

Case Study:

Inflow control for water injection in carbonate reservoir

First FloFuse inflow control technology successfully installed in carbonate reservoir for major operator in the Middle East

Well Data

Location: Middle East

Well Type: Water Injection

Installation Date: Q4 2019



The water injector well was located between two faults which the operator was concerned could result in thief zones, thermal fractures and future fracture propagation after starting injection. There was also unknown fractures parallel to the well which could potentially lead to uneven distribution. The customer required an inflow control solution for this well.

The Challenge

The client's well has multiple different permeability intersecting zones. The challenge was to control the water injection into these different zones in order to provide uniform sweep profile whilst also preventing the possibility of water breakthrough in nearby producers following prolonged injection.

Maximum water injection was required in the middle section of the low permeability zone whilst also controlling water injection in heel and toe part of the open hole. The fractures were expected to propagate in the top and lower zones of the well.

Once the fracture propagates, most of the water would be directed towards the fractures which could risk the low permeability zone with poor water injection distribution. After the well reached total depth, an image log confirmed continuous conductive fractures in the heel and toe sections of the well.

TAQA Solution

The client was initially looking to run standard passive ICDs in this well. TAQA proposed FloFuse Autonomous Injection

Control Device which would help in better managing the fractures and increasing the sweep injection across the low permeability sections of the open hole.

TAQA performed modelling to compare open hole, passive ICD and FloFuse cases. Sensitivities were conducted to show the performance of all 3 technologies in the event of thermal fracture propagates near the heel and toe sections. FloFuse demonstrated far greater control by shutting off the heel and toe zones when fracture propagates and allowing better water injection distribution in the low permeability middle zone.

The final model was completed with actual log data and indicated FloFuse will enhance the water distribution in heel and toe sections with the capability to choke zones when fracture propagates and allow minimal injection rate through ICD for effective water flooding..

Project Results

FloFuse was successfully installed into the well without any operational issues. This marked the first time an autonomous inflow control technology was run in an injector well in this field by the client.

