



**EXPRO**



# WELL ABANDONMENT

---

From late-life reservoir management through to final permanent abandonment, we create bespoke solutions to meet your specific well requirements.

---

---

# LATE-LIFE RESERVOIR MANAGEMENT

---

All oil and gas fields will reach the end of their lifecycle. Ageing wells present complex issues and it is vital to effectively plan the late-life asset operations to realise the economic potential of the asset prior to full decommissioning. Expro provides remedial well operations that are necessary to optimise or enhance production, prior to abandonment.

---

## Candidate well selection

---

We support our clients in providing the right information, at the right time, to make their production enhancement, intervention and abandonment decisions.

Expro regularly assists clients in determining the economics of well operation, including information relating to revenue generation and operating costs.

- Production forecasting
- Well integrity assessment and remedial well operations
- Well maintenance and interventions
- Reservoir monitoring and data acquisition

---

## Production optimisation

---

Working with customers, Expro maximises the production from wells in later life, revitalising them to overcome system limitations. This requires a comprehensive understanding of reservoir, wellbore and surface process facilities and pipelines.

Our service combines Expro's wealth of experience in providing:

- Subsurface and reservoir engineering
- Production technology
- Surface process engineering
- Well intervention and remediation
- Temporary late-life modular production facilities

---

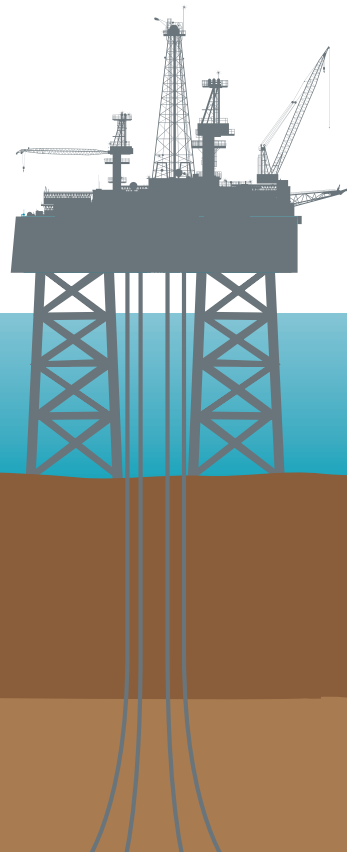
## Well abandonment design

---

Expro understand our client's challenges associated with re-entry and abandonment of an ageing well. This includes safety, environmental and legislative requirements to permanently isolate the reservoir, wellbore and remediate the well location.

We will design a tailor-made plan that ensures minimum cost and maximum operational efficiency:

- Well integrity assessment
- Regulatory consents and applications
- Well abandonment programme creation
- Time and cost estimates
- Scoped evaluation of solutions and economics



---

# WELL INVESTIGATION AND PREPARATION

---

Knowledge of the well integrity status gained through rigless well intervention removes uncertainty in the planning process, creating efficiencies and cost reduction in the final abandonment execution. Expro can deliver this information using fit for purpose solutions prior to mobilisation of expensive equipment, which can then be used in order to decide the correct campaign approach for the field.

---

## Well integrity management

---

Up to date integrity status of the well stock can be used to decide the appropriate campaign approach for the field.

- SafeWells™ well integrity data management system
- Tubing evaluation/tubing caliper surveys
- Downhole video and camera services
- Wellhead maintenance and leak detection services
- Well integrity consulting and engineering

---

## Wellbore access

---

Engineering risk can be mitigated and solutions developed through well intervention.

- Determine ability to set barriers and intervene in the well safely
- Determine suitability for thru-tubing abandonment
- Ranking of project abandonment candidates
- Rig or rigless, slickline and electric line services
- Heavy duty wireline fishing
- Explosive services, radial cutting and tubing punches
- Wellsite supervision of intervention operations

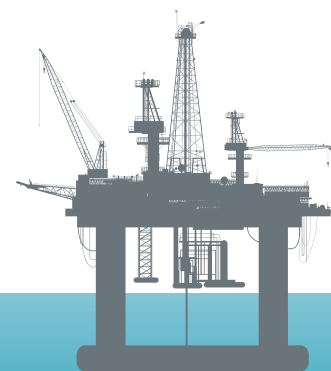
---

## Suspension plugs, cement and verification

---

Once access is proven, the existing cement can be logged and plugs can be set to isolate the reservoir.

- Cement bond logging to verify cement competency
- Set plugs prior to permanent abandonment
- CaTS™ - temporarily abandon subsea wells with monitored suspension plugs, creating efficiency and eliminating steps on subsequent program



# PERMANENT RESERVOIR ABANDONMENT

We understand the challenges associated with re-entry and abandonment of an ageing well and meeting the safety, environmental and legislative requirements to permanently isolate the reservoir, wellbore and remediate the well location. Technology development and collaboration is part of Expro's well abandonment approach. This is demonstrated through our long-term working relationships with technology partners, allowing us to deliver a truly world-class, fully integrated decommissioning service solution.

## Reservoir isolation

Involves restoring the cap rock where all permeable zones penetrated by the well are isolated by permanent barriers, typically mechanical bridge plugs are set and topped by cement plugs. Barrier verification is required before final abandonment.

- Industry leading subsea landing strings for safe wellbore access.
- Tubular/casing string integrity checks, caliper, cement bond logging
- Low cost Installation of permanent barriers using slickline
- Containment of hydrocarbons at surface
- Independent (direction of flow) barrier verification

## Wellbore and wellhead remediation

Intermediate well abandonment may require annuli between casing strings to be tested for integrity, and remediated if required prior to placement of permanent barriers within the wellbore.

- Xmas tree, wellhead removal and re-certification
- Barrier verification, tubular/casing string integrity checks
- Tubular/casing selective perforating
- Remediation perf and wash, perf and squeeze or milling
- Tubular/casing cutting and removal
- Installation of permanent barriers

## Hydrocarbon free facility

Prior to final decommissioning the facility must be made safe and hydrocarbon free. Facilities and pipelines are flushed in preparation for deconstruction activities and once the site is clear there is the final requirement to monitor the site.

- Hydrocarbon handled through temporary mobile production equipment
- Facilities/flow lines flushed and isolated from wells
- Facility/pipeline deconstruction
- Site remediation and monitoring: CaTS™, Expro's wireless communications technology makes it possible to monitor the pressure and temperature in suspended or permanently abandoned wells

