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## OIL AND GAS:

### Environmental concerns still spurring research, development

Nathanial Gronewold, E&amp;E reporter

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Energy industry research and development has been hit hard in the oil price collapse, but one area is still seeing some business.

Weak oil and natural gas prices continue to crimp companies' budgets, even at the largest and wealthiest oil and gas operations. Capital expenditures on new upstream projects have been slashed for two years in a row, causing concerns over future oil supply. R&D spending on new technology and improved extraction techniques has also fallen sharply, hurting academic partners with industry in particular.

But work continues on environmentally friendly applications, driven by federal regulations on methane emissions, wastewater disposal and well integrity. Those rules may compel industry to maintain or even expand its support for research on improving the environmental performance of oil and gas drilling and extraction, even during this downturn.

Indeed, eco-friendly R&D may point toward a viable path for one major research consortium that was earlier facing possible extinction.

"With the last year or so of fallen commodity prices and the impact, that has been hard on exploration budgets, but really, that's hit R&D, as that's really one of the first things to go," said Jack Belcher, a consultant and vice president at HBW Resources LLC.

Still, Belcher said companies could be compelled to direct some funding to R&D primarily because of "a lot of challenges in terms of new regulations, especially on the environmental side, with the new rules regarding methane emissions, new regulation regarding air emissions, of water disposal, a whole host of issues that the industry is challenged with."

Ongoing fears of earthquakes induced by industry activity are propelling a major scientific initiative in Texas. Companies inject wastewater from horizontal drilling and hydraulic fracturing into injection wells deep underground, and these wastewater injection wells have been linked to seismic events.

A contract worth about \$2 million was recently finalized with the company Nanometrics to begin deployment of TexNet. It's a project to establish seismic monitoring equipment across Texas, enabling researchers to monitor the state's seismicity and examine how earthquakes may be tied to oil and gas operations. TexNet is being spearheaded by the University of Texas, Austin's Bureau of Economic Geology, with support from the state government.

The oil price collapse hasn't slowed down preparation and deployment of TexNet.

"Not only will Nanometrics supply and assist in installing the instrumentation for BEG's TexNet, but its world-renowned experts will help to maintain network equipment after installation, allowing the Bureau's staff to focus on network management, scientific products and research activities related to the resulting data," according to the company.

TexNet data will be used by industry and regulators, but will also be made available to

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scientists seeking to better understand Texas' geology and its natural seismicity.

## New partnerships

Belcher's HBW is looking to keep environmental R&D in the oil and gas industry alive for years to come, even in a depressed commodity price environment.

The Research Partnership to Secure Energy for America (RPSEA) was established in 2002 as a quasi-government office tasked to bring academic researchers and energy companies together to collaborate on areas of R&D that might otherwise have been overlooked. RPSEA recently lost congressional funding but has been kept alive by existing funds and Department of Energy support. The oil price collapse affecting industry partners threatens future projects.

In an effort to cope, RPSEA has hired HBW Resources to strengthen its industry ties, with an emphasis on environmental applications for R&D projects. The partnership aims to "grow [RPSEA's] capabilities and opportunities to focus research on the development and deployment of safe and environmentally sensitive technologies to efficiently deliver domestic energy resources."

Belcher said there is no one priority area for the partnership to focus on. Regulatory pushes the industry faces leave open a wide variety of paths for industry R&D, including wastewater cleanup and disposal, emissions controls at oil and gas operations, and seismicity.

"We consider them all priorities," Belcher said. "Clearly, there's flaring, and the methane rule, that's an immediate priority the industry is facing. Another one is well control."

## Funding drying up

The bulk of the RPSEA projects that are still active are environmentally focused.

Examples include the Environmentally Friendly Drilling Technology Integration Program, in partnership with the Houston Advanced Research Center##. A separate \$1.7 million R&D endeavor was seeking out technology to treat drilling and fracking wastewater using osmosis.

Through RPSEA, the Colorado School of Mines has been contracted to explore methods for fracturing shale oil and gas reservoirs using cryogenic liquids, such as liquid carbon dioxide or liquid nitrogen. The approach has the potential to significantly reduce or eliminate the need for water in fracking and guard against groundwater contamination, as the ultra-cooled gases would simply evaporate once reaching higher temperatures. Participants in the project include Pioneer Natural Resources Co., CARBO Ceramics Inc. and Lawrence Berkeley National Laboratory.

But the funding periods for these projects are scheduled to end this summer. The cryogenic fracking R&D and Environmentally Friendly Drilling initiatives both show funding periods ending at the start of July. The fracking wastewater osmosis treatment research ran out of initial funding at the end of May.

Belcher says he's not worried. HBW wouldn't have signed up to assist RPSEA if it didn't think environmental R&D in oil and gas had a viable future.

"We're working with RPSEA to help identify new opportunities for research and development to tackle what we consider to be the big challenges facing industry today," he said.

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