REVISED U.S. EPA PERMIT APPLICATION FOR CLASS I NON-HAZARDOUS INJECTION WELL(S) AREA PERMIT

The Newhall Land and Farming Company
Los Angeles County, California

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Introduction

At the request of The Newhall Land and Farming Company (Newhall Land), WZI Inc. has prepared this Class I Injection Well Area Permit application for brine injection wells that will be utilized for disposal of treated wastewater associated with the proposed Newhall Ranch Water Reclamation Plant (WRP) , located within Los Angeles County in Valencia, California (**Regional Location Map, Exhibit 1**). It is anticipated that at maximum injection volume a minimum of eight injection wells will be required. Based on an evaluation of potential injection zones and underground sources of drinking water, a Class I injection well permit from the U. S. Environmental Protection Agency (EPA) Underground Injection Control (UIC) program is required.

A new (WRP) is proposed for the treatment of domestic and commercial sewage associated with the Newhall Ranch Specific Plan, a new community. The WRP will be constructed by Newhall Land and will be owned and operated by the Newhall Ranch County Sanitation District, a publicly owned treatment works. The WRP will be located on the south side of State Route 126, north of the Santa Clara River near the Los Angeles/Ventura counties boundary (**Topographic Map, Exhibit 2**). A National Pollutant Discharge Elimination System (NPDES) permit CA0064556 was issued to the Newhall Ranch County Sanitation District, a public entity, on September 6, 2007 for discharge of up to 2 million gallons per day (MGD) of tertiary treated wastewater from the WRP to the Santa Clara River.

Installation of a Reverse Osmosis (RO) system at the WRP is proposed to meet the NPDES water quality effluent limit of 100 mg/l chloride for discharge to the Santa Clara River. The majority of the effluent from the WRP will be used for reclaimed water purposes. The planned use of the reclaimed water is for landscape irrigation during the dry months, generally April through October. When the reclaimed water cannot be used for irrigation, RO will be used to treat a portion of the effluent to meet the NPDES discharge limits for discharge to the Santa Clara River. The resulting RO permeate will be blended with the remaining flow to meet the required chloride discharge limit. For design purposes the targeted chloride concentration in the blended stream was set to 80 milligrams per liter. It is anticipated that the WRP will treat 2 million gallons per day (MGD) of influent during the first phase of development of the Newhall Ranch Specific Plan, increasing to 6.8 MGD at final build-out. The maximum estimated volume of brine to be injected is 0.508 MGD for approximately 5 months per year.

This permit application is for the disposal of brine concentrate generated by the RO system during November through March (the winter season). The area investigated for potential injection was defined by the boundaries of the Newhall Ranch Specific Plan and adjacent land and mineral rights owned by Newhall Land, which included the unproductive eastern edge of the Del Valle oil field and the abandoned Castaic Junction oil field (**Oil Field Location Map (Exhibit 3**).

It is anticipated that at least eight wells (includes two backup wells) will be required to dispose of the maximum injection volume of 508,000 gallons per day. All wells will be drilled from a central drill site. The proposal includes that the first well drilled will be vertical with all subsequent wells drilled directionally from a central location. Two potential drill sites have been identified.

Injection Zones

This application describes the geological evaluation that identified the injection zones and demonstrates that injection into these zones will not impact USDWs. The selection of injection zones considered geology, hydrogeology, groundwater quality and operational and regulatory requirements. Potential injection zones interpreted to occur beneath the Newhall Land site were assessed using the following criteria:

- USDW protection
- TDS greater than 10,000 mg/L
- Other UIC regulatory requirements compliance
- Thickness and permeability sufficient for injection capacity

The potential injection zones, the Pliocene Pico and the Miocene Modelo formations (**Type Log, Exhibit 4**), have produced oil and gas and have proven injection potential associated with the oil field operation in the Del Valle, Castaic Junction and surrounding oil fields. The potential injection zone depths range from 3,500 feet to 9,500 feet. Although Miocene sands extend well below a depth of 10,000 feet, particularly in the Castaic Junction oil field, an estimated depth limit of 9,500 feet was selected for the base of injection. Beyond this depth, porosity and permeability of the reservoir sands may decrease and the required injection pressure and associated cost to inject may increase.

The reported water quality of the proposed injection zones ranges from approximately 21,800 ppm to 13,800 ppm total dissolved solids, and therefore the injection zones are not considered Underground Sources of Drinking Water as defined in UIC regulations 40 CFR Parts 144 *et seq*. The upper Pico siltstone and shale, which is situated above the proposed injection zone, was identified as a suitable confining zone with a thickness of at least 500 feet extending over the area investigated.

Area of Review

The Area of Review (AOR) is the radius around the injection well in which impacts from injection could potentially occur. It is based on parameters of the injection zone and the location of Underground Sources of Drinking Water (USDWs). Two methods were used to calculate and compare potential AORs, the pressure wave calculation and the volumetric method (Attachment A). These calculations indicate that an AOR of one-quarter mile is reasonable, however wells within one-half mile of the area permit boundary were reviewed as requested by U.S.E.P.A. Using reasonable site-specific data and assumptions, calculations indicate that these wells will not provide a conduit and will not result in impacts to USDWs. There are producing and idle oil wells within the Area of Review (Attachment A). Newhall Land will not inject into the same zones that are producing or idle and perforated that are within one-quarter mile of the injection well. This relationship is presented in Attachment C. All injection well locations and injection intervals will be approved by U. S. EPA.

Faults are also present within the AOR, however, these faults form traps for oil production and are therefore considered sealing faults that will not act as conduits for migration of injection fluid as discussed in Attachment B.

Underground Source of Drinking Water (USDW)

The water wells within the AOR vary in depth from approximately 135 to 800 feet below ground surface. Most of the water wells were completed in the interval from approximately 50 to 240 feet below ground surface. One well was completed in the interval from 240 to 780 feet below ground surface (Attachment D).

The USDW is comprised of the Alluvium, the Saugus and possibly the very upper portion of the

Pico where it grades laterally into the Saugus. Groundwater, used for municipal, industrial and agricultural purposes, in the project area is obtained from the Quaternary Alluvium and the Pleistocene Saugus Formation. The Alluvium is present along drainages, such as the Santa Clara River and associated tributaries. The Saugus is present at the very eastern edge of the Del Valle oil field and thickens to the east. Water wells within the Area of Review are located adjacent to the Santa Clara River (**General Geologic Map, Exhibit 5**). In area of the Del Valle oil field the Alluvium varies from approximately a few feet to 50 feet in thickness, the Saugus Formation is absent and Alluvium rests unconformably on the Pico Formation(**Cross Sections A-A', F-F', and E-E', Exhibits 6 – 8**). The clayey siltstone in the upper Pico Formation forms a barrier to groundwater flow.

The base of the USDW in the AOR, as defined by a TDS of less than 10,000 mg/l, is not specifically known but is not expected to extend below the base of the confining zone in the Pico. Based on reported water quality information associated with the oil field operations, the TDS of the proposed injection zone ranges from 13,700 ppm to 21,800 ppm. Injection will be into the lower Pico Formation and Modelo Formation. In addition, portions of the upper Pico have been used for disposal of oil field wastewater under Class II permits in the Del Valle oil field, and thus are considered exempt as an USDW for Class II purposes.

The Upper Pico formation is the confining zone. As described in Attachment G, it consists of low permeable clay, shale and siltstone. It is laterally continuous throughout the Area of Review and ranges in thickness from approximately 500 feet to 2000 feet.

The aquifer below the confining layer will be sampled during the drilling of the first injection well to verify the base of the USDW. The extent of the injection zone will be finalized based on information obtained during drilling, including the formation water sample analyses.

Drilling and Testing Program

Attachments I, L, and M provide details on the proposed drilling and testing of the injection zone and wells at the Newhall Land site. Directional drilling of the injection wells from a central drill site is proposed to limit piping requirements and surface disturbance. The approximate directional drill depth is estimated to be 13,000 feet for a maximum true vertical depth of 9,500 feet as shown on Exhibit 21, a cross sectional schematic view of the directional well.

For the well completions, 16 inch diameter conductor casing will be cemented to 100 feet and 10-3/4 inch diameter, 45.5#, K-55LT&C surface casing will be run below to approximately 3,000 feet and cemented to the surface. The long string casing will be 7-5/8 inch diameter, 39# P110 buttress casing (7 inch, 38# P110) and will extend approximately 10 feet below the top of the target injection zone. Injection will be conducted through 4-1/2 inch diameter, 15.1# L-80 tubing. A Baker Model dual seal retrieval LOK set packer will be used to secure the tubing and isolate the injection zone.

To control injection, each injection zone will be limited to a net 200 foot interval which will be perforated through the casing. Injection in each well will be initiated in the deepest 200 foot injection zone. Once the 200 foot zone has reached fracture pressure, the zone will be abandoned with a cement plug and the next higher 200 foot zone will be perforated for injection. The maximum injection rate is estimated to be approximately 58 gallons per minute (0.083 MGD) or 2,000 barrels per day based on injection in the neighboring oil fields.

Monitoring Program

Attachment P outlines a proposed monitoring program for injection operations at the Newhall

Land site. The monitoring program will consist of continuous readings of injection pressure, annular pressure, flow rate and volume, as well as quarterly sampling and analysis of wastewater to be injected. Pressure readings in the annulus of the 7-5/8 inch diameter casing and the 4-1/2 inch diameter tubing will be capable of detecting any leaks within the tubing or at the packer. Annual well testing will include pressure buildup and radioactive tracer evaluation to ensure no fluid migration above the shoe of the 7-5/8 inch diameter casing or around the packer. Measurements and data will be submitted to U.S. EPA on a quarterly basis and maintained at the site for inspection. Injection fluid initially will be monitored for a suite of organic and inorganic constituents as well as physical parameters. Follow-up quarterly monitoring will be limited to inorganic and physical parameters. Additional analyses will be performed if there is a significant change in influent to the WRP as indicated by quarterly monitoring results performed under the NPDES permit. A hazardous waste determination will be made on the injection fluid prior to injection and at any change in the waste stream or treatment process that could impact water quality.

Plugging and Abandonment Program

Injection in each well will be initiated in the deepest portion of the well. Once an injection well is no longer necessary or not performing as required, the well will be abandoned in accordance with EPA abandonment procedures. Attachment Q provides a general plugging and abandonment program for the injection wells. The exact depths of the plugs and abandonment procedures will be determined after the well has been installed. At a minimum, the following plugs and plate are anticipated:

In general, the following plugs and plate will be used in the abandonment process:

- Plug across injection zone, extending approximately 200’ above perforations or to the base of the next 200’ net injection interval.
- Plug at base of the surface casing, estimated at a true vertical depth of approximately 3000 feet (200-foot plug).
- Plug at surface of the well (100-foot plug).
- Cut casing 5 feet below ground and weld steel plate on top of casing stub.

ATTACHMENT A – AREA OF REVIEW METHODS

Give the methods and, if appropriate, the calculations used to determine the size of the area of review (fixed radius or equation). The area of review shall be fixed radius of ¼ mile from the well bore unless the use of an equation is approved in advance by the Director.

Requirements

UIC regulations require that an *Area of Review* (AOR) be established around a new injection well for the investigation of possible pathways for vertical migration of injected fluids, including improperly abandoned wells or conductive geologic faults. Within that area, data that are *reasonably available from public records* are reviewed to identify existing, improperly completed and abandoned wells, faults and fractures. In order to conduct this investigation, the AOR must first be determined using site-specific conditions. Regulations require that the minimum AOR for a Class 1 Non-Hazardous UIC is a *fixed radius* of 0.25 mile (1,320 feet) around the injection well, but may be larger as defined by site-specific conditions. A 0.5 mile radius around the area permit boundary was used for this permit application.

The determination of the AOR also involves a consideration of the *radius of endangering influence also called the zone of endangering influence (ZEI).* As defined in the regulations, the ZEI is the radial zone around the well that extends to the point where the projected injection cone of impression, or pressure curve, intersects the potentiometric surface of the lowermost USDW. If the radius of endangering influence is calculated to be larger than the fixed radius of 0.25 mile, then the ZEI becomes the AOR.

Approach

Although reasonable and conservative estimates are used in the following calculations, results contain many assumptions and uncertainties that may need refinement after the drilling and testing phases of this project. The pressure wave calculation method, which is perhaps the most relevant to potential injection impacts from this project, estimates the horizontal movement of the pressure wave in the injection zone. This calculation is used to predict pressure increases at the closest wells that penetrate the injection zones. The other method used to calculate the zone of endangering influence is the volumetric method. An estimate is made of the minimum distance of wastewater flow from an injection well assuming that the wastewater will uniformly occupy an expanding cylinder with the well or wells at the center.

Estimated Area of Review – Pressure Wave Calculation Method

Calculations have been made to determine the feasibility of injecting brine effluent into Pliocene and Miocene sands. Based on a review of well data in the Del Valle and Castaic Junction oil fields, average injection zone characteristics were determined. The injectivity calculations contained the following assumptions: a reservoir volume of 205,113,585,600 cubic feet based on the net sand isopach map in the area of investigation; porosity of 25.5 percent; and permeability of 123 millidarcies.

The limiting parameters in planning a water disposal project are the pressure needed to overcome the formation resistance to injection flow rate and the pressure which develops over time due to compression of the formation rock and the fluids trapped in the pore space between sand grains. The latter depends on the size of the continuous aquifer into which injection occurs, as well as the compressibility of the formation rock and fluids.

The combined compressibility of friable sandstone and contained water is approximately 0.00002 vol/vol/psi, as reported in published data (Newman, 1973). The size of the continuous aquifer was inferred from geologic interpretation of cross sections and maps constructed from well data throughout the Del Valle and Castaic Junction oil fields.

Calculations of pressure build-up were made in two parts: pressure build-up due to flow resistance (**Exhibit 11**) and pressure build up due to compression (**Exhibit 12 and 13**). The pressure wave calculation is used to estimate the pressure build-up around the well bore and in the formation due to the injection of fluid (Craft and Hawkins p.314, 1959). For this calculation anticipated injection parameters were used: 200 foot net injection interval with an injection rate of 58.3 gallons per minute (2,000 barrels per day). It is anticipated that the bottom hole injection well spacing will be a quarter mile or less. The pressure increase at the midpoint of the injection interval (6,250 feet) due to flow resistance after 100 years at a radius of 0.25 feet (immediately around the wellbore) is 103 psi and at a distance of 1320 feet it is 49 psi. Assuming a hydraulic gradient of 0.433 psi/ft, the pressure head at 6250 feet is estimated to be 2706 psi.

The calculation of pressure build-up due to compression of the reservoir is based on the annual injection volume, the anticipated reservoir volume (the net sand thickness and areal extent), and reservoir porosity. The brine generated and thus the injection volume are expected to increase annually starting in the year 2010, based on a ramp-up schedule supplied by Newhall Land that reflects the anticipated build-out of the specific plan. The maximum brine generation of 0.508 MGD is associated with the maximum influent of 6.8 MGD to the WRP, which is estimated to occur in the year 2019. The injection volume was calculated assuming injection of brine for 152 days (5 months) per year. The reservoir volume was determined to be 205,113,585,600 cubic feet based on measurements of the Injection Zone Net Sand Isopach Map (**Exhibit 16**). The results of the calculations of the surface pressure build-up due to injection are shown in tabular form by year on **Exhibit 12** and in a plot on **Exhibit 13**. The reservoir fracture pressure is the limiting factor for pressure buildup. Assuming a fracture pressure of 0.7 psi/foot and a mid-point of perforations of 6500 feet, the pressure limit is 1735 psi. As shown on the Surface Injection Build-up Plot, the limit of injection is shown by the intersection of the Adjusted Surface Pressure curve with the Limiting Surface Pressure line of 1735 psi, which occurs approximately in the year 2173. The estimated injection life for the entire area is in excess of 150 years, based on a ramp-up of injection to a maximum rate of 0.508 MGD for 152 days per year. This analysis was conservative as it did not account for any decrease in formation pressure related to oil production that has occurred historically.

Estimated Area of Review – Volumetric Calculation Method

An estimate of the minimum distance of wastewater flow from an injection well can be made by assuming that the wastewater will uniformly occupy an expanding cylinder with the well or wells at the center. The equation for this case is:

$r = (V/bn)^{1/2}$

r = radial distance of the wastewater front from the well (ft)

V = cumulative volume of injected wastewater (bbl)

b = effective reservoir thickness (ft)

n = average effective porosity

As discussed by Warner and Lehr in *An Introduction to Technology of Subsurface Wastewater Injection*, the minimum distance of travel will be exceeded due to dispersion, density segregation and channeling through high permeability zones. An estimate of the influence of dispersion can be made with the following equation:

$$r' = r + 2.3\,(Dr)^{1/2}$$

where r' = radial distance of travel with dispersion (ft)

r = 100% invasion radius from the previous calculation

D = dispersion coefficient; 3 feet for sandstone aquifers

The results of the calculations for the undispersed and dispersed radius of influence for each injection well are shown in **Exhibit 14.** Two different aquifer thicknesses were analyzed, 2200 feet , the average thickness in the vicinity of the Del Valle oil field and 1000 feet, the average thickness in the vicinity of the Castaic Junction oil field. The injection rate for each well will be approximately 58.3 gallons per minute (2000 barrels per day). The average porosity, based on core data in the field, is 25.5%. The injection period is for 100 years. The dispersed radius for a 2200 feet aquifer thickness is 570 feet over 100 year time period. The dispersed radius for a 1000 feet aquifer thickness is 822 feet over a 100 year time period.

Area of Review Selection

Until the injection wells are drilled and tested, there are unknowns associated with determining a reasonable AOR. However, using reasonable input estimates, the calculations support an AOR of 0.25 miles.

ATTACHMENT B – MAPS OF WELL/AREA AND AREA OF REVIEW

Submit a topographic map, extending one mile beyond the property boundaries, showing the injection well(s) or project area for which a permit is sought and the applicable area of disposal review. The map must show all intake and discharge structures and all hazardous waste treatment, storage, or disposal facilities. If the application is for an area permit, the map should show the distribution manifold (if applicable) applying injection fluid to all wells in the area, including all system monitoring points. Within the area of review, the map must show the following:

Class I – The number, or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface features, including residences and roads, and faults, if known or suspected. In addition, the map must identify those wells, springs or other surface water bodies, and drinking water wells located within one quarter mile of the facility property boundary. Only information of public record is required to be included in this map:

Physical Setting and Surface Water Features

The location of the proposed injection wells is approximately 4 miles west of Interstate 5 on the north side of State Highway 126 in Section 29, Township 4 North, Range 17 West, San Bernardino Base & Meridian while the proposed WRP will be located on the south side of State Route 126, north of the Santa Clara River near the Los Angeles/Ventura counties boundary (**Topographic Map, Exhibit 2**). The outline for the Area Permit, the property boundary, and the wells are shown on the Oil Field Location Map (**Exhibit 3**). The injection wells will be directionally drilled from drilling islands located on the north side of the Santa Clara River which forms the predominant surface drainage feature in the area. The location of the proposed drill sites are shown on aerial photograph of the area which shows the property outline, roads and other nearby features (**Exhibit 18**). The two proposed central drill sites locations are in section 15, T4N/R17W or section 14, T4N/R17W. The bottom hole locations of the injection wells will be up to a mile from the surface location within the Area Permit. There will be one pipeline from the WRP to a tank on the injection well site.

Topographically, the area varies from gently dipping slopes along the floodplain of the Santa Clara River to steep, rugged hillsides with incised drainages in the areas to the north and south of the river. Precipitation in the area averages approximately 18 inches per year with the majority of the rainfall occurring from approximately December to mid March.

The predominant surface drainage in the area is the Santa Clara River which flows to the west where it empties into the Pacific Ocean. Other drainages that are tributary to the Santa Clara River in the project area include Castaic Creek, in the eastern area of the Newhall Land property, and Martinez Grande Canyon and Martinez Chiquito Canyon located to the north of the Santa Clara River. Numerous additional small gullies and canyons, which are also tributary to the Santa Clara River, are located throughout the area.

The east-west trending Holser Canyon fault is exposed at the surface approximately one mile north of the Del Valle oil field as shown on the geologic map (**Exhibit 5)**. In the subsurface, as shown on the Top Miocene Structure Contour Map (**Exhibit 15**), the Holser Fault appears to die out in an eastern direction near the Castaic Junction oil field. On the Top Miocene Structure Contour Map, another unnamed fault was identified that is parallel to and south of the Holser Fault. This fault has not been identified on the surface. Both of these faults provide traps for oil accumulation. The Holser fault forms the trap for the North Ramona oil field and the unnamed fault forms the trap for the accumulation in the northernmost accumulation (Kinler Area) in the

Del Valle oil field.

The Newhall Land property is located in proximity to the Newhall-Potrero, Del Valle, and Castaic Junction oil fields. Approximately 120 oil and gas wells have been drilled within the AOR. In addition to the oil and gas wells, approximately 36 water wells are located within the AOR. The locations of the oil and water wells are depicted on the Oil Field Location Map, **Exhibit 3** and a compilation of the oil and gas wells and water wells are included in **Tables 1and 2,** respectively. A more detailed map showing the oil wells with the lease name and the operator is included in **Appendix 1** with the well schematics for the wells within the AOR. The well logs and well histories for all the oil wells within the Area of Review are included on a disc in **Appendix 2**. Several residences and associated buildings are located within the AOR, primarily along Chiquito Canyon Road. Industrial office buildings are present in the eastern area of the site adjacent to Commerce Center Drive. The Chiquita Canyon Landfill is also located east of Chiquito Canyon Road and north of Highway 126.

ATTACHMENT C – CORRECTIVE ACTION PLAN AND WELL DATA

Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review, including those on the map required in B, which penetrate the proposed injection zone. Such data shall include the following: Class 1 – A description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion and any additional information the Director may require. In the case of new injection wells, include the corrective action proposed to be taken by the applicant under 40 CFR 144.55.

Well Data

The outline of the property boundary, the area permit, the area of review and locations of the oil/gas and water wells are depicted on the Oil Field Location Map, **Exhibit 3.** A compilation of the oil and gas wells and water wells located within the AOR are included in **Tables 1and 2,** respectively. Well schematics of all the oil/gas wells which penetrate the proposed injection zone are included on a disc in **Appendix 1**. A large scale map showing all the well locations is also included in Appendix 1. All available well histories and electric logs for oil/gas wells within the AOR are provided on a disc in **Appendix 2**. None of the water wells penetrate the confining zone.

Corrective Action Plan

No corrective action was identified after a review of all the wells located within the AOR. There are a number of productive and idle oil wells located outside the property boundary but within the Area of Review. The initial injection zone will be within the Bering zone, present at depths of approximately 8600' to 8000' below ground surface. This zone is not productive within the Del Valle oil field, therefore, injection will not interfere with production. Cross sections AA-AA' and BB-BB' (**Exhibits 9a and 9b**) shows the relationship between the proposed initial injection and the surrounding production and idle wells. The location of the cross sections, the oil wells, the proposed drill site and the Area of Review are shown on a map of the eastern half of Del Valle oil field (**Exhibit 10**).

ATTACHMENT D – MAP AND CROSS SECTIONS OF USDW

Submit maps and cross sections indicating the vertical limits of all underground sources of drinking water within the area of review (both vertical and lateral limits for Class I), their position relative to the injection formation and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection.

Extent of USDW

An USDW is defined as an aquifer or its portions: *which supplies any public water system or an aquifer which contains a sufficient quantity of ground water to supply a public water system and currently supplies drinking water for human consumption or contains fewer than 10,000 mg/l total dissolved solids* (40 CFR Part 144.3). Confining layers, which generally consist of low permeability clay, shale, and siltstone, are necessary to provide an effective barrier to vertical migration of injected fluids into shallower zones. The primary confining layer identified in the area is a thick section of siltstone and shale located in the upper portion of the Pico Formation. The confining layer is depicted on cross sections A-A', F- F' and E- E', **Exhibits 6, 7**, and **8** respectively**.** As shown on the Confining Zone Isopach Map (**Exhibit 17**), the confining zone varies in the project area from approximately 500 feet to over 2,000 feet in thickness. In addition to the primary confining zone in the upper portion of the Pico Formation, numerous silts and shales are present in the lower portion of the Pico Formation and the upper Modelo Formation that would inhibit vertical fluid migration.

The USDW is present in the Alluvium and Saugus Formation and may extend to the upper Pico. Groundwater wells located within the AOR are located adjacent to the Santa Clara River where the Alluvium and the Saugus Formation are present at the surface. In the western portion of the AOR the Pico Formation is present at the surface. The water wells are generally screened to a depth of 150' to 200' below ground surface, with a maximum depth of 780' (**Table 2**). The TDS measured in groundwater samples ranged from 838 mg/l to 1670 mg/l. Based upon available information, it is likely the USDW extends to the base of the Saugus and may be present in the upper Pico above the confining zone. As described below, the upper portion of the Pico has been used for disposal of Class II wastes in the Del Valle oil field, and therefore would not be considered an USDW within the oil field boundary. The estimated vertical limit of the USDW is shown on Cross Sections A-A' and E-E', **Exhibits 6 and 8** respectively. As shown on the cross section, the USDW is present above the confining zone. During drilling of the first injection well, groundwater samples will be collected in the first sand below the confining zone to confirm the vertical position of the USDW with respect to the confining zone.

USDW Aquifers

Groundwater, used for municipal, industrial and agricultural purposes in the project area is obtained from the Quaternary Alluvium and the Pleistocene Saugus Formation. The alluvial deposits generally range from Pleistocene to Holocene (Recent) age and occur on the Santa Clara River Valley floor as stream channel and floodplain deposits, as alluvial fans near the mouths of canyons, as elevated terraces along the margins of the basin, and as terraces in the low foothills adjoining the Santa Clara River Valley. The alluvial deposits generally consists of sand and silty sand with gravel and cobbles. Thickness of the alluvium varies but the maximum thickness is considered to be approximately 200 feet in the central portion of the Santa Clara River drainage (Slade, 1988). Groundwater wells within the project area are located along the Santa Clara River as shown on the General Geologic Map (**Exhibit 5**) and the Oil Field Location Map (**Exhibit 3**). These irrigation supply wells, owned by Newhall Land, are generally screened in the Saugus Formation at depths of 70 to 200 feet below ground surface. Groundwater was initially encountered in the Alluvium at a depth of approximately 10 feet. The Alluvium varies from approximately 12 to 65 feet in thickness as reported on the lithologic drilling logs prepared for these wells.

The Saugus Formation typically consists of slightly indurated fine to coarse-grained, pebble to cobble bearing sandstones with interbedded siltstones and clayey siltstones. The Saugus Formation receives groundwater recharge from direct infiltration of precipitation, deep percolation of groundwater from saturated alluvium, and subsurface flow from adjoining older rocks.

In area of the Del Valle oil field the Alluvium varies from approximately a few feet to 50 feet in thickness, the Saugus Formation is absent and Alluvium rests unconformably on the Pico Formation. The clayey siltstone in the upper Pico Formation forms a barrier to groundwater flow. The Saugus Formation is present just to the east of the Del Valle oil field, and thickens to the east as shown on cross section A-A' (**Exhibit 6**).

The reported water quality of the Modelo sands varies from 13,700 ppm to 17,100 ppm total dissolved solids (California Division of Oil and Gas, 1991), and therefore is not considered an USDW as defined by U.S. EPA.

The water quality of the lower Pico, as reported in the Del Valle field, is 21,800 ppm total dissolved solids (California Division of Oil and Gas, 1991) and as such is not considered an USDW. No data is available in the Castaic Junction oil field or for the upper Pico in the Del Valle field, therefore collection of water samples in the Pico during drilling of the injection zone is recommended.

Sands within the Pico have also been used for water disposal starting in 1949 with the "Vasquez" WD-1 located in section 17, T4N, R17W and in 1951 in the "Handy" No.4 located in section 18, T4N, R17W. These wells are located outside of the Area of Review in the western portion of the Del Valle oil field. The injection zone in the "Vasquez" WD-1 is 2125'to 2355' (230' gross). Injection was curtailed in this well in from 1986 through 1991 due to a tubing leak, but it has been injecting up to 220 barrels per day (9,240 gallons per day) since 1992. The injection zone in "Handy" No. 4 was initially 2490' to 2620' (130' gross) and was modified in 1967 to 1790' to 2155' (365' gross). This well is presently idle.

ATTACHMENT F – MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA

Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining intervals) and generalized maps and cross sections illustrating the regional geologic setting. (Does not apply to Class II wells.)

Regional Geological Setting

The subject property is located within the Transverse Range Geomorphic Province of southern California which is characterized by modest- to high-elevation mountainous terrain that exhibits an east-west structural trend. The proposed well site lies in the eastern portion of the Cenozoic Ventura Basin which forms an east-west trending sedimentary trough that approximately parallels the Santa Clara River Valley and offshore Santa Barbara Channel. The area near the Santa Clara River is immediately underlain by a thin section of recent age alluvial and fluvial deposits associated with the Santa Clara River and tributary drainages. Below the stream bed deposits lies a thick sedimentary section which ranges in age from Pleistocene to Miocene and grades from non-marine deposits near the surface to marine sediments at depth (General Geologic Map, **Exhibit 5**).

Faults

Within the AOR, the identified faults generally do not extend higher than the lower Pliocene portion of the Pico Formation, with the exception of the Holser Fault and a parallel unnamed fault identified in the subsurface. The Holser Fault is a sealing fault which provides the trapping mechanism for the production in the Ramona oil field and the northern portion (Kinler Area) of the Del Valle oil field (California Division of Oil and Gas, 1991).

Outside the AOR to the southeast, the Del Valle Fault has been identified at the surface. The faulting in the area does not appear to intersect the overlying Saugus Formation or local alluvial deposits which serve as underground sources of drinking water.

Stratigraphy

The property is located in proximity to the Newhall-Potrero, Del Valle, and Castaic Junction oil fields in an area that is underlain by a thick sedimentary section which ranges in age from Recent alluvial deposits to Miocene marine sediments. The stratigraphy for the Del Valle and Castaic Junction oil fields is depicted on the type logs, **Exhibit 4**, which are typical electric logs for each field showing the stratigraphic section encountered in the subsurface. Productive zones in each field are highlighted in green on the type log.

Portions of the property are immediately underlain by a thin section of recent age alluvial and fluvial deposits associated with the Santa Clara River and tributary drainages. The deposits consist primarily of poorly bedded, unconsolidated gravel, sand, and silt (Winterer and Durham, 1962).

The marine Pico Formation is exposed at the surface in the Del Valle field, averaging approximately 6,000 feet in thickness. It consists of an upper and lower member. The lower member is comprised of siltstone with interbedded fine grained silty sandstone, sandstone and conglomerate (Winterer and Durham, 1962), while the upper member is predominately claystone and siltone with lenticular sands. The Pico grades upward and laterally to the east into the upper Pliocene to Pleistocene age Saugus Formation which is exposed at the surface over much of the eastern portion of the property and reaches a maximum thickness of approximately 7,500 feet in the area of investigation. The Saugus Formation is comprised of interfingering shallow-water marine, brackish-water, and non-marine deposits that grade upward and laterally into nonmarine sediments. Lithologically, the Saugus formation consists of interbedded gray to greenish gray fine grained sandstone, silty sandstone, or sandy siltstone (Winterer and Durham, 1962).

Structure

Structurally, the Ventura Basin consists of a narrow, sediment filled trough with an axis that approximately coincides with the Santa Clara River Valley and the Santa Barbara Channel. The submerged portion of the basin beneath the Santa Barbara Channel is an area of gently undulating folds which become increasingly complex in the eastern portion of the basin. In the eastern area of the basin the sedimentary sequence becomes increasingly compressed into east trending folds that are offset by several major thrust faults (Dibblee, 1988). Locally within the basin, the Newhall-Potrero, Del Valle, and Castaic Junction oil fields consist of generally east-west trending asymmetrical anticlines. Numerous thrust or reverse faults cut the producing zones within each field. Structure in the project area is depicted on the **Cross Sections A-A’, F-F’, and E-E’**(**Exhibits 6, 7, and 8**) which were modified from published cross sections (Winterer and Durham, 1962). Cross section A-A’ is an east-west cross section which extends along structure through the Del Valle and Castaic Junction oil fields. Cross Section F-F’ is a north-south trending cross section through the Del Valle oil Field. Cross Section E-E’ is a north-south trending cross section through Newhall-Potrero and Castaic Junction oil fields. The zones which produce in the oil fields are highlighted in green.

The structure of the Del Valle oil field, based on contours drawn on the Top Miocene (**Exhibit 15**), is easterly plunging anticline continuing to the Castaic Junction oil Field. The Top Miocene horizon was selected because it was tied to paleontological data for this area (Winterer and Durham, 1962). This horizon is shown on the cross sections and the type logs.

Structure at the Del Valle oil field is dominated by the Del Valle and Holser Canyon thrust faults. The east-west trending Holser Canyon fault is exposed at the surface approximately one mile north of the Del Valle Oil Field. In the subsurface, as shown on the Top Miocene Structure Map, the Holser Fault appears to die out in an eastern direction near the Castaic Junction oil field. The Del Valle fault is a southward dipping reverse fault which is exposed at the surface near the center of the Del Valle oil field, shown on cross section F-F’(**Exhibit 7**). The surface trace of the Del Valle fault trends in an eastern direction and turns to the south in the southeast corner of Section 16. Several smaller thrust faults traverse the Del Valle anticline (Lande, 1964).

Injection Zone

Two major zones suitable for injection have been in the project area; the Miocene age Modelo Formation and the Pliocene age Pico Formation. Although Miocene sands extend well below a depth of 10,000 feet, particularly in the Castaic Junction oil field, an estimated depth limit of 9500 feet was selected for the base of injection. Beyond this depth, porosity and permeability of the reservoir sands may decrease and the required injection pressure and associated cost to inject may increase. The upper limit of the injection zone was determined by separation from the Saugus Formation, the groundwater aquifer. The Injection Zone Net Sand Isopach Map (**Exhibit 16**) represents sand with porosity and permeability as identified on electric logs within the Miocene from 9500 feet through the Pliocene up to a depth of approximately 3500 feet. Sand counts by well are summarized in **Table 3**. The maximum thickness of the injection zone of 2500 feet of net sand was identified in the eastern edge of the Del Valle field. The injection zone thins to the east toward the Castaic Junction field, consisting only of Pico Formation due to the increasing depth of the Modelo Formation. Over the crest of the Castaic Junction field structure, the Pico sand thins to approximately 600 feet. The measured injection zone volume determined from the net sand isopach map is 205,113,585,600 cubic feet. Characteristics of the Modelo and Pico Formations are presented below.

Pliocene age Pico Formation

The marine Pliocene age Pico Formation unconformably overlies the Modelo Formation in the project area. In the area of the Del Valle oil field the Pico Formation extends from surface outcrop to depths in excess of 6,000 feet (**Cross Section F-F'**, **Exhibit 7**). From surface outcrop, the Pico Formation dips to the east where it is unconformably overlain by over 7,000 feet of the Upper Pliocene to Pleistocene age Saugus Formation in the area of the abandoned Castaic Junction Oil Field (**Cross Section A-A'**, **Exhibit 6**). In the area of the Castaic Junction oil field, the injection zone is entirely in the Pico due to the depth of the Modelo sands in excess of 10,000 feet (**Cross Section A'A'**, **Exhibit 6 and Cross Section E-E', Exhibit 8**).

The Pico Formation has an average thickness of approximately 6,100 feet (Mefferd, 1965) and is composed primarily of siltstone with interbedded fine grained silty sandstone, sandstone, and conglomerate (Winterer and Durham, 1962). The sandstone and conglomerate zones tend to be lenticular in nature and vary in thickness from a few inches to as much as 500 feet (Winterer and Durham, 1962).

Oil and gas have been produced from several zones within the Pico Formation at the Del Valle field. Porosity of reservoir sands within the Pico Formation vary from approximately 19% to 28% with permeabilities varying from approximately 93 to 225 millidarcies (California Division of Oil and Gas, 1991). The published porosity and permeability data is consistent with average porosity and permeability values identified for the overall proposed injection zone from well data (**Table 4**).

Miocene Age Modelo Formation

The marine Upper Miocene age Modelo Formation is composed primarily of poorly sorted sandstone and thin bedded brown to gray siltstones, mudstones, and siliceous shale. Within the Del Valle oil field the top of the Modelo Formation varies in depth from approximately 4,000 feet to 10,000 feet (**Cross Section A-A'**, **Exhibit 6 and Cross Section F-F', Exhibit 7**).

The formation is over 8,000 feet thick and contains numerous, separate oil producing sand intervals identified as the Vasquez, Videgain, Intermediate, Del Valle and Lincoln zones. Each of the zones consists of sand sections that vary in thickness up to approximately 500 feet and are separated by silt and shale sections.

Porosity of the sand zones within the Modelo Formation varies from approximately 13% to 30% with permeabilities varying from approximately 40 to 600 millidarcies (California Division of Oil and Gas, 1991). Porosity and permeability data derived from sidewall samples collected in individual wells in the Del Valle oil field are presented in **Table 4**. According to the well data, average porosity for the proposed injection zone (both Modelo and Pico Formations) is 25.5% with an average permeability of 123 millidarcies.

Confining Zone

Confining layers, which generally consist of low permeability clay, shale, and siltstone, are necessary to provide an effective barrier to vertical migration of injected fluids into shallower zones. In addition, confining layers are necessary to protect Underground Sources of Drinking Water (USDW) from injected fluids. A USDW is defined in the Code of Federal Regulations (40 CFR) as an aquifer or its portions: *which supplies any public water system or an aquifer which contains a sufficient quantity of ground water to supply a public water system and currently* *supplies drinking water for human consumption or contains fewer than 10,000 mg/l total dissolved solids* (40 CFR Part 144.3).

The primary confining layer identified in the area is a thick section of siltstone and shale located in the upper portion of the Pico Formation. The confining layer is depicted on cross sections A-A', F- F' and E- E', **Exhibits 6, 7**, and **8** respectively**.** As shown on the Confining Zone Isopach Map (**Exhibit 17**), the confining zone varies in the project area from approximately 500 feet to over 2,000 feet in thickness. In addition to the primary confining zone in the upper portion of the Pico Formation, numerous silts and shales are present in the lower portion of the Pico Formation and the upper Modelo Formation that would inhibit vertical fluid migration.

ATTACHMENT H – OPERATING DATA

Submit the following proposed operating data for each well (including all those to be covered by area permits): (1) average and maximum daily rate and volume of the fluids to be injected: (2) average and maximum injection pressure; (3) nature of annulus fluid; (4) for Class I wells, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness of injection fluids; (5) for Class II wells, source and analysis of the physical and chemical characteristics of the injection fluid; (6) for class III wells, a quantitative analysis and ranges in concentrations of all constituents of injected fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.

Injection Well Locations

Two potential drilling islands have been identified by Newhall Land as shown on **Exhibit 18**. The sites range in size from 0.75 acre to 1.0 acre. One site is located off of Franklin Parkway, west of Commerce Center Drive, and one site is located adjacent to Chiquito Canyon Road. Both locations are located north of Route 126. The site plan for the drill site is attached as **Exhibit 19**. It is anticipated that the first injection well will be drilled at the Chiquito Canyon Road drill site. The majority of the injection wells will be directionally drilled, but the first well will be vertical. Injection procedures are discussed in greater detail in **Attachment K**.

Daily Rate and Volume of Injection

The maximum recommended injection rate per well is approximately 58.3 gallons per minute (2,000 barrels per day) during the estimated five month period each year that injection is required. The injection volume will increase annually to reflect the development in the Specific Plan area, starting in the year 2010 with an influent flow to the WRP of 0.12 million gallons per day (MGD) and reaching a maximum influent flow of 6.8 MGD in the year 2019. A portion of the WRP discharge will be sent to the RO (anticipated to be used only 5 months of the year). The RO concentrate will be injected. As a general estimate the RO concentrated generated is approximately 7.5% of the WRP effluent. The initial daily injection volume will be 72,000 gallons per day increasing to a maximum of 508,000 gallons per day. The increase in volume will depend upon the rate of buildout of the development. The projected volume increase is shown on the Injection Pressure Buildup Calculation (**Exhibit 12**) and the on Surface Injection Pressure Build-up Plot (**Exhibit 13)**. At the maximum injection volume of 508,000 gallons per day, eight injection wells will be required. A minimum of two backup wells are proposed as a contingency in the event injection wells are not operable for any period of time.

Nature of Annulus Fluid

The annulus will be filled with 3% KCL water or equivalent with corrosion inhibitor and biocide.

Injection Fluids

The projected RO concentrate quality is presented in **Table 5**. The projected water quality is based on a similar wastewater treatment plant influent. Once the WRP is operating and prior to initiation of injection, wastewater samples from the RO concentrate will be analyzed for physical, chemical and radiological characteristics to characterize the injection fluid and to ensure that no hazardous substances are injected into the well. A hazardous waste determination will be conducted prior to injection and at any time that wastewater procedures are changed. Injection water will be filtered prior to the well head to prevent plugging of the injection well perforations.

ATTACHMENT I – FORMATION TESTING PROGRAM

Describe the proposed formation testing program. For Class I wells the program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.

Fracture Pressure Determination

The open-hole testing planned for the Pliocene and Miocene sands will determine the formation pressure and maximum injection pressure using a step rate test. 3% KCL water will be used for all testing. The formation fracture gradient as provided by CDOGGR ranges from 0.8 to 1.0 psi/ft. The surface fracture pressure was estimated to be 1735 psi at the midpoint of perforations (6500 feet) using a conservative formation fracture gradient of 0.7 psi/ft and the hydrostatic pressure of 0.433 psi/ft.

Injection Formation Testing

Injection formation information as described in 40 CFR 146.12 (e), shall be determined through well logs and tests and shall include porosity, permeability, static formation pressure, and effective thickness of the injection zone. Before surface and long string casings are set, a dual induction/spontaneous potential/gamma ray/caliper log will be run over the course of the entire open hole sequence after the well is drilled to each respective terminal depth. Sidewall samples will be collected from the proposed injection zones for lithologic data and porosity and permeability tests. After each casing is set and cementing is complete, a spherically focused cement bond evaluation log will be run over the course of the entire cased hole sequence. A pressure-falloff test will be conducted to evaluate the formation permeability.

Groundwater samples will be collected from the proposed injection zones to demonstrate either the presence and characteristics of, or the lack of, any USDWs and to confirm compatibility of the injectate with the injection formation. Formation water samples will be analyzed for pH, electrical conductance, temperature, total dissolved solids, cations, anions, specific gravity and as directed by EPA.

Mechanical Integrity Test

A mechanical integrity test will be conducted in accordance with 40 CFR 146.8 to verify the absence of leaks in the casing and tubing. The test will be conducted for a minimum of 30 minutes at a pressure equal to the maximum allowable injection pressure determined from the fracture pressure testing. Temperature, spinner and natural radioactive logs will be run to ensure the fluid is entering the injection zone only and that no fluid migration is indicated around the packer.

ATTACHMENT J – STIMULATION PROGRAM

Outline any proposed stimulation program.

Injection wells may require stimulation when wellhead pressures approach allowable levels. Possible sandface or perforation problems can be identified and treated as follows:

Bacteria- downhole anaerobic bacteria can grow in the perforations and cause wellhead pressures to increase. Treatment requires the use of bactericide or non-toxic chemicals

Scale- typically a buildup (precipitation) of calcite (calcium carbonate) occurs at the perforations and is treated with hydrochloric acid.

Solids- this condition results when the filtering system has allowed silts and other suspended fines to enter the wellbore. Recommended treatment consists of a hydrochloric acid preflush followed by a hydrochloric/hydrofluoric acid combination.

These are proposed treatment methods, any methods selected will be dependent upon site specific conditions which will be presented to EPA for approval prior to implementation.

ATTACHMENT K – INJECTION PROCEDURES

Describe the proposed injection procedures including pump, surge tank, etc.

Proposed Injection Procedures

To minimize piping requirements and surface disturbance, it is proposed that the injection wells be directionally drilled from a central location or drilling island. Drilling islands are common for oil field development in urban areas such as Los Angeles. Two potential drilling islands have been identified by Newhall Land as shown on **Exhibit 18**. The sites range in size from 0.75 acres to 1.0 acres. One of the sites is located off of Franklin Parkway, west of Commerce Center Drive (section 14, T4N/R17W), and the second is located adjacent to Chiquito Canyon Road (section 15, T4N/R17W). Both locations are north of Route 126. The preliminary design of the drilling island is shown as **Exhibit 19.** The brine water will be pumped from the WRP to a tank at the drill site location. The brine water will be pumped from the tank to the injection wells. The wellhead will be designed with a tap to allow for sampling of the injection fluid prior to conveyance down the tubing string. A minimum pressure of 100 psi at shut-in conditions shall be maintained on the tubing/casing annulus.

Brine water will be distributed to the injection wells by control valves and associated water flow rate meters, with injection pressure monitoring. Limits will be set based on fracture gradient limitations. Injected water volumes will be accumulated from the injection rate data and reports created which summarize injected volumes on a monthly basis. Any rate limitations which may have been invoked by the control system will be noted, so as to allow business process management of the injection well field.

<u>Enclosure and Controls</u>

The controls and enclosure will be constructed on the drill site. The controls will include measurement devices for individual wellhead injection pressures, volumes, and annulus pressure with overall wellhead temperature and total volume.

<u>Pumps, Piping and Tank</u>

Pumps will be designed to accommodate the flows and pressures needed to assure proper injection of the brine stream. A standby pump will be provided. Spill containment will also be provided within the pump station. Due to the changing flow and pressure characteristics over the duration of the project it is possible that the required number and type of pumps may be changed to accommodate needed head and flow conditions. The pump and pump enclosures will be designed to meet County noise requirements for the land use in the area of the pump stations.

The pump supply and discharge piping is proposed to be constructed from either lined heavy-wall carbon steel, non-corrosive alloys or high-pressure rated polymer lines, so as to protect for piping corrosion failures.

It is expected that the tank located at the injection site will have minimal capacity, sufficient to provide a system time constant adequate for effective process control (approximately 500 barrels). Surge storage of water is expected to be managed at the WRP site, not on the injection site, due to the limited available footprint at each site. A full polymer, or polymer-lined or epoxy-coated carbon steel tank construction will be used.

<u>Fencing</u> - The site will be fenced to provide security.

ATTACHMENT L – CONSTRUCTION PROCEDURES

Discuss the construction procedures (according to §146.12 for Class 1, §146.22 for Class II and §146.32 for Class III) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks and the drilling, testing and coring program and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to packer for Class I.)

Permits

The injection well will require a permit for a UIC Class I injection well from U.S. EPA under the UIC program and a drilling permit from Los Angeles County.

Casing Program

A Schematic Design for the typical well is included as **Exhibit 20**. Final depths will be determined by the field conditions, well logs and input from the drilling consultant and geologist. U.S. EPA approval will be obtained for any revisions prior to installation. The first well drilled will be a vertical well. The casing and cementing program presented below is for the directional wells, although one vertical well will be constructed using the same casing and tubing. The total depth will be approximately 9,500' rather than 13,000'. All the follow-up wells will be directionally drilled. Exhibit 21 is a schematic of the proposed vertical and directional wells in cross sectional view.

Tubing

4- 1/2", 15.1 #/ft L-80 EUE tubing or 3-1/2" L-80 EUE, from ground surface to perforated interval.

Packers (and other down hole tools)

A single Baker dual seal retrievable LOK set packer (or equivalent)

Casing

Listed below under casing design.

Well Completion (perforated, tubing and packer)

Shoot the 200' injection interval as specified by the on-site geologist with four 1/2" jet holes per foot using a 5" casing gun.

The packer will be run on the tubing and mechanically set. The KCL water with corrosion inhibitor and biocide will be loaded into the back side of the packer.

Casing Design

a. Conductor Casing

100' to surface, 16" 65# H40 steel conductor pipe, or equivalent, with at least ¼" wall thickness placed in an augered hole with the annulus backfilled with concrete.

b. Surface Casing

3,000' to surface, 10 ¾" 45.5# K-55LT&C, or equivalent, cemented to the surface

c. Long String Casing

13,000’ to surface, 7-5/8” 39# P110 Buttress or 7” 38# P110, or equivalent, cemented to the surface in three stages.

Design Specification

7-5/8” 39# P110

Burst 12,620 psi

Collapse 11,060 psi

Yield 1,066,000 lb; buttress joints yield 1,258,000 lb; tube yield 1,231,000 lb

Casing Collapse Pressure/External Pressure

Pc= 0.052 NcpLs

Pc= Pressure Collapse

Nc=Collapse Safety Factor=1.125

P = mudweight=11.5#/gal

Ls=length of section=13,000’

Pc=(0.0520)(1.125)(11.5)(13,000)= 8,746psi

Fracture Pressure = (Fracture Gradient)(Depth) = (0.733psi/ft)(13,000ft) = 9,525psi

This calculation indicates the burst pressure of the 7-5/8” 39# P110 casing can withstand pressure greater than the fracture pressure.

Axial Loading (Tension)

A joint strength safety factor of 1.8 is utilized:

7-5/8” 39# P110 13,000’ to surface – yield 1,060,000 psi

13,000 (39#/ft) = 507,000 psi

1,060,000psi/507,000psi = 2.10

The joint strength of the P110 is sufficient to support the weight of the string using a minimum safety factor of 1.8.

Cementing Program

Conductor Pipe – 16” conductor in “ hole to 100’

Cement conductor pipe into cellar floor.

Surface Casing- 10 3/4” string in 14” hole to 3000’

For 11 ¾” O.D. in a 14” hole: 0.3160 cu. ft/lin. Ft x 3,000’ = 948 cu. ft. + 45% excess = 1374.6 cu. ft.

- Use centralizers as deemed necessary opposite all fresh water zones
- Use metal petal baskets as needed
- Run temperature log after initial set

Cement slurry consisting of 1091 sacks class “G” cement premixed 1:1 with pozlin, 2% bentonite, and 2% $CaCl_2$. Slurry will be displaced from casing with 3% KCl water.

Long String Casing- 7 5/8” string in 9 5/8” hole to 13,000’

For 8 5/8” O.D. in a 9 5/8” hole: 0.0995 cu.ft./lin. ft. x 13,000’ = 1293.5 cu. ft. + 45% excess = 1875.58 cu. ft.

Cement long string in three stages.

- Use float collar & float shoe two joints apart
- Use one or two (as required) DV tools opposite firm formations
- Use two metal petal baskets under each DV tool
- Use centralizers throughout injection zone and above and below each DV tool
- Use preflush ahead of each stage
- Use excess cement each stage calculate with caliper log
- Run temperature survey and bond log after initial set time
- Calculate back pressure to hold on casing to prevent microannulus or micro fractures
- Use of staging is for the purpose of full cementation from TD to surface, or at least well up into surface casing.

Cement slurry consisting of 1027 sacks class “G” cement premixed 1:1 with pozlin, 2% bentonite, and 2% $CaCl_2$. Slurry will be displaced from casing with 3% KCl water.

Logging Procedures

A mud logger will be used when drilling is initiated.

Prior to Casing

Before surface and long string casings are set, a dual induction/spontaneous potential/gamma ray/caliper log will be run over the course of the entire open hole sequence after the well is drilled to each respective terminal depth. Sidewall samples will be collected from the proposed injection zones for lithologic data and porosity and permeability tests.

Cased Hole Logs

After each casing is set and cementing is complete, a spherically focused cement bond evaluation log will be run over the course of the entire cased hole sequence. Temperature, spinner, and/or natural radioactive logs will be run to ensure that injection fluid is contained within the tubing and injection zone.

Deviation Checks

Vertical holes: hole deviation will be monitored with drift shots at 500’ intervals and when tripping to change drilling bits until advised otherwise. It the total down hole deviated position as calculated by drift shots exceed 100’ deviation from the surface location, run a multishot survey and take corrective measures if necessary.

Directional holes: directional wells drilled using a dyna drill, mud motor or similar technique and surveyed during drilling to ensure the well is drilled in the correct location.

Drilling, Testing and Coring Program

Well cuttings will be logged from surface to total depth by, or under the supervision of a California Professional Geologist. A lithologic log will be prepared and submitted with the well completion report. Drilling conditions and any indications of gas/oil will be recorded on the lithologic log. Lithologic information will be obtained from the confining zone and the proposed injection zone interval from wireling sidewall samples. The lithologic samples will be tested for porosity and permeability.

Formation Water Sampling

Samples of the formation water in the selected injection zone will be taken and analyzed to determine the physical, chemical and radiological characteristics of the water. Samples from open-hole testing, if successful, will be analyzed before well completion. If testing fails to produce a credible sample in the target injection zone, the well will be completed and formation water produced from the target injection zone will be used for sample analysis.

Proposed Annulus Fluid

The annulus will be filled with 3% KCL water with corrosion inhibitor and biocide. The annulus will be tested to 1,500 psi to insure integrity of casing, packer, and tubing. A minimum pressure of 100 psi at shut-in conditions shall be maintained on the tubing/casing annulus. Within the first quarter of injection operations, the range of fluctuation of annular pressure considered normal during periods of injection will be determined. The results will be submitted with the first quarterly report after injection operations have commenced.

ATTACHMENT M – CONSTRUCTION DETAILS

Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

Construction Diagram

An injection well schematic of a typical injection well is attached as **Exhibit 20**. A cross sectional view a typical directional well with respect to the drilling island is attached as **Exhibit 21**.

ATTACHMENT O – PLANS FOR WELL FAILURES

Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or well failures so as to prevent migration of fluids into any USDW.

Contingency plans for injection are necessary in the event of pressure build-up in a well, mechanical well failure, or loss of mechanical integrity, which necessitates the cessation of injection. Newhall Land proposes to drill redundant injection wells to provide for this situation to ensure there will be adequate provisions for brine disposal. The wells operate for approximately five months during the year, so there will be adequate time to schedule well maintenance work such that injection is not interrupted by normal activities. If a well fails and cannot be repaired prior to the end of its intended life, it will be abandoned.

ATTACHMENT P – MONITORING PROGRAM

Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

Quarterly Reporting

A quarterly report will be prepared for submission to the EPA which will include the following elements:

- Monthly average, maximum, and minimum values for the continuously monitored parameters of injection pressure, annular pressure, flow rate, and volume of injectate.
- Results of chemical, physical, and any other relevant analyses conducted on the injection fluids.
- Results of any annual testing conducted since the last quarterly report.
- Results of periodic tests for mechanical integrity conducted since the last quarterly report.
- Any well rehabilitation or work-over activities.

Continuous Monitoring

The well will be equipped with a pressure monitoring device to allow for continuous recording of the injection pressure at the wellhead and pressure in the annulus between the casing and the tubing. Pressure measurements will be conducted with a digital recorder to accuracy of one psi. In addition, the flow rate, volume, and temperature of injectate will be continuously monitored in the supply line immediately before the wellhead by a continuous reading device. The monitored parameter, recording frequency and the precision required are listed below:

Continuously Monitored Parameter	Recording Frequency	Measured Precision
Injection Rate (gallons per minute)	Hourly	0.1 gallon
Daily Injection Volume (gallons)	Daily	0.1 gallon
Total Cumulative Volume (gallons)	Daily	0.1 gallon
Well Head Injection Pressure (psig)	Hourly	0.1 psig
Annular Pressure (psig)	Hourly	0.1 psig
Injection Fluid Temp (F deg.)	Hourly	0.1 F degree

Quarterly Monitoring

Injection fluids will be sampled and analyzed on a quarterly basis while the well is in operation or every time there is a significant change in injection fluid. Samples will be collected under appropriate quality assurance/quality control (QA/QC) procedures following a sampling and analysis plan that will be prepared and implemented for the well. All samples collected for analysis will be transported to and analyzed by a California certified laboratory with proper Chain of Custody documentation. The following constituents and methods are to be included in the program:

Inorganic Constituents – appropriate U.S. EPA methods for major anions and cations (including an anion/cation balance), TDS, and Total Suspended Solids (TSS).

General and Physical Parameters – appropriate U.S. EPA or certified laboratory methods for turbidity, pH, conductivity, hardness, specific gravity, alkalinity and biological oxygen demand (BOD).

Trace Metals – U.S. EPA Method 2100.8 for trace metals analysis.

Volatile Organic Compounds (VOCs) – U.S. EPA Methods 8010/8020 or 8240

Semi-Volatile Organic Compounds – U.S. EPA Method 8270.

The first sample will be analyzed for all constituents. Follow-up samples will be analyzed for inorganic constituents and general and physical parameters. Additional constituents will be analyzed if the WRP influent quarterly monitoring results indicate there is a change in the character of the influent. The samples will be collected using a chain of custody document showing the date, exact location, time of sampling or field measurements, name of sampler, sample method. This information together with the laboratory reports will be submitted in the Quarterly Monitoring Report. A hazardous waste determination will be performed prior to injection and at any time that wastewater procedures are changed.

Annual Monitoring

To ensure that injected fluid is moving into the injection zone only, an annual logging program will be conducted. Temperature, spinner and natural radioactive logs will be run to evaluate possible fluid migration above the shoe of the 7-5/8 inch diameter casing or around the packer. In addition, as previously described, the annulus of the 7-5/8 inch diameter casing and 4-1/2 inch diameter tubing will be monitored with a continuous pressure recorder at the surface to detect any leaks in the tubing or packer.

Five-Year Monitoring

A mechanical integrity test will be conducted on the injection well at least every 5 years, in accordance with 40 CFR 146.8. Mechanical integrity testing will also be conducted within 30 days from completion of any work-over. Tests will be included in the next quarterly monitoring report.

Record Keeping Retention

All laboratory analyses and flow volume records for injected fluids will be maintained for three years after the injection well has been plugged and abandoned. Monitoring reports, calibration and maintenance records and continuous monitoring readings will be kept for five years after the injection well has been plugged and abandoned. After the retention time, records may be discarded upon written approval from the EPA.

ATTACHMENT Q – PLUGGING AND ABANDONMENT PLAN

Submit a plan for plugging and abandonment of the well including: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium prior to placement of the plugs. Also for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDWs. Submit this information on EPA Form 7520-14, Plugging and Abandonment Plan.

An exact plugging and abandonment program cannot be developed for the well until drilling and construction are complete. Plug depths and remaining fluids in the borehole will vary depending on the depth of the injection zone.

Plug Placement Method

The balance method will be used in the placement of cement plugs as described below.

Balance Method

In placing a cement plug, a balanced condition is achieved when hydrostatic pressures inside the pipe are equal to those on the outside of the pipe (annulus). For cement placement, the drill pipe or tubing is hung at a depth where the bottom of the cement plug will begin. The cement is then displaced down the tubing with a suitable workover fluid. Displacement continues until the height of cement in the tubing equals the height outside the tubing. When this condition is reached, the pumps can be turned off and there will be no movement of fluids. The fluid columns are in static equilibrium. Placement of the plug is completed by pulling the pipe out of the hole and allowing the cement to occupy the full space in the casing.

To control injection, the injection interval open at any time will be approximately 200' net interval. Once this zone has reached fracture pressure, the zone will be abandoned with a cement plug placed across the perforations and the next higher 200' net interval will be perforated. The maximum net sand thickness is 2500' at the eastern edge of the Del Valle oil field ranging to a minimum thickness of 600' over the crest of the Castaic Junction oil field.

Plugging and Abandonment Program

In general, the following plugs and plate will be used in the abandonment process:

- Plug across injection zone, extending approximately 200' above perforations or to the base of the next 200' net injection interval.
- Plug at base of USDW, estimated at approximately 3000 feet (200-foot plug.
- Plug at surface of the well (100-foot plug).
- Cut casing 5 feet below ground and weld steel plate on top of casing stub.

The plugging and abandonment program will proceed as follows:

- Move in and rig up workover rig
- Check casing pressure
- Kill well with 10# mud (check tubing pressure & calculate weight required)
    - Bull head in volume of tubing
    - Rise in casing pressure evidence of tubing leak
- Set wire line plug in tubing
- Remove tree

- Nipple up BOPs, test
- Remove wire line plug
- Pick up & unseat from packer
- Circulate around w/ mud twice
- Pull out of hole with tubing
- If this is sound, can use it as work string for cementing
- Set wireline bridge plug above packer, pressure test 7 5/8" casing. If no leaks, proceed, if leaks, locate and squeeze
- Run in with work string with 2" stringer thru packer & cover perforation interval with cement.
- Pickup out of packer and equalize cement plug of 2-3000'; pick up out of plug and repeat until casing is full up to 500' above surface casing shoe
- Equalize 500' cement plug at surface, lay down tubing
- Nipple down BOPS
- Cut off 7 5/8" casing 5' below surface
- Weld on steel cap
- Rig down, move out rig

Exhibit 22 is a well abandonment schematic. As shown on the schematic, intervals between cement plugs will be filled with drilling fluid with a density of approximately 9.7 lb/gallon and a viscosity of 40-45 sec/qt . U.S. EPA may approve modifications to this program based on information developed during the drilling, construction and operation of the well. In addition, U.S. EPA may modify the program in the future based on approved workovers or well modifications. Newhall Land will notify U.S.EPA no less than 45 days before conversion, workover, or abandonment. Within 60 days of abandonment, Newhall Land will provide details of the plugging plan on Form 750-14 to U.S. EPA. Wells will be properly plugged in accordance with the plugging and abandonment program after injection operations have ceased for two years unless the permittee demonstrates that the wells will be used in the future or that the well will not endanger USDWs while temporarily abandoned. Once the injection wells have been abandoned, the well cellar will be removed and backfilled. Surface facilities, including pumps, tanks, piping and the control room will be removed and the area will be restored to original conditions.

Costs for plugging and abandoning the injection well have been estimated at $145,050. This estimate assumes a 13,000' 7 5/8" hole cemented to the surface. Preliminary cost estimates are included in **Appendix 3** attached to this application.

ATTACHMENT R – NECESSARY RESOURCES

Submit evidence such as a surety bond or financial statement to verify that the resources necessary to close, plug or abandon the well are available.

Financial assurance per 40 CFR 144.28 will be provided to U.S. EPA by Newhall Land prior to operation of the injection well. The amount of the financial assurance will be determined by U.S. EPA and will consider the estimated costs for the proposed plugging and abandonment program. Costs for plugging and abandoning the injection well have been estimated at $145,050 per injection well. This estimate assumes a 7 5/8" hole cemented to the surface. Preliminary cost estimates are included in **Appendix 3** attached to this application.

ATTACHMENT S – AQUIFER EXEMPTIONS

If an aquifer exemption is requested, submit data necessary to demonstrate that the aquifer meets the following criteria: (1) does not serve as a source of drinking water; (2) cannot now and will not in the future serve as a source of drinking water; and (3) the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system. Data to demonstrate that the aquifer is expected to be mineral or hydrocarbon production, such as general description of the mining zone, analysis of the amenability of the mining zone to the proposed method, and time table for proposed development must also be included. For additional information on aquifer exemptions, see 40 CFR Sections 144.7 and 146.04.

Not applicable.

ATTACHMENT T – EXISTING EPA PERMITS

List program and permit number of any existing EPA permits, for example, NPDES, PSD, RCRA, etc.

The Newhall Land and Farming Company does not have any existing EPA permits.

ATTACHMENT U – DESCRIPTION OF BUSINESS

Give a brief description of the nature of the business.

Newhall Land, a subsidiary of Land Source Communities LLC, is a premier community planner in north Los Angeles County. Its primary activities are planning communities in Valencia, Calif., and on Newhall Ranch, which together form one of the nation's most valuable landholdings. Newhall Ranch is a 12,000-acre community planned for over 21,000 homes, 19,000 jobs and nine square miles of open space (more than 50 percent of its total area). These communities are located on the Company's 34,000 acres, 30 miles north of downtown Los Angeles. In addition, Newhall Land maintains active agriculture operations on land within its property located in Los Angeles and Ventura Counties.

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TABLES

TABLE 1

							OIL FIELD WELLS											
DEL VALLE OIL FIELD WELLS - SECTIONS 15, 16, 21,T4N, R17W, SB																		
Operator Name	**Field Name**	**Lease**	**Well #**	**API**	**Well Type**	**Well Status**	**Current Open Inverval**	**Date Spud**	**TD**	**KB**	**Abandon Date**	**S**	**T**	**R**	**BM**	**Area Name**	**Pool Name**
Chevron U.S.A. Inc.	Del Valle	Newhall	1	03706695	OG	Plugged		1924	5800	974	1925	15	4N	17W	SB	Main Area	No Pool Breakdown
Chevron U.S.A. Inc.	Del Valle	Blair	5	3706668	OG	Plugged		1953	2525	1046	1954	15	4N	17W	SB	Main Area	No Pool Breakdown
LBTH Inc.	Del Valle	Blair	7	03706669	OG	Plugged		1951	10505	1015	2000 *	15	4N	17W	SB	Main Area	No Pool Breakdown
LBTH Inc.	Del Valle	Blair	27	03706670	OG	Plugged		1944	10290	1042	2000	15	4N	17W	SB	Main Area	No Pool Breakdown
Chevron U.S.A. Inc.	Del Valle	Boobier	1	03706671	OG	Plugged		1947	8855	1126.8	1948	15	4N	17W	SB	Main Area	No Pool Breakdown
ExxonMobil Corp.	Del Valle	Castaic Junction G Unit No 1	1	03706638	OG	Plugged		1957	11505	1030	1957	15	4N	17W	SB	Main Area	No Pool Breakdown
Union Oil Co. of Calif., Opr.	Del Valle	Leibhart	1	03706717	OG	Plugged		1941	8103	1025	1962 *	15	4N	17W	SB	Main Area	No Pool Breakdown
Union Oil Co. of Calif., Opr.	Del Valle	Leibhart	2	03706718	OG	Plugged		1955	6292	1108	1955	15	4N	17W	SB	Main Area	No Pool Breakdown
Rothschild Oil Co.	Del Valle	Barbour	1	03706664	OG	Plugged		1950	7361	1212	1953	16	4N	17W	SB	Main Area	No Pool Breakdown
Amax Petroleum	Del Valle	Barbour	1	3706626	OG	Plugged		1950	7361	1212	1961	16	4N	17W	SB	Kinler	
Amax Petroleum	Del Valle	Barbour	2	3706627	OG	Plugged		1950	7345	1188	1961	16	4N	17W	SB	Main Area	
Amax Petroleum	Del Valle	Barbour	3	3706628	OG	Plugged		1951	7462	1139	1956	16	4N	17W	SB	Main Area	
Plains Expl. & Prod. Co.	Del Valle	Barnes	1	03706696	OG	Plugged		1954	6020	1139	1954	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	2	03706697	WD & WD	Plugged		1950	7345	1189	1986	16	4N	17W	SB	Main Area	Lower Del Valle & Upper Del Valle
Vintage Prod California LLC	Del Valle	Barnes	3	03706698	OG	Idle	5625-6811	1943	5526	1086.5	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	4	03706699	OG	Idle	6225-6303	1944	8285	1068	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	5	03706700	OG	Idle	5340-5380, 5515-5568	1944	5610, REDRILL 6819	1082.5	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	6	03706701	OG	Idle	5385-5500, 5260-5355	1945	5941	1415	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	7	03706702	OG	Idle	6345-6395, 6495-6505, 6530-6643, 6646-6674	1947	6674	1063	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	8	03706703	WD & WF	Idle	6603-6949	1946	6950	1057	I	16	4N	17W	SB	Main Area	Lower Del Valle
Vintage Prod California LLC	Del Valle	Barnes	9	03706704	OG	Idle	5630-5670	1947	8620	1066	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Plains Expl. & Prod. Co.	Del Valle	Barnes	10	03706705	OG	Plugged	CSG CMNTD IN PLACE @461' TO SURFACE	1947	1344	1084.6	1947	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	11	03706706	DG	Idle	2883-2867, 2924-2891, 2951-2840	1950	3620	1082.5	I	16	4N	17W	SB	Main Area	Gas Zone
Vintage Prod California LLC	Del Valle	Barnes	12	03706707	OG	Idle	6466-6018, 6630-40, 6664-88, 6707-35, 6740-6886	1951	7014	1238	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	13	03706708	OG	Idle	6328-6456	1951	8098	1039	I	16	4N	17W	SB	Main Area	No Pool Breakdown

TABLE 1

Operator Name	Field Name	Lease	Well #	API	Well Type	Well Status	Current Open Inverval	Date Spud	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
Vintage Prod California LLC	Del Valle	Barnes	14	03706709	OG	Active	8105-95, 8290-8345, 8385-8490, 9012-9053, 9055-9105,	1951	9536	1072.21	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	15	03706710	OG	Active	5920-5976, 6075-6265, 6090-6180, 6430-6495, 6520-6610, 6630-6655	1951	7050	1414	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	16	03706711	WD	Active	6633-7003	1951	6590	1077	A	16	4N	17W	SB	Main Area	Lower Del Valle
Vintage Prod California LLC	Del Valle	Barnes	17	03706712	OG	Idle	5690-5760	1951	9550	1082	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	18	03706713	OG	Active	4524-46, 4550-90, 4595-4620, 4943-5079	1954	5080	1055.98	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	19	03706714	OG	Idle	2865-3641	1951	6776	1082.6	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	20	03706715	OG	Idle	5010-5214, 4989-5215	1954	5340	1093.99	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Barnes	21	03706716	OG	Idle	6467-6962	1954	6962	1292	I	16	4N	17W	SB	Main Area	No Pool Breakdown
G. R. Nance Co. Inc.	Del Valle	Gallagher	1	03721365	OG	Plugged		1973	12468	1190	1973	16	4N	17W	SB	Kinler Area (ABD)	No Pool Breakdown
Scope Industries Inc.	Del Valle	Kinler	16-1	03706666	OG	Plugged		1951	8590	1225.65	1951	16	4N	17W	SB	Kinler Area (ABD)	No Pool Breakdown
The British American Oil Prod	Del Valle	Kinler So Cal	1	3706631		Plugged		1948 dry hole	6857	1290	1948	16	4N	17W	SB	Kinler	
Amax Petroleum	Del Valle	Kinler	1	3706629		Plugged		1949	7653	1195	1961	16	4N	17W	SB	Kinler	
Amax Petroleum	Del Valle	Kinler	2	3706630		Plugged		1950 drl & ab	8361	1158.73	1950	16	4N	17W	SB	Kinler	
Vintage Prod California LLC	Del Valle	Lincoln	1	03706719	OG	Idle	6559-6634 6680-6954	1940	6954	1339	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	2	03706720	OG	Plugged		1940	6220	1291	2007	16	4N	17W	SB	Main Area	No Pool Breakdown
Plains Expl. & Prod. Co.	Del Valle	Lincoln	3	03706721	WD	Plugged		1941	7906	1081	1960	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	4	03706722	OG	Active	6046-6167	1941	6170	1272	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	5	03706723	OG	Active	5979-6112	1941	6113	1298	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	6	03706724	OG	Idle	6010-6130 6243-6429	1941	6430	1325	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	7	03706725	OG	Idle	5875-5940 7146-7635	1950	7637	1060	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	8	03706726	OG	Plugged		1941	6105	1272	2007	16	4N	17W	SB	Main Area	No Pool Breakdown
Plains Expl. & Prod. Co.	Del Valle	Lincoln	9	03706727	DG	Plugged		1941	8181	1230	1945	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	10	03706728	OG	Active	6057-6210	1941	8625	1300	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	11	03706729	OG	Plugged		1941	6954	1283	2007	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	12	03706730	OG	Idle	6669-6890 7885-8150	1943	9088	1333	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	13	03706731	OG	Idle	6632-6695	1945	6701	1131	I	16	4N	17W	SB	Main Area	No Pool Breakdown

TABLE 1

Operator Name	Field Name	Lease	Well #	API	Well Type	Well Status	Current Open Inerval	Date Spud	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
Vintage Prod California LLC	Del Valle	Lincoln	14	03706732	OG	Idle	6425-6445 6405-6415 6300-6400 6250-6285	1945	6850	1293	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	15	03706733	OG	Active	11,742-10,942 10,297-10,110 9759-9754, 8105-7840, 7825-7540,	1946	11868	1314	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	16	03706734	OG	Idle	Bridge plug at 6770'; 6690-6760	1949	13035	1316	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	17	03706735	OG	Idle	8280-8155 8110-8035 7995-7600 6850-6700 6280-6395	1952	8410	1279	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	18	03706736	OG	Active	6995-7020 7056-7105 7118-7130 7135-7190 7305-7405 7457-7497 7505-7540	1954	10318	1069	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	19	03706737	OG	Idle	9684-9694 10,001-10,201	1954	10440	1286	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	20	03706738	OG	Idle	6,219-6,401	1955	10320	1268	I	16	4N	17W	SB	Main Area	No Pool Breakdown
Vintage Prod California LLC	Del Valle	Lincoln	21	03706739	OG	Active	6136-6560	1955	6580	1326	A	16	4N	17W	SB	Main Area	No Pool Breakdown
Pancanadian Petroleum Co.	Del Valle	N.L.&F.	1-16	03722947	OG	Plugged		1950	9696	1162	1985	16	4N	17W	SB	Main Area	No Pool Breakdown
Black Hawk Resources Corp.	Del Valle	N.L.&F.	1-16	03722707	OG	Plugged		1983	9696	1162	1983	16	4N	17W	SB	Main Area	No Pool Breakdown
Havenstrite Oil Co.	Del Valle	Vasquez	1	03706634	OG	Plugged		1941	9708	1110	1945	21	4N	17W	SB	Main Area	No Pool Breakdown
Thompson Oil Co., Inc.	Del Valle	Vasquez	2	03706690	OG	Idle	6714-6919	1946	6919	1414	I	21	4N	17W	SB	Main Area	No Pool Breakdown
Thompson Oil Co., Inc.	Del Valle	Vasquez	3	03706691	OG	Active	6195-6440	1951	6891	1241	A	21	4N	17W	SB	Main Area	No Pool Breakdown
Chevron U.S.A. Inc.	Del Valle	Vasquez	4	03706692	OG	Plugged		1951	6719	1320	1977	21	4N	17W	SB	Main Area	No Pool Breakdown
Thompson Oil Co., Inc.	Del Valle	Vasquez	5	03706693	OG	Active	6348-6582	1951	6583	1416	A	21	4N	17W	SB	Main Area	No Pool Breakdown
Thompson Oil Co., Inc.	Del Valle	Vasquez	6	03706694	OG	Active	6020-6250	1951	6250	1047	A	21	4N	17W	SB	Main Area	No Pool Breakdown
The Newhall Land & Farming Co.	Del Valle	Socal	1	03706662	OG	Plugged		1951	8032	1520	1958	21	4N	17W	SB	South Area	No Pool Breakdown
The Newhall Land & Farming Co.	Del Valle	Socal	2	03706663	OG	Plugged		1951	6819	1374	1958	21	4N	17W	SB	South Area	No Pool Breakdown
Quintana Petroleum Corp.	Del Valle	N.L.&F.	1-21	03722347	OG	Plugged		1981	5285	1397	1987	21	4N	17W	SB	South Area	No Pool Breakdown

CASTAIC JUNCTION OIL FIELD WELLS - SECTIONS 13, 14, 23, 24, T4N, R17W, SB

Operator Name	Field Name	Lease	Well#	API	Well Type	Well Stat	Current Open Inerval	SPUD DATE	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F 12	2	03716535	WF	Plugged		1959	13800	1211	1988	13	4N	17W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F	58	03716521	OG	Plugged		1956	12650	986	1993	13	4N	17W	SB	Any Area	21 Main & Del Valle
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F	63	03700147	OG	Plugged		1958	13382	1102	1993	13	4N	17W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F	64	03716525	PM	Plugged		1959	14426	1133	1993	13	4N	17W	SB	Any Area	21 North

TABLE 1

Operator Name	Field Name	Lease	Well #	API	Well Type	Well Status	Current Open Inverval	Date Spud	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F	65	03716470	OG	Plugged		1959	14017	993	1994	13	4N	17W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F	67	03716526	OG	Plugged		1960	13372	979.6	1995	13	4N	17W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F	72	03716530	OG	Plugged		1962	13696	1047	1992	13	4N	17W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	NL&F	76	03716534	OG	Plugged		1963	13550	1207	1993	13	4N	17W	SB	Any Area	21 North
Monterey Resources Inc.	Castaic Junction (ABD)	N.L.&F.	1	03722056	OG	Plugged		1980	13218	1125	1981 *	14	4N	17W	SB	Any Area	No Pool Breakdown
ExxonMobil Corp.	Castaic Junction (ABD)	N.L.&F.	2	03716473	OG	Plugged		1950	11823	963	1993	14	4N	17W	SB	Any Area	21 Del Valle
ExxonMobil Corp.	Castaic Junction (ABD)	N.L.&F.	9	03716480	OG	Plugged		1952	12157	995	1993 *	14	4N	17W	SB	Any Area	21 Del Valle
ExxonMobil Corp.	Castaic Junction (ABD)	N.L.&F.	50	03716515	OG	Plugged		1955	11235	959	1993 *	14	4N	17W	SB	Any Area	21 Del Valle
Humble	Castaic Junction (ABD)	N.L.&F.	55	3716518	OG	Plugged		1956	13970	1174	1956	14	4N	17W	SB	Any Area	21 Del Valle & No breakdown
ExxonMobil Corp.	Castaic Junction (ABD)	N.L.&F.	68	03716527	OG	Plugged		1960	11838	1002	1993	14	4N	17W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	N.L.&F.	70	03716529	OG	Plugged		1961	13401	1068	1995	14	4N	17W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	N.L.&F.	77	03722047	OG	Plugged		1980	11985	979	1993	14	4N	17W	SB	Any Area	21 Del Valle & North
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	59	03716522	OG	Plugged		1957	13650	1249.8	1993	18	4N	16W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	60	03705101	OG	Plugged		1958	13365	1108	1988	18	4N	16W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	66	03701977	OG	Plugged		1960	13553	1162.3	1990	18	4N	16W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	69	03716528	WF	Plugged		1960	13635	1051.9	1988	18	4N	16W	SB	Any Area	21 North
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	71	03706299	WS	Plugged		1960	13600	1145	1990 *	18	4N	16W	SB	Any Area	No Pool Breakdown
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	4	03716475	OG	Plugged		1950	10651	1275	1995	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	19	03716490	OG	Plugged		1953	12222	1334	1995	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	20	03716491	OG	Plugged		1953	10851	1342	1992	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	21	03716492	OG	Plugged		1953	10879	1383	1992	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	24	03716495	OG	Plugged		1953	10865	1380	1995	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	28	03716499	OG	Plugged		1953	10840	1367	1992	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	29	03706300	OG	Plugged		1954	10866	1207	1990	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	30	03716500	OG	Plugged		1954	11704	1250	1995	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	31	03716501	OG	Plugged		1954	10878	1217	1993	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	34	03716504	OG	Plugged		1955	11240	1232	1990	19	4N	16W	SB	Any Area	10-B
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	35	03716505	OG	Plugged		1954	10753	1192	1986	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	41	03716508	OG	Plugged		1954	10950	1398	1988	19	4N	16W	SB	Any Area	10-A

TABLE 1

Operator Name	Field Name	Lease	Well #	API	Well Type	Well Status	Current Open Inverval	Date Spud	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	48	03716513	OG	Plugged		1955	11350	1275	1992	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	49	03716514	WF	Plugged		1956	10928	1274	1995	19	4N	16W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	1	03716472	OG	Plugged		1949	11952	964	1993	23	4N	17W	SB	Any Area	21 Main
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	10	03716481	OG	Plugged		1952	11530	1155	1995	23	4N	17W	SB	Any Area	15 & 21 Main
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	45	03716511	OG	Plugged		1955	11947	955	1955	23	4N	17W	SB	Any Area	No Pool Breakdown
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	46	03716512	OG	Plugged		1955	10800	999	1991	23	4N	17W	SB	Any Area	15
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	52	03716516	WF	Plugged		1955	10937	1129	1991	23	4N	17W	SB	Any Area	15
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	54	03716517	OG	Plugged		1955	12077	942	1956	23	4N	17W	SB	Any Area	No Pool Breakdown
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	56	03716519	OG	Plugged		1955	11949	986	1992	23	4N	17W	SB	Any Area	21 Main
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	57	03716520	OG	Plugged		1956	11240	1116	1956	23	4N	17W	SB	Any Area	15
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	78	03722728	OG	Plugged		1982	18856	1150	1990 *	23	4N	17W	SB	Any Area	No Pool Breakdown
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	3	03716474	OG	Plugged		1950	10115	1220	1978	24	4N	17W	SB	Any Area	15
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	5	03716476	OG	Plugged		1951	10532	1312	1995	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	6	03716477	OG	Plugged		1951	12019	1222.35	1995	24	4N	17W	SB	Any Area	21 Main & 15
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	7	03716478	OG	Plugged		1951	10600	1277	1992	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	8	03716479	OG	Plugged		1951	11080	1287	1993	24	4N	17W	SB	Any Area	15 & 10A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	11	03716482	OG	Plugged		1952	10948	1332	1992	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	12	03716483	OG & PM	Plugged		1952	12340	1141	1988	24	4N	17W	SB	Any Area	21 Main
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	13	03716484	OG	Plugged		1954	12000	1215	1992	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	14	03716485	WF	Plugged		1952	12304	1250	1993	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	15	03716486	OG	Plugged		1958	13180	1385.5	1992	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	16	03716487	OG	Plugged		1953	10790	1154	1992	24	4N	17W	SB	Any Area	10-B
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	17	03716488	OG	Plugged		1953	12368	1188	1993	24	4N	17W	SB	Any Area	21 Main
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	18	03716489	OG	Plugged		1953	12365	1193.7	1992	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	22	03716493	WF	Plugged		1953	10730	1138	1992	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	23	03716494	OG	Plugged		1953	12226	1248	1995	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	25	03716496	WF	Plugged		1953	9750	1225	1994	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	26	03716497	OG	Plugged		1953	11727	1270	1995	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	27	03716498	OG	Plugged		1954	12343	1402	1993	24	4N	17W	SB	Any Area	21 Main
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	32	03716502	OG	Plugged		1954	10600	1386	1992	24	4N	17W	SB	Any Area	10-A

TABLE 1

Operator Name	Field Name	Lease	Well #	API	Well Type	Well Status	Current Open Inverval	Date Spud	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	33	03716503	OG	Plugged		1954	10693	1108	1987	24	4N	17W	SB	Any Area	10-B
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	39	03706409	WF	Plugged		1954	10537	1150	1990	24	4N	17W	SB	Any Area	10-B
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	40	03716507	OG	Plugged		1954	10850	1254	1992	24	4N	17W	SB	Any Area	10-B
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	42	03716509	OG	Plugged		1955	10978	1172	1993	24	4N	17W	SB	Any Area	15
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Land & Farming Co.	53	03706358	WF	Plugged		1955	10870	1223	1993	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Corporation	1	03706359	OG	Plugged		1951	10901	1392	1995	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Corporation	2	03716471	OG	Plugged		1951	12634	1379	1952	24	4N	17W	SB	Any Area	10-A
ExxonMobil Corp.	Castaic Junction (ABD)	Newhall Corporation B-1	3	3706298	OG	Plugged		1955	11250	1428	1988	24	4N	17W	SB		

NEWHALL-POTRERO OIL FIELD WELLS - SECTIONS 22, T4N, R17W, SB

Operator Name	Field Name	Lease	Well#	API	Well Type	Well Stat	Current Open Inverval	Date Spud	TD	KB	Abandon Date	Sec	Twnshp	Range	BM	Area Name	Pool Name
Chevron U.S.A. Inc.	Newhall-Potrero	N. L. & F.	1	03712658	OG	Plugged		1944	7699	898	1956	21	4N	17W	SB	Any Area	1-2-3
Chevron U.S.A. Inc.	Newhall-Potrero	N. L. & F.	2	03712659	OG	Plugged		1945	12073	891	1957	21	4N	17W	SB	Any Area	1-2-3
Oryx Energy Co.	Newhall-Potrero	Rancho San Francisco	67	03713246	OG	Plugged		1947	8060	896	1982	21	4N	17W	SB	Any Area	1-2-3
Quintana Petroleum Corp.	Newhall-Potreto	NL&F Trifielld	1	3722352	OG	Plugged		1982	10368	953	1982 *	22	4N	17W	SB	Any Area	1-2-3
Oryx Energy Co.	Newhall-Potrero	NL&F 1	1	3712619	OG	Plugged		1955	15106	1083.6	1956	22	4N	17W	SB	Any Area	1-2-3
Chevron U.S.A. Inc.	Newhall-Potrero	Newhall	1	03712660	OG	Plugged		1942	8120	897	1969	22	4N	17W	SB	Any Area	1-2-3

OIL FIELD WELLS - SECTIONS 7, 9, 10, 11, 12, T4N, R17W, SB

Operator Name	Field Name	Lease	Well#	API	Well Type	Well Stat	Current Open Inverval	Date Spud	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
Chevron U.S.A. Inc.	Any Field	Newhall	F-1	03706111	OG	Plugged		1959	14032	1019.75	1959	7	4N	16W	SB	Any Area	No Pool Breakdown
Southern Calif. Gas Co.	Honor Rancho	WEZU	25	03707614	GS	Active	10122-9828	1958	10342	1135	Active	7	4N	16W	SB	Southeast Area	Wayside 13
Southern Calif. Gas Co.	Honor Rancho	WEZU	25A	03721683	GS	Active	9514-9813	1976	9841	1151	Active	7	4N	16W	SB	Southeast Area	Wayside 13
Southern Calif. Gas Co.	Honor Rancho	WEZU	25B	03721684	GS	Active	9420-9813	1976	9830	1152	Active	7	4N	16W	SB	Southeast Area	Wayside 13
Southern Calif. Gas Co.	Honor Rancho	WEZU	25C	03721685	GS	Active	9527-9827	1976	9567	1169	Active	7	4N	16W	SB	Southeast Area	Wayside 13
Southern Calif. Gas Co.	Honor Rancho	WEZU	30	03707617	GS	Active	10150-10371, 10391-10486	1961	10584	1283	Active	7	4N	16W	SB	Southeast Area	Wayside 13
Chevron U.S.A. Inc.	Any Field	Seaboard-So. Cal. Pet. Daugherty	1	03706117	OG	Plugged		1952	6017	1241.5	1952	9	4N	17W	SB	Any Area	No Pool Breakdown
	Any Field	Viregain	1	Cannot locate in DCOGGR files								9	4N	17W	SB		
Shell Western E & P Inc.	Any Field	Daugherty	1	03705882	OG	Plugged		1938	2220	1345	1938	9	4N	17W	SB	Any Area	No Pool Breakdown
Chevron U.S.A. Inc.	Any Field	Malis	1	03706091	OG	Plugged		1947	9411	1281	1947	10	4N	17W	SB	Any Area	No Pool Breakdown

TABLE 1

Operator Name	Field Name	Lease	Well #	API	Well Type	Well Status	Current Open Inverval	Date Spud	TD	KB	Abandon Date	S	T	R	BM	Area Name	Pool Name
Marathon Oil Co.	Any Field	Mabel S. Henderson	1	03705621	OG	Plugged		1950	5875	1376	1950	10	4N	17W	SB	Any Area	No Pool Breakdown
Atlantic Oil Co.	Hasley Canyon	Strawn	1	03705148	OG	Plugged		1956	6614	1325	1957	10	4N	17W	SB	Any Area	No Pool Breakdown
Petrominerals Corp.	Hasley Canyon	Sterling	1-10	03721801	OG	Plugged		1981	5810	1345	2003	10	4N	17W	SB	Any Area	Val Verde
Petrominerals Corp.	Hasley Canyon	Sterling	2-10	03721816	OG	Plugged		1978	5899	1389	2003	10	4N	17W	SB	Any Area	Val Verde
Petrominerals Corp.	Hasley Canyon	Sterling	3-10	03721871	OG	Plugged		1979	5830	1403	1991	10	4N	17W	SB	Any Area	Val Verde
Montara Petroleum Co.	Hasley Canyon	Sterling	81X	03721466	OG	Plugged		1975	6007	1376	1975	10	4N	17W	SB	Any Area	No Pool Breakdown
U.S. Natural Gas C & Manning	Hasley Canyon	Strawn	1	3706205	OG	Plugged		1949	9435	1342	1950	10	4N	17W	SB		
Fernando Oil Co.	Hasley Canyon	Well	1	3705395	OG	Plugged		1923	3744	NA	1923	10	4N	17W	SB		
Chevron U.S.A. Inc.	Any Field	Fernando	1	03706082	OG	Plugged		1941	8034	1250.9	1997, 1999, 2005	11	4N	17W	SB	Any Area	No Pool Breakdown
Chevron U.S.A. Inc.	Any Field	Newhall	B-1	03706107	OG	Plugged		1953	8079	1128	1953 &1997*	11	4N	17W	SB	Any Area	No Pool Breakdown
Chevron U.S.A. Inc.	Any Field	Newhall	D-1	03706108	OG	Plugged		1956	11645	1120	1957 & 1997*	11	4N	17W	SB	Any Area	No Pool Breakdown
Chevron U.S.A. Inc.	Any Field	Newhall	D-2	03706109	OG	Plugged		1957	12064	1060	1957	12	4N	17W	SB	Any Area	No Pool Breakdown
ExxonMobil Corp.	Any Field	NL&F	B-1	03705490	OG	Plugged		1951	12744	1007	1951	12	4N	17W	SB	Any Area	No Pool Breakdown
Vintage Prod California LLC	Honor Rancho	Honor Rancho 'A' (NCT-1)	27	03707281	OG	Plugged		1959	10425	1049	1959	12	4N	17W	SB	Main Area	Wayside 13
Southern Calif. Gas Co.	Honor Rancho	WEZU (NCT1)	26	03707615	GS	Idle	Plugged to 8688	1959	10301 Redrill 9971	1074	Idle	12	4N	17W	SB	Southeast Area	Wayside 13
Note: Well Files & Logs provided on Diskette					OG=Oil & Gas WD=Wtr Dspsal WF=Wtr Flood DG =Dry Gas						* Abandon /Drlg Problems **No history for abandonment				SB= San Bernardino		

TABLE 2

Water Wells															
Operator Name	**Well #**	**No.**	**Well Status**	**Date Spud**	**TD Boring**	**TD Completion**	**S**	**T**	**R**	**BM**	**Completion Intervals**	**Depth of Static Water Level**	**Date Measured**	**TDS**	**Sample Date**
											Ft.	**Ft.**		**mg/l**	
Newhall Land & Farming	B-5	04N/17W-22E01S	Active	8/31/46	126	120	22	4N	17W	SB	26-118			1164	10/11/1963
Newhall Land & Farming	B-6	04N/17W-22FS	Active	9/15/46	117	117	22	4N	17W	SB	30-117	13.6	1/10/2008	1367	10/11/1963
Newhall Land & Farming	B-7	04N/17W-F S	Abandon	10/29/46	102	100	22	4N	17W	SB	18-88			1439	10/11/1963
Newhall Land & Farming	B-10	04N/17W-22E04S	Inactive	11/14/56	142	142	22	4N	17W	SB	30-48, 55-92, 110-130			1244	10/11/1963
Newhall Land & Farming	B-11	04N/17W-22E S	Active				22	4N	17W	SB					
Newhall Land & Farming	B-11A		Active				22	4N	17W	SB					
Newhall Land & Farming	B-14	04N/17W-22F001S	Active	5/24/06	255	250	22	4N	17W	SB					
Newhall Land & Farming	B-16	e027898	Active	7/12/05	164	160	22	4N	17W	SB	50-135	24	8/2/2005		
Newhall Land & Farming	B-17	e031054	Abandon Dry	6/20/05	870	800	22	4N	17W	SB	240-780	0	8/12/2005	1600	3/8/2006
Newhall Land & Farming	B-18	e027027	Abandon Dry	6/1/05	830	470	21	4N	17W	SB	90-150, 280-450	4	7/20/2005	1670	3/8/2006
Newhall Land & Farming	B-20	e031538	Active	8/30/05	250	250	22	4N	17W	SB	50-115, 160-200, 200-240	10	10/4/2005	862	10/4/2005
Newhall Land & Farming	C	04N/17W-14Q02S	Active	2/27/36	148	148	14	4N	17W	SB	80-135	18			
Newhall Land & Farming	C-3	04N/17W-23D01S	Active	11/1/39	130	120	23	4N	17W	SB	31-118	15	4/25/1940		
Newhall Land & Farming	C-4	04N/17W-23BS	Active	11/14/39	148	148	23	4N	17W	SB	25-120	19	4/25/1940		
Newhall Land & Farming	C-5	04N/17W-14R S	Active	12/11/39	139	139	14	4N	17W	SB	31-133	17	4/25/1940	1006.6	7/13/1972
Newhall Land & Farming	C-6	04N/17W-14R S	Inactive	12/27/39	103	103	14	4N	17W	SB	26-93	21	9/24/1940		
Newhall Land & Farming	C-7	04/17W-14R S	Inactive	12/21/48	132	130	14	4N	17W	SB	40-62, 66-107, 112-120	29	5/17/1950		
Newhall Land & Farming	C-8	04N/17W-14R S	Active	2/1/50	710	280	14	4N	17W	SB	30-130	13.3	10/19/1950		
Newhall Land & Farming	C-9	745285	Active												
Newhall Land & Farming	C-10	e036013	Active	6/15/05	465	200	14	4N	17W	SB	70-170	26	2/4/2006	1090	2/4/2006
Newhall Land & Farming	C-11	e033107	Active	9/30/05	255	250	23	4N	17W	SB	70-110, 170-235	26	11/22/2005	838	11/21/2005
Newhall Land & Farming	C-12		Active	8/30/06	255	250	23	4N	17W	SB	60-95, 105-120, 130-160, 190-230				
Newhall Land & Farming	C-13		Abandon Dry	8/31/06	277	277	23	4N	17W	SB					
Newhall Land & Farming	E	04N/17W-12B03S	Inactive	4/10/37	180	119	12	4N	17W	SB	12-93	34.8	5/6/1976	1277	8/14/1973
Newhall Land & Farming	E-2	04N/17W-12G01S	Inactive	9/22/37	542	250	12	4N	17W	SB	30-130				
Newhall Land & Farming	E-4	04/17W-13CS	Abandon	9/22/1937	142		13	4N	17W	SB	50-136				
Newhall Land & Farming	E-5	04N/17W-13C02S	Inactive	4/22/42	160	148	13	4N	17W	SB	24-128	15	2/9/1955		
Valencia Water Company	E-7	04N/17W-12S	Abandoned	2/10/56	160	125	12	4N	17W	SB	100'-120'	25.6	7/5/1957		
Newhall Land & Farming	E-9	04N/17W-12RS	Inactive	7/24/57	134	134	12	4N	17W	SB	75-130	31.6	7/30/1957	934	7/13/1972
Valencia Water Company	E-14		Active	5/10/04	191	150	12	4N	17W	SB	76-114	21	6/23/2004	900	6/24/2004
Newhall Land & Farming	E-15	2925763	Active	2/18/04	200	160	12	4N	17W	SB	90-135	34	3/19/2004		
Newhall Land & Farming	E-16	925761	Active	2/18/04	200	170	13	4N	17W	SB	80-145	17	3/30/2004		
Newhall Land & Farming	G-1	e031540	Active	9/29/05	205	195	18	4N	16W	SB	90-135, 145-165		10/13/2005	760	10/26/2005
Newhall Land & Farming	G-3	e032602	Active	10/14/05	195	190	13	4N	17W	SB	90-160	21	11/08/-5	760	11/8/2005
Newhall Land & Farming	G-45	04N/16W-18BS	Active	12/31/45	140	140	18	4N	16W	SB	40-140	12	3/9/1955		
Newhall Land & Farming	156	04N/17W-13JS	Active	9/19/61		1805.55	13	4N	17W	SB				1165	9/30/1963
Newhall Land & Farming	161	04N/17W-13CS	Active		180		13	4N	17W	SB					
Newhall Land & Farming	X-3	04N/17W-12R01S	Inactive	5/27/54	161		12	4N	17W	SB	75-145	19.2	3/2/1955		
Valencia Water Company	VWC E-17	925762	Active	2/18/04	195	150	14	4N	17W	SB	80-120	32	4/12/2004		
Valencia Water Company	VWC 206	804825	Active	7/30/03	2150	2130	18	4N	16W	SB	490-630	53	1/19/2004		

Table 3

GROSS SAND COUNTS											
					Miocene Sand Count		Pliocene Sand Count		Bering Sand Count		TOTAL
Field Name	Operator	Lease/Well	API Number	S, T, R, M	Footage	Net	Footage	Net	Footage	Net	Net
Del Valle	Humble (ExxonMobil)	Castaic Junction Gas Unit No. 1 Well 1	03706638	S15,T4N,R17W,SB	5890'-9000'	1286'	4525'-5890'	537'			1823'
Del Valle	Standard (LBTH Inc.)	Blair 27 (Formerly Havenstrite Liebhart 2)	03706670	S15,T4N,R17W,SB	5550'-8700'	2263'	(Sepulveda) 4570'-5550'	289'			2552'
Del Valle	Union Oil	Liebhart 1	03706717	S15,T4N,R17W,SB	5900'-8103'	1161'	5180'-5900'	250'			1411'
Del Valle	Union Oil	Liebhart 2	03706718	S15,T4N,R17W,SB	6100'-6300'	82'	4490'-6100'	540'			622'
Del Valle	Standard Oil	Blair 7	03706669	S15,T4N,R17W,SB	5175'-8620'	2003'	5175'-5890'	300'			2303'
Del Valle	Vintage	Lincoln 11	03706729	S16,T4N,R17W,SB	5787'-6755'	630'	to 4200'	522'			1152'
Del Valle	Vintage	Lincoln 18	03706736	S16,T4N,R17W,SB	5600'-6450'	600'+	to 4200'	485'	7000'-7300'	358'	1443'
Del Valle	Rothschild	Barbour 1	03706664	S16,T4N,R17W,SB	5500'-5700'	141'	to 4850'	424'			565'
Del Valle	Blackhawk Resources	NL&F 1-16	03722707	S16,T4N,R17W,SB	5900'-8300'	605'+		358'			963'+
Del Valle	Havenstrite Oil Co.	Vasquez 1	03706634	S21,T4N,R17W,SB	6200'-8970'	1595'	to 6000'	310'			1905'
Del Valle	Chevron	Encinas Fee 1	03706633	S20,T4N,R17W,SB	5108'-7866'	1123' *		175'			1298'
Del Valle	Mobil Oil Corp	NL&F 3	03706661	S20,T4N,R17W,SB	5680'-8500'	1455' *		866'			2341'
Castaic Junction	Monterey Resources	NL&F 1	03716473	S14,T4N,R17W,SB	6100'-9400'	1408'	to 6100'	245'			1653'
Castaic Junction	Humble	NL&F 55	03716518	S14,T4N,R17W,SB	6150'-8900'	826'		300'			1126'
Del Valle	Humble	NL&F 70	03716529	S14,T4N,R17W,SB				926'			926'
Del Valle	Humble	NL&F 64	03716525	S14,T4N,R17W,SB				1187'			1187'
Castaic Junction	Humble	NL&F 2	03716473	S14,T4N,R17W,SB	to 8900'	915'		123'			1038'

*No correction for dip

Table 4

P&P DATA					
	Well	**Well**	**Well**	**Well**	**Well**
Field Name	Del Valle	Del Valle	Del Valle	Del Valle	Del Valle
Operator	Blackhawk	LBTH Inc.	Quintana	Vintage	Nahama & Weagant
Lease/Well	NL&F 1-16	Vasquez WD 1-17	U.S.A. Heisler 1	NL&F 1-20	Del Valle 1-20
API Number	3722707	03706659	03722353	03722052	03729956
S, T, R, M	S16,T4N,R17W,SB	S17,T4N,R17W,SB	S19,T4N,R17W,SB	S20,T4N,R17W,SB	S20,T4N,R17W,SB
Sand	Lincoln	Pliocene		Upper Del Valle	Miocene
Footage					6610'-9000'
Porosity	27.80%	28.40%	22.90%	24.70%	25.00%
Permeability	111	666 md	191	224	116 md avg.
Data Source	small # sws	sidewall samples	sidewall samples	40 sidewalls	11 sidewall samples
	Well	**Well**	**Well**	**Well**	**Well**
Field Name	Del Valle	Del Valle	Del Valle	Del Valle	Del Valle
Operator	Quintana	Blackhawk	Quintana	Quintana	Quintana
Lease/Well	NL&F 11-20	NL&F 4-20	NL&F 12-20	NL&F 14-20	NL&F 1-21
API Number	03722738	03722308	03722746	03729957	03722347
S, T, R, M	S20,T4N,R17W,SB	S20,T4N,R17W,SB	S20,T4N,R17W,SB	S20,T4N,R17W,SB	S21,T4N,R17W,SB
Sand		Intermediate Del Valle		Pico	Pliocene, Miocene
Footage		6650'-8727'			4158-5230
Porosity	33.00%	23.20%	25.00%	22.60%	25.00%
Permeability	50 md	97 md	102 md	113 md	107
Data Source	sidewall samples	Intermediate 15 SWS Del Valle 827'	sidewall samples	sidewall samples	42 sidewalls

TABLE 5

PROJECTED BRINE CONCENTRATE

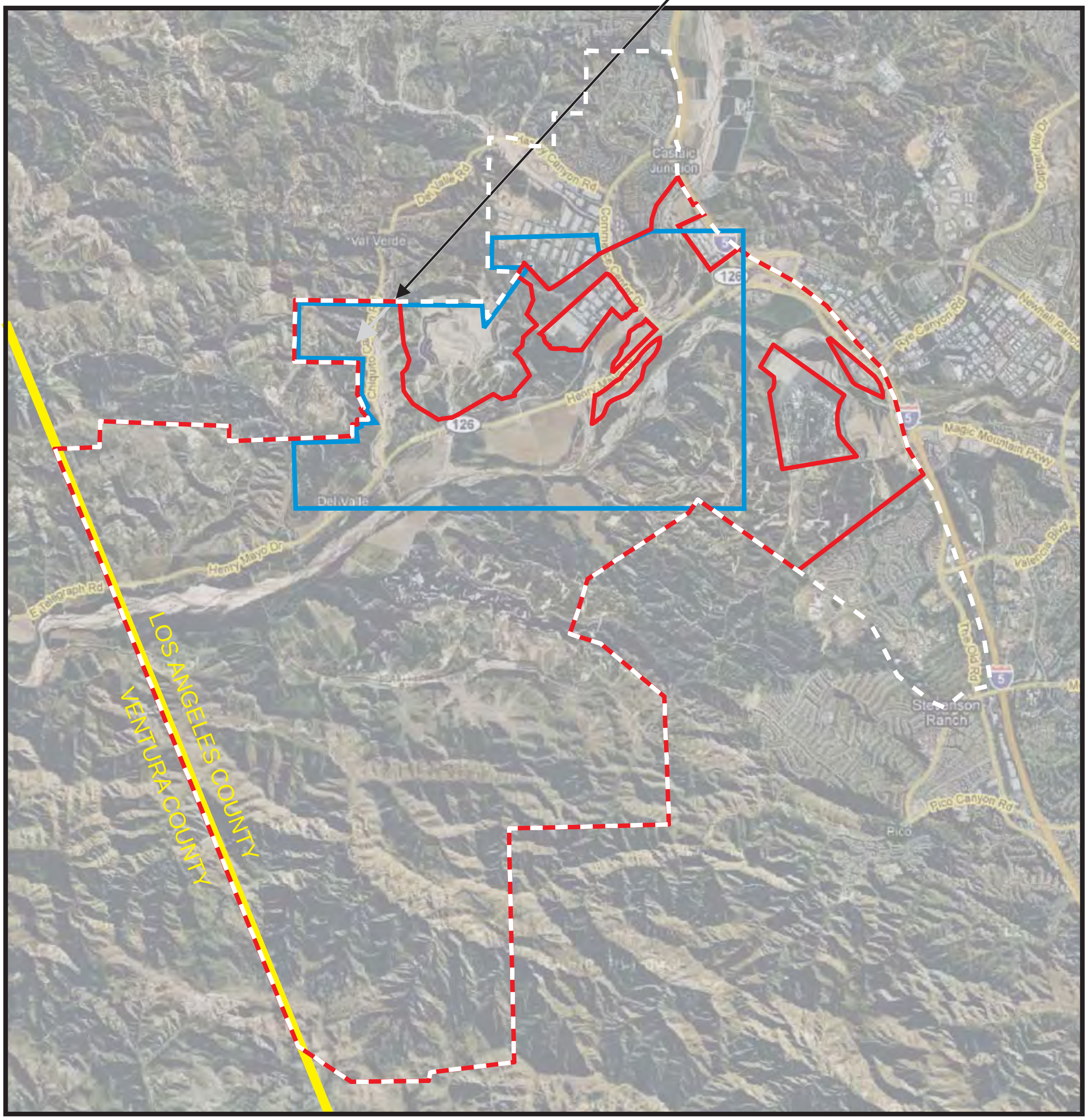
CONSTITUENT	UNIT	Feed Chloride Concentration
		Cl=138 mg/l
Calcium, Ca	mg/l	337
Magnesium, Mg	mg/l	109
Sodium, Na	mg/l	515
Potassium, K	mg/l	122
Ammonium, NH_4	mg/l	4.4
Barium, Ba	mg/l	0.54
Strontium, Sr	mg/l	0.54
Carbonate, CO_3	mg/l	.06
Bicarbonate, HCO_3	mg/l	700
Sulfate, SO_4	mg/l	901
Chloride, Cl	mg/l	729
Fluoride, F	mg/l	1.5
Nitrate, NO_3	mg/l	5.5
Boron, B	mg/l	0.69
Total Dissolved Solids, TDS	mg/l	3,422
pH	-	7.9

EXHIBITS

N

LOS ANGELES COUNTY, CA

PROJECT LOCATION

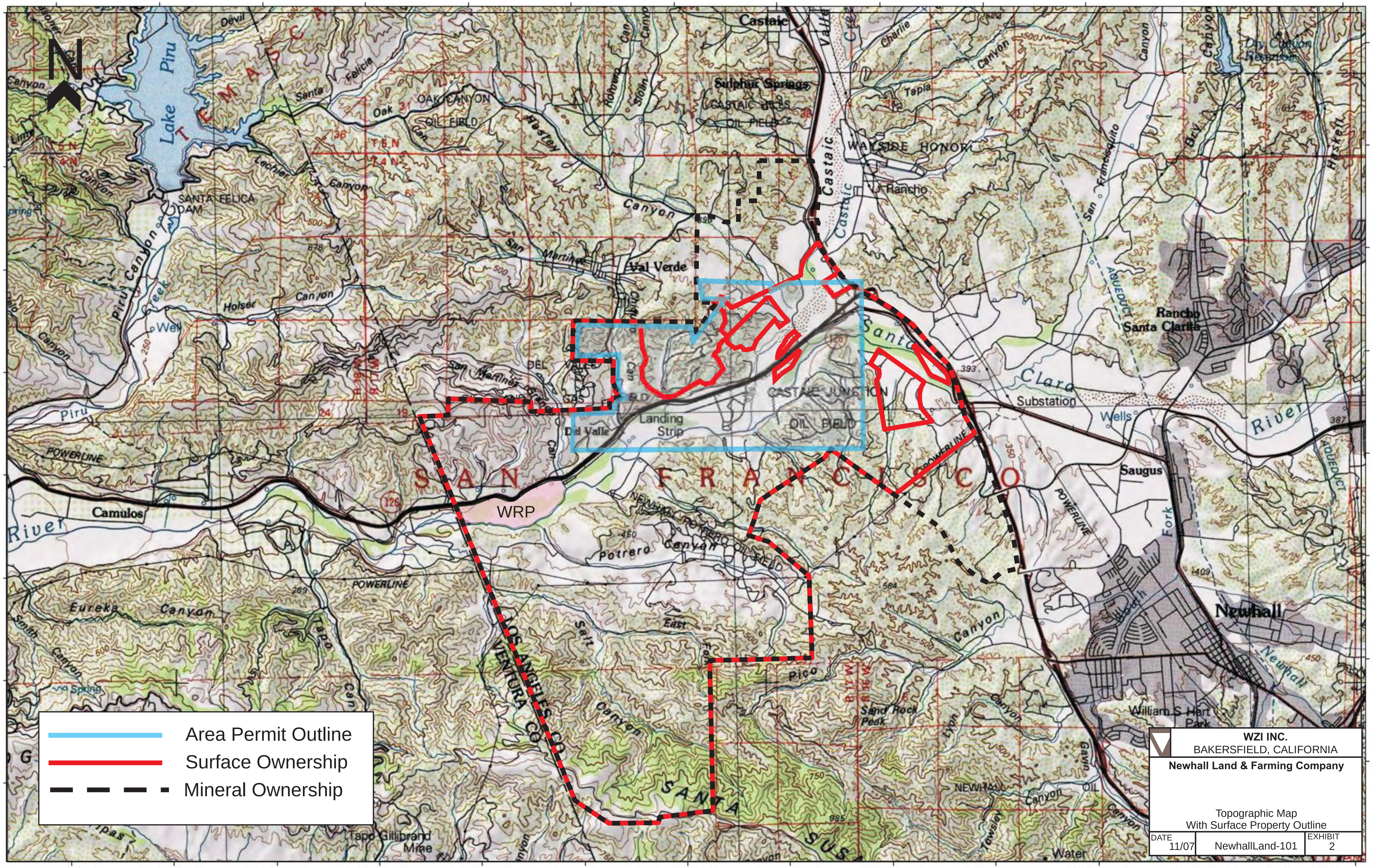


Surface Ownership

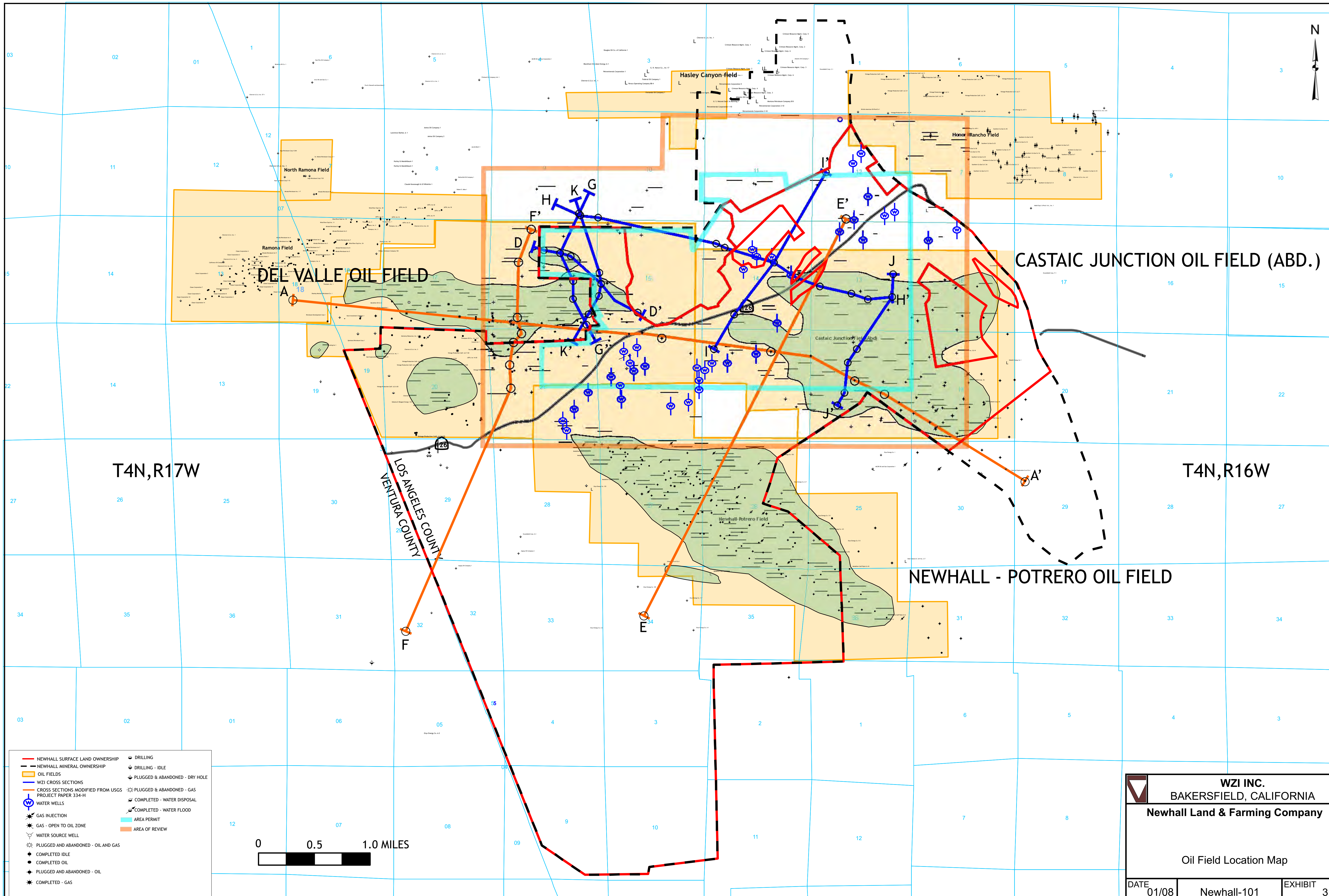
Mineral Ownership

Area Permit Outline

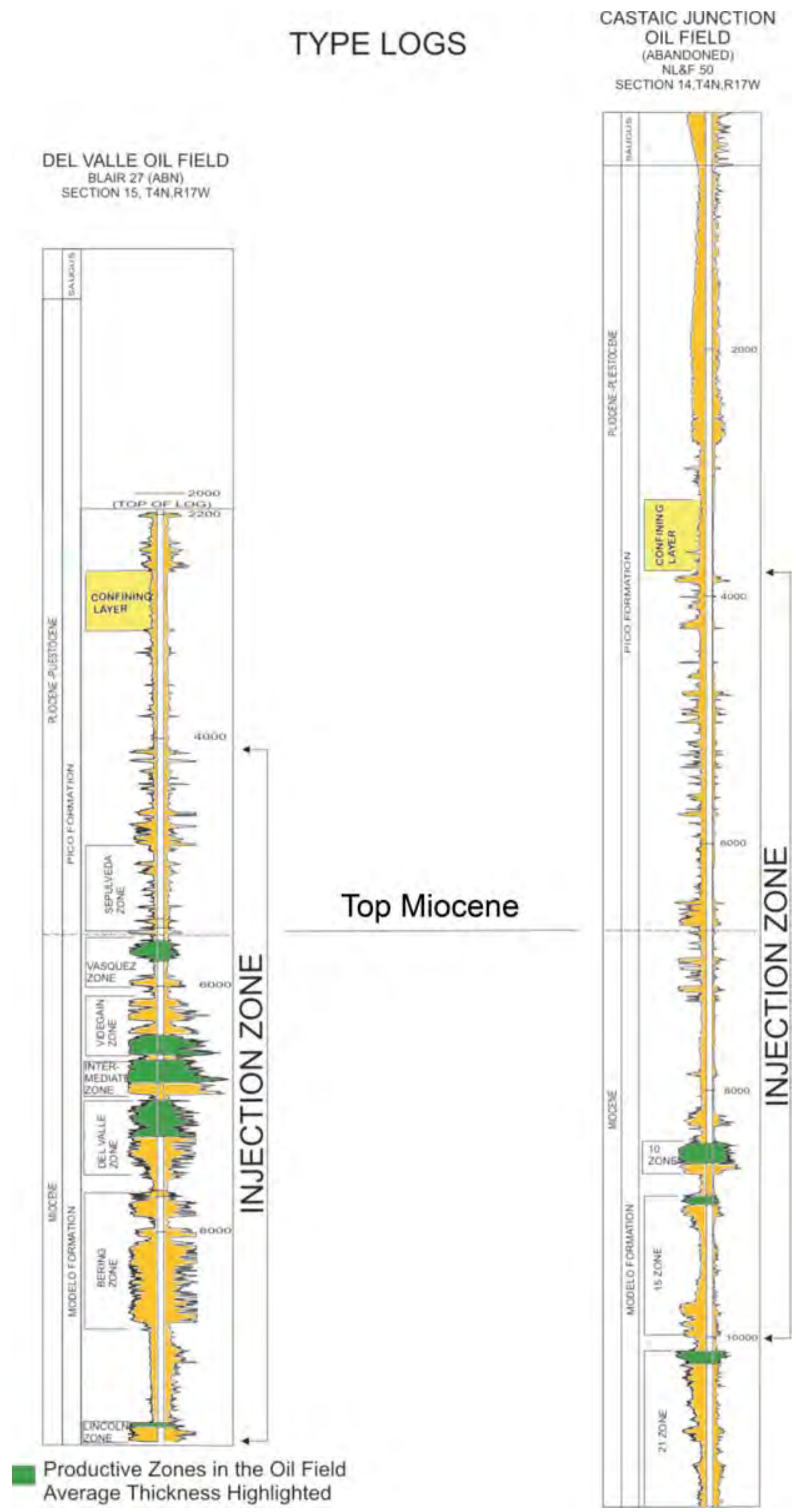
WZI INC. BAKERSFIELD, CALIFORNIA		
Newhall Land & Farming Company Regional Location Map		
DATE 11/07	NewhallLand-101	EXHIBIT 1



Area Permit Outline
Surface Ownership
Mineral Ownership
WRP
Castaic
Val Verde
Landing Strip
Del Valle
Saugus
Newhall
Camulos
Rancho Santa Clarita
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
Topographic Map
With Surface Property Outline
DATE 11/07
NewhallLand-101
EXHIBIT 2


N
Hasley Canyon field
North Ramona Field
Ramona Field
Honor Rancho Field
DEL VALLE OIL FIELD
CASTAIC JUNCTION OIL FIELD (ABD.)
Castaic Junction Field (Abd)
NEWHALL - POTRERO OIL FIELD
Newhall-Potrero Field
T4N,R17W
T4N,R16W
LOS ANGELES COUNTY
VENTURA COUNTY
A
A'
D
D'
E
E'
F
F'
G
G'
H
H'
I
I'
J
J'
K
K'
126
0
0.5
1.0 MILES
NEWHALL SURFACE LAND OWNERSHIP
NEWHALL MINERAL OWNERSHIP
OIL FIELDS
WZI CROSS SECTIONS
CROSS SECTIONS MODIFIED FROM USGS PROJECT PAPER 334-H
WATER WELLS
GAS INJECTION
GAS - OPEN TO OIL ZONE
WATER SOURCE WELL
PLUGGED AND ABANDONED - OIL AND GAS
COMPLETED IDLE
COMPLETED OIL
PLUGGED AND ABANDONED - OIL
COMPLETED - GAS
DRILLING
DRILLING - IDLE
PLUGGED & ABANDONED - DRY HOLE
PLUGGED & ABANDONED - GAS
COMPLETED - WATER DISPOSAL
COMPLETED - WATER FLOOD
AREA PERMIT
AREA OF REVIEW
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
Oil Field Location Map
DATE 01/08
Newhall-101
EXHIBIT 3

TYPE LOGS

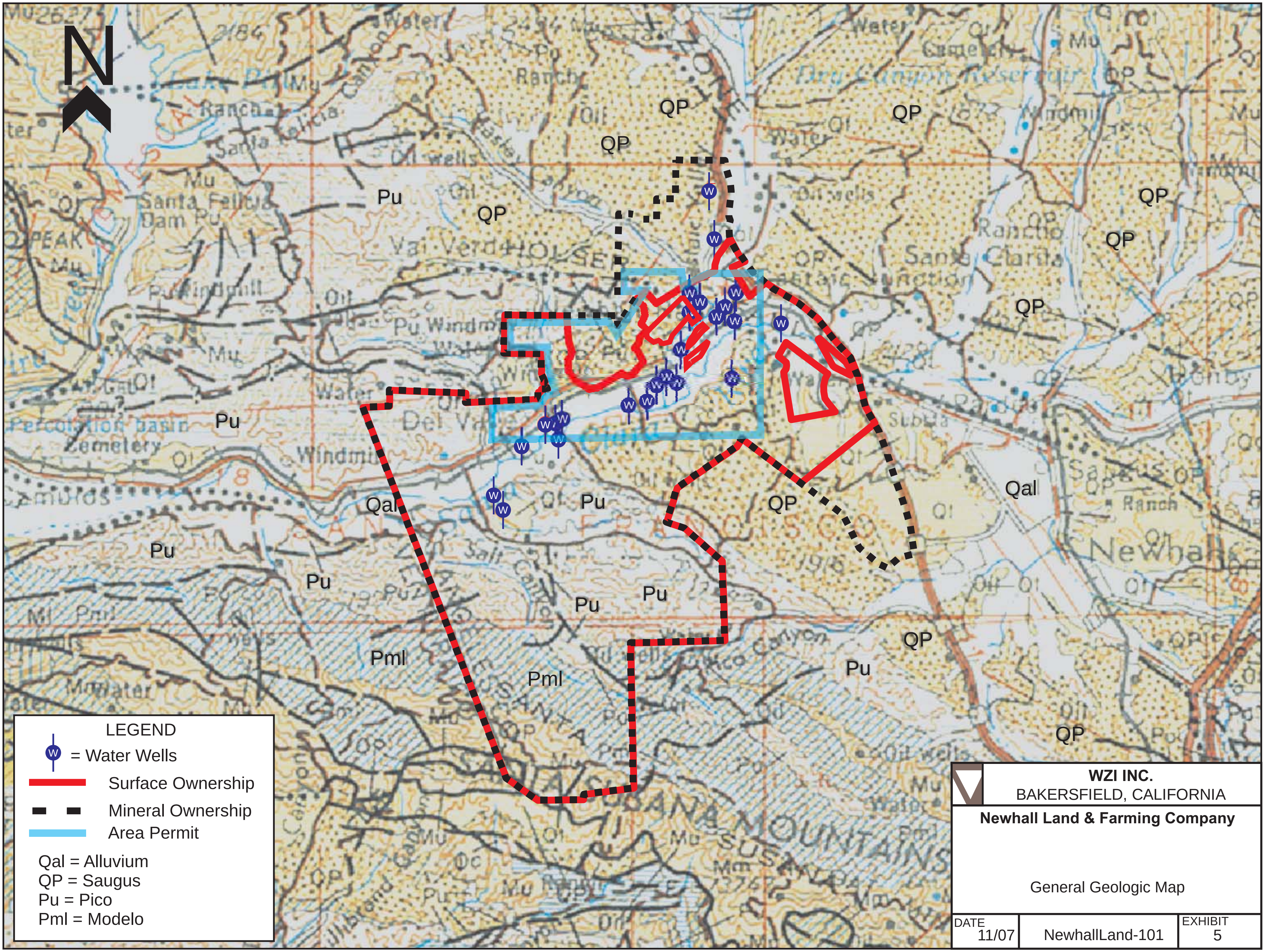


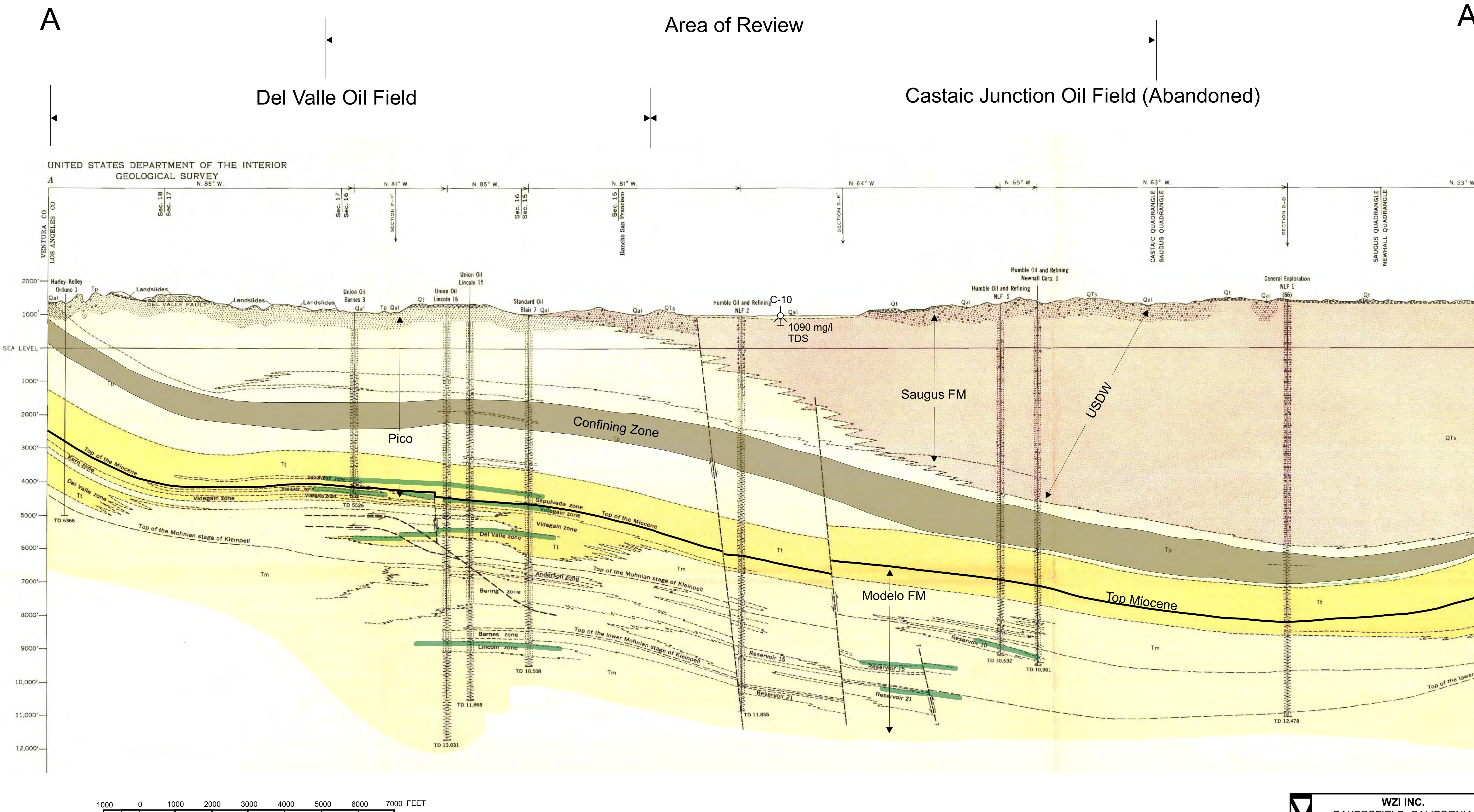
WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company

Type Logs

DATE		EXHIBIT
11/07	NewhallLand-101	4


N
QP
Pu
Qal
Pml
LEGEND
= Water Wells
Surface Ownership
Mineral Ownership
Area Permit
Qal = Alluvium
QP = Saugus
Pu = Pico
Pml = Modelo
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
General Geologic Map
DATE
11/07
NewhallLand-101
EXHIBIT
5



Productive Zones

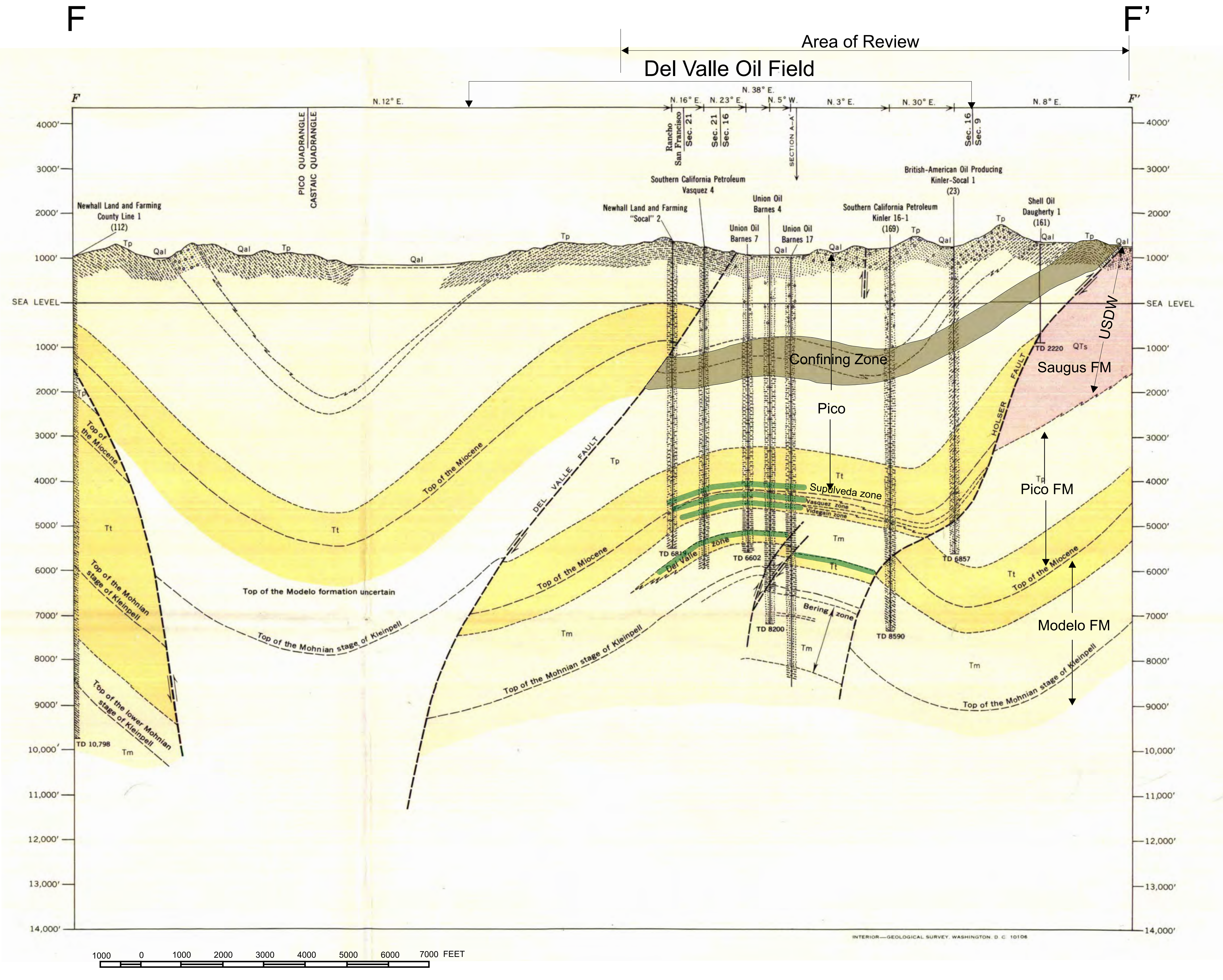
Modified From: USGS Professional Paper 334-H

WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company
USGS Cross Sections

Section A to A'

DATE 1/08	NewhallLand-101	EXHIBIT 6



Productive Zones

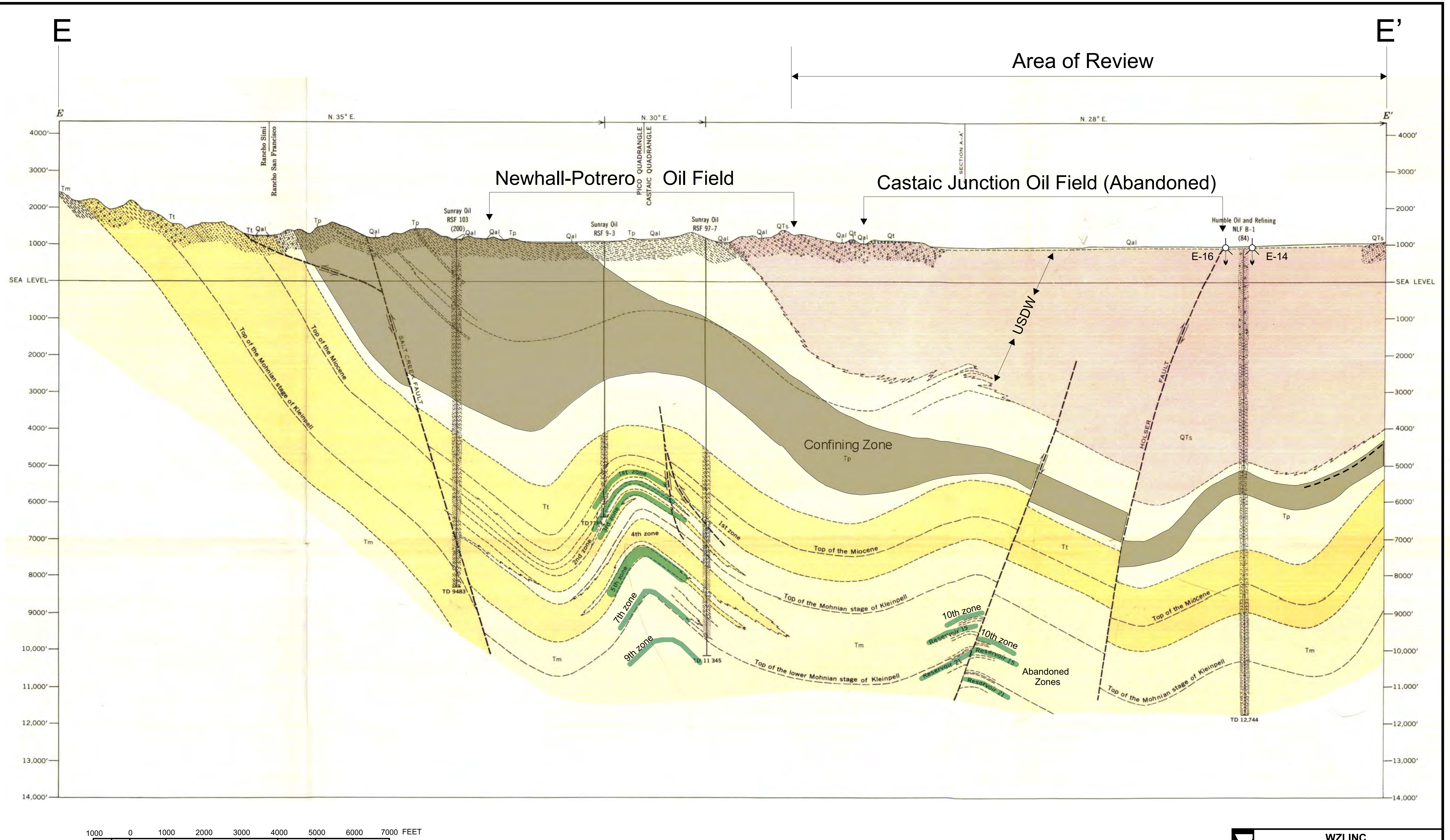
Modified from: U.S.G.S Prof. Paper 334-H

WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company
USGS Cross Sections

Section F to F'

DATE		EXHIBIT
1/08	Newhall Land	7



Productive Zones

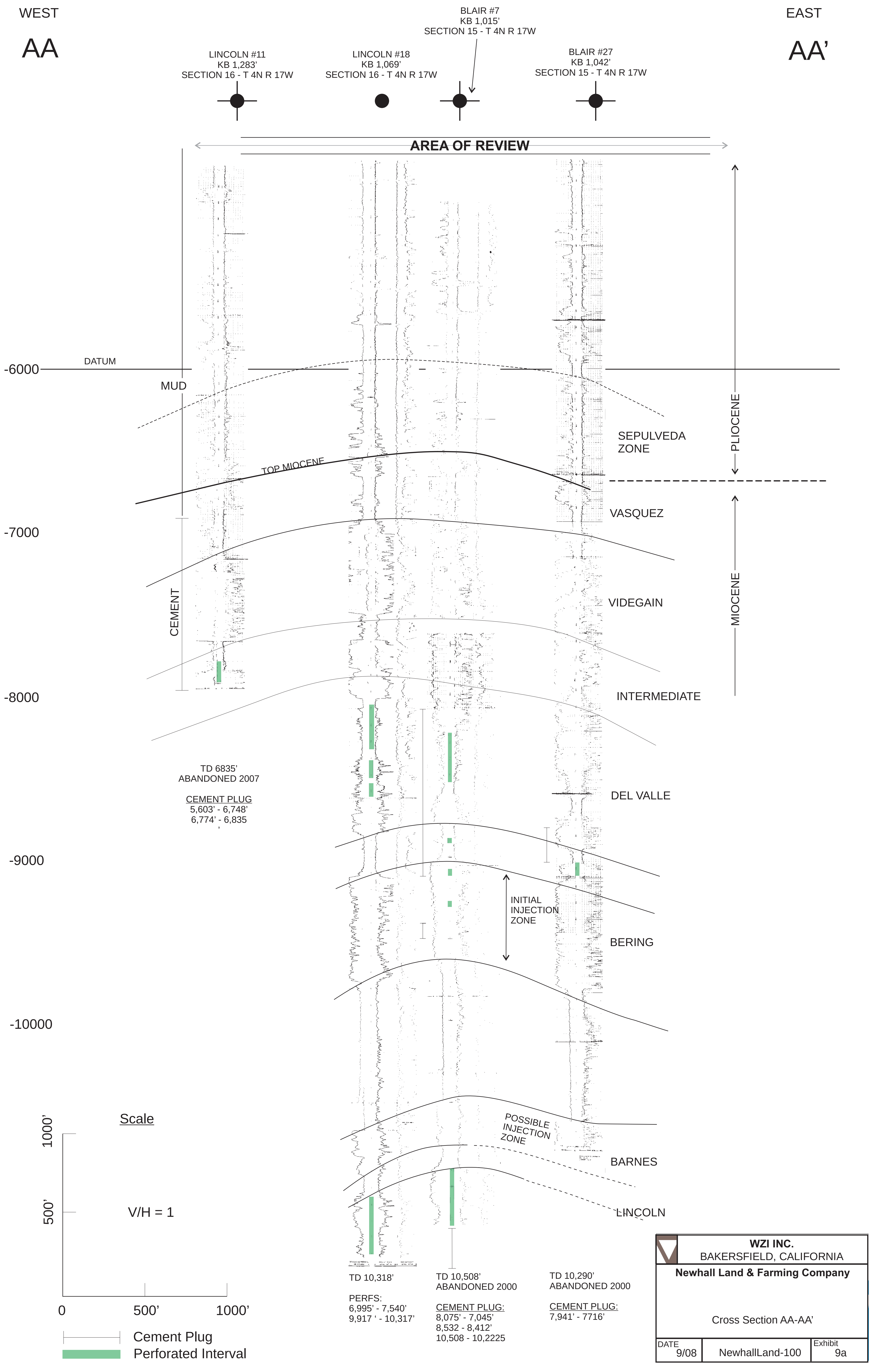
Modified from:
U.S.G.S Professional Paper 334-H

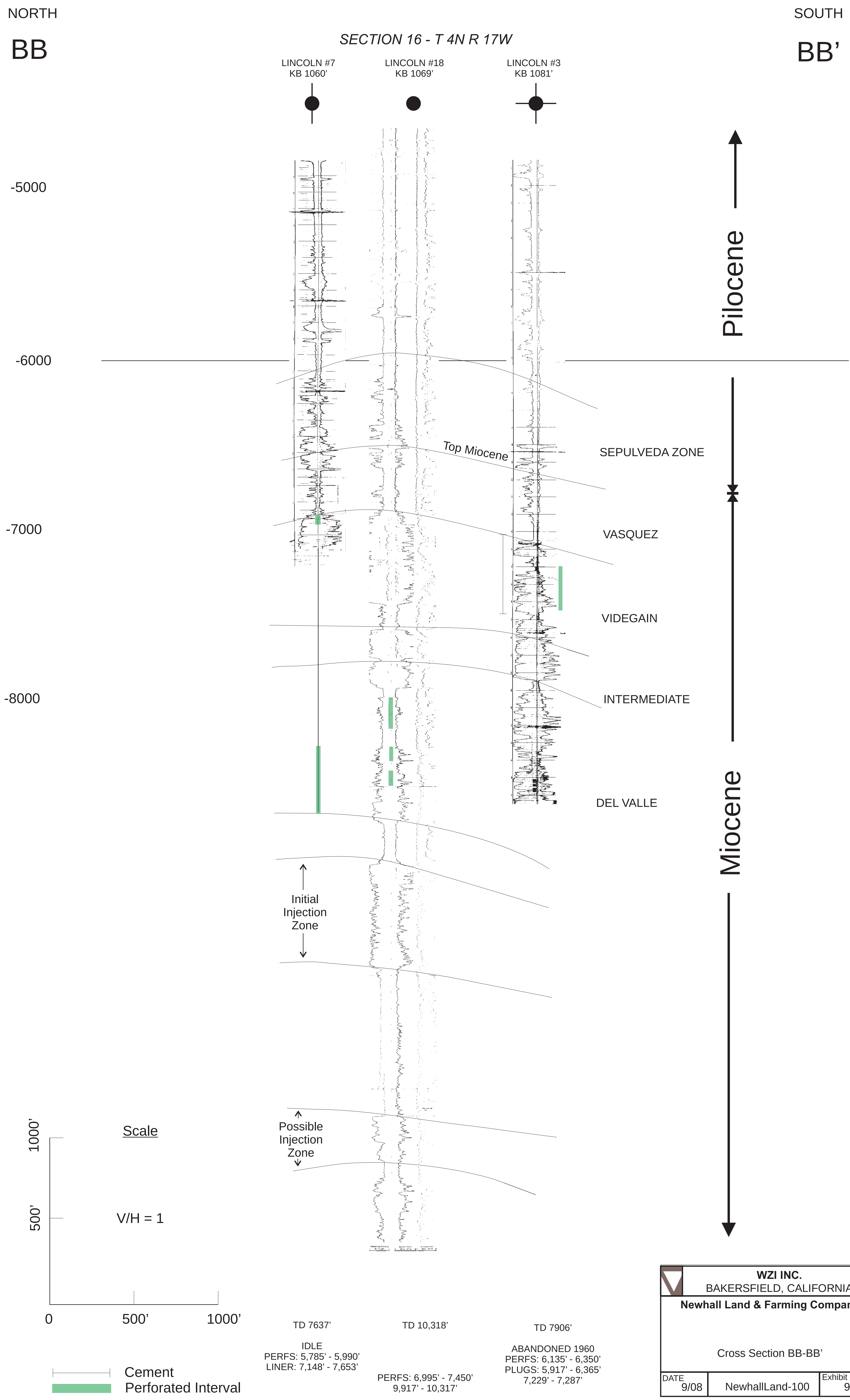
WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company
USGS Cross Sections

Section E to E'

DATE 1/08	Newhall Land	EXHIBIT 8


WEST
AA
EAST
AA'
BLAIR #7
KB 1,015'
SECTION 15 - T 4N R 17W
LINCOLN #11
KB 1,283'
SECTION 16 - T 4N R 17W
LINCOLN #18
KB 1,069'
SECTION 16 - T 4N R 17W
BLAIR #27
KB 1,042'
SECTION 15 - T 4N R 17W
AREA OF REVIEW
-6000
DATUM
MUD
SEPULVEDA
ZONE
PLIOCENE
TOP MIOCENE
VASQUEZ
-7000
CEMENT
VIDEGAIN
MIOCENE
INTERMEDIATE
-8000
TD 6835'
ABANDONED 2007
CEMENT PLUG
5,603' - 6,748'
6,774' - 6,835
DEL VALLE
-9000
INITIAL
INJECTION
ZONE
BERING
-10000
Scale
1000'
500'
V/H = 1
0
500'
1000'
POSSIBLE
INJECTION
ZONE
BARNES
LINCOLN
TD 10,318'
PERFS:
6,995' - 7,540'
9,917 ' - 10,317'
TD 10,508'
ABANDONED 2000
CEMENT PLUG:
8,075' - 7,045'
8,532 - 8,412'
10,508 - 10,2225
TD 10,290'
ABANDONED 2000
CEMENT PLUG:
7,941' - 7716'
Cement Plug
Perforated Interval
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
Cross Section AA-AA'
DATE
9/08
NewhallLand-100
Exhibit
9a

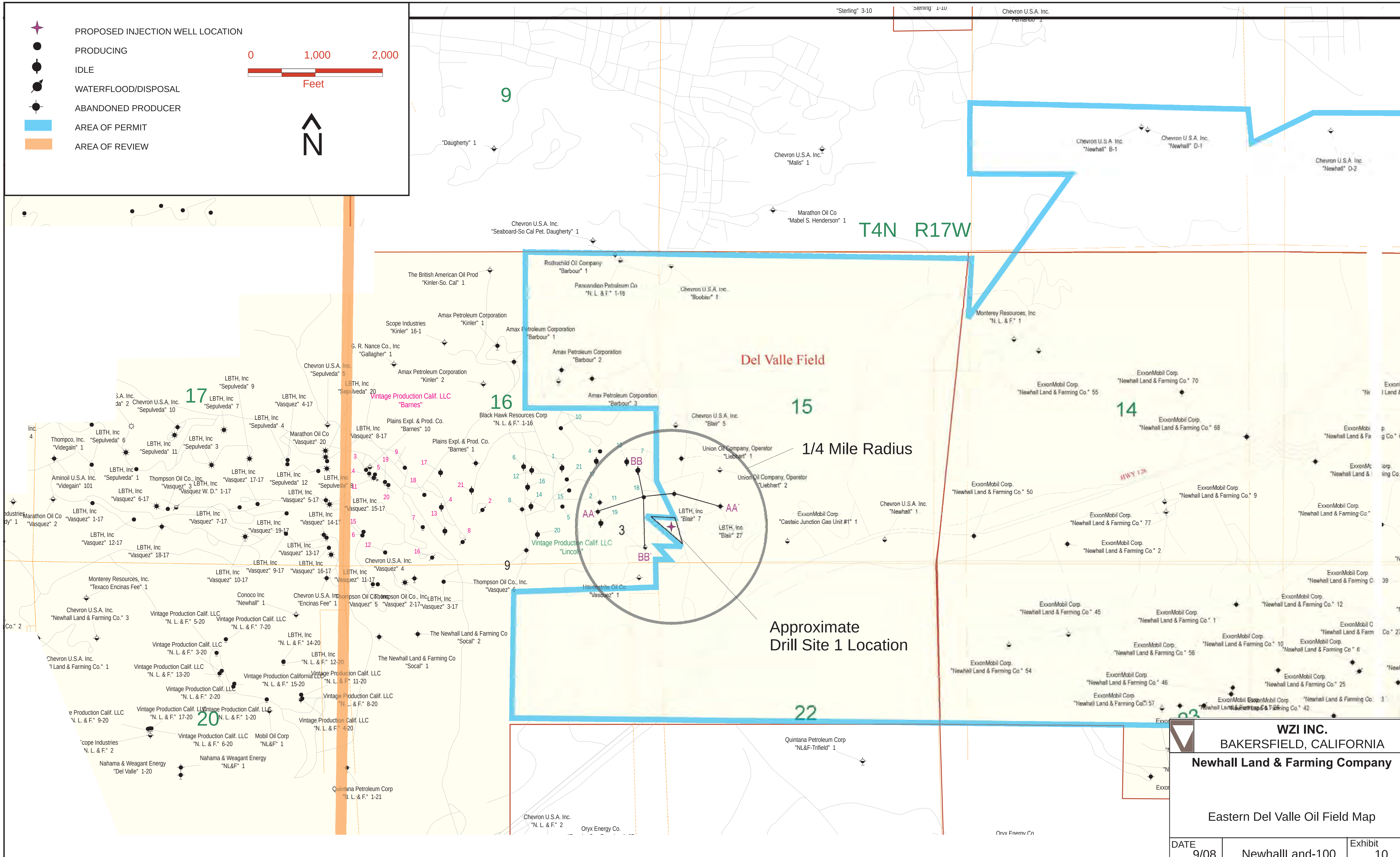


WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company

Cross Section BB-BB'

DATE		Exhibit
9/08	NewhallLand-100	9b



PROPOSED INJECTION WELL LOCATION
PRODUCING
IDLE
WATERFLOOD/DISPOSAL
ABANDONED PRODUCER
AREA OF PERMIT
AREA OF REVIEW
0 1,000 2,000
Feet
N
T4N R17W
Del Valle Field
9
16
17
15
14
20
22
1/4 Mile Radius
Approximate
Drill Site 1 Location
AA
AA`
BB
BB`
3
Vintage Production Calif. LLC
"Barnes"
Vintage Production Calif. LLC
"Lincoln"
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
Eastern Del Valle Oil Field Map
DATE
9/08
NewhallLand-100
Exhibit
10

Exhibit 11

NEWHALL LAND CO.

TYPICAL WATER DISPOSAL WELL
PRESSURE WAVE CALCULATION

	FORMATION PROPERTIES:		
	=====================		
0	Porosity (Fraction)	0.255	
k	Permeability (Darcies)	0.123	
u	Viscosity (cp)	0.9	
c	Compressibility (1/psi)	0.00002	
B	Form. Vol. Ftr.	1	
h	Thickness (ft)	200	
q	I*njection* Rate (B/D)	1,999	58 GPM
		1,989	58 GPM
mpp	Mid-point of Perfs. (ft)	6,250	
d	Depth to Water (ft)	1000	
g	Fluid Gradient (psi/ft)	0.433	
pe	Static Press @ mpp (psi)	2,273	
H	Hydraulic Head @ mpp (ft)	5,250	

FORMULAE: (Craft and Hawkins, p.314)
============

re=[kt/(0.04uc0)]^1/2

pe-p=quBln(re/r)/(7.08kh)

PRESSURE BUILD UP (PSI):
=====================

	Radius from wellbore (ft)				
Time (yrs)	0.25	100	1320	2500	3700
1999 B/D (RATE PER WELL)					
1	103	52	26	19	15
5	103	60	34	27	23
10	103	64	37	31	27
15	103	66	40	33	29
20	103	68	41	34	30
25	103	69	42	36	32
100	103	76	49	43	39
1,989 B/D (RATE PER WELL)					
1	102	52	25	19	15
5	102	60	34	27	23
10	102	64	37	31	27
15	102	66	39	33	29
20	102	67	41	34	30
25	102	68	42	35	31
100	102	76	49	42	38

Injection Pressure Calculation
Ramp-up Influent to 6.8 MGD

Year	Cumulative Annual Influent to WRP MGD	Adjusted Cumulative Annual Wastewater Flow (12.5% increase) MGD	Cumulative Wastewater Injectate MGD (assumes 7.5% of annual wastewater flow greater than 1 MGD inflow)	Bbls / Day	Cum K Bbls	Pressure Increase (psi)	Adjusted Surface Press.	Press @ 6,500 Ft.	Press Grad (psi/ft)	Inj (KGD)	Number of Injection Wells
2009	0	0.00	0.0000	0	0	0	0	2,815	0.433	0	0
2010	0.104	0.12	0.0720	1,714	261	1	118	2,816	0.433215	72	1
2011	0.312	0.36	0.0720	1,714	521	3	123	2,817	0.43343	72	1
2012	0.52	0.60	0.0720	1,714	782	4	126	2,819	0.433645	72	1
2013	0.728	0.83	0.0720	1,714	1,042	6	133	2,820	0.43386	72	1
2014	1.079	1.24	0.0927	2,206	1,378	7	137	2,822	0.434137	93	1
2015	2.08	2.38	0.1786	4,253	2,024	11	151	2,825	0.43467	179	2
2016	2.951	3.38	0.2534	6,034	2,941	16	166	2,830	0.435427	253	3
2017	3.939	4.51	0.3383	8,054	4,165	22	182	2,837	0.436437	338	4
2018	4.927	5.64	0.4231	10,074	5,697	31	201	2,845	0.4377	423	5
2019	5.915	6.77	0.5080	12,094	7,535	40	210	2,855	0.439217	508	6
2020	5.915	6.77	0.5080	12,094	9,373	50	220	2,865	0.440733	508	6
2021	5.915	6.77	0.5080	12,094	11,211	60	230	2,875	0.44225	508	6
2022	5.915	6.77	0.5080	12,094	13,050	70	240	2,884	0.443767	508	6
2023	5.915	6.77	0.5080	12,094	14,888	80	250	2,894	0.445284	508	6
2024	5.915	6.77	0.5080	12,094	16,726	90	260	2,904	0.4468	508	6
2025	5.915	6.77	0.5080	12,094	18,565	100	270	2,914	0.448317	508	6
2026	5.915	6.77	0.5080	12,094	20,403	109	279	2,924	0.449834	508	6
2027	5.915	6.77	0.5080	12,094	22,241	119	289	2,934	0.45135	508	6
2028	5.915	6.77	0.5080	12,094	24,080	129	299	2,944	0.452867	508	6
2029	5.915	6.77	0.5080	12,094	25,918	139	309	2,953	0.454384	508	6
2030	5.915	6.77	0.5080	12,094	27,756	149	319	2,963	0.4559	508	6
2031	5.915	6.77	0.5080	12,094	29,594	159	329	2,973	0.457417	508	6
2032	5.915	6.77	0.5080	12,094	31,433	169	339	2,983	0.458934	508	6
2033	5.915	6.77	0.5080	12,094	33,271	178	348	2,993	0.46045	508	6
2034	5.915	6.77	0.5080	12,094	35,109	188	358	3,003	0.461967	508	6
2035	5.915	6.77	0.5080	12,094	36,948	198	368	3,013	0.463484	508	6
2036	5.915	6.77	0.5080	12,094	38,786	208	378	3,023	0.465001	508	6
2037	5.915	6.77	0.5080	12,094	40,624	218	388	3,032	0.466517	508	6
2038	5.915	6.77	0.5080	12,094	42,462	228	398	3,042	0.468034	508	6
2039	5.915	6.77	0.5080	12,094	44,301	238	408	3,052	0.469551	508	6
2040	5.915	6.77	0.5080	12,094	46,139	247	417	3,062	0.471067	508	6
2041	5.915	6.77	0.5080	12,094	47,977	257	427	3,072	0.472584	508	6
2042	5.915	6.77	0.5080	12,094	49,816	267	437	3,082	0.474101	508	6
2043	5.915	6.77	0.5080	12,094	51,654	277	447	3,092	0.475617	508	6
2044	5.915	6.77	0.5080	12,094	53,492	287	457	3,101	0.477134	508	6
2045	5.915	6.77	0.5080	12,094	55,330	297	467	3,111	0.478651	508	6
2046	5.915	6.77	0.5080	12,094	57,169	307	477	3,121	0.480168	508	6
2047	5.915	6.77	0.5080	12,094	59,007	316	486	3,131	0.481684	508	6
2048	5.915	6.77	0.5080	12,094	60,845	326	496	3,141	0.483201	508	6
2049	5.915	6.77	0.5080	12,094	62,684	336	506	3,151	0.484718	508	6
2050	5.915	6.77	0.5080	12,094	64,522	346	516	3,161	0.486234	508	6
2051	5.915	6.77	0.5080	12,094	66,360	356	526	3,170	0.487751	508	6
2052	5.915	6.77	0.5080	12,094	68,198	366	536	3,180	0.489268	508	6
2053	5.915	6.77	0.5080	12,094	70,037	376	546	3,190	0.490784	508	6
2054	5.915	6.77	0.5080	12,094	71,875	385	555	3,200	0.492301	508	6
2055	5.915	6.77	0.5080	12,094	73,713	395	565	3,210	0.493818	508	6
2056	5.915	6.77	0.5080	12,094	75,552	405	575	3,220	0.495334	508	6
2057	5.915	6.77	0.5080	12,094	77,390	415	585	3,230	0.496851	508	6
2058	5.915	6.77	0.5080	12,094	79,228	425	595	3,239	0.498368	508	6
2059	5.915	6.77	0.5080	12,094	81,066	435	605	3,249	0.499885	508	6
2060	5.915	6.77	0.5080	12,094	82,905	445	615	3,259	0.501401	508	6
2061	5.915	6.77	0.5080	12,094	84,743	454	624	3,269	0.502918	508	6
2062	5.915	6.77	0.5080	12,094	86,581	464	634	3,279	0.504435	508	6
2063	5.915	6.77	0.5080	12,094	88,420	474	644	3,289	0.505951	508	6
2064	5.915	6.77	0.5080	12,094	90,258	484	654	3,299	0.507468	508	6
2065	5.915	6.77	0.5080	12,094	92,096	494	664	3,308	0.508985	508	6
2066	5.915	6.77	0.5080	12,094	93,934	504	674	3,318	0.510501	508	6
2067	5.915	6.77	0.5080	12,094	95,773	514	684	3,328	0.512018	508	6
2068	5.915	6.77	0.5080	12,094	97,611	523	693	3,338	0.513535	508	6
2069	5.915	6.77	0.5080	12,094	99,449	533	703	3,348	0.515052	508	6
2070	5.915	6.77	0.5080	12,094	101,288	543	713	3,358	0.516568	508	6
2071	5.915	6.77	0.5080	12,094	103,126	553	723	3,368	0.518085	508	6

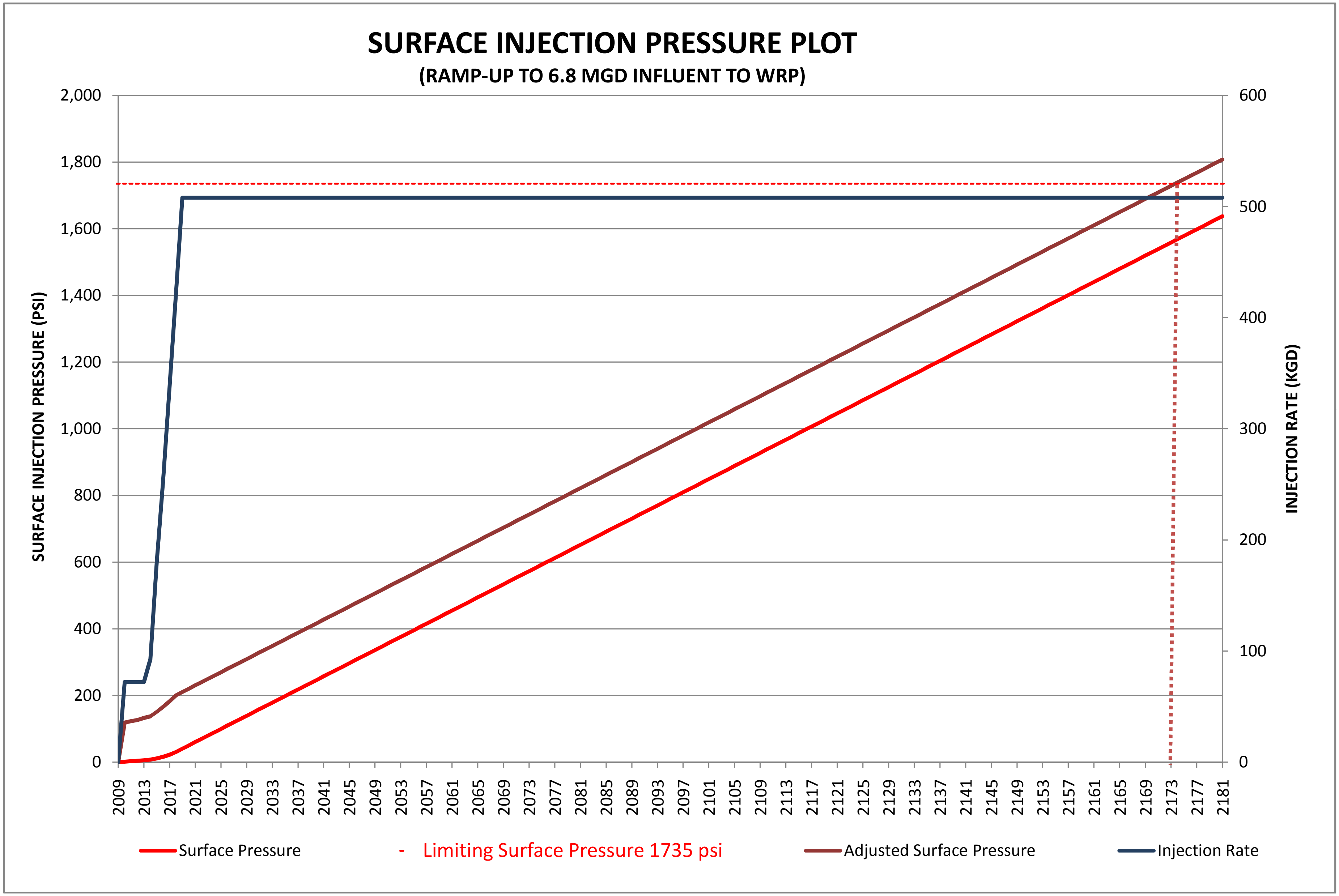

SURFACE INJECTION PRESSURE PLOT
(RAMP-UP TO 6.8 MGD INFLUENT TO WRP)
SURFACE INJECTION PRESSURE (PSI)
INJECTION RATE (KGD)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
600
500
400
300
200
100
0
2009
2013
2017
2021
2025
2029
2033
2037
2041
2045
2049
2053
2057
2061
2065
2069
2073
2077
2081
2085
2089
2093
2097
2101
2105
2109
2113
2117
2121
2125
2129
2133
2137
2141
2145
2149
2153
2157
2161
2165
2169
2173
2177
2181
Surface Pressure
Limiting Surface Pressure 1735 psi
Adjusted Surface Pressure
Injection Rate

EXHIBIT 13

Exhibit 14

Volumetric Invasion Calculation

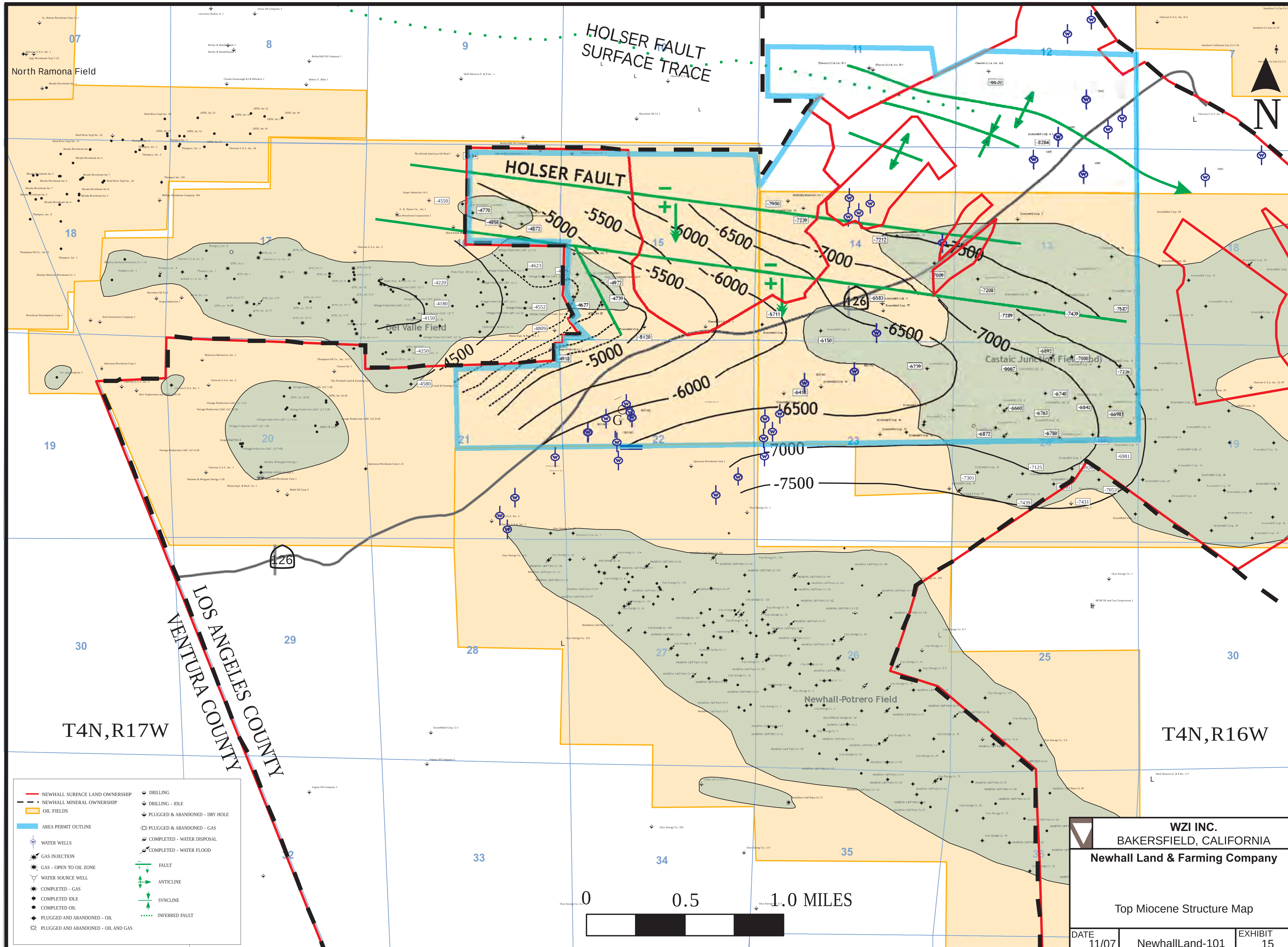
Undispersed Radius
r= (((365 x q x t)/(7758 x n x Se x h x pi)) x 43560)^0.5

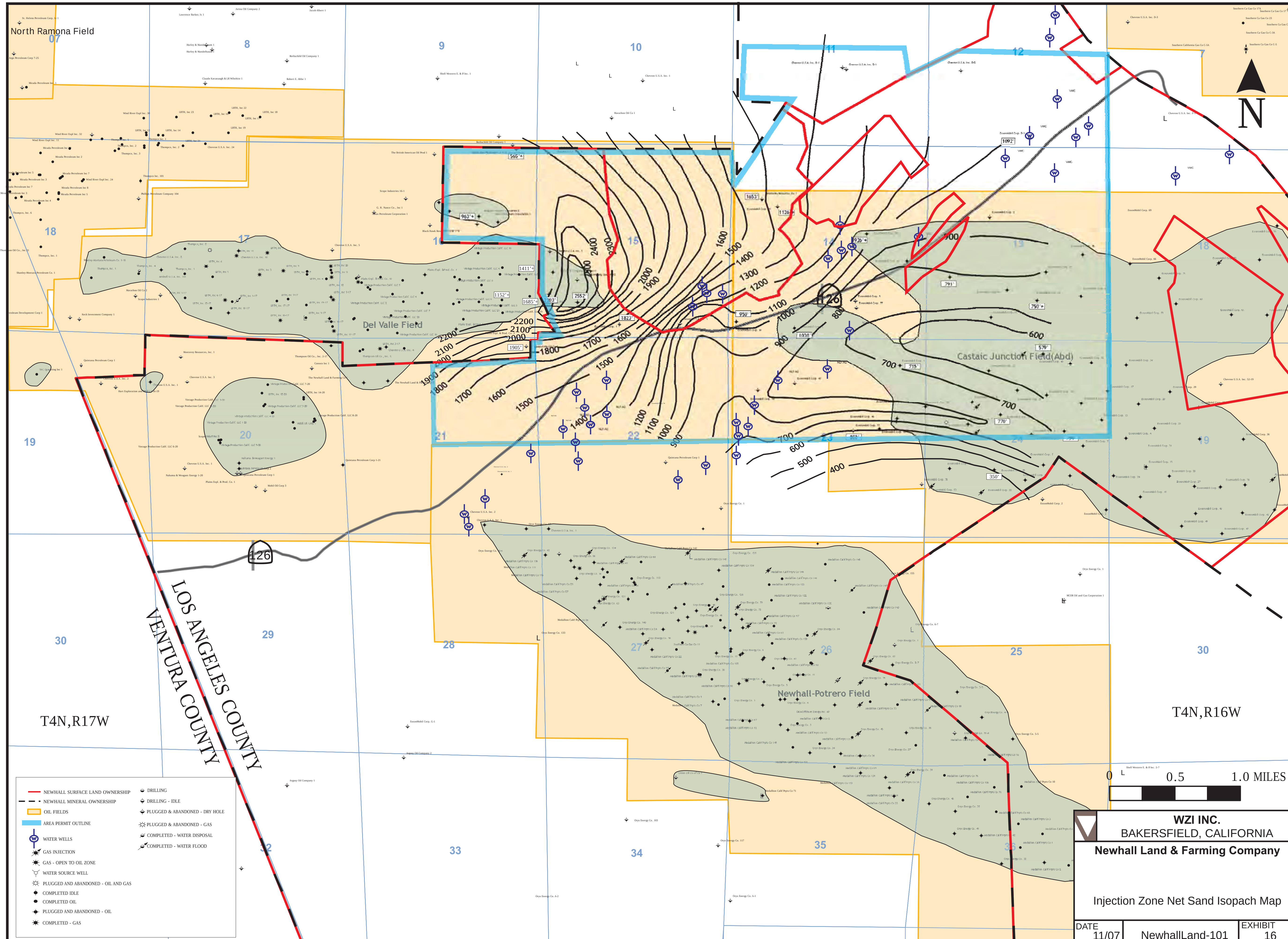
q	Rate	2000	b/d
t	Time	1	years
		10	
		20	
		50	
		100	
n	porosity	25.50%	
Se	Sweep Efficiency	100%	
h	Reservoir Thickness	2200	ft
		1000	ft
D	Dispersion Coefficient	3	ft

Dispersed Radius
r'= r + 2.3(D*r)^0.5

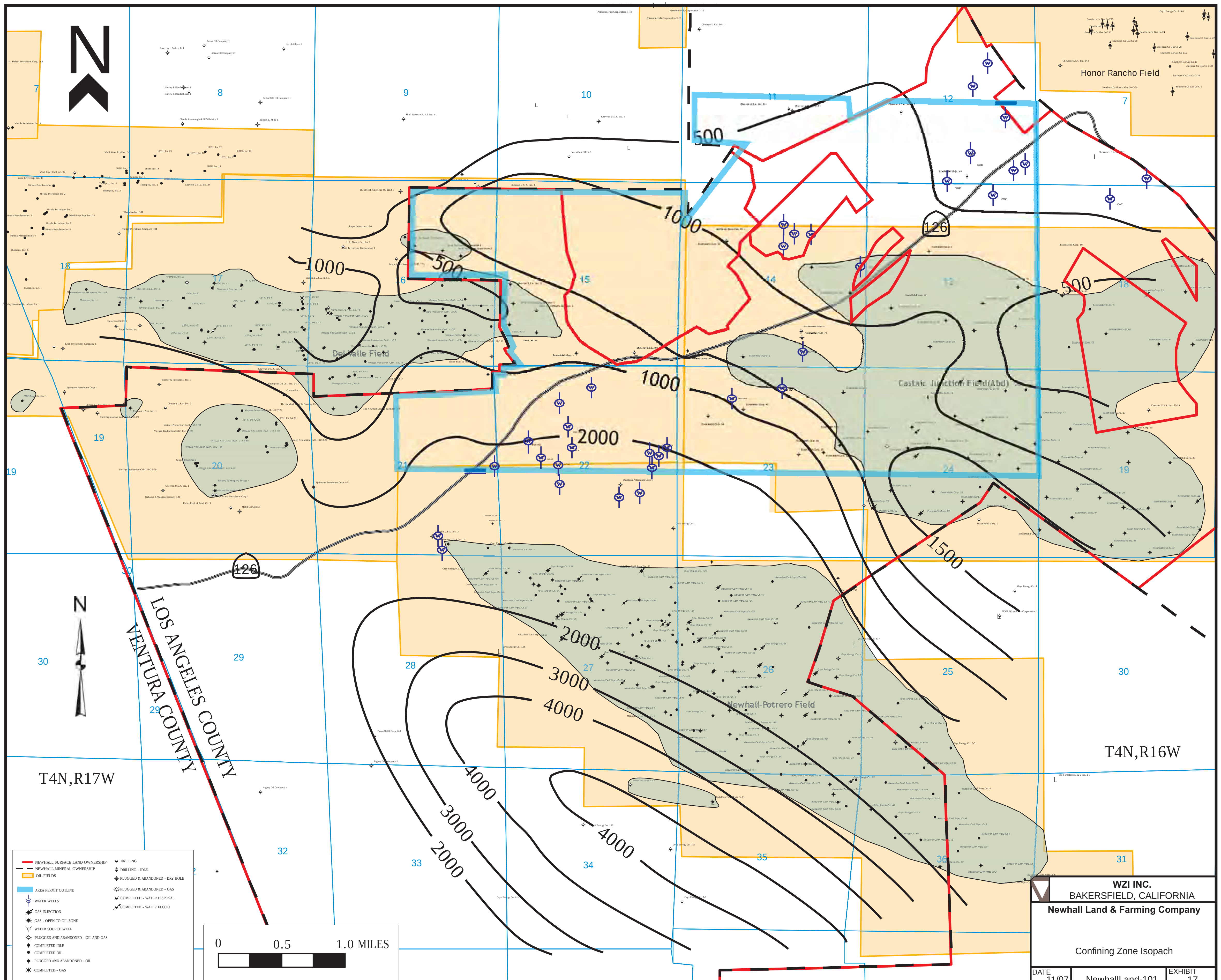
2200 Ft reservoir thickness case		
Years	Undispersed Radius (ft)	Dispersed Radius(ft)
1	48	76
10	153	202
20	216	274
50	341	415
100	482	570

1000 ft reseroir case		
Years	Undispersed Radius (ft)	Dispersed Radius (ft)
1	72	105
10	226	286
20	320	391
50	506	595
100	715	822


HOLSER FAULT SURFACE TRACE
HOLSER FAULT
North Ramona Field
Del Valle Field
Castaic Junction Field (abd)
Newhall-Potrero Field
LOS ANGELES COUNTY
VENTURA COUNTY
T4N,R17W
T4N,R16W
N
-5000
-5500
-6000
-6500
-7000
-7500
-4500
0
0.5
1.0 MILES
NEWHALL SURFACE LAND OWNERSHIP
NEWHALL MINERAL OWNERSHIP
OIL FIELDS
AREA PERMIT OUTLINE
WATER WELLS
GAS INJECTION
GAS - OPEN TO OIL ZONE
WATER SOURCE WELL
COMPLETED - GAS
COMPLETED IDLE
COMPLETED OIL
PLUGGED AND ABANDONED - OIL
PLUGGED AND ABANDONED - OIL AND GAS
DRILLING
DRILLING - IDLE
PLUGGED & ABANDONED - DRY HOLE
PLUGGED & ABANDONED - GAS
COMPLETED - WATER DISPOSAL
COMPLETED - WATER FLOOD
FAULT
ANTICLINE
SYNCLINE
INFERRED FAULT
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
Top Miocene Structure Map
DATE 11/07
NewhallLand-101
EXHIBIT 15



North Ramona Field
Del Valle Field
Castaic Junction Field(Abd)
Newhall-Potrero Field
LOS ANGELES COUNTY
VENTURA COUNTY
T4N,R17W
T4N,R16W
N
126
0 0.5 1.0 MILES
NEWHALL SURFACE LAND OWNERSHIP
NEWHALL MINERAL OWNERSHIP
OIL FIELDS
AREA PERMIT OUTLINE
WATER WELLS
GAS INJECTION
GAS - OPEN TO OIL ZONE
WATER SOURCE WELL
PLUGGED AND ABANDONED - OIL AND GAS
COMPLETED IDLE
COMPLETED OIL
PLUGGED AND ABANDONED - OIL
COMPLETED - GAS
DRILLING
DRILLING - IDLE
PLUGGED & ABANDONED - DRY HOLE
PLUGGED & ABANDONED - GAS
COMPLETED - WATER DISPOSAL
COMPLETED - WATER FLOOD
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
Injection Zone Net Sand Isopach Map
DATE
11/07
NewhallLand-101
EXHIBIT
16



Honor Rancho Field
Del Valle Field
Castaic Junction Field(Abd)
Newhall-Potrero Field
LOS ANGELES COUNTY
VENTURA COUNTY
T4N,R17W
T4N,R16W
126
500
1000
1500
2000
3000
4000
NEWHALL SURFACE LAND OWNERSHIP
NEWHALL MINERAL OWNERSHIP
OIL FIELDS
AREA PERMIT OUTLINE
WATER WELLS
GAS INJECTION
GAS - OPEN TO OIL ZONE
WATER SOURCE WELL
PLUGGED AND ABANDONED - OIL AND GAS
COMPLETED IDLE
COMPLETED OIL
PLUGGED AND ABANDONED - OIL
COMPLETED - GAS
DRILLING
DRILLING - IDLE
PLUGGED & ABANDONED - DRY HOLE
PLUGGED & ABANDONED - GAS
COMPLETED - WATER DISPOSAL
COMPLETED - WATER FLOOD
0 0.5 1.0 MILES
WZI INC.
BAKERSFIELD, CALIFORNIA
Newhall Land & Farming Company
Confining Zone Isopach
DATE 11/07
NewhallLand-101
EXHIBIT 17

Surface Ownership

Mineral Ownership

SCALE IN FEET

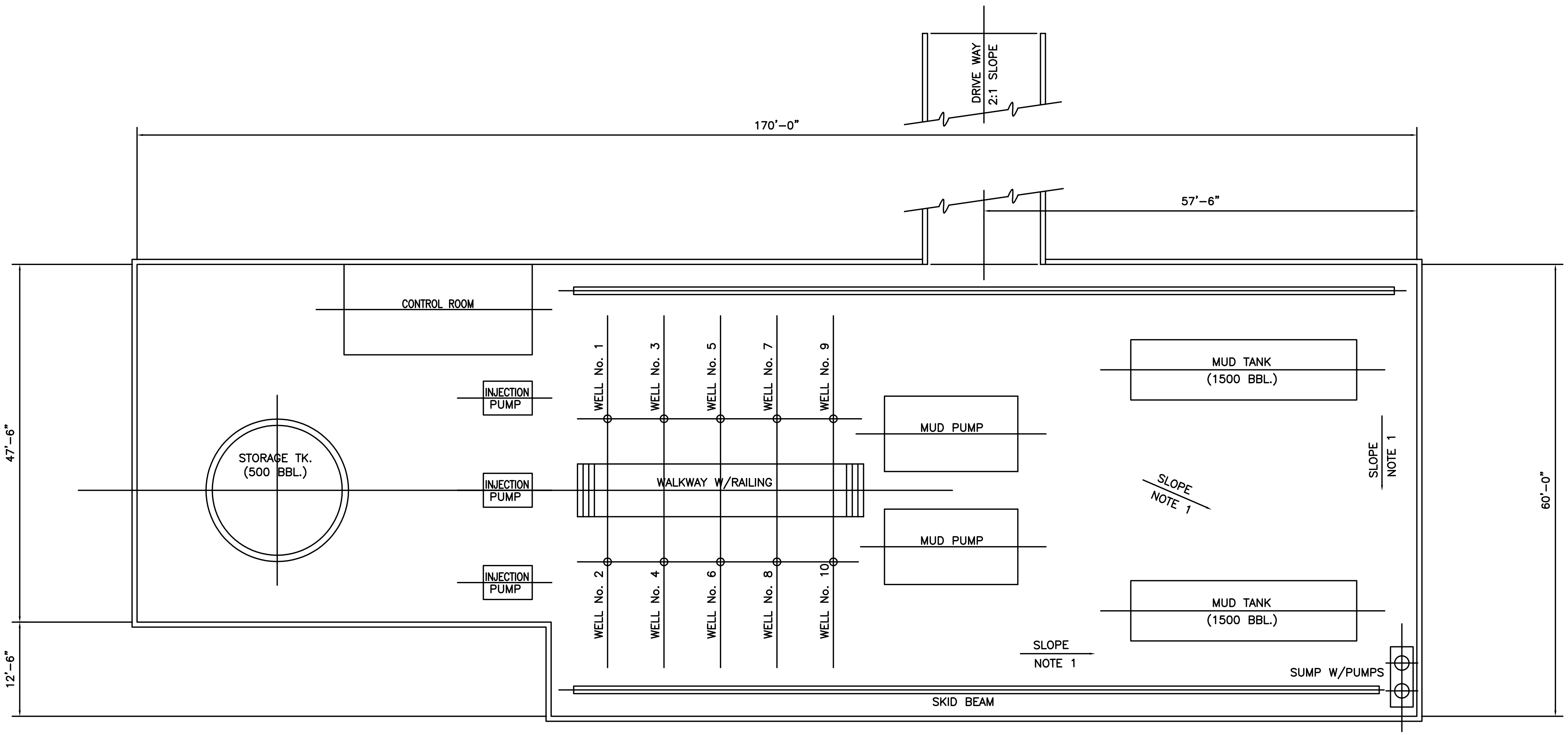
0 672 1,344

WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company

Potential Drill Site
Location Map

DATE		EXHIBIT
02/08	NewhallLand-101	18



PLAN
SITE LAYOUT

NOTE:

1. FLOOR SLIGHTLY SLOPED TOWARDS SUMP WITH PUMPS AS INDICATED TO DRAWING.

2' 0' 2' 4' 8' 12' 16'
HORIZONTAL SCALE: 1/8"=1'-0"

Number	Revision	Date	By
A	INITIAL ISSUE – FOR REVIEW	4-24-08	ML

RAMSGATE ENGINEERING, INC.

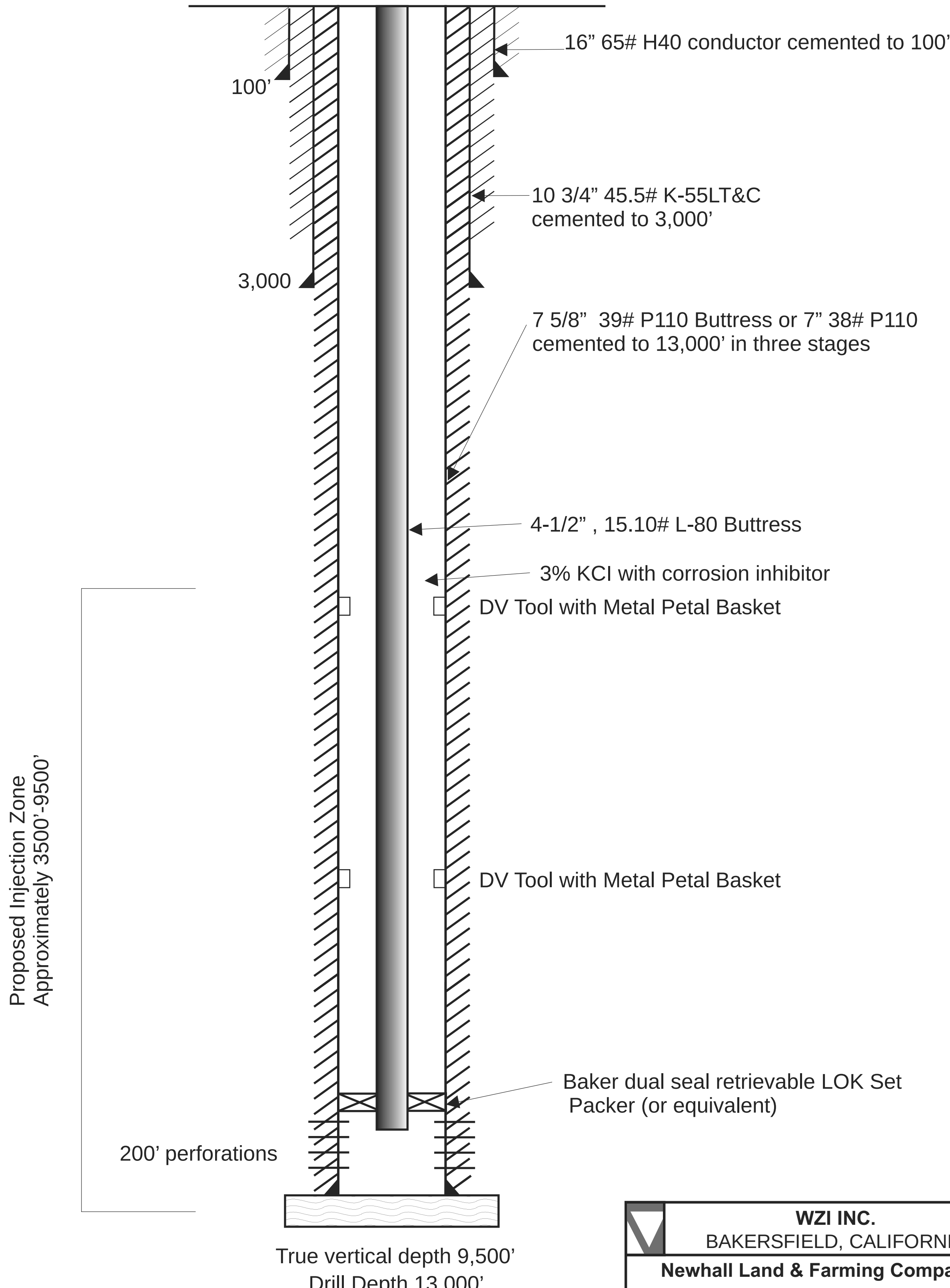
Position	Name	Date
Designed By :	M. LAYPORT	4-23-08
Drawn By :	M. LAYPORT	4-23-08
Checked By :	–	–
Approved By :	–	–

WZI INC.
BAKERSFIELD, CALIFORNIA

WASTEWATER INJECTION PROPOSAL

PRELIMINARY DRILL SITE – PLOT PLAN

Date:		EXHIBIT	Scale :	Rev. :
1/08	NewhallLand – 101	19	1/8" = 1'-0"	A



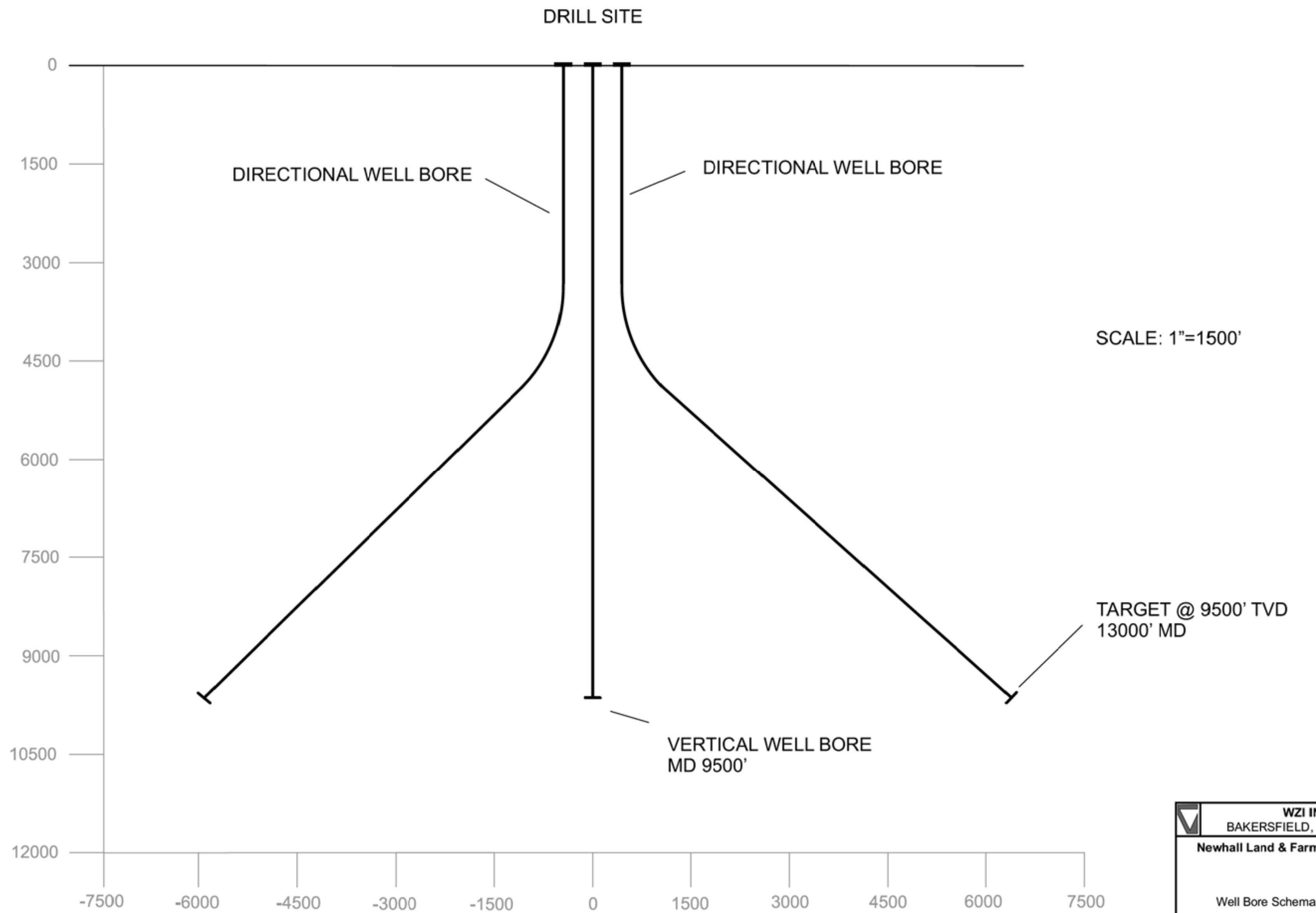
Note: All depths and descriptions are approximate.

WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company

Injection Well Schematic

DATE		EXHIBIT
11/07	NewhallLand-101	20

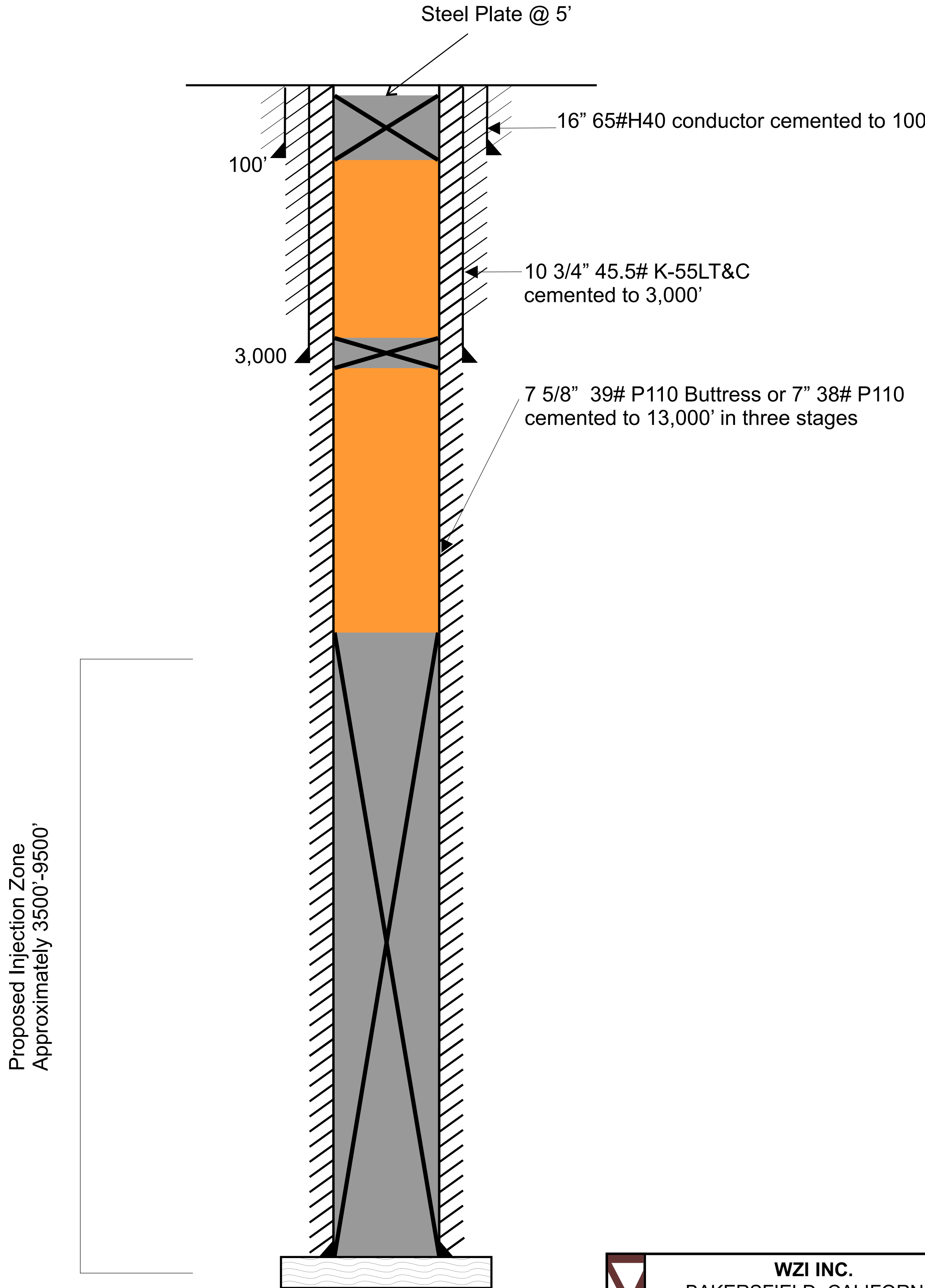


WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company

Well Bore Schematic Diagram

DATE		EXHIBIT
11/08	NewhallLand-101	21



Cement Plug

Heavy Mud

Note: All depths and descriptions are approximate.

WZI INC.
BAKERSFIELD, CALIFORNIA

Newhall Land & Farming Company

Proposed Injection Well
Abandonment Schematic

DATE		EXHIBIT
11/07	NewhallLand-101	22

APPENDIX 1

APPENDIX 2

APPENDIX 3