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Efficiency Extra Edition

Happy New Year!

T2E3 Newsletter
January 2010

How to determine Expected Performance

Last year's newsletter included details relating to **Corrected Performance**, so this year, I thought we'd start out with a discussion of **Expected Performance**. The story starts out similarly: selecting raw data, making sure all sensors are calibrated and locations verified to make sure the point you are recording is indeed the one you want.

If you've followed my previous newsletters, you are now trending both measured and corrected performance (heat rate and output), and can see how corrected performance points out when maintenance or water washes may be necessary. **But what do you tell your dispatcher when they ask how much power you can deliver during the next hour or the next day?**

Operators can often answer this question based on their knowledge of the plant's past operating history. But for new operators or periods following maintenance or upgrades, the estimates may not be accurate enough for your needs. When relying on personal knowledge of a plant, you may also tend to be more conservative in your estimate of the expected output the plant can deliver, which may cost your facility money in lost profits – not only will you be asked to generate a lesser amount, but your efficiency may suffer by not operating at full load.

There are a number of different ways to determine the expected performance of your plant:

1. Statistical regression models: These can be easy to put together, and result in a fairly good number for expected output and heat rate. But there are some limitations – you normally have to pick just a single parameter as the explanatory variable (x-axis). This leaves the user to interpret when other variables are causing changes in performance. If you pick ambient temperature as the x-axis, you'll need to scrub the data to minimize the impact due to changes in humidity, pressure and the status of any augmentation or inlet cooling equipment you may have (duct burners, steam injection, SPRINT, chillers, foggers, evap coolers, etc.).

You also need to be sure to select data only when equipment is operating at full capacity. For models built from all available operating data, you may get a result which tells you what you have been *asked* to generate in the past – but not what your plant is *actually capable* of doing. This is especially true for plants that often operate in AGC.

2. Cycle deck models: (GateCycle, PEPSE, IPSEPRO, APPS, etc.) While these models can take a lot longer to put together, they can be more flexible in the result they provide. Once the plant model has been built and verified, various inputs (ambient conditions, equipment status, etc.) can be adjusted as needed to determine the expected

Announcements

- **Read & Comment at Tina's Blog:** www.t2e3.com/blog
- **Next LM6000 Seminar** March 11 & 12, 2010 In San Diego, CA see details on page 2

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output and heat rate of the facility. There are also drawbacks to this type of model – a lot of information is required to build the initial model, if built from scratch, and verification can be a time consuming process, especially if it is desired to "tune" the model to current degradation levels.

3. Spreadsheet models: For plants with available engineering expertise, but no cycle deck experience, a spreadsheet based model may be a good compromise. Information collected during construction, and often included in plant acceptance test procedures (including correction curves), can be used to create an expected performance model within a relatively simple spreadsheet. Statistical analysis can then be used to verify and/or adjust the design model to fit current levels of equipment degradation. The spreadsheet models can get complex, depending on the level of detail desired. Other drawbacks to the spreadsheet models include the amount of time required to build them and verify the results.

By knowing your expected performance, you can work with your power marketers to improve your dispatched loads for better productivity and profitability!

If you need help with your modeling efforts, please contact me!

LM6000 Performance Characteristics, Testing and Long-Term Condition Monitoring Seminar

When: **March 11 & 12, 2010** Where: **San Diego, CA**

Near the WTUI Venue: http://www.wtui.com

Additional information on the seminar, including an agenda, can be found on at www.t2e3.com/LM6000.php.

T2E3 Performance Analysis Services for Power Plants

Including:

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,

Training – both public and private seminars are available. Interactive sessions increase attendees' knowledge and understanding of the thermodynamic cycles, instrumentation and analyses needed to improve equipment performance and reliability.

Performance Test Support – for annual capacity or PPA performance tests. Support available includes developing procedures, analyses and reports as well as on-site test direction.

Performance and Dispatch Models Support for power marketers and dispatchers to increase their understanding of the operation of your facility. Do they constantly dispatch the plant at loads which are difficult or impossible to maintain? T2E3 can help you build tools and training programs to help all parties understand the expected changes in performance due to ambient conditions and operating constraints.

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