

# Upstream Oil & Gas

## CHALLENGES AND SOLUTIONS

Emerson Data Management consultants are experts at bringing time-series data to business analytics and process optimization for upstream oil and gas industries. We design and implement program-based, ROI-centric production data management initiatives for our clients that provide concrete, measurable value at each implementation phase. We can provide:

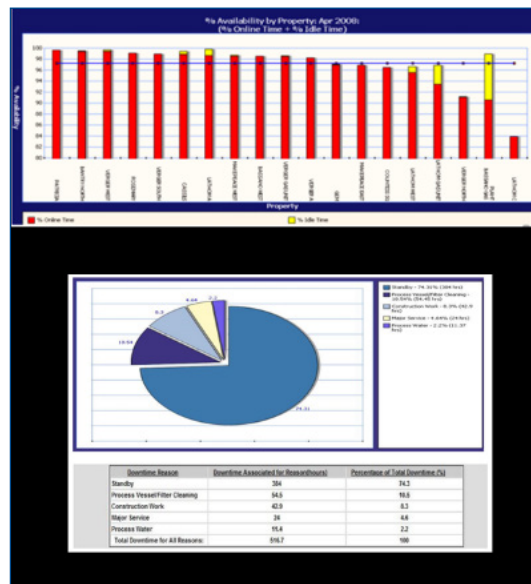
PROCESS	CHALLENGES	EMERSON VALUE-ADD
Well Optimization	<ul style="list-style-type: none"> <li>■ High count of low producing wells</li> <li>■ Geological dispersion</li> <li>■ Multiple drilling techniques across assets</li> <li>■ Varying life cycle</li> </ul>	<ul style="list-style-type: none"> <li>■ Reference Models for conventional and enhanced recovery well optimization scenarios</li> <li>■ BI toolset integration for multi-asset optimization</li> <li>■ Many successfully implemented projects</li> <li>■ ARC-GIS integrations with PI</li> </ul>
Facility Optimization	<ul style="list-style-type: none"> <li>■ Downtime reporting/ Non-Productive Time (NPT)                             <ul style="list-style-type: none"> <li>- Downtime classification</li> <li>- Opportunity cost</li> </ul> </li> <li>■ Production efficiency (OE Score (%))                             <ul style="list-style-type: none"> <li>- Throughput</li> <li>- Quality of product</li> <li>- Theoretical capacity</li> <li>- Pipeline gathering system integrity</li> <li>- Regulatory requirements</li> <li>- Maintenance</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ Engineering and operations workshop delivery</li> <li>■ ROI-based opportunity assessments</li> <li>■ PI event frame and notification construction</li> <li>■ Automated work order generation</li> <li>■ Program-based PDM initiatives</li> </ul>

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Data Management	<ul style="list-style-type: none"> <li>■ Disparate SCADA             <ul style="list-style-type: none"> <li>- Utilization on &amp; off-site (cloud based)</li> </ul> </li> <li>■ Data Quality &amp; Consistency</li> <li>■ Unstructured Data Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>■ Hub &amp; spoke and corporate historian architectures</li> <li>■ Point count optimization/ cost containment models</li> <li>■ Standardized data integrity checks</li> <li>■ Upstream oil and gas domain knowledge</li> <li>■ Customer-specific data catalogues/ master data</li> </ul>
Business	<ul style="list-style-type: none"> <li>■ Collaboration across business units             <ul style="list-style-type: none"> <li>- Drives need for different data sets</li> <li>- Ops/engineering/geo sciences</li> </ul> </li> <li>■ Varying scope of interest             <ul style="list-style-type: none"> <li>- Per well/field/region/corporate entity</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ Light-weight data governance models</li> <li>■ Experience with shop floor to C-suite dashboarding</li> <li>■ JV data sharing &amp; BU-specific data views</li> </ul>

## POTENTIAL BENEFITS TO UPSTREAM CLIENTS: PI SYSTEM SUPPORT CAPABILITIES

- Automating Manually Entered Data
- Automating Reports
- Providing Historical Reference Data
- Providing Context to Data
- Standardizing Analysis
- Tracking KPIs via Management Dashboards
- Communicating Key Info. via Notifications & Alerts
- Troubleshooting / Data Access via Mobile Device
- Providing HMI SCADA Graphics



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### UPSTREAM BUSINESS PROCESSES: PI SYSTEM SUPPORT DETAILS

The table below illustrates some common upstream business processes and the typical form of assistance the PI System and PI Client Tools provide to improve ease, speed, efficiency and accuracy of data analysis.

UPSTREAM BUSINESS PROCESS	DEGREE OF SUPPORT	SAMPLE TYPES OF SUPPORT FROM PI SYSTEM
Well Monitoring and Optimization	H	<ul style="list-style-type: none"> <li>■ RT/NRT data availability for trending</li> <li>■ View well data (in dashboards / reports format) on mobile devices</li> </ul>
Well Downtime Tracking	HH	<ul style="list-style-type: none"> <li>■ Calculate and report NPT consistently across assets</li> <li>■ Auto-generate work orders</li> <li>■ Custom PI Notification alerts via text or email</li> </ul>
Data Volumes Reporting	H	<ul style="list-style-type: none"> <li>■ RT / NRT data availability for trending</li> <li>■ Integrate with all SCADA systems for scalable analysis (e.g. well, site, region, company-wide, etc.)</li> <li>■ Generate reports for expedited analysis of production data</li> </ul>
Production Forecast (7-30 days)	MH	<ul style="list-style-type: none"> <li>■ Calculate production forecast using actual data for custom ranges</li> </ul>
Product Quality Tracking / LIMS Integration	MH	<ul style="list-style-type: none"> <li>■ Integrate production data with LIMS system data for improved analysis and reporting</li> </ul>
Communicating Findings	HH	<ul style="list-style-type: none"> <li>■ Auto-generated reports (pdf or xls) emailed to a distribution list (e.g. broader group than PI user community)</li> <li>■ Field and Operations data available for analysis in city-center</li> </ul>

## VISUAL CONTEXTS FOR PI SYSTEMS DATA

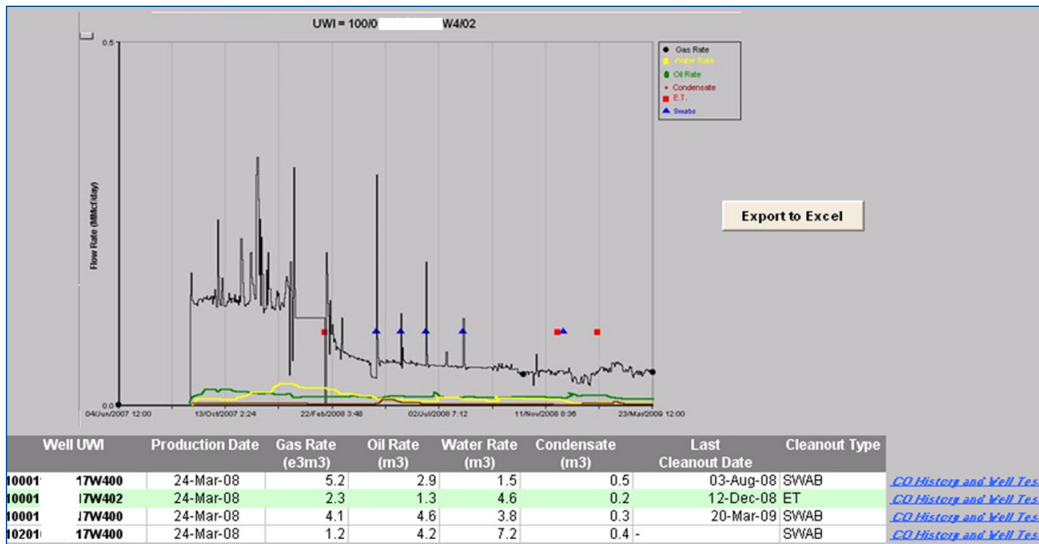
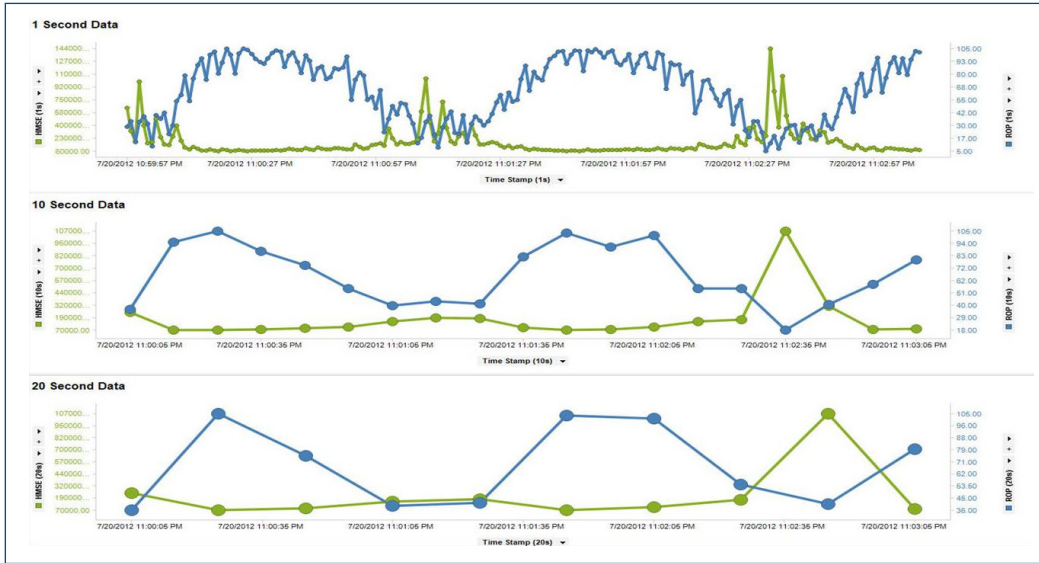


## PI SYSTEM BENEFITS

- A full, preserved, real-time data trail of plant/field process variable values.
- Analysis of real time process data allows for operational, engineering and management users to make educated, site-specific production and operational decisions to enhance production and increase operational efficiencies.
- Standard platform that can collect and store data from any field/plant control system. Corporate users only need to access a single source to see real time data for all sites.
- A central location for key calculations (production, KPIs, etc) that can be used by all business stakeholders.
- Reduced impact to field/plant control system infrastructure as users would not need to login to the remote systems to see their processes in real time.
- Advanced trending, reporting and notification capabilities available with historian solutions.
- Standard access interfaces that allow for easy integration to downstream systems (asset management, field data capture, production and financial accounting, etc.).
- Secure access to real time data for partners.

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## ANALYSIS EXAMPLES: RIG & DRILLING OPTIMIZATION OPPORTUNITIES IN UPSTREAM EXPLORATION



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