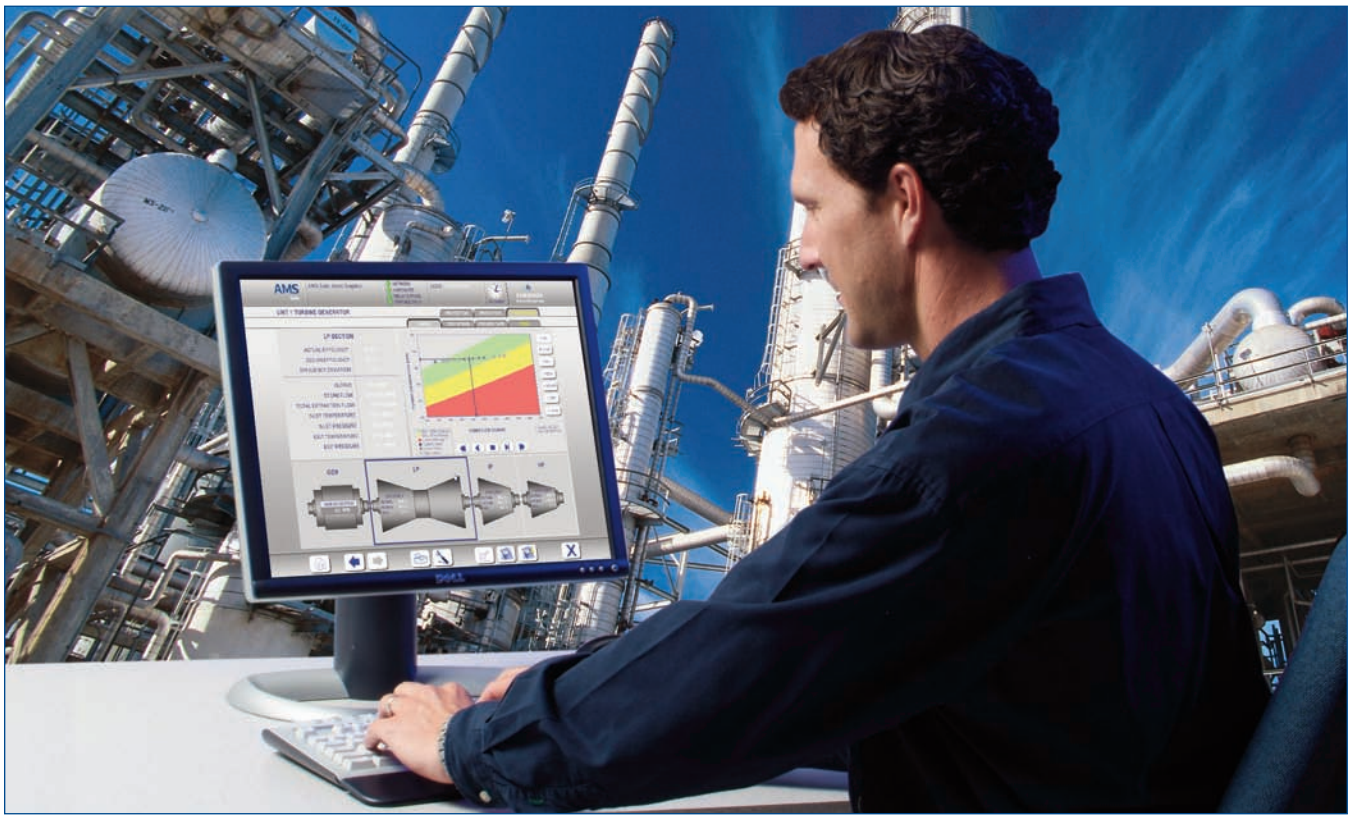
AMS Suite: Global Performance Advisor

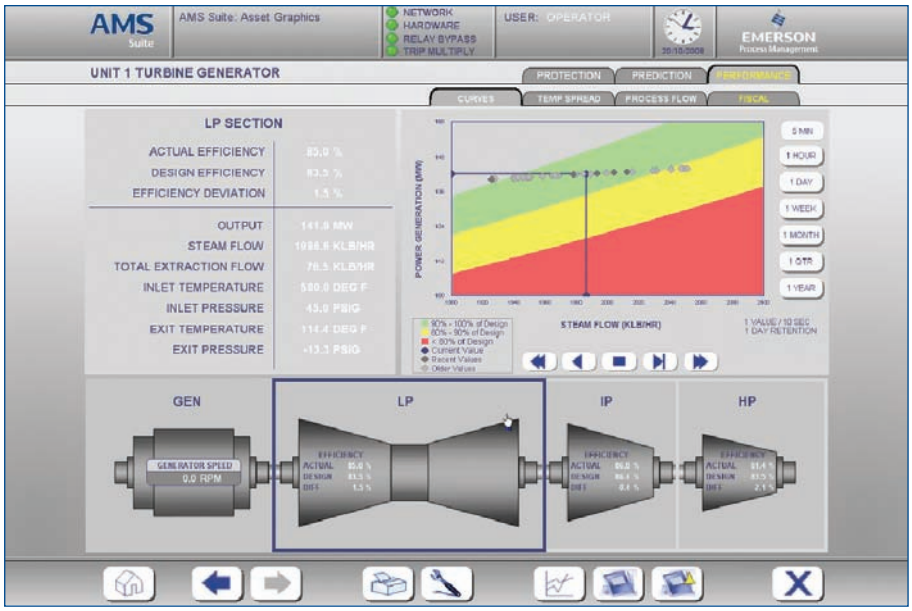


Real-time equipment performance health feedback integrates with process automation so you can run your plant with confidence.

- *Achieve and maintain optimum equipment performance*
- *Track key performance indicators in real-time against target operation*
- *Quantify thermodynamic efficiency losses*
- *Prioritize and plan maintenance activities*
- *Determine the root cause of production inefficiencies*

Overview

The performance of all critical equipment will deteriorate over time, resulting in lost performance, increased energy usage, and reduced throughput. Identification of the deviation from equipment design, combined with early detection, is vital to your plant's profitability. Knowing the health and performance of your mechanical equipment allows you to be proactive with your maintenance planning instead of reacting to unexpected events.



Intuitive user interface reveals clear green-yellow-red operational zones combined with critical protection and prediction information.

AMS Performance Advisor allows you to run your process more efficiently, track operating performance against targets, schedule maintenance activities, and determine the root cause of production asset inefficiencies. When your maintenance and operations staff are alerted to degrading asset performance, critical production decisions can be made to eliminate outages and improve your bottom line.

Achieve and Maintain Optimum Equipment Performance

AMS Performance Advisor calculates thermodynamic-based equipment performance using industry standard ASME PTC performance calculation techniques to provide deviation from design diagnostics on your critical machinery, including turbines, compressors, boilers, and other production assets.

Specific key performance indicators combined with clear graphical operating plots show exactly where the equipment is currently operating versus expected or design condition.

Tuning over the first twelve months is included with AMS Performance Advisor and executed by thermodynamic experts to ensure system feedback is credible.

Combining performance data with protection and prediction diagnostics helps your reliability program shift from reactive to planned.

AMS Performance Advisor provides calculated information for the following key equipment types:

- Compressor – Centrifugal
- Compressor – Reciprocating
- Gas Turbine
- Steam Turbine
- Boiler
- Fired Heater / Furnace
- HRSG
- Condenser – Air Cooled
- Condenser – Water Cooled
- Large Pump
- Large Fan
- Condenser – Water Cooled
- Cooling Tower

Benefits for the Entire Facility

- **Operators** receive real-time feedback of equipment performance to influence control changes and help meet operational targets
- **Maintenance** experts can access in-depth diagnostics to understand degradation trends and status by correlating condition and performance data
- **Process Engineers** can identify potential instrument problems, pinpoint degradation sources, and evaluate the effectiveness of cost improvement actions
- **Management** receives financial value of performance deviations

Integrated Solution

AMS Performance Advisor is part of a seamless integrated solution approach that combines monitoring capabilities for key production assets:

- Protection
- Prediction
- Performance
- Process automation

This solution monitors mechanical assets for temperature, vibration, and efficiency deviations that, if not acted upon, often result in an unplanned shutdown.

Real-Time Equipment Performance Monitoring

The real-time information available from AMS Performance Advisor helps you pinpoint opportunities for performance improvement that would otherwise go unnoticed. Differentiating features add value and knowledge to equipment operation.

- Data connectivity to any historian or DCS regardless of vendor
- Intuitive graphical presentation clearly displays current operating point compared to design criteria
- Integration of protection, prediction, and performance information
- Quarterly tuning of system through first year to ensure credible feedback

Flexible Data Connectivity

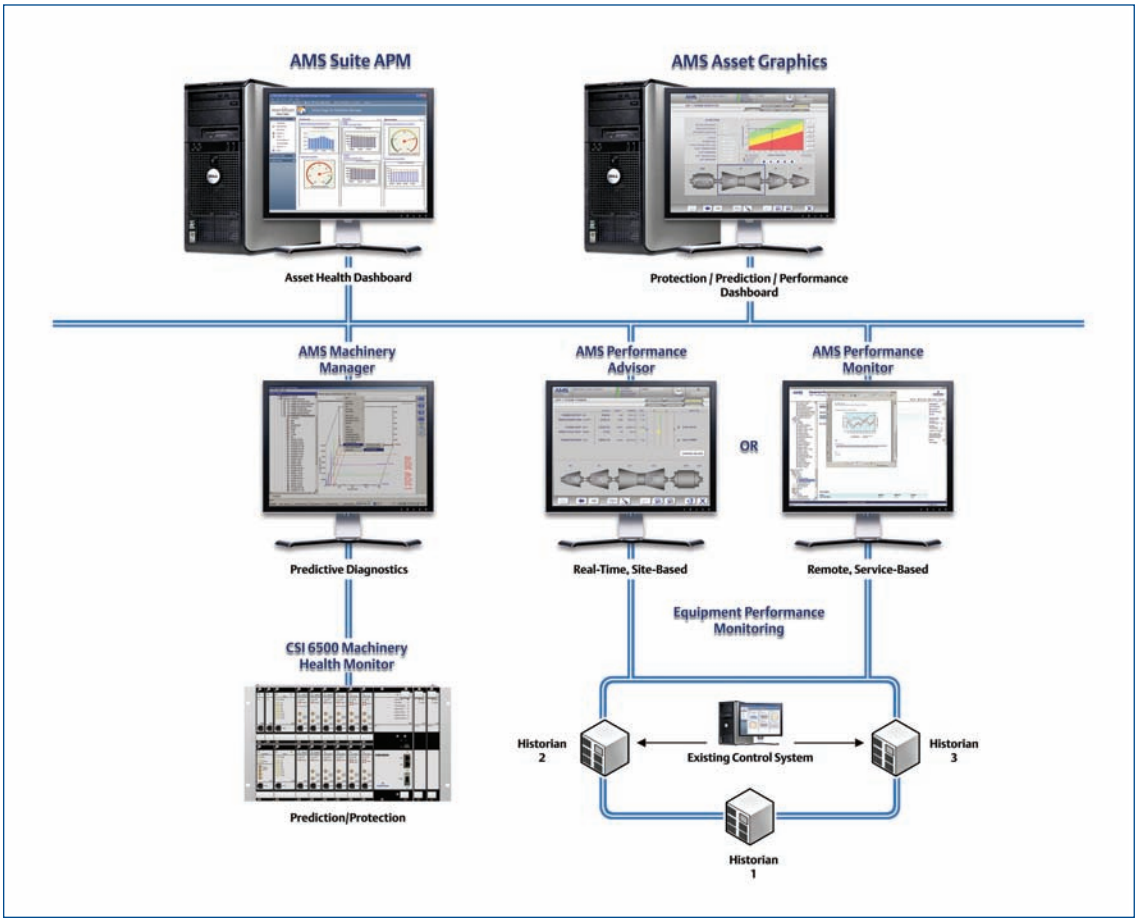
AMS Performance Advisor receives measurement input data from existing field instrumentation or from manually-entered values. Data can be connected to any manufacturer's DCS or data historian. This flexibility means that plants with multiple sources of input data and information systems can unify their performance calculations in a single, centralized location.

Leverages Open Protocols

Data connectivity methods are based around industry-standard OPC or OLE (Object Linking and Embedding) for process control. Popular plant historians, such as OSI® PI® are also supported.

Availability of Data Values

AMS Performance Advisor can support data that is entered several times per shift rather than continuously measured. The manual data is submitted directly into the DCS or historian where AMS Performance Advisor will access using the same method as the continuously measured values.



AMS Performance Advisor receives input data from any plant historian via industry-standard OPC protocol.

Intuitive User Interface

Graphical displays can provide key information to guide decisions towards managing "controllable losses" by operating towards optimal targets. AMS Asset Graphics presents a graphical interface for protection, prediction, and performance diagnostics utilizing the latest approaches for information clarity:

- Gray screen backgrounds
- Color only when abnormal
- Touch-screen navigation
- Single-equipment layer
- Status safeguards

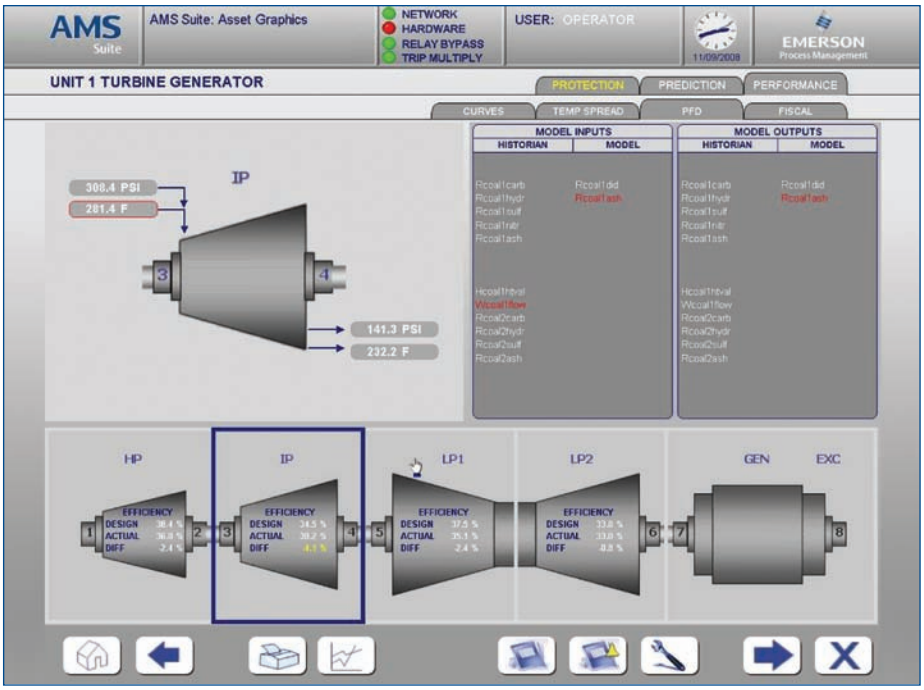
Single Equipment Layer

All equipment information is available one level deep from the home navigation page. A tab for performance reveals all relevant information.

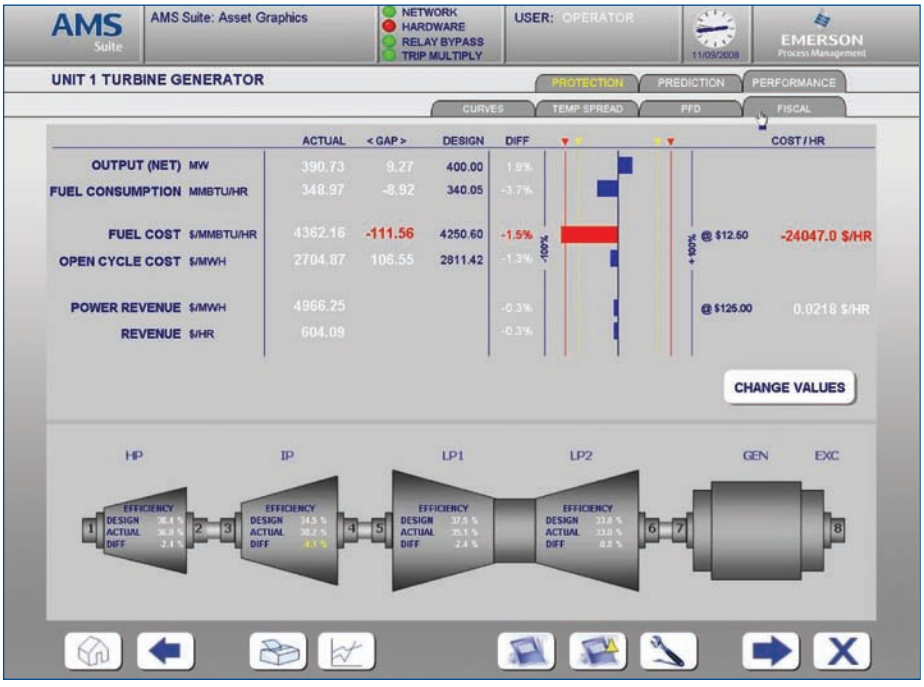
Multiple Users

AMS Performance Advisor communicates specific diagnostics aligned to plant roles.

- **Operators** obtain feedback on set point changes with plots that utilize colored regions.
- **Maintenance** resources can prioritize planned activities.
- **Process Engineers** can visually isolate poor measurements in the process flow and influence on the module calculations.



The Process Flow tab provides an easy way to correlate measurements to the equipment module and determine the impact on model results.



The Fiscal tab shows current financial cost deviation. Trends can reveal accumulated costs and benefits for managing controllable losses.

Part of AMS Suite

AMS Performance Advisor is a key component of AMS Suite, an industry leading family of predictive maintenance applications.

AMS Suite brings together predictive diagnostics from production and automation assets to help your facility meet business targets.

AMS Suite: Asset Graphics

AMS Performance Advisor presents diagnostic information through AMS Asset Graphics. The graphical user interface uses standard OPC data communication to provide a common interface for the sources of monitored content. AMS Asset Graphics also stores historical trend data.

AMS Suite: Asset Performance Management

AMS Suite APM provides a comprehensive view of the health and performance of the production assets. With AMS Suite APM, you can identify and prioritize the risks to your production.

AMS Suite: Equipment Performance Monitor

Remote analysis of equipment performance data in AMS Performance Advisor is available using the export feature to AMS Performance Monitor. Detailed remote analysis is an optional service contract offering. This capability provides ongoing thermodynamic analysis expertise for AMS Performance Advisor.

Credible System Feedback

AMS Performance Advisor is configured by thermodynamic experts and includes features that are designed to handle common challenges to credible system feedback. Key features include data validation and manipulation, accuracy of results, and analog input filtering.

Input Data Validation

AMS Performance Advisor evaluates the quality of DCS/historian input signals and uses them to provide status, augment data, and issue alerts or warnings.

Since equipment performance calculations are measured to tenths of a percent, module input measurements must be accurate. AMS Performance Advisor ensures the accuracy of these calculations and delivers reliable results.

Analog Input Filtering

AMS Performance Advisor evaluates the quality of DCS/historian input signals and uses them to provide status, augment data, and issue alerts or warnings.

Fidelity of AMS Performance Advisor is ensured through built-in analog input filtering and validation techniques. Analog signals may have a small degree of smoothing applied inside AMS Performance Advisor to improve performance analysis, particularly when noisy data is present.

A reported “poor” or “suspect” status of any input or substituted value is made visible through AMS Asset Graphics in the Process Flow tab, delivering an early warning mechanism for problematic data connectivity or measurement devices.

Configurations and Results That You Can Trust

While spreadsheet applications have been used in the past for equipment performance calculations, they have proven to be cumbersome and innacurate. AMS Performance Advisor accommodates real-life complexities while providing credible results that you can trust. Compared to do-it-yourself spreadsheets, AMS Performance Advisor provides overwhelming benefits.

- Easier comparison of reference operation at "standard conditions"
- Non-cumbersome data cleaning and validation techniques
- Seasonal effects that are easily identified
- Model data smoothing to help you understand underlying performance trends
- Easy to use detailed graphical interface and historian capabilities that interface with external data sources
- Consistent model approach for similar units on a site-wide and organization-wide basis

Workstation Specifications

AMS Performance Advisor executes on a dedicated workstation computer with a Microsoft Windows operating system. For all DCS and historian types, the interface utilizes standard Ethernet (TCP/IP). Data is transferred via an OPC Server or OSI PI provided separately by the DCS or Historian manufacturer.

AMS Performance Advisor is initially installed on a dedicated master workstation. The master workstation can be a server or standard computer as recommended below. AMS Performance Advisor can be accessed at multiple workstations on the same network, simply requiring an installation of AMS Asset Graphics connection to the master workstation (requires a multi-user license).

Minimum Requirements	
Operating Systems	Windows XP Pro SP3 or Windows 2003 Server (Vista not supported)
Processor	2 GHz Pentium, 2 GB RAM (XP)
Hard Drive	100 GB disk space
Network	Ethernet (TCP/IP protocol)
Browser	Internet Explorer 6 or later
Screen Resolution	XGA (1024 x 768)
Other	USB 1.1 port, PDF Reader

Recommended Requirements	
Operating Systems	Windows XP Pro SP3 or Windows 2003 Server (Vista not supported)
Processor	3 GHz Dual Core Pentium, 4 GB RAM (XP)
Hard Drive	250+ GB disk space
Network	Ethernet (TCP/IP protocol)
Browser	Internet Explorer 7 or later
Screen Resolution	SXGA (1280 x 1024) WSXGA (1680 x 1050)
Other	USB 2.0 port, PDF Reader, and Microsoft Office Software

Part Numbers and Ordering Information

Core License

Part Number	Product Description
MHM-AMSPA-CORE-LICENSE-US	AMS Performance Advisor Core License, 1st Yr Tuning 1x/Qtr
MHM-AMSPA-CORE-LICENSE-WA	AMS Performance Advisor Core License, 1st Yr Tuning 1x/Qtr

Equipment Modules

Part Number	Product Description
MHM-AMSPA-MOD-COMP RECIP	Module: Compressor - Reciprocating
MHM-AMSPA-MOD-COMP CENTRF	Module: Compressor - Centrifugal
MHM-AMSPA-MOD-GAS TURBINE	Module: Gas Turbine
MHM-AMSPA-MOD-STEAM TURN	Module: Steam Turbine
MHM-AMSPA-MOD-HEAT EXCHAN	Module: Heat Exchanger
MHM-AMSPA-MOD-BOILER	Module: Boiler
MHM-AMSPA-MOD-HEATER	Module: Heater
MHM-AMSPA-MOD-FURNACE	Module: Furnace
MHM-AMSPA-MOD-CONDENSER	Module: Condenser
MHM-AMSPA-MOD-HRSG	Module: HRSG
MHM-AMSPA-MOD-LARGE PUMP	Module: Large Pump
MHM-AMSPA-MOD-LARGE FAN	Module: Large Fan
MHM-AMSPA-MOD-COOLING TWR	Module: Cooling Tower
MHM-AMSPA-MOD-2ND SIMILAR	Module: 2nd Equipment of Module Type (requires same mfg & model #)

AMS Asset Graphics

Part Number	Product Description
PMS-LZ-30000	AMS Asset Graphics, Standalone Runtime Lic, 30000 elements
PMS-LZ-30000-FLOAT-X	AMS Asset Graphics, X Floating Network Runtime Lic,30000 elements
MHM-INST-AMSAG-AMSPA 1MOD	AMS Asset Graphics, per 1 Module, Install Services
MHM-INST-AMSAG-CUSTOM 3LD	AMS Asset Graphics, customization 3 Labor Days, Install Services

NOTE: See AMS Asset Graphics Price List for X floating runtime license beyond 2.

Dedicated Work Station PC

Part Number	Product Description
A4500H3	Computer Work Station to run AMS Performance Advisor, 110v
A4500H3-IN	Computer Work Station to run AMS Performance Advisor, 220v, NON-US destination
call factory	Touch Panel PC to run AMS Performance Advisor or AMS Asset Graphics

NOTE: Customer may provide a work station computer that meets the specifications stated in the product data sheet.

Ongoing Services

Part Number	Product Description
MHM-AMSPA-TUNE ANNUAL-4X	Ongoing Tuning per year (4x/Yr)
MHM-AMSPA-TUNE ANNUAL-6X	Ongoing Tuning per year (6x/Yr)
SUPPORT-AMSPA	AMS Performance Advisor Software Support, 1 YEAR, after 1st year
ATC-2040xx	AMS Performance Advisor training, 3 days

Where "XX" is KN-Knoxville, TN; AU-Austin, TX; RE-Regional Training Facility; CS-Customer Site

How to Order

Using the part numbers for each respective element, choose one of each of the following:

- Core License
- Equipment Modules
- 2nd Similar Equipments
- AMS Asset Graphics
- Dedicated workstation
- All services necessary to execute set-up phases are included

AMS Performance Advisor

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POWERS PlantWeb

AMS Suite: Global Performance Advisor powers PlantWeb with predictive and proactive maintenance through performance monitoring of process and mechanical equipment to improve availability and performance.

EMERSON™
Process Management