

Aquifer Exemption for Produced Waters



Kern County has some of the most productive oil fields in the United States. Many of the oil reserves in the County, particularly on the west side, are present in shallow geologic strata, including the Tulare Formation. The shallow depth has allowed for the rapid, wide-scale development of these oil reserves. However, oil production also produces large volumes of saline water. This produced water is either reinjected back into the formation or placed in evaporation/percolation ponds.

In recent years, many of the oil field ponds have been ordered closed due to water quality concerns. The only remaining option at this time has been to reinject the produced water back into the formation. However, the shallow strata, notably the Tulare Formation, is a source of groundwater supply throughout the Kern groundwater sub-basin, including agricultural and community users immediately east of the major oil fields on the west side of Kern County. The Central Valley Regional Water Quality Control Board (RWQCB) is concerned about potential impacts to groundwater supplies caused by produced water reinjection. Therefore, to reinject produced water back into the oil formations, the oil field operators must now obtain aquifer exemptions. To obtain aquifer exemptions, the operators must demonstrate that produced water will not adversely impact groundwater that is used as a source of supply, either now, or in the future.

Aquilologic has been retained by one major oil field operator to support its aquifer exemption application. This work includes an evaluation of hydrogeologic conditions to characterize the separation of groundwater west and east of the anticline (along which most of the oil fields exist). That is, whether groundwater on the west side of the anticline is hydrologically connected to groundwater on the east side toward the agricultural and community users. We are also evaluating the vertical hydrologic connectivity between formations used for reinjection, and the shallower aquifers in the Tulare Formation used for groundwater supply. In addition, if hydrologic connections exist, we will evaluate whether produced water will migrate toward aquifers used for groundwater supply and the geographic areas from where this groundwater is pumped.