Director’s Message

By Don Labbe, PE and ISA Fellow
ISA Power Industry Division (POWID) Director
Invensys Operations Management

Welcome to the Summer 2011 edition of What’s Watt, the Power Industry Division (POWID) tri-annual newsletter. The POWID 2011 Symposium was held in Charlotte, North Carolina, USA, from 6-8 June and featured high-level keynote speakers addressing industry critical issues, and an outstanding technical program of 75 technical papers and presentations on timely automation topics impacting the power industry. Our new Director-elect, Denny Younie, served as the general chair, and Tim Hurst led the technical program efforts with the support of Tim McCreary as co-program chair. They were assisted by David Roney and Terri Graham serving as technical paper and program coordinator. Mike Skoncey coordinated the Honors and Awards Luncheon and the distribution of many deserving ISA POWID awards described in this newsletter. Joe Vavrek coordinated event publicity and doubled as a photographer for the event, along with Paula Labbe. Selected photos are included in the newsletter. There were 14 session developers, each with a specialty in the power industry: Jason Makansi, Tim Hurst, Gordon McFarland, Chad Kiger, Bob Queenan, Tim Richardson, Jim Batug, Tom Stevenson, Roger Hull, Dr. Xinsheng Lou, Seth Olson, Steven Freel, Dr. Edson Bortoni (all the way from Brazil), and Bob Hubby. Our webmaster, Gary Cohee, kept the POWID website loaded with the latest symposium information.

With participation from Mexico, India, Korea, China, Brazil, France, and Japan, the symposium had the 2nd highest number of attendees in the last ten years. Thirteen major sponsors took part in the symposium, demonstrating the latest offerings of automation technology. Based on attendee feedback, the symposium met or exceeded expectations.

The 75 papers and presentations were produced by over 125 authors and co-authors. Our technical paper review coordinator called on over 65 technical paper reviewers to conduct the peer review of all technical papers. Following the symposium, the ISA 67, Nuclear Power Plant Standards Committee, and ISA77, Fossil Fuel Power Plant Standards Committee had their major annual meetings. Considering our program committee, keynote speakers, authors and co-authors, reviewers and committee members, hundreds of industry volunteers were involved in the production of this incredible symposium.

This is what makes ISA POWID unique, volunteers sharing their knowledge and experience to better the power automation industry. Our industry is vital to providing affordable, secure energy for the world. Through ISA and the POWID symposium each of us are em-POWID to contribute to this grand endeavor.

Upcoming ISA and POWID International Conferences

ISA Automation Week
Technology and Solutions Event
Arthur R. Outlaw Convention Center, Mobile, Alabama, USA
17–20 October 2011

55th Annual ISA POWID Symposium
Renaissance Austin Hotel
Austin, Texas, USA
3–8 June 2012
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A Request From the Newsletter Editor

By Dale Evely, PE
POWID Newsletter Editor

The goal that POWID works toward is to publish three newsletters each calendar year, with the basic schedule of being published in March (spring), August (summer) and December (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 US. Since the newsletter is only as good as its content, I would like to encourage each of you to submit technical articles as well as other articles of broad interest for publication in future newsletters. Technical content that is specific to the automation side of the power industry is what provides the best benefit to our membership, so 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. If the article is not authored by you, please provide us with a statement that you have cleared publication of the material with the author. I look forward to hearing from you.
Dr. GOODDATA (#2)
By Ronald H. Dieck, Ron Dieck Associates

Introduction and Review:
Welcome back! This is another in the series of Dr. Gooddata's columns on the characterization of "good" data. In the last Newsletter we discussed common definitions for "good" data. Phrases such as "right on", "nominal", and (my favorite) "astonishingly close" were given as definitions of "good" data. "Bad" data was described as unexpected test results that disprove the experimenter's theory or as data taken with "bad" instrumentation. All the aforementioned (I like that word) definitions are "subjective."

What is "Good" or "Bad" Data?
Here are just a few additional definitions of "good" and "bad" data:
- "Good" data is data taken with an instrument calibrated in the test environment.
- "Good" data is taken with an instrument properly ranged.
- "Good" data is obtained after evaluation of the instrument accuracy! That is an absolute requirement.
- "Good" data is obtained by comparing test results to a base line.
- "Good" data is "spot on." That's a new one on me. How big is this spot anyway? What shape? Is it free hand or computer drawn (thus making it instantly correct [a little sarcasm there])?

Some of those were really thoughtful; but let's now move to definitions for "good" or "bad" data that are strictly objective and more general.

Acceptable Definition for "Good" Data?
What then, is "good" data? To understand the correct answer to that question we first must consider why tests or experiments are conducted! That's right, we need to think about what we are going to do before we do it!

Why are "tests" conducted? They are conducted to obtain knowledge about some physical process. Remember, the scientific method (theory, experiment or test, analyze, conclude) needs test data from which valid conclusions can be drawn. So, it seems we need a definition for a "valid" conclusion.

One fine definition for "valid" conclusions is as follows: a "valid" conclusion is one that is unambiguously supported by test data! Ha! We are right back at defining the quality of our test data, this time as data which unambiguously supports a test result! Seems like circular reasoning, doesn’t it?

Think of it this way: valid conclusions are drawn from test data that, despite the errors it contains, provides unambiguous support for the conclusion. For those conclusions to be unambiguous, it is necessary that the differences or levels observed in test data be in excess of that which could have been obtained because of measurement errors alone. Wow! We are about to stumble on something profound here. We may actually be getting close to a definition for "good" data! Be careful; you may be surprised by the definition from Dr. Gooddata!

"Good" data may be defined as follows: "good" data is test data whose errors do not influence the drawing of valid test conclusions. "Good" data will not have measurement errors so large that those errors alone could yield the test result observed. Conversely, "bad" data has errors so large that they could account for the test result observed. Seems simple, doesn’t it? However, we are admitting we need to compare numbers! Aarrggghhh! Kepler revisited! Whoa! We are slipping into some unknown territory here. Can it be that we need numerical definitions for "good" data? "Horrors! How can I manipulate things to come out the way I want if I have to develop numbers too? I’d rather just hand wave." (Sorry, I got too personal there.) (Note that both “good” and “bad” data are defined in the context of their use, not the predisposition or prejudices of the experimenter.)

If these somewhat simple definitions for “good” and “bad” data are acceptable, we are then left with the need to define the limits of the influence of the measurement errors that are always present! Also, we need to define measurement error itself.

What is Measurement Error?
What is measurement error? The most common definition for measurement error is “the difference between the measured value obtained and the “true” value. That is, $\text{Error} = (\text{Measured} - \text{True})$. “I know what I got”, says the novice experimenter, “what is this ‘true’ value?” Yes, Charlotte, we are left again with the need to develop another definition, one for the “true” value. After we have a definition for the “true” value, only then can we understand the definition for measurement error. (Sigh! Will this chain of definitions never end?)

What is the “true” value? It is the value or test result that would have been obtained by a national standard laboratory or the value of some physical standard. Physical standard "true" values include the atomic clock and the triple point of water. They are "true" by definition. Also by definition, the test result certified by a national standard laboratory is “true.” That is, all agree to that reference or “true” value.

Be careful to never define the “true” value as the result you got. It isn’t. Remember that we never get the “true” value in a test measurement process. There is always measurement error that alters our test result so it does not yield the “true” value.

If then the definition for measurement error is the difference between what we get in our test and the “true” value, how can we know how valid our conclusions are if we don’t know the “true” value? (Very important questions here, pay attention.) If the measurement errors are sufficiently small so that they don’t influence the decision process that is based on the test results, we can obtain valid conclusions. Or, stated another way, if the measurement errors are sufficiently small, the difference between our test result and the “true” value is insignificant as it pertains to our decision process.

Note in all the above the extreme emphasis on decisions. Making decisions is why we conduct tests; there is no other reason. Uncertainty analysis will provide an estimate of how far away from our test result we could expect the “true” value to be. The need for measurement uncertainty analysis is based on the need to reach valid conclusions and make correct decisions. If you don’t care about those two things, forget uncertainty analysis. (Ignorance is bliss.)

What kind of measurement errors can influence our decisions?

Types of Measurement Errors and Their Effects:
There are three major types of measurement errors. Do you know what they are? Do you have any candidates? Send in your ideas to Dr. Gooddata RonDieck@aol.com and maybe you’ll see your idea here in print!

Next time, Dr. Gooddata will cite and define the three major error types. (I can hardly wait!) You probably know two of them. The third will be a surprise but a real error type. I hope to see you here then. Remember, use numbers, not adjectives.
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Self-regulating and integrating processes respond differently and require the use of different tuning methods. It is therefore important when tuning a controller to know if the process is an integrating or a self-regulating process.

Before we answer the question about throttle pressure, let’s begin by reviewing self-regulating and integrating process types. To analyze the dynamics of a process in a control loop, we typically place the controller in manual, make a step change in the controller output, and see how the process responds.

**Self-Regulating Processes**

After a step change in controller output, the process variable of a self-regulating process moves toward a new level where it gradually settles out. A self-regulating process has an internal method of regulating its process variable to balance the change in controller output. The process naturally seeks its point of equilibrium. Most processes are self-regulating. A common example of a self-regulating process is a feedwater valve controlling the flow of feedwater into the boiler. If the valve is opened by a few percent, the feedwater flow rate will increase and then stabilize at a new level.

**Integrating Processes**

After a step change in controller output, an integrating process responds with a steady ramp instead of reaching a stable value. The process variable will only stabilize if the controller output is returned to its original position, as shown in Figure 2. A common example of an integrating process is liquid level in a tank. If we change the balance between flow in and flow out, the level will keep on ramping up or down.

**Differences in Tuning**

Control loops for self-regulating processes are relatively easy to tune compared to integrating processes. Control loops for integrating processes can overshoot badly and can become oscillatory very quickly. Because of the fundamental difference in response to a step change in controller output, we have to treat self-regulating and integrating processes differently when tuning their controllers. This begins with applying different tuning rules. And while self-regulating processes require both proportional and integral control modes for good control performance, integrating processes rely heavily on the proportional control mode and much less on the integral control mode.

**Throttle Pressure**

Throttle pressure control loops can be a challenge to understand and tune because under certain conditions they act like self-regulating processes, while other times they act like integrating processes.

**Throttle Pressure in Turbine-Following Mode**

In turbine following mode, the throttle pressure controller manipulates the governor valves to control throttle pressure, and the unit load controller manipulates the firing rate to control megawatts produced.
We can place the throttle pressure controller in manual and step its output up by a few percent to determine the process type of throttle pressure (Figure 4). The governor valves respond to the step by opening a few percent and admitting more steam to the turbine. This increases the MW produced, and decreases the throttle pressure. The unit load controller responds to the increase in MW produced by decreasing the firing rate. This further decreases the steam pressure. The decrease in steam pressure results in less steam being admitted to the turbine through the governor valves (still at constant position). Because the MW production decreases, the unit load controller increases the firing rate until the MW produced and the firing rate are back at the levels from before the test. However, the throttle pressure will now be lower, but the more open governor valves admit the same amount of steam to the turbine as before the test.

This is a complex and interesting set of dynamics, but the final result of our step test is that the throttle pressure stabilizes at a lower value. So, in turbine-following mode, throttle pressure is a self-regulating process.

Imagine that we could place the throttle pressure controller in manual but leave the load controller to control megawatts (most front-end controls do not allow this – for good reason). As before, we want to step the pressure controller’s output up by a few percent to see what process type the throttle pressure is. If we increase the pressure controller’s output, the fuel flow increases and more steam is produced in the boiler (Figure 6). This increases the steam pressure which increases the steam flow through the turbine and consequently increases the MW generated, but because our load controller is still in auto, it throttles down the governor valves to keep the generator load constant. So the additional steam has nowhere to go.

This situation is similar to a tank with more liquid flowing in than out – the tank level increases. In the case of the boiler and turbine, the steam pressure increases. As long as we have a mismatch between steam produced in the boiler and steam consumed by the turbine, the steam pressure keeps on increasing. This is the way an integrating process behaves. So in boiler-following mode, throttle pressure is an integrating process, with all the control challenges associated with an integrating process.

Tuning Implications
Because throttle pressure is an integrating process in boiler-following mode, but a self-regulating process in turbine-following mode, the two modes require different tuning settings – often implemented in two different controllers.

In boiler-following mode, the throttle pressure control loop has a tendency to oscillate, similar to the problem experienced with level control loops. This is bad for unit stability, because it causes the fuel flow to oscillate, which causes almost all other critical control loops to oscillate too.

Integral control mode is the primary source of oscillations in integrating processes. Therefore a tuner should take care not to use too much integral when tuning the throttle pressure controller in boiler-following mode. The tuning problem is compounded by the relatively slow dynamics of the boiler. This can cause tuners to use an excessively high controller gain and further destabilize the control loop. If boiler-following mode is being used, it may be beneficial to “help” the throttle pressure controller with a feedforward from unit load demand.
Conclusion
Although most pressure control loops contain self-regulating processes, throttle pressure is an exception being an integrating process when the unit runs in boiler-following mode. This requires special tuning considerations to ensure throttle pressure and fuel flow remain stable. Incorrect tuning of the throttle pressure controller can cause oscillations in all critical control loops around the boiler.

About the Author
Jacques Smuts is the founder and principal consultant of OptiControls Inc. in Houston, Texas. He delivers control loop optimization services and training to industrial companies worldwide and has more than 20 years of experience in process control, including 7 years in power plants.

Jacques has developed controller tuning and loop performance monitoring software that ranks among the top three applications in their class. He has trained hundreds of engineers and technicians in the field of process control, and has optimized thousands of control loops.

Jacques is an authority on control loop performance monitoring and optimization and has dedicated his career to improving the performance of industrial controls though his services, training, literature, and software. He regularly posts articles on process control at http://blog.opticontrols.com.

He can be reached at jsmuts@opticontrols.com.

ISA symposia: intersections of knowledge and networking
By H. Leo Staples, Jr., 2011 ISA President and ISA POWID Excom Member

When we ask ISA members what they are looking for from ISA, we consistently hear “networking” and “knowledge.” There are a variety of ways in which ISA provides networking and knowledge opportunities—the most remarkable being division symposia.

I joined ISA in 1989, and like most members, I joined a division. Working in the electric power industry, I joined ISA’s Power Industry Division (POWID). I enjoyed reading the newsletters, but I did not participate in division symposia.

Years later, when I attended my first POWID symposium, I learned just how much I had been missing. The technical papers were outstanding, and I found a great deal of value in networking with other power industry professionals. I brought back knowledge from the POWID symposium that I could apply at my company right away.

A few examples are: My company applied lessons that I learned in providing cost-effective monitoring of ambient temperature in a remote control room. I applied information I learned from a presentation to help teach drum level measurement and control to power plant staff members. We began incorporating best practices learned at symposia in our own control system replacement projects.

I am proud to say that at the end of 2011, I will have attended each of ISA’s division symposia—at least once. I still find useful information that enables my company to improve operations. I also enjoy meeting the technical leaders in our profession. I find that being with the best in our profession brings out the best in me.

I would like to take this opportunity to inform you of the many choices of ISA division symposia. I am confident you will make connections with other professionals and find a wealth of information at these events that can help you and your colleagues excel in your careers. I challenge you to explore at least one of the following division symposia to find the knowledge and technical support opportunities that best fit your company’s needs.

- Analysis Division (AD) Symposium (met 10-14 April): A forum for the discussion of new and innovative processes and other analytical techniques, developments, and applications. The program included a training course developed and presented by AD members.
- ISA Safety & Security Symposium (met 13-14 April): This event not only focused on Safety Instrumented Systems (SIS) topics, but it also included material on cybersecurity and associated challenges in designing and implementing SIS and process automation solutions.
- ISA Fugitive Emissions-LDAR Symposium (met 17-19 May): The air compliance industry’s only conference whose sole purpose is to share best practices for Leak Detection and Repair and Directed Inspection and Maintenance programs.
- ISA POWID Symposium (met 5-10 June): Automation professionals provided information on the latest innovations in controls, instrumentation, cybersecurity, Smart Grid, regulatory issues, and variable energy technologies that impact the power generation delivery systems.
- International Instrumentation Symposium (met 20-24 June): Industry experts presented papers on important topics, including electronic instrumentation, wireless technology, cybersecurity, aerospace systems, process measurement and control, virtual instrumentation systems, laser and electro-optics instrumentation, geo-science and remote sensing, and more.
- Water & Wastewater and Automatic Controls Symposium (met 22-23 June): Industry experts covered topics, including water and wastewater processing, water collection, water treatment, and the latest controls equipment and instrumentation.
- Marketing & Sales Summit (7-9 September): Automation professionals will cover a variety of sales and marketing topics designed to get you ready for Customer 2.0. Topics include public relations, search engine optimization, and product management.

Division symposia are annual events. Please check the conferences and events calendar regularly to stay informed about ISA’s latest events. If you missed the event this year there is always next year to look forward to.
ISA POWID Symposium 2011—another successful conference

By Don Labbe and Denny Younie

The symposium committee put together an intense technical program with 14 sessions spanning 2 ½ days (6-8 June). The following is a quick summary of what you missed if you were unable to attend:

Keynote addresses:
• Welcome Address by Bob Lindemann – ISA President Elect
• 1st keynote: Christopher Guith – VP for Policy at the Institute for 21st Century Energy, US Chamber of Commerce- FACING OUR ENERGY REALITIES: A Plan to Fuel our Recovery

Industry Roundtable with Keynote speakers Christopher Guith, Ken Thomas, Dr. Robert Peltier, Editor in Chief Power Magazine, and host Jason Makansi, noted author. The roundtable focused on many challenging issues facing the U.S. power industry based on their wide perspectives.

Honors & Awards luncheon hosted by Mike Skoncey with Keynote speaker W. Brian Hiatt, Concord City Manager, providing a colorful history of Concord and the many attractions.

Monday Sessions:
• Session 3A: New Nuclear Plant Status and Issues
• Session 3B: Fossil Power and the Environment
• Session 3C: Role of Wireless
• Session 3D: Knowledge management-Nuclear Fleet

Tuesday Keynote: Perry Pederson – Security Specialist U.S. NRC – NRC Cyber Update

Tuesday Sessions:
• Session 4A: NRC & Digital Platforms
• Session 4B: Evolving Roles of Gas Turbines
• Session 4C: Cyber Security, Part 1
• Session 4D: Fleet Centers of Excellence
• Session 5A: Nuclear Plant Modernization
• Session 5B: Fossil Plant Performance, Part 1
• Session 5C: Cyber Security, Part 2

Wednesday Sessions:
• Session 6A: Simulation – Key to Success
• Session 6B: Fossil Plant Performance, Part 2
• Session 6C: The Smarter Power Industry

There were 75 technical presentations: 46 based on technical papers and 29 of the presentation only style. A CD was distributed at site with 33 of the final technical papers. The presentations are posted on the ISA POWID web site. The technical papers are being incorporated into the ISA Technical Paper database.

235 people attended the Symposium and it featured 15 sponsors and 15 additional exhibitors along with a large number of additional Booth and Table Top exhibits. This set a new record sponsorship level for the event. Information on the latest in automation products and services were available. Through our vendor support both the technical quality and the financial success of the symposium was greatly enhanced.

We had the 2nd highest number of registrations in the last 10 years with international participation from Mexico, India, Korea, China, Brazil, France, and Japan.

Following the symposium there were meetings of ISA 67, Nuclear Power Plant Standards committee, and ISA77, Fossil Fuel Power Plant Standards Committee. ISA also conducted three short courses during the event.

The logistics support for this major event was most ably provided by ISA staff, led by Rodney Jones.

Thanks to the support of many, ISA POWID 2011 was a major technical and financial success.

For program details, please visit www.isa.org/honors

17 October 2011
6:00 p.m.
The Battle House Renaissance Hotel & Spa
Mobile, Alabama, USA
2011 POWID symposium photo collages
Photos by Paula Labbe and Joe Vavrek; Collages assembled by Paula Labbe

Bob Lindeman, ISA President-Elect, Welcoming Remarks

The Opening Night Reception - participants and families enjoying some evening time
Keynote Address by Christopher Guith, VP of Policy at the Institute for 21st Century Energy, US Chamber of Commerce

Nuclear Power Industry Keynote Address – Mr. Ken Thomas, Industry Consultant
H&A Luncheon Keynote - W. Brian Hiatt – Concord City Manager: history of Concord N.C. and current attractions

Tuesday Keynote Session: Perry Pederson – Security Specialist U.S. NRC- ISA POWID Controls and Instrumentation Conference; NRC Cyber Update
Industry Roundtable led by Jason Makansi with Keynote speakers Christopher Guith, Ken Thomas & guest Dr. Robert Peltier, Editor in Chief Power Magazine
A Spouse’s Point of View
Concord North Carolina didn’t ring a bell, but the Charlotte Motor Speedway did. I saw the huge complex for the first time from the air, as we approached the Charlotte Airport. I had no idea that the speedway was in Concord, or that it would be so close to our hotel, The Embassy Suites.

The ISA POWID Conferences have always been held in exciting and interesting locations. Places, I’d probably never see or explore, if it wasn’t for these conferences. This year, I would give the Embassy Suites Hotel my vote for the “Best Buffet Breakfast” award. The buffet was held in the main lobby every morning. A full array of colorful fresh fruit, made to order omelets, and every other breakfast food you could possible think of, was offered. This banquet was included in the room rate. The hotel staff was courteous and very helpful when it came to directions, or selecting a good restaurant to get a flair for the local culture and cuisine. As you enter the hotel, you were greeted with a bright neon art sculpture that towers in a large atrium surrounded by a water fountain. Various glass art displays were featured throughout the lobby.

A spouse’s room was set up for us in the Kitty Hawk conference area on the second floor. All spouses, and the families of conference participants, were welcome. This is more than a gathering place, it’s where old friends reunite, and new friendships are formed. Over the years, I have made some incredible friends here. Year to year we look forward to being together, and catching up on the past year’s events. We come from different backgrounds, different parts of the United States and abroad….So different, yet we are very much alike. We come together as friends. It’s where young parents seek, and casually get advice, from people who have been there. We discuss upcoming weddings, empty nests and how to deal with it, and we even got to help with the blue prints of a retirement home being built by one couple attending the conference. They were happy to receive new ideas and suggestions on decorating. In the spouse’s room, plans for the week are made….Where to go? What to see and explore?

I never know what is in store for me when I go to the ISA conferences. Once, I found myself floating quietly, 3600 feet above the Arizona desert, in a hot air balloon at sunrise. Then enjoying a champagne breakfast when we landed, in the desert, far from ev-
Everything except nature. Another time, I rode a trolley car through the streets of San Francisco, topping the afternoon off with lunch on Pier 39, overlooking a group of playful seals. I strolled through the garden of Andrew Jackson’s Tennessee Plantation, and saw a fig tree for the very first time. I visited the Jack Daniel’s Distillery, and discovered how whiskey was made. The list goes on and on. The best part of this is that these new experiences were all shared with ISA friends.

I guess it shouldn’t surprise me that this year, I found myself zipping around the Charlotte Motor Speedway, going 100mph, with a retired race car driver! It was amazing! I first heard about this tour from one of the ISA members and his wife, who took the tour on a previous visit to North Carolina. I found myself harnessed in, and zooming around the 24 degree pitched turns. Anyone who knows me knows I take my camera everywhere I go. The racetrack was no exception. My seat belt was so tight that I was anchored in place, but I managed to click a few fun photos while on the track, some very crooked, as we made our way around the turns. I was riding shotgun. The track was 1 ½ miles long, and we made the loop in a blink of an eye. The driver asked how my pictures came out. I replied, could be better. He put the pedal to the floor, and we were off again! This time, I got some awesome photographs.

After a full tour of the Charlotte Motor Speedway, including a photo session in the Winner’s Circle, we drove to another race track, The Z MAX Drag Strip. This was a ¼ mile drag strip, where I found myself holding onto my hat, as the green signal light gave us the OK to go. I thought… me, on a drag strip?? No way, but here I was having the time of my life! Next came the dirt track, it was a red, clay track, dry, and dusty, so we didn’t drive on it. Still, I got to see what it was like. Now, I have another incredible adventure to add to my long list of ISA conference experiences.

We did so many great activities while in North Carolina. There was truly something for everyone. We explored small, historic, towns. Visited their antique, yarn, bead, and quilt shops. We noticed the unique, old style buildings, and the pleasant southern charm of its people. We ventured into downtown Charlotte, surrounded by skyscrapers. We walked through a Modern Art garden on a beautiful sunny day. We enjoyed lunch at an upscale restaurant, and completed our visit to the city by enjoying a few hours at the Mint Museum, right in the heart of Charlotte.

As this conference ended, there was no shortage of laughter or smiles. We were leaving with memories that will last a lifetime, memories that were made with friends we only see once a year. So until the next time, I wish you all the very best.

Other Local Attractions
ISA POWID Awards Presented
By: Mike Skoncey, ISA POWID Honor & Awards Chair

During the annual POWID Honors & Awards luncheon, which was held during the ISA POWID Symposium this past June in Charlotte, North Carolina; awards were presented to recognize individuals and a facility as described in the following.

This year’s Achievement Award recipient was Jacques Smuts, who started his career in the power industry after graduating from the University of Johannesburg in 1990. Jacques cofounded a company called ControlServe in 1997 specializing in control loop optimization software called TuneWizard and taught a two day course on tuning in various global locations. In 2001, Jacques moved to the United States when PAS acquired TuneWizard and the Training portion from ControlServe. While at PAS, Jacques worked as their Director of their process control business unit and developed ControlWizard control loop performance assessment software. Jacques also held the offices of Vice President of Technology and Chief Technical Officer at PAS. In Dec. 2009 Jacques founded OptiControls Inc, which is a process consulting and training services company. In his spare time, Jacques authors technical papers, writes a process control blog called Control Notes, and does research work for EPRI on process controls. He is a leading authority on process control, controller tuning and control loop performance monitoring. Jacques has been a member of ISA since 1998 and is a licensed Professional Engineer. The POWID Executive Committee congratulates Jacques on being our 2011 Achievement Award recipient.

This year’s Service Award recipient was Bob Hubby. It has been a long time coming that we finally honor Bob with this award. Since joining ISA in 1963, Bob has provided both division and society with numerous hours of service. He has held various positions listed as follows:

- POWID Executive Committee 1975–present
- POWID Honor and Awards Chair 1978–1988
- POWID Division Director 1990–1992
- POWID Symposium General Chair 1996–1998
- ISA I&S Department Vice President 1999–2001
- ISA I&S Department Vice President-elect 1997–1999
- ISA Advisory Board Chairman 1997–1999
- ISA Advisory Board Member 1993–1999
- ISA SP67 & SP77 Standards and Practices 1977–present

Bob has a BSME from Yale University and a MSEE from the University of Pennsylvania. Bob has held various positions at the old Leeds and Northrop from Project Manager to Application Consultant/Specialist and at MAX Controls the positions of Manager MAX1000 & Director Regional Sales-Middle East. Besides ISA, Bob is a member of ASME where he holds the membership grade of Life Member in both Societies. He has received from both Societies the following awards: 1) ASME dedicated Service Award in 1986; 2) ISA S&P Recognition of Achievement 1993, 1994 & 2003; 3) ISA Distinguished Society Service Award. Over the years, Bob has authored so many papers and provided special services that we don’t have space to list them all. The POWID Executive Committee and the ISA Society congratulate Bob on this award and thank him for his services to the industry.
Technical paper awards for papers presented during the 2010 ISA POWID Symposium were as follows:

- 2nd BEST PAPER: “Steam Drum Level Measurement Temperature Equalizing Column Concerns” authored by Dale P. Evely.
- 3rd BEST PAPER: “Nonlinear Adaptive Control Based on Parameter Identification for a Boiler System” authored by Shizhong Yang, Chunjiang Qian and Weisong Tain.

This year’s Facilities Award recipient was the Alstom’s Boiler Simulation Test Facility in Windsor, Connecticut. The Alstom facility is an industrial pilot scale facility that has been effectively used to test advanced clean coal combustion technologies. The facility has been equipped with state of the art sensing equipment for testing. Some of the equipment tested is as follows: 1) Flue Gas Emission System; 2) Three-dimensional flame imaging and temperature mapping; 3) Advanced flow monitors and fuzzy controllers for dynamic coal flow controls; 4) Advanced flame scanners and igniters; and 5) Carbon-in-ash monitor. Some technologies that are being tested under sponsorship from Alstom, US DOE and other major partners are as follows: 1) Ultra low NOx combustion system; 2) Mercury emission controls; 3) SO2 capture using both wet & dry flue gas desulfurization; and 4) Oxy-fired coal combustion for CO2 capture. We congratulate the Alstom Facility and their employees on their award.

Also during the POWID Honors & Awards luncheon recognition was given to the POWID Symposium General Chair, the Program Chair, and the Session Developers who had all worked so hard to make the event a success.

Finally, as a part of the POWID Honors and Awards luncheon, the event vendors and sponsors were thanked for their contribution to the success of the event.
Collage of Photos taken at the Exhibit Floor of the Conference showing some of the Vendor excitement

Event Sponsors and the Exhibit Floor
Each year, ISA’s Standards and Practices (S&P) Department reviews the overall participation of over 3,000 individuals involved in ISA standards activities to identify and honor those who have provided exceptional service on ISA standards development committees.

In 2010, several authors were nominated and awarded the S&P Department Award from the ISA77 sub-committees. At the 2011 POWID Symposium’s Honor and Award Luncheon, Co-Chair Robert Hubby and Daniel Lee presented the S&P Department Award to authors from three ISA77 sub-committees.

The first award was presented to the major contributing authors of a new standard entitled “Fossil Fuel Power Plant Steam Turbine Controls” (ANSI/ISA-77.14.01-2010). This award was presented to Jeff Schleis (Wood Group), Jim Olson (TVA), and Andy Gavrilos (ABB). The citation reads: “For outstanding leadership and technical expertise as co-author of ISA77.14.01, Fossil Fuel Power Plant Steam Turbine Controls.” This standard addresses steam turbine governor controls and overspeed protection of steam turbine generators in fossil power plants.

The second award was presented to the major contributing authors of a new technical report entitled “Tracking and Reporting of Instrument and Control Data” (ANSI/ISA-TR77.70.01-2010). This award was presented to Jody Damron (Salt River Project) and Laura Somak (Salt River Project). The citation reads: “For outstanding leadership and technical expertise as co-author of ISA-TR77.70.01, Tracking and Reporting of Instrument and Control Data.” This technical report provides guidance in the design and function of a method for instrument tracking and documentation control that is adaptable for use by multiple plants and is compatible with many of the available plant-site-distributed control systems.

The third award was presented to the major contributing authors of a new standard entitled “Selective Catalytic Reduction (SCR) Control Systems” (ANSI/ISA-TR77.82.01-2011). This award was presented to Cyrus Taft (Taft Engineering) and Mark Buzanowski (Peerless Manufacturing Co.). The citation reads: “For outstanding leadership and technical expertise as co-author of ISA77.82.01, Selective Catalytic Reduction (SCR) Control Systems.” This standard will address the control functions associated with the selective catalytic reduction systems on fossil-fired steam boilers greater than 200,000 lbs/hr and combustion turbines greater than 25 megawatts. This includes the outlet NOx control using ammonia flow control, startup and shutdown logic, bypass/isolation logic, dilution air system control, ammonia storage and delivery system control, and catalyst cleaning systems.
The ISA77 committee and its subcommittee members regularly meet three times a year to reaffirm or develop automation standards for use in Fossil Power Plants. The ISA77 committee has over 50 members, all industry experts, who volunteer their time and share their expertise in the development of automation standards. POWID members are encouraged to use these standards in their normal business, provide comments on the standards to committee chairs, and to consider participating on a standards committee.

ISA77 awards, presented by Bob Hubby and Dan Lee, ISA77 co-chairs, to:

- **Jeff Schleis** for outstanding leadership and technical expertise as co-author of ISA77.14.01, Fossil Fuel Power Plant Steam Turbine Controls.
- **Andy Gavrilos** for outstanding leadership and technical expertise as co-author of ISA77.14.01, Fossil Fuel Power Plant Steam Turbine Controls.
- **Jim Olson** for outstanding leadership and technical expertise as co-author of ISA77.14.01, Fossil Fuel Power Plant Steam Turbine Controls.
- **Jody Damron** for outstanding leadership and technical expertise as co-author of ISA-TR77.170.01, Tracking and Reporting of Instrument and Control Data.
- **Laura Somak** for outstanding leadership and technical expertise as co-author of ISA-TR77.170.01, Tracking and Reporting of Instrument and Control Data.
- **Cyrus Taft** for outstanding leadership and technical expertise as co-author of ISA77.82.01, Selective Catalytic Reduction (SCR) Control Systems.
- **Mark Buzanowski** for outstanding leadership and technical expertise as co-author of ISA77.82.01, Selective Catalytic Reduction (SCR) Control Systems.
POWID receives Outstanding Division Award from ISA

Don Labbe, our ISA POWID Director, in late July received the following announcement from Peggie Koon, the ISA Industries and Sciences Vice President: “Congratulations on being nominated as this year’s recipient of the Industries & Sciences Outstanding Division Award! You and the POWID Board have done an excellent job in developing a successful Symposium, expanding the Division’s reach, and providing excellent technical content to your membership and the Power Industry at large.”

This award will be presented at the ISA Automation Week Honors & Awards banquet on Monday, October 17th in Mobile, Alabama. Don Labbe would like to recognize the fact that this award is recognition of the Division’s performance during 2010 when it was under the direction of then Director Cyrus Taft. If you are interested in attending the Automation Week Honors & Awards banquet you can find more information on that at: http://www.isa.org/Content/NavigationMenu/General_Information/Honors_and_Awards1/2011_Gala/2011_Gala.htm.


The 55th Annual ISA Power Industry Division (POWID) Symposium will take place 3–8 June 2012, in Austin, Texas, USA. We will review all submissions for this conference and publish accepted papers in the Conference Proceedings via electronic media.

The proceedings will be available later to the general ISA membership through the ISA POWID website. Some of the topical areas of the conference are listed below. Focus on some aspect of the theme, “Power Generation: Automation Today and Tomorrow” is encouraged and application relevant to the power industry is necessary. Topics to consider for your paper are:

- Cybersecurity Issues and Solutions
- Nuclear Plant Innovations and Enhancements
- Smart Grid
- Renewable Energy
- Nuclear Power, New and Existing Fleet
- Fossil Power, Conventional Steam, and Combined Cycle Plants
- Environmental Issues
- Sensors including Wireless Sensor Networks
- Asset Management including Equipment Condition Monitoring
- Other Power Related Issues

**Submission Deadlines:**

- Abstract due ................................... 15 January 2012
- First Draft due ................................. 26 February 2012
- Final Paper due .................................. 30 April 2012
- Draft Presentation due ......................... 30 April 2012
- Final Presentation due .......................... May 2012

To submit your abstract go to [www.isa.org/powersymp](http://www.isa.org/powersymp)

**For more information contact:**

Gary Cohee, General Chairman
GARYACOHEE@aol.com

James Batug, Fossil Program Co-Chair
jpbatug@pplweb.com

TBD Nuclear Program Co-Chair

Rodney Jones, ISA Division Administrator
rjones@isa.org
ISA Automation Week 2011
By Don Labbe - Energy Track Chair
Invensys Operations Management

ISA Automation Week 2011 is being held 18–20 October 2011 in Mobile, Alabama, USA, and presents the latest in automation technologies across the many industries serviced by ISA. As specific technologies are applied at a higher level in certain industries, the advancements in these technologies provide an opportunity for cross fertilization to other industries like Power. Automation Week provides an opportunity for all to glean best practices, technologies and advancements in automation.

The program chair for Automation Week is the renowned Greg McMillan who has made a great personal commitment to producing a high quality conference and states, “I’ve never worked with a group that has worked so diligently to create such a stellar technical program. The quality of this conference surpasses anything I’ve ever seen. We have expanded the spectrum of topics on both ends to cover installation, operations, and maintenance, as well as advances in process control. When you attend, you will gain knowledge gathered and shared by peers with hundreds of years of combined experience—peers who understand what you do. It’s simply a technical program that is absolutely superior and unmatched at any other conference. Join us!”

Greg has recruited a number of leaders in the industry to serve as chairs for the following tracks: Safety & Security, Advanced Process Control, Automation & Control, Analyzers, Wireless Technology, Human Asset Optimization, Installation Operations & Maintenance, and Energy. The following is a list of sessions associated with each track. The Energy track includes descriptions of each session, since this track may relate best to the Power industry.

Energy
- Building & Industrial Automation & Energy Management Improve Energy Efficiency: Energy Management Systems can assist building management engineers to visualize their facilities and make real-time decisions based upon current data. Facility managers can study various metrics like seasonal demand and building occupancy to design a building management system that makes the most effective use of energy. An enterprise infrastructure captures real-time energy consumption data and uses this information to actively manage efficiency improvements and cost reductions.
- Energy Optimization: Monitor, Improve, and Sustain Energy Productivity: Success in energy optimization depends on deploying the right combination of technology, decision-making and leadership resources. This session compares the characteristics of industry leaders and laggards, describes how to discover and capitalize on common energy opportunities, and details a state-of-the-art methodology for energy-intensive processes.
- Modeling Provides Practical Solutions for Emissions Compliance and Controls: Modeling has been raised to a high level of confidence and industry acceptance; model predictions can be substituted for actual measurements in emissions monitoring and dynamic models can be applied to design control logic prior to installation.
- Enhancing Fossil Fired Power Plant Controls to Meet Changing Load Dispatch Requirements: Novel coal fired power plant designs and controls address efficiency, load dispatch capability, cost savings and enhanced revenue. Control and operational flexibility are key to key ingredients to sustainable cost effective electric generation.
- Hydro and Alternative Energy Control and Optimization: Renewable energy provides reliable power and opportunities for optimization; maximizing hydro efficiency increases the load generation of a limited resource and a fully integrated solar power system allows full isolation from the grid.
- Novel Methods to Lower Fuel Consumption and Conserve Energy: Through control enhancements the full benefit of alternative fuels, like biomass, and energy conservation to lower fossil fuel consumption can be realized.

Safety and Security
- Stuxnet and Securing Control Systems
- Safety Instrumented System Applications
- Alarms in Safety Critical Applications
- Threats and Modeling
- The Convergence of Safety and Security for Industrial Controls Systems
- SIS Testing and Documentation Practices
- Industrial Control System Security Standards
- Findings from the Field
- Partial Stroke Testing of SIS Valves

Advanced Process Control
- ARC Inside: The Automation Market Outlook and Business Performance Strategies for 2012 and Beyond
- Model Predictive Control and Real Time Optimization
- Advanced Applications I and II
- Performance Analysis of Controlled Systems
- Optimizing Control
- Statistical Methods for Analysis and Modeling
- Simple Model-Based Control Techniques
- Advanced Control Techniques

Automation and Control
- Applications of Simulations
- DCS/SCADA
- Measurement Technology
- Reactor Control
- Distillation Column Control
- Measurement Research
- Regulatory Control Performance
- Applications/Building Automation
- Industrial Practices

Analyzers
- GTFK Award Papers
- Analyzer Technician Opportunities Project (ATOP)
- Gas Chromatography
- Advances in Spectroscopy
- Environmental and Process Monitoring Issues and Answers
- pH Measurement and Control Opportunities

Wireless Technology
- Wireless, Cyber Security, and Control Systems
- Utilize all of the Data from Wireless and Smart Instrumentation
- Large Scale Sensor Network
- Wireless Measurement and Control Opportunities
- Industrial Wireless Applications
- New Technologies for Wireless Applications
- Wireless Applications in Robotics, NC Machines, and Predictive Maintenance
- Ask The Wireless Experts
- How the Oil and Gas Companies in Saudi Arabia and Northern Alberta are Using Wireless

Continued on page 24
**Human Asset Optimization**
- Social Media and Automation
- Project Management: Best Practices
- Career Discussion
- Learning for Your Career and Your Plant
- Personal Development
- Automation Competency Model

**Installation, Operations, and Maintenance**
- Plant and Process Startups: Pain Free if Done Right!
- Successful Project Management - Tips and Examples
- Trends and Advances in the Pulp and Paper Industry Instrumentation
- Calibration: Learn from the Experience of Others
- Codes, Regulations, and Standards
- Modern Approaches to Maintenance Management
- How to Challenge the Control Loop and Improve PID
- Plant Optimization - It's a Continuous Process
- Project Acceptance - Things You Must Know

This elaborate technical program provides an opportunity to be exposed to many critical topics in the automation industry. If you or a colleague have an opportunity, participation in ISA Automation Week 2011 is highly recommended.

**POWID awards nomination request to all POWID members**

By Mike Skoncey
POWID Honors & Awards Coordinator

If you don’t see a POWID member’s name that you respect or your facilities name below, then it’s time for you to nominate those members or your facility for a POWID division award. POWID awards that are intended to be given out annually are the Achievement Award, the Service Award, and the Facility Award. **Award nominations are due by 3 February 2012** and nomination forms can be found on the link that resides on the home page of the POWID website at: [www.isa.org/~powid](http://www.isa.org/~powid). If you want to go directly to the forms the link is: [http://www.isa.org/~powid/awards/POWIDawardForms.zip](http://www.isa.org/~powid/awards/POWIDawardForms.zip).

**Past POWID Achievement Award Recipients are:**

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<tr>
<th>Year</th>
<th>Name</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>Marjorie Widmeyer</td>
<td>Washington Public Supply</td>
</tr>
<tr>
<td>1993</td>
<td>Harold S. Hopkins</td>
<td>Utility Products of Arizona</td>
</tr>
<tr>
<td>1992</td>
<td>Joseph M. Weiss</td>
<td>Electric Power Research Institute</td>
</tr>
<tr>
<td>1991</td>
<td>Richard Hottenstine</td>
<td>Gilbert/Commonwealth</td>
</tr>
<tr>
<td>1990</td>
<td>Paul Kenney</td>
<td>Forney</td>
</tr>
<tr>
<td>1989</td>
<td>Gordon R. McFarland</td>
<td>Combustion Engineering</td>
</tr>
<tr>
<td>1988</td>
<td>Peter J. Clelland</td>
<td>Philadelphia Electric Company</td>
</tr>
<tr>
<td>1987</td>
<td>Q. B. Chou</td>
<td>Ontario Hydro</td>
</tr>
<tr>
<td>1986</td>
<td>Robert N. Buschell</td>
<td>Ebasco Services Incorporated</td>
</tr>
<tr>
<td>1985</td>
<td>John E. Coles</td>
<td>New Orleans Public Services Company</td>
</tr>
<tr>
<td>1984</td>
<td>Robert L. Criswell</td>
<td>Foster Wheeler Energy Corporation</td>
</tr>
<tr>
<td>1983</td>
<td>Porter J. Womeldorf</td>
<td>Illinois Power Company</td>
</tr>
<tr>
<td>1982</td>
<td>Theodore C. Reitz</td>
<td>Gilbert Associates, Incorporated</td>
</tr>
<tr>
<td>1981</td>
<td>Richard H. Morse</td>
<td>Leeds &amp; Northrup Company</td>
</tr>
<tr>
<td>1979</td>
<td>Samuel G. Dukelow</td>
<td>Bailey Controls Company</td>
</tr>
<tr>
<td>1978</td>
<td>Oliver W. Durrant</td>
<td>Babcock &amp; Wilcox Company</td>
</tr>
<tr>
<td>1977</td>
<td>Alfred Watson</td>
<td>Westinghouse Electric Corporation</td>
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**Past POWID Service Award Recipients are:**

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<th>Name</th>
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<tr>
<td>2011</td>
<td>Robert N. Hubby</td>
<td>ISA and ASME Life Member</td>
</tr>
<tr>
<td>2009</td>
<td>Stephen E. “Skip” Wells</td>
<td>Southern Company Generation</td>
</tr>
<tr>
<td>2008</td>
<td>Jim Redmond</td>
<td>Southern California Edison (retired)</td>
</tr>
<tr>
<td>2007</td>
<td>Dan Antonelli</td>
<td>Invensys</td>
</tr>
<tr>
<td>2006</td>
<td>Roger Hull</td>
<td>Emerson Power &amp; Water Solutions</td>
</tr>
<tr>
<td>2005</td>
<td>Denny Younie</td>
<td>Wood Group</td>
</tr>
<tr>
<td>2004</td>
<td>Dale P. Evely</td>
<td>Southern Company Generation</td>
</tr>
<tr>
<td>2003</td>
<td>Dan Lee</td>
<td>ABB Bailey Controls</td>
</tr>
<tr>
<td>2002</td>
<td>Gary Cohee</td>
<td>Applied Control Systems</td>
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<tr>
<td>2001</td>
<td>Rudy Neustadter</td>
<td>Raytheon Nuclear Group (retired)</td>
</tr>
<tr>
<td>2001</td>
<td>Harold Sternberg</td>
<td>ABB Bailey Controls</td>
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</table>

Don Christopher, the POWID Historian, is researching the names of the POWID Service Award recipients prior to 2001.

**Past POWID Facility Award Recipients are:**

<table>
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<tr>
<th>Year</th>
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<tr>
<td>2011</td>
<td>Boiler Simulation Test Facility</td>
<td>Alstom</td>
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<td>2009</td>
<td>Rutenberg Power Station</td>
<td>Israel Electric</td>
</tr>
<tr>
<td>2008</td>
<td>Morgantown Generating Station</td>
<td>Mirant, Mid-Atlantic LLC</td>
</tr>
<tr>
<td>2007</td>
<td>Sim Gideon Power Plant</td>
<td>Lower Colorado River Authority</td>
</tr>
<tr>
<td>2006</td>
<td>Independence Steam Electric Station</td>
<td>Entergy Incorporated</td>
</tr>
<tr>
<td>2005</td>
<td>C. P. Crane</td>
<td>Constellation Energy</td>
</tr>
<tr>
<td>2004</td>
<td>Monticello Steam Electric Station</td>
<td>TXU Energy</td>
</tr>
<tr>
<td>2003</td>
<td>Elrama Power Plant</td>
<td>Reliant Energy</td>
</tr>
<tr>
<td>2002</td>
<td>W. A. Parrish Power Plant</td>
<td>Reliant Energy</td>
</tr>
<tr>
<td>2001</td>
<td>J. H. Campbell Plant</td>
<td>Consumers Energy</td>
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<tr>
<td>2000</td>
<td>Sundance Power Plant</td>
<td>Trans Alta Corporation</td>
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<tr>
<td>1999</td>
<td>Heskett Station</td>
<td>Montana-Dakota Utilities</td>
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<tr>
<td>1997</td>
<td>Mount Storm Power Station</td>
<td>Virginia Electric Power</td>
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<tr>
<td>1996</td>
<td>Gibson Power Station</td>
<td>Cinergy</td>
</tr>
<tr>
<td>1995</td>
<td>T. B. Simon Power Plant</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>1994</td>
<td>Oklaunion Power Station</td>
<td>Central &amp; Southwest</td>
</tr>
<tr>
<td>1993</td>
<td>Gaston Power Station</td>
<td>Alabama Power</td>
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<tr>
<td>1992</td>
<td>Eddystone Power Station</td>
<td>Philadelphia Electric Company</td>
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**Past Robert N. Hubby Scholarship Recipients are:**

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<th>Year</th>
<th>Name</th>
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<tbody>
<tr>
<td>2010</td>
<td>Michael Adams</td>
<td>Ohio State University</td>
</tr>
<tr>
<td>2008</td>
<td>Sharanya Jaganathan</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Brandon Cavello</td>
<td>Pennsylvania State University</td>
</tr>
</tbody>
</table>
The Best Paper from the 2010 ISA POWID Symposium

During the Honors and Awards Luncheon in June, the Best Paper Award for the 2010 POWID Conference in Charlotte was presented to Cyrus Taft, John Sorge and Jackson Willis for the paper entitled “Thermocouple Response Time Study for Steam Temperature Control.” This technical paper is provided in its entirety in this newsletter for your reading pleasure.

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THERMOCOUPLE RESPONSE TIME STUDY FOR
STEAM TEMPERATURE CONTROL

Cyrus Taft
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Harriman, TN 37748

John Sorge
Southern Company Generation
Birmingham, AL 35203

Jackson Willis
Southern Company Generation
Birmingham, AL 35203

KEYWORDS
Thermocouple response time, thermowell design, steam temperature control

ABSTRACT

The response time of sensors in control loops is always an important factor in the loop performance. A typical desuperheating spray steam temperature control system in a power plant utilizes two temperature measurements, one at the desuperheater outlet and another at the boiler outlet. The desuperheater outlet temperature should be a fast responding measurement to help eliminate disturbances quickly. Recent testing at two plants indicated that the desuperheater outlet temperature response time was considerably slower than expected. This initiated a study to determine why the response time was slow. Issues investigated included the type of thermocouple, grounded or ungrounded, the size of the thermocouple, the installation of the thermocouple, and the design of the thermowell. This paper presents the results of the study and includes a finite element analysis of a few thermowell designs and plans for lab testing to assess dynamic performance. The impact of the slow response time on the control loop performance is also studied.

INTRODUCTION

Temperature measurements are used extensively in power plants to monitor and control many important processes. Some of the most critical temperature measurements are the steam temperatures in the boiler, in particular the final superheater outlet temperature and the desuperheater outlet temperature. In a typical drum boiler, the dry saturated steam leaving the drum passes through multiple superheating sections before it leaves the boiler (Figure 1). A very common temperature control method is to inject water into the steam between superheater
sections to cool the steam. These two measurements are commonly used in a cascade steam temperature control system in which the final temperature is the measured variable for the outer loop and the desuperheater outlet is the measured variable for the inner loop. In any control loop, the response time of the process is an important component in the performance of the loop. Faster responding processes are generally easier to control tightly. Temperature measurements in steam boilers and many other processes are inherently slower responding than many pressure and flow measurement. The total response time of the temperature measurement is comprised of the response time of several components in the temperature measurement system. When measuring temperature in high pressure steam lines, the relatively fragile temperature sensors are installed in thermowells to protect the sensors from the harsh steam conditions. The thermowells are heavy metal tubes and, consequently, slow down the temperature response at the sensor. Other factors in the overall temperature measurement response time include the heat transfer from the steam to the thermowell, the conduction across the thermowell, the heat transfer from the thermowell to the sensor sheath and finally to the sensor itself. If the sensor is not fully inserted in the bottom of the well the heat transfer between the well and the sensor will be significantly degraded. In the 1970's, one major control system vendor sold a silver-tipped thermocouple specifically designed to minimize the response time of the desuperheater outlet temperature [1].

In this paper, the response time of boiler steam temperature sensors will be discussed. Test methods and results will be provided along with finite element analysis of thermowell heat transfer dynamics. The impact of the desuperheater temperature response time on the steam temperature control performance will also be discussed.

**PROCESS DESCRIPTION**

Although the subject of temperature measurement response time is applicable to many industrial processes, in this paper the focus is on the steam temperature control process in drum boilers using desuperheating spray water injection. This process is very common in fossil power plants and is usually one of the more difficult control applications in the plant.

In a drum boiler, steam is generated in the furnace waterwall tubes and the boiling steam/water mixture is returned to the drum. In the drum, the steam is separated from the water before leaving the drum on its way to the superheater. The superheater is arranged in multiple sections with the first section called the primary superheater. There may be one or two additional superheater sections depending on the particular boiler's design. For the example discussed here, only one additional section is provided. Between the two sections of superheaters is a desuperheater in which water from the feedwater system is injected through spray nozzles into the steam. As the water evaporates, it cools the steam and provides a means for temperature control. The evaporation happens very quickly provided the spray nozzles atomize the spray water well. The temperature just downstream of the desuperheater after the evaporation is completed is measured and referred to as the desuperheater outlet temperature. After the steam leaves the desuperheater it passes through the final superheater before leaving the boiler. The temperature of the steam leaving the boiler is also measured and referred to as final superheater outlet temperature. The flow of water into the desuperheater is regulated by a modulating
control valve which is supplied with feedwater from the boiler feedpump discharge or from the economizer inlet.

![Figure 1](Boiler Steam Flow Diagram)

**TIME RESPONSE CHARACTERISTICS**

For this time response discussion assume that the initiating event is a step change in the position demand to the spray valve. The valve position response for a pneumatic valve can be approximated by 1-2 seconds of deadtime followed by a 2-5 second time constant (Figure 2). The water flow into the desuperheater essentially responds instantly to changes in the spray valve position. The desuperheating process is a very quick process so the actual steam temperature leaving the desuperheater changes almost as fast as the water flow entering the desuperheater. The time constant of the water flashing into steam probably is less than one second. The measured temperature of the desuperheater outlet responds considerably slower than the actual temperature. The response characteristic for the measured temperature should be approximately a 2-3 second deadtime followed by a 30 second time constant based on tests conducted on several nearly new units in the 1980’s. The 30 second time constant is due to the combined effects of the thermowell and the temperature sensor with the thermowell being the dominant effect.
After leaving the desuperheater, the steam flows through the final superheater and out of the boiler. The time required for the steam to flow from the desuperheater outlet to the boiler outlet is approximately 5-10 seconds (Figure 3). The response time of the final outlet temperature at the boiler is typically about a 60 second deadtime followed by a 100-200 second time constant. If it only takes 5-10 seconds for the steam to reach the boiler outlet, why is the response at the outlet so much slower? The answer is the large thermal mass of the metal in the final superheater. As the cooler steam enters the final superheater, the metal tubes are hotter than the steam. As the cool steam flows through the superheater tubes, the tubes get cooler as the steam gets a little hotter. Eventually the cool steam cools the entire length of the tubes and the cooler steam reaches the outlet of the boiler. It can take 1-2 minutes for the cool steam to reach the boiler outlet, hence the long deadtime in the measured temperature.

Figure 2
Expected time response of desuperheater components
Several open loop step response tests were conducted on the superheat spray valves on the unit under study. The test procedure began with placing the steam temperature control loop in manual mode, taking the unit off of automatic dispatch, and putting the boiler master and turbine master in manual mode. The unit was then given time to reach a steady condition but the unit never really settled out. There were continuous disturbances present even when all major control loops were in manual. When the unit was as settled as possible, the spray valve demand on one side was stepped up by the operator. The unit was given approximately 20 minutes to come to a new steady condition. The DCS historian was used to record date every second while the test was underway.

The results of one test are shown in Figure 4. It is clear that there are disturbances present and these disturbances make it more difficult to measure the actual response times. The desuperheater outlet temperature response time is approximately 90-100 seconds. This is considerably slower than the expected response time of 30 seconds. This discrepancy between the expected and actual response time initiated an investigation into the cause.
As a result of the slow time response observed on the desuperheater outlet thermocouple, the plant staff began checking the installation in an attempt to identify the cause. Several problems were found including:

1. The thermocouple spring-loading mechanism appeared to be insufficient which may have allowed the thermocouple tip to not be in direct contact with the bottom of the thermowell.
2. The inside diameter of the thermowell was 0.5" and the outside diameter of the thermocouple was 0.25" so there was a considerable air gap around the outside of the thermocouple.
3. The thermocouple was ungrounded meaning that the thermocouple junction was not directly touching the tip of the thermocouple sheath. The thermal insulation within the sheath slows down the response of the thermocouple.
4. The thermowell design was very heavy duty and featured a straight shank rather than a tapered shank. The wall thickness of the straight shank was 0.437" throughout its length. The thickness of the bottom of the thermowell was not known but was thought to be approximately the same as the wall thickness (Figure 5). This thermowell was installed during plant construction (early 1960s) and originally housed a Bailey Pyrotron RTD.
5. The thermocouple tip design itself seemed to be not very conducive to quick response time and the condition of the lead wires insulation inside the sheath was questionable with some indications of electrical shorts between leads in the sheath (Figure 5).
To address these problems the plant staff installed new thermocouples in the left hand and right hand desuperheater outlet locations. The thermowell was not changed. The new thermocouples were grounded (Type K), 0.5" in diameter and were installed with spring loading in the head to ensure the thermocouple remained in direct contact with the bottom of the well at all times.

After the new thermocouples were installed, the open loop step response tests were repeated and the results are shown in Figure 6. Maybe surprisingly, the time constant of the temperature measurement did not notably change. The conclusion that was drawn from this was that the main culprit in the slow response time was the heavy duty thermowell.
HEAT TRANSFER ANALYSIS

To investigate this further, several finite element analysis (FEA) models of the existing and more common thermowells were developed to analyze the time response of the heat transfer from the fluid outside of the thermowell to the thermocouple (TC) element. ANSYS Mechanical (an FEA platform from ANSYS, Inc.) was used as the simulation environment for these studies. Effects included in this study were:

- Thermocouple (TC) design - Exposed, grounded, and ungrounded TCs
- Thermowell design – Bailey Pyrotron, Wika Instruments, Wika Instruments (modified)
- Thermocouple sheath diameter / thermowell bore diameter
- Contact of TC tip to thermowell
- Convection heat transfer from fluid to thermowell
- Conduction heat transfer through thermowell
- Contact heat transfer from thermowell to TC sheath
- Convection heat transfer from thermowell to TC sheath (when there is gap)
- Conduction heat transfer from the TC sheath through the thermocouple insulation to the TC junction

Given the paper constraints, only a couple of the above possible combinations are discussed.

**Thermocouple Sheath / Thermowell Bore Diameter Mismatch** – Among the many design choices for I&C Designers are the selection of the thermocouple sheath diameter and thermowell bore...
diameter. Common historical practice is for the thermocouple diameter to match the thermowell bore diameter. For example, for a thermowell with a 0.385" diameter bore, a thermocouple with a 3/8" (0.375") sheath diameter would be selected. This combination would provide a relatively large contact area between the thermocouple and thermowell, greatly improving heat transfer characteristics. Conversely, a quoted adverse impact is that the relatively close fit would make the thermocouple more difficult to replace. The impact of this mismatch for a 10°F increase in steam temperature is shown in Figure 7. As shown, the measurement time constant increases from approximately 19 seconds to 64 seconds. The following assumptions are relevant to these results: (1) the 3/8" TC is in intimate contact with the thermowell throughout its length and (2) the 1/4" TC contacts the thermowell only at the base of the thermowell. Arguably, these two assumptions place the mismatch in the most adverse light, but the results are indicative of the large response time differences that can be obtained.

Figure 7
Impact of thermocouple sheath / thermowell bore diameter mismatch on response time
Thermowell Design – As discussed previously, the “robust” Bailey Pyrotron thermowell design has significant adverse impacts on the desuperheater outlet response time. The relative impact for exposed type thermocouples is shown in Figure 8. As shown, the time constant for the Bailey design is more than twice that of a Wika design (a more typical tapered design).

Figure 8
Impact of thermowell design on response time, with properly fitted grounded thermocouples
Thermocouple Not Being Seated – As might be expected, if the thermocouple is not seated properly, the response time will increase substantially. An example of this impact is shown in Figure 9 and it shows the time constant increasing by an order of magnitude (~30 seconds to ~300 seconds).

Figure 9
Impact of thermocouple not being seated
LAB TESTING

Lab tests using precision thermowells and thermocouples were used to verify and refine the finite-element analysis results. Wika Instruments provided two threaded, tapered thermowells - one with a ¼" bore and one with a 3/8" bore. Wika also provided two sets of thermocouples – one set at ¼" diameter and one set at 3/8" diameter (Figure 10). Each set contained an exposed, grounded, and ungrounded thermocouple.

![Collection of thermocouples and thermowells to be tested in the lab](image)

Since high-accuracy tests would be extremely difficult to perform in the steam line of interest, the tests will take place in a mid-temperature lab setting (Figure 11). The tests were performed in a molten salt bath at 350°F. A room temperature thermowell was submerged in the molten salt. An array of five grounded 1/8" thermocouples (chosen for their short response time) was submerged simultaneously. The responses of all thermocouples (including the one in the thermowell) were recorded. This test was performed for all thermowell and thermocouple combinations – a total of nine test runs.
Figure 11
Thermocouple baths used for testing thermocouple response times

The results of these tests were compared to the results of separate set of finite-element analysis models. These FEA models were created specifically to model the lab tests with initial conditions, bulk temperatures, and convection values adjusted to the conditions of each individual test. If necessary, the FEA models were to be adjusted until the FEA results and the lab results correlate closely. Possible areas of refinement for the FEA models include the addition of contact resistance, the adjustment of convection values, and the addition of heat transfer to the base of the thermowell (or heat “leaving” the thermowell). It was found that none of these refinements were necessary. However, due to salt temporary solidifying on the thermowell, it was necessary to model a dynamic load up to the point of when the salt melted off of the thermowell. Beyond this point, the FEA models were nearly identical to the lab results and it was determined that the method of modeling and calculating a convection value was valid. Since the thermowells have internal conditions that are nearly identical at low and high temperatures, these validated models were used to simulate the response at high temperature steam conditions (with adjustments made for convection and other fluid conditions).
IMPACT ON CONTROL SYSTEM PERFORMANCE

It is known that adding time lag in the feedback of a control loop will degrade the performance of the loop. In this study it appears that the time lag of the desuperheater outlet temperature is actually about 100 seconds when it is expected to be about 30 seconds. This measurement is used as the feedback signal for the inner loop of the cascaded steam temperature control strategy as shown in Figure 12. To evaluate the impact that the additional time lag has on the overall loop performance, a simple dynamic model of the control system and the process was developed in the MATLAB/Simulink environment.

One of the parameters in the model was the desuperheater outlet temperature measurement response time. The control system was equivalently tuned for two different desuperheater outlet temperature measurement response times, 25 seconds and 100 seconds. The final superheater temperature measurement response model was the same for both cases. Transients were performed on both the fast and slow models to quantify the impact of the change in the inner loop process response on the control performance. The transients consisted of four step changes as shown in Table 1. Throughout the transient the control performance of the faster responding loop is better than the slower responding loop (Figure 13) as expected. Table 2 quantifies the differences between the two results. From a percentage perspective, the difference in performance is quite significant which indicates it is definitely worthwhile to use as fast a response as possible for the desuperheater outlet temperature measurement.

Figure 12
Superheat steam temperature control strategy

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Table 1
Description of transient to evaluate control performance

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>+1.0 deg step change in final superheat setpoint</td>
</tr>
<tr>
<td>1000</td>
<td>+1.0 deg step disturbance in desuperheater outlet temperature</td>
</tr>
<tr>
<td>2000</td>
<td>+1.0 step disturbance in desuperheater spray flow</td>
</tr>
<tr>
<td>3000</td>
<td>+1.0 deg step disturbance in final superheater outlet temperature</td>
</tr>
</tbody>
</table>

Figure 13
Comparison of control performance with fast and slow inner loop temperature measurement.

<table>
<thead>
<tr>
<th>Performance criteria</th>
<th>Fast process</th>
<th>Slow process</th>
<th>Percent Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to reach setpoint</td>
<td>347 sec</td>
<td>497 sec</td>
<td>43%</td>
</tr>
<tr>
<td>Peak deviation from desuperheater disturbance</td>
<td>0.48 F</td>
<td>0.58 deg F</td>
<td>21%</td>
</tr>
<tr>
<td>Peak deviation from spray flow disturbance</td>
<td>0.07 F</td>
<td>0.13 F</td>
<td>86%</td>
</tr>
<tr>
<td>Time to return to setpoint from superheater disturbance</td>
<td>349 sec</td>
<td>500 sec</td>
<td>43%</td>
</tr>
</tbody>
</table>
CONCLUSION

One important factor in control system performance is the response time of the process measurement used in the control system. In this paper, the response time of one common boiler temperature measurement, the desuperheater outlet, is examined. Step response tests on an actual unit produced unexpectedly long response times which prompted further investigation to identify the cause. Several issues related to the installation of the thermocouple were identified but replacing the thermocouple and correcting the installation issues did not improve the response time. The only component not replaced was the thermowell which was a particularly thick-walled design featuring an untapered shank. To better understand the heat transfer dynamics of various thermowell designs, finite element analysis was used to analyze several designs. The thick-walled design had almost double the time constant of a more typical tapered tip design. Laboratory tests to verify the FEA models are described and will be performed in the near future. In summary, there are many factors which influence the overall response time of the temperature measurement in boiler steam lines. In the particular case analyzed here, the thick-walled thermowell is the primary culprit in the longer than expected response time.

REFERENCES

New and Returning POWID Members

The Power Industry Division (POVID) of ISA continues to grow. We would like to welcome all of our new and returning 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 and control related to the production of electricity. 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!

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Mr. Chad Newhook
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Automation Specialist
Mr. Abiodun Temitope Odewale
Chevron Nigeria Ltd
Instrument Technician
ISA POWID Executive Committee
February 2011 Meeting Minutes

Meeting: ISA Power Industry Division Executive Committee Meeting

Chairperson: Don Labbe
Recorder: Tom Stevenson
Date/Time: Feb. 22, 2011 1:00 PM To 5:00 PM, EST
Location: ISA HQ, Research Triangle Park, NC

Attendees:

Members Present
Cyrus Taft
Bob Hubby
Denny Younie
Don Andrasik
Daniel Lee
Xinsheng Lou
Allan Zadiraka**
Gary Cohee**
Aaron Hussey
Tim Hurst**
Tom Stevenson**
Don Labbe**
Jim Batug**
Michael Skoncey**
Danny Crow**

Members Absent
Jason Makansi
Bill Sotos
Seth Olson
In-Young Chung
Tim McCreary
Brandon Parker
Roger Hull
Edson Bortoni
Joe Vavrek
Dale Evely
Jody Damron
Gordon McFarland
Jim Olson
Don Christopher
Leo Staples
Robert Webb*
Marjorie Widmeyer*
Ron Hicks*

*indicates member emeritus    ** Indicates on conference call
** part time

1. Call to Order
Denny Younie, ISA Power Industry Division Director-Elect, called the meeting to order at 1:18 p.m. EST.

2. Introduction of Members and Guests
Cyrus Taft conducted a Meeting Attendance roll call and circulated a POWID Executive Committee Roster for updates.

3. Review & Approve Agenda
The POWID Executive Committee Meeting Agenda previously distributed by email was distributed at the start of this meeting. With no changes the agenda was approved by voice vote.

4. Review & Approve Minutes of Last Meeting
The minutes for the October POWID EXCOM meeting held at the Westin Galleria, Houston, TX were previously distributed electronically to the POWID EXCOM members. Hard copies of the minutes were also circulated at the meeting. With no changes to the minutes, the minutes were approved by voice vote.

5. Director Staff Reports
a) Division Report

There is a new campaign to bring new members and return previous members initiated by the ISA President, Leo Staples, called the “Power of One Membership” challenge. The challenge is for each volunteer to add or recruit at least one member.

ISA POWID Executive Committee
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4. Review & Approve Minutes of Last Meeting
The minutes for the October POWID EXCOM meeting held at the Westin Galleria, Houston, TX were previously distributed electronically to the POWID EXCOM members. Hard copies of the minutes were also circulated at the meeting. With no changes to the minutes, the minutes were approved by voice vote.

5. Director Staff Reports
a) Division Report

There is a new campaign to bring new members and return previous members initiated by the ISA President, Leo Staples, called the “Power of One Membership” challenge. The challenge is for each volunteer to add or recruit at least one member.

ISA POWID Executive Committee
February 2011 Meeting Minutes

Meeting: ISA Power Industry Division Executive Committee Meeting

Chairperson: Don Labbe
Recorder: Tom Stevenson
Date/Time: Feb. 22, 2011 1:00 PM To 5:00 PM, EST
Location: ISA HQ, Research Triangle Park, NC

Attendees:

Members Present
Cyrus Taft
Bob Hubby
Denny Younie
Don Andrasik
Daniel Lee
Xinsheng Lou
Allan Zadiraka**
Gary Cohee**
Aaron Hussey
Tim Hurst**
Tom Stevenson**
Don Labbe**
Jim Batug**
Michael Skoncey**
Danny Crow**

Members Absent
Jason Makansi
Bill Sotos
Seth Olson
In-Young Chung
Tim McCreary
Brandon Parker
Roger Hull
Edson Bortoni
Joe Vavrek
Dale Evely
Jody Damron
Gordon McFarland
Jim Olson
Don Christopher
Leo Staples
Robert Webb*
Marjorie Widmeyer*
Ron Hicks*

*indicates member emeritus    ** Indicates on conference call
** part time

1. Call to Order
Denny Younie, ISA Power Industry Division Director-Elect, called the meeting to order at 1:18 p.m. EST.

2. Introduction of Members and Guests
Cyrus Taft conducted a Meeting Attendance roll call and circulated a POWID Executive Committee Roster for updates.

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The February issue of Power Magazine included 4 technical papers from the POWID 2010 symposium. For the past few years Power Magazine has been featuring POWID symposium papers in the February issue. Of note Robert Peltier, Editor-in-Chief, participated in a POWID 2010 panel session and plans to participate in POWID 2011.

b) Financial Reports
Rodney provided the financial report for the POWID Scholarship, which is the only financial item for POWID. It was noted that if we maintain the scholarships at $4K/each, then we will not have an adverse effect on the endowment currently at $184K in December 2010.

c) POWID Manual of Operations (MOP) Review
1) 12/11/10 version was sent for ballot
2) Received 27 Yes; 1 No votes
3) Several suggestions regarding the next issue were received particularly from the international members. The MOP will be reviewed every two (2) years. Thanks from Don Labee to all who provided comments.

d) Nominating
Dan Lee, Cyrus Taft reported:
1) Five (5) new candidates were nominated to EXCOM and all were prioritized in a ballot process completed by email.
2) With existing board members at that time there were no open slots.
3) Invited four (4) existing distinguished members to become members emeritus – Bob Hubby, Robert Webb, Marjorie Widmeyer and Ron Hicks accepted.
4) Seth Olson, In-Young Chung, Xinsheng Lou, and Brandon Parker were elected to EXCOM Board.
5) Expect more open slots to open later this year.

6. Standards Committee Reports
a) ISA67 Nuclear Power Plant Standards Committee – Bob Queenan will report after the spring symposium.

b) ISA77 Fossil Fuel Power Plant Standards Committee – Bob Hubby/Daniel Lee met October 5th in Houston and provided a brief report. Three new documents were completed: 14.01 Steam Turbine Controls, 70.01 – Tracking and Controlling Instrument Documentation in Fossil Power Plants, and 82.01 – SCR Instrumentation and Controls Standard. Three (3) documents were reaffirmed: 60.02 - Alarms, 41.01 Boiler Combustion Control, and 70.02 – Instrument Piping Standards. Several ISA77 contributors are to be honored at the POWID Honors & Awards banquet in Charlotte.

c) The following goals were established for 2011: 20.01 Fossil Power Plant Simulators for reaffirmation; 42.01 Feedwater Control-Drum Type for reaffirmation, 22.01 Power Plant Automation for draft, 40.01 Functional diagramming for balloting, and exploring a new committee on Performance of Process Control Systems.

7. Membership Service Committee Reports
a) Honors & Awards – Mike Skoncey presented a written report.

1) Two (2) candidates for Fellows have been nominated and all documents have been submitted.

b) ISA77 Fossil Fuel Power Plant Standards Committee – Bob Hubby/Daniel Lee reported:
1) POWID Manual of Operations (MOP) Review
2) ½ page symposium ad scheduled for Mar/Apr of InTech
3) 2 symposium Email blasts to an ISA rented list
4) An advanced notice discussion was initiated by Cyrus Taft expressing a need for a schedule showing all publicity deadlines with the intent of getting ahead and eliminating the review rush.

Action: Don to request a schedule of publicity deadlines from Rodney.

c) Web Page – Gary Cohee (POWID WEB Page Coordinator) provided a written report - Both sites are up to date with a new sponsor logo to be added when it is available.

Continued on page 44
Website hits are 8,000 thus far this year vs. 7,000 last year at this time. Send in any new content for posting.

1) Power Community on isa.org – Dan Lee provided a written report. Technical paper database has been corrected on the ISA website. Ten more proceedings were scanned and nine submitted thus far. 60% are done and there are 20 years missing. 878 POWID papers thus far. More recent missing proceedings are 1991 and 1996-1998. Alan Zadiraka requested instructions regarding website access/links.

Action: Dan Lee to provide a brief article for the website with a link to the POWID technical papers.

2) Social networking, LinkedIn, FaceBook, & others – Alan Zadiraka requested that status change of websites should be posted on LinkedIn. Alan indicated eighty-eight (88) members are in the ISA POWID group, up from 40 in several months. Alan encouraged active use to promote POWID. Alan submitted an article in the upcoming newsletter.

3) POWID & POWIDTECH list-serves – There was no new information on list-serves.

d) External Marketing – Jason Makansi, External Marketing Coordinator, did not provide a report. Jason has been promoting POWID through his company email blasts. Don requested that the director and director-elect be added to the distribution list.

Action: Don to request Jason to add director and director-elect to email blast distribution.

e) ISA Marketing – Rodney provided information on the marketing plan coordinated by Becky Schneider of symposium & division marketing: email blast on 3/11; press release on keynote speakers; ½ page InTech ad in Mar/Apr; and press release with plans for a final MOU for EXCOM Ballot later this spring.

9. Symposium

a) POWID 2011, Charlotte, NC, June 5-9, 2011

Denny Younie reported so far 60+ abstracts with 50+ after reviews expected. Hotel space/food & beverage all arranged. There is a Sunday reception & 2 evening events by sponsors. Program is in review and will be available in next few days. Exhibits space is sold out, but booths still available. More attendees expected due to proximity to power related companies. Sponsors thus far: 1 Platinum- Invensys; 2 ISA Corporate Partners- GE Energy and OSIsoft; 4 Gold and many Silver: Emerson, Case M&I, Honeywell, Siemens, ABB, Areva, Consolidated Controls, Hurst Technology, PAS, REM, POWER Magazine, and Westinghouse. Expected attendance is 120 full registrations vs. 180 at Las Vegas, with additional speaker, vendor, one day and other registrations. Keynote speakers are Christopher Guith, Tim Roxey, Ken Thomas and Bob Lindemann, ISA President-elect. Leo Staples, ISA President, may also attend. Cyrus volunteered to MC Honors & Awards if Mike Skoncey is not able to attend.

b) POWID 2012, Austin, TX, June 3-8, 2012.

Gary Cohee volunteered to be the General Chair for POWID 2012. A ballot was conducted on the hotel and the Renaissance Hotel in Austin was chosen. Final contract is in the works and ISA will try to have information to handout at this year's symposium, particularly for the vendors to reserve a spot for next year.

c) POWID 2013, Date and Location TBD. Possible locations for 2013 include Albuquerque, Phoenix, Denver/Loveland, and San Diego.

10. ISA Automation Week

a) Houston TX – 2010 – Gordon McFarland and Tim McCreary served as Track Chair for the Energy Track. The Energy Track came off well and the main objectives for ISA were met; bring out the technical content. There was a change in the conference design restricting the exhibit hall to those registered for the conference, which caused many complaints. ISA has decided to change that policy in 2011.

b) Automation Week – Oct 17-20, 2011, Mobile, AL – Greg McMillan is serving as the Program Chair using a new track management system called Omnipress (not X-CD). No flash drives this year. The Exhibit section will have an open day (8-5 with pass), otherwise a $25 fee. Wednesday and Thursday offer more tech content for a $100 registration fee. There is an Energy & Environmental Track like last year. ISA has expressed an interest in having POWID members serve on this track.

11. Old Business

a) International POWID Sub-section – ISA has been in discussions with the ISA Delhi Section of India regarding the India POWID conference. The issues have not yet been resolved.

b) Section/Division MOU – Dan Lee coordinated an effort to draft a Memorandum of Understanding regarding ISA Sections and the POWID Division Symposium. The status of the MOU was discussed in the Long Range Planning meeting, A draft MOU will be distributed to EXCOM for comment with plans for a final MOU for EXCOM Ballot in 2012.

c) POWID eNews Prototype – Don Andrasik discussed the concept of the eNews prototype: an email sent to ISA POWID members with one or more abstracts (teasers) linked to existing technical papers with additional promotional information. Among other features, there would be a need for an Opt-out option. There has not been significant progress on the prototype.

Action: Don Andrasik to assess feasibility of eNews.

12. New Business

a) Long Range Planning Results – 2013 locations – West – Phoenix, Denver/Loveland and San Francisco/San Diego. If anyone has knowledge, please make suggestions. Cyrus will request ISA's Chesley to obtain proposals from these cities.


13. Time & Date of Next Meeting

The next meeting of the Power Industry Division Executive Committee will be held on Sunday, June 5th at the Embassy Suites Hotel in Concord, NC.

14. Adjournment

A motion to adjourn and via voice vote the motion was approved and the meeting was adjourned at 5 pm.
ISA77 Standards Committee
Meeting Minutes

Meeting: ISA77 Fossil Fuel Power Plant Standards Committee

Recorder: Daniel Lee
Date/Time: June 8, 2011
Location: Embassy Suite Hotel in Concord, NC

Attendees: Members
Daniel Lee (Co-Chair) Bob Hubby (Co-Chair) Edison Bortoni
Ed F. Gaoi Don Andrasik Dave Roney Curtis Jones
Gary Cohee Mike Skoncey Jacques Smuts
Danny Crow Cyrus Taft Denny Younie
Michael Cushing Paul Toigo
Jerry Gilman Joe Vavrek
Alex Lekick Allan Zadiraka
Xinsheng Lou Ellen Fussell-Policastro (ISA)
Gordon McFarland

Isaac77 Active Subcommittee Reports

<table>
<thead>
<tr>
<th>Committee</th>
<th>Published Date</th>
<th>Status - (EPR Date)</th>
<th>Chair Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISA77.10 Turbine Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISA77.13 Turbine Steam Bypass Systems</td>
<td>2008</td>
<td>Current Standard</td>
<td>Report not required</td>
</tr>
<tr>
<td>ISA77.14.01 Steam Turbine Controls</td>
<td>2010</td>
<td>Current Standard</td>
<td>Report not required</td>
</tr>
<tr>
<td>ISA77.20 Plant-wide Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISA77.20.01 Fossil Power Plant Simulators</td>
<td>2005</td>
<td>In Reaffirmation (2011 Q3)</td>
<td>Alex Lekich was in attendance and reported that the committee is scheduled to meet on June 9 (8:00am) to resolve outstanding comments from the ISA77 ballots. Alex reported that the committee is still reviewing all the referenced Applicable Standards. The revised draft has been prepared per the new ISA format. Currently the committee membership includes nine (9) voting members and 18 information members. Upon completion, the final draft will be resubmitted to SP 77.20 and SP 77 committee ballot.</td>
</tr>
</tbody>
</table>

Review & Approve Agenda
The ISA77 Committee meeting agenda was previously distributed with the meeting announcements. Dan requested a new item on Hydro Controls Standard Investigation be added under New Business. Dan asked if there were any other comments or corrections to the agenda. With no comments, Bob Hubby motioned that the revised agenda be approved as the meeting agenda. Mike Cushing seconded the motion and via voice vote the revised agenda was approved.

Review & Approve Minutes of Last Meeting
The February 23, 2011 ISA77 committee minutes was distributed electronically and an approval ballot was distributed electronically. From the electronic ballot, the meeting minutes were approved with only two editorial comments received. The minutes were correct and the updated minutes were submitted to the committee web site. Dan reported that in the future the ISA77 committee meeting minutes will be balloted via electronic ballots.

Co-Chair Opening Remarks
Dan reported that Ellen reviewed the committee chairs for the different committees. It was noted that the ISA77.42.01, ISA77.42.02, ISA77.70.01 and ISA77.70.02 have different standards chairs. It was decided that for the ISA database the ISA77.42 and ISA77.70 committees will be listed as co-chairs. The committee discussed if ISA77.70.01 and ISA77.02 should have different document numbers. After some discussion, any renumbering of documents will be addressed when the documents are up for reaffirmation.

Managing Director Opening Remarks
Joe Weiss was not present and did not submit a report. Dan has not received a copy of the last S&P meeting minutes thus, Dan was unable to report on the S&P Board activities.

Action: Joe to forward a copy of the current S&P Meeting minutes.
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<tr>
<td>ISA77.22.01 Power Plant Automation</td>
<td></td>
<td>New Standard (2011 Q4)</td>
<td>Henrik Johansen was not in attendance. Dan Lee reported that the ISA77.22.01 committee held one teleconference since the last physical meeting in February. The committee continues to edit the document with new author content and review/discussion of existing text. The committee is scheduled to meet on June 9 (1:00 pm) to continue drafting the document.</td>
</tr>
<tr>
<td>ISA77.40 Boiler Series</td>
<td></td>
<td>Draft (2011 Q4)</td>
<td>Dan reported that the current draft of the technical report has been updated and submitted to the committee web page and that the last meeting minutes was submitted to the committee web page. Dan reported that he had prepared and distributed a memo requesting a document number for this technical report. Dan called a teleconference to review this memo but the teleconference was poorly attended. It was decided to informally submit the memo and report to Tom McAvinew (S&amp;P 5.0 Chair) for his review and direction. Tom replied that he and Jim Carew (ISA5.1 chair) have reviewed the memo and document and believed the document should be under ISA5.1. Tom requested that that the memo should be officially sent. Dan has scheduled a short meeting on June 9 to review the draft memo with members of the committee. The plan is to officially obtain a document number and then proceed with the committee balloting.</td>
</tr>
<tr>
<td>ISA77.41.01 Boiler Combustion Controls</td>
<td>2010</td>
<td>Current Standard</td>
<td>Gordon McFarland (chair) was in attendance and informed the ISA77 committee that he will be retiring soon and wished to resign as committee chair. The committee acknowledged Gordon’s support of this standard and his support of the ISA77 committee. Dan asked members present if anybody wished to assume the position of chair for ISA77.41.01. After some discussion, Xinsheng Lou volunteered. Bob Hubby made a motion to approved Xinsheng as chair of ISA77.41.01 and Gary Cohee seconded the motion. Via voice vote the motion passed. <em>Action:</em> Ellen to update roster accordingly</td>
</tr>
<tr>
<td>ISA77.42.01 Feedwater Control – Drum Type</td>
<td>2006</td>
<td>Current Standard</td>
<td>Paul Tiago (chair) was in attendance and reported that the committee will meet on June 9 (10:00 am) to resolved ISA77 ballot comments. The ISA77.42.01 standard was approved by ISA77 but the subcommittee needs to resolve the comments. The ISA77.42.01 was issued for public review and no comments were received.</td>
</tr>
<tr>
<td>TR77.42.02 Feedwater Controls-Drum Level Measurement</td>
<td>2009</td>
<td>Current Technical Report</td>
<td>Cyrus Taft asked the question if TR77.42.02 should be combined with ISA77.42.01. After some discussion, the consensus was to keep the documents separate.</td>
</tr>
<tr>
<td>ISA77.43.01 Unit Plant Demand Development</td>
<td>2008</td>
<td>Current Standard</td>
<td>Report not required</td>
</tr>
<tr>
<td>ISA77.44.01 Steam Temperature Controls</td>
<td>2007</td>
<td>Current Standard</td>
<td>Report not required</td>
</tr>
<tr>
<td>ISA77.60 HMI Series</td>
<td></td>
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<tr>
<td>ISA77.60.02 Alarms</td>
<td>2010</td>
<td>Current Recommended Practice</td>
<td>Report not required</td>
</tr>
<tr>
<td>ISA77.60.04 CRT Displays</td>
<td>2008</td>
<td>Current Standard</td>
<td>Report not required</td>
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Liaison Reports

a) IEC TC65 Technical Advisory Group – Dave Roney reported that he did receive a 2011 registration to join this committee. However, his company did not approve to pay the registration fee and thus, he is not a member of this advisory group. Dan asked if anybody else is a member of this advisory group or wished to be a member. With no response the IEC TC65 Advisory Group liaison position will be removed from the agenda.

b) NFPA 85 – Dan Lee reported that the NFPA 85 Revisions 2011 has been published and is available through NFPA’s web site. The next revision publication is scheduled for 2015 and the revision cycle should start in 2013. Dan reported that NFPA created a new committee NFPA 56 titled “Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems”. Dan distributed a NFPA memo about the creation of this committee and the standards’ draft scope and purpose. Allan reported that NFPA is handling this standard under an emergency schedule due to recent incidents.

c) IEEE – Cyrus Taft was in attendance and reported on a recent statement by NIST on the importance of an industry standard for Smart Grid. It appears that IEEE is researching this topic.

d) ASME – Cyrus Taft was in attendance and no new activities were reported.

e) ISA101 – Bob Hubby was present and reported that a new draft is being updated and will be reissued for committee balloting. The committee is currently confirming voting status of some 70 committee members.

f) VGB – Henrik Johansen was not present and no report was submitted.

Old Business
Performance of Power Plant Control Systems: Dan reported that a temporary web site was created for ISA77.40.WG2 so that reference material can be stored and distributed. Various interested members provided reference material to Dan which was posted on the new web site. Ellen issued a call for new members from the ISA77 committee and those who respond become members of this working group. Dan was supposed to issue a public call for members but since there was no scope and purpose, Dan did not complete this task. The WG2 will meet tomorrow to solicit a committee chair, develop a scope and purpose and prepare a document outline. Dan opened the discussion as to the ISA77 document number for this new standard. After some discussion the committee agreed to use ISA77.30.01.

New Business:
Hydro Control Standards – Dan reported that Edison requested the ISA77 committee consider the possibility of creating a new standard on Hydro Power Plant Control. At first the committee discussed if Hydro fit within the ISA77 committee scope. After some discussion, it was decided that maybe the ISA77 scope should be expanded to include renewable energy (i.e., wind, solar, hydro). As hydro power plants include rotating machinery, the possibility exists to include this standard within the Turbine series standards. The committee decided to first research existing standards. Edison agreed to lead this effort.

Action: Dan Lee to discuss the possibility of expanding the ISA77 committee scope to include renewable energy with the S&P Department.

Action: ISA77 members are to research existing standards on Hydro Control and forward any reference to Edison. Edison will correlate and report at the next ISA77 committee meeting.

Time & Date of Next Meeting
Dan reported that the next ISA77 committee physical meeting will be held during the ISA Automation Week in Mobile Alabama at the Arthur R Outlaw Convention Center. Typically, the ISA77 subcommittee meetings are held on Tuesday morning and the ISA77 committee meets from 3:00 to 5:00 pm on Tuesday October 18, 2011. The sub-committee meetings and times will be determined and posted later.

Adjournment
Dan asked for a motion to adjourn. Bob motioned to adjourn the ISA77 committee meeting. Cyrus seconded the motion and via voice vote the ISA77 committee meeting was adjourned at 2:35 pm.