

# Nitrate Reducing Bacteria

## ENVIRONMENTAL ALTERNATIVE TREATMENT TO PREVENT SRB WELL SOURING AND MICROBIOLOGICALLY INFLUENCED CORROSION (MIC)

### OVERVIEW

Multi-Chem, a Halliburton Service, offers operators an exclusive, effective and environmentally conscious treatment to eliminate sulfate reducing bacteria (SRB), which cause souring and corrosion. This multi-functional technology, which consists of a nitrate-reducing bacteria (NRB) and an SRB inhibitor, has proven successful for many operators, who have gone more than seven years before needing to retreat a well.

SRBs are often introduced into the formation during the drilling or hydraulic fracturing process. They are also present in many mature fields. Once in the well and formation, SRBs utilize naturally occurring nutrients, and in the process generate H<sub>2</sub>S, souring produced oil and gas. The presence of ferrous ions may also lead to the formation of iron sulfide, impeding production and can facilitate under deposit corrosion. SRBs are also known to be associated with an aggressive metal-pitting attack known as microbiologically influenced corrosion (MIC).

### HOW IT WORKS

This H<sub>2</sub>S control technology, exclusive to Multi-Chem, is an effective multi-functional treatment that uses a nitrate, non-hazardous, active NRB and an SRB metabolic inhibitor to control the bacteria, providing a cost-effective and more environmentally-acceptable alternative to biocide treatments.

Selected to thrive in a reservoir's particular conditions, reservoir-specific NRBs are introduced 'on-the-fly' into the well, where they compete with SRBs for the limited nutrient resources downhole. As the bacteria component of this NRB solution consumes nutrients and grows, nitrite is produced, a compound that directly inhibits SRB metabolic activity. This results in a well without SRB colonization.

Unlike traditional solutions, Multi-Chem's NRB solution competitively excludes detrimental bacteria, negating the requirement for additional biocides.



OVER  
2000  
WELLS TREATED  
SUCCESSFULLY

### FEATURES:

- » Eliminates sulfide production and SRB populations
- » Live-strain NRB produce nitrite, a natural SRB inhibitor
- » Controls biogenic hydrogen sulfide and iron sulfide buildup in production equipment
- » Cures the effects of externally induced contamination that can sour production
- » Improves the ecological profile of the microbiological control program by reducing the need for biocide

### BENEFITS:

- » Helps mitigate risks associated with H<sub>2</sub>S as fields grow older, controlling maintenance costs associated with souring
- » Protects against MIC for extended asset life
- » Yields better quality of production water for re-use due to reduced sulfide production
- » More environmentally friendly than traditional biocide treatments

For a specialty chemicals treatment program characterized by superior service and chemical application expertise that maximizes the value of your assets, contact us at [multichem@halliburton.com](mailto:multichem@halliburton.com)

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