

# SHALE PLAY **WATER** MANAGEMENT

[Jul/Aug 2019]

RESPONSIBLE SOLUTIONS FOR NORTH AMERICA'S OIL & GAS INDUSTRY

## KEYS TO SUCCESS: Taking a Page From **CONVENTIONAL MIDSTREAM**

**AERATION  
ECONOMICS**

**CUT SCALING WITH  
DYNAMIC MIXING**

**+  
TAKING  
THE LEAP  
TO REUSE**



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# SHALE PLAY WATER MANAGEMENT

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Business Headlines

Legislation Would Boost U.S. Research into CO<sub>2</sub> Capture

Under pressure for a response to the climate change “do something” chorus, Republican legislators have introduced a bill that would direct the government’s energy research labs to look into technology that removes carbon dioxide from the air.

Of the many solutions offered to head off a predicted global climate catastrophe, this is one of the few not aimed at choking off fossil fuel usage.

In the meantime, interest continues to grow in direct air capture technology pioneered by a Canadian company that pulls CO<sub>2</sub> from air at groundlevel and injects into oil formations for enhanced recovery. With financial support from a division of Occidental Petroleum, the carbon capture technology will be evaluated

in a pilot project currently under development in the Permian Basin.

To provide a boost to carbon capture and sequestration technologies, Sen. John Cornyn (R-Texas) in May introduced S. 1675, called Launching Energy Advancement and Development. The bill would fund research and development of “commercially viable technologies for the capture of carbon dioxide produced during the generation of natural gas-generated power.”

“The US leads the world in emissions reduction, but to build on that success, we need to incentivize innovation and partner with the private sector to create affordable solutions,” Cornyn said in a published report. The bill would “encourage the continued domestic use of natural gas to protect the environment and remain a global leader in energy innovation.”

A similar bill sponsored by Sen. John Barrasso (R-Wyo.) in February would direct funding into research for CO<sub>2</sub> capture and development of commercially viable uses for the gas.

After announcing in January it was co-sponsoring with Chevron research into direct CO<sub>2</sub> capture technology, Occidental doubled down in May with a plan to jointly build a pilot facility in the Permian capable of capturing 500 kilotons of atmospheric CO<sub>2</sub> per year.

Developed by Carbon Engineering, of British Columbia, the technology would enable low-cost EOR in mature oilfields operated by Oxy, according to a company release.

If the project continues past approvals, construction would begin in 2021 and operations commence two years later.

Artist rendering of one of several direct air capture facilities developed by Carbon Engineering that together would trap up to 1 million tons of CO<sub>2</sub> per year. Image courtesy Carbon Engineering Ltd.





Properly installed lightning rods can protect produced water storage tanks from lightning strikes. Photo courtesy KLP

### Lightning Strikes Trigger SWD Tank Fires

A pair of lightning strike-caused fires within two weeks at saltwater disposal facilities in North Dakota has renewed calls for standardization of lightning protection devices and their installation.

Lightning was said to have caused a fire at a SWD facility near Keene, ND, on June 14, according to news reports. The fire at the Bullrock SWD facility was extinguished by firefighters using foam. The company later posted notice that the facility was restarted and resumed operations the next day.

On June 3, a lightning strike caused a fire at a SWD facility northeast of Alexander, ND, and resulted in the release of 3,400 bbl of produced water. The facility, including five 500-bbl water tanks, reported to be operated by Hydro Clear, was said to have been destroyed.

Earlier in the year, a SWD facility suffered extensive damage in an explosion and fire.

That incident in January involved an explosion and fire at a SWD facility in Watford City, ND, operated by White Owl Energy Services. The explosion damaged several nearby buildings and smoldered for several days. An investigation into the cause of the incident has not been released although a lightning strike was ruled out.

According to Underwriters Laboratory, lightning strikes account for more than \$1 billion in annual structural damage to buildings in the U.S.

Mike Kuefler, owner of Kuefler Lightning Protection, St. Ignatius, MT, said that although a lightning protection system cannot prevent a strike, it will provide a safe path on which the electrical current can be safely directed to the ground.

### Cash Flow Stays Tight for Shale Producers

Despite pressure from investors to rein in capital intensive projects and reduce debt, a majority of oil companies surveyed in the first quarter were operating on negative cash flows, according to a report from Rystad Energy.

The Norwegian oil and gas consulting firm studied 40 American oil companies with predominant assets in shale plays and focused on cash available for expansion, debt reduction or dividends. Of the group, only four companies were reported operating with a positive cash flow.

Total cash from operations fell to \$9.9 billion in the first quarter from \$14 billion one year earlier, said Alisa Lukash, a senior analyst at Rystad. “This is the lowest CFO we have seen since the fourth quarter of 2017,” she said.

“The gap between capex and CFO has reached a staggering \$4.7 billion, which implies tremendous overspend,” Lukash added.

Shale companies have relied on bond markets to finance operations and without funding and debt refinancing, capex would eventually have to be cut. However, only a few of the more heavily leveraged shale operators have issued bonds, mostly due to an increased Fed Rate and market concerns over short-term risk for domestic oil companies, the Rystad report advised.

Firmer prices in the second quarter should see cash flow levels improve while capex remains stable, the report concluded.



RYSTAD ENERGY

## XRI Acquires Fountain Quail Water Management

Water midstream company, XRI Holdings, announced in June that it acquired the water treatment and recycling division of Fountain Quail Energy Services.

An industry leader in produced water treatment, recycle and reuse technology with operations in the Permian and other key producing basins, Fountain Quail Water Management will function as a wholly-owned subsidiary of XRI operating under the Fountain Quail name. The announcement indicated that members of the company's senior leadership have joined XRI and will lead the company's water treatment and recycling division.

The acquisition is intended to "enhance XRI's owned network of water midstream systems with full recycle and reuse capabilities and will set the standard for flexibility and sustainability for water in the Permian," stated John Durand, president of XRI.

Fountain Quail Water Management adds "low-cost, high-efficiency recycle technology that is second-to-none," said Matthew Gabriel, CEO at XRI. Under the combined operation "it is now possible for customers in the Delaware and Midland Basins to reuse, blend or swap 100 percent of their produced water with our water to obtain water of virtually any specification," he added.

The acquisition "underscores XRI's commitment to environmental stewardship and strengthens its position as standard bearer of the water midstream sector," Gabriel said.

A pioneer in development of cost effective, reliable water treatment, recycling and reuse technologies, Fountain Quail Water Management

established a successful track record of commercial operations dating to the mid-1990s. Its fixed and semi-fixed ROVERTM systems, mobile SCOUTTM systems, and mobile MAVREXTM chlorine dioxide water treatment systems are capable of filling a broad range of customers' water recycling and reuse demands.

Headquartered in Midland, Texas, XRI is a leading full-cycle water midstream company with integrated infrastructure assets strategically located throughout the Permian Basin. The company operates more than 300 miles of permanent, buried pipeline infrastructure and provides development, production, treatment and transportation of water for use in the oil and natural gas industry.



## Innovations in Water Treatment Tech Funded

Development and commercialization of new, low-cost produced water technologies are the goal of a funding opportunity announced by the Dept. of Energy's Office of Fossil Energy in May.

As part of the office's produced water R&D efforts, the program offers \$5 million in funding for cost-shared research and development of treatment technologies that reduce wastewater and increase freshwater supplies.

The program is managed by the National Energy Technology Laboratory and will focus on projects that "improve the efficiency of existing commercial processes, specifically



those that target removal of challenging constituents."

Initiated by the White House, the goal of Water Security Grand Challenge is to "transform the energy sector's produced water from a waste to a resource," according to the DOE announcement.

*Visit the Office of Fossil Energy's web site for more information.*

## Artesia Refinery to Expand

Holly Frontier, operator of the only refinery in southeast New Mexico, filed paperwork in May to expand its refinery at Artesia.

Owned by Holly Frontier, the Navajo Refinery has a rated oil capacity of 102,000 b/d and can process most grades of crude, including heavy, sour, light and sweet grades.

The filing with the New Mexico Environment Department indicated the refinery would add a renewable diesel unit, including a new boiler and heater. The expansion would also add six new storage tanks, railcar loading and unloading rack, new cooling tower and piping components.

## Saudi Breakeven Price Not So Deep

Saudi Arabia, the production pacesetter of OPEC countries, said in June that it would not lift the production cuts it enacted in the fourth quarter to support stronger prices, according to market reports.

Russia, the OPEC second largest producer, refused to commit to reduced production, the reports said. In the meantime, a new analysis was released showing just how important price supports are to the desert kingdom.

Oil marketers have long believed that Aramco, the Saudi national oil company, enjoyed the lowest breakevens of any oil company because of its vast inventory of legacy production wells. The impact of such amortized assets allowed Aramco to realize breakevens of \$10 bbl or less, or so conventional wisdom held.

However, a new filing on its finances has lifted the veil on Aramco's costs and caused analysts to suggest the Aramco's breakeven is closer to \$40 bbl. In fact, a report in June by an oil market expert predicted prices would not remain below \$45 bbl for too long without the Saudis taking action to cut production and raise prices.

When Aramco ramped up production in late 2014 to teach U.S. shale producers a lesson, the ensuing price drop in 2015 caused real pain for the Saudi economy and cut deeply into Aramco's income and free cash flow. When prices recovered in 2017, Aramco was again posting figures that returned it to the top spot as the world's most profitable company.

This spring, Aramco, a private company with very closely held books, issued a bond offering that provided a glimpse into company finances and revealed just how far ahead it is in terms of profitability. With Brent crude averaging \$71.34 in 2018, Aramco posted \$111 billion in earnings, compared to earnings of \$59.4 billion for Apple, the world's second most profitable company. The next oil company on the list, ExxonMobil, posted earnings last year of \$20.8 billion.



Emblem of Saudi Arabia

An examination of the financial picture at Aramco by analyst Robert Rapier showed it earned just \$13 billion during the downturn in 2016.

If prices were to drop to \$45 bbl, OPEC, led by the Saudis "would have to take action to prop up prices as the cartel did in 2016. Otherwise, they (Saudis) would be in deep financial trouble," Rapier commented.

In the meantime, markets this spring continued riding the oil price roller coaster with no end of the ups and downs in sight.

According to DrillingInfo, flat prices in early June reflected a market "being pulled in opposite directions" by the OPEC supply cut extension and concerns about the health of the global economy.

### Report: Western Spills Up but Volumes Down

According to a report from the Center for Western Priorities, the number of fluid spills from oil and gas activities in three western states increased 2.5 percent last year although total spill volumes have declined.

"Oil and gas-related spills have a significant impact on the land, water and surrounding communities," said Jesse Prentice-Dunn, policy director at the center. "There is clearly a need to improve safeguards."

According to its annual wrap-up of spills using data provided by state oil and gas regulators, the center reported a total 2,834 spills that released 17,998 bbl of oil and 174,943 bbl of produced water in Colorado, New Mexico and Wyoming in 2018. Compared to 2017, volumes of oil spilled decreased by 432 bbl while produced water spill volumes decreased by 25,054 bbl.

In Colorado, legislation sharply increasing penalties for violations of spill regulations is cited as a factor in the decrease in spills and spill volumes, according to the Colorado Oil and Gas Association.

"Colorado has seen total spills decrease since 2015 by more than 25 percent despite a 40 percent increase in oil production," said Scott Pres-tidge, director of communications at COGA. "Total spilled fluid volume accounts for only 0.003 percent of fluid volume handled by producers." The Center for Western Priorities is an environmental news organization that reports on conservation issues in the West and generally opposes oil and gas development.



OIL & PRODUCED WATER SPILLS IN THREE WESTERN STATES				
2018	Colorado	New Mexico	Wyoming	Total
SPILLS	596	1,523	715	2,834
OIL BBL	504	15,982	605	17,988
PRODUCED WATER BBL	12,841	91,914	70,188	174,943