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CASE STUDY

August 2024

WAND Online Case Study

Remote Shale Gas Well Pad, Ohio, US

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OVERVIEW

APPLICATION	Online wall thickness monitoring of remote Well Pads
CLIENT	Confidential
ASSET	Remote Shale Gas Well Pad
LOCATION	Ohio, US

CHALLENGES

The customer required an online thickness monitoring solution for well pad applications. Due to the remote nature of the site, they required a solution that does not rely on an on-site wireless infrastructure.

The sand erosion rate could not be accurately monitored using conventional methods so a permanently installed solution was required to provide accurate and repeatable thickness data. This would enable the customer to accurately determine the effect of increased flow rate on the rate of sand erosion at a new well.

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SOLUTION

The WAND-Online service acquires thickness data from WAND sensors and automatically uploads them directly to the cloud based iDART. WAND sensors are installed directly to piping or vessels at pre-determined thickness monitoring locations. Remote data collectors (WAND-RDCs) are installed onto the asset to acquire thickness data at defined intervals.

Each WAND-RDC is equipped with a thermocouple that takes a temperature reading with each ultrasonic reading so that temperature compensation can be applied in iDART. The data from the WAND-RDCs are sent via Bluetooth 5.0 to a gateway which in turn transmits the data via 4G to the iDART software.

WAND-Online is simple to set up, as it does not require on-site wireless infrastructure. The service provides accurate, wall thickness trending without the need for personnel on-site.

After successfully piloting WAND-Online on a mature well pad, the customer deployed WAND-Online at a new well pad. The aim was to push the flow rate of the well to its maximum to determine the effect of increased flow rate on the sand erosion rate. With this data, the customer could maximise production whilst monitoring the effect on the the integrity of the equipment. 54 WAND sensors and 9 WAND-RDCs were installed across the site on sand traps and GPUs by our local partner Precision Group. The pre-configured WAND-Gateway was connected to a power supply onsite and automatically connected to all WAND-RDCs at the well pad. Via 4G the gateway communicated with iDART to enable a daily measurement configuration to be applied. Daily thickness data was then sent directly to iDART for the end user to view remotely without the need for personnel on-site.

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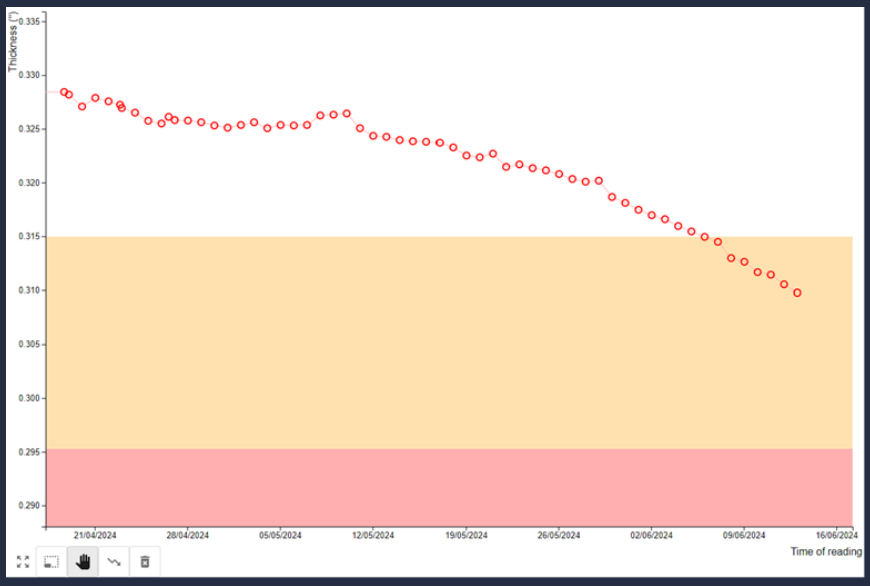
RESULTS

As the WAND sensors are permanently installed, the exact same location is measured each time providing reliable, repeatable and actionable data. Due to the accuracy of WAND-Online, the customer could determine the effect of increased flow rate on the rate of sand erosion. They were able to increase the flow rate of the well by 50% and accurately determine the lifetime of the equipment based upon the erosion rate calculated. Certain locations experienced a short-term erosion rate of 3.1mm (0.123")/year in the first 2 months of production as seen in figure 1.

As sensors were installed across 3 identical lines, the result showed that not all lines were wearing at the same rate. The operator was able to make informed maintenance decisions to replace equipment with significant wall loss alongside existing work scopes to reduce downtime and maintain the increased rate of production. Due to the remote location of the site, this saved the operator on multiple mobilisation costs for maintenance teams.

The precision of the system allowed the operator to determine the optimum balance between flow rate and internal wall loss to maximise profitability and minimise downtime.



- Figure 1: Thickness loss trend line over 2-month period.
- Orange section represents warning thickness set by the user.
- Red section is the end-of-life thickness set by the user.

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RETURN ON INVESTMENT

There are several ways that WAND-Online financially benefited the end user.

1. Cost comparison to manual UT

	Manual UT	WAND-Online
NDT personnel time on site	5mins per TML 50 x 5mins 4hrs	0hrs
Time saving WAND-Online	4hrs/day 28hrs/week 840hrs/month	
Return on investment	ROI within 1month	

2. Increased rate of gas production

Using WAND-Online the customer was able to confidently increase well production by 50% whilst monitoring the effect on the integrity of their asset.

Based on most recent pricing this resulted in an additional $43,000/day.
Without accurate daily thickness data, it would not be possible to safely operate the well at an increased flow rate.

3. Benefits and ROI through daily measurement

a. Accurate monitoring can prevent unplanned shutdown and LOPC

Daily thickness data allows close monitoring of wall loss giving warning before complete wash out occurs. This prevents LOPC, environmental damage and any subsequent clean up costs required

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b. Prevents loss of earnings due to well downtime.

Maintenance work can be included in existing scope and planned downtime. This results in maximum time online for the well and therefore maximum profits. 1 day of downtime would result in approx. $130,000 of lost earnings. Instant return on investment.

c. Reduces the cost of maintenance work.

Due to the remote nature of the site, the customer was able to save on multiple mobilisation costs for maintenance teams. The system proved that not all equipment or lines were wearing at the same rate meaning the maintainence work could be focussed on key areas.