

The world's largest GTL facility runs on LIMS



The challenges that Shell and Qatar Petroleum faced at Pearl GTL, Qatar demanded a proven and reliable data management solution to collate testing data, enhance oil movement and batch tracking as well as improve production and operations management – LIMS was the answer

Pearl GTL has no shortage of world records. Established by Shell and Qatar Petroleum in 2006, the facility includes the largest GTL plant and one of the largest instrumentation and control systems anywhere on earth. GTL technology enables Qatar – in partnership with Shell – to open up new opportunities in new markets, monetising its enormous natural gas resources through the creation of high-quality, easy-to-export liquid fuels. The facility processes 1.6 billion cubic feet of wellhead gas per day to remove contaminants and refine natural gas liquids. Using the proprietary Shell Middle Distillate Synthesis (SMDS) process, Pearl GTL converts output from the world's largest non-

associated gas field into fuels, lubricants and other high-quality products which Shell ships to markets around the world.

The challenge

The scale and diversity of Pearl GTL makes it an incredibly complex operation. The building phase alone required Shell to create a private offloading quay in Ras Laffan City so it could import two million freight tonnes of necessary materials and equipment.

It was clear from the beginning that Pearl GTL would need a highly sophisticated software solution to manage the data coming out of a quality control system that receives a constant stream of 34,000

transmitted measurements. These tests gauge well content, volume, emissions, equipment condition and hundreds of other issues integral to the plant's operation. In addition to collection and storage, the data also needed to be organised, integrated and analysed to ensure product quality, plant and customer safety, environmental protection and production efficiency.

"A project of Pearl GTL's magnitude hasn't been attempted before," says Ajith Kumar, senior business analyst for Qatar Shell GTL. "With billions of investor dollars and tens of thousands of jobs at stake, data management was a major priority. To maximise production with quick decisions, we needed condensed, accurate



Mansoor Al-Shamri, laboratory manager, and Ajith Kumar, senior business analyst, at the Pearl GTL laboratory

information at our fingertips at all times."

Additionally, Shell and Qatar needed a solution that would ensure that Pearl GTL's labs remained in compliance with ISO 17025 and other standards at all times and could retrieve data that demonstrated compliance in the event of an audit.

LIMS to the rescue

With so many prerequisites for success, Pearl GTL needed a proven solution. The right laboratory information management system (LIMS) would allow Pearl GTL's sampling program to meet its designers' sophisticated ambitions. It would present accurate, unbiased information which would enable Shell to maintain the highest

standards of safety, regulatory compliance and environmental commitment without sacrificing financial performance. In fact, a LIMS would enhance Pearl GTL's bottom line by collating testing data, which allows managers to make impactful business decisions quickly.

Given the operation's complexity, not just any LIMS solution would do. In addition to organising sample results, Pearl GTL's LIMS would need to be fully integrated and communicate with a variety of other systems, including operations management, batch tracking and enterprise resource planning (ERP) systems. Without full integration of the LIMS to existing enterprise systems, making a venture the size and scale of Pearl GTL successful would be nearly impossible. Shell chose Thermo Scientific SampleManager LIMS for its state-of-the-art testing laboratories, because the solution offered unparalleled support for each of the Pearl GTL facility's stringent requirements.

Better production through automation and integration

One of Shell's main reasons for choosing the LIMS was its ability to work with other systems. At Pearl GTL, the LIMS is

integrated with an operations management system (known as OTTER), process historian (PI), an oil movement and batch tracking system, laboratory instruments and other production systems.

The way the LIMS integrates with PI is a particular source of efficiency for Shell and Qatar Petroleum at Pearl GTL. Whereas some labs manually send test results to operations, technologists and process engineers, among other users, at Pearl GTL results become available to all relevant parties within the PI system as soon as they are authorised in SampleManager. This means that the many employees whose work hinges on quality sampling are receiving the information they need in real time.

Another critical consumer of lab data is Pearl GTL's oil movement and batch tracking system. Again, the LIMS creates efficiencies by eliminating wait times. When panel operators need to move oil to new tanks in preparation for shipping, for example, they do not have to wait to be notified of test results, minimising demurrage charges for loading delays that can cost as much as USD 35,000 per day. As soon as the results have been issued in the lab, LIMS notifies operators through the oil movement system, with which

Pearl GTL plant at night



it is seamlessly integrated. Since Pearl GTL opened, the facility has incurred no demurrage charges – an incredible feat for an operation so large.

A LIMS also helps Pearl GTL operators more efficiently collect data from the field for analysis in the lab. Using the OTTER system, all sample points in the field are marked with radio frequency identification tags. When field operators perform sample rounds, a handheld computer guides them to each sample point and then automatically records the required information, whether the sampling task is routine or non-routine.

"It's amazing how much overhead we were able to eliminate with the OTTER system," says Mansoor Al-Shamri, laboratory manager for Qatar Shell GTL. "Field operators can do their jobs faster and also more accurately, since they're not recording

readings by hand. And ultimately, it's SampleManager that enables the real-time aspect of the OTTER system to be possible."

The LIMS is fully integrated with OTTER, so the data collected in this system are instantly transferred to SampleManager from the field for analysis by managers or technicians back in the lab, saving Pearl GTL an estimated 2,400 hours of work per year.

Finally, the LIMS makes it possible for Pearl GTL to meet an increasingly crucial requirement of oil and gas laboratories: regulatory compliance. ISO 17025 established an international standard for how sampling labs manage data collection, security, instrumentation, traceability, personnel and more. By collecting complete data records, the LIMS ensures that Pearl GTL is always in compliance with ISO 17025 and other standards. The solution

also guarantees that compliance can be easily proven in the case of an audit.

Conclusion

From the moment it broke ground in 2006, the ambitious Pearl GTL project needed to be grounded in proven, dynamic technologies. Shell and Qatar Petroleum used a LIMS to help their ambitious vision excel by managing a highly sophisticated sample program. Pearl GTL's testing program enables the world's largest gas to liquids facility to operate efficiently and safely while adhering to regulations and maintaining profitability, and a LIMS is the lynchpin that makes it all possible. ■

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