Case Study focus on WEM

# Helping an Operator Get a Return on Its Investment

*A crucial part of solving problems is figuring out what not to do, what won't work.*

*When an independent operator determined that a larger-than-expected pressure drop at a compressor platform was affecting production volumes for 2 gas wells 13 miles away, the solution seemed somewhat obvious and simple—replace the existing compressor with a larger one. ◆ But analysis using P.E. Moseley's Well Evaluation Model (WEM) determined that adding a compressor at that location would not solve the problem. So they decided against that plan, which prevented a $150,000 investment that would have yielded no real production gain.*

*When markets improve, "Plan B" could yield a bigger payoff yet.*

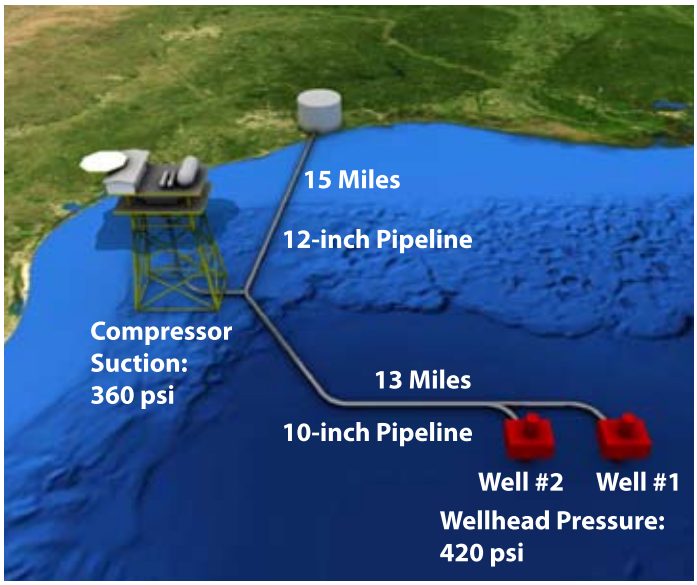


Figure 1. A lower-than-expected pressure drop at a compressor platform was impacting production for 2 gas wells in shallow water 30 miles off the Texas coast. Using WEM, the operator was able to develop a solution to resolve the pressure problem and more than double current production.

An independent operator is producing gas from two shallow, low-pressure wells about 30 miles offshore Texas in 50 ft of water (Figure 1). Well #1 is 1,600 ft deep and Well #2 is 2,700 ft deep in a sand formation. The two wells, with combined production of 600 Mcfd, flow into a single 10-inch line, with a wellhead pressure of 420 psi.

Thirteen miles from the wellheads towards shore, sits a compressor platform to boost the pressure to move the gas another 15 miles through a 12-inch line where it intersects a sales line onshore.

In monitoring operations, the operator discovered that the pressure at the compressor platform was 360 psi—an unexpected 60-psi pressure drop from the wellheads. Analysis with WEM determined that, for the system size, volume of gas, and distance, the expected pressure drop would be about 5 psi.

The operator strongly suspected sand and water were restricting gas flow in the 10-inch line. Over the years, many other wells in the area had been shut in because of excessive sand and water production. From the current wells to the platform, it was all "uphill," further evidence to support water in the lines.

First thought for a solution was to pig the line, but the system was not designed for it. And if the water and sand were as bad as expected (based on the 60-psi pressure drop and sand and water in other area wells), then the risk of plugging the line—and losing it for good—were too great a risk for the operator.

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Next, the operator proposed setting a larger compressor on the existing compressor platform to lower the suction pressure to 50 psi and increase production. But WEM analysis determined that, because of the existing pressure drop in the wells and the probability of sand and water, a new, larger compressor would not have the necessary effect on the wellhead pressure to realize the potential production rate increase.

The cost of that new compressor was estimated at $150,000, but would have had only nominal production improvements (if any at all), so the operator saved making that investment.

Using WEM, the operator conducted further production optimization analysis and determined that, if the wellhead pressure was lowered, the combined production from the two wells could be improved from the current 600 Mcfd—to 1.5 MMcfd—with an estimated reserve increase of 2.5+ Bcf.

Further WEM analysis showed that setting a new, larger compressor on the wellhead platform would reduce the wellhead pressure to achieve these calculated production increases. However, the wellhead platform is very small and requires additional space for a compressor, at a total estimated cost of $500,000.

With the current economic uncertainty and lower gas prices, the project is not currently possible. But when markets stabilize and product prices improve, the operator is positioned to realize a good return on a relatively modest capital investment.

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**About P.E. Moseley & Associates, Inc.**

P.E. Moseley & Associates, Inc. (Moseley) develops and supports software and delivers training, mentoring, and consulting services exclusively for the oil and gas industry. Products and services focus on well design, production optimization and reserves.

Since its inception in 1982, the company has delivered innovative, analytically-rigorous, user-friendly software solutions, beginning with WEM (Well Evaluation Model), the first software to apply nodal analysis to well design and production optimization.

Virtually all software is developed and supported in-house by a Moseley team of advanced-degree experts and superior programmer talent. This elite team means Moseley customers receive fast, accurate technical support and rapid response to user requests for new functionality.

Founder and president Dr. Phillip E. Moseley drives development, support, training and consulting. A team of Moseley associates executes the vision through continuous product enhancement and support, consulting, and delivery of public or company-specific training in well design and production optimization using Moseley software.

**About WEM**

Well Evaluation Model (WEM) is field-tested, analytically rigorous well productivity software that improves performance throughout the full life cycle of oil and gas wells, from design to abandonment.

Engineers use WEM to design, monitor, analyze, troubleshoot, and optimize producing and injecting systems, artificial lift, completions and more.

The first commercial software to apply nodal analysis to well design and production optimization, WEM features an intuitive, easy-to-use graphical user interface of a well schematic performance model. The array of equipment and options in WEM ensures that any producing or injecting system can be modeled.

Nodal analysis for well performance is based on the principle that reservoir inflow and wellbore outflow can be independently characterize as functions of flow rate. The single rate that balances the pressure losses in the inflow-outflow system defines well flow.

Starting from this premise, optimizing well productivity has evolved to a process of systematic updating of well parameters and comparing incremental flow rates with the associated cost of the proposed changes.

WEM integrates the wide variety of engineering technologies necessary to develop quick, accurate solutions for virtually any well performance issue.

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