/ Exploration & Appraisal Testing
A leading provider of integrated Exploration and Appraisal well test solutions
Expro offers market-leading technology and expertise to provide a full package of Exploration and Appraisal (E&A) well testing services, with specific strengths in subsea wells and high flow rate gas wells.

With 40 years of experience, from remote land to frontier deepwater environments, Expro ensures that your well test objectives are achieved through efficient and high quality data.
What we offer

Providing the complete package of exploration and appraisal well testing services Expro is one of the most experienced international well testing companies in the world, offering our customers the complete range of mobile systems and specialist services, delivering quality data and operational efficiency across land and deep water well sites.

With 40 years’ experience of delivering our customers’ test objectives, Expro provides integrated solutions across the exploration and appraisal phase of any well. The data that we provide throughout every well test allows our customers to plan the optimal exploitation of their reservoirs.

Expro has operational bases across the world and has developed an unparalleled track record for delivering tailor-made solutions to meet the challenges faced by our customers.

Expro offers the complete well test package, utilising some of the industry’s most reliable technologies, including:

- Surface well testing packages
- Expro Landing String Assemblies (ELSA)
- Drill Stem Testing (DST)
- Tubing Conveyed Perforating (TCP)
- Fluid sampling, wellsite chemistry and PVT analysis
- Real-time data services, including CaTS™ wireless Surface Read Out Systems (SRO)
- Wireline intervention services
- CaTS™ Advanced Reservoir Testing (ART) system

Our product lines

- Well Testing & Commissioning
- Fluids
- DST/TCP
- Subsea Safety Systems
- Wireless Well Solutions
- Well Intervention
- Equipment Sales
- Expro PowerChokes®
Surface well testing packages

The primary function of surface well test equipment is to provide a safe and efficient system to separate hydrocarbon phases, to measure and collect accurate well data and importantly, to collect representative fluid and gas samples. The data monitored includes pressures, temperatures and flow rates recorded at multiple locations on the well test package.

**Features:**
- 40 years of experience of providing well testing services
- Operational bases in all hydrocarbon producing areas in the world
- Over 2,000 well tests carried out
- 150+ well test packages in the field

**Benefits:**
- Reliable and rugged equipment, meeting industry standards, means dependable data gathering from well test operations
- Trained and competent personnel to ensure ‘right first time’ operations
- Technical and logistical backup available globally

The surface well test system is a combination of the following equipment and services:

**Surface test tree**

The flowhead isolates the well at surface from the reservoir and enables the downstream process equipment to be depressurised and made safe. It is typically equipped with a lift sub, swivel and temporary pipework connections for the flow and kill wing valves. It comprises four gate valves installed in a forged solid block manifold. The flow wing valve is actuated and controlled by a hydraulic panel connected to the emergency shutdown system. The swivel is situated below the tree block and enables rotation of the string.

In my opinion, Expro is the only choice for Pioneer Alaska well testing.
Operational bases in all hydrocarbon producing areas in the world
Surface well testing packages

Solids exclusion
Expro recognises that solids management is crucial to a safe and efficient well operation. In addition to our existing 5k and 10k sand filter systems, Expro has developed 10K and 15K Cyclonic Desanders. Expro’s solids exclusion equipment is designed to be deployed close to the wellhead and upstream of the first well control device, allowing solids to be removed at high pressure and thereby reducing erosion in the downstream equipment.

Benefits:
- Efficient removal of solids
- No moving parts
- Low back pressure design permits high flow rates
- Fitted with a bypass facility
- Online removal of solids

Choke systems
The choke manifold controls the well flow via a fixed or an adjustable choke. Expro provides a range of choke manifolds in various configurations, with operating pressures up to 15,000 psi, allowing the customer to specify a choke manifold suited to their well parameters.

Expro’s choke systems provide reliability and security, with easy maintenance and multiple safety features, operating efficiently and effectively. Our equipment provides unparalleled wear resistance therefore reducing costly damages. The use of this technology in the exploration and appraisal market is ideal to reduce downtime where continuous flow data is critical to the success of the operation. Based on the latest engineering design and technology, our choke systems have become industry leaders.

Features:
- Single isolation, dual isolation and bypass type manifolds ensure there is always a solution for the customer
- Choice of adjustable choke types ensure equipment is suitable for well parameters
- Partial or fully automated operation of isolating valves
- Actuated choke operation for severe service and HP/HT applications
- Reliable choke flow estimation through use of industry standard choke bean sets
Surface well testing packages

Heat exchangers

Expro offers various types of heat exchangers which typically comprise high pressure coils contained within a steam jacket. Expro’s multi-tube heat exchangers are significantly more efficient than the conventional direct heat exchangers used in well test operations. The combination of eliminating bends in the tubes and their large surface area promotes highly efficient heat transfer compared with conventional heaters. It also aids reliability since the flow profile makes this type of heat exchanger far less prone to erosion from solids production.

Features:
- Direct, indirect and multi-tube heaters within fleet
- Direct steam heat exchangers provide vast reaction to changing process conditions
- Heater control systems ensure accurate regulation of process temperature
- Safety systems protect vessel and process coils against overpressure

Three-phase separator

Hydrocarbon flow is directed to Expro’s three-phase separator where the oil, water and liquid phases are separated and metered. Expro’s inventory includes various designs of both horizontal and vertical separators which meet the well flow parameters stated by the customer. The separators are designed to maximise the efficiency of the separation process.

Features:
- High capacity gas and liquid separation
- Accurate rate measurement of the produced gas and liquids
- A collection point for samples for onsite analysis
- Modular design for ease of transport
- Greater operational flexibility
- A range of working pressures and flow capacities to suit most applications
- Separator parameters monitored and measured through the EDGE data acquisition system
Surface well testing packages

Data acquisition

Expro’s EDGE is a Windows based data acquisition and management system. It provides a total data solution for a wide range of applications including well testing, extended production tests and platform process plant monitoring. The extensive multitasking capabilities of EDGE allow it to incorporate data from a multitude of sources using various communication protocols. This includes surface instrumentation, other Expro services (WWS, DST, Subsea, etc.), and third-party equipment. EDGE incorporates ‘data to desk’ functionality, this service provides the client with the full suite of tools necessary to view real-time data through a web browser anywhere in the world.

Features:
- Real-time data monitoring, processing and logging
- Graphical user interface (GUI) for live data and trending
- Visual and audible alarm monitoring
- Industry standard communications
- Data export and reporting

Produced water system

The produced water leaves the separator vessel and is directed to the surge tank where it can be stored, accurately measured and degassed prior to being stored in the stock tank. To dispose of the water overboard in a responsible and environmentally-safe manner, Expro uses a produced water treatment package. This filter system is designed to provide a light, compact, reliable and economic method of filtering water, lightly contaminated brines and fluid cushions.

Features:
- An environmentally safe and proven method of disposal of produced water
- Compact skid-mounted design for offshore deployment
- Ability to handle a wide range of process containments (e.g. solids and emulsions)
- Removes risk of oil discharge during well testing and treatment clean-up operations
- Small footprint size and suitable for mobile drilling rigs or production platforms
- Reliable filter system using proven filter elements

Environmentally safe disposal

Oil fluids are directed to Expro’s leading burner technology for environmentally-safe disposal. The gas flow is directed through to the flare, where the latest silencer technology can be employed to reduce noise to an acceptable level. The Sea Emerald burner features carefully positioned multiple burner tips, which create maximum flame turbulence and air ingestion, making the burn very clean and eliminating smoke.

Features:
- Highly efficient and environmentally friendly
- Third-party rated at over 99.993% efficiency
- Modular design can be used in multiples to match anticipated flow rates
- Stable pilot assembly provides reliable ignition source
- Clean start-up, wide turndown ratio, simple operation
- Designed to minimise smoke and fallout
- Eliminates the requirement for storage tanks
Expro Landing String Assemblies (ELSA)

ELSA EA landing strings are in-riser systems used to allow well operations to be conducted safely during drill stem testing from a semi-submersible rig or drillship in water depths up to 10,000 ft. They provide the ability to rapidly shut-in the well and disconnect should conditions require it. Expro has a variety of systems available covering: high-rate, high pressure, high temperature, deep water and electric submersible pump (ESP) application, ensuring we provide the right solution for our client’s needs.

All systems include a subsea test tree, which provides a dual barrier to isolate the well and a disconnect facility from the well in case of emergency. A retainer valve is added to the system just above the BOP shear rams ensuring the landing string content is contained upon disconnect. Single or dual lubricator valves can be provided to allow safe deployment of intervention tool strings. Depending on operational requirements the subsea test tree and retainer valve will be controlled by a direct hydraulic (DH) or an electro-hydraulic (EH) control system.

Features:
- Cutting capability
- Pump through capability
- Independent ball closure
- Redundancy
- Downhole functionality
- Small operating volumes

Benefits:
- Guarantees well isolation
- Ability to kill well
- Allowing one ball to cut coiled tubing or wire and other ball to seal
- Rapid response well isolation and un latch
- Secondary unlatching system
- Option to allow permanent monitoring cable, subsurface safety valve control line or chemical injection line to pass across disconnect point of subsea test tree
20 years of deepwater experience

10,000 feet water depths

3,000+ operations
Drill Stem Testing (DST)

A drill stem test offers the fastest and safest method of evaluating the potential of a newly-discovered hydrocarbon-bearing formation. After the well has been drilled and cased, the first stage of a well test is to run a DST string in conjunction with a downhole data system with the option to include tubing conveyed sampling and tubing conveyed perforating systems.

The DST bottomhole assembly is designed around your test objectives and well parameters. We provide downhole systems, including perforating guns, with the functionality to effectively and safely perform the well test. These systems capture quality data such as bottomhole pressures and temperatures during flow (drawdown) and shut-in (build up) periods and representative single-phase formation fluid samples.

Our DST tools

Our core DST tools were introduced to the field in 1987 giving them a proven track record of over 25 years. At that time it was the first universally applied cased hole DST tool string with 5” OD and 2.25” ID, rated to 15,000 psi and 350°F, as per NACE MR-01-75. The additional functionality from our new generation Expro DST tools means that we now provide fully integrated solutions across exploration and appraisal well testing at 15,000 psi differential pressures, and up to 450°F.

Features:
- 15k psi DST tools supplied as standard
- Functional and efficient for all well types and applications, including deepwater and HP/HT
- Integrated real-time wireless surface readout and tubing conveyed PVT sampling systems

Benefits:
- Over 25 years of DST experience
- Dedicated in-house DST engineering team developing new and innovative tools
- Highly trained and experienced field personnel
Expro has been a full service TCP provider to the industry for over 30 years, servicing the exploration and appraisal well testing and well completions markets. We have an outstanding track record in North America, including deepwater operations in the Gulf of Mexico.

In recent years we have strategically expanded our capabilities globally, with successful operations in Sub-Saharan Africa. We have licences set up and in-process in other regions in line with delivering fully integrated well testing services.

We use industry-leading gun products underpinned by API RP 19B test data. We make our selection based on the best solution for our client’s project; considering the gun performance specific to well conditions, logistics and any special requirements.

We provide gun sizes from 2½” up to 7” OD with full phasing and shot densities in RDX, HMX and HNS explosives packages and charge types, such as deep penetrating, super-deep penetrating, big hole (for gravel packing), good hole and reactive liners. We can also offer stimulation products such as the StimGun.

All Expro’s mechanical, hydraulic and pyrotechnic firing heads, gun releases and associated accessories are designed in-house.

**Features:**
- Firing head success rate at over 99%
- Specialists in bespoke perforating solutions
- Full TCP job design capability for optimised results

**Benefits:**
- Over 30 years of in-house design and operations expertise and track record
- Access to industry-leading gun systems to provide the best solution
- Highly trained and experienced field personnel
**Fluids sampling and analysis**

Expro employs the latest technology to capture both fluid and liquid samples from the well test process. The latest techniques are used to provide onsite analysis to the highest standards.

We offer a fully integrated package of hydrocarbon reservoir and process fluid flow measurement, sampling and analysis services. This data is essential for our customers to enable them to accurately assess reservoir size and production profile, and to optimise design of their process facilities.

The Expro Fluids team are the most technically proficient and best equipped service provider in this discipline available to the oil and gas industry. Our service offerings to customers are based on three clear principles:

- Highest measurement standards
- Highest standards of competence, traceability and certification
- Best customer service

Expro’s market-leading sampling and analysis services are provided from a network of laboratories and support centres in all oil exploration and production regions.

**Features:**

- Wellsite open hole sample validation analysis
- In-situ reservoir fluid sampling, PVT wellhead and separator sampling
- Multi phase sampling, IsoSplit®
- Separator efficiency analysis by IsoSplit® for accurate GOR/CGR ratio
- Non-hydrocarbon analysis
- PVT laboratories / full compositional analysis
- Flow assurance
- Sulphur speciation
- Sample transfer and management

**Benefits:**

- Three highly technical laboratories with over 60 years of experience
- Accurate reservoir data for field development studies
Real-time data services

Expro has continuously developed its capability to acquire accurate and reliable high quality data, allowing the customer to make informed decisions quickly, effectively and efficiently.

Expro’s data acquisition services provide monitoring solutions that apply at all locations from sand face to burner tip, including: the EDGE data acquisition system for surface process monitoring; precision quartz memory gauges for reservoir pressure and temperature data; and the CaTS™ wireless surface readout (SRO) system, providing real time bottom hole data on demand.

The CaTS system transmits data to surface in real time using electromagnetic signals. Having access to SRO data provides confidence in the data quality and quantity, leading to early decision making and optimisation of the testing program duration.

**Features:**
- Uses the well-proven CaTS wireless communications technology
- High specification quartz crystal sensors
- Dual purpose gauge features both SRO and memory functionality
- Dual redundancy throughout the system for enhanced reliability

**Benefits:**
- No need for wireline intervention to receive data at surface, reducing intervention risk
- Suitable for use in high H₂S/CO₂ harsh condition environments
- Compatible with onshore, jack-up and semi-submersible operations

Another world first was the subsea deployment of Expro’s CaTS™ on one of the Clair Ridge appraisal wells. This tool provides a unique insight into pressure across the field, helping to give BP and its partners a better understanding of Clair’s complex reservoir formations.
Well intervention services

Expro is a leading global provider of wireline intervention services. We are the world’s largest independent wireline service company, employing more than 1000 people in support of our operations globally.

Expro offers an extensive range of slickline services with innovative equipment, together with highly trained competent experts. We provide every slickline capability from basic completion intervention applications to advanced services. In addition to standard .108” slickline, Expro also provide .125” and .160” slickline which gives performance capabilities similar to braided cable. Expro can also accommodate customer requirements in relation to pressure control equipment ranging from 3” to 7 5/8” and from 5K psi to 15K psi.

Our slickline services include:

- TCP firing head installation & retrieval
- TCP gun string release
- Debris removal from DST string and TCP firing head
- Bottomhole samplers
- Downhole pressure and temperature gauges
- MPLT (Memory Production Logging Tool)

Features:

- Large portfolio of equipment and tooling available for challenging environments including H₂S and HP/HT wells
- Reliable, dependable and field proven technology
- A start-to-finish service with personnel focused on operational success
- Proven track record in supplying slickline services for E&A operations worldwide
- Continual focus into improvement of service delivery is standard across Expro

Benefits:

- Experienced personnel: on the job and in support of your operations
- Using a highly respected slickline provider like Expro lets you, the customer, concentrate on other challenging aspects of your well design knowing that the success of any slickline content in your well will be secure in our hands
Expro employs more than 1000 people in support of our operations globally.
CaTS™ Advanced Reservoir Testing (ART)

Uncertainty regarding reservoir connectivity and compartmentalisation is one of the biggest risks that operators have to contend with when formulating the field development plan. This uncertainty can be reduced by maximising the time spent on appraising the prospect but the pressure on minimising rig time and cost reduction means that sometimes, critical decisions regarding field development plans are taken based on very limited data sets.

By the application of the CaTS wireless monitoring technology, well testing no longer has to end at well abandonment. CaTS can be installed into an appraisal well at the end of a DST and used to monitor the reservoir response for several years after well abandonment. By using the abandoned appraisal well as a long-term monitoring asset it is possible to record any interference effects resulting from production or injection events in the adjacent field area. This data provides high value information about the reservoir continuity and connected volumes between several remote well locations.

CaTS can also be applied in those situations where a long term pressure build-up (PBU) may be required to accurately characterise the reservoir; continuing to accurately monitor the PBU long after the rig has departed the location.

The Advanced Reservoir Testing concept

Pressure and temperature data from a CaTS gauge located adjacent to the abandoned reservoir is transmitted wirelessly to a seabed receiver, where it is stored locally. The data is subsequently uploaded from the seabed receiver to a vessel passing overhead using through-seawater communications.

**Features:**

- CaTS signal transmission is not affected by cement plugs, bridge plugs or by cemented pipe
- CaTS can be installed into the well cost effectively using conventional wireline or coiled tubing equipment and procedures

**Benefits:**

- There is no requirement for a tubing or completion string to be installed in the well, minimising rig time and meaning that the well can be permanently abandoned with no requirement to re-enter the well to recover the tubing and perform a final abandonment
- Any in-well cable arrangement represents a potential leak path; CaTS has no in-well cabling meaning that the integrity of the well abandonment is not compromised

…the CaTS data has already proven its value on one of the newly commissioned wells.
Expro’s mission is **well flow management**. We provide services and products that measure, improve, control and process flow from high-value oil and gas wells, from exploration and appraisal through to mature field production optimisation and enhancement.

With a specific focus on **offshore, deepwater** and other **technically challenging environments**, we provide a range of mission critical services across **three key areas:**

- Well Test & Appraisal Services
- Subsea, Completion & Intervention Services
- Production Services

Our vision is to be the **market leader** in well flow management, using the industry’s best people, to deliver the highest standards of safety, quality and **personalised customer service**.

We provide a range of solutions including:

- Exploration & Appraisal Testing
- Subsea Safety Systems
- Drilling & Completion
- Flowback & Clean-up
- Production
- Well Integrity & Intervention

Expro’s **40+ years** of experience and innovation empowers the company to offer **tailor-made solutions** for customers across the energy sector. With over 5,400 employees in over 50 countries, Expro offers a **truly global service solution**.
For further information on Exploration and Appraisal Well Testing, please contact:

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