Digitalisation: Its role in wells management

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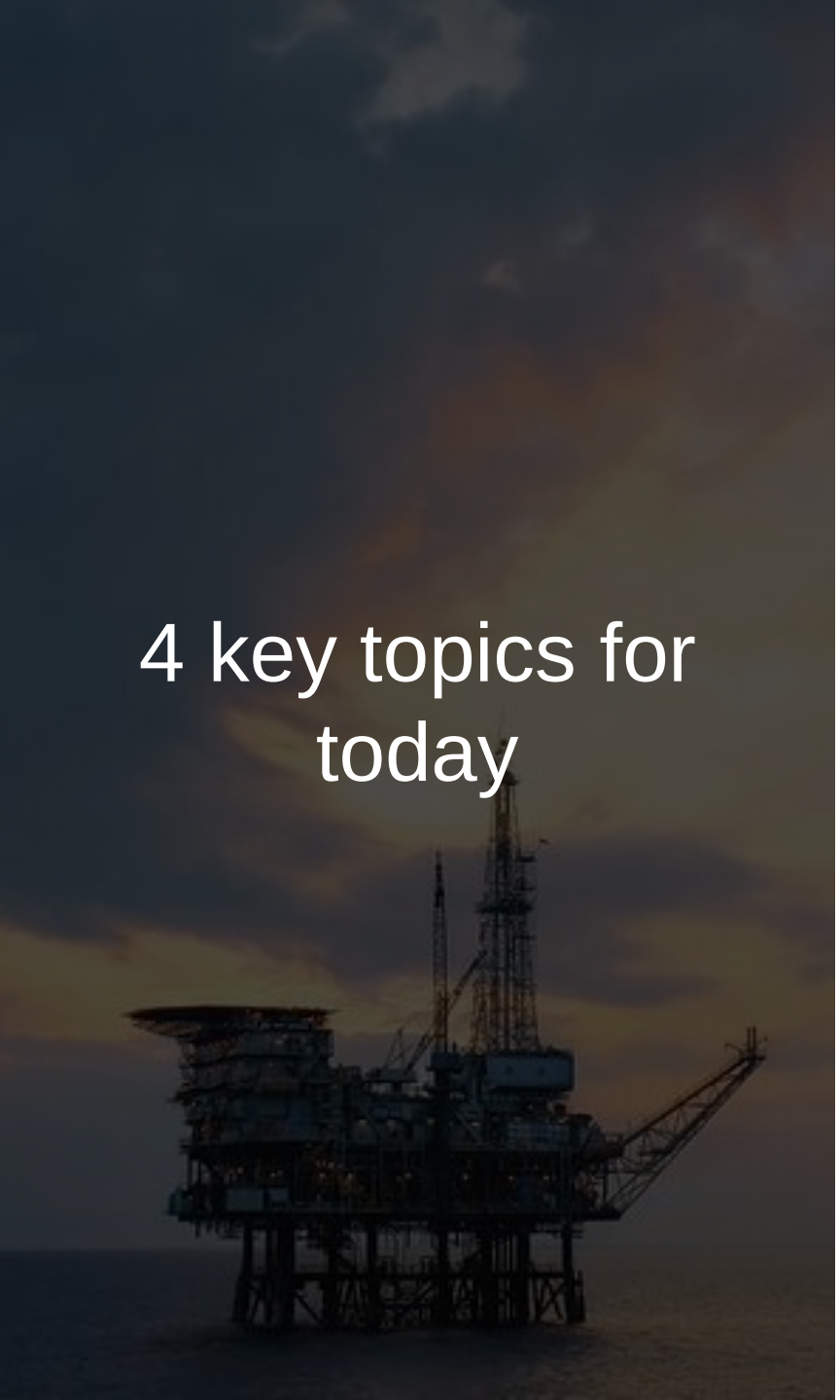
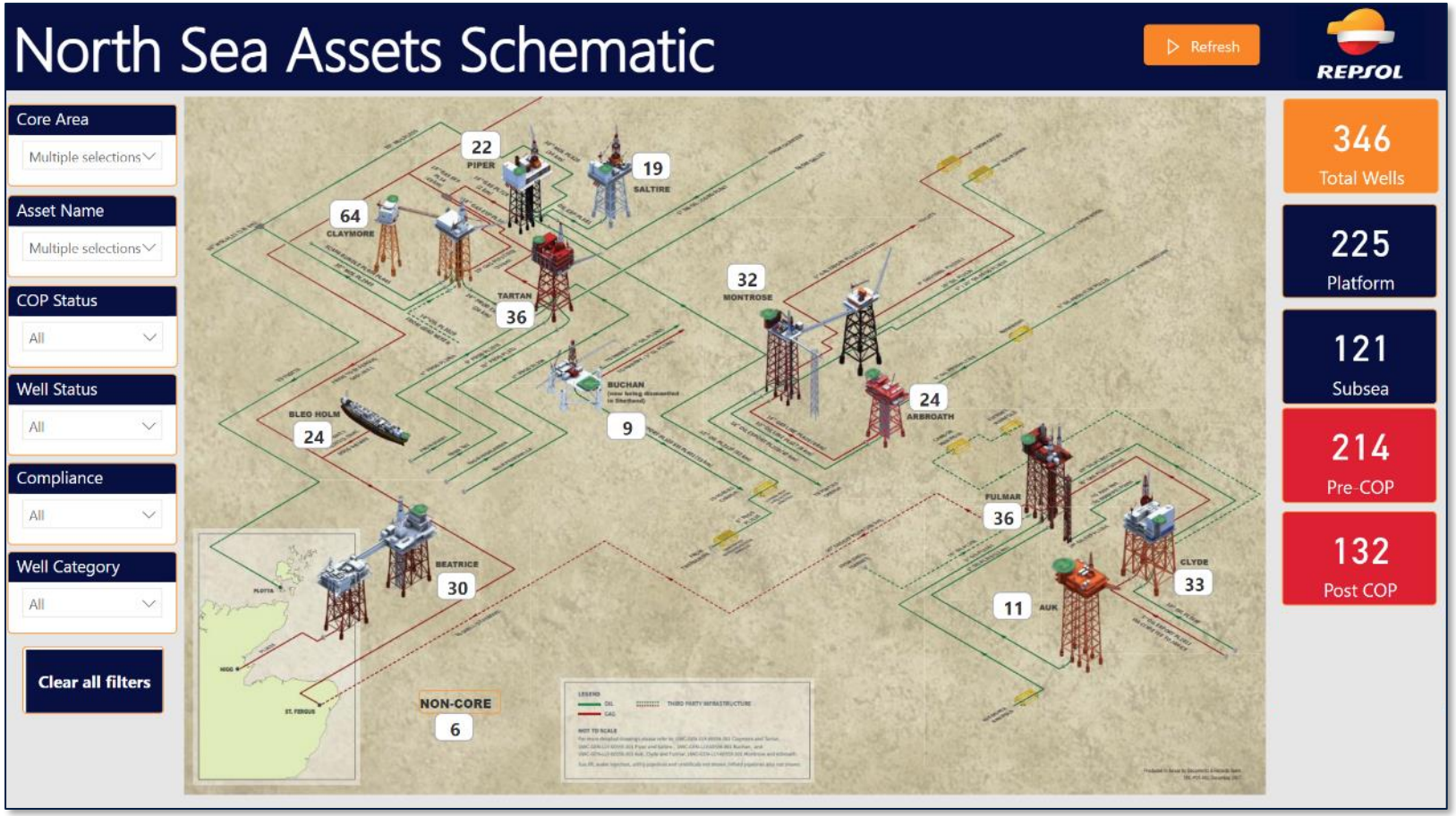


4 key topics for today

- Repsol UK context & well integrity mgmt.
- Digitalisation objectives and set-up
- Digitalisation benefits
- Repsol digital system real-time demo

Repsol UK | Mature North Sea Operator managing a portfolio of 346 wells



Operational context

- **11** offshore assets
- **346** Offshore wells:
  - 225 platform
  - 121 subsea
- **Legacy wells**, with several previous operators

Well verification | Routines carried out periodically

Platform wells

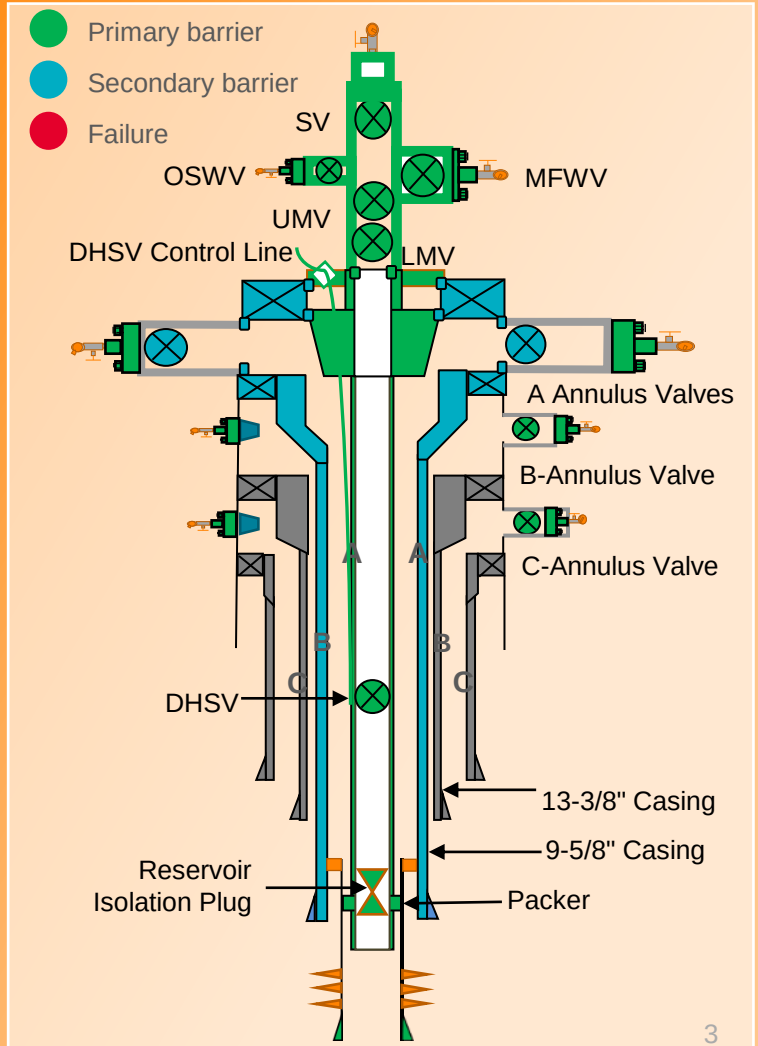
- Inflow / pressure test tree and annulus valves
- Inflow test DHSV
- Pressure test / inflow test control lines
- Inflow test reservoir isolation plugs (where installed)
- Wireless gauge verification
- Sting wellhead voids
- KP4 survey (external condition inspection)
- Biennial annulus top-up and test to operational MAASP

Subsea wells

- Tree Valve Integrity Test (TVIT)
- General Visual Inspection (GVI)

Note: MAASP = Maximum Allowable Annular Surface Pressure; DHSV = Downhole Safety Valve

Example
Well A04: Free-Flow Producer



Well integrity mgmt. | Understanding integrity is key as it drives wells mgmt. costs & P&A schedule

Wells integrity mgmt.

Wells mgmt. costs

Integrity drives…

- **Frequency** of scheduled interventions and well verification routines
- **Unexpected events** related to integrity requiring reactive wells management activities
- **Complexity** of required well interventions and verifications

P&A schedule

- Management of P&A **planning priorities**
  - **Risk wells** within Repsol UK portfolio
  - Technical **efficiencies enablement** (e.g., through tubing abandonment)
  - Alignment with **business plans** & budget
- **Regulatory commitments** on wells P&A and consents

Objectives | Optimisation of wells mgmt. cost and P&A schedule through digital tools and real-time dashboards

REPSOL

Non-exhaustive

AI powered

SALUS

Power BI

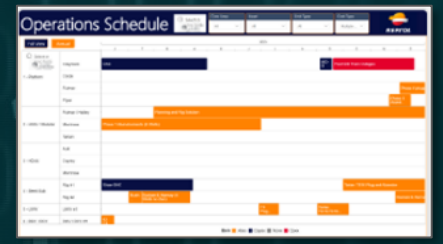
IBM maximo®

eWorks

Digital tools

Wells mgmt. cost optimisation + P&A schedule optimisation

Real-time dashboards



Set-up | Comprehensive set of tools supporting end-to-end wells integrity management

Integrity mgmt. process	Maintain wells management system	Identify verification needs	Execute well verification routines	Conduct risk assessment	Report non-compliants	Manage workorders	Optimise schedule
Key activities	• Gather well status information in wells management system • Maintain updated information	• Integrate Repsol UK & Repsol performance standards • Align well status and performance with standards	• Carry out periodic routines for verification - e.g., Tree Valve Integrity Test (TVIT) and General Visual Inspection (GVI)	• Pre-populate assessments • Generate terms of reference • Extract info from P&IDs & other • Review previously completed assessments • Identify risks & compromised Repsol standards	• Manage prohibitions, deviations, and sign-offs	• Manage workorders and deferrals • Drive repairs & maintenance	• Identify opportunities for - risk reduction (P&A prioritization and wells mgmt. activities), - production protection and production adding
Digital support	Power BI PLATFORM WELL STATUS	Power BI PLATFORM WELL STATUS	*n.a.*	SALUS WRA Copilot	eWorks Dispensation tool	IBM maximo ⊕ Workorder & deferral mgmt. software	Power BI WSIT RISK MATRIX Power BI Wells Project Hopper

Note: WSIT = Well Status Integrity Tool ; WRA = Wells Risk Assessment

Deep dive in next slides

WRA Copilot | Usage of GenAI tool for automated Wells Risk Assessments (WRA)

Developed by Salus, aiming to reduce risk assessment time by 50%

Why

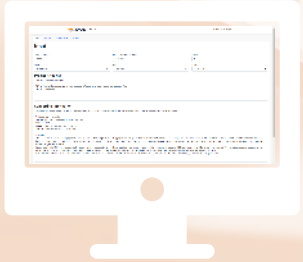
- Over 2,500 wells in UKCS, many of which are close to, or beyond original design life
- Risk assessing impairments to wells is becoming an increasing burden for Operators
- Inputs & outputs need to be of quality and exhaustive

What

- Verifies that required information (well impairment, conditions & well history) is provided as per standards
- Identifies impairments & highlight standards not met
- Pre-populates a risk assessment for user's review
- Assesses user's proposed forward plan

How

- Built on top of the OpenAI API, using GPT-4 Large Language Model
- Extracts information from P&IDs and other existing documents



Where

- Current application
  - Well risk assessments for well integrity mgmt.
- Expected future application:
  - Well program reviews
  - Well interventions

Digitalisation benefits | Enabling time optimisation, alignment with integrity standards and real-time decisions

Key digitalization benefits…

- Reduced time consumption
- Alignment with standards
- Real-time decision-making

…achieved through…

- **Integration** of all sources for well integrity information in a single system
- **Exhaustive** data collection with no gaps in the information
- **Accessibility** for all onshore and offshore teams to latest data
- Full **visibility** of well integrity status across the fleet
- Data with **customisable** filters: field, well, status etc.
- **Automated** risk assessment & well ranking based on historical trends & best practices
- **Enhanced visualization** of risks output and opportunities (well hopper) without presentations or reports

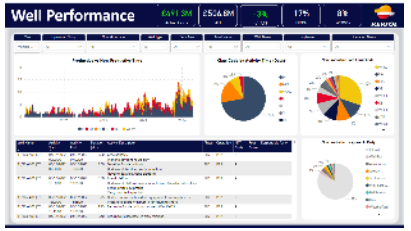
Repsol UK digitalisation | Built robust system of digitalized tools allowing for data-driven value-adding decisions

HSE

Well integrity

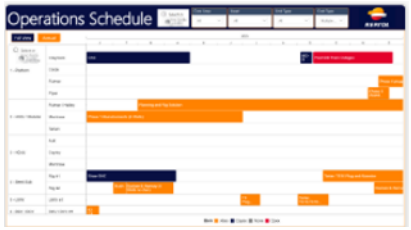
Reporting

Performance & KPIs



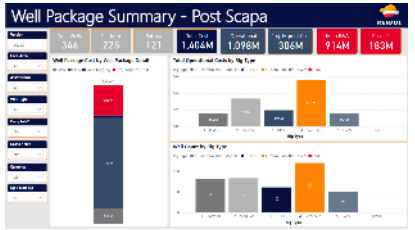
Project specific

Rig Scheduling



Wells Hopper

Well abandonmt. liabilities



Resource allocation

Contracts

Wells consents

Key tools & docs

Decom support vessels & rigs

Decom technology register


And now…
Digital system real-time demonstration