

Columbia Gas Pipeline Transforms Data into Predictive Analytics

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Keywords

Gas Pipelines, Predictive Analytics, Prescriptive Analytics, Dashboards, Enterprise Analytics, OSIsoft PI Coresight, Reliability, Force Majeure

Overview

Columbia Gas Pipeline Group (CGP) manages over 15,000 miles of natural gas pipelines that span 16 states from New York to the Gulf of Mexico. As ARC Advisory Group learned at a recent OSIsoft Users Conference, with over 1.1 million horsepower of compression housed in over 100 stations

Columbia Pipeline Group (CPG) manages over 15,000 miles of natural gas pipelines that span 16 states from New York to the Gulf, with over 1.1 M horsepower of compression housed in over 100 stations, which can be challenging. "It is paramount that the company deliver gas reliably," according to Emily Rawlings, System Reliability Manager. This report describes how CPG expanded its usage of the PI System to enable it to make better use of data, visualization tools, and information to make better, more informed decisions.

distributed across its extensive pipeline network, the company had experienced some past challenges delivering gas to its customers, particularly during extreme weather conditions, like the US experienced this past winter.

In her well-received presentation, Emily Rawlings, System Reliability Manager, discussed how CPG operated pipelines in a challenging weather environment that she referred to as the "Polar Vortex" - of which the US has experienced four this year, making it one of the coldest winters that the company has measured in over 30 years.

"Keeping gas flowing with harsh weather like we've experienced over the past year can be challenging," stated Ms. Rawlings. However, by accessing historical and real time data in the company's OSIsoft PI System, viewing trends in OSIsoft's PI Coresight, and taking full advantage of an enterprise agreement that allows CPG unlimited access to tags, software, and support the company can obtain information and intelligence that allows it to react to station failures and respond quickly.



Operating Reliably in Challenging Weather Conditions

Due to a significant failure that occurred in 2010, the company needed to improve its gas delivery reliability based on industry best practices.

Toward the end, the company expanded its existing client relationship with OSIsoft through an enterprise software agreement and worked with technical consultants from Rovisys to identify the right data to look at to help prevent asset failures or events from compressor stations.

This involved using real time data to run algorithms and analysis so company employees know what is going on, can make changes to prevent any abnormal events before a failure happens, and help ensure that the gas flows safely and reliably. The operators can view dashboards with KPIs to predict abnormal behavior, prevent downtime, and increase reliability.

Operators can view data in real time and compare the information to historical data to help prevent equipment damage and other abnormal events.

CPG refers to the project as "Enterprise Analytics."

Implementing "Enterprise Analytics"

Under its new OSIsoft Enterprise Agreement, CPG can take advantage of as



Compressor Station Dashboard at Columbia Gas Pipeline Polar Vortex

many tags, software capabilities, and support services as needed. (Prior to the enterprise agreement, the company had to delete tags before it could add new ones, which it found limiting). CPG can now utilize unlimited tags and add new stations as needed. The organization can view over 150 dashboards and added

about 80 Apple iPads to enable personnel to log in from home, a remote compressor station, or their desks to give them real-time visibility into what's happening at the station. For example, for a compressor, the com-

pressor operator dashboard shows the unit, the unit status, heat rate, and discharge pressure; all in real time.

Predictive and Prescriptive Analytics Provide Tangible and Intangible Benefits

This past winter, CPG operations analysts responsible for different geographic regions used the new tools and dashboards to predict weather-related issues that could impact gas delivery in their regions. In one instance, the operations analysts logged into PI Coresight and noticed the fuel rate was low on a compressor. In response, a valve on the compressor was drained of oil, which returned the fuel flow rate to normal. The company estimated that this action prevented a significant valve failure at the compressor station.

Through proactive steps such as the one mentioned above, the company estimates that it has prevented around 30 events since 2011.

In addition to these tangible benefits, the company believes its Enterprise Analytics project has delivered significant intangible benefits as well. As

A force majeure is a shutdown of the system so that the company cannot deliver gas.

Ms. Rawlings explained, "Companies thrive and survive on their customers; so increased customer confidence is huge. If you are seen as a company that delivers gas reliably with no downtime, no force majeure, no failures, cus-

tomers will come to you. Every time we prevent disruptions in our gas supply, we build a stronger reputation. This not only helps us retain our customers but helps us expand with new customers."

Future Plans

In the future, the company plans to add executive-level dashboards that give added visibility to corporate offices. "Decisions should be made on the basis of the data that you have, rather than on gut feel. CPG can use our data to make smart, well-thought-out, knowledge-based capital decisions," stated Ms. Rawlings. "There are huge benefits going from a reactive environment to a proactive environment. You have a chance to see what's happening immediately and prevent costly fixes," she added. The company also wants to add measurement stations at the company's distribution stations, which she referred to as the "cash register" of the company. By

adding visualization, the company can see what's happening in those measuring stations, such as a bypass that's open or billing issues and determine opportunities to improve.

Recommendations

Based on ARC research and analysis, we recommend the following actions for owner-operators and other technology users:

- Use data visualization technology to gain a better understanding about what is happening in operations to be able to better avoid incidents and maximize reliability
- Have a structured plan for benchmarking opportunities and spend more time planning on the front-end to make a well-thought-out execution plan
- Base operational decisions on both real-time and historical data and information by integrating enterprise analytics and trends
- Use dashboards in operations to make data more meaningful to the users
- Use data for predictive and prescriptive analytics
- Measure the benefits obtained from avoiding abnormal events

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