
State Water Resources Control Board

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DATE: December 14, 2023

**SUBJECT: TECHNICAL REVIEW MEMO, AQUIFER EXEMPTION APPLICATION,
PREMIER RESOURCE MANAGEMENT, LLC, NORTH ANTELOPE HILLS
OIL FIELD, KERN COUNTY**

State Water Board staff (Staff) reviewed the "Aquifer Exemption Application - Tulare Formation Aquifer Exemption Justification – North Antelope Hills Oil Field Expansion Kern County, California" prepared by Premier Resource Management, LLC dated January 5, 2023 (application). During our review, several questions and data gaps were identified and are included in this document. Staff request additional information to address these questions and data gaps to continue our review.

Current beneficial use – CFR 146.4 (a) AND PRC 3131 a(2)

1. Application Section 6.5.1 indicates that no domestic or irrigation wells were identified within a 14-mile radius of the proposed expansion boundary. However, well 27S20E34G001M (reporting 179 mg/L TDS in 1966) and well 27S20E34C001M (no TDS reported) are on the well survey maps. Please investigate these wells to verify if they are still active and provide any additional information gathered in the updated application.
2. The Application Executive Summary states that "The AE formations contain water not suited for drinking water or any other beneficial purposes near North Antelope Hills because of the high TDS concentrations, presence of hydrocarbons and other constituents harmful to human and plant health (boron, arsenic, and volatile hydrocarbons)." However, the lab reports do not indicate arsenic or volatile hydrocarbons results. Please provide evidence to support this water quality statement.

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

3. Application Section 6.1 states that "Based on data from well logs and shallow bore holes, there is no groundwater above the producing zones in the Tulare Formation and the alluvium in the proposed expansion of the field." These logs and shallow bore hole data do not appear to be provided. Some logs on the cross sections appear to have some logged intervals within the alluvium, but the type logs start in Tulare clay. Please provide logs that show the alluvium and any data on units above the Tulare Formation.
4. Application Section 6.1 states "Each MW is accessed quarterly by E&B Natural Resources Corporation to determine if groundwater is present. All three MWs are dry, no fluids present." The permits show that anticipated groundwater is shallow 100-120' bgs, however neither well completion reports nor monitoring data is provided for these wells. Please provide this missing information.
5. Water quality of the injectate is not provided in the application. In order to ensure the preservation of beneficial use waters, please provide water sample quality reports of the injectate.

Future use - CFR 146.4 (b)(1)

6. Appendix D indicates limited evidence of commercially producible oil quantities. For example, wells 3-30, 2-25, 1-25 only show trace oil in the Tulare sand. Additionally, in document **PRM_Tulare Formation_AE Application Figures.pdf**, Figure 7 only indicates a small area with provable economical oil production. Please reduce the proposed AE boundary to only include areas with commercially producible oil quantities or provide additional evidence of commercially producible oil supplies in all areas of the proposed boundary.
7. Not all the core data for Tulare listed in Table B is provided. Please provide the missing information.
8. Bonefish 1-25 has a different API number on Table B of the application than it does in the core log provided in Appendix C. Provide the correct core log for this well or an explanation for the different API numbers.

Containment – PRC 3131 a(3)

9. Oil/water contact is identified as the downward containment mechanism. However, the Operator states that they will be steamflooding the Tulare Oil Sands and steamflooding/waterflooding the sand units of the Temblor Formation and Kreyenhagen Formation which are in hydraulic connection with the Tulare Oil Sands. Since the oil/water contact will not be static when producing these zones, how will containment be maintained?
10. Application Section 8.2 states that "To the easternmost part of the exemption area the confinement mechanism is unknown with any certainty but is suspected to be due to pinchout onto a local high (the Belridge structure)." Please indicate if this information is unknown due to a data gap or other reason. Provide any evidence pertaining to the sealing nature of Fault D.

11. The lateral continuity of the Conoas shale is unclear, please provide a structure map of that shale bed.

Additional Questions and Concerns

12. In APPENDIX A1: OIL FIELD OPERATORS, what does "Any Field" under the field section mean?
13. The Kreyenhagen Formation underlying the proposed AE exemption area is currently undergoing a non-USDW determination by CalGEM, please provide an update on the progress of that determination.