



## Sustained casing pressure and gas bubbles successfully eliminated in Permian Basin well abandonment (P&A)

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### CHALLENGE

Sustained casing pressure and gas bubbles at surface during well abandonment

### SOLUTION

Rigless deployment of Wel-lok CRT on wireline

### RESULT

Pressure eliminated and bubble test passed

### INTRODUCTION

The Wel-lok CRT (Cement Repair Tool) has been developed to eliminate sustained casing pressure, or casing vent flow, in cemented annuli. Unlike traditional methods of perf and squeeze or perf and wash, this tool does not require any surface pumping pressure to squeeze or circulate the sealing material into place. The tool is also run rigless on electric line, sealing through casing perforations, so section milling is not required.

The bismuth-based alloy has no porosity and solidifies to create a seal in minutes as opposed to hours with traditional cement and resins, eliminating the possibility of a micro-annulus being formed to allow future gas migration. If full bore access is required, it can be milled out and still maintain a gas tight seal in the annulus.

### ABOUT US

BiSN's Wel-lok technology is a metal-to-metal downhole sealing solution developed to provide a permanent seal through a thermite heat ignition and a rapid solidification process of eutectic bismuth alloy. The use of bismuth alloy is advantageous because once it is heated, the metal liquifies and is equal to that of the viscosity of water. The liquid bismuth alloy can then filter through porous locations prior to solidification, as opposed to conventional methods such as cement or resin.

## CHALLENGE

The Permian Basin operator was abandoning a gas well with annular pressure between 10 3/4" and 13 3/8" casings. CBL runs showed intermittent cement bonding between the casings to a distinct depth, indicating a cement squeeze from surface had been performed previously. An additional surface squeeze job was performed followed by multiple attempts to perf and squeeze through the 10 3/4" casing with no success in eliminating the pressure and gas bubbles at surface.

## SOLUTION

After discussions with the operator, a Wel-lok CRT was chosen for this well in large part because of the previous successful deployment of over 100 Wel-lok tools for abandonment to address gas migration. Prior to the deployment of the Wel-lok CRT, perforation guns were run in the well to establish communication between the 10 3/4" and 13 3/8" casings. The CRT was run in the well, on wireline, to setting depth across the perforations and activated by applying 240V for 30 seconds. This started the chemical reaction in the heater to melt the alloy. With its low viscosity and high density, the alloy flowed through the perforations with gravity and into the annulus to provide an impermeable gas tight seal. An overpull was taken to confirm the tool had set and anchored in the well and the CRT was electronically released from the wireline.

## RESULTS

The well was successfully bubble tested, resulting in zero bubbles at surface and allowing the operator to complete the permanent well abandonment. With bubbles and pressure successfully eliminated from this well, BiSN moved on to the next well for the same operator with the same issues of sustained casing pressure and surface gas bubbles.



## BUSINESS VALUE

After multiple failed attempts to eliminate casing pressure and gas bubbles with cement, the operator was able to complete the well abandonment, as directed by the regulatory authority. Doing so allowed them to avoid potential fines and remove the well from their corporate liability.