

Remediation of Cadotte MBR Disposal Well with HFR-1000™ Mud Acid System

Montney Formation, Alberta

This case study highlights the successful remediation of a declining Montney disposal well using Fluid Energy's HFR-1000™ Mud Acid system. It outlines the background and challenges of the Cadotte MBR well, the acid system's implementation, and the significant performance improvement observed post-treatment.

The Cadotte MBR disposal well was commissioned to handle produced water from a newly developed Montney pad. Fluids were filtered through a combination of 50-micron and 5-micron absolute filters before injection, with early flowback processed through 5-micron nominal filters that required frequent replacement due to heavy particulate loading.

The well was completed using an open-hole ball drop system, with post-frac milling of the ball seats. Despite initial filtration steps, the well's performance deteriorated during early flowback of the newly completed wells.

CHALLENGE

The Cadotte disposal well experienced a 90% decline in injection capacity over 60 days. The primary damage mechanism was suspected to be blockage caused by 100-mesh flour or silica sand. Previous stimulation attempts using a competitor's 15% HCl emulsified acid system—applied with a mutual solvent and breaker—failed to restore performance.



Figure 1. Silica samples from filter (5 and 25 micron)



FINDINGS



Increase in Injection Capacity

Post-treatment average injection rate **increased 35% and stabilized at 600 m³/day**, demonstrating the effectiveness of the HFR-1000 mud acid system.



Validated Compatibility and Solubility

Laboratory testing confirmed up to 75% solubility of formation samples and no precipitation when mixed with produced water—ensuring safe and efficient application.



Successful Remediation Where Others Failed

Previous stimulation attempts using competitor acid systems were unsuccessful; Fluid Energy's solution **restored well performance and stabilized injection**.



Safe, Non-Toxic Acid System

HFR-1000 is **non-corrosive to dermal tissue** and DOT-compliant, offering a safer alternative for sandstone acidizing without sacrificing performance.

SOLUTION

To address the declining injectivity, Fluid Energy proposed an aggressive sandstone acidizing treatment using its HFR-1000 Mud Acid system, in combination with HCR-7000® Modified Acid™.

Why HFR-1000?

- An inhibited HF acid system, non-toxic and non-corrosive to dermal tissue when unactivated (DOT-compliant).
- Designed for safe and effective remediation of sandstone formations.
- When paired with HCR-7000, the system minimizes metal precipitation and delivers enhanced formation penetration.

Laboratory Testing

- Solubility Testing: Performed on formation cuttings at 55°C for 6 hours with a 5.6:1 ratio of HCR-7000 to HFR-1000.
 - Solubility reached 59% at 1995 m and 75% at 2795 m.
- Compatibility Testing: Produced water was mixed with HCR-7000 and HFR-1000 and heated to 55°C.
 - No solids precipitated, confirming compatibility.

Treatment Execution

A total of 17 m³ of HCR-7000 was simultaneously pumped at a 5.6:1 ratio with 3 m³ of HFR-1000 to create a 20 m³ batch containing 3% HFR-1000. The Mud Acid was introduced at surface and blended in the wellbore using a twin pumper system. This was followed by a staged soak and flush sequence utilizing a 3% Ammonium Chloride solution. The operation included:

- 3.0 m³ of HFR-1000
- 17.0 m³ of HCR-7000
- 25.0 m³ of 3% Ammonium Chloride (used for pre- and post-flush)

Following a controlled soak period and displacement, the well was returned to injection.

RESULTS

Following the stimulation, the well's average injection rate increased to 600 m³/day over 80 days—an improvement of more than 35% compared to previous competitor treatments.

Cumulative injection analysis confirmed that the treatment successfully solubilized the damaging silica and opened up new pathways in the formation, enabling sustained performance.

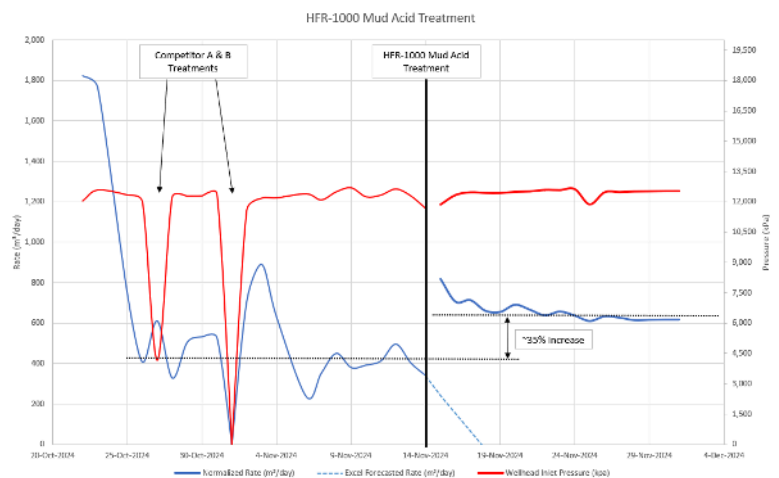


Figure 2 : Injection rate and wellhead pressure before and after HFR-1000 treatment. HFR-1000 delivered a sustained 35% increase in injection rate compared to prior competitor treatments, with stable wellhead pressure.

CONCLUSION

Fluid Energy's HFR-1000 Mud Acid system delivered a safe, compatible, and highly effective remediation for the Cadotte MBR disposal well. The combination of laboratory validation and field execution resulted in injectivity improvement, overcoming prior treatment failures. This case further validates the HFR-1000 system as a superior and safer alternative for sandstone remediation in high-solids disposal environments.

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