



OIL & GAS PLATFORM MAINTAINS HIGH PRODUCTION EFFICIENCY WITHOUT COMPROMISING ASSET INTEGRITY USING EMERSON'S SAND MONITORING SOLUTIONS

Customer

Oil and gas operator based in the North Sea.

Application

Monitoring the entrained sand upstream at multiple wellheads.

Challenge

An offshore platform in the North Sea began operating at the end of 2015 with a focus on maintaining long-term asset integrity. The operator's strategy around sand management was to maximize operational efficiency while balancing the safety and integrity of the facility. Since the first production of oil, the platform has been recording high production efficiency rates greater than 97% and intends to maintain this high level.

The challenge with producing at such high rates is that wells are likely to start producing sand after a relatively short period of time, especially in sand prone reservoirs or if solutions to maximize hydrocarbon recovery are deployed. One of the key issues of sand production is that sand particles entrained in the produced fluids are abrasive, eroding pipelines, valves, and other surface equipment. Over time, this erosion can lead to metal loss, pipe or valve failure, or even leaks. This can pose real risk to the integrity of the facility and potentially force the operator to reduce production rates to minimize the entrained sand, which would in turn reduce the operational efficiency. It is estimated that a 5% drop in production at this site would generate \$285,000 in lost revenues per day.

Solution

The operator chose to instrument all 15 wells with Emerson Sand Acoustic Monitors (SAM) (Image 2) to complement their existing Emerson Intrusive Sand Probes. The acoustic detectors can instantly identify when sand is present by converting the ultrasonic noise of the impacting particles into a quantified output. All detectors were calibrated by means of sand injection to enable accurate quantification of entrained sand, thus gaining a good understanding of the specific erosion risk. In parallel, the output from the acoustic detectors is correlated with the erosion rate and estimated wall thickness loss from other sensors. This increases confidence in the measurement and provides further assurance during operations.

Results

- Maintained high operational efficiency without compromising the integrity of the facility
- Avoided unplanned downtime by performing predictive maintenance on equipment
- Obtained real-time KPIs that support quick decision making

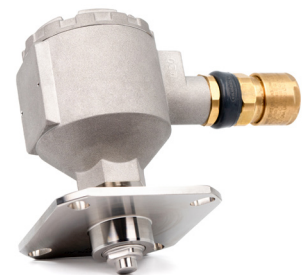


Image 1. Emerson's Sand Acoustic Monitor accurately detects sand accumulation in real-time.

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Thanks to the high sensitivity of Emerson's SAM sensors, the wells are monitored continuously, accurately detecting sand accumulation in real-time, even in wells with ultra-low concentration of sand in the fluid. The wells at this site have been reporting sand rates ranging between zero up to 0.0015 g/s, and a metal loss rate lower than 0.001 mm/y (reference data from January 2024). With these key performance indicators at hand, the operator can confidently maintain increased oil production rates with the reassurance in knowing that the integrity of the facility is not impacted.

The graph below (Image 3) illustrates the data from one of the wells, showing a negligible sand accumulation below 1kg over the course of one month, suggesting a sand rate as low as 0.0003g/s. Given the low sand rate, the graph shows no noticeable change in the metal loss curve, which clearly indicates that this level of sand production has no significant erosive impact on pipes or other critical components of well infrastructure.

If the sand mass or sand rate at any of the wells crosses the minimum threshold, it will trigger an alarm that the operator can act on immediately, and perform data driven adjustments to optimize production rates.

By monitoring the sand rate and its erosive impact in real-time, the operator can also perform predictive maintenance by forecasting potential equipment failures and then taking preventative measures to avoid unplanned downtime.

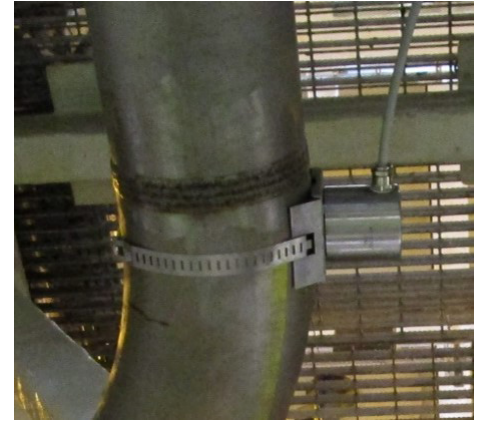


Image 2. Emerson's Sand Acoustic Monitor installed on-site.

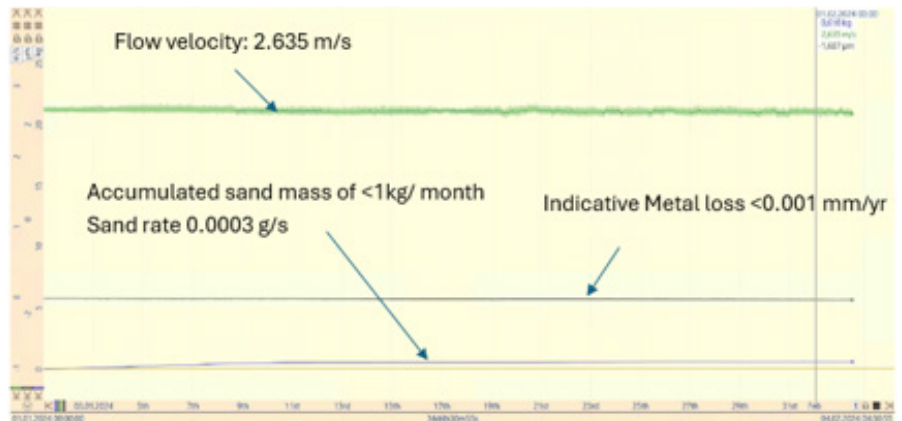


Image 3. Graph illustrating sand mass accumulation and indicative metal loss.

Conclusion

Through real-time sand and erosion monitoring, the operator can confidently achieve their production objectives, knowing that the asset is not at risk from sand production. In this case, by utilizing data from real-time sand and erosion monitoring, the operator can actively track sand production levels and detect any potential erosive effects on equipment. This technology not only provides peace of mind, but also enables the operator to maintain optimal production rates and ensure sustained facility integrity.

The ability to control the integrity aspects of oil production in real-time is the ultimate tool for improving financial performance. In this case, deploying real-time monitoring systems for sand and erosion from Emerson delivered a fast return on investment (ROI), with an indicative payback in less than 3 days.

For more information, visit [Emerson.com/Corrosion-Erosion](https://emerson.com/corrosion-erosion)

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