



# Wireline Combinable Leak Detection

Sondex Wireline Ltd  
2014

**Imagination at work.**

Did you know?

~ 40% of the wells have  
well integrity issues

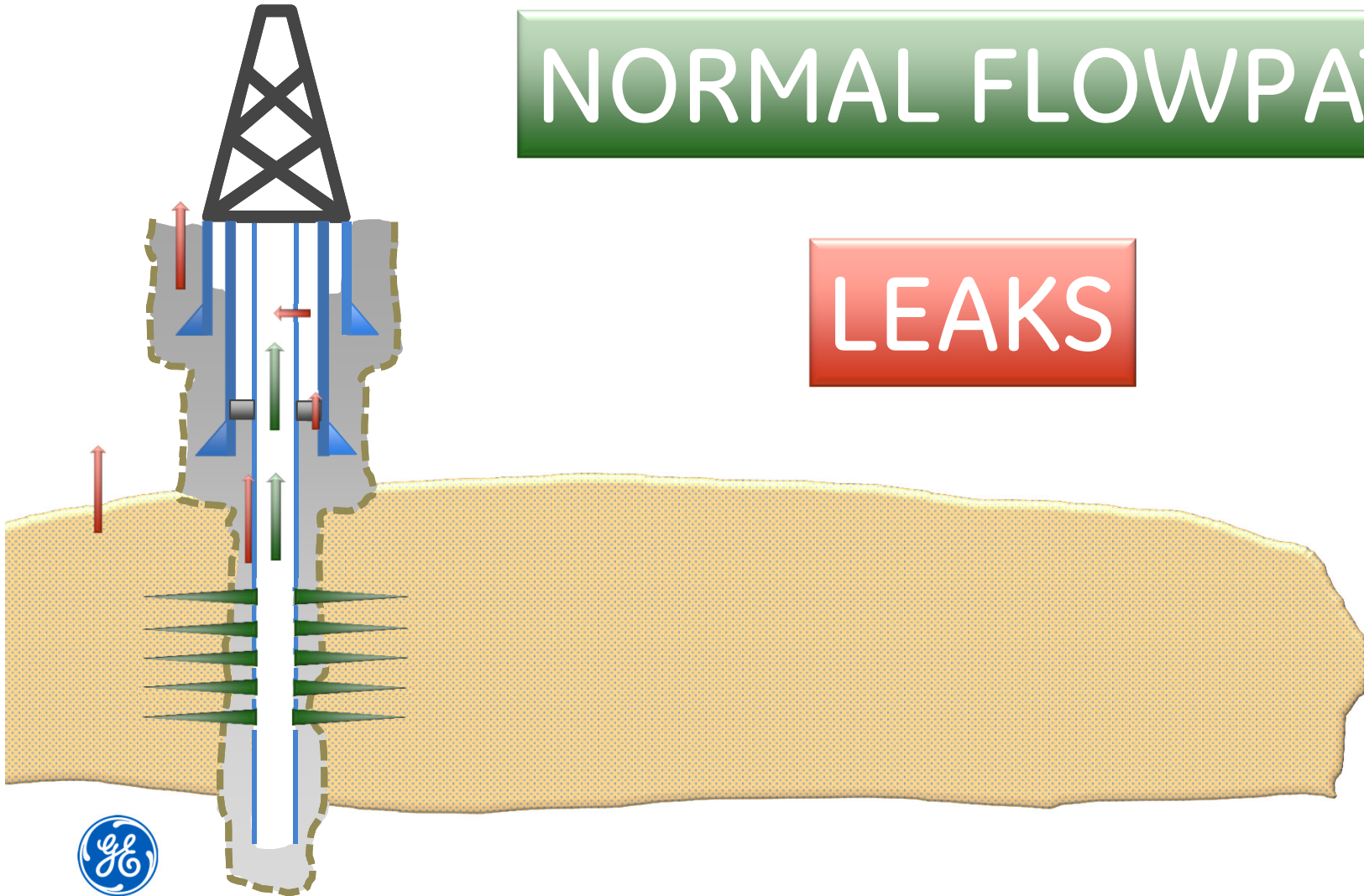
The cost of liability is not  
affordable



# Leaks in a well

NORMAL FLOWPATH

LEAKS



# Leak detection applications

## Production & Abandonment

- Valves, mandrels leaks...
- Leaks and crossflow behind casing/tubing
- Preventive integrity verification after gas breakthrough\*
- Time lapse monitoring\*\*

## Drilling

- Anti-collision monitoring
- Underground blowout, crossflow
- Early detection of leaks behind surface and production casings



A simple but powerful well integrity diagnostics tool

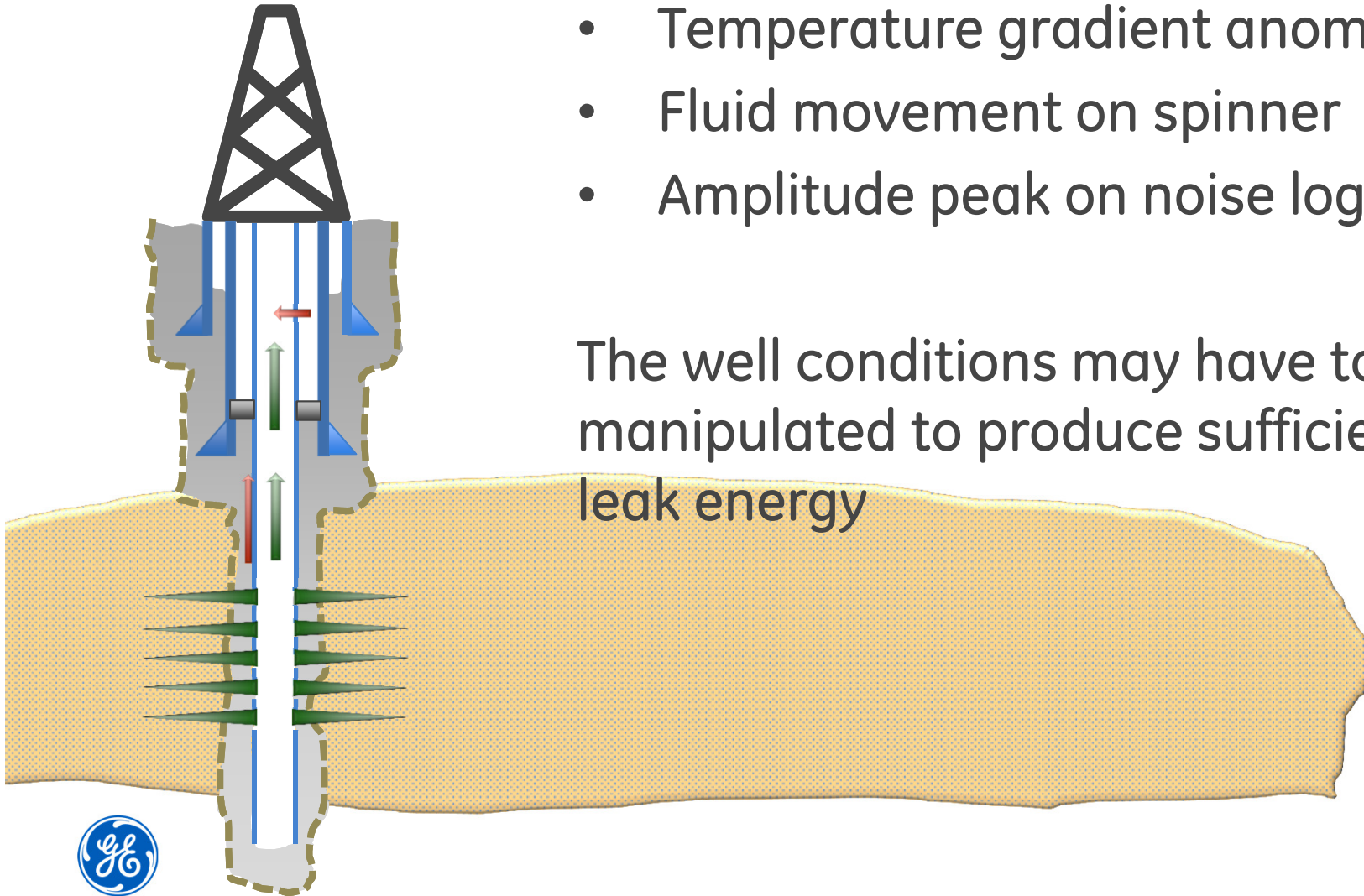


# Noise logging principles



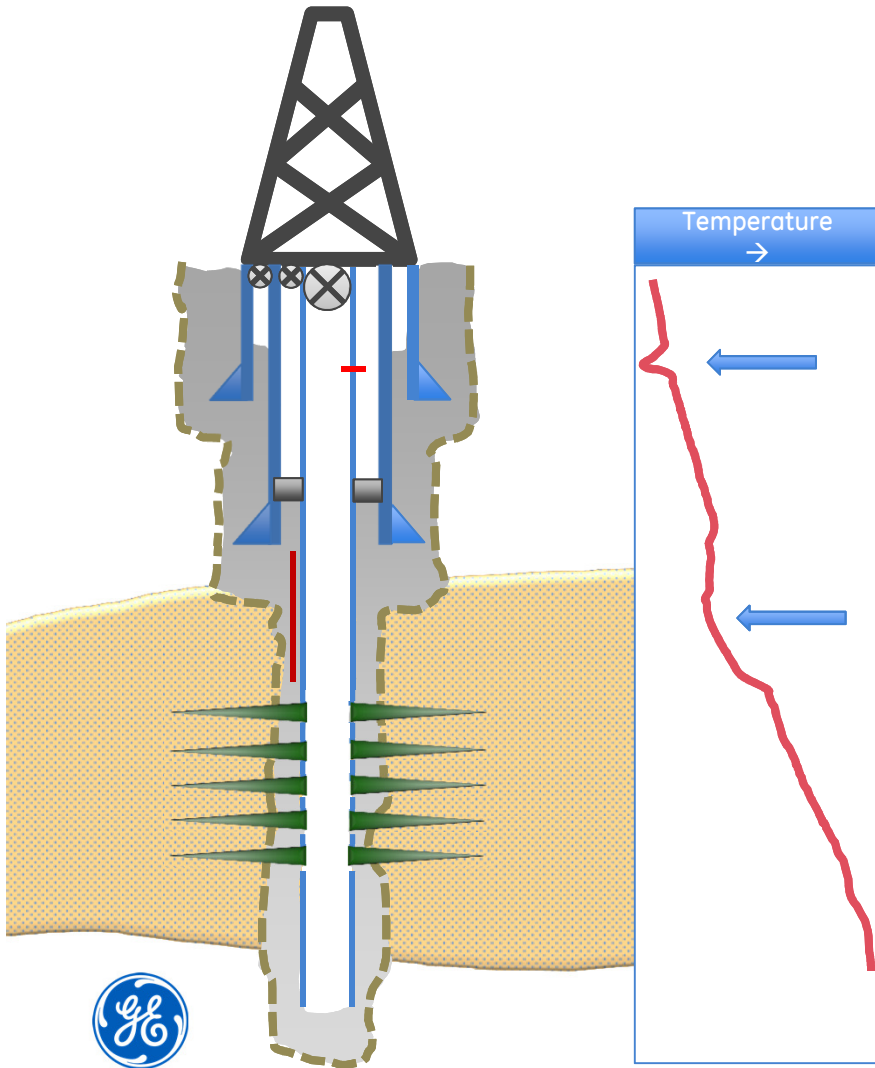
# It's about finding the leak signature

- Temperature gradient anomaly
- Fluid movement on spinner
- Amplitude peak on noise log



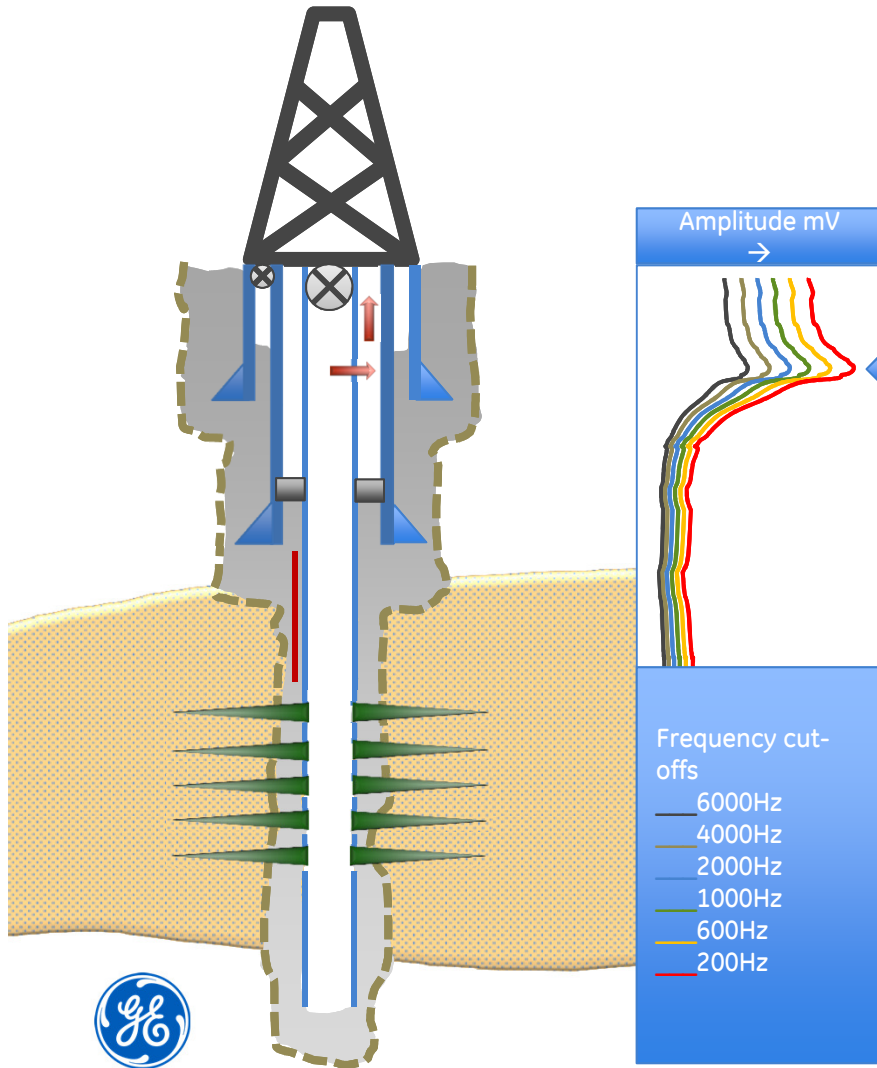
The well conditions may have to be manipulated to produce sufficient leak energy

# Shut-in pass: the temperature baseline



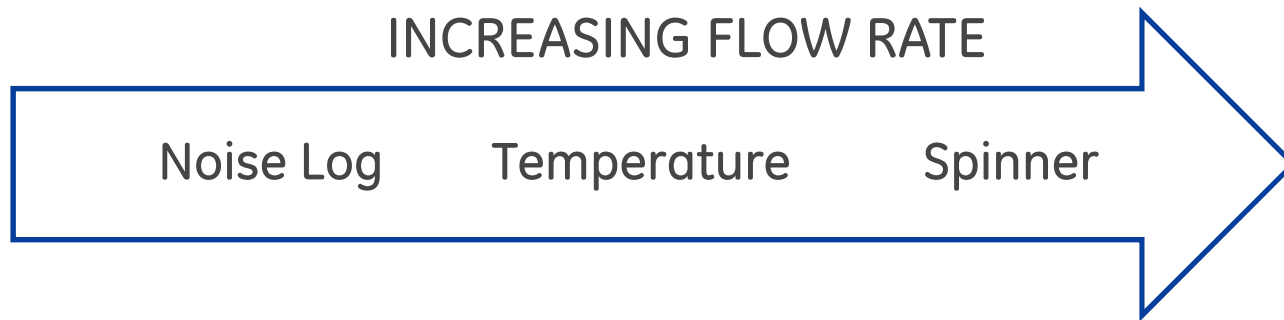
- The wellbore and annuli are closed
- The wellbore and annuli have equalized pressures
- The temperature log shows the residual signature of gas leaks cooling down the wellbore

# Bleeding pass: recording the noise stations



- The wellbore is closed
- The relevant annulus is bled off to stimulate the leak
- If the energy of the leak is sufficient, an increase of amplitude is detected, in this example from the leak depth and above
- If the leak energy is not sufficient, injection must be used

# What tool should be used?



In practice noise and temperature are always run together for leak detection

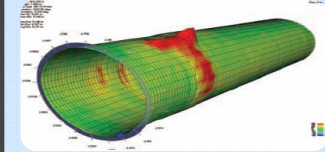
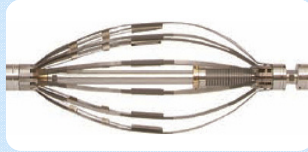


## What else?

- A spinner may show a direct leak into or from the wellbore if the flowrate is large enough but not always
- A hold-up tool is useful to determine the fluid types and levels
- The noise baseline changes in different mixtures due to change of coupling



# Sondex Well Integrity Portfolio



## MIT

2" to 14"  
casing ID  
24, 40, 60  
fingers

20,000psi  
350 degF

## MTT

2 to 7"  
casing ID  
12 sensors

15,000psi  
300 degF

## RBT

2 to 13 3/8"  
casing ID  
6 or 8  
sectors

20,000psi  
350degF

## Leak detection

1 11/16" OD  
Fully  
combinable  
24" long

20,000psi  
350degF

## WIPER- WIVA

Data  
analysis &  
3D display

Real time  
3D MIT

Ladies & Gentlemen...



Sondex Leak Detection Tool



Sondex leak detection technology

A new, cost effective solution for Well Integrity risk management

# A digital acoustic combinable leak detection tool



Example in combination with Production Logging (MAPS)



# Sondex n-combinable leak detection tool Specifications

## Environmental specifications

1 11/16"

350degF

20kpsi

24" make-up length

10 lbm

## Measurement specifications

Piezo-electric

0 to 12.7 kHz

Digital, Ultrawire, Thru-wire

Survey & Continuous time station log

(Depth log)

6 selectable cut-off

Selectable fixed gain & autogain

## Features

N-combinable\*

Adjustable /re-playable cut-offs

Real time FFT spectrum monitor

Real time cut-offs monitor

Colour VDL

Road noise filters

Presentation gain

Combinable to Sondex PL and WI tools in any order

Short make-up length → easy to transport and run

Low maintenance

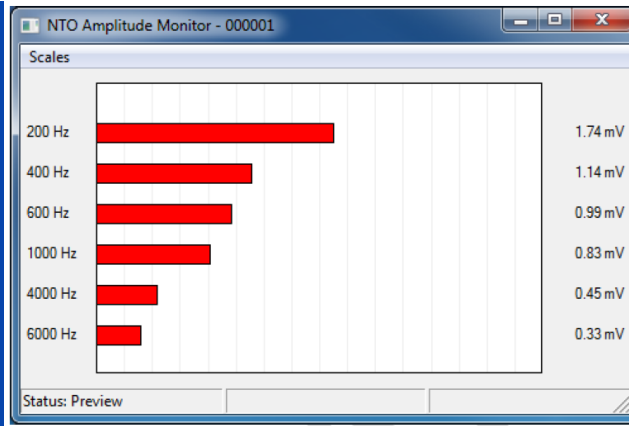
Cost effective multiplied diagnostics opportunities

\* Several tools can be combined in one string

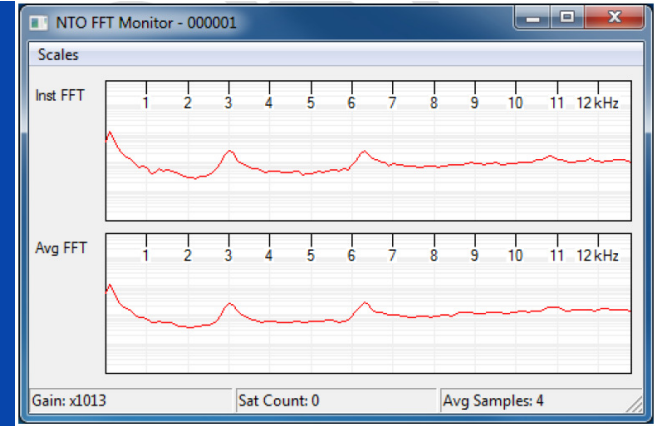


# Features

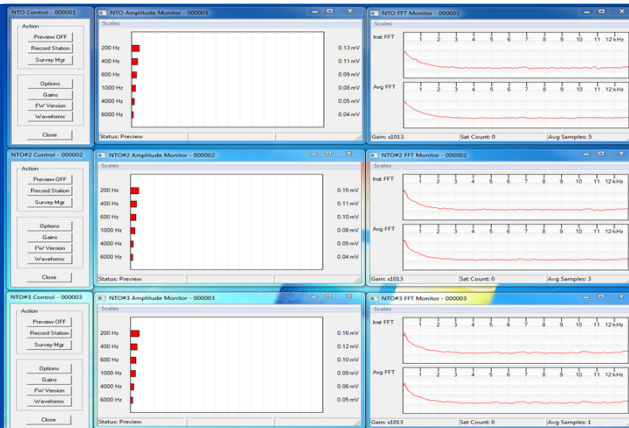
## Cut-offs



## FFT



## 3 tools



## VDL

