

Food Safety Expert Panel Recycled Oilfield Water for Crop Irrigation

In California, oil wells actually extract far more water than oil from underground oil-bearing geologic formations. The water that is brought to the surface during oil and gas production activities is called “produced water.” Produced water is first separated from the oil, and then is either disposed of in injection wells, treated and discharged to percolation ponds, or is treated and recycled. Recycled produced water has been used to irrigate crops in the areas east and north of Bakersfield for at least 30+ years. Kern County is an arid area with water supply issues, and has an economy closely linked to agriculture and petroleum extraction.

Currently, there are four oil companies that send oil field produced water to four irrigation districts. The Central Valley Water Board requires that these companies test the produced water for a variety of chemicals to ensure that there will not be any negative impacts associated with the use of their produced water. To date, no studies have shown that irrigating food crops with produced water poses any threat to public health.

Nonetheless, some water quality advocates have contended that monitoring requirements imposed by the Regional Board are not sufficient to definitively conclude that irrigating with produced water is completely safe, and some have urged regulatory agencies to ban this practice entirely. In the interest of ensuring public safety and confidence in these practices, staff of the Central Valley Water Board recently took action by convening a Food Safety Expert Panel in order to proactively seek additional expert input.

How Much Water is Produced During Oil Production?

In 2013, 1.9 billion barrels of water (about 240,000+ acre feet) were produced during the production of approximately 150 million barrels of oil (42 gallons/barrel). About 50,000 acre feet per year of produced water is used for irrigation of crops for human consumption. The remaining produced water is typically disposed in permitted underground injection wells or surface disposal (ponds and sprayfields).

What about Fracking Fluids in Produced Water?

Hydraulic fracturing, or “fracking,” is a method of well stimulation that consists of pumping a mixture of liquids, chemicals, and sand down an oil or gas well under high pressure to cause the geologic formations to crack. To our knowledge, no produced water from wells that have been hydraulically fractured is being applied to crops for human consumption. Oil wells that have been fracked also generate produced water. The Board and the public have concerns about produced water from wells that have been fracked, since little is known about the toxicity

of these fracking fluids. The Board has never authorized the use of produced water from fracked wells on food crops.

How is Oilfield Water Treated and Regulated?

Produced water is treated by various methods to remove sediments, hydrocarbons, and other constituents before it is sent to storage/evaporation ponds (ponds). Once in the ponds, the produced water is blended with surface and/or groundwater before it is used for irrigation.

Cawelo Water District, North Kern Water District, Jasmin Ranchos Mutual Water Company, and Kern-Tulare Water District receive produced water to supplement imported surface water and pumped groundwater to meet the irrigation needs of the crops grown within the Districts. The water districts using the most produced water (Cawelo Water District and North Kern Water District) blend approximately 20,000 to 30,000 acre-feet per year of produced water with surface and groundwater supplies before irrigating crops with the mixed water. This mixed water is one of the significant water sources for 95,000 acres of cropland. Irrigation with this mixed water is regulated by Board-issued Waste Discharge Requirements (WDRs), which conditionally allow the water to be used for irrigation and which require monitoring. WDRs stipulate maximum discharge limits for providers of produced water.

How is Waste Water Regulated?

Recycling of water is encouraged by State policy as a means to supplement California's limited water supply, provided that the water is suitable for the intended use. The Water Quality Control Plan for the Tulare Lake Basin, Second Edition, revised January 2004 (the "Basin Plan") which provides the blueprint for the Board's regulation of waste discharges in the Tulare Lake Basin, states that "blending of wastewater with surface or groundwater to promote beneficial reuse of wastewater may be allowed where the Regional Water Board determines such reuse is consistent with other regulatory policies set forth or referenced herein." Policies referenced in the Basin Plan include applicable State Water Board policies.

What Type of Data are Collected on the Use of Recycled Oilfield Water for Crop Irrigation?

The Water Boards collect data on flow and oilfield waste constituents, and have recently expanded this list to include the testing required by the [Groundwater Monitoring Model Criteria](#) adopted through SB 4. In addition, monitoring requirements are being updated to include reporting of all chemicals being used by oil producers during their drilling, maintenance, and production activities from wells that supply produced water for irrigation and those chemicals are included in the monitoring requirements for the produced water. Water samples are sent to third-parties certified under the State Water Board's Environmental Laboratory Accreditation Program (ELAP) for analysis. Analytical results for the discharges of oil field produced water to agriculture are available for review at the Central Valley Water Board's Fresno Office or through the online database CIWQS.

Water Quality

Produced water is identified as a supplemental source of water, with potential beneficial uses that include livestock watering, industrial applications, irrigation, and stream augmentation. The ability to beneficially use produced water depends on a variety of factors, including its quality and the level of treatment that it receives. The Central Valley Water Board has collected data on produced water through monitoring reports and facility inspections. For decades, blended water has been analyzed for a wide range of constituents, including priority pollutants and petroleum constituents. Samples are collected and analyzed by certified laboratories. The water is tested following treatment and prior to being blended and distributed for irrigation. Before treatment and blending, a few samples have shown analytical results higher than some water quality standards that apply to drinking water and to agricultural use. These constituents include boron (0-2.2 mg/L), which can be toxic to certain crops, arsenic (0-72 µg/L), and nitrate (0-34 mg/L), which are regulated according to health-protective drinking water standards. Two samples tested positive for benzene (1.3 µg/L, 4.4 µg/L) at a level exceeding a drinking water standard, but the majority of samples either indicated that concentrations were less than the water quality standard for benzene or were non-detect for benzene. When the water is tested after being distributed for irrigation (i.e., after blending with surface water and/or groundwater), a few samples have shown results exceeding the drinking water standards for arsenic (0-62 µg/L) and nitrate (0-14 µg/L). Boron (0-1.1mg/L) also remains at levels that may be toxic to certain crops. However, these constituents are found naturally in the geologic formations that produce the oil and produced water, and there is no evidence that the blended water going to irrigation poses a threat to crops or public health. Furthermore, additional data are being collected to confirm that the consumption of the products being irrigated with blended water is safe. If you would like more information on the quality of the blended water, the Central Valley Water Board has gathered information on the water (including a water quality spreadsheet) and placed it online at:

http://www.waterboards.ca.gov/centralvalley/water_issues/oil_fields/food_safety/index.shtml.

What Will the Food Safety Expert Panel do?

Since the State Water Board and Regional Water Boards are not responsible for crop safety (crop safety primarily falls under the jurisdiction of the California Department of Public Health), the Central Valley Water Board convened the Food Safety Expert Panel to advise it in crop safety matters. The Central Valley Water Board will work with the Food Safety Expert Panel to investigate whether recent allegations concerning potential threats to food safety from oilfield produced water have merit.

What if the Food Safety Expert Panel and the Board Find a Threat to Public Health?

The Food Safety Expert Panel is reviewing produced water reuse on agriculture, related constituents, and continuing to evaluate whether any evidence indicates that such reuse poses any threat to public health. If the Food Safety Expert Panel, the State and Regional Boards, or our sister State Agencies (including Department of Public Health and Department of Food and Agriculture) find there is a threat to public health posed by the application of oil field produced

water to crops, the Board will immediately require that oil field operators modify their discharges to eliminate that threat or will mandate the cessation of such discharges.

Who sits on the Food Safety Expert Panel?

The Food Safety Expert Panel includes representatives from the California Department of Public Health, Food and Drug Branch; California Department of Food and Agriculture; California Department of Fish and Wildlife, State Water Resources Control Board, United States Environmental Protection Agency, PSE Healthy Energy, Lawrence Berkeley National Laboratories, and additional representatives with expertise in Food Safety. You can find the Project Charter at:

http://waterboards.ca.gov/centralvalley/water_issues/oil_fields/food_safety/meetings/2016_011_2_fs_of_water_proj_charter.pdf.

How Can I Stay Informed?

For more information, visit the Central Valley Regional Water Quality Control Board webpage at:

http://waterboards.ca.gov/centralvalley/water_issues/oil_fields/food_safety/index.shtml.

You can also sign up for the Food Safety / Oil Field Wastewater Reuse email list through the Water Board's LYRIS list at:

http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml.