We Engineer Solutions to Suit your Assets

With over $6 billion in revenues, 30,000 people working in more than 50 countries we have a strong network of capability and expertise built over 30 years of successful operations to help you wherever you need it.
Crude Changes

• Unprecedented strains of regulations, crude slate changes, economics, etc.
• Too many warnings: fines for non-compliance, jobs at risk, Tier III specs, RIN’s for ethanol etc.
• Lower capital budgets to be used to create robust supply chain optimization system, trained operators, reliability, & monitoring of assets to ensure efficient operations.
• Monitoring to encompass environmental management, functional safety, equipment condition monitoring, and unit monitoring.
• Benefits: Operational Intelligence (OT) can lead to 5-15% improvement in productivity with standardized source of information.
A Brave New World!

- U.S. refineries processing the lightest cocktail of crudes, hitting operational limits to use Light Tight Oil (LTO).
- Asia's oil refiners can choose from over 300 crudes.
- Crude slate complicates catalyst performance and yields of complex units like FCC, and increases load on reformers and Alky units to meet the octane specs.
- Greater unpredictability on quality as one well may have significantly different properties from the well next to it.

Crude oil price fluctuations

Margin per barrel
What’s being used now?

“Joe knows what to do, but he is on vacation for next 2 weeks”
“We get the printout from the control room to track production”
“We know what we are producing, but not if we are out of compliance”
Need for Remote Monitoring

- Manufacturing facilities need to know how assets are performing, and how they SHOULD be performing.
- Today, information exists in silos and comes from disparate sources.
- Need for standardization across the corporation with ability to interpret that data intelligently to track and predict performance.
- Solutions exist that can connect to plant sources like data historian and DCS and drive that data through smart simulation and modeling tools, to monitor and recommend process improvements and use predictive analytics to predict future performance.
- **Benefits:** Standardized, single source of information to monitor and predict process unit, environmental, and reliability systems across the enterprise.
How does Monitoring work?

**Step 1**
Collect plant data from various sources

**Step 2**
Reconcile/Filter DATA

**Step 3**
Send data to smart simulation models as well as dashboard system

**Step 4**
Compare simulation predicted data with actual data to determine operational gaps

**Step 5**
Repeat Step 1 to 4 for continuous performance monitoring

Improve performance and profits via continuous monitoring
Single Version of the Truth

ERP Finance
Manual Inputs
Document Control
Maintenance Management
Historian(s) SCADA
E-Learning
LMS
Engineering Simulation
Environmental Management

Data repository
Need for Environmental Monitoring

- Corporate wide solution required to manage increasingly complex monitoring requirements and regulatory calculations
- Be prepared for audit protection, compliance and protect your “license to operate”.
- Need for real-time tracking of emissions to proactively respond and take action before non-compliance occurs
- Tight regulations for air emissions, water, and GHG
Increased Regulations, Higher Enforcement, Lesser Manpower

Number of Pages of Regulations Added to the Federal Register Each Year, 1936-2011

Source: Ten Thousand Commandments

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Need for Information Across Corporation

**Operations**
Need to run the plant based on the compliance values instead of relying on estimates, allowing higher production levels.

**Environmental**
Need to use consistent calculation methodology across all process units, providing confidence and relieving audit stress.

**Management**
Need to receive updates in time to make operational adjustments, allowing changes to be made before problems occur.
Ensure that...

**Warnings**
The system is continuously watching for problems before they occur, in order to allow time to take preventative action.

**Analytics**
Near misses can be analysed to determine if underlying operating procedures could be contributing to problems.

**Integration**
Data can be automatically transferred to PCN networks, ERP systems using the native interfaces for each. Not vendor dependent.
Future Trends

As technology evolves, newer concepts will emerge to monitor assets and ensure increased productivity, such as machine learning, drone operation for quality tracking, and immersive systems for virtual plant operation. However, human factors will continue to be critical to operate these assets.

Drones and machines will increasingly be a part of our life, but it's still time before SkyNet takes over!
Conclusions and Recommendations

• Before you can run, try to crawl. Establishing an operations monitoring system strategy is critical to information sharing, collaboration and efficiency. Start with a smaller project that migrates information from a small part of the plant into a software-based solution.

• “If you don’t start somewhere, you’re gonna go nowhere”-Bob Marley

• Consider vendor-independent or flexible systems that can work across disparate data sources and information systems.

• Ensure individuals that they will not lose their way of work and they will not be replaced by a machine. Effective Change Management.

• Take the time to prepare a clear scope of supply and end objective for the initiative. We all know the project needs to be done, but identifying specific objectives goes a long way to ensure success.

• Identify an internal champion that is incentivized and held responsible for the initiative.

• Measure benefits: Before and After