

/ Expro Excellence

Meters

Check metering – the importance of water injection surveillance and the use of sonar technology to improve data quality



Objectives

- Occidental Petroleum Qatar (Oxy) and Qatar Petroleum (QP) made it a priority to implement and improve water flooding practices in all oil producing reservoirs of the Idd El Shargi North Dome (ISND) Field – a key component of their current and future field development is the use of water injection for pressure support
- Oxy uses water injection rates as an input in their reservoir simulation models and nodal analysis – accurate measurement of the individual water injection line is a critical input into reservoir simulation models
- Traditional ultrasonic flow meters (USM) had been installed by Oxy on the injection lines, however the total water injected as measured at the pump discharge did not agree with the total as reported by the USM on the individual lines, resulting in questionable data being input into the models
- Oxy needed to determine which of the USM was not measuring accurately

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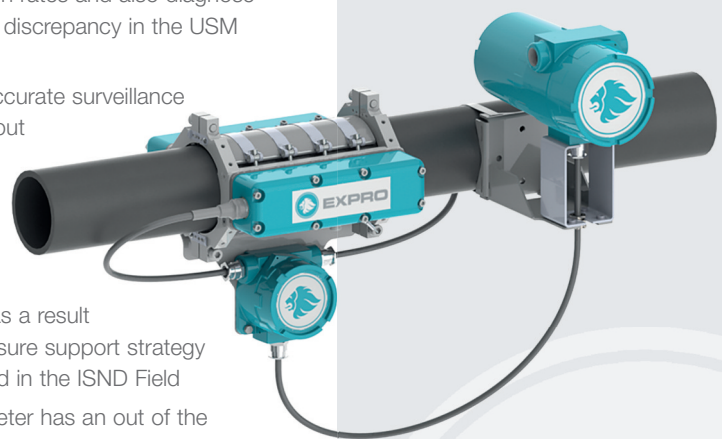
- Sonar meters and surveillance technicians mobilised at short notice - the survey was performed over a period of several days
- Large diameter sonar meters (18") were installed at the pump discharge and recycling lines, with small diameter sonar meters installed at wellheads – this allowed for a full survey of all injection water flow lines simultaneously (discharge, injection, and recycling)

- The data reported by Expro's sonar meters was used to reconcile the pumped and injection rates, and to diagnose discrepancies in USM readings
- Expro provided post-job data reports to Oxy to document the results of each of the tests

Value to client

- Total flow rates reported by the USM for the individual injection lines could not be reconciled with the measured or computed discharge from the pumps – the discrepancies caused errors/inaccuracies with reservoir simulation models
- Using the data obtained from Expro's surveillance campaign, Oxy were able to match up the pumped and allocated water injection rates and also diagnose and isolate a discrepancy in the USM readings
- With more accurate surveillance of pump output and injection rates, the reservoir simulation models were tuned as a result and the pressure support strategy was improved in the ISND Field
- The sonar meter has an out of the box clamp-on performance of +/-2% - this level of accuracy allowed Oxy to perform in situ calibration of the existing USM to avoid future errors in injection water metering

To optimise enhanced recovery, it was essential to couple reservoir simulation models and nodal analysis with actual measured data



Contact

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