

Case Study - 3

Over 80% reduction in gas production in more than 20 wells completed with AICV® technology in fractured carbonate field

IPTC-21411-MS

A major oilfield in the Middle East with a gas cap is on production since the 1960's. As the reservoir has many fractures and produces light oil, (1.8-3 cP), many of the wells suffered from excessive production of gas and water and have to shut in the wells, leaving significant oil reserves and production stranded.

Challenges and Objectives

Due to the presence of a fracture network across the reservoir, there was a challenge of early water and gas breakthrough which leads to lower oil production and poor influx distribution. There were no means to control the gas downhole, hence operators had to shut in the wells at the surface due to extremely high GOR. The operator was looking for cost-effective and field-proven technology to prevent the free gas production from wells and control water production to maximize the oil production, as well as rejuvenate shut-in wells to produce economically.

Solutions

Autonomous Inflow Control Valve (AICV®) is the first autonomous inflow control technology that can shut off water and gas production autonomously and without any intervention. As a result, the operator decided to re-complete more than 20 horizontal wells with AICV® technology. Each well was designed based on its reservoir and subsurface attributes to determine the optimum configuration. The AICV® completion consists of up to 22 AICV® joints, distributed across multiple compartments.

Results

Based on the well production data, it was found that all AICV® wells were performing above expectations. The gas production was reduced up to 83% and GOR for many wells were close to solution GOR. Furthermore, AICV® also reduced the water cut from 80% to up to 26%. Oil production increased more than 55% and in some wells it has double the oil production. Furthermore, many shut-in wells were able to produce economically, thus increasing the field recovery and substantially less CO₂ and greenhouse gas (GHG) emissions. These results equated to over 24,000 tpa (tones per annum) carbon dioxide reduction. As a result of the AICV® performance and impact on reservoir, economics and environment, it is now considered a default completion in this field.

LOCATION
Middle East

NUMBER OF WELLS
> 20

OPERATOR
Major Middle East E&P

DEPLOYMENT
Onshore

RESERVOIR
Fractured carbonate field

COMPLETION
4-1/2" AICV® with wire wrap screen and swell packers

Results



80%

Reduced gas production



50%

Increased oil production



24,000 tpa

CO₂ reduction

