

REMOTE MONITORING, DIAGNOSTICS AND PROGNOSTICS OF POWER GENERATION ASSETS: *Best Practices for "Lean M&D"*

November 29-30, 2017
EUCI Office Building
Conference Center
Denver, CO

OVERVIEW

Traditional power generation asset efficiency and reliability has become more critical as plants are being operated to accommodate renewables. Many operators want to migrate from a reactive or preventative maintenance approach to a condition-based maintenance approach to maintain reliability and optimize costs. At the same time, internal subject matter expert (SME) resources are being reduced (or retiring). A centralized, remote monitoring and diagnostic (M&D) center can effectively support a large number of plants to leverage SME resources and optimize reliability and performance. The workshop discusses the need for and potential benefits of a remote M&D program to improve plant efficiency and reliability. Participants will learn the critical elements of a successful remote M&D program including: data, people, process and technology. The concept of "Lean M&DTM" will be introduced, which utilizes advanced tools and practices for automated diagnostics and remaining useful life predictions to enhance the information output and value of the M&D center. Best practices for M&D implementation and common challenges will be shared. The workshop will also address requirements and advancements in the analytical tools necessary for a successful and scalable M&D program, including discussion and examples of diagnostics and prognostics. The session will provide helpful information for owners, operators or managers looking to implement a new M&D program or improve an existing M&D program.

LEARNING OUTCOMES

- Define the primary drivers and benefits of a remote M&D center
- Review the various options for implementing a remote M&D and their advantages/disadvantages
- Define a Lean M&D program and understand its potential benefits
- Identify and discuss the critical components of a M&D program (Data, People, Process & Technology)
- Review various anomaly detection techniques and methods
- Explore best practices for Advanced Pattern Recognition (APR) modeling
- Review & apply various diagnostic techniques and cases to determine the likely cause of a fault
- Review & apply various prognostic techniques and cases to determine asset remaining useful life
- Review a power generation case study that incorporates accurate anomaly detection, diagnostics and prognostics.

WHO SHOULD ATTEND

- Operators/owners of power generation assets looking to implement a new Monitoring and Diagnostic (M&D) center
- Operators/owners of power generation assets looking to improve performance & operation of an existing M&D center
- O&M providers for generation assets looking to enhance offerings to their customers and/or create new revenue streams by offering remote M&D services
- Equipment OEMs offering remote M&D services for their equipment to enhance performance and/or reliability

COURSE TIMING

WEDNESDAY, NOVEMBER 29, 2017

8:00 – 8:30 am **Registration and Continental Breakfast**

8:30 am – 5:00 pm **Course Timing**

12:00 – 1:00 pm **Group Luncheon**

AGENDA

Remote Monitoring & Diagnostics Fundamentals

- Remote Monitoring & Diagnostics for Power Plants
 - o Market drivers for a remote monitoring & diagnostic center
 - o Benefits of remote monitoring and a condition-based maintenance program
 - o Setting goals for your remote M&D program
- Structural Options for Remote M&D
 - o In-house, centralized remote M&D
 - o Outsourced M&D
 - o Lean M&D – Detection, diagnostics & prognostics
- Key Components of a Successful Remote M&D Program
- Data
 - o Acquisition, quality, frequency and storage
- People
 - o Staffing, training, SMEs and plant personnel
- Process
 - o Communication & workflow
 - o Analytic model development and management
 - o Quantifying and tracking financial benefits
- Technology/Tools
 - o Anomaly detection techniques (identify the problem)
 - o Diagnostic techniques (determine the cause of the problem)
 - o Prognostic techniques (determine the time available to act)
- Key Challenges when Establishing a Remote M&D Center
- What is a Lean M&D Program?
 - o Accurate anomaly detection (minimize false alarms)
 - o Automated diagnostics (pinpoint cause of fault)
 - o Automated prognostics (estimate remaining useful life)
 - o Efficient alarm management and workflow process

Anomaly Detection Techniques and Case Study

- Accurate Anomaly Detection Techniques
 - o Key features of ideal APR solution
 - o APR model examples with key features
- Best Practices of APR Model Building
 - o Data selection, filtering, and analysis
 - o Model configuration, calibration, and maintenance
- APR Model Case Study
- Key Challenges for Anomaly Detection

COURSE TIMING

THURSDAY, NOVEMBER 30, 2017

8:00 – 8:30 am **Continental Breakfast**

8:30 am – 12:30 pm **Course Timing**

AGENDA

Diagnostic Techniques and Case Study

- Drivers and Benefits of Diagnostics
 - o Importance of diagnostics
 - o Benefits of diagnostics
- Define and Contrast Diagnostic Techniques
 - o Rule-based methods
 - o Model-based methods
 - o Case-based methods
- Belief Network Diagnostic Methodology
- Diagnostic Examples
- Key Challenges for Diagnostics

Prognostic Techniques and Case Study

- Drivers and Benefits of Prognostics
 - o What is prognostics?
 - o Importance of prognostics for Lean M&D
 - o Benefits of prognostics for Lean M&D
- Define and Contrast Prognostic Techniques
 - o Reliability-based (Weibull, mean-time-to-failure)
 - o Stress-based (modified-Weibull, proportional hazards models)
 - o Condition-based (cumulative damage model, general path models)
- Prognostic Examples
- Key Challenges and Limitations of Prognostic Models
- Wrap-up/Conclusions

COURSE INSTRUCTORS

Randy Bickford

President and Chief Technology Officer, Expert Microsystems (EMS)

Randy Bickford is the founder and President of Expert Microsystems. Randy is a recognized worldwide expert in predictive analytics for asset health management and prognostics. He is one of the industry's pioneers and holds multiple patents in the areas of pattern recognition, fault detection, diagnostics, and prognostics.

Randy also led development of the Fleet-wide Prognostics and Health Management Suite software, a web-based, enterprise-scale platform for improved health management of power plant assets and other industrial asset fleets. This product is available through the Electric Power Research Institute (EPRI) or directly from EMS. Randy has also worked with EPRI in developing best practices for advanced pattern recognition modeling; best practices for remote monitoring and diagnostic centers; and developing and characterizing an asset fault signatures database for a wide range of power generation assets.

Scott Affelt

President, Co-Founder XMPLR Energy

Scott Affelt is the President and co-founder of XMPLR Energy, a consulting firm focused on: data analytics and digitalization solutions and strategies for Energy and Power; business development strategies for disruptive technologies; and technology transfer/licensing strategies and implementation for new markets (USA and foreign). Scott is also a partner at the Zurich-based, AVP Group, a management consulting and M&A firm focused on the power, renewables and water industries where he co-leads the North America, Power and Digitalization practices.

Previously, Mr. Affelt was Vice-President of Business Development, Sales and Marketing at Zolo Technologies and venture-funded cleantech company. Prior to Zolo, Mr. Affelt was President of Doosan Babcock Energy America LLC (formerly Mitsui Babcock USA LLC) where he introduced the company's after-market services business including coal boiler upgrades and innovative emission reduction solutions into the US market.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

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

INSTRUCTIONAL METHODS

Case studies, PowerPoint presentations and classroom exercises will be used in this course.

PROCEEDINGS

The proceedings of the course will be published, and one copy will be distributed to each registrant at the course.

EVENT LOCATION

EUCI Office Building Conference Center

4601 DTC Blvd, B-100
Denver, CO 80237

NEARBY HOTELS

Hyatt Regency Denver Tech Center

7800 E. Tufts Ave
Denver, CO 80237
Phone: 303-779-1234
0.3 miles away

Hilton Garden Inn Denver Tech Center

7675 E. Union Ave
Denver, CO 80237
Phone: 303-770-4200
0.6 miles away

Denver Marriott Tech Center

4900 S. Syracuse St
Denver, CO 80237
Phone: 303-779-1100
0.7 miles away

Hyatt Place Denver Tech Center

8300 E. Crescent Parkway
Greenwood Village, CO 80111
Phone: 303-804-0700
0.9 miles away

IACET CREDITS



EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 1.0 CEUs for this course.

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this event may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.

REGISTRATION
to register [CLICK HERE](#) or

Call: 201 871 0474
fax: 253 663 7224
email: register@pmaconference.com
web: <http://pmaconference.com/>
Mail: POB 2303 Falls Church Va 22042

Please make checks payable to: "PMA"

EVENT LOCATION

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 4601 DTC Blvd, B-100
 Denver, CO 80237

See nearby hotels on page 6

PLEASE REGISTER

REMOTE MONITORING, DIAGNOSTICS AND PROGNOSTICS OF POWER GENERATION ASSETS COURSE

NOVEMBER 29-30, 2017: US \$1395,
 Early bird on or before November 10, 2017: US \$1195

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

Print Name Job Title

Company

What name do you prefer on your name badge?

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List any dietary or accessibility needs here

CREDIT CARD INFORMATION

Name on Card Billing Address

Account Number Billing City Billing State

Exp. Date Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx) Billing Zip Code/Postal Code

OR Enclosed is a check for \$ _____ to cover _____ registrations.

Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before October 27, 2017 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course 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.