
State Water Resources Control Board

June 5, 2018

Kenneth A. Harris Jr., State Oil & Gas Supervisor
Department of Conservation
Division of Oil, Gas & Geothermal Resources
801 K Street, MS 18-05
Sacramento, CA 95814-3530
ken.harris@conservation.ca.gov

FINAL CONCURRENCE ON THE AQUIFER EXEMPTION PROPOSAL, TULARE FORMATION, MCKITTRICK OIL FIELD, KERN COUNTY

Dear Mr. Harris:

State Water Resources Control Board (State Water Board) staff, in consultation with Central Valley Regional Water Quality Control Board staff (collectively Water Boards staff), have reviewed the proposal provided by the Division of Oil, Gas and Geothermal Resources (DOGGR) on October 25, 2016 to expand the aquifer exemption for the Tulare Formation in the McKittrick Oil Field. The proposal seeks to extend the exemption to the east of the existing exempted area (East Area) and to the west of the existing exempted area (West Area) in both the upper and lower Tulare Formation (see enclosed map). The Amnicola Claystone separates the upper Tulare Formation from the lower Tulare Formation. Water Boards staff assessed whether the proposal meets the criteria set forth in California Public Resources Code (PRC) section (§) 3131 and § 146.4 of Title 40 of the Code of Federal Regulations (CFR) and considered comments received during the public comment process.

Public Comment Process

On November 9, 2017, State Water Board staff preliminarily concurred with the proposal to expand the exemption of the upper and lower Tulare Formation in both the East and West Areas pending the State's public comment process. On January 26, 2018, DOGGR published notice of the exemption proposal and opened a public comment period. DOGGR and State Water Board staff held a joint public hearing to receive comments on the exemption proposal on February 27, 2018. The comment period closed on March 14, 2018. DOGGR and State Water Board staff have reviewed and responded in writing to the comments received during the comment period and public hearing.

Concurrence with Limitation on Underground Injection Control (UIC) Projects

State Water Board staff preliminarily concur with the proposal to expand the exemption of the upper and lower Tulare Formation in both the East and West Areas. In order to ensure that

injected fluids do not affect the quality of water that may reasonably be used for any beneficial use and remain in the proposed exempted area, the following limitation shall be applied to injection activities in the upper Tulare Formation:

- In the areas east and west of the axis of the eastern-most anticline in the upper Tulare Formation (approximated by the dashed line on the enclosed map), including existing exempted areas, (1) the volume of fluids injected on the east may not exceed the volume of fluids extracted on the east and (2) the volume of fluids injected on the west may not exceed the volume of fluids extracted on the west as measured over a five-year period. Operators with injection activities in the upper Tulare Formation will collectively provide an annual report to the Water Boards and DOGGR on fluid balance data (comparing injection and extraction volumes) for the preceding five years. If injection or production wells are screened across the upper Tulare Formation and another zone(s) or formation(s), operators will specify the volume of fluid injected into and extracted from the upper Tulare Formation and provide the basis (e.g., data, calculations) for this determination.

In conjunction with the evaluation of current and future Class II UIC projects in the proposed exempted area, DOGGR and Water Boards staff will consider incorporating conditions, described below, into UIC project approvals.

State and Federal Exemption Criteria

As required by PRC § 3131(a)(1) and 40 CFR § 146.4(a) the proposed exempted area does not currently serve as a source of drinking water. Only one plugged and abandoned, oilfield-related water supply well has been identified within the proposed exempted area. No water supply wells have been identified in the Tulare Formation within one mile of the proposed exempted area.

Consistent with 40 CFR § 146.4(b)(1), the proposed exempted area will not in the future serve as a source of drinking water because it is hydrocarbon producing or contains hydrocarbons that are expected to be commercially producible. In addition, as per PRC § 3131(a)(2), the injected fluids are not expected to affect the quality of water that is, or may reasonably be, used for any beneficial use because (1) the groundwater contained in the proposed exempted area is not expected to be put to beneficial use because it contains petroleum hydrocarbons and also contains constituents such as boron and total dissolved solids at concentrations that limit its suitability for agricultural, domestic, and other beneficial uses, and (2) the injected fluids are expected to remain in the proposed exempted area.

The requirement of PRC § 3131(a)(3) is also satisfied because the injected fluids are expected to remain in the proposed exempted area due to a combination of geologic conditions and operational controls. Vertical containment for the upper Tulare Formation is provided by the basal alluvial clay, where present, operational controls, and the underlying lower permeability Amnicola Claystone. Vertical containment for the lower Tulare Formation is provided by the overlying lower permeability Amnicola Claystone and the underlying lower permeability siltstones and claystones of the San Joaquin-Etchegoin Formations. Lateral containment in the proposed exempted area will be maintained by a production-induced inward hydraulic gradient and by the McKittrick Thrust Fault along a portion of the western boundary of the proposed exempted area.

Conditions on UIC Projects

Approval of Class II UIC projects involves a joint review by DOGGR and Water Boards staff. For any injection project east of the axis of the eastern-most anticline in the upper Tulare Formation, Water Boards staff will seek the inclusion of a requirement to monitor groundwater east of the proposed exempted area with sentinel wells to confirm the containment of injected fluids.

DOGGR and Water Boards staff will consider incorporating conditions into approvals of Class II injection projects. Potential conditions include, but are not limited to, the following:

1. In cases where injection is proposed into the proposed exempted area where oil production has not been established (e.g., the expansion in the upper Tulare Formation in the East Area), verifying the presence of commercially producible hydrocarbons and demonstrating an inward hydraulic gradient;
2. Monitoring to demonstrate an inward hydraulic gradient in the upper and lower Tulare Formation; and
3. Groundwater monitoring to demonstrate that injected fluids remain in the exempted area (e.g., sentinel well monitoring). If a monitoring requirement is incorporated in a project approval, the operator must submit a plan to the Central Valley Regional Water Quality Control Board for consideration.

If you have any questions regarding this matter, please contact Mr. John Borkovich at (916) 341-5779 or john.borkovich@waterboards.ca.gov.

Sincerely,

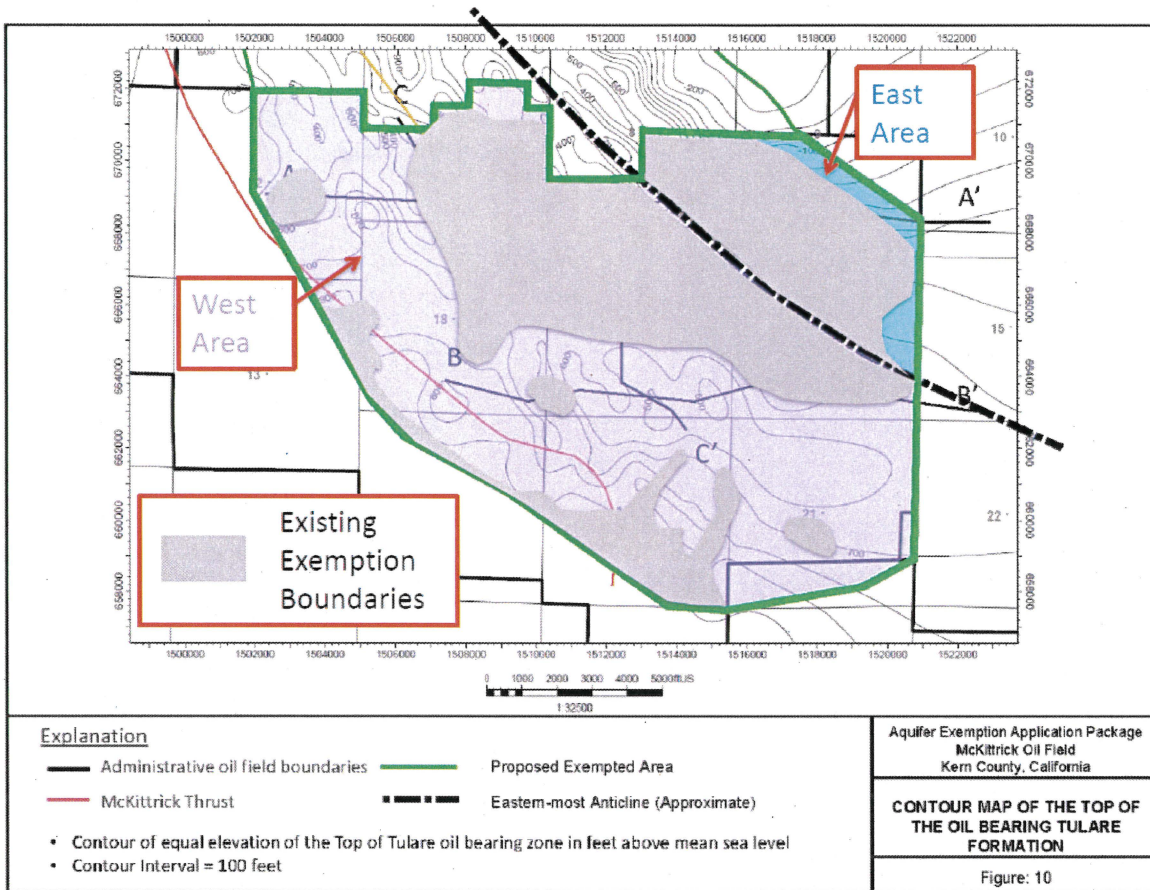


Jonathan Bishop
Chief Deputy Director

cc: Patrick Pulupa
Executive Officer
Central Valley Regional Water Quality Control Board
patrick.pulupa@waterboards.ca.gov

Cameron Campbell
Deputy, Inland District
Department of Conservation
Division of Oil, Gas & Geothermal Resources
cameron.campbell@conservation.ca.gov

Enclosure



Explanation

- Administrative oil field boundaries
- Proposed Exempted Area
- McKittrick Thrust
- Eastern-most Anticline (Approximate)
- Contour of equal elevation of the Top of Tulare oil bearing zone in feet above mean sea level
- Contour Interval = 100 feet

Aquifer Exemption Application Package
McKittrick Oil Field
Kern County, California

**CONTOUR MAP OF THE TOP OF
THE OIL BEARING TULARE
FORMATION**

Figure: 10