DATA OPTIMIZES OPERATIONS: AIR LIQUIDE'S LIQUID ASSETS

In 2017, Air Liquide began opening remote operation control centers (ROCCs) around the world to monitor and respond to plant conditions in real time. These centers connect plant operators, remote analysts, and industry experts who work together to identify potential machine failures and find ways to optimize plant performance. Every day, Air Liquide collects over a billion data streams from thousands of pieces of equipment spread across 80 countries. In his presentation at PI World 2019, Guoning Zhang, a Performance Analytics Manager at the recently opened ROCC in Malaysia, spoke about how his team uses the PI System™ to optimize operations of their pipeline networks and gas production facilities spread across eight countries in Southeast Asia.

Founded in 1902, Air Liquide is a worldwide leader in industrial gases. They serve approximately three million customers across multiple industries, including medical supply providers, oil and gas producers, and chemical and electronics manufacturers. Large Industries, a world business line of Air Liquide, operates hundreds of plants and primarily produces oxygen and hydrogen using air separation units and steam methane reformer units. In 2015, Large Industries launched its Smart and Innovative Operations (SIO for short) initiative with two clear goals: eliminate unplanned shutdowns and double the efficiency gains of its gas production plants by 2020.

Air Liquide's SIO initiative is divided into 4 key streams: SIO.Drive, SIO.Predict, SIO.

Optim and SIO.Perform. Last year, Olivier Rioux, an SIO initiative project manager for Air Liquide, presented the results for the SIO. Perform pillar at PI World Barcelona 2018. He explained how the company obtained dramatic efficiency savings that paid for the project within three months by applying a new algorithm to operational data gathered by the PI System. Within eight months, Air Liquide's operational savings were 10 times greater than the initial cost of the project. "All the power of [the PI System] and what we can do is really huge," said Rioux. This year, Air Liquide returned to PI World to talk about how the PI System helped it achieve results for the SIO.Optim pillar of the initiative, which focuses on using real-time data to enhance operational decision making and analytics.

CHALLENGE

Optimize operations of pipeline network and gas production facilities.

SOLUTION

The PI System with AF and partner solutions help to determine best configuration of compressors and plant loads.

BENEFIT

Enabled predictive maintenance and reduced carbon emissions and energy consumption.

Performance analysts rely on PI System data to determine the most efficient process configurations for equipment.

"All these optimization efforts for SIO.Optim require data," Zhang said. Air Liquide's ROCC in Malaysia has over 700 users across Southeast Asia accessing 10 years of historical operational data as well as real-time data stored in the PI System. Analysts at the ROCC compare real-time and historical data to monitor plant performance, define, and apply directly the most efficient settings for each production unit. They also use data to identify potential machine failures, schedule preventive maintenance, and look for ways to optimize the operational configurations of their pipeline networks.

Zhang spoke about one such pipeline network in Singapore. The network stretches over 124 miles and connects five production units, supplying oxygen, nitrogen, and hydrogen to customers. These pipelines contain many different rotating compressors, which maintain pressure and flow throughout the system. Varying in age, compressors from different manufacturers can have very different operational profiles and performance. "It's really hard to figure out in real time without data what the best combination [of equipment] is. That's where SIO.Optim comes into the picture," Guoning said.

Working in partnership with Alizent, an OSIsoft system integrator, performance analysts at Air Liquide's ROCC in Malaysia used Asset Framework (AF), a contextualization layer of the PI Server, to

generate a digital twin model of the pipeline network. With AF, users can link key related attributes together using metadata into a unified hierarchy of all their equipment. Relying on AF-based analytics, ROCC engineers can calculate KPIs in real time and identify the best combination of compressors to minimize power consumption and reduce the carbon footprint.

The PI System also allows ROCC engineers to easily connect their data to the other types of advanced analytics solutions such as Seeq and AIMMS. "We have powerful in-house tools and partner tools connected to PI. With the help of all these systems, we are optimizing our plant in an efficient manner," Guoning said.

Recently, Air Liquide signed an Enterprise Agreement (EA) with OSIsoft to expand their capabilities with the PI System. "This is good news," said Jayakumar Manoharan, Smart Manufacturing Technology Manager for Air Liquide, during the talk. "With this Enterprise Agreement, there is no longer any limitation for us. We have unlimited tags, unlimited user tools, and we also have training packages. With OSIsoft, we're boosting up our SIO projects, interconnecting various solutions, collecting more data from the field and visualizing more data."

For more information about Air Liquide and the PI System, watch the presentation here.

PARTNERS:
Alizent & Seeq

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The beauty of using Asset Framework is that we can we can do the job one time and then deploy quickly to all the same category of machine."

— Guoning Zhang, Performance Analytics Manager, Air Liquide

Manoharan, Jayakumar; Roy, Andrea; and Zhang, Guoning, "How Air Liquide leverages on PI technologies to optimize its operations - SIO.Optim program."
<https://www.osisoft.com/Presentations/How-Air-Liquide-leverages-on-PI-technologies-to-optimize-its-operations---SIO-Optim-program/>