

SUCCESS STORY



Increasing Facility On-stream Time and Safety Margins Using Modular Procedural Automation



Chevron

Location: U.S Gulf of Mexico

Industry: Exploration & Production

“Crews are also comfortable with the MPA solution and are beginning to request that MPA be applied to other procedures.”

- Engineering Manager, Chevron

The Challenge

In 2008 and 2009, two new deepwater facilities were brought online by Chevron's Gulf of Mexico Business Unit (GOM). Operating procedures were developed by the project teams and maintained on paper. Chevron GOM management and engineers recognized that keeping procedures up to date and consistent execution among operating facilities had a significant impact to platform reliability. Further, as procedures reflected and often embodied the knowledge of the crew, a method was needed to capture and retain knowledge, employ best practices, and enforce consistent application of procedures. These new facilities can take hours to bring back online, and having consistent, effective procedures could avoid nuisance outages and enable facilities to be brought back online sooner. An electronic procedural automation solution was sought that could become a standard across the GOM facilities.

The Solution

After initial investigation and testing, in 2010 Chevron GOM launched two pilot projects that employed Yokogawa technology for electronic procedural automation. The two selected platforms used PLC's for platform automation systems. Fortunately, the Yokogawa Modular Procedural Automation (MPA) technologies integrated with of the PLC systems via an off-the-shelf, commercially available OPC interface. A dynamic simulator was used to test OPC communications between the Yokogawa solution and the PLC's. Each platform had multiple systems from which data had to be extracted, and the commercial middleware OPC product was used to consolidate communications among the various PLC systems.

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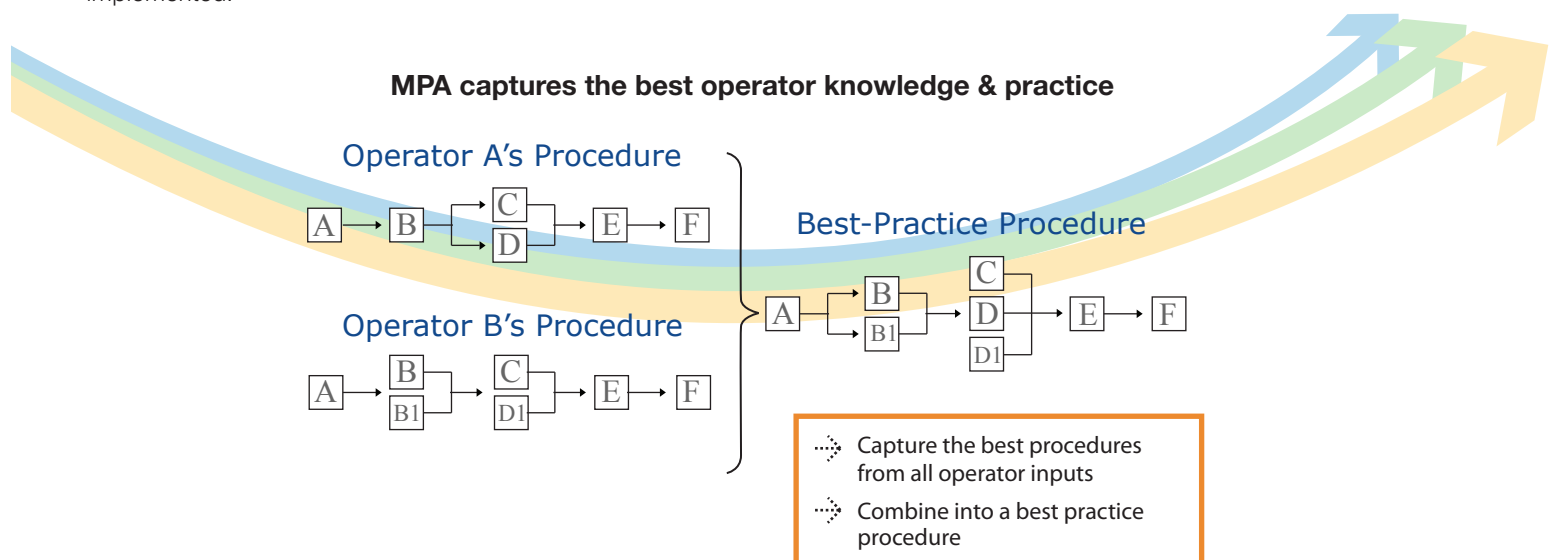
SEE
CLEARLY

KNOW
IN ADVANCE

ACT
WITH AGILITY

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A single procedure was selected to pilot and the proof-of-concept of MPA was first tested on the dynamic simulator. The results were shared with the different crews, which enabled the crews to gain familiarity with MPA before it was implemented fully on each platform. The selected procedure needed to be meaningful but not difficult to implement. On one facility the testing of Emergency Shutdown Stations (ESD) was the subject of the pilot procedure. Nuisance shut-ins of the platform had previously occurred because the paper-based procedure was not executed properly. On the other platform another procedure was automated using MPA: realigning flow-lines from wells on the manifold. If this procedure is not done correctly, a nuisance shut-in of a well could occur. Like the ESD procedure, the dynamic simulator was used to design and test the procedure before it was implemented.



Active X components were used to integrate the electronic procedures into the operator's HMI, which guided the operator/crew through the procedure. Chevron GOM found that no special training was required as operators were able to easily step through the procedure first offline and without risk to the facilities. MPA was implemented like "another operator", according to Chevron GOM engineers. If the operator decided to take control of the procedure, he could do so at any point. MPA provided messaging to operators for each step, such as the closure of a valve, and then waited for the operator to take appropriate action. These two specific procedures required that an operator be actively involved, but that would not have to be the case with all procedures, some of which could be more automated. A single server that hosted all the required software was installed on the platform control system network, making the physical implementation straightforward.

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Business benefits

Installation of the new MPA technology occurred in the fourth quarter of 2010 and has been running without incident, according to the Chevron GOM engineers. Engineering also reports that "Crews are also recognizing the value of the MPA solution and are beginning to request that MPA be applied to other procedures." In 2011 additional, more complicated procedures are being planned with faster implementation anticipated, given that a very flexible architecture is now in place on each facility. Since the architecture and MPA technology is consistent between the two platforms, Chevron GOM can now deploy and maintain procedures as modules, reducing engineering time and increasing operating consistency among facilities. This is also a source of value for future deepwater facilities which can leverage the work done on existing facilities. One of the two pilot facilities plans to expand the use of MPA to other ESD-related procedures, while the other facility will employ MPA to support the start-up process. Using MPA to guide the start-up of a facility will significantly reduce the time required to reach full production.



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