

## Formation Damage Remediation in the Cardium

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Trican's two-step process, with the application of a wax specific solvent package 24 hours prior to an acid squeeze, resulted in significant production gains.

### **Business Need**

Our customer, operating in the Cardium formation, came to us looking to remediate damage and improve production. In the Cardium, there are several different types of formation damage mechanisms that can impair production. In order to identify the best solution, we conducted a thorough investigation of the unique well properties. Oil samples analyzed contained approximately 15% to 20% wax and 1% to 3% by weight asphaltenes. Additionally, water samples from the area exhibited a high tendency to scale calcium carbonate, and solids samples from bailers yielded solid calcium carbonate. After evaluating the data, Trican identified wax precipitation and calcium carbonate scale as the most likely damage mechanisms.

### **Trican Solution**

To remediate the damage mechanisms, Trican used a two-step process. The first step focused on the wax precipitation, and the second step on the calcium carbonate scale.

Wax is a common organic scale in producing wells that can lead to restricted flow and decreased production. The buildup of wax can be remediated with mechanical or chemical methods. Chemical methods offer the ability to remove wax buildup from the perforation tunnels, as well as the formation, and in this case was the preferred removal technique. A custom blend of aromatic and aliphatic solvents was squeezed into the formation and left to soak for 24 hours, allowing the solvent time to disperse the wax into solution.

The next step addressed the calcium carbonate scale. Calcium carbonate scale is common in the oil and gas industry, and is often caused by a temperature change or pressure drop. This type of scale can lead to significant production restrictions and formation damage. The acid blend used to remove calcium carbonate scale for all treatments was Trican's Platinum DSA (Dirty Sandstone Acid)<sup>®</sup>. Platinum DSA<sup>®</sup> is a proprietary blend of organic and inorganic acids designed specifically to treat fluid sensitive sandstone formations, such as the Cardium. The blend contains surfactants, anti-sludge agents and solvents to ensure the formation remains water wet and consolidated.

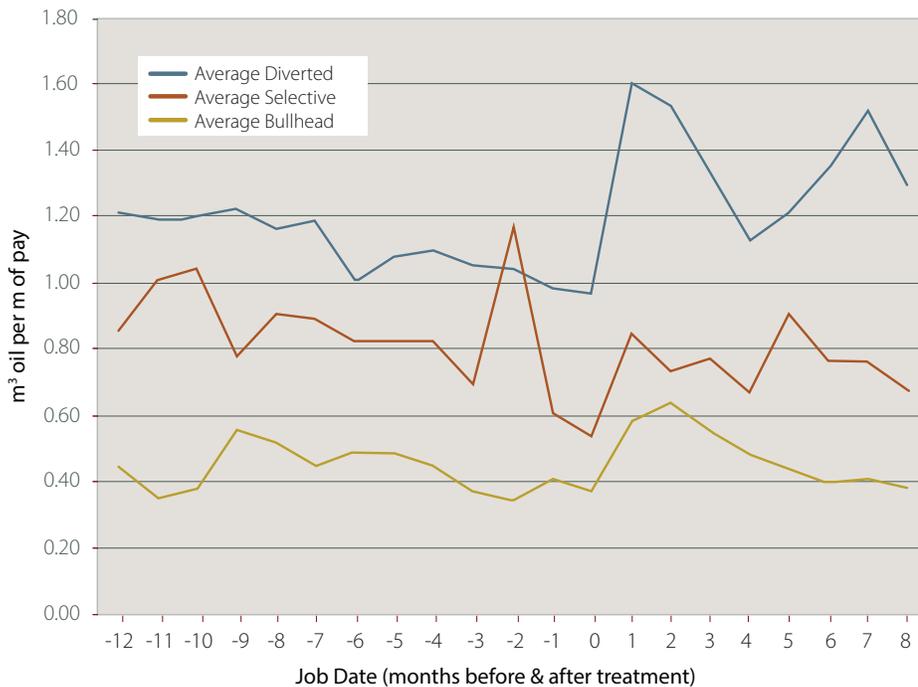
In this case, to discover which application method would provide the best results, the calcium carbonate scale was treated in three different ways. Chemically diverted acid stimulation was used on four of the wells, five wells were treated down the annulus, and two wells were stimulated using a selective packer system.

### **Trican Result**

Trican's two-step process with the application of a wax specific solvent package 24 hours prior to an acid squeeze resulted in significant production gains for the operator. All wells experienced an overall increase in production, with the wells stimulated by chemical diversion showing the biggest increase in production per metre of pay.

## Comparison of Diverted / Selective / Bullhead

Figure 1: Average per metre of pay increase in oil production by treatment type



## Case Study Snapshot

**Study Area:** Cardium Formation

### Challenges:

- Evaluate and identify formation damage.
- Remediate formation damage and increase production.

### Trican Solution:

- Employ a two-step process to remediate both the wax precipitation and the calcium carbonate scale.
- Apply a wax specific solvent package and allow to soak for 24 hours.
- Remediate the calcium carbonate in three ways, using Trican's Platinum DSA acid blend in all treatments.

### Result:

- Significant production gains for the operator, with the wells stimulated with chemical diversion showing the biggest increase in production per metre of pay.



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