

Aptech Updates

June 2004

Aptech Engineering Services, Inc.

Volume 1, Issue 1

APTECH Investigators Featured in TV Show

APTECH accident investigators, Dr. Geoff Egan and Dr. Kim Clark were featured on the TV show Extreme Evidence. The program aired September 29, 2003 on Court TV featuring an accident reconstruction performed by APTECH on a newsworthy explosion of a rocket fuel oxidizer plant in Henderson, Nevada. The half hour show highlighted video of the incident and its use in the accident reconstruction process. Two competing theories for the cause and origin of the fire that initiated the explosions were presented: the high pressure natural gas pipeline underneath the plant, and the explosive properties of Ammonium Perchlorate (AP). APTECH's analysis showed conclusively that Ammonium Perchlorate, which is classified as an oxidizer, can under certain circumstances detonate and explode. This was clear from the video and model tests performed by APTECH.

For more information or a copy of the show, please contact Dr. Geoffrey Egan or Dr. Kimble Clark.



Fossil Power Service News

New Technology for Coal Plants to Lower NO_x and Eliminate Pulverizer Fires

APTECH has recently submitted a patent application for a new technology that has significant emissions and operating benefits for coal fired power plants. This new technology is especially attractive for high volatile coals such as Powder River Basin coals. The technology recycles clean flue gas from downstream of the exhaust particulate removal system into the primary air feed to the pulverizers, where it picks up pulverized coal and then proceeds to the burners.

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Petrochemical Service News

APTECH's Petrochemical Director Teaches Mechanical Integrity Course

Stephen Anderson, director of APTECH's Petrochemical Services Group, provided a 1-week training course in Abu Dhabi during the month of October 2003. The 5-day course, titled "Technical and Engineered Safety in Petrochemical Plants" was presented in the Le Meridium Hotel, Abu Dhabi. Fifteen students and engineers from Abu Dhabi, Saudi Arabia, Oman, Jordan, Qatar, and Kuwait attended the course. The course content included industry regulations, legislation and industry standards, risk management, plant and equipment design and

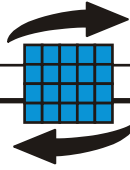
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Nuclear Power Service News

Development of Wear Degradation Module

The Nuclear Power Group at APTECH has been retained by a California utility company to develop a predictive model for wear degradation in steam generators. The objective of this project is to provide the utility company with an updated wear model tailored specifically to the ongoing wear degradation in the steam generators. This is being achieved by modifying the existing version of the axial cracking module in APTECH's OPCON™ work station. This will serve as the computational engine for an OPCON-like package consisting of Visual Basic GUI connected to the wear calculator.

More Nuclear Generation News on page 4

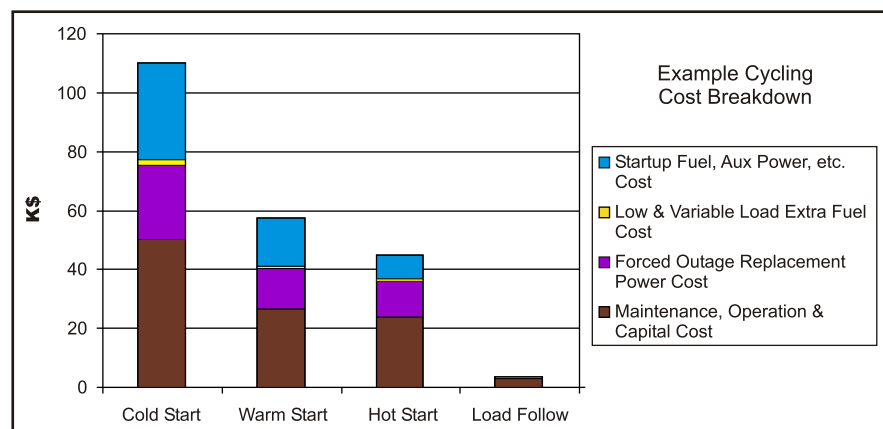


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 New Technology for Coal Plants to
 Lower NO_x & Eliminate Pulverizer Fires
 The Flue Gas Recirculation (FGR) in the primary air helps to create a reducing atmosphere zone in the primary air flame where different radicals are formed such as OH and CN, which later react with the nitrogen oxides formed in the secondary flame, reducing the formation of nitrogen oxides and emissions from the stack. The amount of flue gas injected into the air delivery system is adjusted, depending on the level of oxygen required to achieve stable ignition and combustion and provide optimum NO_x reduction at various loads.

The most important anticipated benefit is a significant reduction, estimated at up to 40%, in NO_x formation at the burner. It can be used with or without SCR and can be used to reduce the size and cost of a planned SCR retrofit. Another anticipated benefit is a lower risk of fire and explosions in the pulverizers. The cost to implement this technology is estimated at about 5\$/KW. It is believed to have the highest benefit to cost ratio of any low NO_x technology. In addition, there are no monthly costs for additives or maintenance. THIS TECHNOLOGY IS PATENT PENDING. APTECH would be willing to consider a partner to develop this exciting technology. If you would like more information, please call Terry Rettig in our Sunnyvale, CA office at (408) 745-7000.

Compressed Air Energy Storage

Steve Lefton presented APTECH's work on the evaluation of the viability and economics of Compressed Air Energy Storage (CAES) at the EESAT Conference in San Francisco. The paper, titled "True Cost of Cycling Power Plants Enhances the Value of Compressed Air Energy Storage (CAES) Systems" by Paul Grimsrud, Steve Lefton, and Phil Besuner, was well received and provided the audience with a measure of the benefits of CAES to utilities that have a fleet of power plants including coal fueled units that do not cycle at night. These units provide the power to the CAES system during off peak periods and the CAES system provides peak power in the day in place of expensive gas-fired peaking generation.



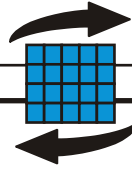
Measuring Wall Loss On-Line without Removing the Insulation

Two technical papers were presented by APTECH at the 2003 ASME Pressure Vessels and Piping Conference in Cleveland, Ohio on July 2, 2003 by Marvin Cohn, Manager of High Energy Systems at APTECH. The first paper, "Case Studies of Pulsed Eddy Current to Measure Wall Loss in Feedwater Heater Shells" (APTECH TP143) described the implementation of recent developments to perform cost-effective pulsed eddy current (PEC) examinations to assess wall loss due to Flow Assisted Corrosion (FAC). Recent advances in the hardware and software have improved APTECH's ability to scan for wall loss without removing insulation.

Using this technique, APTECH has performed more than 100 fossil and nuclear power plant inspections and evaluations over the past 6 years. Projects have been performed on piping and feedwater heater shells, on-line or off-line. A recent development is the use of the PEC Defect Algorithm to estimate the minimum wall thickness in addition to the average wall thickness (AWT). The paper compares results using ultrasonic examination (UT), the PEC AWT estimates, and the PEC Defect Algorithm estimates.

The second technical paper (APTECH TP142) is "Comparison of a Life Consumption Analysis to Section II, Subsection NH Design Rules for a Main Steam Girth Weld Creep Crack." In spring 1999, Arizona Public Service

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APTECH's Petrochemical Director
Teaches Mechanical Integrity Course



safety systems, inspection and maintenance practices, risk based inspection, fitness-for-service, failure analysis, and human factors and was illustrated with many case studies of industrial accidents and industry examples analyzed by APTECH. The course provided a good overview of how engineers should manage the technical integrity and safety of pressure equipment. Because of the positive feedback, this course will be presented on a bi-annual basis in the future. The presentation was made in conjunction with Steve's visit to the area on a project for several of APTECH's Middle East petrochemical projects. If you are interested in more information on this course, contact Steve Anderson in our Houston, TX office at (281) 558-3200.



APTECH Supports Industry Association

In May 2003, APTECH attended the National Petrochemical and Refinery Association (NPRA) Maintenance conference in Salt Lake City. This was the 10th year in a row that APTECH has hosted a booth at the conference and was presented with a 10-year plaque by the organizing committee. Steve Harper of the APTECH South African office participated and attended the conference on behalf of the Houston office.



APTECH's Technology in Demand in the Middle East

APTECH's Petrochemical Services Group has recently completed several projects in the Middle East. These projects have included pipeline integrity and firewater pipeline integrity studies for Gasco in Abu Dhabi and process piping projects for SABIC in Saudi Arabia. APTECH has recently been awarded an inspection and maintenance project for Kuwait Oil Tanker Company as well as a study of black powder in gas lines owned by Gasco. Because of the expansion of projects in the Middle East, APTECH has signed with agents, Masad Trading in Abu Dhabi and Al Qahtani and Sons in Saudi Arabia in order to facilitate the execution of these projects and provide our clients with local support.

APTECH Selected as Alliance Partner for World Class Supplier

In order to increase market share and to enhance customer field service to customers of Flexider in North America, Flexider S.r.l., the premier provider of expansion bellows, recently selected APTECH Petrochemical Services Group to provide engineering and field services to refineries and chemical plants in the Western Hemisphere, particularly in North America. This alliance will provide quick turnaround services to Flexider's customers in the region.

Flexider believes that this partnership will represent an unquestionable advantage for the marketing and installation of its products in plants located in this region, the main advantages to customers are:

- Immediate availability of engineering services on Flexider's products
- Local staff to provide customer support

For more information, please contact Steve Anderson in Houston.



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Integrity Evaluation of Pressurizer Heater Sleeve Penetrations

APTECH is performing an integrity evaluation of Pressurizer Heater Sleeve Penetrations. The sleeves, which are fabricated from Alloy 600, are susceptible to primary water stress corrosion cracking (PWSCC). The overall project objective is to establish the acceptable flaw size and fatigue crack growth margins for PWSCC flaws that could penetrate the Alloy 600 sleeve, and to verify that the integrity of the pressurizer bottom head will be maintained for the life of the plant under the postulated design conditions.

Measuring Wall Loss On-Line without Removing the Insulation, Continued from page 2

Company performed an examination of several girth welds of a main steam piping system at Cholla Power Station, Unit 2. A significant creep-related crack was found in a weld which had experienced 158,000 operating hours. The APTECH methodology, described in the paper, predicted life exhaustion at a minimum time of about 148,000 operating hours.

The American Society of Mechanical Engineers (ASME) Subsection NH methodology, was shown to be very conservative for this example. The Subsection NH guidelines for Level A Service Loadings indicate safe operation up to 10,000 hours for the combined primary membrane plus bending stress intensities under the design conditions. Since the part-through wall crack was found after 158,000 operating hours, this indicates substantial margin on observed life for the actual service conditions of this piping system as compared to the safe operating life under Subsection NH design conditions.