PROTECTOZONE VP Temporary Zonal Isolation
Minimizes Reservoir Damage
Viscous pill eliminates fluid losses during PetroEcuador workover operations

CHALLENGE
Formation damage during routine workover operations decreases production by up to 50%.

SOLUTION
Use PROTECTOZONE* viscous pill (VP) to temporarily isolate and protect the reservoir when working over wells.

RESULTS
Increased production while decreasing the time and cost of workover operations.

Losing completion fluid and production
In Ecuador, many reservoirs are low pressure (subhydrostatic) and highly permeable. The loss of completion fluid during workover operations frequently results in fines migration and the creation of emulsions.

In a study of 23 wells, PetroEcuador concluded that the loss of completion brine during workover operations damaged the reservoirs, and production decreased by an average of 30% after a well was worked over. It was also concluded that the use of fluid-loss control pills with sized solid particles, in many cases, damaged the reservoirs due to solids invading the matrix.

Maintaining production with PROTECTOZONE VP viscous pills
A PROTECTOZONE VP pill is a solids-free, crosslinked polymer system that is spotted across low-pressure and/or highly permeable reservoirs to temporarily isolate and protect them from fluid invasion during a workover operation. Preventing the loss of completion fluid into the reservoir minimizes possible formation damage and loss of productivity. PROTECTOZONE VP pills have:

■ Wide range of application: temperatures of 90 to 290 degF; permeability: 10 to 2,000 mD
■ Long-term stability controlled by internal or external breakers
■ High retained permeability due to the use of low-residue polymer
■ Good compatibility with most brines and formation fluids

Production before and after workover operations after implementing PROTECTOZONE VP viscous pills.
**CASE STUDY: PROTECTOZONE VP viscous pill eliminates lost fluids during PetroEcuador workover operations**

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**Anaconda 2**
The well Anaconda 02 was producing 690 bbl/d with 4% BS&W from the lower Napo T formation at a depth of +/- 10,000 ft, with high permeability (>200 mD), low pressure (<1,500 psi), and high temperature (<210 degF). When the well had to be worked over to repair a tubing-casing leak, a PROTECTOZONE VP viscous pill was spotted across the producing interval prior to pulling the tubing.

After the workover, which took 3 days, the well was put back on production and produced 724 bbl/d with 7% BS&W.

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**Auca 40**
The well was producing 150 bbl/d with 2.5% BS&W from the Napo T formation at a depth of +/- 10,000 ft, with high permeability (>250 mD), low pressure (<2,000 psi), and high temperature (<210 degF), when an ESP failure required the well to be shut in and worked over. During the workover, the pay zone was reperforated and tested at 336 bbl/d with 27% BS&W. To avoid further losses of completion fluid to the formation while replacing the ESP, a PROTECTOZONE VP viscous pull was spotted across the perforated interval.

When the well was put back on production after the workover, which lasted 7 days, the well produced 520 bbl/d with 5% BS&W. Currently, after more than one year, production has stabilized at 459 bbl/d of fluid with no change in BS&W.

The added value of using PROTECTOZONE VP pills to effectively isolate and protect reservoirs during workover operations has been repeatedly demonstrated in various PetroEcuador fields.