Director’s Message
By Gary Cohee

Hello to all of our ISA Power Industry Division (POWID) Members. The preparation of this Director’s Message for our POWID Summer 2006 Newsletter, “What’s Watt”, takes place just after our 16th Annual Joint ISA POWID/EPRI Controls and Instrumentation Conference has come to a close.

Before discussing our annual Conference, I want to make some announcements.

First, on the ISA Society level, Ron Hicks was selected by the ISA Honors and Awards Committee, and approved by the ISA Executive Board, as an ISA Fellow. This is indeed a prestigious honor that ISA bestows on a very few and select individuals. In addition Cyrus Taft was awarded the ISA E. G. Bailey Award. This award recognizes excellence in the design, development or application of instrumentation, systems, and automation in the utilities or process control industries. And Gordon McFarland was awarded the Standards and Practices Award. This award recognizes significant contributions in organizing, developing, or administering standards and practices. All three are members of the Power Industry Division Executive Committee. Congratulations Ron, Cyrus, and Gordon.

Second, POWID held its annual Honors and Awards Program on 5 June 2006, during the Conference. It gives me great pleasure to announce the following award recipients:

<table>
<thead>
<tr>
<th>ISA Power Industry Division 2006 Awards</th>
<th>Recipient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement Award</td>
<td>Donald Labbe</td>
</tr>
<tr>
<td>Outstanding Service Award</td>
<td>Denny Younie</td>
</tr>
<tr>
<td>Facilities Award</td>
<td>Entergy, Inc. Independence Steam Electric Station</td>
</tr>
<tr>
<td>2005 Best Paper Author</td>
<td>Jeffrey Phillips</td>
</tr>
</tbody>
</table>

Please check inside the newsletter for a full description of these awards, a biographical profile of the recipients for the Achievement and Outstanding Service award, and a photograph of the recipients receiving their plaques at our POWID Honors and Awards Program in San Jose, CA. There is also a reprint of our POWID 2005 Best Technical Paper. My sincerest congratulations to all of our POWID award recipients.

Third, it is my pleasure to inform you that your ISA Power Industry Division has been selected as the ISA “Outstanding Division” among the Industries and Sciences Divisions of ISA’s Automation and Technology and Industries and Sciences Department. POWID was selected by the ISA Honors and Awards Committee and approved by the ISA Executive Board during the ISA President’s Spring Meeting in Orlando, Florida. This is the 9th consecutive year that your Power Industry Division has been selected for this prestigious honor. My many thanks to all of the Power Industry Division Executive Committee Members and our Power Industry Division Members for your support and contributions that made this award and recognition possible. I hope you are able to attend the ISA Honors and Awards Banquet in Houston, Texas on 16 October, during ISA EXPO 2006, and see your Director proudly accept this award for our Division. Again, it is all of your collective efforts that have made this honor for our Division possible.

continued on page 2
**Director's Message, continued from page 1**

Let us also not forget the efforts of our past POWID Directors, Wayne Holland, Gordon McFarland, Roger Hull, Ron Hicks, Bob Hubby, and others who have cleared the path for our Division to consistently achieve this recognition.

I also want to inform you that your POWID Executive Committee approved Timothy Hurst of Hurst Technologies Corp and Jim Redmon with Southern California Edison as new Members on your POWID Executive Committee during our meeting held at ISA Headquarters in Research Triangle, NC on 28 February 2006. Welcome aboard Tim and Jim.

I am very pleased to report that our 16th Annual Joint ISA POWID/EPRI Controls and Instrumentation Conference, held in San Jose from 5-7 June 2006, was a success for the ISA Power Industry Division and for EPRI (Electric Power Research Institute). As our Conference name implies, this has been the 16th consecutive year that your ISA Power Industry Division has co-programmed with EPRI and this has been a very successful and rewarding partnership. We look forward to many more rewarding years jointly programming with EPRI for our annual conferences. This was also POWID's 49th consecutive year to have programmed an annual Conference. The success of this conference is due to the countless efforts of many individuals who made up our 2006 San Jose Conference Team, but I want to single out three individuals whose efforts made this success possible: Marjorie Widmeyer, who served as the 2006 Conference General Chair; Bob Webb, who served as the 2006 Conference ISA Program Chair; and, Don Labbe, who served as our 2006 Conference Paper Review Coordinator. I want to thank our Conference key sponsors who were Emerson, Invensys, and Power Magazine. Their contributions help to keep our Conference registration fees low. Please look for their banners within our newsletter. We also had twenty-one vendors participating in our product display booths. We also do not want to overlook the many contributions from our ISA support team of Rodney Jones, Sherrie Gorgi, and Loanna Overcash.

Looking at the calendar ahead, the ISA EXPO 2006 Conference and Exhibit will be held again in Houston, Texas, from 17-19 October 2006. Roger Hull is our POWID Conference Program Coordinator, and our Session Moderators are Danny Crow, Phil Reeves, and Allan Zadiraka. POWID will also be conducting a POWID Executive Committee meeting, Standards meetings, and don’t forget the ISA Honors and Awards Banquet on the evening of 16 October 2006. Our 17th Annual Joint ISA POWID/EPRI Controls and Instrumentation Conference (50th Anniversary ISA POWID Conference) will be held on 10-15 June 2007, at the Sheraton Station Square Hotel, Pittsburgh, PA, so mark your calendar. We have secured a $125/night rate at the hotel. Mike Skoncey and Allan Zadiraka have volunteered to serve as the ISA General Chair and ISA Program Chair, respectively. Please look for the Call for Papers in this newsletter for our upcoming 17th Annual Joint ISA POWID/EPRI Controls and Instrumentation Conference in Pittsburgh, PA. Mike and Allan are looking for Session Developers, Technical Paper Authors, and Panelists for a round table session. We are also looking to partner with key contributing Conference sponsors and will have product display booths available. Please contact Mike Skoncey (mskoncey@firstenergycorp.com) and Allan Zadiraka (ajzadiraka@babcock.com) for more details. Details for this Conference can also be found on our Conference Web site at [www.isa.org/powersymp](http://www.isa.org/powersymp).

Also, your POWID Executive Committee is seeking nominations for the “Robert N. Hubby ISA Power Industry Division Academic Scholarship”. Nominations will come from you, our ISA Power Industry Division Members, not from the students applying for the scholarship. You would be the student’s sponsor. Contact Michael Skoncey mskoncey@firstenergycorp.com, our POWID Honors and Awards Chair, on the application details.

If you have any questions or suggestions, please send me an email message at [garyacohee@aol.com](mailto:garyacohee@aol.com).

Best Regards,
Gary Cohee
2005-2006 ISA Power Industry Division Director

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**2006 POWID Awards**

We extend our appreciation and congratulations to the following recipients awarded for their contribution to our industry during the 49th Annual POWID Symposium/16th Joint ISA-EPRI Conference in San Jose, CA:

- **2006 General Chairman**
  - Marjorie Widmeyer

- **2006 Program Chairman**
  - Bob Webb

- **2006 EPRI Program Chairman**
  - Brandon Rasmussen

- **2005 Best Technical Paper Awards**
  - **1st Best Paper**
    - Jeffrey Phillips
    - *Instrumentation & Control Needs for Integrated Gasification Combined Cycles*
  - **2nd Best Paper**
    - Donald Labbe
    - *Entergy Independence NOx/Heat Rate Optimization and Steam Temperature Control with Neural Net/Model Predictive Control Combo*
  - **3rd Best Paper**
    - Ray Torok
    - *Performing Risk-Informed Defense-In-Depth and Diversity Assessments For Digital Upgrades in Nuclear Plants*

- **2006 POWID Facility Award**
  - Entergy, Inc.
  - Independence Station

- **2006 POWID Service Award**
  - Denny Younie

- **2006 POWID Achievement Award**
  - Don Labbe

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**Thank you to our 2006 Controls and Instrumentation Conference Sponsors**

- Emerson
- Invensys
- Power Magazine

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**2005-2006 ISA Power Industry Division Director**

Gary Cohee

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**Director's Message, continued from page 1**

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If you have any questions or suggestions, please send me an email message at [garyacohee@aol.com](mailto:garyacohee@aol.com).

Best Regards,
Gary Cohee
2005-2006 ISA Power Industry Division Director
Power Industry Honors And Awards

POWID 2006 Symposium – San Jose, CA

Each year the POWID Division of ISA honors its members with the following awards:

The **Achievement Award** is for the purpose of recognizing individuals whose efforts have advanced the generation of electrical power. These efforts are exemplified through the individual’s outstanding achievements, original design application, or special contributions toward the development of engineering concepts in the field of instrumentation and controls within the power industry.

The **Service Award** is for outstanding service in the field of instrumentation. The service of the individual must be noteworthy, exemplary, or exceed the normal duties of the office held. The service is of a nature that advances the stature of the Power Division and/or ISA.

The **Facility Award** was created to honor facilities that demonstrate innovative application of control systems or instrumentation technology within the power industry.

The **Technical Paper Awards** are awarded to four authors whose papers were voted best by reviewers and the Executive Committee (EXCOM) members. The papers that are reviewed to receive this award are the ones that are presented at POWID’s Annual Symposium and ISA’s Fall Conference.

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### History of the POWID Achievement Award

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>Alfred Watson</td>
<td>Westinghouse Electric Corp</td>
</tr>
<tr>
<td>1978</td>
<td>Oliver W. Durrant</td>
<td>Babcock &amp; Wilcox Company</td>
</tr>
<tr>
<td>1979</td>
<td>Samuel G. Dukelow</td>
<td>Bailey Control Company</td>
</tr>
<tr>
<td>1981</td>
<td>Richard H. Morse</td>
<td>Leeds &amp; Northrop Company</td>
</tr>
<tr>
<td>1983</td>
<td>Porter J. Womeldorf</td>
<td>Illinois Power Company</td>
</tr>
<tr>
<td>1984</td>
<td>Robert L. Criswell</td>
<td>Foster Wheeler Energy Corp.</td>
</tr>
<tr>
<td>1985</td>
<td>John E. Coles</td>
<td>New Orleans Public Service Co</td>
</tr>
<tr>
<td>1986</td>
<td>Robert N. Buschell</td>
<td>EBASCO Services, Inc</td>
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<tr>
<td>1987</td>
<td>Q. V. Chou</td>
<td>Ontario Hydro</td>
</tr>
<tr>
<td>1988</td>
<td>Peter J. Clelland</td>
<td>Philadelphia Electric Company</td>
</tr>
<tr>
<td>1989</td>
<td>Gordon McFarland</td>
<td>Combustion Engineering</td>
</tr>
<tr>
<td>1990</td>
<td>Paul Kenny</td>
<td>Sargent &amp; Lundy</td>
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<tr>
<td>1991</td>
<td>Richard Hottenstine</td>
<td>Gilbert/Commonwealth</td>
</tr>
<tr>
<td>1992</td>
<td>Joe Weiss</td>
<td>EPRI</td>
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<tr>
<td>1993</td>
<td>Harold Hopkins</td>
<td>Utility Products of Arizona</td>
</tr>
<tr>
<td>1994</td>
<td>Marjorie A. Widmeyer</td>
<td>Washington Public Power Supply</td>
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<tr>
<td>1995</td>
<td>Edwin M. Good</td>
<td>Florida Power Corp.</td>
</tr>
<tr>
<td>1996</td>
<td>Robert N. Hubby</td>
<td>MAX Control Systems</td>
</tr>
<tr>
<td>1997</td>
<td>Robert W. Hill</td>
<td>Amtech Services</td>
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<tr>
<td>1998</td>
<td>Cyrus Taft</td>
<td>EPRI</td>
</tr>
<tr>
<td>1999</td>
<td>Ron Johnson</td>
<td>Sargent &amp; Lundy</td>
</tr>
<tr>
<td>2000</td>
<td>Ron Hicks</td>
<td>Black &amp; Veatch</td>
</tr>
<tr>
<td>2001</td>
<td>Leon Gruber</td>
<td>Westinghouse</td>
</tr>
<tr>
<td>2002</td>
<td>Jim Batug</td>
<td>PP&amp;L Generation</td>
</tr>
<tr>
<td>2003</td>
<td>Frank Ryan</td>
<td>Leeds &amp; Northrop</td>
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<tr>
<td>2004</td>
<td>Don Christopher</td>
<td>Reliant Energy</td>
</tr>
<tr>
<td>2005</td>
<td>Jeffrey Williams</td>
<td>Emerson Process Management</td>
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<tr>
<td>2006</td>
<td>Don Labbe</td>
<td>Invensys Process Systems</td>
</tr>
</tbody>
</table>

2006 POWID Honor and Awards Luncheon in Review

by Michael J. Skoncey-Chairperson

**Luncheon Speaker**

This year’s luncheon speaker was Daniel Fenton-President/CEO San Jose Convention and Visitors Bureau. Dan provided the attendees with a talk on the San Jose’s points of interest. We thank Dan for taking the time from his busy schedule to talk to our attendees on the great city of San Jose.

**The Achievement Award**

This year’s recipient of the POWID Achievement Award is Don Labbe from Invensys. Don graduated from the University of Massachusetts with bachelor’s degree in Nuclear Engineering, and has worked in the power industry for over 30 years. Don’s career started at the GE Knolls Atomic Power Lab where he modeled reactor design methods. While at GE Don moved over to the fossil business side, where he designed and wrote a paper on combined cycle and ship propulsion systems. Don then moved on to Stone & Webster working and writing papers on Modeling Steam Temperatures, Sootblowing Optimization, NOx Automation, and Dual Fuel Firing. His next move was to Foxboro, now Invensys, where he continues his work on Model Predictive Control, NOx optimization, and Smart Sootblowing. During his career Don has published 33 papers and articles and has 4 patents. In 2005, Don was rewarded by his peers being elevated to ISA Fellow and given the E. G. Bailey Award. Don has elected to give his $4,000 scholarship that comes with our award to the Lowell Scholarship Fund at the University of Massachusetts. The Executive Committee again thanks and congratulates Don on his past work and achievements.

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The Service Award
This year’s recipient of the POWID Service Award was Denny Younie. Denny has worked tirelessly as the General Chairman to provide us with the 2004 & 2005 symposiums. Denny has been an ISA Member since 1998. His additional service has included being the chairman of SP77.14 Steam Turbine Controls subcommittee and being an Executive Committee member. Denny has spent over 30 years of his career in the instrumentation and control field, with over 23 years in the controls of rotating machinery. He is employed by the Wood Group Turbine Control Services as the Steam Turbine Global Market Manager. The Executive Committee thanks and congratulates you for your dedication to our Division.

The Facility Award
Entergy’s Independence Steam Electric Station

Entergy Independence Station
Newark, Arkansas
The two Entergy Independence units of Newark Arkansas were constructed in the early 80’s to provide clean power to the south central US. Each unit can produce in excess of 800 MW burning low emissions PRB coal. The units were originally designed for base load operation and featured electronic controls.

To meet changing load requirements of the new century a coordinated multi phased controls upgrade program was completed within a 3 year period for both units. The objective of the program was to enhance dispatch capability and improve unit availability with heat rate and emissions reductions.

The first phase was replacement of the Boiler Controls, Burner Management and Sootblowing Controls. Included was an upgrade of existing instrumentation and final drive elements essential to the dispatching and performance needs of both units. One example was the replacement of the 152 furnace damper drives on each unit by cost effective reliable drives which provided the means for the upcoming DCS to effectively control furnace fouling and reduce NOx emissions and later for the optimization system to achieve further NOx reductions.

A DCS based training simulator was included with the project to allow for design and checkout of control logic and operator displays, and for operator training prior to actual operation and for ongoing refresher classes.

The second phase was implementation of a dynamic optimization system with integral smart soot blow to further lower NOx emissions, extract more heat rate benefits, and improve steam temperature dynamic control. The instrumentation needs and base control design had been addressed earlier, which maximized the derived benefits of the optimization system.

The DCS upgrade provided coordinated load control with a 2 ½% load ramp capability. Automated mill start up sequences provided smooth on/off transitions for the coal mills allowing continuous ramping throughout the load range. Automatic regulatory control provided tight setpoint regulation of drum level and other critical parameters, reducing equipment stress and promoting longer component life. Furnace controls provided protection for furnace components and fouling conditions. The DCS fulfilled the dispatch and availability requirements of the controls upgrade program.

The optimization system produced additional NOx reductions of 25% with simultaneous heat rate benefits of 2/3% while achieving ramp rates of 3.3%. Side benefits of reduced tube erosion and lower thermal stress of high temperature components were also realized.

Past Facility Award Recipients

<table>
<thead>
<tr>
<th>Year</th>
<th>Utility</th>
<th>Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Entergy</td>
<td>Independence</td>
</tr>
<tr>
<td>2005</td>
<td>Constellation Energy</td>
<td>C.P. Crane</td>
</tr>
<tr>
<td>2004</td>
<td>TXU</td>
<td>Monticello</td>
</tr>
<tr>
<td>2003</td>
<td>Reliant Energy</td>
<td>Elrama</td>
</tr>
<tr>
<td>2002</td>
<td>Texas Genco</td>
<td>W. A. Parish</td>
</tr>
<tr>
<td>2001</td>
<td>Consumers Energy</td>
<td>J. H. Campbell</td>
</tr>
<tr>
<td>2000</td>
<td>Trans Alta Corp</td>
<td>Sundance</td>
</tr>
<tr>
<td>1999</td>
<td>Montana Dakota Utilities</td>
<td>Heskette</td>
</tr>
<tr>
<td>1997</td>
<td>Virginia Electric Power</td>
<td>Mount Storm</td>
</tr>
<tr>
<td>1995</td>
<td>Cenergy</td>
<td>Bibson</td>
</tr>
<tr>
<td>1995</td>
<td>Michigan State University</td>
<td>T.B. Simon</td>
</tr>
<tr>
<td>1994</td>
<td>Central &amp; Southwest</td>
<td>Oklaunion</td>
</tr>
<tr>
<td>1993</td>
<td>Alabama Power</td>
<td>Gaston</td>
</tr>
<tr>
<td>1992</td>
<td>Philadelphia Electric</td>
<td>Eddystone</td>
</tr>
</tbody>
</table>
Best POWID Technical Papers – 2004

Each year POWID recognizes the best paper(s) from the previous year’s conferences. The three best papers from 2005 are:


2nd Best Paper – Entergy Independence NOx/Heat Rate Optimization and Steam Temperature Control with Neural Net/Model Predictive Control Combo, by Donald Labbe

3rd Best Paper – Performing Risk-Informed Defense-In-Depth and Diversity Assessments For Digital Upgrades in Nuclear Plants, by Ray Torok

Although all three 2005 Best Papers are outstanding, the best of the best is included in this issue of What’s Watt for your reading enjoyment. The 2nd and 3rd Best Papers will be included in the next (Fall) newsletter.

Our appreciation and congratulations to all authors presenting at our conference, and especially to the above authors for their time and effort to develop papers of excellence.

Future ISA/POWID International Conferences:

ISA Power Industry Division:
Pittsburgh, PA 10-15 June 2007
Phoenix, AZ June 2008

ISA EXPOS
Houston, TX 17-19 Oct 2006
Houston, TX 2-4 Oct 2007

50th Anniversary POWID Symposium

On 10-15 June 2007, ISA will host the 50th POWID Symposium and in partnership with EPRI the 17th Annual Joint ISA POWID/EPRI on Controls and Instrumentation Conference in Pittsburgh, PA. The conference will provide power industry leaders with information on the latest innovations in instrumentation, automation, security, and business systems technology.

In 1958, the United States launched its first space satellite, Elvis Presley was inducted into the US Army, and Pan American Airways began regular jet airline service from New York to Paris. In May of that same year, the first Power Instrumentation conference was held in New York City with approximately 50 people in attendance. H. H. Johnson was the General Chairman and W. D. Burns was the Program Chairman. The conference was such a rousing success that it was repeated the following year in Kansas City where the attendance jumped to 235.

Since that time, the Power Division of ISA has held a conference every year at various locations across the USA and Canada. The conference has become an international event with participants from around the world. In 1992, EPRI (Electric Power Research Institute) came on board as a co-sponsor of the event. In addition to the technical sessions, the conference also hosts various interest group meetings, ISA Power Plant Standards working group meetings, and vendor exhibits.

To mark the 50th anniversary, the programming committee is planning a number of special events to make this a trip worth remembering:

• Sunday night reception
• Tuesday night 50th anniversary dinner
• A great spouse’s itinerary, so bring your significant other to help celebrate this event
• A keepsake gift will be given to early registrants, to commemorate the anniversary

So mark your calendar and join us in celebrating this milestone in POWID history, and don’t forget to register early for your special gift.

2007 Program Committee

Michael Skoncey General Chairperson
Allan Zadiraka ISA Program Co-Chair
Aaron Hussey EPRI Program Co-Chair
Daniel Lee POWID Director
Cyrus Taft POWID Director Elect
Tim Hurst Paper Review Coordinator
Mike Skoncey Honors and Awards Coordinator
Joe Vavrek Publicity Coordinator
Rodney Jones ISA Staff Contact

P.S. The 2007 U.S. Open will be played next year at Oakmont Country Club, Oakmont PA just outside of Pittsburgh on 14-17 June, which is the weekend after our conference. So you golf enthusiasts might be interested in staying for the Open. Better get your tickets early, supplies are limited.
2 May 2006

Mr Gary A. Colec
Applied Control Systems
PO Box 5847
Beaumont, TX 77726-5847

Dear Gary:

Congratulations!

Based on the deliberations of the ISA Honors & Awards Committee and approval of the ISA Executive Board, the Power Industry Division was voted Outstanding Division from the Industries & Sciences Department.

Award presentations will be made at the Annual ISA Honors & Awards Banquet which will be held on Monday evening, 16 October at the Hyatt Regency Hotel in Houston, Texas, USA. This outstanding and enjoyable event is our opportunity to provide recognition and express appreciation for your outstanding achievement. I hope you will be able to attend to accept this award on behalf of the Division.

Again, congratulations to you and the Power Industry Division on receiving this honor.

Sincerely,

Kenneth R. Baker
President

KR/Bdwe
Enclosure: RSVP
cc: Paul Grahn, Industries & Sciences Vice President
2007 Power Industry Division Facilities Award Nomination Form

Facility Name: ____________________________________________________________

Location: ________________________________________________________________

Description of Facility: ___________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

What is Innovative about it? ________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

What was learned? _________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

What are the Benefits to the?

Facility _________________________________________________________________

Industry _________________________________________________________________

ISA/Power Industry Division _______________________________________________

Examples:

Productivity
Reliability
Operating Flexibility
Efficiency
Availability

Who to Contact at the Facility for more Information? ____________________________

________________________________________________________________________
Key Project Dates:

- **Start:**
- **Installation:**
- **Testing Period:**
- **In-Service:**

Major Contributors:

- 
- 
- 
- 
- 

Other Awards received by the Facility:

- 
- 
- 
- 
- 

Additional Comments:

- 
- 
- 
- 
- 

Nomination Submitted By:

- 

Name, Address, and Phone Number of Nominator:

- 
- 
- 

Note: Please submit nomination by 1 February 2007
2007 Power Industry Division Achievement Award Nomination Form

This award was created for the purpose of recognizing individuals for their outstanding achievement, original design application, or special contribution toward the development of engineering concepts in the field of instrumentation and controls for the advancement of electric power generation.

Nominees Name: __________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________

What was their Outstanding Achievement, Original Design or Contribution to the Power Industry:_______________________________
__________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
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Additional Comments: _____________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
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Nomination Submitted By:__________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
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Name, Address, and Phone Number of Nominator: ___________________________________________________________________________
__________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________
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Note: Please submit nomination by 1 February 2007
2007 Service Award Nomination Form

This award is for outstanding service in the field of instrumentation within the Power Industry. The service of the individual is to be noteworthy, exemplary, or unique and exceeds the normal duties of the office or position held. The service is of a nature that advances the stature of the Power Industry Division and/or ISA.

Nominees Name: __________________________________________________________________________________________________________
________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________

Contributions to the ISA Power Industry Division or the ISA Society:____________________________________________________________
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________________________________________________________________________________________________________________________
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Additional Comments: _____________________________________________________________________________________________________
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Nomination Submitted By:__________________________________________________________________________________________________
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Name, Address, and Phone Number of Nominator: ___________________________________________________________________________
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Note: Please submit nomination by 1 February 2007
2007
ISA POWER INDUSTRY DIVISION
ROBERT N. HUBBY ACADEMIC SCHOLARSHIP
APPLICATION FORM

Postmark Deadline: 15 January 2007
Applications must be received by 19 January 2007
All Application materials must be submitted in English

ELIGIBILITY REQUIREMENTS

All Applicants Must:
- Currently be enrolled in an undergraduate program in a Power Industry related field (e.g. Mechanical / Electrical Engineering or Computer Science) at an educational institution in their country of residence.
- Four year degree program applicants must be in their sophomore year or higher of their study or its equivalent
- Applicants must be full-time students in an accredited educational institution and have at least an overall GPA of 3.0 on a 4.0 scale.

Please print legibly using black or blue ink or type.

<table>
<thead>
<tr>
<th>PERSONAL INFORMATION</th>
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<tr>
<td>Last Name</td>
<td>First Name</td>
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<tr>
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<td>City</td>
<td>State/Province</td>
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| E-Mail Address | Home Telephone Number |

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<th>EDUCATIONAL DATA</th>
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<td>Current Enrollment: College or University Name</td>
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<td>College or University Address (City / State / Postal Code / Country)</td>
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### Beginning Year

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<th>College / University Undergraduate Major</th>
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### Expected Date of Graduation

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<th>What type of degree will applicant earn upon graduation? (Please place a check in the appropriate box)</th>
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<tr>
<td>Associate</td>
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### REFERENCE LETTERS

Two letters of recommendation are required. At least one of the letters should be from a faculty member who is familiar with the applicant’s educational program. Faculty recommendations must be on college/university letterhead. The references should comment on the applicant’s character and potential leadership, or for making a significant contribution to the instrumentation, systems, and automation profession in the Power Generation Industry. This can be based on the applicant’s course work, projects, or activities. A confidential recommendation is not required. Each letter of recommendation must be signed by the person making the recommendation and attached to this form by the Submitter.

Note: If the person providing the letter wishes to write a confidential reference, he or she should place the original letter in a sealed envelope and have the Submitter include it with the application.

### ADDITIONAL SUPPORTING INFORMATION

Submitter should include the following information in his or her application package:

1. **Educational Record, Activities, and Honors**
   - Include an official copy of all post high school transcripts with this application that includes all courses attempted and/or completed to date. Degree audit forms and web documents are not acceptable. Be sure all transcripts are legible.
   - List career-related extracurricular activities in which you have participated.
   - List any non-career related activities
   - List academic honors, civic honors, or awards you have received
   - List any professional and honorary society memberships

2. **Employment Record / Work Experience**
   - List all jobs the applicant has held. Include the name of the employers, the dates of employment, and the type of work you performed.

3. **Essay Question**
   - The applicant shall describe his or her ambitions and qualifications as an innovator or future leader in a career in the instrumentation, systems, or automation field within the Power Generation Industry. Applicant shall describe his or her career objectives and how the award of the ISA Power Industry Division academic scholarship would help him or her to attain his or her objective. Explain why you want to enter this particular field of engineering or computer science. Comment on what you have achieved and learned through your studies and activities, and what this indicates about your character and determination. Your essay should not exceed 400 words and should be typed and double-spaced.

4. **Submitter’s Reason for Submitting this Applicant**
   - Submitter shall write a paragraph describing why he is submitting this applicant for this scholarship.

### APPLICANT’S CERTIFICATION

Applicant authorizes his or her college/university to make available to ISA information concerning their academic records. The applicant shall understand that falsification of any information disqualifies the applicant for any current or future scholarships. The applicant also understands that all applicants will be evaluated on educational achievement, work experience, and their submitted essay. Submission of an application in no way guarantees that a scholarship will be awarded. Incomplete applications will not be considered.

Name________________________ Signature________________________
Address________________________ City________________________ State________________________
Date ___________ Telephone ___________ Email Address ___________

SUBMITTER'S CERTIFICATION
I hereby certify that all information submitted on this application is true and accurate to the best of my knowledge and I currently am a member of ISA and the ISA Power Industry Division.

Name ______________________________ Signature ____________________________
Address ____________________________ City ___________ State ___________
Telephone __________________________ Email Address _______________________
Date ___________________________ ISA Membership Number ___________________

Mailing Instructions
Send three copies (one original and two copies) of the application and required documentation. Each copy should be stapled with attachments in the following order:

- Completed application
- Two Reference Letters
- Transcript (original transcript with raised seal should accompany original application)
- Awards and Honors / Extracurricular Activities
- Employment History
- Essay
- Submitters reason for submitting application

Mail the original and two copies unfolded in an envelope postmarked no later than 19 January to:

Michael J. Skoncey
ISA POWID - Honor and Awards Coordinator
First Energy Generation Corp.
W.H. Sammis Plant
P.O. Box 176, Route 7
Stratton, OH 43961
U.S.A.

APPLICATION MUST BE POSTMARKED BY 15 JANUARY 2007
AND RECEIVED BY 19 JANUARY 2007, TO BE ELIGIBLE FOR AWARD

Scholarship reviews will begin 20 January 2007. Scholarship recipient will be notified electronically by 30 April 2007. Scholarship recipient will be requested to attend the ISA Power Industry Division’s Annual Symposium Honors and Awards Luncheon to receive his or her award. This Luncheon will be held on 11 June 2007, at Sheraton Station Square Hotel in Pittsburgh, Pennsylvania, during the 17th Annual Joint ISA/EPRI Controls and Instrumentation Conference. It is not a requirement for the scholarship recipient to attend this Luncheon to receive the scholarship. The ISA Power Industry Division will reimburse the scholarship recipient for his or her reasonable travel expenses to this Conference and will provide a complimentary Conference registration. Individuals not being awarded a scholarship will be notified by 1 May 2007.

Do not contact ISA for application status. No application or associated documentation will be returned to applicants. More information about the ISA Power Industry Division can be found at www.isa.org/~powid.
I & C Needs of Integrated Gasification Combined Cycles

Jeffrey N. Phillips
Project Manager
Future Coal Generation Options
Electric Power Research Institute
Charlotte, NC 28262

KEYWORDS
Gasification, Coal, Sensors, Combustion Turbines, Air Separation Units, Integrated Control Strategies

ABSTRACT
Integrated gasification combined cycle (IGCC) power plants are a promising technology for clean coal-based power generation. However, the experience of the first few commercial units has shown that system reliability has been significantly lower than that of conventional coal power plants. Innovations in instrument and control technology could help reverse this trend. This paper reviews the primary opportunities for improvement in instrument and controls of an IGCC on a section by section basis.

INTRODUCTION
Integrated gasification combined cycle plants produce power using solid fuels such as coal and petroleum coke and approach both the environmental benefits of a natural gas-fueled plant and the thermal performance of a combined cycle. In its simplest form, the solid fuel is gasified with either oxygen or air, and the resulting raw gas (called syngas, an abbreviation for synthetic gas) is cooled, cleaned of particulate matter and sulfur species, and fired in a combustion turbine. By removing the emission-forming constituents from the gas under pressure prior to combustion in the power block, IGCC plants can economically meet extremely stringent air emission standards. The hot exhaust from the combustion turbine passes to a heat recovery steam generator (HRSG) where steam is produce that drives a steam turbine. Power is produced from both the combustion and steam turbines; hence the name combined cycle (1). A block flow diagram of an IGCC system is shown in Figure 1.

Commercial and near commercial sized plants using IGCC technologies have now accumulated several years of operating experience. There are currently two commercial-sized, coal-based IGCC plant projects operating in the US and two in Europe. The essential characteristics of these plants are shown in Table 1 (2).
Table 1 - Major Coal-based IGCC Plants

<table>
<thead>
<tr>
<th>Project Name / Location</th>
<th>Combustion Turbine</th>
<th>Gasification Technology</th>
<th>Net Output MW</th>
<th>Start-up Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUON (formerly Demkolec) / Buggenum, The Netherlands</td>
<td>Siemens V 94.2</td>
<td>Shell</td>
<td>253</td>
<td>January 1994</td>
</tr>
<tr>
<td>Wabash River / Indiana</td>
<td>GE 7 FA</td>
<td>E Gas (ConocoPhillips)</td>
<td>262</td>
<td>October 1995</td>
</tr>
<tr>
<td>Tampa Electric Co. / Polk Power Station / Florida</td>
<td>GE 7 FA</td>
<td>Texaco (GE Energy)</td>
<td>250</td>
<td>September 1996</td>
</tr>
<tr>
<td>ELCOGAS / Puertollano, Spain</td>
<td>Siemens V 94.3</td>
<td>Prenflo (now marketed as Shell)</td>
<td>300</td>
<td>December 1997</td>
</tr>
</tbody>
</table>

The main challenges with regard to the widespread adoption of this technology are: (i) demonstration of high availability equal to or better than existing direct Pulverized Coal (PC) plants and (ii) capital cost reduction to compete with state-of-the-art PC plants and natural gas based combined cycles. The first challenge is illustrated by the availability data of the four IGCC plants shown in Figure 2. Availability factors for conventional pulverized coal combustion power plants are typically in the range of 85 to 90%, with the best approaching 95%. This means that 85 to 90% of the time a typical PC plant is available to operate. When a plant is not available to operate it is typically because of either planned or unplanned maintenance activity.

The trends shown in Figure 2 indicate that the four IGCC plants have taken four to five years to reach availability factors between 60 and 80% and that none have reached the levels typical for conventional coal plants.

It should note that the data in Figure 2 exclude the impact of combined cycle operation on back-up fuels. All four plants are capable of operating on natural gas or distillate fuel when syngas is not available. The Tampa Electric plant, for example, has exceeded 85% availability for 6 of the last 7 years when operation on back-up fuel is also considered. However, because of the high price of natural gas and distillate compared to coal, the economics of an IGCC is strongly influenced by its coal-fueled availability.

Based on analysis of the causes of unscheduled outages at the four IGCCs listed in Table 1, and discussions with major IGCC technology suppliers as well as key staff at the US Department of Energy, the Electric Power Research Institute (EPRI) believes that improvements in instrumentation and control technology could have a significant positive impact on the coal-fueled availability of IGCCs. The key areas where those I&C improvements are needed are described in this paper.
COAL FEEDING I&C NEEDS

Accurately monitoring the quality and quantity of coal being fed to a gasifier is critical to maintaining smooth operation. In an ideal gasifier, only enough oxygen would be injected as is needed to react with the carbon in the coal based on the simplified chemical reaction:

\[ C + \frac{1}{2}O_2 \rightarrow CO \]  \hspace{1cm} (1)

In a real gasifier however, additional oxygen is added in order to convert some of the carbon monoxide (CO) to carbon dioxide (CO2):

\[ CO + \frac{1}{2}O_2 \rightarrow CO_2 \]  \hspace{1cm} (2)

This second reaction is highly exothermic and generates the heat needed to drive the other gasification reactions. High temperatures are also needed to ensure operation above the slagging temperature, or melting point, of the coal’s ash. Since direct measurement of the gasifier operating temperature is difficult (see the discussion under the next heading) the gasifier operating conditions are usually controlled by monitoring the amount of CO\textsubscript{2} in the syngas. This can be thought of as the gasification equivalent of the O\textsubscript{2} concentration in a boiler’s stack gas. A schematic diagram for this gasifier control strategy is shown in Figure 3.

If coal quality rapidly changes, such as an increase in the amount of ash or a change in the oxygen or moisture content of the coal, it may take several minutes or longer for the full impact of this change to be detected by the gas composition analyzer. During that time the temperature within the gasifier may fall and the slag may freeze or the amount of unconverted carbon in the solids exiting the gasifier may rise to levels that cause difficulties in the downstream processing.

An on-line coal quality analyzer would help greatly by providing plant operators and the gasifier control system with “advanced warning” of changes in coal quality that might adversely impact the gasification operations. Percent ash content and the percentages of the major ash species (alumina, silica, and oxides of calcium and iron) are the most important attributes that need to be monitored for all types of slagging gasifiers. Also, for gasifiers which use coal-water slurry to feed the gasifier, the percent water content of the slurry is an important parameter to monitor.

An accurate coal feed rate meter is a second need for this section of an IGCC. Coal is injected into a gasifier in one of two modes: dense-phase, pneumatic transport or as coal-water slurry. In either mode the coal flow is at high pressure (>2 MPa) as the gasifier is also operated at high pressure in order to produce a syngas suitable for feeding the combustion turbine. Both transport modes are difficult to measure with accuracy of the full range of gasifier operating conditions including start-up and shutdowns.
GASIFIER I&C NEEDS

There are two generic types of gasifier vessel designs. One uses multiple layers of refractory brick to insulate the metal pressure containing vessel wall from the hot gasification reaction zone (typically >1400°C in a slagging gasifier). The other uses a water-cooled “membrane wall in which boiler tubes are welded together to form a continuous wall around the reaction zone. A thick, metal pressure shell behind the membrane contains the process pressure.

The refractory-lined vessel design is considerably cheaper to build than the membrane wall construction. However, the refractory is worn down by chemical attack from the gasification products and the molten slag and it also suffers from thermal fatigue fractures due to the large temperature cycles experienced during start-ups and shutdowns. This refractory typically must be replaced every 6 to 18 months at a cost of about $1 million including materials and labor.(3)

Because of the high cost of replacement, a gasifier owner wants to extend the use of given set of refractory for as long as is prudent. However, given the substantial damage that could be caused to the pressure shell if the refractory is allowed to deteriorate too much, gasifier owners also periodically inspect the condition of the refractory. Unfortunately, such an inspection requires the process to be shutdown and cooled off before staff can enter the gasifier. The distance from the gasifier centerline to the refractory surface is then measured at various places within the gasifier to get an overview of the state of the refractory. A new measurement system is needed which would allow the contour of the refractory surface to be mapped without a person having to enter the gasifier. Ideally this mapping should take place while the gasifier is operating to minimize downtime. Less ideally, but still an improvement over the current state-of-the-art, would be a system that mapped the refractory while the gasifier was shutdown but still hot. This would allow the gasifier to be quickly restarted after the mapping and minimize thermal fatigue on the refractory.

A second approach to refractory monitoring could be a system that inferred the refractory condition by monitoring the temperatures on the cold side of the refractory. The key would be having complete coverage of the refractory while minimizing the number of sensors to keep both initial cost and on-going O&M costs low.

A second part of the gasifier system which requires frequent maintenance is the feed injector. This is particularly true for gasifiers fed by coal-water slurries. Drops from the slurry can impinge on the injector’s metal surface causing failure due to thermal fatigue cracking. According to the U.S. Department of Energy, typical injector life in a slurry-fed gasifier is between two and six months. (3)

In order to avoid unnecessary shutdowns, it would be useful to have a feed injector integrity monitoring system which could advise operators on when an injector needed to be replaced.

Slag viscosity measurement is another important I&C need in the gasifier. The operating conditions within a gasifier are typically dictated by two considerations: adequate carbon conversion and staying above the ash melting point of the coal. One way to achieve both is to “overfire” the gasifier by sending more oxygen to the gasifier. However, this harms the overall efficiency of an IGCC by
increasing the parasitic power load of the air separation unit, and, in the case a refractory-lined gasifier, it also shortens the life of the refractory.

For most coals the ash melting point is more constraining than carbon conversion considerations and therefore sets the operating temperature of the gasifier. If the composition of the ash changes, the viscosity versus temperature characteristic of the slag will also change. This means the appropriate operating temperature of the gasifier should also change to avoid either overfiring or freezing of the slag within the gasifier.

An indication of the slag viscosity at the point where the slag exits the gasifier would be a valuable tool for gasifier operators. This tool could take the form of an actual viscosity measurement, or a measurement of the thickness of the molten slag layer (an increasing thickness would be an indication of the need for a hotter gasifier), or an estimated viscosity derived from the composition of the ash in the gasifier feed stream. The latter approach would have to recognize that some partitioning of the ash species occurs within the gasifier with more volatile species exiting with the gas phase.

A companion to the slag viscosity measurement is the need for an accurate measurement of the gas phase temperature within the gasifier. The two most important locations for monitoring temperature are where the slag exits the gasifier and where the syngas exits the gasifier. In some gasifiers, this is the same location (i.e., down-fired gasifiers have both slag and syngas exiting at the bottom).

Because of the challenging physical conditions within the gas phase of a gasifier, direct measurement of the syngas temperature has not been successful. Instead the temperature is measured at some point downstream of the gasifier, and the gasifier exit temperature is estimated from an energy balance around the equipment between the gasifier exit and the measurement point. The accuracy of such an approach suffers due to the large number of parameters that impact the calculation including gas composition and flow rate. The calculation is particularly inaccurate during non steady-state operation such as start-up and load changes.

Rapid, on-line syngas composition measurement is the final important I&C need in the gasifier section of an IGCC. As indicated in Figure 3, the main control loop for the gasifier oxygen-to-coal ratio depends on measuring the syngas CO₂ composition. Currently, syngas composition is measured by taking a gas sample downstream of the gasifier after the gas has been cooled and particulates have been removed. Typical raw syngas analyses are shown in Table 2. The sample is then sent to a gas chromatograph (GC). Because of the cycle time of the GC and the residence time it takes for the syngas to travel from the gasifier to the sample point, it can take as long as 5 minutes for a change in gasifier operating conditions to be reflected in the syngas analysis.

In order to have rapid feedback between changes in the gasifier feed control valves and the syngas composition; it would be helpful to have a composition measurement that analyzed the composition at the gasifier exit. A tunable laser absorption-based system could be a potential solution, if it could be made reliable enough for control system use. Keeping an optical port open in a slagging environment will be one the challenges.
Table 2 – Typical raw syngas composition of three commercial coal gasification processes (trace species not included)

<table>
<thead>
<tr>
<th></th>
<th>Syngas A</th>
<th>Syngas B</th>
<th>Syngas C</th>
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<tr>
<td></td>
<td>%vol</td>
<td>%vol</td>
<td>%vol</td>
</tr>
<tr>
<td>Ar</td>
<td>1.02</td>
<td>0.93</td>
<td>1.13</td>
</tr>
<tr>
<td>CH₄</td>
<td>1.10</td>
<td>0.03</td>
<td>0.06</td>
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<tr>
<td>CO</td>
<td>52.33</td>
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<td>CO₂</td>
<td>10.90</td>
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<tr>
<td>H₂</td>
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<tr>
<td>H₂O</td>
<td>0.95</td>
<td>1.23</td>
<td>0.18</td>
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<tr>
<td>H₂S</td>
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<td>0.69</td>
<td>0.58</td>
</tr>
<tr>
<td>N₂</td>
<td>0.93</td>
<td>4.42</td>
<td>0.81</td>
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<tr>
<td>Sum</td>
<td>100.00</td>
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<td>100.00</td>
</tr>
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</table>

**SOLIDS HANDLING I&C NEEDS**

Downstream of the gasifier the syngas is cooled in a waste heat boiler, and then the entrained solids are removed in a either a rigid barrier, pulse-cleaned filter or a venturi scrubber. The advantage of the former is the solids are captured dry and can be sold for use in cement if low in carbon or recycled to the gasifier if high in carbon. It also simplifies the treatment process for any water which condenses out of the syngas downstream of the filter as that water is solids-free.

However, if one of the filter elements should fail, it is important to quickly detect this failure and shutdown the gasifier before the downstream equipment is fouled by flyash and char. A system for detecting filter element failure is therefore another IGCC I&C need.

Several dry solids removal systems have caused outages when collected solids built up at the bottom of the filter vessels due to plugging of the solids depressurization path. The level of the solids eventually reached the filter elements and ultimately caused the elements to break. A reliable level detection system that will trip the process before the solids reach the level of the filter elements is the second I&C need of the solids removal section.

Ideally the level detection should not be based on a radiation source as this brings additional regulatory and training requirements to the maintenance of the plant.

**“BLACK WATER” HANDLING I&C NEEDS**

For IGCCs which do not have a dry solids filter, the water which circulates through the venturi scrubbers is a dilute slurry of flyash, char and water. For obvious reasons this slurry is often referred to as “black water”. The black water contains dissolved gases such as H₂S and CO₂ as well as chlorides and ammonia. The resulting mixture can have a widely varying pH depending on the syngas.
composition, the chloride content of the coal, and the amount of blowdown from the circulating flow. Reliable, on-line pH measurement is required in order to adequately control the pH of the black water. If pH is allowed to swing, dissolved solids can precipitate out and plug the piping with calcium carbonate and other solids.

Unfortunately, the combination of high pressure and moderately high temperature (circa 200°C) is not suitable for most pH meters. Depressurizing and cooling a slipstream sample of the black water typically causes the pH to change and therefore does not provide a true indication of the process. Reliable pH meters that can operate at the process temperature and pressure and also not be fouled by the solids in the black water are needed.

Also needed for controlling the black water system are flow meters which can stand up to the combination of high pressure, 200°C, and solids loading. Magmeters would be a logical solution if their electronics could be designed to withstand the process temperature.

**COMBUSTION TURBINE I&C NEEDS**

Combustion turbine OEMs are concerned about the quality of the syngas being sent to their turbines. In order to adequately control the combustion process, the heating value of the syngas must be known. Rapid, on-line analysis of the fuel composition, from which heating value can be calculated, or rapid, direct analysis of the heating value is needed. GCs do not provide the response time needed for this application. As with the gasifier syngas measurement, tunable laser absorption is a potential application here.

In addition to knowing the composition of the major species of the syngas which contribute to the heat value, combustion turbine manufacturers also want to know if any species which could be harmful to the turbine are in the syngas. Such a measurement could be used to trigger a switch to a back-up fuel such as natural gas or distillate fuel oil until the syngas is back within the manufacturer’s specified limits. Among the items of interest are particulate matter, metal carbonyls, arsenic, and vanadium.

**AIR SEPARATION UNIT I&C NEEDS**

Despite the fact that an air separation unit (ASU) is considered commercially mature technology, at least three commercial IGCC power plants have suffered lengthy outages due to failures associated with the control of the main air compressor in their ASUs.(4,5,6). In two cases the actuator systems for the main air compressor inlet guide vanes proved to be inadequate. In the third case an error in the surge control logic led to damage to the compressor’s third stage. Based on these experiences, more care in the design of the ASU control system is clearly needed.
GENERAL IGCC I&C NEEDS

A cost-effective process protection system is an important need for IGCCs. Nuisance trips caused by instrument failures are particularly costly to IGCCs due to their relatively long shutdown and start-up cycles. These types of trips can be limited by using multiple voting logic (e.g., 2 out of 3). However, additional instrumentation adds additional costs. Recommendations on cost-effective, yet safe protection system designs are needed.

Advanced, integrated control strategies are a final I&C need for IGCC power plants. An IGCC contains at least four separate processes which can have strong interactions on one or more of the other processes: ASU, gasification, syngas clean-up including sulfur recovery and the combined cycle. Three of these processes (ASU, sulfur recovery, and the combined cycle) are typically supplied by a vendor that is independent of the gasification process supplier and often are provided with independent control systems. Improved control strategies are needed to ensure that the IGCC process as a whole operates as close to its optimum as possible over the full range of operating conditions (i.e., varying ambient conditions and varying load levels).

The interaction between the combustion turbine and the ASU is one example. The air fed to the ASU can come from one of two sources: a bleed stream from the combustion turbine compressor discharge or a stand-alone air compressor driven by an electric motor. Optimizing the amount of air that comes from the two sources is not an intuitively obvious task. Increasing the bleed flow from the combustion turbine lowers the pressure ratio of the turbine which has an impact on the power cycle’s efficiency. However, under some ambient and load conditions, some air must be bled from the combustion turbine compressor in order to avoid surge. Reducing the load of the stand-alone air compressor, on the other hand, may cause it to operate at a lower efficiency. Sophisticated controls are needed to find the “sweet spot” for both machines.

A second example is the start-up procedure of the IGCC. If all of the equipment is at ambient temperature due to a long maintenance outage, a start-up can take more than 4 days. Most of that time to spent cooling down the ASU to cryogenic conditions. Also, once the gasifier begins producing syngas, that syngas must be flared until it meets all the specifications for the combustion turbine, principally supply pressure and sulfur content. This “lining out” of the process can take up to two hours from the time coal first enters the gasifier until flaring has stopped. In addition to the cost of the coal which goes to waste, the emissions from the flare are also an unwanted situation. A control strategy to minimize the ASU cool down period and the flaring time would be welcomed developments.

REFERENCES


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Presented at the 15th Annual Joint ISA POWID/EPRI Controls and Instrumentation Conference
48th Annual ISA POWID Symposium, 5-10 June 2005, Nashville, TN


![Figure 1 - IGCC Process block diagram.](image)

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Presented at the 15th Annual Joint ISA POWID/EPRI Controls and Instrumentation Conference
48th Annual ISA POWID Symposium, 5-10 June 2005, Nashville, TN
Figure 2 – Availability and Capacity Factor (CF) data for the four coal-based IGCC units described in Table 1. Note that capacity factors are typically 5 to 10 points lower than availability.
Figure 3 – A schematic diagram of the syngas composition control loop.
A Golden Celebration of Innovations and Technologies
Visiting the Past, Examining the Present, and Looking to the Future

10-15 June 2007 Pittsburgh, Pennsylvania

The 17th Annual Joint ISA POWID/EPRI Controls & Instrumentation Conference will take place June 10-15, 2007 in Pittsburgh, Pennsylvania. This conference will celebrate the 50th anniversary of the ISA POWID’s symposium. What a better place to celebrate this occasion then the birthplace of ISA, which started in Pittsburgh in 1945. So mark these dates on next year’s calendar and join us in celebrating this important milestone along with reviewing the past and gaining new knowledge within our industry. You don’t want to miss this!

Some of the topical areas for this conference are listed below. Focus is encouraged on some aspect of the conference theme, “A Golden Celebration of Innovations and Technologies - Visiting the Past, Examining the Present, and Looking to the Future, and application to some aspect of the power industry is necessary. All submissions will be reviewed and papers accepted for presentation will be published in the Conference Proceedings via CD.

Power Plant Control Systems
- Power plant control system retrofit projects
- Boiler, turbine, emission, and balance of plant (BOP) control
- Control strategies, control systems tuning
- Digital control systems
- Distributed control systems – Fieldbus, wireless networks and other distributed architectures
- Integration of disparate control systems from multiple vendors, emission monitors, BOP suppliers… a protocol soup nightmare?
- Control room design
- Optimization systems, automation systems, business system integration
- Process measurements,
- Emissions, performance, and sensor monitoring and validation

Advanced Technologies
- Advanced control design and implementation
- New applications of control and signal processing
- Improved simulation and modeling
- Expert systems, neural networks, advances
- Computer aided design and engineering – Smart P&ID’s
- Data centered design and records management
- Asset management
- Plant Automation – One Button Start

Fossil Plant Issues and Technologies
- Control requirements for the new supercritical and ultracritical once through boilers and IGCC units
- Carbon sequestration, oxygen firing, chemical plants on-site

Power Plant Safety
- Burner Management Systems
- Application of NFPA 85, SP84 (IEC 61511)
- OSHA 1910.279 applicability
- Control of hazardous energy
- Other safety regulations and requirements

I&C System Security
- Regulatory requirements – NERC 1200, 1300, future
- Application of ISA 99 and other standards
- Trouble with security solutions – are the solutions worse than the problem?
- Experience – what works and what doesn’t

Other Power Industry Issues
- Deregulation – Impact on automation design, operation and maintenance
- Competition – less sharing?
- Consolidations -better utilization of resources or just more work for the weary?
- Aging workforce and other demographics, knowledge retention, training, new regulations – environmental, personnel management, etc.

Nuclear Plant Issues and Technologies
- Setpoints in retrospect – can we avoid excessive costs for unnecessary rework?
- Digital upgrades – experience and new directions
- ISFSIs – Instrumentation – not an issue

Submission guidelines, application, deadlines and more details may be found online at www.isa.org/powersymp

Questions? Contact Mike Skonceny, General Chair, 740-637-6324 or mskonceny@firstenergycorp.com
Allan Zadiraka, Program Chair at 330-960-1376, ajzadiraka@babcock.com
or Rodney Jones, ISA Division Support, 919-990-9418, rjones@isa.org
Meeting: SP77 Fossil Fuel Power Plant Standards Committee

Chairman: Dan Lee
Recorder: Loanna Overcash/Dan Lee
Date/Time: June 7, 2006
Location: Doubletree Hotel, 2050 gateway Place, San Jose, CA.
Distribution: SP77 committee and subcommittee

Attendees:
Members Present Members Present Guest
Gary Cohee Mukesh Pandya Dave Tapley
Don Christopher Dave Roney
Jerry Gilman Jeff Schleis
Bill Hocking Cyrus Taft
Daniel Lee Dennis Younie
Jim Olson Allan Zadiraka
ISA Staff: Loanna Overcash

Call to Order
The ISA SP77 Fossil Fuel Power Plant Standards Committee meeting was called to order at 8:07 AM EDST by SP77 Vice-Chair, Daniel Lee.

Introduction of Attendees
Dan asked everyone present to introduce themselves. Dan circulated an attendance list and SP77 committee roster for members to sign and update.

Review & Approve Agenda
The SP77 Committee meeting agenda was previously distributed with the meeting announcements. With no comments to the meeting agenda, the agenda was approved.

Review & Approve Minutes of Last Meeting
Copy of the March 1, 2006 SP77 committee minutes was distributed electronically to the SP77 Committee and a few hard copies were available for review. With no comments, the March 1, 2006 minutes were approved as written.

SP77 Active Subcommittee Reports
Dan Lee reported that during the POWID EXCOM meeting, members were solicited to assume the SP77 Chair position. As the POWID Director for 2007, Dan will be unable to support the SP77 Chair role but is willing to continue supporting the SP77 Vice-chair position. Wayne Holland has been both the SP77 Managing Director and SP77 Chair for over 10 years but has not been active for the past two years. The SP77 Managing Director is appointed by the I&S Department officers and reports on the Division activities. The SP77 Chair is appointed by the POWID Division Director and manages all the SP77 subcommittees. SP77 members were solicited to support the SP77 Chair. With no volunteers, the SP77 Chair assignment was put on hold with the expectation that someone will volunteer by October 2006.

SP77.13.01 – Turbine Bypass System – Loanna reported that with no negative ballots and enough reaffirmation ballots received, the SP77.13 balloting is closed. Jeff Schleis (Chair) will update the standard, formally respond to ballots with editorial comments and send final draft on for ISA Public Review and then ANSI/S&P Board Review approval.

SP77.14.01 – Steam Turbine Controls – Jeff Schleis (Chair) reported that the subcommittee continues to work on the standards draft by holding weekly web meetings. Allot of work has been done to make the standard consistent with the other SP77 standards. The subcommittee will hold a physical meeting tomorrow (6/8/06) to continue with draft editing. With a few more web meetings, Jeff expects the subcommittee could complete the SP77.14.01 draft for balloting by early September. Balloting comments would then be received and reviewed during a physical meeting in Houston at the ISA 2006 Fall Expo.

SP77.20.01 – Simulation Standard – Allan Zadiraka reported that the planned March teleconference did not occur and the subcommittee will not meet during the POWID conference. Subcommittee members who previously agreed to work on the committee are unable to participate so the chair needs to solicit more people from the simulator community.

SP77.40.01 – Functional Diagram Usage Technical Report - Dan Lee (Chair) reported that the SP77.40 Working Group’s last meeting was held October 26, 2005 at McCormick Lakeside Center in Chicago, IL. Due to the SP77.40 WG1 chair’s other ISA activities, work on this technical report has not progressed much. To date only a few author assignments were received. Based on SP77 committee schedules, the workgroup will meet informally on Thursday (6/08/06) to work on existing author assignments. The next schedule committee meeting will be a physical meeting during the ISA Fall Expo in Houston.

SP77.41.01 – Published in 2005.

SP77.42.01 – Loanna reported that the SP77.42.01 2006 edition has been approved by the S&P Board. Loanna will confirm when the new published standard will be available.

TR77.42.02 – Jerry Gilman just received from Randy McSpadden a copy of the drum level technical report. Jerry is teaching Thursday and will not be able to hold any subcommittee meeting until after 4pm. Dan Lee agreed to meet with Jerry to review the draft status and discuss the next task(s).

SP77.43.01 – Published in 2002. Reaffirmation to start in 2007.

SP77.44.01 – Dan Lee (Chair) reported that the SP77.44.01 (Steam Temperature Control for Drum and Once-Through Boilers) last physical meeting was March 1, 2006 at ISA Headquarters in Research Triangle Park, NC. The committee worked on the consolidation of the SP77.44.01 and SP77.44.02 standards into a single Steam Temperature Standard and to address outstanding committee comments. These updates were incorporated into a preliminary draft 4. Draft 4 will not be distributed until the last couple of author assignments are completed. The next SP77.44 committee’s meeting is scheduled for Thursday 06/08/06 to complete draft 4. Afterward, draft 4 will be distributed for SP77 committee ballot. All are invited to
attend the committee meeting. The subcommittee plans on holding a physical meeting during the ISA 2006 Fall Expo in Houston.

**SP77.44.02** – Dan Lee reported that SP77.44.02 was up for reaffirmation in 2006 but work has already been started to combine SP77.44.02 with SP77.44.01. See report on SP77.44.01.

**SP77.60.02** – Loanna reported that the SP77.60.02 2006 edition has been approved by the S&P Board. Loanna will confirm when the new published standard will be available.

**SP77.60.04** – Published in 2004.

**RP77.60.05** – Loanna reported that RP77.60.05 is out for reaffirmation balloting by the SP77 committee members. Only a few ballots have been received and SP77 voting committee members are asked to return their ballots. Loanna Overcash will remind everyone via email to vote.

**SP77.70.01** – Published in 2005.

**SP77.82.01** – Cyrus Taft reported the subcommittee last met March 1 2006 at ISA Headquarters in Research Triangle Park, NC. The subcommittee had a good meeting by completing all the section with some text from various authors. Cyrus reported that the subcommittee will meet tomorrow afternoon (06/08/06) to continue editing the draft.

Liaison Reports

**ISA SP5.1 Subcommittee** – Dan Lee reported that since the last SP77 committee meeting on March 1, 2006, there have been no activities or correspondence with SP5.1 committee. The SP5.1 (Instrumentation Symbols and Identification) chair (Jim Carew) is working on responding to comments from Draft 5 ballot and incorporating these comments into Draft 6. Draft 6 has not been distributed nor has any further dialogue occurred to address individual comments.

**IEC TC65 Technical Advisory Group** – Dan Lee reported that there have been no activities or correspondence from the IEC TC65 committee or the IEC TC65 WG9 committee. The WG9 committee seems to have gone dormant in completing their proposed technical reports (Unit Load Control and Fuel/Air Control).

**NFPA** – Dan Lee reported that the NFPA 85 is in the 2007 reaffirmation cycle. The individual committees of NFPA 85 met mid March to resolve any submitted committee or public comments to the proposed revision. Afterwards, NFPA issued a Report on Comments (ROC) that was approved by the individual NFPA 85 committees. The Technical Correlating Committee is meeting June 13 to rule on any outstanding issue and to approval the final draft for the NFPA 85 Revision 2007. Allan reported additional events and dates before the 2007 edition is published.

**ISA TR84.00.05 The Application of ANSI/ISA 84.00.01-2003 (IEC 61511) for Safety Instrumented Functions (SIFs) in Burner Management Systems** – Allan Zadiraka/David Roney reported that the TR84.00.05 subcommittee has finished resolving all comments from the last balloting and the subcommittee plans to conduct a final review in Houston. A discussion was held on the technical report’s scope and purpose and there was some concern expressed about the documents conflicting with the Power industries views as to if a Burner Management System is a “safety system” as defined by the process industry. If there are conflicts of interest within two ISA standards then POWER Division should consider writing a letter to ISA with this concern. Committee members will review the subject for future discussion at the next meeting.

**New Business**

**SP77 Committee Membership**

Dan Lee researched the S&P Board Manual of Operating Practices and discovered that subcommittee chairs do not have to be members of the main committees. Dan reported that presently there are no guidelines for SP77 membership and described for example the membership requirements for SP18. The purpose to resolve this issue is two fold. First, at some point the SP77 roster needs to be updated and there should be some guidelines for the SP77 Chair to remove inactive voting members. Second, when SP77 committee balloting is required it is much harder to achieve a majority when inactive member do not submit their ballots. After some discussion, Jim Olson made a motion that SP77 committee agreed in principle that there should be some requirements within the POWID Division Manual of Operating Practices to address voting rights on the SP77 committee. Gary Cohee seconded the motion and via voice vote the motion passed. Dan Lee will submit some SP77 voting requirements to Cyrus Taft as part of the MOU review cycle.

**Adjournment**

The SP77 committee meeting was adjourned at 2:35 pm.
DIRECTOR
Gary Cohee
Applied Control Systems
P.O. Box 5847
Beaumont, TX 77726
(409) 790-1945

PAST DIRECTOR/CHAIRMAN
NOMINATING COMMITTEE
Wayne Holland
3590 Frey Lane
Kennesaw, GA 30144
(770) 427-3667

SECRETARY/DIRECTOR ELECT
Dan Lee
ABB, Inc.
29801 Euclid Avenue
Wickliffe, OH 44092
(440) 585-6063

HISTORIAN
Don Christopher
Retired

EDITORIAL REVIEW – SPRING CONFERENCE
Tim Hurst
President
Hurst Consulting, Inc.
Angleton, TX 77515
(409) 849-5068

TREASURER
Roger Hull
Westinghouse Process Control
203 Monticello Dr.
Chagrin Falls, OH 44022-3158
(440) 247-9373

NEWSLETTER EDITOR
Dan Antonellis
IPS – Foxboro
33 Commercial St., B51-1C
Foxboro, MA 02035-2099
(508) 549-6344

MEMBERSHIP CHAIRMAN
Danny Crow
IPS – Foxboro
10636 Meadowbrook
Forney, TX 75126
(972) 564-3854

HONORS & AWARDS
Michael Skoncey
First Energy
Sammis Power Station
(740) 537-6324

PUBLICITY
Joe Vavrek
Sargent & Lundy
55 E. Monroe St. 25W53
Chicago, IL 60603
(312) 269-2270

ISA
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, NC 27709