xylem
Let's Solve Water

Upstream Oil & Gas Case Study
Water Transfer

Xylem's Advanced Remote Monitoring Saves $25,000 per Month in Labor Costs and Reveals Cost Savings of Dual Fuel Diesel Engine Pumpset

Challenge

Optimizing productivity in oil and gas extraction while enhancing the safety and sustainability of operations is a constant challenge. According to Deloitte LLP., large U.S. producers with significant shale oil and gas operations reported operating margins averaging around 20 percent in 2012, a significant drop from 2006 operating margins of 45 percent[1]. A 2019 study of 40 American energy companies by Norwegian consulting company Rystad Energy indicates that 9 out of 10 shale companies in the U.S. spend more than they earn[2]. Against this backdrop, an upstream natural gas extraction operation located in Pennsylvania consulted Xylem about how smart technology could ensure the sustainability of its water transfer process. The operation's isolated location meant traveling just a couple of miles to different areas of the site could take up to one hour, making this project an ideal candidate for remote monitoring and control (M&C) technology that freed up labor to focus on more complex tasks.

Smart technology in operation – remote monitoring and control

Xylem worked closely with the operation's management team to develop an M&C solution best suited to the task. The team agreed that Xylem Advanced Remote Monitoring (ARM) would be the ideal technology to monitor the operation's two Godwin Dri-Prime HL160 diesel-driven pumps that were transferring water to support the drilling process. The client decided to rent the Xylem's advanced M&C technology for the duration of the project.

The Xylem Advanced Remote Monitoring (ARM) is a standalone panel that can be installed on any temporary or permanent site. System data can be collected and viewed on a customizable website. The device communicates through a cellular signal with an optional satellite signal. Xylem's remote monitoring and control of pumps on site allows for a better use of labor and resources and can eliminate the need for in-person pump watch in many jobs and locations. It also provides risk and pump failure avoidance.

Xylem Advanced Remote Monitoring (ARM) technology monitored two Godwin Dri-Prime HL160 diesel-driven pumps that were transferring water to support the drilling process. The device communicated through a satellite signal providing remote monitoring and control of the pumps on site, eliminating the need for in-person pump watch.

Project Highlights:

- Xylem advanced remote M&C technology enhanced the sustainability and efficiency of the project's water transfer operations
- Xylem Advanced Remote Monitoring (ARM) saves approx. $25,000 per month in labor costs by eliminating the need to manually monitor and control the pumps
- Xylem ARM clearly showed the amount of fuel being used by the pumps. Equipped with this information the team decided to switch to a dual fuel pump engine of diesel and natural gas

Solutions:

- Xylem Advanced Remote Monitoring (ARM)
- Godwin Dri-Prime HL160 diesel-driven pumps

1 Englund, J. and A. Mittal. U.S. shale: a game of choices. Deloitte University Press. (2014) Accessed at https://www2.deloitte.com/content/dam/insights/us/articles/us-shale-gas-ecosystem/DUP-750_US-Shale-A-game-of-choices_vFINAL.pdf

2 Rystad Energy. Just 10% of shale oil companies are cash flow positive. Press release, (May 29, 2019) Accessed at https://www.rystadenergy.com/newsevents/news/press-releases/Just-10-percent-of-shale-oil-companies-are-cash-flow-positive/

Xylem ARM provides monitoring of diesel engine parameters including engine speed, fuel consumption, failure and shutdown, oil pressure, engine temperature and engine hours. It can also monitor electric motor and VFD parameters such as motor speed, amperage, voltage, power consumption and diagnostic errors. Pump operation parameters including suction pressure/vacuum, discharge pressure, flow and sump level can all be monitored with Xylem ARM. It also allows the user to remotely stop/start the pump as well as controlling speed, PID setpoints, log data and, alarm and operate as PLC.

Due to the site's inaccessible location, cellular internet connection was not available. Satellite was the only option and a direct connection was established to provide a reliable, consistent service. Xylem ARM was set up to monitor the pumps' speed and engine condition, and to alert the operator to impending faults so that they could be managed before they became an issue. The aim of the project was to pump 30 barrel/min or 1300 gal/min and Xylem ARM provided real-time data on the volume of water being moved.

Darrin Ruiz, Regional Applications Engineer for Xylem, said "Thanks to our advanced remote M&C technology we could easily monitor both pumps' performance, including the amount of water they were transferring. This was achieved at a fraction of the cost of manually monitoring and controlling the pumps. It also allowed the team to work on other aspects of the operation without spending long periods of time travelling across the site to check on the pumps."

Benefits of smart tech in upstream Oil & Gas

The Harvard Business Review noted that automation and robotics will play a significant role in improving wellfield efficiency[3]. A robotic drilling rig currently in development promises to complete land wells in 30 percent less time, and with 30 percent fewer man-hours, than manual drilling operations. Automation and control (A&C) solutions can reduce labor needed for checking pumps and valves, and turning systems on or off, and monitoring water quality. With mean wages for petroleum pump system operators and gaugers running $31.87 per hour (plus benefits) as of mid-2018, hours saved in the field add up quickly. The savings are even greater when drive time, vehicle wear and insurance, and the risk of injury on the road, well platform, or ladders are factored into the equation.

Result

As a result of the information revealed by Xylem ARM, the team had a clear understanding of the amount of fuel being used by the pumps. Equipped with this information they decided to switch to a dual fuel pump engine of diesel and natural gas (70 percent diesel/30 percent natural gas). The dual fuel engine delivered significant savings in running costs from $52 per hour for diesel versus just $40 per hour for the equivalent in a dual fuel pump set.

Darrin Ruiz, Regional Applications Engineer for Xylem, said, "Xylem's advanced remote M&C technology significantly enhanced the sustainability and efficiency of our customer's water transfer operations, saving them approximately $25,000[4] per month in labor costs as well as revealing the benefits of switching to a dual fuel pump engine."

Godwin HL250M dual fuel pump engine integrated with Xylem Advanced Remote Monitoring (ARM) technology significantly enhanced the sustainability and efficiency of the project's water transfer operations, saving approximately $25,000 per month in labor costs as well as revealing the benefits of switching to a dual fuel pump engine.

An upstream natural gas extraction operation in Pennsylvania consulted Xylem about how smart technology could ensure the sustainability of its water transfer process. The operation's isolated location meant travelling miles to different areas of the site taking up to one hour, making this project an ideal candidate for advanced remote monitoring and control technology that freed up labor to focus on more complex tasks. Also, reduced trips into the field, minimizing costs and safety risk.

3 Sam, S., et al. Oil's boom-and-bust cycle may be over. Here's why. Harvard Business Review. (2018) Accessed at https://hbr.org/2018/03/oils-boom-and-bust-cycle-may-be-over-heres-why

4 Reference 1800rpm Pump speed, 262 HP or 195kW. 262 HP x .05 = 13 gal/hr diesel. 13gal/hr x $4 gal of diesel = $52/hr of diesel fuel. 195kW x $0.06 kW/hr of Nat Gas = $11/hr of Nat Gas. 70/30r ratio $40/hr dual fuel $12/hr savings. $12/hr x 24hrs x 30 days = $9,000 mos per pumpset. 50/50 ratio $32/hr dual fuel, $20/hr savings. $20/hr x 24hrs x 30 = $14000 mos per pumpset.