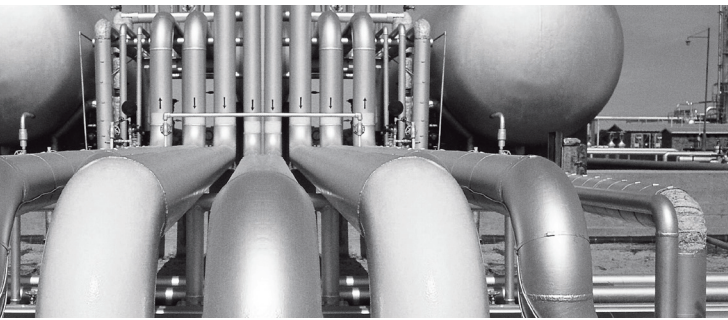


ELIMINATE FAILURE



**FLEET-WIDE MONITORING DEPENDS
ON ADVANCED ASSET ANALYTICS**

OWNER/OPERATORS OF LARGE FLEETS OF POWER STATIONS increasingly rely on a centralized approach to manage the knowledge and data critical to superior performance of their assets. Today's web-enabled communications technology, along with multiple software applications, makes the so-called "war room" or "mission control" approach a practical reality.

Instead of experts residing at each plant, the monitoring center allows sharing of a smaller pool of expertise by all the assets. In addition, in some cases the energy traders sit side by side with the plant-performance analysts so the knowledge of the latter is constantly captured in the activities of the former.

The software "stack" used by these fleet-monitoring centers varies, of course, but has these common elements:

- Data historian that aggregates the appropriate data from the DCS (distributed control system) residing at the plant.
- Thermal performance and heat-rate monitoring system.
- Combustion- and process-optimization system, commonly based on a neural-network approach.
- Enterprise-Asset-Management System (EAM) for task and project scheduling, inventory control, and documentation.
- Advanced predictive-analytics package.

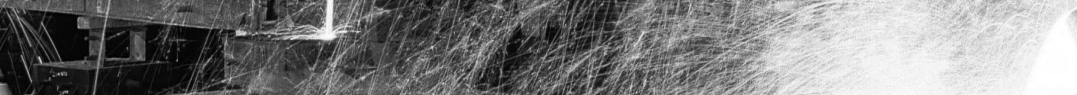
Owner/operators using fleet-wide monitoring report significant value from this stack. For example, one major power company reports that it seeks a 1:10 payback on every dollar spent on software. Even in the earliest phases of operating with a complete monitoring center, this company reports that it already has reduced emergent maintenance from 70 to 60 percent. Emergent maintenance, or unplanned maintenance, is generally the most costly to deal with on a life-cycle basis.

SmartSignal's advanced asset analytic software not only has become a key component of the software stack at these fleet-wide monitoring centers, but it is one that gets a very high favorability rating. A recent survey, conducted through a leading industry publication, revealed that SmartSignal's software is ranked as "superior" in the category of "user-friendliness." It also indicated that most monitoring centers have integrated SmartSignal and OSI PI™ capabilities. SmartSignal provides exception-based advanced prediction, diagnostics, and prioritization capabilities, while OSI PI organizes the data and allows analysts to further investigate SmartSignal's problem notifications. Together, they allow monitoring centers to put performance in context of the unique characteristics of each piece of equipment and the operating profile of the plant.

One user reported that it was expanding the SmartSignal application to include its gas turbine-based generating units. A representative stated: "We have three people in Houston, and all they do is watch the SmartSignal data from all around the fleet." Its generating assets are dispersed through the U.S. Another major power company reported that the implementation, or roll-out, of the SmartSignal software was "flawless" and that in its first full year of operation an estimated \$3.9 million was saved by avoiding critical failures. This number, by the way, does not include any credit for the purchase of replacement power.

For most fleet operators, the most critical key performance indicator (KPI) continues to be equivalent availability factor (EAF), commercial availability, or some other availability benchmark. Availability generally measures whether the plant is able to deliver the output requested by the dispatcher or trader when it is requested. In other words, does

Maximizing availability by eliminating failures is where SmartSignal's advanced asset analytics really prove their value.



the plant start up and achieve load when it is called upon? Do any equipment failures take the plant down when it is scheduled to run?

Reliability and availability take on even greater importance when baseload plants are pushed to higher and higher capacity factors, reserve margins are shrinking, and the market for generating capacity in general becomes constrained. Today, U.S. nuclear plants are operating at a fleet average 90+ percent capacity factor. Coal-fired plants are operating at an average 75 percent capacity factor, and some fleet owners note that their flagship plants are as high as 88 percent. Although plenty of new coal and nuclear plants are on the drawing boards, many are held up by protracted permitting issues and public opposition. Under these conditions, every increment of capacity from existing resources becomes more and more valuable.

Maximizing availability by eliminating failures is where SmartSignal's advanced asset analytics really prove their value. The software analyzes a component's operating history and employs proprietary algorithms to describe its unique normal activity under varying load and operating conditions, using data available from the sensors working with that component.

This creates a model that captures the relationships among the sensors. Real-time data, taken continuously, then is compared to the historical model. Anomalies or irregularities are identified, evaluated, placed in priority, and then communicated to plant experts through notifications.

Software users often are frustrated by difficult training, lack of friendliness of the user interface, and other ways full implementation is retarded. But, in the research, SmartSignal's advanced asset analytics received high marks in these areas. The importance of this method of constructing a model should not be underestimated. Each component in a power plant is unique, not only by unavoidable aspects in the design and manufacturing stages, but because all components operate under different conditions and are maintained differently. To the OEM (original equipment manufacturer), two machines have the same "model number." But, you know that they are unique in the context of your plant.

SmartSignal's models understand the unique characteristics and operating conditions of the equipment. Less sophisticated condition-monitoring techniques rely either on idealized models or direct measurements which may not exhibit the accuracy over time necessary to diagnose problems, show the probability and severity of the potential failures, and convert unplanned physical and financial disasters into orderly maintenance activities.

Experts at the centralized-monitoring centers track unique characteristics of the equipment and any variances. Potential failure modes are indicated, and the overall health is always known.

Another way successful software implementations are measured is by assessing how fast users get up to speed in extracting the benefits. This is often called "speed to value." According to the survey software users often are frustrated by difficult training, lack of friendliness of the user interface, etc. At the same time, knowing the condition of a motor, or any critical piece of equipment, allows repair and maintenance to take place during planned downtime in a more orderly fashion.

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ABOUT SMARTSIGNAL

SmartSignal maximizes worldwide industry equipment performance, availability, and reliability by detecting, diagnosing, and prioritizing equipment and process problems before they become costly failures. Drawing on over 40 patents, SmartSignal delivers specific, relevant, and actionable intelligence that makes people more proactive and productive. SmartSignal serves customers in power generation, oil and gas, mining, aviation, pulp and paper, and other process industries worldwide. SmartSignal and its customers have won over twenty awards for excellence, including the Wall Street Journal Technology Innovation Award.

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