

State Water Resources Control Board

November 29, 2016

Kenneth A. Harris Jr., State Oil & Gas Supervisor
Department of Conservation
Division of Oil, Gas & Geothermal Resources
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FINAL CONCURRENCE ON THE EXPANSION OF THE EXISTING AQUIFER EXEMPTION FOR THE ROUND MOUNTAIN OIL FIELD

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 aquifer exemption proposal provided by the Division of Oil, Gas and Geothermal Resources (DOGGR) on July 21, 2016 for the expansion of the aquifer exemption for the Jewett Sand, Pyramid Hill Sand, Vedder Formation, and Walker Formation in the Round Mountain Oil Field. Pursuant to California Public Resources Code (PRC) section (§) 3131, Water Boards staff assessed whether the proposal conforms to the criteria set forth in § 146.4 of Title 40 of the Code of Federal Regulations (CFR) and other criteria set forth in PRC § 3131. Based on this review, State Water Board staff concur with the exemption proposal. In conjunction with the evaluation of current and future underground injection control (UIC) projects in the proposed exempted areas, DOGGR and Water Boards staff will consider incorporating conditions, described below, into project approvals.

DOGGR provided an exemption proposal for the Round Mountain Oil Field on February 9, 2016. After a technical evaluation, State Water Board staff issued a letter on April 28, 2016 preliminarily concurring with that proposal. DOGGR and the State Water Board held a joint public hearing on the proposal on June 14, 2016 in Bakersfield, California. Following the closure of the comment period on June 25, 2016, DOGGR made revisions to the proposal based on comments received. Specifically, DOGGR made minor modifications to the proposed exempted areas of the Jewett Sand, Pyramid Hill Sand, and Vedder Formation by filling in all or a portion of interior gaps in the original proposed exempted areas. These changes were based on new information regarding faults and the presence of oil within the zones/formations at issue. Due to these modifications to the exemption proposal, a 15 day supplemental public comment period was held from August 22 through September 6, 2016. DOGGR and State Water Board staff have reviewed and responded in writing to the comments received during the two comment periods and public hearing.

As required by PRC § 3131(a)(1) and 40 CFR §146.4, the aquifers at issue (a) do not currently serve as sources of drinking water and (b) will not in the future serve as sources of drinking water because they are currently hydrocarbon energy producing and are expected to produce commercial quantities of hydrocarbons in the future. 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 injected fluids must be of equal or better water quality than baseline groundwater quality established prior to new injection activity, in accordance with conditions to be incorporated into project approvals, and (2) the injected fluids are expected to remain in the proposed exempted areas.

The requirement of PRC § 3131(a)(3) is also satisfied because a detailed technical demonstration has been made that the injected fluids are expected to remain in the proposed exempted areas due to a combination of geologic conditions and hydraulic controls. Predominant geologic features include normal faults, which are present throughout the Round Mountain Oil Field and extend from the deeper granitic (basement rock) through the shallower proposed exempted aquifers. The faults are demonstrated to be sealing as evident by one or more of the following conditions: (1) oil-saturated formations are separated from non-saturated formations across the fault, (2) elevated temperatures/pressures are observed on the injection side of the fault, but are not detected on the other side of the fault, and (3) groundwater and oil-water contact levels are different across the fault.

Fault barriers are present at the northern (Poso Creek and Coffee Canyon faults), southern (Jewett Fault and two unnamed faults extending to the northeast and southwest of the Round Mountain Fault), eastern (Kern River, Kern Gorge, and Round Mountain Faults), and western (Kern Front and Round Mountain Faults) boundaries of the proposed exempted areas. The Jewett and Pyramid Hill Sands are truncated at the western boundaries of their proposed exempted areas by the overlying Freeman Silt (Freeman-Jewett Formation). Permeabilities of the Jewett Sand, Pyramid Hill Sand, and Freeman Silt are 250 millidarcies (md), 209 md, and 0.9 md, respectively. Injected fluids in the proposed exempted areas should also be contained hydraulically, both vertically and laterally, due to the inward hydraulic gradient created by oilfield dewatering activities in the proposed exempted areas.

No water supply wells have been identified in any of the aquifers proposed for exemption within one mile of the administrative boundary of the Round Mountain Oil Field. Water supply wells are completed in the shallower alluvium and Kern River, Santa Margarita, and Olcese Formations, all of which are hydraulically separated from the aquifers proposed for exemption by the underlying, regionally extensive, low permeability, 150 to 500 feet thick Freeman Silt (vertical confining layer). Based on a review of the water supply well information, the completed depths of the deepest water supply wells are approximately 600 to 2,800 vertical feet from the top of the shallowest aquifers proposed for exemption (Jewett or Pyramid Hill Sands).

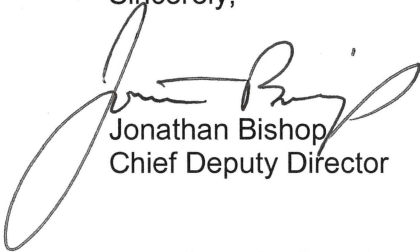
Oil is currently produced from the four aquifers proposed for exemption. The produced water is treated and re-injected in the same aquifers via water disposal, water flood, steam flood, and cyclic steam operations. Injection into the Olcese Formation (an aquifer not proposed for exemption) has been discontinued.

Approval of UIC projects will involve a joint review by DOGGR and Water Boards staff. DOGGR and Water Boards staff will consider including conditions in future injection project approvals. Potential conditions include, but are not limited to, the following:

- 1) Collecting groundwater sample(s) from proposed injection project well(s) that are completed in the portion of the exempted formation proposed for injection to establish baseline groundwater quality prior to fluid injection;
- 2) Requiring that injected fluids be of equal or better water quality than the baseline groundwater quality established from the analysis of groundwater samples collected in the portion of the exempted formation proposed for injection; and
- 3) Monitoring the portion of the exempted formation receiving injected fluids to validate that the fluids will remain in the portion of the aquifer that is exempted.

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: Pamela Creedon
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