

# Packaged system rides to rescue in Colorado

In search of a solution for an enlarged produced water transfer facility, one of the North America's major natural gas producers found its resolution in the design, development and installation of several mobile water transfer skids. The geography of the area – in Piceance Creek, Colorado – meant that the energy producer needed higher pressures and a cost-effective way to transfer injected water from its operations in the field.

Due to the geological make-up of the area surrounding Piceance Creek, Colorado, where its produced water injection site is located, Encana, a leading North American energy producer that focuses on natural gas, oil and natural gas liquids, needed higher pressures, better equipment and a more cost-effective way to transfer injected water from its field operations. The energy producer turned to a DXP/Quadra customer for a recommendation.

At the Encana site, which is located in a mountainous area, water and gas is brought in via multiple wells and forced into a separator. From the separator, Encana pulls natural

gas and natural gas liquids for production and up to 45,000 barrels per day of produced water that needs to be transferred for disposal. DXP/Quadra's goal was to provide the remote power and transfer equipment to move the produced water and natural gas liquids.

The DXP/Quadra team began the process by designing a pre-packaged, enclosed system that would transfer the produced water. In addition, the group designed and fabricated a lease acquisition and custody transfer (LACT) unit that was developed to transfer the natural gas liquids. Next, a key component was to integrate a control

system that would protect and monitor the entire process. The DXP/Quadra team then created a plan to develop a generator system that would power the complete system. Four Waubesa generators were incorporated with automated syncing controls to provide the range of power required.

The equipment that integrated into the packaged pump system included a booster pump, filter vessels, control valves and a variable frequency drive. Because the customer needed a specific flow rate, two produced water pump buildings were designed to house the packaged pump system equipment. Building A provides 15,000 BPD water with two FMC triplex plunger process pumps; Building B provides 30,000 BPD water with two HP Plus horizontal multi-stage centrifugal process pumps, and the LACT (measurement) building featured a 900 BPD condensate with an FMC triplex plunger process pump.

"We found the right pump and generator combination so the customer had a larger flow range capability to handle their flow needs over a range of 500 BPD to peak loads of 45,000 BPD," said Rob Sjomeing, project manager, DXP/Quadra. "This approach saved the customer equipment costs, added efficiency and gave its operators more control over the flow they could garner from the system. Just as significant, we worked closely together as a unit to prepare for set team meetings, to address operator concerns and to review and incorporate all crucial safety concerns."

The system is capable of monitoring and displaying process variables, allowing for operator input (to change flow rates, alarm shutdowns) and for providing data logging capabilities for EPA compliance.

The DXP/Quadra team that developed the system, known as K-22, included: Rob Giese, branch manager for DXP/Quadra's Grand Junction, Colorado, who performed key customer interface in the field; Rob Sjomeing, project engineer; Tom Schader, designer; Rick Fankhauser, shop foreman; and Charlie Struwe, Grand Junction service. In addition, Colorado expert Paul Hanson, area manager and fabrication manager for the Golden, Colorado branch, completed the team, serving as sales and customer interface liaison.

"What is truly innovative about this project is that the system is pre-packaged and produces a wider flow range than others of its kind," Mr Sjomeing added. "The customer only needs to bring natural gas to the generators and process connections to the building."

This transfer skids system, which was fabricated at DXP/Quadra's Golden branch in Colorado, represents the successful interface of service with new equipment fabrication as well as the use of critical controls. The project got underway in February 2011 and the skid system start-up began in early 2012.

## Challenges to the project

In terms of challenges, first, there was the proposed timeframe of 20 weeks. While the first units were shipped in August 2011, there were some delays to the schedule related to customer power needs, the time required to test hundreds of instruments, and all of the sequence considerations that had to be reviewed and incorporated. In addition, pressures are constant at 700-900 PSI.

In addition, DXP/Quadra had to work closely and succinctly with subcontractors and manufacturers in several states. The team also joined efforts to build strong relationships with numerous operators and Encana's engineers to find the most appropriate solution for the system and all personnel concerned. To start a system of this nature, multiple different fields needed to work closely together in a timely fashion to integrate all of the components into a working system. This included generator start-ups, electrical field wiring integration with the packaged system and control system, and mechanical technicians to prepare the rotating equipment.



Installation at Encana's site in Piceance Creek has to adapt to the mountainous surroundings of the area.



DXP/Quadra's team made sure that the equipment integrated into the packaged pump system.

Along the way, a key customer employee left which required other individuals to step up to ensure that overall system control and design was maintained. Added to these challenges was the fact that the site location was remote which made for additional travel time and sometimes tricky logistics. With all of the challenges that were overcome, the customer also experienced a delay due to an unusual environmental issue – a bird was laying eggs in the area so all construction was halted for an interim period until the situation could be

addressed properly by the customer's environment, health and safety group.

Despite all this, after the initial unit delivery, the project was back on track in early 2012 and the system has been running smoothly for more than a year. DXP/Quadra continues to 'tweak' vibrations to the system and to provide ongoing support to the customer, which is seeing full flow ranges.

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DXP/Quadra helped by designing a pre-packaged, enclosed system that transferred produced water.