

## State Water Resources Control Board

July 27, 2021

Uduak-Joe Ntuk, State Oil & Gas Supervisor  
Department of Conservation  
California Geologic Energy Management Division  
801 K Street, MS 18-05  
Sacramento, CA 95814-3530  
[uduak-joe.ntuk@conservation.ca.gov](mailto:uduak-joe.ntuk@conservation.ca.gov)

### **PRELIMINARY CONCURRENCE ON THE PROPOSED AQUIFER EXEMPTION, MONTEREY FORMATION, LOMPOC OIL FIELD, SANTA BARBARA COUNTY**

Dear Mr. Ntuk:

State Water Resources Control Board (State Water Board) staff, in consultation with Central Coast Regional Water Quality Control Board staff (collectively Water Boards staff), have reviewed the aquifer exemption proposal provided by the California Geologic Energy Management Division (CalGEM) on April 5, 2021 to expand the aquifer exemption for the Monterey Formation in the Lompoc Oil Field for Class II injection.

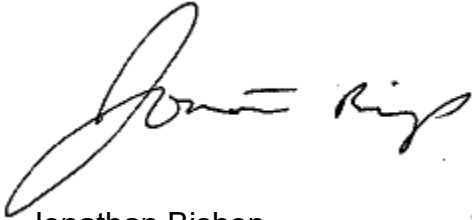
As described in the attached memorandum, State Water Board staff assessed whether the proposal meets the criteria set forth in California Public Resources Code (PRC) section (§) 3131 and § 146.4 of Title 40 of the Code of Federal Regulations (CFR). Based on this review, State Water Board staff preliminarily concur with the proposal to expand the exemption for the Monterey Formation.

### **Conditions on Injection Projects**

Approval of Class II UIC projects involve a joint review by CalGEM and Water Boards staff. CalGEM and Water Boards staff will consider incorporating conditions into approvals of Class II injection projects. Potential conditions include, but are not limited to, requiring monitoring, such as pressure or fluid level monitoring, to confirm that injected fluids remain in the proposed exempted area. If a monitoring requirement is incorporated in a UIC project approval, the operator must submit a work plan to the Central Coast Regional Water Quality Control Board for approval.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan Bishop". The signature is fluid and cursive, with the first name "Jonathan" being more prominent than the last name "Bishop".

Jonathan Bishop  
Chief Deputy Director

cc: Matthew T Keeling  
Executive Officer  
Central Coast Regional Water Quality Control Board  
[matt.keeling@waterboards.ca.gov](mailto:matt.keeling@waterboards.ca.gov)

Rohit Sharma  
Deputy, Coastal District  
Department of Conservation  
California Geologic Energy Management Division  
[Rohit.Sharma@conservation.ca.gov](mailto:Rohit.Sharma@conservation.ca.gov)

**Attachment**

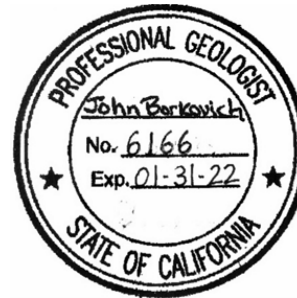
## State Water Resources Control Board

TO: Jonathan Bishop  
Chief Deputy Director

FROM: John Borkovich, PG  
Supervising Engineering Geologist

DATE: July 27, 2021

SUBJECT: **PROPOSED AQUIFER EXEMPTION, MONTEREY FORMATION,  
LOMPOC OIL FIELD, NORTHWEST AREA, SANTA BARBARA  
COUNTY**



On December 9, 2016, the California Geologic Energy Management Division (CalGEM) provided the State Water Resources Control Board (State Water Board) with a proposal to expand the aquifer exemption for the Monterey Formation in the Northwest (NW) Area of the Lompoc Oil Field for Class II injection. CalGEM provided a revised aquifer exemption proposal on April 5, 2021.

State Water Board staff, in consultation with Central Coast Regional Water Quality Control Board staff (collectively Water Boards staff), have reviewed the revised proposal, which was reviewed, signed, and stamped by a professional geologist. Staff have determined that the revised 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).

To confirm that injected fluids remain in the proposed exempted area, staff recommend considering incorporating monitoring requirements, such as pressure or fluid level monitoring, in 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. No water supply wells were identified as being completed within the proposed exempted aquifer (Figure 1).

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. 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 within the proposed exempted area contains petroleum hydrocarbons and constituents such as boron and total dissolved solids (TDS) at concentrations that limit its suitability

for agriculture, domestic, and other beneficial uses and (2) the injected fluids are expected to remain in the proposed exempted area. Water analysis from one sample collected in the NW Area of the Lompoc Oil Field indicate groundwater in the Monterey Formation contains concentrations of TDS of 6,653 milligrams per liter. Water produced from the Monterey Formation in the NW Area is reinjected back into the Monterey Formation for water disposal.

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 Monterey Formation is provided by the overlying Sisquoc Formation (Figure 2). The Sisquoc Formation is approximately 2,200 feet (ft) thick and composed of fine-grained diatomaceous mudstone and claystone with matrix permeabilities ranging from 0.02 to 10 millidarcies.

Since the discovery of oil in the NW area, approximately 3.5 billion cubic feet of natural gas has been produced. The accumulation of natural gas in the Monterey Formation, combined with the low permeability of the overlying Sisquoc Formation, supports the conclusion that the Sisquoc Formation acts as a competent vertical seal.

Lateral containment in the proposed exempted area is provided by a combination of geologic features (faults) and an oil production-induced inward hydraulic gradient. Historically, more fluid (oil and formation water) has been produced (extracted) from the Monterey Formation than has been injected. This fluid imbalance results in a low-pressure sink located near the middle of the proposed aquifer exemption area (Figure 3). A reverse fault, which defines the eastern boundary of the aquifer exemption proposal, has a vertical displacement of greater than 1,000 feet, placing the Monterey Formation in contact with the low permeability Sisquoc Formation (Figure 4).

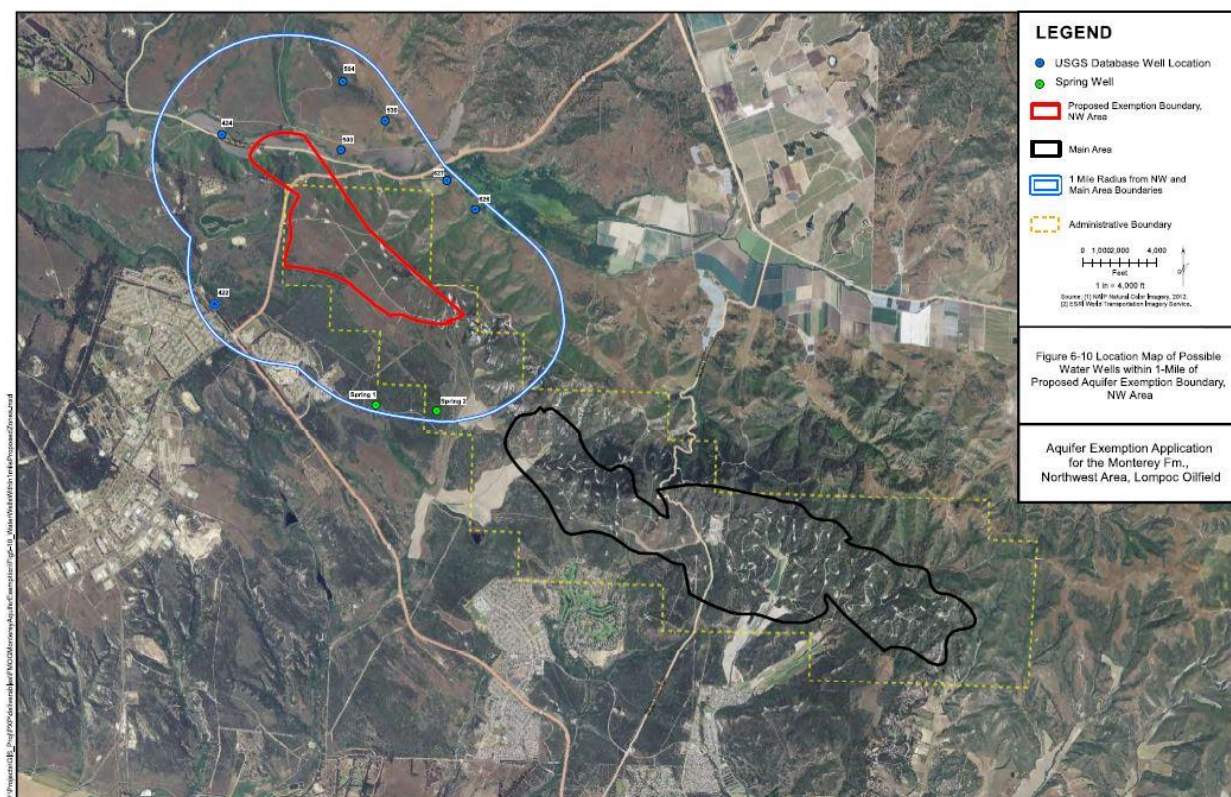
**Figure 1: Water Well Location Map**



Figure 2a: Stratigraphic Cross Section Northwest to Southeast

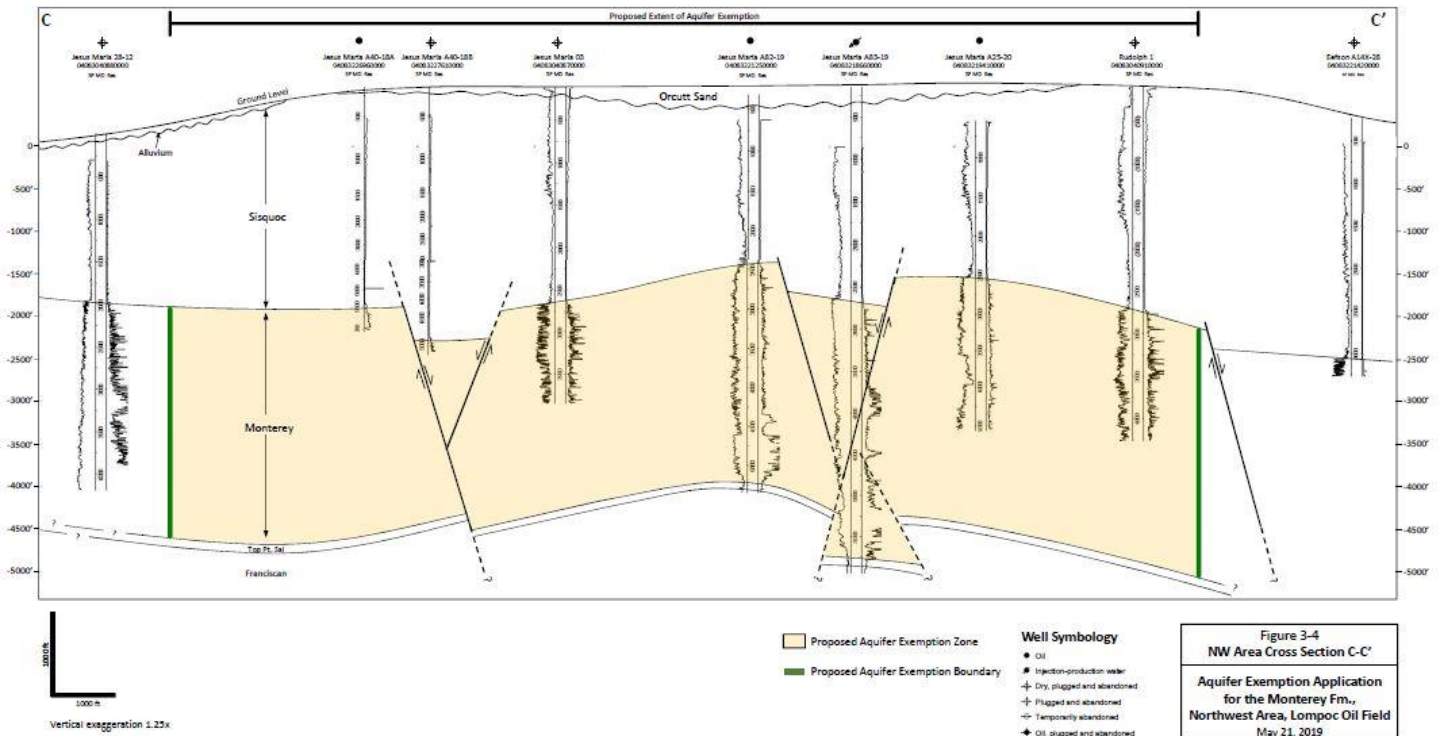
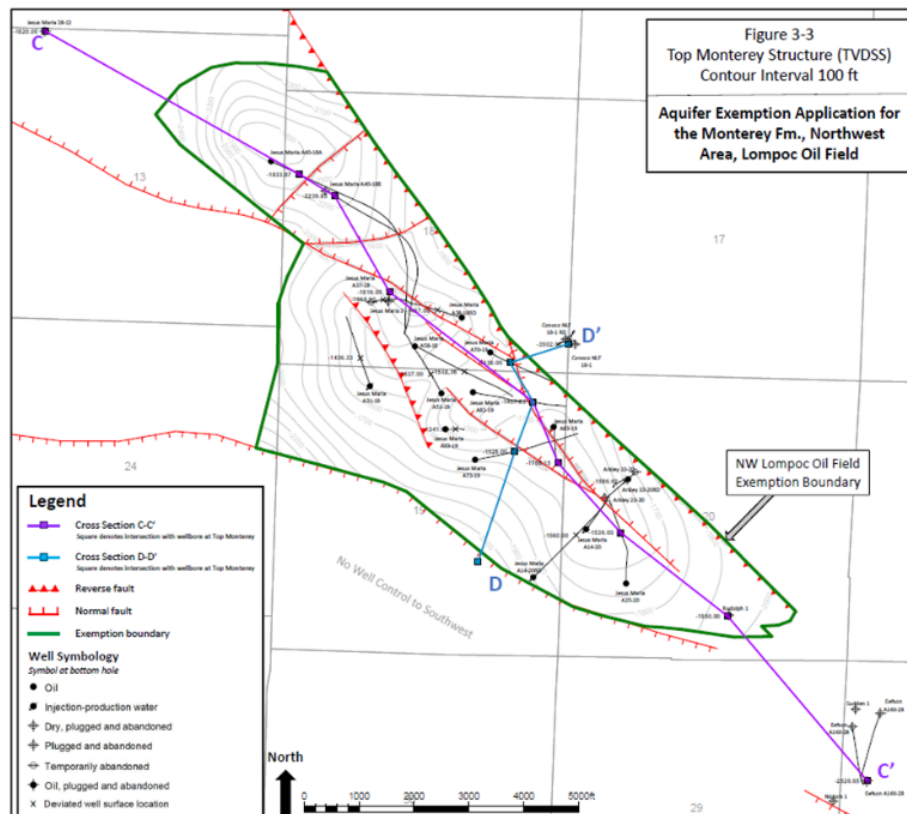
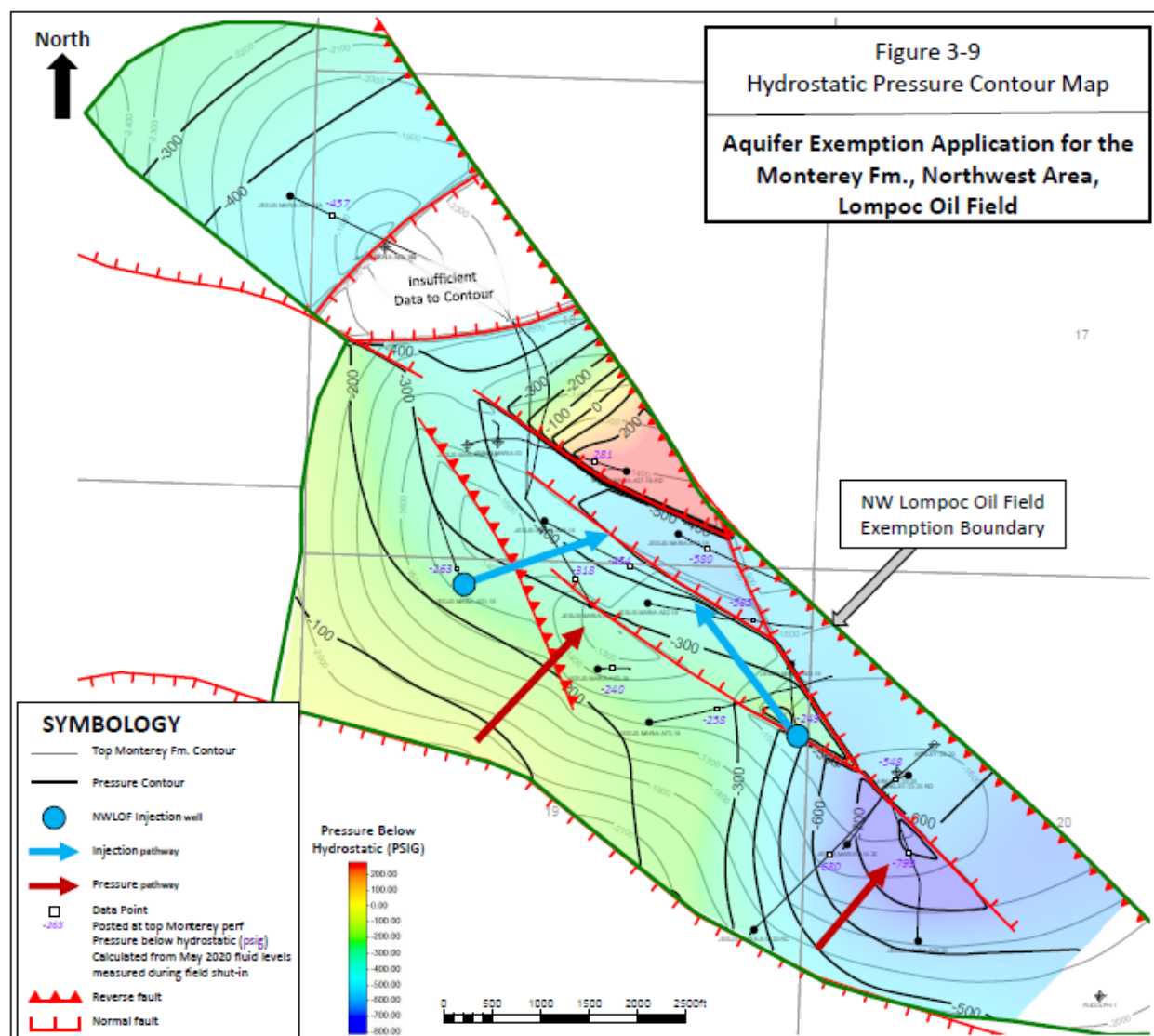


Figure 2b: Cross Section Reference Map



**Figure 3: Hydrostatic Pressure Contour Map**



**Figure 4: Stratigraphic Cross Section West to East**