

First Field Application of the X-treme Slot Jet Isolate Explosives-Free Remedial System

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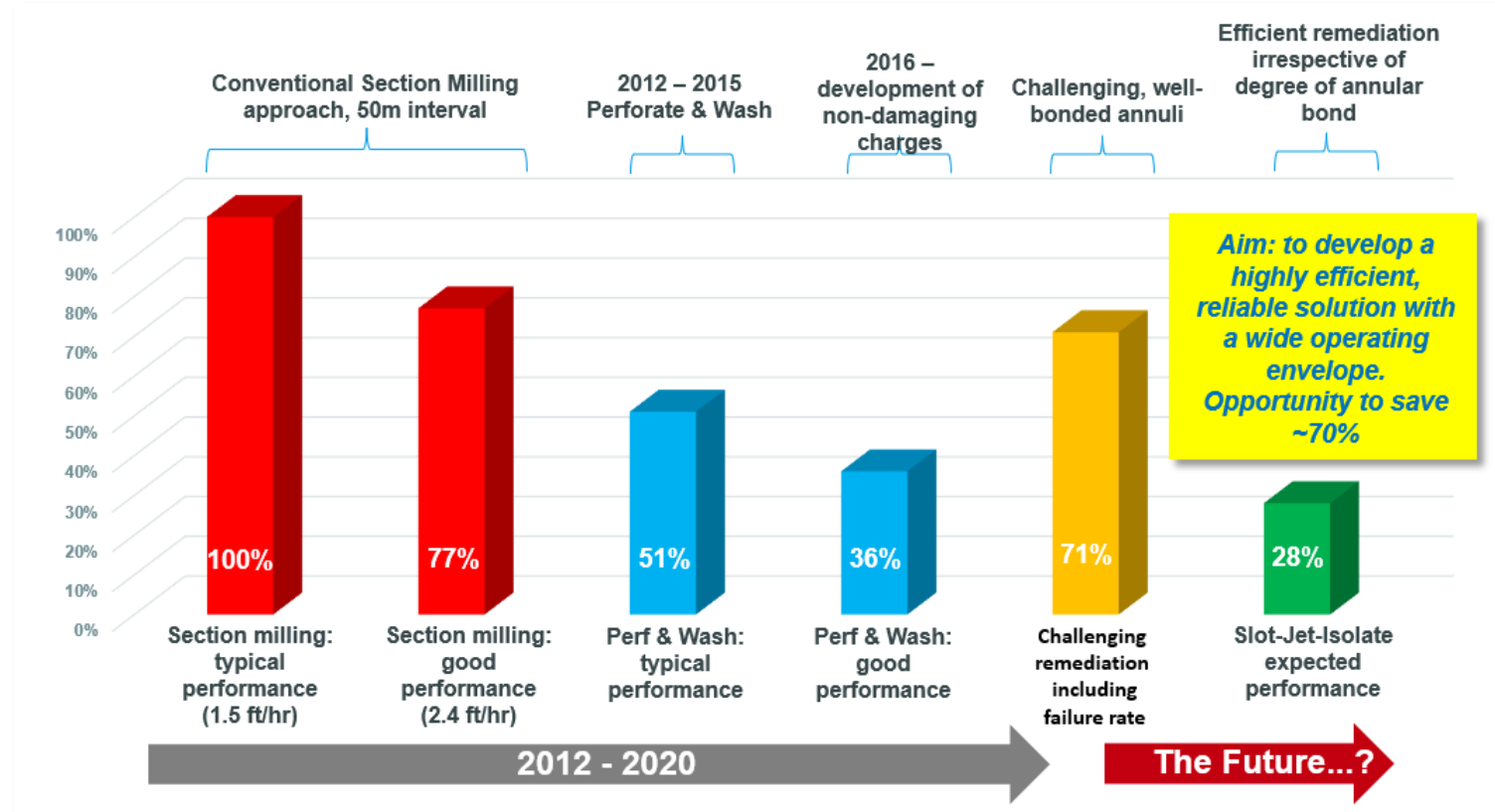


SPE ABERDEEN WELL DECOMMISSIONING 2023
WELLS IN THE FUTURE -
LATE LIFE & DECOMMISSIONING

P&J Live - 6-7 June 2023

TotalEnergies requirement for Enhanced Remedial Technology presented April 2022

- Safety - explosives free
- Multi-use, less waste
- Carbon footprint reduction
- Simple
- Rigorously tested
- Clear indication of hydraulic efficacy
- Proven to be effective on challenging annuli
- Robust compliant barriers
- Fast – install & verify 50m barrier in <72 hrs
- Low standby rate, quick turnaround
- No hidden charges
- **Cost & footprint reduction!**
- ***Flexibility: can be easily reconfigured for different applications – see next slides...***



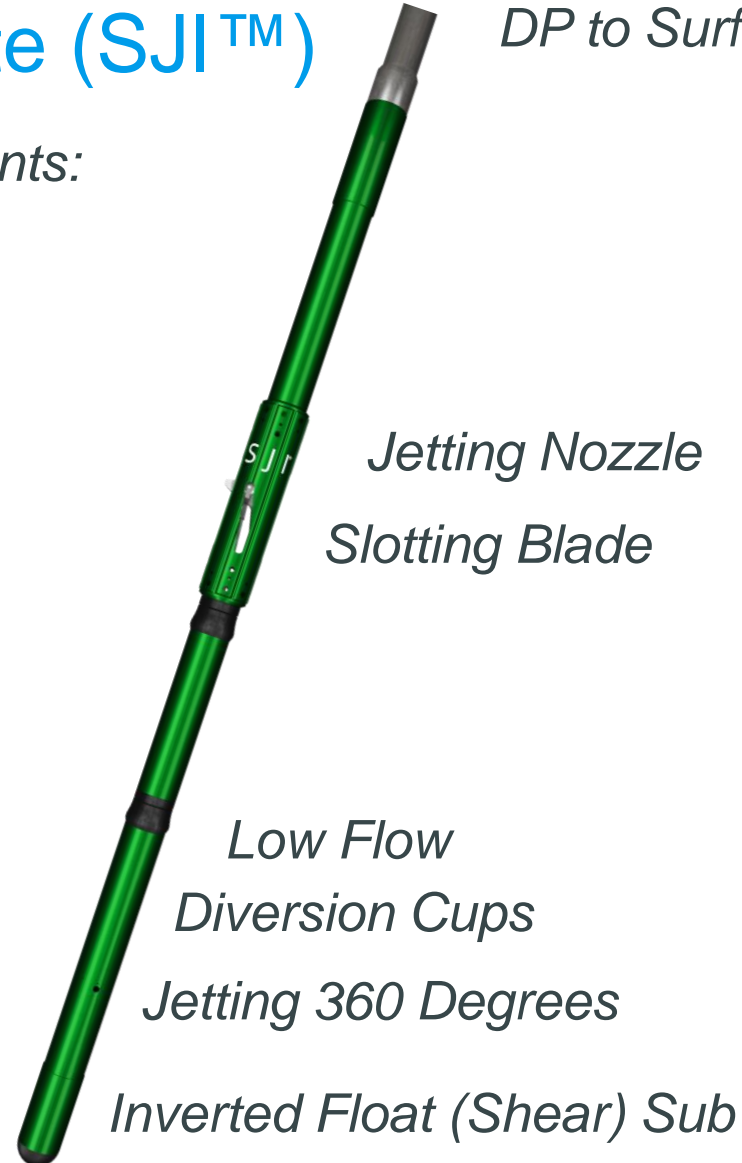
The Solution: X-treme Slot Jet Isolate (SJI™)

X-treme SJI™ Comprises of 3 Main components:

Slotting Tool – Pierces the casing over 4000 times per 200ft section whilst jetting the slots and rattling the casing/cement at the same time.

Jetting Sub – System that jets, flushes and cleans behind the casing circumferentially.

Isolation Sub – Allows isolation material to be forced into the slots and behind the casing providing a permanent barrier.



X-treme Slot Jet Isolate (SJI™)

Three Main Applications

1. Environmental plug or PCC (Perf, Circulate & Cement) with full well control during initial access to the B-annulus. This is achieved with a closed fluid slotting mechanism and transitioning to an open system during cleaning and barrier placement.
2. Full reservoir isolation at the cap rock alternative to Perf, Wash & Cement using an explosives-free hydro-mechanical system. This operation is achieved using an open Slotting & Jetting system to access the B-annulus creating a casing standoff with greatly improved hydraulic efficiency and circumferentially-placed cement remediation.
3. Formation Integrity Test with either full remediation or internal casing cement remediation. This is achieved initially as a closed fluid slotting system with a transition to an open system once the results of the FIT are concluded. Remediation, as per 1 or 2 above.

X-treme Slot Jet Isolate (SJI™) Progress since January 2022

Successful test at
NORCE rig Norway
with TotalEnergies

Testing for Barite sag jetting
& cmt removal & optimised
mod. system

Coiled Tubing 4-3/8"
system designed

JUN 22

SEPT 22

FEB 23

JAN 22

AUG - SEPT 22

DEC 22

First successful SJI implementation:
subsea env. plug installations with
CNOOC UKNS

Slot Jet Cut Pull
Launched

First successful csg recovery:
Slotted & Jetted 381m
1407m casing pulled
TotalEnergies NL

First Application X-treme Slot Jet Isolate

Application: 4 Subsea Wells: PCC to set Environmental Plug

Depth: 465ft & 970ft

Execution: Slotted shallow on closed system 4 x 5ft

Diverter bag shut

Returns through choke & kill lines

Flow check

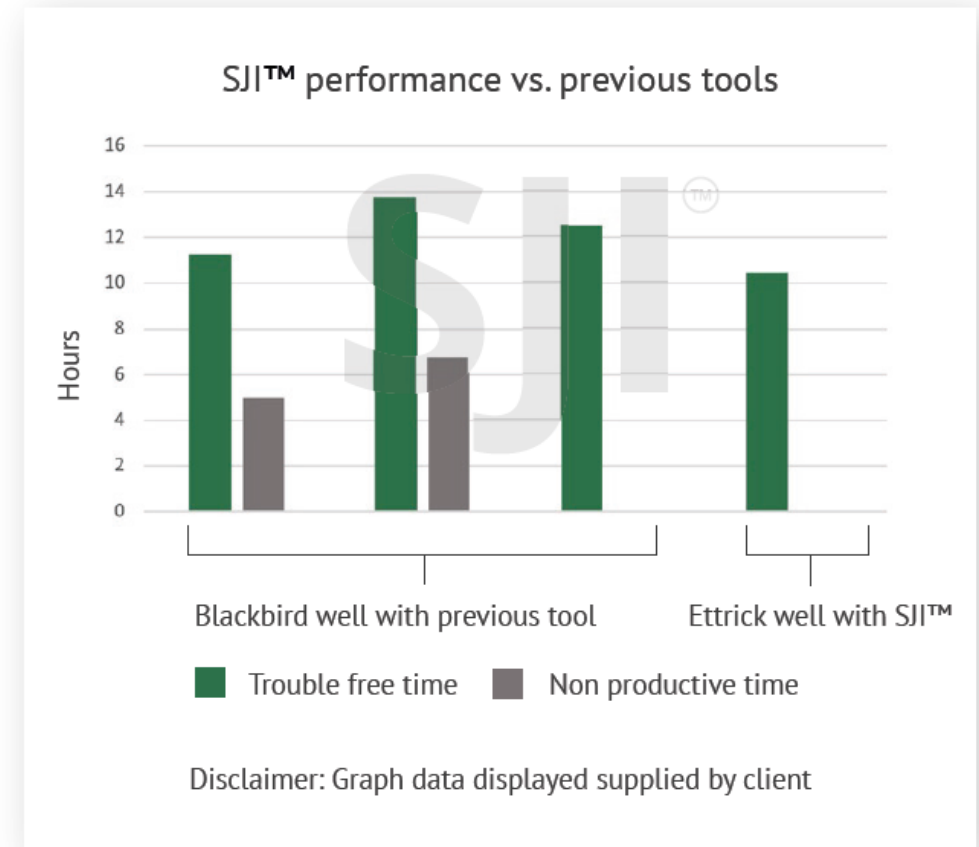
RIH slot deep 4 x 5ft

Shear out lower sleeve to allow circ

Straddle slots with cups above

Circulate at 6bpm (50bls)

POOH



34.3% Saving over alternative methods



After four successful subsea deployments of the X-treme SJI™ in the PCC P&A application, Baker Hughes initiated discussions on the Xtreme Slot Jet Isolate technology and the potential use of the technology in the casing recovery process for P&A.

To assist in the optimisation process of the use of X-treme SJI™ in slot recovery, various tests were executed at the Titan Torque Facility in Aberdeen:

1. Slot & Jet 9 5/8" 47# casing with 750 lpm water
2. Slot & Jet 9 5/8" 47# casing cement inside full inclosed 13 3/8" casing multiple passes to break up cement
3. Simulate washing 9 5/8" casing with opposing cups with settled barite on the backside inside perspex 750lpm with 8 nozzles and 2 ft between cups.
4. Simulate jetting 9 5/8" casing with settled barite on the backside inside perspex 750lpm with 1 nozzle aligned with the slotting blade as it would be with X-treme SJI™

X-treme SJI™ washing with cups 8 nozzles @750lpm



X-treme SJI™ jetting with 1 nozzle aligned @750lpm

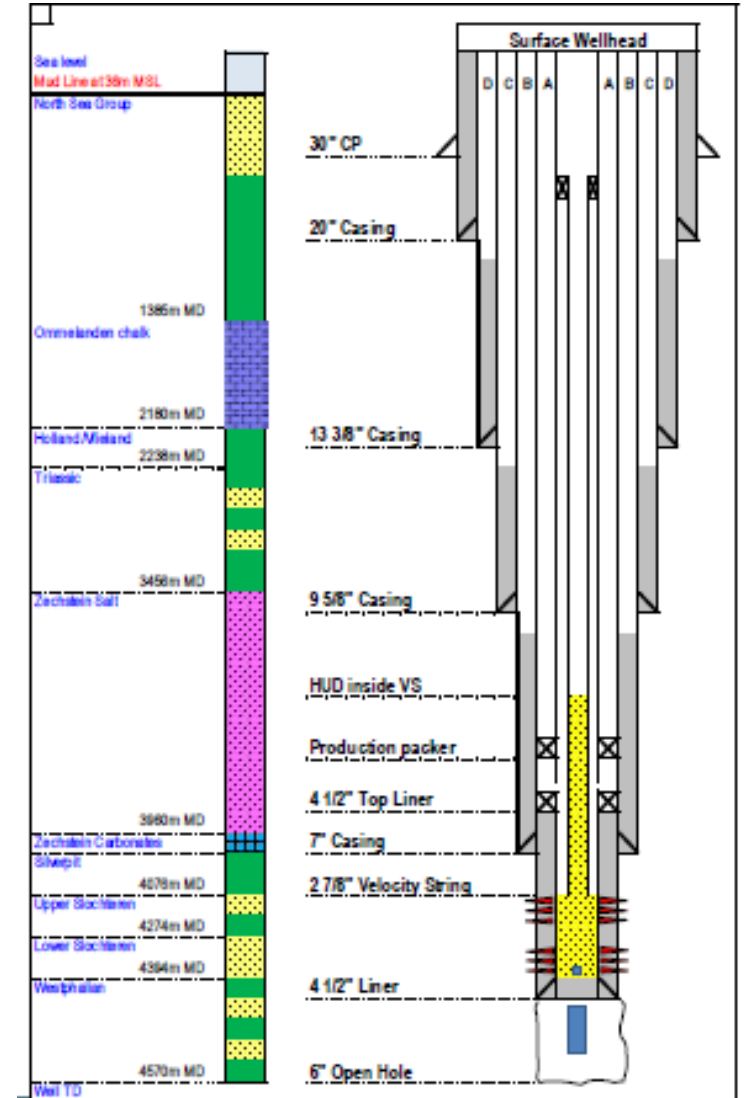


X-treme SJI™ jetting



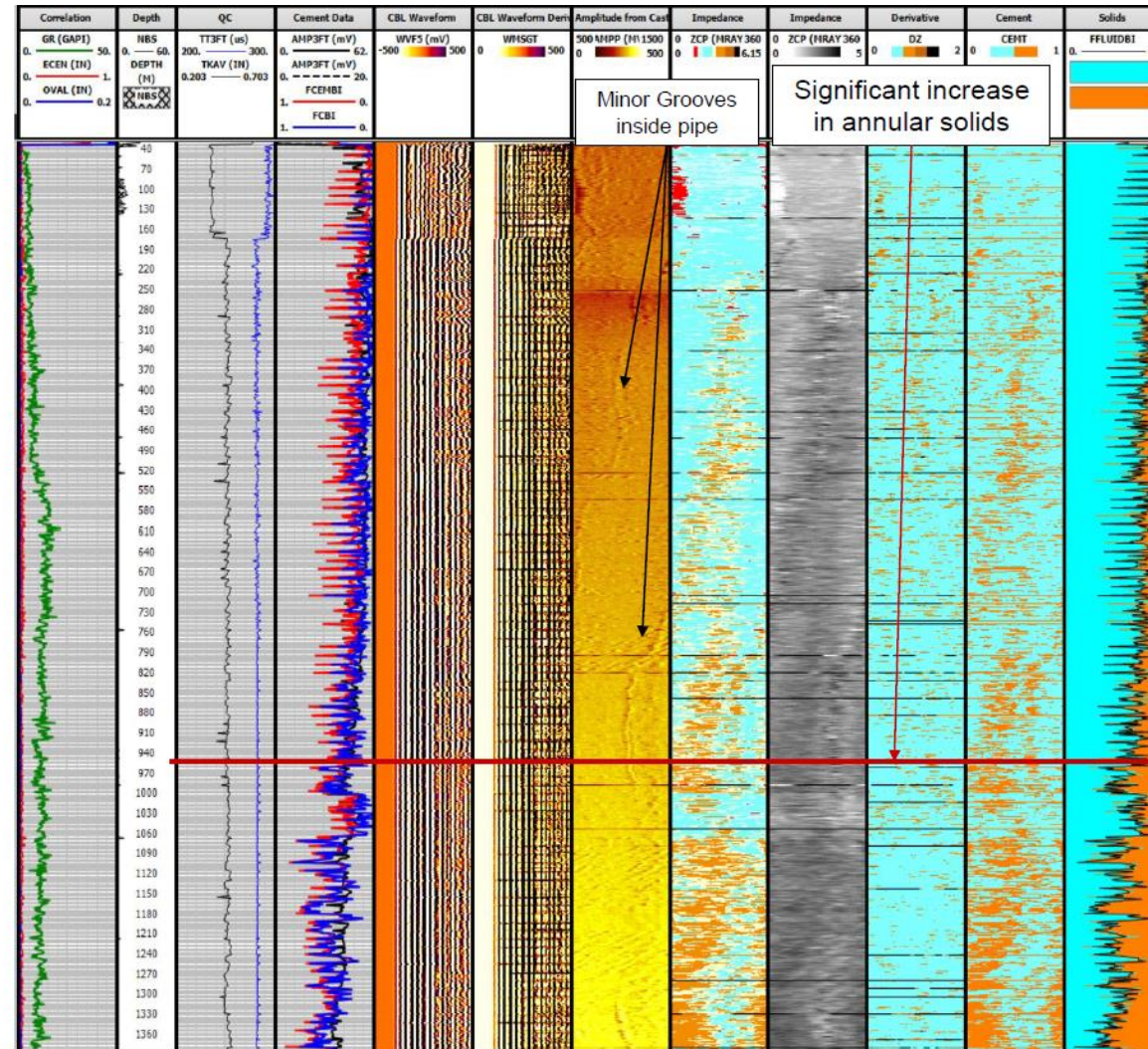
First X-treme SJI™ Casing Recovery application: TotalEnergies NL Well Case Study

- Platform well from 1989 Dutch sector to be abandoned February 2023.
- CT Velocity string pulled.
- 7 5/8" 29.7# & 7" 32# P110 casing inside 9 5/8" casing.
- 7" Casing cut @ 1,407m with over 180klbs overpull without moving.
- OBM barite suspected on the backside of the 7" casing.
- No communication up the B-annulus.
- 2 x 5-7/8" SJI™ tools for slotting 7" casing built, tested and mobilized in under 24hr.
- Logging tools mobilised to determine barite bridges.
- 5-7/8" SJI™ tool's 1st mobilisation.
- 2 to 4 TCP runs or Section Milling were the next options.



Overall Interval (30 – 1387.5mMD)

- Increase in annular solids with depth is generally observed.
- Minor mud solids observed above 223m
- Fair amount of solids observed between 223m - 960m, particularly on the low side.
- Increased azimuthal presence of solids is seen below 960m and more uniformly prominent below 1063.
- Good agreement seen between ACE bond index and 3ft pipe amplitude trend, showing general increase in mud solids with depth.



TotalEnergies Netherlands X-treme SJI™ Results Summary

Operation in the Netherlands struggled during cut and pull of 7" 32# P110. 1407m of csg needed to be removed.
X-treme SJI mobilized to slot and remove barite.

Result:

- Found top of settled barite with mechanical slotting and got returns.
- Mechanically slotted & jetted a total of 381m.
- Great returns of barite during slotting and jetting.
- Converted tool downhole to wash for 22hrs until barite returns stopped.
- **Pulled 1407m of casing.**
- Flexible solution with mechanical slotting where the tool can be activated/deactivated and worked where it's needed.
- Great learnings for future optimization.



Single System



Basic Modular System



Enhanced Modular System



Watch this space:
X-treme SJI™ on Coil
coming soon!

Performance Improvement & Carbon Footprint Reduction

With thanks to:

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Knut Inge Dahlberg @ Baker Hughes

The 'P&A Technology Roadmap' team @ TotalEnergies HQ & R&D

The Drilling & Wells team @ TotalEnergies NL

Steve MacPherson @ CNOOC International Aberdeen

Chris Collie @ Zenith Energy

The team @ TitanTorque

