



EXPRO

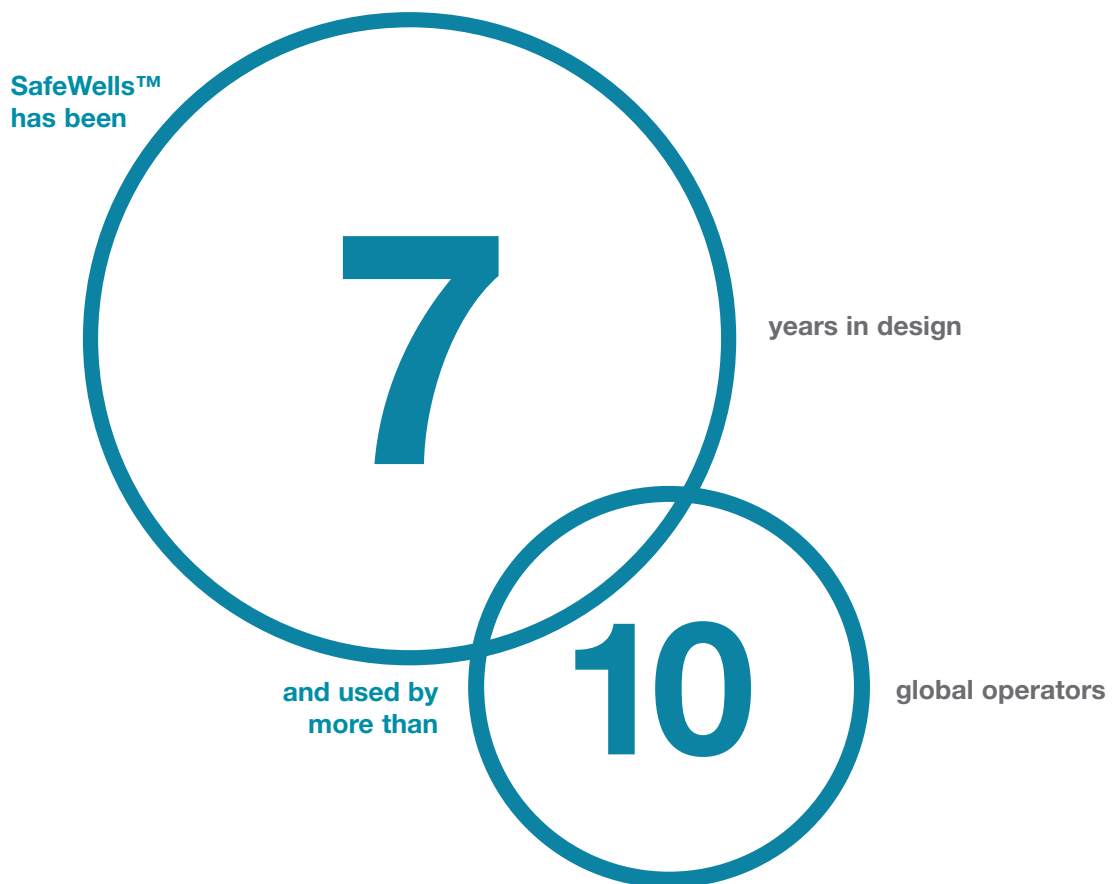
WELL FLOW MANAGEMENT™

SafeWells™

Expro's well integrity solution



SafeWells™ is a **well integrity data management** solution developed by Expro to provide a clear overview of operators' well integrity status.



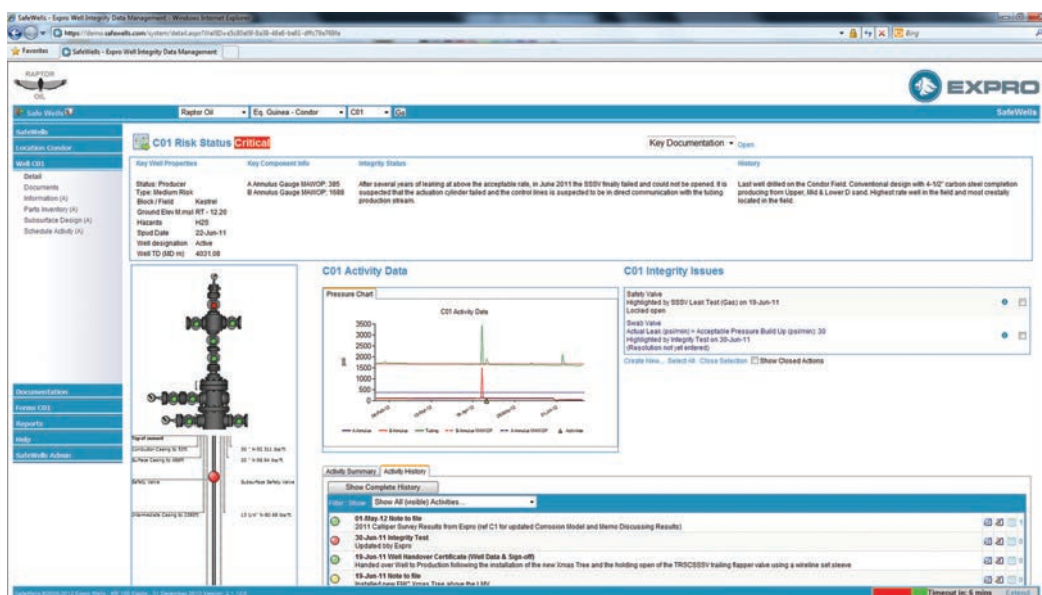


What is SafeWells™?

SafeWells™ is a software solution specifically developed by Expro as an effective well integrity data management system. It monitors and reports on well integrity performance and has been successfully deployed by major operators globally.

SafeWells™ provides a view of current well integrity status' and problems, and allows for tracking of remedial actions as issues arise. Operators can therefore plan their well intervention program safe in the knowledge that they are compliant with their policies, while being able to demonstrate their effectiveness at monitoring and tracking their wells' status.

SafeWells™ is fully configurable to allow multiple parts to be added or removed from the tree/well. An intuitive traffic light system is used to give an instant visual overview of the system status and quickly highlights potential problem areas. Any number of activities such as well integrity tests, valve replacements, annulus top-up or echo tests can be added to the system and scheduled according to company procedures. Trend reports can be generated for any numerical data.



Customised to your needs

SafeWells™ enables operators to improve safety and maximise well availability by providing visibility of integrity issues across their well stock.

Data input can be configured to use clients' existing reporting and documentation structures, to ensure a rapid and effective implementation of the system.

The SafeWells™ main screen by default shows the current well integrity status for the selected well.

Components that put the integrity of the well at risk are clearly shown. Historic maintenance activities that have been performed on the well are available for review.

Well construction

SafeWells™ is primarily designed to manage the integrity of wells from the reservoir to the production choke – and all the barriers and safety critical elements in between.

Visualisation is a key aspect of the SafeWells™ system and wells can be 'built' in the system which is a replica of the equipment in the field as shown (right).



Electronic forms

SafeWells™ can be configured to record any activity that is performed on the well such as well integrity tests, annulus blowdowns and top ups, interventions and valve replacements.

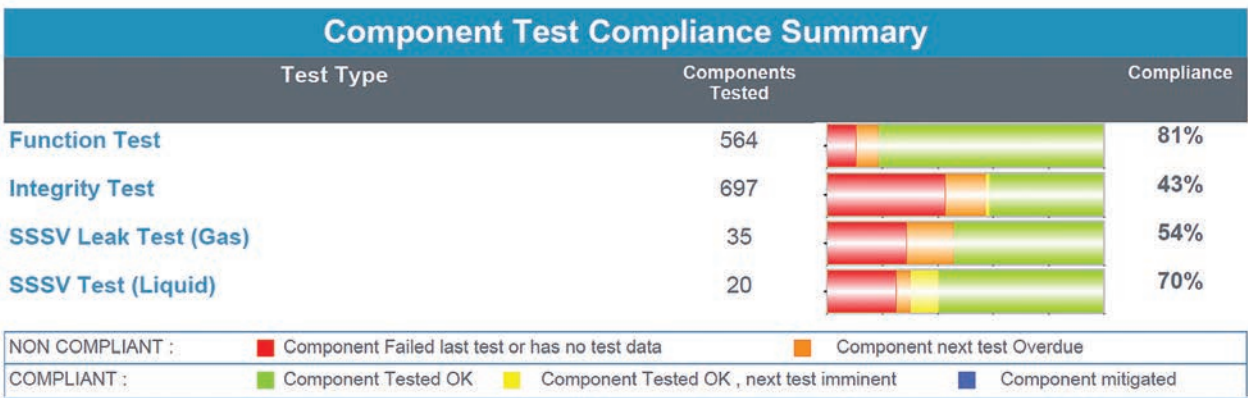
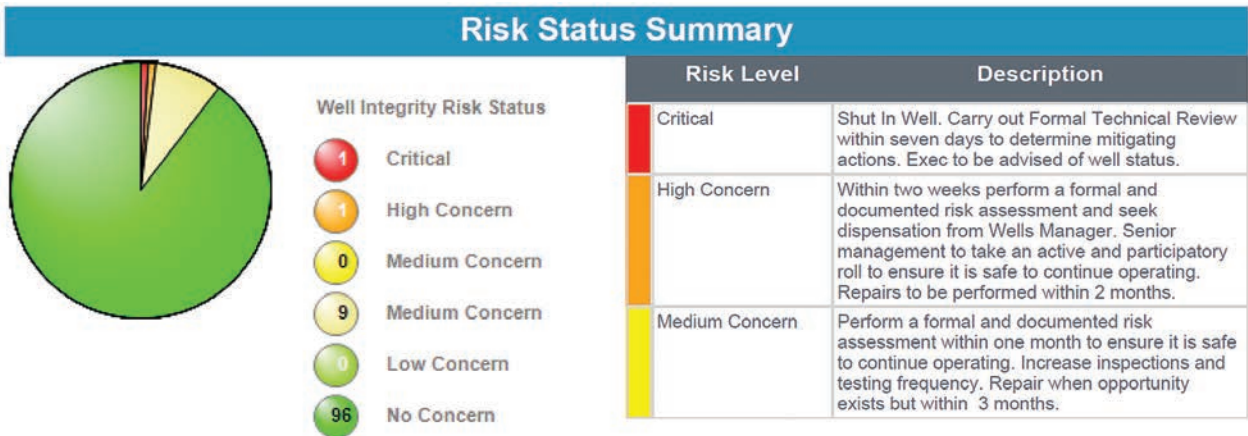
The system implemented by the operator allows the recreation of existing paper based forms to exactly recreate the look and feel that maintenance crews are used to. User friendly e-forms ensure smooth transition from paper systems to electronic systems.

SITHP	2620	psi	Control Line Pressure (SSSV Open)	0	Control Line Pressure (SSSV Closed)	0
Test Method	SITHP		A Annulus Start Pressure	61	A Annulus End Pressure	61
Prog No.			B Annulus Start Pressure	102	B Annulus End Pressure	102
Comments	Closure of the UMW piston/stem commenced after 50 seconds from shut in and was fully closed after 70 seconds. The valve was tested while hooked up to the Well intervention N2 gas bottle.					
	Start Press (psi)	Finish Press (psi)	Test Time (mins)	Actual Leak (psi/min)	Turns to open	Turns/secs to close
Swab Valve	0	360	4	90	23 1/2	23 1/2
Prod/nj Wing Valve	0	260	10	26	17.5cm	17.5cm
Kill Wing Valve	0	465	4	116	24 1/4	24 1/4
Upper Master	0	71	10	7	16.5cm	16.5cm
Lower Master	0	53	10	5	23 3/4	23 3/4

The forms can also be configured to automatically send e-mail notifications to designated personnel if values recorded are outwith company procedures. For example, if the pressure build-up on the subsurface safety valve is greater than acceptable API values, then an automatic e-mail will be sent immediately to the appropriate people.

Reporting

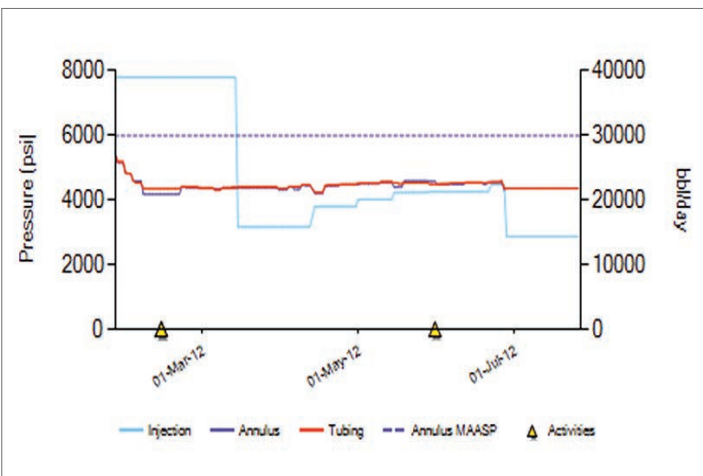
SafeWells™ reports have been specifically generated to support the demonstration of policy compliance to management and legislative authorities. The example below shows the types of tests that should be routinely performed on the well and how effectively these have been performed.



Production data

Most companies normally have a data acquisition system continuously monitoring annulus and tubing pressure. SafeWells™ can monitor annulus pressure over a specified time period – showing limits and sending notifications to personnel if trigger values are reached or exceeded.

Pressures and well integrity related activities are on the same chart, allowing the engineer to determine if an operation on the well has had an impact on the annulus pressure. This type of view also provides an easy way to identify possible communication issues.



The benefits of SafeWells™



As an industry, we have a duty of care to ensure that we are safely operating our wells. Well integrity is not solely an issue of well availability. A combination of corporate social responsibility and developments in government legislation are driving renewed focus on the topic of well integrity.

From the wellhead to the sandface, poor condition of wells has potential HSE consequences, as some operators have discovered. Thus, ensuring the integrity of critical barriers in a well is of utmost importance.

Benefits of SafeWells™:

- Integrity compliance
- Visible corporate & social responsibility
- Demonstrable safety performance
- Flexible configuration
- Expro specialist well integrity support
- Enhanced data management
- Comprehensive reporting

Commercial benefits:


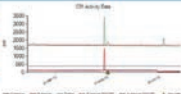

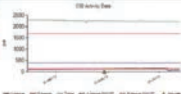


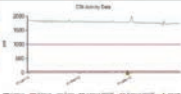
- **Engineering cost reductions:** Typically it takes an engineer up to a month to prepare the documentation required for the mechanical integrity report which is reviewed annually by HSE in accordance with the design and construction regulations. SafeWells™ can easily generate this report
- **Audit cost reductions:** Auditors can review well integrity records by logging in to the software remotely. This provides a direct cost saving to customers as they do not have to spend so much time with the auditor on site. (100 wells = \$50,000 saving)
- **Operators insurance premiums reduced** (100 wells = \$150,000 p/a saving)

Management benefits:

- Visibility of well integrity status across entire business
- Improved HSE performance
- Competitive improvement reporting
- Globally accessible
- Improved management of change process
- Demonstration to regulatory body, shareholders and investors that wells are managed
- Raised profile as an operator

Operational benefits:

- Identification and justification of improved integrity test processes, reducing time spent by crew at the well site
- Output reports provide crews with forewarning of existing problems prior to start of operations. The report below, for example, is printed weekly and included as part of the emergency response process

Well	Tree Image	Key Properties	Integrity Issues	Activities Due	Pressure Data																								
C01		Block / Field : Kestrel Ground Elev RT = 12.20 M.msl : Hazards : H2S Spud Date : 2011-6-22 0:0 Well designation : Active Wellhead : Dry Tree Operating Status : Producer	<table><thead><tr><th>Part</th><th># Issues</th><th>Failure Mode</th><th>Since</th></tr></thead><tbody><tr><td>Safety Valve</td><td>1</td><td>Not specified</td><td>19-Jun-11</td></tr><tr><td>Swab Valve</td><td>1</td><td>Not specified</td><td>30-Jun-11</td></tr></tbody></table> <p>After several years of leaking at above the acceptable rate, in June 2011 the SSDV finally failed and could not be opened. It is suspected that the actuation cylinder failed and the control lines is suspected to be in direct communication with the tubing production stream.</p>	Part	# Issues	Failure Mode	Since	Safety Valve	1	Not specified	19-Jun-11	Swab Valve	1	Not specified	30-Jun-11	<table><thead><tr><th>Activity</th><th>Last Tested</th><th>Next Due</th></tr></thead><tbody><tr><td>Function Test</td><td>20-Nov-10</td><td>20-May-11</td></tr><tr><td>Integrity Test</td><td>19-Jun-11</td><td>19-Jun-12</td></tr><tr><td>SSDV Leak Test (Gas)</td><td>19-Jun-11</td><td>19-Jun-12</td></tr></tbody></table>	Activity	Last Tested	Next Due	Function Test	20-Nov-10	20-May-11	Integrity Test	19-Jun-11	19-Jun-12	SSDV Leak Test (Gas)	19-Jun-11	19-Jun-12	
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C02		Block / Field : Kestrel Ground Elev KB = 13.61 M.msl : Spud Date : 2011-7-5 0:0 Well designation : Active Well TD (MD m) : 3619.51 Wellhead : Dry Tree Operating Status : Producer	<p>Since this well does not contain a SSDV it will always have at least a failure score of 2 which is Low Risk. Any other problems will probably result in a higher score and a medium or high risk rating.</p>	<table><thead><tr><th>Activity</th><th>Last Tested</th><th>Next Due</th></tr></thead><tbody><tr><td>Function Test</td><td>20-May-11</td><td>20-Nov-11</td></tr><tr><td>Integrity Test</td><td>27-May-11</td><td>27-May-12</td></tr></tbody></table>	Activity	Last Tested	Next Due	Function Test	20-May-11	20-Nov-11	Integrity Test	27-May-11	27-May-12																
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C03		Block / Field : Kestrel Ground Elev KB = 12.2 M.msl : Spud Date : 2011-7-1 0:0 Well designation : Active Well TD (MD m) : 3665.66 Wellhead : Dry Tree Operating Status : Producer	<p>The carbon steel completion is experiencing corrosion due to CO2. The corrosion level was significantly less than other wells due to well being historically lower rate and lower pressure but with the addition of production from ten Lower D sand ten corrosion rate has increased significantly. The last multi-finger calliper survey run in May 2011 indicated maximum wall thickness penetration of 38%. Corrosion modelling indicates with 97% certainty that tubing integrity will be retained until at least Dec-2017.</p> <p>It is planned to be worked over in 2013 when the CS completion will be replaced with 13Cr tubing.</p>	<table><thead><tr><th>Activity</th><th>Last Tested</th><th>Next Due</th></tr></thead><tbody><tr><td>Function Test</td><td>20-Nov-10</td><td>20-May-11</td></tr><tr><td>Integrity Test</td><td>26-May-11</td><td>26-May-12</td></tr><tr><td>SSDV Leak Test (Gas)</td><td>26-Apr-10</td><td>26-Apr-11</td></tr></tbody></table>	Activity	Last Tested	Next Due	Function Test	20-Nov-10	20-May-11	Integrity Test	26-May-11	26-May-12	SSDV Leak Test (Gas)	26-Apr-10	26-Apr-11													
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C04		Block / Field : Kestrel Ground Elev KB = 13.60 M.msl : Spud Date : 2011-7-6 0:0 Well designation : Active Well TD (MD m) : 3630.00 Wellhead : Dry Tree Operating Status : Producer	<table><thead><tr><th>Part</th><th># Issues</th><th>Failure Mode</th><th>Since</th></tr></thead><tbody><tr><td>KB Wing Valve</td><td>1</td><td>Not specified</td><td>12-Jun-11</td></tr></tbody></table> <p>None. The new FMC 10K PSD30 tree and new 13Cr completion should retain integrity for the life of the well.</p>	Part	# Issues	Failure Mode	Since	KB Wing Valve	1	Not specified	12-Jun-11	<table><thead><tr><th>Activity</th><th>Last Tested</th><th>Next Due</th></tr></thead><tbody><tr><td>Function Test</td><td>08-Jun-11</td><td>08-Dec-11</td></tr><tr><td>Integrity Test</td><td>08-Jun-11</td><td>08-Jun-12</td></tr><tr><td>SSDV Leak Test (Gas)</td><td>08-Jun-11</td><td>08-Jun-12</td></tr></tbody></table>	Activity	Last Tested	Next Due	Function Test	08-Jun-11	08-Dec-11	Integrity Test	08-Jun-11	08-Jun-12	SSDV Leak Test (Gas)	08-Jun-11	08-Jun-12					
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The benefits of SafeWells™

SafeWells™ allows the customer to store pertinent information (equipment status, maintenance records, test procedures, service schedules and reports, intervention records, traceability documentation, etc) about their production string, annuli, wellhead and xmas tree. The customer defines acceptance criteria for each barrier (or can use built-in API standards) and based on test results, servicing compliance, etc, each barrier is subsequently rated with an integrity ranking. Management dashboards then consolidate the integrity of the wells to provide a report outlining the overall integrity status of the asset. This will include overdue service reports, critical well status lists and alarm settings. One of the unique features of SafeWells™ is the ability of the client to customise their own database, test reports and input screens, to align the system with their policies and procedures.

Our customers chose SafeWells™ because it:

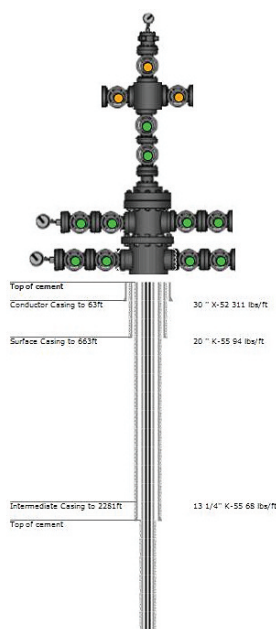
- Provides an efficient well integrity management system where one is currently lacking
- Enhances and improves the effectiveness of their existing spreadsheet tracking system
- Demonstrates to regulatory bodies, shareholders and investors that they have a system to manage the integrity of their wells. Interestingly, a number of clients have done this successfully to aid negotiations with regulatory bodies
- Reduces insurance premiums. Many of our clients in the UK sector have presented SafeWells™ to their insurers and successfully negotiated large discounts on their policies accordingly. Interestingly in one specific example, the insurance savings covered the cost of implementing SafeWells™ in the first place
- Raises their profile as an operator that has a genuine concern for the environment and the safety of their personnel and assets
- Helps them sleep at night

Who should be using SafeWells™?

SafeWells™ is a product which can be used by anyone that owns a well and wants to monitor the integrity of that well. It makes no difference whether this is surface or subsea, onshore or offshore, producer or injector, flowing or shut-in, producing or abandoned. SafeWells™ should be used by all operators.



... Well done ALL. The ideas from us all have/are/continue to be translated into great visualisation changes with a terrific impact. This clearly demonstrates that we have a truly flexible package that goes from strength to strength. – **Tullow**



...SafeWells™ is a powerful tracking and assessment tool.

– **Marathon**

Be part of the solution



SafeWells™ users are welcome at our annual product development forum.

This provides an excellent opportunity to discuss well integrity among our SafeWells™ customers ensuring that the software is developed in line with industry and legislative requirements.

Support number +44 (0) 1224 214750

Support@safewells.com

SPE Papers

SPE 142449 "The Seven Pillars of Well Integrity Management", The Design and Implementation of a Well Integrity Management System in Tullow Oil. Simon J. Sparke / Tullow Oil plc, Richard Conway & Simon Copping / Expro, 2011.

SPE 123201 "A Systematic Approach to Well Integrity Management", Alex Annandale, Marathon Oil UK; Simon Copping, Expro, 2009.

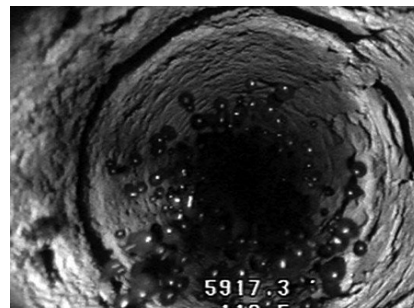


Providing a complete service

SafeWells™ can be used to record data and results that are provided from Expro's complete range of well integrity services.

Camera services

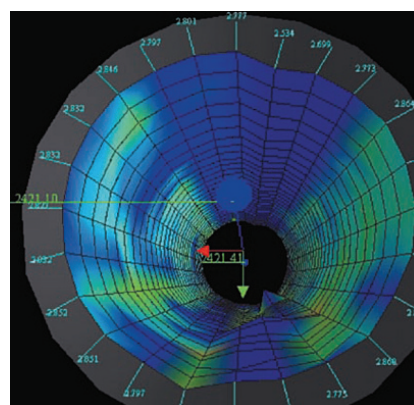
Expro's range of downhole camera systems offers operators a cost-effective way to see downhole problems rather than inferring them or just plain guessing. Downhole video is a proven technology and more than 5,000 downhole video surveys have been run in a wide range of oil and gas well conditions. Video applications have evolved to provide a cost-effective diagnostic and preventative tool that can be run for a multitude of applications.



Electronic calipers

Expro's range of electronic multi-finger caliper tools accurately measure the internal diameter of the casing or tubing strings using up to 40 independent fingers.

Whether used as part of a scheduled casing integrity monitoring program or for a one-off problem investigation, an accurate 3D picture of the downhole conditions can be quickly established at the well site using Expro's Multi-finger Image Processing Software (MIPS). Appropriate remedial action can then be quickly implemented, ensuring that any compromised production time is minimised.



Wellhead maintenance

The Expro Wellhead Maintenance service forms a key part of Expro's well integrity capability for assets in the newer HP/HT developments through to the mature brownfield environment.

Range of services include:

- Xmas tree valve greasing and valve pressure testing
- Annuli valve greasing and valve pressure testing
- Annulus integrity monitoring, including annulus top-up and pressure testing
- Hanger seal/pack-off testing
- Gate valve and actuator repairs
- Echo meter liquid level detection (optional)
- SCSSSV inflow test and function test (optional)

Our crews use SafeWells™ to record results of the maintenance work, and to alert our customers immediately should any problems arise.

Integrity engineers

Our team of experienced engineers provide a range of well integrity services including:

- Well integrity training
- Well integrity policy and procedure writing
- Maximum allowable surface pressure (MAASP) calculations
- Independent well examination services

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**.

Expro's **40+ years** of experience and innovation empowers the company to offer **tailor-made solutions** for customers across the energy sector. With 4,500 employees in over 50 countries, Expro offers a **truly global service solution**.



For more information contact:

safewells@exprogroup.com

Or visit www.exprogroup.com/contact