California Farmers Look to Oil Industry for Water

Lauren Sommer, KQED Science | April 7, 2014
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Water from Chevron's Kern River oil field supplies almond orchards near Bakersfield. (Lauren Sommer/KQED)

With California's reservoirs running low, many Central Valley farmers are struggling to keep their trees and crops alive this year.

In the southern San Joaquin Valley, some are getting extra water from an unlikely source: the oil industry.

California is the third largest oil-producing state in the country, extracting roughly 200 million barrels a year. But in the process of getting oil, companies also produce massive volumes of water, found naturally in the same underground formations.

"To produce one barrel of oil, we produce about nine barrels of water," says Chevron's Thep Smith, walking around the company's Kern River oil field, east of Bakersfield. Almost 10,000 pump jacks cover the hills. The field is more than a century old, but is still the second-most productive in the state.

The rock formations that bear oil in California are also full of briny, brackish water, leading to an old saying about oil companies in California: they're actually water companies that get oil as a byproduct. "This is really a water plant that skims oil," Smith says.

After the oil is separated, Chevron handles millions of gallons of water a day. The company uses about a quarter of it to enhance oil production, turning the water into steam and injecting it back into the rock formation to boost oil flow.

"The stuff here is really heavy oil," Smith says, "kind of like molasses. At room temperature, it actually is almost solid."

After using some for steam, there's still plenty of water to get rid of. Many companies dispose of it long-term by pumping it back underground, where it's trapped in rock layers.

From Pump Jacks to Produce

In the only project of its kind in the state, Chevron's water travels several miles through a 40-inch pipe, until it arrives in a reservoir used by the Cawelo Water District. Chevron provides up to a quarter of the water district's supply each year, around 26,000 acre-feet.

"The fact that we have this water coming in, it's a tremendous bonus," says David Ansolabehere, general manager of the irrigation district, near Bakersfield. "We deliver water to about 45,000 acres, about 95 percent permanent crops which are nut trees, citrus and vineyards," he says.

The district mixes Chevron's water with an equal amount of freshwater, until it reaches a quality that works for local orchards.

"We can't deliver it straight," Ansolabehere says. "It has too much salt, but we blend it down and then it's irrigation quality."

Water from Chevron gushes out of a pipeline in a reservoir that serves the Cawelo Water District. (Lauren Sommer/KQED)

During this year's drought, it's the district's only reliable supply, since water deliveries from state and federal water projects have been cut completely.

"It's going to be very tough," Ansolabehere says. "We're looking at just making sure the landowners can keep their trees alive this year."

Other Central Valley water districts are in the same boat right now, which is why Ansolabehere says there's been a lot of interest in this recycling project.

"Lately, I've been getting a lot of phone calls," he says, "meeting with people that want to do the same type of thing."

Oil Industry as Water Source, Not Sink

Oil and agriculture have long been neighbors in Kern County. And it hasn't been lost on farmers that while their water supplies are going dry this year, the industry next door isswimming in billions of gallons.

It's especially true on the west side of the San Joaquin Valley, where many water districts rely almost entirely on tenuous supplies imported from elsewhere in the state.

"You have tremendous water resources that are a byproduct of oil production," says Tupper Hull of the Western States Petroleum Association, an oil industry group.

"It's very conceivable that in the very near future," Hull says, "oil production could be a net provider of water for California ag and other purposes, as opposed to a consumer."

Opponents have criticized the oil industry's use of water, largely because the controversial oil extraction technique known as hydraulic fracturing, or fracking, consumes freshwater. Recycling water would offset that use, but to duplicate Chevron's project in other parts of the state, the industry would face significant hurdles.

High Water Treatment Costs

"One of the problems they've seen at that project is very high arsenic levels in the water," says Kassie Siegel of the Center for Biological Diversity, an environmental advocacy group.

Until a few years ago, Chevron released water from the Kern River field into a local creek during the winter, when demand from farmers was low. The water wasn't diluted and the company was fined by the regional water quality control board for violating limits on arsenic.

"It just shows again that there's no safe way to deal with the oil and gas wastewater," Siegel says. "Every single method that has been proposed and used has real risks and health harms associated with it."

Chevron's Kern River field produces millions of gallons of brackish water a day as a byproduct of oil extraction. (Lauren Sommer/KQED)

Dealing with contaminants could be even tougher in other oil fields. "The water that's here at Kern River field is at an almost near freshwater quality," says Chevron's Abby Auffant, "and that is different from water elsewhere."

Water produced in the company's other fields is significantly saltier and would need to go through a treatment process like reverse osmosis, which adds cost.

"If we were able to identify a cost-effective manner in which to treat the water," Auffant says, "it's certainly something that we would be interested in."

The economic case improves in drought years when water prices are sky-high, but drought economics only last so long.

"Normally the water's going for $30-40 an acre-foot," says Ansolabehere. "When it costs you $500 to treat it, there's not really a market except for years like this and then you can't get the treatment in place in time to really make any effect. So you have to think a couple years ahead."

As technology advances and reduces those costs, he adds, it becomes more likely that water recycling projects would come together.

For many, the drought has added new urgency, as a reminder of the state's limited water resources. "I think as the resource becomes more strained, people look to these other sources as a solution," says Harry Starkey, general manager of the West Kern Water District, west of Bakersfield.

"That conversation is happening on the west side," Starkey says. "It'll be interesting to see if you can get oil companies, that tend to be very private, to engage. Getting those two to partner up in those regards – they're different classmates. It's a matter of building trust."

It's something many farmers are watching closely, as they face the long, dry summer ahead.