OFFSHORE
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Offshore Platform Information Management

Making the most of your operational data in a demanding environment

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Introduction

Offshore and deep-water production has been a significant factor in the sustained growth of the oil and gas industries over the past decade and this trend is expected to continue beyond 2013. In the period from 2009 to 2015 the industry is expected to have grown in the order of 500 billion USD with key investment areas including, but not limited to, the Gulf of Mexico, South and Central Americas, West Africa and the North Sea in Europe.

This only tells part of the story; in many parts of the world, capital investment in offshore production is winding down due to a desire to increase profitability in changing markets, and for this challenge, technology providers such as Yokogawa, have developed and delivered solutions for fixed and floating offshore platforms, in order to improve the operational safety and profitability of an expanding industry within the increasingly competitive commercial landscape.

Yokogawa Vigilant Plant solutions and services address the unique challenges faced in the offshore industry by better utilizing business and production information as it is derived from operational activities in order to directly improve safety, operational and maintenance procedures, profitability, reducing the overall cost of achieving and maintaining production excellence.

Not easy sailing

As the global commitment to deep-water production increases, so does the environmental and safety risk, leading to operational challenges in remote environments. Extreme temperatures, sub-sea conditions, site inaccessibility and fragile ecological factors have a significant impact on safety. Similarly the consequences of interrupted production are magnified by location inaccessibility, extreme weather and equipment or manpower bottle-necks.

As the hub of automation and information technology in the production environment, how can platform technology provide solutions for the following?
- Health, Safety and Environment
- Production, and downtime reduction
- Operations support in the field
- Remote condition monitoring & Predictive maintenance
- Manpower utilization

Increasingly, new platforms are designed from the ground up with planned operational procedures incorporating advanced information technology for addressing the issues above; such as detailed alarm or functional safety philosophies, supported by standards based software and change management. However existing platforms without the benefit of incorporating the latest technology in the design phase as part of lessons learned, face the challenge of deriving the best possible performance from their available infrastructure.

Fortunately, the methodologies for data acquisition from legacy systems, and their integration into a cohesive, reliable core for analysis, reporting, and performance and lifecycle optimization have achieved a high level of maturity with the Vigilant Plant. The key benefits of this exist mainly in the way information is utilized to leverage higher safety and business results. High level production information solutions are often applied to long running assets, bridging the gap in performance between Greenfield and Brownfield sites.

Vigilant Plant and the intelligent platform

The Vigilant Plant solutions for offshore platforms are Information Acquisition and Management solutions built around the production control layer; which could include multiple control and functional safety systems by various vendors. Raw data from all automated systems is captured and consolidated to a secure, central repository.

Additionally, human operational activities and standard procedures can be captured and modularized to provide further context to the automated information.

Consolidating both process and alarm and event data across all systems provides an integrated, collaborative data platform. But the real benefits are what the information is used for and how it is used.

In light of the challenges discussed above, objectives of the Intelligent Platform include:

Support for Operations/Maintenance procedure

Control and Procedure can be linked and automated with Modular Procedural Automaton. This breaks control operations into modular sequences that can assembled into complex procedures, which can either provide real time guidance of best practices, or execute direct control on the DCS to minimize error and standardize results.

Communication between personnel, departments and shift teams is quite often a failure point leading to or propagating operational issues. To address this, a platform for managing task activity between operations and maintenance can be adopted but must also provide effective electronic logging, shift handover

reporting, and where possible, interface directly to the information layer to automatically acquire reporting data, and interface also to the business and maintenance layer so logs, running hours or performance KPIs can be made available with minimum manual error.

Visualization of information is often overlooked which is compromised when not readily available. Information should be presented in a form that can be readily consumed for the situation at hand therefore a lot of consideration of what, how and who will use the vast amount of data collected is required. This then funnels the critical information for each objective into a relatively fewer but more valuable items.

Functional Safety Management and Reporting

Safety begins at the planning stages, and continues well into de-commissioning of the asset. Responsible asset owners and operators understand that safety considerations need to be interlaced with every factor of operation with preliminary risk analysis before or during the design phase, laying the foundation for functional safety design. But then, during operation, functional safety must be assessed and monitored to validate the risk reduction provided.

Safety Function Monitoring solutions on the intelligent platform incorporate the analyzed risk mitigation required by HAZOP or LOPA studies as a design expectation and compare this to the real plant safety performance during the plant lifecycle or risk analysis phases. By capturing all safety activation related data as it occurs, the intelligent platform not only identifies potential safety issues when things may go wrong but also provides opportunities to reduce unnecessary maintenance when things go right.

Alarm Management

With standards available today such as the ISA 18.2, and supporting technologies built around these standards, a number of tools can be deployed on the intelligent platform, starting with the capabilities of the control systems. However, implementing a well-defined Alarm Philosophy typically goes beyond the control layer. Both EEMUA 191 and ISA 18.2 define the alarm philosophy approach as a number of stages, playing a role in the design and deployment of the control system, and as a process that continues through the operational lifecycle.

For both greenfield and brownfield facilities, the advanced platform should:
- Consolidate alarms and events across all plant systems
- Identify trips and automatically present

relevant information for each occurrence
- Provide automatic analysis of alarm behavior according to standards based performance factors
- Provide a means to rationalize and action on this information, using a master database capable of auditing and versioning, approving set-points and priorities based on operating modes
- Provide a means to enforce alarm decisions on the control layer, providing management of change at the operating level and closing the loop for continuous improvement.

Condition Based Monitoring and Predictive Maintenance

The information layer can be applied to condition based monitoring by utilizing two valuable properties: sub-system integration and performance calculation. Data from running equipment such as boilers, pumps, vessels can be converted in real time to present the performance condition of each unit or individual asset.

The performance degradation of these assets over time can also be tracked with extrapolation and used as basis for predictive maintenance. This increases the uptime and profitability of the platform while giving greater visibility to potential breakdowns and faulty or failing equipment.

Production Performance and Downtime Reduction

Raw process information is valuable to control operations, but for performance analysis, a lot of effort can often be wasted in data extraction and conversion before meaningful, actionable information is derived. This may be fraught with error and inconsistent practices unless the information layer is extended to automatically calculate key performance indicators from raw metrics in real time. Analyzing and categorizing the conditions and reasons for downtime events in the plant as they occur provides opportunities for local or remote exploration of production bottle-necks.

A partnership based on performance and reliability

As our customers push further into deep-water and remote production, Yokogawa responds to provide a comprehensive suite of offshore solutions to achieve the intelligent remote platform. Our development and deployment efforts carry the burden of performance and reliability in harsh environments. As new challenges arise, Yokogawa is committed to supporting the industry with the Vigilant Plant. ∎

Contact information

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