An Integrated Approach To Effective Well Decommissioning From Wells and Subsurface

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Integrated Approach

Collaboration between Subsurface and Wells

In 2022, we launched a **new wells P&A operating model** and that was to enable to our ability to manage the upcoming wave of decommissioning activity.

We intend to address this opportunity via campaign strategy for platform P&A, sub-sea P&A and facilities removals scope (versus standalone project delivery) that will **utilise the resources optimally** and in the most cost-efficient manner.

We are committed to ensuring that our wells and production facilities are decommissioned safely, **responsibly and efficiently** at the end of their economic life.

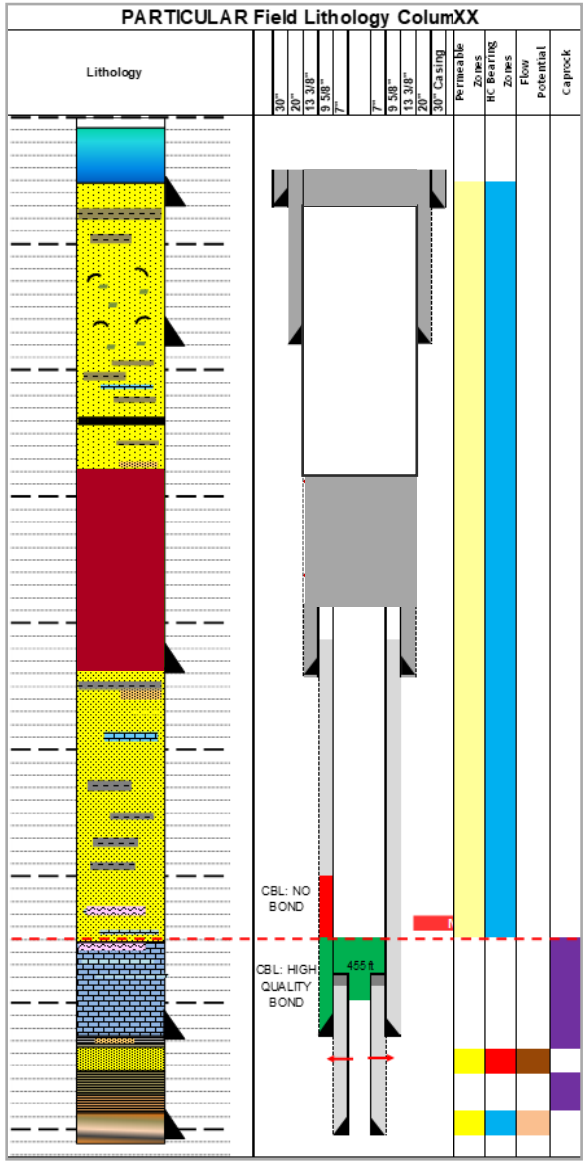
Understanding Barriers

Both technical and organisational

Individual

Project

Organisational



Environmental

Intermediate

Primary / Reservoir

Challenges across the basin

Common challenges highlighted by the Industry

Decommisioning Projects

- Decommissioning seen as not value-adding
- Focus shifting back onto revenue-generating projects in higher oil price environment
- Preparing for the decommissioning “wave”
- Focusing attention on projects to realise efficiency (taking a portfolio approach)
- While being opportunistic

Organisational

- Understanding resource requirements
- Allocation of talent
- Decommissioning as a career
- Maintaining expertise throughout project
- Keeping corporate knowledge
- Communication

Ensuring functional excellence and collaboration in Well P&A

We have launched a new P&A operating model to enable to our ability to manage the upcoming wave of decommissioning activity.

- integrated, dedicated teams considering wells, subsurface and decom
- maintaining functional excellence and technical oversight

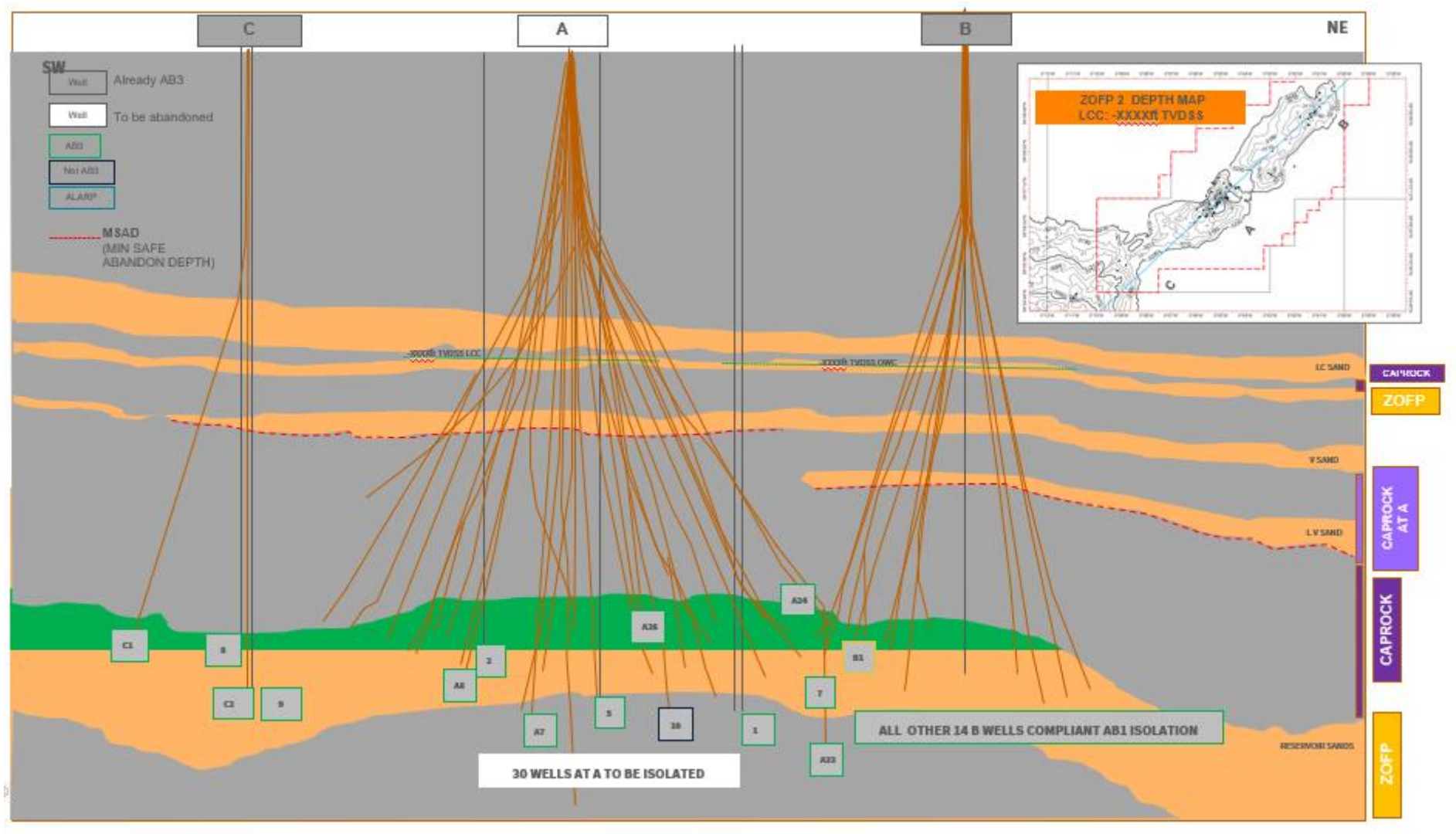
We will liquidate the “decom opportunity” via campaigns of Wells P&A (platform/sub-sea), engineering down and clean (EDC), and facilities removals scope (versus standalone project delivery).

- recognise the required timelines
- have the appropriate number of people, from the right departments, in place throughout

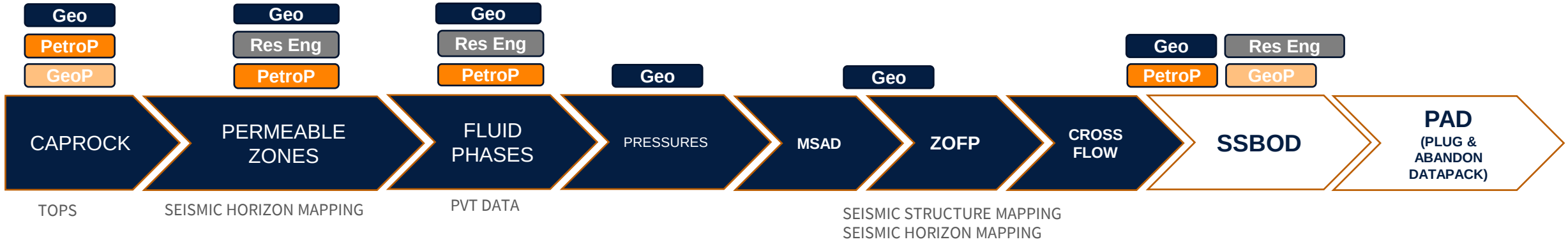
We are committed to ensuring that our wells and production facilities are decommissioned safely, responsibly and efficiently at the end of their economic life.

Identifying the Subsurface and Wells challenges

Required the development of an integrated workflow



Collaboration and development of an Integrated workflow



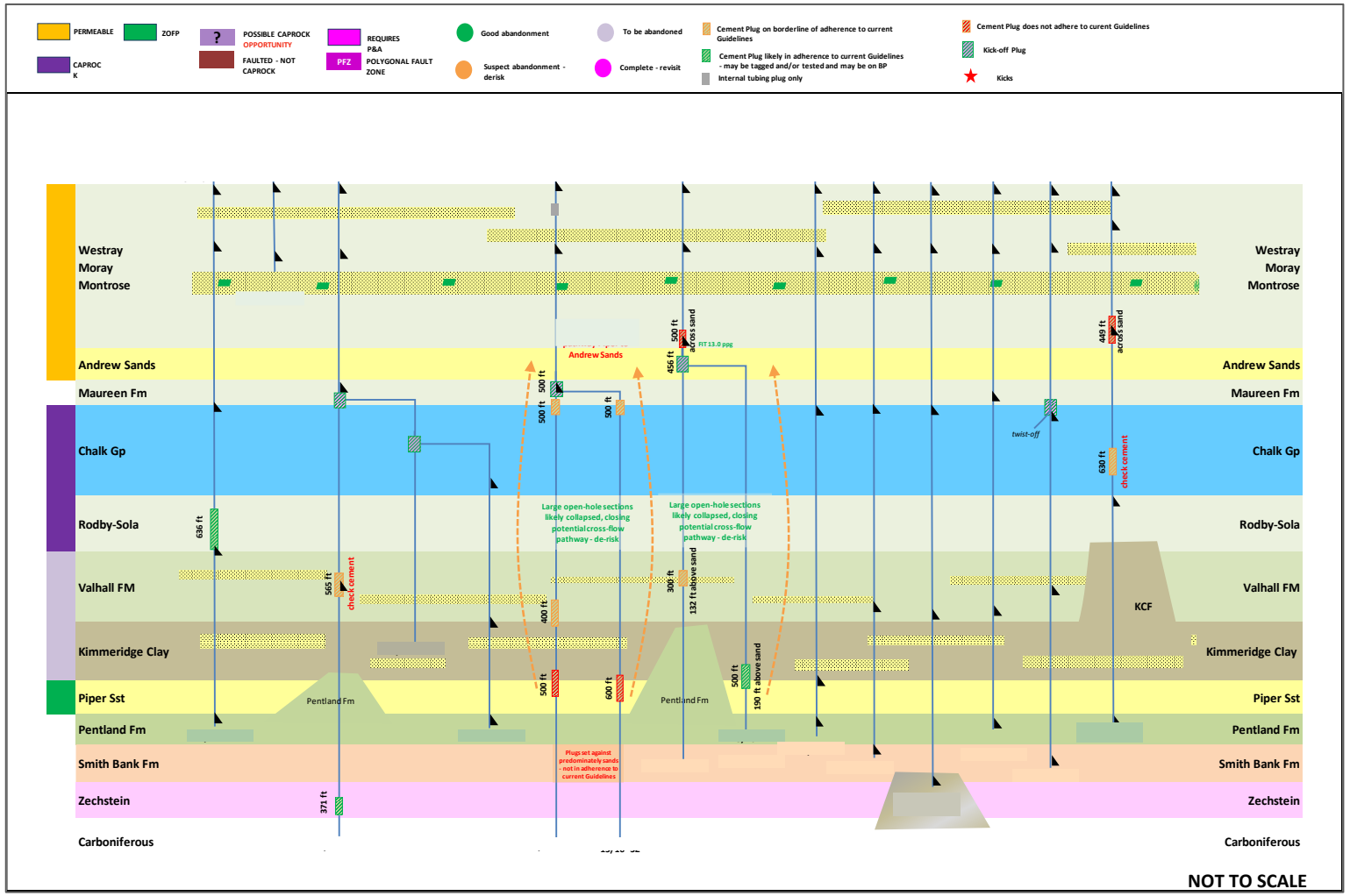
Resulting in improved operating practices

Improved Plug and Abandonment Data Packs

Working collaboratively and cross functionally, an integrated approach is taken to complete the Subsurface Basis of Design and Well Abandonment Basis of Design.

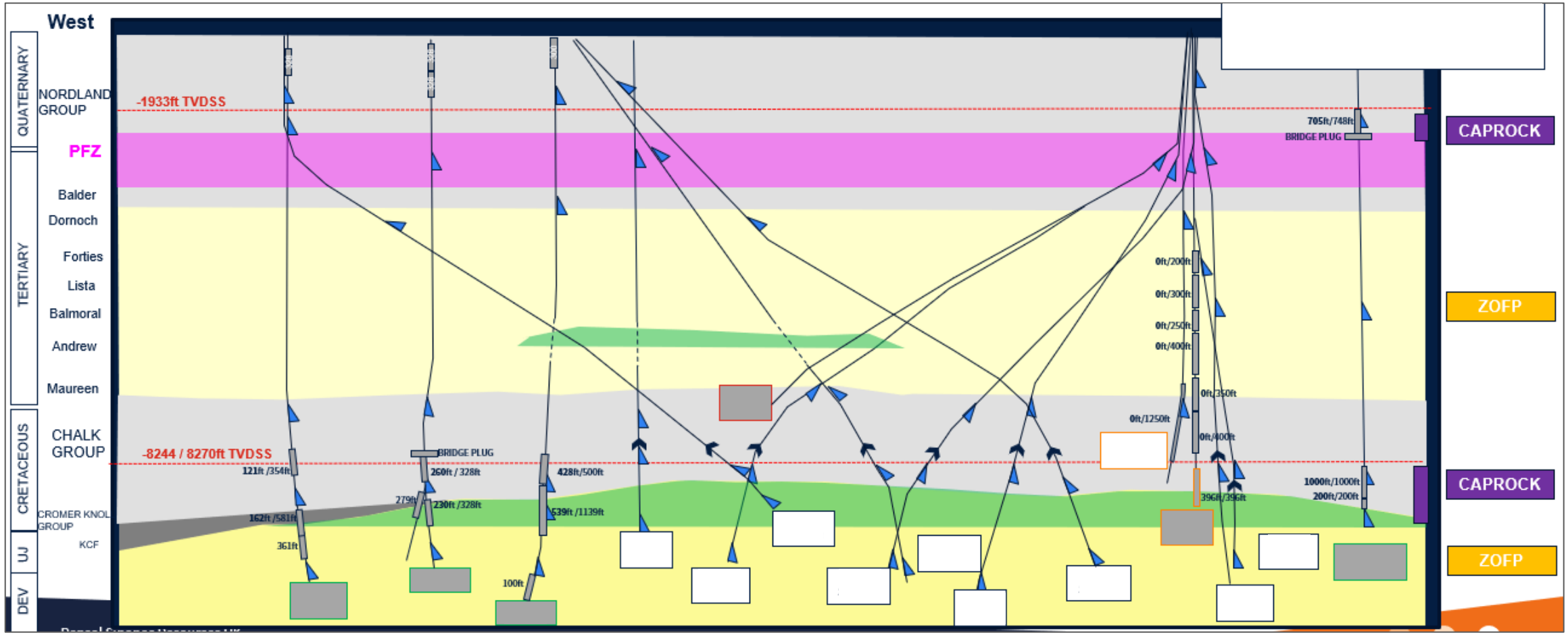
This includes:

- Data mining subsurface and wells
- Integrated assessment (reservoir recharge, minimum safe abandonment depth (MSAD), barrier requirements, shales, well architecture and integrity)
- Plumbing diagrams
- Informing the final well abandonment design



With the integration of all data sources

Subsurface and wells



Traffic Light System for Barrier Assessment

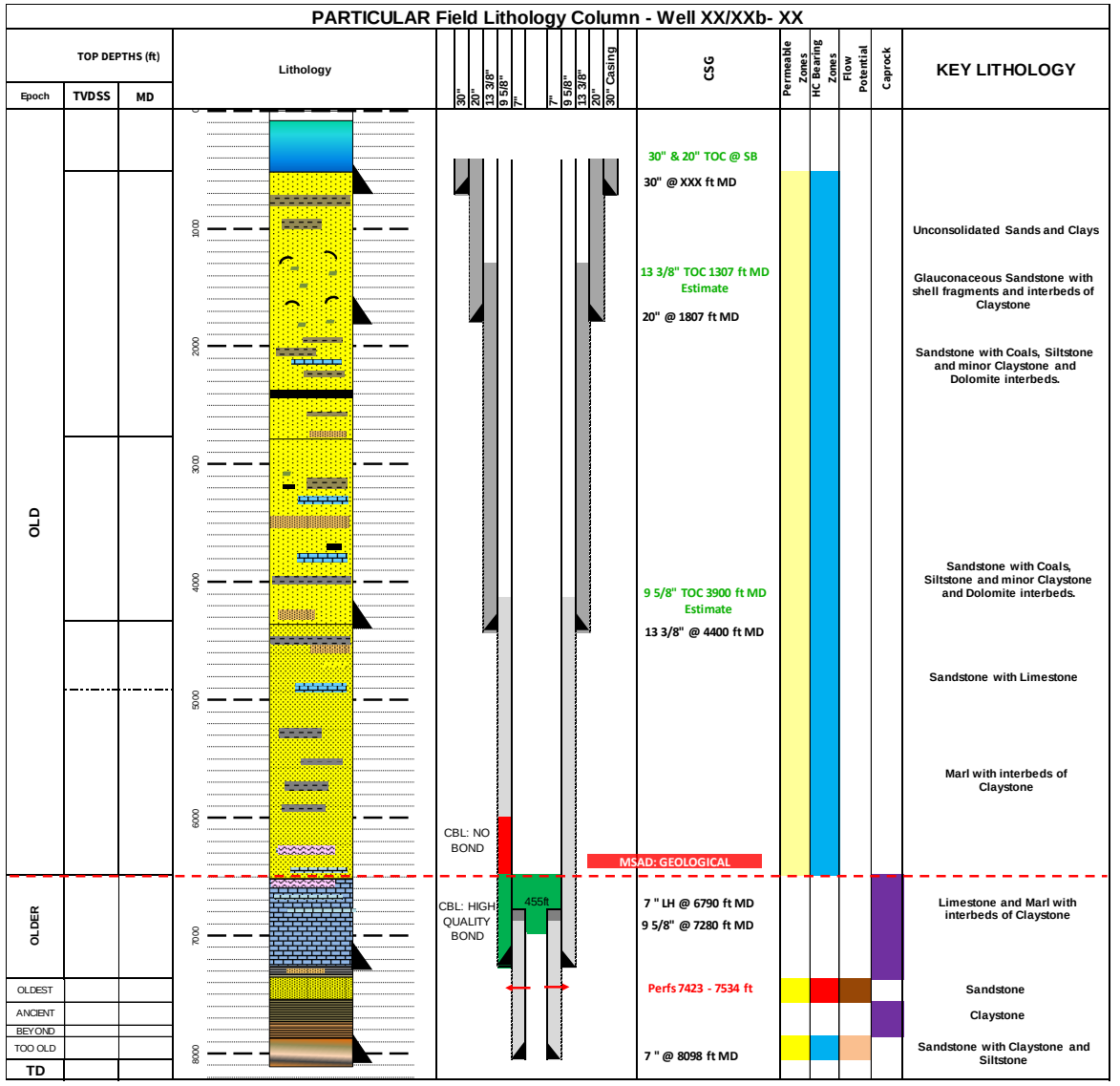
Collaboration and functional excellence

RED: No plug / barrier of any kind in place

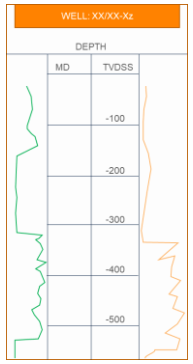
AMBER: A barrier in place but, not tagged/tested or problem with cement job described or not of sufficient thickness against Caprock and below MSAD - triggers an investigation and or Risk Assessment by P&A Engineering

YELLOW: Barrier in place, is of sufficient thickness against Caprock and below MSAD - triggers an investigation and or Risk Assessment by P&A Engineering

GREEN: Annular Cements, Section Milling and Mechanical plug placement have all been checked by P&A Engineering and signed off as Repsol Well Abandonment Standard / OEUK Guideline compliant



Considering the acceptance of a Shale Barrier



PETROPHYSICAL INTERP IN WELL

Y

CAPROCK (non-net) >200ft (or 2x 100ft) thick sections or cumulative 100ft thick?

N

NO SHALE BARRIER

Y

Cement Evaluation Log
SEALING SHALE INDICATED?

Y

ISOLATION TEST in other wells on field?

Y

Accept by correlation?

N

ISOLATION TEST

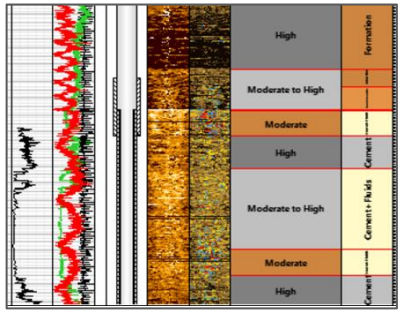
N

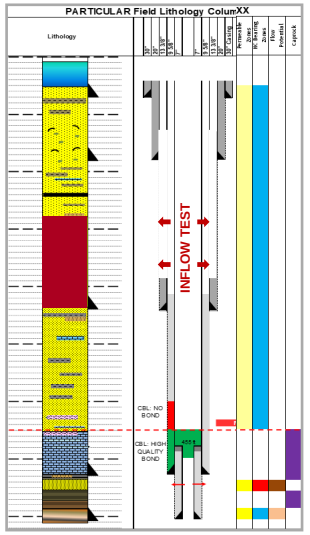
NO SHALE BARRIER

N

CORRELATE IN FROM NEARBY WELL

Y





SUBSURFACE

WELLS

Completing the integrated evaluation

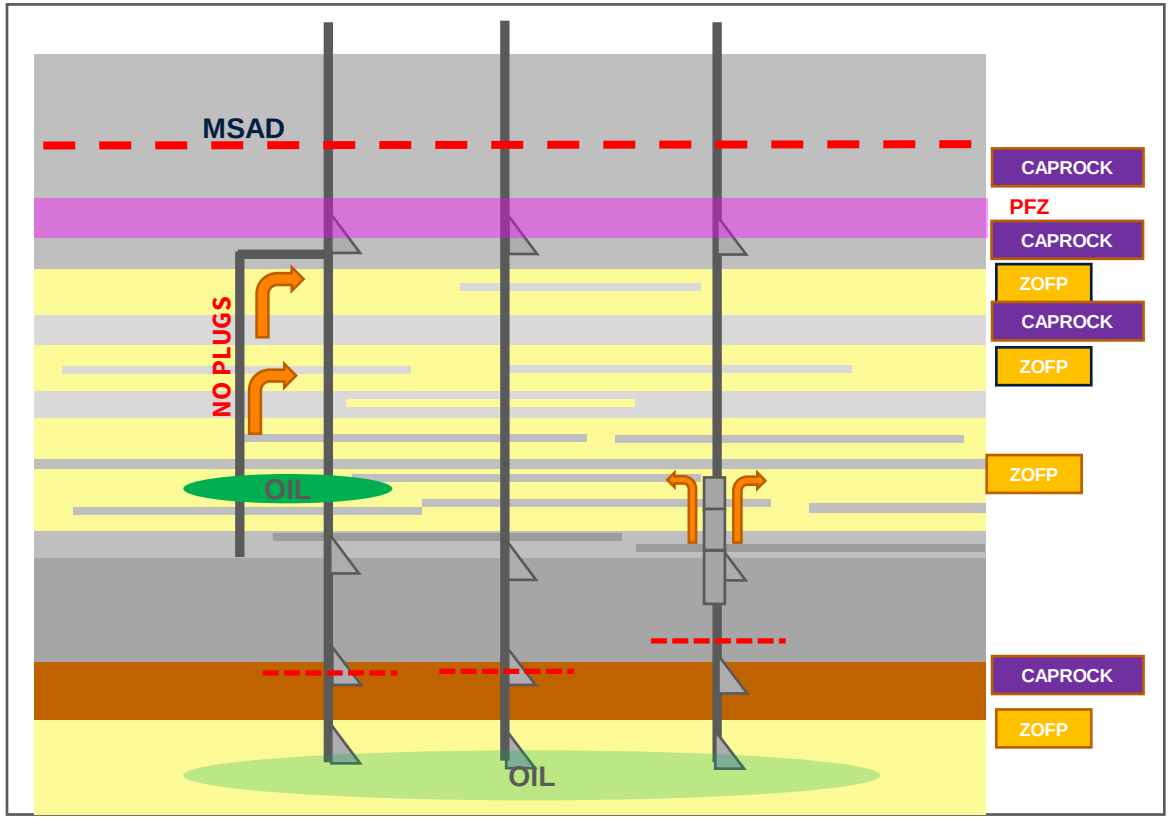
5

CROSS FLOW

Subsurface Basis of Design Process

- Identify possible routes for Cross Flow
- Platinum Standard: **PLUMBING DIAGRAM**
- Collate all Wells (and Sidetracks) Well Architecture
  - Including casings depths, TTOC, cementing reports, sidetrack kick off depths
  - Isolation and abandonment schematics

PLUMBING DIAGRAM



Connected volume estimation for all current and future ZOFP

Ration of Volume of Cross Flow Connected Zones XX:XXX

***Modelling rate of Cross Flow**

*May not be required based on ratio of connected volumes

Consequences / Implications

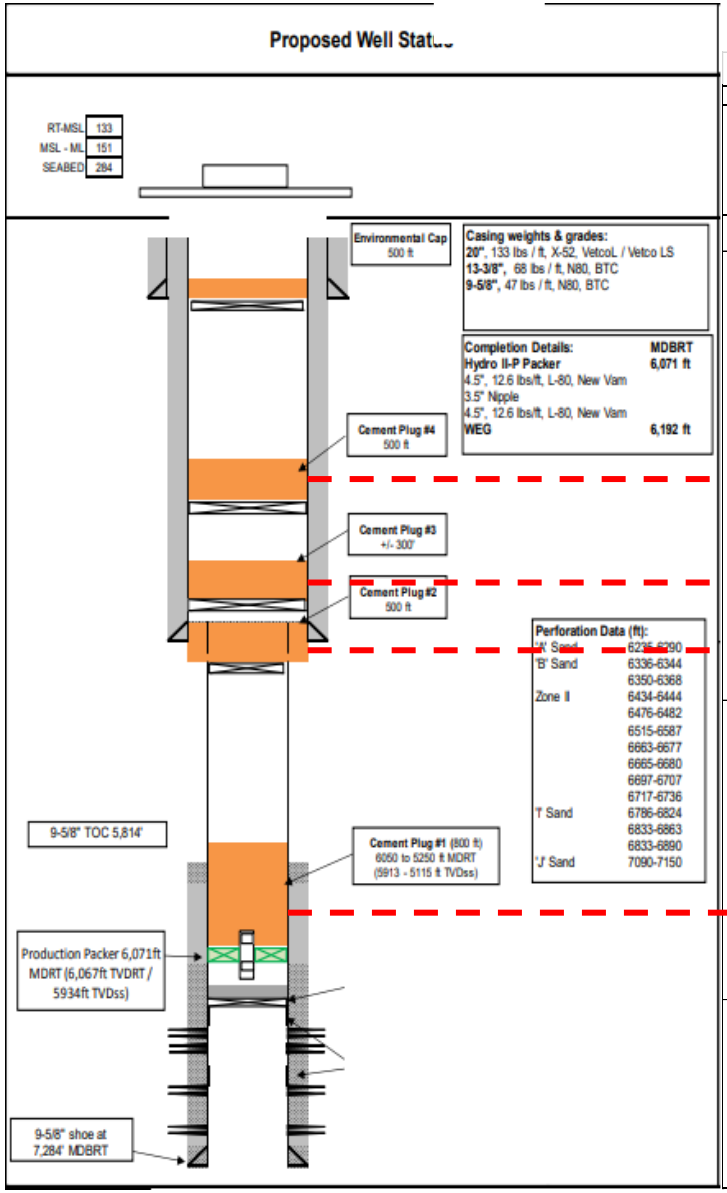
Risk Assessment / * ALARP Considerations

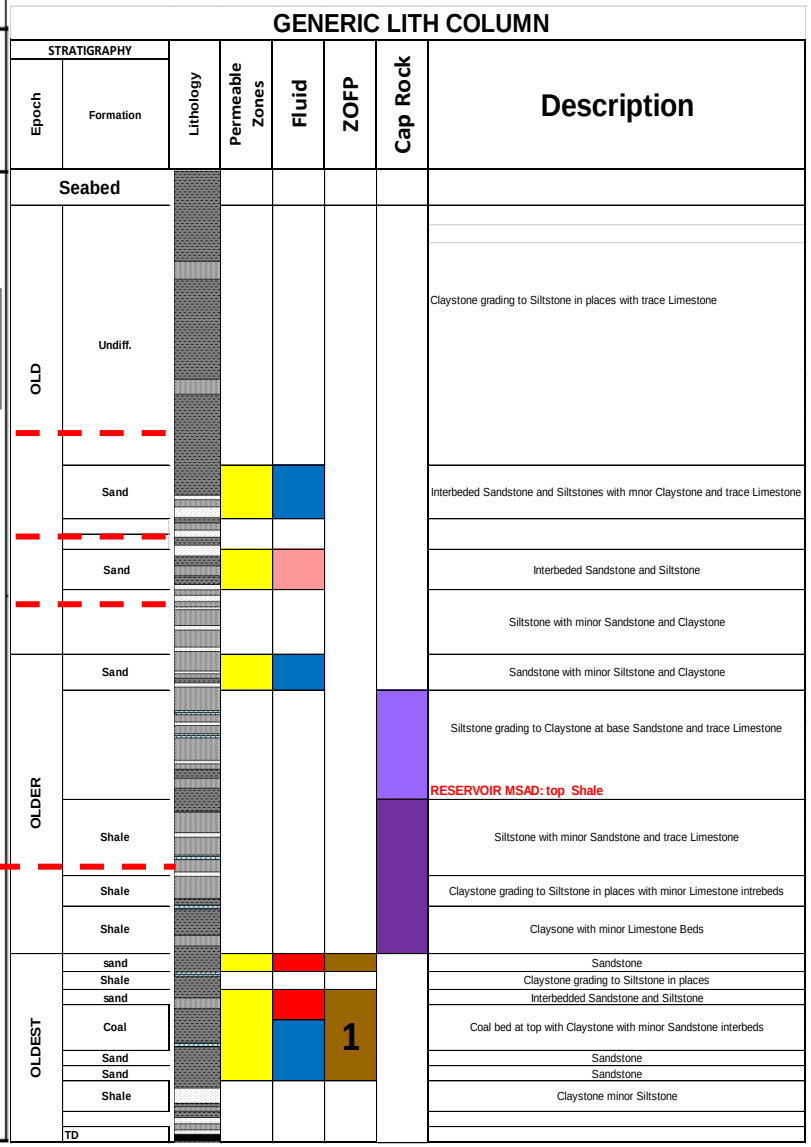
*for Engineering Design phase

Results in Value Creation

Subsurface BoD (2017) evaluation results in corresponding Abandonment BoD which recommends the following plug structure (isolation of four ZOFP).

Revised **strategy based on collaboration and an integrated process** removes requirement for 3 out of 4 plugs while still retaining compliance.





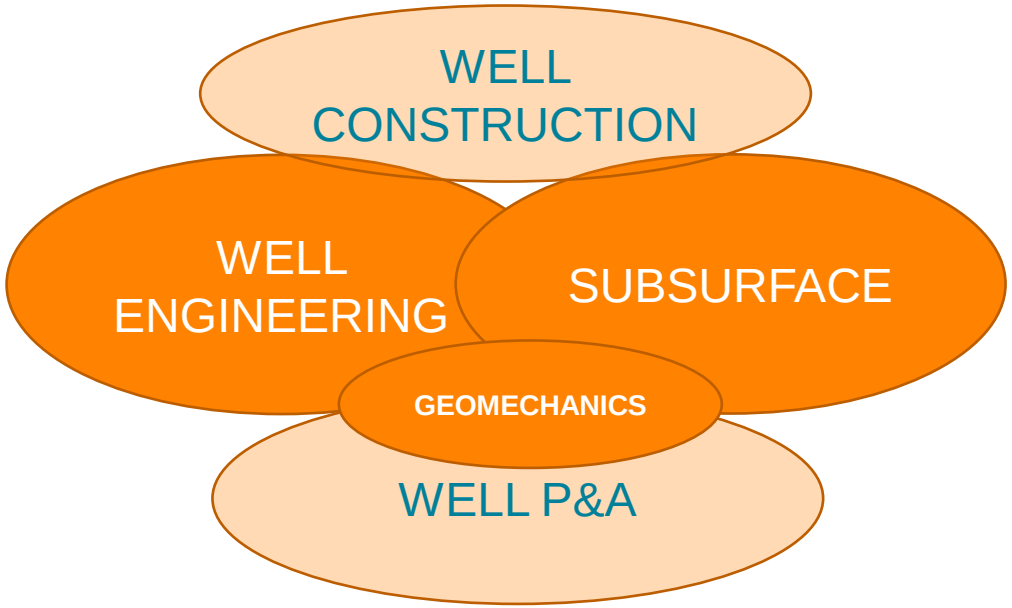
Working in a collaborative way to employ functional excellence in the optimisation of Well P&A

Collect all Offset Data

Pore Pressure Prediction Curves

Overburden Drilling Hazards

Swelling Shales



Data Mining

Minimum Safe Abandonment Depth calcs

ZOFP identification

Shale Barriers

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