



Shell UK Operated

Delivering more value from Wells

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Reserves: Our use of the term “reserves” in this presentation means SEC proved oil and gas reserves.

Resources: Our use of the term “resources” in this presentation includes quantities of oil and gas not yet classified as SEC proved oil and gas reserves. Resources are consistent with the Society of Petroleum Engineers 2P and 2C definitions.

Organic: Our use of the term Organic includes SEC proved oil and gas reserves excluding changes resulting from acquisitions, divestments and year-average pricing impact.

Shales: Our use of the term ‘shales’ refers to tight, shale and coal bed methane oil and gas acreage.

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- Shell UK Technology Strategy
- Ceramic Screens
- NAFpac completion
- Annular WSO

Shell UK Technology Strategy

Shell UK Technology Strategy

Technology delivering value to Shell UK bottom line by

- Increasing Production
- Decreasing Deferment
- Reducing CAPEX, OPEX & ABEX
- Reducing HSSE Exposure



Indicated Potential Benefit to UK Business

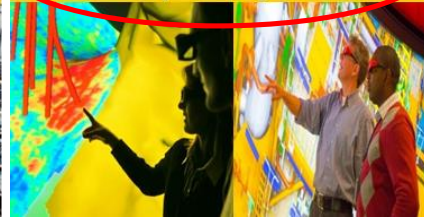


Realised and captured through current business reporting – minimises duplication and repetition

Improved Maintenance (Reliability and Availability)



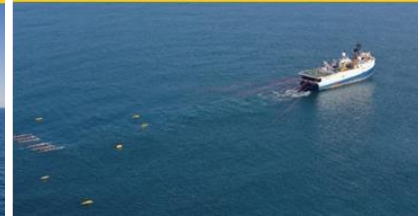
Improve Well, Reservoir and Facility Management



Efficient Decommissioning



Ensure Safe Growth



Ensure Safe Production



Management and Reduction of Emissions



Delivering more value from wells underpins several strands of the Shell UK Technology Strategy

Continue to elevate visibility and communication of technology solutions

- Promote replication in RDS
- Quarterly highlights – summary on screens around office

Driving an internal and external focus on Technology

- Introduction of Technology Network (>20 focal points assigned to specific themes)
- Actively engaging and defining areas of focus in OGTC Solution Centres

Well, Reservoir and Facility Management Technology Focus

- “In well” or well enhancement technologies sought by both pull and push methods
- WRFM Technology replication thrusts
- Shell UK both contributes and benefits from Shell Global Technology catalogue
- Additional discipline specific global networks and forums

The screenshot shows the Shell Global Technology Catalogue website. The header is yellow with the Shell logo on the left, a globe icon, and the text "Global Technology Catalogue" in the center. A search bar is on the right. Below the header is a navigation menu with "Home", "Add Technology", and "Help". A "Filter Technologies" sidebar on the left includes sections for "Technology areas", "Technology Platforms", "Maturity of technology", "Sharing with partners", "Disciplines", "# Coding", "Date entry added", and "Date entry last modified". The main content area shows a grid of technology cards. The first card is for "Injectable sealants" (GTC ID: 1562) with a description: "Pump KCI MS Sealant in to wellhead seal ports, allow it to set based on curing time and carry out inflow test. Do case if it leaks again." The second card is for "Articlock - subsea equipment deployment" (GTC ID: 1498) with a description: "Articlock increases operating limits for installing equipment, reduces by up to 400%. Conductors, Flowbase, X's all come with maximum." The third card is for "Bismuth BISN for Water Shut Off" (GTC ID: 1424) with a description: "A wireline deployable alternative to traditional P&A solutions by melting variations of Bismuth and alloy metals down hole using a thermite." The fourth card is for "CannSeal for Abandonment" (GTC ID: 1501) with a description: "Electric wireline operated tool that in a single run perforates and squeezes sealant into the annulus creating a competent seal behind the."

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Shell UK Technology Plan – Delivering more value from Wells

Discover

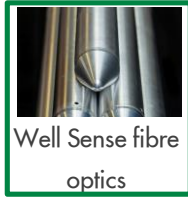
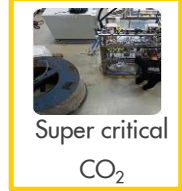
Develop

Demonstrate

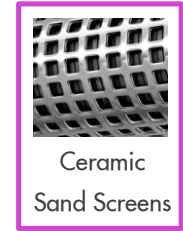
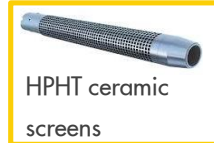
Deploy



Oil based (NAF) gravel packing



Annular WSO plug



Well Reviews
Vendors
JV partners
OGTC
Shell Global Tech

Vendors
CWI
Global expertise

Vendors
Assets
Operations

Shell UK
Global
Technology team
JV partners

Case studies – technology overview

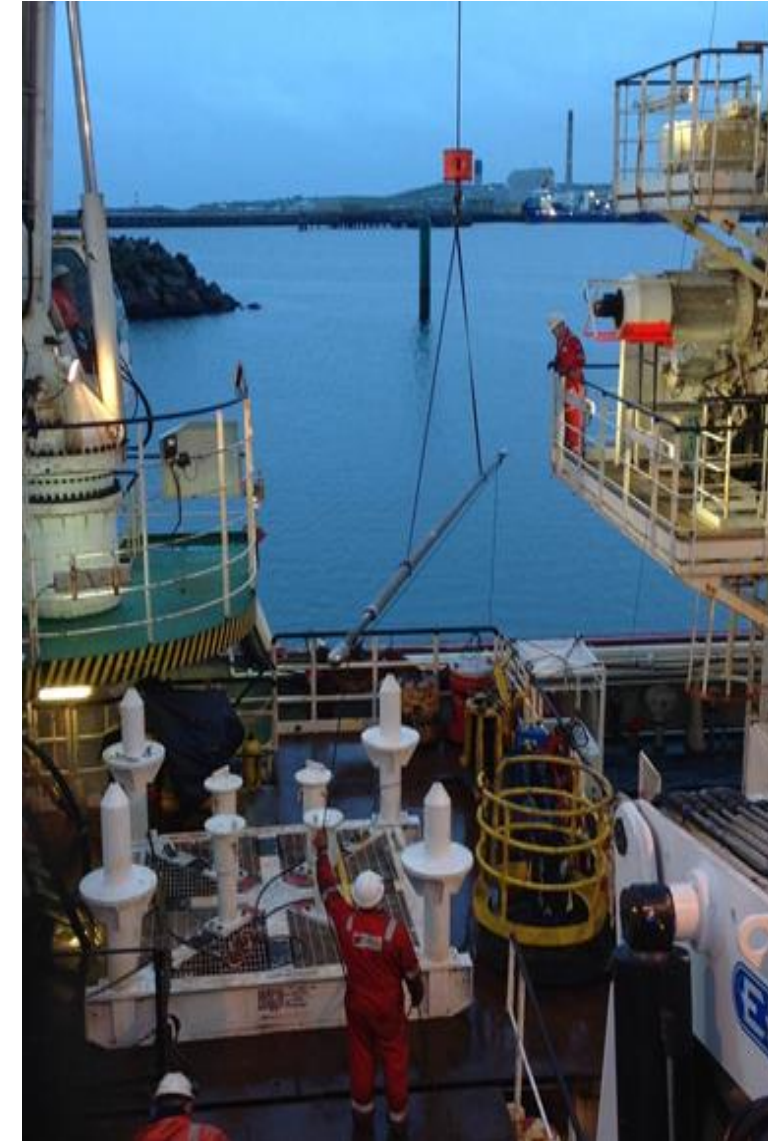
Ceramic Sand Screens

Context / Business Challenge

- Opportunity was identified to produce the gas cap (through blown down) in the Gannet C reservoir, which contains two crestal well penetrations.
- Typically to access the reservoir crest in these wells, a rig workover and recompletion with sand control would be required to produce the gas cap volumes.

Technology deployed / Benefits

- Ceramic sand screens have higher tolerance to erosion and jet velocities, which enables the screens to be placed directly over perforations.
- Through tubing deployment and placing screens across the perforations allows the requirement for a workover to be avoided
- Add perforations and screen installation performed using the LWIV saving significant intervention costs



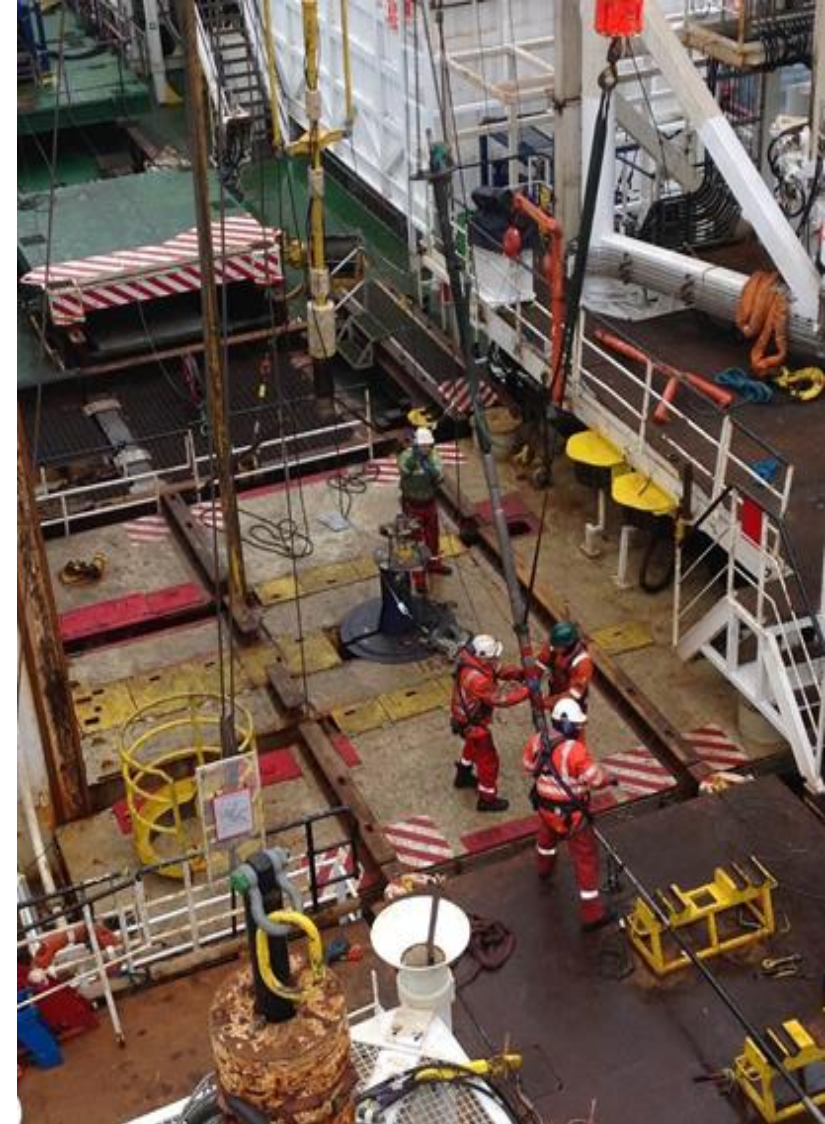
Ceramic Sand Screens

Summary

- Replicated in second Gannet well
- Enabling production of the Gannet C gas cap
- No sand production at surface observed
- Good well productivity with no drop in P.I. / skin build up observed

Learnings / Future use

- Intervention design varies between wells and design considerations are required for equipment selection and deployment
- Sump packer not included to avoid failed sand pack off around screen and in perforations (causing high skins)
- Replicated in second Gannet well
- Ceramic screens for HPHT have been developed and awaiting suitable candidate well
- Ceramic screens are a option for well design / remediation/ optimisation across Shell UK



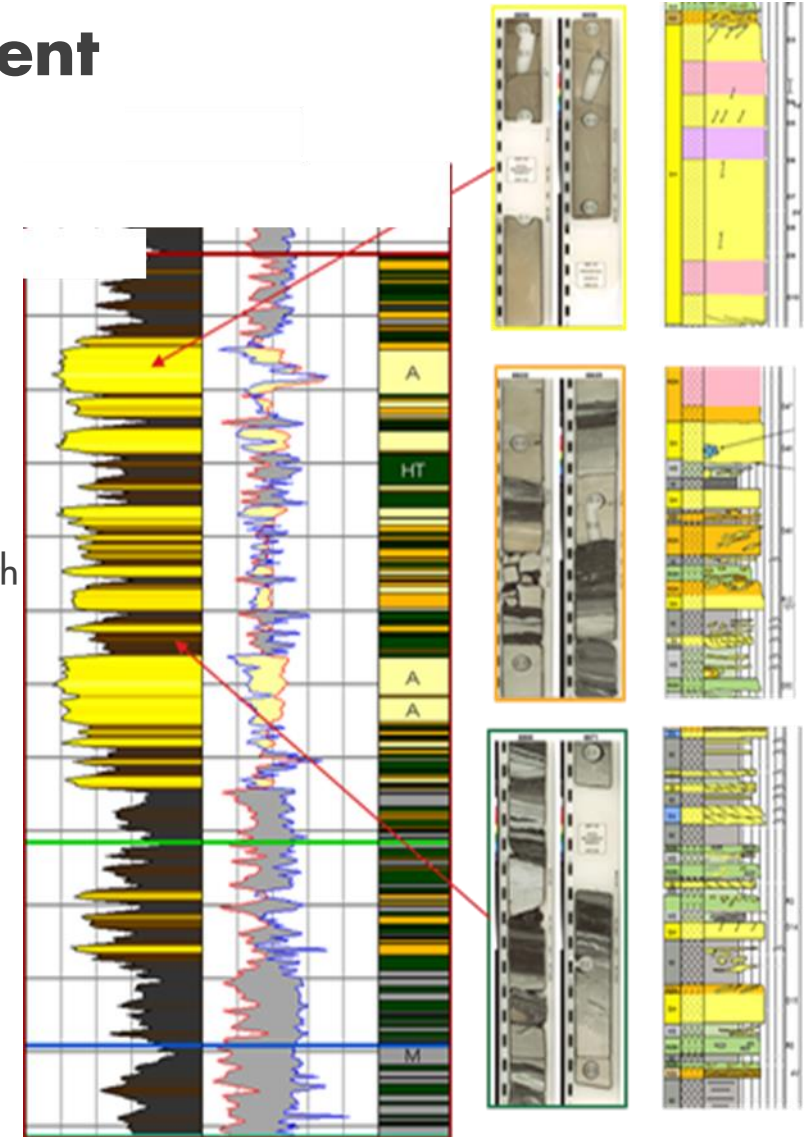
Non-aqueous gravel packing method development

Context / Business Challenge

- A Shell UK planned development is a low net to gross reservoir with highly reactive interbed shales
- Very high mud weights are required to control shales during drilling and on production these are expected to initially fail and cause major risks to a typical stand alone screen completion

Technology planned / Benefits

- The NAFpack method uses an oil based reservoir DIF prior to performing a viscosified fluid pack with the use of alternative path wire wrap sand screens
- Sand screen are run in conditioned DIF
- Shales are be controlled during drilling of reservoir section
- Installed transport tubes on screens allows gravel packing of any areas bridged off by shale or hole collapse following mud displacement
- Enables completion in highly challenging reservoir with low skins (analogue data)
- Allows for higher POS of completion installation and mitigates against risk of sand screen failure (shales controlled and screen protected due to gravel installation)



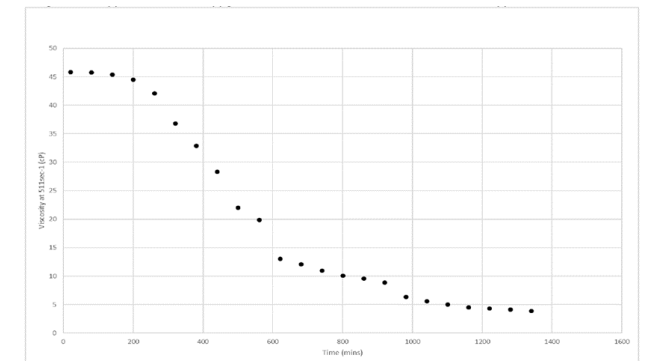
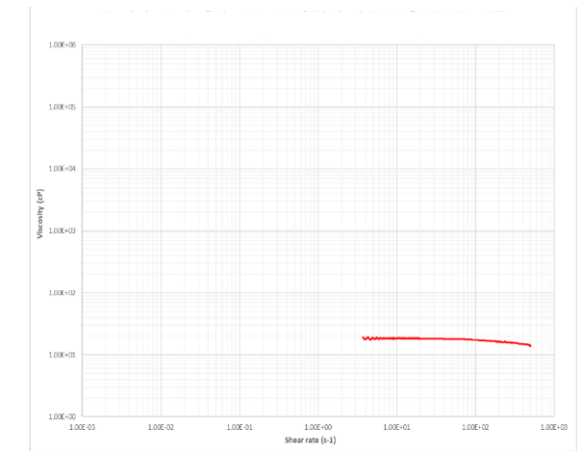
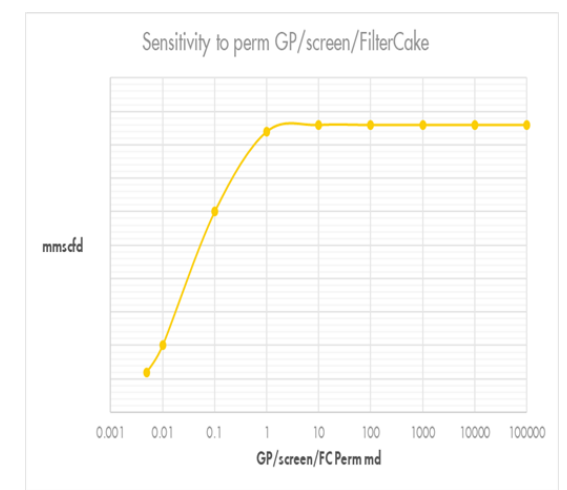
Non-aqueous gravel packing method development

Summary

- Method allows for completion and production of volumes from the challenging gas reservoir
- Requires detailed design of reservoir DIF and gravel pack fluids
- Operational procedures are key for success
- Interaction of DIF / gravel pack fluid / screen and proppant is key to achieving good clean up and low skin well

Learnings / Future use

- Complex fluid design is required with significant laboratory testing
- Gravel pack fluid can be design to control interbedded shales
- Particle size engineering required in all steps to avoid or minimise any plugging tendency of screens during installation and clean up operations
- First completion of this type in Shell globally and no analogues in the industry (currently known to us) of use in gas wells and weights of 11.4 ppg +



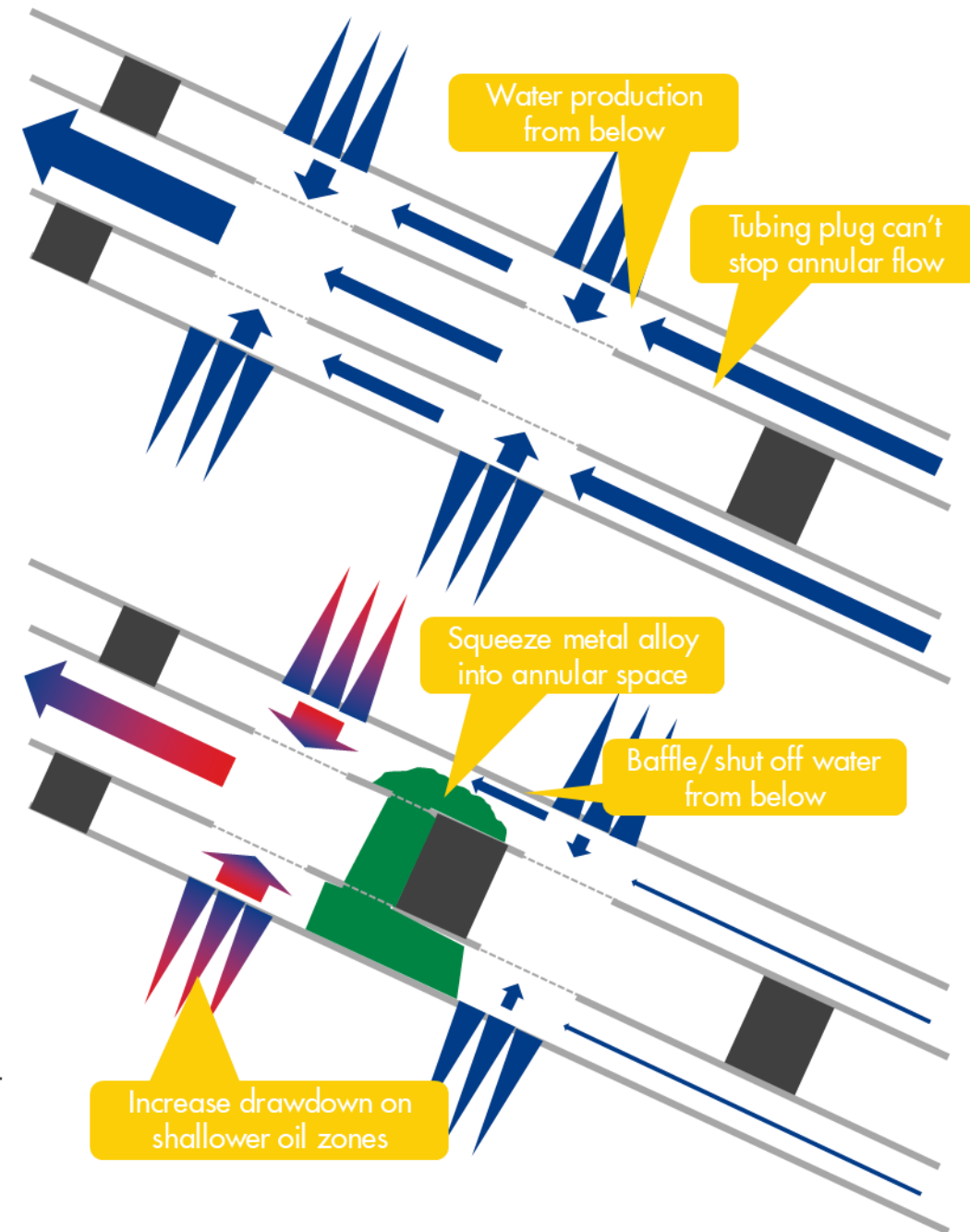
Annular Water-Shut Off technologies

Context / Business Challenge

- Well that producing with significant W/C and opportunities to perform an intervention for WSO
- Water shut-off interventions typically consist of tubing or liner plugs set against an annular isolation (packer or shales)
- The well was believed to be produced from the annulus from lower perforations not isolation from the oil producing zone

Technology deployed / Benefits

- The metal alloy WSO plug is designed to be deployed across a tubing plug and isolate the annulus from lower zones
- A metal alloy is squeezed into the annular space of a well in order to stop water production from below
- Enables shallower oil zones to be produced at higher rates without being backed out from deeper water producing zones



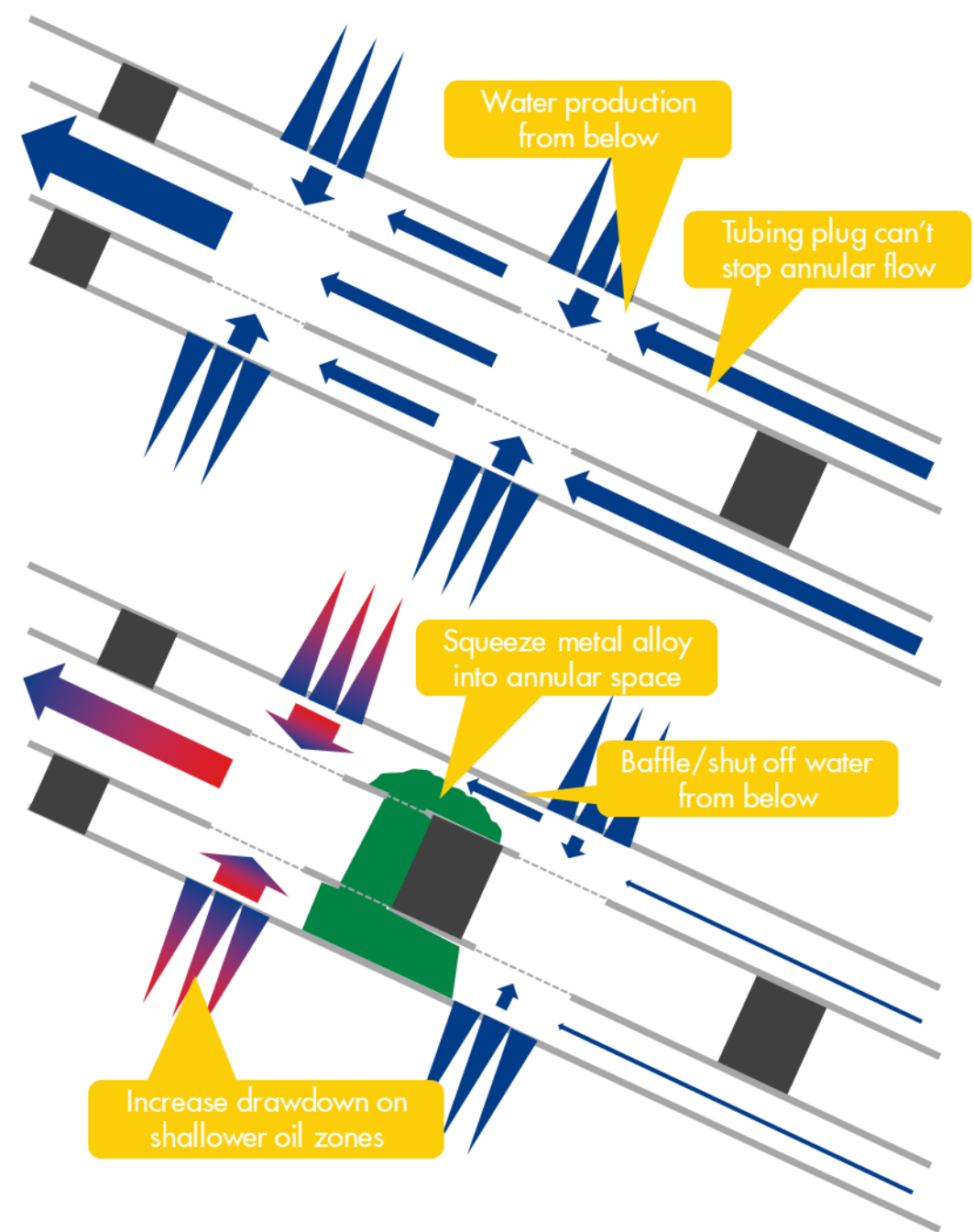
Annular Water-Shut Off

Summary

- Successful intervention and tool deployment
- Annular shut off without requirement for coil tubing intervention
- Good well productivity with no drop in P.I. / skin build up observed

Learnings / Future use

- Improved downhole results may be obtained on wells without significant crossflow and at lower angle
- Unlocks feasibility for two further wells





Q&A

