power Plants** written by: Chuan Wang, Abhinaya Joshi, Rahul Terdalkar, Xinsheng Lou, Joe Quinn and Carl Neuschaefer of Alstom.
- **Pulverizer Diagnostics for Improved Plant Dynamic Performance and Reliability** written by: Chance Kleineke of Engineering Consultants Group, Lawrence Williamson of Alabama Power, Mark Little of EPRI, and John Sorge of Southern Company Generation.

POWID Awards Nomination Request to All POWID Members

You can tell from the quality of the presentations at our POWID Symposium and the discussions between attendees that a lot of talent resides in ISA’s Power Industry Division (POWID). There are many individuals that display their talents in “beyond the norm” fashion. During your busy days, when such an individual is identified, recognize them by nominating that person, or an exemplary Power Facility for a POWID award as listed below:

- POWID Achievement Award
- POWID Service Award
- POWID Facilities Award
- Robert N. Hubby Scholarship

Nomination forms for these POWID awards are available through the POWID website at: https://www.isa.org/division/powid/honors-and-awards/. Nominations for POWID Awards and Applications for the Hubby Scholarship are due by February 1, 2016.

Do not forget there are also ISA -- Celebrating Excellence and other awards that many POWID members are well deserving of. Information on those awards and how to submit nominations for them can be found at: https://www.isa.org/members-corner/isa-honors-and-awards/.

---

**POWID 2015 Achievement Award winner Aaron Hussey, One of the Best Paper Awards for POWID 2014 to Xinsheng Lou, POWID 2015 Service Award winner Don Labbe, and 2015 ISA S&P Department Award to Klemme Herman.**
ISA POWID Symposium 2015 - Photo Collages
Photos by: Paul Labbe Captions by: Don Labbe


Above: Local Student Meetings with POWID Experts coordinated by Prokash Paul of WVU.

Above: POWID 2015 General Chair Xinsheng Lou with ISA Event Coordinator Carol Schafer, POWID 2015 Program Chair Seth Olson with ISA coordinator Rodney Jones, and ISA Learning Consultant Andy Hayworth.

Above: Rick Roop, President of ISA addresses the group.
Above: Scott Stallard, VP Black & Veatch; Keynote on Integrating Clean Renewables into the Grid – Optimizing the Collective Capabilities of Renewable and Conventional Generation.

Above: Dr. Pengju Kang, Executive Technical Lead, GE Global R&D; Keynote on the Impact of Industrial Internet on Power Generation.

Above: Dr. Robert Romanosky, USDOE NETL; Keynote on Fossil Energy Research and Development for Clean Power Production.

Above: Industry Roundtable on Cybersecurity, changing landscape of fossil generation portfolios, integration of renewables and effects of policy and regulation on the industry moderated by Jason Makansi, Pearl Street Inc., and panelists Scott Stallard of Black & Veatch, Dr. Pengju Kang of GE, Dr. Robert Romanosky of USDOE NETL and Leo Staples, Senior Manager Utility Operational Compliance, OG&E.

Above: Mike Smith, Senior Cyber Policy Advisor for the US Dept. of Energy; Keynote on Cybersecurity Collaboration in the Electricity Subsector.

Above: POWID 2015 Technical Paper Coordinator-Teri Graham of Hurst Technologies, General Chair-Xinsheng Lou of Alstom, Program Chair-Seth Olson of Chevron, Track Chairs-Aaron Hussey of Expert Microsystems, Bob Queenan of Scientech, Susan Maley of EPRI, Don Labbe of Schneider Electric and Jim Batug.

Above: Opportunity for socializing with fine food and industry experts.

ISA Members: **Unemployed?**
Learn how to extend your membership for **FREE**

Visit:
isa.org/unemployedmembers
to learn more
Pulverizer Diagnostics for Improved Plant Dynamic Performance and Reliability

Chance Kleineke
Engineering Consultants Group, Inc.
Akron, OH 44333

Lawrence Williamson
Alabama Power
Birmingham, AL 35203

Mark Little
EPRI
Charlotte, NC 28262

John Sorge
Southern Company Generation
Birmingham, AL 35203

KEY WORDS
Pulverizer, Advanced Pattern Recognition (APR), Instrumentation and Controls (I&C), Monitoring and Diagnostics (M&D)

ABSTRACT

With the increasing electrical power derived from renewable energy sources as well as ever-changing gas prices, the output requirements of existing fossil-fueled power plants have significantly changed and will continue to do so. Typically originally built to be base-loaded, these plants now are being required to endure load following, significantly reduced load, or cycling offline completely at times. Coal pulverizers play an important role in all aspects of power plant performance, including availability, efficiency, and responsiveness. In relationship to dynamic response, pulverizer response often limits a plant’s maximum load rate-of-change. Improved pulverizer control has the potential to increase overall plant responsiveness at many plants, but not all pulverizer response problems are control-related problems and it is often difficult to discern the root cause of a problem. To this end, EPRI is conducting a project with an overall goal to diagnose and identify the source of pulverizer performance problems including those originating from equipment deterioration, controls, instrumentation, and fuel changes. The effort concentrates on the use of typically installed instrumentation and deploying low-cost additional instrumentation that could provide a more robust monitoring system providing a more refined diagnostic capability and developing on-line diagnostic methods for use by plant staff, the M&D Center, and others. Specific project tasks include development of on-line test procedures to determine pulverizer responsiveness and degradation; develop diagnostic rules or fault signatures and use test data to validate the techniques; and develop practical troubleshooting procedures for plant personnel. Alabama Power’s Greene County Unit 2 is
the host site of this project. This paper provides an overview of the project and results of the effort to date.

INTRODUCTION

The coal pulverizer is a vital piece of equipment for coal-fired electric utility plants and the pulverized fuel system is critical to the availability, efficiency and responsiveness of coal-fired boilers. Plants use coal pulverizers in a direct-fire system to grind the fuel to an appropriate fineness and dry the material just before it enters the boiler. Coal pulverizers tend to be the largest cause of forced derates in a plant. While these do not typically result in removal of the unit from service, mill issues do increase maintenance expenditures throughout the year. Figure 1 shows typical causes for mill downtime. Mill performance can also directly influence combustion, NOx formation, unburned carbon (loss-on-ignition, LOI) and boiler slagging [1].

Coal pulverizers were originally designed as a base-load piece of equipment. Plants are now required to endure load following, operate at reduced load for extended periods, or cycle offline completely at low-demand periods. With the increasing demands of competitive markets, more prominent renewable energy sources, and tighter restrictions on emissions, companies continue to utilize coal pulverizers further outside of original design criteria.

Not all pulverizer performance issues are control related. Monitoring coal mills via controlled process variables and instrumenting for other measured values is vital to maximizing performance of not only an individual pulverizer, but the boiler unit as well. Evaluation of the signatures and patterns of mill process data can provide a basis for effective predictive monitoring practices. An overall goal for monitoring a fleet of pulverizers is to diagnose and identify the source of performance problems and differentiating among equipment deterioration, control issues, faulty instrumentation, and fuel changes. This study concentrates on utilizing a plant’s historized data to develop online diagnostic methods for use by plant staff, central monitoring centers, and others. This project was initiated to identify fault signatures and develop on-line process anomaly detection methods.
BACKGROUND

The coal pulverizer is the key processing component of the fuel delivery system and its performance is instrumental in availability, efficiency and responsiveness of the generating facility by providing consistent properly sized fuel for combustion. The coal is crushed to a very fine, powder-like consistency to allow the greatest amount of surface area per volume and higher efficiency during combustion. Coal size is typically reduced through three different means: impact, crushing and attrition. Different mill types exist that incorporate one or more of these means to crush the coal. This study will focus on B&W MPS type coal pulverizers, a form of vertical air-swept pulverizer in which coal is fed from above onto the center of a rotating table. Centrifugal force uniformly feeds the coal outward, forcing the coal under spring-loaded rollers or tires, which reduces the size of the coal.

In addition to grinding the coal, pulverizers also dry the fuel to prevent any delays in the combustion process. Hot primary air enters the mill from below the grinding table. As the air enters the grinding zone by flowing around the perimeter of the table known as the throat, it fluidizes the particles that have just passed under the tires. Velocity at the throat is very important as it must lift all the fuel particles, reducing spillage to the hot-air section below the table. As the coal particles are lifted, velocity decreases allowing larger particles to fall back into circulation. The particles must also pass through a mechanical classifier, either stationary or dynamic, that causes coarse particles to fall back to
the grinding zone. The very fine particles contain more surface area allowing the hot air to quickly vaporize moisture content as they undergo classification.

The temperature of the air exiting the mill is lower than when it enters due to the thermal energy required to reduce coal moisture. The hot air, evaporated moisture and pulverized coal then flow directly to the boiler. The fineness of the coal that passes into the burner lines directly affects boiler performance. Fuel particles typically have less than two seconds to complete the combustion process in the boiler. Any unburned carbon, referred to as loss-on-ignition (LOI), then carries through the boiler and is collected downstream. This large particle carryover can contribute to boiler slagging and NOx output. Particle fineness proves to be of high importance in this process, therefore optimizing pulverizer performance and limiting maintenance downtime is critical to running an efficient operation.

A fleet of pulverizers is typically used, though the total number of mills per boiler varies based on the size of the unit and throughput of the mills. As little as one mill can be used to feed a boiler, though this greatly limits efficiency. Typical arrangements may have 6-12 mills per unit, with some units considered “mill-critical” where all mills must be in operation in order to supply full load from the boiler. It is beneficial in design of a coal-fired unit to have one mill more than needed so that full load may be attained with a mill down, say, for maintenance.

UNIT DESCRIPTION

Greene County is located on the Warrior River about 10 miles north of Demopolis, Alabama. The facility is jointly owned: Alabama Power owns 60% and Mississippi Power owns 40% of the steam units. The plant is operated by Alabama Power. Construction of the steam units began in 1962, Unit 1 began commercial operation in 1965 and Unit 2 began commercial operation in 1966. In 1993, construction began on nine GE combustion turbines. Five CT’s began commercial operation in May, 1995 and the other four followed in May, 1996. Steam units 1 and 2 use coal as the primary fuel. The combustion turbines use gas as the primary fuel and oil as the secondary fuel. Unit 2 is the host site for the current demonstration.

Unit 2 is a 250 MWe (nameplate) unit. A list of the major components of this unit is shown in Table 1. The unit incorporates a Riley Stoker¹ radiant, natural-circulation boiler rated at 1,750,000 lb/hr of steam at an operating pressure of 2500 psig with superheat and reheat temperature of 1000°F and 1000°F, respectively. At these conditions, the heat release rate in the furnace is 18,200 Btu/ft³/hr and the total thermal output 2.9x10⁹ Btu/hr. This unit was designed to use eastern bituminous coal as a fuel but now often uses other type coals, including PRB. Originally a pressurized boiler, it was converted to

¹ Riley is now a division of Babcock Power.
balanced draft in the late 1970s. Eighteen (18) low NOx burners (B&W XCL) were installed on the unit during the late 1990s. Three retrofitted B&W MPS 75G pulverizers supply pulverized coal to six burners each. The unit is equipped with a Metso Max distributed control system. The current version is a mixture of Max1000plus+ and MaxDNA2 hardware and software.

Table 1 - Major Component List

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Vendor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler</td>
<td>Riley</td>
<td>Rated capacity - 1,800,000 lb/hr at 2,400 psig and 1000°F superheat and 1000°F reheat; 18 burners total (9 front wall / 9 rear wall)</td>
</tr>
<tr>
<td>Burners</td>
<td>B&amp;W</td>
<td>XCL (Modified by Riley)</td>
</tr>
<tr>
<td>Pulverizers</td>
<td>B&amp;W</td>
<td>Three(3) MPS 75G pulverizers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Capacity ~ 40 tons/hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Each pulverizer supplies six (6) burners</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dynamic classifiers</td>
</tr>
<tr>
<td>Feeders</td>
<td>Merrick</td>
<td>Model 496-G Gravimetric Feeders</td>
</tr>
<tr>
<td>Control System</td>
<td>Metso</td>
<td>Max1000plus+ / MaxDNA2 distributed controls</td>
</tr>
</tbody>
</table>

The B&W MPS pulverizer, seen in Figure 2, is a roller race mill operating at slow speed driven by a constant speed (885 RPM) motor which drives the grinding table through a triple reduction gear box. The low speed output shaft rotates at approximately 27 RPM. Grinding elements consist of three fixed position roll wheel assemblies that fan in a rotating segmental grinding ring. Rolls are spring loaded to obtain the pressure required for grinding. Spring tension on Unit 2 pulverizers is adjustable with an automatic wheel loading system that varies spring tension with various feeder flows. Dynamic (rotating) motor driven, classifiers are used on these pulverizers. Operators adjust the speed of these classifiers to maintain mill loading. A cutaway can be seen in Figure 3.
Figure 2 – Pulverizers.
Figure 3 – MPS Pulverizer Cutaway, courtesy of The Babcock & Wilcox Company.

An overview of the air system is shown in Figure 4. Two motor driven forced draft fans supply air to the primary and secondary air systems. Ljungstrom rotating air heaters (2) supply the heated combustion air to these systems. A three-damper arrangement (per pulverizer) is used to regulate the flow and temperature of the air entering the pulverizers.
DATA COLLECTION

Data collection for the project had as a goal to provide data to support the “real-time” diagnosis of pulverizer performance and reliability with anticipated sinks for this data being advanced pattern recognition (APR) modeling packages and EPRI’s Diagnostic Advisor. The intent was to limit the
data, to a large degree, to that which is considered “typical” plant instrumentation. Part of the scope of the project was to identify minimal additional instrumentation that could be added to the monitoring system that would enhance the troubleshooting and fault detection process to include the most common failures and degradation issues (Figure 5). For a simple example as shown in Table 2, the detection of Fault A would require Sensor 1, Sensor 2, and Sensor 3. More robust identification of faults would require more sophisticated techniques such as Case Based Reasoning, which is used in EPRI’s Diagnostic Advisor.

Figure 5 – Instrumentation Decision Tree.

Distributed with permission of authors by ISA 2014
Presented at the 57th Annual ISA POWID Symposium; http://www.isa.org
Table 2 – Sensor / Fault Matrix

<table>
<thead>
<tr>
<th>Fault / Sensor</th>
<th>Sensor 1</th>
<th>Sensor 2</th>
<th>Sensor 3</th>
<th>Sensor N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault A</td>
<td>High</td>
<td>Low</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Fault B</td>
<td>Low</td>
<td>High</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault C</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Fault N</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

PULVERIZER PROCESS DATA

The plant’s historian, Aspen Info Plus21, is being used to collect the large majority of the data undergoing analysis. For the analysis period, consisting of approximately six months, approximately 175 points of 10 minute sample data were retrieved from the historian for further analysis. Points included, amongst others, coal and air flows; pulverizer motor current; primary air temperatures; pulverizer discharge temperatures; hot, tempering, and primary damper positions; mill differential pressure; classifier speed; and unit load. The collected data was reviewed for reasonableness prior to use (mainly to discard erroneous data points from further analysis) but no special effort to cleanse or otherwise correct faulty data was made above what the plant does as part of their normal practice. As for the sampling rate, it was felt that the 10 minute data was sufficiently fast to capture operational or equipment changes that would manifest in longer periods (hours to days to years) pulverizer system degradation whilst minimizing the difficulty of handling very large data sets. For those features which occur over shorter periods (seconds to minutes) faster sampling would be required or these features could be “mapped” to a longer period (most likely in the DCS but potentially in the historian). Possible “mappings” include moving averages (mean, variance, others) and period determination for oscillatory processes, amongst others.

In addition to the data collected through the plant historian, a standalone vibration monitoring system was deployed and vibration data collected from each of the three pulverizers. Accelerometers were installed at the pinion drive shaft (Inboard Axial), the second intermediate shaft (Inboard Vertical) and the outboard end of the gearbox (Outboard Axial) (red arrows, Figure 6). Low cost industrial accelerometers were used and attached to the pulverizer using magnet mounts (Figure 7). With this configuration, the effective measurement frequency range is 30 to 120,000 CPM (0.5 to 2000 Hz). A National Instruments (NI) Compact RIO system was used to power the accelerometers and perform sampling (Figure 8). A data collection cycle was triggered every 30 minutes with sampling at 10,240 Hz for 10 seconds. All channels were sampled simultaneously. Waveform datasets were stored locally and periodically uploaded to a server. The datasets, one for each 30 minute period, are stored in NI’s
TDMS (Technical Data Management Streaming) format which facilitates importing into other programs for subsequent analysis.

Figure 6 – Accelerometer locations, cutaway courtesy of The Babcock & Wilcox Company.
Figure 7 – Pulverizer gearbox accelerometers.

Figure 8 – Vibration monitoring system.
CORRELATIONS

Advanced pattern recognition (APR) software can easily be adapted to varying process industries. Utilizing historical data of multiple variables, APR finds correlations among the variables to predict a current value of variable A based on the values of variables B, C, etc. This method can identify a variable that is deviating from an expected value, seen in Figure 9, as opposed to a hard-limit alarm method. These deviations can provide early indication of anomalies caused by various types of changes. This leads to preliminary indications of impending faults such as equipment wear or failure, process upset conditions such as plugging, and monitoring instrumentation failure or degradation. The pulverizer process lends itself well to pattern recognition since so many components of the system are related to each other.

![Figure 9: Early fault detection compared to hard-limit methods.](image)

Kernel regression is a statistical, nonparametric regression method in which historical data is used as a training baseline [2]. For a current point, the method finds a certain number of nearest neighbors and performs a weighted averaged to obtain a predicted value. A modified kernel regression method is used in the APR software used in this study, provided by ECG, Inc. This allows for faster fault detection by computing a weighted average. In typical regression methods such as linear regression, if a fault was introduced in one variable, the predicted values of the other variables may reflect that erroneous data because the method assumes error-free independent variables. This, however, is not common in process monitoring.

The historical data was pulled into a local data historian to use with the APR software. Models were built to determine correlations among the variables. Major variables for a coal pulverizer include the coal feed rate, mill DP, inlet temperature, motor amps, and air flow. These parameters should typically correlate well within a single system. An example can be seen below showing the correlations among these variables for Mill A (Figure 10). Three distinct air flow vs coal flow curves can be seen for Mill A. Typically, a single correlative curve would be produced. The correlations for Mill B and C are also shown below to display the slight differences each mill can present (Figures 11 and 12).
Figure 10: Mill A Major Variables.

Figure 11: Mill B Major Variables.
All process variables relating to the mills as well as Unit MW and boiler demand were included in building other models for each mill. These models include 31 variables, making them more complex. The training data for these models varied due to individual mill operation, but was roughly November 19, 2013 to January 29, 2014 for each of the three mills.

**PERFORMANCE ANOMALY DETECTION**

Data was provided for January and February 2012, January and February 2013, and August 2013 through March 17, 2014. The models are run against all data in the system and show a time period prior to the training data where mill DP and inlet temperature deviated from the training data and were higher than expected (Figure 13). This time period of November 1 thru November 24 was a time period the plant was testing PRB (Powder River Basin) coal on Unit 2. PRB coal typically leads to thicker bed levels and lower DP. PRB is also inherently higher in moisture content. This requires higher inlet temps to properly dry the coal. Unit 2 moisture for this period averaged 27.7% while the month of December averaged 7.7% moisture burning GLF coal. Figure 14 shows another example of the differences in operation with two different fuel types. This example mill is not located at the Greene County site, but shows differences in PRB coal vs. lignite coal.

Figure 14: Example mill PRB vs. Lignite.

Distributed with permission of authors by ISA 2014
Presented at the 57th Annual ISA POWID Symposium; http://www.isa.org
Monitoring these process control variables in real time allows plant personnel to see changes as they take place. When a change in the operation of the mills is detected with APR, control parameters may need adjusted on one or more mills to return the system to more optimal conditions. At the very least, this change in fuel can be tracked and the operators can see in real time the effect that different fuels may have on the unit.

**VIBRATION ANALYSIS**

Three accelerometers were installed on each mill in the study to monitor the gearboxes of the mills. Readings are taken at the pinions drive shaft (Inboard Axial), the second intermediate shaft (Inboard Vertical) and the outboard end of the gearbox (Outboard Axial). Major gear drive frequencies are shown in Table 3.

<table>
<thead>
<tr>
<th>Shaft or Gear Mesh</th>
<th>Cycles per minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor, input shaft</td>
<td>900</td>
</tr>
<tr>
<td>First intermediate shaft</td>
<td>565</td>
</tr>
<tr>
<td>Second intermediate shaft</td>
<td>136.8</td>
</tr>
<tr>
<td>Main vertical shaft</td>
<td>27.63</td>
</tr>
<tr>
<td>High speed gear mesh</td>
<td>24,300</td>
</tr>
<tr>
<td>First helical gear mesh</td>
<td>12,996</td>
</tr>
<tr>
<td>Second helical gear mesh</td>
<td>2,601</td>
</tr>
</tbody>
</table>

The overall vibration value (ips Pk) can be trended overtime to monitor changes in vibration levels for a particular piece of equipment. These changes can be due to fatigue wear, looseness, misalignment, or imbalance in rotating machinery such as the pulverizer gear box. This is typically an adequate method to monitor the equipment, but it cannot narrow down specific components or faults. An example of the overall vibration trend for Mill 2A IBA is shown in Figure 15. No specific gearbox or motor faults have occurred since the implementation of the added accelerometers. But monitoring the overall trend for step changes or gradual increases in overall vibration can be an early indicator of an impending problem.
Analyzing the frequency data can help differentiate between the different components inside the gearbox. Example frequency data can be seen below in Figure 16. Monitoring the energy or amplitude of known frequencies allows plant personnel to see if a specific component within the gearbox is deteriorating. This vibration information may also be used in the APR analysis.

Figure 16: Example spectral data from mill gearbox.

Distributed with permission of authors by ISA 2014
Presented at the 57th Annual ISA POWID Symposium; http://www.isa.org
CONCLUSION

Monitoring the pulverizers of a coal-fired electric generating plant is essential to keep maintenance costs down and unit efficiency up. Either by utilizing standard process variables associated with the mills, or with additional telemetry, a continuous monitoring process such as APR can ensure conditions within the mill do not change during operation. Differentiating between a process change, a faulty instrument, or an impending mechanical issue allows operators and maintenance personnel to adjust control parameters or schedule maintenance as needed. The content of this paper is an interim overview of the methods used for an EPRI study. The final results will be published through EPRI in a technical report.

REFERENCES

Call for Papers

The POWID Symposium is the largest conference dedicated to automation, control systems, and instrumentation in the power generation industry. The Symposium Program Committee is soliciting abstracts for full papers and for presentations. All paper submissions will be peer-reviewed to ensure high quality and originality. Symposium proceedings will be published in the conference proceeding for distribution to attendees and also made available on the ISA website. Suggested topics for submissions include:

59th ISA POWID Symposium Paper and Presentation Topics

Innovations, demonstrations, and application of instrumentation and sensors for Nuclear, Fossil, and Renewable Assets
- Including wireless sensors, equipment & component health monitoring, corrosion detection, heat rate & combustion performance monitoring, and steam quality sensing

Analysis, application, and optimization of process control and automation
- Changes in PID for flexible operation, model-based control, non-linear dynamic optimization, model-free adaptive control, and advanced approaches to control for complex systems
- Equipment and component analytics, diagnostics, and prognostics
- Validation and application of models, algorithms, and simulations supporting improvements in plant performance including but not limited to heat rate, process efficiency, integrated operations, environmental management, and security

Progress in Human Factors Engineering
- Progress related to alarm management, high performance human machine interface (HMI), control center design, and interaction with mobile devices

Review of advanced, transformational, and breakthrough sensor and control technologies that support the next generation power system
- Novel approaches for low cost pervasive sensing, innovative approaches to improve operations using digital technologies, and breakthrough concepts for process control

Analysis, developments, applications and case studies on Cyber Security for generating plants

For more information on the 59th ISA POWID Symposium and to submit an abstract, please go to www.isa.org/powersymp or contact:

General Chair
Susan Maley
smaley@epri.com

Program Co-Chair
Seth Olson
seth.olson@chevron.com

Program Co-Chair, Nuclear
Chad Kiger
chad@ams-corp.com

Program Co-Chair, Advanced Technology for Generation
Sydni Credle
sydni.credle@netl.doe.gov

Program Co-Chair, Hydro & Renewables
Rick Meeker
meeker@caps.fsu.edu

Program Co-Chair, Cybersecurity
Michael Firstenberg
MichaelF@waterfall-security.com

Program Co-Chair, Generation
Xinsheng Lou
xinsheng.lou@power.alstrom.com

• Abstract Due: 19 February
• Draft Paper Due: 18 March
• Final Paper Due: 20 May
• Rights and Responsibilities Form Due: 27 May
• Draft Presentation Due: 27 May
• Final Presentation Due: 10 June

Setting the Standard for Automation™
DR. GOODDATA (#8)

By Ronald H. Dieck
Ron Dieck Associates, Inc.
RonDieck@aol.com

Welcome again to Dr. Gooddata country. It is nice to have you back. I hope you enjoy the ride this time. Hold on, it will be a little bumpy.

Last time we completed the comparison of uncertainty analysis results obtained by both the US/ASME (or engineering) method and the ISO method. Please be reminded that the engineering method groups errors and uncertainties by their effect on test results. That is, the effects, and groups, are either random or systematic. The ISO method groups errors and uncertainties by the origin of the data available to estimate those uncertainties. That is, they are grouped as Type A if there is data to calculate a standard deviation for an uncertainty and Type B if not. Yea!!! A simple description of the two most widely accepted models for uncertainty analysis in the world! Direct from Dr. Gooddata to you!

Now let’s get complicated. Up to now, all our work has been on uncertainty analyses where all the uncertainties are in the same units. That is, they were all pressure (psi), temperature (F, R, K or C), length (meters, feet), etc. That’s fine for the simplest cases. However, the most important cases often require determining the uncertainty of a result, a (read this carefully) calculated result. (Horrors! We have to think, too?)

What is a result? Consider the result as a flow measurement with an orifice. There would be up stream and down stream pressure measurements (psi), fluid temperature (F), orifice diameter (in.) and maybe, time (sec.). Obtaining the uncertainty in each of these measurements does not result in knowing the uncertainty in the calculated result, flow.

Oh, what shall we do? We must propagate! That’s right, propagate. Not the biological kind, the mathematical kind. We must evaluate the effect on flow that errors in pressure, temperature, diameter and time have. Those errors, and their uncertainties, must be converted into the four corresponding uncertainties in flow units so they can be combined by root-sum-square. The evaluation of those effects on the result is called “uncertainty propagation.” The propagation process uses the equation for flow and the four parameters used in the calculation. It is complicated so we will first consider a simpler result.

For this first case, a calculation is required (an equation) but all parameters are still in the same units. The example we’ll use is the sum of two weights. How does uncertainty propagation figure into that situation? Both measurements, the weights, are in the same units and yet, uncertainty propagation is required because an equation is used to compute the test result. Let’s explore.

First, we need to write the equation (sometimes we don’t but we’ll cover that later) for the result. It is:

\[ W_T = W_1 + W_2 \]  

Where

\[ W_T \] = The total of the two weights  
\[ W_1 \] = The first test weight  
\[ W_2 \] = The second test weight

In this situation, we have the uncertainties for each of the test weights. That is, \( b_{W_1}, b_{W_2}, s_{\mu_1}, s_{\mu_2} \), represent the systematic and random standard uncertainties of weights one and two respectively.

How do we combine them? Let’s first consider the case where all errors and uncertainties are independent. The basic equation for any result is:

\[ R = f(X_1, X_2, \ldots) \]  

In that case, the fundamental equation for combining independent systematic standard uncertainties is:

\[ b_R = \sqrt{\sum \left( \frac{\partial R}{\partial X_i} \right)^2 b_i^2} \]  

That partial derivative (that’s right, calculus here) is called the sensitivity, or influence coefficient of a particular uncertainty source. It relates the parameter’s uncertainty to its effect on the calculated result.

The equation for combining independent random standard uncertainties is:

\[ s_{X_R} = \sqrt{\sum \left( \frac{\partial R}{\partial X_i} \right)^2 s_i^2} \]  

The exact same influence coefficients show up here too. The difference is that here we are dealing with random not systematic standard uncertainties.

How do these propagation equations get used to calculate the uncertainty of our total weight? Aha! That’s the question. Let’s see how that works!

For the sensitivity of \( W_T \) with respect to \( W_1 \) we calculate the partial derivative as follows:

\[ \left( \frac{\partial W_T}{\partial W_1} \right) = 1 \]  

(4)

For the sensitivity of \( W_T \) with respect to \( W_2 \) we calculate the partial derivative as follows:

\[ \left( \frac{\partial W_T}{\partial W_2} \right) = 1 \]  

(5)

(They don’t get much simpler than that, folks.)

Then, for the systematic terms, we utilize Equation (2) above. Expanded it becomes:

\[ b_{W_T} = \left[ \left( \frac{\partial W_T}{\partial W_1} \right)^2 (b_1^2) + \left( \frac{\partial W_T}{\partial W_2} \right)^2 (b_2^2) \right]^{1/2} \]  

This becomes:

\[ b_{W_T} = \left[ (1)^2 (b_1^2) + (1)^2 (b_2^2) \right]^{1/2} \]  

(7)

Since it is expected that the systematic standard uncertainty of the first weight is the same as the systematic standard uncertainty of.
the second and because we assumed they are independent, we have:

\[ b_1 = b_2 \]  

\[ b_{w_i} = \left[ (1)^2 (b_1)^2 + (1)^2 (b_2)^2 \right]^{\frac{1}{2}} = \sqrt{2} b_i \]  

Thus, if these systematic standard uncertainties are independent, the systematic standard uncertainty of the total weight is the square root of two times the systematic standard uncertainty of one weight.

How does this work for random components?

For the random components we have the identical partial derivatives of Equations (4) and (5) above. The Taylor’s series expansion yields an equation very, very similar to the one for the independent systematic case! Amazing, we don’t have to do partial differentiation again. Yea!

Specifically, combining the random standard uncertainties is also done by root-sum-square by expanding Equation (3) above as follows:

\[ s_{\bar{X},R} = \left[ \left( \frac{\partial W_1}{\partial W_1} \right)^2 (s_{\bar{X},1})^2 + \left( \frac{\partial W_2}{\partial W_1} \right)^2 (s_{\bar{X},2})^2 \right]^{\frac{1}{2}} \]  

As with the systematic case, we note that the two random standard uncertainties are the same. That is:

\[ s_{\bar{X},1} = s_{\bar{X},2} \]  

Therefore, we have:

\[ s_{\bar{X},w_i} = \left[ \left( \frac{\partial W_1}{\partial W_1} \right)^2 (s_{\bar{X},w_1})^2 + \left( \frac{\partial W_2}{\partial W_1} \right)^2 (s_{\bar{X},w_2})^2 \right]^{\frac{1}{2}} = \sqrt{2} s_{\bar{X},w_i} \]  

That is, the random standard uncertainty of the total weight is the square root of two times the random standard uncertainty of one weight. That’s the same answer we got for the systematic terms.

Now, let’s reconsider the systematic terms. When we weigh two test weights on the same scale, it is reasonable to conclude that the systematic error for the first weight will be the same as the systematic error for the second weight. This means that the errors are “correlated.” Whoa! That’s a new term. What does that mean? How will that change our analysis of the uncertainty for the total of the two weights?

We’ll find out next time.

Until then, remember, use numbers, not adjectives!

---

**ISA POWID Executive Committee Update**

The ISA Power Industry Division (also known as POWID) is organized within the Industry and Sciences (I&S) Department of ISA to provide a means for information exchange among engineers, scientists, technicians, and management involved in the use of instrumentation and control in the production of electrical power by any means including but not limited to fossil and nuclear fuels. The POWID Executive Committee (EXCOM) administers the activities of the division. The Executive Committee normally meets three times per year, traditionally in late winter or early spring, at the POWID Annual Symposium in June, and at or near the timeframe of the annual Fall ISA Leaders’ Meeting. POWID Executive Committee meeting minutes are available on the ISA POWID website at: [https://www.isa.org/division/powid/leadership/](https://www.isa.org/division/powid/leadership/). You must be a POWID member to view these minutes.

Photos above by Paula Labbe: POWID Executive Committee Meeting on Sunday June 7th
The ISA standards supporting the commercial nuclear power industry fall under the purview of SP67. The committee and its several subcommittees met at the ISA POWID Symposium in Kansas City in June of this year. The meetings were well attended and addressed many current topics. Some highlights:

- ISA67.01 provides guidance for transducer and transmitter installations. They are working on a revision to the 2007 standard and are targeting a November ballot. Bill Barasa of Sargent & Lundy chairs the group.
- ISA67.02 focuses on sensing lines and tubing requirements. The standard was issued in 2014, and they are evaluating some SMR and AP1000 issues for inclusion in the next revision. The chair is Klemme Herman of Bechtel, who has guided the group to an ISA Award for outstanding work!
- ISA67.03 is about detection of small leaks in the reactor coolant system. With the advent of highly reliable fuel, this is a challenging area where technology is limiting. The group is currently inactive, awaiting the result of research into viable approaches.
- ISA67.04 addresses setpoints. There are two related documents: the standard – ISA67.04.01 – and the recommend practice – ISA67.04.02. Currently the group is working to resolve issues with the draft regulatory guide the NRC has issued for comment. They are also looking at adding guidance on how to calculate As Found and As Left limits. Pete VandeVisse of DC Cook has resigned from the chair, and several candidates are being considered for his replacement.
- ISA67.06 has performance monitoring as their scope. An active group chaired by Brent Shumaker of AMS, they are incorporating comments into the 2002 standard and will ballot a revision this year. They are also looking into requirements for extending surveillance intervals, and how performance monitoring could help to justify longer times between tests.

I’m working to make our standard meetings more accessible to those on limited travel budgets by using conference calls and WebEx links, and I’m working to add more online content to the web sites for SP67 and the subcommittees. I’m looking forward to continuing to add value to the industry, and to mentoring new engineers as they start to enter the area of standards use and development. We welcome additional participation in all our committees. More information about the ISA67 Committee and its activities can also be found at the ISA67 committee website www.isa.org/isa67/.

Hello, POWID members! The ISA 77 committee recently held a physical meeting after the ISA POWID Symposium in Kansas City. The meeting minutes will be posted on the ISA 77 committee web site. The ISA 77 committees continue to make progress in the revision/drafting of multiple standards. Both the ISA-77.42.01 Feedwater Control – Drum Type and ISA 77-82.01 SCR Instrumentation and Control Standard have completed ISA 77 balloting and both documents have been approved with comments. Based on the committee comments, both documents will start a revision cycle to resolve these comments.

The ISA 77 committee will soon vote on approving the scope and purpose for creating a new document titled “Definitions and Basic Control Concepts”. The purpose of this technical report is to establish uniform terminology for the ISA 77 Fossil Fuel Power Plant series standards and to explain commonly used control concepts, which are not described in detail within the ISA 77 documents. The technical report serves as a guideline for suppliers, owner operator, and engineers preparing design or system configurations.

A report was given that NERC has issued an industry advisory requesting all generator governors have their frequency droop logic enabled and calibrated for a maximum of 36 mHz deadband and a maximum of 5% droop. The national grid stability has been on the decline as many existing steam generators have been decommissioned. NERC would like to see the industry voluntarily comply with NERC’s advisory.

The ISA 77 subcommittee met the next day to resolve committee comments and to work on document drafts. The documents that were reviewed include:

- ISA-77.00.01 Definitions and Basic Control Concepts (new document)
- ISA-77.13.01 Steam Turbine Bypass Systems (in revision)
- ISA-77.14.01 Steam Turbine Controls (in revision)
- ISA-77.22.01 Power Plant Automation (new document)
- ISA-77-42.01 Feedwater Control – Drum type (in revision)
- ISA-77-82.01 SCR Instrumentation and Control Standard (in revision)

If you are interested in any of these topics and would like to contribute in the development of these standards, please contact the respective committee chair. Most committee meetings are held via web meeting so travel is not required. Your technical input is greatly appreciated.

The ISA 77 committee next meeting is scheduled for October 21 at 11:00am ET via a Live Web meeting. The ISA 77 committee meetings are open to members and guest. If you wish to become active with ISA 77 or have any suggestion/comments, please feel free to contact Bob or Dan dan.lee@us.abb.com. More information about the ISA77 Committee and its activities can also be found at the ISA77 committee website www.isa.org/isa77/.
POWID Membership Recognition
February 2015 through June 2015

By: Dan Lee
POWID Membership Chair

The Power Industry Division (POWID) of ISA continues to grow. We would like to welcome all of our new POWID members and our new student POWID members. We hope you will take advantage of everything POWID has to offer for your work and your career including the opportunity to network with power industry professional colleagues across the globe. Our primary goal is to provide a means for information exchange among engineers, scientists, technicians, and managers involved in instrumentation, control and automation related to the production of power. POWID is active in developing industry safety and performance standards, working closely with two ISA standards committees—ISA67, Nuclear Power Plant Standards, and ISA77, Fossil Power Plant Standards. The Division also conducts technical training and sponsors awards for power plants and individuals advancing instrumentation and control within the power industry. POWID welcomes your involvement in our division activities. Opportunities are available to provide information for our newsletter and web site, to develop papers for presentation at our annual conference, and to participate in our division’s management structure. It’s a great way to get to know other industry professionals, to gain professional recognition, and to keep informed!

Welcome New POWID Members

Neil Agarwal, Automation Engineer - CDM Smith
Mr. Kelly Ihenegbe Agbonaubare, Engineer
Mr. Nassr S. Al-Alawi, Senior Control & Automation Engineer - Petroleum Development Oman
Robert Alexander, Instrumentation & Controls Specialist - Barr Engineering Company
Hamad Al-Fouzan, Engineer - Saudi Aramco
Robby Angelloz, Jr., Director - The Newton Group
Mr. Raghv K. Avali, Advanced I&C - Westinghouse Electric
Aivar Avalo, IT Architect - Eesti Energia AS
John Ballentine
Simanta Bora
Kenneth Brackin
Jaime Briones, Ingeniero I&C Sener Ingenieria Y Sistemas
Ben Chorpening, Mechanical Engineer - NETL
Mr. Scott W Coleman, Marketing Manager - Owl Computing Technologies
Mr. Herve Daussien, Managing Director - COESSI
Greg Doerges, Director - Persev Automation Ltd.
Ryan Ebel, Electrical Engineer - Lyondellbasell
Michael Fleenor - Sega Inc
Mr. Diego Andres Forero
John Ballentine
Simanta Bora
Kenneth Brackin
Jaime Briones, Ingeniero I&C Sener Ingenieria Y Sistemas
Ben Chorpening, Mechanical Engineer - NETL
Mr. Scott W Coleman, Marketing Manager - Owl Computing Technologies
Mr. Herve Daussien, Managing Director - COESSI
Greg Doerges, Director - Persev Automation Ltd.
Ryan Ebel, Electrical Engineer - Lyondellbasell
Michael Fleenor - Sega Inc
Mr. Diego Andres Forero
Robert Alexander, Instrumentation & Controls Specialist - Barr Engineering Company
Hamad Al-Fouzan, Engineer - Saudi Aramco
Robby Angelloz, Jr., Director - The Newton Group
Mr. Raghv K. Avali, Advanced I&C - Westinghouse Electric
Aivar Avalo, IT Architect - Eesti Energia AS
Mr. Luc Jean Pau Limoges
Mr. Raymond Howard Linden
Jerry Longworth - Compugen
Ms. Shreyas Murthy - Dayananda Sagar College of Engineering
Mr. Siddharthan Thamotharan - Valliammai Engineering College
Mr. Siddharthan Thamotharan - Valliammai Engineering College
Ms. Lini Thomas
Mr. Rajapandiyan Venkatesan - Valliammai Engineering College
Ms. Adithi R Waikar - Dayananda Sagar College of Engineering
Mr. Jamie Waring

Welcome New POWID Students

Kishore Kumar Banda - Dayananda Sagar College of Engineering
Mr. Jorge Williams Bernardo Lemos
Mr. Walace Fernandes Carvalho - SENAI - Vitória
Mr. Claudiney Rosa Da Sívia DE Souza
Mr. Enio Jose De Oliveira Nogueira Neto
Joe Ditsworth
Ms. Lakshmi Kumanan - Valliammai Engineering College
Mr. Chandan Kumar - Dayananda Sagar College of Engineering
Mr. Luc Jean Pau Limoges
Mr. Raymond Howard Linden
Jerry Longworth - Compugen
Ms. Shreyas Murthy - Dayananda Sagar College of Engineering
Mr. Siddharthan Thamotharan - Valliammai Engineering College
Mr. Siddharthan Thamotharan - Valliammai Engineering College
Ms. Lini Thomas
Mr. Rajapandiyan Venkatesan - Valliammai Engineering College
Ms. Adithi R Waikar - Dayananda Sagar College of Engineering
Mr. Jamie Waring