



Bakken Operator Reduces Water Injection by 76%

HALITE INHIBITOR USED WITH FRESH WATER TO PREVENT SALT BRIDGING AND LOWER WATER COST

UNITED STATES

CHALLENGE

High salt content of the water in the formation, causing salt deposition downhole, in tubulars and surface equipment, requiring large amounts of fresh water.

SOLUTION

Application of Multi-Chem's patented halite control product, MX 2-3875, along with fresh water.

RESULT

Inhibition of halite with corresponding reduction in fresh water use by up to 76% and increased production rates by at least 10%.

OVERVIEW

High salinity brines are a common problem in the Williston Basin. As these brines are produced from the reservoir, super saturation and downhole evaporative effects cause sodium chloride salt to precipitate into a hard deposit known as halite. This precipitated salt can deposit downhole, in pipelines, or in surface equipment which can restrict, limit or prevent production. Operators have only a few options in dealing with salt precipitation:

Control the system pressure and temperature to keep the produced water under saturation with respect to halite formation.	» This proves to be difficult to maintain and operationally not reliable
Inject fresh water in order to dilute the salt to control saturation.	<ul style="list-style-type: none"> » Fresh water is a valuable resource, estimated at \$3 – \$5/bbl in the Williston Basin » Reduces production rates by 10 – 20% » Batch treatment dissolves already formed downhole halite deposits over a limited period of time causing fluctuating production rates
Use halite inhibitors with fresh water to keep salt in solution.	<ul style="list-style-type: none"> » Can allow for a reduction in total fresh water use » Fresh water reduction savings pay for inhibitor product

CHALLENGE

Multi-Chem worked with a Bakken operator to address a severe salt deposition issue. After relying on high volume fresh water continuous treatments to maintain normal production, a patented halite control product, MX 2-3875, was introduced to control salt precipitation and reduce the required fresh water volumes.

The active ingredient in MX 2-3875 halite inhibitor, through the mechanism of nucleate crystal threshold inhibition, adsorbs into salt nucleate crystalline faces and edges, preventing precipitation into a hard scale. Proprietary salt saturation indices were used to both optimize fresh water reduction volumes and halite inhibitor dosages.

SOLUTION

Through the addition of Multi-Chem's MX 2-3875 halite inhibitor, salt precipitation was halted and the required amount of fresh water was reduced over time by 76%. The

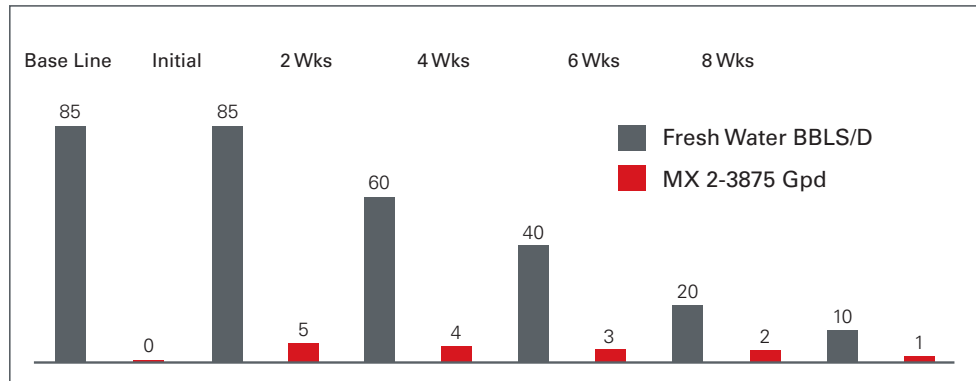
optimization process reduced fresh water injection by 65 barrels per day, with plans to optimize further. This resulted in a demonstrated savings of \$74,000 per annum per well with a return on investment (ROI) of 111%. The ROI did not take into account increased production rate benefits.

BENEFITS

Multi-Chem has the expertise to optimize chemical treatment programs to the exact combination of water and halite control product needed for a particular well and reservoir formation. This solution delivered the following benefits:

- » Easy-to-apply technology
- » Optimized field operations, treatment programs and well performance
- » Documented results based on actual field performance

Water Usage Over Time



Graph shows dramatic reduction of fresh water required for injections when combined with patented MX 2-3875 halite inhibitor.

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