Water, Water Everywhere in California Oil Production

Richard Nemec, Shale Gas Daily, 9-26-14

In the drought-scarred West and the current era of hydraulic fracturing (fracking), California's preponderance of water produced in conjunction with oil is gaining more attention among industry and government leaders.

Gov. Jerry Brown on Thursday signed a new law (SB 1281) on oil/gas production and water use, beefing up the detailed level of reporting on the source and use of water produced with oil. Steve Bohlen, who heads the state’s Division of Oil, Gas and Geothermal Resources (DOGGR), last week reported statistics showing the state's total oil production of nearly 200 million bbl last year also produced more than 3 billion barrels of water.

A source at the Western States Petroleum Association (WSPA) echoed this, saying the amounts of water produced with oil are 10-15 times greater than the oil produced. The quality of those water supplies varies greatly, according to WSPA spokesperson Tupper Hull.

Bohlen and Hull both said there is an ongoing effort to find more beneficial uses for those large volumes of water. Chevron Corp.'s Kern River field in the San Joaquin Valley, for example, supplies more than 750,000 barrels of water to the Cowelo Water District in Kern County, Hull said.

"Other companies use [oil produced water] to irrigate plants and crops on the property they own; some of it is treated and used in enhanced oil recovery (EOR) operations, and some of it is used for dust control," Hull said.

The water-oil combination can be traced back to the geologic fact that oil was deposited in lake and marine environments millions of years ago, so water was present during the oil formation process, a DOGGR spokesperson said. "If the oil migrated from the source rock to a reservoir rock, it displaced water as it accumulated in a trap," he said.

"There is always some water produced with the oil at the beginning, and the percentage of water increases as oil production continues."

Nearly 2 billion of the 3.1 billion barrels of water produced with oil in California last year was reinjected for EOR. Another 831 million barrels of that water was injected into disposal wells, the DOGGR spokesperson said. "A small amount of higher quality produced water is treated and used for agriculture."

The huge amounts of water produced with oil in California come out "in a very wide range of qualities, such as total dissolved solids, heavy metals, benzene, hydrocarbons, etc.," Hull said. "Some of it is simply too dirty to be used."

Hull said the industry has always used efficiency measures aimed at reusing as much of the oil produced water as possible, and this was the case long before the current drought magnified the importance of the efforts.

Previously, operators have preferred to use fresh water for hydraulic fracturing, the DOGGR spokesperson said, but "evolving technology and concerns over water usage may prompt service companies to more frequently use produced water in well stimulation."

Other states, such as North Dakota, track the volumes of water produced with oil, but they are not of the same proportion as in California. In North Dakota there are roughly 1.4 barrels of water produced with every barrel of oil, a Department of Mineral Resources spokesperson said.

Under California's new law (SB 1281), quarterly reports will be required by operators to DOGGR, including "the source and volume of any water reported," meaning "water used to generate or make up the composition of any injected fluid or gas." The reports also now will have to detail the treatment of water and the use of treated or recycled water in oil/gas activities.