Please fill in the name of the event you are preparing this manuscript for.	International Petroleum Technology Conference 2023 (15th IPTC)
Please fill in your 5-digit IPTC manuscript number.	IPTC-23038-Abstract
Please fill in your manuscript title.	Unlocking Potential in Highly Depleted and Tight Reservoir Through Unique Completion Approach: A Case Study from West Kuwait

Please fill in your author name(s) and company affiliation.

Given Name	Surname	Company
Abdullah Ibrahim	Abu-Eida	Kuwait Oil Company
Milan	Patra	Kuwait Oil Company
Bader	Akbar	Kuwait Oil Company
Kutbuddin	Bhatia	Halliburton
Alaa	Alboueshi	Halliburton
Amr	Abdelbaky	Halliburton
Walid	Eid	Halliburton

Abstract

The Minagish field is a high potential field which poses several challenges in terms of hydrocarbon flow optimization through highly varied carbonate intervals with low reservoir pressure support and reduced fluid movement. Due to this, the operative strategies have prioritized primary well completion using energized acid fracturing technology over regular stimulation. During fracturing, the acid system will form highly etched channels in the formation. Most of the fluid will flow into the path of least resistance leaving large portions of the formation untreated. As a result, the fracturing treatment options decline significantly, thus results are not optimum in each stage.

Excessive fluid loss and achieving complete frac coverage for an entire interval is a challenge for any acid frac treatment performed in a multiple perforated well with variations in reservoir characteristics. Acid fracturing using Cohesive Foam Diversion (CFD) is performed using CO_2 blend and self-diversion. The fracture face dissolution is controlled by reactivity, which is greatly reduced after foaming for similar acid strength and reservoir conditions. The dual chemical diversion in CFD methodology is highly critical to the overall stimulation success. The technique includes pumping high half-life foam diversion, considering the several sets of perforations and wide presence of natural fractures, followed by in-situ HCl based crosslinked system employed for improving targets. A multimodal approach is employed wherein bubble size is tuned that can bridge pore throats once exposed to reservoir conditions. The CFD diversion shifts the fracture to unstimulated areas to create complex fractures that increase reservoir contact volume and improves overall conductivity along with accelerating post frac fluid recovery.

This paper examines CFD in acid fracturing and describes the crucial diversion strategy. Unlike available diverters used in other fields, this is unaffected at low pH values and in live acids. Proper foam quality design, selection and combination with in-situ crosslink acid effectively plug the fracture generated previously and generate pressure high enough to initiate another fracture for further ramification. The customized CFD fluids have established their value as low damage fracturing fluids and have good inherent fluid-loss control characteristics, leaving a much thinner gel filtercake residue that helps to regain a high percentage of conductivity after treatment.

The first application of CFD methodology is tuned to address the exclusive challenges of well procedures, formation technical complications, high-execution economics, and untouched high potential from this depleted gas reservoir. A direct result of this acid fracturing treatment is that the post-operation data showed high contribution along the section in a continuous manner. Additionally, this methodology can be considered as best practice for application in uneven challenges in other fields.