

Rocky Mountains Region,
United States

Innovative application of CO₂ injection boosts mature fields production in the Rocky Mountains region and contributes to carbon capture and storage

Horizontal pumping system technology and field service combine to increase recoverable oil and gas reserves

CHALLENGE

- Maximize recovery of oil reserves in unconventional, mature fields
- Improve EOR efficiency
- Manage changing flow rates and other unpredictable conditions

SOLUTION

Summit ESP delivered:

- CO₂ booster pump for efficient injection
- Flexible, assembled skid components
- Ability for Summit ESP technicians to make system adjustments as needed

RESULT

- Provided reliable, cost-effective HPS technology that could be adjusted on the fly
- Increased recoverable oil and gas reserves over conventional water injection
- Proved CO₂ injection capabilities, including for CCS
- Gained customer trust and secured additional EOR jobs

Overview

Halliburton Summit ESP® — A Halliburton Service has been successfully applying its CO₂ booster pump for enhanced oil recovery (EOR) projects in the Rocky Mountains region of the U.S. for the past several years. This durable electric submersible pump (ESP) is a specially designed horizontal pumping system (HPS) that, when used in combination with Summit's expert field services, significantly increases recoverable oil and gas reserves in mature fields. This same CO₂ injection technique can also help with the growing need for carbon capture and storage (CCS).



Summit ESP horizontal pumping system for injecting CO₂.

Challenge

Unconventional, mature oil fields require more advanced EOR technology to maximize production. In addition, highly experienced technicians are needed onsite to manage unpredictable operating conditions, including a potentially fluctuating flow rate.

Result

Over the years, Summit ESP® has demonstrated a high standard of quality, along with fast response times. Our ability to meet our customers' exacting technology requirements has led to building trust with our customers and to Summit's eventual entry into the CO₂ pump market as a major player.

The case study shows, that Summit ESP technicians, with their engineered solution, were able to handle an unplanned reduction in flow rate by easily pivoting to a retrofit kit. The unique, modular design avoided the replacement of the entire system, thus saving the operator time and money compared to competitor systems. This combination of outstanding technology and service has led to Summit ESP being awarded orders for new CO₂ units.

Solution

Summit ESP introduced an HPS product line in 2016. Building upon existing customer relationships, trust was built by first servicing competitor units and then selling water- injection HPS units directly to the same customers. This opened the door for recommending higher-specification CO₂ pumping, with the first order being the installation of a 2,000-psi, 15-stage SN35000, 800-hp HPS unit that could pump approximately 1,000 U.S. gallons per minute (gpm).

In this case, the customer had overestimated the production volumes, as revealed after the HPS installation. Fortunately, Summit's flexible HPS design can be easily adapted for changing operating conditions.

Therefore, despite the actual requirements being one-third of the original flow rate, Summit ESP field service technicians were able to quickly retrofit the updated 37-stage SH9000 pumps to the existing skid to efficiently produce the lower flow rate, while minimizing the additional capital cost to the customer. For most other pump technologies, the entire pump system would have had to be replaced at a significantly higher cost and with an extended lead time. The unique design of the Summit ESP CO₂ booster pump assembly provides the additional benefit of allowing the original pump to be reinstalled, if needed, to accommodate increased flow rates in the future.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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