



App Note - Oil Production

PT878 Clamp-On Ultrasonic Meters optimizes water injection process efficiency and operation cost

Panametrics TransPort® PT878 liquid portable clamp-on ultrasonic flow meter performs water injection flow measurements to optimize process efficiency and operation costs as part as the EOR (Enhanced Oil Recovery) project for major oil producer in Algeria.

Problem

A major oil producer in Algeria had challenges with optimizing the efficiency and operation cost of their water injection process due to unreliable and inaccurate measurement of the existing turbine meters. That was due to:

- Poor performance in dirty streams or with corrosive materials (salt content)
- Subject to fouling by foreign materials -fibers, tars etc
- Bearings subject to wear or damage
- Shift in calibration when bearings replaced
- Can be damaged by over speeding (over 150 percent) or by hydraulic shock
- Pressure loss

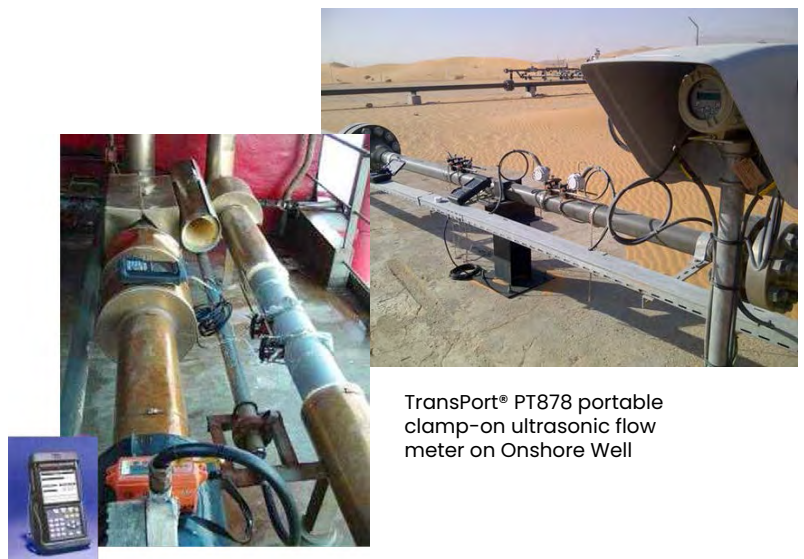
Consequently the total injected water quantity was not measured accurately leading to production loss. Several unplanned outages were required to maintain the turbine meters.

Solution

Panametrics Digital Solutions field service engineer in Algeria, Allaoua Felfoul, proposed to use Panametrics portable PT878 ultrasonic flow meter to diagnose the problems and identify the turbine meters with performance weaknesses.

The Panametrics meters were also used to isolate the process issues and to accurately and reliably measure the injection rates.

Portable PT878 ultrasonic flow meter used do a survey on various water injection high pressure lines from 6" to 20" through produced water processing from separation to injection.



TransPort® PT878 portable clamp-on ultrasonic flow meter on Onshore Well

Benefits

- Low-cost to retro-fit on existing facility
- No shutdown required for installation
- No drift expected on measured value over time
- No intrusive parts to foul nor apertures/ports to block
- Zero pressure drop created
- Diagnostics indicate condition of meter and process
- Can be used for pump protection e.g. re-injection skid

Results

PT878 measures proved successful for all measuring points, the survey helped the operation to define the current injection rates, the turbine meters which were out of spec and needed to be maintained and recalibrated. The capability of the PT878 to measure at low flow helped to detect leaky valves and troubleshoot other costly problems on other equipment at an early stage.

A calculation was done to determine the actual savings in capital cost-out of using permanent ultrasonic flow meters versus maintaining faulty turbine meters. The result showed a 30% savings in capital cost-out. The capital cost calculated was based on the following equation:

$(\text{Well shutdown cost} + \text{new meters or spare parts cost} + \text{Labor cost}) \times \text{Number of Days Shutdown.}$



PT878 in use on 12-inch Produced Water line, with insertion-turbine 3D downstream

Another calculation was done to determine the actual saving in operational cost of Ultrasonic Versus Turbine indicate 80% to 90% saving in operation cost versus turbine. The operation cost calculated based on the following equation:

$(\text{Well shutdown cost} + \text{spare parts cost} + \text{Labor cost}) \times \text{Number of Days.}$

The customer decided to purchase Panametrics PT878 meters with all necessary accessories and plans to replace turbine meters with permanent clamp on Ultrasonic meters (XMT868I) gradually using the saving calculations mentioned above to get the budget approved.

Panametrics, a Baker Hughes business, provides solutions in the toughest applications and environments for moisture, oxygen, liquid and gas flow measurement.

Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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