inflow control
Making Better Wells®

85% Gas Shut-off in Mature Carbonate Reservoir with Ultra Light Oil

A major carbonate oilfield in the Middle East had significant gas communication through its fracture network. The operator had significant gas breakthrough and the high GOR (gas oil ratio) made the well un-producible. The operator had to shut-in the well, leaving significant oil reserves and production stranded.

Overview

- **Location:** Middle East
- **Operator:** Major Middle East E&P
- **Deployment:** Land, mature field
- **Reservoir:** Carbonate
- **Oil Viscosity:** 0.4 - 0.6 cP
- **Completion:** Horizontal oil producer installing 4-1/2" AICV® with wire wrap screen filter, 10 packers and 44 AICVs.

Challenges

- High gas oil ratio (>10,000 SCF/STB).
- Less than 50% of the wellbore contributed to the total oil production due to gas ingress.
- Ultra-light oil.
- Limited options to manage the gas ingress from the reservoir with the available completion equipment. Passive ICDs were not effective options due to passive ICDs lack of gas choking capabilities as they have a fixed inflow area.

AICV® - Reservoir Management Solution

InflowControl worked with the operator to design a lower completion that was reservoir centric, aiming to maximizing oil production and long term oil recovery .

Reservoir, log, and production data were all studied and then a well completion design was agreed upon with the operator and InflowControl which consisted of 44 AICVs segmented in the carbonate wellbore by 10 packers. Five of the packers were mechanical for additional strength and the remaining were swellable packers for the required zonal isolation.

The AICV® stays open for oil production and starts to close off as GOR increases. Zones with high gas or water cut ingress will be choked back or shut-off depending upon the multi-phase mixture of that zone –yet– oil bearing zones will produce as the AICVs remain open for oil, based on the viscosity and density properties of oil vs. gas and water. The effectiveness of the AICV® autonomously shutting in high GOR zones means that the effective tubular drawdown is 're-distributed' to the oil saturated zones which means increased oil production and total oil recovery from the reservoir.

Results

- **85% Gas reduction after installing AICVs.**
- 5x Increase in oil production from the lower well section.
- Entire wellbore now contributing oil due to AICVs.
- Stable well production to date (over 30months).
- Zero NPT (non productive time) during installation.
- Reference publication: IPTC-20195-MS.