
State Water Resources Control Board

December 21, 2022

Uduak-Joe Ntuk, State Oil & Gas Supervisor
Department of Conservation
California Geologic Energy Management Division
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FINAL CONCURRENCE ON THE PROPOSED AQUIFER EXEMPTION, MONTEREY FORMATION, LOMPOC OIL FIELD, NORTHWEST AREA, 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) and considered comments received during the public comment process. Based on this review, State Water Board staff concur with the proposal to expand the exemption for the Monterey Formation.

Public Comment Process

On July 27, 2021, State Water Board staff preliminarily concurred with the exemption proposal pending the State's public comment process. On March 11, 2022, CalGEM published notice of the exemption proposal and opened a public comment period. CalGEM and State Water Board staff held a joint public hearing to receive comments on the exemption proposal on April 12, 2022. The comment period ended on April 27, 2022. CalGEM and State Water Board staff have reviewed and responded in writing to the comments received during the comment period and public hearing.

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

Conditions on Injection Projects

Approval of Class II Underground Injection Control (UIC) projects involves a joint review by CalGEM and Water Boards staff where they consider incorporating conditions into the approval. 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 groundwater 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 Ms. Janice Zinky at janice.zinky@waterboards.ca.gov.

Sincerely,



Jonathan Bishop
Chief Deputy Director

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

Miguel Cabrera
Deputy, Northern District
Department of Conservation
California Geologic Energy Management Division
Miguel.Cabrera@conservation.ca.gov

Attachment

State Water Resources Control Board

TO: Jonathan Bishop
Chief Deputy Director

FROM: Janice Zinky, PG
Supervising Engineering Geologist

DATE: November 28, 2022

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, reviewed the revised proposal, which was signed and stamped by a California-licensed professional geologist, and considered comments received during the public comment process. Based on this review, State Water Board staff 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, or is expected to be, capable of commercial hydrocarbon production. 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 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 indicates groundwater in the Monterey Formation contains concentrations of total dissolved solids of 6,653 milligrams per liter. Water produced from the Monterey Formation in the NW Area is disposed of by reinjection back into the Monterey Formation.

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 (Figures 2a and 2b). The Sisquoc Formation is approximately 2,200 feet 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).

An analysis of potential well bore conduits from the proposed aquifer exemption area to overlying beneficial use aquifers (conduit analysis) was not conducted since the proposed aquifer exemption area is not overlain by beneficial use aquifers (Figures 5 and 6).

Figure 1: Water Well Location Map

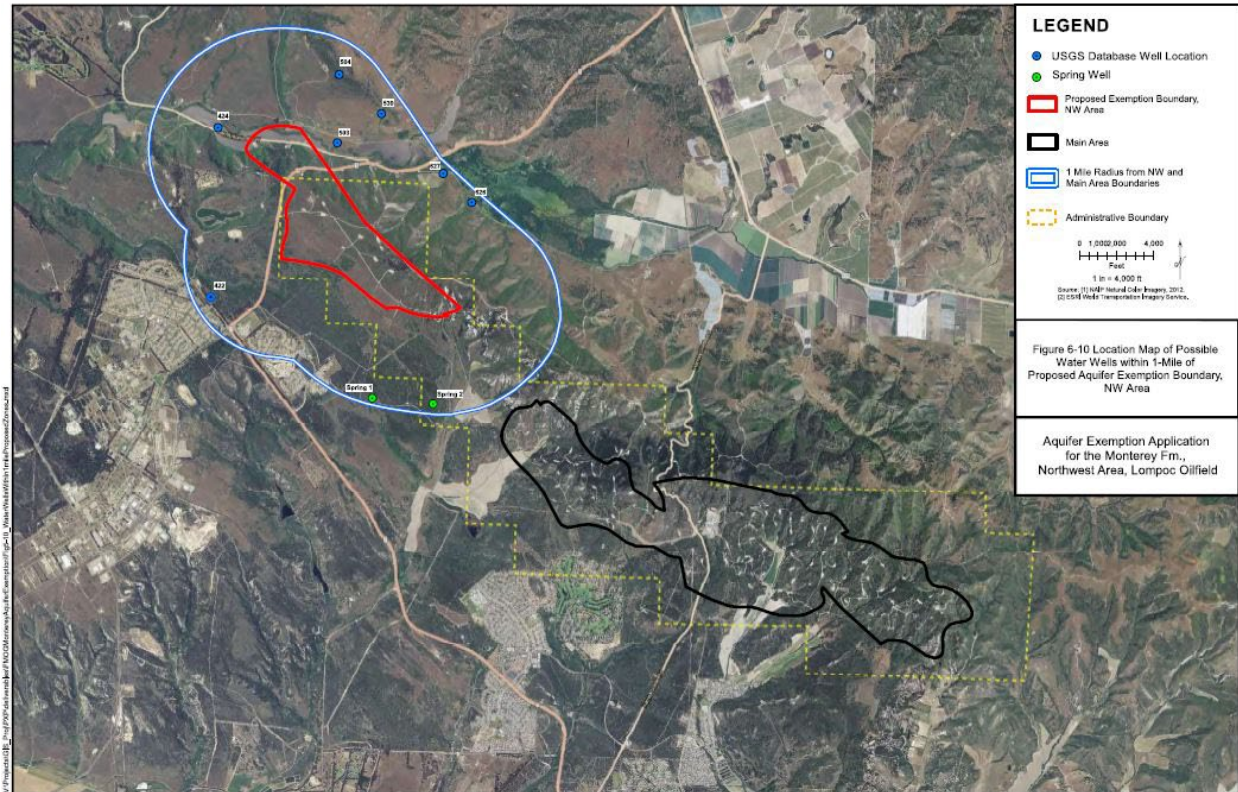


Figure 2a: Stratigraphic Cross Section Northwest to Southeast

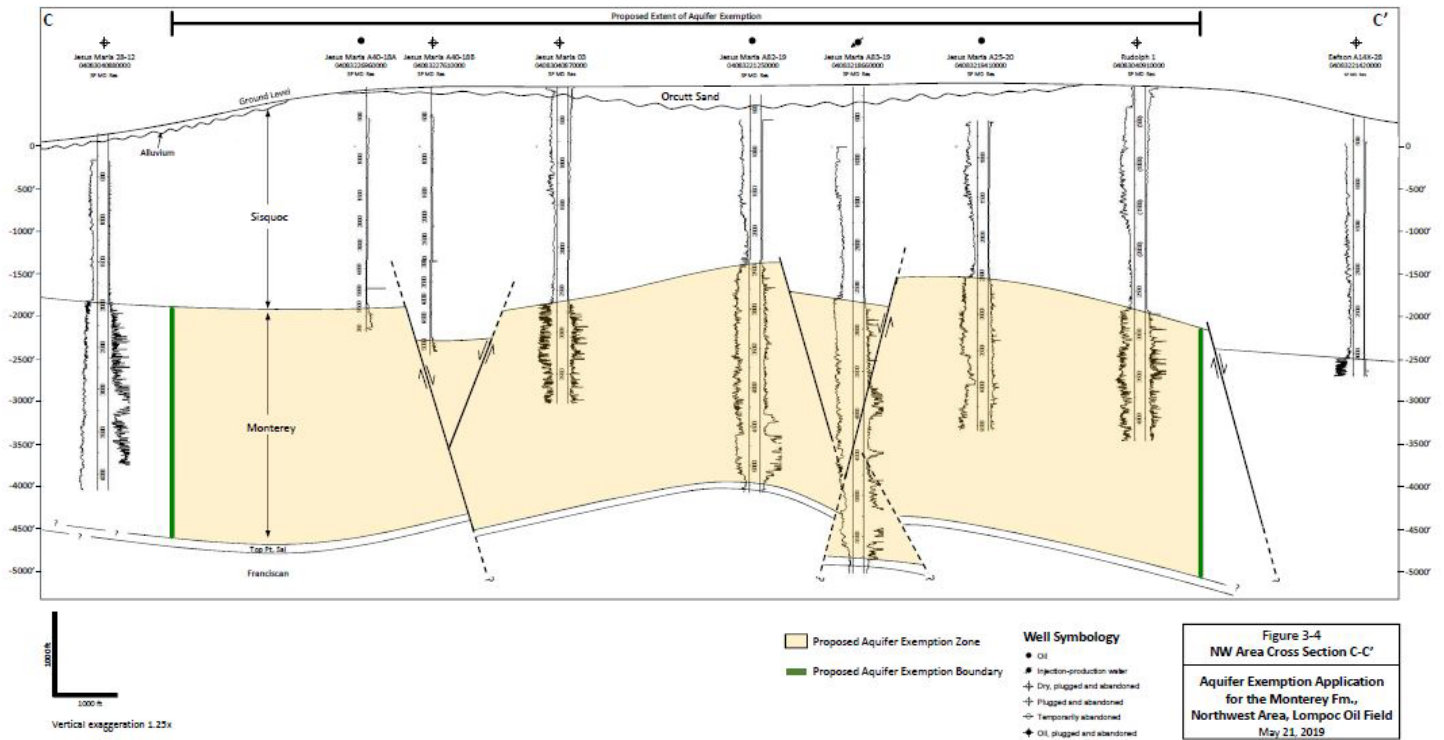


Figure 2b: Cross Section Reference Map

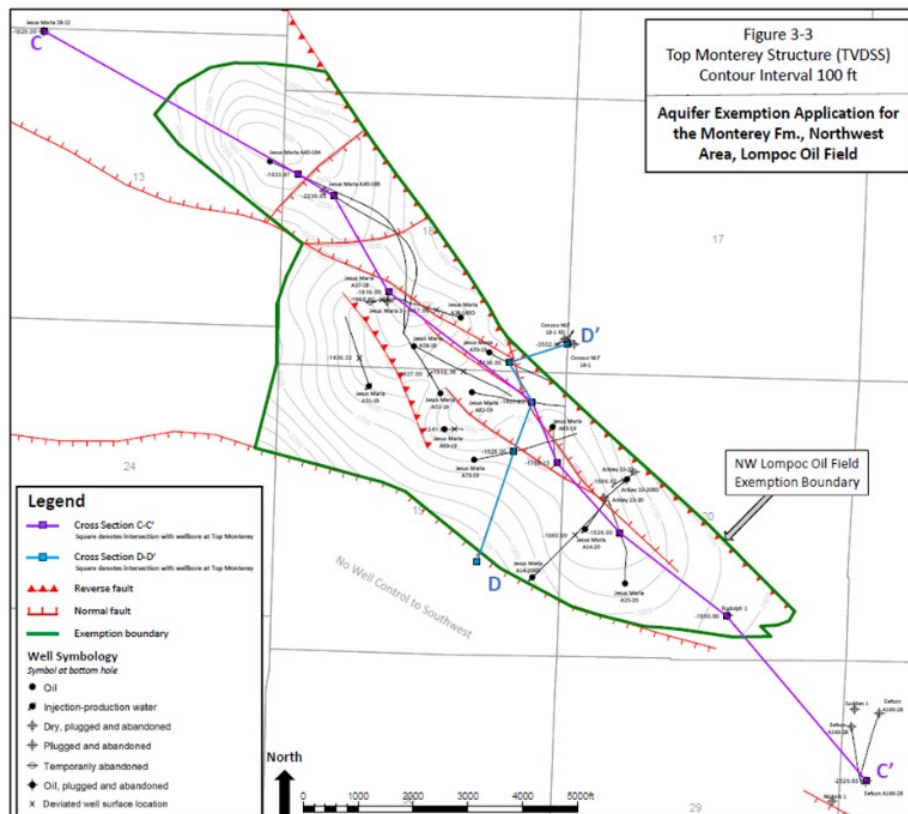


Figure 3: Hydrostatic Pressure Contour Map

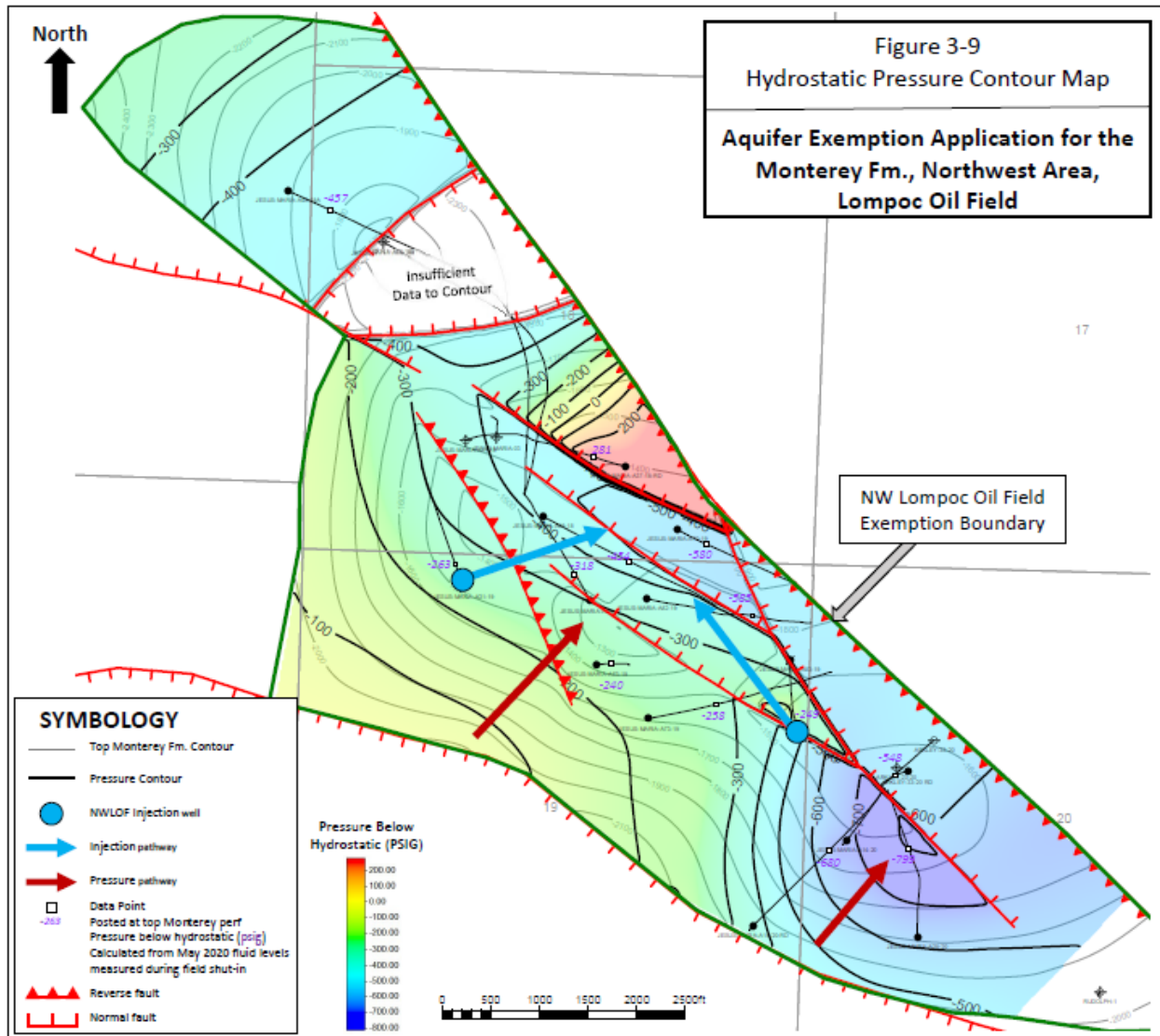


Figure 4: Stratigraphic Cross Section West to East

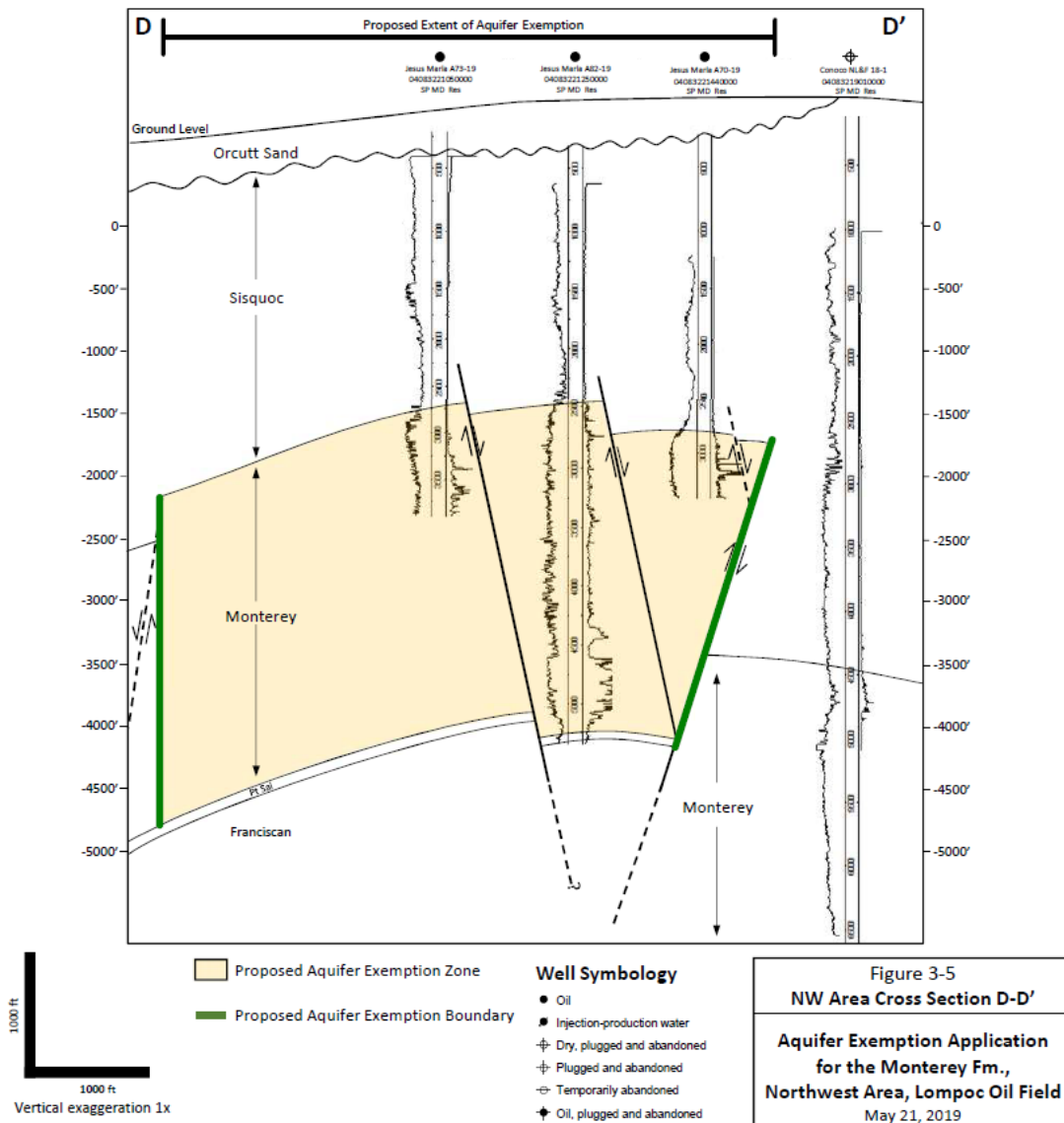


Figure 5: County of Santa Barbara Groundwater Basin Map

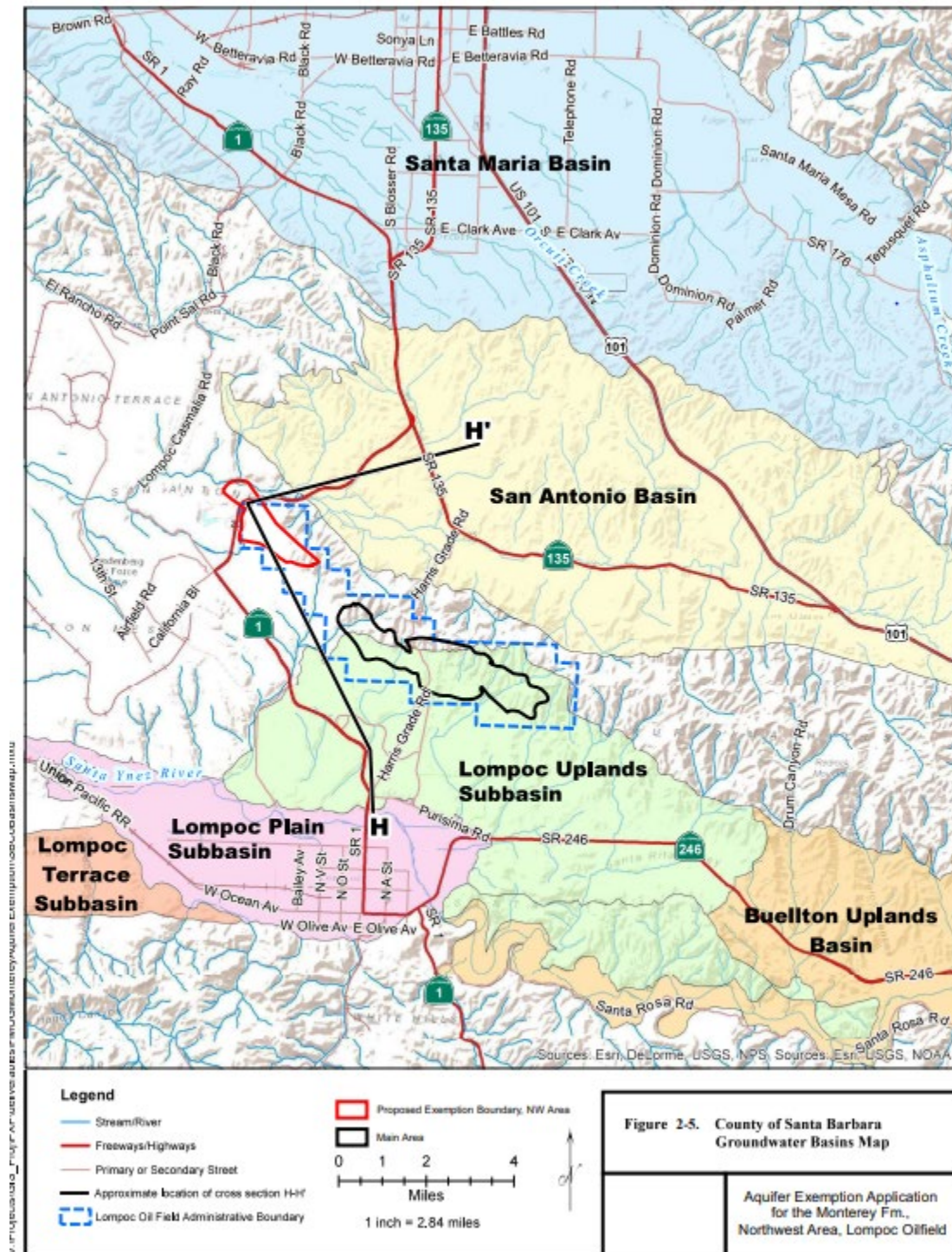


Figure 6: Generalized Hydrogeologic Cross Section H-H'

