



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

September 28, 2017

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: Aquifer Exemption Request for the Jasmin Oil Field, Kern 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 the Cattleberry Sand, a portion of the Vedder Formation, in the Jasmin Oil Field in Kern County, California.

The approved aquifer exemption boundaries and depths, along with EPA's analyses and rationale in support of the approval, are detailed in the enclosed Record of Decision, also available at: <https://www.epa.gov/pacific-southwest-media-center/epas-oversight-californias-underground-injection-control-uic-program>. 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 federal exemption criteria:

- The portion of the formation proposed for exemption in the oil field does not currently serve as a source of drinking water; and
- The portion of the formation proposed for exemption in the oil field cannot now and will not in the future serve as a source of drinking water because it is commercially hydrocarbon-producing.

If you have any questions, please contact David Albright, Acting Assistant Director, Water Division, at (415) 972-3971.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tomás Torres", with a long horizontal flourish extending to the right.

Tomás Torres
Director, Water Division

September 28, 2017

Enclosure: Aquifer Exemption Record of Decision for Jasmin Oil Field

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

US Environmental Protection Agency (EPA) 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 expansion of the aquifer exemption (AE) for the Cantleberry Sand, a member of the Vedder Formation, within the administrative boundaries of the Jasmin 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: July 21, 2017

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

Substantial or Non-Substantial Program Revision: Non-Substantial

The EPA determined this is a non-substantial program revision because it is an expansion to an existing aquifer exemption in an active oil field, is associated with site-specific Class II UIC well permits, and does not require a state-wide programmatic change or a program revision with unique or significant implications for the State’s 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”).

Operator: Hathaway, LLC.

Well/Project Name: The Cantleberry Sand Member in the Jasmin Oil Field.

Well/Project Location: The Jasmin Oil Field AE, including the proposed expansion, is located in the southern San Joaquin Valley, north of Bakersfield, California. The proposed aquifer exemption is location in Sections 9, 10, 14, 15, 16, and 22 of Township 25 South, Range 27 East, Mount Diablo Meridian. [Refer to Figure 1.]

County: Kern

State: California

Well/Project Permit Number: There are currently seven Class II injection wells, including three water disposal wells and four steam flood enhanced oil recovery (EOR) wells, in the portion of the Jasmin Oil Field proposed for exemption.

Well Class/Type: Class II EOR and Waste Disposal (WD) wells.

DESCRIPTION OF PROPOSED AQUIFER EXEMPTION

Aquifer to be Exempted: The Cantleberry Sand Member of the Vedder Formation.

Areal Extent of Aquifer Exemption: The areal extent of the existing AE and the proposed expansion in the Jasmin Oil Field is approximately 1,363 acres. This acreage includes 454 acres of productive boundaries (approved at primacy in 1983), and approximately 909 acres comprising the current oil producing area outside the boundaries and planned future commercially producible areas. The lateral boundaries of the proposed exemption area are defined by a stratigraphic pinchout of the Cantleberry Sand (to the north and east), the oil-water contact (to the west), and a sealing fault (to the south). DOGGR provided three GIS shapefiles that delineate the AE boundary and are included in the administrative record for this ROD. Refer to Figure 1 for a depiction of the existing and proposed exemption areas and Figures 2 and 3 for depictions of the areal extent of the aquifer proposed for exemption.

Lithology, Total Dissolved Solids (TDS), Depth, Thickness, Porosity, and Permeability of the Aquifer: Sampling data provided in the AE application reflects that the average total dissolved solids (TDS) concentration of the Cantleberry Sand ground water is 384 milligrams per liter (mg/L). The following table summarizes the lithology, TDS levels, depth, thickness, and average porosity and permeability information for the aquifer proposed for exemption.

<i>Aquifer</i>	Cantleberry Sand Member of the Vedder Formation.
<i>Lithology</i>	Very fine-grained to medium-grained, friable, quartz-rich, and well sorted sand.
<i>TDS (mg/L)</i>	384 mg/L (average) ranges from 310 mg/L to 410 mg/L, based on 9 samples.
<i>Depth to Top (feet bgs)</i>	2,650 to 3,050 feet.
<i>Thickness (feet)</i>	Ranges from zero (at a pinchout along the northern and eastern boundaries) to 80 feet within the proposed exemption area.
<i>Average Porosity and Permeability</i>	Porosity averages 35%. Permeability ranges from 600 to 5,000 millidarcies (mD), with an average of 2,100 mD.

Confining Zone(s): The Cantleberry Sand is vertically confined by bentonitic claystones that are present above and below it, within the area proposed for exemption. The aquifer is confined laterally by a stratigraphic pinchout (to the north and east), an inward pressure gradient caused by withdrawal of fluids from the Cantleberry Sand (to the west), and a sealing fault (to the south). [Refer to Figures 4.1 through 4.4.]

Injectate Characteristics: The injectate consists of steam and excess produced water that is not being used for beneficial use (i.e., irrigation) and is injected to enhance the production of high viscosity crude oil.

BACKGROUND

On July 21, 2017, DOGGR submitted a request for EPA Region 9's approval to expand the current AE designation for the Cantleberry Sand beneath the Jasmin Oil Field, in an unincorporated area administered by Kern County, in the Southern San Joaquin Valley, California. 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 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, subject to state regulatory requirements, could approve Class II injection into the identified formation.

The Cantleberry Sand has been producing oil since 1947 and continues to serve as a source of crude oil within the Jasmin Oil Field. Cyclic steaming was initiated in the field in the 1980s to increase the amount of oil recovery. The Jasmin Oil Field has produced over 3 million barrels (bbls) of oil since 1977. There is no measurable gas production from the Cantleberry Sand in the Jasmin Oil Field.

EPA exempted a portion of the Cantleberry Sand in the Jasmin Oil Field at the time of DOGGR's Class II primacy approval in 1983 because it is a hydrocarbon-producing formation. This prior approved aquifer exemption area of approximately 454 acres was based on commercial petroleum production depicted in the document, "California Oil and Gas Fields, Vol. I, North and East Central California, 1973."

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 package, the State Water Resources Control Board (State Board) determined that the portion of the Cantleberry Sand that is proposed for exemption does not currently serve as a source of drinking water, and is not hydraulically connected to domestic drinking water or public water supply wells. This is based on an evaluation of the formation's properties (including information about oil saturation through oil shows, pressure data, logs, core data, sidewall core analyses, and permeability and porosity data); confinement of the formation to ground water flow; and information about water supply wells in the area. DOGGR's review demonstrated that the Cantleberry Sand does not currently serve as a source of drinking water in the area proposed for exemption because there are no existing drinking water supply wells, public or private, that currently, or in the future would draw water from the aquifer within the area proposed for exemption. Furthermore, the Cantleberry Sand is vertically and laterally

confined (separated) from USDWs, and no existing drinking water wells are hydraulically connected to the aquifer proposed for exemption.

Water Supply Wells: DOGGR’s AE proposal included information about water wells in the area proposed for exemption, and confirmed that no drinking water wells draw from the Cantleberry Sand. While EPA regulations require that an aquifer must not currently serve as a source of drinking water, DOGGR reviewed all beneficial use wells within the area proposed for exemption—which the State defines to include wells for both drinking water uses and non-drinking water uses, such as irrigation.

To identify potential water supply wells, DOGGR performed water well database searches, reviewing well records from the Department of Water Resources (DWR) and the Kern County Environmental Health (KCEH) Division. DOGGR also contacted water districts in proximity to the Jasmin Oil Field, including the Kern-Tulare Water District, Jasmin Ranchos Mutual Water Company, and Richgrove Community Services District to ensure the accuracy of the water well search.

The water supply well search area (study area) included the entire surface expression of the area proposed for exemption, plus all adjacent one square mile sections that touch a one mile buffer area around the area proposed for exemption. This expanded search area was selected to account for any uncertainty in the locations of the wells identified.

The well search identified 55 wells: four public water supply (PWS) wells, four domestic wells, and 47 irrigation wells. None of the wells that were identified source water from the Cantleberry Sand. All of the wells are within the undifferentiated Kern River-Chanac Formation, above the Cantleberry Sandy and separated by multiple confining layers. Additionally, the four PWS wells are 2.4 miles away from the closest portion of the area proposed for exemption. See Table 1 for the complete water well inventory.

No public drinking water supplies or private drinking water wells within the area studied currently use the Cantleberry Sand as a source of drinking water. The nearest community to the area proposed for exemption is the unincorporated community of Richgrove, which is four miles northwest of the proposed exemption area; the City of Delano is 10 miles west of the proposed aquifer exemption area.

Groundwater Flow Patterns: DOGGR evaluated available hydrogeologic information on the aquifer proposed for exemption and the overlying formations, including injection and production data. Flow in the Cantleberry Sand is driven by pressure gradients created by oil production and injection activities. More fluid has been withdrawn from the aquifer (approximately 166 million barrels, from 1977 through mid-2016) than is reinjected (approximately 6 million barrels over the same time period), creating an inward pressure gradient (i.e., a “pressure sink”). According to DOGGR, ground water flow is predicted to be towards the producing wells for the lifetime of the Jasmin Oil Field.

Confinement of the Formation to Groundwater Flow: The upper confining zone is a bentonitic claystone that overlies the Cantleberry Sand and serves as a barrier to upward fluid

migration. This confining claystone layer is 2 to 35 feet thick in the proposed exemption area; the average thickness is 10 feet. The permeability of this upper confining claystone ranges from 5.8 mD to 65 mD, with an average of 24.5 mD; this is based on measurements and analyses of 14 core samples acquired from 6 wells. This claystone is also identifiable in the electric and mud logs from wells throughout the proposed exemption area. The Freeman-Jewett Silt, which lies above the claystone and acts as a secondary seal, is 200 feet thick in the area of the proposed aquifer exemption. As depicted in Figures 4.1 through 4.4, there are additional confining shales that provide several hundred feet of hydrologic separation between the Cantleberry Sand and the shallow USDW in the Kern River-Chanac Formations.

The lower confining zone is a laterally continuous bentonitic claystone that provides vertical confinement of fluids of the Cantleberry Sand from the underlying Walker Formation. This claystone is 3 to 41 feet thick in the proposed exemption area; the average thickness is 12 feet. The average permeability of the lower confining claystone is 23.4 mD. Permeabilities range from 0.4 mD to 60 mD; this is based on 41 samples from 10 wells.

Lateral confinement to fluid migration is provided by a stratigraphic pinchout, a sealing fault, and an inward pressure gradient caused by net withdrawal of fluids from the Cantleberry Sand. See Figures 4.1 through 4.4.

- To the north and east, the boundary of the area proposed for exemption is defined by a pinchout of the Cantleberry Sand. This pinchout is the oil trapping mechanism in the Jasmin Oil Field. Well logs provide evidence for the existence of this pinchout.
- To the west, containment along the oil-water contact is the result of an inward pressure gradient caused by the withdrawal of fluids from the Cantleberry Sand. Evidence of this pressure sink is based on pressure data collected in idle wells across the Jasmin Oil Field, from 1996 to 2015. The elevation of the oil-water contact along the western boundary is also affected by the presence of east-west trending sealing faults along the western boundary of the area proposed for exemption. The sealing nature of the faults is evidenced by variation in elevations of the oil-water contact within the Cantleberry Sand along this boundary based on analyses of core samples taken from the wells, and electric logs.
- To the south, the area proposed for exemption is defined by a sealing fault and the existing aquifer exemption area. The ability of the fault to trap oil is indicative of its sealing capability. The sealing nature of the fault is also demonstrated by differences in the elevation of the oil-water contact within the Cantleberry Sand across the fault.

The Vedder Formation, of which the Cantleberry Sand is a member, does not outcrop in or near the proposed exemption area. Therefore, the Cantleberry Sand is not in direct contact with any potential surface recharge.

After reviewing information regarding the drinking water supply, the ground water flow within the Cantleberry Sand, and the lateral and vertical confinement of the formation as described in the AE application, the EPA concludes that the portion of the Cantleberry Sand proposed for

exemption is not a source of drinking water and it is not hydraulically connected to any domestic or public water supply wells. Hence, 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.

The Cantleberry Sand within the Jasmin Oil Field has been producing oil since 1947. DOGGR provided information on historic production of wells in the area proposed for exemption along with supporting documentation such as well logs, production data, and oil shows that support the demonstration of the presence of producible quantities of oil in the Cantleberry Sand.

DOGGR's AE request provides well logs depicting an oil producing zone in the Cantleberry Sand, along with cross sections that confirm the presence of current and residual oil in the area proposed for exemption. Cross sections provided by DOGGR illustrate similar stratigraphy in the existing and proposed exempt areas; oil production has occurred in wells in both areas.

DOGGR's request also includes maps that illustrate cumulative oil production from the Cantleberry Sand in the proposed exemption area. Several wells throughout the area proposed for exemption have produced in excess of 100,000 bbls of oil. Since 1977, over 3 million bbls of oil have been produced from the Cantleberry Sand. (See Figure 5.)

Based on a review of information such as well logs, production data, and oil shows, and given the long history of oil production, the implementation of enhanced recovery techniques, and recent trends in field production, the EPA has determined that the aquifer proposed for exemption meets the criteria at 40 CFR § 146(b)(1).

PUBLIC NOTICE AND COMMENT

DOGGR provided public notice of this proposed AE on March 20, 2017. A public hearing was held on April 19, 2017 in Bakersfield, CA. The written comment period closed on April 19, 2017. DOGGR provided the EPA a summary of the public comments, copies of the public comments submitted, a transcript of the public hearing, and their responses to the written and verbal comments.

In making this decision, the EPA reviewed the information submitted by the State, including all the written and oral comments submitted to the State during its public comment process. One commenter who wrote to DOGGR requested that the EPA reject the exemption request before environmental review has occurred under the National Environmental Policy Act (NEPA). The EPA believes that the public comment and hearing procedures 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 action.

The commenter also raised concerns regarding protection of species under the federal Endangered Species Act. This issue is outside the scope of EPA's AE decision as this action does not authorize future injection activities at the surface. Approval of this aquifer exemption concerns ground water that is thousands of feet below the surface, and a review of materials submitted by the commenter indicate that there are no subsurface listed threatened or endangered species that would be affected by the EPA's approval.

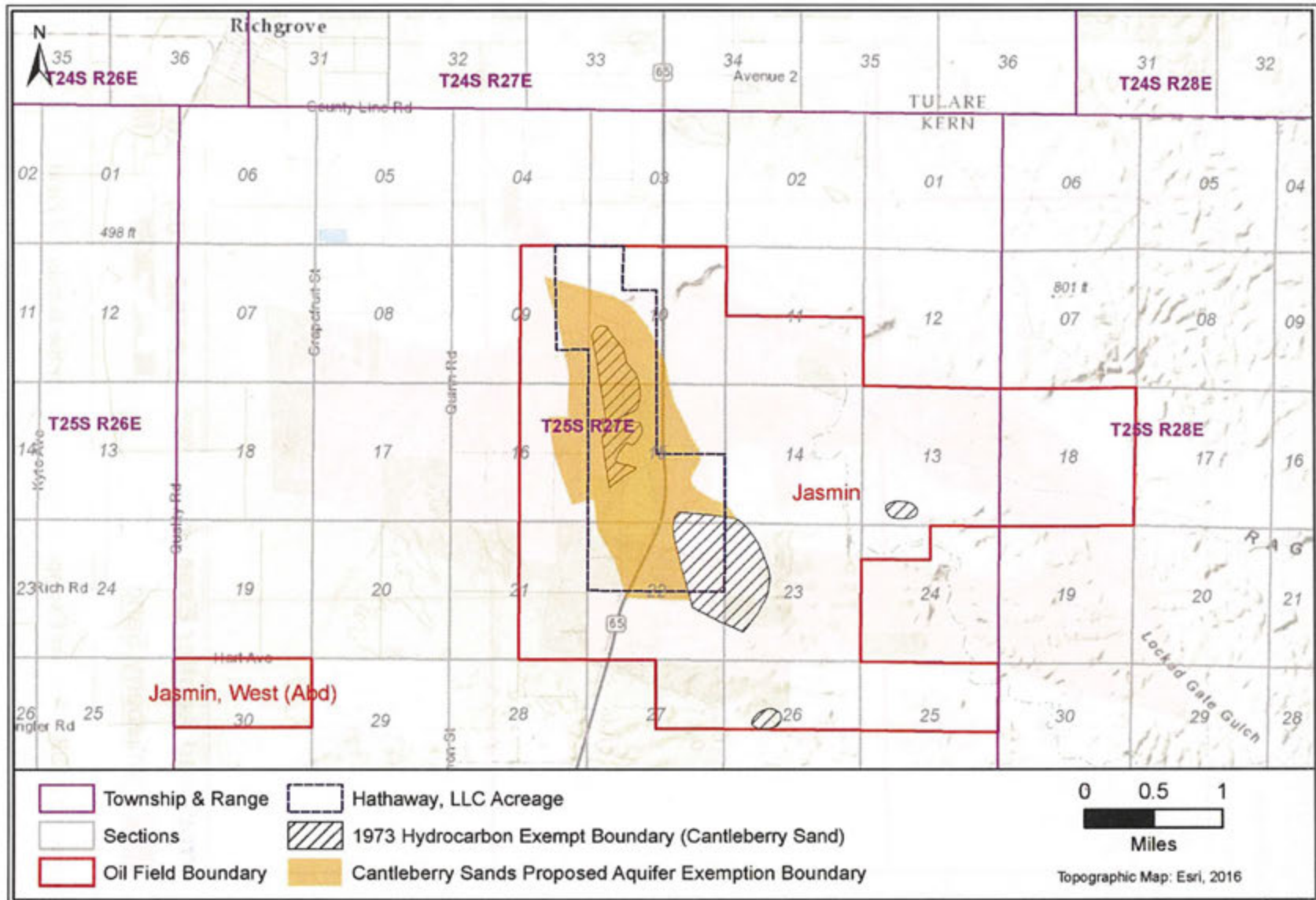
Additionally, the commenter questioned whether the current aquifer exemption criteria reflect changing climate conditions and modern water treatment technologies. In considering whether the aquifer proposed for exemption cannot now and will not in the future serve as a source of drinking water because it is hydrocarbon producing, the EPA reviewed data about hydrocarbon production in the Cantleberry Sand. Based on a review of well logs, historic production data, and oil shows, the EPA believes that it is reasonable to conclude that the formation will continue to be commercially producible into the foreseeable future and meets the requirements at 40 CFR § 146.4(b)(1).

CONCLUSION AND DECISION

Based on a review of the entire record, including all the written and oral comments submitted to DOGGR during its public comment process, 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.

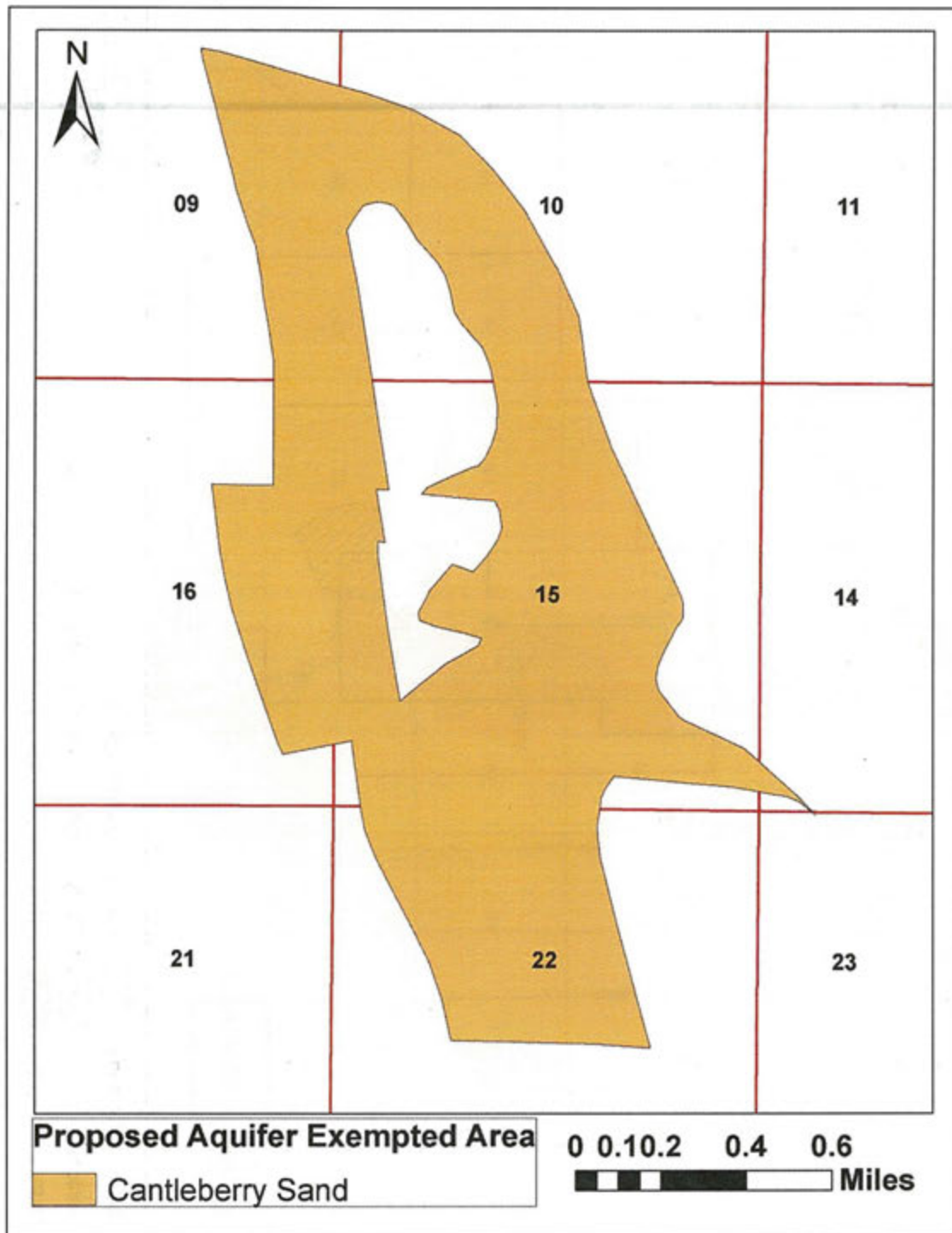
Effective Date: September 28, 2017

Figure 1: Location of the Jasmin Oil Field, Kern County, California



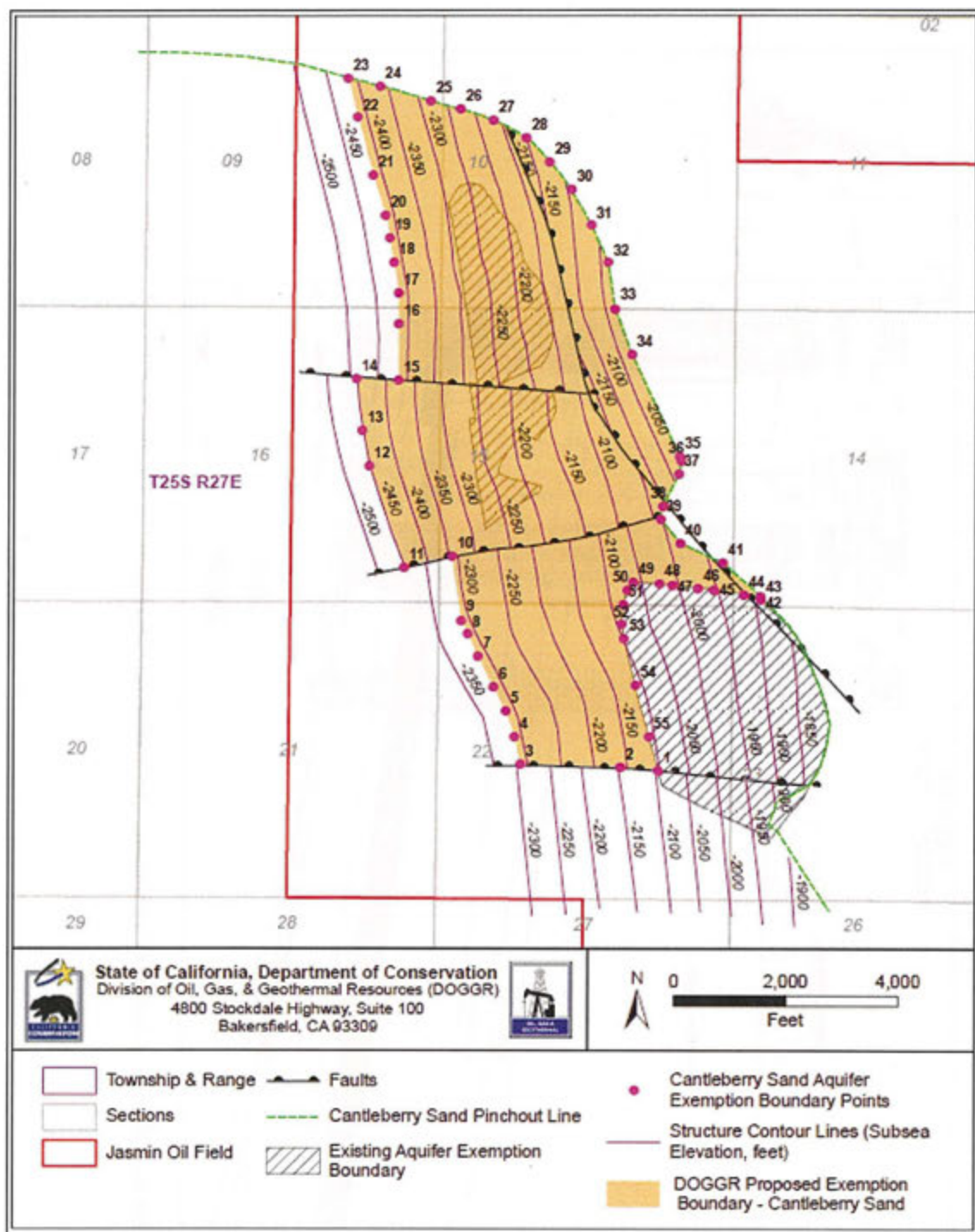
Source: Exhibit 1, DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

Figure 2: Cantleberry Sand Aquifer Exemption Location Map, Jasmin Oil Field, Kern County, California



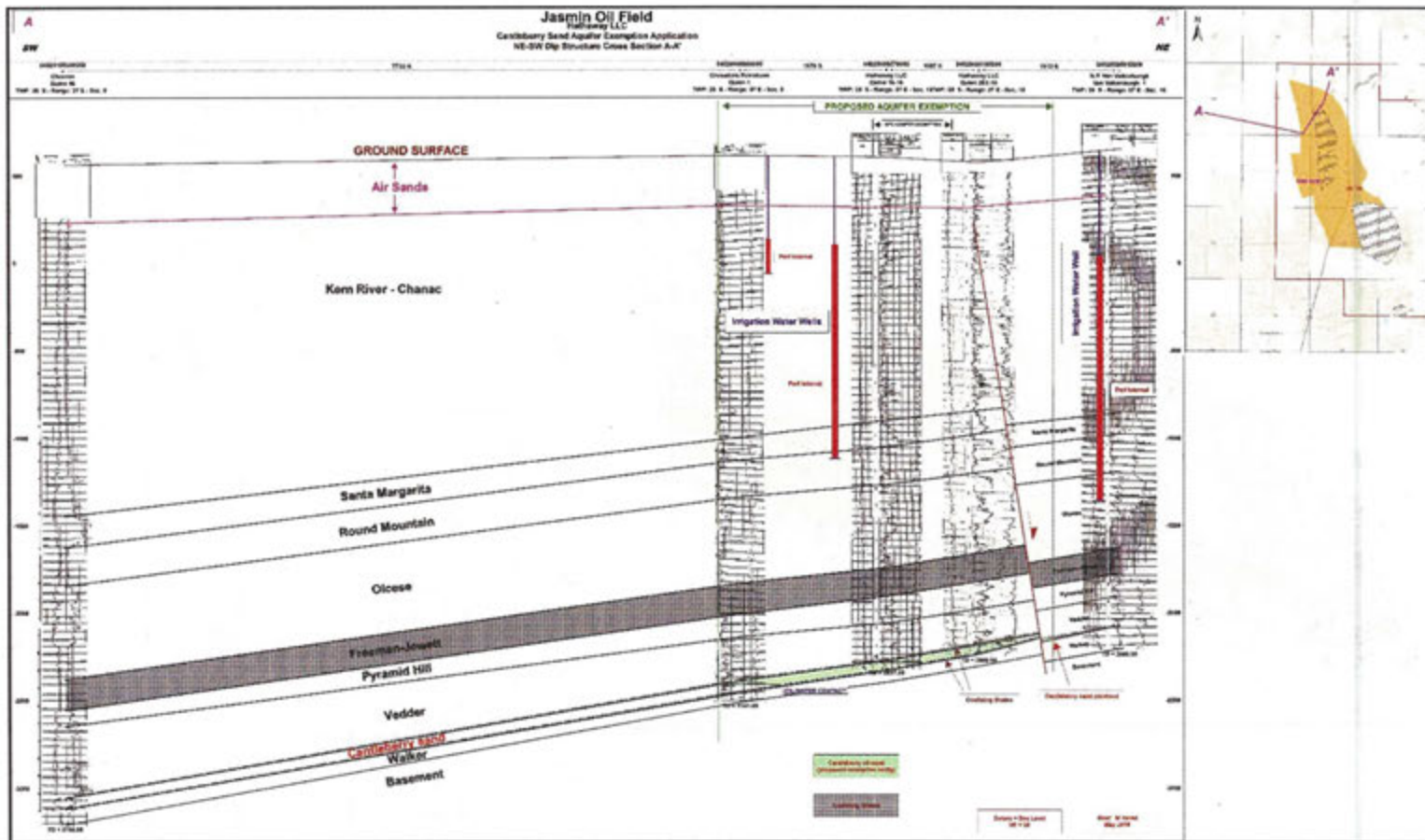
Source: DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

Figure 3: Cantleberry Sand Structure, Aquifer Exemption Boundary Points Map, Jasmin Oil Field, Kern County, California



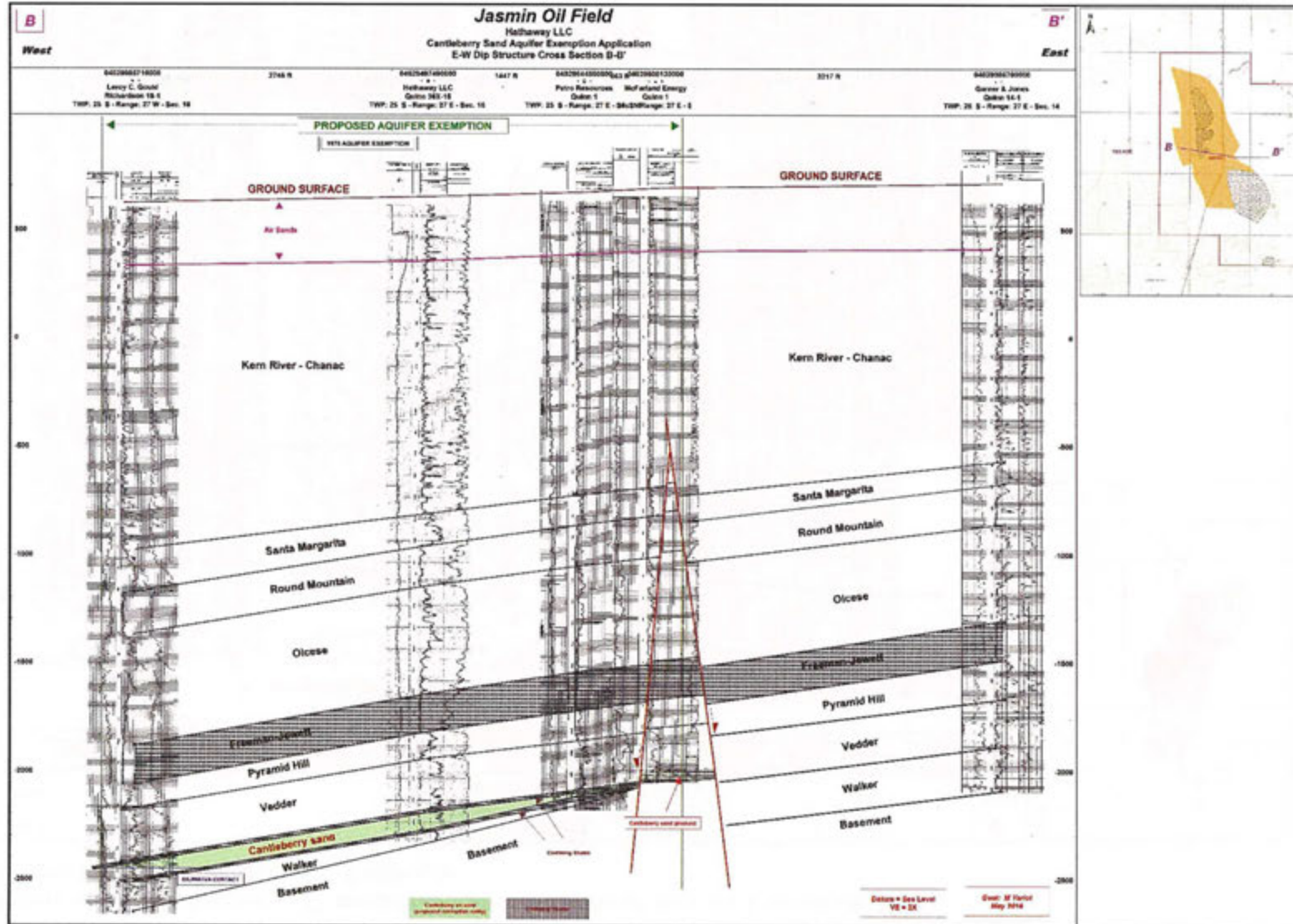
Source: DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

**Figure 4.1: Cross Section A-A' across the Cantleberry Sand Aquifer Exemption Area
Jasmin Oil Field, Kern County, California**



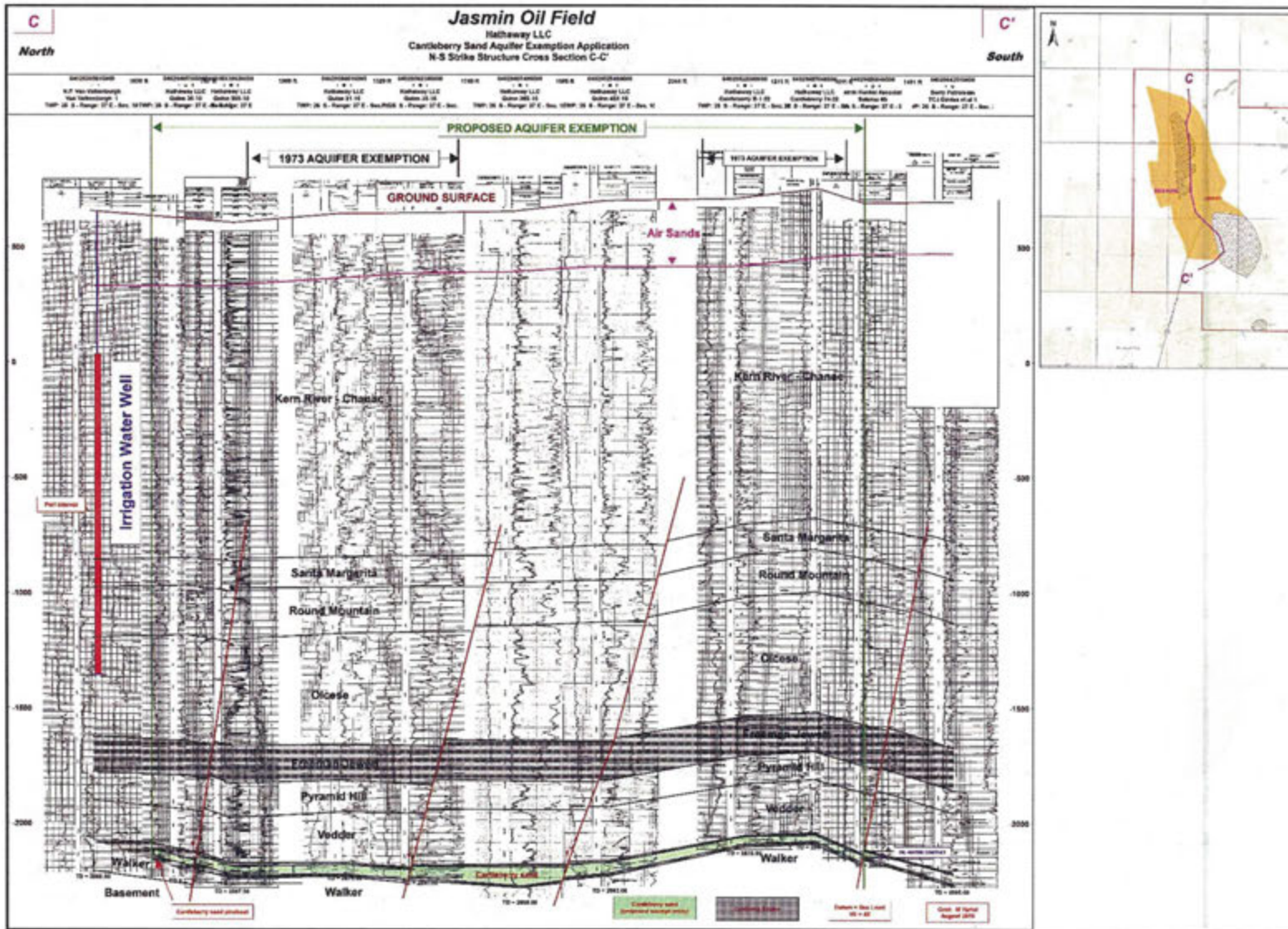
Source: Exhibit 4a, DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

Figure 4.2: Cross Section B-B' across the Cantleberry Sand Aquifer Exemption Area
 Jasmin Oil Field, Kern County, California



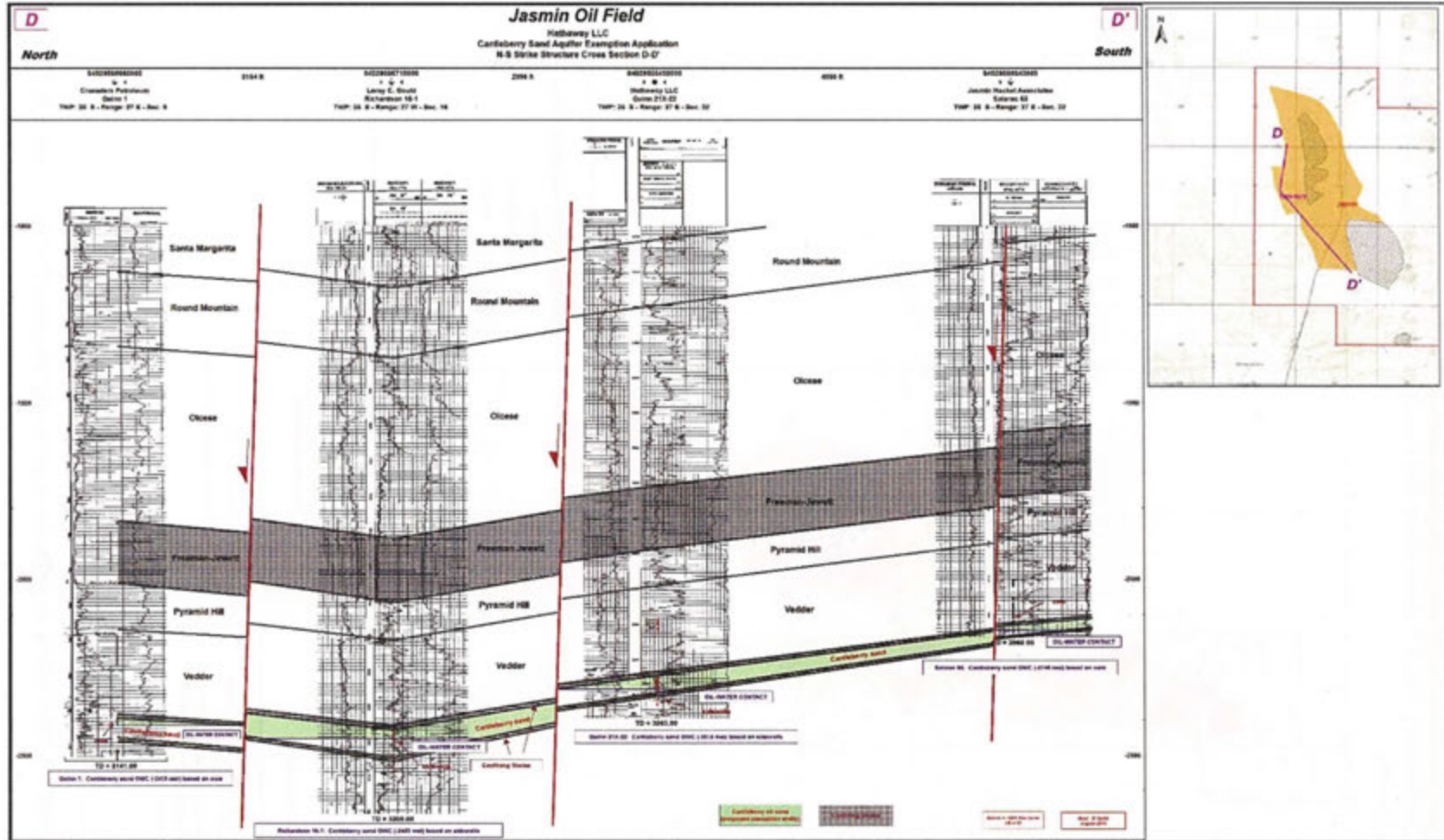
Source: Exhibit 4b, DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

Figure 4.3: Cross Section C-C' across the Cantleberry Sand Aquifer Exemption Area
 Jasmin Oil Field, Kern County, California



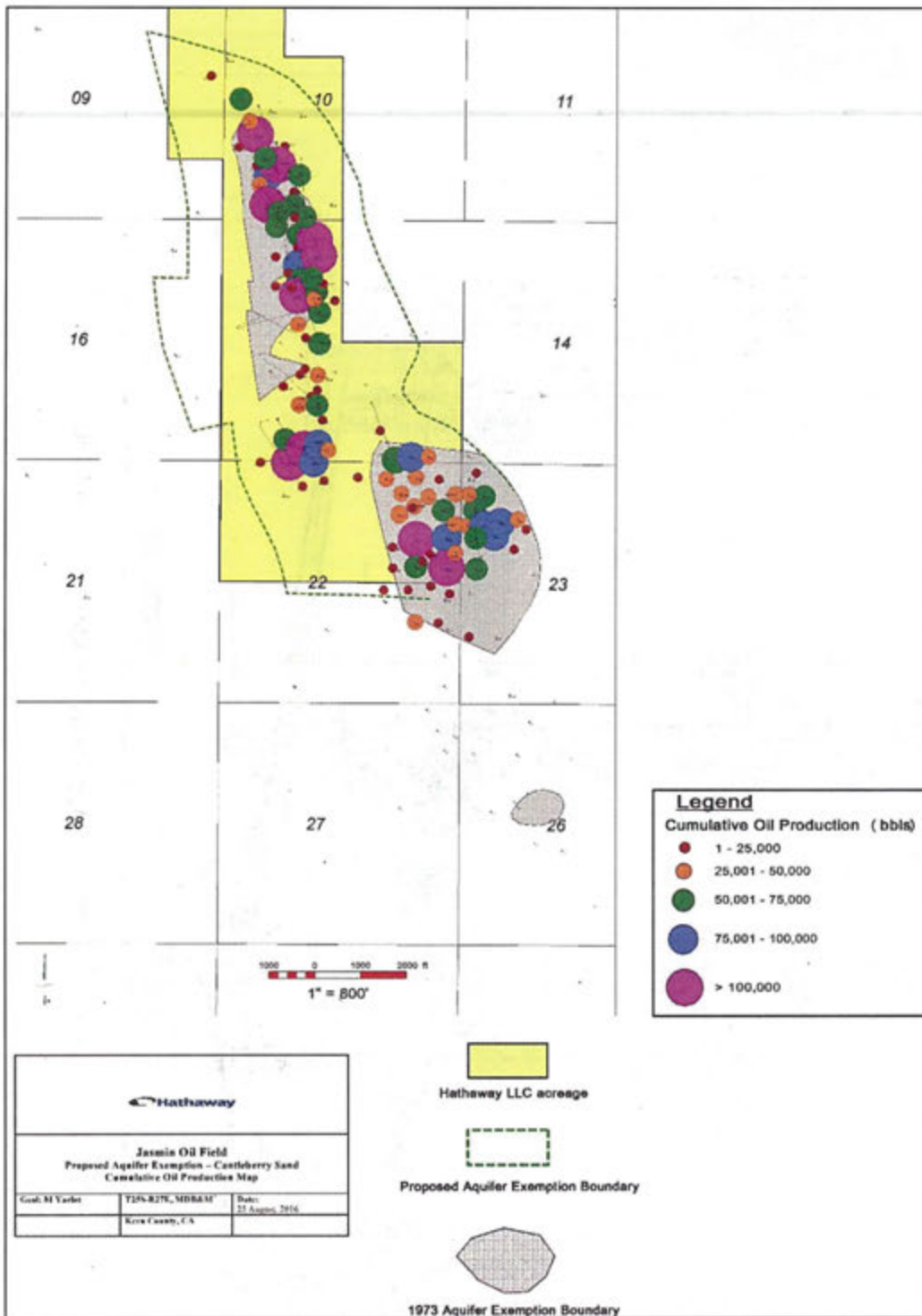
Source: Exhibit 4c, DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

**Figure 4.4: Cross Section D-D' across the Cantleberry Sand Aquifer Exemption Area
Jasmin Oil Field, Kern County, California**



Source: Exhibit 4d, DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

Figure 5: Cattleberry Sand Cumulative Oil Production Map, Jasmin Oil Field, Kern County, California



Source: Exhibit 10, DOGGR's Aquifer Exemption Application for the Jasmin Oil Field

Table 1: List of Active Water Wells

Well ID	Map ID	Well Type	DWR Log Number	KCEH Log Number	Date Completed	Total Depth (ft bgs)	Perforations		Ground Elevation (ft)	Formation(s) of Water Well Completion
							From (ft bgs)	To (ft bgs)		
Tulare: T 24S, R 26E, Sec 36-1	1	Public Water System	60074	-	5/5/1961	1,002	502	1,002	510	KR-CH
Tulare: T 24S, R 27E, Sec 31-1	2	Public Water System	-	-	10/6/1953	801	600	801	521	KR-CH
Tulare: T 24S, R 27E, Sec 31-2	3	Public Water System	489111	-	3/6/1992	850	480	850	524	KR-CH
Tulare: T 24S, R 27E, Sec 31-3	4	Public Water System	085423	-	12/1/1980	1,213	650	1,080	508	KR-CH
Kern: T 25S, R 27E, Sec 2-1	5	Domestic	99929	-	9/9/1974	1,908	700	1,900	626	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 2-2	6	Irrigation	116316	-	-	1,650	500	1,650	626	KR-CH, SM
Kern: T 25S, R 27E, Sec 3-1	7	Irrigation	99905	-	3/25/1974	2,000	700	2,000	607	KR-CH, SM
Kern: T 25S, R 27E, Sec 3-2	8	Irrigation	118714	-	9/14/1966	1,720	500	1,720	629	KR-CH, SM
Kern: T 25S, R 27E, Sec 3-3	9	Irrigation	118642	-	3/14/1966	1,800	500	1,800	660	KR-CH, SM
Kern: T 25S, R 27E, Sec 3-4	10	Irrigation	76134	-	5/10/1963	1,954	506	1,954	609	KR-CH, SM
Kern: T 25S, R 27E, Sec 4-1	11	Irrigation	-	-	1/22/1957	1,860	-	-	576	KR-CH, SM
Kern: T 25S, R 27E, Sec 4-2	12	Irrigation	-	-	2/16/2006	820	405	820	588	KR-CH
Kern: T 25S, R 27E, Sec 4-3	13	Irrigation	-	WP0010854	2/25/2008	800	400	800	563	KR-CH
Kern: T 25S, R 27E, Sec 4-4	14	Domestic	173568	-	3/21/1986	632	485	627	554	KR-CH
Kern: T 25S, R 27E, Sec 4-5	15	Irrigation	118727	-	7/10/1967	1,700	495	1,700	583	KR-CH, SM
Kern: T 25S, R 27E, Sec 5-1	16	Irrigation	36189	-	3/10/1953	1,980	520	1,980	561	KR-CH, SM
Kern: T 25S, R 27E, Sec 5-2	17	Irrigation	-	-	4/30/1947	1,084	-	-	552	KR-CH
Kern: T 25S, R 27E, Sec 5-3	18	Irrigation	-	-	1/15/1976	650	350	650	551	KR-CH
Kern: T 25S, R 27E, Sec 5-4	19	Irrigation	1095634	-	7/23/2005	820	606	806	569	KR-CH
Kern: T 25S, R 27E, Sec 8-1	20	Irrigation	66486	WP0008818	5/21/1971	1,100	549	1,059	564	KR, CH
Kern: T 25S, R 27E, Sec 8-2	21	Irrigation	66483	-	7/26/1971	999	498	999	566	KR, CH
Kern: T 25S, R 27E, Sec 8-3	22	Irrigation	63546	-	5/20/1973	990	540	990	572	KR, CH
Kern: T 25S, R 27E, Sec 8-4	23	Irrigation	-	-	11/16/1955	2,000	1604	2,000	564	KR, CH, SM
Kern: T 25S, R 27E, Sec 8-5	24	Irrigation	-	-	8/15/1956	2,150	1200	1,630	556	KR, CH
Kern: T 25S, R 27E, Sec 8-6	25	Irrigation	-	-	12/5/1955	2,195	1574	2,195	574	KR, CH, SM, RM
Kern: T 25S, R 27E, Sec 8-7	26	Irrigation	-	-	4/2/1954	2,150	1704	2,140	581	KR, CH, SM, RM
Kern: T 25S, R 27E, Sec 9-1	27	Irrigation	-	-	9/20/1967	1,757	503	1,757	599	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 9-2	28	Irrigation	-	-	8/20/1966	1,725	500	1,725	604	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 10-1	29	Irrigation	24315	-	3/2/1972	2,000	604	2,000	595	KR-CH, SM, RM, OC

Well ID	Map ID	Well Type	DWR Log Number	KCEH Log Number	Date Completed	Total Depth (ft bgs)	Perforations		Ground Elevation (ft)	Formation(s) of Water Well Completion
							From (ft bgs)	To (ft bgs)		
Kern: T 25S, R 27E, Sec 10-2	30	Irrigation	811	-	11/4/1968	2,000	600	2,000	647	KR-CH, SM, RM, OC
Kern: T 25S, R 27E, Sec 11-1	31	Irrigation	-	-	3/15/1952	1,060	-	-	649	KR-CH, SM
Kern: T 25S, R 27E, Sec 15-1	32	Irrigation	-	-	-	597	-	-	645	KR-CH
Kern: T 25S, R 27E, Sec 15-2	33	Irrigation	e0091243	-	6/5/2009	700	480	680	626	KR-CH
Kern: T 25S, R 27E, Sec 15-3	34	Irrigation	-	-	2/26/1957	480	300	480	675	KR-CH
Kern: T 25S, R 27E, Sec 16-1	35	Irrigation	347	-	4/25/1969	1,800	704	1,800	646	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 16-2	36	Irrigation	116314	-	7/9/1965	1,720	450	1,720	646	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 17-1	37	Irrigation	834	-	9/6/1969	2,115	500	2,115	581	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 17-2	38	Irrigation	830	-	11/28/1969	2,300	500	2,300	597	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 17-3	39	Irrigation	e0241081	-	10/7/2014	2,210	1570	2,090	578	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 20-1	40	Irrigation	118704	-	4/14/1966	1,885	500	1,885	632	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 20-2	41	Irrigation	805	-	12/18/1968	2,000	500	2,000	595	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 21-1	42	Irrigation	87001	-	3/30/1969	1,825	1025	1,825	636	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 21-2	43	Irrigation	349	-	5/13/1969	1,848	554	1,848	688	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 23-1	44	Irrigation	116298	-	10/25/1966	1,520	500	1,520	729	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 24-1	45	Irrigation	118737	-	3/19/1968	1,800	500	1,800	781	KR-CH, SM, RM, OC
Kern: T 25S, R 27E, Sec 26-1	46	Irrigation	783327	WP0006209	8/9/2000	1,805	795	1,805	787	KR-CH, SM, RM, OC
Kern: T 25S, R 27E, Sec 26-2	47	Irrigation	67432	-	3/19/1971	1,800	604	1,800	789	KR-CH, SM, RM, OC
Kern: T 25S, R 27E, Sec 26-3	48	Domestic	27138	-	8/31/1968	353	203	353	791	KR-CH
Kern: T 25S, R 27E, Sec 26-4	49	Irrigation	118746	-	8/26/1968	2,000	502	2,000	766	KR-CH, SM, RM, OC
Kern: T 25S, R 27E, Sec 26-5	50	Irrigation	48311	-	8/31/1958	630	330	630	775	KR-CH
Kern: T 25S, R 27E, Sec 26-6	51	Domestic	e020956	WP0007883	10/8/2004	350	100	250	792	KR-CH
Kern: T 25S, R 27E, Sec 27-1	52	Irrigation	118723	-	8/4/1967	2,000	996	2,000	670	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 27-2	53	Irrigation	e0188705	-	9/4/2013	1,600	840	1,600	675	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 28-1	54	Irrigation	350	-	6/4/1969	1,820	504	1,820	718	KR-CH, SM, RM
Kern: T 25S, R 27E, Sec 28-2	55	Irrigation	118502	-	12/15/1965	1,880	730	1,880	706	KR-CH, SM, RM

bgs = below ground surface

- = Information Not Available

KR-CH = Undifferentiated Kern River-Chanac SM = Santa Margarita

RM = Round Mountain OC = Olcese

Source: Table 3, DOGGR's Aquifer Exemption Application for the Jasmin Oil Field