PETRONAS CARIGALI is the upstream arm of Malaysia’s state-owned, fully integrated oil and gas company. It is responsible for exploration and production, with 190 offshore platforms and a total yield of more than 2 million barrels of oil each day. As the offshore business continues to grow, PETRONAS needed better tools to manage its fleet. It selected the OSIsoft PI System™.

“The PI System is a vital tool for engineers to properly perform their role in the dynamic oil and gas world.” – C Sathya Murthi, Staff Engineer, PETRONAS

**Situation**

PETRONAS operates dozens of offshore oil and gas platforms, with significant growth on the horizon. Each platform extracts oil, gas and/or gas condensate. No matter which type, all of them are complex, isolated, operations that require specific systems to monitor each of the individual assets and processes on board.

Each of the platform’s on-site processes has its own unique local database. As a result, operational data was stored across many systems. Platform operators were unable to access real-time data they needed to actively monitor when the operations were at risk of exceeding safe operating limits or critical operating limits.

Furthermore, PETRONAS was unable to quickly troubleshoot problems when they occurred. Data synthesis and analysis was performed by PETRONAS’ on-shore engineering team. In the case of an event or performance issue, engineers had to travel to the platform via helicopter, stay overnight and download the data onto a USB stick to carry it back to regional offices for review and analysis. It could take up to three weeks for engineers to retrieve the data, analyze it and suggest corrective action. Additional time was required to implement, report performance and collect the data to report results to the company’s management team in Kuala Lumpur.

“To go to offshore is not a straightforward thing,” said Musreen Azwan, Instrumentation Engineer at PETRONAS and project manager for the PI System installation. “It’s very time consuming, but we had no other way, because we had to get the data back to the office.”

This had a real financial impact on the company. On one platform, for example, a pressure monitoring system regularly triggered platform shutdowns when pressure levels surpassed a certain limit. Because it usually takes two to three days to get a platform back up and running after an automated shutdown, each incident resulted in millions of dollars in operating losses. To more quickly address such problems, PETRONAS needed reliable access to its real-time data. It turned to the PI System.

**Solution**

By 2013, PETRONAS had installed PI Servers at 8 of its 52 mother platforms in Malaysia. It plans to install the PI System at 23 additional platforms in 2014 and 15 platforms in 2015. At each platform, the PI System collects data from various systems around the facility, creating a common, easily accessible, database for on-site operators to monitor real-time conditions using visualization and notification tools.

Data from the local PI System is also sent upstream to PI Servers at regional offices. The connections are highly secure, with data flowing only one direction — from the platform to the regional offices — over its own fiber optic
Data was siloed across multiple systems on the offshore platforms and operators lacked real-time visibility for performance. To analyze data, engineers had to fly to the platforms and download the information to USBs for later analysis at regional offices. Slow troubleshooting, analysis, and reporting reduced productivity and cost the company significant money.

Benefits

Installing the PI System on its offshore platforms is already showing remarkable returns for PETRONAS. Engineers no longer need to travel to the offshore platforms to access data—it’s available at the regional office level, in real-time without any human intervention. That means PETRONAS has been able to reduce the diagnostic and troubleshooting period from as long as three weeks to just a few minutes. Now, they can immediately access current data from the platforms. Using PI System analysis tools, they can investigate causes of issues (as they happen) and suggest local-level changes.

Operators are better able to respond to real-time data to improve safety and reliability. Now they can monitor critical equipment and process instruments, in real-time, and detect the early warning signs of failure. When equipment is not performing within the safe operating parameters, operators and engineers can collaborate using the same live data to take preventative actions and avoid triggering an automatic shutdown. In the case of the automated platform shut down mentioned above, on-site operators had lacked visibility into what triggered the shutdowns; based on limited system observations, they assumed it was an error in the shutdown logic and routinely brought the platform back online without making changes to the equipment or processes. Consequently, the costly shutdowns continued to occur. By observing the problem in real-time, engineers were able to identify the root cause of the high pressure exhibited in the system. It was not a problem with the logic; the pressure was in fact spiking to dangerous levels, presenting a significant safety concern. Engineers were able to quickly rectify the problem, making platform operations safer and preventing five shutdowns at one platform in the first year.

Managers at the Kuala Lumpur office are also benefitting from the PI System. With better data, they have been able to address issues more quickly and now they can track performance across PETRONAS’ entire platform portfolio. PI System data is also helping them set performance standards for regional engineers and empowers them to take action to meet those targets, saving the company time and money. “Our vision was to turn data into profitable information,” says Musreen. “The PI System has made that a reality.”

Business Challenge

- Data was siloed across multiple systems on the offshore platforms and operators lacked real-time visibility for performance.
- To analyze data, engineers had to fly to the platforms and download the information to USBs for later analysis at regional offices.
- Slow troubleshooting, analysis and reporting reduced productivity and cost the company significant money.

Solution

- Local PI Servers were installed on PETRONAS’ offshore platforms. The local servers give operators real-time visibility into platform operations.
- Real-time data from the platforms is sent to regional and central PI Servers (via fiber optic or VSAT networks) for use by onshore personnel.

Customer Results

- Accessing data to troubleshoot problems now takes minutes, not weeks.
- Platform operators and on-shore engineers can collaborate to troubleshoot problems using the same, real-time data.
- Monitoring operations in real-time with the PI System prevented five unplanned shutdowns at one offshore platform in 2013.