ASSESSMENT OF NITROGEN LOADING OF GROUNDWATER
SHADOW RUN RANCH

TM 5223RPL3, P00-030
ER No. 00-02-035

Prepared By:

Wiedlin & Associates, Inc.
Applications in Groundwater Science

July 6, 2012

For:

Shadow Run Ranch, LLC
P.O. Box 1249
Pauma Valley, CA 92061

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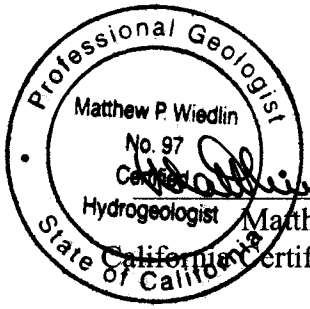

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For:

Shadow Run Ranch, LLC
P.O. Box 1249
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EXECUTIVE SUMMARY

A 44 home residential development is proposed for Shadow Run Ranch in Pauma Valley. The property is currently the site of a 200 acre citrus and avocado grove. Under the proposed development the 44 homes will rely on individual septic systems and potable water from Yuima Municipal Water District. Additionally, grove acreage will be reduced to 144 acres under the proposed project.

Five water wells are located down gradient and across Highway 76 within the San Luis Rey River. These wells are owned by the applicant, but are not within the project site. Three of the wells are operated by Yuima Municipal Water District (YMWD). These wells are monitored for water quality by YMWD on a regular basis. Water quality monitoring information indicates that nitrate concentrations in groundwater samples collected from these wells is elevated and on rare occasions have exceeded the Maximum Contaminant Level (MCL) for nitrate (as nitrogen) of 10 milligrams per liter (mg/l). In May 2012, groundwater samples were collected from the four on-site irrigation wells, as well as one off-site irrigation well. Samples were analyzed for nitrate, as nitrogen. Nitrate concentrations ranged from below the reporting limit of 0.5 mg/l at the well located furthest up gradient at the site, to 8.9 mg/l at the well located furthest down gradient.

Because the proposed project will introduce a new source of nitrogen that will migrate to the water table, the San Diego County Environmental Health Department (DEH) requested an analysis of nitrogen loading. This analysis addresses both the addition of nitrogen to the site from the proposed septic systems, but also the reduction of nitrogen caused by the decrease in fertilizer application that will occur as a result of the planned reduction in grove acreage.

The study also characterizes the occurrence of groundwater at the site. Groundwater occurs beneath the site in saturated alluvial fan deposits. Alluvial fan deposits are generally highly permeable due to their coarse sediment texture. On-site well yields on the order of hundreds of gallons per minute indicate that the alluvial fan deposits at the site are permeable with respect to water. The alluvial fan deposits, along with the high annual rainfall rates that occur in the mountains upgradient and beyond the project boundaries, result in groundwater inflow to the property that likely is well in excess of groundwater recharge that occurs from direct rainfall infiltration on-site.

The change in land use is expected to result in about an 11 percent decrease in nitrogen loading under the new project, compared to current conditions. Hence, on-site nitrate concentrations in groundwater, measured as high as approximately 9 mg/l may be expected to eventually decline by about 1 mg/l. Because nitrate measurements in groundwater samples collected from the YMWD wells on a quarterly basis exhibit variations in excess of 1 mg/l it is not likely that the decline in nitrate concentrations will be readily evident. However, the analysis indicates that an increase in nitrate concentrations in groundwater at the site or at the YMWD wells is not expected as a result of the proposed project.

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1.0 INTRODUCTION

The project, known as "Shadow Run Ranch, LLC," (hereinafter "project") consists of 44 residential lots and three open space lots that are proposed to accommodate biological, agricultural, and recreational uses. The project site encompasses 248.26 acres (TRS, 2012) and is located in the unincorporated community of Pala/Pauma in north central San Diego County (Figure 1). Annexation to the local service district is also proposed for potable water and fire services and sewer service will be provided via individual septic systems on each lot.

This report documents an assessment of the change in nitrogen loading of groundwater from the existing citrus and avocado grove land use to the proposed land use that will not only include the new residences, but will also result in a reduction in grove acreage. Hence an increase in nitrogen loading will occur from the additional septic systems that will be introduced with the project and a decrease in nitrogen loading will also occur from the removal of grove acreage that is also associated with the new project.

2.0 SETTING

The following characterizes the topography, watershed boundaries, rainfall distribution, and general geologic setting near the site.

2.1 TOPOGRAPHY AND WATERSHED BOUNDARIES

As described by URS Consultants in their Updated Geologic Hazards Study (URS, 2009), the site is on an alluvial fan surface derived from the erosion of the nearby steep granitic mountain slopes of Agua Tibia Mountain, Crosley Saddle, and Eagle Crag to the north and northeast (Figure 2).

Land surface elevation at the site ranges from approximately 750 feet mean sea level (ft msl) to 1,620 ft msl. Land surface elevations within the watershed surrounding the site range from approximately 670 ft msl at the San Luis Rey River to nearly 4,780 feet at Agua Tibia Mountain (Figure 2). The local watershed encompassing the site covers approximately 6,700 acres (over 10 square miles).

2.2 RAINFALL DISTRIBUTION

Due to the steep mountain slopes and relatively high land surface elevations north of the site, the orographic effect of these slopes forces moist coastal breezes upward. As the air rises it is cooled. This process results in increasingly higher annual rainfall within the watershed as land surface elevation increases. An excerpt from the County of San Diego 30-Year Average Annual Precipitation Map overlaid on the USGS topographic map shows that average annual rainfall ranged from a low of 18 to 21 inches at the site to 33 to 35 inches at the upper reaches of the local watershed.

2.3 GEOLOGIC SETTING

As described by URS Consultants, the oldest rocks outcropping in the site vicinity are Cretaceous age intrusive igneous rock of Agua Tibia Mountain and older pre-Cretaceous metamorphic and metasedimentary rocks in the north-northeast portion of the site (URS, 2009). Rock units mapped in the area include the Woodson Mountain Granodiorite and the San Marcos Gabbro. The pre-Cretaceous metamorphic rocks are not named, according Kennedy, 2000 (URS, 2009). Erosion of the high relief Agua Tibia Mountain has generated broad, coalescing alluvial fans along the margins of the San Luis Rey River Valley. The site is underlain by alluvial fan deposits that include cobble to large boulder clasts of predominantly granitic rock. The alluvial fan deposits range in age from Pleistocene to Holocene age. Alluvium is present in the San Luis Rey River Valley and in the lesser on-site tributary drainages like Fry Creek (URS, 2009). Though alluvium in the lesser tributary drainages would not be expected to be saturated with groundwater as depth to groundwater is most likely greater than the relatively shallow alluvial deposits.

For reference, URS has prepared a detailed geologic map of the site and 7.5-minute quadrangle geologic maps, have been jointly published by the USGS and the California Geological Survey. The 7.5 minute quadrangle maps, specifically relevant to the project vicinity are Pala, Vail Lake, Boucher Hill, and Pechanga. These geologic maps can be obtained in PDF format on line at http://www.conservation.ca.gov/cgs/rghm/rgm/Pages/southern_region_quads.aspx.

The Elsinore Fault zone occurs within Pauma Valley and within the upper portion of the project site (URS, 2009). The fault zone is likely responsible for pronounced physiographic highs such as Agua Tibia Mountain and Palomar Mountain and hence is a causal factor in the development of the alluvial fans at the site.

3.0 HYDROGEOLOGY

Information regarding on-site water wells and water wells in the immediate vicinity of the project that are owned by the project applicant is summarized. A discussion of groundwater occurrence is presented including a qualitative discussion of local groundwater recharge processes, presentation of groundwater level and groundwater flow direction information, and a discussion of the relative contribution of groundwater inflow from the local watershed to groundwater flow along the San Luis Rey River. Lastly, nitrate concentrations in groundwater are presented.

3.1 WATER WELL INFORMATION

Four agricultural irrigation wells, PV-6 through PV-9 occur at the site (Figure 2). These wells will continue to provide irrigation water only for the project. Well PV-10, an irrigation well, is located just east of the project site and is owned by the Schoepe family. Five production wells, PV-1 through PV-5, are located along the San Luis River channel just south of the site (Figure 2). These wells are also owned by Schoepe family. Well PV-1 is inactive. Wells PV-2 through PV-4 are managed and pumped by the Yuima Municipal Water District (YMWD). Well PV-5 is

monitored by the YMWD but apparently has not been actively pumped for at least several years. The water wells were installed between 1972 and approximately 1992 (Table 1).
All ten wells are completed in the alluvial fan deposits and in some cases continue into the underlying fractured granitic rock (Table 1, Appendix A). Total depth of the wells ranged from 175 feet at PV-1 to approximately 1,000 feet at Wells 5 and 9. In some cases the quality of the driller's logs are questionable, in other cases the wells have gamma ray logs to support the driller's log.

Extended pump tests conducted by pump service contractors indicate that production rates at all the wells range between 200 gpm to 450 gpm. Specific capacity values range between 1.8 gpm per foot of drawdown to 6.0 gpm per foot of drawdown (Table 1).

3.2 GROUNDWATER OCCURRENCE

Unpumped groundwater depths measured in February 2012 for the YMWD wells and in April 2012 for the on-site wells ranged between 96 feet and 409 feet (Table 2). The 409 foot groundwater level was measured at well PV-7. It is uncertain if this anomalously deep measurement is accurate, a result of incomplete pumping recovery, or related to faulting along the Elsinore Fault Zone. The water level measurement at well PV-7 results in a localized deflection in the direction of groundwater flow (Figure 4) toward the southwest. However, this well is completed several hundred feet into bedrock while its neighboring wells are completed either above bedrock to 80 feet into bedrock according to hand drawn, draft logs prepared by an unknown author (Appendix A). Saturated alluvial sediment thicknesses are based on recent groundwater level measurements range between 30 to 77 feet for the YMWD production wells to approximately 190 to 365 feet for the on-site wells. The greater saturated alluvial sediment thicknesses on the property versus the river bed are attributable to reportedly deeper bedrock - alluvium contacts on the property (Appendix A). However, the quality of those lithologic interpretations are uncertain.

The overall direction of groundwater flow at the site is southward from the head of the alluvial fan toward the San Luis Rey River (Figure 4). Groundwater flow in the immediate vicinity of the YMWD wells is convergent as suggested by groundwater elevations at upstream wells PV-2 and 3 having somewhat lower static groundwater elevations than downstream wells, PV-4 and PV-5. The groundwater hydraulic gradient on-site is approximately 0.08 feet of groundwater elevation change per horizontal foot. As one approaches the YMWD water levels, the gradient flattens by nearly an order of magnitude to approximately 0.007 feet per foot. This change in gradient likely reflects the extended cone of depression associated with YMWD groundwater pumping.

In the western United States uplifted mountains, bordered by subsided valleys, often have alluvial fans that occur along the transition between these tectonic physiographic features. The alluvial fan deposits are typically coarser grained and higher in permeability closer to the mountain front and decrease in coarseness and permeability toward the valley. Runoff coming from the mountains can soak into the coarse deposits (Fetter, 1994). As demonstrated in Figure 2, rainfall occurs at significantly higher rates in the mountains. Hence infiltration of runoff into the alluvial fans is an important hydrogeologic process in delivering water to the water table and

most probably plays a greater role in groundwater recharge than infiltration of rainfall that falls directly on to the site.

Groundwater inflow into the San Luis Rey River of course is not limited to the alluvial fan deposits that are present at the site. The drainage area of the San Luis Rey River at the point where the river encounters the site encompasses hundreds of square miles, including extensive areas that occur at land surface elevations greater than 4,000 feet msl where rainfall rates are exceptional high. Similarly, Pauma Valley has extensive agricultural groves, hence nitrate sources off site and upgradient of the site are also extensive and subject to degrading groundwater pumped from the YMWD water wells.

3.3 NITRATE CONCENTRATIONS

Groundwater samples are collected from YMWD water wells (PV-2 through PV-4) and analyzed for nitrate (NO_3^-), every 3 to 4 months. On-site, groundwater samples were collected from wells PV-6 through PV-10 on May 7, 2012 and analyzed for nitrate (as nitrogen), Total Kjedahl Nitrogen and Total Dissolved Solids (TDS) (Appendix B). TKN is a measure of the sum of the concentrations of organic nitrogen, ammonia (NH_3), and ammonium (NH_4+). Hence, with the exception of nitrite, Total Nitrogen in groundwater has been measured. The occurrence of nitrite (NO_2^-) in groundwater is highly unlikely as environmental conditions in the unsaturated zone and within an unconfined aquifer typically oxidizes the various reduced forms of nitrogen found in fertilizer as well as septic leachate completely to nitrate. TKN concentrations in the on-site groundwater samples were all below the laboratory reporting limit of 0.5 mg/l (Appendix B). Hence it is reasonably inferred that nitrate concentrations detected in groundwater is the only form of nitrogen occurring in groundwater.

The distribution of nitrate in groundwater across the site indicates that the grove operation is a likely source of nitrate as concentrations in the upgradient water wells are at or near the reporting limit. Nitrate concentrations at the site appear to increase as groundwater flows from the upgradient end of the grove to the down gradient end of the grove (Table 3 and Figure 5). Nitrate concentrations are greatest at the two most down gradient wells at the site, PV-9 and PV-10 at concentrations of 8.9 and 7.9 milligrams per liter (mg/l) compared to a state and federal maximum contaminant level (MCL) of 10 mg/l. Groundwater samples collected at YMWD wells, PV-2 through PV-4, in October and September 2011, ranged from 6.4 to 7.3 mg/l (Figure 5). The slightly lower nitrate concentrations suggest that groundwater inflow along the San Luis Rey River provides somewhat greater dilutive capacity for nitrate compared to groundwater flow beneath the site.

4.0 NITROGEN MASS BALANCE

A five year record of fertilizer purchases for the Shadow Run Ranch provides the basis for estimating the mass of nitrogen delivered to the soil from agricultural activity (Appendix C). A literature search for citrus tree uptake of nitrogen was researched on-line, through the San Diego County/University of California, Davis Agricultural Extension, and the University of California, Riverside (UCR) Library. On-line research identified research conducted by the University of Florida that estimated nitrogen uptake efficiency in citrus trees. Gary Bender, Ph.D. a farm

advisor from the San Diego County/University of California, Davis Agricultural Extension, who specializes in deciduous fruit trees, reviewed one of the University of Florida nitrogen uptake efficiency publications and indicated that there were no comparable studies in Southern California (Bender, 2012). A literature search at the UCR Library also did not provide any comparable studies.

Nitrogen uptake efficiency indicates how much of the nitrogen applied to the soil is taken up by the crop. A summary document prepared by the University of Florida reports that a well managed citrus grove planted in sandy soil will have a nitrogen uptake efficiency between 40 and 60 percent (University of Florida, 2006). Hence, approximately 50 percent of the nitrogen in fertilizer remains in the environment. Once oxidized to nitrate, nitrogen in soil is typically stable and is unlikely to leave the hydrogeologic environment other than through groundwater pumping.

Under the project, 44 residential lots equipped with septic systems will be developed at the property. As part of the development, grove acreage will decrease from 200 acres to 144 acres. Accordingly, nitrate loading will increase from one source and decrease from another.

4.1 CURRENT NITROGEN LOADING

Fertilizer purchase records for Shadow Run Ranch from 2007 through 2011 indicate that between approximately 8,300 kilograms (kg) to 20,100 kg of Total Nitrogen are purchased annually (Figure 6). Over the five year period Shadow Run Ranch Total Nitrogen purchases averaged 12,860 kilograms (Figure 6). Assuming a nitrate uptake efficiency of 50 percent, approximately 6,430 kg of nitrogen is expected to reach the water table from current agricultural practices.

4.2 NITROGEN LOADING UNDER THE PROPOSED PROJECT

Nitrogen loading to groundwater under the new project will differ from current conditions in two principal ways. The residential development will include 44 individual septic systems with nitrogen bearing septic effluent. The proposed project will also have less grove acreage. This will result in a decrease in the mass of nitrogen enriched fertilizer applied to the soil. The following provides an estimate of how each change in land use may affect the rate of nitrogen loading to groundwater.

4.2.1 Anticipated Nitrogen Loading from Septic Discharge

The addition of 44 residential homes will generate domestic wastewater containing reduced forms of nitrogen. The discharge of the wastewater via leach fields and infiltration through the unsaturated zone typically oxidizes the reduced forms of nitrogen to nitrate. The following provides an estimate of nitrogen loading from the proposed residential development.

Nitrogen loading from domestic wastewater is a function of the average septic wastewater flow rate and the average nitrogen concentration . Wastewater flow is generally a function of the number of people residing in the home. It is assumed that on average the homes in the

development will have five bedrooms and will populated with two residents in the master bedroom and one resident in the four remaining bedrooms. Hence on average it is assumed that for the purposes of estimating wastewater flow there will be six full time residents per home. The California Department of Water Resources estimates, for the purpose of urban water management planning, that indoor water use in newer homes is approximately 75 gallons per day per resident (DWR, 2011). However, this per capita rate of internal residential water consumption is considered very high by DWR and EPA (DWR, 2011 and EPA, 1980) and both agencies indicate most residences use approximately 55 gallons per day per resident.
Septic leachate was collected from suction lysimeters that were placed below several different San Diego County leach fields in a study conducted by San Diego State University. Nitrate concentrations detected in these samples ranged between 30 and 40 mg/l (Huntley, 1987).

Alternatively, the EPA Design Manual for Onsite Wastewater Treatment and Disposal (EPA, 1980) reports that approximately 11.2 grams of Total Nitrogen per day can be anticipated per individual resident. This approach permits bypassing an estimate of the average wastewater flow rate.

Applying both approaches, the estimated annual mass of Total Nitrogen applied to the site from the septic discharge of 44 homes ranges between 1,094 kg per year for the first approach to 1,079 kg per year for the second approach (Table 4). Hence the two approaches provide essential the same Total Nitrogen load estimate. This estimate will likely be on the high side relative to the actual nitrogen loading that will eventually occur at the site because the per capita rate of internal residential water use is considered quite high and the assumption that all 44 homes will have an average occupancy of six residents.

4.2.2 Reduction in Nitrogen Loading, Grove Acreage Decrease

Grove acreage is expected decrease from the current 200 acres to 144 acres after development. Assuming uniform fertilizer application rates across the grove it would be expected the Total Nitrogen application to the soil would decrease by (200-144) acres / 200 acres; or 28 percent. Since the average annual Total Nitrogen application to soil over the past five years is 12,860 kg, under the project one can anticipate Total Nitrogen applications to soil decreasing 28 percent to approximately 9,260 kg; a reduction of approximately 3,600 kg per year. Accounting for nitrogen uptake efficiency at a rate of 50 percent, nitrogen reaching groundwater from fertilizer application is anticipated to decrease by 1,800 kg per year under the project (Table 5).

4.2.3 Net Change in Nitrogen Loading

Under the proposed project, nitrogen loading to groundwater is expected to change from the current average of 6,430 kg per year through an increase of 1,094 kg of Total Nitrogen from septic discharge and through a decrease of 1,800 kg of Total Nitrogen caused by a planned decrease in grove acreage and fertilization (Figure 7). These changes in land use result in an estimated average nitrogen loading of 5,724 kg per year or a decrease of approximately 706 kg per year.

The anticipated reduction in nitrogen loading is approximately 11 percent of the current average nitrogen loading rate. Assuming that the sole source of nitrogen for on-site groundwater is on-site fertilizer applications, an 11 percent reduction in nitrogen loading would imply an eventual 11 percent reduction in nitrate concentrations in groundwater (Table 5). Hence a 9 mg/l nitrate concentration may eventually decline to approximately 8 mg/l. As both of these values fall within the normal range variability observed in nitrate concentrations measured at the YMWD wells, it is likely that decline in nitrate concentrations associated with the project would be difficult to detect. On the other hand, a potential future rise in nitrate concentrations in groundwater would not be expected to be attributable to the change in land uses discussed herein.

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TABLES

TABLE 1
WELL CONSTRUCTION AND PRODUCTION RATE SUMMARY

Well No.	Completion Date	RP Elevation	Total Depth	Well Seal	Well Screen Interval	Flow Rate Based On Contractor Extended Well Tests
PV-1	Not Available	680	175	Not Available	70-175	135 feet of drawdown(88' dtw to 225' dtw)@ 194 gpm, second two hour step, August 15, 1994; specific capacity 1.4 gpm/ft
PV-2	9/21/1972	679	248.5	100	100-248.5	50 feet of drawdown (108' dtw to 158' dtw) @ 300 gpm, 2 hour step, 3rd step in variable duration step test, date unknown, specific capacity 6.0 gpm/ft; Hidden Valley Pump Work Order 3218
PV-3	3/8/1988	680	256	20	20-26, 29-75, 90-127, 140- 174, 240-245	38 feet of drawdown (93' dtw to 131' dtw) @ 180 gpm, 1:45 hour step, 4th step in variable duration step test, date unknown, specific capacity 4.7 ; Hidden Valley Pump Work Order 3924
PV-4	6/6/1988	681	185	20	20-37, 43-68, 74-112, 160-165	
PV-5	10/18/1989	683	1,000	20	20-60, 80-210, 210-1,000 open bore	
PV-6	May 1981 or earlier	1200	465	Not Available	beginning at 260 +/-; based on Aug 1981 video log report	150 ft of drawdown (163' dtw to 313' dtw) @ 450 gpm, specific capacity 3.0 gpm/ft (May 7-20, 1981)
PV-7	Jan-91	1014	579	Not Available	Not Available	130 ft of drawdon (220' dtw to 350' dtw) @ 300 gpm, specific capacity 2.3 gpm/ft, July 1992
PV-8	1992?	916	740	Not Available	Not Available	159 ft of drawdown @ 450 gpm, specific capacity 2.8 gpm/ft, July 1992
PV-9	1992?	838	>1,010	Not Available	Not Available	200 ft of drawdown @ 360 gpm, specific capacity 1.8 gpm/ft, July 1992
PV-10	Not Available	824	392	Not Available	Not Available	

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TABLE 2
GROUNDWATER LEVELS

Well No.	DTW	RP Elevation	GW Elevation	Date
PV-1	Not Measured	680	-	Apr-12
PV-2	100.4	679	578.6	Apr-12
PV-3	98.9	680	581.1	Apr-12
PV-4	96.3	681	584.7	Apr-12
PV-5	96.4	683	586.6	Apr-12
PV-6	345	1200	855	4/16/2012
PV-7	409	1014	605	4/17/2012
PV-8	231	916	685	4/18/2012
PV-9	254	838	584	4/19/2012
PV-10	248	824	576	Oct-11

TABLE 3
NITRATE CONCENTRATIONS IN GROUNDWATER

Well No.	Nitrate (As Nitrogen) mg/l	Date of Sample Collection	Source
PV-1	Not Measured		
PV-2	31	10/11/2011	YMWD
PV-3	33	10/11/2011	YMWD
PV-4	22	10/11/2011	YMWD
PV-5	Not Measured		
PV-6	< 0.05	5/4/2012	EnviroMatrix Analytical Laboratories
PV-7	0.58	5/4/2012	EnviroMatrix Analytical Laboratories
PV-8	4.05	5/4/2012	EnviroMatrix Analytical Laboratories
PV-9	8.9	5/4/2012	EnviroMatrix Analytical Laboratories
PV-10	7.9	5/4/2012	EnviroMatrix Analytical Laboratories

TABLE 4
NITROGEN LOADING FROM SEPTIC DISCHARGE
44 PROPOSED HOMES

Approach No. 1					
homes	**flow1 gpd**	**concentration2 mg/l**	**flow liters/yr**	**nitrate flux to subsurface mg/yr**	**kg/yr**
44	450	40	27,357,086	1,094,283,432	1,094
Approach No. 2					
homes	**Residents per home**	**Total Nitrogen grams per capita per day[3]**		**g/yr**	**kg/yr**
44	6	11.2	Not Applicable	1,079,232	1,079

Notes:

1) Based on 6 residents in a 5 bedroom home consuming 75 gpd per capita of water, indoor usage (DWR, 2011).

1) USEPA Design Manual, Onsite Wastewater Treatment and Disposal System, EPA 25/1-80-012, 1980; Pg 50. Average daily wastewater flow from a typical residential dwelling is approximately 45 gal, capita/day. ... it is typically no greater than 60 gpcd and seldom exceeds 75 gpcd.

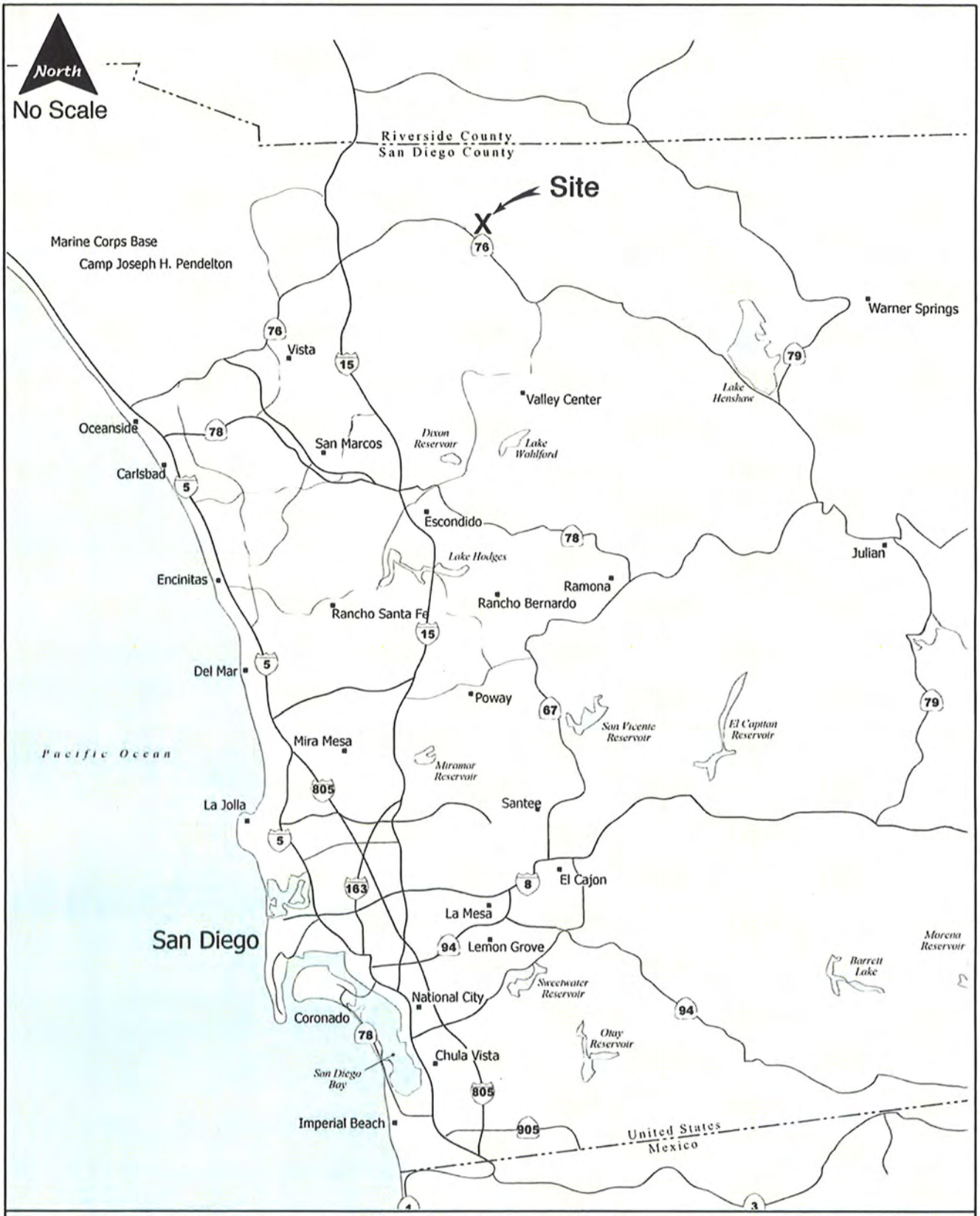
2)Technical Report, Review of Subsurface Wastewater Disposal Policy, San Diego Water Quality Control Board, September 30, 1987 (Huntley, 1987)

3) USEPA Design Manual, Onsite Wastewater Treatment and Disposal System, EPA 25/1-80-012, 1980; Table 4-3

TABLE 5
CHANGE IN NITROGEN LOADING

Avg. Annual Nitrogen Fertilizer Loading to Groundwater-Current Conditions	Net Reduction in Avg. Annual Nitrogen Loading To Groundwater From Fertilizer-Proposed Project	Increase in Annual Nitrogen Loading to Groundwater By Septic Effluent-Proposed Project	Estimated Annual Total Nitrogen Loading To Groundwater-Proposed Project	Relative Percent Change In Nitrogen Loading	Change in Concentration, assuming a NO3 (as N) Concentration of 9 mg/l
(kg)	(kg)	(kg)	(kg)	(%)	(mg/l)
6,430	-1,800	1,094	5,724	-11.0%	-0.99

FIGURES



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Regional Vicinity Map

Figure 1

EXPLANATION

PVW-2 Applicant's Water Well Available For Yuima Water District Operations

PVW-6 Applicant's Water Well, Grove Operations

New Well Location Provided By Dept. of Env. Health Services

0.0 — 1.0 mile

N

Precipitation (Inches)

- 3 - 6
- 6 - 9
- 9 - 12
- 12 - 15
- 15 - 18
- 18 - 21
- 21 - 24
- 24 - 27
- 27 - 30
- 30 - 33
- 33 - 35
- Rivers
- Water Bodies

33-35 in/yr

30-33 in/yr

27-30 in/yr

24-27 in/yr

21-24 in/yr

18-21 in/yr

PVW-7
PVW-6
PVW-8
PVW-9
PVW-10
PVW-5
PVW-3
New Well
PVW-1
PVW-4
PVW-2

Rainfall Distribution Map Modified From: County of San Diego 30 - Year Average Annual Rainfall Map San Diego County Dept. of Planning and Land Use, 9/1/2005

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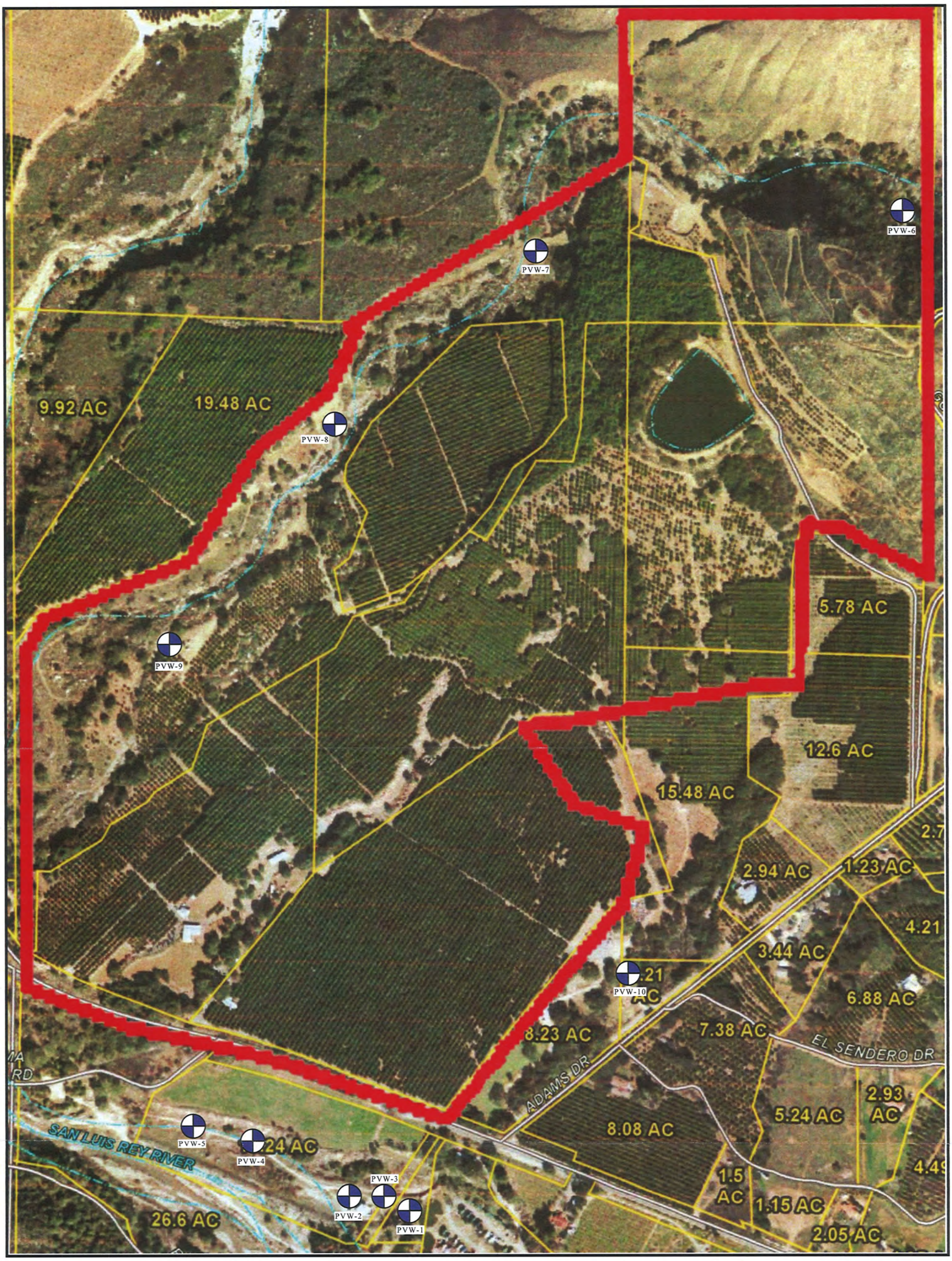
SHADOW RUN RANCH
PAUMA VALLEY

FIGURE 2
30-YEAR AVERAGE ANNUAL RAINFALL DISTRIBUTION

P. O. Box 910462 San Diego, CA 92191-0462
Ph 858 259-6732

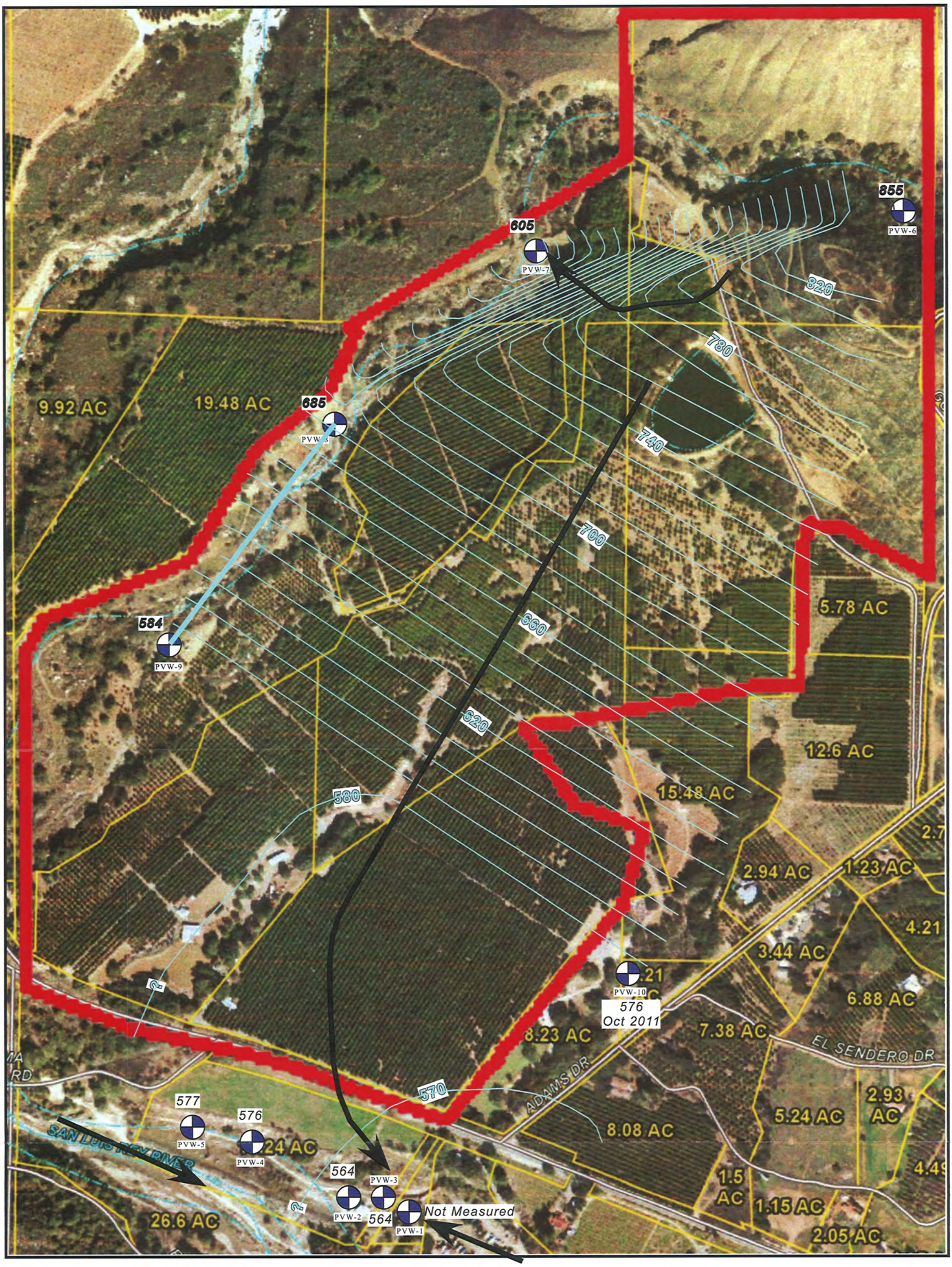


N

West Pauma Valley Ranch Water Well

0' 400' 800'

FIGURE 3 WELL LOCATIONS



EXPLANATION

N

West Pauma Valley Ranch Water Well

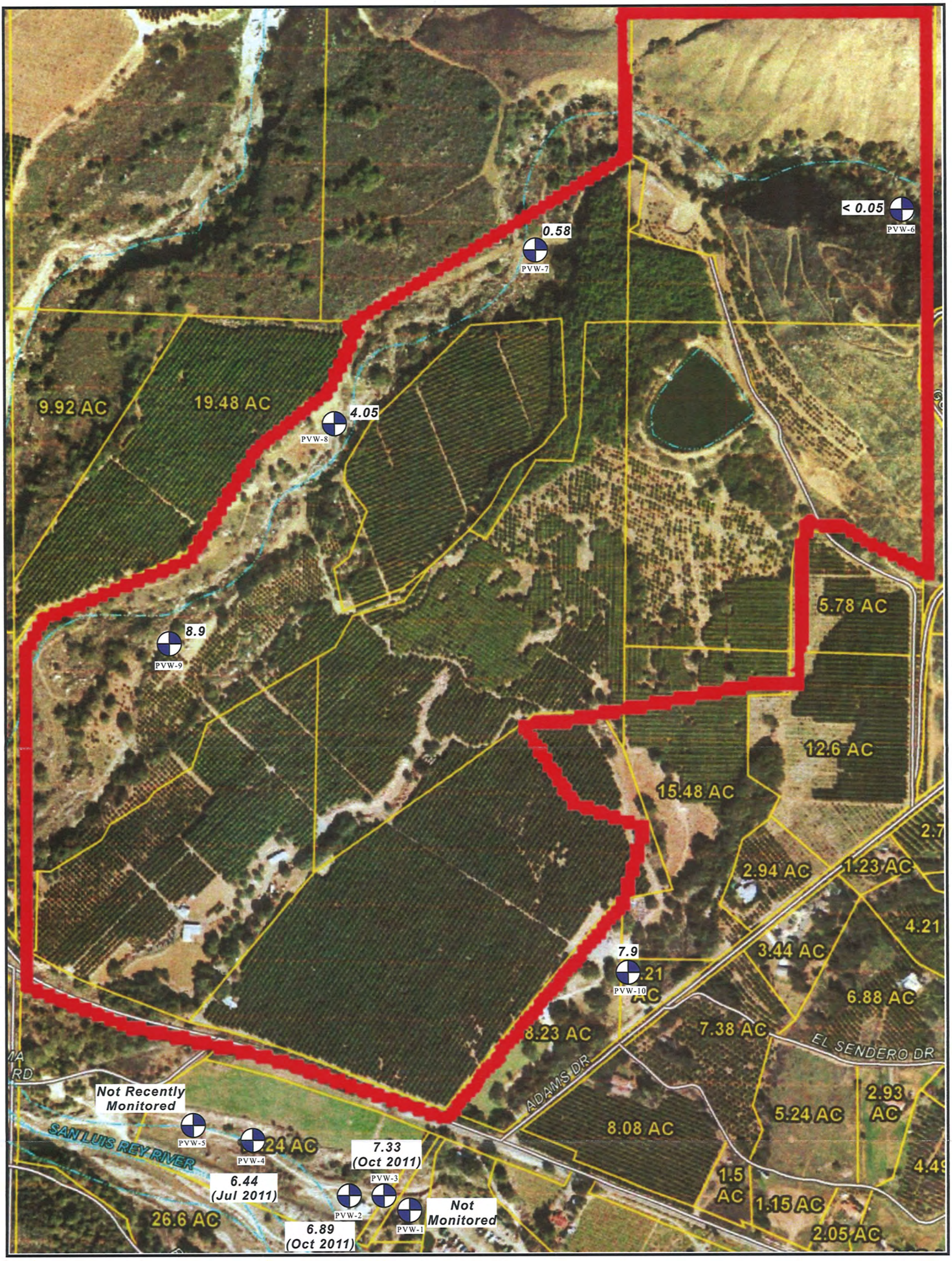
576 Groundwater Elevation, Feet Mean Sea Level Measured Either in February or April 2012

570 Contour of Equal Groundwater Elevation, Feet Mean Sea Level

? Queried Where Contour Lines Are Inferred Beyond Data Limits

0' 400' 800'

FIGURE 4 GROUNDWATER ELEVATIONS FEBRUARY/APRIL 2012



N West Pauma Valley Ranch Water Well

0.58 Nitrate measured as Nitrogen in groundwater (milligrams per liter), May 2012

0' 400' 800'

FIGURE 5 NITRATE IN GROUNDWATER

FIGURE 6
YEARLY TOTAL NITROGEN PURCHASES
SHADOW RUN RANCH

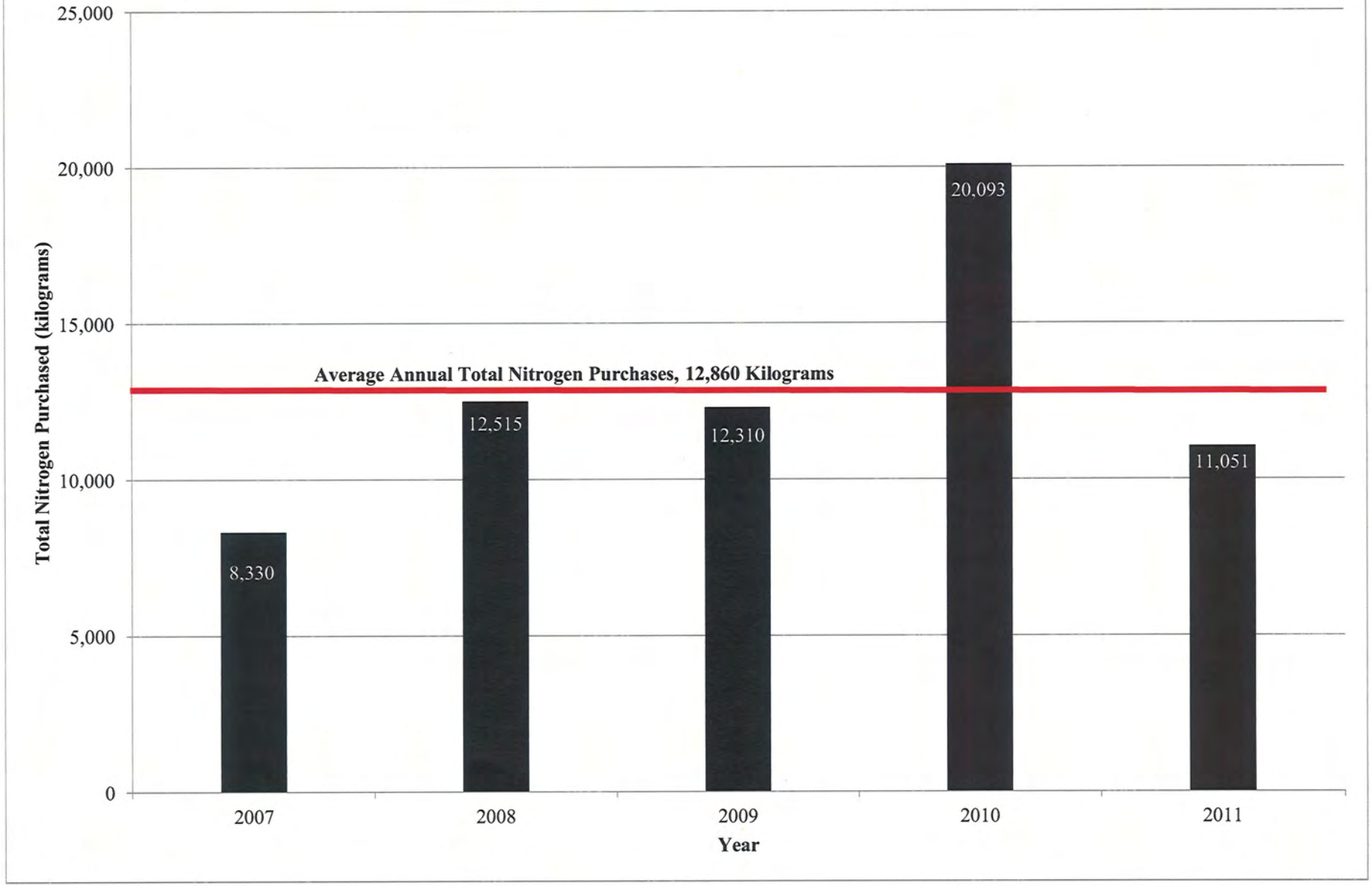
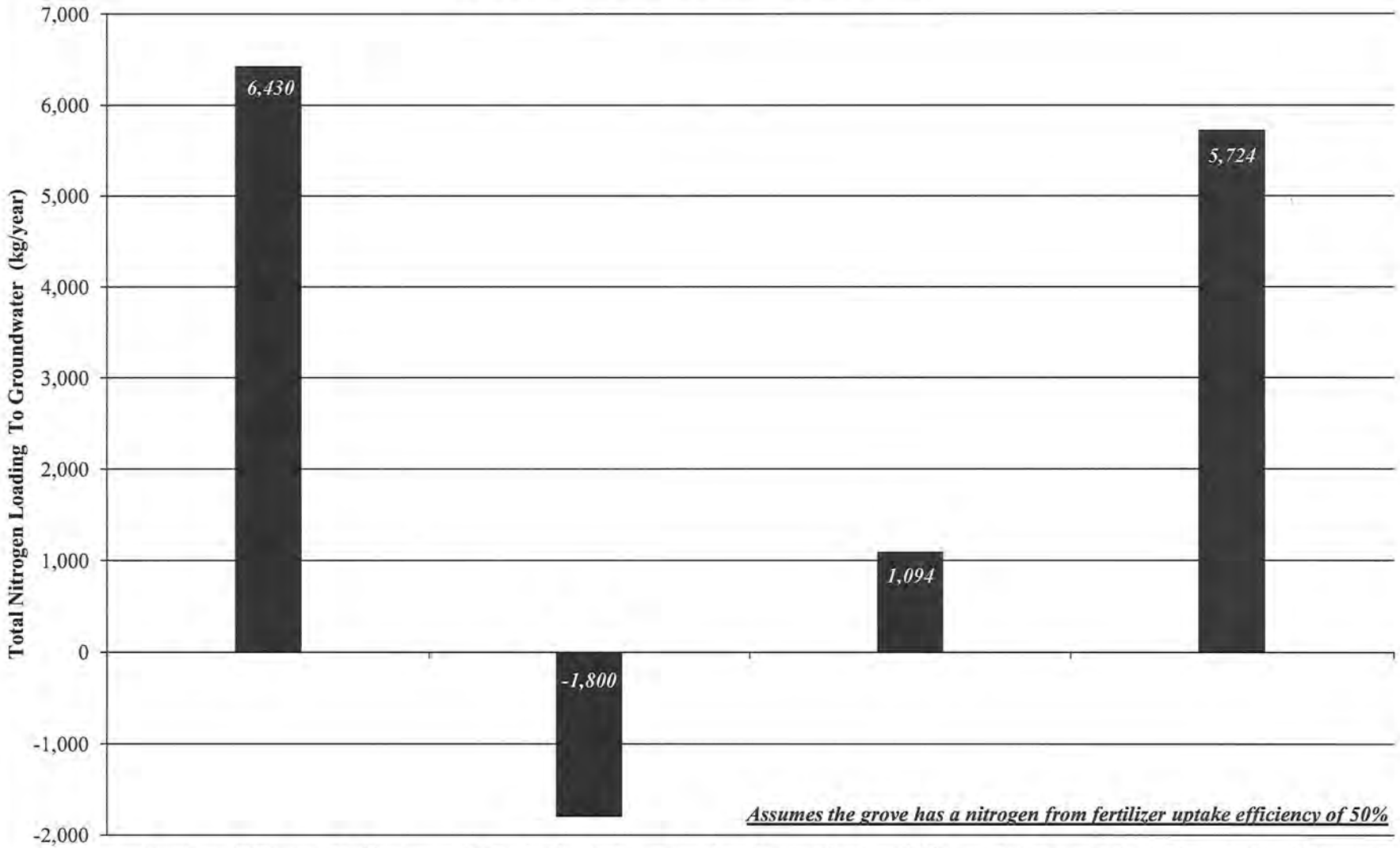
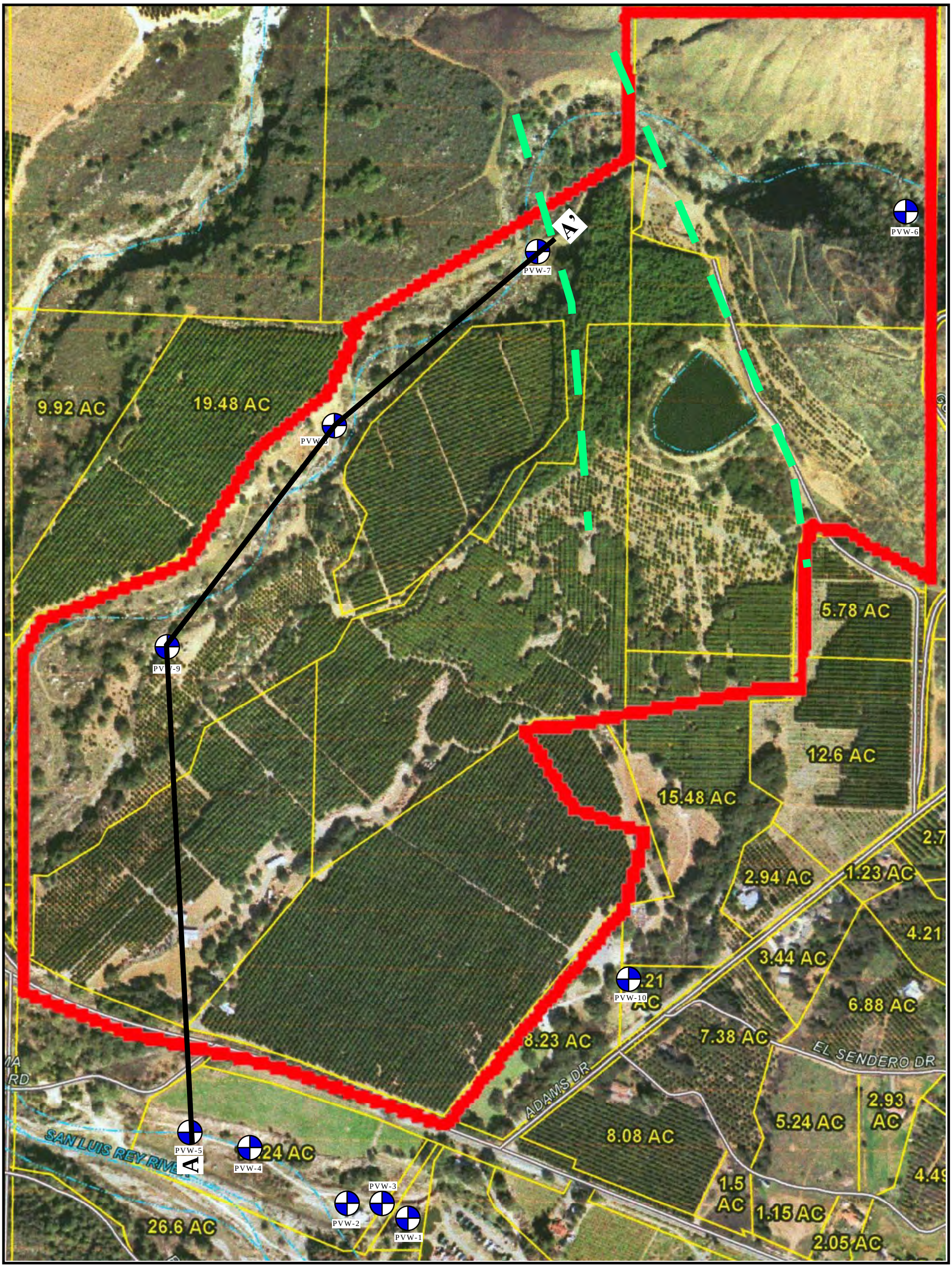


FIGURE 7
ANNUAL TOTAL NITROGEN LOADING TO GROUNDWATER
CURRENT & PROPOSED CONDITIONS



APPENDIX A
LITHOLOGIC INFORMATION



N

West Pauma Valley Ranch Water Well

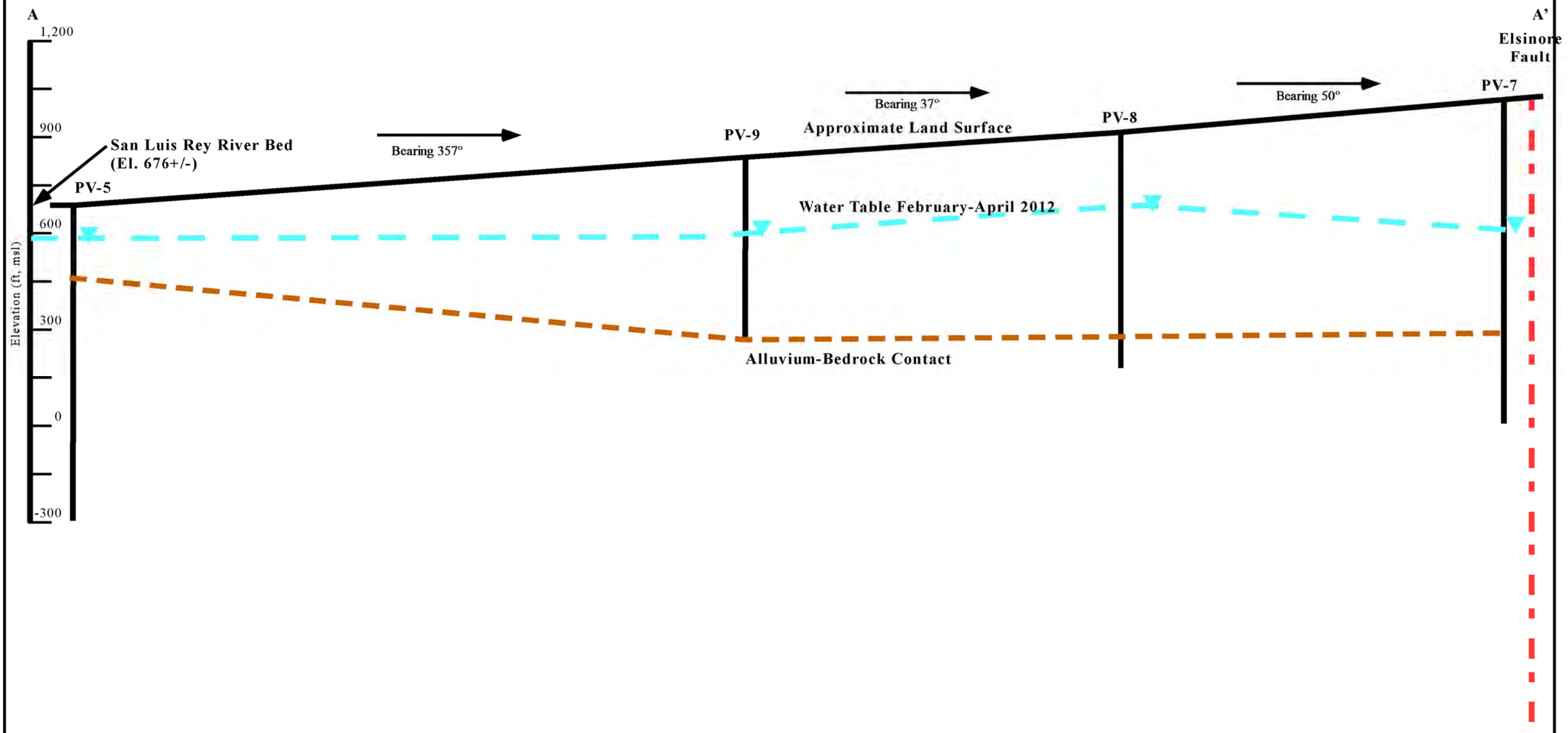
Approximate Location of
Elsinore Fault Zone
(per URS, Plate 1 12-14-01

0' 400' 800'

APPENDIX A CROSS SECTION LOCATION

Wiedlin & Associates, Inc.
Applications in Groundwater Science

DRAFT & PRELIMINARY HYDROGEOLOGIC SCHEMATIC CROSS SECTION



Bedrock Contacts From Preliminary Graphical Lithologic Logs of Wells PV-7 through PV-9; Prepared By Zhouping Guo, July 24, 1992
Bedrock Contact For Well PV-5 From Driller's Report
Elsinore Fault Location Represents the Approximate Location of the Western Edge of Elsinore Fault Zone Per URS, Plate 1, December 4, 2001

1' = 300' No Vertical Exaggeration

June 25, 2012

weleneo

WELL ENGINEERING SURVEYS

Gamma-Ray Log

COMPANY FLUIDMASTER, INC.

WELL PAUMA VALLEY RIVER #1

FIELD SHADOW RUN RANCH PV

STATE CALIFORNIA COUNTY SAN DIEGO

LOCATION: SEC. ____ TWP. ____ RGE. ____

SHADOW RUN RANCH PV

OTHER SERVICES: NONE

PERMANENT DATUM: GROUND LEVEL ELEV. ____

LOG MEASURED FROM: G.L. 0 FT. ABOVE PERM. DATUM

DRILLING MEASURED FROM: N/A

ELEV.: K.B. ____ D.F. ____ G.L. ____

DATE	4/8/88
RUN NO.	ONE
TYPE LOG	GAMMA-RAY
DEPTH-DRILLER	N/A
DEPTH-LOGGER	142'
BOTTOM LOGGED INTERVAL	141'
TOP LOGGED INTERVAL	0'
TYPE FLUID IN HOLE	WATER
MAX. REC. TEMP., DEG. F.	N/A
RECORDED BY	R. KEENAN
WITNESSED BY	A. SCHOEPE

BOREHOLE RECORD

RUN NO.	BIT	FROM	TO
ONE	N/A		15$\frac{1}{2}$"

CASING RECORD

SIZE	WGT.	FROM	TO
15$\frac{1}{2}$"	COND	0'	142

EQUIPMENT DATA

Gamma Ray		Neutron	
Run No.	ONE	Run No.	
Tool Model No.	G27X4LD-153	Log Type	
Diameter	2"	Tool Model No.	
Detector Model No.	--	Diameter	
Type	SCINT.	Detector Model No.	
Length	4"	Type	
Distance to N. Source	--	Length	
		Source Model No.	
General		Serial No.	
Hoist Truck No.	DV-1	Spacing	
Instrument Truck No.	DV-1	Type	
Tool Serial No.	153	Strength	

LOGGING DATA

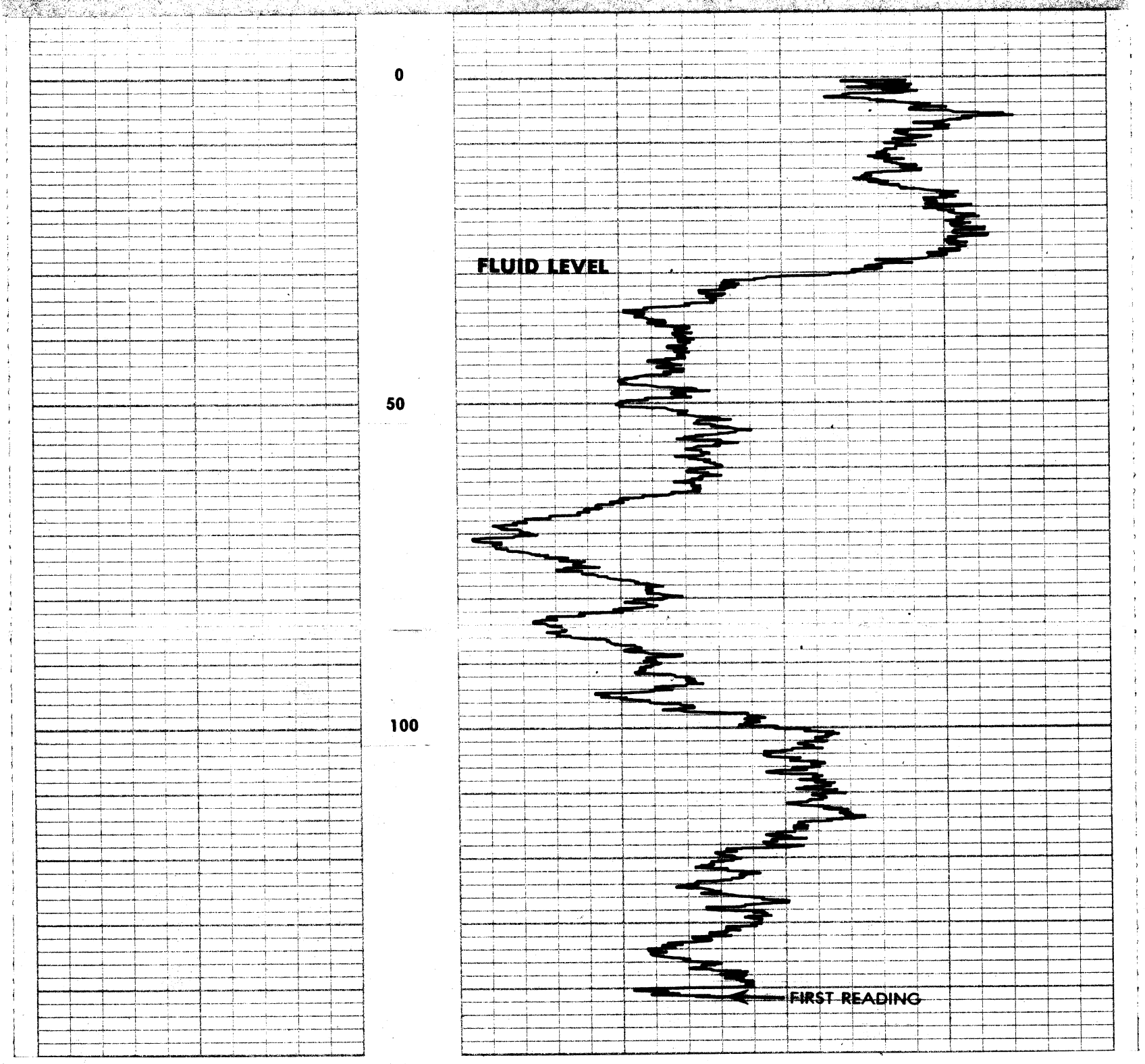
General				Gamma Ray				Neutron			
Run No.	Depths From	Depths To	Speed Ft/Min.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units per Log Div.
ONE	141'	0'	15	5	50/1000	10L	2				

Reference Literature:

Remarks:

Fold Here

	DEPTHS	GAMMA-RAY API UNITS
		20 60



Pauma Well #2 (PV-2)

DUPLICATE
Retain this copy

WATER WELL DRILLERS REPORT

(Sections 7079, 7080, 7081, 7082, Water Code)

THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

Do Not Fill In

Nº 33683

State Well No.

Other Well No.

(1) OWNER:

Name Mr. Adolph Schoepe

Address 1800 Via Burton

Anaheim, California.

(2) LOCATION OF WELL:

County San Diego Owner's number, if any 2

Township, Range, and Section T10S, R1W, SW¼ of Sec 5,

Distance from cities, roads, railroads, etc. West End of Pauma Valley, S of Hwy 76.

(3) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Destroying ☐

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☒ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary ☐

Cable ☒

Other ☐

(6) CASING INSTALLED:

STEEL: SINGLE ☒ DOUBLE ☐ OTHER:

If gravel packed

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
+ 1	100	24"	¼"	24"	0	248'6"
+ 5	248'6"	6"/14"	5/16			

Size of shoe or well ring: Size of gravel: 1/4" to ½"

Describe joint Welded

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
100'	244'	8	4	¼ x 4
244'	248'6"	# 100	Slot Johnson	
Stainless Steel Well Screen				

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes ☒ No ☐ To what depth 100 ft.

Were any strata sealed against pollution? Yes ☐ No ☐ If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing Cement Grout & Double Casing

(9) WATER LEVELS:

Depth at which water was first found, if known 25 ft.

Standing level before perforating, if known ft.

Standing level after perforating and developing 44 ft.

(10) WELL TESTS:

Was pump test made? Yes ☒ No ☐ If yes, by whom? Water Well Supply Co.

Yield: 1,029 gal./min. with 88 ft. drawdown after 1 hrs.

Temperature of water Was a chemical analysis made? Yes ☐ No ☒

Was electric log made of well? Yes ☐ No ☒ If yes, attach copy

(11) WELL LOG:

Total depth 248' 6" ft. Depth of completed well 253' 6" ft.

Formation: *Describe by color, character, size of material, and structure*

0' ft. to	12' ft.
Gray Sand	
12'	38' (Gray Sand &)
38'	63' (Boulders No Boulders)
Gray Cemented sand & Boulders	
63'	75'
Gray Granite Boulder Correct	
75'	81'
Gray sand, Boulders and Clay No Boulder	
81'	92'
Gray Granite Boulder No Boulders Sand & Clay only	
92'	164'
Brown Cemented Sand, Clay and Boulders No B	
164'	168'
Gray Granite Boulder No Boulders Sand & Clay only	
168'	245'
Gray Cemented Sand, Gravel & Boulders No Boulders	
245'	248'
Gravel coarse with small amount of sand Correct	
248'	248'6"
Extremely Hard Granite	

Work started 5/8 1972, Completed 9/21 1972

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Acme Drilling Co.

(Person, firm, or corporation) (Typed or printed)

Address P. O. Box 835

Valley Center, Calif. 92082

[SIGNED] W. R. Doughty

(Well Driller)

License No. 174287 Dated Sept. 21, 1972

SKETCH LOCATION OF WELL ON REVERSE SIDE

DWR 188 (REV. 9-65)

1/30/91 RoN
9/14/92 FAX RoN PV-3

TRIPLICATE
Owner's Copy

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in
No. 296917

Notice of Intent No. _____
Local Permit No. or Date W 30326

State Well No. _____
Other Well No. _____

(1) OWNER: Name Adolf Schoepe
Address 1800 Via Burton
City Anaheim, CA ZIP 92803

(2) LOCATION OF WELL (See instructions):
County San Diego Owner's Well Number 3
Well address if different from above Pauma Valley
Township 10 S Range 1 W Section 6
Distance from cities, roads, railroads, fences, etc. see attached

WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☐
Irrigation ☒
Industrial ☐
Test Well ☐
Municipal ☐
Other ☐
(Describe)

(5) EQUIPMENT:
Rotary ☒ Reverse ☐
Cable ☐ MUD Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☒ No ☐ Size 5/16" x #16 125
Diameter of bore _____
Packed from 21 yds to _____ ft.

(7) CASING INSTALLED:
Steel ☒ Plastic ☒ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0	20	24	.250
0	265	12.75	SDR 21

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Slot size
20	26	.057
29	75	
90	127	
140	174 &240-245'	

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 20 ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval _____ ft.
Method of sealing cement

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion 18.39 ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? R. Anderson
Type of test Pump ☒ Bailer ☐ Air lift ☐
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge _____ gal/min after _____ hours Water temperature _____
Chemical analysis made? Yes ☐ No ☒ If yes, by whom? _____
Was electric log made Yes ☒ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth _____ ft. Completed depth 265 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	13	Loose, med. to coarse sand w/some small boulders
13		Boulders
13	16	Coarse Sand
16	17	Boulders
17	21	Medium grained sand
21	25	Slightly coarser sand and more consolidated
25	33½	Med. to coarse sand, partly consoliated
33½	40	Loose sand
40	45	Slightly tighter sand w/rocks
45	55	Loose sand and gravel, rocks @ 47'6"
55	71	Semi consolidated sand and some gravels
71	75	Loose sand and gravel
75	89	Loose sand and gravel, w/ black silts
89	94	Rocks in semi-consolidated Sand and gravels
94	109	Sand and gravels w/rocks @ 103 104
109	111	Rocks
111	126	Semi-consolidated sand and gravel w/rust staining
126	132	Loose sand and gravel w/rocks @ 132
132	141	Sand, few gravels
141	146	Rocks in sand and gravel
146	154½	Sand & gravel w/fewer rocks
154½	159	Rocks, drills tight and rough
159	161½	Sand & gravels, looser drillin
161½	172	Rocks in semi-consolidated sand and gravels
172	176	Rocks,drills hard, rough and slow
176	213	Altered granite, high clay content to 188', broken rock @ 197.5' (Continued)

Work started 12/30 19 87 Completed 3/8/ 19 88

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signed R. Anderson (Well Driller)
NAME REX ANDERSON CORP. (Person, firm, or corporation) (Typed or printed)
Address P.O. Box 384
City Julian ZIP 92036
License No. 305739 Date of this report 3/10/88

CONFIDENTIAL
NOT FOR PUBLIC USE
WATER CODE SEC. 13752

DWR 188 (REV. 12-86) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM 86 96355

TRIPLICATE
Owner's Copy

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in
No. 296918

Notice of Intent No. _____
Local Permit No. or Date _____

State Well No. _____
Other Well No. _____

(1) OWNER: Name _____
Address _____
City _____ ZIP _____

(2) LOCATION OF WELL (See instructions):
County _____ Owner's Well Number _____
Well address if different from above _____
Township _____ Range _____ Section _____
Distance from cities, roads, railroads, fences, etc. _____

WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☐ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☐
Irrigation ☐
Industrial ☐
Test Well ☐
Municipal ☐
Other ☐
(Describe)

(5) EQUIPMENT:
Rotary ☐ Reverse ☐
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☐ No ☐ Size _____
Diameter of bore _____
Packed from _____ to _____ ft.

(7) CASING INSTALLED:
Steel ☐ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Slot size

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☐ No ☐ If yes, to depth _____ ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval _____ ft.
Method of sealing _____

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion _____ ft.

(11) WELL TESTS:
Was well test made? Yes ☐ No ☐ If yes, by whom? _____
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge _____ gal/min after _____ hours Water temperature _____
Chemical analysis made? Yes ☐ No ☐ If yes, by whom? _____
Was electric log made Yes ☐ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth _____ ft. Completed depth _____ ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
213	225	Altered granite, high clay content
225	234	Faulted rock, granite, high clay content
234	241	Broken granite
241	242½	Faulted granite, high clay content
242½	262½	Faulted rock, [illegible] w/rough spots
262½	265	Granite

Work started _____ 19__ Completed _____ 19__

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Signed _____ (Well Driller)
NAME _____ (Person, firm, or corporation) (Typed or printed)
Address _____
City _____ ZIP _____
License No. _____ Date of this report _____

CONFIDENTIAL
NOT FOR PUBLIC USE
WATER CODE SEC. 13752

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

welenco

WELL ENGINEERING SURVEYS

Gamma-Ray Log

COMPANY FLUIDMASTER, INC.

WELL PALMA VALLEY RIVER #3

FIELD SHADOW RUN RANCH PV

STATE CALIFORNIA COUNTY SAN DIEGO

LOCATION SHADOW RUN RANCH PV

OTHER SERVICES NONE

SEC. TWP. RGE.

PERM. DATUM GROUND LEVEL Elev. 0 Ft. ABOVE PERM. DATUM

LOG MEASURED FROM GROUND LEVEL 0 Ft. ABOVE PERM. DATUM

DRILLING MEASURED FROM GROUND LEVEL

Elev.: K.B. D.F. G.L.

Date 1/28/08

Run No. ONE

Type Log GAMMA-RAY

Depth-Driller 250'

Depth-Logger 245'

Bottom Logged Interval 245'

Top Logged Interval 0'

Type Fluid in Hole WATER

Salinity, PPM Cl N/A

Density Lb/Gal

Level Full

Max. Rec. Temp. Deg. F.

Operating Rig Time

Recorded By R. KERMAN

Witnessed By A. SCHOEPE

BOREHOLE RECORD

Run No.	Bit From	Bit To	Size	Weight / Ft.
ONE	N/A		23" COND.	0'
			15¼" PVC	0'

CASING RECORD

Size	Wgt. / Ft.	From	To
23" COND.	0'	0'	20'
15¼" PVC	0'	0'	245'

RECORDED DATA

Gamma Ray

Run No.	ONE
Tool Model No.	G27X4LD-153
Diameter	2"
Detector Model No.	--
Type	SCINT.
Length	4"
Distance to N. Source	--

Neutron

Run No.	
Log Type	
Tool Model No.	
Diameter	
Detector Model No.	
Type	
Length	
Source Model No.	
Serial No.	
Spacing	
Type	
Strength	

General

Hoist Truck No.	DV-1
Instrument Truck No.	DV-1
Tool Serial No.	153

LOGGING DATA

Run No.	General: Depths From	Depths To	Speed Ft/Min.	Gamma Ray: T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.	Neutron: T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units per Log Div.
ONE	245'	24'	15	5	50/1000	10L	2				
	24'	0'	15	5	50/1000	17L	2				

Reference Literature:

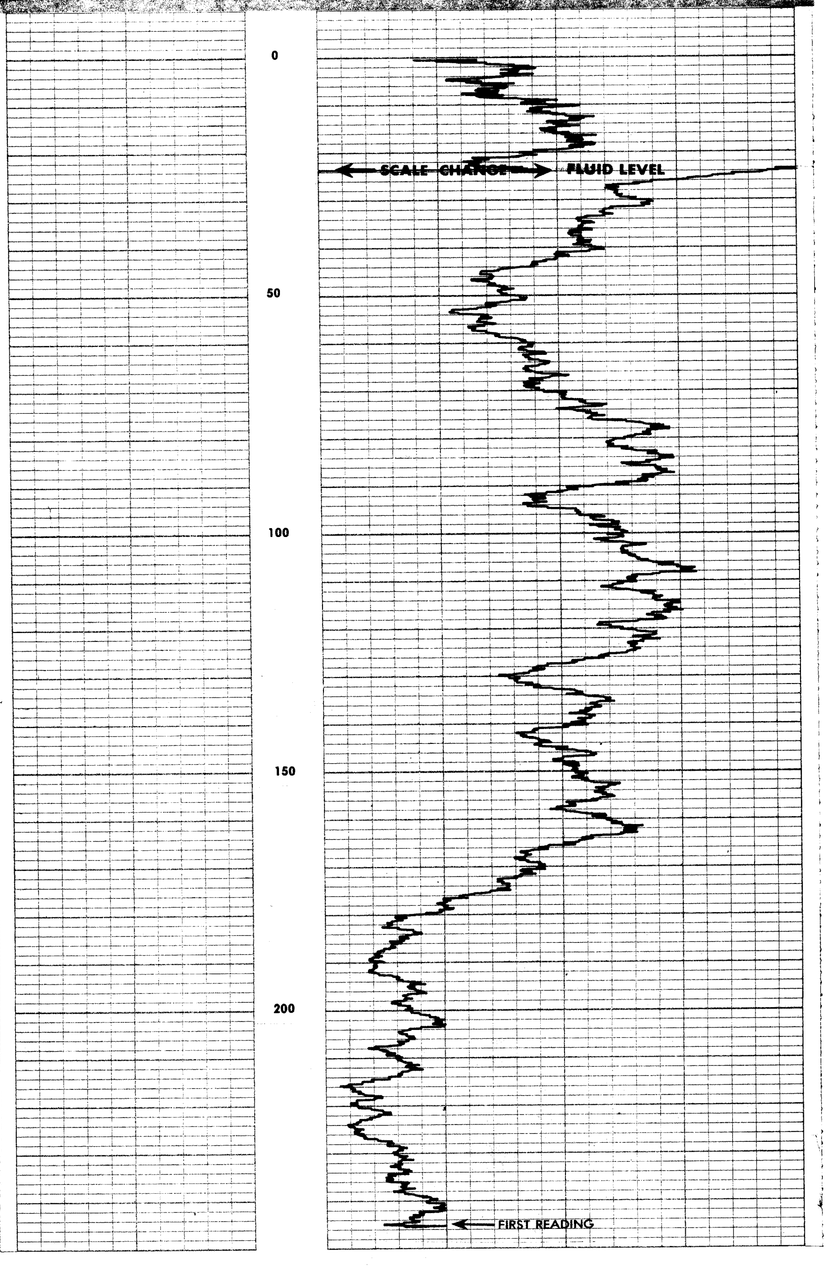
Remarks:

Fold Here

DEPTHS

34 GAMMA-RAY 74

20 API UNITS 50



River Well #4

County Mail Station —A-21

PV-4

FIRST CARBON COPY

ASSESSORS PARCEL NUMBER
130 040 15

COUNTY OF SAN DIEGO
DEPARTMENT OF HEALTH SERVICES
1700 PACIFIC HIGHWAY, SAN DIEGO, CA 92101-2417

W 30350

Notice of Intent No. _____
Local Permit No. or Date W 30330

WATER WELL DRILLERS REPORT
(INSERT under ORIGINAL PAGE w/carbon of State Form)

State Well No. _____
Other Well No. _____

(1) OWNER: Name Adolf Schoepe
Address 1800 Via Burton
City Anaheim, CA Zip 92803

(2) LOCATION OF WELL (See instructions):
County San Diego Owner's Well Number _____
Well address if different from above Puama Valley Area
Township 10S Range 1W Section 6
Distance from cities, roads, railroads, fences, etc. see attached

DEPARTMENT USE ONLY
Completed Well Construction:
Date _____
Date Inspected _____
Comments _____
Water Sample Taken? _____
Sanitarian's Approval: _____

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item (12))

(4) PROPOSED USE:
Domestic ☐
Irrigation ☒
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

(5) Equipment:
Rotary ☒ Reverse ☐
Cable ☐ Air ☐ MUD
Other ☐ Bucket ☐

(6) Gravel Pack:
Yes ☒ No ☐ Size 5/16"x#16
Diameter of above _____
Packed from 17 yds. ft. to _____ ft.

(7) Casing Installed:
Steel ☒ Plastic ☒ Concrete ☐

(8) Perforations:
Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot Size
0	24	28⅝	.250	20	37	.057 slot
				43	68	
0	185	15.3		74	112	
				160	165	

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 20 ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval _____ ft.
Method of sealing cement grout

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion 35.3 ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? R. Anderson
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge _____ gal/min after _____ hours Water temperature _____
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made? Yes ☐ No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth ____ ft. Depth of completed well 185 ft.

from ft.	to ft.	Formation (Describe by color, character, size or materia
0	4½	Semi-consolidated sand & ro
4½	7	Rocks
7	8	Loose sand and gravel
8	20	Semi-consolidated sand & gravel & rocks, worse past 10 ft.
20	25	Loose sand and gravel, some clay lenses.
25	33	Loose sand and gravel, few rocks
33	43	Sand and gravel, occasional rocks (Loose)
43	48	Sand and gravel
48	53	Sand and gravel (Loose)
53	75	Sand and gravel, slightly tighter and coarser past 68
75	96	Loose sand and gravel
96	112	Sand gravel and rocks, getting progressively rough with depth
112	148	Faulted rock
148	166	Clayey faulted rock w/ hard spot @ 166 ft.
166	167	Broken granite
167	185	Faulted granite w/quartz seam @ 179 ft.

Work Started 3/23 1988 Completed 6/6 1988

WELL DRILLERS STATEMENT: I hereby declare under penalty of perjury that the information provided in this report is true. This water well was installed in compliance with San Diego County Code and State of California, Department of Water Resources, Bulletin No. 74.

SIGNED Rex E Anderson (Well Driller)
REX ANDERSON CORPORATION
NAME (Person, firm, or Corporation) (Type or Print)
ADDRESS P.O. BOX 384
CITY Julian ZIP 92036
LICENSE NO. 305739 DATE THIS REPORT 6/6/88

DHS:EHP-732 (83) CONFIDENTIAL — NOT FOR PUBLIC USE — WATER CODE SEC. 13752

PV5

DUPLICATE
Driller's Copy

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

No. 336558

Notice of Intent No. _____
Local Permit No. or Date W 61051

State Well No. _____
Other Well No. _____

(1) OWNER: Name Adolf Schoepe
Address 1800 Via Burton
City Anaheim, CA ZIP 92803

(2) LOCATION OF WELL (See instructions):
County San Diego Owner's Well Number R.W.#5
Well address if different from above Hwy 76, Pauma Valley
Township 10S Range 1W Section 6
Distance from cities, roads, railroads, fences, etc.
see attached

WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☐
Irrigation ☒
Industrial ☐
Test Well ☐
Municipal ☐
Other ☐
(Describe)

(5) EQUIPMENT:
Rotary ☒ Reverse ☐
Cable ☐ Air mud ☒
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☒ No ☐ Size 5/16" x #16
Diameter of bore 8"
Packed from 30 yds to ft.

(7) CASING INSTALLED:
Steel ☒ Plastic ☒ Concrete ☐

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
0	250	15.3	heavy	20	60	high dai
			wall	80	210	density
0	20	30"	.250			

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 20 ft.
Were strata sealed against pollution? Yes ☐ No ☒ Interval _____ ft.
Method of sealing cement grout

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion 33 ft.

(11) WELL TESTS:
Was well test made? Yes ☐ No ☒ If yes, by whom? R. Anderson
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test _____ ft. At end of test _____ ft.
Discharge Unknown gal/min after _____ hours Water temperature _____
Chemical analysis made? Yes ☐ No ☒ If yes, by whom? _____
Was electric log made Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth _____ ft. Completed depth 1000 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	7	Coarse sand and small boulders
7	8'10	Smooth tight drilling
8'10"	10	Smooth tight drilling
10	16½	Med. to coarse sands
16½	18	Bolders
18	18'10"	Smooth tight drilling
18'10"	19'10"	Loose sand and gravels
19'10"	21'	Sand and gravel
21	110'6	Med to coarse sand, some small boulders
110'6"	116	D.G.
116	118	Smooth, soft formation
118	120	Med. to coarse, black silt
120	124½	Hard rock
124½	128	Soft spot
128	215	Soft broken granite showing decompositon
215	1000	Hard granite, w/some quarts veins

Work started 7/7 19 88 Completed 10/18 19 89

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Signed [signature] (Well Driller)
NAME REX ANDERSON CORPORATION (Person, firm, or corporation) (Typed or printed)
Address P.O. Box 384
City Julian ZIP 92036
License No. 305739 Date of this report 10/18/89

CONFIDENTIAL NOT FOR PUBLIC USE WATER CODE SEC. 13752

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

DWR 188 (REV. 12-86) 86 96355

velenco

ELECTRIC-GAMMA RAY LOG

FILING NO.

COMPANY SCHOEPE ENTERPRISES

WELL PV-5

FIELD PAUMA VALLEY

STATE CALIFORNIA COUNTY SAN DIEGO

LOCATION: SOUTH OF 76

SEC 6 TWP 9S RGE 1W

OTHER SERVICES: BHTU

Permanent Datum: GROUND LEVEL, Elev.

Log Measured From TOP OF CASING Ft. Above Perm. Datum

Drilling Measured From GROUND LEVEL

Elev.: K.B.

D.F.

G.L. 682.9

Date	3/6/89		
Run No.	ONE		
Depth—Driller	840'		
Depth—Logger	837'		
Btm. Log Inter.	834'		
Top Log Inter.	124'		
Casing—Driller	8.25"@124'	@	@
Casing—Logger	124'		
Bit Size	7 7/8"		
Type Fluid in Hole	WATER		
Dens. | Visc.	N/A	|	|
pH | Fluid Loss	N/A	| ml	| ml
Source of Sample	PIT		
R_m @ Meas. Temp.	4.8 @ 85 °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	4.8 @ 85 °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	MEAS |	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F
Time Since Circ.	--		
Max. Rec. Temp.	N/A °F	°F	°F
Equip. | Location	DV-1 | L.A.	|	|
Recorded By	RIDDER		
Witnessed By	TIM GILES		

EQUIPMENT DATA

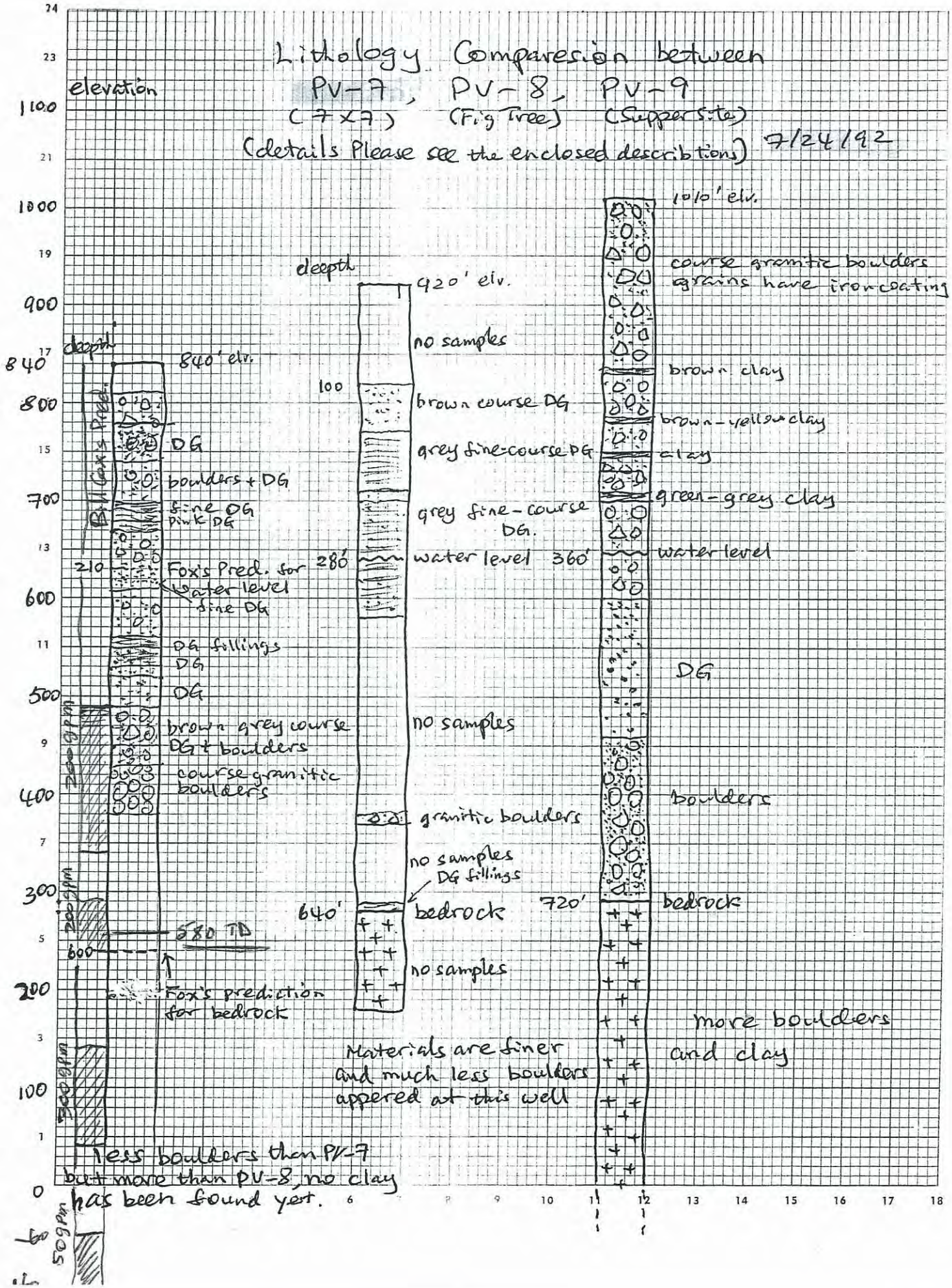
Gamma Ray				Neutron			
Run No.	ONE			Run No.			
Tool Model No.	220			Log Type			
Diameter	1 3/4"			Tool Model No.			
Detector Model No.	--			Diameter			
Type	SCINT			Detector Model No.			
Length	8"			Type			
Distance to N. Source	--			Length			
				Source Model No.			
General				Serial No.			
Hoist Truck No.	DV-1			Spacing			
Instrument Truck No.	DV-1			Type			
Tool Serial No.	220-77			Strength			

LOGGING DATA

General				Gamma Ray				Neutron			
Run No.	Depths From	Depths To	Speed Ft./Min.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units per Log Div.
1	835'	0'	20	3	500/370	OL	15				
	F-FACTOR= 6.00										

GAMMA RAY API UNITS | Depths | GUARD RESISTIVITY OHMS M²/M | DETAIL CURVE Single Point

0 150 | .2 1.0 10 | 100 1000


Lithology Comparesion between
PV-7, PV-8, PV-9
(7x7) (Fig Tree) (Suppers site)
(details Please see the enclosed descriptions) 7/24/92
elevation
deepth
840' elv.
DG
boulders + DG
fine DG
pink DG
Fox's Pred. for water level
fine DG
DG fillings
DG
DG
brown grey course DG + boulders
course granitic boulders
580 TD
Fox's prediction for bedrock
less boulders than PV-7
but more than PV-8, no clay
has been found yet.
420' elv.
no samples
brown course DG
grey fine-course DG
grey fine-course DG.
water level
no samples
granitic boulders
no samples
DG fillings
bedrock
no samples
Materials are finer
and much less boulders
appeared at this well
1010' elv.
course granitic boulders
grains have iron coating
brown clay
brown-yellow clay
clay
green-grey clay
water level
DG
boulders
bedrock
more boulders
and clay

PA-9 6-00 353'

wait on Mechanic

Samples:

PA-8 (Fig Tree Well)

60'—100 — light color course granitic boulders

100-150' — brown course DG — fillings

150-210' — grey fine-course DG

210-220' — brown fine-course DG

220-300 — grey fine-course DG

300-310 — light grey fine course DG

310-320 — grey fine-course DG

320-340 — grey-light brown fine course DG

540-550 — light fine-course granite boulders

600-640' — grey fine-course DG fillings.

PA-9

30-60' boulder light color coarse granite with pink color

60-100 light grey DG. calcite separated from other minerals.

100-140 light color with pink boulders and DG. calcite seperated from others

140-150' dark grey fine DG fillings between boulders

150-160' grey with pink course DG iron stain.

160-170 same as 140-150'

170-200 light pink color boulders

200-230 dark color fine DG — fillings

230-290 — light pink course DG and boulders. iron stain

290-295 — grey to color fine DG fillings

295-310' — light pink DG. Calcite seperated from others

310-320 — 50% black gabbro. 50% granite DG

320-330 — same as 295-310'

330-357 — course DG 80% dark grey gabbro 20% granite

BV-9

350 - 390. brown grey course DG and boulders

390 - 410. brown grey course DG & boulders

410 - 460 course granite boulders

460 - 420 - dark grey course grandiorite with brown granitic grains

7/23/92

La Joya well PA12 70.00 9:35

Rod. 130.4 10:00 566.61

163/40 gals 90/120/130

average 85/110/144

Sounding tube 987'

567.27' 10:37

pump letting 972'

11:00 163350 gals

629.37

Water column 629.66 10:59

+ 130.4

Cable depth = 760'

Lithology of 7*7 (PV-7)

Shadow Run Ranch, Pauma
November, 90--January, 91
By Zhouping Guo

Location: Frey Creek--Aluvine fan overlay and granite bedrocks environment.

Footage	Lithology
50	95% light grey course quartz-granite. Quartz grains have rose color coating. In granite: 50% quartz, 45% Na-feldspar and 5% biotite. 5% dark grey diorite
50-60	" "
60-70	80% light grey course granite (grains have iron coating), 20% dark grey fine course diorite.
70-80	80% light grey course granite, 20% dark grey diorite. Iron coating disappears, but see quartz from quartz vein with iron coating.
90-90	90% light grey course granite, 10% dark grey diorite.
90-100	90% light grey course granite, 10% diorite, <1% quartz vein.
100-105	100% light grey course granite: 60% feldspar and quartz, 40% biotite. Some grains have iron coating.
105-110	" "
110-115	100% grey course biotite-granite: 60% feldpsar and quartz, 40% biotite.
115-120	" "
120-125	" "
125-130	90% grey-course biotite-granite, 10% quartz from quartz vein. Quartz grains size from 1-5 mm.
130-135	" "
135-140	95% grey course biotite-granite, 5% quartz vein. Some of the quartz grains have iron coating.
140-145	100% grey course biotite-granite.

145-150	100% light grey course granite: 80% feldspar and quartz, 20% biotite, <1% quartz vein.
150-155	" "
155-160	" "
160-165	100% grey course biotite-granite: 50% feldspar and quartz, 50% biotite.
165-170	" "<1% quartz vein
170-175	100% grey course biotite-granite: 40% feldspar and quartz, 60% biotite and hornblend.
175-180	60% grey course granite, 40% dark grey fine course diorite.
180-185	50% light yellow clay (first time clay has appeared), 50% course granite, <1% quartz vein. The clay more likely acts as cement material between the boulders.
1850190	100% light grey quartz-granite: 90% quartz and feldspar, 10% dark minerals (biotite), <1% dark grey granite or diorite.
190-195	100% light grey quartz-granite: 90% quartz and feldspar, 10% dark. Some grains have iron coating.
195-200	100-% light grey quartz-granite: 10% rose color K-feldspar.
200-205	100% grey biotite-granite. Some grains have iron coating.
205-210	" "
210-215	" "
215-220	" "
220-225	" "
225-230	" "
230-235	80% dark grey course biotite-granite, 20% yellow clay.
235-240	100% grey course biotite-granite: 60% feldspar and quartz, 40% biotite.
240-245	" "
245-250	100% light grey quartz-granite. Some grains have iron coating.

250-255 100% light grey (quartz-granite) : 80% quartz and Na-feldspar, 15% rose color K-feldspar, 5% biotite.

255-260 " "

260-265 60% light grey quartz-granite, 10% dark grey, fine course diorite, 30% clay. In granite, rose color K-feldspar is 20% of all minerals.

265-270 70% clay, 15% light grey quartz-granite, 15% dark grey diorite.

270-275 90% dark grey fine course diorite, 10% light grey quartz-granite. Diorite chips range from 0.5-20 mm.

275-280 50% clay, 30% light grey course quartz-granite, 20% dark grey fine course diorite.

280-285 70% dark grey fine course diorite, 30% light grey quartz-granite, <1% clay.

285-290 99% light grey course quartz-granite, 1% dark grey diorite. 80% of grains have iron coating.

290-300 85% light grey course quartz-granite, 15% dark grey diorite. 50% of granite grains have iron coating.

300-310 90% light grey course granite (80% feldspar & quartz, 20% biotite), 10% dark grey fine course diorite. 5% of granite grains have iron coating.

310-320 80% green-gray clay, 15% light grey course granite, 5% dark grey diorite.

320-330 60% light grey course quartz-granite, 30% dark grey fine diorite, 10% red clay.

330-340 100% light grey course quartz-granite. 90% grains have iron coating.

340-350 " "

350-360 100% light grey course quartz-granite: 70% of granite grains have iron coating.

360-370 " "

370-380 90% dark grey fine course diorite, 10% light grey course quartz-granite with iron coating.

380-390 100% light grey course mozonite (?) (may be gneiss) with 50% rose color K-feldspar, 40% Na-feldspar & quartz, 10% dark minerals. It is very similar to gneiss.

390-400	98% light grey course quartz-granite, 2% dark grey fine diorite. 90% of granite grains have an iron coating.
400-410	100% decomposed granite (DG). Some grains have iron coating. <1% of diorite.
410-420	95% DG -- course quartz-granite, 5% dark grey diorite.
420-430	100% DG -- course quartz-granite.
430-440	no sample
440-450	100% DG -- course quartz-granite.
450-460	85% DG (of which 80% grains are coated by iron), 15% dark grey diorite.
460-470	99% light grey course quartz-granite, 1% Calcium chips. 40% of grains have an iron coating.
470-480	99% DG, 1% Calcium chips. 90% of grains have an iron coating.
480-490	100% DG, <1% Calcium chips. 20% of grains have an iron coating.
490-500	50% DG-course granite, 50% dark grey diorite.
500-510	70% DG-course granite, 30% dark grey diorite, <1% calcium chips.
510-520	100% DG-course granite, <1% diorite. 100% grains have iron coating.
520-530	" "
530-540	" "
540-550	100% DG-course granite, 40% grains have iron coating.
550-560	50% light grey course quartz-granite, 50% dark grey course grained diorite. 90% of granite grains have an iron coating.
560-570	99% light grey course quartz-granite, 1% dark grey granodiorite.
570-580	97% course quartz-granite.
600-610	30% course quartz-granite, 70% dark grey course grained diorite.
610-620	90% grey course granite, 10% grained diorite.

Matt Wiedlin

From: R.L. Deutschendorf,Sr./Sherrill Schoepe [wpvr101@yahoo.com]
Sent: Thursday, April 19, 2012 12:18 PM
To: Matt Wiedlin
Cc: Malcom Vinje
Subject: Well 10 data DTW taken in October 2011

Matt,

Well 10 has a static water level of 248 feet, the well depth is 392 feet.

Ron

APPENDIX B
LABORATORY REPORTS

EnviroMatrix Analytical, Inc.

15 May 2012

West Pauma Valley Ranch Inc.
Attn: Ron Deutschendorf
P.O. Box 1249
Pauma Valley, CA 92061

EMA Log #: 12E0144

Project Name: Shadow Ron Ranch LLC

Enclosed are the results of analyses for samples received by the laboratory on 05/07/12 11:26. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon
Laboratory Director

CA ELAP Certification #: 2564

Client Name: West Pauma Valley Ranch Inc.
Project Name: Shadow Ron Ranch LLC

EMA Log #: 12E0144

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
PV-6	12E0144-01	Drinking Water	05/07/12 06:00	05/07/12 11:26
PV-7	12E0144-02	Drinking Water	05/07/12 06:00	05/07/12 11:26
PV-8	12E0144-03	Drinking Water	05/07/12 06:00	05/07/12 11:26
PV-9	12E0144-04	Drinking Water	05/07/12 06:00	05/07/12 11:26
PV-10	12E0144-05	Drinking Water	05/07/12 06:00	05/07/12 11:26

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: West Pauma Valley Ranch Inc.
Project Name: Shadow Ron Ranch LLC

EMA Log #: 12E0144

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PV-6 (12E0144-01) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Kjeldahl Nitrogen	ND	0.5	mg/l	1	2050903	05/09/12	05/09/12	SM4500 N C	
PV-7 (12E0144-02) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Kjeldahl Nitrogen	ND	0.5	mg/l	1	2050903	05/09/12	05/09/12	SM4500 N C	
PV-8 (12E0144-03) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Kjeldahl Nitrogen	ND	0.5	mg/l	1	2050903	05/09/12	05/09/12	SM4500 N C	
PV-9 (12E0144-04) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Kjeldahl Nitrogen	ND	0.5	mg/l	1	2050903	05/09/12	05/09/12	SM4500 N C	
PV-10 (12E0144-05) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Kjeldahl Nitrogen	ND	0.5	mg/l	1	2050903	05/09/12	05/09/12	SM4500 N C	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: West Pauma Valley Ranch Inc.
Project Name: Shadow Ron Ranch LLC

EMA Log #: 12E0144

Microbiological Parameters by Standard Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PV-6 (12E0144-01) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Coliforms	Absent		None	1	2050810	05/07/12	05/08/12	SM9223	
E. Coli	Absent		"	"	"	"	"	"	
PV-7 (12E0144-02) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Coliforms	Absent		None	1	2050810	05/07/12	05/08/12	SM9223	
E. Coli	Absent		"	"	"	"	"	"	
PV-8 (12E0144-03) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Coliforms	Absent		None	1	2050810	05/07/12	05/08/12	SM9223	
E. Coli	Absent		"	"	"	"	"	"	
PV-9 (12E0144-04) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Coliforms	Absent		None	1	2050810	05/07/12	05/08/12	SM9223	
E. Coli	Absent		"	"	"	"	"	"	
PV-10 (12E0144-05) Drinking Water	**Sampled: 05/07/12 06:00**		**Received: 05/07/12 11:26**						
Total Coliforms	Absent		None	1	2050810	05/07/12	05/08/12	SM9223	
E. Coli	Absent		"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: West Pauma Valley Ranch Inc.
Project Name: Shadow Ron Ranch LLC

EMA Log #: 12E0144

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2050903										
Blank (2050903-BLK1)				Prepared & Analyzed: 05/09/12						
Total Kjeldahl Nitrogen	ND	0.5	mg/l							
LCS (2050903-BS1)				Prepared & Analyzed: 05/09/12						
Total Kjeldahl Nitrogen	3.4	0.5	mg/l	4.10		82	80-120			
LCS Dup (2050903-BSD1)				Prepared & Analyzed: 05/09/12						
Total Kjeldahl Nitrogen	3.4	0.5	mg/l	4.10		83	80-120	0.9	20	
Duplicate (2050903-DUP1)		**Source: 12D0724-02**		Prepared & Analyzed: 05/09/12						
Total Kjeldahl Nitrogen	0.3	0.5	mg/l		ND				20	
Matrix Spike (2050903-MS1)		**Source: 12D0724-02**		Prepared & Analyzed: 05/09/12						
Total Kjeldahl Nitrogen	2.2	0.5	mg/l	4.10	ND	53	80-120			QM-05
Matrix Spike Dup (2050903-MSD1)		**Source: 12D0724-02**		Prepared & Analyzed: 05/09/12						
Total Kjeldahl Nitrogen	2.2	0.5	mg/l	4.10	ND	53	80-120	0.2	20	QM-05

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: West Pauma Valley Ranch Inc. **EMA Log #: 12E0144**
Project Name: Shadow Ron Ranch LLC

Notes and Definitions

QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CHAIN-OF-CUSTODY RECORD

– EnviroMatrix EMA Analytical, Inc. ——

4340 Viewridge Ave., Ste. A - San Diego, CA 92123 - Phone (858) 560-7717 - Fax (858) 560-7763

EMA LOG #: 12E0144

Client: West Pauma Valley Ranch Inc

Attn: Ron Deutschendorf

Samplers(s): Miguel Fernandez

Address: 14504 State Hwy 76 / PO Box 1249

Pauma Valley CA 92061

Phone: 760 742-3097 Fax:

Email: WPVR101@Yahoo.com

Billing Address: PO Box 1249

Pauma Valley CA 92061

Project ID: Shadow Run Ranch LLC

Project #: PO #:

Requested Analysis

ID #	Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container # / Type	Oil & Grease □ 413.1 □ 413.2 □ 1664	8015B (TPH) □ Gas □ Diesel □ Ext	624/8260 (VOC) Full BTXE MTBE Oxy Nap	625 / 8270 (SVOC) □ PAH only	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (Organotin Compounds)	□ pH □ EC □ TSS □ TDS	□ Nitrate □ Nitrite ☒TKN □NH3	CAC Title 22/CAM17 Metals □ TTLC □ STLC	TCLP (RCRA) □ Metals □ Organics	Cd Cr Cu Pb Ni Ag Zn □ Dissolved	Coliform, □ Total (MTF) □ Fecal (MTF)	Colilert, T+E.Coli ☒P/A □ Enumeration	Enterococcus, □ MTF □ Enterolert	Heterotrophic Plate Count (HPC)	□ BOD □ COD □ Cyanide	.					
1	PV-6	5-7-12	6 AM	DW	3P										X					X									
2	PV-7	↓	↓	↓	↓										X					X									
3	PV-8														X					X									
4	PV-9														X					X									
5	PV-10														X					X									
6																													
7																													
8																													
9																													
10																													

Matrix Codes: A = Air, DW = Drinking Water, GW = Groundwater, SW = Storm Water
WW = Wastewater, S = Soil, SED = Sediment, SD = Solid, T = Tissue, O = Oil, L = Liquid

Shipped By: □ Courier □ UPS □ FedEx □ USPS □ Client Drop Off □ Other

[1]**Turn-Around-Time:** □ Same Day □ 24 hr □ 48 hr □ 3 day □ 4 day □ 5 day ☒STD (7 day)

[1]**Reporting Requirements:** □ Fax ☒PDF □ Excel □ Geotracker/EDF □ Hard Copy □ EDT

[1]**Sample Disposal:** □ By Laboratory □ [2]Return to Client: P/U or Delivery □ Archive

Sample Integrity

Correct Containers: Yes No N/A | Containers Properly Preseved: Yes No N/A

Custody Seals Intact: Yes No N/A | Temp @ Receipt:_____

COC/Labels Agree: Yes No N/A | Sampled By: Client EMA Autosampler

	RELINQUISHED BY	DATE/TIME	RECEIVED BY
Signature	Ronald J. Deutschendorf	5-7-12	Signature
Print	Ronald J. Deutschendorf	1126	Print DAVID NGUYEN
Company:	West Pauma Valley Ranch Inc		Company: EMA
Signature			Signature
Print			Print
Company:			Company:
Signature			Signature
Print			Print
Company:			Company:

Project/Sample Comments:

10°C on Ice

[1]Additional costs may apply, consult a project manager for details.

[2]EMA reserves the right to return any samples that do not match our waste profile.

NOTE: By relinquishing samples to EMA, Inc., client agrees to pay for the services requested on this COC form and any additional analyses performed on this project. Payment for services is due within 30 days from date of invoice. Samples will be disposed of 7 days after report has been finalized unless otherwise noted. All work is subject to EMA's terms and conditions.

EnviroMatrix Analytical, Inc.

11 May 2012

West Pauma Valley Ranch Inc.
Attn: Ron Deutschendorf
P.O. Box 1249 Pauma Valley
Pauma Valley, CA 92061

EMA Log #: 12E0107

Project Name: Shadow Run Ranch LLC

Enclosed are the results of analyses for samples received by the laboratory on 05/04/12 11:54. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon
Laboratory Director

CA ELAP Certification #: 2564

Client Name: West Pauma Valley Ranch Inc.
Project Name: Shadow Run Ranch LLC

EMA Log #: 12E0107

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
PV6	12E0107-01	Drinking Water	05/04/12 06:00	05/04/12 11:54
PV7	12E0107-02	Drinking Water	05/04/12 06:00	05/04/12 11:54
PV8	12E0107-03	Drinking Water	05/04/12 06:00	05/04/12 11:54
PV9	12E0107-04	Drinking Water	05/04/12 06:00	05/04/12 11:54
PV10	12E0107-05	Drinking Water	05/04/12 06:00	05/04/12 11:54

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: West Pauma Valley Ranch Inc.
Project Name: Shadow Run Ranch LLC

EMA Log #: 12E0107

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
PV6 (12E0107-01) Drinking Water	**Sampled: 05/04/12 06:00**		**Received: 05/04/12 11:54**						
Nitrate as N	ND	0.05	mg/l	1	2050835	05/08/12	05/08/12	SM4500 NO3 E	W-02
Total Dissolved Solids	**827**	20.0	"	"	2050731	05/07/12	05/09/12	SM2540 C	
PV7 (12E0107-02) Drinking Water	**Sampled: 05/04/12 06:00**		**Received: 05/04/12 11:54**						
Nitrate as N	**0.58**	0.25	mg/l	5	2050835	05/08/12	05/08/12	SM4500 NO3 E	W-02
Total Dissolved Solids	**407**	20.0	"	1	2050731	05/07/12	05/09/12	SM2540 C	
PV8 (12E0107-03) Drinking Water	**Sampled: 05/04/12 06:00**		**Received: 05/04/12 11:54**						
Nitrate as N	**4.05**	1.25	mg/l	25	2050835	05/08/12	05/08/12	SM4500 NO3 E	W-02
Total Dissolved Solids	**424**	20.0	"	1	2050731	05/07/12	05/09/12	SM2540 C	
PV9 (12E0107-04) Drinking Water	**Sampled: 05/04/12 06:00**		**Received: 05/04/12 11:54**						
Nitrate as N	**8.90**	1.25	mg/l	25	2050835	05/08/12	05/08/12	SM4500 NO3 E	W-02
Total Dissolved Solids	**461**	20.0	"	1	2050731	05/07/12	05/09/12	SM2540 C	
PV10 (12E0107-05) Drinking Water	**Sampled: 05/04/12 06:00**		**Received: 05/04/12 11:54**						
Nitrate as N	**7.90**	1.25	mg/l	25	2050835	05/08/12	05/08/12	SM4500 NO3 E	W-02
Total Dissolved Solids	**741**	20.0	"	1	2050731	05/07/12	05/09/12	SM2540 C	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: West Pauma Valley Ranch Inc. **EMA Log #: 12E0107**
Project Name: Shadow Run Ranch LLC

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2050731										
Blank (2050731-BLK1)				Prepared: 05/07/12 Analyzed: 05/09/12						
Total Dissolved Solids	ND	20.0	mg/l							
Duplicate (2050731-DUP1)		**Source: 12E0106-01**		Prepared: 05/07/12 Analyzed: 05/09/12						
Total Dissolved Solids	16500	20.0	mg/l		16500			0.08	20	
Reference (2050731-SRM1)				Prepared: 05/07/12 Analyzed: 05/09/12						
Total Dissolved Solids	304	20.0	mg/l	272		112	74.6-125.4			
Batch 2050835										
Blank (2050835-BLK1)				Prepared & Analyzed: 05/08/12						
Nitrate as N	ND	0.05	mg/l							
LCS (2050835-BS1)				Prepared & Analyzed: 05/08/12						
Nitrate as N	0.44	0.05	mg/l	0.500		87	80-120			
LCS Dup (2050835-BSD1)				Prepared & Analyzed: 05/08/12						
Nitrate as N	0.45	0.05	mg/l	0.500		90	80-120	3	20	
Duplicate (2050835-DUP1)		**Source: 12E0063-01**		Prepared & Analyzed: 05/08/12						
Nitrate as N	ND	0.05	mg/l		ND				20	
Matrix Spike (2050835-MS1)		**Source: 12E0063-01**		Prepared & Analyzed: 05/08/12						
Nitrate as N	0.55	0.05	mg/l	0.500	ND	111	80-120			
Matrix Spike Dup (2050835-MSD1)		**Source: 12E0063-01**		Prepared & Analyzed: 05/08/12						
Nitrate as N	0.55	0.05	mg/l	0.500	ND	111	80-120	0	20	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: West Pauma Valley Ranch Inc. **EMA Log #: 12E0107**
Project Name: Shadow Run Ranch LLC

Notes and Definitions

W-02	The sample for nitrate analysis was preserved with H2SO4 after the nitrite portion of the analysis was completed to extend the holding time for the sample. Nitrate results are corrected for the nitrite contribution per the method.
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

CHAIN-OF-CUSTODY RECORD

– EnviroMatrix Analytical, Inc. —
4340 Viewridge Ave., Ste. A - San Diego, CA 92123 - Phone (858) 560-7717 - Fax (858) 560-7763

EMA LOG #: 12E0107

Client: West Paauma Valley Ranch Inc
Attn: Ken Deutschendorf
Samplers(s): Megael Fernandez
Address: 14504 State Hwy 76 / PO Box 1249
Pauma Valley CA 92061
Phone: 760-742-3097 Fax: 760-742-4460
Email: WPVR101@yahoo.com
Billing Address: PO Box 1249 Pauma Valley CA 92061

Project ID: Shadow Run Ranch LLC
Project #: PO #:

Requested Analysis

ID #	Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container # / Type	Oil & Grease □ 413.1 □ 413.2 □ 1664	8015B (TPH) □ Gas □ Diesel □ Ext	624/8260 (VOC) Full BTXE MTBE Oxy Nap	625 / 8270 (SVOC) □ PAH only	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (Organotin Compounds)	□ pH □ EC □ TSS □ TDS	Nitrate □ Nitrite □ TKN □ NH3	CAC Title 22/CAM17 Metals □ TTLC □ STLC	TCLP (RCRA) □ Metals □ Organics	Cd Cr Cu Pb Ni Ag Zn □ Dissolved	Coliform, □ Total (MTF) □ Fecal (MTF)	Colilert, T+E.Coli □ P/A □ Enumeration	Enterococcus, □ MTF □ Enterolert	Heterotrophic Plate Count (HPC)	□ BOD □ COD □ Cyanide	TDS				
1	PV6	5-4	6AM	DW	1/P										X									X				
2	PV7	5-4	6AM	DW	1/P										X									X				
3	PV8	5-4	6AM	DW	1/P										X									X				
4	PV9	5-4	6AM	DW	1/P										X									X				
5	PV10	5-4	6AM	DW	1/P										X									X				
6																												
7																												
8																												
9																												
10																												

Matrix Codes: A = Air, DW = Drinking Water, GW = Groundwater, SW = Storm Water
WW = Wastewater, S = Soil, SED = Sediment, SD = Solid, T = Tissue, O = Oil, L = Liquid

Shipped By: □ Courier □ UPS □ FedEx □ USPS ☑ Client Drop Off □ Other

[1]Turn-Around-Time: □ Same Day □ 24 hr □ 48 hr □ 3 day □ 4 day □ 5 day ☑ STD (7 day)

[1]Reporting Requirements: □ Fax ☑ PDF □ Excel □ Geotracker/EDF □ Hard Copy □ EDT

[1]Sample Disposal: ☑ By Laboratory □ [2]Return to Client: P/U or Delivery □ Archive

Sample Integrity

Correct Containers: Yes No N/A
Containers Properly Preseved: Yes No N/A
Custody Seals Intact: Yes No N/A
Temp @ Receipt: _____
COC/Labels Agree: Yes No N/A
Sampled By: Client EMA Autosampler

	RELINQUISHED BY	DATE/TIME	RECEIVED BY
Signature	Ken Deutschendorf	5/4/12 1154	David Nguyen
Print	Ronald L. Deutschendorf		
Company:	Shadow Run Ranch		EMA
Signature			
Print			
Company:			
Signature			
Print			
Company:			

Project/Sample Comments:

13° C on Ice

[1]Additional costs may apply, consult a project manager for details.

[2]EMA reserves the right to return any samples that do not match our waste profile.

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APPENDIX C
FERTILIZER PURCHASE RECORDS

L&M FERTILIZER

Shadow Run Ranch

QUANTITY ↓

PRODUCT

	A	B	C	D	E	F	G	H	I	J
1	Date	Cust #	Doc #	Customer Name	Units/Per	SKU	Description	Sell QTY	Sell Price	Extension
2	2/28/2012	5694	420625	WEST PALMA VALLEY RANCH*	50/EA	H1/2S	[illegible]	-50.00	1.50	-75.00
3	2/21/2012	5694	420479	WEST PALMA VALLEY RANCH*	240/BG	460000	46-0-0 UREA 50-LB	240.00	18.67	4,528.80
4	2/21/2012	5694	420459	WEST PALMA VALLEY RANCH*	2000/BG	460000	46-0-0 UREA 50-LB	2,000.00	18.75	33,500.00
5	2/21/2012	5694	420457	WEST PALMA VALLEY RANCH*	294/BG	151515H	15-15-15 HYDRO-PRILLS 5(	294.00	18.59	5,759.46
6	9/23/2011	5694	416888	WEST PALMA VALLEY RANCH*	420/BG	151515H	15-15-15 HYDRO-PRILLS 5(	420.00	18.73	7,866.60
7	9/23/2011	5694	416887	WEST PALMA VALLEY RANCH*	1008/BG	151515H	15-15-15 HYDRO-PRILLS 5(	1,008.00	17.95	18,093.60
8	9/23/2011	5694	416887	WEST PALMA VALLEY RANCH*	1008/BG	151515H	15-15-15 HYDRO-PRILLS 5(	1,008.00	17.95	18,093.60
9	7/14/2011	5694	414992	WEST PALMA VALLEY RANCH*	252/BG	150000	15.5-0-0 CALCIUM NITRATI	252.00	10.25	2,583.00
10	6/24/2011	5694	414039	WEST PALMA VALLEY RANCH*	252/BG	150000	15.5-0-0 CALCIUM NITRATE	252.00	11.25	2,835.00
11	4/19/2011	5694	411769	WEST PALMA VALLEY RANCH*	40/BG	460000	46-0-0 UREA 50-LB	40.00	16.56	662.40
12	2/24/2011	5694	410181	WEST PALMA VALLEY RANCH*	360/EA	GYP50	GYPSUM (CALCIUM SULFA	360.00	4.75	1,710.00
13	2/23/2011	5694	410109	WEST PALMA VALLEY RANCH*	192/BG	000053	0-0-53 POTASSIUM SULFA	192.00	24.25	4,656.00
14	2/23/2011	5694	410108	WEST PALMA VALLEY RANCH*	168/BG	151515H	15-15-15 HYDRO-PRILLS 5(	168.00	18.81	3,160.08
15	11/24/2010	5694	408007	WEST PALMA VALLEY RANCH*	-280/BG	460000	46-0-0 UREA 50-LB	-280.00	14.25	-3,990.00
16	11/5/2010	5694	407625	WEST PALMA VALLEY RANCH*	1000/BG	460000	46-0-0 UREA 50-LB	1,000.00	14.25	14,250.00
17	10/25/2010	5694	407351	WEST PALMA VALLEY RANCH*	630/BG	151515H	15-15-15 HYDRO-PRILLS 5(	630.00	16.39	10,325.70
18	3/23/2010	5694	401112	WEST PALMA VALLEY RANCH*	120/BG	460000	46-0-0 UREA 50-LB	120.00	15.76	1,891.20
19	3/10/2010	5694	400686	WEST PALMA VALLEY RANCH*	931/BG	000050	0-0-50 POTASULFATE *0MR	931.00	17.85	16,618.35
20	3/10/2010	5694	400685	WEST PALMA VALLEY RANCH*	931/BG	000050	0-0-50 POTASULFATE *0MR	931.00	17.85	16,618.35
21	2/24/2010	5694	400175	WEST PALMA VALLEY RANCH*	400/BG	460000	46-0-0 UREA 50-LB	400.00	15.10	6,040.00
22	2/24/2010	5694	400174	WEST PALMA VALLEY RANCH*	480/BG	460000	46-0-0 UREA 50-LB	480.00	15.10	7,248.00
23	2/24/2010	5694	400173	WEST PALMA VALLEY RANCH*	360/EA	GYP50	GYPSUM (CALCIUM SULFA	360.00	4.25	1,530.00
24	10/12/2009	5694	397156	WEST PALMA VALLEY RANCH*	1008/BG	150000	15.5-0-0 CALCIUM NITRATE	1,008.00	10.78	10,866.24
25	6/15/2009	5694	393553	WEST PALMA VALLEY RANCH*	240/EA	GYP50	GYPSUM (CALCIUM SULFA	240.00	4.25	1,020.00
26	6/22/2009	5694	392913	WEST PALMA VALLEY RANCH*	240/EA	GYP50	GYPSUM (CALCIUM SULFA	240.00	4.25	1,020.00
27	3/12/2009	5694	390420	WEST PALMA VALLEY RANCH*	320/BG	460000	46-0-0 UREA 50-LB	320.00	15.10	4,832.00
28	2/25/2009	5694	389824	WEST PALMA VALLEY RANCH*	-10/BG	000053	0-0-53 POTASSIUM SULFA	-10.00	27.98	-279.80
29	2/25/2009	5694	389815	WEST PALMA VALLEY RANCH*	784/BG	000053	0-0-53 POTASSIUM SULFA	784.00	27.98	21,936.32
30	2/25/2009	5694	389815	WEST PALMA VALLEY RANCH*	794/BG	000053	0-0-53 POTASSIUM SULFA	794.00	27.98	22,216.12
31	2/24/2009	5694	389648	WEST PALMA VALLEY RANCH*	520/BG	460000	46-0-0 UREA 50-LB	520.00	15.10	7,852.00
32	9/29/2008	5694	386349	WEST PALMA VALLEY RANCH	1008/BG	150000	15.5-0-0 CALCIUM NITRATE	1,008.00	15.90	16,027.20
33	9/29/2008	5694	386348	WEST PALMA VALLEY RANCH	1008/BG	150000	15.5-0-0 CALCIUM NITRATE	1,008.00	15.90	16,027.20
34	6/24/2008	5694	383327	WEST PALMA VALLEY RANCH	6/EA	002826-2	00-20-26 FORMULA 1 2.5G#	6.00	43.50	261.00
35	2/28/2008	5694	379156	WEST PALMA VALLEY RANCH	784/BG	000053	0-0-53 POTASSIUM SULFA	784.00	17.65	13,837.60
36	2/28/2008	5694	379155	WEST PALMA VALLEY RANCH	784/BG	000053	0-0-53 POTASSIUM SULFA	784.00	17.65	13,837.60
37	2/13/2008	5694	378726	WEST PALMA VALLEY RANCH	520/BG	460000	46-0-0 UREA 50-LB	520.00	17.56	9,131.20
38	11/15/2007	5694	376527	WEST PALMA VALLEY RANCH	1/BG	800000018	15-15% MANGANESE/ZINC	1.00	47.13	47.13

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7607281072 Page:1-2

	A	B	C	D	E	F	G	H	I	J
39	11/15/2007	5694	378527	WEST PAUMA VALLEY RANCH	1/EA	TFHIMAG	TECH FLO HI MAG 20% MG	1.00	58.59	58.59
40	8/7/2007	5694	374591	WEST PAUMA VALLEY RANCH	280/BG	130044AP	13-0-46 POT NIT PRILL 50L	280.00	18.53	5,188.40
41	6/21/2007	5694	374077	WEST PAUMA VALLEY RANCH	400/BG	130044AP	13-0-46 POT NIT PRILL 50L	400.00	18.53	7,412.00
42	6/29/2007	5694	374921	WEST PAUMA VALLEY RANCH	400/BG	130044AP	13-0-46 POT NIT PRILL 50L	400.00	17.40	6,960.00
43	6/8/2007	5694	373755	WEST PAUMA VALLEY RANCH	400/BG	130044AP	13-0-46 POT NIT PRILL 50L	400.00	17.40	6,960.00
44	3/23/2007	5694	368420	WEST PAUMA VALLEY RANCH	40/BG	460000	46-0-0 UREA 50-LB	40.00	12.98	519.20
45	3/3/2007	5694	367625	WEST PAUMA VALLEY RANCH	120/BG	460000	46-0-0 UREA 50-LB	120.00	11.93	1,431.60
46	2/23/2007	5694	367369	WEST PAUMA VALLEY RANCH	180/BG	460000	46-0-0 UREA 50-LB	180.00	11.93	2,147.40
47	2/23/2007	5694	367368	WEST PAUMA VALLEY RANCH	40/BG	460000	46-0-0 UREA 50-LB	40.00	11.93	477.20
48	12/11/2006	5694	365311	WEST PAUMA VALLEY RANCH	4/EA	LOBI	LOBI UREA 50 LB	4.00	20.85	83.40
49	12/11/2006	5694	365311	WEST PAUMA VALLEY RANCH	2/BG	00000018	15-15% MANGANESE/ZINC	2.00	32.99	65.98
50	12/11/2006	5694	365311	WEST PAUMA VALLEY RANCH	3/EA	TFHIMAG	TECH FLO HI MAG 20% MG	3.00	58.59	189.77
51	11/7/2006	5694	364444	WEST PAUMA VALLEY RANCH	6/BG	00000018	15-15% MANGANESE/ZINC	6.00	28.89	173.34
52	11/7/2006	5694	364444	WEST PAUMA VALLEY RANCH	12/BG	130044GO	13-0-46 POT NIT GG/SOL 5	12.00	18.53	222.36
53	11/7/2006	5694	364444	WEST PAUMA VALLEY RANCH	4/EA	TFHIMAG	TECH FLO HI MAG 20% MG	4.00	56.59	226.36
54										
55										

* FOLIAR APPLIED!

13-0-46 POSSIBLE FOLIAR APPLICATION ALSO!