

SwRI-developed test rig performs well under wet gas condition

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SwRI has designed a test loop for evaluating compressor performance under wet gas conditions.

Engineers in Southwest Research Institute's (SwRI) Mechanical Engineering Division have successfully tested a two-stage centrifugal compressor for offshore production. A test loop designed and built at SwRI was used to evaluate the compressor's performance under wet gas conditions. The testing was conducted for a major energy producer.

Compressors, in general, are designed for dry [gas](#) applications. However, natural gas production often includes the presence of liquids. The ability to separate liquids from the gas is advantageous, especially if the liquid is a useful commodity. Conventional separation is practical for land-based applications, but can be difficult when production is offshore due

to space and weight constraints.

The objective of the test program was to validate the client's design of a dry gas extraction system for use in a wet gas environment. Testing was conducted at an inlet pressure of 300 psia, with liquid volume fractions up to 5 percent. Performance measurements included shaft power, gas power, water injection flow rates, axial thrust, radial and axial vibration, and separator performance.

"We developed a test loop that allowed us to evaluate the system under closed loop conditions at elevated suction pressure," said Principal Engineer David Ransom, who serves as project manager for the test effort. "This condition is more representative of anticipated field conditions, providing more meaningful performance data for comparison to our client's wet gas compression performance models."

Provided by Southwest Research Institute

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