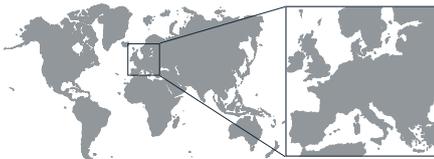


# Evaluating injection erosion

## Thickness accuracy avoids misunderstanding

### Case study: **SPACE® Vernier**

A high rate water injection well was evaluated to determine if the rates were sustainable in the long term without promoting excessive erosion.



**Region:** Offshore North Sea  
**Well Type:** Water injector

#### Case Benefits

- Internal diameter measurement in unperforated liner confirmed absence of flow induced erosion
- Combination of internal diameter and thickness measurements confirm absence of flow induced erosion throughout perforated liner section
- Reduction of injection rate due to misleading data avoided

#### Key Capabilities

- Real-time information from e-line conveyed services
- Full 360° coverage of internal and external profiles
- Speed of sound sensor ensures real-time calibration
- Comprehensive quantitative analysis of tubular condition
- 3D rendering to aid understanding available immediately on wellsite

#### Challenge

Experience has shown that under certain conditions the sustained injection of water at high rates can promote accelerated erosion of cemented casings or liners, especially through the perforated sections.



Accurate evaluation of any metal loss due to injection erosion is required in order to balance well lifetime against enhancements in production.

Traditional methods such as caliper tools measure only ID, and the fingers risk “hanging” in perforations leading to potentially erroneous conclusions.

#### Solution

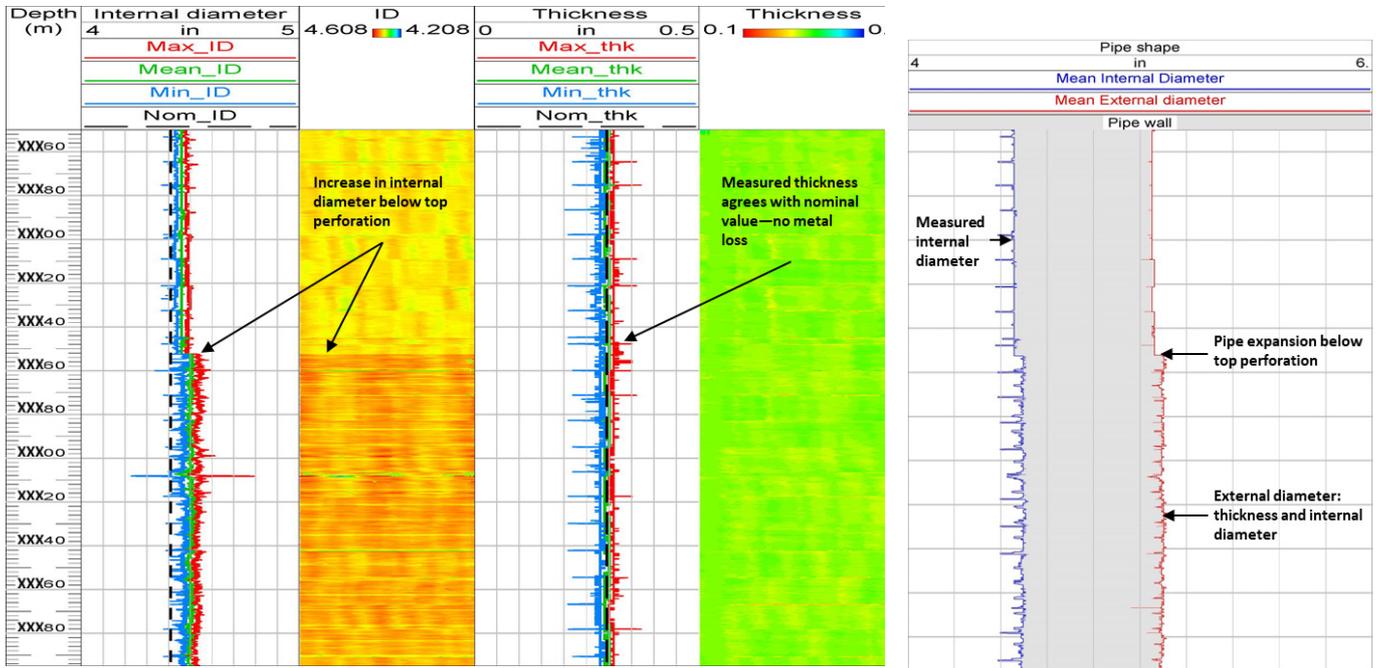
The ultrasonic array of the **SPACE® Vernier** allows completely non-contact measurement of the internal diameter of a perforated tubular around its entire circumference.

The directed beam of ultrasound also allows simultaneous direct reading of wall thickness, providing a complete evaluation of the perforated casing or liner.



**Result**

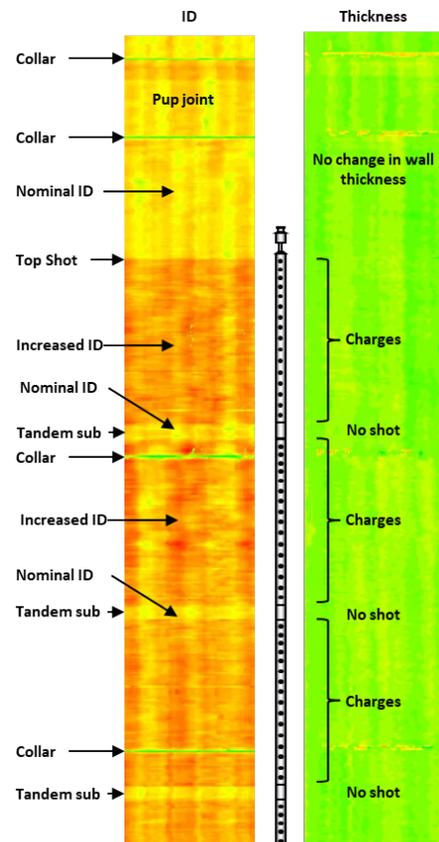
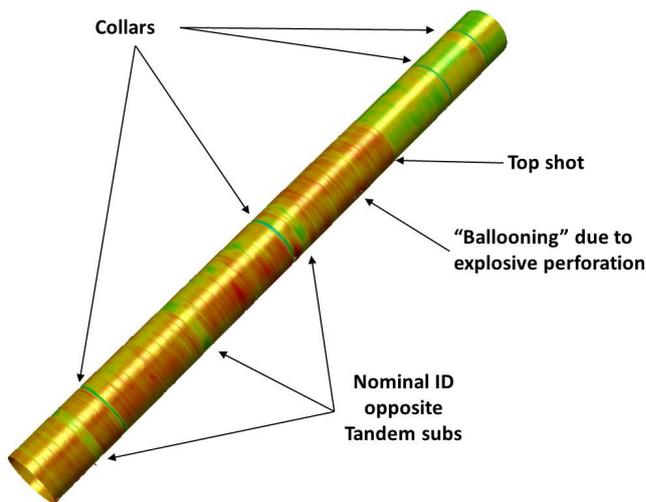
The survey showed that measured internal diameter above the perforated zone was close to nominal value, indicating no erosion the liner. Below the top perforation, there was a noticeable increase in measured ID, which if taken in isolation, would lead to the conclusion there had been significant erosion. However, the measured thickness showed no corresponding reduction which indicated that the liner had been “ballooned” out during perforating rather than eroded away, meaning that the well was being operated at a sustainable level.



Inner diameter and thickness comparison

Average wall thickness profile

Expanding the depth scale reveals further features, such as a pattern in the liner expansion consistent with perforating gun bodies interspersed with tandem subs. The increase in internal diameter is only apparent where charges were present and not over the tandem subs which contain no explosive charges.



Captured by **SPACE®**