

Efficiency Extra Edition

T2E3 Newsletter
2nd Quarter 2007

Analyze your Performance: Compressors

In the first T2E3 newsletter, I mentioned the five steps to a more efficient plant. And, by reading both that newsletter and this one, you've already achieved Step 1! Now, for a head start on Step 2, I'd like to share some information for keeping your gas turbine compressor in tip-top shape.

Understand your Compressor Performance

Gas turbines consist of a compressor, combustor and turbine section. The turbine is where the energy released from the fuel in the combustor is expanded and converted into useful work. Forty to sixty percent of that work is sent back into the compressor section to support the entire power generation process. Due to this large work load imposed by the compressor, **any efficiency gains in the compressor section have nearly a one-to-one impact on the overall efficiency of the entire gas turbine cycle.**

Keeping the compressor clean is paramount in maintaining overall gas turbine efficiency and will also remove one unknown when trying to determine the cause of observed changes in performance. Fouling on the compressor blades is a direct result of the physical environment in which the gas turbine operates and the load schedule of the unit. Units which operate in a dry, dusty environment, far from urban areas, need a lot fewer water washes than those that are located near major highways or industrial areas – where the higher concentrations of pollutants in the air are more likely to be ingested and stick to your compressor blades.

Optimize your Water Wash Schedule

Since the frequency of water washing needed to keep your unit clean is highly dependent on your particular circumstances, following OEM or water wash skid provider guidelines may end up costing you money - either in lost performance due to too few washes, or in wasted water and

chemicals due to too many. In order to know when you should run a water wash, you need to monitor your compressor efficiency and track it versus time and run hours. When the cost of the lost performance becomes more than the cost of the next wash, you'll know it's time to take the unit offline and perform the wash. For some units, this may be weekly; for others, it may be only once per season or once per year. It all depends on your specific operating scenario.

Once you know that your water wash schedule is maintaining the compressor at the desired level of cleanliness, you will be better able to notice other changes in gas turbine performance – especially step changes in compressor or overall efficiencies. Asking questions about changes in performance will lead to instrumentation and equipment inspections, and potentially maintenance activities, which will improve unit reliability and help to maintain the unit in tip-top shape for both today, and the long term.

Software by T2E3 Can Help

I'm in the final stages of developing a compressor efficiency tracker program with the single purpose of optimizing your water wash schedule. It's priced at the cost of less than 3 water washes, and in many cases will be able to save you more than it costs in less than a single operating season – of course, that's all dependent on your specific operating scenario. Demonstration versions of the program are now available, please contact me for more information via phone: [425-821-6036](tel:425-821-6036) or email: tinat@t2e3.com

Announcements:

- **LM6000 Seminar Scheduled for September 12 & 13 in Seattle, WA**

(see page 2 for more)

Products & Services:

Analysis Tools

Software and Excel Add-Ins:

- * Compressor Efficiency
- * Steam & Water Flow
- * Moist Air Properties

Training Seminars

Annual Performance Test Support

Performance Monitoring Program Design, Support and Evaluation



T2E3

Energy Efficiency Enterprises



14260 120th PL NE
Kirkland, WA 98034

Phone: 425-821-6036
Fax: 253-550-6992
E-mail: performance@t2e3.com

To receive a copy of this quarterly newsletter automatically, along with other announcements for T2E3 products and services, send an email to performance@t2e3.com, and mention this newsletter in the subject or body of the message. Your email address will be held in strict confidence and not be shared with any other parties.

To view this or other T2E3 newsletters online, visit:

<http://www.t2e3.com/news.php>

LM6000 Performance Seminar to be held in Seattle this September

Learn about the thermodynamic relationships behind Gas Turbine **performance**, and how to apply this to your units and your site.

Delve into the economics and application of correction curves - including an understanding of **Throttle Push**.

Get an overview of **ASME PTC-22**, the standard on gas turbine performance testing.

Learn about performance **monitoring** programs for gas turbines, what you need to look out for, and what to do if you think you may have a problem.

Walk away with information and ideas that you can apply to your operation immediately.

September 12th & 13th at Seattle's Mayflower Park Hotel.

See the T2E3 website for more information:

<http://www.t2e3.com/LM6000.php>

Visit us on the web!

www.t2e3.com

T2E3 Provides Services for Power Generators

Including the following:

- **Analysis Tools & Software** – from customized spreadsheets to add-ins for Excel or complete compiled programs, T2E3 can develop software tools and analyses to support all your performance monitoring needs, including integrating your existing tools with available site data systems, to create online systems providing data and results in real-time.
- **Training** – both public seminars and customized options are available. Highly interactive sessions increase attendees' knowledge and understanding of the thermodynamic cycles, instrumentation and analyses needed to improve equipment performance and reliability.
- **Performance Test Support** – if your site is required to perform annual capacity or power purchase performance tests, having Tina Toburen from T2E3 on site to direct the testing can lead to a smoother test execution with more consistent performance results. Professional reports can also be produced to communicate the results to all required parties.
- **Commercial Program Design and Evaluation** – For sites interested in a more complete enterprise solution for performance monitoring, T2E3 can support your program planning and design, including evaluation of the various commercial products available within the industry for performance

monitoring. Choosing the correct solution will depend on the specific goals and objectives of your performance monitoring program.

Unlock the potential of your operation. Call for more information on how we can work together, today!

