Geohydrologic Evaluation of Maximum Perennial Yield Tapo Canyon Tributary Subarea

Ventura County, California

Prepared for: RBF Consulting and

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GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD
TAPO CANYON TRIBUTARY SUBAREA – VENTURA COUNTY, CALIFORNIA

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GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD TAPO CANYON TRIBUTARY SUBAREA VENTURA COUNTY, CALIFORNIA

1.0 EXECUTIVE SUMMARY

This report presents the methodology, analysis, and findings of an evaluation of the maximum perennial yield of the ground water basin within the Tapo Canyon area of the Santa Susana Mountains immediately north of Simi Valley, California. Evaluation of the maximum perennial yield was conducted in order to assess potential future increase of ground water production from the area. The scope of the evaluation included:

- Data collection and review,
- Delineation of the drainage area encompassing Tapo Canyon,
- Identification of the limits of the ground water basin,
- Analysis of historical geohydrological data,
- Estimation of the maximum perennial yield of the ground water basin using multiple methods,
- Identification of potential future well sites, and
- Preparation of this report.

Previous estimates of the perennial yield of the Tapo Canyon area ranged from 1,005 to 1,445 acre-ft/yr. For this investigation, the historical data was supplemented with more recent ground water levels and pumping data for Wells Nos. 31 and 32 operated by County Waterworks District No. 8 (District), to refine the previous perennial yield estimates as a basis for future ground water resource planning.

Tapo Canyon and its associated drainages are tributary to the Calleguas Creek Watershed of southern Ventura County, California. The immediate watershed that encompasses Tapo Canyon is referred to in this report as the Tapo Canyon Tributary Subarea (also referred to as the Study

Area). The topography of the Study Area is hilly with ground surface elevations ranging from more than 3,000 ft above mean sea level (amsl) to approximately 1,100 ft amsl. The climate of the Study Area is considered Mediterranean and receives an average of 17.3 inches of precipitation annually.

The geology of the Tapo Canyon Tributary Subarea is characterized by Tertiary marine and nonmarine sedimentary rocks that have been folded and faulted by tectonic activity. The area is positioned along the axis of the northwest-southeast trending Happy Camp Syncline located in between the inactive Santa Susana Thrust Fault and Simi Fault Zone. The Happy Camp Syncline is significant for this investigation because the formations closest to the center of the syncline (Saugus and Pico) form the Tapo Canyon Ground Water Basin. The ground water basin is an 8 square mile elongated area trending east-west that is bound on the north by the Santa Susana Fault and on the south by the impermeable Monterey Shale.

Data from pumping tests and ongoing production yields from the existing wells in the Study Area indicate that the permeability of the aquifer system in the Tapo Canyon Ground Water Basin is relatively high. Wells constructed in the area are capable of pumping as much as 3,000 gallons per minute and aquifer transmissivity has been estimated to range from 60,000 to 100,000 gallons per day per ft.

Ground water has been produced from the Tapo Canyon Ground Water Basin since the early 1900s. Ground water production data are available from 1920 to the present with a gap in data between 1972 and 1993. Ground water production from the basin averaged approximately 1,340 acre-ft/yr between 1928 and 1947. Production increased between 1947 and 1967 to an annual average of 1,800 acre-ft/yr and then declined again in the early 1970s. Current annual production by the District and the Gillibrand mining operation (the only two current ground water producers in the Study Area) is approximately 1,130 acre-ft/yr (average of 2001 to 2005 pumping).

Two independent methods were used to assess the maximum perennial yield of the Tapo Canyon

Tributary Subarea. Each method represents an independent approach, thereby resulting in a cross check on the final perennial yield estimate. The methods considered during the assessment of maximum perennial yield were:

- Ground Water Level and Production Analysis
- Watershed Model

The ground water level and production analysis considers total production and its effect on ground water elevations over multiple climatic cycles. The watershed model takes into account long-term inflow, outflow and change in ground water storage.

Based on the analyses presented in this report, the following have been concluded regarding the maximum perennial yield of the Tapo Canyon Tributary Subarea:

- The Study Area for this investigation includes the Tapo Canyon Tributary Subarea, which encompasses the total 11,356-acre drainage catchment, and the Tapo Canyon Ground Water Basin, which is a smaller area of the drainage catchment (5,129 acres) and represents the primary ground water aquifer system of the Study Area.

- The estimated maximum perennial yield of the Tapo Canyon Ground Water Basin based on historical ground water level and production data and taking into consideration precipitation trends is approximately 1,350 acre-ft/yr. This estimate is approximately 18 percent of precipitation (average of 17.3 inches) that falls on the ground water basin on an average annual basis.

- The average annual ground water recharge within the total 11,356 acre Tapo Canyon Tributary Subarea is estimated to be 2,177 acre-ft/yr, based on watershed model results. This rate of recharge is approximately 13 percent of average annual precipitation for the subarea.
- The perennial yield value of 1,350 acre-ft/yr is considered a better estimate of the

maximum perennial yield of the Study Area because the ground water recharge estimate from the watershed model includes portions of the Study Area that are not economically viable for ground water production.

- The current combined average annual ground water production from the District's Wells Nos. 31 and 32 and Gillibrand Well No. 2 (1,130 acre-ft/yr) is below the long-term maximum perennial yield (1,350 acre-ft/yr) estimated for the Study Area.

- Based on recent Southern California Edison pumping test data (January 2005), Well 31 is capable of a pumping rate of 1,500 gpm and Well 32 is capable of 1,050 gpm. At these pumping rates, the existing wells are capable of producing up to 2,500 acre-ft/yr (assuming 60 percent utilization), which is well in excess of the estimated maximum perennial yield.

Although the existing wells within the basin are capable of fully utilizing the maximum perennial yield, if additional wells are desired, it is recommended to construct them in areas that correspond to the central axis of the Happy Camp Syncline. Suggested well sites include upper Tapo Canyon north of former Well No. 12 and Iron Trough Canyon between the District's Well No. 32 and Gillibrand Well No. 2. Tripas Canyon may also yield potential well sites although test drilling is recommended in this area to verify the nature and thickness of the aquifer system.

2.0 INTRODUCTION

Tapo Canyon is a tributary drainage within the Santa Susana Mountains immediately north of Simi Valley, California (see Figure 1). The ground water resources of the area have been utilized for municipal supply and gravel mining operations for more than 50 years. Currently, both the Ventura County Waterworks District No. 8 (District) and the P.W. Gillibrand Mining Corporation produce ground water from the area. However, the District is considering expanding the current ground water production if the available long-term water supply from the area supports it. As no recent evaluations of the ground water resources in the area have been conducted, this report presents an analysis of available ground water supplies to the Tapo Canyon area.

2.1 Purpose and Scope

The purpose of this report is to summarize the methodology, analysis, and findings of an evaluation of the maximum perennial yield of the ground water basin within the Tapo Canyon Study Area. Further, the report provides recommendations regarding the placement of future ground water production wells. The scope of this evaluation included:

- Data collection and review,
- Delineation of the drainage area encompassing Tapo Canyon,
- Identification of the limits of the ground water basin,
- Analysis of historical geohydrological data,
- Estimation of the maximum perennial yield of the ground water basin using multiple methods,
- Identification of potential future well sites, and
- Preparation of this report.

2.2 Project Location

Tapo Canyon is located within the northeastern portion of the Calleguas Creek Watershed in southern Ventura County, California (see Figure 1). The Calleguas Creek Watershed encompasses approximately 341 square miles, extending from the Los Angeles-Ventura County line on the east to the Pacific Ocean on the west. The Santa Susana Mountains form the northern boundary of the watershed and the Simi Hills and Santa Monica Mountains form the southern boundary.

The Study Area for this evaluation is the drainage area that encompasses Tapo Canyon, which is shown on Figures 1 and 2 and referred to in this report as the Tapo Canyon Tributary Subarea. This Study Area, which covers approximately 18 square miles, is located within the Santa Susana Mountains north of Simi Valley.

2.3 Previous Investigations

The earliest study reporting on the perennial yield of the aquifer within the Study Area was California Department of Water Resources (CDWR) Bulletin 75 (CDWR, 1959), which estimated it to be approximately 1,200 acre-ft/yr. Since that time, three reports have been prepared with estimates of perennial yield for the Tapo Canyon area:

- Killingsworth, 1964: 1,400 acre-ft/yr
- Boyle Engineering, 1972: 1,005 acre-ft/yr
- Johnson, 1980: 1,445 acre-ft/yr

2.4 Sources of Data

Data used to evaluate the maximum perennial yield of the Study Area for this investigation was obtained from multiple sources, including both public agencies and private companies. Specific types of data compiled for the study included driller's logs, ground water production data, ground water level data, precipitation and evaporation data, pumping test data and ground water quality data. The data analysis task involved tabulating and summarizing information from documented, public and private files, as well as personal communications with local and state agencies. Much of the well production and ground water level data was provided by the District. Precipitation data was provided by the Ventura County Water Protection District. Key reports consulted for the analysis and in the preparation of this report included:

- *Tapo Dam and Reservoir Hydrology Report*, Boyle (1972)
- *Groundwater Elevations in the Vicinity of CUP-1367, CZS Corporation, Tapo Canyon*, Johnson (1980)
- *Geologic Map of the Santa Susana Quadrangle, Ventura and Los Angeles Counties, California, 1:24,000*, Dibblee (1992a)
- *Geologic Map of the Simi Quadrangle, Ventura County, California, 1:24,000*, Dibblee (1992b)
- *Evaluation of Total Dissolved Solids*, West Coast Environmental and Engineering (WCEE, 2003).
- *Hydraulic Modeling of the Calleguas Creek Watershed with the U.S. EPA Hydrologic Simulation Program – FORTRAN (HSPF)*, Aqua Terra (2005).

A complete list of references cited in this report is provided in Section 9.

3.0 DESCRIPTION OF THE STUDY AREA

3.1 Physiography and Topography

The Study Area is located within the Transverse Ranges geomorphic province of southern California. This province is characterized by east-west trending mountain ranges separated by similarly trending alluvial valleys (Norris and Webb, 1990). The major drainage systems (e.g. the Arroyo Simi River) trend in an east-west direction parallel to the mountains, receiving runoff from tributary drainages in the surrounding highlands. The Tapo Canyon Tributary Subarea (the Study Area) is located on the south slope of the Santa Susana Mountains.

The topography of the Study Area is hilly with moderate relief. Ground surface elevations range from more than 3,000 ft above mean sea level (amsl) along the northern ridge to approximately 1,100 ft amsl where the Tapo Canyon drainage empties into Simi Valley. The hill slopes within and surrounding the Study Area are rugged and moderately steep (as much as 75 degrees) (Cilweck and Hitchingham, 1970). The canyon has two major tributaries, Tripas Canyon (9.27 square miles to its junction with Tapo Canyon) and Gillibrand Canyon (4.90 square miles) (Boyle, 1972). Minor tributaries include Iron Trough and Windmill Canyons. All tributaries drain into Tapo Creek, which flows out of the Study Area into Simi Valley (see Figure 2).

3.2 Climate

The climate of the Study Area is considered Mediterranean (dry summer subtropical), which is characterized by warm dry summers and mild wet winters (Ritter, 2006). The average high and low temperatures in January are 68 and 40 degrees Fahrenheit, respectively. The average high and low temperatures in August are 96 and 58 degrees Fahrenheit, respectively.

3.2.1 Precipitation

Historical precipitation records are available from three precipitation stations within or immediately adjacent to the Study Area: Santa Susana 4NNE (which includes Stations 196, 196a and 196b), Station 242, and Station 62 (see Figure 2 for precipitation station locations). Historical annual precipitation between 1928 and 2004 based on records from Stations 62 and Santa Susana 4NNE is shown on Figure 3. Average annual precipitation, based on these data is 17.3 inches per year. Precipitation extremes range from 6.24 inches in 2002 to 52.16 inches in 1983 (see Table 1). Precipitation cycles can be observed from the cumulative departure from mean precipitation line on Figure 3. The data show cyclical precipitation trends between 1928 and 2004:

1. 1928-1935: 9-year dry period;
2. 1936-1944: 8-year wet period;
3. 1945-1965: 21-year dry period;
4. 1966-1969: 4-year wet period;
5. 1970-1977: 8-year dry period;
6. 1978-1986: a 9-year wet period;
7. 1987-1991: a 5-year dry period;
8. 1992-1998: a 7-year wet period; and
9. 1999-2004: a 6-year dry period.

Although the duration of most precipitation cycles typically ranges from 4 to 9 years, a notable exception is the 21-year dry period between 1945 and 1965. Although a drought of this magnitude has not been observed in the Study Area since that time, it shows that they can occur and should be considered for future water resource planning.

3.2.2 Evaporation

Evaporation rates for the Study Area were based on pan evaporation records from the Fillmore Fish Hatchery, located approximately 7 miles northwest of the Study Area (see Figure 1). This station, located at an elevation of 465 ft amsl, is the closest station to the Study Area with historical pan evaporation records (Aqua Terra, 2005). Based on monthly pan evaporation measurements collected between 1971 and 2004, the mean monthly evaporation rate ranges from 3.20 to 7.64 inches, with an average annual evaporation rate of 60.35 inches.

3.3 Existing Water Purveyors and Wells

Locations of historical and existing wells in the Study Area are shown on Figure 4. Ground water has been pumped from the study area from as early as 1915 (Boyle, 1972). Wells were constructed in Tripas, Iron Trough and Upper Tapo Canyons by the Tapo Mutual Water Company, who operated the wells until the 1960s. The Rosa Water Company also operated a well in Gillibrand Canyon (Well No. 33) although the period of operation for this well is unknown. Prior to 1960, ground water pumped from the Study Area was used primarily for irrigation and domestic water supply. Ventura County Waterworks District 14 (which later became District 8 Simi Valley) took over operation of the Tapo Mutual Water Company wells in the late 1960s (Boyle, 1972). Presently, the District and the P.W. Gillibrand Co. gravel mining operation are the only ground water producers within the Study Area.

Review of available well logs, previous investigations and personal communications with local agencies has identified a total of 38 ground water production wells that have been constructed within the Study Area within the past century (see Figure 4). Currently, the District produces ground water from two wells (Nos. 31 and 32) within the Study Area. The P.W. Gillibrand Company currently operates one production well (Gillibrand Well No. 2) for on-site mining

processes. In addition, a monitoring well (MW4a)[1] is maintained on site to monitor the quality of percolated water from recycling/settling ponds. All other wells that have been drilled are assumed to have been destroyed or abandoned. A summary of well completion data is provided in Table 2. Driller's logs for selected wells are provided in Appendix A.

3.4 Ground Water Production

Annual ground water production in the Tapo Canyon Watershed from 1920 through 1971 ranged from approximately 920 acre-ft (1941) to 2,629 acre-ft (1966) with an average of 1,500 acre-ft per year (see Figure 5 and Table 3). Although ground water production data is not available for the period between 1972 to 1993, Johnson (1980) reported that irrigation for agriculture declined significantly during the 1970s and was replaced by water production for gravel mining operations and municipal supply. If the ground water production demand during this time period was similar to that observed in 1994 (270 acre-ft; see Figure 5), it would represent a significant decrease in overall ground water production from the basin from that observed between 1920 and 1971.

At the present time, the District operates Well Nos. 31 and 32 at approximately 1,500 and 1,050 gallons per minute (gpm), respectively. Between 1994 and 1999, combined annual ground water production from these wells averaged 131 acre-ft/yr. Since year 2000, the average annual ground water production from Well Nos. 31 and 32 has been approximately 1,050 acre-ft/yr.

Production data for the Gillibrand Well No. 2 were not available. However, personal communication with representatives of the P.W. Gillibrand Co. indicates that Well No. 2 produces ground water at the instantaneous rate of 500 gpm but is used to replace water lost to evaporation and percolation in their wash water ponds. As such, the well is not likely operated on a full-time basis. Assuming Well No. 2 is operated 4 hrs per day at 500 gpm, this would

[1] Other monitoring wells associated with the Gillibrand Mining Operation may exist (i.e. MWs 1 through 3). However, they could not be located based on available data.

amount to approximately 130 acre-ft/yr. It should be emphasized, however, that this estimate is based on general assumptions and not actual data.

Using the above information and assumption, the average annual ground water production from the Study Area between 2001 and 2005 was approximately 1,180 acre-ft/yr.

4.0 GEOLOGY

4.1 Regional Geology

The Tapo Canyon Tributary Subarea is located within the Santa Susana Mountains of the Transverse Ranges geomorphic province of Southern California. This province is characterized by west-trending valleys and ridges, reflecting a parallel series of anticlines (elevated ridges), synclines (valleys) bounded by faults (CDMG, 1997). In the vicinity of the Study Area, the Santa Susana Mountains consist of marine and nonmarine sedimentary rocks ranging in age from early Tertiary (65 million years before present) to Pleistocene (10,000 years before present).

The Santa Susana Mountains and surrounding topography have been shaped by the tectonic history of the area. Prominent faults include the Oak Ridge, San Cayetano, Santa Susanna, and Simi faults, all of which are reverse faults that have accounted for much, if not all, of the uplift in these mountains (Norris and Webb, 1990). Movement along the faults near the Study Area has occurred in Pleistocene to recent times (Jennings, 1994) and the area remains seismically active, as evidenced by the 1971 Sylmar earthquake (M 6.6) and the 1994 Northridge earthquake (M 6.7).

4.2 Study Area Geology

The Tapo Canyon Tributary Subarea is positioned along the axis of the northwest-southeast trending Happy Camp Syncline located in between the inactive Santa Susana Thrust Fault and Simi Fault Zone (see Figure 6). The Happy Camp Syncline is a structural feature whereby geologic formations on either side of the central axis of the syncline dip toward the center. The formation in the center of the syncline is youngest with progressively older formations away from the center. Bedding planes of exposed bedrock in the area typically strike to the northwest and dip approximately 10 to 50 degrees towards the synclinal axis (Dibblee, 1992a and 1992b). Additional faults, shear zones and joint patterns have been mapped by Cilweck and Hitchingham (1970) within the southern portion of Tapo Canyon although no recent displacement was observed.

4.2.1 Bedrock

Bedrock in the Tapo Canyon area is comprised of marine and non-marine sedimentary deposits of the Llajas, Sespe, Upper Topanga Sandstone, Monterey Shale, Pico, and Saugus Formations (Dibblee, 1992a and 1992b). The bedrock complex, listed from older to younger, consists of the following:

- Llajas (Tl) – Middle Eocene marine claystone and siltstone
- Sespe (Tsp) - Oligocene and late Eocene non-marine sandstone and conglomerate
- Upper Topanga Sandstone (Ttus) – Middle Miocene marine sandstone
- Monterey Shale (Tm/Tml) – Middle and late Miocene marine shale
- Pico (Tps) – Pliocene marine sandstone
- Saugus (Ts) – Pleistocene marine and non-marine sandstone, siltstone, and conglomerate.

The southern boundary Tapo Canyon Tributary Subarea intersects a small portion of the Llajas Formation. This is the oldest formation in the Study Area and is comprised of gray to brown micaceous claystone/siltstone and semi-friable sandstone. The formation dips to the north beneath the Tapo Canyon Tributary Subarea but it has not been observed during the drilling of wells (either water wells or oil wells) in this area. Given the thickness of the overlying Sespe Formation, it is likely that the Llajas Formation occurs at a depth beneath the Study Area that is prohibitive for water wells.

The Sespe Formation is stratigraphically above the Llajas Formation and is the predominant outcrop within the southern portion of the Tapo Canyon Tributary Subarea (see Figure 6). The formation is approximately 4,500 ft thick and, based on Dibblee (1992a), underlies the entire Study Area (see Figure 7). The Sespe Formation consists of nonmarine clastic sediments comprised of light gray to tan semi-friable bedded sandstone with localized cross-beds and scattered lenses of pebbles and cobbles. North of the Santa Susana Thrust, these beds are the primary oil bearing units for the South Tapo Canyon Oil Field (Dibblee, 1992a). However, the

permeability of the Sespe Formation for ground water flow is apparently not significant as no ground water production wells are constructed within it.

A thin outcrop of Upper Topanga Sandstone occurs stratigraphically between the Sespe Formation and underlying Monterey Shale. This formation consists of nearly white, friable and massive sandstone.

The Monterey Shale (also referred to as the Modello Formation by Yeats, 1987) is a relatively thick formation (approximately 1,500 ft) overlying the Topanga Sandstone and Sespe Formations. The formation is shown both south and north of the Happy Camp Syncline (see Figures 4 and 5) indicating that it is present beneath most of the Study Area (Dibblee, 1992a). The formation consists primarily of impermeable shale. As such, the top of this formation likely represents the deepest portion of the aquifer system beneath the Study Area.

The Pico Formation has been mapped at the land surface through the central portion of the Study Area along the axis of the Happy Camp Syncline. This formation is characterized by soft (semi-consolidated), medium- to coarse-grained sandstone with debris and structure that are indicative of a nearshore marine depositional environment (i.e., pebbles, shells and cross-beds). Some ground water production wells in the Study Area are perforated within the upper part of this formation and it is considered part of the aquifer system.

The Saugus Formation is also mapped at the land surface along the axis of the Happy Camp Syncline. This formation is comprised of weakly consolidated nonmarine sandstone, siltstone, pebble/cobble conglomerate and coquina beds. Most of the ground water production wells constructed within the Study Area have been perforated within this formation.

4.2.2 Quaternary Alluvial Deposits

Alluvial deposits in the Study Area include three general groups: Holocene to Recent alluvium (Qg/Qa), Holocene to Recent landslide debris (Qls), and Pleistocene older surficial sediments (Qoa). The younger alluvium (Qg/Qa) occurs primarily within the immediate drainages of Tapo and Gillibrand Creeks and along the lower flanks of the surrounding slopes (see Figure 6). These deposits consist of unconsolidated silt, sand and gravel derived from the surrounding bedrock formations. The thickest sequences approach 70 ft near the center of the valley above the confluence of Tapo and Gillibrand Creeks (Cilweck and Hitchingham, 1970). Holocene to Recent landslide debris (Qls) of varying size and thickness exists along the base of many slopes and narrow swales on the hillsides throughout the Tapo Canyon area. The largest landslide, with an estimated thickness of 50 ft, exists at the northeast flank of Big Mountain (see Figure 6. The majority of landslides in the Study Area are relatively old and stable (Cilweck and Hitchingham, 1970). Pleistocene surficial sediments (Qoa) underlie the Qa and unconformably overlie the Saugus Formation. In the areas south of the Santa Susana Thrust Fault they consist of subangular detritus of Miocene age shale and sandstone deposits. The borehole log for the District's Well No. 32 indicates that the thickness of this sediment is at least 40 ft.

5.0 GEOHYDROLOGY

5.1 Surface Water

The Tapo Canyon Tributary Subarea is defined by the topographic surface water drainage divides that encompass Tapo Canyon and the smaller drainages that are tributary to it (see Figure 2). This area encompasses 11,356 acres (18 square miles). The individual drainages are herein referred to as subunits following the nomenclature of Aqua Terra (2005) and include Upper Tripas Canyon, Lower Tripas Canyon, Windmill Canyon, Lower Gillibrand Canyon and Upper Tapo Canyon (see Figure 8). All of the drainages are ephemeral (i.e. flow only during the wet season or after prolonged periods of above normal precipitation). During periods of flow, surface water discharges out of Tapo Canyon via Tapo Creek and eventually into the Arroyo Simi River to the south of the Project Area (see Figure 2).

Although surface water flow in the drainages of the Study Area is seasonal, year round flowing springs have been reported. West Coast Environmental and Engineering (WCEE, 2003) reported the presence of seasonal and year round springs although they did not provide details as to their location and approximate yields. Likewise, a figure in Marsh (1970) showed two springs in the study area.

5.2 Ground Water

The ground water basin is distinguished from the tributary subarea by the geology of the area. The Happy Camp Syncline results in folded formations that outcrop both north and south of the syncline (see Figure 6). The formations closest to the center of the syncline (Saugus and Pico) are younger, less consolidated and consist of sediments that are more permeable (sand and gravel) than the surrounding formations. These formations form the ground water basin. Formations bounding the Saugus and Pico formations on the north and south are older, more consolidated and consist of sediments that are less permeable (siltstone and claystone). For

purposes of this report, the ground water basin within the Tapo Canyon Tributary Subarea is referred to as the Tapo Canyon Ground Water Basin. This ground water basin has been correlated with the Grimes Canyon Aquifer (Johnson, 1980) and has also been referred to as the Gillibrand Ground Water Basin (WCEE, 2003) in previous studies.

The lateral extent of the Tapo Canyon Ground Water Basin is defined by three types of boundaries: lithologic boundaries, fault boundaries, and topographic drainage area boundaries (see Figure 6). The lithologic boundaries occur where permeable sediments of the Saugus and Pico formations bound impermeable sediments of the Sisquoc Formation and Monterey Shale. The north-central boundary of the ground water basin is a fault boundary defined by the Santa Susana Fault, which is assumed to present a relatively impermeable boundary between the rocks to the north and permeable water-bearing sediments to the south. The remaining boundaries correspond to the limits of the Tapo Canyon Tributary Subarea. It is possible that the ground water basin extends to the east and west outside the limits of the tributary subarea. However, this would have to be confirmed through the construction and monitoring of ground water wells in the Pico or Saugus formations near the tributary subarea boundary. The areal extent of the Tapo Canyon Ground Water Basin, using the boundaries described above, is approximately 5,130 acres (8 square miles).

The subsurface base of the ground water basin is assumed to be the top of the Monterey Shale. Driller's logs from wells historically drilled in the Study Area suggest that most of the wells have been perforated within the Saugus Formation, including District Wells 31 and 32 (see Figure 7). However, some more recent wells have been extended into the Pico Formation, which extends to depths of up to 1,500 ft below ground surface (see Figure 7) where it contacts the top of the Monterey Shale. Thus, the Monterey Shale is assumed to be the base of the effective aquifer system although more data should be collected to confirm the ground water yield and storage of the Pico Formation.

Although the younger Quaternary alluvial deposits (Qa/Qg, Qol and Qoa) appear to be permeable based on a review of drillers logs, the thickness of these sediments is limited and, as such, they do not represent a significant portion of the aquifer system. From the drillers logs for Wells 31 and 32, the base of the alluvium (top of the Saugus Formation) is interpreted to be the interface with the "hard packed sand" or fine sand. This interface typically occurs between 45 and 100 ft below ground surface. This is a minor portion of the total aquifer thickness within the Saugus and possibly Pico formations.

5.2.1 Aquifer Characteristics

Data from pumping tests and ongoing production yields from the existing wells in the Study Area indicate that the permeability of the aquifer system in the Tapo Canyon Ground Water Basin is relatively high. Pumping tests in Wells 31 and 32, which were conducted at the time of construction, indicate instantaneous production yields of 1,800 to 2,100 gallons per minute (gpm), respectively. The corresponding specific capacities are 21 and 35 gpm/ft of drawdown. Using the method of Theis et al., 1963, the corresponding aquifer transmissivity is estimated to be 60,000 to 100,000 gallons per day per ft (gpd/ft). The specific capacity and corresponding transmissivity for Gillibrand Well No. 2 compares well with the data from Wells 31 and 32, although this well was tested at a discharge rate of 3,000 gpm.

5.2.2 Ground Water Movement

Ground water flow within the Tapo Canyon Ground Water Basin could not be evaluated based on available data. Ground water levels were available from the District's Wells 31 and 32, however data from more than two wells are needed to assess ground water flow direction and gradient. In many ground water basins, it can be assumed that ground water flows in approximately the same direction as surface flow. However, in the Tapo Canyon Ground Water Basin, the geologic structure may have a significant effect on the ground water flow direction. In

the central portion of the ground water basin (in the vicinity of the production wells), ground water likely flows in a southerly direction and, during periods of high ground water levels, discharges as surface water outflow via Tapo Canyon Creek. However, ground water level data from more wells within the basin are needed to assess the ground water flow direction and gradient.

5.2.3 Historical Ground Water Level Trends

Historically, ground water levels in the Tapo Canyon Ground Water Basin have fluctuated between a high of approximately 1,485 ft amsl in the late 1920s and recently to a low of approximately 1,377 ft amsl in 1971 (see Appendix B). Ground water level records from Well Nos. 15 and 20A show a general decline in ground water levels between the mid-1920s and 1971 (see Figure 9). However, the greatest ground water level declines were observed between 1947 and 1967, a period that corresponds to relatively high production rates from the basin (averaging approximately 1,800 acre-ft/yr) and below normal precipitation. By year 2000, ground water levels in Wells 31 and 32 had recovered to pre-1920 levels.

Similarities in ground water level trends between wells located in different canyons of the ground water basin suggest that the aquifer system is hydraulically connected throughout the basin and independent of topography. The hydrograph for Well No. 15, located in Upper Tapo Canyon, and the hydrograph for Well No. 20A, located in Iron Trough Canyon, look very similar for the periods of record that overlap (see Figures 4 and 9). Furthermore, Well No. 31 also shows similar ground water elevations over time as wells in canyons to the west. These data show that the aquifer system is a regional feature independent of surface topography.

5.2.4 Ground Water Quality

Ground water in the Tapo Canyon Ground Water Basin is calcium bicarbonate to calcium sulfate type water that is characterized by relatively high total dissolved solids (TDS) concentrations (see Figure 10). The ground water quality characterization is based on recent analysis of ground water samples from the District's Wells Nos. 31 and 32 and Gillibrand Well No. 2 and older analyses of samples from Well Nos. 10A, 29, 31 and 33 (see Table 4). The concentration of TDS in ground water from the basin ranges from 620 to 836 milligrams per liter (mg/L). These concentrations exceed the California Department of Health Services (DHS) Primary Maximum Contaminant Level (MCL) of 500 mg/L. The presence of nitrate in some samples suggests that historical agricultural land use in the area has impacted the water quality and may, in part, be responsible for the elevated TDS concentrations. Higher TDS concentrations in the principal aquifer in the Tapo Canyon Ground Water Basin may also be the result of dissolution of minerals from the surrounding Monterey Shale or fine-grained layers within the Pico and or Saugus formations (Hem, 1992).

Ground water from the Gillibrand monitoring well MW-4a, which is perforated in the Monterey Shale and is therefore outside the Tapo Canyon Ground Water Basin, has a different chemical signature than ground water within the basin. Ground water from MW-4a is sodium bicarbonate type water as compared to calcium bicarbonate to calcium sulfate type water within the basin (see Figure 10). The TDS of the ground water from MW-4a is higher than that within the basin, ranging from approximately 1,600 to 2,000 mg/L (see Table 4).

6.0 ANALYSIS OF MAXIMUM PERENNIAL YIELD - METHODOLOGY

Maximum perennial yield is defined as:

> *The maximum quantity of ground water perennially available if all possible methods and sources are developed for recharging the basin. This quantity depends on the amount of water economically, legally, and politically available to the organization or agency managing the basin (Todd, 1980).*

By definition, the maximum perennial yield is some portion (i.e. subset) of the total amount of ground water recharge that the aquifers receive from precipitation on an average annual basis. Not all of the water that reaches the ground water aquifer can be developed for beneficial use because either it is not economically feasible, or there is no legal right to the water, or political constraints prevent or inhibit development.

Estimating the average annual ground water recharge involves relating geohydrologic and ground water basin operational factors in a quantitative form. It requires a detailed understanding of the basin's inflow terms (including all precipitation, infiltration, and other recharge), and outflow terms (including ground water extraction, evapotranspiration, and losses to the surface and/or adjacent ground water reservoirs).

Prior to conducting the maximum perennial yield analysis, the Tapo Canyon Tributary Subarea was subdivided into multiple tributary subunits (see Figure 8). Tributary subunits represent smaller surface water drainage areas within the larger tributary subarea. Thus, the boundaries of the subareas represent surface water drainage divides. For most of the Tapo Canyon Tributary Subarea the drainage divides do not necessarily represent ground water flow divides, as described in Sections 5.2.2 and 5.2.3. Thus, the ground water basin transects the various surface water tributary subunits.

Two independent methods were used to assess the maximum perennial yield of the Tapo Canyon Tributary Subarea. Each method represents an independent approach, thereby resulting in a cross check on the final perennial yield estimate. The methods considered during the assessment of maximum perennial yield were:

- Ground Water Level and Production Analysis
- Watershed Model

The ground water level and production analysis considers total production and its effect on ground water elevations over multiple climatic cycles. The watershed model takes into account long-term inflow, outflow and change in ground water storage.

6.1 Ground Water Level and Production Analysis

The ground water level and production analysis follows the zero net draft method of Chow (1964) and is a useful technique for estimating maximum perennial yield. This method involves plotting average depth to ground water for a selected period of time and comparing it to ground water production for the same period. If the mean ground water elevation at the beginning and end of the period is the same, the production during the period is taken as a measure of the maximum perennial yield.

6.2 Watershed Model

Another method used to estimate the average annual ground water recharge was through the use of a watershed model. The watershed model is a computer tool that assists in solving the water balance, or hydrologic budget, of a watershed. The water balance takes into account all of the quantifiable hydrologic variables that affect the water resources of the catchment. These variables include daily precipitation, surface water infiltration, surface water runoff,

evapotranspiration, and deep percolation (see Figure 11). The deep percolation term given by the watershed model is considered an estimate of the average annual ground water recharge.

The model code used for the Tapo Canyon Tributary Subarea watershed model was the Hydrological Simulation Program – Fortran (HSPF; EPA, 1997). This program uses measured precipitation and potential evapotranspiration[2] (PET) to estimate surface water runoff, actual evapotranspiration[3] (ET), and ground water recharge within the watershed.

A recent analysis of the Calleguas Creek Watershed (of which the Tapo Canyon Tributary Subarea is a part) was conducted by Aqua Terra Consultants (Aqua Terra, 2005) which resulted in the development of an HSPF model for the larger watershed. This work was conducted for the Ventura County Watershed Protection District as part of the Callequas Creek Watershed Management Plan. Input parameters for the Tapo Canyon Tributary Subarea HSPF model used in this study were obtained from the Calleguas Creek Watershed Model (Aqua Terra, 2005).

6.2.1 Conceptual Watershed Model

As any given volume of precipitation falls within a watershed or, in this case, tributary subarea, it is ultimately subject to multiple fates as shown on Figure 11. Interaction of precipitation with the ground surface will generally determine the volume of streamflow within the subarea. Among the processes that actively govern streamflow at the ground surface are initial abstraction, infiltration, and overland flow. Ground water recharge occurs if the amount of infiltration exceeds the capacity of the soil to hold the water.

[2] The amount of water that would be lost to the atmosphere through evaporation and uptake by plants (transpiration) under a given climatic condition if there were unlimited soil moisture.

[3] The amount of water that would be lost to the atmosphere through evaporation and uptake by plants (transpiration) under a given climatic and soil moisture condition.

6.2.1.1 Initial Abstraction

A portion of the precipitation falling on the watershed tributary subarea is intercepted by vegetation and other above ground objects, such as buildings, and is defined as interception. Part of the intercepted precipitation wets and adheres to these objects before returning to the atmosphere through evaporation. This mechanism is called “interception loss”.

The water that does reach the ground during precipitation events can follow several pathways that do not necessarily result in ground water recharge. Almost immediately, some of the water is evaporated from the soil surface. Some precipitation is temporarily stored in topographic depressions (i.e. “depression or surface detention storage”) where it can slowly infiltrate into the subsurface or evaporate. Some precipitation infiltrates into the shallow subsurface where it is either evaporated back out of the soil zone or is utilized by plants. The effects of vegetation interception, transpiration, evaporation, and depression storage are combined to determine a volume of water that is referred to as “initial abstraction” or “initial loss.”

In summary, of the precipitation that reaches the ground surface within any given watershed, a substantial portion is prevented from percolating to the ground water due to:

- Interception by impermeable surfaces (rocks, concrete, etc.) and evaporated,
- Evaporation directly off of the ground surface,
- Evaporation out of the shallow soil zone, and
- Interception and utilization by plants.

6.2.1.2 Infiltration and Interflow

A portion of the precipitation that reaches the ground surface infiltrates into the shallow subsurface. This infiltration is a function of many variables, including (but not limited to) soil permeability, vegetation type and cover, surface slope, precipitation intensity and duration, and

the ambient moisture content of the soil. If the supply rate of precipitation is greater than the capacity of the soil to accommodate it, infiltration will occur into the shallow subsurface.

Movement of infiltrating water in the shallow subsurface is known as interflow. Infiltration rate is highly dependent on soil permeability and, if low permeability layers exist above the water table, infiltrating water can temporarily pond in these areas (a condition known as interflow detention storage). Depending on the permeability of the soil and the amount of infiltrating water, some of the water will evaporate back out of the soil and some will percolate to the ground water as recharge.

6.2.1.3 Overland Flow

If the volume of precipitation that reaches the ground surface exceeds the initial abstraction, overland flow occurs and collects to form small rivulets, which eventually lead to streams (known as routing). Because infiltration occurs at the same time as overland flow, the relationship between the two processes must be considered. For example, spatial variations in the infiltration characteristics of the ground cover will allow overland flow in some areas and not others.

6.2.1.4 Ground Water Recharge

If the volume of water in the shallow soil zone exceeds the field capacity (the amount of water that can be held by the soil particles without draining away) and the amount that is evaporated or consumed by plants (evapotranspiration or ET), it will percolate to the ground water surface as recharge. Depending on the depth to ground water, some of this water may still be subject to ET and or contribute to the baseflow of streams.

6.2.2 Model Input

Most of the input parameters for the Tapo Canyon Tributary Subarea watershed model were obtained from the Ventura County Watershed Protection District's calibrated Calleguas Creek Watershed Model (Aqua Terra, 2005). Precipitation data was obtained from the Ventura County Watershed Protection District (VCWPD).

6.2.2.1 Model Subunits

The Tapo Canyon Tributary Subarea was subdivided into five tributary subunits for the watershed model: Upper Tripas Canyon, Lower Tripas Canyon, Windmill Canyon, Lower Gillibrand Canyon and Upper Tapo Canyon (see Figure 8). Each subunit was assigned hydrologic parameters such as topographic characteristics, precipitation, evapotranspiration (ET), and land use type. The land use types for Tapo Canyon Tributary Subarea mainly consist of open space with some low and medium density residential areas. The tributary subunits range in size from 645.5 to 4,333 acres. The total area of the Tapo Canyon Tributary Subarea is 11,356 acres.

6.2.2.2 Precipitation

Because precipitation is the only source of water to the Study Area, it is the only inflow term into the watershed model. Historical precipitation input into the model included hourly data from the Santa Susana 4NNE (a combination of stations 196, 196a and 196b) and Station 242 weather stations (see Figure 2). Annual precipitation data from the same database are summarized in Table 1. Precipitation was distributed throughout the watershed model of the Tapo Canyon Tributary Subarea in accordance with Aqua Terra (2005).

6.2.2.3 Potential Evapotranspiration

Potential evapotranspiration for the Tapo Canyon Tributary Subarea was based on monthly evaporation records from the Fillmore Fish Hatchery. The monthly data was disaggregated into daily data based on the daily potential evaporation from the Lake Cachuma Evaporation Station located near Santa Barbara. The daily evaporation was further disaggregated into hourly evaporation for simulation in the watershed model. Finally, hourly evaporation was converted to hourly potential evapotranspiration (PET) by applying a pan coefficient of 0.74 (Aqua Terra, 2005).

6.2.2.4 Streamflow

Calibration of the watershed model upon which the Tapo Canyon Tributary Subarea watershed model is developed is based on stream gage data from two stream gages along the Arroyo Simi River. Calibration is based on daily stream gage data from Stations 802 (Arroyo Simi at Royal Avenue) and 803 (Arroyo Simi at Madera Rd Bridge) (see locations on Figure 2).

6.2.3 Model Output

6.2.3.1 Surface Runoff

The precipitation that reaches the ground surface (after interception) is separated into infiltration, interflow storage, surface detention storage, or runoff. The amount of water allotted to infiltration and interflow storage is a function of the infiltration characteristics of the soils within the model subarea and the slope of the land surface.

When precipitation amounts exceeded soil infiltration capacity, the balance of available water was separated into surface runoff, which was estimated using the Chezy-Manning equation

(Crawford and Linsley, 1966) and an empirical expression that relates runoff depth to depression storage. The rate of surface runoff is determined by the following equation:

$$R = (t)(r)(D_s)(1+0.6(D_s/D_{se})^3)^{1.67}$$

where:

R = Surface Runoff, [inches/t]

t = Time Interval, [hr/interval]

r = Routing Variable, [unitless]

D_s = Mean Surface Detention Storage Over the Time Interval, [inches]

D_{se} = Equilibrium Surface Detention Storage (inches) for Current Supply Rate

The routing variable is given by the following equation:

$$r = 1{,}020\sqrt{S_{LS}}/(n)(l)$$

where:

S_{LS} = Slope of the Runoff Surface, [ft/ft]

n = Manning Friction Coefficient, [unitless]

l = Length of the Runoff Surface, [ft]

6.2.3.2 Evapotranspiration

Actual ET estimated by the watershed model is represented as a function of the potential ET (PET) described in Section 6.2.2.3 and the sum of ET from surface water, interception storage, the upper soil zone, shallow ground water, and the lower soil zone (i.e. vadose zone). Total PET demand is met from these sources, starting with surface water and proceeding through the other sources in the order listed. For example, the surface water in the model (not including interception storage) will be used up until the PET demand is met. Remaining PET will then be satisfied from interception storage. If interception storage does not meet the PET demand, then

water from the upper soil zone will be utilized, etc. The actual ET estimated by the model is the sum of the ET sources used to fulfill the PET demand.

6.2.3.3 Ground Water Recharge

The watershed model estimates ground water recharge as deep subsurface percolation that does not contribute to baseflow of a stream and/or ground water ET. It is strictly the ground water that contributes to the replenishment of the aquifer system.

6.2.4 Model Calibration

The Tapo Canyon Tributary Subarea watershed model used for this evaluation is calibrated as part of the larger Calleguas Creek Watershed model, which was prepared and calibrated by Aqua Terra (2005). The Calleguas Creek Watershed model includes an Upper Arroyo Simi hydrographic unit of which the Tapo Canyon Tributary Subarea is a part (see Figure 2). The Upper Arroyo Simi hydrographic unit was calibrated and validated against the Arroyo Simi at Royal Avenue and Arroyo Simi at Madera Rd Bridge stream gages. The calibration period was from October 1994 through December 2002.

For the calibration stage the watershed model input parameters were adjusted in order to match simulated stream flow with observed stream flow at the two stream gages. Simulated stream flow was calibrated to observed stream flow during the period from October 1994 through December 2002. The deviation between simulated and observed stream flow over the calibration period ranged from -4.7 to 0.5 percent. This calibration is considered “very good” (less than 10 percent deviation) in accordance with (Donigian, 2002). Because the Study Area is part of the hydrographic unit upon which the calibration is based, the calibration also applies to the watershed model for this evaluation.

7.0 FINDINGS

7.1 Estimate of Maximum Perennial Yield Based on Ground Water Level and Production History

The relatively long period of available record for ground water level graphs (hydrographs) in the Tapo Canyon Tributary Subarea provided the best indicator of available perennial yield. The longest available record was from Well No. 20A, with ground water level records dating from 1928 to 1972 (see Figure 9). Long-term records are also available for Well No. 15. Furthermore, ground water level trends throughout the Tapo Canyon Ground Water Basin behave similarly such that ground water levels measured more recently in different wells can be used to supplement the older data.

Changes in historical ground water levels within Well Nos. 20A and 15 can be attributed to both precipitation trends and ground water production amounts within the Tapo Canyon Ground Water Basin. Between 1928 and 1941, ground water levels generally declined over a period with an average annual production rate of approximately 1,330 acre-ft/yr (see Figure 12). Ground water levels showed a slight recovery between 1941 and 1947 during which an average of 1,360 acre-ft/yr was produced from the basin. However, the 1941 to 1947 period included three years of above-normal precipitation (see Figures 3 and 12; 1941, 1943 and 1944), which resulted in more ground water recharge during this period. The 20-year period from 1947 to 1967 was not only a period of relative below normal precipitation, but the average basin ground water production rate over the period increased to approximately 1,800 acre-ft/yr. As a result, ground water levels dropped approximately 92 ft in Well No. 20A over this time period (see Figures 9 and 12).

Although the ground water level and production record is less complete from 1971 to 1993, the ground water level recovery observed in the District's Wells Nos. 31 and 32 between 1971 and the present time is likely a result of decreased ground water production and increased available precipitation over this time period. In 1971, average annual production from the Tapo Canyon

Ground Water Basin was approximately 1,300 acre-ft/yr. In 1994, this production amount had dropped to 270 acre-ft/yr (140 acre-ft/yr by the District plus an estimated 130 acre-ft/yr from the gravel mining operation). If the ground water levels observed in the late 1920s are indicative of historical high ground water levels, then the ground water levels observed in Well Nos. 31 and 32 in year 2000 indicate the ground water basin has completely recovered from the overdraft condition of the 1950s and 1960s. Ground water levels in Well Nos. 31 and 32 have dropped slightly (approximately 16 ft) since 2001 but ground water production has increased again to 1,130 acre-ft/yr and the area was in a dry climatic cycle between 1998 and 2004 (see Figure 12).

Although ground water levels in the Tapo Canyon Ground Water Basin have been declining since 2001 at the current ground water production rate of 1,130 acre-ft/yr, historical data show that, over the long term, ground water levels in the basin would likely stabilize at production rates as high as 1,350 acre-ft/yr. This is supported by the ground water level response to pumping and precipitation from 1928 to 1947 and the 1968 to 1971 ground water level recovery observed in Well No. 20A. Thus, the estimated maximum perennial yield of the Tapo Canyon Ground Water Basin based on historical ground water level and production data and taking into consideration precipitation trends is approximately 1,350 acre-ft/yr.

7.2 Estimate of Average Annual Ground Water Recharge Based on the Watershed Model

The calibrated watershed model described in Section 6.2 was used to assess the average annual ground water recharge of the Tapo Canyon Tributary Subarea. Ground water recharge is represented by the deep percolation portion of the watershed model water budget that does not contribute to baseflow of a stream and is not subject to ET. For the 11,356 acre Tapo Canyon Tributary Subarea, the average annual ground water recharge is estimated to be 2.3 in/yr or 2,177 acre-ft/yr. This rate of recharge is approximately 13 percent of average annual precipitation for the subarea.

The difference between the perennial yield estimate from the evaluation of ground water levels and pumping history and the average annual recharge from the watershed model is likely due to the difference between the ground water basin area and the watershed model area (the total Tapo Canyon Tributary Subarea). The ground water basin represents an area that is less than half that of the total tributary subarea (5,129 acres vs. 11,356 acres; see Figure 6). The boundaries of the ground water basin were selected because they are relatively impermeable (with the exception of the western and eastern extents). Thus, deep percolation estimated using the watershed model for areas outside the ground water basin will not likely contribute significant amounts of recharge to the aquifer system within the ground water basin because flow across the basin boundaries will be restricted.

The geologic formations outside the ground water basin boundaries are relatively consolidated with low permeability and would not likely yield economical quantities of ground water to wells. None of the wells previously constructed within the Sespe Formation to the south of the ground water basin have produced significant amounts of ground water. Furthermore, the Monterey Shale is relatively impermeable. Thus, the ground water recharge estimated by the watershed model for these areas of the Tapo Canyon Tributary Subarea is not likely economical to extract and is not considered part of the maximum perennial yield of the Study Area.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

Based on the analyses presented in this report, the following have been concluded regarding the maximum perennial yield of the Tapo Canyon Tributary Subarea:

- The Study Area for this investigation includes the Tapo Canyon Tributary Subarea, which encompasses the total 11,356-acre drainage catchment, and the Tapo Canyon Ground Water Basin, which is a smaller area of the drainage catchment (5,129 acres) and represents the primary ground water aquifer system of the Study Area.

- The estimated maximum perennial yield of the Tapo Canyon Ground Water Basin based on historical ground water level and production data and taking into consideration precipitation trends is approximately 1,350 acre-ft/yr. This estimate is approximately 18 percent of precipitation (average of 17.3 inches) that falls on the ground water basin on an average annual basis.[4]

- The average annual ground water recharge within the total 11,356 acre Tapo Canyon Tributary Subarea is estimated to be 2,177 acre-ft/yr, based on watershed model results. This rate of recharge is approximately 13 percent of average annual precipitation for the subarea.

- The perennial yield value of 1,350 acre-ft/yr is considered a better estimate of the maximum perennial yield of the Study Area because the ground water recharge estimate from the watershed model includes portions of the Study Area that are not economically viable for ground water production.

[4] The percent of precipitation may be lower if the entire ground water basin, which extends outside the Study Area, is considered.

- The current combined average annual ground water production from District Well Nos. 31 and 32 and Gillibrand Well No. 2 (1,180 acre-ft/yr) is below the long-term maximum perennial yield (1,350 acre-ft/yr) estimated for the Study Area.

- Based on recent Southern California Edison pumping test data (January 2005), Well 31 is capable of a pumping rate of 1,500 gpm and Well 32 is capable of 1,050 gpm. At these pumping rates, the existing wells are capable of producing up to 2,500 acre-ft/yr (assuming 60 percent utilization), which is well in excess of the estimated maximum perennial yield.

8.2 Recommendations

A number of data gaps were identified during this investigation that, if addressed, could help refine the perennial yield estimate. A primary data gap is the annual production from Gillibrand Well No. 2. Estimates of production from this well were based on the reported use of the well but the estimated annual production represents the greatest unknown in the analysis. Knowledge of the annual production would help assess how much additional perennial yield is available from the ground water basin. Ground water production from the basin between 1972 and 1994 is another significant data gap that, if addressed, would provide valuable insight into the ground water level recovery of the 1970s and 1980s. Other data that would be helpful include:

- Ground water level data from the Gillibrand monitoring well and other wells in the Study Area (other than Well Nos. 31 and 32) for use in evaluating the ground water flow regime of the basin, which at this point is not known;
- Depth-specific ground water yield from the deeper Pico Formation to assess its contribution to the ground water yield of the basin;
- Depth-specific ground water quality data to assess potential aquifer zones of higher quality ground water; and

- Controlled pumping tests of existing wells to obtain more reliable estimates of aquifer properties (transmissivity and hydraulic conductivity).

As described in Section 8.1 (last bullet), the production potential for existing Well Nos. 31 and 32 is capable of maximizing the perennial yield of the Tapo Canyon Ground Water Basin. However, if additional wells are desired, it is recommended to construct them in areas that correspond to the central axis of the Happy Camp Syncline (see Figure 13). Suggested well sites include upper Tapo Canyon north of former Well No. 12 and Iron Trough Canyon between the District's Wells No. 32 and Gillibrand Well No. 2. Tripas Canyon may also yield potential well sites although test drilling is recommended in this area to verify the nature and thickness of the aquifer system.

9.0 REFERENCES

Aqua Terra, 2005. Hydraulic Modeling of the Calleguas Creek Watershed with the U.S. EPA Hydrologic Simulation Program – FORTRAN (HSPF). Dated March 10, 2005.

Boyle Engineering, 1972. Tapo Dam and Reservoir Hydrology Report. Prepared for the Ventura County Department of Public Works, Ventura County Water Works Districts, Ventura County, California.

California Department of Public Works Division of Water Resources, 1933. Ventura County Investigation; Bulletin 46.

California Department of Water Resources, 1959. Water Quality and Water Quality Problems, Ventura County; Bulletin 75; February 1959.

California Division of Mines and Geology, 1997. Seismic Hazard Zone Report for the Simi Valley East and Simi Valley West 7.5-minute Quadrangles, Ventura and Los Angeles Counties, California. California Department of Conservation, Division of Mines and Geology, Seismic Hazard Zone Report 002.

Cilweck, B.A., and Hitchingham, D., 1970. Tapo Canyon Dam and Reservoir Reconnaissance Investigation, Project No. 3361, Engineering Geology and Soil Engineering Report. Published by the Ventura County Department of Public Works, Water and Sanitation Division. Dated June 4, 1970.

Crawford, N.H., and Linsley, R.K., 1966. Digital Simulation in Hydrology: Stanford Watershed Model IV, Technical Report No. 39, Department of Civil Engineering, Stanford University, July 1966.

Dibblee, Thomas W., Jr., 1992a. Geologic Map of the Santa Susana Quadrangle, Ventura and Los Angeles Counties, California, 1:24,000.

Dibblee, Thomas W., Jr., 1992b. Geologic Map of the Simi Quadrangle, Ventura County, California, 1:24,000.

Donigian, A.S., Jr. 2002. Watershed Model Calibration and Validation: The HSPF Experience. WEF-National TMDL Science and Policy 2002, November 13-16, 2002. Phoenix, AZ, WEF-2002 Specialty Conference Proceedings on CD-ROM.

EPA, 1997. Hydrological Simulation Program – FORTRAN (HSPF), released by the United States Environmental Protection Agency, April 1997.

Hem, J.D., 1992. Study and Interpretation of the Chemical Characteristics of Natural Water, 3rd ed.; U.S. Geological Survey Professional Paper 2254.

Jennings, C.W., 1994. Fault Activity Map of California and Adjacent Areas, with Locations and Ages of Recent Volcanic Eruptions; California Division of Mines and Geology Geologic Data Map No. 6; 1:750,000 scale.

Johnson, B.B, 1980. Groundwater Elevations in the Vicinity of CUP-1367, CZS Corporation, Tapo Canyon.

Killingsworth, C.C., 1964. Report on Underground Water Conditions of the Tapo Mutual Water Company. Dated January 28, 1964.

Marsh, Gordon S., 1970. Tapo Canyon Dam and Reservoir Reconnaissance Investigation. Published by the Ventura County Department of Public Works, Water and Sanitation Division. Dated June 1, 1970.

Norris, R.M., and Webb, R.W., 1990. Geology of California. John Wiley & Sons, Inc. Second Edition.

Ritter, M. E., 2006. The Physical Environment: An Introduction to Physical Geography. www.uwsp.edu/geo/faculty/ritter/geog 101/textbook/title_page.html

Theis, C.V., R.H. Brown, and R.R. Meyer, 1963. Estimating the Transmissibility of Aquifers from the Specific Capacity of Wells; in Methods of Determining Permeability, Transmissibility, and Drawdown; U.S. Geological Survey Water-Supply Paper 1536-I.

Todd, D.K., 1980. Groundwater Hydrology. Second Edition, John Wiley & Sons.

West Coast Environmental and Engineering, 2003. Evaluation of Total Dissolved Solids. Prepared for the P.W. Gillibrand Company, Simi Valley, California. Dated August 26, 2003.

Yeats, R.S., 1987. Late Cenozoic Structure of the Santa Susana Fault Zone; in Recent Reverse Faulting in the Transverse Ranges, California; U.S. Geological Survey Professional Paper 1339.

FIGURES

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COUNTY WATERWORKS DISTRICT NO. 8 CITY OF SIMI VALLEY

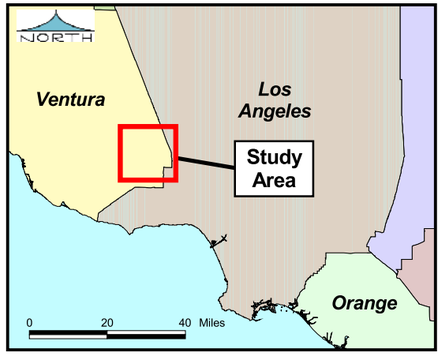
GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD
TAPO CANYON TRIBUTARY SUBAREA, VENTURA COUNTY, CALIFORNIA

STUDY AREA LOCATION

EXPLANATION

- Tapo Canyon Tributary Subarea Boundary
- Calleguas Creek Watershed Boundary
- Calleguas Creek Watershed Sub-basin Boundary
- Fillmore Fish Hatchery — Ventura County Watershed Protection District Evapotranspiration Station used in Analysis
- white dashed line — County Boundary
- State Highway
- Major Street
- Surface Water
- Creek, River or Drainage Channel

California County Inset



Prepared by: DWB

Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees

NORTH
0 2 4 Miles

13-SEP-06

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Figure 1

GIS_proj\city_of_simi_valley_9-06\0_tapo_cyn_per_yield_9-06.apr

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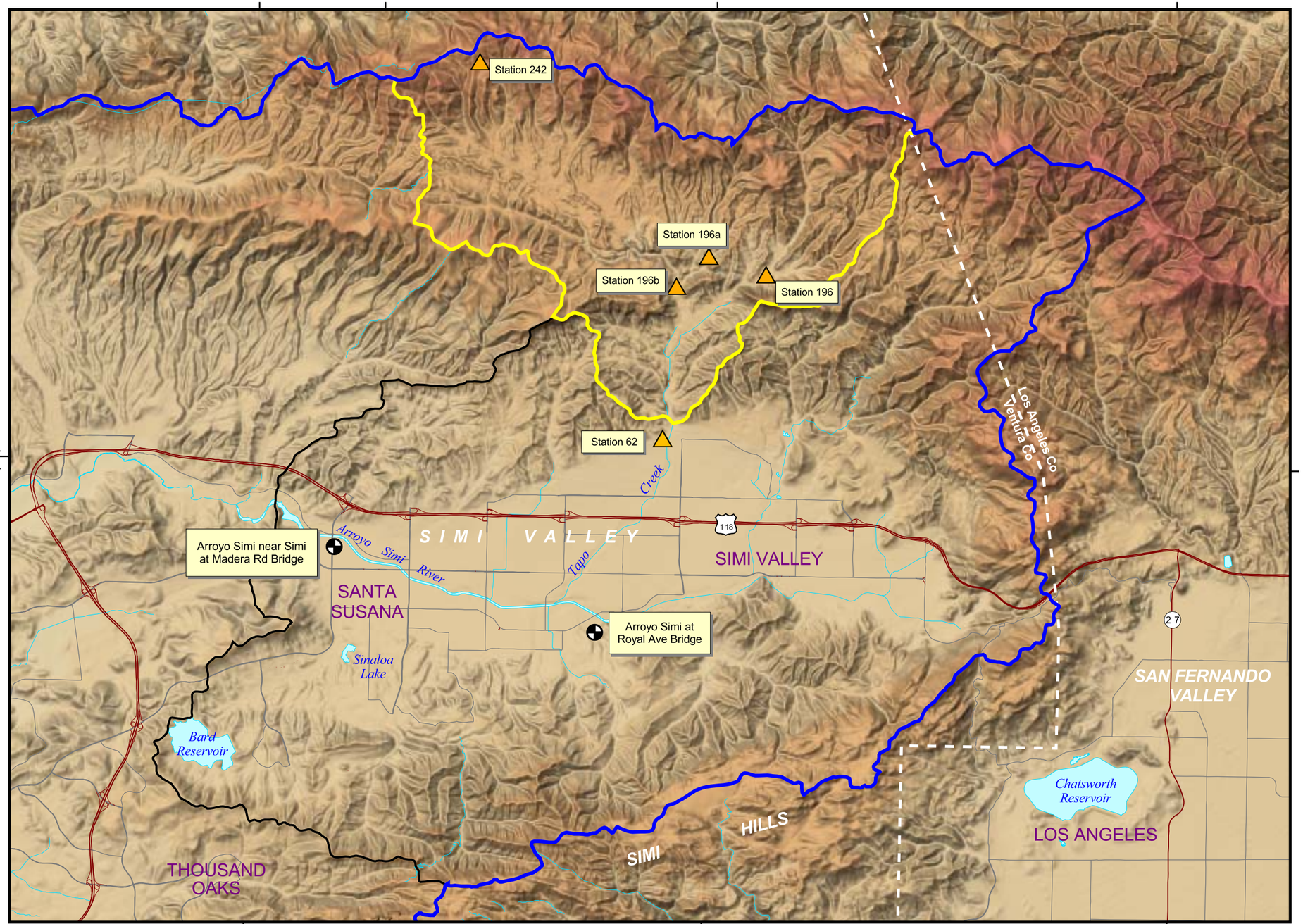
COUNTY WATERWORKS DISTRICT NO. 8 CITY OF SIMI VALLEY

GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD
TAPO CANYON TRIBUTARY SUBAREA, VENTURA COUNTY, CALIFORNIA

TAPO CANYON TRIBUTARY SUBAREA



EXPLANATION

- Tapo Canyon Tributary Subarea Boundary
- Upper Arroyo Simi Hydrographic Unit
- Precipitation Station Source: Station 62 - DWR Bulletin No. 46 (1933). Other Stations - Ventura County Watershed Protection District (2006).
- USGS Stream Gaging Station and Designation
- white dashed line — County Boundary
- State Highway
- Major Street
- Surface Water
- Creek, River or Drainage Channel

13-SEP-06

Prepared by: DWB

Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees

NORTH

0 1 2 Miles

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Figure 2

GIS_proj\city_of_simi_valley_9-06\0_tapo_cyn_per_yield_9-06.apr

Precipitation and Cumulative Departure From Mean Precipitation
Tapo Canyon Tributary Subarea

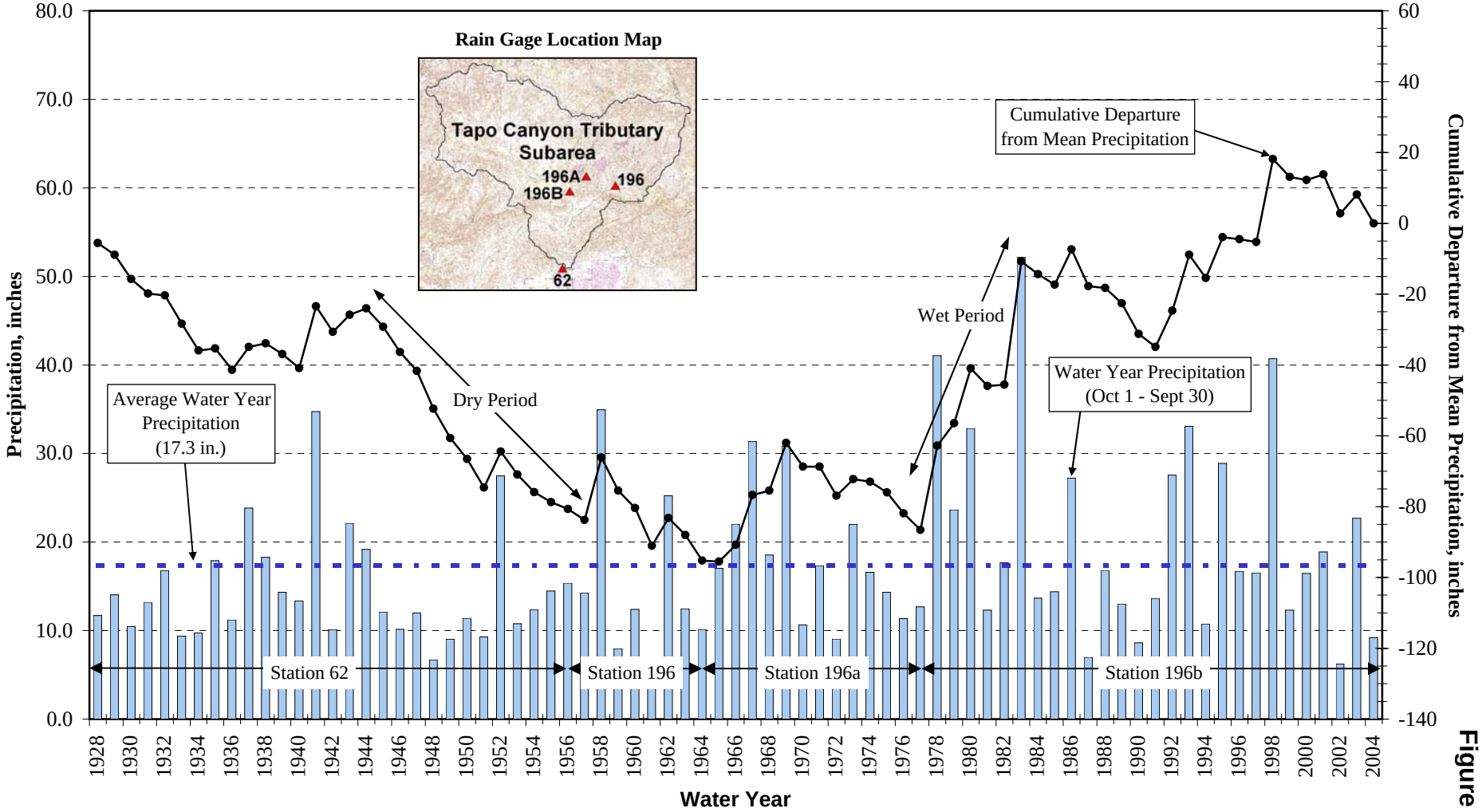

Figure 3

RBF CONSULTING /
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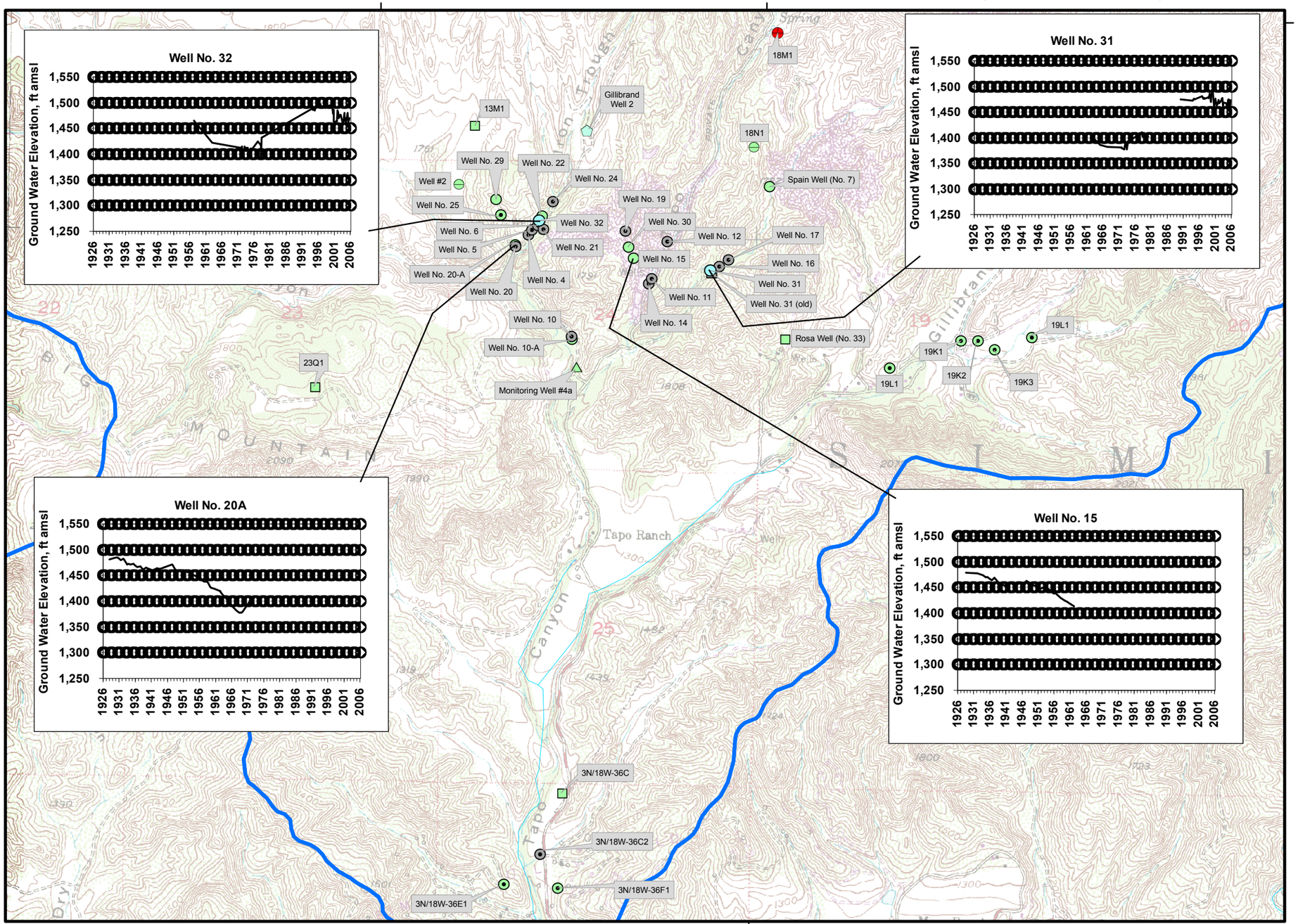
GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD
TAPO CANYON TRIBUTARY SUBAREA, VENTURA COUNTY, CALIFORNIA



WELL LOCATIONS

EXPLANATION

Well Classification

- Industrial
- Irrigation
- Monitoring
- Municipal
- Private
- Test Borehole
- Test Well
- Unknown

Well Status

- Abandoned
- Destroyed
- Non-Pumping
- Pumping
- Unknown

Example: = Pumping Municipal Well

Tapo Canyon Tributary Subarea Boundary

NOTE: Hydrograph for Well 31 includes the old and new well information.

NOTE: Gillibrand Well 2 Location based on West Coast Environmental and Engineering, 2003.

13-SEP-06

Prepared by: DWB

Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees

NORTH

0 1,000 2,000 Feet

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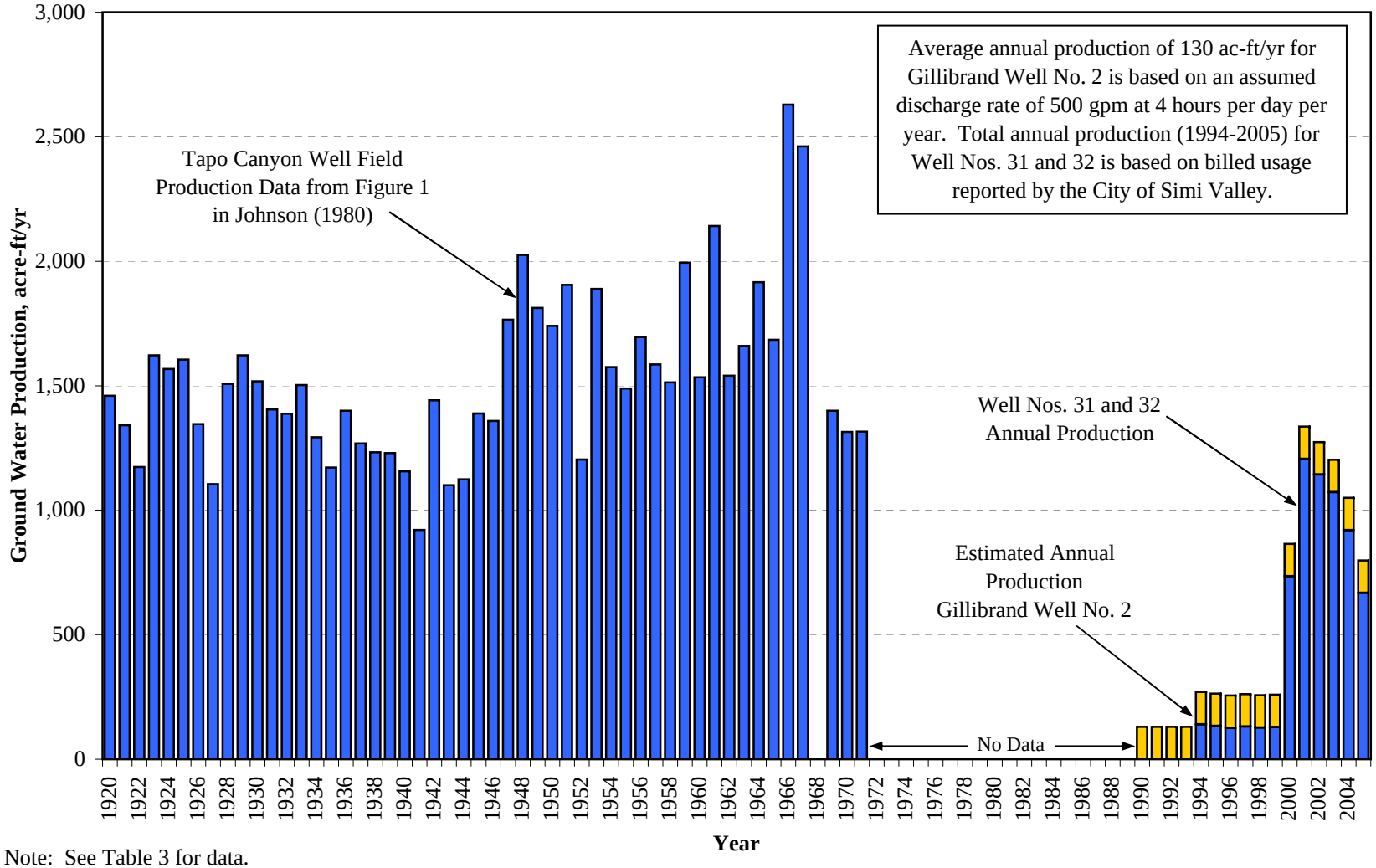
Figure 4

GIS_proj/city_of_simi_valley_9-06/0_tapo_cyn_Fig4_well_locs_9-06.mxd

Ground Water Production
Tapo Canyon Ground Water Basin



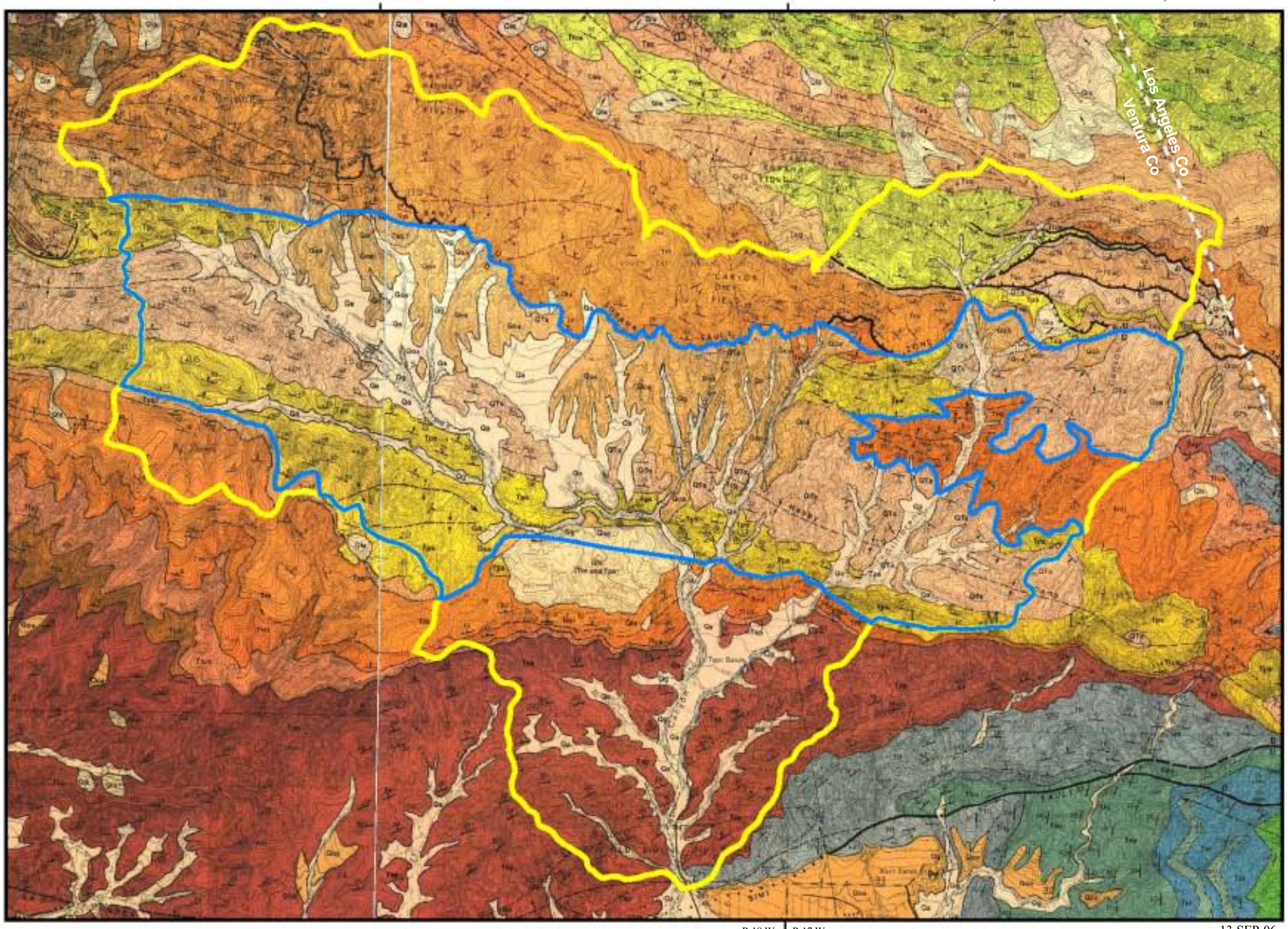
Note: See Table 3 for data.

Figure 5

RBF CONSULTING /
COUNTY WATERWORKS DISTRICT NO. 8 CITY OF SIMI VALLEY

GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD
TAPO CANYON TRIBUTARY SUBAREA, VENTURA COUNTY, CALIFORNIA

GEOLOGY OF THE TAPO CANYON AREA



EXPLANATION

- Tapo Canyon Subbasin Boundary
- Ground Water Basin Boundary
- Qa/Qg Surficial Sediments
- Qls Landslide Debris
- Qoa Older Surficial Sediments
- QTs Saugus Formation
- Tps/Tp Pico Formation
- Ttos/Ttoc Towsley Formation
- Tsq/Tsqs Sisquoc Formation
- Tm/Tml Monterey Shale
- Ttus Upper Topanga Sandstone
- Tsp Sespe Formation
- Tll/Tllg Llajas Formation
- Tsu/Tsus/Tsi Santa Susana Formation
- Kcs Chatsworth Formation
- white dashed line — County Boundary

13-SEP-06

Prepared by: DWB

Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees

Source of Geology:
Dibblee, T.W. "Geologic Map of the Santa Susana Quadrangle". (DF-38). 1992.

NORTH

0 3000 6000 Feet

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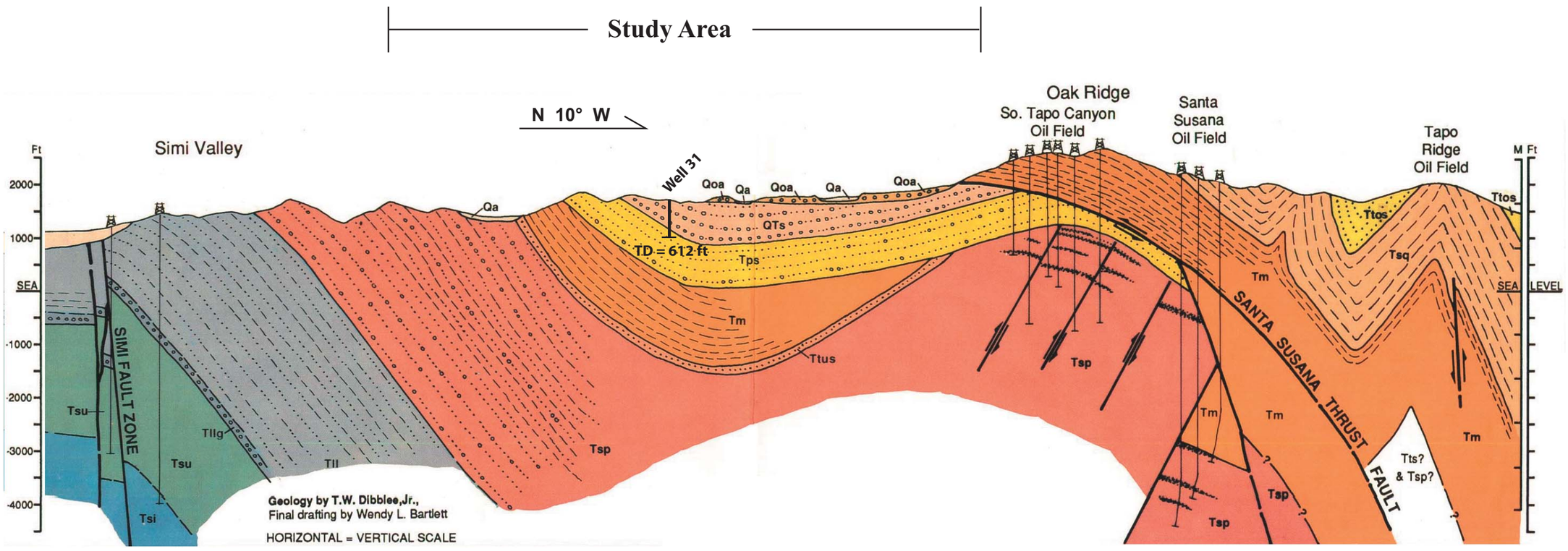
Figure 6

GIS_proj\city_of_simi_valley_9-06\0_tapo_cyn_per_yield_9-06.apr



Source of Geology:
Dibblee, T.W. "Geologic Map of the Santa Susana Quadrangle". (DF-38). 1992.

See Figure 6 for Geologic Legend.

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RBF CONSULTING / VENTURA COUNTY WATERWORKS DISTRICT NO. 8

GEOLOGIC
CROSS-SECTION

Drawn: DWB
Checked:
Approved:
Date: 13-SEP-06

Figure 7

RBF CONSULTING /
COUNTY WATERWORKS DISTRICT NO. 8 CITY OF SIMI VALLEY

GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD
TAPO CANYON TRIBUTARY SUBAREA, VENTURA COUNTY, CALIFORNIA

TAPO CANYON TRIBUTARY SUBUNITS

EXPLANATION

- Tapo Canyon Tributary Subarea Boundary
- Tapo Canyon Subunit Boundary
- white dashed line — County Boundary
- Major Street
- Surface Water
- Creek, River or Drainage Channel

T.3 N.
T.2 N.

R.18 W. | R.17 W.

13-SEP-06

NORTH

0 3000 6000 Feet

Prepared by: DWB

Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees

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Figure 8

GIS_proj\city_of_simi_valley_9-06\0_tapo_cyn_per_yield_9-06.apr

Static Ground Water Elevations
Tapo Canyon Ground Water Basin

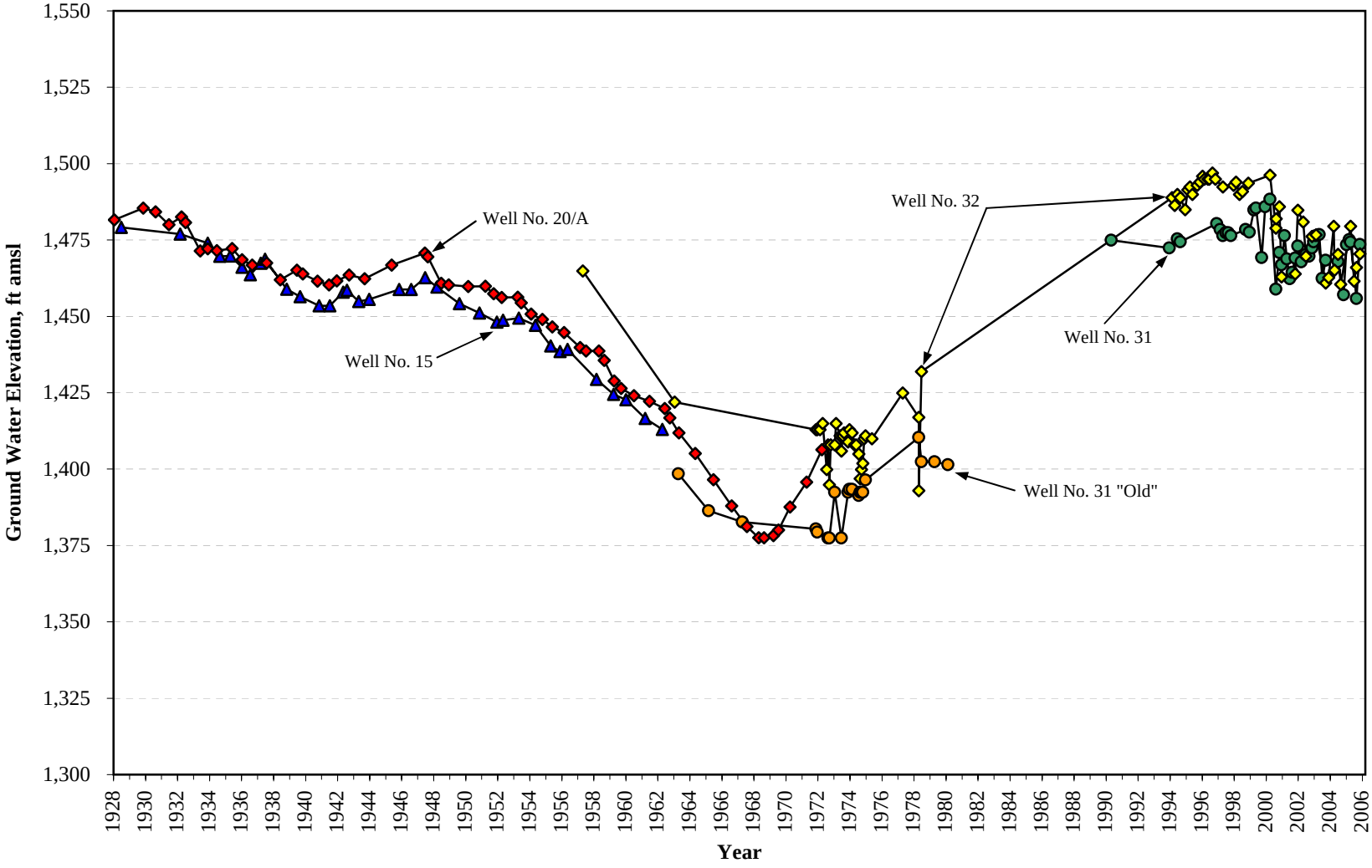
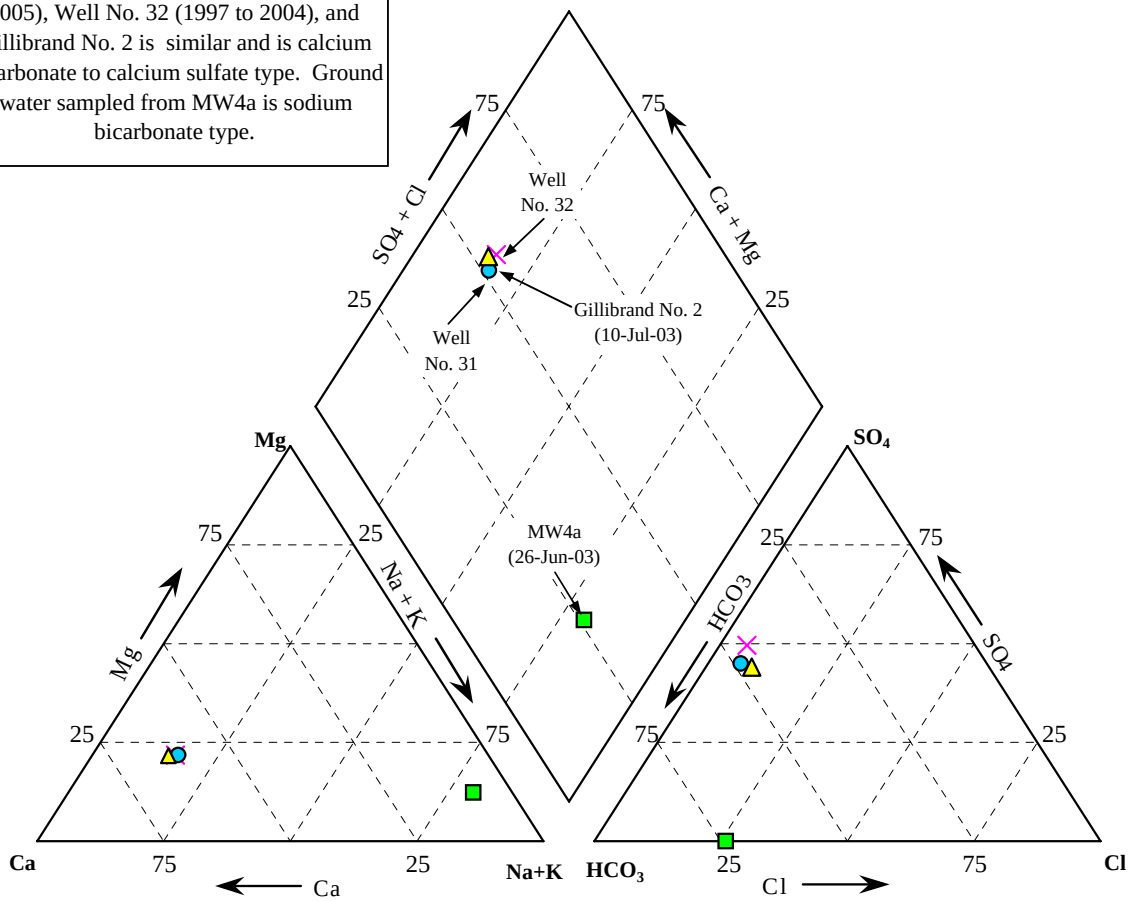


Figure 9

Figure 10

Water Quality Trilinear Diagram
Wells in Tapo Canyon Ground Water Basin

Water quality results indicate that ground water sampled from Well No. 31 (1997 to 2005), Well No. 32 (1997 to 2004), and Gillibrand No. 2 is similar and is calcium bicarbonate to calcium sulfate type. Ground water sampled from MW4a is sodium bicarbonate type.



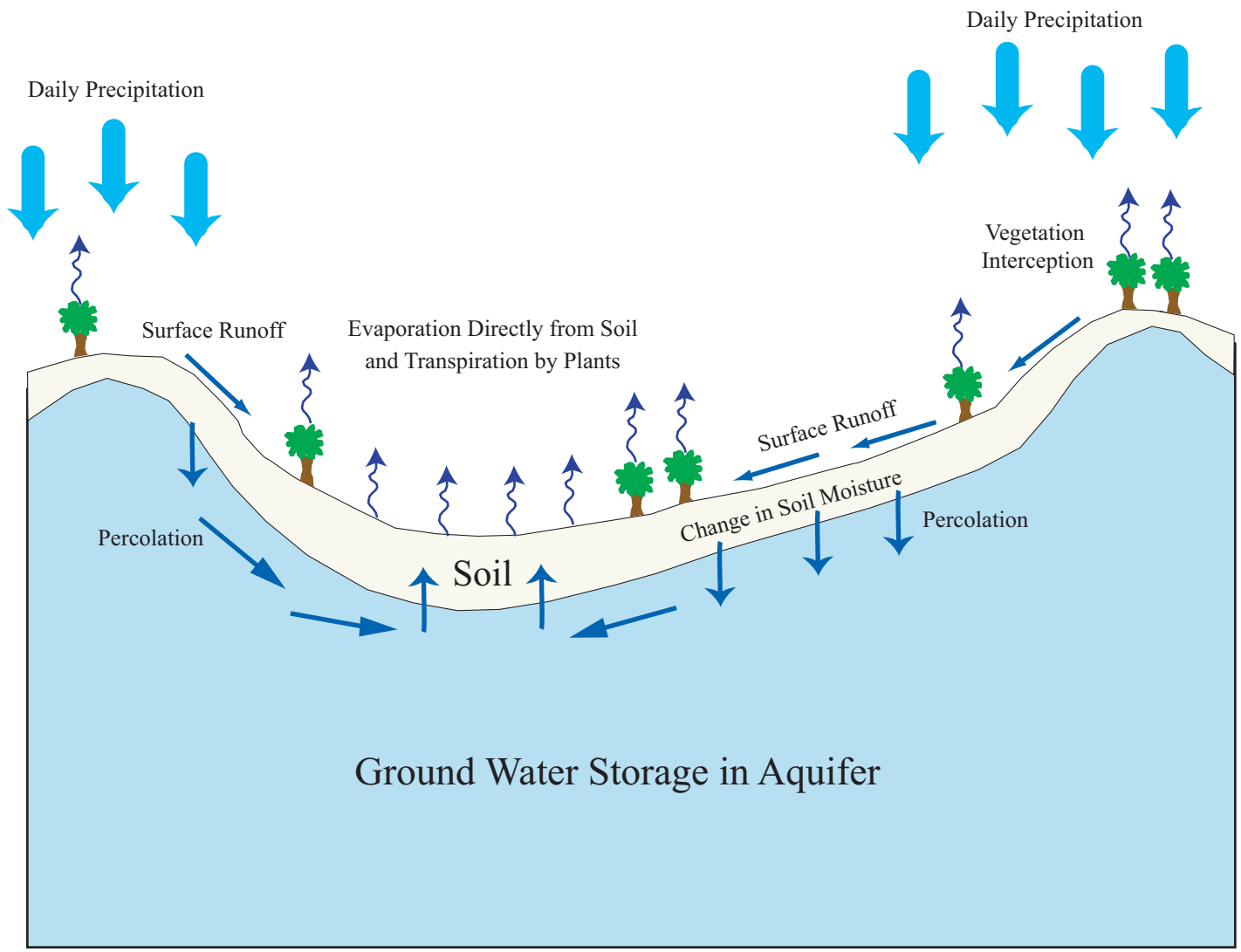
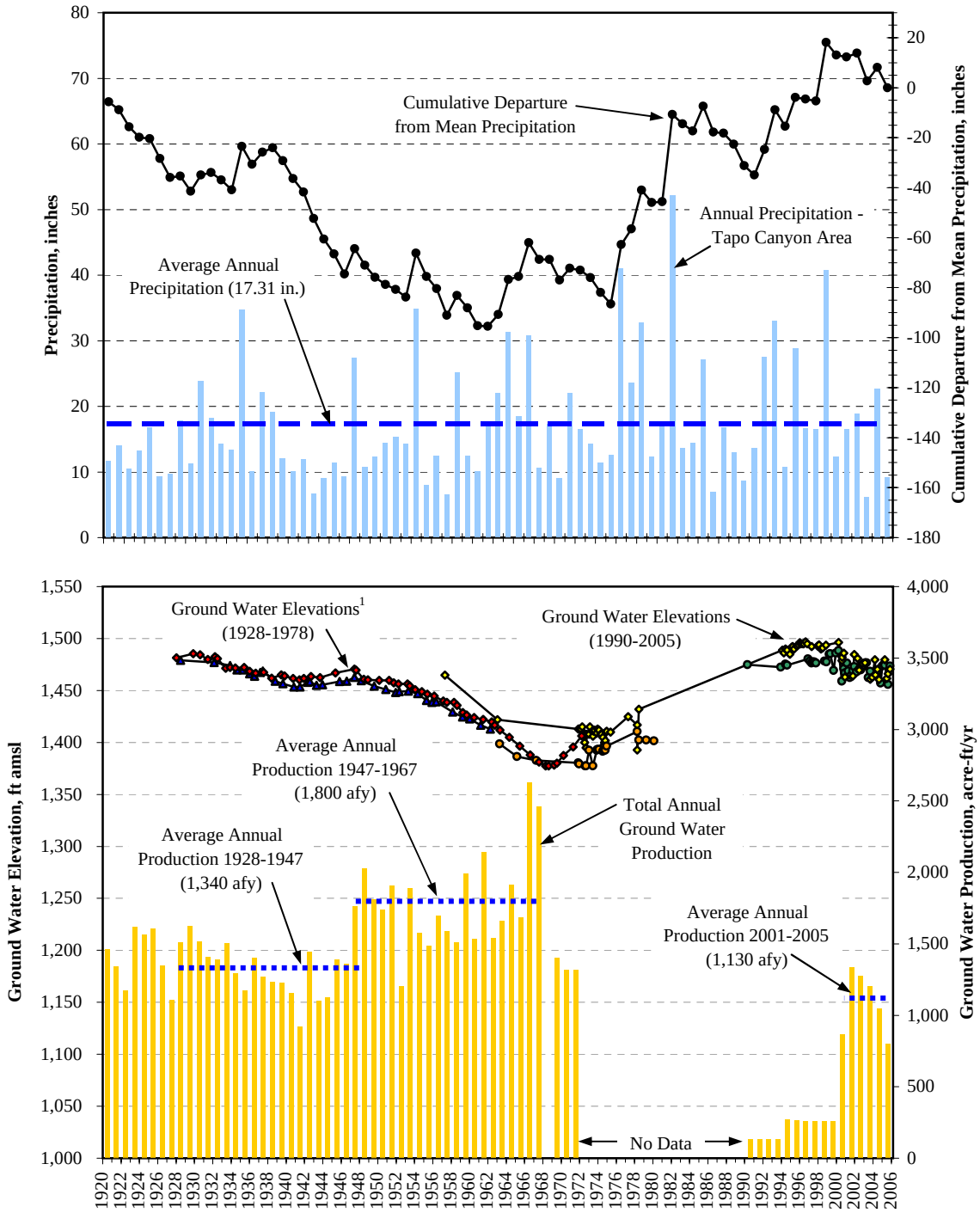


Figure 11	Drawn: DWB	RBF CONSULTING / VENTURA COUNTY WATERWORKS DISTRICT NO. 8	GEOSCIENCE
	Checked:	SCHEMATIC DIAGRAM OF WATERSHED MODEL	GEOSCIENCE Support Services, Incorporated P.O. Box 220, Claremont, CA 91711 Tel: (909)920-0707 Fax: (909)920-0403 www.gssiwater.com
	Approved:		
	Date: 13-SEP-06		

Figure 12

Precipitation, Production and Ground Water Elevations
Tapo Canyon Tributary Subarea

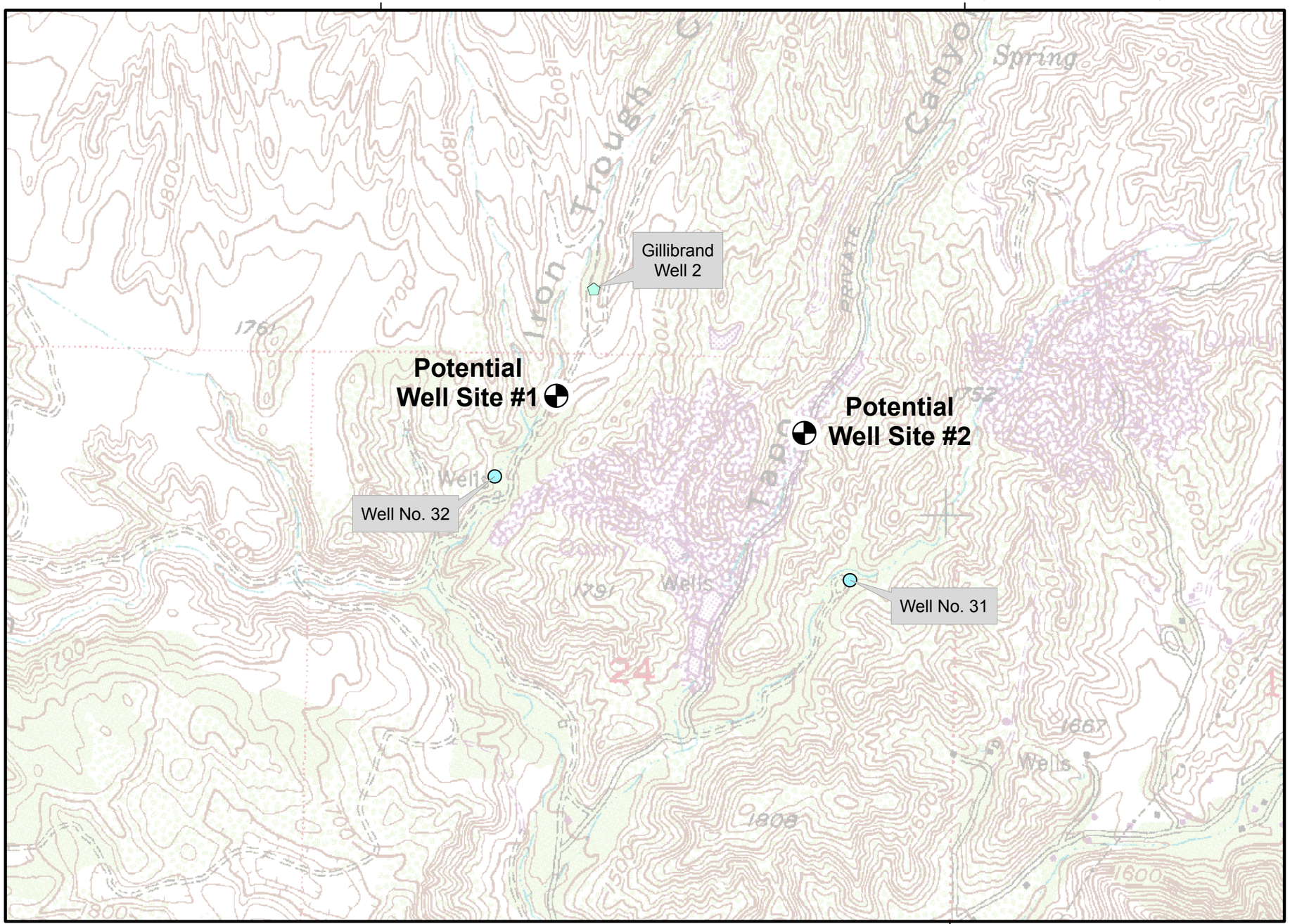


[1]Note: See Figure 9 for Individual Well Designations

RBF CONSULTING /
COUNTY WATERWORKS DISTRICT NO. 8 CITY OF SIMI VALLEY

GEOHYDROLOGIC EVALUATION OF MAXIMUM PERENNIAL YIELD
TAPO CANYON TRIBUTARY SUBAREA, VENTURA COUNTY, CALIFORNIA

POTENTIAL FUTURE WELL LOCATIONS



EXPLANATION

Potential Future Well Location

Well Classification

Pumping Industrial Well

Pumping Municipal Well

NOTE: Gillibrand Well 2 Location based on West Coast Environmental and Engineering, 2003.

T.3 N.

R.18 W. | R.17 W.

13-SEP-06

Prepared by: DWB

Map Projection:
UTM Zone 11, NAD27
Central Meridian: -117 degrees

NORTH

0 500 1,000 Feet

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Figure 13

GIS_proj/city_of_simi_valley_9-06/0_tapo_cyn_Fig13_prop_locs_9-06.mxd

TABLES

Table 1

Summary of Annual Precipitation
Tapo Canyon Tributary Subarea

Year	Annual Precipitation			
	Susana Sta 196 [inches]	Susana Sta 196a [inches]	Susana Sta 196b [inches]	Tripass Station 242 [inches]
1957	14.26	NA	NA	NA
1958	34.93	NA	NA	NA
1959	7.96	NA	NA	NA
1960	12.40	NA	NA	NA
1961	6.64	NA	NA	NA
1962	25.23	NA	NA	NA
1963	12.44	NA	NA	NA
1964	10.12	NA	NA	NA
1965	NA	17.05	NA	NA
1966	NA	22.03	NA	NA
1967	NA	31.37	NA	NA
1968	NA	18.53	NA	NA
1969	NA	30.82	NA	NA
1970	NA	10.63	NA	NA
1971	NA	17.32	NA	NA
1972	NA	9.06	NA	11.04
1973	NA	22.01	NA	26.00
1974	NA	16.58	NA	17.59
1975	NA	14.32	NA	15.50
1976	NA	11.35	NA	12.44
1977	NA	12.68	NA	14.54
1978	NA	NA	41.06	47.96
1979	NA	NA	23.65	25.84
1980	NA	NA	32.84	36.76
1981	NA	NA	12.30	14.00
1982	NA	NA	17.68	20.60
1983	NA	NA	52.16	48.84
1984	NA	NA	13.67	13.32
1985	NA	NA	14.40	12.87
1986	NA	NA	27.22	32.98
1987	NA	NA	6.99	9.00
1988	NA	NA	16.82	20.51
1989	NA	NA	12.99	14.32

Table 1

Summary of Annual Precipitation
Tapo Canyon Tributary Subarea

Year	Annual Precipitation			
	Susana Sta 196 [inches]	Susana Sta 196a [inches]	Susana Sta 196b [inches]	Tripass Station 242 [inches]
1990	NA	NA	8.63	9.56
1991	NA	NA	13.65	19.17
1992	NA	NA	27.56	30.56
1993	NA	NA	33.08	40.89
1994	NA	NA	10.74	13.75
1995	NA	NA	28.89	36.66
1996	NA	NA	16.70	19.90
1997	NA	NA	16.52	20.22
1998	NA	NA	40.72	49.41
1999	NA	NA	12.31	11.39
2000	NA	NA	16.46	19.20
2001	NA	NA	18.89	24.17
2002	NA	NA	6.24	8.45
2003	NA	NA	22.69	22.89
2004	NA	NA	9.19	12.46

Source: Ventura County Watershed Protection District.
NA - Not Available

Summary of Wells Within the Tapo Canyon Tributary Subarea

Well No.	Alternative No.	Well Owner	Well Locations		State Well No.	Well Use	Well Status	Year Installed	Borehole Depth [ft bgs[1]]	Well Depth [ft bgs]	Casing Diameter [in.]	Perforated Intervals [ft bgs]	Maximum Yield [gpm[2]]	Source
			x	y										
18N1	4-59-14	Levi Blomker	34.33758453	-118.70856262	03N/17W-18N1	Private	Unknown	1959	370	370	8	320-360	27	Driller's Log
Well No. 2	24D3	P.W. Gillibrand	34.33563461	-118.72494107	03N/18W-24D3	Private	Pumping	1990	1520	1300	28	520-1,280	3,000	Driller's Log
DWR 03N/17W-19L3	36C	Tim Boyle	34.30757011	-118.71861142	03N/18W-36C	Irrigation	Unknown	1996	142	142	4	42-77; 82-117; 122-142	Unknown	Driller's Log
13M1	NA	Bluesky Ranch	34.33833614	-118.72411207	03N/18W-13M1	Irrigation	Unknown	1991	456	456	8	240-330; 351-392; 393-456	Unknown	Driller's Log
23Q1	NA	Big Sky Ranch	34.32615055	-118.73275378	03N/18W-23Q1	Irrigation	Unknown	1991	465	465	6	380-460	5	Driller's Log
Well No. 31 (old)	24H1	Tapo Mutual Water Company	34.33172062	-118.71078881	03N/18W-24H1	Irrigation	Abandoned	1950	805	744	26.25	120-720	550	Driller's Log
Rosa Well (No. 33)	19M	Tapo Mutual Water Company	34.32871839	-118.70662381	03N/17W-19M	Irrigation	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Monitoring Well No. 4a	24L	P.W. Gillibrand Co., Inc.	34.32728230	-118.71822613	03N/18W-24L	Monitoring	Unknown	1998	Unknown	Unknown	Unknown	Unknown		Well Permit Application
Well No. 32	24C7 (22-P-28)	City of Simi Valley Dist. #8	34.33401416	-118.72044286	03N/18W-24C7	Municipal	Pumping	1957	765	654	14	204-654	2,100	Driller's Log
Well No. 22	24D1 (22-P-7)	Tapo Mutual Water Company	34.33391063	-118.72039347	03N/18W-24D1	Municipal	Unknown	1946	300	220	16	56-210	1,100	Driller's Log
Well No. 20-A	24E3 (22-P-8)	Tapo Mutual Water Co (Ventura Co)	34.33288005	-118.72174742	03N/18W-24E3	Municipal	Unknown	1943	408	153	16	50-145	Unknown	Driller's Log
Spain Well (No. 7)	19D	Tapo Mutual Water Company	34.33575477	-118.70765064	03N/17W-19D	Municipal	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 15	24G	Tapo Mutual Water Company	34.33234878	-118.71514695	03N/18W-24G	Municipal	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 10-A	24L	Tapo Mutual Water Company	34.32855214	-118.71850830	03N/18W-24L	Municipal	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 29	24D	Tapo Mutual Water Company	34.33497102	-118.72286415	03N/18W-24D	Municipal	Unknown	1946	660	Unknown	14	Unknown	Unknown	Ventura Co. Map
Well No. 30	24G	Tapo Mutual Water Company	34.33285361	-118.71543478	03N/18W-24G	Municipal	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 31	24H	City of Simi Valley Dist. #8	34.33183815	-118.71086265	03N/18W-24H	Municipal	Pumping	1990	612	604	16.625	104-594	1,800	Driller's Log
18M1	NA	P.W. Gillibrand	34.34285900	-118.70734306	03N/17W-18M1	Test Well	Destoyed	1990	823	50	28	Unknown	Unknown	Driller's Log
19L1	23-P-5	D.C. Gillibrand	34.32746310	-118.70079247	03N/17W-19L1	Unknown	Unknown	1950	78	Unknown	6	Unknown	Unknown	Driller's Log
19K1	23-P-2	Unknown	34.32878137	-118.69684007	03N/17W-19K1	Unknown	Unknown	1934	90	90	12	41-60; 65-75	Unknown	Driller's Log
19K2	23-P-1	Rita Gillibrand	34.32879430	-118.69590698	03N/17W-19K2	Unknown	Unknown	1949	94	94	10	55-80	Unknown	Driller's Log
19K3	33-P-3	Balinger	34.32839978	-118.69496569	03N/17W-19K3	Unknown	Unknown	1940	300	300	7	136-193	Unknown	Driller's Log
19L1	23-P-5	D.C. Gillibrand	34.32899874	-118.69291454	03N/17W-19L1	Unknown	Unknown	1950	78	Unknown	6	Unknown	Unknown	Driller's Log
36C2	22-Q-3	Tapo Mutual Water Company	34.30473293	-118.71979076	03N/18W-36C2	Unknown	Abandoned	1944	253	Unknown	Unknown	Unknown	Unknown	Driller's Log
Anderson Oil #14	22-Q-1 (36H1)	Anderson Oil	34.30331935	-118.72177539	03N/18W-36E1	Unknown	Unknown	Unknown	1416	Unknown	Unknown	Unknown	Unknown	Driller's Log
36F1	22-Q-2	Anderson	34.30319845	-118.71877731	03N/18W-36F1	Unknown	Unknown	Unknown	138	138	8.625	40-138	Unknown	Driller's Log
Well No. 16	24H	Tapo Mutual Water Company	34.33203446	-118.71037110	03N/18W-24H	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 17	24H	Tapo Mutual Water Company	34.33234246	-118.70986454	03N/18W-24H	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 19	24G	Tapo Mutual Water Company	34.33359182	-118.71563171	03N/18W-24G	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 14	24G	Tapo Mutual Water Company	34.33117306	-118.71428069	03N/18W-24G	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 11	24G	Tapo Mutual Water Company	34.33140677	-118.71411807	03N/18W-24G	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 12	24G	Tapo Mutual Water Company	34.33314622	-118.71329799	03N/18W-24G	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 10	24L	Tapo Mutual Water Company	34.32867587	-118.71852559	03N/18W-24L	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 24	24C	Tapo Mutual Water Company	34.33490794	-118.71969417	03N/18W-24C	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 25	24D	Tapo Mutual Water Company	34.33424384	-118.72258169	03N/18W-24D	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 20	24E	Tapo Mutual Water Company	34.33280156	-118.72172726	03N/18W-24E	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 4	24E	Tapo Mutual Water Company	34.33334907	-118.72103136	03N/18W-24E	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 5	24E	Tapo Mutual Water Company	34.33358410	-118.72082993	03N/18W-24E	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 6	NA	Tapo Mutual Water Company	34.33378413	-118.72050993	03N/18W-24D	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map
Well No. 21	NA	Tapo Mutual Water Company	34.33360522	-118.72019692	03N/18W-24C	Unknown	Abandoned	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Ventura Co. Map

Notes:
NA - Not Applicable
[1] feet below ground surface
[2] gallons per minute

Table 2

Tapo Canyon Ground Water Basin Annual Ground Water Production

Year	Well Nos. 15, 20/20A, 31 and 32 (Combined Production)	City of Simi Valley Well No. 31	City of Simi Valley Well No. 32	TOTAL PRODUCTION[1]	TOTAL WATER SOLD[2]
	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]
1920	1,459.5	-	-	**1,459.5**	-
1921	1,341.6	-	-	**1,341.6**	-
1922	1,173.7	-	-	**1,173.7**	-
1923	1,621.7	-	-	**1,621.7**	-
1924	1,567.7	-	-	**1,567.7**	-
1925	1,605.1	-	-	**1,605.1**	-
1926	1,345.8	-	-	**1,345.8**	-
1927	1,104.8	-	-	**1,104.8**	-
1928	1,507.2	-	-	**1,507.2**	-
1929	1,622.1	-	-	**1,622.1**	-
1930	1,518.0	-	-	**1,518.0**	-
1931	1,404.7	-	-	**1,404.7**	-
1932	1,387.3	-	-	**1,387.3**	-
1933	1,502.3	-	-	**1,502.3**	-
1934	1,293.2	-	-	**1,293.2**	-
1935	1,170.9	-	-	**1,170.9**	-
1936	1,399.8	-	-	**1,399.8**	-
1937	1,268.3	-	-	**1,268.3**	-
1938	1,232.7	-	-	**1,232.7**	-
1939	1,229.0	-	-	**1,229.0**	-
1940	1,156.8	-	-	**1,156.8**	-
1941	920.4	-	-	**920.4**	-
1942	1,441.4	-	-	**1,441.4**	-
1943	1,100.0	-	-	**1,100.0**	-

Table 3

Tapo Canyon Ground Water Basin Annual Ground Water Production

Year	Well Nos. 15, 20/20A, 31 and 32 (Combined Production)	City of Simi Valley Well No. 31	City of Simi Valley Well No. 32	TOTAL PRODUCTION[1]	TOTAL WATER SOLD[2]
	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]
1944	1,123.7	-	-	**1,123.7**	-
1945	1,389.1	-	-	**1,389.1**	-
1946	1,358.1	-	-	**1,358.1**	-
1947	1,765.0	-	-	**1,765.0**	-
1948	2,025.9	-	-	**2,025.9**	-
1949	1,812.3	-	-	**1,812.3**	-
1950	1,740.0	-	-	**1,740.0**	-
1951	1,905.0	-	-	**1,905.0**	-
1952	1,203.2	-	-	**1,203.2**	-
1953	1,888.4	-	-	**1,888.4**	-
1954	1,574.4	-	-	**1,574.4**	-
1955	1,488.6	-	-	**1,488.6**	-
1956	1,694.7	-	-	**1,694.7**	-
1957	1,586.0	-	-	**1,586.0**	-
1958	1,513.9	-	-	**1,513.9**	-
1959	1,993.8	-	-	**1,993.8**	-
1960	1,533.9	-	-	**1,533.9**	-
1961	2,141.6	-	-	**2,141.6**	-
1962	1,540.1	-	-	**1,540.1**	-
1963	1,659.6	-	-	**1,659.6**	-
1964	1,915.9	-	-	**1,915.9**	-
1965	1,684.1	-	-	**1,684.1**	-
1966	2,629.4	-	-	**2,629.4**	-
1967	2,461.4	-	-	**2,461.4**	-

Table 3

Tapo Canyon Ground Water Basin Annual Ground Water Production

Year	Well Nos. 15, 20/20A, 31 and 32 (Combined Production)	City of Simi Valley Well No. 31	City of Simi Valley Well No. 32	TOTAL PRODUCTION[1]	TOTAL WATER SOLD[2]
	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]
1968	-	-	-	**0.0**	-
1969	1,400.0	-	-	**1,400.0**	-
1970	1,314.1	-	-	**1,314.1**	-
1971	1,315.0	-	-	**1,315.0**	-
1972	-	-	-	**0.0**	-
1973	-	-	-	**0.0**	-
1974	-	-	-	**0.0**	-
1975	-	-	-	**0.0**	-
1976	-	-	-	**0.0**	-
1977	-	-	-	**0.0**	-
1978	-	-	-	**0.0**	-
1979	-	-	-	**0.0**	-
1980	-	-	-	**0.0**	-
1981	-	-	-	**0.0**	-
1982	-	-	-	**0.0**	-
1983	-	-	-	**0.0**	-
1984	-	-	-	**0.0**	-
1985	-	-	-	**0.0**	-
1986	-	-	-	**0.0**	-
1987	-	-	-	**0.0**	-
1988	-	-	-	**0.0**	-
1989	-	-	-	**0.0**	-
1990	-	-	-	**0.0**	-
1991	-	-	-	**0.0**	-

Table 3

Tapo Canyon Ground Water Basin Annual Ground Water Production

Year	Well Nos. 15, 20/20A, 31 and 32 (Combined Production)	City of Simi Valley Well No. 31	City of Simi Valley Well No. 32	TOTAL PRODUCTION[1]	TOTAL WATER SOLD[2]
	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]	[acre-ft]
1992	-	-	-	**0.0**	-
1993	-	-	-	**0.0**	-
1994	-	140.1	-	**140.1**	-
1995	-	133.0	-	**133.0**	-
1996	-	125.7	-	**125.7**	-
1997	-	131.4	-	**131.4**	-
1998	-	126.8	-	**126.8**	-
1999	-	102.9	26.5	**129.4**	-
2000	-	377.7	356.8	**734.6**	-
2001	-	575.6	308.9	**884.5**	**1205.6**
2002	-	408.0	571.0	**979.0**	**1143.9**
2003	-	282.6	435.2	**717.8**	**1072.7**
2004	-	115.9	338.1	**454.1**	**919.5**
2005	-	212.5	440.7	**653.2**	**668.0**
Average	**1,530.0**	**227.7**	**353.9**		

Source of data: County Waterworks District No. 8 City of Simi Valley; Data for Well Nos. 15 and 20/20A and production during the period 1920-1971 are from Figure 1 of Johnson (1980).

[1] Production as reported from meter readings at the individual wells.

[2] Total water sold as reported by the City of Simi Valley.

Table 3

Selected Water Quality - Tapo Canyon Wells

Well	Collection Date	Total Dissolved Solids [mg/L]	Nitrate (as NO_3) [mg/L]	Aluminum [ug/L]	Selenium [ug/L]	Specific Conductance [umhos/cm^2]
Gillibrand No. 2	10-Jul-03	690	12.8	NA	NA	1,020
MW4a	12-Dec-02	1,950	< 0.1	19	24	2,310
	26-Jun-03	1,594	NA	NA	NA	2,980
Well No. 10A	4-Oct-68	830	NA	NA	NA	NA
Well No. 29	23-Apr-70	725	29	NA	NA	NA
Well No. 31	23-Apr-70	826	NA	NA	NA	NA
	8-Apr-96	NA	0.8	NA	NA	NA
	13-Feb-97	660	7	NA	NA	890
	18-Feb-98	620	9.9	NA	12	890
	10-Nov-98	738	2.2	NA	NA	932
	12-Dec-01	NA	1.8	NA	NA	NA
	21-Oct-02	NA	0.49	NA	NA	NA
	29-Apr-04	770	< 0.4	NA	NA	1,060
	23-May-05	780	0.5	NA	NA	1,090
Well No. 32	23-Apr-70	836	21	NA	NA	NA
	8-Apr-96	NA	21	NA	NA	NA
	13-Feb-97	800	20	NA	NA	1,000
	18-Feb-98	720	15	NA	44	990
	10-Nov-98	690	12.8	760	< 5	876
	12-Dec-01	NA	9.5	NA	NA	NA
	21-Oct-02	NA	2.4	NA	NA	NA
	29-Apr-04	680	3.8	NA	NA	948
Well No. 33	15-May-70	732	NA	NA	NA	NA
MCL or Action Level		500[1]	45[1]	1000[1]	50[1]	900[2]

[1] California Department of Health Services (DHS) Primary Maximum Contaminant Levels.
[2] California DHS Secondary Maximum Contaminant Level.
mg/L = milligrams per liter
ug/L = micrograms per liter
umhos/cm^2 = micro ohms per square centimeter
<0.1 = Constituent not detected above the indicated detection limit.

Table 4

APPENDIX A

Driller's Logs

3N/18W-24H

TRIPLICATE
Owner's Copy

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in
No. 159589

State Well No.
Other Well No.

Permit No. or Date 2555

(1) OWNER: Name City of Simi Valley County Water Works Dist. 48
Address 2929 Tapo Canyon Road
City Simi Valley CA Zip 93063

(2) LOCATION OF WELL (See instructions):
County Ventura Owner's Well Number 31
Well address if different from above
Township Range Section
Distance from cities, roads, railroads, fences, etc.
½ of Tapo Canyon & Bennett. Appx. ½ Mile
NE of Aerator tank on dirt road.

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 ☐
Stock ☐
Municipal ☒
Other ☐

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

(6) GRAVEL PACK:
Yes ☒ No ☐ Size #5
Diameter of bore 28"
Packed from 80 to 604 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	604	16	5/8			
			5/16	104	594	.070
Copper Bearing						

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 80 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 52.5 ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? Midway
Type of test Pump ☒ Bailer ☐ Air lift ☐
Depth to water at start of test ft. At end of test 140 ft.
Discharge 1800 gal/min after 24 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 612 ft. Depth of completed well 504 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	120	Sand
120	150	Gray blue clay
150	175	Gray clay & sand
175	260	Gray blue clay
260	275	Gray clay & sealshells
275	355	Gray clay, sand & shells
355	380	Gray clay
380	410	Dark clay & shells
410	500	" " "
500	612	Sand & Gravel & Blue clay w/some sea shells

240' - 1½" Air line
90' - 4" gravel pipe

Work started 5/17 19 90 Completed 5/18 19 90

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 Midway Drilling & PUmp Co. (Person, firm, or corporation) (Typed or printed)
Address P O Box 4608
City Saticoy CA Zip 93007
License No. 295490 Date of this report 5/5/90

DB (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

7533

08/20/98 08:08 FAX 805 583 6300 SIMI VALLEY ENGINEERING → PSC 004/018

DUPLICATE
File Original and Triplicate with the
DIVISION OF WATER RESOURCES
P. O. BOX 1079
SACRAMENTO 5, CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

SHEET 1

Do Not Fill In
State Well No. 3N/18W-24H1
Other Well No.
Region 4

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

15423

(1) Driller: 302
Name Roscoe Moss Company
Address 4360 Worth Street
Los Angeles, California.
License No. 624 Classification C-57

(2) Proposed use or uses (*check*): Domestic ☐ Irrigation ☒ Domestic and Irrigation ☐ Municipal ☐ Industrial ☐ Test well ☐ Other
2

(3) Equipment used (*check*): Rotary ☒ Cable ☒ Dug well ☐ Other

Owner:
Name Tapo Mutual Water Company
Address Simi, California.

(4) Type of work (*check*): New well ☒ Reconditioning of well ☐ Deepening existing well ☐

(5) Well log:
Total depth of well 805 ft.

Give details of formations penetrated, such as silt, peat, muck, sand, gravel, clay, shale, sandstone, hardpan, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard, brittle).

Depth From Ground Surface	
0 ft. to 25 ft.	Sand and gravel
25 " " 58 "	Blue clay
58 " " 84 "	Sand and boulders
84 " " 115 "	Brown clay
115 " " 155 "	Blue clay and rocks
155 " " 170 "	Hard sand
170 " " 185 "	Blue clay
185 " " 194 "	Clay, stks sand
194 " " 260 "	Blue clay
260 " " 291 "	Blue clay, sand and shells
291 " " 310 "	Sand and gravel
310 " " 316 "	Sandy blue clay
316 " " 345 "	Sand and gravel
345 " " 350 "	Clay
350 " " 375 "	Sand and gravel streaks of clay
375 " " 415 "	Sandy blue clay
415 " " 440 "	Sandy clay and shells
440 " " 458 "	Sand, stks blue clay
458 " " 538 "	Hard sand and shells
538 " " 610 "	Sandy clay
610 " " 668 "	Blue shale
668 " " 710 "	Clay and gravel
710 " " 790 "	Sandy blue clay
790 " " 805 "	Hard brown shale.

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If additional space is required, continue on DWR Form No. 246—Supplement, and attach to respective report copies.

(6) Casing left in well:

LENGTH FT.	DIAMETER INCHES	SINGLE, DOUBLE, WELDED, OR OTHER	LBS. PER FOOT OR GAGE OF CASING	SEATING BELOW GROUND SURFACE, FT.
24'	26" 1/4" Conductor pipe	X-X-2	30	
120 -	14" x 1/4" Blank pipe			
600' -	14" x 1/4" Perforated pipe.			

Type and size of shoe or well ring ..... Welded joints— ☐ Yes ☐ No

D.W.R. Form No. 246

...ICATE
...iginal, Duplicate and Triplicate with the
...TER RESOURCES
...O. BOX 1799
...CRAMENTO 8, CALIFORNIA

SHEET 2

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

Do Not Fill In
State Well No. 3N/18W-24H1
Other Well No.
Region 4

(7) **Perforations:**
Type of perforator used Pre-perforated
Perforated 120 ft. to 720 ft. Hole size 12" No. of holes 7

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(8) **Water levels:**
Depth at which water first encountered ft.
Depth to water before perforating ft.
Depth to water after perforating ft.
Note any change in water level while drilling

(9) **Well pumping test:**
Date of test 6-26-50 By whom Roscoe Moss Company
Depth to water when test started 80' ft.
G.P.M. at beginning of test 550
Drawdown from standing level 35' ft.
G.P.M. at completion of test 1500
Drawdown at completion of test 84 ft.
Length of time tested 79 hours.
Temperature of water
Was gas present in water? ☐ Yes ☐ No

(10) **General:**
Was well gravel packed? yes Size of rock Thickness of pack
Was a surface sanitary seal provided? yes
Were any strata sealed against pollution? ☒ Yes ☐ No If yes, attach detailed description. Top 24'
Strata sealed 0 to 24'
Was analysis made of water? ☐ Yes ☒ No If yes, attach copy.
Was electric log made of well? ☐ Yes ☒ No If yes, attach copy.
If well abandoned, was it plugged and sealed?
Method of plugging and sealing Bottom plug

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(11) **Location:**

Section No. 24
Township 3-N
Range 18-W
Base & Meridian S.B.
Show location of well in Section, thus (X)
Distances to section lines from well, N or S. 1600 ft. and E or W. 550 ft.
Show location of nearest known well, thus (O)
Distance to nearest known well 600 ft.

(12) **Time of work:**
Work started date 5-11-50 Completed date 5-31-50
Date of this report July 12, 1950

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] Roscoe Moss Company
(Company)
By A. A. Barnes Secretary
License No. 624 Classification C-57
Dated July 12, 1950, 19

FIELD CHECK OF WELL LOCATION

DRILLER Roscoe Moss. CHECKED BY HEH.

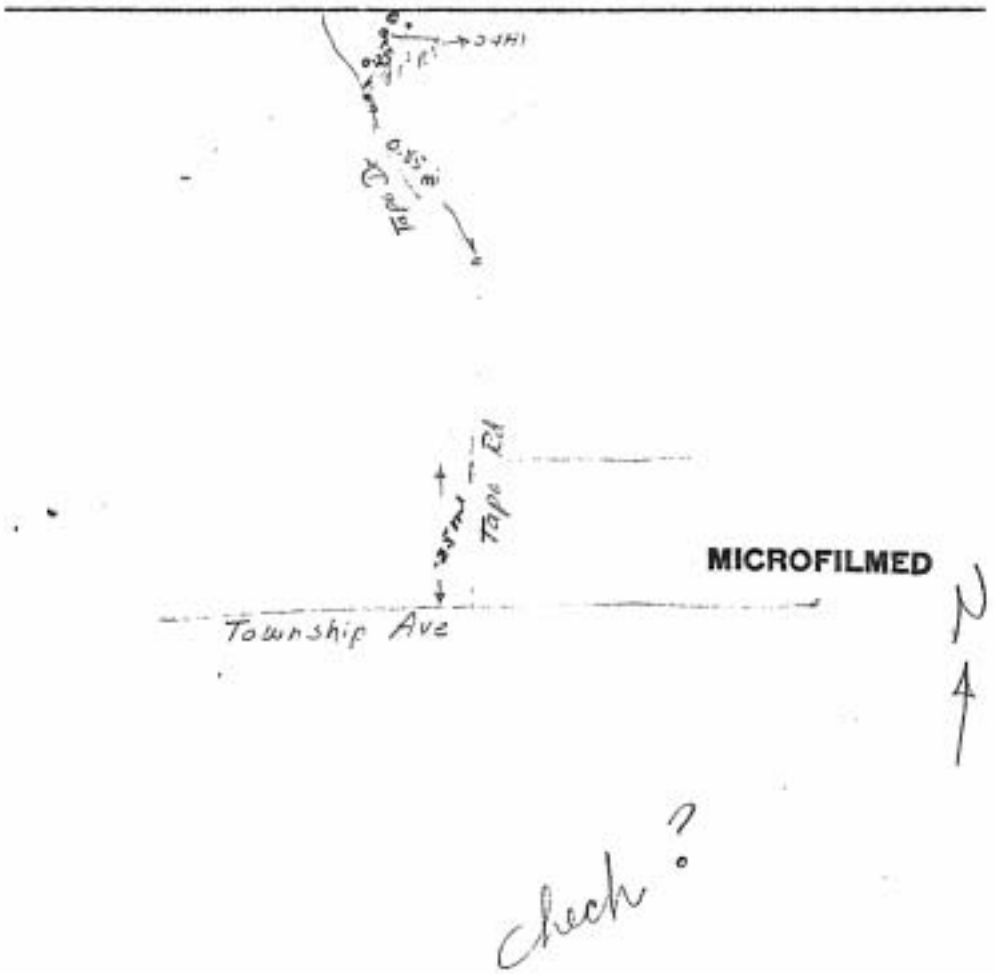
OWNER Sugar Mat-Water Co DATE 9-1 1954.

PUMP NO. _____.

METER NO. 33-2888. USMT. 863087

STATE WELL NO. 3N/19W-24H1

LOCATE WELL WITH REFERENCE TO ROADS AND ROAD INTERSECTIONS: ALSO INDICATE DISTANCES AND DIRECTIONS TO NEARBY CITIES OR TOWNS.



MICROFILMED

check?

DUPLICATE
For Original, Duplicate and Triplicate with the
DIVISION OF WATER RESOURCES
P. O. BOX 1070
SACRAMENTO 5, CALIFORNIA

WATER WELL DRILLERS REPORT

(Sections 7074, 7077, 7078, Water Code)

STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

Do Not Fill In
State Well No. 3N/18W-24G7
Other Well No. 4-58-45
Region

(1) DRILLER: (person, firm, or corporation)
Name George Chamberlain
Address 3626 Township Ave.
Simi, Calif.

OWNER:
Name Tapo Mutual Water Co.
Address Simi, Calif.

JUL 21 1958 LOS ANGELES

(2) Proposed Use (Check)

				Equipment	
Domestic	☐	Industrial	☐	Rotary	☒
Irrigation	☒	Test Well	☐	Cable	☐
Municipal	☐	Other	☐	Dug Well	☐
				Other	☐

(3) CASING: 654 ft. of 14 in. 1/4 in. ft./ga. casing 654 ft. in well

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Type and size of shoe or well ring none

(4) PERFORATIONS:
Type of perforator used Machine cut
Perforated 204 ft. to 654 ft. 30 holes per ft. in.

Diameter of perforations 5/32 in., length 2 in.

(5) WATER LEVELS:
Was electric log made of well? ☐ Yes ☒ No If yes, attach copy.
Depth at which water was first found 80 ft.
Standing level before perforating 80 ft.
Standing level after perforating 80 ft.
Note your observation of any change in water level while drilling no
Was a surface sanitary seal provided? yes

(6) WELL PUMPING TEST:
Capacity 2100 gal./min. 60 ft. draw down

Was well gravel packed? yes
Are any stress raised against pollution? no
Temperature unknown Was a chemical analysis made? Yes Attach Report
If abandoned was well capped?

(7) TYPE OF WORK (check):
New well ☒ Reconditioning of well ☐
Deepening existing well ☐

(8) LOCATION OF WELL:
County Ventura
R. D. or Street No.
Location of well: 40 ft. west of well
-Ve 22.
sketch on back

WELL LOG:
Total depth of well 765 ft.
Formation: Mention size of water gravel—

From	To	Formation
0 ft.	6 ft.	Surface
6 "	21 "	Sand & gravel
21 "	43 "	Brown clay streaks of sand
43 "	64 "	Hard fine sand
64 "	92 "	Coarse sand loose
92 "	119 "	Coarse fine sand
119 "	187 "	Coarse sand
187 "	189 "	Brown clay
189 "	195 "	Brown & blue clay with sand streaks
195 "	219 "	Brown clay with sand streaks
219 "	231 "	Brown, yellow, grey sandy clay
231 "	287 "	Coarse sand
287 "	376 "	Blue clay
376 "	404 "	Coarse blue & white sand
404 "	416 "	Fine blue & white sand
416 "	421 "	Dark blue clay, Light grey sandy clay
421 "	472 "	Coarse sand
472 "	524 "	Blue clay with gravel
524 "	635 "	Coarse blue, white, black & grey sand
635 "	649 "	Sandy blue & grey clay
649 "	677 "	Grey sandy clay
677 "	698 "	Dark sandy shale & clay
698 "	765 "	Blue & Grey sandy clay, Dark grey shale & blue shale

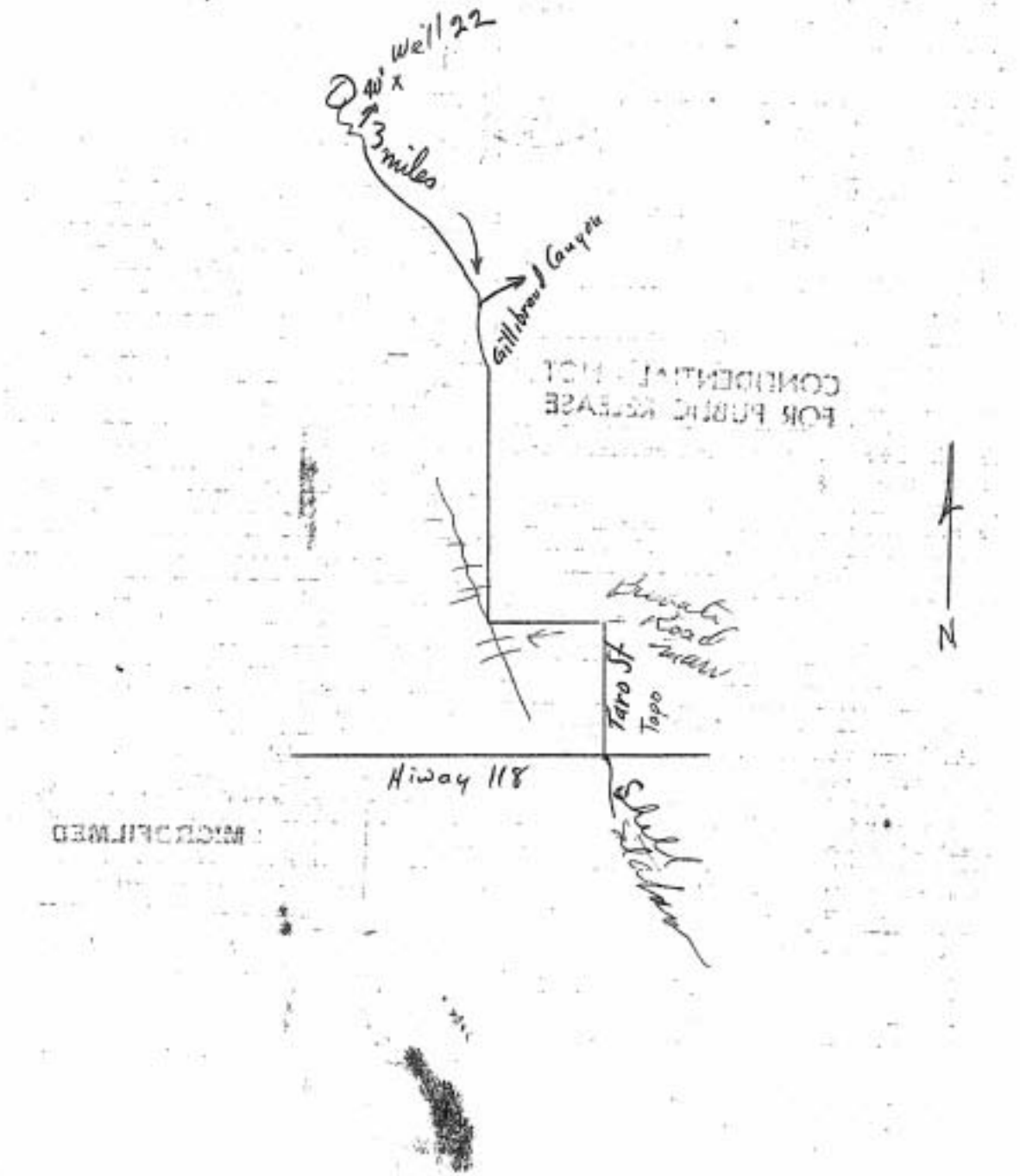
CONFIDENTIAL
In MICROFILMED
Section 7074 of the Water Code
State of California

Work started 4/4 19 57 Completed 4/27 19 5
Date of Report May 2, 1957

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] George Chamberlain
Well Driller

By
License No. 133233 Classification C 57
Dated 6-15-58 19


well 22
40' x
3 miles
Gillibrand Canyon
N
Taro St
Topo
Hiway 118

DIVISION

COUNTY Ventura

NEAR

DEPARTMENT OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

WELL LOG

BASIN 24E3

DWR No. 3N/18W-24E3 S & M

OTHER No. 22-P-8

3N/18W-24E3
(Bn 1175)

LOCATION just above old compressor plant, to replace no.?

OWNER Tapo Mutual Water Company ADDRESS

DRILLED BY Harry Crinklaw ADDRESS

DRILLING METHOD GRAVEL PACKED DATE COMPLETED May 1943

SIZE OF CASING DEPTH 16" 153' STRUCK WATER AT

PERFORATIONS 50-145 SIZE 3/8 X 6" No. 6 rows

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. DRAWDOWN FT. HOURS RUN

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

SURFACE ELEV. DATUM SOURCE OF INFORMATION

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS	SP. YIELD %	
0 - 25		sandy			
25 - 50		cemented gravel and sandstone			
50 - 90		water sand and gravel			
90 - 195		sandstone and boulders			
95 - 98		Water sand			
98 - 100		hard gravel and holders			
100 - 109		gravelly muck			
109 - 112		tight gravel			
112 - 128		packed sand			
128 - 135		cemented gravel			
135 - 138		real water gravel			
138 - 140		cemented gravel			
140 - 145		water gravel			
145 - 210		hard conglomerate			
210 - 225		fine blue sand			
225 - 230		conglomerate			
230 - 235		sandy blue clay			
235 - 272		hard conglomerate			
272 - 277		sandy blue clay			
277 - 297		packed sand			
297 - 299		water sand			
299 - 315		hard sand			
315 - 320		sandy gray clay			
320 - 323		cemented gravel			
323 - 330		gray shale			
330 - 331		sandy			
331 - 335		sandstone			
335 - 338		blue gray shale			
338 - 342		hard cond			

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FOR FIELD COPIES USE ALTERNATE LINES

LOG OBTAINED BY DATE SHEET 1 OF

FORM 253 (6000) 11-57 10M Δ SPO

INVESTIGATION

DIVISION OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

SHEET 2

NUMBER

WELL LOG

LOCAL DESIGNATION 3N/18W-24H1

DEPTH	ELEVATION OF BOTTOM OF STRATUM	MATERIAL	THICKNESS FEET	% VOIDS	ABSOLUTE VOIDS FEET	TOTAL VOIDS FEET
342 - 346		sandy gray shale				
346 - 356		hard sand				
356 - 362		sandstone				
362 - 382		hard conglomerate				
382 - 383		blue shale				
383 - 404		hard sandstone				
404 - 408		sandy				
408 - 310		hard lime rock				
		Reamed hole out to 25" and set 153' of 16" I.D.				
		heavy plain and casing. Perforated from 50' to 145'				
		six rows of 3/8 x 6" slots				

FOR FIELD COPIES USE ALTERNATE LINES

MICROFILMED

34° 20' 10.8"
118° 43' 30.0"

ORIGINAL
File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in
No. 273656

Office of Intent No. 249353
Local Permit No. or Date

State Well No. 03N/18W-24D03
Other Well No. Permit no. 2393

(1) OWNER: Name P.W. Gillibrand
Address P.O.Box 3476
City Simi Valley, CA 93063 ZIP

(2) LOCATION OF WELL (See instructions):
County Ventura Owner's Well Number #2
Well address if different from above
Township 3N Range 17W Section 18
Distance from cities, roads, railroads, fences, etc.

WELL LOCATION SKETCH

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

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

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

(6) GRAVEL PACK: 8x12 650-1100
10x20 1100-1300
Yes ☐ No XX Size
Diameter of bore 26"
Packed from 50 ft. to 1300 ft.

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

From ft.	To ft.	Dia. in.	Gage or Wall	Perforations From ft.	To ft.	Slot size
0	50	28	.250	520	700	.060
+2	520	16	.312	700	760	.040
700	760	16	.312	760	880	.060
760	880	16	.312	880	1280	.035

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

(9) WELL SEAL:
Was surface sanitary seal provided? Yes XX No ☐ If yes, to depth 50 ft.
Were strata sealed against pollution? Yes ☐ No XX Interval ft.
Method of sealing Sand cement Grout

(10) WATER LEVELS:
Depth of first water, if known 215 ft.
Standing level after well completion 215 ft.

(11) WELL TESTS:
Was well test made? Yes XX No ☐ If yes, by whom? RDC
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test 215 ft. At end of test 335 ft.
Discharge 3000 gal/min after 25 hours Water temperature
Chemical analysis made? Yes ☐ No XX If yes, by whom?
Was electric log made Yes XX No ☐ If yes, attach copy to this report

(12) WELL LOG: Total depth 1520 Completed depth 1300 ft.

from ft. to ft.	Formation (Describe by color, character, size or material)
0- 33	Brown clay with coarse gravel
-	lenses
33- 64	Coarse gravel with fine to
-	medium sand
64- 96	Coarse gravel with brown clay
-	lenses
96-191	Fine to medium sand
191-223	Fine to medium sand with
-	30% brown clay
223-255	5% brown clay with fine to
-	medium sand
255-539	Fine to medium sand
539-573	Fine to medium sand with
-	20% brown clay
573-603	Fine to medium sand with
	brown clay
603-635	Fine to medium sand
635-763	Fine to medium sand with
-	10% brown clay
763-826	Medium to coarse sand with
-	clay lenses
826-921	Fine sand with gray clay
931-984	Fine to medium sand with
-	gray clay silt lenses
984-1111	Fine to medium sand with
-	gray silt
1111-1206	80% gray silt
1206-1520	Gray silt with fine sand

Work started 10-26-89 19__ Completed 1-8-90 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 Rotzman Drilling Company (Person, firm, or corporation) (Typed or printed)
Address 46471 N. Division
City Lancaster, CA ZIP 93534
License No. 316599 Date of this report 1-31-90

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

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NOT FOR PUBLIC USE
WATER CODE 13752

REGION 4

COUNTY Ventura

NEAR

DEPARTMENT OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

WELL LOG

BASIN

DWR No. 3N/18W-24D1 B & M

OTHER Nos. 22-P-7

LOCATION

OWNER Tapo Mutual Water ADDRESS

DRILLED BY H. Crinklaw ADDRESS

DRILLING METHOD GRAVEL PACKED DATE COMPLETED January 1946

SIZE OF CASING DEPTH STRUCK WATER AT

PERFORATIONS 56' to 210' 1/4 x 6" slots SIZE NO.

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. DRAWDOWN FT. HOURS RUN

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

SURFACE ELEV. DATUM SOURCE OF INFORMATION

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS	SP. YIELD %
0 - 20		soil and gravelly		
20 - 45		yellow clay		
45 - 95		blue clay with thin streaks of water sand		
95 - 100		hard sand		
100 - 117		blue clay with thin water streaks		
117 - 164		hard sand		
164 - 175		water gravel		
175 - 186		hard sand		
186 - 189		water sand		
189 - 198		hard rock		
198 - 205		water sand		
205 - 240		blue clay		
240 - 300		hard sand and gray shale		
		To replace No 20 in Iron Trough Canyon Set 168' of heavy 16" O.D. and 52' of heavy 12" on bottom to a total of 220' deep. drilled a 24" hole and gravel packed it.		

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FOR FIELD COPIES USE ALTERNATE LINES

LOG OBTAINED BY DATE SHEET 1 OF

FORM 263. 1M

DR. 4

COUNTY Ventura

NEAR

DEPARTMENT OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

WELL LOG

BASIN Santa Susana
DWR No. 3N/18W-24N1
OTHER No. No Co. No.

Irrigation
New well

LOCATION

OWNER Tapo Mutual Water Company ADDRESS Simi, Calif.

DRILLED BY Roscoe Moss Company ADDRESS 4360 North St., Los Angeles, Calif.

DRILLING METHOD Rotary GRAVEL PACKED yes DATE COMPLETED 5/31/50

SIZE OF CASING DEPTH 24' 26"1/4" Conductor pipe STRUCK WATER AT
120 - 14" x 1/4" Blank pipe
PERFORATIONS 600" - 14" x 1/4" Perforated pipe SIZE NO.
120 - 720 1 1/4" no of holes 7

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. 550' DRAWDOWN FT. 84' HOURS RUN 79 hours

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

SURFACE ELEV. 1600' ~~805~~ ft. DATUM SOURCE OF INFORMATION

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS	SP. FIELD %	
0 - 25		sand and gravel			
25 - 58		blue clay			
58 - 84		sand and boulders			
84 - 115		brown clay			
115 - 155		blue clay and rocks			
155 - 170		hard sand			
170 - 185		blue clay			
185 - 194		clay, stks sand			
194 - 260		blue clay			
260 - 291		blue clay, sand and shells			
291 - 310		sand and gravel			
310 - 316		sandy blue clay			
316 - 345		sand and gravel			
345 - 350		clay			
350 - 375		sand and gravel streaks of clay			
375 - 415		sandy blue clay			
415 - 440		sandy clay and shells			
440 - 458		sand, stks blue clay			
458 - 538		hard sand and shells			
538 - 610		sandy clay			
610 - 668		blue shale			
668 - 710		clay and gravel			
710 - 790		sandy blue clay			
790 - 805		hard brown shale			
		surface sanitary seal provided			
		strata sealed against pollution Top 24'			
		Strata sealed 0 to 24'			
		bottom plug			

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LOG OBTAINED BY DATE SHEET 1 OF

FORM 263, 5000 11-61 new △ SPG

FIELD CHECK OF WELL LOCATION

DRILLER George Chamberlain. CHECKED BY Holland.

OWNER Tapo Mutual Water Co. DATE July 23, 1959.

PUMP: MAKE Pomona; SERIAL NO. PW 2734

MOTOR: MAKE Fairbanks-Morse; NO. F279900 HP 50

METER NO. 333-2653.

STATE WELL NO. 3N/18W-24C 7.

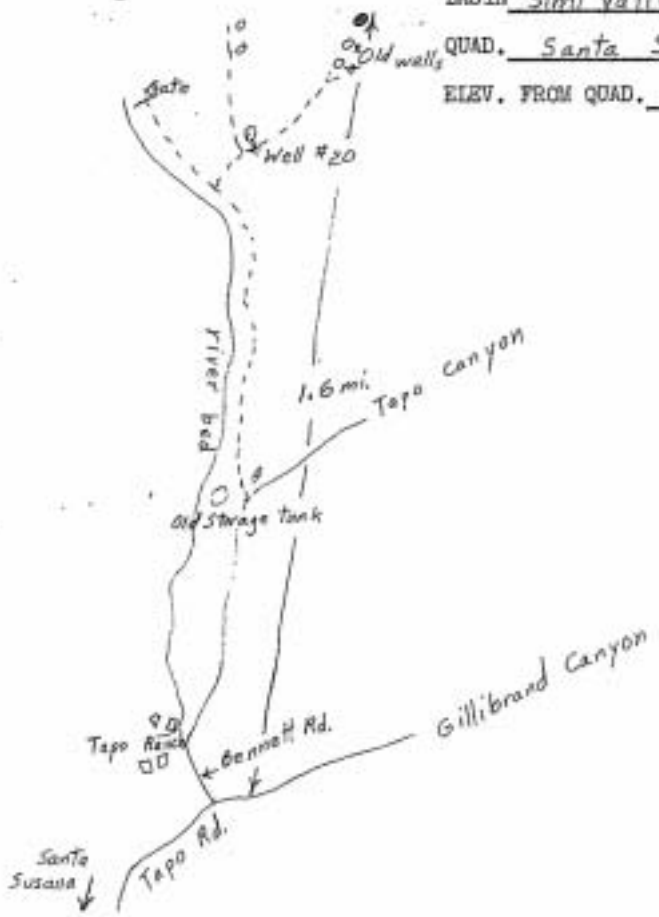
LOCATE WELL WITH REFERENCE TO ROADS AND ROAD INTERSECTIONS; ALSO INDICATE DISTANCES AND DIRECTIONS TO NEARBY CITIES OR TOWNS.

W. W. D. RPT. NO. 4-58-45

BASIN Simi Valley (Trib.) (4-9)

QUAD. Santa Susana

ELEV. FROM QUAD. 1580'



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REGION 4

COUNTY Ventura

NEAR

DEPARTMENT OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

WELL LOG

BASIN Santa Susana
DWR No. 3N/18W-36C2
OTHER No. 22-Q-3

LOCATION 2900 feet north of Walnut Street. Produced west and 25 feet west of Tapo Dr.

OWNER Tapo Mutual Water Co. ADDRESS

DRILLED BY H.Crinklaw ADDRESS

DRILLING METHOD GRAVEL PACKED DATE COMPLETED July 1944

SIZE OF CASING DEPTH STRUCK WATER AT

PERFORATIONS SIZE No.

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. DRAWDOWN FT. HOURS RUN

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

SURFACE ELEV. DATUM SOURCE OF INFORMATION

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS	SP. FIELD %	
0 - 15		soil			
15 - 22		sandy clay			
22 - 30		sand and gravel			
30 - 35		bolders			
35 - 60		dirty sharp sand and gravel			
60 - 65		hard bolders			
65 - 72		sandstone			
72 - 74		extra hard rock			
74 - 80		sandy gray clay			
80 - 82		sticky clay			
82 - 86		sandy gray clay			
86 - 90		bolders			
90 - 91		hard sandstone			
91 - 97		sandy gray clay			
97 -120		sticky blue clay			
120-121		hard broken rock			
121-138		sandy gray shale			
138-160		sticky blue shale			
160-180		sandy gray shale			
180-190		hard blue shale			
190-213		sandy gray shale			
213-216		hard rock			
216-253		sandy gray shale			
		Not enough water to justify well			

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LOG OBTAINED BY DATE SHEET 1 OF

FORM 253. (DWR) 11-57 10M Δ SPS

FORM 115 INVESTIGATION

Santa Ana
DIVISION OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

3N/1W-36F1 SHEET 1

WELL LOG

NUMBER 22-Q-2

LOCAL DESIGNATION

LOCATION 2375' N. of Walnut St. &
175' E. of Tapa Dr.

OWNER Anderson

SKETCH

DATE COMPLETED

DIAMETER OF CASING 5 5/8" X138'

DRILLED BY Crinklaw

SOURCE OF INFORMATION driller

INSPECTED WHILE DRILLING SEE FILE NO.

SURFACE ELEVATION

DEPTH	ELEVATION OF BOTTOM OF STRATUM	MATERIAL	THICKNESS FEET	% VOIDS	ABSOLUTE VOIDS FEET	TOTAL VOIDS FEET
0-35		brown sandy clay				
35-55		sandstone				
55-56		broken sandstone				
56-78		sticky grey clay				
78-80		sandy				
80-95		hard sand				
95-97		coarse sand				
97-131		packed sand				
131-132		hard sand				
132-138		sandy				
		perf. 90.-138'				

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FOR FIELD COPIES USE ALTERNATE LINES

LOG OBTAINED BY DATE

Santa Susana 3N/18W-36H1 ~~1~~

VENTURA COUNTY WATER SURVEY

WELL LOG

NUMBER 22-9-1

PHOTO POINT 5-43.4-1

OWNERS NO.

3N/18W 36 H1

LOCATION 3339 ft. N. of Walnut St. & 700 ft. W. of Topo Dr. produced, Anderson oil #14

OWNER _____ ADDRESS _____

DRILLED BY Harry Crinklaw ADDRESS _____

DRILLING METHOD _____ GRAVEL PACKED _____ DATE COMPLETED _____

SIZE OF CASING _____ STRUCK WATER AT _____

PERFORATIONS _____ SIZE _____ NO. _____

WATER LEVEL BEFORE PERFORATING _____ AFTER _____

TEST DATA: DISCHARGE G. P. M. _____ DRAWDOWN FT. _____

OTHER DATA AVAILABLE: WATER LEVEL RECORD _____ ANALYSIS _____

SURFACE ELEV. _____ SOURCE OF INFORMATION _____

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS
0 to 5		soil	
5 - 50		Brown shale	
50 - 148		Blue shale	
148 - 149		Hard shell	
149 - 185		Blue shale	
185 - 190		shell	
190 - 209		Blue shale	
209 - 210		shell	
210 - 215		Blue shale	
215 - 216		shell	
216 - 232		B. shale	
232 - 234		shell	
234 - 269		B. shale	
269 - 270		shell	
270 - 279		B. shale	
279 - 280		shell	
280 - 287		B. shale	
287 - 288		shell	
288 - 351		B. shale	
351 - 352		shell	
352 - 385		B. shale (? brown shaley streak ?)	
385 - 386		shell	
386 - 410		B. shell	
410 - 449		shells	
449 - 462		B. shale	
462 - 467		shell	
467 - 505		B. shale	
505 - 507		(?) C&G in broken shale	
(continued on sheet 2)			

Eocene Rocks

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LOG OBTAINED BY _____ DATE _____ SHEET 1 OF 2

VENTURA COUNTY WATER SURVEY

WELL LOG

NUMBER 22-9-1

PHOTO POINT

OWNERS NO.

LOCATION

OWNER ADDRESS

DRILLED BY ADDRESS

DRILLING METHOD GRAVEL PACKED DATE COMPLETED

SIZE OF CASING STRUCK WATER AT

PERFORATIONS SIZE NO.

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. DRAWDOWN FT.

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

SURFACE ELEV. SOURCE OF INFORMATION

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS
(Cont.)			
507-568		B. shale	
568-569		shell	
569-626		Oil sand and shale	
626-627		Hard sand	
627-628		shell	
628-633		B. shale	
633-634		shell	
634-697		Hard shale	
697-711		shells	
711-735		shale	
735-741		Sand and shale oil	
741-755		B. shale	
755-756		shell	
756-766		Sand and shale oil	
766-776(?)		Hard sand and shale (? show oil)	
776?-789		sticky shale	
789-813		B. shale	
813-825		shells	
~~[illegible]~~			
817-824		Oil sand	
825-843		B. shale	
843-845		shell	
845-862		B. shale	
862-873		H. sand	
873-969		Thin shells, oil sand + little shale	
969-1054		Good oil sand + shale	
1054-1056		shells	
(Continued on sheet 3)			

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LOG OBTAINED BY DATE SHEET 2 OF 3

VENTURA COUNTY WATER SURVEY

WELL LOG

NUMBER 22-Q-1

PHOTO POINT

OWNERS NO.

LOCATION

OWNER ADDRESS

DRILLED BY ADDRESS

DRILLING METHOD GRAVEL PACKED DATE COMPLETED

SIZE OF CASING STRUCK WATER AT

PERFORATIONS SIZE NO.

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. DRAWDOWN FT.

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

SURFACE ELEV. SOURCE OF INFORMATION

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS
(Cont.)			
1056-1087		B. shale and sand	
1087-1089		Hard shell	
1089-1146		B. shale	
1146-1155		Sand oil and gas	
1155-1169		B. shale	
1169-1186		Hard sand	
1174-1192		shells	
1192-1359		shale and small shells some show of oil	
1359-1386		shells	
1386-1388		Hard sand	
1388-1395		Hard shale	
1395-1400		Hard sand and cong.	
1400-1403		Conglomerate	
1403-1408		Hard sand and shells, show oil	
1408-1410		Conglomerate.	
		measured out and found it to be	
		1415 and 11 inches	
		I.D. by Harry Crinklaw.	

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LOG OBTAINED BY DATE SHEET 3 OF 3

DUPLICATE
To Original, Duplicate and Triplicate with the
DIVISION OF WATER RESOURCES
P. O. BOX 1079
SACRAMENTO 8, CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

SHEET 1

Do Not Fill In
State Well No. 2N/17W-18N1
Other Well No. 4-59-14
Region

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

(1) Driller:
Name: Harry Crinklaw
Address: 2810 N. Erringer Rd.
Simi, Calif.
License No. 35022 Classification C37

(2) Proposed use or uses (*check*):
Domestic ☒ Municipal ☐
Irrigation ☐ Industrial ☐
Domestic and Irrigation ☐ Test well ☐
Other

(3) Equipment used (*check*):
Rotary ☒
Cable ☐
Dug well ☐
Other

Owner:
Name: Levi Blomker
Address: Santa Susana, Calif.

(4) Type of work (*check*):
New well ☒ Reconditioning of well ☐
Deepening existing well ☐

(5) Well log:
Total depth of well 370 ft.

Give details of formations penetrated, such as silt, peat, muck, sand, gravel, clay, shale, sandstone, hardpan, rock. Include size of gravel (diameter) and sand (fine, medium, coarse), color of material, structure (loose, packed, cemented, soft, hard, brittle).

Depth From Ground Surface	
0 ft. to 3 ft.	Soil
3 " " 7 "	Gravel
7 " " 12 "	Boulders
12 " " 140 "	Coarse sand
140 " " 150 "	Gravel and bolders
150 " " 152 "	Hard conglomerate
152 " " 160 "	Brown sand
160 " " 225 "	Sandy white clay
225 " " 319 "	Blue clay with sea shells
319 " " 336 "	Blue clay
336 " " 347 "	Blue clay with streaks of sand
347 " " 350 "	Soft coarse sand
350 " " 357 "	Blue clay
357 " " 359 "	Coarse sand
359 " " 370 "	Blue clay

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In Accordance with
Section 7073.1 of the Water Code
State of California

If additional space is required, continue on DWR Form No. 246—Supplement, and attach to respective report copies.

(6) Casing left in well:

LENGTH FT.	DIAMETER INCHES	SINGLE, DOUBLE, WELDED, OTHER	LBS. PER FOOT OR GAGE OF CASING	SEATING BELOW GROUND SURFACE, FT.
270 ~~370~~	6	Single	20	370
100	8			

Type and size of shoe or well ring ..... Welded joints ☒ Yes ☐ No

D.W.R. FORM NO. 246

...ith the

...IFORNIA

SHEET 2

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

Do Not Fill In
State Well No. 3N/17W-18M1
Other Well No. 4-59-14
Region

Blomker

(7) **Perforations:**

Type of perforator used Machine cut

Perforated 320 ft. to 360 ft. Hole size 100 mesh No. of holes 12

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(8) **Water levels:**

Depth at which water first encountered 315 ft.
Depth to water before perforating ft.
Depth to water after perforating ft.
Note any change in water level while drilling

(9) **Well pumping test:**

Date of test 6-6 By whom Driller
Depth to water when test started 225 ft.
G.P.M. at beginning of test 27
Drawdown from standing level 40 ft.
G.P.M. at completion of test 27
Drawdown at completion of test 40 ft.
Length of time tested 3 hrs
Temperature of water Cold
Was gas present in water? ☐ Yes ☒ No

(10) **General:**

Was well gravel packed? Yes Size of rock #4 Thickness of pack 3"
Was a surface sanitary seal provided? No
Were any strata sealed against pollution? ☐ Yes ☒ No If yes, attach detailed description.
Strata sealed
Was analysis made of water? ☐ Yes ☒ No If yes, attach copy.
Was electric log made of well? ☐ Yes ☒ No If yes, attach copy.
If well abandoned, was it plugged and sealed?
Method of plugging and sealing

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(11) **Location:**

North

1 MILE

Section No. 18
Township 3 N
Range 17 W
Base & Meridian Rancho Simi
Show location of well in Section, thus (X)
Distances to section lines from well, N or S. 5000 ft. and E or W. 750 ft.
Show location of nearest known well, thus (O)
Distance to nearest known well 2000 ft.

(12) **Time of work:**

Work started date 5-26 Completed date 6-6-1959
Date of this report July 24, 1959

WELL DRILLER'S STATEMENT:

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

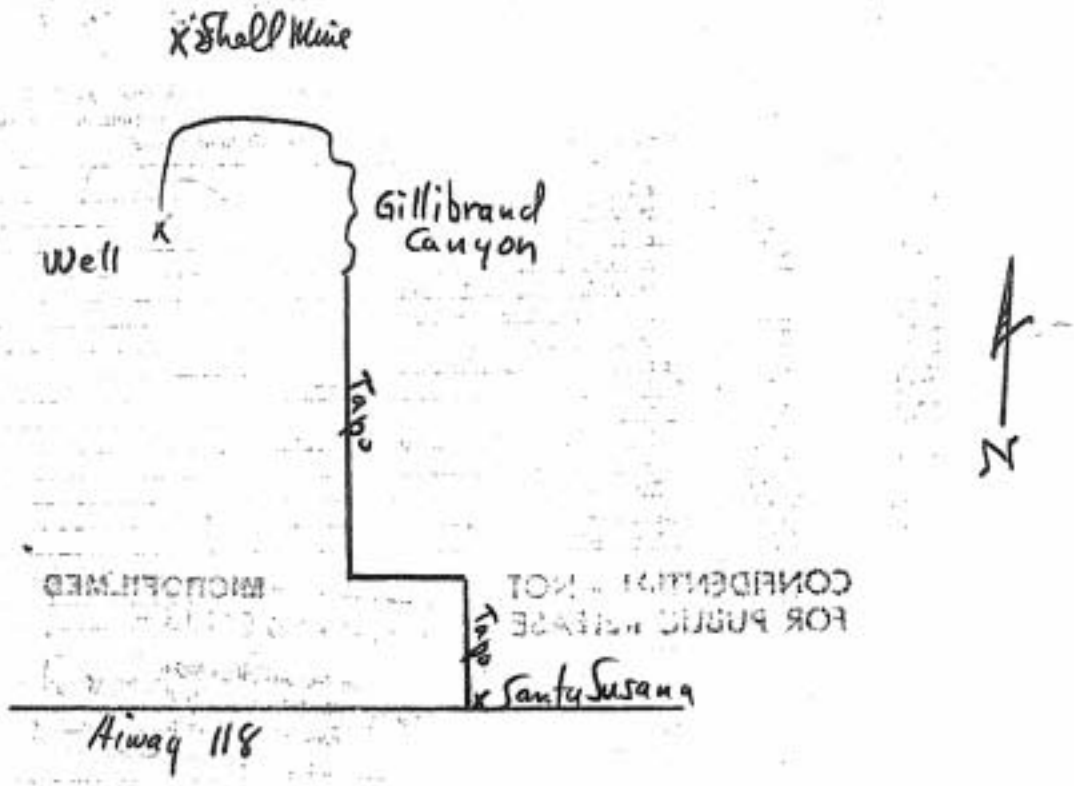
[SIGNED] Harry Cinkelar
Well Driller

By

License No. 35022 Classification C57

Dated, 19

D.W.R. FORM NO. 246



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MICROFILMED
1989 JUL 30 AM 10 03
DEPARTMENT OF WATER RESOURCES SACRAMENTO

34° 20' 32.9"
118° 42' 28.4"

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

ORIGINAL
File with DWR

Do not fill in

No. 251724

Notice of Intent No. 249345
Local Permit No. or Date

State Well No. 03N/17W - 18M1
Other Well No. Permit no. 2343

(1) OWNER: Name P.W. Gillibrand
Address P.O.Box 3476/5131 Tapo Cyn. Rd.
City Simi Valley, CA ZIP 93063

(2) LOCATION OF WELL (See instructions):
County Ventura Owner's Well Number
Well address if different from above NW¼, NW¼, SW¼
Township 3N Range 17W Section 18
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 ☐ Bailer ☐

(6) GRAVEL PACK:
Yes ☐ No ☒ Size NONE
Depth of bore
Packed from ft. to ft.

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

From ft.	To ft.	Dia. in.	Gage or Wall
0	50	28"	Y4

(8) PERFORATIONS: N/A
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 50 ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval ft.
Method of sealing 10 sack sand & cement grout

(10) WATER LEVELS:
Depth of first water, if known N/A ft.
Standing level after well completion N/A 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 823 ft. Completed depth 0 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	30	Brown Clay, medium to coarse sand
30	128	Medium to coarse sand with blue clay
128	286	Fine to medium gravel with sand
286	317	Oil formation, some clay with fine to medium sand
317	348	Fine to medium sand with some clay, oily formation
348	570	Black clay with fine sand
570	823	Black clay with fine sand
		Backfill with clean sand from 823' to 50'. 50' to surface with 10 sack sand and cement grout.

Work started 10-25 19 89 Completed 1-8- 19 90

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 Rothman Drilling Company (Person, firm, or corporation) (Typed or printed)
Address 46471 N. Division
City Lancaster, CA ZIP 93534
License No. 316599 Date of this report 1-31-90

ONLY
NOT FOR PUBLIC USE
WATER CODE SEC. 13752

DWR 188 (REV. 12-88) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM 86 N035

DUPLICATE
File Original, Duplicate and Triplicate with the REGIONAL WATER POLLUTION CONTROL BOARD No. 4
(Insert appropriate number)

WATER WELL DRILLERS REPORT
(Sections 7076, 7077, 7078, Water Code)

STATE OF CALIFORNIA

Do Not Fill In
№ 40776
State Well No. 3N/17W 19R1
Other Well No. 3N

(1) OWNER:
Name: Simi Valley Development Co.
Address: 3350 Wilshire Blvd.
Los Angeles 5, Calif.

(2) LOCATION OF WELL:
County: Ventura Owner's number, if any:
R. F. D. or Street No.:

(3) TYPE OF WORK (check):
New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

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

(5) EQUIPMENT:
Rotary ☒
Cable ☐
Dug Well ☐

(6) CASING INSTALLED:
SINGLE ☒ DOUBLE ☐

From ft.	to ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	to ft.
0	675	12		24"	0	675

If gravel packed

Type and size of shoe or well ring:
Describe joint: Collars welded
Size of gravel: #3 & 4

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(7) PERFORATIONS:
Type of perforator used: preperforated - 100 mesh
Size of perforations: 2½ in., length, by 5/64 in.

From ft.	to ft.	Perf. per row	Rows per ft.
255	675	14	2

(8) CONSTRUCTION:
Was a surface sanitary seal provided? ☒ Yes ☐ No To what depth: 93 ft.
Were any strata sealed against pollution? ☐ Yes ☐ No. If yes, note depth of strata:
From 750 ft. to 675 ft. cemented

Method of Sealing: 36" hole - 26" conductor pipe

(9) WATER LEVELS:
Depth at which water was first found: 350 ft.
Standing level before perforating: ft.
Flow level after perforating: ft.

(10) WELL TESTS:
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Contractor
Yield: 875 gal./min. with 11 ft. draw down after 48 hrs.
Temperature of water: Was a chemical analysis made? ☐ Yes ☐ No
Was electric log made of well? ☒ Yes ☐ No

(11) WELL LOG:
Total depth: 750 ft. Depth of completed well: 675 ft.
Formations: Describe by color, character, size of material, and structure.

From ft.	to ft.	Description
0	7	Brown sandstone
7	19	Coarse sand
19	56	Coarse gravel & rocks
56	68	Coarse sand
68	84	Fine sand
84	88	Gravel & rocks
88	92	Coarse sand
92	98	Grey & brown clay
98	105	Coarse sandy brown clay
105	146	Coarse gravel-small brown clay streaks
146	214	Hard fine sand-blue clay streaks
214	222	Gravel
222	228	Hard fine sand and blue clay
228	273	Sandy blue clay
273	334	Blue clay with gravel streaks
334	337	Gravel
337	372	Blue clay with fine sand streaks
372	402	Hard fine sand
402	455	Fine sand with blue clay streaks
455	460	Hard fine sand
460	462	Blue clay
462	474	Hard fine sand
474	492	Sandy blue & grey clay
492	518	Sandy blue clay with streaks sand & gravel
518	652	Sandy blue clay with hard sand streaks
652	665	Coarse sand with some blue clay
665	750	Blue clay with sandy streaks

CONFIDENTIAL
MICROFILMED
In Accordance With
Section 7076.1 of the Water Code
State of California

Work started: 7/27/61, 19.. Completed: 8/12/61, 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.

NAME: George Chamberlain (Typed or printed)
Address: 2293 1st Street
Simi, Calif.
[Signature] Well Driller
License No. 133233 Dated: 8/31/61, 19..

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

DWR 374 **WELL DATA**

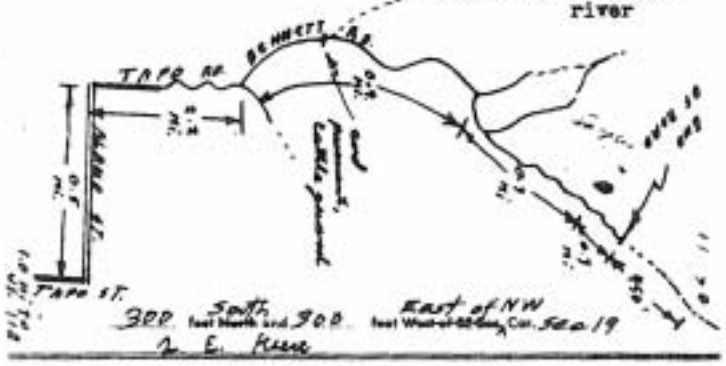
Key ☐ Hyd. ☐ Key & Hyd. ☐ Index ☐ Other ☐

Owner SIMI VALLEY LAND & DEVELOPMENT CO.
Address 3350 WILSHIRE BLVD.
Address LOS ANGELES
Address

State No. 3N/17W-19D1
Other No.

Location: County VENTURA Area
Basin 4 Basin SIMI 4-9
USGS Quad. SANTA SUSANA Quad. No. 62-47
T 3N R 17W Sec. 19 Lot D SB B&M

Description Tapo Rd. N to Bennett Rd. left on Bennett Pavement ends 0.5 mi. continue, bearing right, for 0.9 mi. turn right on old paved rd. follow rd. 150', and take right fork.follow dirt road, 0.3 mi to old well, 20' left/o rd. cont. o.3 mi. to fence, walk 450' search along riverbed well on left side of riverbed, on 10' pleatu, 50' left of river



DESCRIPTION OF REFERENCE POINT

(a) _____

_____, _____ ft. above/below land surface, Date _____

(b) _____

_____, _____ ft. above/below land surface, Date _____

(c) _____

_____, _____ ft. above/below land surface, Date _____

Ref. Pt. Elev.: (a) _____ ft.; (b) _____ ft.; (c) _____ ft.

Ground Elev.: (a) _____ ft.; (b) _____ ft.; (c) _____ ft.

Determined from: (a) _____; (b) _____; (c) _____

DESCRIPTION OF WELL

Use NO PUMP 7/19/62 Depth 750 ft.

Casing: size 12" in., perforations 225 - 675

Aquifer(s) _____

Driller CHAMBERLIN

Date drilled 8-12-61 Log filed: Open ☐ Confidential ☐ 40776

DESCRIPTION OF EQUIPMENT

Pump type _____, Make _____

Serial No. _____, Size of discharge pipe _____ in.

Motor kind _____, Make _____

Horsepower _____, Serial No. _____

Elec. Motor No. _____, Transformer No. _____

TEST DATA

MICROFILMED

Agency _____

Date of Test _____ 19 ____, Capacity of well _____ G.P.M.

Static Water Level _____ ft., Drawdown _____ ft.

REGION

COUNTY Ventura

NEAR

DEPARTMENT OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

WELL LOG

BASIN Santa Susana

DWR NO. 3N/17W-19L1 B & M

OTHER NO. 23-P-5

LOCATION

OWNER D.C.Gillibrand ADDRESS Tapo Canyon

DRILLED BY J.C. & P.W.Gillibrand ADDRESS

DRILLING METHOD cable tools GRAVEL PACKED DATE COMPLETED May 1950

SIZE OF CASING DEPTH 6" STRUCK WATER AT

PERFORATIONS SIZE No

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. DRAWDOWN FT. HOURS RUN

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

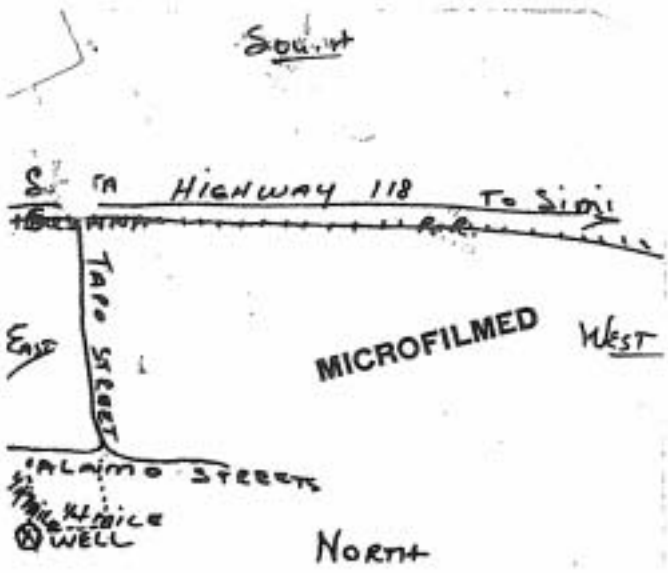
SURFACE ELEV. DATUM SOURCE OF INFORMATION Memory of J.C.Gillibrand

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS	SP. YIELD %	
25		Cobblestone			
		sand - coarse clay			
78		fine sand			
		Note: Well to be deepened			

FOR FIELD COPIES USE ALTERNATE LINES

LOG OBTAINED BY FitzGerald DATE May 8, 1950 SHEET 1 OF

FORM 263


South
HIGHWAY 118
To Simi
TAPO STREET
East
West
MICROFILMED
ALAMO STREET
WELL
North

ORIGINAL
File with DWR

Page ___ of ___

Owner's Well No. 1

Date Work Began 9/26/95, Ended 10/10/96

Local Permit Agency County of Ventura

Permit No. 3851 Permit Date 10/2/95

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 447071

DWR USE ONLY — DO NOT FILL IN

03N17W19L03S

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

61-01-0810-345

APN/TR/LOT/BLK

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc*
0 : 84	Sand
84 : 92	Clay W/ Sand
92 : 114	Sand
114 : 142	Sandyclay w/ intermittant rock

TOTAL DEPTH OF BORING 142 (Feet)

TOTAL DEPTH OF COMPLETED WELL 140 (Feet)

WELL OWNER

Name TIM BOYLE

Mailing Address 5180 Tapo Cyn. Rd.

Simi Valley, CA. 93063

CITY STATE ZIP

WELL LOCATION

Address 5180 Tapo Cyn. Rd.

City Simi Valley, CA. 93063

County Ventura

APN Book ___ Page ___ Parcel ___

Township ___ Range ___ Section ___

Latitude ___ DEG. MIN. SEC. NORTH Longitude ___ DEG. MIN. SEC. WEST

LOCATION SKETCH

NORTH

SOUTH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

✓ NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY (Describe Procedure and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

___ MONITORING

WATER SUPPLY

___ Domestic

___ Public

✓ Irrigation

___ Industrial

___ "TEST WELL"

___ CATHODIC PROTECTION

___ OTHER (Specify)

DRILLING METHOD Drilling Mud FLUID ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED 10/9/95

ESTIMATED YIELD* 45 (GPM) & TEST TYPE Air

TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL/ GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE (IF ANY) (Inches)
0 : 42	9"	X				P.V.C.	4"		
42 : 77	"		X			"	"		.060
77 : 82	"	X				"	"		
82 : 117	"		X			"	"		"
117 : 122	"	X				"	"		
122 : 142	"		X			"	"		"

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 : 30	X			
30 : 140			X	Pea gravel

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME IRES Pump & DRILLING, INC. (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

3517 ALMOND DR. OXNARD, CA. 93030

ADDRESS CITY STATE ZIP

Signed [signature] 10/10/95 670983

WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C57 LICENSE NUMBER

DWR 188 (REV. 7-96) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Thomas Guide, 478 - G2

FORM 115 INVESTIGATION

SANTA SU 3N/17W-19K1 SHEET 1

DIVISION OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

NUMBER

WELL LOG

LOCAL DESIGNATION

LOCATION E. AVE - RAILROAD

OWNER

SKETCH

DATE COMPLETED APRIL 19, 1924

DIAMETER OF CASING 12"

DRILLED BY H. SCHLEBAUM

SOURCE OF INFORMATION DRILLER

INSPECTED WHILE DRILLING SEE FILE NO.

SURFACE ELEVATION

DEPTH	ELEVATION OF BOTTOM OF STRATUM	MATERIAL	THICKNESS FEET	% SAND	ABSOLUTE SAND FEET	TOTAL SAND FEET
0-10		SANDY SOIL				
10-28		SAND AND GRAVEL - GRY				
28-34		YELLOW CLAY				
34-40		SAND AND GRAVEL - GRY				
40-41		BLUE CLAY				
41-63		WATER GRAVEL				
63-65		MUCK BLUE				
65-10		WATER GRAVEL				
10-40		HARD BLUE CLAY				
		PERFORATED WITH MILLS 2/8" KNIFE				
		41'-63'				
		50'-10'				

MICROFILMED

FOR FIELD COPIES USE ALTERNATE LINES

LOG OBTAINED BY DATE

FORM 2-32 100 CALIFORNIA STATE PRINTING OFFICE

FORM 115

INVESTIGATION

SANTA SUSANA – 3N/17W-19K2

SHEET 1

DIVISION OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

NUMBER 23-P-1

WELL LOG

LOCAL DESIGNATION

LOCATION N.E. OF HOUSE

OWNER RITA SILLIBRAND

DATE COMPLETED AUG. 17, 1999

DIAMETER OF CASING

DRILLED BY HARRY GRINKLAW

SOURCE OF INFORMATION DRILLER

INSPECTED WHILE DRILLING SEE FILE NO.

SURFACE ELEVATION

SKETCH

DEPTH	ELEVATION OF BOTTOM OF STRATUM	MATERIAL	THICKNESS FEET	% VOID	ABSOLUTE VOID FEET	TOTAL VOID FEET
0-15		SOIL				
15-45		SANDY BROWN CLAY AND BOULDERS				
45-46		SANDY BLUE CLAY				
46-48		RED WOOD				
48-55		SANDY BLUE CLAY				
55-62		WATER SAND				
62-66		CLAY				
66-87		STREAKS OF WATER AND CLAY				
87-94		HARD BLUE SHALE				
	SET 74' OF 12" IN 24' SECTIONS IN 15" HOLE, AND GRAVEL PACKED. PERFORATED 55' TO 87'. WATER STANDS AT 55'.					

MICROFILMED

FOR FIELD COPIES USE ALTERNATE LINES

LOG OBTAINED BY DATE

REGION

COUNTY Ventura

NEAR

DEPARTMENT OF WATER RESOURCES
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

WELL LOG

BASIN Santa Susana
SWR No. 3N/17W-19K3 B & M
OTHER NOS. 33-P-3
23

LOCATION

OWNER Balinger ADDRESS

DRILLED BY Crinklaw ADDRESS

DRILLING METHOD Rotary GRAVEL PACKED DATE COMPLETED Feb. 23, 1940

SIZE OF CASING DEPTH 7" O.D. set to 300 feet STRUCK WATER AT

PERFORATIONS 136' to 189', 180' to 193' SIZE NO.

WATER LEVEL BEFORE PERFORATING AFTER

TEST DATA: DISCHARGE G. P. M. DRAWDOWN FT. HOURS RUN

OTHER DATA AVAILABLE: WATER LEVEL RECORD ANALYSIS

SURFACE ELEV. DATUM SOURCE OF INFORMATION Log - Crinklaw

DEPTH	ELEV. OF BOTTOM OF STRATUM	MATERIAL	THICKNESS	SP. YIELD %	
3		soil			
25		sand and rocks			
135		packed sand			
138		sandstone			
155		blue clay			
156		hard shale			
183		blue clay			
193		sandy - wet			
194		hard shale			
200		sandy clay			
		Crinklaw indicated position on photo 5-451			

FOR FIELD COPIES USE ALTERNATE LINES

LOG OBTAINED BY FitzGerald DATE May 7, 1950 SHEET 1 OF

FORM 263

APPENDIX B

Ground Water Elevations

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31 ("Old")	24-Apr-63	128.9	1398.5	Static
31 ("Old")	18-Mar-65	141.0	1386.4	Static
31 ("Old")	25-Apr-67	144.7	1382.7	Static?
31 ("Old")	1-Dec-71	147.0	1380.4	Static?
31 ("Old")	1-Jan-72	148.0	1379.4	Static?
31 ("Old")	1-Sep-72	150.0	1377.4	Static?
31 ("Old")	1-Oct-72	150.0	1377.4	Static?
31 ("Old")	1-Feb-73	135.0	1392.4	Static?
31 ("Old")	1-Jul-73	150.0	1377.4	Static?
31 ("Old")	1-Dec-73	135.0	1392.4	Static?
31 ("Old")	1-Jan-74	134.0	1393.4	Static?
31 ("Old")	1-Mar-74	134.0	1393.4	Static?
31 ("Old")	1-Aug-74	136.0	1391.4	Static?
31 ("Old")	1-Sep-74	135.0	1392.4	Static?
31 ("Old")	1-Oct-74	135.0	1392.4	Static?
31 ("Old")	1-Nov-74	135.0	1392.4	Static?
31 ("Old")	1-Jan-75	131.0	1396.4	Static?
31 ("Old")	1-May-78	117.0	1410.4	Static?
31 ("Old")	1-Jul-78	125.0	1402.4	Static?
31 ("Old")	1-May-79	125.0	1402.4	Static?
31 ("Old")	1-Mar-80	126.0	1401.4	Static?
31	18-May-90	52.5	1474.9	Static?
31	1-Jan-94	55.0	1472.4	Static?
31	5-Jan-94	55.4	1472.0	Static
31	11-Jan-94	55.0	1472.4	Static
31	24-Jan-94	55.0	1472.4	Static
31	2-Feb-94	55.0	1472.4	Static
31	10-Feb-94	56.5	1470.9	Static
31	28-Feb-94	55.3	1472.1	Static?
31	11-Mar-94	54.3	1473.1	Static?
31	18-Mar-94	54.0	1473.4	Static?
31	28-Mar-94	53.4	1474.0	Static?
31	8-Apr-94	53.8	1473.6	Static
31	28-Apr-94	58.0	1469.4	Static?
31	4-May-94	56.0	1471.4	Static
31	9-May-94	58.3	1469.2	Static
31	25-May-94	54.0	1473.4	Static?
31	15-Jun-94	67.0	1460.4	Static?
31	20-Jun-94	69.0	1458.4	Static?
31	27-Jun-94	55.0	1472.4	Static?
31	5-Jul-94	52.0	1475.4	Static?
31	13-Jul-94	62.0	1465.4	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	27-Jul-94	53.0	1474.4	Static?
31	1-Aug-94	58.8	1468.6	Static?
31	8-Aug-94	54.0	1473.4	Static?
31	16-Aug-94	53.0	1474.4	Static?
31	24-Aug-94	53.0	1474.4	Static?
31	30-Aug-94	54.0	1473.4	Static?
31	7-Sep-94	53.0	1474.4	Static?
31	13-Sep-94	54.0	1473.4	Static?
31	20-Sep-94	54.0	1473.4	Static?
31	28-Sep-94	53.0	1474.4	Static?
31	25-Oct-94	93.0	1434.4	Pumping?
31	1-Nov-94	51.0	1476.4	Static?
31	23-Nov-94	54.0	1473.4	Static?
31	30-Nov-94	54.0	1473.4	Static?
31	20-Dec-94	51.0	1476.4	Static?
31	28-Dec-94	51.0	1476.4	Static?
31	31-Jan-95	50.7	1476.7	Static
31	8-Feb-95	50.5	1476.9	Static
31	13-Feb-95	49.7	1477.7	Static
31	23-Feb-95	50.0	1477.4	Static
31	27-Feb-95	51.2	1476.2	Static
31	9-Mar-95	49.8	1477.6	Static
31	16-Mar-95	51.0	1476.4	Static
31	30-Mar-95	49.2	1478.2	Static
31	5-Apr-95	51.4	1476.0	Static
31	13-Apr-95	50.0	1477.4	Static?
31	27-Apr-95	51.0	1476.4	Static
31	4-May-95	51.5	1475.9	Static
31	8-May-95	51.2	1476.2	Static?
31	18-May-95	51.3	1476.1	Static
31	31-May-95	50.0	1477.4	Static?
31	6-Jun-95	50.0	1477.4	Static?
31	20-Jun-95	51.3	1476.2	Static
31	6-Jul-95	50.0	1477.4	Static?
31	11-Jul-95	50.5	1476.9	Static
31	29-Sep-95	56.0	1471.4	Static?
31	30-Oct-95	49.0	1478.4	Static?
31	15-Nov-95	52.0	1475.4	Static?
31	29-Nov-95	52.0	1475.4	Static?
31	8-Dec-95	49.9	1477.5	Static?
31	18-Dec-95	49.5	1477.9	Static?
31	2-Jan-96	56.0	1471.4	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	9-Jan-96	48.2	1479.2	Static
31	16-Jan-96	49.0	1478.4	Static?
31	26-Jan-96	49.0	1478.4	Static?
31	13-Feb-96	49.0	1478.4	Static?
31	29-Feb-96	47.0	1480.4	Static?
31	10-Mar-96	48.0	1479.4	Static?
31	19-Mar-96	47.0	1480.4	Static?
31	3-Apr-96	48.0	1479.4	Static?
31	11-Apr-96	47.0	1480.4	Static
31	17-Apr-96	47.5	1479.9	Static?
31	15-May-96	49.0	1478.4	Static?
31	30-May-96	51.0	1476.4	Static?
31	20-Jun-96	57.5	1469.9	Static?
31	2-Jul-96	57.5	1469.9	Static?
31	19-Aug-96	48.0	1479.4	Static?
31	10-Sep-96	57.0	1470.4	Static
31	19-Sep-96	47.0	1480.4	Static
31	25-Sep-96	48.0	1479.4	Static
31	30-Sep-96	49.0	1478.4	Static
31	9-Oct-96	50.0	1477.4	Static?
31	16-Oct-96	50.0	1477.4	Static?
31	22-Oct-96	48.0	1479.4	Static?
31	31-Oct-96	46.0	1481.4	Static?
31	7-Nov-96	47.0	1480.4	Static?
31	15-Nov-96	47.0	1480.4	Static?
31	27-Nov-96	47.0	1480.4	Static?
31	16-Dec-96	47.0	1480.4	Static?
31	31-Dec-96	45.0	1482.4	Static?
31	7-Mar-97	49.0	1478.4	Static
31	13-Mar-97	54.0	1473.4	Static
31	19-Mar-97	49.0	1478.4	Static
31	26-Mar-97	47.0	1480.4	Static
31	2-Apr-97	46.0	1481.4	Static
31	9-Apr-97	46.0	1481.4	Static
31	17-Apr-97	46.0	1481.4	Static
31	23-Apr-97	46.0	1481.4	Static
31	30-Apr-97	47.5	1479.9	Static?
31	7-May-97	51.0	1476.4	Static?
31	12-May-97	47.0	1480.4	Static?
31	29-May-97	48.5	1478.9	Static?
31	9-Jun-97	52.0	1475.4	Static?
31	17-Jun-97	50.5	1476.9	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	24-Jun-97	55.0	1472.4	Static?
31	30-Jun-97	50.0	1477.4	Static?
31	10-Jul-97	50.0	1477.4	Static?
31	15-Jul-97	50.0	1477.4	Static?
31	23-Jul-97	50.0	1477.4	Static?
31	30-Jul-97	51.0	1476.4	Static?
31	19-Aug-97	49.0	1478.4	Static?
31	26-Aug-97	49.0	1478.4	Static?
31	3-Sep-97	50.0	1477.4	Static?
31	11-Sep-97	50.0	1477.4	Static?
31	17-Sep-97	50.0	1477.4	Static?
31	30-Sep-97	49.0	1478.4	Static?
31	8-Oct-97	115.0	1412.4	Pumping
31	15-Oct-97	51.0	1476.4	Static?
31	30-Oct-97	51.0	1476.4	Static?
31	7-Nov-97	51.0	1476.4	Static?
31	12-Nov-97	51.0	1476.4	Static?
31	18-Nov-97	51.0	1476.4	Static?
31	11-Dec-97	50.0	1477.4	Static?
31	24-Dec-97	51.0	1476.4	Static?
31	30-Dec-97	57.0	1470.4	Static?
31	5-Jan-98	58.0	1469.4	Static?
31	29-Jan-98	58.0	1469.4	Static?
31	25-Feb-98	56.0	1471.4	Static?
31	4-Mar-98	56.0	1471.4	Static?
31	11-Mar-98	56.0	1471.4	Static?
31	31-Mar-98	55.0	1472.4	Static?
31	8-Apr-98	59.0	1468.4	Static?
31	14-Apr-98	59.0	1468.4	Static?
31	22-Apr-98	60.0	1467.4	Static?
31	30-Apr-98	60.0	1467.4	Static?
31	8-Jun-98	51.0	1476.4	Static?
31	18-Jun-98	53.0	1474.4	Static?
31	24-Jun-98	53.0	1474.4	Static?
31	30-Jun-98	53.0	1474.4	Static?
31	8-Jul-98	53.0	1474.4	Static?
31	10-Jul-98	48.0	1479.4	Static?
31	21-Jul-98	57.0	1470.4	Static?
31	29-Jul-98	53.0	1474.4	Static?
31	5-Aug-98	57.0	1470.4	Static?
31	12-Aug-98	49.5	1477.9	Static?
31	18-Aug-98	57.0	1470.4	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	25-Aug-98	54.0	1473.4	Static?
31	31-Aug-98	110.0	1417.4	Pumping?
31	9-Sep-98	48.0	1479.4	Static?
31	16-Sep-98	54.3	1473.1	Static?
31	24-Sep-98	97.0	1430.4	Pumping
31	30-Sep-98	47.0	1480.4	Static?
31	6-Oct-98	49.0	1478.4	Static?
31	15-Oct-98	45.0	1482.4	Static?
31	21-Oct-98	47.3	1480.2	Static
31	30-Oct-98	47.3	1480.2	Static
31	4-Nov-98	47.8	1479.6	Static?
31	12-Nov-98	44.3	1483.1	Static?
31	23-Nov-98	157.0	1370.4	Pumping?
31	25-Nov-98	51.4	1476.0	Static?
31	1-Dec-98	50.9	1476.5	Static
31	9-Dec-98	51.0	1476.4	Static?
31	14-Dec-98	52.7	1474.7	Static
31	17-Dec-98	52.5	1474.9	Static?
31	22-Dec-98	52.3	1475.1	Static?
31	30-Dec-98	49.8	1477.6	Static
31	31-Dec-98	149.7	1377.7	Pumping
31	1-Jan-99	49.8	1477.6	Static?
31	6-Jan-99	50.0	1477.4	Static?
31	13-Jan-99	50.3	1477.2	Static?
31	3-Feb-99	50.0	1477.4	Static?
31	16-Feb-99	53.4	1474.0	Static
31	17-Feb-99	50.2	1477.2	Static?
31	1-Mar-99	44.4	1483.0	Static?
31	10-Mar-99	43.4	1484.0	Static?
31	17-Mar-99	42.2	1485.2	Static?
31	24-Mar-99	42.0	1485.4	Static?
31	31-Mar-99	42.3	1485.1	Static?
31	14-Apr-99	42.6	1484.8	Static?
31	21-Apr-99	44.5	1482.9	Static?
31	28-Apr-99	43.6	1483.8	Static?
31	30-Apr-99	43.6	1483.8	Static?
31	5-May-99	42.4	1485.0	Static?
31	13-May-99	43.8	1483.6	Static?
31	19-May-99	48.7	1478.7	Static
31	27-May-99	51.1	1476.3	Static
31	31-May-99	42.0	1485.4	Static?
31	2-Jun-99	42.0	1485.4	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	10-Jun-99	164.0	1363.4	Pumping
31	16-Jun-99	45.0	1482.4	Static?
31	30-Jun-99	47.4	1480.0	Static?
31	7-Jul-99	48.0	1479.4	Static?
31	15-Jul-99	48.0	1479.4	Static?
31	21-Jul-99	48.7	1478.7	Static?
31	30-Jul-99	45.3	1482.1	Static?
31	11-Aug-99	53.8	1473.6	Static?
31	31-Aug-99	52.7	1474.7	Static?
31	9-Sep-99	53.0	1474.4	Static?
31	17-Sep-99	52.4	1475.0	Static?
31	30-Sep-99	52.0	1475.4	Static?
31	11-Oct-99	58.2	1469.2	Static?
31	14-Oct-99	53.4	1474.0	Static?
31	20-Oct-99	53.5	1473.9	Static?
31	28-Oct-99	53.6	1473.8	Static?
31	31-Oct-99	53.4	1474.0	Static?
31	10-Nov-99	56.5	1470.9	Static?
31	17-Nov-99	41.8	1485.6	Static?
31	24-Nov-99	42.3	1485.1	Static?
31	30-Nov-99	44.5	1482.9	Static?
31	8-Dec-99	41.3	1486.1	Static?
31	15-Dec-99	44.2	1483.2	Static?
31	22-Dec-99	42.8	1484.6	Static?
31	30-Dec-99	41.5	1485.9	Static?
31	5-Jan-00	43.6	1483.8	Static
31	14-Jan-00	144.0	1383.4	Pumping
31	19-Jan-00	43.6	1483.8	Static
31	28-Jan-00	131.0	1396.4	Pumping
31	31-Jan-00	135.0	1392.4	Pumping
31	9-Feb-00	42.8	1484.6	Static
31	24-Feb-00	40.2	1487.2	Static
31	29-Feb-00	132.0	1395.4	Pumping
31	8-Mar-00	39.7	1487.7	Static
31	15-Mar-00	39.1	1488.3	Static
31	31-Mar-00	41.3	1486.1	Static
31	5-Apr-00	42.1	1485.3	Static
31	14-Apr-00	41.6	1485.8	Static
31	19-Apr-00	39.1	1488.3	Static
31	27-Apr-00	39.3	1488.1	Static?
31	30-Apr-00	41.8	1485.6	Static
31	1-May-00	41.7	1485.7	Static

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	3-May-00	42.1	1485.3	Static
31	10-May-00	42.8	1484.6	Static
31	17-May-00	39.3	1488.1	Static
31	25-May-00	40.3	1487.2	Static
31	31-May-00	41.5	1485.9	Static
31	7-Jun-00	51.2	1476.2	Static?
31	13-Jun-00	120.1	1407.3	Pumping?
31	21-Jun-00	121.6	1405.8	Pumping?
31	28-Jun-00	52.3	1475.1	Static?
31	30-Jun-00	116.2	1411.2	Pumping?
31	5-Jul-00	49.1	1478.3	Static?
31	12-Jul-00	49.6	1477.8	Static?
31	26-Jul-00	50.0	1477.4	Static?
31	31-Jul-00	51.6	1475.8	Static?
31	9-Aug-00	119.7	1407.7	Pumping?
31	16-Aug-00	71.9	1455.5	Pumping?
31	23-Aug-00	60.9	1466.5	Static?
31	31-Aug-00	68.5	1458.9	Static?
31	6-Sep-00	150.0	1377.4	Pumping?
31	13-Sep-00	64.0	1463.4	Static?
31	20-Sep-00	60.0	1467.4	Static?
31	27-Sep-00	68.0	1459.4	Static?
31	5-Oct-00	65.0	1462.4	Static?
31	11-Oct-00	58.2	1469.2	Static
31	18-Oct-00	60.2	1467.2	Static?
31	25-Oct-00	125.0	1402.4	Pumping
31	31-Oct-00	52.0	1475.4	Static
31	15-Nov-00	56.5	1470.9	Static?
31	22-Nov-00	125.0	1402.4	Pumping
31	30-Nov-00	53.8	1473.6	Static?
31	13-Dec-00	160.0	1367.4	Pumping?
31	20-Dec-00	160.0	1367.4	Pumping?
31	3-Jan-01	60.5	1466.9	Static?
31	10-Jan-01	53.6	1473.8	Static
31	17-Jan-01	58.2	1469.2	Static
31	31-Jan-01	54.9	1472.5	Static
31	1-Feb-01	52.1	1475.3	Static
31	7-Feb-01	136.3	1391.1	Pumping
31	15-Feb-01	51.2	1476.2	Static
31	21-Feb-01	53.4	1474.0	Static
31	28-Feb-01	49.1	1478.3	Static
31	14-Mar-01	51.0	1476.4	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	22-Mar-01	118.0	1409.4	Pumping?
31	28-Mar-01	50.7	1476.7	Static?
31	2-Apr-01	49.9	1477.5	Static?
31	10-Apr-01	49.4	1478.0	Static?
31	18-Apr-01	50.6	1476.8	Static?
31	25-Apr-01	68.1	1459.3	Static
31	30-Apr-01	65.6	1461.8	Static
31	9-May-01	58.6	1468.8	Static
31	16-May-01	130.0	1397.4	Pumping
31	23-May-01	128.0	1399.4	Pumping
31	31-May-01	129.6	1397.8	Pumping?
31	1-Jun-01	65.5	1461.9	Static
31	7-Jun-01	60.7	1466.7	Static
31	14-Jun-01	145.3	1382.1	Pumping?
31	20-Jun-01	130.0	1397.4	Pumping
31	29-Jun-01	142.3	1385.2	Pumping?
31	5-Jul-01	73.0	1454.4	Static
31	12-Jul-01	65.1	1462.3	Static
31	19-Jul-01	59.6	1467.8	Static
31	24-Jul-01	62.0	1465.4	Static
31	31-Jul-01	141.6	1385.8	Pumping?
31	1-Aug-01	74.6	1452.8	Static
31	8-Aug-01	140.3	1387.1	Pumping?
31	16-Aug-01	139.8	1387.6	Pumping?
31	22-Aug-01	136.6	1390.8	Pumping?
31	31-Aug-01	61.1	1466.3	Static?
31	5-Sep-01	63.0	1464.4	Static?
31	12-Sep-01	142.3	1385.1	Pumping?
31	19-Sep-01	112.8	1414.6	Pumping?
31	26-Sep-01	136.7	1390.7	Pumping?
31	30-Sep-01	64.3	1463.1	Static
31	10-Oct-01	142.0	1385.4	Pumping?
31	17-Oct-01	141.6	1385.8	Pumping?
31	24-Oct-01	129.3	1398.1	Pumping?
31	31-Oct-01	152.2	1375.2	Pumping?
31	7-Nov-01	56.1	1471.3	Static
31	13-Nov-01	58.3	1469.1	Static
31	20-Nov-01	120.0	1407.4	Pumping?
31	29-Nov-01	53.2	1474.2	Static
31	5-Dec-01	53.0	1474.4	Static
31	12-Dec-01	58.5	1468.9	Static
31	19-Dec-01	128.6	1398.8	Pumping

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	26-Dec-01	56.4	1471.0	Static
31	31-Dec-01	52.2	1475.2	Static
31	9-Jan-02	54.4	1473.0	Static
31	16-Jan-02	53.0	1474.4	Static
31	23-Jan-02	58.7	1468.7	Static
31	31-Jan-02	52.0	1475.4	Static
31	6-Feb-02	116.0	1411.4	Pumping
31	13-Feb-02	53.0	1474.4	Static
31	20-Feb-02	54.3	1473.1	Static?
31	28-Feb-02	142.2	1385.2	Pumping?
31	7-Mar-02	124.9	1402.5	Pumping?
31	14-Mar-02	63.0	1464.4	Static
31	21-Mar-02	63.0	1464.4	Static
31	27-Mar-02	126.7	1400.7	Pumping
31	31-Mar-02	59.6	1467.8	Static
31	10-Apr-02	60.9	1466.5	Static
31	16-Apr-02	57.0	1470.4	Static
31	24-Apr-02	135.0	1392.4	Pumping?
31	30-Apr-02	58.3	1469.1	Static?
31	8-May-02	69.8	1457.6	Static?
31	15-May-02	139.5	1387.9	Pumping?
31	22-May-02	160.0	1367.4	Pumping?
31	28-May-02	158.0	1369.4	Pumping?
31	5-Jun-02	153.0	1374.4	Pumping?
31	12-Jun-02	58.9	1468.5	Static?
31	19-Jun-02	139.0	1388.4	Pumping?
31	26-Jun-02	75.0	1452.4	Static
31	30-Jun-02	74.5	1452.9	Static
31	10-Jul-02	55.6	1471.8	Static?
31	17-Jul-02	57.2	1470.2	Static
31	31-Jul-02	60.6	1466.8	Static
31	7-Aug-02	65.2	1462.2	Static?
31	14-Aug-02	64.0	1463.4	Static
31	21-Aug-02	62.7	1464.7	Static
31	25-Sep-02	57.7	1469.7	Static
31	30-Sep-02	129.5	1397.9	Pumping?
31	16-Oct-02	58.0	1469.4	Static
31	24-Oct-02	56.3	1471.1	Static
31	31-Oct-02	56.5	1470.9	Static?
31	6-Nov-02	55.2	1472.2	Static?
31	13-Nov-02	54.1	1473.3	Static
31	20-Nov-02	54.8	1472.6	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	27-Nov-02	54.4	1473.0	Static?
31	30-Nov-02	55.0	1472.4	Static?
31	2-Dec-02	55.0	1472.4	Static?
31	11-Dec-02	52.9	1474.5	Static
31	18-Dec-02	52.0	1475.4	Static
31	27-Dec-02	53.8	1473.6	Static?
31	31-Dec-02	52.8	1474.6	Static?
31	8-Jan-03	53.0	1474.4	Static?
31	15-Jan-03	162.0	1365.4	Pumping?
31	22-Jan-03	52.6	1474.8	Static?
31	30-Jan-03	53.4	1474.0	Static?
31	5-Feb-03	53.2	1474.2	Static?
31	12-Feb-03	53.2	1474.2	Static?
31	20-Feb-03	52.0	1475.4	Static
31	28-Feb-03	51.0	1476.4	Static
31	5-Mar-03	51.0	1476.4	Static
31	13-Mar-03	51.8	1475.6	Static
31	19-Mar-03	51.8	1475.6	Static?
31	25-Mar-03	52.0	1475.4	Static
31	31-Mar-03	140.0	1387.4	Pumping?
31	30-Apr-03	50.8	1476.6	Static
31	7-May-03	50.8	1476.6	Static
31	14-May-03	50.6	1476.8	Static
31	25-Jun-03	61.0	1466.4	Static?
31	30-Jun-03	65.0	1462.4	Static?
31	16-Jul-03	128.7	1398.7	Pumping?
31	23-Jul-03	65.0	1462.4	Static
31	31-Jul-03	132.0	1395.4	Pumping?
31	2-Sep-03	128.7	1398.7	Pumping?
31	9-Sep-03	57.0	1470.4	Static?
31	17-Sep-03	57.0	1470.4	Static?
31	24-Sep-03	61.0	1466.4	Static?
31	30-Sep-03	59.0	1468.4	Static?
31	8-Oct-03	59.0	1468.4	Static?
31	16-Oct-03	63.0	1464.4	Static?
31	23-Oct-03	116.0	1411.4	Pumping?
31	31-Oct-03	60.0	1467.4	Static?
31	5-Nov-03	56.3	1471.1	Static?
31	13-Nov-03	54.5	1472.9	Static?
31	18-Nov-03	56.2	1471.2	Static?
31	25-Nov-03	56.6	1470.8	Static?
31	30-Nov-03	55.2	1472.2	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	2-Dec-03	55.2	1472.2	Static?
31	10-Dec-03	55.3	1472.1	Static?
31	17-Dec-03	134.0	1393.4	Pumping?
31	23-Dec-03	55.3	1472.1	Static
31	31-Dec-03	53.4	1474.0	Static?
31	6-Jan-04	54.5	1472.9	Static?
31	14-Jan-04	60.4	1467.0	Static?
31	21-Jan-04	55.0	1472.4	Static?
31	28-Jan-04	54.1	1473.3	Static?
31	7-Apr-04	132.2	1395.2	Pumping?
31	14-Apr-04	55.0	1472.4	Static
31	21-Apr-04	54.1	1473.3	Static
31	27-Apr-04	55.0	1472.4	Static?
31	30-Apr-04	133.3	1394.1	Pumping?
31	1-Jul-04	70.5	1456.9	Static
31	8-Jul-04	65.0	1462.4	Static
31	14-Jul-04	59.5	1467.9	Static?
31	21-Jul-04	149.0	1378.4	Pumping?
31	30-Jul-04	82.1	1445.3	Static
31	4-Aug-04	58.7	1468.7	Static?
31	11-Aug-04	75.3	1452.1	Pumping?
31	18-Aug-04	64.1	1463.3	Static
31	25-Aug-04	140.5	1386.9	Pumping?
31	31-Aug-04	59.0	1468.4	Static
31	8-Sep-04	78.8	1448.6	Static
31	30-Sep-04	59.5	1467.9	Static?
31	6-Oct-04	59.2	1468.2	Static
31	13-Oct-04	73.5	1453.9	Static
31	31-Oct-04	75.8	1451.6	Static
31	1-Nov-04	75.8	1451.6	Static
31	17-Nov-04	65.6	1461.8	Static?
31	24-Nov-04	70.3	1457.1	Static
31	30-Nov-04	56.7	1470.7	Static
31	1-Dec-04	56.8	1470.6	Static
31	15-Dec-04	57.7	1469.7	Static?
31	22-Dec-04	57.2	1470.2	Static?
31	31-Dec-04	57.4	1470.0	Static?
31	13-Jan-05	54.6	1472.8	Static
31	19-Jan-05	62.2	1465.2	Static?
31	26-Jan-05	54.6	1472.8	Static?
31	31-Jan-05	54.0	1473.4	Static
31	9-Feb-05	54.9	1472.5	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
31	16-Feb-05	53.2	1474.2	Static?
31	28-Feb-05	52.5	1474.9	Static?
31	9-Mar-05	60.4	1467.0	Static?
31	16-Mar-05	66.4	1461.0	Static?
31	23-Mar-05	51.7	1475.7	Static?
31	31-Mar-05	52.3	1475.1	Static?
31	6-Apr-05	63.5	1463.9	Static?
31	13-Apr-05	63.0	1464.4	Static
31	20-Apr-05	43.6	1483.8	Static
31	28-Apr-05	52.9	1474.5	Static
31	2-May-05	53.1	1474.3	Static?
31	11-May-05	55.4	1472.0	Static?
31	18-May-05	56.0	1471.4	Static
31	25-May-05	56.3	1471.1	Static?
31	1-Jun-05	53.9	1473.5	Static?
31	9-Jun-05	66.3	1461.1	Static?
31	15-Jun-05	135.0	1392.4	Pumping?
31	22-Jun-05	69.2	1458.2	Static?
31	30-Jun-05	59.1	1468.3	Static?
31	6-Jul-05	70.1	1457.3	Static?
31	14-Jul-05	71.6	1455.8	Static?
31	20-Jul-05	136.4	1391.0	Pumping?
31	27-Jul-05	54.5	1472.9	Static?
31	3-Aug-05	136.5	1390.9	Pumping?
31	17-Aug-05	138.4	1389.0	Pumping?
31	24-Aug-05	133.8	1393.6	Pumping?
31	31-Aug-05	132.6	1394.8	Pumping?
31	8-Sep-05	77.4	1450.0	Static?
31	14-Sep-05	71.6	1455.8	Static?
31	22-Sep-05	82.6	1444.8	Static?
31	28-Sep-05	71.6	1455.8	Static?
31	9-Nov-05	54.7	1472.7	Static?
31	16-Nov-05	53.7	1473.7	Static?
31	23-Nov-05	133.2	1394.2	Pumping?
31	30-Nov-05	53.9	1473.5	Static
32	2-May-57	80.0	1464.9	Static?
32	30-Jan-63	123.0	1421.9	Pumping?
32	1-Dec-71	132.0	1412.9	Pumping?
32	1-Jan-72	132.0	1412.9	Pumping?
32	1-Mar-72	132.0	1412.9	Pumping?
32	1-May-72	130.0	1414.9	Pumping?
32	1-Aug-72	145.0	1399.9	Pumping?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	1-Sep-72	137.0	1407.9	Pumping?
32	1-Oct-72	150.0	1394.9	Pumping?
32	1-Nov-72	137.0	1407.9	Pumping?
32	1-Feb-73	137.0	1407.9	Pumping?
32	1-Mar-73	130.0	1414.9	Pumping?
32	1-Apr-73	131.0	1413.9	Pumping?
32	1-May-73	132.0	1412.9	Pumping?
32	1-Jun-73	134.0	1410.9	Pumping?
32	1-Jul-73	139.0	1405.9	Pumping?
32	1-Aug-73	134.0	1410.9	Pumping?
32	1-Sep-73	133.0	1411.9	Pumping?
32	1-Dec-73	136.0	1408.9	Pumping?
32	1-Jan-74	132.0	1412.9	Pumping?
32	1-Mar-74	133.0	1411.9	Pumping?
32	1-May-74	137.0	1407.9	Pumping?
32	1-Jun-74	137.0	1407.9	Pumping?
32	1-Aug-74	140.0	1404.9	Pumping?
32	1-Sep-74	148.0	1396.9	Pumping?
32	1-Oct-74	145.0	1399.9	Pumping?
32	1-Nov-74	143.0	1401.9	Pumping?
32	1-Dec-74	135.0	1409.9	Pumping?
32	1-Jan-75	134.0	1410.9	Pumping?
32	1-Jun-75	135.0	1409.9	Pumping?
32	1-May-77	120.0	1424.9	Pumping?
32	1-May-78	128.0	1416.9	Pumping?
32	5-May-78	152.0	1392.9	Pumping?
32	1-Jul-78	113.0	1431.9	Pumping?
32	1-Feb-94	59.0	1485.9	Static
32	10-Feb-94	58.3	1486.7	Static
32	28-Feb-94	56.0	1488.9	Static
32	3-Mar-94	56.0	1488.9	Static
32	11-Mar-94	59.0	1485.9	Static
32	18-Mar-94	55.0	1489.9	Static
32	28-Mar-94	59.3	1485.7	Static
32	1-Apr-94	59.3	1485.7	Static
32	8-Apr-94	57.3	1487.7	Static
32	28-Apr-94	63.0	1481.9	Static
32	4-May-94	58.6	1486.3	Static
32	9-May-94	58.5	1486.4	Static
32	25-May-94	58.0	1486.9	Static
32	15-Jun-94	55.0	1489.9	Static
32	20-Jun-94	55.0	1489.9	Static

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	27-Jun-94	72.0	1472.9	Static
32	5-Jul-94	55.0	1489.9	Static
32	7-Jul-94	72.0	1472.9	Static
32	13-Jul-94	73.0	1471.9	Static
32	25-Jul-94	57.0	1487.9	Static
32	1-Aug-94	60.9	1484.0	Static
32	16-Aug-94	55.0	1489.9	Static
32	24-Aug-94	56.0	1488.9	Static
32	30-Aug-94	56.0	1488.9	Static
32	7-Sep-94	56.0	1488.9	Static
32	13-Sep-94	56.0	1488.9	Static
32	20-Sep-94	55.0	1489.9	Static
32	28-Sep-94	55.0	1489.9	Static
32	23-Nov-94	60.0	1484.9	Static?
32	30-Nov-94	60.0	1484.9	Static?
32	20-Dec-94	57.0	1487.9	Static?
32	28-Dec-94	60.0	1484.9	Static?
32	19-Jan-95	65.0	1479.9	Static?
32	26-Jan-95	54.0	1490.9	Static?
32	31-Jan-95	57.3	1487.7	Static?
32	8-Feb-95	56.5	1488.4	Static?
32	13-Feb-95	56.7	1488.2	Static?
32	23-Feb-95	62.3	1482.7	Static?
32	28-Feb-95	53.5	1491.4	Static?
32	9-Mar-95	56.5	1488.4	Static
32	16-Mar-95	58.0	1486.9	Static
32	30-Mar-95	54.0	1490.9	Static?
32	5-Apr-95	56.8	1488.1	Static?
32	13-Apr-95	52.5	1492.4	Static?
32	27-Apr-95	55.0	1489.9	Static
32	4-May-95	56.5	1488.4	Static
32	8-May-95	55.2	1489.7	Static?
32	18-May-95	56.4	1488.5	Static
32	31-May-95	54.0	1490.9	Static?
32	7-Jun-95	55.0	1489.9	Static?
32	20-Jun-95	53.5	1491.4	Static
32	6-Jul-95	55.0	1489.9	Static?
32	11-Jul-95	54.0	1490.9	Static
32	29-Sep-95	52.0	1492.9	Static?
32	30-Oct-95	50.5	1494.4	Static?
32	15-Nov-95	54.0	1490.9	Static?
32	29-Nov-95	51.0	1493.9	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	8-Dec-95	51.0	1493.9	Static?
32	18-Dec-95	51.6	1493.3	Static?
32	2-Jan-96	53.0	1491.9	Static?
32	9-Jan-96	51.0	1493.9	Static?
32	16-Jan-96	52.0	1492.9	Static?
32	26-Jan-96	49.0	1495.9	Static?
32	13-Feb-96	50.0	1494.9	Static?
32	11-Mar-96	50.0	1494.9	Static?
32	3-Apr-96	50.0	1494.9	Static?
32	11-Apr-96	50.5	1494.4	Static?
32	17-Apr-96	50.0	1494.9	Static?
32	26-Apr-96	50.0	1494.9	Static?
32	15-May-96	50.0	1494.9	Static?
32	30-May-96	50.0	1494.9	Static?
32	20-Jun-96	50.0	1494.9	Static?
32	1-Jul-96	50.0	1494.9	Static?
32	11-Sep-96	48.0	1496.9	Static?
32	19-Sep-96	50.0	1494.9	Static?
32	25-Sep-96	51.0	1493.9	Static?
32	30-Sep-96	50.0	1494.9	Static?
32	9-Oct-96	51.0	1493.9	Static?
32	16-Oct-96	51.0	1493.9	Static?
32	22-Oct-96	51.0	1493.9	Static?
32	31-Oct-96	50.0	1494.9	Static?
32	7-Nov-96	52.0	1492.9	Static?
32	15-Nov-96	50.0	1494.9	Static?
32	27-Nov-96	50.0	1494.9	Static?
32	16-Dec-96	50.0	1494.9	Static?
32	31-Dec-96	50.0	1494.9	Static?
32	8-Jan-97	52.0	1492.9	Static?
32	24-Jan-97	51.0	1493.9	Static?
32	7-Mar-97	50.0	1494.9	Static?
32	13-Mar-97	50.0	1494.9	Static?
32	19-Mar-97	50.0	1494.9	Static?
32	26-Mar-97	50.0	1494.9	Static
32	2-Apr-97	50.0	1494.9	Static
32	9-Apr-97	50.0	1494.9	Static?
32	17-Apr-97	50.0	1494.9	Static
32	23-Apr-97	50.0	1494.9	Static
32	30-Apr-97	50.0	1494.9	Static?
32	7-May-97	52.5	1492.4	Static?
32	13-May-97	50.0	1494.9	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	29-May-97	50.0	1494.9	Static?
32	9-Jun-97	50.0	1494.9	Static?
32	17-Jun-97	50.0	1494.9	Static?
32	24-Jun-97	51.0	1493.9	Static?
32	30-Jun-97	50.0	1494.9	Static?
32	10-Jul-97	50.0	1494.9	Static?
32	16-Jul-97	50.0	1494.9	Static?
32	23-Jul-97	49.0	1495.9	Static?
32	30-Jul-97	51.0	1493.9	Static?
32	19-Aug-97	50.0	1494.9	Static?
32	26-Aug-97	50.0	1494.9	Static?
32	2-Sep-97	50.0	1494.9	Static?
32	11-Sep-97	51.0	1493.9	Static?
32	17-Sep-97	51.0	1493.9	Static?
32	30-Sep-97	52.0	1492.9	Static?
32	8-Oct-97	53.0	1491.9	Static?
32	13-Oct-97	53.0	1491.9	Static?
32	29-Oct-97	53.0	1491.9	Static?
32	7-Nov-97	54.0	1490.9	Static?
32	11-Nov-97	54.0	1490.9	Static?
32	18-Nov-97	54.0	1490.9	Static?
32	11-Dec-97	54.0	1490.9	Static?
32	24-Dec-97	54.0	1490.9	Static?
32	30-Dec-97	52.0	1492.9	Static?
32	4-Jan-98	52.0	1492.9	Static?
32	4-Mar-98	51.0	1493.9	Static?
32	11-Mar-98	52.0	1492.9	Static?
32	31-Mar-98	52.0	1492.9	Static?
32	8-Apr-98	124.0	1420.9	Pumping
32	14-Apr-98	53.0	1491.9	Static?
32	22-Apr-98	53.0	1491.9	Static?
32	30-Apr-98	55.0	1489.9	Static?
32	1-May-98	55.0	1489.9	Static?
32	20-May-98	55.0	1489.9	Static?
32	8-Jun-98	53.0	1491.9	Static?
32	18-Jun-98	53.0	1491.9	Static?
32	24-Jun-98	54.0	1490.9	Static?
32	30-Jun-98	54.0	1490.9	Static?
32	8-Jul-98	54.0	1490.9	Static?
32	21-Jul-98	54.0	1490.9	Static?
32	29-Jul-98	54.0	1490.9	Static?
32	5-Aug-98	52.0	1492.9	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	12-Aug-98	51.0	1493.9	Static?
32	19-Aug-98	52.0	1492.9	Static?
32	24-Aug-98	125.0	1419.9	Pumping?
32	26-Aug-98	120.0	1424.9	Pumping?
32	31-Aug-98	50.0	1494.9	Static?
32	9-Sep-98	50.0	1494.9	Static?
32	16-Sep-98	53.2	1491.7	Static?
32	24-Sep-98	52.0	1492.9	Static?
32	30-Sep-98	51.0	1493.9	Static?
32	6-Oct-98	51.0	1493.9	Static?
32	15-Oct-98	51.0	1493.9	Static?
32	21-Oct-98	47.0	1497.9	Static
32	29-Oct-98	51.0	1493.9	Static
32	12-Nov-98	51.0	1493.9	Static?
32	23-Nov-98	51.5	1493.4	Static
32	24-Nov-98	121.4	1423.5	Pumping
32	1-Dec-98	51.2	1493.7	Static?
32	9-Dec-98	51.3	1493.6	Static?
32	14-Dec-98	51.0	1493.9	Static?
32	22-Dec-98	51.1	1493.8	Static?
32	30-Dec-98	51.0	1493.9	Static
32	31-Dec-98	122.4	1422.5	Pumping
32	1-Jan-99	51.0	1493.9	Static?
32	6-Jan-99	50.9	1494.0	Static?
32	13-Jan-99	51.0	1493.9	Static?
32	13-May-99	63.7	1481.2	Static?
32	19-May-99	64.1	1480.8	Static?
32	30-Jul-99	50.0	1494.9	Static?
32	4-Aug-99	52.0	1492.9	Static?
32	11-Aug-99	49.7	1495.2	Static?
32	18-Aug-99	51.4	1493.5	Static?
32	31-Aug-99	50.7	1494.2	Static?
32	9-Sep-99	52.7	1492.2	Static?
32	17-Sep-99	62.7	1482.2	Static?
32	30-Sep-99	51.3	1493.6	Static?
32	11-Oct-99	105.0	1439.9	Pumping?
32	14-Oct-99	50.1	1494.8	Static?
32	20-Oct-99	51.4	1493.5	Static?
32	28-Oct-99	51.2	1493.7	Static?
32	31-Oct-99	50.5	1494.4	Static?
32	10-Nov-99	49.1	1495.8	Static?
32	17-Nov-99	48.7	1496.2	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	24-Nov-99	118.0	1426.9	Pumping
32	30-Nov-99	49.5	1495.4	Static?
32	8-Dec-99	107.0	1437.9	Pumping
32	15-Dec-99	105.0	1439.9	Pumping
32	22-Dec-99	102.4	1442.5	Pumping
32	30-Dec-99	112.5	1432.4	Pumping
32	9-Feb-00	56.8	1488.1	Static
32	24-Feb-00	48.3	1496.7	Static?
32	29-Feb-00	49.0	1495.9	Static
32	8-Mar-00	47.6	1497.3	Static
32	15-Mar-00	51.3	1493.6	Static
32	31-Mar-00	110.0	1434.9	Pumping
32	5-Apr-00	113.0	1431.9	Pumping
32	14-Apr-00	108.0	1436.9	Pumping
32	19-Apr-00	48.7	1496.2	Static
32	27-Apr-00	52.1	1492.8	Static
32	30-Apr-00	51.0	1493.9	Static
32	3-May-00	42.1	1502.8	Static?
32	10-May-00	42.8	1502.1	Static
32	17-May-00	39.3	1505.6	Static
32	25-May-00	40.3	1504.7	Static
32	31-May-00	41.5	1503.4	Static
32	7-Jun-00	38.3	1506.7	Static?
32	13-Jun-00	43.3	1501.6	Static?
32	21-Jun-00	43.8	1501.2	Static?
32	28-Jun-00	43.5	1501.4	Static?
32	30-Jun-00	74.5	1470.4	Static?
32	5-Jul-00	116.2	1428.7	Pumping?
32	12-Jul-00	121.5	1423.4	Pumping?
32	19-Jul-00	124.0	1420.9	Pumping?
32	26-Jul-00	123.0	1421.9	Pumping?
32	31-Jul-00	125.7	1419.2	Pumping?
32	9-Aug-00	98.8	1446.2	Pumping?
32	16-Aug-00	97.7	1447.2	Pumping?
32	23-Aug-00	98.1	1446.8	Pumping?
32	31-Aug-00	66.0	1478.9	Static?
32	6-Sep-00	63.0	1481.9	Static?
32	20-Sep-00	59.3	1485.6	Static?
32	15-Nov-00	59.0	1485.9	Static?
32	13-Dec-00	86.4	1458.5	Static?
32	20-Dec-00	81.1	1463.8	Static?
32	29-Dec-00	78.9	1466.0	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	3-Jan-01	82.0	1462.9	Static
32	10-Jan-01	78.4	1466.5	Static
32	17-Jan-01	77.0	1467.9	Static
32	24-Jan-01	80.7	1464.2	Static
32	31-Jan-01	75.5	1469.4	Static
32	1-Feb-01	55.2	1489.7	Static
32	7-Feb-01	63.8	1481.1	Static
32	15-Feb-01	56.6	1488.3	Static
32	21-Feb-01	74.7	1470.2	Static
32	28-Feb-01	49.1	1495.8	Static
32	7-Mar-01	52.1	1492.8	Static?
32	14-Mar-01	57.0	1487.9	Static?
32	22-Mar-01	50.8	1494.1	Static?
32	28-Mar-01	59.6	1485.3	Static?
32	2-Apr-01	61.1	1483.8	Static
32	11-Apr-01	65.2	1479.7	Static
32	18-Apr-01	121.0	1423.9	Pumping
32	25-Apr-01	62.3	1482.6	Static
32	30-Apr-01	60.5	1484.4	Static
32	9-May-01	122.0	1422.9	Pumping
32	16-May-01	66.6	1478.3	Static
32	23-May-01	66.3	1478.6	Static?
32	31-May-01	64.5	1480.4	Static?
32	7-Jun-01	121.5	1423.4	Pumping
32	14-Jun-01	63.6	1481.3	Static
32	20-Jun-01	122.7	1422.2	Pumping
32	30-Jun-01	68.1	1476.8	Static
32	5-Jul-01	119.8	1425.1	Pumping?
32	12-Jul-01	62.4	1482.5	Static?
32	19-Jul-01	61.2	1483.7	Static
32	24-Jul-01	62.9	1482.0	Static
32	31-Jul-01	109.0	1435.9	Pumping?
32	8-Aug-01	65.3	1479.6	Static
32	16-Aug-01	70.2	1474.7	Static
32	22-Aug-01	64.1	1480.8	Static
32	31-Aug-01	62.8	1482.1	Static?
32	5-Sep-01	64.1	1480.8	Static?
32	12-Sep-01	118.4	1426.5	Pumping?
32	19-Sep-01	123.5	1421.4	Pumping?
32	26-Sep-01	64.3	1480.6	Static?
32	30-Sep-01	117.7	1427.2	Pumping?
32	10-Oct-01	68.4	1476.5	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	17-Oct-01	79.7	1465.2	Static?
32	24-Oct-01	65.8	1479.1	Static?
32	31-Oct-01	63.7	1481.2	Static
32	7-Nov-01	63.1	1481.8	Static
32	13-Nov-01	81.0	1463.9	Static
32	20-Nov-01	61.5	1483.4	Static?
32	29-Nov-01	63.6	1481.3	Static?
32	5-Dec-01	61.6	1483.3	Static?
32	12-Dec-01	63.3	1481.6	Static?
32	19-Dec-01	67.0	1477.9	Static
32	26-Dec-01	60.5	1484.4	Static?
32	31-Dec-01	59.7	1485.2	Static
32	9-Jan-02	60.2	1484.7	Static
32	16-Jan-02	68.8	1476.1	Static
32	23-Jan-02	63.2	1481.7	Static
32	30-Jan-02	55.2	1489.7	Static
32	31-Jan-02	64.5	1480.4	Static
32	6-Feb-02	64.1	1480.8	Static?
32	13-Feb-02	126.0	1418.9	Pumping?
32	20-Feb-02	61.0	1483.9	Static?
32	28-Feb-02	66.6	1478.3	Static?
32	7-Mar-02	69.5	1475.4	Static?
32	14-Mar-02	65.2	1479.7	Static
32	21-Mar-02	63.2	1481.7	Static
32	27-Mar-02	122.2	1422.7	Pumping
32	31-Mar-02	62.4	1482.5	Static
32	10-Apr-02	62.4	1482.5	Static
32	16-Apr-02	62.5	1482.4	Static?
32	24-Apr-02	63.4	1481.5	Static?
32	30-Apr-02	59.0	1485.9	Static?
32	8-May-02	63.3	1481.6	Static?
32	15-May-02	64.0	1480.9	Static?
32	22-May-02	111.4	1433.5	Pumping?
32	28-May-02	125.6	1419.3	Pumping?
32	31-May-02	68.3	1476.6	Static?
32	5-Jun-02	68.2	1476.7	Static?
32	12-Jun-02	123.6	1421.3	Pumping?
32	19-Jun-02	70.9	1474.0	Static?
32	26-Jun-02	79.1	1465.8	Static?
32	30-Jun-02	127.0	1417.9	Pumping?
32	10-Jul-02	124.7	1420.2	Pumping?
32	17-Jul-02	75.3	1469.7	Static?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	24-Jul-02	128.3	1416.6	Pumping?
32	31-Jul-02	126.0	1418.9	Pumping?
32	7-Aug-02	123.8	1421.1	Pumping?
32	14-Aug-02	128.2	1416.7	Pumping?
32	21-Aug-02	124.7	1420.2	Pumping?
32	28-Aug-02	127.4	1417.5	Pumping?
32	30-Aug-02	123.8	1421.1	Pumping?
32	4-Sep-02	126.9	1418.0	Pumping?
32	11-Sep-02	115.0	1429.9	Pumping?
32	20-Sep-02	132.0	1412.9	Pumping?
32	25-Sep-02	115.3	1429.6	Pumping?
32	30-Sep-02	128.4	1416.5	Pumping?
32	16-Oct-02	128.5	1416.4	Pumping?
32	24-Oct-02	74.5	1470.4	Static?
32	31-Oct-02	130.2	1414.7	Pumping?
32	6-Nov-02	85.4	1459.5	Static?
32	13-Nov-02	77.8	1467.1	Static
32	20-Nov-02	128.0	1416.9	Pumping?
32	27-Nov-02	133.0	1411.9	Pumping?
32	30-Nov-02	68.7	1476.2	Static?
32	2-Dec-02	68.7	1476.2	Static?
32	11-Dec-02	122.6	1422.3	Pumping?
32	18-Dec-02	68.0	1476.9	Static
32	27-Dec-02	67.9	1477.0	Static?
32	31-Dec-02	68.5	1476.4	Static
32	8-Jan-03	131.6	1413.3	Pumping?
32	15-Jan-03	69.7	1475.2	Static
32	22-Jan-03	68.2	1476.7	Static?
32	30-Jan-03	67.0	1477.9	Static?
32	5-Feb-03	130.7	1414.2	Pumping?
32	12-Feb-03	67.0	1477.9	Static?
32	20-Feb-03	68.0	1476.9	Static?
32	28-Feb-03	74.7	1470.2	Static
32	5-Mar-03	68.2	1476.7	Static?
32	13-Mar-03	127.0	1417.9	Pumping?
32	19-Mar-03	68.4	1476.5	Static?
32	25-Mar-03	69.0	1475.9	Static
32	31-Mar-03	122.0	1422.9	Pumping?
32	30-Apr-03	63.8	1481.1	Static
32	7-May-03	70.6	1474.3	Static?
32	14-May-03	70.0	1474.9	Static?
32	21-May-03	126.0	1418.9	Pumping?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	28-May-03	67.2	1477.7	Static?
32	31-May-03	126.0	1418.9	Pumping?
32	2-Jun-03	126.0	1418.9	Pumping?
32	12-Jun-03	69.2	1475.7	Static?
32	17-Jun-03	70.6	1474.3	Static?
32	25-Jun-03	125.0	1419.9	Pumping?
32	30-Jun-03	118.0	1426.9	Pumping?
32	8-Jul-03	76.2	1468.7	Static?
32	16-Jul-03	113.8	1431.2	Pumping?
32	23-Jul-03	125.4	1419.5	Pumping?
32	31-Jul-03	127.4	1417.5	Pumping?
32	9-Sep-03	72.0	1472.9	Static?
32	17-Sep-03	80.0	1464.9	Static?
32	24-Sep-03	74.3	1470.6	Static?
32	30-Sep-03	125.0	1419.9	Pumping?
32	8-Oct-03	84.0	1460.9	Static?
32	16-Oct-03	133.0	1411.9	Pumping?
32	23-Oct-03	124.0	1420.9	Pumping?
32	31-Oct-03	136.0	1408.9	Pumping?
32	5-Nov-03	72.8	1472.1	Static?
32	13-Nov-03	71.6	1473.3	Static?
32	18-Nov-03	87.9	1457.0	Static?
32	25-Nov-03	81.4	1463.5	Static?
32	30-Nov-03	73.2	1471.7	Static?
32	2-Dec-03	73.2	1471.7	Static?
32	10-Dec-03	73.5	1471.4	Static?
32	17-Dec-03	82.2	1462.7	Static?
32	23-Dec-03	74.3	1470.6	Static?
32	31-Dec-03	72.6	1472.3	Static?
32	6-Jan-04	80.3	1464.6	Static?
32	14-Jan-04	126.0	1418.9	Pumping?
32	21-Jan-04	74.1	1470.8	Static?
32	28-Jan-04	73.4	1471.5	Static?
32	7-Apr-04	65.4	1479.5	Static?
32	14-Apr-04	56.0	1488.9	Static?
32	21-Apr-04	115.4	1429.5	Static
32	27-Apr-04	111.5	1433.4	Pumping?
32	1-May-04	79.8	1465.1	Static?
32	1-Jul-04	132.5	1412.4	Pumping
32	8-Jul-04	93.2	1451.7	Static
32	14-Jul-04	74.6	1470.3	Static
32	21-Jul-04	86.8	1458.1	Static

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	30-Jul-04	125.6	1419.3	Pumping
32	4-Aug-04	119.3	1425.6	Pumping
32	11-Aug-04	133.2	1411.7	Pumping?
32	18-Aug-04	72.5	1472.4	Static
32	25-Aug-04	83.7	1461.2	Static
32	31-Aug-04	130.0	1414.9	Pumping?
32	8-Sep-04	128.4	1416.5	Pumping
32	15-Sep-04	84.4	1460.5	Static?
32	22-Sep-04	133.9	1411.0	Pumping?
32	30-Sep-04	76.1	1468.8	Static
32	6-Oct-04	131.7	1413.2	Pumping
32	13-Oct-04	124.9	1420.0	Pumping
32	31-Oct-04	76.3	1468.6	Static
32	1-Nov-04	76.3	1468.6	Static
32	10-Nov-04	75.4	1469.5	Static
32	17-Nov-04	88.0	1456.9	Static?
32	24-Nov-04	132.5	1412.4	Pumping
32	30-Nov-04	74.6	1470.3	Static
32	1-Dec-04	74.6	1470.3	Static
32	8-Dec-04	71.9	1473.0	Static?
32	15-Dec-04	73.7	1471.2	Static?
32	22-Dec-04	129.5	1415.4	Pumping?
32	28-Dec-04	70.7	1474.2	Static?
32	31-Dec-04	73.0	1471.9	Static?
32	3-Jan-05	73.0	1471.9	Static?
32	13-Jan-05	69.4	1475.5	Static
32	19-Jan-05	67.9	1477.0	Static?
32	26-Jan-05	81.7	1463.2	Static?
32	31-Jan-05	72.8	1472.1	Static?
32	31-Jan-05	61.4	1483.5	Static
32	9-Feb-05	69.4	1475.5	Static?
32	16-Feb-05	67.2	1477.7	Static?
32	23-Feb-05	68.0	1476.9	Static?
32	28-Feb-05	65.4	1479.5	Static?
32	9-Mar-05	66.0	1478.9	Static?
32	16-Mar-05	73.4	1471.5	Static?
32	23-Mar-05	65.9	1479.0	Static?
32	31-Mar-05	66.3	1478.6	Static?
32	6-Apr-05	126.8	1418.1	Pumping?
32	13-Apr-05	128.8	1416.1	Pumping
32	20-Apr-05	71.9	147.3	Static?
32	29-Apr-05	72.1	1472.8	Static

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
32	2-May-05	65.4	1479.5	Static?
32	11-May-05	69.2	1475.7	Static?
32	18-May-05	122.4	1422.5	Pumping?
32	25-May-05	123.6	1421.3	Pumping?
32	1-Jun-05	69.4	1475.5	Static?
32	8-Jun-05	53.0	1491.9	Static?
32	9-Jun-05	129.4	1415.5	Pumping?
32	13-Jun-05	128.8	1416.1	Pumping?
32	15-Jun-05	131.8	1413.1	Pumping?
32	18-Jun-05	53.0	1491.9	Static?
32	20-Jun-05	71.9	1473.0	Static?
32	22-Jun-05	128.6	1416.3	Pumping?
32	24-Jun-05	54.0	1490.9	Static?
32	28-Jun-05	72.1	1472.8	Static?
32	30-Jun-05	54.0	1490.9	Static?
32	30-Jun-05	78.6	1466.3	Static?
32	6-Jul-05	130.6	1414.3	Pumping?
32	14-Jul-05	132.1	1412.8	Pumping?
32	20-Jul-05	83.4	1461.5	Static?
32	27-Jul-05	127.2	1417.7	Pumping?
32	3-Aug-05	130.2	1414.7	Pumping?
32	17-Aug-05	72.1	1472.8	Static?
32	24-Aug-05	73.4	1471.5	Static?
32	31-Aug-05	79.7	1465.2	Static?
32	8-Sep-05	121.6	1423.3	Pumping?
32	14-Sep-05	78.9	1466.0	Static?
32	22-Sep-05	116.4	1428.5	Pumping?
32	28-Sep-05	132.7	1412.2	Pumping?
32	9-Nov-05	75.6	1469.3	Static?
32	16-Nov-05	72.8	1472.1	Static?
32	23-Nov-05	131.2	1413.7	Pumping?
32	30-Nov-05	74.4	1470.5	Static
33	1-Feb-94	75.3	1433.7	Static
33	10-Feb-94	76.4	1432.6	Static
33	28-Feb-94	75.3	1433.7	Static
33	3-Mar-94	75.3	1433.8	Static
33	11-Mar-94	75.2	1433.8	Static
33	18-Mar-94	73.8	1435.2	Static
33	28-Mar-94	75.0	1434.0	Static
33	1-Apr-94	75.0	1434.0	Static
33	8-Apr-94	74.9	1434.1	Static
33	28-Apr-94	75.0	1434.0	Static

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
33	4-May-94	74.8	1434.3	Static
33	9-May-94	75.0	1434.0	Static
33	25-May-94	74.0	1435.0	Static
33	8-Jun-94	75.0	1434.0	Static
33	15-Jun-94	73.0	1436.0	Static
33	20-Jun-94	75.0	1434.0	Static
33	27-Jun-94	73.7	1435.3	Static
33	5-Jul-94	73.7	1435.3	Static
33	7-Jul-94	73.0	1436.0	Static
33	25-Jul-94	73.0	1436.0	Static
33	1-Aug-94	74.5	1434.5	Static
33	16-Aug-94	72.0	1437.0	Static
33	24-Aug-94	73.0	1436.0	Static
33	30-Aug-94	72.0	1437.0	Static
33	7-Sep-94	73.0	1436.0	Static
33	13-Sep-94	73.0	1436.0	Static
33	20-Sep-94	75.0	1434.0	Static
33	28-Sep-94	73.0	1436.0	Static
33	5-Apr-95	71.8	1437.3	Static
33	13-Apr-95	72.0	1437.0	Static
33	27-Apr-95	70.5	1438.5	Static
20/A	22-Jan-28	11.4	1481.6	Static?
20/A	12-Nov-29	7.6	1485.4	Static?
20/A	19-Aug-30	8.7	1484.3	Static?
20/A	18-Jun-31	13.0	1480.0	Static?
20/A	4-Apr-32	10.5	1482.5	Static?
20/A	3-Jul-32	12.3	1480.7	Static?
20/A	5-Jun-33	21.5	1471.5	Pumping?
20/A	20-Nov-33	20.9	1472.1	Pumping?
20/A	21-Jun-34	21.5	1471.5	Pumping?
20/A	3-Jun-35	20.8	1472.2	Pumping?
20/A	14-Jan-36	24.4	1468.6	Pumping?
20/A	5-Sep-36	26.2	1466.8	Pumping?
20/A	27-Jul-37	25.6	1467.4	Pumping?
20/A	6-Jun-38	31.1	1461.9	Pumping?
20/A	22-Jun-39	27.9	1465.1	Pumping?
20/A	3-Nov-39	29.1	1463.9	Pumping?
20/A	5-Oct-40	31.5	1461.5	Pumping?
20/A	19-Jun-41	32.7	1460.3	Pumping?
20/A	15-Dec-41	31.4	1461.6	Pumping?
20/A	21-Sep-42	29.5	1463.5	Pumping?
20/A	15-Sep-43	30.7	1462.3	Pumping?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
20/A	22-May-45	26.2	1466.8	Pumping?
20/A	22-Jun-47	22.3	1470.7	Pumping?
20/A	28-Aug-47	23.5	1469.5	Pumping?
20/A	27-Jun-48	32.1	1460.9	Pumping?
20/A	12-Dec-48	32.7	1460.3	Pumping?
20/A	5-Mar-50	33.2	1459.8	Pumping?
20/A	1-Apr-51	33.2	1459.8	Pumping?
20/A	9-Oct-51	35.6	1457.4	Pumping?
20/A	5-Apr-52	36.8	1456.2	Pumping?
20/A	10-Apr-53	36.7	1456.3	Pumping?
20/A	28-Jun-53	38.6	1454.4	Pumping?
20/A	7-Feb-54	42.2	1450.8	Pumping?
20/A	23-Oct-54	44.0	1449.0	Pumping?
20/A	5-Jun-55	46.5	1446.5	Pumping?
20/A	29-Feb-56	48.3	1444.7	Pumping?
20/A	5-Mar-57	53.2	1439.8	Pumping?
20/A	18-Jul-57	54.4	1438.6	Pumping?
20/A	5-May-58	54.3	1438.7	Pumping?
20/A	6-Sep-58	57.4	1435.6	Pumping?
20/A	19-Apr-59	64.1	1428.9	Pumping?
20/A	23-Sep-59	66.6	1426.4	Pumping?
20/A	11-Jul-60	69.0	1424.0	Pumping?
20/A	4-Jul-61	70.8	1422.2	Pumping?
20/A	17-Jun-62	73.2	1419.8	Pumping?
20/A	7-Oct-62	76.3	1416.7	Pumping?
20/A	9-May-63	81.2	1411.8	Pumping?
20/A	14-May-64	87.9	1405.1	Pumping?
20/A	4-Jul-65	96.5	1396.5	Pumping?
20/A	24-Aug-66	105.1	1387.9	Pumping?
20/A	7-Aug-67	111.8	1381.2	Pumping?
20/A	2-May-68	115.5	1377.5	Pumping?
20/A	3-Sep-68	115.5	1377.5	Pumping?
20/A	3-Apr-69	114.8	1378.2	Pumping?
20/A	24-Jul-69	112.9	1380.1	Pumping?
20/A	17-Apr-70	105.4	1387.6	Pumping?
20/A	2-May-71	97.3	1395.7	Pumping?
20/A	11-Apr-72	86.7	1406.3	Pumping?
15	27-Jun-28	46.9	1479.1	Pumping?
15	2-Mar-32	49.1	1476.9	Pumping?
15	20-Nov-33	52.0	1474.0	Pumping?
15	28-Aug-34	56.3	1469.7	Pumping?
15	20-Apr-35	56.3	1469.7	Pumping?

Summary of Ground Water Elevations
Tapo Canyon Ground Water Basin

Well No.	Date	Depth to Ground Water [ft bgs]	Ground Water Elevation [ft amsl]	Remarks
15	14-Jan-36	59.9	1466.1	Pumping?
15	23-Jul-36	62.4	1463.6	Pumping?
15	15-Mar-37	58.6	1467.4	Pumping?
15	23-Jun-37	57.3	1468.7	Pumping?
15	31-Oct-38	67.1	1458.9	Pumping?
15	29-Aug-39	69.5	1456.5	Pumping?
15	9-Nov-40	72.6	1453.4	Pumping?
15	13-Jul-41	72.5	1453.5	Pumping?
15	11-May-42	68.1	1457.9	Pumping?
15	8-Aug-42	67.5	1458.5	Pumping?
15	5-May-43	71.1	1454.9	Pumping?
15	26-Dec-43	70.4	1455.6	Pumping?
15	7-Nov-45	67.2	1458.8	Pumping?
15	14-Aug-46	67.1	1458.9	Pumping?
15	23-Jun-47	63.4	1462.6	Pumping?
15	18-Mar-48	66.4	1459.6	Pumping?
15	17-Aug-49	71.9	1454.1	Pumping?
15	19-Nov-50	74.9	1451.1	Pumping?
15	17-Dec-51	77.9	1448.1	Pumping?
15	10-May-52	77.2	1448.8	Pumping?
15	4-May-53	76.5	1449.5	Pumping?
15	20-May-54	78.9	1447.1	Pumping?
15	3-May-55	85.7	1440.3	Pumping?
15	2-Dec-55	87.5	1438.5	Pumping?
15	18-May-56	86.8	1439.2	Pumping?
15	12-Mar-58	96.6	1429.4	Pumping?
15	8-Apr-59	101.5	1424.5	Pumping?
15	14-Jan-60	103.3	1422.7	Pumping?
15	26-Mar-61	109.4	1416.6	Pumping?
15	23-Apr-62	113.0	1413.0	Pumping?
15	14-Oct-63	119.7	1406.3	Pumping?
15	12-Sep-68	139.8	1386.2	Pumping?
15	10-Feb-70	144.6	1381.4	Pumping?
15	6-Jul-70	146.5	1379.5	Pumping?
15	17-Jun-71	141.4	1384.6	Pumping?