EUCI CONFERENCE

# THE DIGITALLY INTEGRATED POWER PLANT:

## Optimizing Process Improvements

February 26-27, 2014
Hilton Anatole
Dallas, TX

## WORKSHOPS

**Pre-conference Workshop**

**Prognostics 101:**

**Fundamentals of Predictive Maintenance Techniques Based on Advanced Data Acquisition and Analysis**

Tuesday, February 25, 2014

**Post-Conference Workshop:**

**Centralized and Remote M&D Centers 2.0:**

**Best Practices / Lessons Learned**

Friday, February 28, 2014

EUCI is authorized by IACET to offer 1.4 CEUs for the conference and 0.3 CEUs for each workshop.

AUTHORIZED IACET PROVIDER

**Host Utility**

Luminant

**Sponsors**

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DYNAMIC RATINGS

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CCJ ONline COMBINED CYCLE Journal

# OVERVIEW

The power plant is the core business component of every integrated utility, merchant power operator and on-site power facility designed to serve load. Great attention, therefore, is devoted to squeezing out every increment of benefit from the "mechanical" dimension of power plant assets: the physical process equipment. Less attention has historically been paid to the "digital" dimension: the control and automation technology systems that regulate the mechanical equipment.

Yet, mining this digital asset intelligence buried within the industrial control systems (ICS) and operational technology (OT) is the key to unlocking tremendous enterprise value and deliver bottom-line financial improvements. Today's key to optimizing the performance and economics of combined cycle, coal and other fossil power plants lies in creating a unified "brain" to manage the complex physical system. This means designing the automation system as the platform, and integrating disparate, discrete - often siloed - applications such as:

- Diagnostic packages
- Predictive analytics
- Heat rate monitoring
- Alarm management
- Optimization software
- Plant simulators
- Dispatch and scheduling software
- 3-D visualization
- Emissions management and reporting

While the technology advances to enable this convergence, unique aspects of power generation - such as the need for mission critical reliability, the diversity of installed legacy control systems, and disparate functional silos - mandate that certain automation technologies be singularly addressed. NERC CIP and other cybersecurity measures are an example of these conditions that require singular attention and demand new policies, work practices and technology utilization, along with an unprecedented level of automation inventory tracking, upgrading, and life cycle planning demands.

This conference brings together all the professional disciplines responsible for balancing these requirements and properly deploying available technologies to achieve optimum operational performance and reliability of a power plant. Its aim is to provide this team with an in-depth examination of the unique automation technology issues being faced by utilities, and to share what have proven to be successful courses of action. It will explore approaches being deployed to effectively address the integration and management of automation technology across the various silos of power generation. Finally, it will provide strategies for leveraging digital automation technology to achieve realistic, but significant, gains in the performance of operations at a portfolio, plant and enterprise level.

**FIVE EASY WAYS TO REGISTER**

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PMA
P.O. Box 2303
Falls Church, VA 22042

**Five: Web Site**
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## WHO SHOULD ATTEND

Management and engineers with responsibilities in the following areas:

- I&C
- Operations
- Performance and Reliability
- Plant
- Asset
- Risk
- NERC compliance
- Fleet operations
- IT
- Engineering services

In addition, professionals with responsibilities in the following functional areas:

- Distributed control system (DCS)
- Programmable logic controllers (PLCs)
- NERC compliance
- Cybersecurity management system
- Process optimization software
- Thermal performance monitoring
- Predictive analytics
- Condition monitoring
- Alarm management
- On-line fuel analysis
- Intelligent instrumentation and field devices and networks
- Use of wireless, portable digital assistants, and internal network tools
- Cycling and dispatch cost estimation
- Fleet operations and management system
- Dispatch, electricity trading, and scheduling
- Continuous emissions monitoring and compliance reporting
- Computer-based maintenance management system (CMMS)
- Corporate and enterprise resource planning (ERP) system

## LEARNING OUTCOMES

Through ample case studies and expert documentation, attendees will have the opportunity at this conference and related workshops to:

- Discuss multiple ways of extracting differential value from the plant control system
- Assess concepts for incorporating intelligent automation strategies into power plants
- Identify options for achieving integrated automated intelligence through predictive, modeling, simulation, optimization, and "prognostics" tools
- Examine the creation of a proprietary process for balancing data generation and analysis to improve the situational awareness of plant operators
- Detail the value measurements, the industry factors, objective achievements and database "mining" elements that are necessary to yield the least risk plant and fleet optimization scenarios
- Evaluate means to address and optimize planning for legacy systems
- Identify emerging technologies and how they are likely to influence future automation technology considerations
- Illustrate the use and impacts of mobile, portable and wireless devices on plant operations
- Explore best practices for the effective implementation of security tools and technology

# AGENDA

## Wednesday, February 26, 2014

**8:00 – 8:30 a.m.** **Registration and Continental Breakfast**

**8:30 – 8:45 a.m.** **Overview and Welcome**

*- Jason Makansi, President, Pearl Street Inc.*

**8:45 – 10:30 a.m** **Opening "Keynote" Panel Discussion**

Assessing and Coming to Terms with Future Automation Management Needs

Technology

- Technology advancements
- Legacy systems
- Cybersecurity requirements
- Software/hardware interface

People

- Staff technical proficiency
- Staff expertise retirements
- Distributed vs Centralized resources

Business

- Capital availability and allocation
- Regulatory
- Consolidation and economies of scale
- In-house vs out-sourcing solutions

Moderated by:

*- Jason Makansi, President, Pearl Street Inc.*

Panelists:

*- Bob Yeager, President, Emerson Power & Water Solutions*

*- Stephen Horn, Senior Vice President, Luminant*

*- Pat Kennedy, Chief Executive Officer, OSIsoft*

*- Ed Schweitzer, President, Schweitzer Engineering Laboratories*

**10:30 – 10:45 a.m.** **Morning Break**

> ***Outstanding! A users' group for instrument and control items and issues, which was not tied to any particular vendor."***
>
> – GM – I & C Fleet Team, NextEra Energy

> ***Detailed, well thought-out and organized session."***
>
> – Prod Mgr, GE

# AGENDA

## Wednesday, February 26, 2014 (CONTINUED)

### I. Monetizing Power Plant Digital Assets

**10:45 – 11:30 a.m.** **Managing Ongoing Support Costs for a Plant's Digital Infrastructure**

- Strategies for justifying spend for software upgrades, systems integration, standardization, etc.
- Balancing configuration change management processes
  - What is minimally required?
  - When do you reach diminishing returns?
- Managing perpetual license fees and tag costs
- Avoiding overlapping capabilities in hardware and software
- Right-sizing the workforce
  - Balancing on-site vs centralized M&D and remote resources

*- Mark Prince, Senior Technology Support Specialist, Entergy*

**11:30 a.m. – 12:30 p.m.** **Determining How to Address Obsolescence**

- Retrofitting vs. alternatives and work-arounds
- Assessing risks and reliability impacts
- Prioritizing based on operational value
- Reconciling mandatory retirement guidelines with equipment/software obsolescence and vulnerabilities

*- Arthur L. Mayclin, Manager – I&C Engineering, Calpine*

**12:30 – 1:30 p.m.** **Group Luncheon**

**1:30 – 2:30 p.m.** **Approaching the Plant's Digital Assets from a Life-cycle Perspective**

- Leveraging emerging technologies
  - Virtualization
  - Simulation
  - Cloud services
  - Virtual factory acceptance testing (FAT)
  - Virtual fleet management

*- Gary Woodward, Director – Strategic Programs, Emerson Power & Water Solutions*

# AGENDA

## Wednesday, February 26, 2014 (CONTINUED)

### II. Exploring Best Practices for Plant Automation Design

**2:30 – 3:30 p.m.** **Power Plant Control Design Criteria**

- Establishing and maintaining control design standards
  - What aspects of control design are most beneficial to standardize?
  - How are standards established?
  - How are they implemented across the fleet? How are they incorporated into AE designs on new plant builds?

*- Mark Thompson, Plant Manager LOS, Basin Electric*

**3:30 – 3:45 p.m.** **Afternoon Break**

**3:45 – 4:30 p.m.** **Approaching Automation from a Holistic Perspective**

- What level of integration of various plant systems is appropriate?
- How does cybersecurity impact infrastructure decisions and implementation?

*- Clint Carter, Director – Operations Services, Luminant*

**4:30 – 5:30 p.m.** **Design Basis for Field Equipment**

- New sensors and final control devices that are not prevalent today at power plants — what parameters could we measure (that we aren't)?
  - Which would give the greatest bang for the buck in terms of comprehensive plant performance improvement and cost management?
- How does pervasive sensing play role?
- Where is wireless of most value?
- What are examples of innovative applications for wireless technologies?
- How do you maximize smart field equipment assets and asset management software for improved O&M?

*- Brian Hollingshaus, Senior Project Manager - Fossil Operations & Maintenance, Electric Power Research Institute (EPRI)*

*- Ray DeBerge, Superintendent Technical Support & Operations – Gas Turbine & Renewables Department, Ameren*

**5:30 – 6:30 p.m.** **Networking Reception**

> "
>
> ***Very professional audience and speakers!"***
>
> – CTO, TVA

# AGENDA

## Thursday, February 27, 2014

**8:00 – 8:30 a.m.** **Continental Breakfast**

### III. Implementing Innovative Digital Technologies

**8:30 – 9:30 a.m. Situational and Functional Awareness**

- Organizing, presenting and managing data, information for rapid, reliable assimilation and applied to various functions
  - Human reliability
  - Operators
  - Maintenance
  - Engineering
  - Management
  - Training

*- Harvey Ivey, Manager – I & C Systems and Field Support, Southern Company*

*- Hector Perez, High Performance HMI Product Manager, PAS*

**9:30 – 10:30 a.m.** **Translating 'Big Data' at an Operational Level**

- Operational analytics
- Generation bidding and performance reporting criteria
- Dashboard development

*- Brian J. Vokal, Vice President of Operations, Maintenance, and Engineering, Midland Cogeneration Venture (invited)*

**10:30 – 10:45 a.m.** **Morning Break**

**10:45 – 11:45 a.m.** **Plant Operations and Mobile/Portable Devices**

- What are the realistic options for remote monitoring?
- What equipment modifications are necessary to enable effective use of the technology?
- Operational integrity and limits
- Do operations' requirements drive the mobile technology or does the mobile technology drive the operations requirements?
- Wireless environments

*- Greg Young, SmartGen Project Manager, Duke Energy*

**11:45 a.m. – 12:45 p.m.** **The Evolution from Diagnostics to "Prognostics"**

- A review of technologies that provide an anticipatory look at
  - Conditions
  - Operating parameters
  - Notifications
- Short-term vs. long-term applications
- Maintenance planning

*- Tony Pink, General Manager, Dynamic Ratings*

# AGENDA

## Thursday, February 27, 2014 (CONTINUED)

**12:45 – 1:45 p.m.** **Group Luncheon**

**1:45 – 2:30 p.m.** **Considering Emerging Technologies**

- Visualization and virtual 3-D plant models
- Cloud-based applications
- Expanded remote monitoring applications
- Advanced simulation
- Scan/link/print from QR codes
- Digitizing practices for knowledge retention to combat workforce attrition

*- Glenn Evans, Electrical Field Support Manager, Southern Company*

*- Paul Kurchina, Principal, Kurmeta*

**2:30 – 4:30 p.m.** **Tour of Luminant Power Optimization Center**

- Balancing on-site vs centralized M&D and remote resources
- Staff resources and digital assets in harmony

*- Clint Carter, Director – Operations Services, Luminant*

> ***Really enjoyed the conference. Superb speaker array — highest quality speakers I have seen in quite a while!"***
>
> – Mgr – Advanced Applications, Emerson Power & Water Solutions

## PRE-CONFERENCE WORKSHOP
# PROGNOSTICS 101: FUNDAMENTALS OF PREDICTIVE MAINTENANCE TECHNIQUES BASED ON ADVANCED DATA ACQUISITION AND ANALYSIS

## OVERVIEW

The power of massive digital data acquisition, storage, and analysis has created a new class of technologies commonly called prognostics, known variously as predictive analytics, operational analytics, prognostic control, predictive-based maintenance, and advanced diagnostics and control. Simplistically, diagnostics says "you have cancer." Prognostics says, "you have six months to live." Prognostics quantifies, through correlations, statistics, pattern recognition, and measurement, the future "state" of a component, machine, or system, and/or an assessment of risk associated with that state with respect to continued operation. Wireless sensors are adding a whole new dimension to prognostics and advanced M&D. Leading control system vendors are embedding prognostic capability into their offerings to simplify the overall digital plant.

This workshop will provide registrants with a firm grounding in the fundamentals of prognostics. Examples will be provided from other areas, such as economics, investment, weather, social media, airline automation, medical, and personal health. Significant attention will be devoted to explaining, from a generic perspective, the various analytical techniques that form the basis for the proprietary "black box" of commercial solutions. Also, the workshop will consider the many power plant applications for which prognostics have provided substantial value to owner/operators.

## LEARNING OUTCOMES

Attendees will gain practical skills and insights on how to:

- Assess how prognostics fit with other digital applications at the plant and for the fleet
- Evaluate how the various prognostics' components can be practically applied
- Discuss the types of commercial prognostics' offerings
- Evaluate applications in different types of power plants under different operating envelopes
- Examine the challenges associated with administering prognostics applications

# AGENDA

## Tuesday, February 25, 2014

**12:30 – 1:00 p.m.** **Registration**

**1:00 – 4:00 p.m.** **Workshop Timing**

**I. Definitions and Examples in Practice**

**II. History and Enablers**

**III. Context**

- How prognostics fits with other digital applications at the plant and for the fleet
  - M&D
  - Maintenance management
  - Control and automation

**IV. Components**

- Technologies
- Techniques
- Algorithms
- Mathematical models
- Statistical models
- Computer models

**V. Commercial Offerings**

**VI. Applications in Different Types of Power Plants under Different Operating Envelopes**

**VII. Addressing the Challenges**

- Model upkeep
- Model training
- Data rates and resolution
- Transient behavior
- Cybersecurity
- Standards
- False indications
- Software version proliferation
- Data fog
- "Dumbed down" operators vs smarter operators
- Direct measurements vs inferred measurements

# INSTRUCTOR

**Jason Makansi** / President / Pearl Street Inc.

## POST-CONFERENCE WORKSHOP
# CENTRALIZED AND REMOTE M&D CENTERS 2.0: BEST PRACTICES / LESSONS LEARNED

## OVERVIEW

More than a decade ago, centralized remote monitoring and diagnostics facilities began to appear serving electric utilities and independent/merchant power producers. These facilities have evolved as the backbone M&D technologies and principles – data historians storage and trending, real-time thermal efficiency, equipment health and condition, simulation, reliability centered maintenance, and others – have gotten more robust. Today's M&D centers are making greater use of wireless measurements, advanced sensors, and a greater variety of the backbone technologies. More revealing perhaps is how the data and knowledge available from these technologies are being integrated into the human organizations, communicated among those with a need to know, and shared among third party vendor monitoring centers and the owner/operators themselves.

This workshop offers a review of the history and experience with these facilities, a snapshot of today's best practices, and an extrapolation into the near future. In addition, the workshop leaders — who have visited many of these facilities, operated them, and/or helped design and build them — will discuss the challenges facing organizations with these facilities. In summary, the experiences of at least a dozen owner/operators with these facilities will be captured in this workshop.

## LEARNING OUTCOMES/AGENDA

### Friday, February 28, 2014

**8:00 – 8:30 a.m.** **Registration and Continental Breakfast**

**8:30 – 11:45 a.m.** **Workshop Timing**

Attendees will have the opportunity to learn from M&D Center operators, as they:

- Describe how responsibilities are shared between plant and M&D center
- Discuss how to gain confidence of plant staff to optimize M&D center operations
- Explain how to avoid fire drills from false positive indications
- Examine how these centers must address cybersecurity issues
- Evaluate software version control and obsolescence
- Assess data fog and situational awareness
- Assess the contribution of M&D centers to operational continuity and consistency in a period of financial weakness for owner/operators

## INSTRUCTORS

**Arthur L. Mayclin** / Manager / I&C Engineering, Calpine

**Mark Prince** / Senior Technology Support Specialist / Entergy

**Jason Makansi** / President / Pearl Street Inc.

**Aaron Hussey** / Director – Technical Services / Expert MicroSystems

## INSTRUCTIONAL METHODS

Panel discussions, case studies, and PowerPoint Presentations will be used in this conference and affiliated workshops.

## REQUIREMENTS FOR SUCCESSFUL COMPLETION OF PROGRAM

Participants must sign in/out each day and be in attendance for the entirety of the conference to be eligible for continuing education credit.

## IACET CREDITS

EUCI has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. In obtaining this approval, EUCI has demonstrated that it complies with the ANSI/IACET Standards, which are widely recognized as standards of good practice internationally.

As a result of its Authorized Provider membership status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards.

EUCI is authorized by IACET to offer 1.4 CEUs for the conference and 0.3 CEUs for each workshop.

## EVENT LOCATION

A room block has been reserved at the Hilton Anatole, 2201 Stemmons Freeway, Dallas, TX 75207, for the nights of February 24-27, 2014. Room rates are $179, plus applicable tax. Call 214-748-1200 for reservations and mention the EUCI program to get the group rate. The cutoff date to receive the group rate is February 3, 2014, but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

## PROCEEDINGS

A copy of the conference proceedings will be distributed to attendees at the event. If you are unable to attend or would like to purchase additional copies, flash drives are available two weeks after the conference is complete. The cost per flash drive is US $395 (add US $50 for international shipments). Flash drives include visual presentations only. Upon receipt of order and payment, the flash drive will be shipped to you via regular USPS mail.

NOTE: All presentation flash drive sales are final and are nonrefundable.

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☐ AND *BOTH*
**PRE-CONFERENCE** AND **POST-CONFERENCE WORKSHOPS:** FEBRUARY 25-28, 2014 : US $2295
EARLY BIRD ON OR BEFORE FEBRUARY 14, 2014: US $2095

☐ **THE DIGITALLY INTEGRATED POWER PLANT** AND *ONE* **CONFERENCE WORKSHOPS:**
US $1895
EARLY BIRD ON OR BEFORE FEBRUARY 14, 2014: US $1695
- ☐ **PRE-CONFERENCE WORKSHOP:** TUESDAY, FEBRUARY 25, 2014
- ☐ **POST-CONFERENCE WORKSHOP:** FRIDAY, FEBRUARY 28, 2014

☐ **THE DIGITALLY INTEGRATED POWER PLANT** CONFERENCE ONLY
FEBRUARY 26-27, 2014 : US $1495
EARLY BIRD ON OR BEFORE FEBRUARY 14, 2014: US $1295

☐ **SINGLE WORKSHOP ONLY:** US $595, EARLY BIRD ON OR BEFORE FEBRUARY 14, 2014: US $495
- ☐ **PRE-CONFERENCE WORKSHOP:** TUESDAY, FEBRUARY 25, 2014
- ☐ **POST-CONFERENCE WORKSHOP:** FRIDAY, FEBRUARY 28, 2014

☐ I'M SORRY I CANNOT ATTEND, BUT PLEASE SEND ME THE CONFERENCE PROCEEDINGS FOR US $395. (PLEASE ADD $50 FOR INTERNATIONAL SHIPPING.)

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

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All cancellations received on or before January 24, 2014, will be subject to a US $195 processing fee. Written cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event or publication. This credit will be good for six months. In case of event cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at (201) 871-0474.
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