

## Performance Summary

DATE -  
October 2021

JOB TYPE-  
Pre Frac SSD  
Manipulation with  
Impact Hammer  
& Shifting Tool

The Hydropulsion Pico Circ Sub has been deployed in conjunction with Impact hammers & Shifting Tools in Erbil, Kurdistan.

The operator was able to clearly identify when the tool was in flow thru or circulating mode by observing the circulating pressures.

In circulation mode, full flow exits through the external ports to the annulus and the tools below are isolated from the pumped fluid. At 0.8 bpm the circulating pressure was recorded at 2300-2400 psi

When cycled to flow thru mode, full flow is directed to the tools below. At 0.8 bpm the circulating pressure was 2800 psi and the Shifting Tool & Impact Hammer were both fully operational. During operation of the Impact Hammer approx. 50l/min is dumped to the annulus.

In Conclusion, The Pico Circ Sub provided excellent results when run in a BHA along with an Impact Hammer & Shifting tool.

### **Operation Highlights**

*PCS Successfully Cycled 8 times. locating & manipulating the SSD's at 2130 ft to the closed position and at 1770 ft to open position.*

*A positive circulating pressure indication, ensured the operator was continually aware of the PCS mode.*

*150 bbl of treated KCL were circulated through the PCS at a higher flow rate than would have been achievable had the PCS not been included in the BHA. This ensured that the feed rate for the zone was sufficiently high following the frac that an additional run to pump acid was not required.*

