



# Decommissioning and Restoration – Fostering Excellence through Regulations, Innovation, and Sustainable Practices

---

30–31 JULY 2024 | BANDAR SERI BEGAWAN, BRUNEI



# Designing 4 Decommissioning: Front loading your decommissioning risk management approach

Jamie Stewart






# Designing 4 Decommissioning



- **Agenda: Fostering Excellence Through Learning**
  - P&A – An Economic Challenge
  - Having a Well Decommissioning Engineering Delivery Plan
  - Designing for Decommissioning – Guidelines and Regulations
  - Identifying Risk – Upfront of the Well P&A
  - Well Decommissioning Assurance – Isolations and Phased Approach
  - Well decom design features of a new well at construction phase
  - How data is collected and used for our Well P&A design.

# Designing 4 Decommissioning



**Status:-**  
Abandoned 1920's.

**Procedure:-**

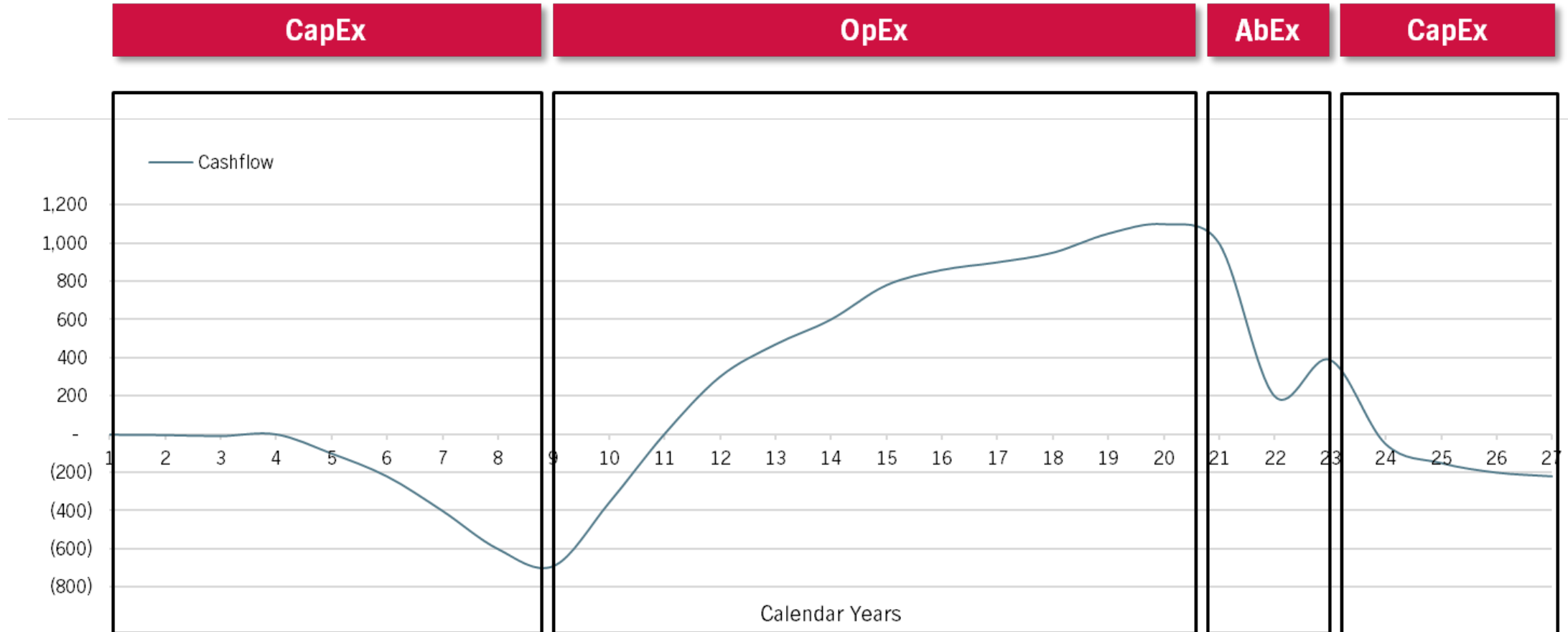
1. Mix and drop 20 sacks construction cement on top of fish at 2102'.
2. Drop iron cylinder od Diameter 11" to 11 1/2 "; Length +/- 2' to lodge above 10- 3/4 " casing stump at 791'.
3. Drop 5 cu.ft. earth on top of this bridge.
4. Mix and drop 20 sacks construction cement on top of clay plug at +/- 791'.
5. Place temporary plug at +/- 15'.
6. Mix and place 10 sacks cement surface plug.
7. Cut off 13" casing slightly below ground level.
8. Weld on cover plate to 26".



# Designing 4 Decommissioning



An Economic Challenge  
Sustainably Decommissioning to Re-purpose | OPEX to ABEX to CapEx



An Economic Challenge  
Sustainably Decommissioning to Re-purpose | OPEX to ABEX to CapEx

## ABEX

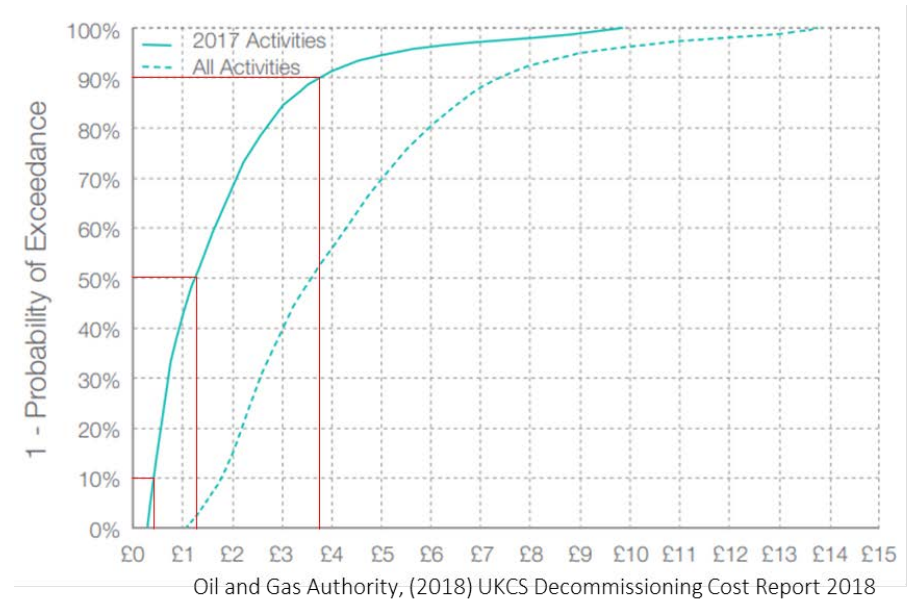
Abandonment & Decommissioning Expenditure

### Risk Associated to ABEX

- Eternal perspective on well isolation risk and exposure from leakage
- Cost assurance and control

### What Options are available to the Operator?

1. Sell the Assets and liability
2. Sell the Assets and retain an element of ARO
3. Execute the Asset Retirement
  1. Internally
  2. Externally



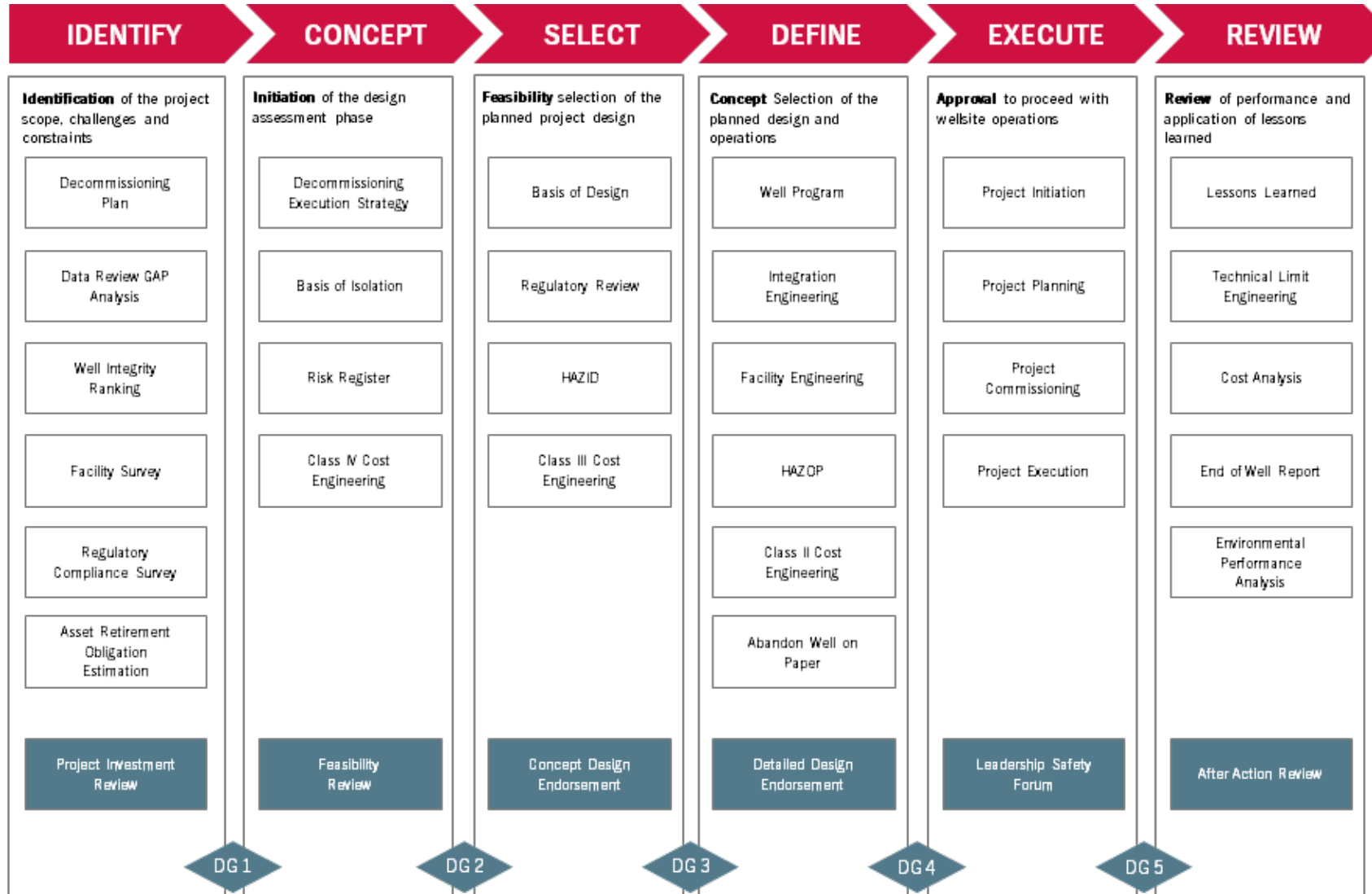
### ABEX Risk and Uncertainty

- High impact events have an increased probability in abandonment phase
- Uncertainty demonstrated through front loaded risk profile
  - P10@ £0.8M, P50@ £1.25M and P90@£3.85M



# Designing 4 Decommissioning

Your Roadmap from OPEX to ABEX – WDEDP  
Well Decommissioning Engineering Delivery Plan



**An Auditable Roadmap to Safely Decommission Wells**

Developed from 30+ years safely decommissioning wells, across 5 continents.

Clear accountability and assurance under grant of authority process.

Decision gate control points, ensuring all regulatory and stakeholder needs are met.

Fully bridgeable to your existing drilling or well intervention management processes.

## Well Decommissioning Assurance

### Legislation, Standards and Guidelines

30 CFR Part 250 Subpart Q (New to Database of 2/19/2022)  
Decommissioning Activities

Title 30 - Mineral Resources  
Chapter II - Bureau of Safety and Environmental Enforcement, Department of the Interior  
Subchapter B - Offshore  
Part 250 - Oil and Gas and Sulphur Operations in the Outer Continental Shelf

Subpart Q Decommissioning

**NORSOK Standard**  
NORSOK D-010:2021+AC2

**OEUK**  
Well Decommissioning  
Guidelines  
Issue 7  
Nov 2022

Minimum Cement Barrier Lengths for Selected Countries

Country	Number of Barriers	Barrier Length (m)	Reference
UK	2	30	OEUK Well Decommissioning Guidelines
Norway	2	50	NORSOK D-010
Netherlands (Onshore)	1	100	Dutch Mining Act
USA (Offshore)	2	30	30 CFR 250
Canada	1	30	Drilling & Production Guidelines
UAE (Abu Dhabi)	1	50	ADNOC
Australia	1	Not specified	NOPSEMA
Malaysia	2	30	Petronas
Brazil	2	30	IBP



## Risk Identification – Knowing Up Front

Data Collection – Cased Hole Logging

### Data Collection Gains - During Workover Operations

#### Casing Integrity

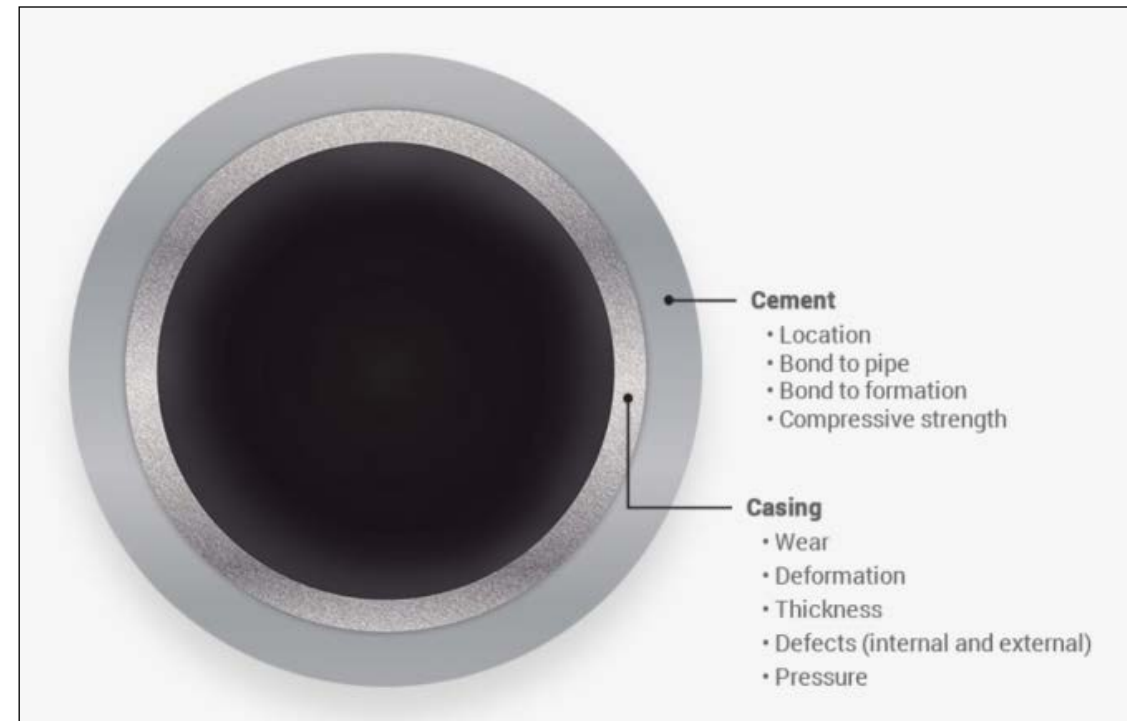
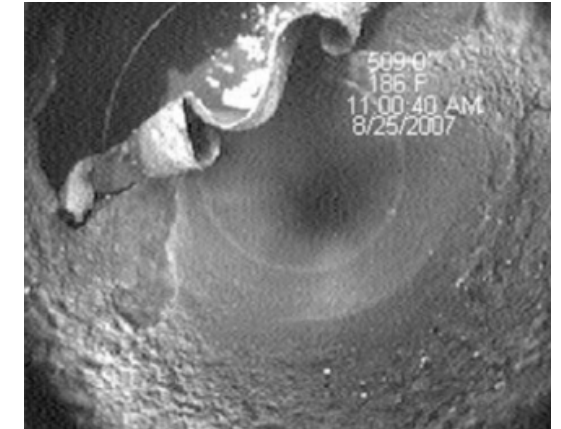
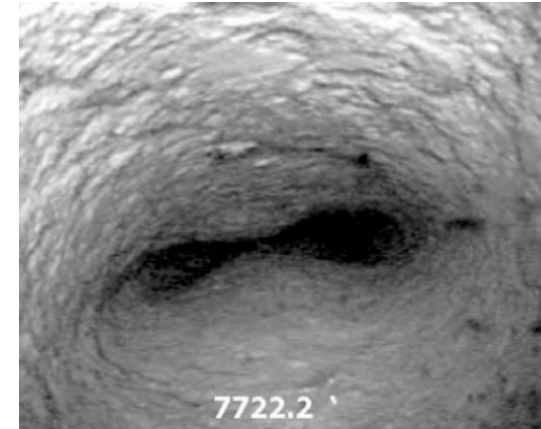
- Ovality
- Parted Connections
- Burst/Collapsed Tubing

#### Fluids

- Pore and Fracture Pressure Prediction
- Annular Mud Settlement
- Annulus Crossflow

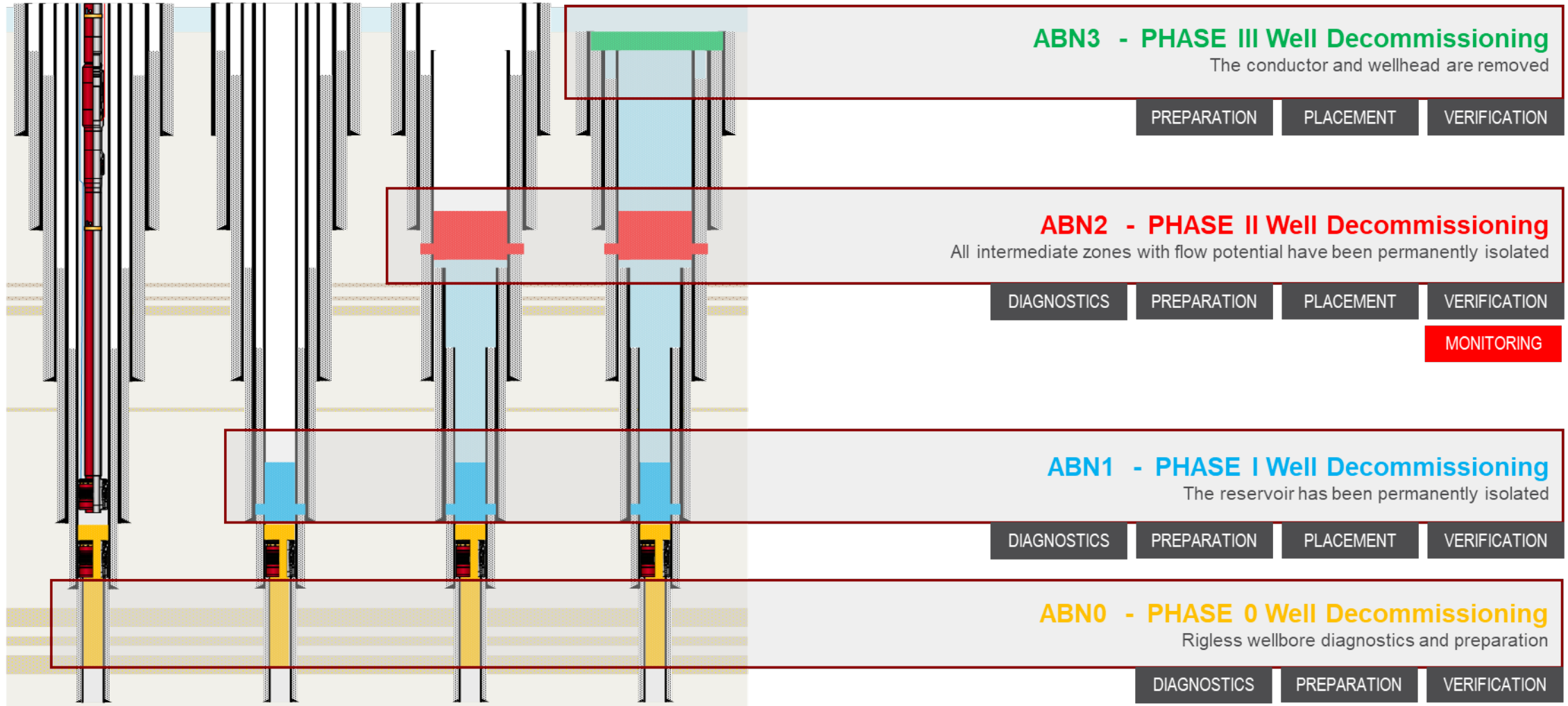
#### Cement Integrity

- Bond to casing and formation
- Micro channelling and annuli



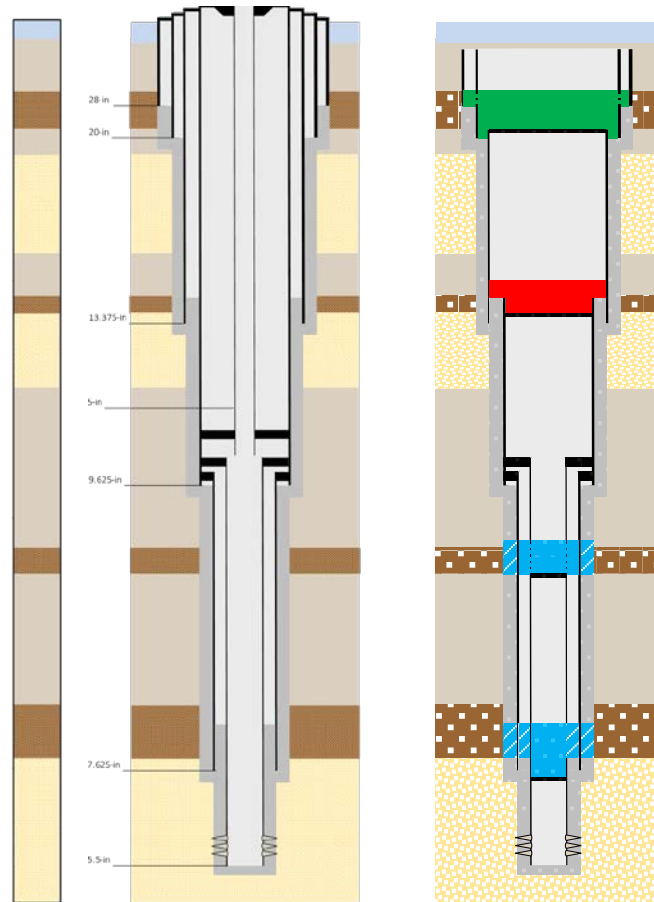
## Well Decommissioning Assurance

### Isolation and Phasing



# Designing 4 Decommissioning

## Designing Wells for Efficient Decommissioning To Enable Sustainable Repurposing



### Target Isolation Formation Access

- Enable Access to Target Shales
- Eliminate Tubular overlap
- Perform XLOT of contingency formations
- Minimize well accessories across target formations

### Annular Cement Placement

- Minimize cement placement across target formations
- Minimize well accessories across target formations

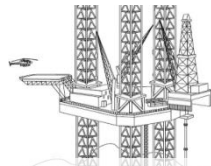
### Well Barrier Evaluation at Construction

- Perform “First Log” on each annular isolation interval
- Inflow test Liner top packers

### Completion Design

- Ensure Packer is set adjacent to annular isolation
- Design setting depth to allow Packer to be pushed downhole

# Designing 4 Decommissioning Data Acquisition



## Well Construction Drilling Phase

### Create:

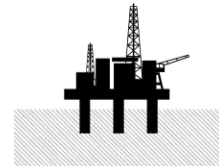
#### Exploration Data

Seismic, Coring, Logging  
Reservoir Testing

#### Production Data

Sampling, Logging

» Well Construction Data



## Mid Life Operations Workover

### Use:

#### Well Construction Data

### Plan Operations:

#### Intervention

#### Stimulation

#### Workover

#### Re-perforation

» Well Construction Data

» Mid Life Data



## Cessation of Production Reservoir Abandonment

### Use:

#### Well Construction Data

#### Mid Life Data

### Plan Operation:

#### Reservoir Abandonment

#### Infill Sidetrack Drilling

#### New Target Sidetrack Drilling

» Well Construction Data

» Mid Life Data

» COP Data





# Designing 4 Decommissioning



- **In Summary:**

- Well Decommissioning Engineering Delivery – Impacts Success or Failure
- Data Outputs from Cased Hole Logging can significantly de-risk abandonment unknowns.
- Well decom design features of a new well at construction phase – Cost & Time savings
- Data acquisition is key – Front Loaded – Can significantly de-risk uncertainty.



# Designing 4 Decommissioning: Front loading your decommissioning risk management approach

## Questions