



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

April 30, 2019

Kenneth A. Harris Jr.
State Oil and Gas Supervisor
Division of Oil, Gas, and Geothermal Resources
California Department of Conservation
801 K Street, MS 18-05
Sacramento, CA 95814-3530

Re: Approval of Aquifer Exemption for the Arroyo Grande Oil Field, San Luis Obispo County, California

Dear Mr. Harris:

Based on a thorough review of the supporting documents submitted by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources and the State Water Resources Control Board, the U.S. Environmental Protection Agency (EPA) hereby approves the aquifer exemption request for portions of the Dollie Sands Member of the Pismo Formation in the Arroyo Grande Oil Field in San Luis Obispo County, California.

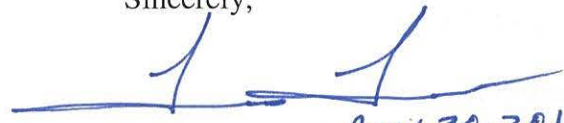
In accordance with applicable regulations at 40 C.F.R. Parts 144, 145, and 146, we find that this aquifer exemption request is a non-substantial program revision, and the requested formation meets the following federal exemption criteria:

- The portions of the formation proposed for exemption in the field do not currently serve as source of drinking water; and
- The portions of the formation proposed for exemption in the field cannot now and will not in the future serve as a source of drinking water because they have been demonstrated to contain commercially producible quantities of hydrocarbons.

The approved aquifer exemption boundaries and depths, along with the EPA's analysis and rationale in support of the approval, are detailed in the enclosed Record of Decision. In addition, we are enclosing the application and other documents submitted by the state to the EPA that were considered in this approval decision. Due to the size of these additional enclosures, we are providing, via email, a link to an electronic folder containing all the remaining documents.

If you have any questions, or if you have any difficulty accessing the electronic folder, please contact David Albright, Acting Assistant Director of our Tribal and State Assistance Branch, at (415) 972-3971.

Sincerely,



Tomás Torres *April 30, 2019*
Director, Water Division

Enclosures: Aquifer Exemption Record of Decision for the Arroyo Grande Oil Field
GIS Shape Files of Approved Aquifer Exemption
Original Arroyo Grande Aquifer Exemption Application
Supplemental Arroyo Grande AE Application
Letter from Kenneth Harris to David Albright dated March 8, 2019

cc: Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board

US Environmental Protection Agency Region 9
Underground Injection Control (UIC) Program
AQUIFER EXEMPTION RECORD OF DECISION

This Record of Decision (ROD) provides the EPA’s decision to approve an aquifer exemption (AE) for portions of the Dollie Sands Member of the Pismo Formation in the Arroyo Grande Oil Field, background information concerning the AE request, and the basis for the AE decision.

Primacy Agency: California Division of Oil, Gas, & Geothermal Resources (DOGGR)

Date of Aquifer Exemption Request: June 8, 2018

Exemption Criteria: DOGGR requests this exemption because it has determined that it meets the criteria at 40 CFR § 146.4(a) and § 146.4(b)(1).

Substantial or Non-Substantial Program Revision: Non-Substantial

Although the EPA must approve all revisions to EPA-approved state UIC programs, the process differs depending on whether the EPA finds the revision to be a substantial or non-substantial program revision. The EPA determined that this is a non-substantial program revision because it is associated with an active oil field and is not a state-wide programmatic change or a program revision with unique or significant implications for California’s Class II UIC program. The decision to treat this AE request as a non-substantial program revision is also consistent with the EPA’s “Guidance for Review and Approval of State Underground Injection Control (UIC) Programs and Revisions to Approved State Programs” (“Guidance 34”), which explains that the determination of whether a program revision is substantial or non-substantial is made on a case-by-case basis.

Current Operator: Sentinel Peak Resources, California LLC.

Well/Project Name: The Dollie Sands Member of the Pismo Formation in the Arroyo Grande Oil Field.

Current Well/Project Permit Number: There are approximately 207 Class II enhanced oil recovery (EOR) wells and 16 water disposal wells in the Arroyo Grande Oil Field within the portions of the aquifer proposed for exemption.

Well/Project Location: The aquifer proposed for exemption underlies Township 31 South Range 12 East, Section 36; Township 31 South Range 13 East, Sections 31, and 32; and Township 32 South Range 13 East, Section 6, Mount Diablo Base and Meridian (MDB&M). [Refer to Figures 1 and 2.]

County: San Luis Obispo

State: California

Future Well Class/Type: Class II EOR and produced water disposal in the areas proposed for injection.

DESCRIPTION OF PROPOSED AQUIFER EXEMPTION

Aquifer to be Exempted: Portions of the Dollie Sands Member, which is a subset of the Edna Member of the Pismo Formation, within the Arroyo Grande Oil Field.

Areal Extent of Aquifer Exemption: DOGGR has proposed a 575-acre exemption in an area planned for expanded commercial oil production. The lateral boundaries of the proposed exempt areas are defined by a sealing fault and transitions to low-permeability claystones and tar sands. DOGGR provided GIS shapefiles that delineate the AE boundary and are included in the administrative record for this ROD. Refer to Figure 2 for a depiction of the areal extent of the aquifer proposed for exemption. The proposed exemption is an expansion to an existing 340-acre AE approved by the EPA at the time California's Class II program was approved for primacy in 1983. The combined areal extent of the existing AE and the proposed AE in the Arroyo Grande Oil Field is approximately 915 acres.

Lithology, Total Dissolved Solids (TDS), Depth, Thickness, Porosity, and Permeability of the Aquifer: The following table presents the lithology, range of TDS levels, depth, thickness, and average porosity and permeability information about the aquifer proposed for exemption.

<i>Aquifer</i>	Dollie Sands Member of the Pismo Formation.
<i>Lithology</i>	Arkosic sandstone.
<i>TDS (mg/L)</i>	2,192 mg/L (average of 15 samples ranging from 700 mg/L to 3,500 mg/L).
<i>Depth to Top (feet MSL)</i>	-173 to + 365 feet mean sea level (MSL), average depth 350 ft. MSL, and a minimum of 250 feet below ground surface (bgs).
<i>Thickness (feet)</i>	1,250 to 2,000 feet (averaging 1,450 feet).
<i>Porosity and Permeability</i>	Porosity ranges from 11 to 47%. Permeability is 1 to 8,521 millidarcies (mD).

Confining Zone(s): In the Arroyo Grande Oil Field, the Dollie Sands Member is confined above by tar sands and below by the low permeability siltstone/claystone of the Miguelito Member of the Pismo Formation. Lateral confinement of the Dollie Sands Member is provided by faulting to the north and facies changes/transitioning to impermeable siltstones and claystones to the south and to tar sands to the east, west, and southwest. See Figures 3.1 through 3.7.

BACKGROUND

On February 8, 2016 the EPA received a request from DOGGR, along with concurrence from the California State Water Resources Control Board (State Water Board) (together, the "State") to exempt a portion of the Dollie Sands Member of the Pismo Formation of the Arroyo Grande Oil Field, in San Luis Obispo County. The EPA reviewed the package and provided detailed comments to DOGGR in April 2016. In response, DOGGR provided additional information in August 2016, conducted further evaluation, modified the proposed boundary of the exemption, and prepared a supplemental AE package. After completing a public comment period on the

supplemental package in December 2017, DOGGR evaluated the public comments and prepared a final AE request, which EPA received on June 8, 2018.

DOGGR reviewed the operator's request and proposed this AE based on the criteria at 40 CFR §146.4(a): it does not currently serve as a source of drinking water; and at 40 CFR §146.4(b)(1): it cannot now and will not in the future serve as a source of drinking water because it is mineral, hydrocarbon, or geothermal energy-producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.

After the EPA's approval of the AE, the exempt formation would not be protected as an "underground source of drinking water" (USDW) under the Safe Drinking Water Act (SDWA) and DOGGR could review and approve Class II injection into the identified formation, subject to state and other regulatory requirements.

Oil production in the Arroyo Grande Oil Field began with surface mining of tar sands in 1880. The first oil well was completed in 1906. Water injection for enhanced oil recovery began in 1949, and steam injection (steaming) began in 1978. Today there are about 260 production wells operating in the field. Current oil production averages 1,350 barrels (bbl) of oil per day, and about 19 million bbl of oil have been produced from the field to date.

BASIS FOR DECISION

Regulatory Criteria under which the AE is Requested and Approved

40 CFR § 146.4(a) It does not currently serve as a source of drinking water.

In their concurrence on this AE request, the State Water Board concluded that the portion of the Dollie Sands Member proposed for exemption does not currently serve as a source of drinking water and it is not hydraulically connected to any domestic or public water supply wells. The State Water Board's review was based on an evaluation of information about water supply wells in the area, groundwater flow patterns, and confinement of groundwater flow. The EPA concludes that the information provided demonstrates that the aquifer proposed for exemption does not currently serve as a source of drinking water because there are no existing drinking water supply wells, public or private, that currently or in the future would draw water from the portion of the Dollie Sands Member proposed for exemption. In addition, the formation is vertically and laterally confined (i.e., separated) from other USDWs and no aquifers that serve as sources of drinking water are hydraulically connected to the formation. Further, within the State Water Board's water well search area (described more fully below), the portion of the Dollie Sands Member is not currently a source of drinking water.

Water Supply Wells: DOGGR's AE request included information about wells near the area proposed for exemption to establish that no drinking water wells draw from the portion of the aquifer proposed for exemption. The application includes the results of an evaluation that identified 13 potential wells within one-quarter mile of the proposed exempt area. Of these 13 potential wells, three were determined by the state not to be wells (i.e., they were misidentified

as wells based on aerial photography), one is an agricultural well that has been out of service for many years, and the remaining nine are domestic water wells (Refer to Table 1).

Four of the nine domestic wells are located to the southeast of the AE area. These wells are on the north flank of the Oak Park Structural Basin, which is a separate and distinct hydrologic basin from the Arroyo Grande Oil Field, isolated by tar sands and differing geology. Therefore, it is not hydraulically connected to the portion of the formation proposed for exemption. Of the remaining five domestic water wells, one well to the north of the proposed AE boundary is separated from the Dollie Sands Member by the Arroyo Grande Fault Zone, which prevents any hydraulic connection to the Dollie Sands Member. There are two domestic wells to the south that are completed in a thin alluvium layer, that is separated from the Dollie Sands Member by the Second Pismo Tar Sand Member, which prevents hydraulic connection between the two formations. The remaining two domestic wells are located on the east side of the proposed AE boundary and are also separated from the Dollie Sands Member by a tar sand, which prevents fluid flow. In addition, based on a capture zone analysis performed for these two wells, the wells would not draw water from the portion of the Dollie Sands Member proposed for exemption. A capture zone analysis evaluates the portion of the aquifer from which the wells would draw water over their predicted 30-year lifetime. DOGGR performed this analysis by following the 1999 California Drinking Water Source Assessment and Protection Program's (DWSAPP) guidelines.

Finally, the State Water Board identified the nearest public water system well, which is slightly less than one mile from the boundary of the proposed AE. This well is hydraulically isolated from the proposed AE area by its location on the north side of the Arroyo Grande fault.

Groundwater Flow Patterns: To estimate groundwater flow patterns, DOGGR evaluated available hydrogeologic information on the Dollie Sands Member, including bottom hole pressure data from wells within the proposed area to be exempted, the results of a hydraulic analysis of the Arroyo Grande Syncline (the geologic bowl-shaped structure in which the oil field is located), and information about injection and production activities in the region. Based on this information, DOGGR concluded and the State Board concurred that ground water within the Dollie Sands Member moves toward the producing wells in the center of the syncline.

Confinement of the Formation to Groundwater Flow: Vertical confinement is provided by tar sands above and a low permeability siltstone/claystone below the Dollie Sands Member. The upper 250 feet of the Dollie Sands Member consists of shallow tar sands that serve as an upper barrier to fluid flow. Tar sands are sandstones that contain bitumen, a form of petroleum, which reduces their permeability. The existence of the tar sands above the Dollie Sands Member is documented in the well driller's field notes prepared during drilling and installation of monitoring wells in the Arroyo Grande Oil Field, and in studies by the U.S. Geological Survey (USGS) and DOGGR. The Miguelito Member of the Pismo Formation, which lies below the Dollie Sands Member, provides lower confinement. This siltstone/claystone has a low permeability (averaging 28.7 mD) as demonstrated by core data provided in DOGGR's application. The Miguelito Member is several hundred feet thick and is present throughout the area proposed for exemption, as depicted in cross sections derived from well logs.

Lateral confinement of the Dollie Sands Member is provided by faulting to the north and transitions/facies changes to the south, east, and west. See Figures 3.1 through 3.7.

- *To the north*, the Arroyo Grande Fault provides containment of injected fluids. Evidence that the Arroyo Grande Fault acts as a barrier to fluid migration includes: offset formations in the subsurface as evidenced by well log data; mud logs in multiple wells showing fault gouge and the presence of oil inside the fault zone; core samples showing different oil saturations across the fault; and the presence of productive wells to the south of the fault, and uneconomic wells on the north side of the fault.
- *To the south, east, and west*, transitioning of the Dollie Sands Member to impermeable siltstones and claystones to the south and into tar sands to the east, west, and southwest provides barriers to fluid movement. Evidence for these facies changes is provided by changes in permeability (as shown in laboratory-verified core samples); well tests and logs (including mud logs, strip logs, and electric logs) that characterize the lithology of the formations; reduced oil saturation and the lack of mobile oil outside the AE area; and the absence of oil in water wells outside of the AE area.

The State's analysis includes operational details of the Arroyo Grande Oil Field, which also provides evidence of the hydraulic isolation of the proposed exempt formation. The operations cause an inward pressure gradient due to differences in the volumes of water injected versus the fluids produced from the field. The applicant provided five years of production and injection data from the Dollie Sands Member. Between 2010 and 2016, 60,275,331 bbl of oil and water have been produced from the Dollie Sands Member, and 38,280,100 bbl of water and steam have been injected. This results in a net fluid withdrawal of 21,995,231 bbl.

After reviewing information regarding the location and depth of the existing domestic water wells, groundwater flow within the Dollie Sands Member, and the lateral and vertical confinement of the formation as described in the AE request, the EPA concludes that the Dollie Sands Member of the Pismo Formation is not currently a source of drinking water and is not hydraulically connected to any domestic or public drinking water supply wells. Therefore, the EPA has determined that the aquifer proposed for exemption meets the criteria at 40 CFR § 146.4(a).

40 CFR § 146.4(b)(1) *It cannot now and will not in the future serve as a source of drinking water because it is mineral, hydrocarbon, or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.*

DOGGR provided information on hydrocarbon production in the area proposed for exemption along with supporting documentation such as historic production data, the locations of current and historical producing wells, and well logs and core data to demonstrate the presence of commercially producible quantities of oil in the Dollie Sands Member within the Arroyo Grande Oil Field.

The Arroyo Grande Oil Field produces 1,350 bbl of oil per day. Between 2010 and 2016, 3,026,838 bbl of oil and 5,732,660 million cubic feet of gas were produced from the Arroyo

Grande Oil Field. DOGGR's AE package also includes maps that illustrate cumulative oil production from wells in the Dollie Sands Member in the proposed exemption area. Since EOR operations began in 1949, several wells throughout the area proposed for exemption have produced up to 600,000 bbl of oil. (See Figure 4).

The data provided indicates that hydrocarbons are distributed vertically and laterally throughout the oil field, in the currently exempted portions of the Dollie Sands Member, and the portion proposed for exemption. All the sands in the field are hydrocarbon-bearing. Cross sections, a type-log, and resistivity logs indicate that the Dollie Sands Member is commercially productive. Oil saturation information based on core samples from wells within the oil field also demonstrates the presence of commercially producible quantities of hydrocarbons in the Dollie Sands Member. The average oil saturation in the Dollie Sands is 34%, with saturation values ranging up to 87%.

Based on the EPA's review of information including well logs, production data, oil saturation, the history of oil production, and the effective implementation of enhanced recovery techniques such as steaming, the EPA has determined that the aquifer proposed for exemption meets the criteria at 40 CFR § 146.4(b)(1).

PUBLIC NOTICE AND COMMENT

DOGGR provided public notice of this proposed AE on August 20, 2015, and held a public hearing on September 21, 2015 in San Luis Obispo, CA. The public comment period closed on September 21, 2015. On December 2, 2015 and on December 8, 2017, DOGGR provided public notice of supplemental 15-day comment periods on additional information that was developed by DOGGR regarding the proposed exemption. DOGGR provided the EPA a summary of the public comments, copies of the public comments submitted, a transcript of the public hearing, and DOGGR's responses to the written and oral comments.

On August 23, 2018, Congressman Salud Carbajal, the representative for the district where the Arroyo Grande Oil Field is located, hosted a public workshop in San Luis Obispo about the aquifer exemption process and the proposed exemption for the Arroyo Grande Oil Field. The workshop was attended by local residents, representatives of the Regional Water Quality Control Board, representatives from the Congressman's office, several NGO's, and the operator of the Arroyo Grande Oil Field. At the workshop, the EPA presented an overview of the aquifer exemption process and responded to questions from participants. The EPA also distributed cards on which participants could submit comments or questions. The EPA collected 104 cards with questions and comments from the workshop. After reviewing these 104 cards, the EPA determined that none of these comments identified new issues; all comments were either addressed by DOGGR's response to comments document or in this ROD.

In making this decision, the EPA considered all the information submitted by the State, including all the written and oral comments submitted to the State during its public comment process. In addition, the EPA considered written comments in letters submitted directly to the EPA outside of the public comment process provided by DOGGR. Specific issues not included in DOGGR's Response to Comments are addressed below.

One commenter (The Center for Biological Diversity) wrote to DOGGR and commented that the EPA should reject the aquifer exemption request before an environmental review has occurred under the National Environmental Policy Act (NEPA). The EPA believes that the public comment and hearing process afforded by DOGGR, the technical analysis to protect USDWs required in the aquifer exemption proposal process under the EPA's UIC regulations, and the enabling legislation in the SDWA provide a functionally equivalent environmental review for this decision.

The same commenter also raised concerns regarding protection of listed species and critical habitat under the federal Endangered Species Act (ESA). After consideration of this issue, the EPA has determined that ESA consultation is not required because the AE approval has no effect on any listed threatened or endangered species or the designated critical habitat of such species. The EPA's conclusion is based on a number of considerations. First, the AE approval changes the jurisdictional status of a confined aquifer hundreds of feet underground under the SDWA. None of the species of concern are present in the subsurface portions of the aquifer considered in the EPA's approval action and it is unclear or speculative whether any listed species or critical habitat overlaps with the surface-level activities. In addition, the Clean Water Act National Pollutant Discharge Elimination System Permit for discharges into Pismo Creek is expressly protective of endangered species. Furthermore, the EPA's approval of the AE is only one preliminary step in the process leading to potential fluid injection into the aquifer, with many additional steps (including state actions and decisions and actions by third party operators) that must occur prior to injection and prior to any potential effects to protected species or habitat at the surface. For example, EPA understands that a new operator has acquired the site and has yet to finalize a project proposal for the site, which the State of California must then review and approve. Thus, EPA would not be the legal cause of potential effects to listed species or designated critical habitat, if any.

Additionally, the commenter questioned whether the current aquifer exemption criteria reflect changing climate conditions and modern water treatment technologies. In considering whether the aquifer proposed for exemption cannot now and will not in the future serve as a source of drinking water because it is hydrocarbon producing, the EPA reviewed data about hydrocarbon production in the Dollie Sands Member. Based on a review of historic production data, well logs and core data, and the locations of current and historical producing wells, the EPA affirms the State's finding that the formation will continue to be commercially producible into the foreseeable future and meets the existing requirements at 40 CFR § 146.4(b)(1).

Finally, in a separate letter to EPA, citing 40 C.F.R. § 145.32(b)(2), the Center for Biological Diversity requested that EPA treat this aquifer exemption request as a "substantial program revision," hold a formal hearing, and provide public notice of the proposed aquifer exemption in the Federal Register. In this letter, the commenter misinterprets the requirements of 40 C.F.R. § 145.32(b)(2) as applying to aquifer exemptions for Class II wells. In fact, the regulation cited only applies to aquifer exemptions for Class VI wells used for geologic sequestration and reads: "All requests for expansions to the areal extent of Class II enhanced oil recovery or enhanced gas recovery aquifer exemptions *for Class VI wells* must be treated as substantial program revisions" (emphasis added). 40 C.F.R. § 145.32(b)(2). The requirement to treat aquifer exemptions as

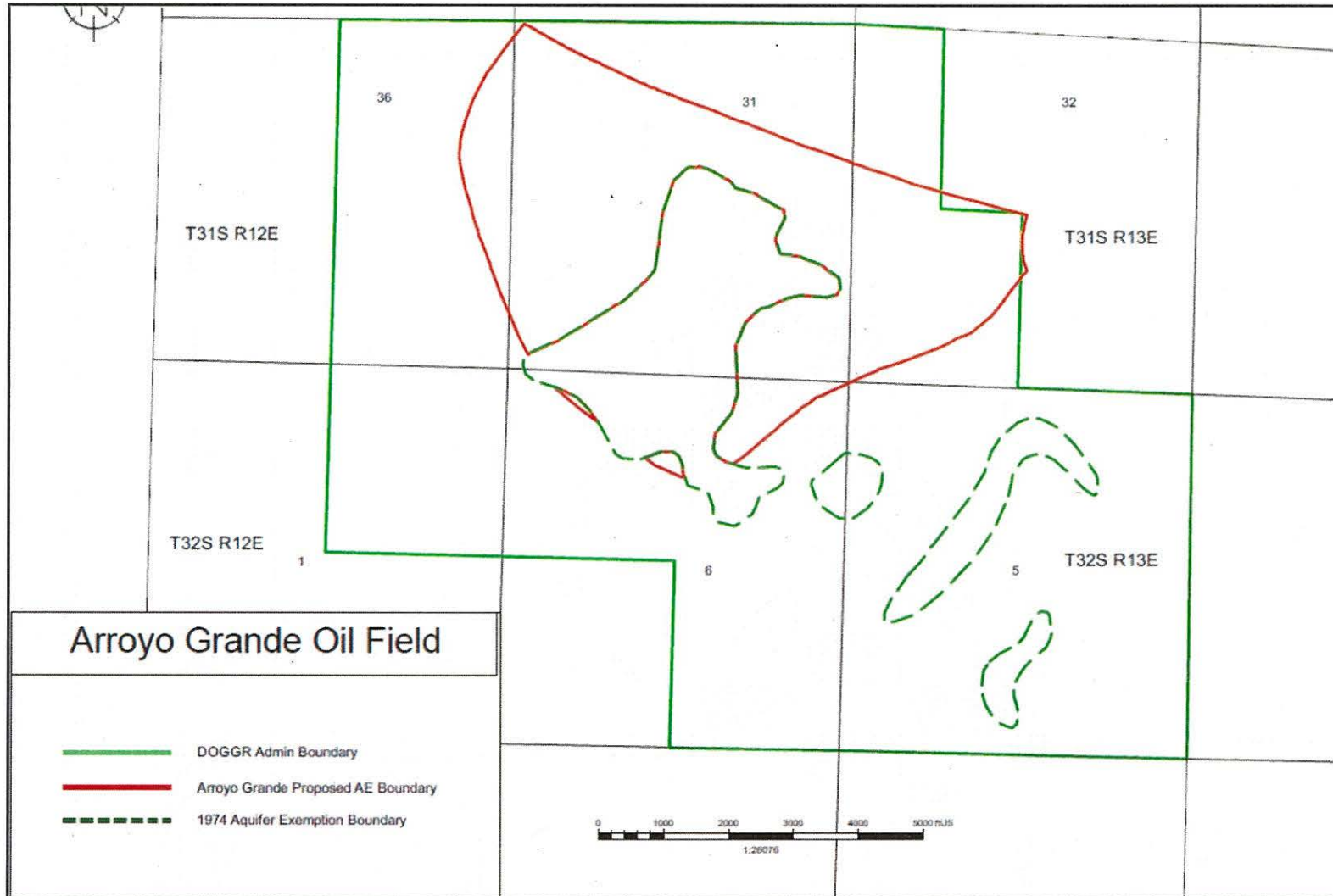
substantial program revisions in this section only applies to expansions of existing aquifer exemptions for geologic sequestration projects (Class VI wells). See 75 Fed. Reg. 77291, 77229 (Dec. 10, 2010). However, as discussed earlier, as a part of its review of the proposed aquifer exemption, EPA considered whether to treat the exemption request as a substantial or non-substantial program revision. EPA determined, consistent with agency guidance, that the proposed exemption is a non-substantial program revision because it is associated with an active oil field and is not a state-wide programmatic change.

CONCLUSION AND DECISION

Based on a review of the entire record, including all written and oral comments submitted to DOGGR during its public comment process, as well as comments submitted directly to the EPA, the EPA finds that the exemption criteria at 40 CFR § 146.4(a) and § 146.4(b)(1) have been met, and the EPA approves the aquifer exemption request as a non-substantial program revision.

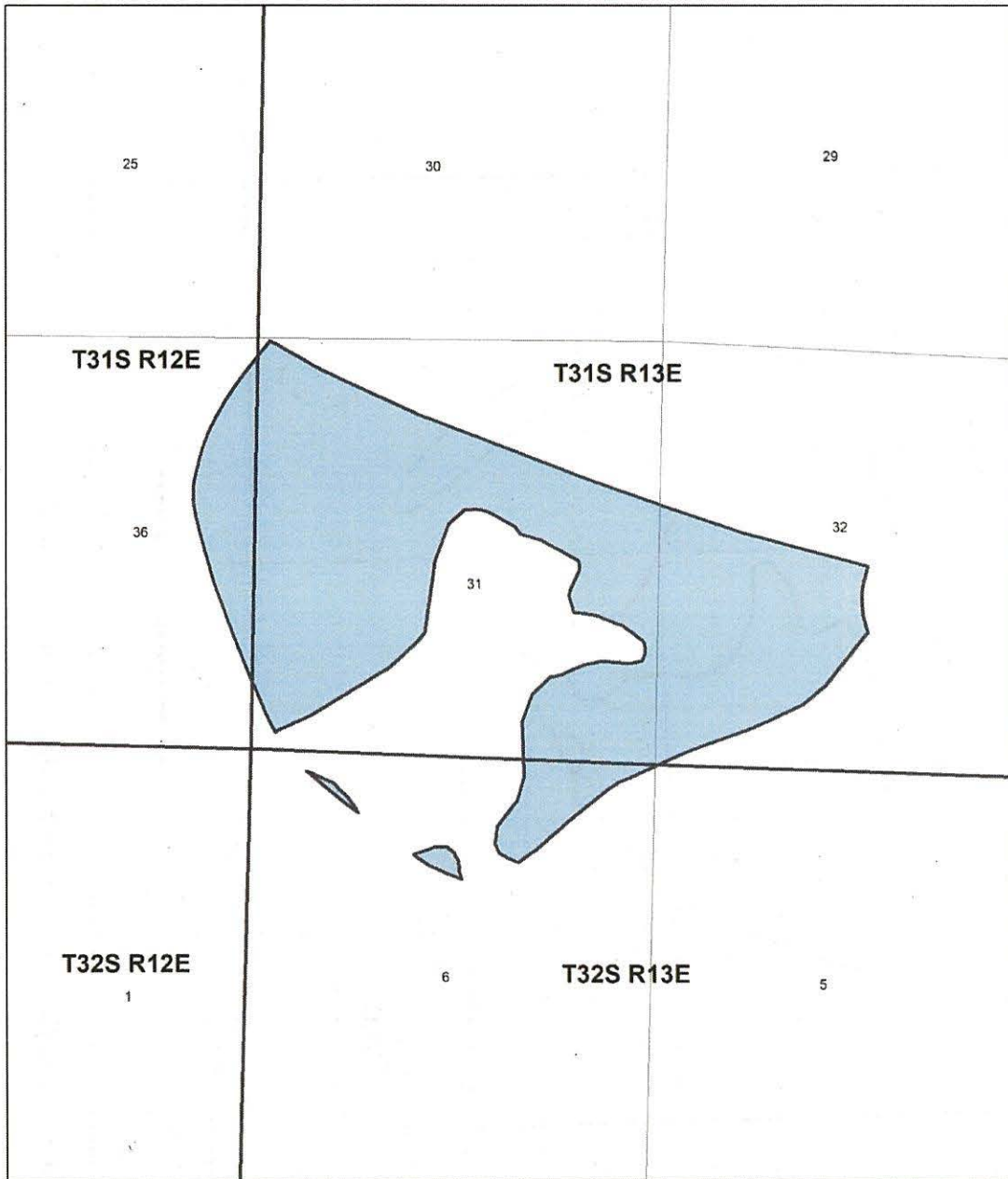
Effective Date: April 30, 2019

Figure 1: Location of the Arroyo Grande Oil Field, San Luis Obispo County, California




Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 2: Dollie Sands Aquifer Exemption Location Map, Arroyo Grande Oil Field, San Luis Obispo County, California



Proposed Exemption Area

 Dollie Sands Member - Arroyo Grande Field
Proposed Exemption Area

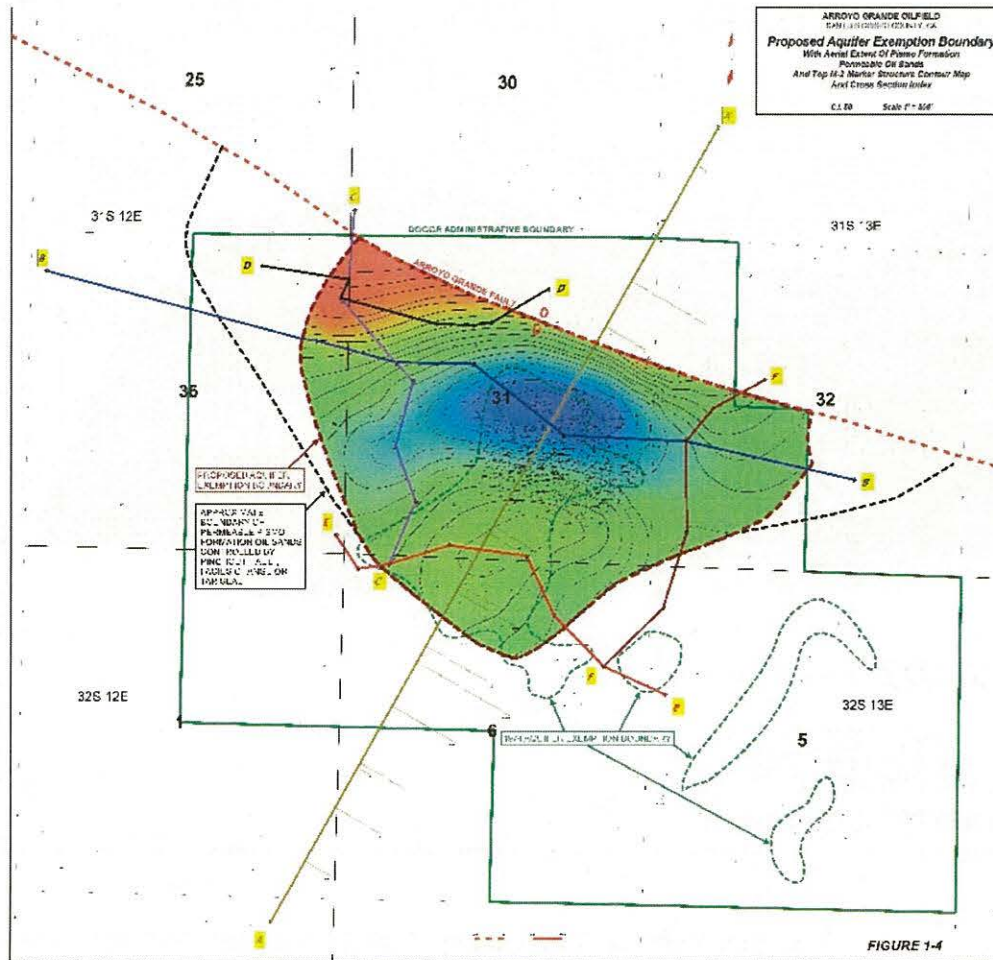
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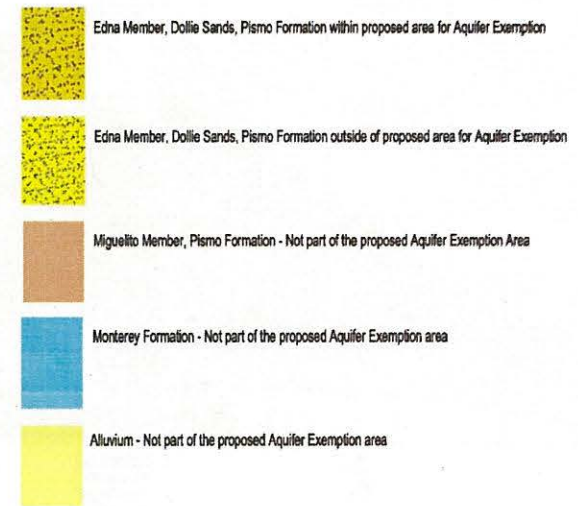
Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 3.1: Cross Section Index Map and Formation Legend for the Dollie Sands Aquifer Exemption Area, Arroyo Grande Oil Field, San Luis Obispo County, California

Index map

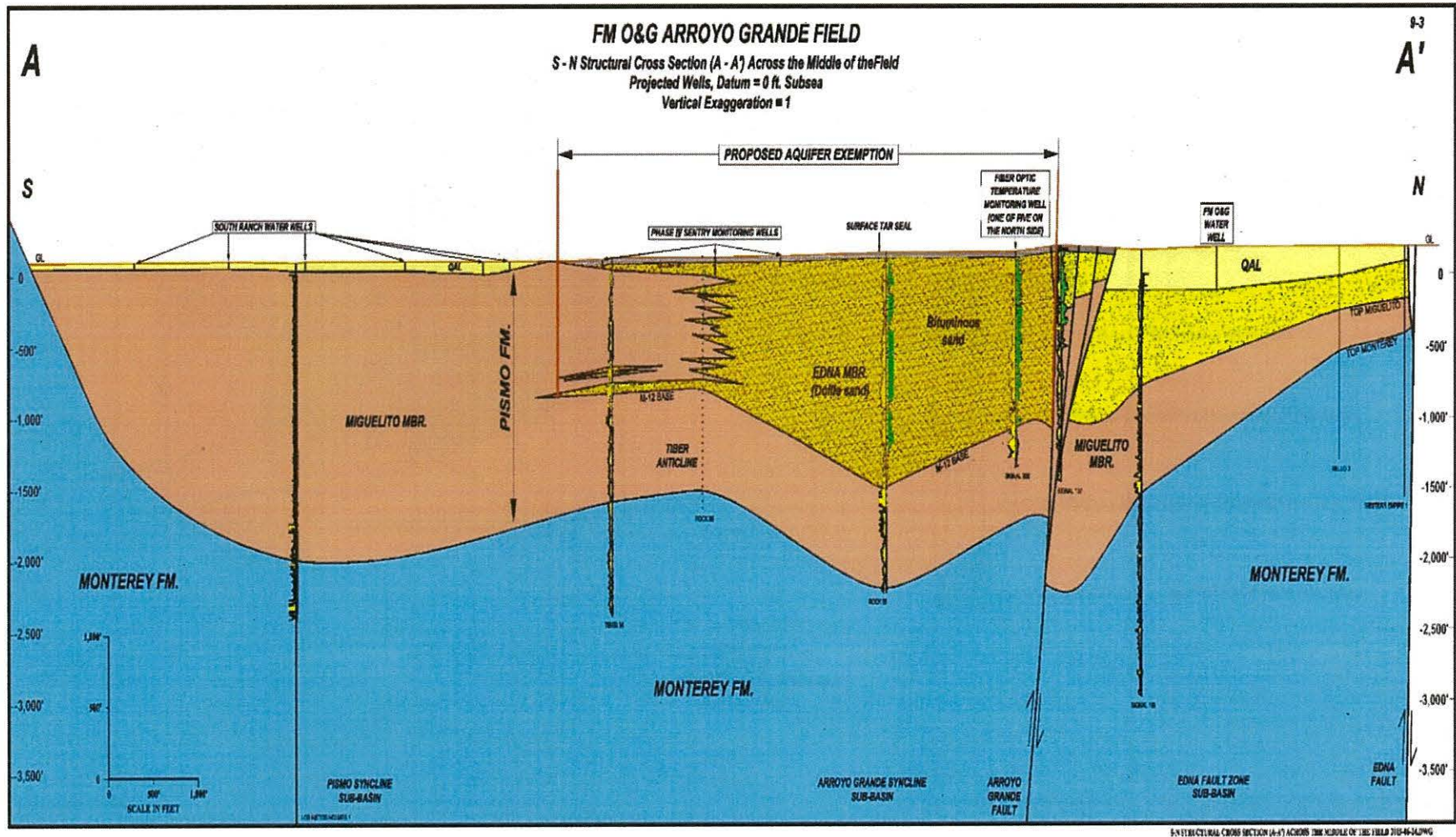


Formation legend for Figures 3.2 through 3.7



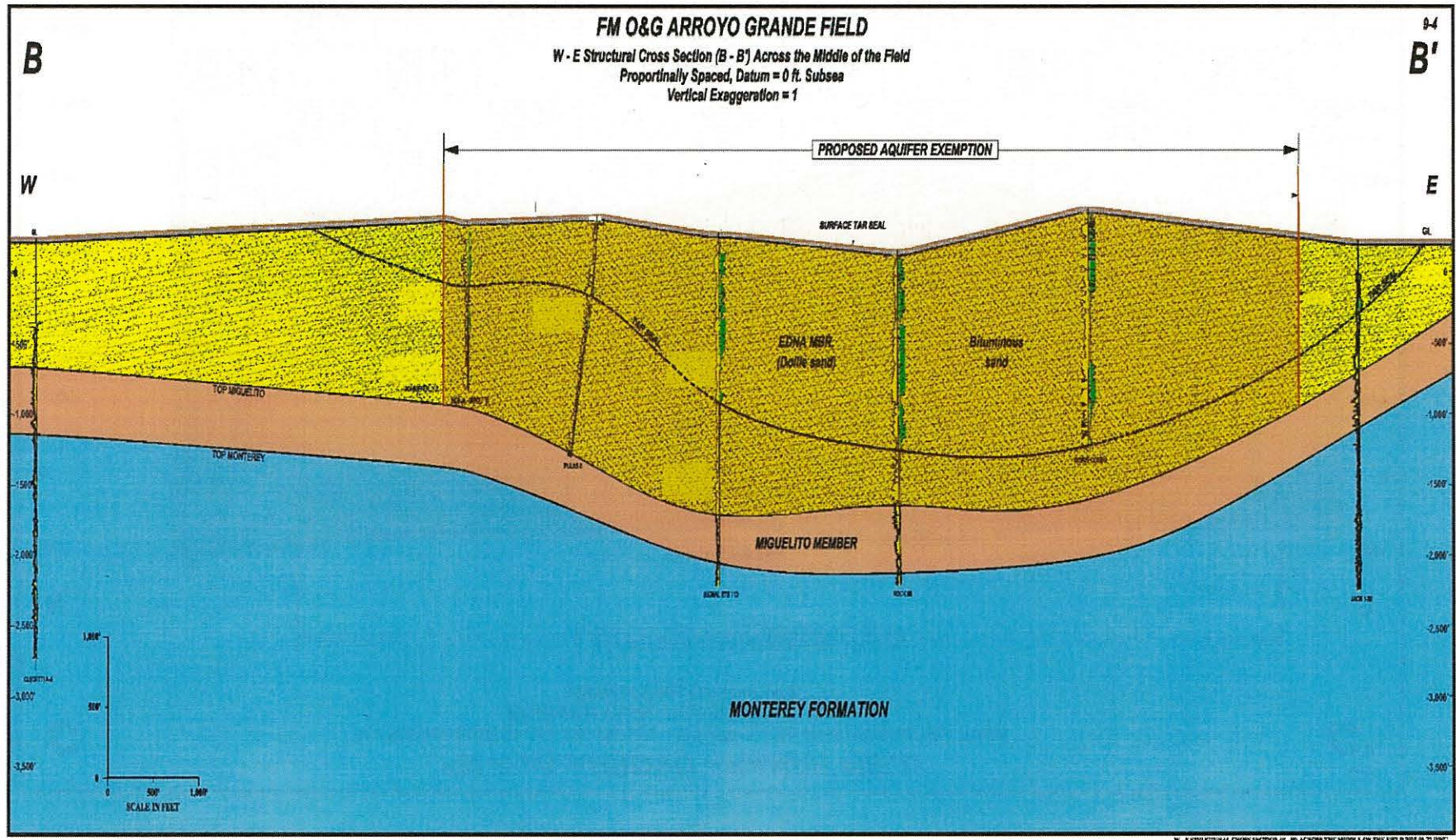
Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 3.2: Cross Section A-A' across the Dollie Sands Aquifer Exemption Area
 Arroyo Grande Oil Field, San Luis Obispo County, California



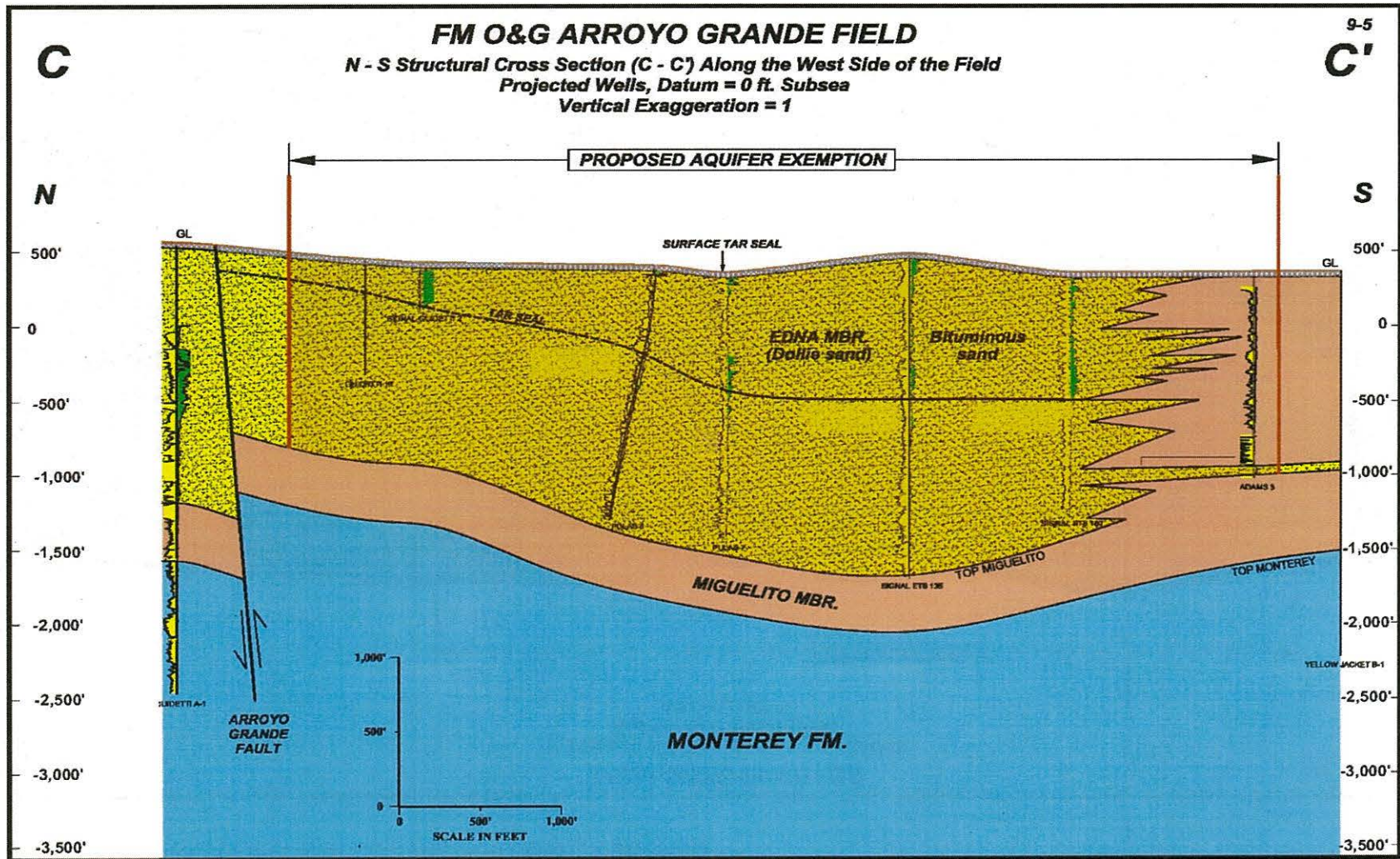
Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 3.3: Cross Section B-B' across the Dollie Sands Aquifer Exemption Area
 Arroyo Grande Oil Field, San Luis Obispo County, California



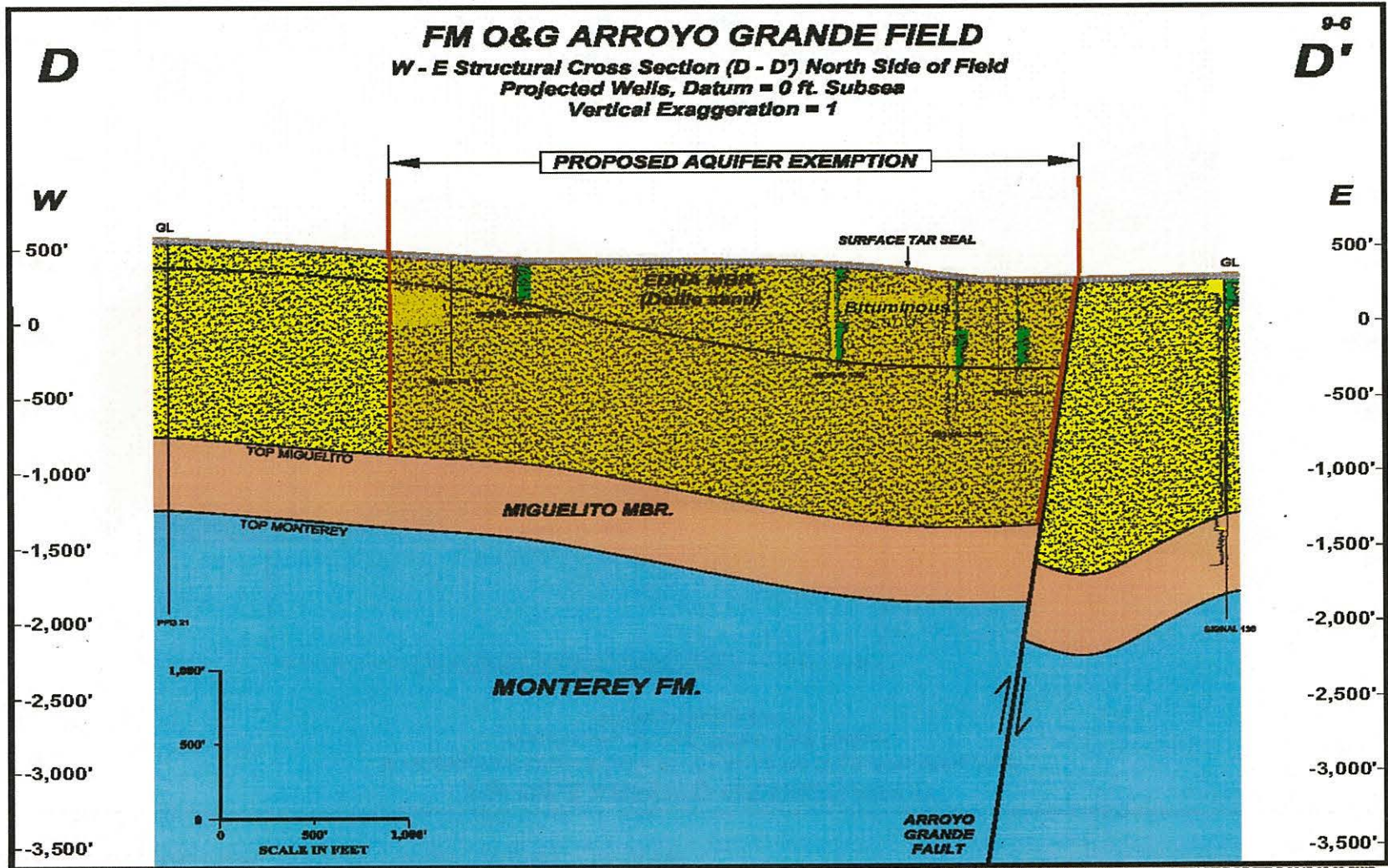
Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 3.4: Cross Section C-C' across the Dollie Sands Aquifer Exemption Area
 Arroyo Grande Oil Field, San Luis Obispo County, California



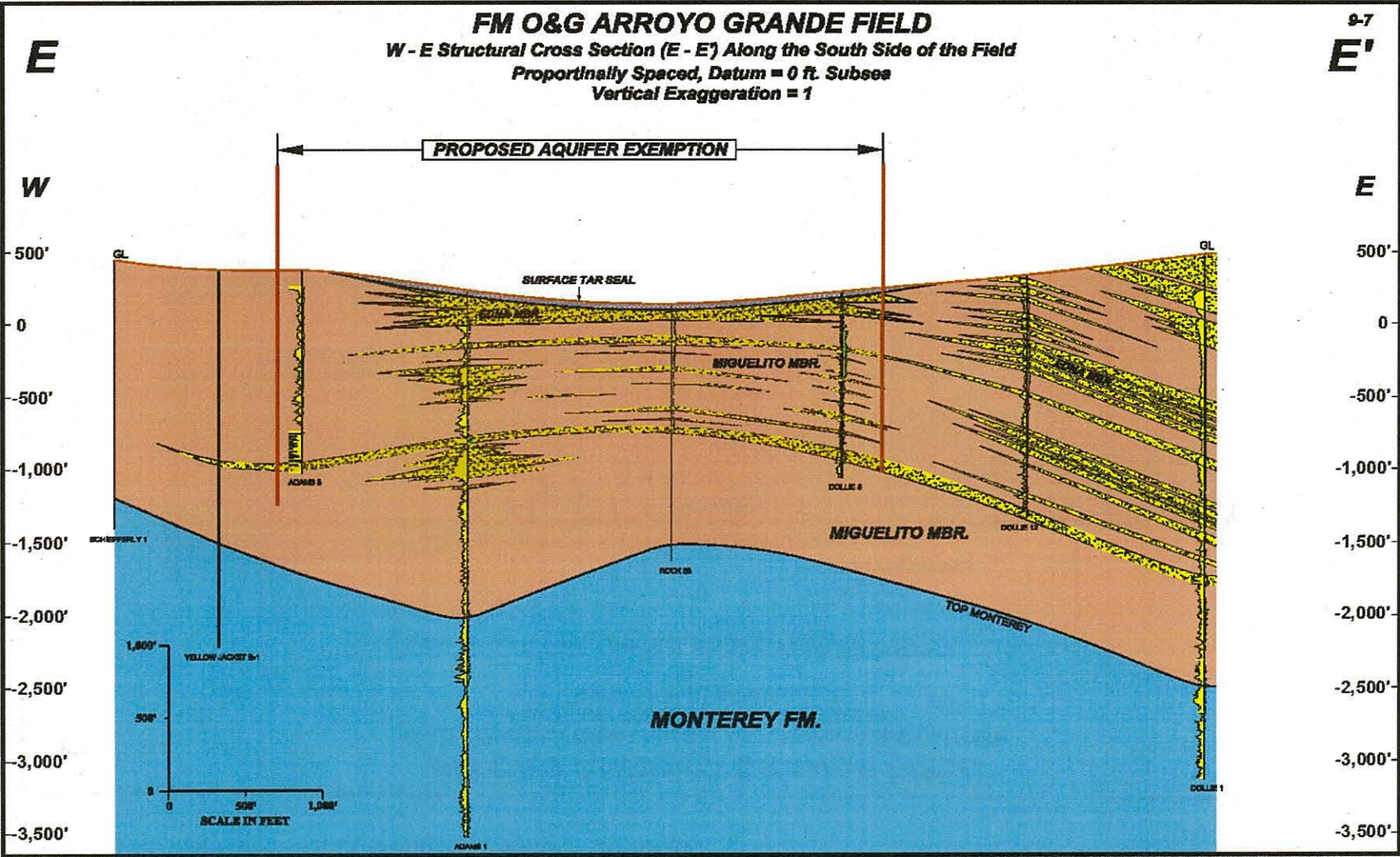
Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 3.5: Cross Section D-D' across the Dollie Sands Aquifer Exemption Area
Arroyo Grande Oil Field, San Luis Obispo County, California



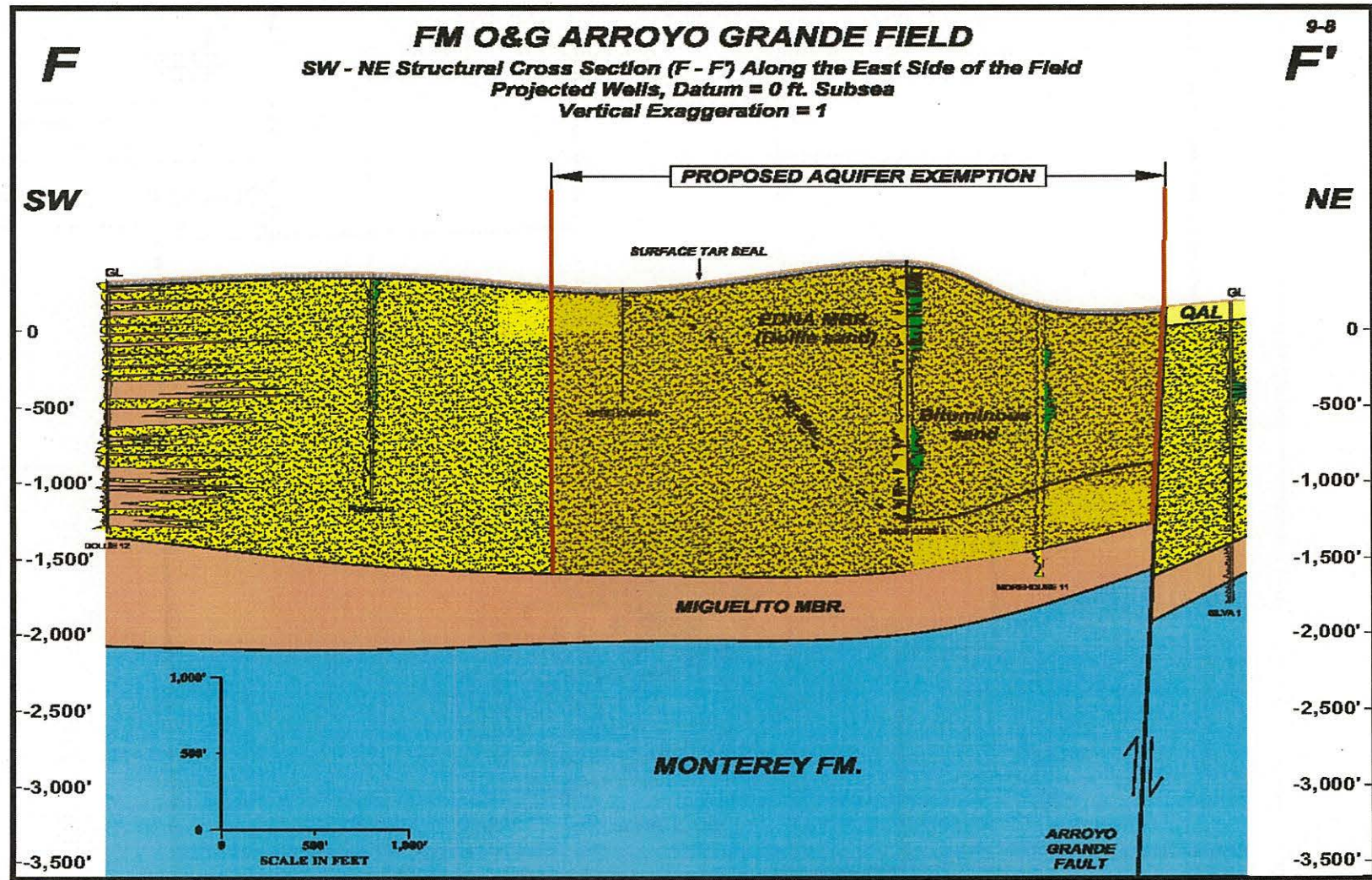
Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 3.6: Cross Section E-E' across the Dollie Sands Aquifer Exemption Area
Arroyo Grande Oil Field, San Luis Obispo County, California



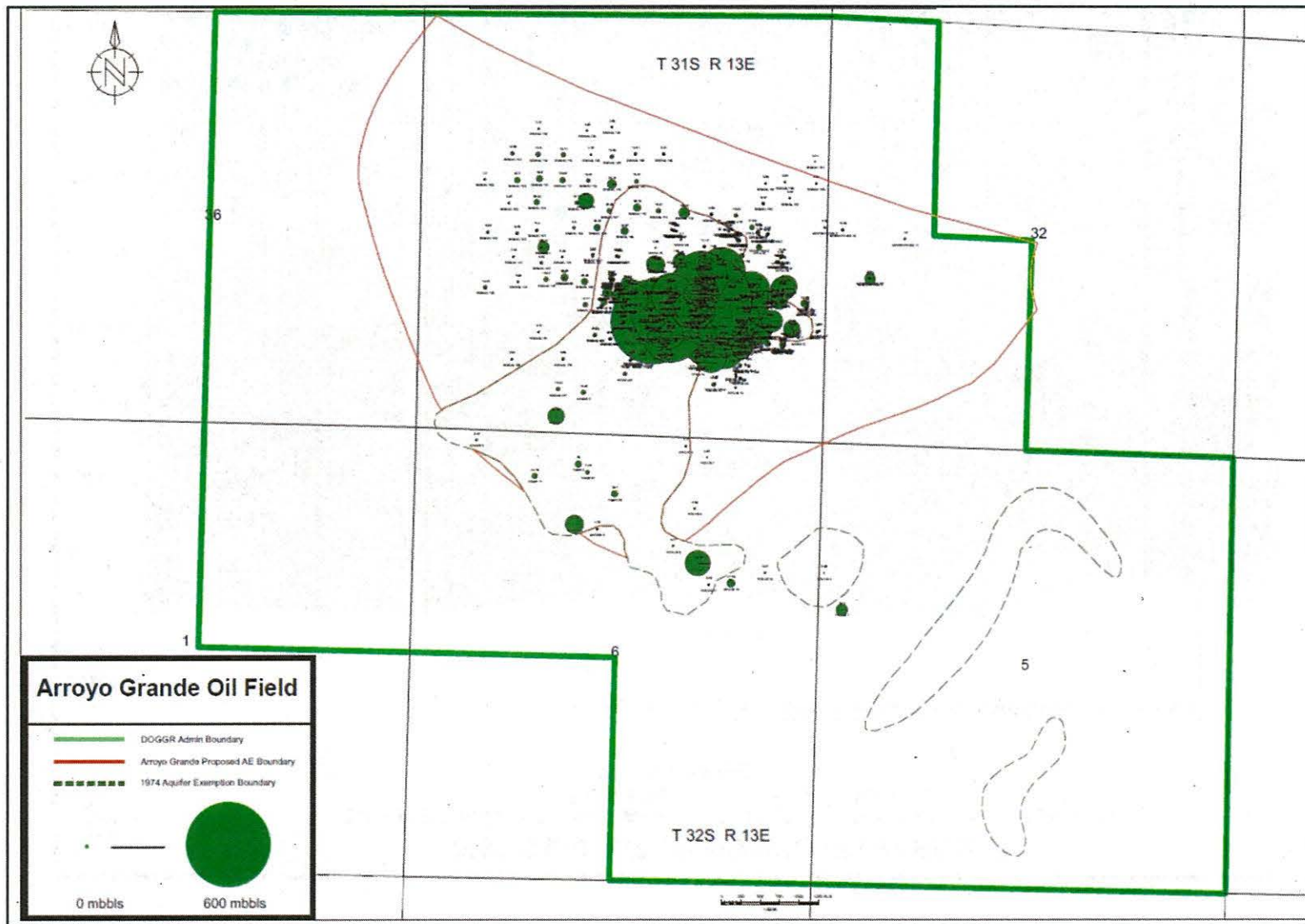
Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 3.7: Cross Section F-F' across the Dollie Sands Aquifer Exemption Area
 Arroyo Grande Oil Field, San Luis Obispo County, California



Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Figure 4: Oil Well Production Map, Arroyo Grande Oil Field, San Luis Obispo County, California



Source: DOGGR's Aquifer Exemption Application for the Arroyo Grande Oil Field

Table 1: List of Water Supply Wells

Well Number*	Property Address	Location**		Well Type	Depth (feet)	Aquifer	Completion	Year Drilled	Data Source(s)***
		Lat	Long						
38	2275 Carpenter Canyon Rd, San Luis Obispo, CA 93401	35.184564°	-120.599255°	Domestic	"shallow"	Not Known****	Unknown	Unknown	3
41	2245 Carpenter Canyon Rd, San Luis Obispo, CA 93401	35.183837°	-120.598844°	Domestic	110	Not Known****	Unknown	Unknown	2
43	125 Tolosa, San Luis Obispo, CA 93401	35.187077°	-120.607885°	Domestic	147	Not Known****	8" casing	Unknown	4, 5
48	2385 Carpenter Canyon Rd, San Luis Obispo, CA 93401	35.185931°	-120.605215°	Agriculture	-	-	-	-	1
50	625 W. Ormonde Rd, San Luis Obispo, CA 93401	35.176440°	-120.611533°	Domestic	Unknown	Oak Park	Unknown	Unknown	9, 13
51	630 W. Ormonde Rd, San Luis Obispo, CA 93401	35.177883°	-120.610265°	Domestic	380	Oak Park	6" casing, screened from 280 to 380 feet	1999	6, 7, 9
54	535 W. Ormande Rd, San Luis Obispo, CA 93401	35.175908°	-120.609129°	Domestic	300	Oak Park	6" casing, screened from 200 to 300 feet	2000	9, 19
84	Price Canyon Rd, San Luis Obispo, CA 93401	35.170727°	-120.621658°	Domestic	40	Pismo Creek Alluvium	8" casing, screened from 22 to 34 feet	1999	9, 12
86	Price Canyon Rd, San Luis Obispo, CA 93401	35.172660°	-120.621986°	Domestic	60	Pismo Creek Alluvium	8" casing, screened from 24 to 54 feet	1999	9, 11
52	610 W. Ormonde Rd, San Luis Obispo, Ca 93401	35.176449°	-120.608807°	Domestic	380	Oak Park	6" casing, screened from 280 to 380 feet	1999	8, 9

Data Sources

- 1 Appendix N of *Aquifer Exemption Supplemental Information Arroyo Grande Oil Field San Luis Obispo, California*, December 2017
- 2 Appendix O of *Aquifer Exemption Supplemental Information Arroyo Grande Oil Field San Luis Obispo, California*, December 2017
- 3 Appendix P of *Aquifer Exemption Supplemental Information Arroyo Grande Oil Field San Luis Obispo, California*, December 2017
- 4 Appendix Q of *Aquifer Exemption Supplemental Information Arroyo Grande Oil Field San Luis Obispo, California*, December 2017
- 5 Public Comment Letter, Natalie Risner, September 21, 2015
- 6 DOGGR submission, *AQUIFER EXEMPTION – ARROYO GRANDE WATER WELL INFORMATION, Water Quality of Oak Park Area*, November 10, 2016
- 7 Well log 529414, *Well 51 Log*
- 8 Well log 529413, *Well 52 Log*
- 9 County of San Luis Obispo property records, <http://assessor.stocounty.ca.gov/assessor/pisa/Search.aspx>
- 10 Well log 536605, *Well 54 Log*
- 11 Well log 511407, *Well 86 Log*
- 12 Well log 511411, *Well 84 Log*
- 13 Email correspondence with the person who rents the property, and phone conversations with one of the owners of the property. No well log readily available.

Notes

- * Both the original and supplemental application packages contain a wealth of information regarding these wells.
- ** All latitudes and longitudes estimated from Google Earth
- *** Well logs from the Department of Water Resources are matched to actual well locations within the constraints of the data contained in the well log.
- **** No well log readily available to determine physical characteristics of aquifer penetrated.

Source: DOGGR’s Aquifer Exemption Application for the Arroyo Grande Oil Field