

Case study: Middle East

# Intelligent Production Systems solution improved reservoir contact, production control with zero NPT

An operator in the Middle East was needing segmented selective production on an aging reservoir. Intelligent completion was the obvious choice to provide enhanced hydrocarbon recovery. Cased-hole intelligent completions are traditionally used to isolate multiple reservoirs and selectively produce from each using a unique lateral. A feedthrough packer, a hydraulically controlled multi-position valve, and a pressure and temperature monitoring gauge are placed strategically to maximize production through the casing window.

In this case, the operator had two reservoirs from which to produce and substantial variable formation contribution throughout the motherbore. In order to increase reservoir exposure and still maintain selective production segmentation Baker Hughes proposed an openhole intelligent completion solution.

The operator selected Baker Hughes based on experience and proven technology, utilizing one cased-hole **Premier™ feedthrough packer** as the upper production packer and four feedthrough **MPas™ hydraulic set formation packer** to segment the motherbore and isolate the two producing reservoirs from each other. Paired Baker Hughes **InForce™ HCM™-A adjustable hydraulic sliding sleeves** and pressure and temperature gauges from the **SureSENS™ permanent downhole monitoring system** were placed in each zone to regulate and monitor production.

A 3 ½-in. system was deployed in the upper cased zone while four smaller 2 ⅝-in. systems were deployed in the openhole section to account for a lower individual flow and mitigate risk associated with larger outside diameter (OD) tools in open hole environments.

Baker Hughes provided the operator with increased reservoir contact and production control as well as reduced material and rig time costs by shortening the casing length normally run beyond the bottomhole assembly (BHA) final depth. While these intelligent completion tools are standard, Baker Hughes was able to combine them for a unique customer-suited solution, driving more efficient hydrocarbon recovery at less installation cost.

The five-zone completion was run and completed with flawless efficiency by Baker Hughes Intelligent Production systems personnel. A combination of SureSENS pressure and temperature gauges continuously monitored tubing and annulus pressures and temperatures.

The gauge systems in the 3 ½-in. section were single tubing sensors while, in the 2 ⅝-in. section, two were deployed: one for the tubing and one for the annulus.

The ¼-in. Inconel 825 Tubing Encapsulated Conductor carried the real-time data to the surface, monitoring the run-in-hole operations and enabling the operator real-time

## Challenges

- Aging reservoir with slowing production
- Varying formation contribution in the motherbore
- Unknown openhole inside diameter (ID) contour
- Potential for control line damage during run-in-hole

## Results

- Installed a combination of HCM-A valves, SureSENS gauges, Premier feedthrough packer, and MPAs packers
- Enabled lower risk and higher recovery installation in the open hole via smaller tool sizes
- Obtained real-time run-in-hole and production data
- Reduced material and installation costs by reducing casing length
- Experienced no health, safety and environmental (HSE) issues or nonproductive time (NPT)

system health checks and packer setting verification.

The 3 ½-in. and 2 ⅝-in. HCM-A adjustable choking valves were function tested at the rotary table, at depth, prior to setting packers, and finally through the wellhead to ensure a perfect installation had been achieved.

During the run in, cross coupling protectors were installed at each joint coupling to maintain control line tension and provide a larger protective OD while getting to depth in the openhole environment.

The smaller tool sizes of the HCM-A valves, SureSENS gauges, Premier feedthrough packer, and MPas packers enabled a lower risk and higher recovery installation in the open hole. This promoted greater efficiency and reduced material and installation costs by reducing casing length.

The flawless execution of the Intelligent Production systems tools results in zero nonproductive rig time.



Intelligent Production Systems flawlessly deployed flow control and well monitoring tools in a challenging openhole environment.

**Baker Hughes** 

[bakerhughes.com](https://www.bakerhughes.com)