Evaluation of Municipal and Domestic Supply (MUN) and Agricultural Supply (AGR) Beneficial Uses of Groundwater in the Southern Portion of the Lost Hills Oilfield

Remote/Online Public Workshop and CEQA Scoping Meeting

INFORMATION DOCUMENT

Introduction

In order to ensure appropriate beneficial use protection, the Central Valley Regional Water Quality Control Board (Central Valley Water Board or Board), in conjunction with the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative, is considering developing an amendment to the Water Quality Control Plan for the Tulare Lake Basin (Tulare Lake Basin Plan) related to the current MUN and AGR designations for a portion of the groundwater basin in the Lost Hills Oilfield.

Staff from the Central Valley Water Board will hold a Public Workshop and California Environmental Quality Act (CEQA) scoping meeting to discuss and solicit comments and suggestions from the public regarding potential alternatives that may become amendments to the Tulare Lake Basin Plan, the means by which regulated entities might comply with any of the alternatives, the significant and cumulative impacts that could result from new implementation provisions, and potential mitigation measures to limit these impacts.

This document summarizes the Basin Plan Amendment Project undertaken by the Central Valley Water Board and identifies some of the potential environmental impacts, both direct and indirect, that should be evaluated under CEQA for the project. This document is not meant to be inclusive of all potential environmental impacts for the project, but to assist in CEQA Scoping to help identify potential environmental impacts that may occur as a result of this project and should be evaluated under the project.

Background

Seneca Resources (Seneca) operates four underground injection wells in the southern portion of the Lost Hills Oilfield in Kern County (See Figures 1 and 2). The wells receive produced water from adjacent production wells completed in the Reef Ridge and Monterey Formations and inject that produced water into the lower Tulare and Etchegoin Formations under permit from the California Division of Oil, Gas, and Geothermal Resources (DOGGR). The receiving water has total dissolved solids (TDS) concentration exceeding 10,000 mg/L and is not considered an underground source of drinking water (USDW) under Federal regulations. Seneca is also regulated in the Lost Hills Oilfield under the Central Valley Water Board's Oilfield General Order.

Although the subject groundwater is not considered a USDW by definition, the water, as with all waters in the Basin, is designated in the Tulare Lake Basin Plan to have municipal and domestic supply (MUN) and Agricultural Supply (AGR) beneficial use, unless specifically de-designated by a Basin Plan Amendment (BPA). Seneca Resources has requested to have the

Central Valley Water Board consider the removal of MUN and AGR beneficial uses from the groundwater in the southern portion of the Lost Hills Oilfield to reflect actual water quality and realistic beneficial uses.

De-designation of beneficial uses requires a BPA to remove the designation of those groundwaters in the Tulare Lake Basin Plan. De-designation of the MUN beneficial use in groundwater is possible under the State Water Resources Control Board's Sources of Drinking Water Policy if certain criteria are met The BPA must demonstrate that the groundwater meets the criteria for de-designation of MUN.

Groundwater in the southern portion of the Lost Hills Oilfield (Proposed De-Designation Area) does not appear to support an unrestricted range of AGR beneficial uses because of naturally occurring geologic conditions that result in elevated levels of salinity constituents, including TDS. The AGR beneficial use included in the Tulare Lake Basin Plan is defined as, "[u]se of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for grazing." This broad definition distinguishes the AGR beneficial use from the MUN use. While limits protective of human health are relatively well-defined (such as the primary Maximum Contaminant Levels [MCLs]), water quality limits developed to protect AGR uses range from the very stringent standards necessary to protect the most salt-sensitive crops to relatively relaxed standards necessary to protect livestock watering. In the absence of an established specific or numeric salinity water quality objective for the protection of the AGR beneficial use, the Central Valley Water Board relies upon scientific literature to provide threshold concentrations that are generally considered to be protective of irrigation and stock watering.

The goal of this project is to review and evaluate available information to determine whether the removal of the MUN and AGR beneficial use designations from ground water in the Proposed De-Designation Area is appropriate. If Central Valley Water Board staff determine the proposed removal of the beneficial uses from groundwater in the project area is appropriate, an amendment to the Tulare Lake Basin Plan will be developed for consideration by the Regional Water Board for adoption and approval.

The Central Valley Water Board is required by CEQA to conduct an environmental analysis of a proposed Basin Plan amendment. (Pub. Resources Code, § 21000 et seq.) The purpose of the public workshop and CEQA scoping meeting is to solicit public input regarding the scope of a proposed amendment along with its potential significant environmental impacts, mitigation measures, and possible alternatives. Public comments will help the Central Valley Water Board and CV-SALTS to refine the scope of its environmental analysis. The Central Valley Water Board will not amend the Basin Plan without first circulating its environmental analysis for further public comment.

Regulatory Context

The State Water Board and the nine Regional Water Quality Control Boards (Regional Water Boards) are the state agencies with primary responsibility for coordination and control of water quality. (Wat. Code, § 13000.) Each Regional Water Board is required to adopt a water quality

control plan, or basin plan, which provides the basis for regulatory actions to protect water quality. (Wat. Code, § 13240 et seq.) Basin plans designate beneficial uses of water, water quality objectives to protect the uses, a program of implementation to achieve the objectives, and a monitoring program to ensure the goals of the program are met. (Wat. Code, § 13050, subd. (j).) Basin Plans, once adopted, must be periodically reviewed[1] and may be revised. State Policies that directly apply to this effort include:

- The *Sources of Drinking Water Policy*: establishes state policy that all waters are considered suitable or potentially suitable to support the MUN beneficial use, with certain exceptions. The Central Valley Water Board incorporated the *Sources of Drinking Water Policy* into its Basin Plans
  by designating all water bodies as supporting the MUN beneficial use; the only waterbodies where the MUN beneficial use does not apply are those water bodies where that use has been specifically identified in the Basin Plans as not having the MUN use.

  Exceptions to the MUN designation are allowed under the *Sources of Drinking Water Policy* for surface and ground waters: 1) with total dissolved solids (TDS) exceeding 3,000 mg/L (5,000 µmhos/cm EC) and where the waters are not reasonably expected by Regional Water Boards to supply a public water system; 2) with contamination, either by natural processes or by human activity, that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices; 3) where there is not sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; 4) for surface waters in systems designed for wastewater collection or conveying or holding agricultural drainage, provided that the discharge from such systems is monitored to assure compliance with all relevant water quality objectives; or 5) in groundwater regulated as a geothermal energy producing source. Exceptions 1) and 2) listed above are typically referred to as *Exception Criterion 1a* and *Exception Criterion 1b*, respectively.

  The *Sources of Drinking Water Policy* addresses only the designation of water as suitable, or potentially suitable for municipal or domestic supply. The *Sources of Drinking Water Policy* does not establish water quality objectives for constituents to protect MUN.

State Water Resources Control Board Resolution 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*, referred to as the *State Anti-Degradation Policy*): generally, prohibits the Central Valley Water Board from authorizing

- activities that will result in the degradation of high-quality waters unless it has been shown that: 1) the degradation will not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives; 2) the

[1] Water Code section 13240 and Section 303 (c)(1) of the federal Clean Water Act (33 U.S.C. § 1313(c)(1).) require a review of basin plans at least once each three-year period to keep pace with changes in regulation, new technologies, policies, and physical changes within the region

degradation will not unreasonably affect present and anticipated future beneficial uses; 3) the discharger will employ Best Practicable Treatment or Control (BPTC) to minimize degradation; and 4) the degradation is consistent with the maximum benefit to the people of the state.

Groundwater in portions of the Lost Hills Oilfield do not support an unrestricted range of AGR beneficial uses due to naturally occurring geologic conditions that result in elevated levels of salinity constituents, including TDS. The AGR beneficial use included in the Basin Plans is defined as, "[u]ses of water for farming, horticulture, or ranching, including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for grazing." This broad definition distinguishes the AGR beneficial use from the MUN use. While limits protective of human health are relatively well-defined (such as the primary MCLs), water quality limits developed to protect AGR uses range from the very stringent standards necessary to protect the most salt-sensitive crops to the relatively relaxed standards necessary to protect livestock watering.

The Tulare Lake Basin Plan contains a list of exceptions whereby the Central Valley Water Board could determine that the MUN beneficial use does not apply in certain waterbodies. These MUN exceptions include waters: 1) with contamination, resulting either from natural processes or human activity, that cannot reasonably be treated for domestic supply use using either Best Management Practices or best economically achievable treatment practices; 2) where there is not sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day; or 3) in aquifers regulated as a geothermal energy producing source.

Those exceptions are limited to the MUN beneficial use, so AGR de-designation requires a different exceptions methodology to determine whether de-designation is appropriate. In the absence of an established salinity water quality objective for the protection of the AGR beneficial use, the Central Valley Water Board relies upon scientific literature to provide threshold concentrations that are generally considered to be protective of irrigation and stock watering. Use of water for agricultural irrigation is severely limited at a TDS concentration greater than 2,000 mg/L (3,000 µmhos/cm EC). This critical threshold for EC was derived from the work of Ayers and Westcot (1985) and recently has been reaffirmed by CV-SALTS (CV- SALTS, 2012). Use of water for stock watering is severely impacted when TDS levels exceed 3,000 mg/L (5,000 µmhos/cm EC). This threshold is based on a Canadian Council of Ministers of the Environment (CCME 2012). CV-SALTS recently reaffirmed this threshold in its review of the literature (CV-SALTS, 2013; see Table 21).

When establishing water quality objectives, the Central Valley Water Board is required to consider all of the following: 1) past, present, and probable future beneficial uses of water; 2) environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto; 3) water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area; 4) economic considerations; 5) the need for developing housing within the region; and 6) the need to develop and use recycled water. (Wat. Code, § 13241.)

Project Description

The Central Valley Water Board is in a multi-year process under which it is evaluating the beneficial uses assigned to surface and ground waters within the boundaries of the Board's Basin Plans. As a part of that process and this project, the Board is:

1. Evaluating whether groundwater in the Proposed De-Designation Area supports the MUN beneficial use, and, if not, whether it may be eligible for de-designation consistent with State Water Board Resolution No. 88-63 (*Sources of Drinking Water Policy*) and the Tulare Lake Basin Plan.

2. Evaluating whether groundwater in the Proposed De-Designation Area supports the AGR beneficial use, and, if not, whether it may be eligible for de-designation consistent with Central Valley Water Board policy and the Basin Plan requirements.

3. Considering the de-designation of MUN and AGR beneficial uses of groundwater in the Proposed De-Designation Area, where those beneficial uses have not been historically supported and are not currently supported. And

4. Considering potential direct and indirect environmental impacts that may occur as a result of the de-designation of the MUN and AGR beneficial uses in groundwater within the Proposed De-Designation Area for purposes of CEQA.

The project does not include groundwater monitoring in the Proposed De-Designation Area. Operations within the Lost Hills Oilfield are currently regulated under the Central Valley Water Board's Oilfield General Order. Under this order, groundwater monitoring is required to determine whether discharges to the Lost Hills Oilfield, including the Proposed De-Designation Area, are causing or contributing to the non-compliance of relevant water quality objectives (WQOs) outside of the Oilfield boundary. This monitoring is required regardless of the designation of MUN and AGR beneficial uses and therefore will continue should de-designation of MUN and AGR beneficial uses be adopted. Groundwater monitoring therefore does not need to be evaluated under CEQA for this project, as a CEQA evaluation was performed during the Oilfield General Order adoption process and it included evaluating the groundwater monitoring.

Project Location

The project study area proposed for de-designation is in western Kern County in the southern portion of the Lost Hills Oilfield (See Figure 1). The study area is identified as Sections 14, 15, 22, 23, 26, and 27 of Township 27S/Range 21 E, Mount Diablo Baseline and Meridian, within the depths of the Lower Tulare and Etchegoin Formations. (See Figures 2 through 5)

Potential Alternatives

In preparation for the CEQA scoping meeting, potential alternatives have been identified to evaluate the MUN and AGR beneficial uses in the groundwater basin within the Proposed De-Designation Area. These alternatives will be presented as a starting point for discussion at the public CEQA scoping meeting and should not be presumed to be the only available alternatives.

Alternatives for CEQA Scoping – De-designation of MUN Beneficial Use

1. No Action
2. De-designate MUN Beneficial Use within the six-section footprint of the Project Area from the surface down, with no vertical de-designation boundary.
3. De-designate MUN within a portion of the Lower Tulare Formation and Etchegoin Formation Based on Application of the Sources of Drinking Water Policy Exception 1a and the non-USDW quality of the groundwater for MUN (See Figures 2 through 5)
4. Development of MUN Site-Specific Salinity Objectives within the Proposed MUN De-designation Boundary.

Alternatives for CEQA Scoping – De-designation of AGR Beneficial Use

1. No Action
2. Development of AGR Site-Specific Salinity Objectives within the Proposed AGR De-designation Boundaries for Irrigation Supply and Livestock Watering.
3. De-designate AGR Irrigation Supply and Livestock Watering Beneficial Uses within the Proposed Horizontal Boundary and No Vertical Boundaries Based on an EC Groundwater Quality Threshold of 5,000 µS/cm (3000 mg/L TDS).
4. De-designate AGR Irrigation Supply and Livestock Watering Beneficial Uses within Proposed Horizontal Boundary and Vertical Boundaries Based on an EC Groundwater Quality Threshold of 5,000 µS/cm (3000 mg/L TDS). (See Figures 2 through 5)

Potential Direct and Indirect Physical Environmental Effects

Implementation of the project, if de-designation is adopted and approved, would result in de-designation of MUN and AGR (agricultural irrigation and livestock watering) beneficial uses at specific variable vertical depths within the proposed horizontal boundaries.

Potential environmental effects that may occur as a result of this project include:

1. Increased salinity of groundwater within the Proposed De-Designation Area; however, please note that no municipal or agricultural groundwater use, within the proposed horizontal boundary and affected vertical depths, is known to be occurring nor anticipated to occur in the future. Additionally, groundwater monitoring under the Oilfield General Order will continue to be performed to evaluate whether discharges within the Proposed De-Designation Area are impacting groundwater in areas outside of the Proposed De-Designation Area boundaries.

References

Ayers, R.S. and D.W. Westcot. 1985. *Water Quality for Agriculture.* Food and Agricultural Organization, Irrigation and Drainage Paper 29 Rev. 1, FAO, United Nations, Rome, 174 p.

Canada. 2012. *Canadian Environmental Quality Guidelines: Water Quality Guidelines for the Protection of Agriculture.*
http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/index.html
Canadian Council of Ministers of the Environment

Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS). 2012. *Salinity Effects on Agricultural Irrigation-Related Uses of Water.* Draft White Paper prepared by CDM Smith. August.

Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS). 2013. *Salt and Nutrients: Literature Review for Stock Drinking Water Final Report.* Report prepared by Kennedy/Jenks Consultants. May.

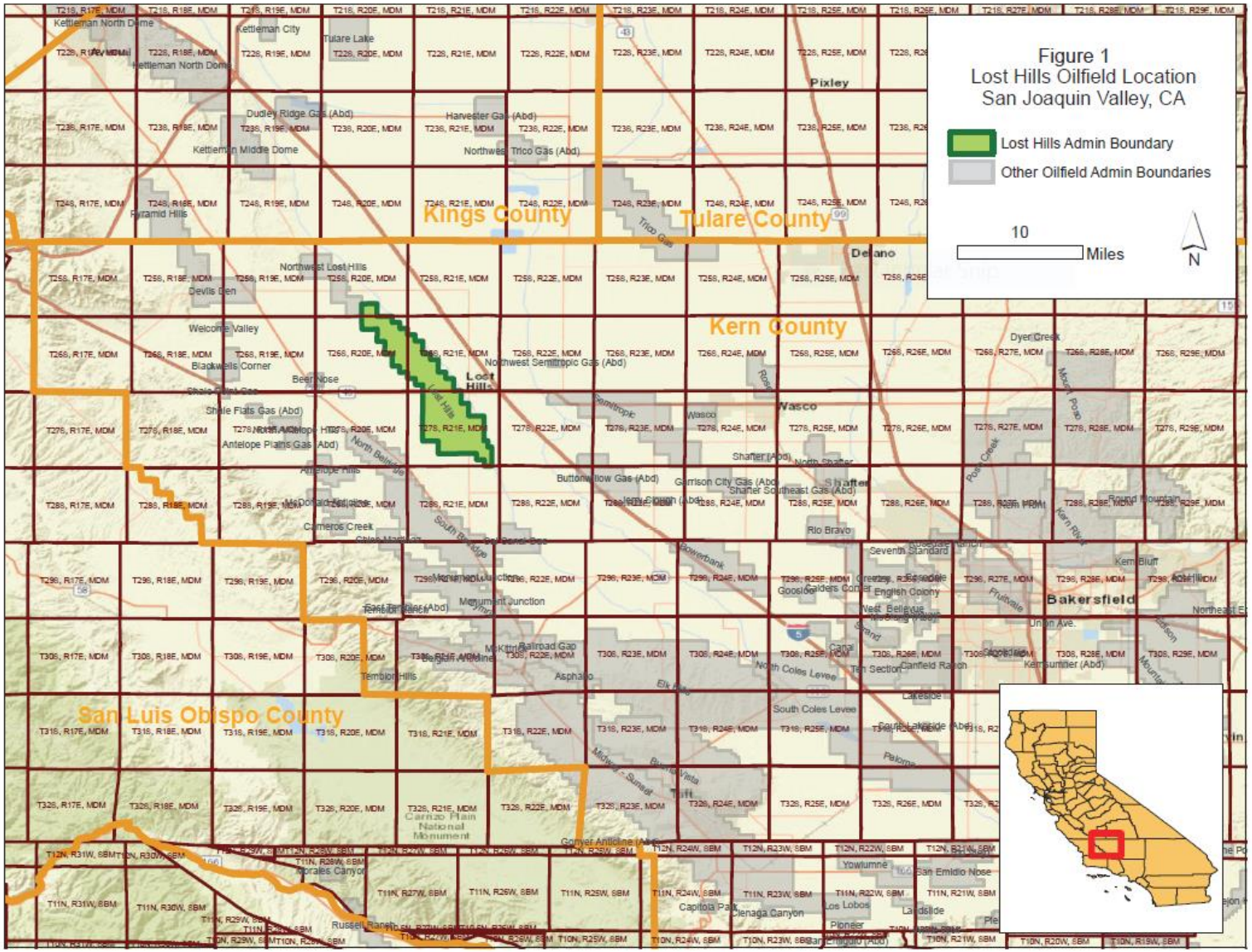

Figure 1 Map of Project Study Area
(Derived from Kennedy-Jenks Consultant Revised Technical Report dated 4/16/18)

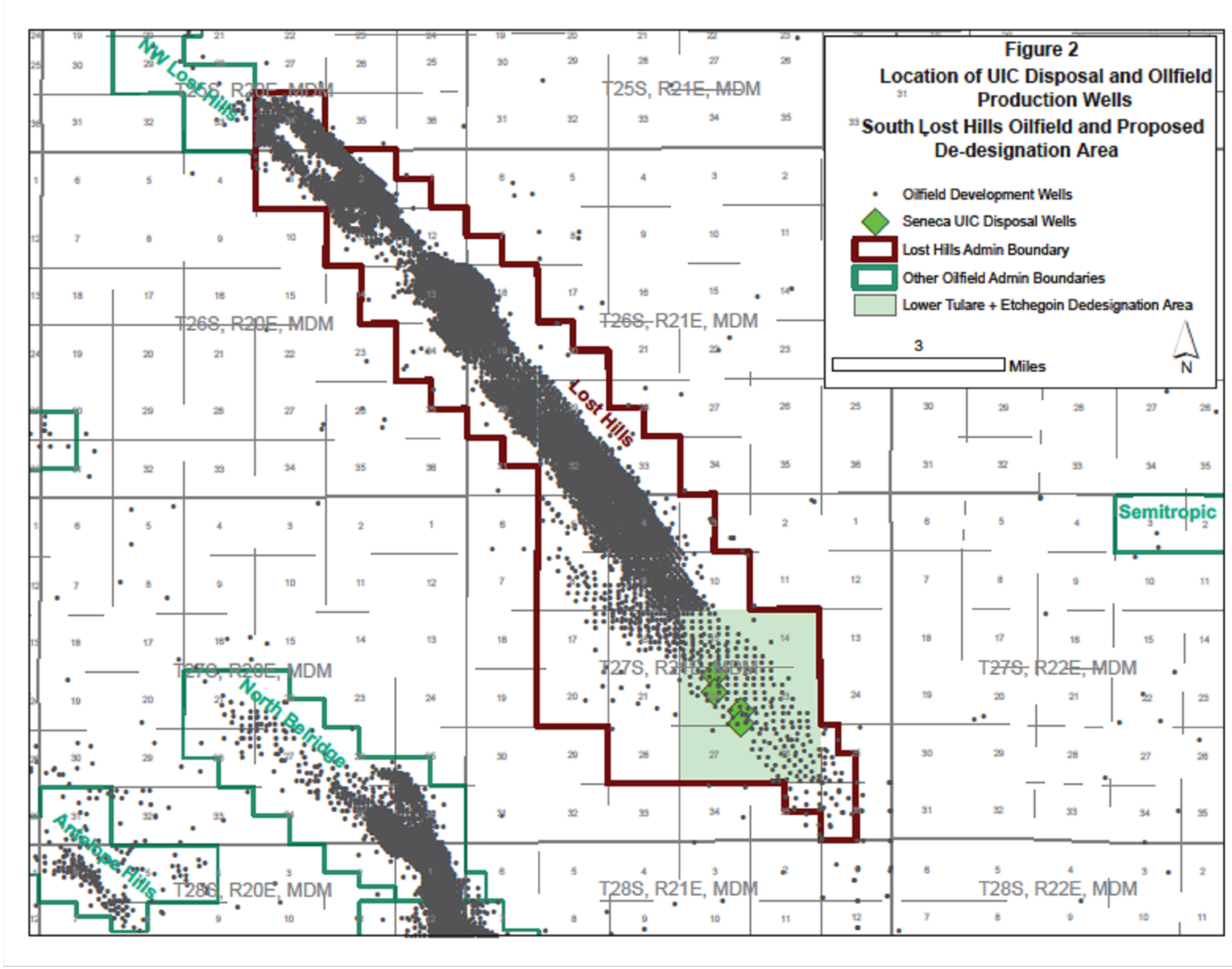

Figure 2 – Proposed De-designation Study Area
(Derived from Kennedy-Jenks Consultant Revised Technical Report dated 4/16/18)

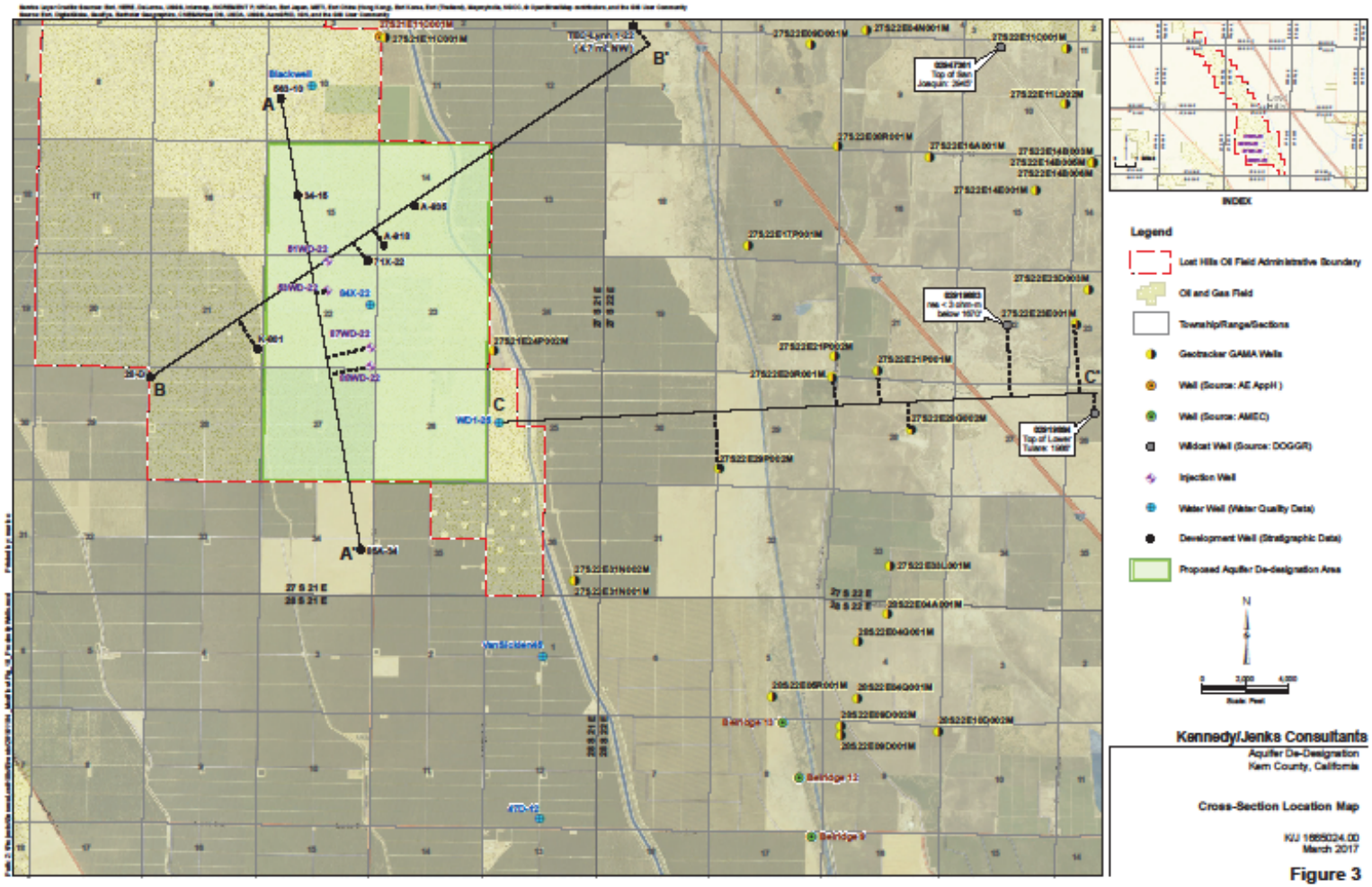

Figure 3 Proposed De-designation Study Area with Geologic Cross Sections Alignment (Derived from Kennedy-Jenks Consultant Revise Technical Report dated 4/16/18)

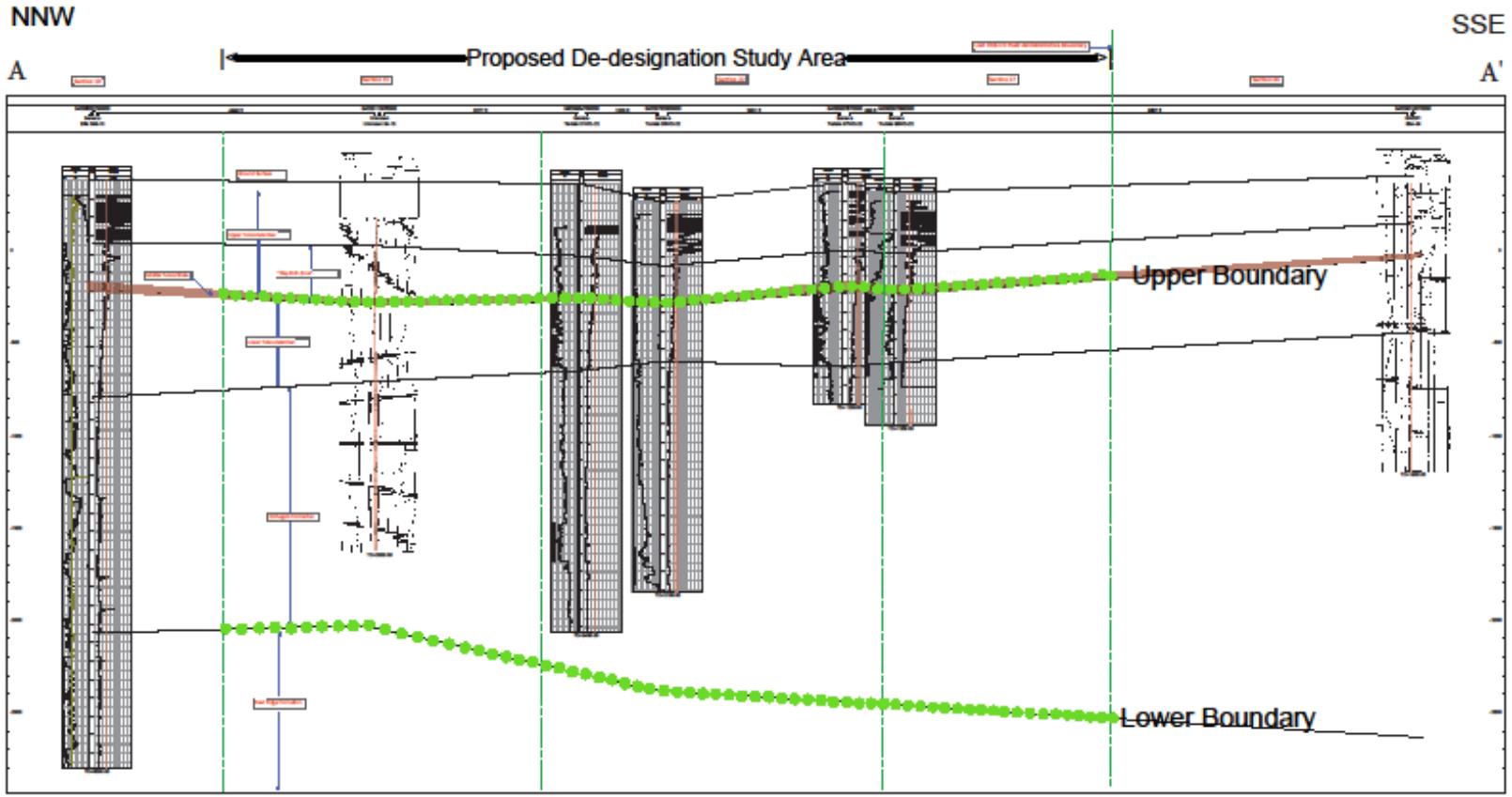

Figure 4 Geologic Cross-Section A-A' - North-Northwest to South-Southeast - South Lost Hills Oilfield

Figure 4 – N-NW to S-SE Cross Section with Vertical Boundaries Shown
(Derived from Kennedy-Jenks Consultant Revise Technical Report dated 4/16/18)

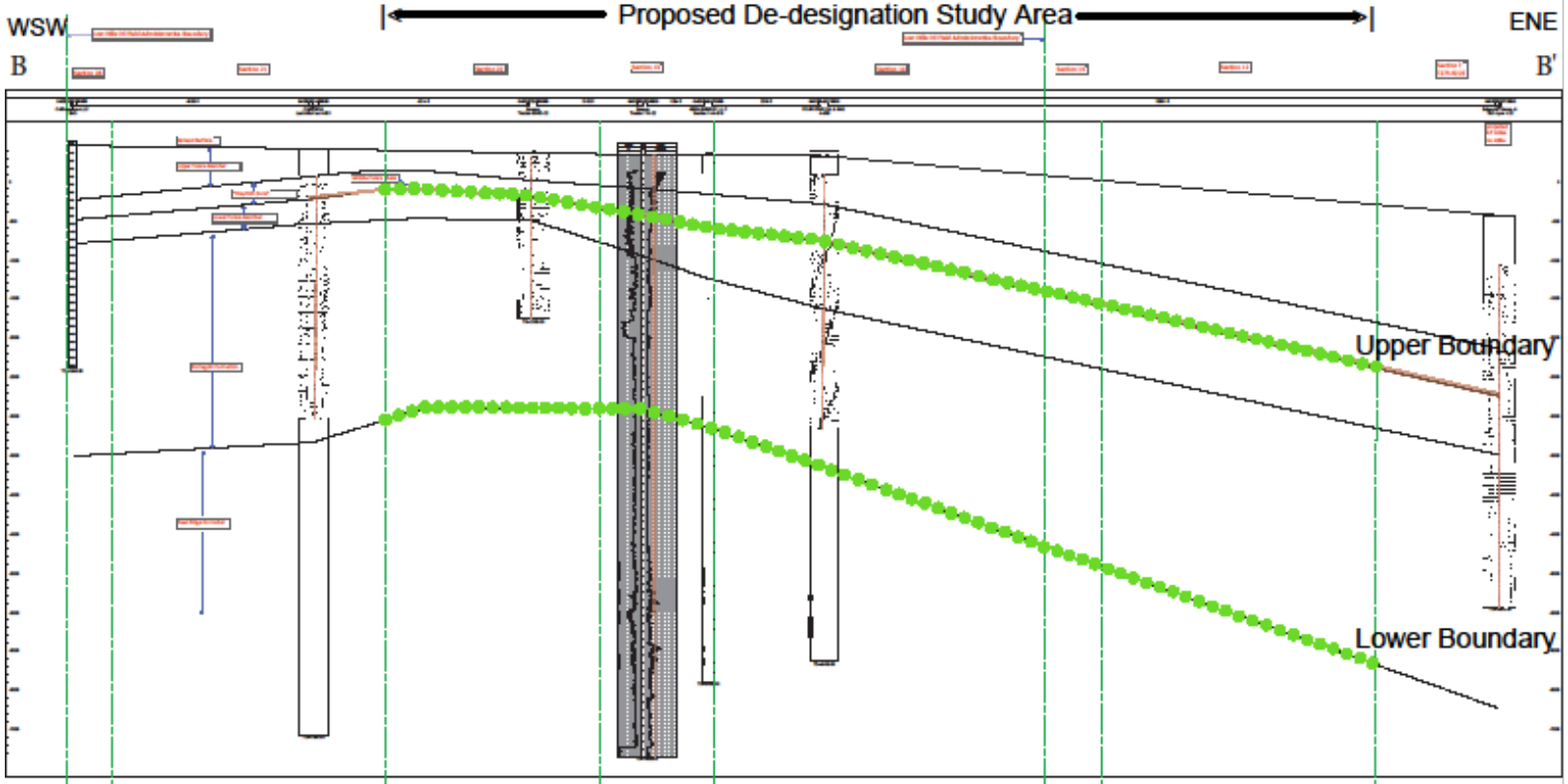

Figure 5 Geologic Cross-Section B-B' - West-Southwest to East-Northeast - South Lost Hills Oilfield

Figure 5 W-SW to E-NE Cross Section with Vertical Boundaries Shown
(Derived from Kennedy-Jenks Consultant Revise Technical Report dated 4/16/18)