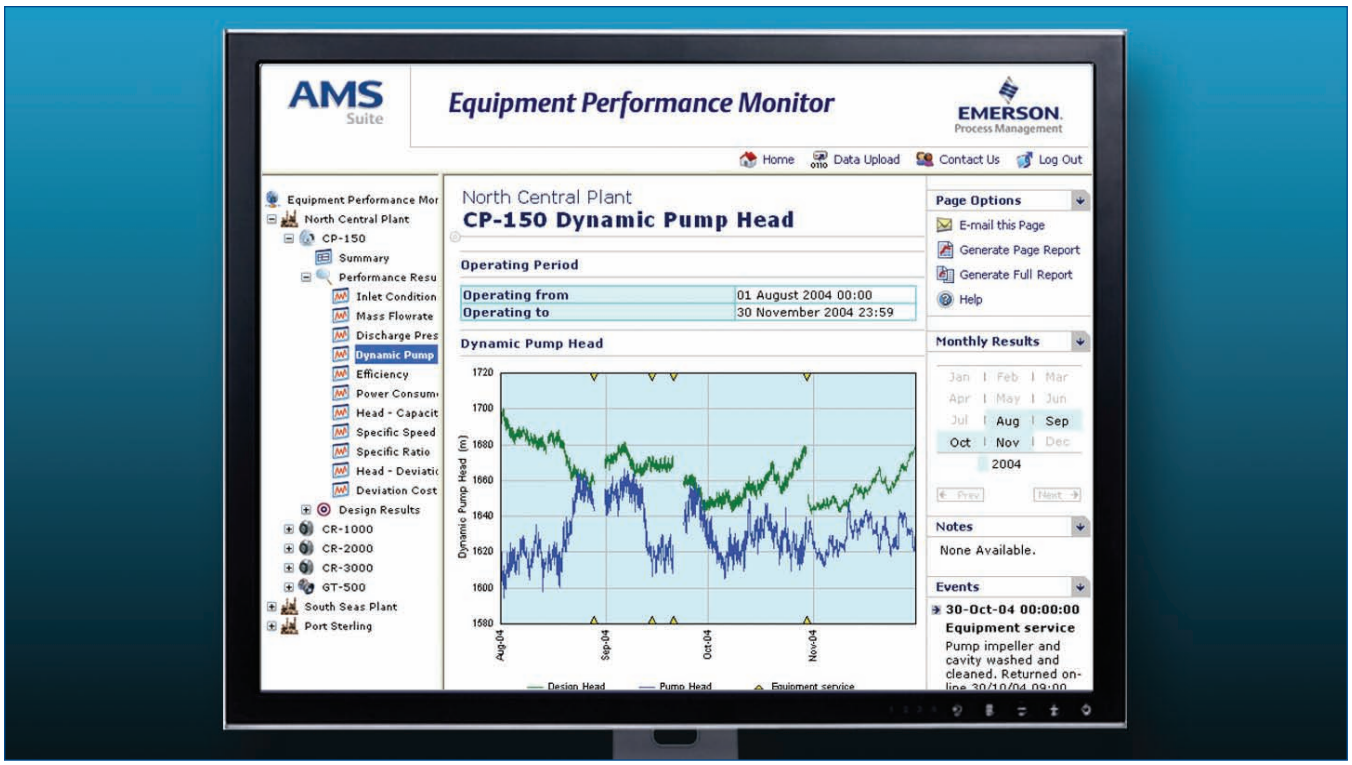
Performance Monitoring - Pumps



Dynamic head production of the pump, relative to design conditions.

- *Increase equipment availability and reliability*
- *Reduce operating costs and maximize throughput*
- *Assess maintenance effectiveness*
- *Identify optimum capacity range*
- *Reduce unplanned maintenance expenditures*
- *Determine the underlying causes for operating deviations*

Enable Predictive Maintenance

AMS Performance Monitor helps achieve the peak performance of Pumps. It facilitates the move to predictive and proactive maintenance programs, maximizing equipment performance.

Equipment Categories

- Positive Displacement
- Rotary
- Centrifugal
- Dynamic / Kinetic
- Multi-stage

AMS Suite: Equipment Performance Monitor

Success Stories

- Evaluated an optimum maintenance strategy, reducing the shutdown cycle from every 2 weeks to every 4 weeks.
- Identified and reduced pumping station power consumption levels for an annual utilities saving of $813,400 per station.
- Determined pump performance from parallel trains to optimize load sharing, reducing unscheduled shutdowns by 80%.
- Identified impeller wear, enabling proactive part procurement, reducing outage and downtime costs.
- Determined optimum speed of pumps throughout lifecycle, allowing delivery of maximum capacity at required discharge pressures.

Capabilities

- Assess performance relative to manufacturer specifications or baseline.
- Conduct detailed thermodynamic analysis of machine operation.
- Indicate cavity and impeller fouling.
- Filter and reconcile process data using rigorous mathematical routines.
- Determine best operating practices for total pump capacity.
- Infer stage performance to highlight maintenance requirements.
- Evaluate the effect of operation on efficiency, head generation, and power consumption.
- Diagnose the root cause of performance degradation.
- Optimize load sharing of multiple pumps to minimize energy consumption.

Key Performance Indicators (KPIs)

The following are typically presented using ASME PTC 8.2 and 7.1 thermodynamic custom-built modeling techniques:

- **Pump Capacity** - The volumetric and mass flowrates achieved by the pump.
- **Upstream Conditions** - Trends the suction temperature and pressure of the pump.
- **Exit Pressure** - The exit pressures achieved for both the measured values and the values predicted by the model.
- **Exit Temperature** - The temperature rise of the process fluid, used to estimate operating efficiency where power consumption is not available.
- **Power Consumption** - The power required to drive the pump is modeled to determine pump efficiency.
- **Dynamic Pump Head** - Actual head production of the pump relative to design.
- **Head vs. Capacity** - Scatter plot shows the actual head generation against design curve, identifying degradation and optimum control regions.
- **Efficiency vs. Capacity** - Scatter plot shows the actual pump performance against design curve, identifying degradation and optimum control regions.
- **Operating Loss Cost** - Track cost of performance degradation (based on design/ reference).
- **Deviation from Design** - Load-independent analysis of operation below design, enabling tracking of performance degradations.

Pump Demonstration available at www.AMSPerformanceMonitor.com

AMS Suite: Equipment Performance Monitor

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