

Case Study - 4

More than 90% reduction in unwanted gas production with retrofit AICV® installation in a multi-layered formation

SPE-210163-MS

An oilfield located in South America produces from a multi-layered structure with API gravities that varies between 14° to 24°. Water injection has been utilized recently to maintain reservoir pressure and improve the recovery factor. Gas migration and water breakthrough have resulted in excessive production of unwanted fluids, leading to problematic well shut-ins and expensive workovers to re-establish production.

Challenges and Objectives

Cased and perforated vertical wells are drilled in this field to access more than 400 ft. of net pay from several producing intervals, separated by shale. A commingled production strategy is used, where oil is recovered from 2 main formation units using artificial lift. This inherently creates a challenging production environment, as injection water and/or formation gas can unpredictably breakthrough in any of the formation layers, impacting well performance.

Solutions

The AICV® is the only autonomous device that can shut-off and effectively manage gas and water without interventions. After a careful evaluation, InflowControl worked closely with the operator to design and retrofit a total of six wells as the default completion in this field (7" C&P wells) cannot provide any type of control whenever the gas/water breakthrough occurs. The wells were completed with several AICV® joints with premium screens using swell packers for compartmentalization

Results

The installation of the AICV® technology has yielded very positive results under the challenging conditions of the field and the application itself, as all selected well candidates were problematic wells. Results indicate that gas production have been reduced by more than 50% and in some of the wells, the reduction has been over 90%, improving voidage replacement ratios. Results indicate balanced oil production from both main formations as the resulting API is around 20° in the wells, meaning that the technology provides effective reservoir management as the decline rates in the field have dropped from 15-20% down to 6-8%. Electrical submersible pumps (ESP) have shown more stable behaviors and extended run life, resulting in less workovers due to ESP failures and no deferred production due to pump issues. Sand production has also improved in general terms. The AICV® technology has helped restoring oil production in six problematic wells, reducing OPEX and reducing CO₂ emissions by 28,000 tpa.

LOCATION
South America

NUMBER OF WELLS
6

OPERATOR
Mid-size International E&P

DEPLOYMENT
Onshore

RESERVOIR
Sandstone reservoir with
heterogenous layered structure
separated by shales

COMPLETION
4-1/2" AICV® with premium screens
and swell packers

Results



50-90%

Reduced gas production



Stable oil production
without well shut-ins



28,000 tpa

CO₂ reduction

