



The RELIABILITY[®] Conference

— Las Vegas —

The RELIABILITY Conference is designed for those who lead, manage and contribute to a reliability and asset management program. Reliability leaders, asset managers, maintenance managers and asset condition management experts will deliver information you can put to use immediately.

Topics Include

- Reliability Centered Maintenance
- Predictive Maintenance
- Work Execution Management
- Asset Condition Management
- Reliability Engineering for Maintenance
- Defect Elimination
- Lubrication
- Key Performance Indicators
- ISO55000 Asset Management
- Computerized Maintenance Management Systems
- Maintenance Planning & Scheduling
- Managing Maintenance
- MRO Spare Parts Management
- Failure Mode and Effect Analysis
- Root Cause Analysis
- Leadership

Uptime[®] Awards

Best Maintenance Reliability Programs

Recognizing the
Best of the Best!

2015

Uptime Magazine congratulates the following outstanding programs for their commitment to and execution of high quality Predictive Maintenance and Condition Monitoring Programs.

To read more about each company,
download the Uptime Award Winners' stories at:

uptimeawards.com

Bristol-Myers Squibb



Bristol-Myers Squibb is a global biopharmaceutical company firmly focused on its mission to discover, develop and deliver innovative medicines to patients with serious diseases. Around the world, our medicines help millions of people in their fight against such diseases as cancer, cardiovascular disease, hepatitis B and C, HIV/AIDS and rheumatoid arthritis.

Our biopharma strategy uniquely combines the reach and resources of a major pharmaceutical company with the entrepreneurial spirit and agility of a successful biotechnology company. With this strategy, we focus on our customers' needs, giving maximum priority to accelerating pipeline development, delivering sales growth and continuing to manage costs.

Bristol-Myers Squibb created a true global community, with a culture and passion for reliability focused on adding value to the business, sharing best practices, continuous improvement and also:

- Empowering employees and partners to deliver excellence in asset management;
- Reducing equipment-related production impacts;
- Increasing work order compliance globally;
- Reducing preventive maintenance tasks through preventive maintenance optimization;
- Development/deployment of standardized criticality analysis tool globally;
- Additional positions created and filled dedicated to reliable point of use vending machines;
- Significant availability improvements on key equipment;
- Paperless work execution on a globally standardized computer maintenance management system.

Central directives are in place for:

- Lubrication Management
- Storeroom Management
- Root Cause Failure Analysis
- Alignment and Balancing



Central Arizona Project

The Central Arizona Project (CAP) is Arizona's single largest supplier of renewable water. CAP is a 336-mile long system of aqueducts, tunnels, siphons, motors, pumps and pipelines that annually pumps more than 1.5 million acre-feet of water from the Colorado River to central Arizona, including the Phoenix and Tucson metropolitan areas. CAP's 15 pumping plants lift water nearly 3,000 feet in elevation and consume about three million megawatt-hours of electricity each year.

CAP provides water for five million people, more than 80 percent of the state's population, as well as 350,000 acres of irrigated agriculture and 11 Native American tribes.

Highlights of CAP's Maintenance Excellence Program

- Sustained maintenance excellence program for 13 years
- Company-wide asset management philosophy
- Dedicated reliability and maintenance engineering functions
- Centralized planning and scheduling
- Ongoing reliability-centered maintenance analysis and implementation
- Cross-functional/cross-departmental partnerships
- Centralized technical and leadership development
- Defined reliability processes, roles and responsibilities
- Arizona Division of Occupational Safety and Health certified voluntary protection program to promote worksite safety and health



University of Central Florida

UCF is the second largest university in the United States. The public, multi-campus, metropolitan research university provides opportunities to over 61,000 students.

UCF anchors the Central Florida city-state in meeting its economic, cultural, intellectual, environmental and societal needs by providing high quality, broad-based education and experience-based learning; pioneering scholarship and impactful research; enriched student development and leadership growth; and highly relevant continuing education and public service initiatives that address pressing local, state, national and international issues in support of the global community.

UCF has embarked on a bold venture to become a new kind of university that provides leadership and service to the Central Florida city-state. While sustaining bedrock capabilities in the future, the university will purposely pursue new strengths by leveraging innovative partnerships, effective interdisciplinarity and a culture of sustainability highlighted by a steadfast commitment to inclusiveness, excellence and opportunity for all.

The services we provide are research, education and public service.

Our goals are to:

1. Offer the best undergraduate education available in Florida.
2. Achieve international prominence in key programs of graduate study and research.
3. Provide international focus to our curricula and research programs.
4. Become more inclusive and diverse.
5. Be America's leading partnership university.

Facilities Operations supports the university's goals by cleaning, maintaining and repairing buildings and equipment to minimize interruptions and create a safe, comfortable and clean environment for our faculty, staff and students.

To support the university's mission and vision, Facilities Operations has implemented a reliability-based culture founded in reliability-based maintenance (RCM), reliability engineering and efficiency principles. As these concepts are new to UCF, this is a far-reaching goal. We have a plan that begins with growing our staff's tools, knowledge and abilities. This will enable us to take the next steps in fostering a reliability-based culture.

The plan for the next five to eight years of RCM implementation at UCF has been laid out and a blueprint developed.



Southern Gardens Citrus

Southern Gardens Citrus (SGC) Processing is the world's largest supplier of 100 percent pure Florida not-from-concentrate orange juice to private label industry and major brands. Opening in 1994, SGC is the newest orange juice processing plant in the United States. Our mission is to: "Continuously improve and become the low-cost supplier of high quality citrus products to our customers, while maximizing returns to our shareholders."

In 1995, we initiated a maintenance excellence effort with the vision of excelling our maintenance program from reactionary to proactive. The lowering of maintenance costs and improvement of the uptime of our equipment/assets for operations were the main goals of this vision. This effort was driven by a new general manager who brought in maintenance consultants to develop strategies and objectives. Asset criticality was established, planners were added and mechanics were placed on area teams. Key performance indicators were established and monitored to determine our results and future course of action. Laser alignment was added to the program to eliminate repetitive failures.

In 2004, our reliability excellence effort was launched with benchmarking and training and additional maintenance consultants. A lingering silo effect was eliminated by centralizing maintenance. A

reliability engineer position was created, as well as an upper management steering team named the Reliability Excellence and Leadership (REAL) Team to monitor and support maintenance reliability efforts. A total productive maintenance inspection style approach to rebuilds was introduced to eliminate unnecessary maintenance costs. SAP as our computer maintenance management system went live in 2008.

Predictive maintenance programs were introduced: Infrared thermography; ultrasound analysis; oil analysis; vibration analysis; and off-line motor testing. Our lubrication program was reinforced with the use of ultrasonics. Fans began to be dynamically balanced with the assistance of vibration analysis. Resources were reallocated to expand these programs and ensure their success, such as training mechanics to become predictive maintenance technicians and redefining our utilities department's responsibilities for our air and steam systems. These processes have assisted SGC in becoming proactive by allowing us to focus on what needs attention. We are constantly looking to expand the use of our predictive maintenance tools to increase their usefulness. This, along with a plant culture of continuous improvement, has allowed our asset condition management to improve year after year and financially justify itself.



The results have been gratifying with year after year reductions in emergencies and maintenance costs, and maximized use of internal labor through the elimination of electrical contractors and the use of other contractors when skills or time is an issue. We have found that we could reduce the maintenance workforce through attrition: 12 mechanics to nine; 12 mechanic helpers to five; two instrument techs to one; and a 50 percent reduction in maintenance management.

Nova Scotia Power

Nova Scotia Power, Inc. (NSPI), a privately owned, vertically integrated electric utility, provides electricity to 500,000 residential, commercial and industrial customers in Nova Scotia, Canada.

In 2011, NSPI began the design and deployment of its asset management program. An asset management office and a common work management system, complete with identical work management practices throughout the fleet, were established at that time.

Key program design features include:

- Incorporation of all operation activities;
- Fleet-wide standards, practices, programs and tools;
- Highly measured activities;
- Technology as an enabler.

The asset management model employs reliability teams composed of representatives from plants, engineering and asset management. Maintenance strategies are deployed on an asset class basis across the fleet and all equipment and maintenance process information is integrated to produce metrics and key performance indicators rolled into layered dashboards and scorecards. Condition assessments are conducted on a fleet basis to produce risk profiles for each major asset class and drive outage planning and investment planning.

Continuous improvement is built into the asset management process.



Portland General Electric

Operating in 52 Oregon cities, Portland General Electric (PGE) serves approximately 829,000 customers, including more than 100,000 commercial customers. PGE receives oversight from state and federal regulatory agencies, including the Oregon Public Utility Commission and the Federal Energy Regulatory Commission.

As Oregon's largest utility, PGE's service territory attracts major employers in diverse industries, such as high technology and health care. Economic growth in northwest Oregon continues to fuel the customer growth rate.

PGE has a diverse mix of stable generating resources that include hydropower, coal and gas combustion, wind and solar, and key transmission resources. These 15 power plants have a total combined generating capacity of 3,357 MW.

By managing PGE's own power plants in conjunction with the available power supplies on the wholesale market, management believes that fully integrated power supply operations provide the flexibility and efficiency necessary to effectively balance the power supply resources to achieve the lowest possible cost for customers.

PGE is focused on providing reliable, responsibly-generated power at a reasonable cost. To accomplish this requires a broad mix of generation resources. While some utilities obtain their power from one or two sources, PGE relies on seven different sources. This greater diversity of power supply contributes to higher reliability and more stable prices.

PGE regards equipment reliability as an indispensable component of our generation excellence business practices. Increased equipment reliability results in valuable improvements to business performance regarding safety, health, environment, sustainability, regulatory compliance and generation availability. Employees are responsible for reliability and strive for excellence in this area every day.

The generation reliability team mission is to integrate leading reliability engineering and maintenance practices into a continuous improvement process designed to reach PGE's maximum potential in a safe working environment. Through the implementation of these practices, PGE sustains improvements in safety, availability, workforce efficiency, risk reduction and increased reliability of our generation assets.

The 11-person corporate team supports a 29-person field team representing each of the power plants. Three recent notable achievements are the development of reliability block diagram models of each of the nine power plants, maintenance strategy development completed at a new wind farm before commissioning and boiler tube inspections using phased array ultrasonic testing.

Additionally, PGE's NDT lab contains various materials testing equipment for validation material composition and properties in the lab and field environment. Most recently, PGE has begun field use of a mobile optical emission spark spectrometer, testing for validation of materials installed in the plant prior to repair or replacement.



Special Recognition Awards

Merck

Best Defect Elimination Program

Merck, which delivers innovative health solutions globally, adopted a culture of defect elimination at its Rahway, NJ, facility. The program empowered the entire organization to eliminate defects at their source. The program resulted in a 25 percent reduction in corrective maintenance, \$1.6 million in cost avoidance and \$1.4 million in cost savings.



Malaysia Airports Holdings Berhad

Best Culture of Reliability

Malaysia Airports became the first airport operator in Asia in 1999 and is in a league of its own with its diverse airport portfolio and business model. Its "Runway to Success: 2015-2020" features sustainability-related plans, initiatives and targets in four focus areas of resource management: energy, water, waste and carbon. Results to date include a significant reduction in GHG emissions, implementation of green initiatives and improved service levels to ensure safety compliance at airports.



Lawrence Livermore National Laboratory

Best Maintenance Reliability Not-for-Profit

Company: Facility Infrastructure Systems of the National Ignition Facility at the Lawrence Livermore National Laboratory.

Hardware: Building, conventional utilities, process utilities, HVAC, vacuum, beam transport structures, large aperture optical components, automated diagnostic equipment, and transport / handling equipment.



Iluka Resources Inc.

Best Decommissioning Program

Iluka's United States mining, concentrating and processing operations are located in Virginia. Heavy mineral concentrate is processed into final products of chloride ilmenite and zircon at a mineral separation plant. Iluka implemented "The Path Forward" strategy, which included the development of a professional maintenance reliability team and focused on teamwork. In planning for the future, Iluka strives to move farther left on the I-I-P-F curve.



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