



Reduce Cost and Size for Well Testing

Achieve an up to 30 percent higher net present value by improving availability, well production, reservoir performance, unit technical costs, and safety performance.

McKinsey on Oil & Gas

The ever-increasing pressure to reduce the risk and cost of oil and gas field development projects has put more pressure on reducing the size, complexity, and weight of projects.

The challenge of upgrading installations—either adding new wells, increasing processing capacity or improving monitoring to optimize production—becomes an almost insurmountable challenge when you are already in production and your footprint is fixed.

In the case of producing offshore platforms, the available space is fixed, but even for onshore fields, modifications may be restricted by the existing equipment and footprint.

What if you could...

- ... complete well and reservoir testing without needing a test separator?
- ... significantly reduce the amount of valves and manifold piping required for test separation?
- ... have equipment that could detect and withstand sand, corrosion, and common offshore hazards?
- ... switch test lines and track changing well characteristics without requiring manual rounds?

CONVENTIONAL WELL TESTING SETUPS DRIVE FOOTPRINT, CAPEX, AND INSTALLATION TIME

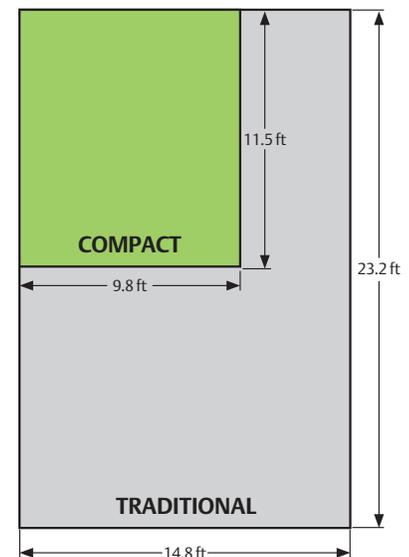
The amount of equipment and material that goes into your installation, and the corresponding weight and footprint, not only makes the field development more complicated, but also increases project installation time, risk, and cost. The traditional test separator with its corresponding piping, valves, and manifold arrangements is one of the big footprint consumers for any oil field.

EXCESSIVE MAINTENANCE AND TESTING INCREASES TRAVEL EXPOSURE AND OPEX

Well testing traditionally involves a lot of travel and field time to switch between wells, purge test separators, start and stop tests, and grab samples. With increased travel time comes increased exposure to potentially hazardous means of transportation, whether by road, sea, or air.

INSUFFICIENT WELL PERFORMANCE INFORMATION PREVENTS OPERATORS FROM OPTIMIZING THE FIELD

In order to efficiently optimize production across all wells, production engineers need as much information as possible about the behavior and performance of each well. Traditional well testing only provides information at periodic intervals or when ordered. By the time the operator receives the information, it may be outdated, and the data only reflects average production during the test period, rather than the dynamic behavior of the well. In addition to the manual labor and cost required to obtain the data, the most significant cost is the lost opportunity to have the operators increase production revenue through proactive management of each well.



Compact well testing requires 1/3 of the footprint of traditional well testing.

COMPACT REMOTE WELL TESTING

Multiphase meters have a slightly higher CAPEX than test separators, but due to a much lower OPEX, a new multiphase meter will save cost over a new test separator after one year. If a test separator already is being used, a new multiphase meter will save cost over the test separator after four years.

“Economic Evaluation of Multiphase Meters”
Samuel Mofunlewi & Joseph. Ajiienka, *Leonardo Journal of Sciences*
July 2007

REDUCE YOUR WELL TESTING FOOTPRINT

In order to decrease the costs associated with weight, space, and installation time, operators are looking for smaller, more integrated equipment that can do the same or more by requiring less space and cost. You can achieve this working with Emerson.

By choosing Emerson’s Compact Remote Well Testing solution, you can achieve the same result as with 21 valves and a test separator, but in a compact package with only seven valves, a multiport flow selector, and a multiphase flow meter. With smaller skid sizes, reduced installation time and cost, you will be able to fully measure individual flow rates of oil, gas, and water without the need for separation. The savings will translate directly into a reduced footprint.

IMPROVE RELIABILITY AND REDUCE TRAVEL EXPOSURE

The risk of a fatal accident is 10 to 50 times higher on a helicopter than aboard an offshore platform¹. Similarly, most onshore operators seek to minimize travel to reduce the risk of road accidents.

With Emerson’s Compact Remote Well Testing solution, you can significantly decrease the time and travel associated with operation and maintenance of a test separator. Not only will this reduce OPEX—it will also improve the safety of your staff by reducing their exposure to potentially hazardous air maintenance trips.

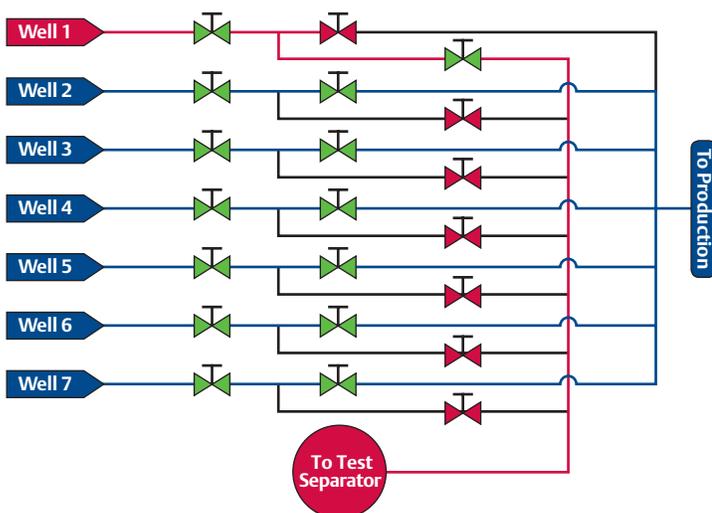
GAIN IMPROVED INSIGHT AND OPTIMIZE PRODUCTION FROM EACH WELL

In order to make well-judged decisions on the right choke setting, chemical injection, gas lift, and water injection for each well in your field, reservoir and production engineers need updated and real-time production data, rather than the typical 24-hour average data, collected at each well maybe once every 30 days.

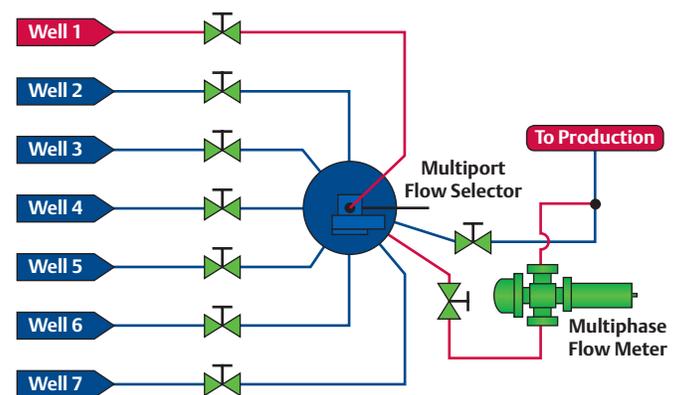
Using the Compact Remote Well Testing solution you can see what the production rates are within minutes after switching to a new well, with only minimal time required for purging or stabilizing the flow. In addition to average production rates, you can also see the dynamic behavior of the well, and determine if the well is stable or slugging, and how it will respond to changes in choke settings. With stable composition and flow rates, it’s possible for you to test every well maybe daily rather than once a month, giving your operators up-to-date information to manage the reservoir and optimize each well.

¹ “Aviation Transport Accident Statistics,” International Association of Oil & Gas Producers, March 2010.

TRADITIONAL MANIFOLD & TEST SEPARATOR



COMPACT WELL TESTING UNIT



COMPACT REMOTE WELL TESTING

INCREASE THE VIABILITY OF MARGINAL FIELDS

Operators face more pressure than ever to optimize production and make marginal fields viable and profitable. Emerson's Compact Remote Well Testing solution relieves much of this pressure by allowing you to better understand the behavior of each well, dramatically reduce your installation footprint and complexity, and simplify operation and processes.

The Bettis Multiport Flow Selector replaces the functionality of a conventional manifold arrangement, allowing you to combine the flow from up to seven wells onto a single, larger diameter outlet, and to direct any of the wells to a dedicated test outlet. While doing so, it reduces the required number of isolation valves from 21 to seven, and correspondingly reduces the amount of required piping.

The Roxar Multiphase Flow Meter replaces the functionality of a conventional test separator, measuring the individual flow rates of oil, gas, and water without the need for any separation. While doing so, you can reduce your footprint from typically 140 square-feet to 1 square-foot and test duration from typically 12-24 hours to 1-3 hours. The Roxar flowmeter also provides real-time information about the dynamic behavior of each well, rather than average flow rates only.

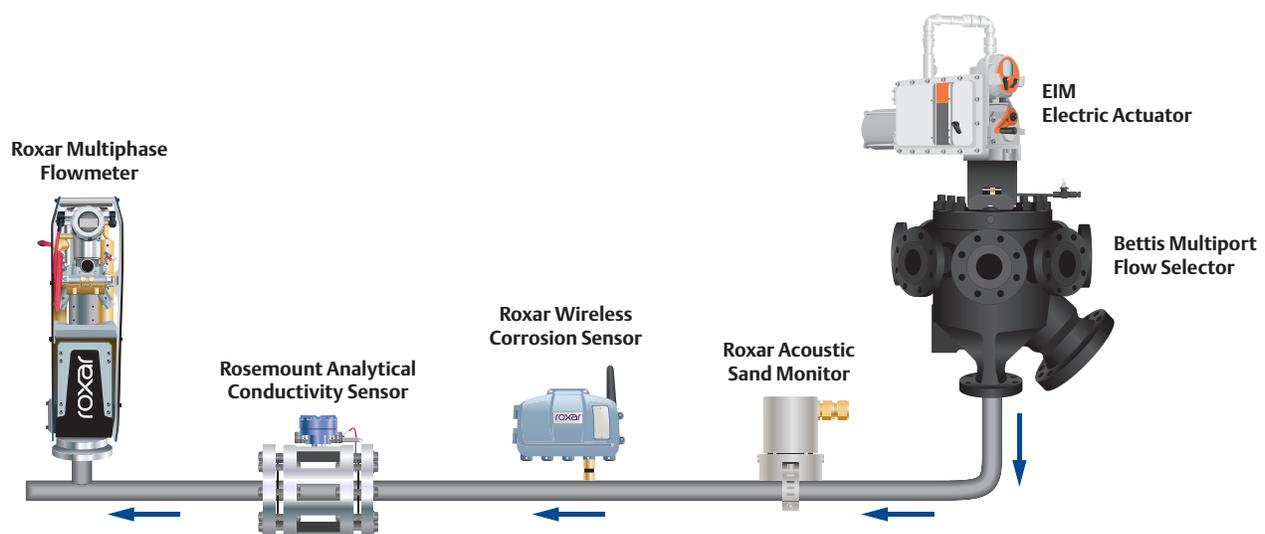
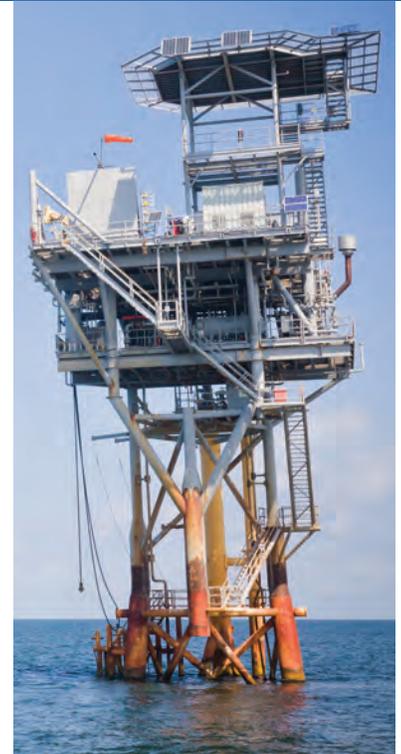
Additional measurements such as water conductivity, sand production, and corrosivity may be added to further complement the information gathered from each well

AUTOMATE YOUR WELL TESTING AND ENHANCE SAFETY

Well testing often means transporting staff by car or helicopter to remote, unmanned locations to switch between wells, monitor the test, and perform routine maintenance of the separator.

However, any time spent on the road or in the air impairs staff safety. Industry statistics reveal that motor vehicle accidents are the leading cause of on-the-job deaths for oilfield workers, and that the risk of a fatal accident is 10-50 times higher during helicopter shuttle than when onboard a platform.

The combination of an electrically actuated Multiport Flow Selector and a Multiphase Flow Meter with no moving parts allows you to configure tests, switch between wells, and harvest all test data from the convenience of your central control room, using any standard industry protocol on any type of communication to link to the production site. Thus you save time and cost, enhance staff safety, and get more accurate and up-to-date information about each well.



COMPACT REMOTE WELL TESTING

With the Remote Well Testing solution, you can decrease the weight and size of your testing solution, automate testing of remote wells, reduce maintenance trips, and gain better insight to optimize recovery and production.

FLOW CONTROL	UNIQUE FEATURES	OUTCOMES
 <p>Bettis Multiport Flow Selector with EIM Electric Multiport Control Actuator</p>	<ul style="list-style-type: none"> Automatically switches between wells for testing More compact than three-way valve manifolds Requires only seven isolation valves instead of 21 Contains EIM Multiport Control Actuator for remote and automatic actuation while retaining safe position during power loss 	<ul style="list-style-type: none"> Decreases installation, operating, wiring, maintenance, and parts costs Reduces skid weight, size, piping, and isolation valves required compared to traditional manifolds
WELL TESTING	UNIQUE FEATURES	OUTCOMES
 <p>Roxar 2600 Multiphase Flow Meter</p>	<ul style="list-style-type: none"> Provides 3D interpretation of the flow rates without any separation Provides real-time trending Better renders hard-to-analyze bubbles and phase mixtures with multi-velocity flow analysis Interchangeable venturi to easily adapt to reduction in flow rates as the field ages 	<ul style="list-style-type: none"> Delivers better, more accurate understanding of gas lift and flow rate to optimize production Increases production and recovery by operating wells at peak potential Extends service life and operating range Reduces maintenance and measurement drift
PROCESS INTEGRITY	UNIQUE FEATURES	OUTCOMES
Roxar FieldWatch Well Test	<ul style="list-style-type: none"> Integrates data from multiphase meter, sensors, and gauges to provide full view to each well Records configuration and properties and generates reports for all wells and well tests 	<ul style="list-style-type: none"> Increases well test accuracy and efficiency Better tracking and projection for well tests Prevent sand from blocking pipelines and separators Avoid errors, repairs and improper results from incorrect meter setup
Roxar CorrLog Corrosion Monitor	<ul style="list-style-type: none"> Calculates the metal loss rate on the Roxar corrosion probes, thus effectively revealing the corrosivity of the fluids from the well on test 	
Roxar Acoustic Sand Monitor	<ul style="list-style-type: none"> Measures the noise generated as the sand from the well hits a pipe bend and integrates this with the flow velocity from the Multiphase Flow Meter to effectively add sand production rate to the total collected well test data 	
Rosemount Analytical Contacting Conductivity Sensor	<ul style="list-style-type: none"> Measures the conductivity of the produced water to reveal any changes in water salinity, breakthrough of formation water, or breakthrough of injected water 	

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