

New Solutions Emerging To Treat And Recycle Water Used In Hydraulic Fracs

By Al Pickett
Special Correspondent

The Barnett Shale, the granddaddy of domestic shale gas plays, is located beneath one of the most populated urban centers in the country: the Dallas-Fort Worth metroplex and its 5 million inhabitants. As if drilling and developing shale gas wells in this urban environment was not challenging enough, the region also is experiencing a drought.

That is significant because—as in shale and tight-sands plays in other parts of the country—Barnett wells require massive hydraulic fracturing to achieve commercial rates of natural gas production, and the slick-water fracs used on Barnett wells consume huge quantities of water. In fact, with horizontal shale wells requiring as much as 1 million gallons of fresh water per frac stage, water has become a hot-button issue facing the development of shale gas plays from the Barnett in the Fort Worth Basin to the Marcellus in the Appalachian Basin.

In response, a number of solutions are emerging that use a variety of methods to recapture, treat, recycle and reuse the water from frac operations in shale and tight-sands gas plays.



Aqua-Pure's processing systems use mechanical vapor recompression evaporation technology packaged in a self-contained, skid-mounted mobile unit that consists of a pretreatment module, an evaporator module and a compressor module.

Mobile MVR Evaporator

Fountain Quail Water Management LLC, a subsidiary of Calgary-based Aqua-Pure Ventures Inc., has nine mobile evaporators in service in the Barnett Shale play, reports Patrick Horner, a process engineer for Fountain Quail.

“We have been recycling frac water since 2005, and to date have processed in excess of 14 million barrels of frac flow-back water in the Barnett Shale play into distilled freshwater for reuse,” he says. “We have multiple units in operation at four sites for Devon Energy Corp. in the Barnett Shale, and other units in operation in Canada for EnCana and BP.”

Aqua-Pure’s systems use mechanical vapor recompression (MVR) evaporation technology, and each unit is designed with a daily output of 2,000 barrels of distilled water and 350 barrels of concentrated brine, according to Horner.

But unlike conventional MVR technology, Horner says Aqua-Pure came up with a mobile MVR evaporator that provides higher capacity with a much smaller facility. “The inherent problem with MVR technology has been size. With any significant capacity, a large stationary facility would be required. A traditional MVR evaporator employs a vertical shell-and-tube heat exchanger that is up to 10 feet

in diameter and 60 feet tall.”

The mobile MVR evaporator system solves both the size problem and the cost of installing a fixed facility, Horner notes. “Although the footprint is similar to that of a traditional MVR evaporator—about 2,500 square feet—the unit is skid-mounted and designed for highway transportation on three low-boy trailers without special permitting,” he says.

The system consists of three modules, each 11.5 feet wide and 12.5 feet high, including a pretreatment module 40 feet long that weighs 25,000 pounds, an evaporator module that is 37 feet long and weighs 42,000 pounds, and a compressor module that is 30 feet long and weighs

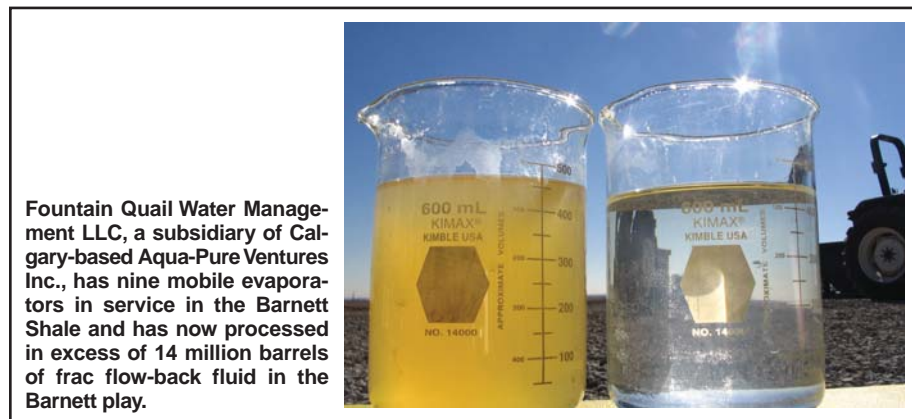
96,000 pounds. Horner says the system also includes interconnecting pipes and electrical connections, as well as a 50-kilowatt generator set.

“The system is totally self-contained,” he comments. “It needs no external source of electric power. We draw natural gas directly from the well to run the compressor and to drive the generator, which produces electricity to power the pumps, instruments and controls.”

When treatment at one site is finished, the operator can drain the system, load it on the trucks with a crane, haul it to a new site, and have it set up within a couple days, Horner claims. “The system reduces water disposal volumes by 85 percent, which means it reduces hauling costs by 85 percent. That takes a lot of trucks off the road,” he adds. “More companies are recognizing the benefit of treating and reusing frac water.”

Horner says Fountain Quail owns and operates the mobile evaporators, charging clients on a per-barrel of treated water basis. “We can set on well pads, or on land strategically located within a few miles of a field,” he explains. “We can service up to 100 frac jobs with one unit. When that sector is drilled and completed, we can move to another site.”

Horner says Fountain Quail also has an agreement with the Weatherford, Tx., wastewater treatment plant to build a pipeline from the city’s treatment plant to a recycling facility, allowing operators in that part of Parker County to use effluents from the treatment plant for frac jobs. “That reduces the need for trucking and operators do not have to rely on one source of water,” he explains. “We hope to have the system near Weatherford operational by the end of this year.” □



Fountain Quail Water Management LLC, a subsidiary of Calgary-based Aqua-Pure Ventures Inc., has nine mobile evaporators in service in the Barnett Shale and has now processed in excess of 14 million barrels of frac flow-back fluid in the Barnett play.