State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Southern District

GROUND WATER IN THE ARROYO GRANDE AREA

District Report

June 1979

CONVERSION FACTORS

Metric to Customary System of Measurement

Quantity	Metric Unit	Multiply by	To get customary equivalent
Length	millimetres (mm)	0.03937	inches (in)
	centimetres (cm) for snow depth	0.3937	inches (in)
	metres (m)	3.2808	feet (ft)
	kilometres (km)	0.62139	miles (m)
Area	square millimetres (mm^2)	0.00155	square inches (in^2)
	square metres (m^2)	10.764	square feet (ft^2)
	hectares (ha)	2.4710	acres (ac)
	square kilometres (km^2)	0.3861	square miles (mi^2)
Volume	litres (l)	0.26417	gallons (gal)
	megalitres	0.26417	million gallons (10^6 gal)
	cubic metres (m^3)	35.315	cubic feet (ft^3)
	cubic metres (m^3)	1.308	cubic yards (yd^3)
	cubic metres (m^3)	0.0008107	acre-feet (ac-ft)
	cubic dekametres (dam^3)	0.8107	acre-feet (ac-ft)
	cubic hectometres (hm^3)	0.8107	thousands of acre-feet
	cubic kilometres (km^3)	0.8107	millions of acre-feet
Flow	cubic metres per second (m^3/s)	35.315	cubic feet per second (ft^3/s)
	litres per minute (l/min)	0.26417	gallons per minute (gal/min)
	litres per day (l/day)	0.26417	gallons per day)(gal/day)
	megalitres per day (Ml/day)	0.26417	million gallons per day (mgd)
	cubic metres per day (m^3/day)	0.0008107	acre-feet per day
Mass	kilograms (kg)	2.2046	pounds (lb)
	tonne (t)	1.1023	tons (short, 2,000 lb)
Velocity	metres per second (m/s)	3.2808	feet per second (ft/s)
Power	kilowatts (kW)	1.3405	horsepower (hp)
Pressure	kilopascals (kPa)	0.145054	pounds per square inch (psi)
	kilopascals (kPa)	0.33456	feet head of water
Specific capacity	litres per minute per metre drawdown	0.08052	gallons per minute per foot drawdown
Concentration	milligrams per litre (mg/l)	1.0	parts per million
Electrical conductivity	microsiemens per centimetre ($\mu S/cm$)	1.0	micromho per centimetre
Temperature	degrees Celsius (°C)	$(1.8 \times °C) + 32$	degree Fahrenheit (°F)

FOREWORD

At present, a major portion of the water supply of the Central Coastal area of California comes from the local ground water basins. Generally, the extraction from these basins has exceeded the replenishment, with the result that the ground water levels have declined.

Recognizing that declining water levels increase energy consumption and pumping costs, water users are asking for more information on current and potential ground water supplies.

To provide this information, the Department of Water Resources and the San Luis Obispo County Flood Control and Water Conservation District entered into a cooperative agreement for a study in the Arroyo Grande area. Such information can be used by local agencies in water supply and basin management planning.

A comprehensive study was made of the geohydrology of the area and the potential use of the water in the offshore aquifers was evaluated.

Appreciation is expressed to the staffs of the San Luis Obispo County Flood Control and Water Conservation District and the San Luis Obispo County Water Resources Advisory Committee for their cooperation and advice throughout the study. Others contributing valuable information include: the United States Geological Survey in Menlo Park; the California Division of Oil and Gas in Los Angeles and Santa Maria; the Regional Water Quality Control Board, Central Coastal Region; the San Luis Obispo County Farm Advisor; water well drillers; local water companies; and numerous private individuals.

Jack J. Coe, Chief
Southern District

TABLE OF CONTENTS

FIGURES

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Southern District

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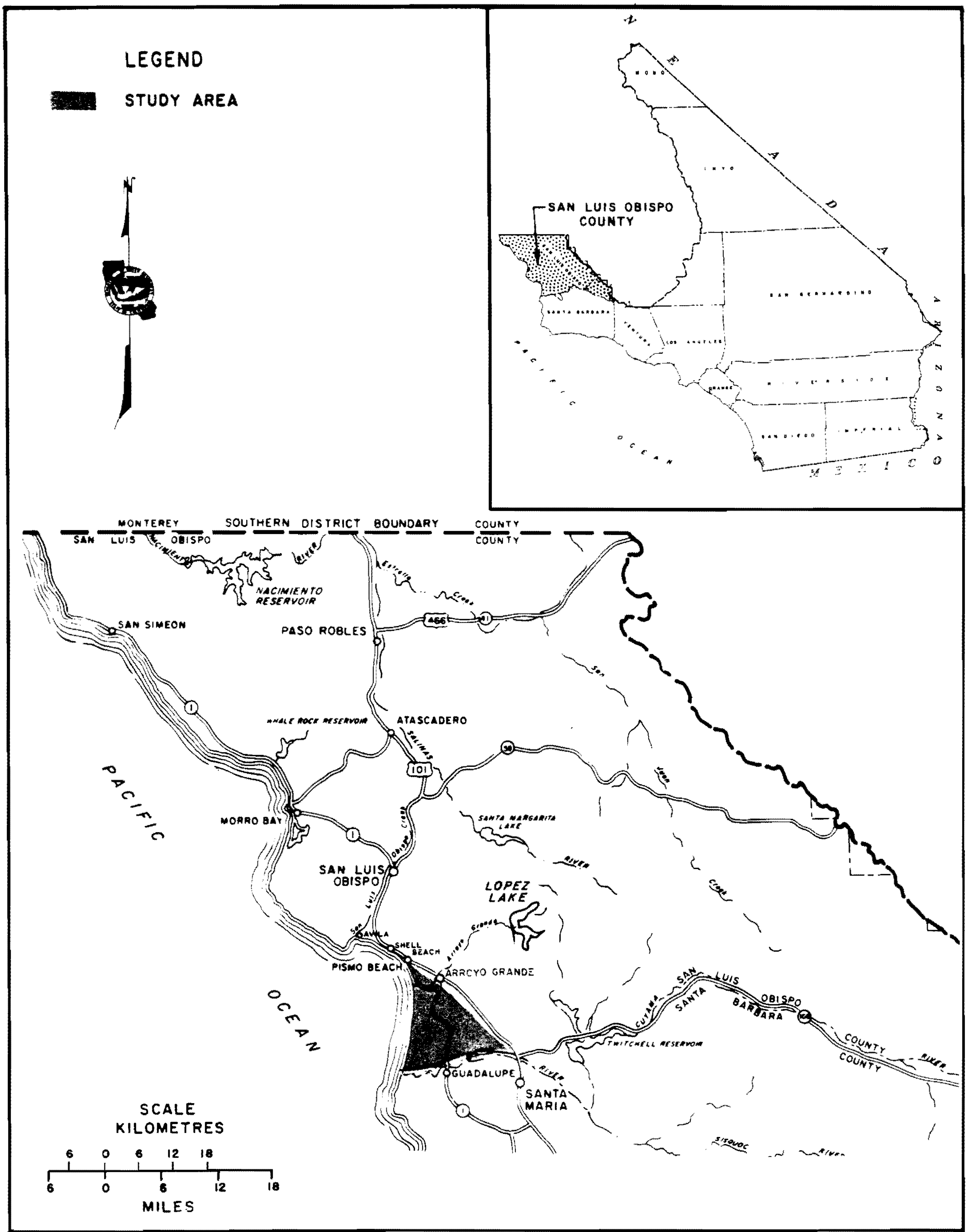

Figure 1 - VICINITY MAP

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

I. INTRODUCTION AND SUMMARY

During the past several decades, San Luis Obispo County has grown substantially in population, accompanied by a proportionate increase in urban and agricultural activities.

At first, its urban and agricultural water demands were met by using surface water supplies and, in time, by using increasing amounts of ground water. Although the amount of surface water available varies from year to year, depending on annual precipitation, the extent of this supply that can be used is generally known. Similar knowledge of the availability of ground water supplies, however, has remained meager. Consequently, the San Luis Obispo County Flood Control and Water Conservation District requested the Department of Water Resources to undertake a study to assess the amount of ground water resources available for inclusion in plans to meet water demands of the county.

One of the areas chosen for study is the area near the community of Arroyo Grande (Figure 1). The Arroyo Grande area was chosen because of a concern that the increasing use being made of its ground water might deplete the supply to the extent that the basin and the ground water resource would become permanently damaged.

Objective of Investigation

Thus the objective of the study is, according to the cooperative agreement between the two agencies, "to identify the information needed for effective use of ground water basins and to develop the information as far as time and funding permit."

Area of Investigation

The Arroyo Grande area is on the coast in the southwesterly corner of San Luis Obispo County 24 kilometres (15 miles) south of San Luis Obispo (Figure 1). It includes the Arroyo Grande Creek and part of the Santa Maria River watersheds (Figure 2). The ground water basin portion, which is the study area, forms a 190-square-kilometre (73-square-mile) triangle bounded by the ocean on the west, the San Luis Obispo-Santa Barbara County line on the south, and Highway 101 along the northeast. The study area plus its watershed covers 53 000 hectares (130,000 acres). → 203.1 sq Mi.

The area lying offshore is also part of the study area. The aquifers in coastal plains usually continue offshore, and the fresh water they contain is an integral part of the area's water resources.

The City of Arroyo Grande and the communities of Grover City and Oceano are within the boundaries of the study area. Nipomo is outside the basin boundaries but is covered in this report because most of its water supply comes from the ground water resources in Nipomo Mesa. The communities of Pismo Beach, Shell Beach, and Avila are nearby but lie outside the basin boundaries and are not covered in this report.

Topography

The rugged Santa Lucia Mountains, rising 600 to 900 metres (2,000 to 3,000 feet) above sea level and trending northwestward along the eastern boundary of the watershed, form a backdrop to the study area. From their upper drainage area, the Arroyo Grande Creek and the Santa Maria River drainage systems wind through deep V-shaped canyons in the Santa Lucia Mountains and terminate in the study area as flat coastal plains that open to the ocean. In the study area the terrain alternates between high-rising sand mesas and these low-lying coastal plains. Recent sand dunes

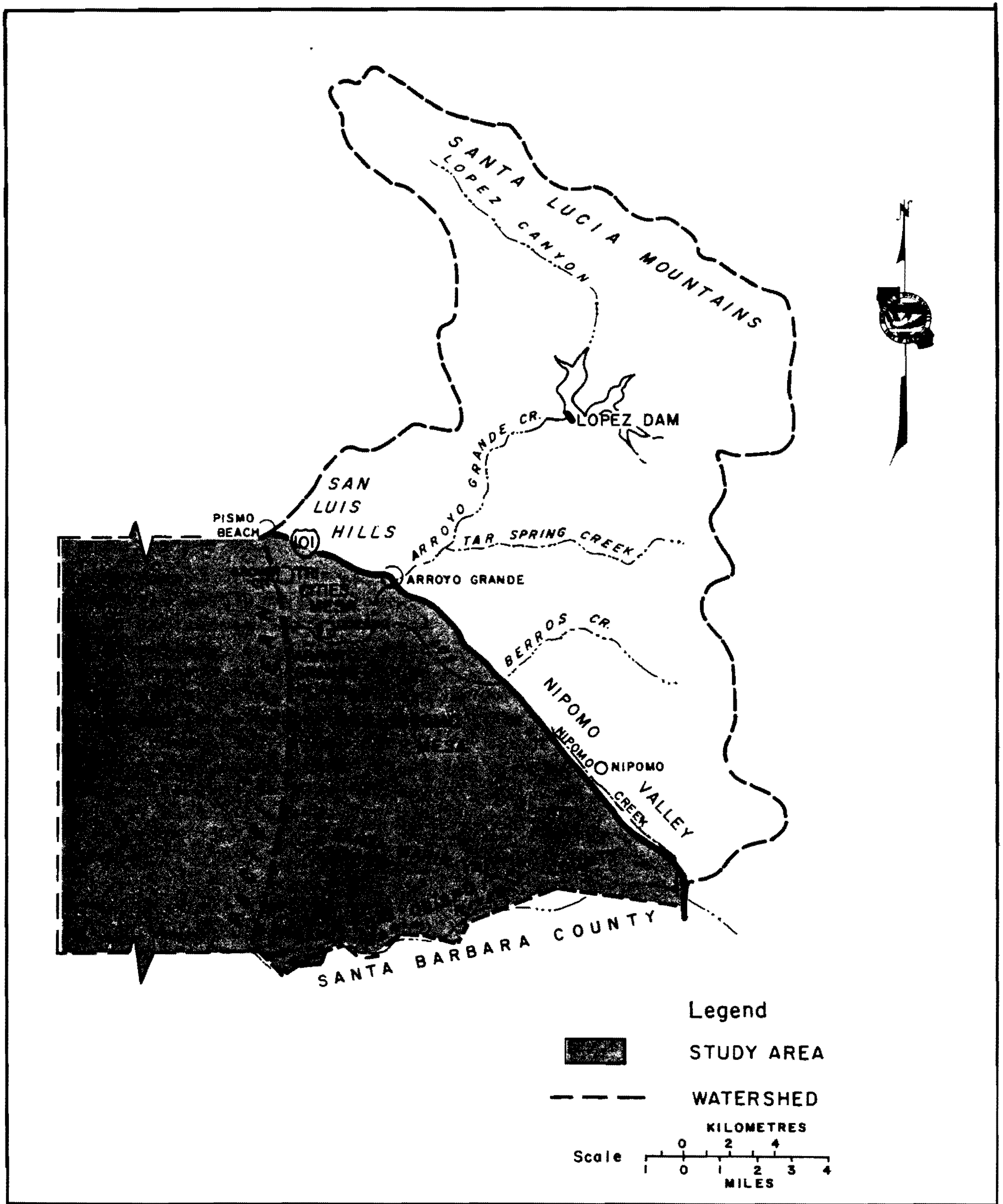

Figure 2 - STUDY AREA AND WATERSHED

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

and the beach run the length of the study area on the west.

The Santa Maria River coastal plain, locally known as the Santa Maria Valley, extends 32 kilometres (20 miles) inland and is 8 kilometres (5 miles) across at its widest point near the coast. Most of the Santa Maria Valley is in adjoining Santa Barbara County; only the portion that lies north of the river between Nipomo Mesa and the San Luis Obispo-Santa Barbara County line is in the study area. This portion consists of 73 square kilometres (28 square miles) of flood plain and dune sand. The flood plain is relatively flat with a slope of about 1.9 metres per kilometre (10 feet per mile).

The Arroyo Grande Creek coastal plain, commonly referred to as the Arroyo Grande Plain, is much smaller than the Santa Maria River coastal plain. It comprises about 12 square kilometres (4.7 square miles) and measures 7.2 kilometres (4.5 miles) from the foothills to the ocean and 3 kilometres (2 miles) across its widest point. The flood plain slopes 2.8 to 3.8 metres per kilometre (15 to 20 feet per mile) from the foothills to the ocean.

The Arroyo Grande Creek drainage upstream from the coastal plain forms a canyon with a narrow flood plain that winds through the mountains for 24 kilometres (15 miles) to Lopez Dam. The flood plain, although narrow, supports extensive farming activities.

The Arroyo Grande Plain separates two sand mesas: Tri-Cities Mesa and Nipomo Mesa. Tri-Cities Mesa, an area of 44 square kilometres (17 square miles), lies in the north end of the study area between the Arroyo Grande Plain and the San Luis Hills on the north. It rises to an average elevation of 60 metres (200 feet) and slopes gradually to the beach and to the Arroyo Grande Plain.

The larger Nipomo Mesa covers an area of about 85 square kilometres (33 square miles) between the Arroyo Grande Plain on the north and the Santa Maria River coastal plain on the south. The eastern part of the mesa rises to more than 120 metres (400 feet) and slopes westward to the beach. Unlike the Tri-Cities Mesa, Nipomo Mesa is marked with drainage gullies that give it a generally uneven, undulating surface. The north and south boundaries are sharply set apart from the adjoining flood plains by steep cliffs. The boundaries, however, are surface features and do not inhibit the subsurface flow of ground water.

A wide, gently sloping beach runs along the entire west boundary. Next to the beach, Recent sand dunes, as much as 30 metres (100 feet) high and 2.4 kilometres (1.5 miles) wide, parallel the beach. From the beach, the ocean floor slopes offshore at a low angle, uninterrupted by underwater canyons or dropoffs that commonly occur offshore of similar large creeks and rivers elsewhere along the California coast. There is a slight increase in the slope of the ocean floor 16 to 19 kilometres (10 to 12 miles) offshore.

Drainage Systems

The study area is drained by two major systems, the Arroyo Grande Creek and the Santa Maria River.

The Arroyo Grande Creek runs a course of about 32 kilometres (20 miles) from the crest of the Santa Lucia Mountain Range to the ocean. The watershed comprises 28 300 hectares (70,000 acres). Its tributaries include Lopez Canyon, Tar Spring Creek, and Los Berros Creek.

The runoff from 17 400 hectares (43,000 acres) of the upper drainage area comprising the upper reaches of Arroyo Grande Creek and all Lopez Canyon is impounded by Lopez Dam to form Lopez Reservoir. The reservoir water is piped to nearby communities along the coast for all or part of their municipal water supply and is also released to Arroyo

Grande Creek for agricultural purposes downstream.

Perennial flow is maintained in Arroyo Grande Creek downstream from Lopez Dam by a combination of natural runoff, underflow from the adjacent hills, irrigation return, and releases from the dam.

The Santa Maria River, running along the southern boundary of the study area, drains part of Nipomo Mesa, Nipomo Valley, and Santa Maria Valley. Infiltration in the Santa Maria River recharges the Santa Maria Valley ground water reservoir.

The Cuyama and Sisquoc Rivers join to form the Santa Maria River, 16 kilometres (10 miles) upstream from the study area. The Santa Maria River within the study area usually flows only during storms. Runoff in the Cuyama River is captured at Twitchell Reservoir, 24 kilometres (15 miles) upstream, for recharge to the Santa Maria Valley and flow in the Sisquoc River usually infiltrates its bed upstream from the Santa Maria River. The Cuyama and Sisquoc Rivers also recharge the Santa Maria Valley ground water reservoir.

Population

The main industry in the Arroyo Grande area is agriculture and its associated businesses. The population is centered in small communities and dispersed thinly throughout the countryside.

In the 9 years of 1968 to 1977, total gross urban and suburban land increased 1 110 hectares (2,742 acres) (Table 1).

In 1970, the Arroyo Grande study area had a population of 23,800. Of this number, over 80 percent were in the urban areas. Table 2, based on data from the San Luis Obispo County Planning Department, shows 1970 and projected increases in the population of about 20 percent for each 10-year period to 2000, with the largest increase of 29 percent expected between 1970 and 1980. In the July 1975 issue of Population and Housing, the San Luis Obispo County Planning Department stated:

TABLE 1
URBAN AND SUBURBAN LAND AREAS
ARROYO GRANDE AREA1/
1968 and 1977

Water service area	1968 2/		1977		Change	
	Hectares	Acres	Hectares	Acres	Hectares	Acres
Residential	605	1,490	1 890	4,671	1 285	3 181
Commercial	65	160	180	443	115	283
Industrial	15	40	125	313	110	273
Unsegregated urban and suburban area	390	970	325	799	-65	-171
Subtotal	1 075	2,660	2 520	6,226	1 445	3,566
Included nonwater service area	590	1,460	255	636	-335	-824
Total gross urban and suburban area	1 665	4,120	2 775	6,862	1 110	2,742

1/ Nipomo Valley not included. Land area data for Nipomo Valley (1977) follows: Residential, 125 ha (309 acres) Commercial, 2 ha (5 acres); Industrial, 9.31 ha (23 acres); unsegregated Urban and Suburban, 16.18 ha (40 acres); included nonwater service area 94 ha (232 acres).

2/ From update of DWR Bulletin No. 103 "San Luis Obispo and Santa Barbara Counties Land and Water Use Survey, 1959".

TABLE 2
POPULATION PROJECTION
ARROYO GRANDE STUDY AREA

	1970*	1980**	1990**	2000**
Rural portion	4,194	4,210	4,090	3,980
Arroyo Grande	7,454	9,990	12,160	14,350
Grover City	5,939	8,190	10,170	12,160
Nipomo	3,642	4,930	6,060	7,180
Oceano	2,564	3,400	4,110	4,820
Total	23,793	30,720	36,590	42,490

* From the 1970 census data
** Determined from the trend line by the San Luis Obispo County Planning Department

"Arroyo Grande Census County Division is the fastest growing Division in the County with a 7 percent population increase over last year. Nipomo is the fastest growing unincorporated town at 12.2 percent and Arroyo Grande at 8 percent tops the incorporated cities." By comparison, the county population increased 5.1 percent during this same period.

Summary of Findings

1. The water demand in the Arroyo Grande area is primarily for irrigation. The irrigation demand was 52.2 cubic hectometres (42,300 acre-feet) in 1977 and is projected to be 52.3 cubic hectometres (42,400 acre-feet) in 2000 without the addition of new supplies or to increase to 58.1 cubic hectometres (47,100 acre-feet) with a supplementary water supply. The urban water demand, which was 4.40 cubic hectometres (3,570 acre-feet) in 1970, is projected to be 7.92 cubic hectometres (6,420 acre-feet) by 2000.

2. The water supply for the study area comes from the ground water in storage and from surface water in Lopez Reservoir. Lopez Reservoir has supplied water for most of the local urban demand since 1969, but all storage in the reservoir is appropriated, and, with the urban water demand increasing, the communities will become more dependent upon the local ground water for their water needs. Except for releases into Arroyo Grande Creek, the water in Lopez Reservoir is not used for irrigation, and ground water continues to be the main agricultural water supply.

   Ground water extractions have resulted in declining water levels in all parts of the study area. With the agricultural and urban demand expected to increase, water levels can be expected to continue to decline. Currently, an exception to this trend is the stable or rising water levels in the Arroyo Grande Plain-Tri-Cities Mesa area. Ground water pumpage has been reduced in this area since the introduction of Lopez Reservoir water for local urban use. However, this is a temporary condition. As the urban demand on the ground water pool increases, the amount extracted will probably again exceed replenishment to this part of the basin and water levels will again decline.

   Currently, municipal and urban waste water is not reclaimed as a water supply. Most of the sewage from the Arroyo Grande Plain-Tri-Cities Mesa area is treated in the South San Luis Obispo County Waste Water Treatment Plant with the effluent discharged to the ocean. Elsewhere, in Nipomo Mesa and the Santa Maria Valley some reuse of waste water is realized as effluent from individual septic tank-leach field systems percolates to recharge the ground water basin.

3. The early part of the study showed that subsurface geologic data and ground water data were lacking on the seaward side of Nipomo Mesa and two exploratory holes were drilled to obtain information in the area. The data from these holes showed that

the sediments below this portion of the study area formed discrete aquifers along the beach. Water well drillers' logs showed that the same aquifers were less defined inland. The specific yields of the aquifers penetrated by the two exploratory holes were calculated to be 9 percent in the upper aquifer and 8 percent in the lower.

4. In 1975, the water in storage above sea level was estimated to be 10.50 cubic hectometres (8,500 acre-feet) in the Arroyo Grande Plain-Tri-Cities Mesa area, 212 cubic hectometres (172,000 acre-feet) in Nipomo Mesa, and 56.2 cubic hectometres (45,600 acre-feet) in the portion of Santa Maria Valley within the study area.

5. The ground water stored in Arroyo Grande Plain-Tri-Cities Mesa area increased by 7.1 cubic hectometres (5,800 acre-feet) from 1965 to 1975, largely reflecting the construction of Lopez Reservoir. In Nipomo Mesa, from 1967 to 1975, the amount of ground water stored declined by 28.0 cubic hectometres (22,000 acre-feet) and in Santa Maria Valley (that portion in San Luis Obispo County) it declined by 3.5 cubic hectometres (2,800 acre-feet).

6. The mineral quality of the ground water in the Arroyo Grande area is generally acceptable for domestic and agricultural uses. The water in the deeper aquifers is generally higher in its mineral concentrations than water in the upper aquifers.

   Nitrate concentrations in the ground water in the Arroyo Grande Plain-Tri-Cities Mesa area exceed the acceptable limits of the State health standards. The high nitrogen concentrations may occur cyclically and the ground water meets the drinking water standards of the State Department of Health Services part of the time.

   The ground water in Nipomo Mesa generally meets the drinking water standards of the State Department of Health Services and is suitable for most agricultural uses.

   The total dissolved solids (TDS) concentrations in the ground water in the Santa Maria Valley of San Luis Obispo County are mainly in the range between 500 and 1 000 mg/l, with some well samples ranging from 1 000 to 1 500 mg/l. A few samples exceed 1 500 mg/l. The ground water is suitable for most agricultural uses.

   As part of an earlier study, 32 piezometers were constructed along the coast to test for sea water intrusion. Thus far no evidence of intrusion has been found.

7. An offshore seismic profile, coupled with what is known about the onshore geology, points to an offshore extension of fresh water-bearing aquifers.

   If the geology along the beach were projected offshore, the water-bearing sediments, which include two aquifer systems, would measure 15 kilometres (9 miles) along the beach and 19 kilometres (12 miles) offshore. At the shoreline between Arroyo Grande Creek and the Santa Maria River, the upper aquifer has an average thickness of 60 metres (190 feet) and the lower aquifer averages 130 metres (430 feet).

8. Assigning the specific yields of the sediments in the test holes on the beach to the sediments offshore, there would be an estimated 3 700 cubic hectometres (3,000,000 acre-feet) in storage offshore between Arroyo Grande Creek and the Santa Maria River. Not all the water would be potable, however, because a wedge of sea water intrudes and displaces fresh water in all aquifers offshore. The size of the

wedge depends upon the hydraulic conditions in individual aquifers.

9. The quality of the water in the aquifers offshore cannot be determined directly with the available data.

10. The full use of local ground water supplies would minimize adverse economic impact in the Arroyo Grande area. However, it is not consistent with the Regional Water Quality Control Board's strategy for implementing the water quality control plan.

Conclusions

1. With average annual replenishment, the amount of ground water in storage at elevations above sea level in the Arroyo Grande Plain-Tri-Cities Mesa area appears to be adequate to meet the water demand until at least 1990, and in the Nipomo Mesa and the Santa Maria Valley within San Luis Obispo County to at least 2000. Generally, as long as ground water levels remain above sea level, the sea water is not likely to intrude.

2. Based upon the geology onshore, the aquifers that underlie the land portion of the study area apparently extend offshore and are in hydrologic continuity with the recharge areas onshore. As the ground water levels on land decline, the water in the offshore aquifers can migrate landward toward the production wells. Thus the available ground water supply includes whatever fresh water returns to the land from the offshore storage.

3. The amount of offshore fresh ground water estimated in this study is speculative. Accordingly, it presents a possibility that intrusion may not be observed onshore for a number of years to come but, on the other hand, provides no assurance that intrusion is not imminent. Consequently, the option of pumping and using ground water beyond the long-term replenishment rate should include provisions for facilities in the future to prevent or alleviate sea water intrusion. Such facilities could entail substantial capital and annual costs.

4. The quality of the water in the aquifer offshore may be similar to that of the water samples obtained from the monitoring wells which probably penetrate the same offshore aquifer onshore. In these samples the TDS concentration ranged from 500 to 1 200 mg/l.

5. There appears to be a need to consider the full use of local ground water, both from the upper and lower aquifers and also a need for concurrent reassessment of the Water Quality Control Plan strategy and the policy underlying the plan.

Recommendations

1. The piezometers along the coast should be monitored on a semi-annual schedule for sea water intrusion. The sudden unexplainable increase of the chloride concentrations in well water by 100 mg/l or more would suggest sea water intrusion.

2. A comprehensive plan should be developed for managing the ground water resources and for providing for the future delivery of a permanent supplemental water supply. The management plan should be selected after fully exploring the potential benefits and risks of alternative plans that include increasing the use of ground water from the confined aquifers for a limited period. Because return of the fresh water from offshore storage may be interrupted by sea water intrusion, the chosen plan should articulate methods to provide a continuing supply in the event of

the premature appearance of sea water intrusion. The plan may provide for an interim water supply or for a significant reduction in the area's water demand or both.

3. In developing a comprehensive plan, consideration should be given to the full use of local ground water, from both the upper and lower aquifers; concurrently, the policy and the strategies of the Water Quality Control Plan would need to be reassessed.

4. Feasible waste water reclamation and reuse plans should be implemented and water conservation instituted in conjunction with further ground water development.

5. Ground water should continue to be the main agricultural water supply and the supplemental urban supply as long as the delivered water quality meets the standards of the State Department of Health Services for domestic drinking water.

II. WATER DEMAND AND SUPPLY

Water Demand

The overall urban water demand shown in Table 3 was estimated for 10-year intervals from 1970 to 2000 by applying a unit use factor of 511 litres (135 gallons) per capita per day to the 1970 census and to the San Luis Obispo County Planning Department's population projections to 2000. These per capita water demands to 2000 do not make allowances for conservation methods that may be widely practiced in the future; therefore, water requirements can be substantially less than those shown.

The urban demand, using the given constant unit use factor, is anticipated to increase from 4.403 cubic hectometres (3,570 acre-feet) in 1970 to 7.919 cubic hectometres (6,420 acre-feet) in 2000, an increase of 80 percent.

By far the largest use of water in this area is for agricultural irrigation.

According to estimates based upon the Department of Water Resources' 1977 land and water use survey, there were 5 545 hectares (13,700 acres) of irrigated agriculture in 1977 (Table 4). The main products were truck crops in Arroyo Grande Valley, citrus, subtropical, and field crops in Nipomo Mesa and Nipomo Valley, and truck and field crops in Santa Maria Valley. The total applied water demand for these crops in 1977 was 52.2 cubic hectometres (42,300 acre-feet). By 2000 the demand is projected to be 52.3 cubic hectometres (42,400 acre-feet) per year if there is no augmentation of water supplies. With more water available and without substantial cost increases, more acres would be irrigated and the applied water demand would probably be 10 percent higher.

Table 5 shows the 1977 applied agricultural water demand and projections to 2000.

Water Supply

The water supply for the Arroyo Grande area comes from local ground water and surface water from Lopez Reservoir.

Therefore, almost all current water supplies in the study area are dependent upon local precipitation. For an insight

TABLE 3
DOMESTIC AND URBAN WATER DEMAND*
ARROYO GRANDE AREA
In cubic hectometres (acre-feet)

	1970		1980		1990		2000	
Rural portion	0.777	(630)	0.789	(640)	0.765	(620)	0.740	(600)
Arroyo Grande	1.357	(1,100)	1.850	(1,500)	2.220	(1,800)	2.714	(2,200)
Grover City	1.110	(900)	1.480	(1,200)	1.850	(1,500)	2.220	(1,800)
Oceano	0.480	(390)	0.630	(510)	0.765	(620)	0.900	(730)
Nipomo	0.678	(550)	0.925	(750)	1.135	(920)	1.345	(1,090)
Total	4.403	(3,570)	5.674	(4,600)	6.735	(5,460)	7.919	(6,420)

*Based upon 511 litres (135 gallons) per capita per day.

TABLE 4
IRRIGATED AGRICULTURE*
ARROYO GRANDE AREA
In hectares (acres)

Area	1977**	1980	1990	2000	With additional water supply 1990	With additional water supply 2000
Arroyo Grande Plain-Tri-Cities Mesa	688 (1,700)	648 (1,600)	648 (1,600)	648 (1,600)	648 (1,600)	648 (1,600)
Arroyo Grande Valley	607 (1,500)	728 (1,800)	769 (1,900)	769 (1,900)	890 (2,200)	1 052 (2,600)
Nipomo Mesa	324 (800)	486 (1,200)	648 (1,600)	769 (1,900)	1 133 (2,800)	1 335 (3,300)
Los Berros Valley	81 (200)	81 (200)	81 (200)	81 (200)	81 (200)	81 (200)
Santa Maria Valley (in San Luis Obispo County)	3 359 (8 300)	2 914 (7,200)	2 954 (7 300)	2 954 (7 300)	2 954 (7 300)	2 954 (7 300)
Nipomo Valley	486 (1,200)	648 (1,600)	769 (1,900)	890 (2,200)	1 052 (2,600)	1 376 (3,400)
TOTAL	5 545 (13,700)	5 505 (13,600)	5 869 (14,500)	6 111 (15,100)	6 758 (16,700)	7 446 (18,400)

*Adapted from data developed for Bulletin 4 "The California Water Plan Policies and Action to the Year 2000".

**In 1977, some parts of the Arroyo Grande area experienced a temporary increase in irrigated acreage in anticipation of greater demand for farm products during the drought.

TABLE 5
ARROYO GRANDE AREA
IRRIGATION WATER DEMAND
In cubic hectometres (acre-feet)

Subarea	1977	1980	1990	2000	With additional water supply 1990	With additional water supply 2000
Arroyo Grande Plain-Tri-Cities Mesa	6.5 (5,300)	6.2 (5,000)	6.2 (5,000)	6.2 (5,000)	6.2 (5,000)	6.2 (5,000)
Nipomo Mesa	2.5 (2,000)	3.5 (2,800)	4.2 (3,400)	5.0 (4,100)	6.3 (5,100)	7.4 (6,000)
Upper Arroyo Grande Valley	5.9 (4,800)	6.5 (5,300)	6.7 (5,400)	6.7 (5,400)	6.9 (5,600)	7.4 (6,000)
Los Berros Valley	0.8 (640)	0.8 (640)	0.8 (640)	0.8 (640)	0.8 (640)	0.8 (640)
Santa Maria Valley (In San Luis Obispo County)	33.3 (27,000)	28.1 (22,800)	28.3 (23,000)	28.3 (23,000)	28.3 (23,000)	28.3 (23,000)
Nipomo Valley	3.2 (2,600)	4.3 (3,500)	4.7 (3,800)	5.3 (4,300)	6.4 (5,200)	8.0 (6,500)
TOTAL	52.2 (42,300)	49.4 (40,040)	50.9 (41,240)	52.3 (42,440)	54.9 (44,540)	58.1 (47,140)

into the amount of water available from natural sources, the 31-year period for water years 1935-36 to 1966-67 was selected as a base period representative of the average climatic conditions in the Arroyo Grande area. This base period represents an interval in which hydrologic conditions prevailing at its beginning and at its end were similar. It began during a dry period and ended at the next similar dry period. The 31-year average annual precipitation ranged from 300 millimetres (11.8 inches) near sea level to 800 millimetres (31.4 inches) at the highest elevations and averaged 410 millimetres (16.2 inches) overall. The San Luis Obispo County's isohyetal map of the average seasonal precipitation during the base period (Figure 3) illustrates the distribution of rainfall over the study area.

Information on waste water and surface water is summarized below. Ground water is discussed in the following chapters.

Waste Water

Currently, reclaimed waste water is not a source of supply. Sewage from Arroyo Grande, Oceano, and Grover City is given secondary treatment at the South San Luis Obispo County Treatment Plant, and the effluent is discharged to the ocean. The plant has a capacity of 9.5 megalitres (2.5 million gallons) per day, or 2.47 cubic hectometres (2,000 acre-feet) per year, but currently discharges an average of 3.8 megalitres (1 million gallons) per day to the ocean.

Sewage in Nipomo Mesa, Nipomo Valley, the Santa Maria Valley, and areas in the Arroyo Grande Plain-Tri-Cities Mesa area outside the South San Luis Obispo County Treatment Plant sewerage system is discharged to septic tank-leach line systems and percolates to replenish the ground water in storage.

Surface Water

The water supply from surface sources comes from Lopez Reservoir and the Arroyo Grande Creek.

Prior to the construction of Lopez Reservoir in 1969, the urban supply was obtained from the local ground water basin. Today the local communities and the City of Arroyo Grande obtain most of their supply from Lopez Reservoir.

Before Lopez Reservoir, the storm runoff in Arroyo Grande Creek flowed unchecked to the ocean and was lost as a water supply. Storm flow in the upper reaches of the Arroyo Grande Creek drainage is now impounded by Lopez Dam and this loss of fresh water to the ocean has been reduced significantly. However, when seasonal rainfall is above average there may not be adequate reservoir storage available to capture the resulting runoff. Consequently, the reservoir has spilled several times since its construction.

The initial designed storage capacity of the reservoir is 63.9 cubic hectometres (51,800 acre-feet). The water supply available from Lopez Reservoir is committed to nearby communities for part or all of their urban supply and to release into Arroyo Grande Creek for agricultural use downstream.

Currently, 10.768 cubic hectometres (8,730 acre-feet) of reservoir water are allocated annually toward meeting water demands in the study area. Of this amount, 5.588 cubic hectometres (4,530 acre-feet) is contracted to nearby communities and the City of Arroyo Grande for their water supply. Arroyo Grande, Grover City, and Oceano (Community Service District 13) have the following entitlements to Lopez Reservoir water: Arroyo Grande, 2.82 cubic hectometres (2,290 acre-feet); Grover City, 0.99 cubic hectometre (800 acre-feet); and Oceano, 0.37 cubic hectometre (303 acre-feet). Avila and Pismo Beach, both of which are outside the study area, also have entitlements to Lopez water.

Another 5.18 cubic hectometres (4,200 acre-feet), the only water from Lopez Reservoir allocated for agricultural use, is released to Arroyo Grande Creek.

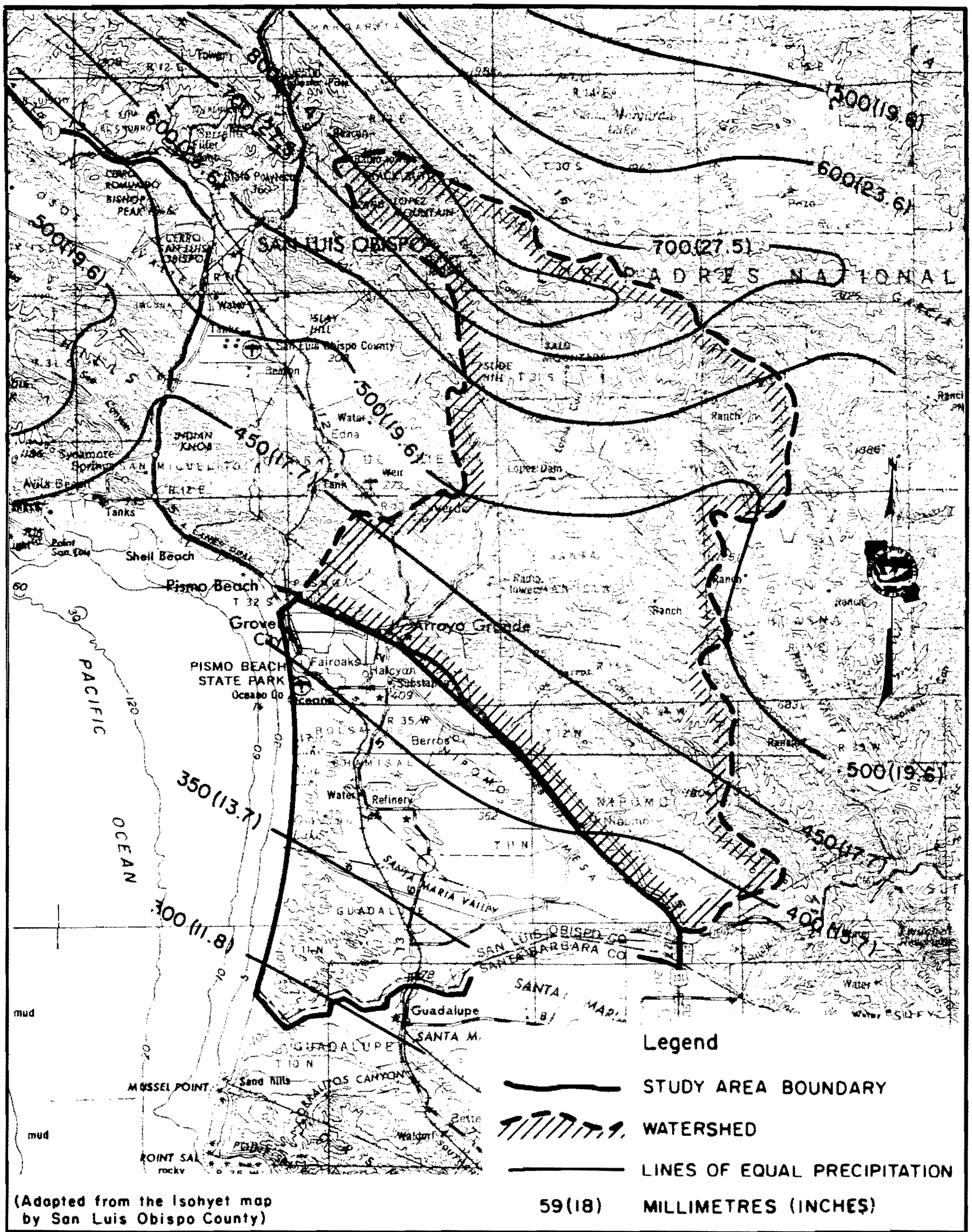

Figure 3 - ARROYO GRANDE AREA, MEAN SEASONAL PRECIPITATION, 1935-36 THROUGH 1966-67

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

Water in the creek is diverted for irrigation in Arroyo Grande Valley. The streamflow also replenishes the ground water resources along its route from Lopez Dam to the ocean.

A mineral analysis of a May 1971 sampling of the reservoir, presented in Table 6, shows that the water in Lopez Reservoir is low in TDS concentration and is of good quality. Water in the Arroyo Grande Creek is initially good quality at Lopez Dam but deteriorates downstream as poor quality irrigation return enters the stream. Near Arroyo Grande, 24 kilometres (15 miles) downstream, the average TDS concentration in the creek had increased to more than 650 milligrams per litre (mg/l). Its TDS concentration exceeds the California domestic water supply standards recommended limit of 500 mg/l.*

Flow in Los Berros Creek, a tributary to Arroyo Grande Creek, is sustained by irrigation return water, underflow, and runoff from the adjacent hills. The creek's water quality exceeds the "limiting concentrations" of the State's domestic water supply standards in its TDS, sulfate, and nitrogen concentrations.

An analysis from Los Berros Creek in 1967 showed a total nitrate (as N) concentration of 20 mg/l. This exceeds the "limiting concentrations" for total nitrogen (as N) of 10 mg/l in the domestic water supply standards. This high nitrogen concentration is attributable to the presence of a feedlot and the use of fertilizers in Los Berros Valley.

The Santa Maria River within the study area has seasonal flow only. Its main tributary, the Cuyama River, is dammed for flood control and local recharge programs, while the other tributary, the Sisquoc River, infiltrates its riverbed before reaching the Santa Maria River.

With the exception of Black Lake, water in the sand dune lakes exceeds the domestic water supply standards in TDS, sulfate, chloride, and fluoride concentrations. Black Lake has good quality water because the lake is sustained by water in the perched water table in Nipomo Mesa. A 1967 analysis of the water in Black Lake showed a TDS concentration of 400 mg/l and no constituents exceeded the limiting concentrations of the State's domestic water supply standards.

TABLE 6
MINERAL ANALYSIS OF SAMPLE FROM LOPEZ RESERVOIR
May 1971

Temperature	70°
EC	602 micromhos/cm
Ca	72 mg/l
Mg	28 mg/l
K	4 mg/l
CO_3	14 mg/l
HCO_3	237 mg/l
SO_4	87 mg/l
Cl	18 mg/l
NO_3	4 mg/l
B	.06 mg/l
F	0.5 mg/l
TDS	327 mg/l
TH	297 mg/l

* Title 17 in California Administrative Code, "Domestic Water Supplies Quality and Monitoring", sets limits for a number of constituents and gives the State Department of Health Services responsibility for enforcement.

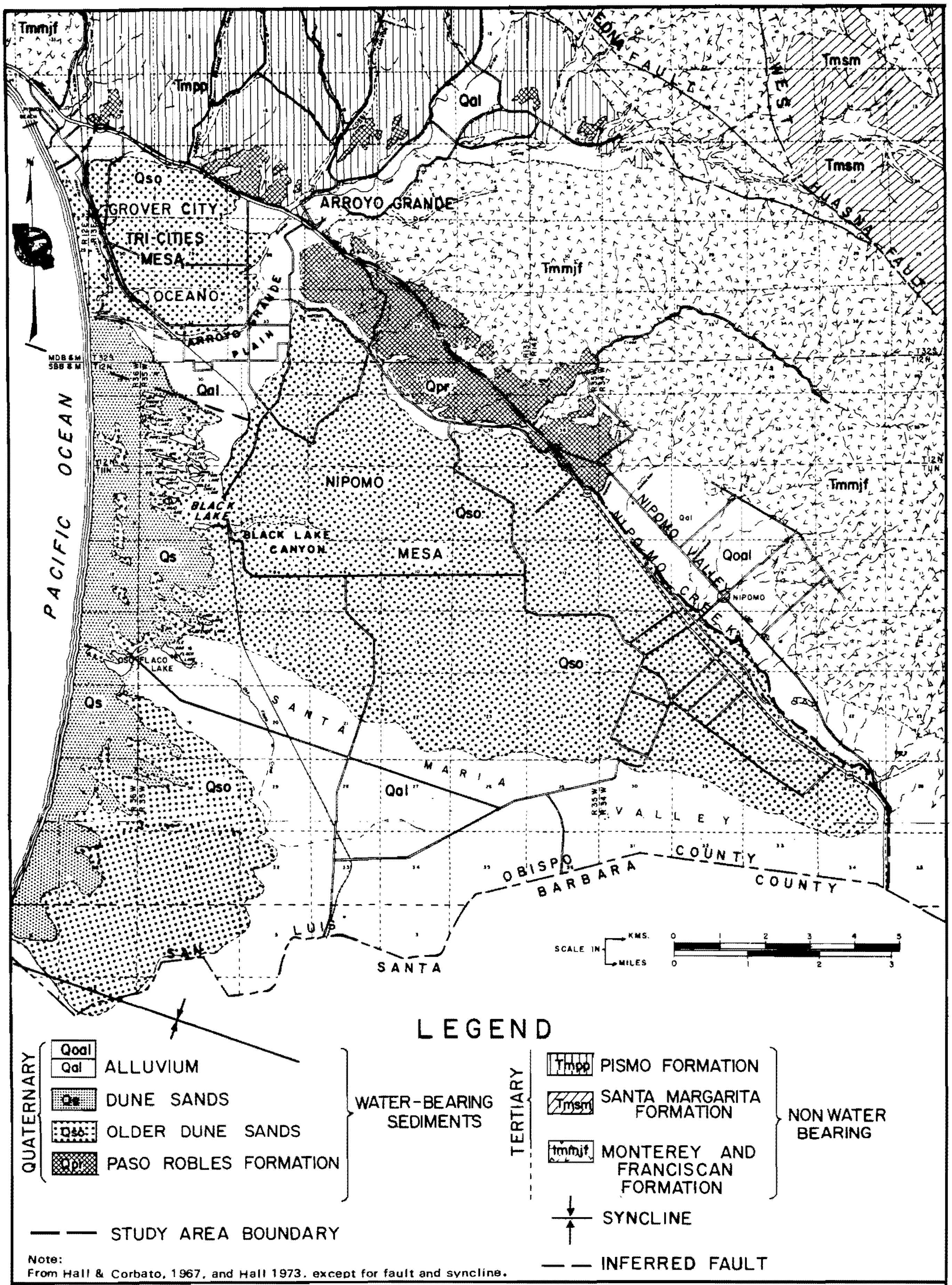

Figure 4 - GEOLOGY MAP

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III. PHYSICAL CHARACTERISTICS OF THE GROUND WATER BASIN

Information on the physical limits of the basin was needed to determine the extent of the ground water resource and to evaluate its potential role in meeting future water demands. Data were available from previous studies by the Department of Water Resources and the U. S. Geological Survey (USGS), including information from water wells, four sea water intrusion monitoring wells, and oil wells. In addition to the existing data, San Luis Obispo County drilled two exploratory holes, PSBO-1 and -2, in an 8-kilometre (5-mile) span in west Nipomo Mesa to obtain subsurface information, where, previously, none had been available. (Induction logs and lithologs of these holes are given in Appendix A.)

Information on the subsurface sediments 1.5 to 3 kilometres (1 to 2 miles) offshore was provided by the USGS from its 1973 offshore geophysical (sparker) survey.

Water-bearing Formations

The formations in the study area can be categorized as water-bearing sands and gravels and nonwater-bearing sandstones, volcanics, and metamorphic rocks. Figure 4 shows the geology.

The nonwater-bearing rocks contain limited amounts of water in weathered material that may extend 30 to 60 metres (100 to 200 feet) below the ground and in joints and fractures that may go even deeper. They form the foothills and mountains upstream from the water-bearing basin area and provide temporary subsurface storage for percolating water and serve as a path by which water moves slowly downgradient into the water-bearing sediments. Thus, nonwater-bearing rocks play an important role in the ground water supply of the area.

Although the yield from the nonwater-bearing formations is small, the accumulative effect is that significant amounts of water are added to the ground water basin as underflow through the interface between the water-bearing and the nonwater-bearing formations. The small amount of water obtainable from wells in these nonwater-bearing formations can be adequate for domestic supplies. If wells are deep and perforated through much of their length, sufficient water may be obtained for a few acres of crops, as shown in the Nipomo Valley where wells penetrate the nonwater-bearing rocks for hundreds of metres.

Alluvium extends below the water table in both the Arroyo Grande Plain and Santa Maria Valley. In Nipomo Valley, alluvium is present as a thin cover on bedrock or as fill in the drainage gullies. The alluvium consists of unconsolidated silts, sands, and gravels with some clay. These sediments readily yield water to wells where they are saturated. Where they lie above the saturated sediments, they permit water to percolate easily to the water table. Large irrigation wells tap the alluvium in Santa Maria Valley and the Arroyo Grande Plain. USGS aquifer tests of two wells in the alluvium in Santa Maria Valley showed discharges of 4 500 and 5 200 litres (1,180 and 1,385 gallons) per minute and a specific capacity of 174 and 423 litres per metre (14 and 34 gallons per foot) of drawdown, respectively.

Recent dune sands lie in a belt between the mesas and the beach. These dunes consist in large part of shifting sands and are differentiated from the older dunes by their lack of vegetative growth. The sands are highly permeable but lie above the water table and are essentially unsaturated.

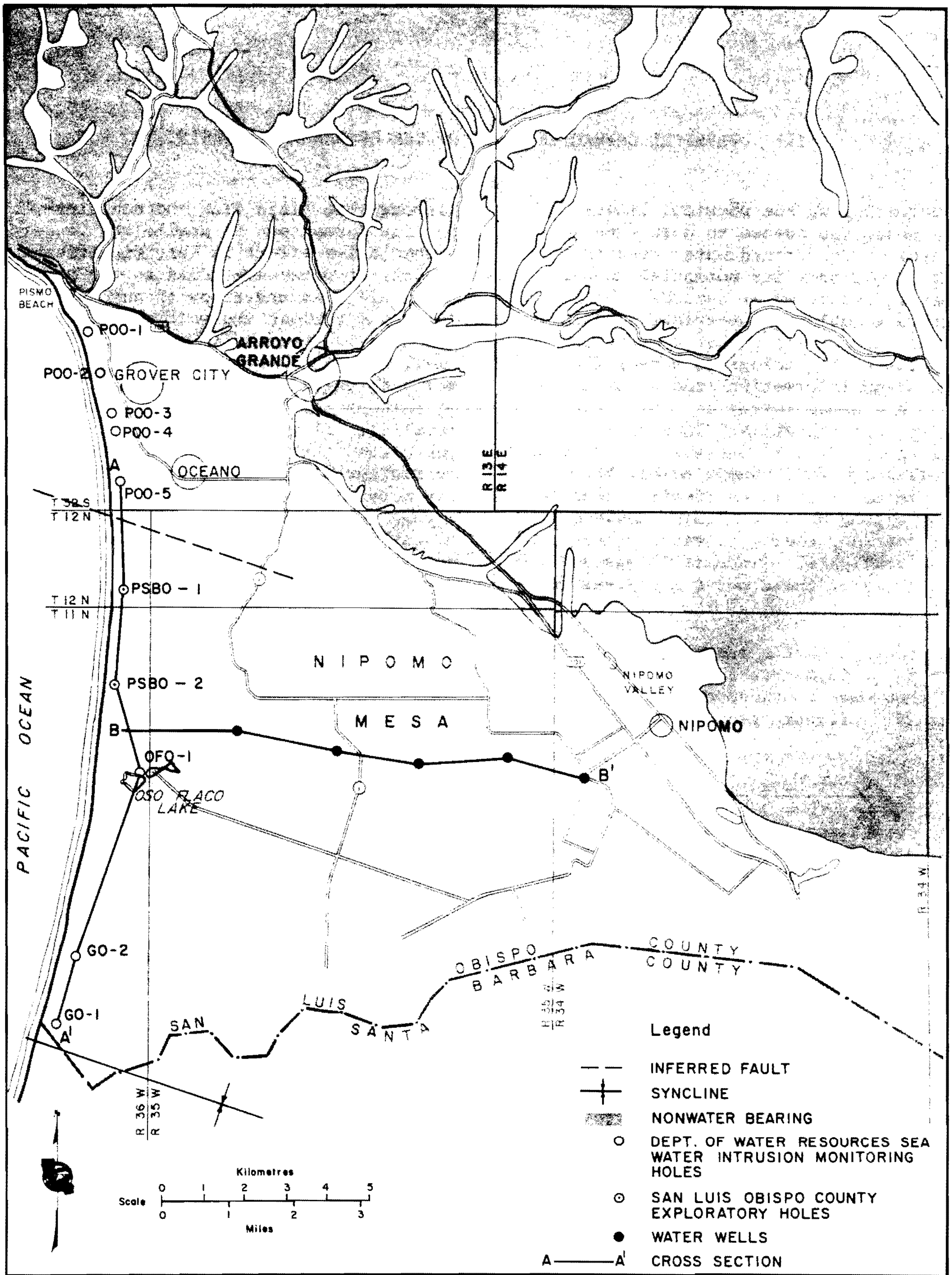

Figure 5 - LOCATION OF TEST HOLES AND CROSS SECTIONS

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Older dune sands form the upper layer of Tri-Cities and Nipomo Mesas. These sands are lightly compacted fine sands containing clay and silt stringers. Most of the formation lies above the water table, but clay strata create local perched water tables. Because of the permeability of the dunes, there is little runoff from the mesas. Precipitation is usually consumed as evapotranspiration or infiltrates to the ground water table.

The Paso Robles Formation is the major water-producing formation in the study area and appears in all the large basins in the county. In the Arroyo Grande Area, it underlies the basin from Tri-Cities Mesa to the Santa Maria Valley. It attains its maximum thickness of more than 300 metres (1,000 feet) along the south boundary of the study area under the Santa Maria River. The formation is composed of sands, gravels, silts, and clay. Thick silt and clay beds separate the sediments into discrete aquifers. Large municipal and irrigation wells draw from the Paso Robles Formation. Reported yields from wells in the formation range from 757 litres (200 gallons) per minute in a municipal well in east Nipomo Mesa to 3 800 and 6 000 litres (1,000 and 1,600 gallons) per minute in industrial wells in the western part of the Nipomo Mesa.

To present a graphic subsurface representation of the water-bearing sediments in the basin, cross sections were drawn along lines A-A' and B-B' shown in Figure 5. Line A-A' (Figure 6) was drawn using data from the sea water intrusion monitoring holes and PSBO-1 and -2. Line B-B' (Figure 7) was constructed using water well drillers' logs.

Geologic Structures

The study area lies between two major northwest-trending fault systems: the Huasna fault zone, located 8 kilometres (5 miles) northeast of Arroyo Grande in the Santa Lucia Mountains, and the Hosgri fault, 19 kilometres (12 miles) offshore. Between the two faults are smaller associated faults and other geologic structures having a northwestward trend. Data from monitoring wells P00-5 and PSBO-1 and a nearby oil well suggest that there is a fault between P00-5 and PSBO-1 near the Arroyo Grande Creek outlet to the ocean. Displacement of the sediments of 60 to 120 metres (200 to 400 feet) is indicated, with the relative movement down on the north side. Another fault south of the San Luis Obispo-Santa Barbara County line is implied by the alignment of folds and faults offshore with sharp folds in Santa Maria Valley.

The study area lies over the north limb of an asymmetrical syncline that underlies the basin. The syncline is the major subsurface geologic structure in the study area. The north limb is longer and slopes at a lesser angle than the south limb. The south limb rises sharply because of its proximity to the hills on the south side of the valley. The axis of the syncline trends east-west through the Santa Maria Valley and intersects the shoreline near the Santa Maria River outlet to the ocean. The north limb of the syncline extends about 14 kilometres (8 miles) at the shoreline to a fault near P00-5. It underlies Santa Maria Valley and Nipomo Mesa. The south limb is considerably shorter, about 1.5 to 3 kilometres (1 to 2 miles) wide.

Base of Fresh Water

The contour lines shown on Figure 8 delineate the effective base of fresh water, which is defined as the top of the fine-grained sediments or bedrock itself. In the construction of the map, minor variations in the base were averaged to present the predominant trends in the configuration of this base of fresh water. The map is a modification of the base of fresh water map contained in the "Preliminary Evaluation of the Water Supply of Arroyo

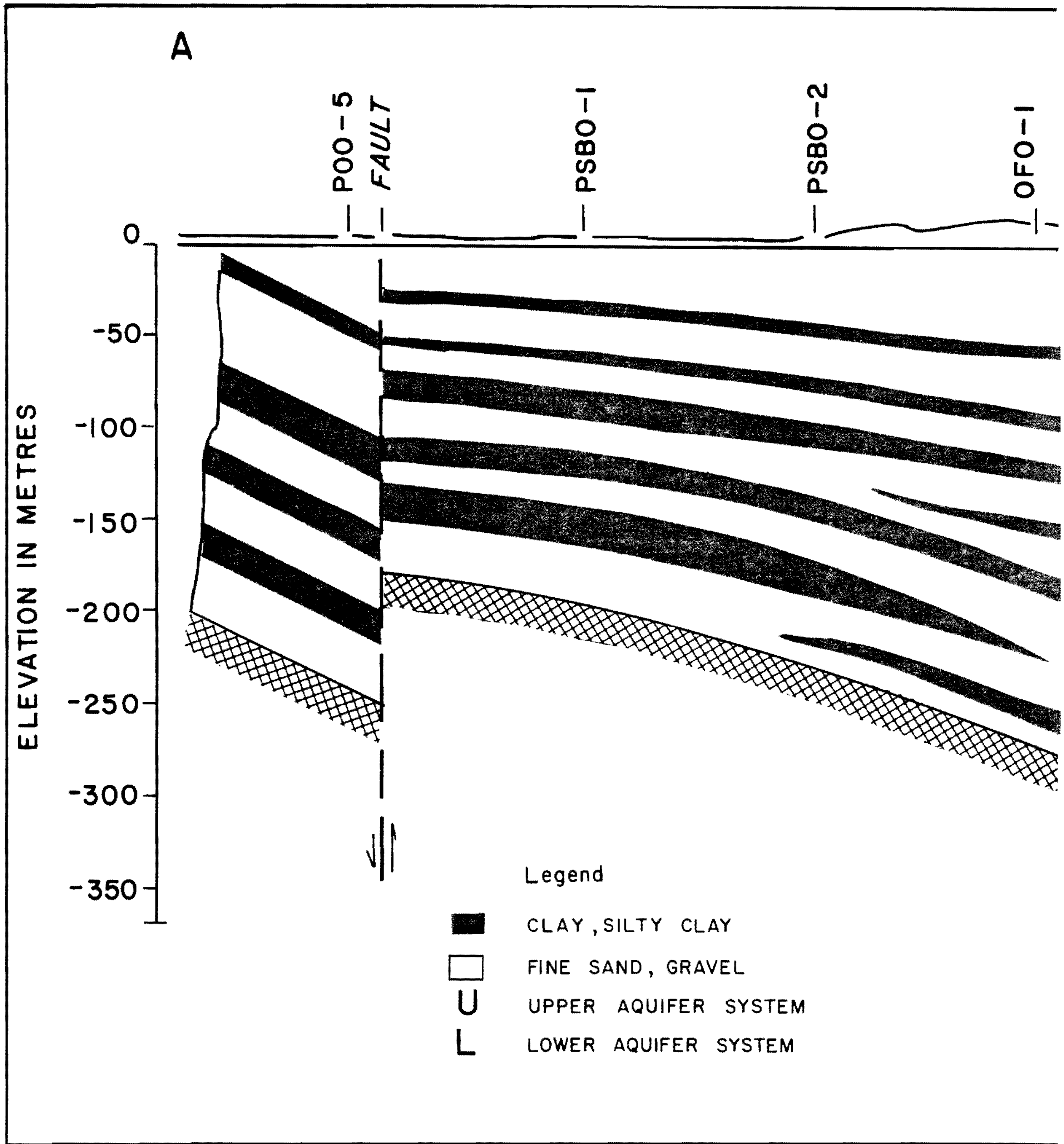

Figure 6 - GENERALIZED CROSS-SECTION A-A'

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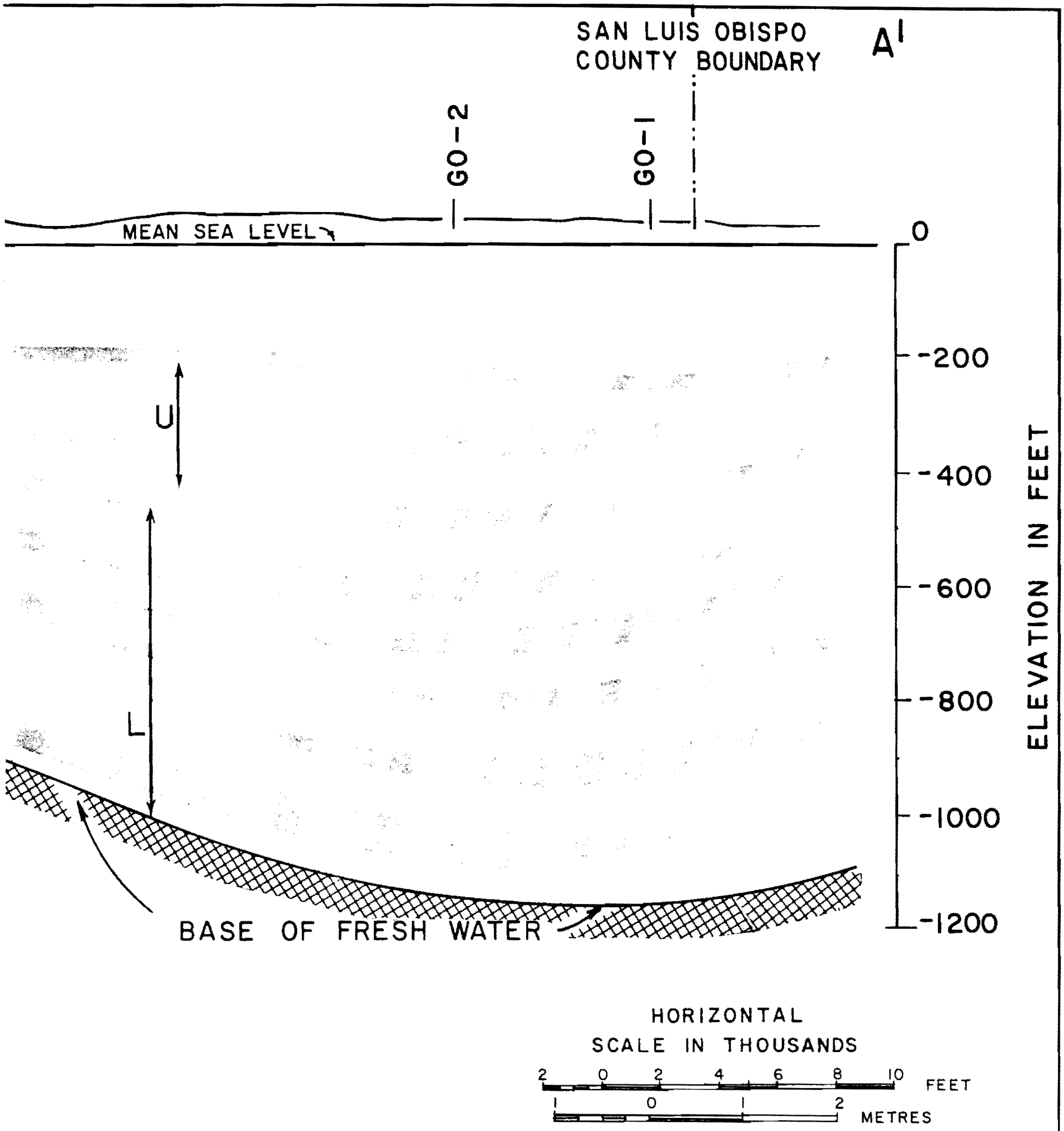

ARROYO GRANDE AREA

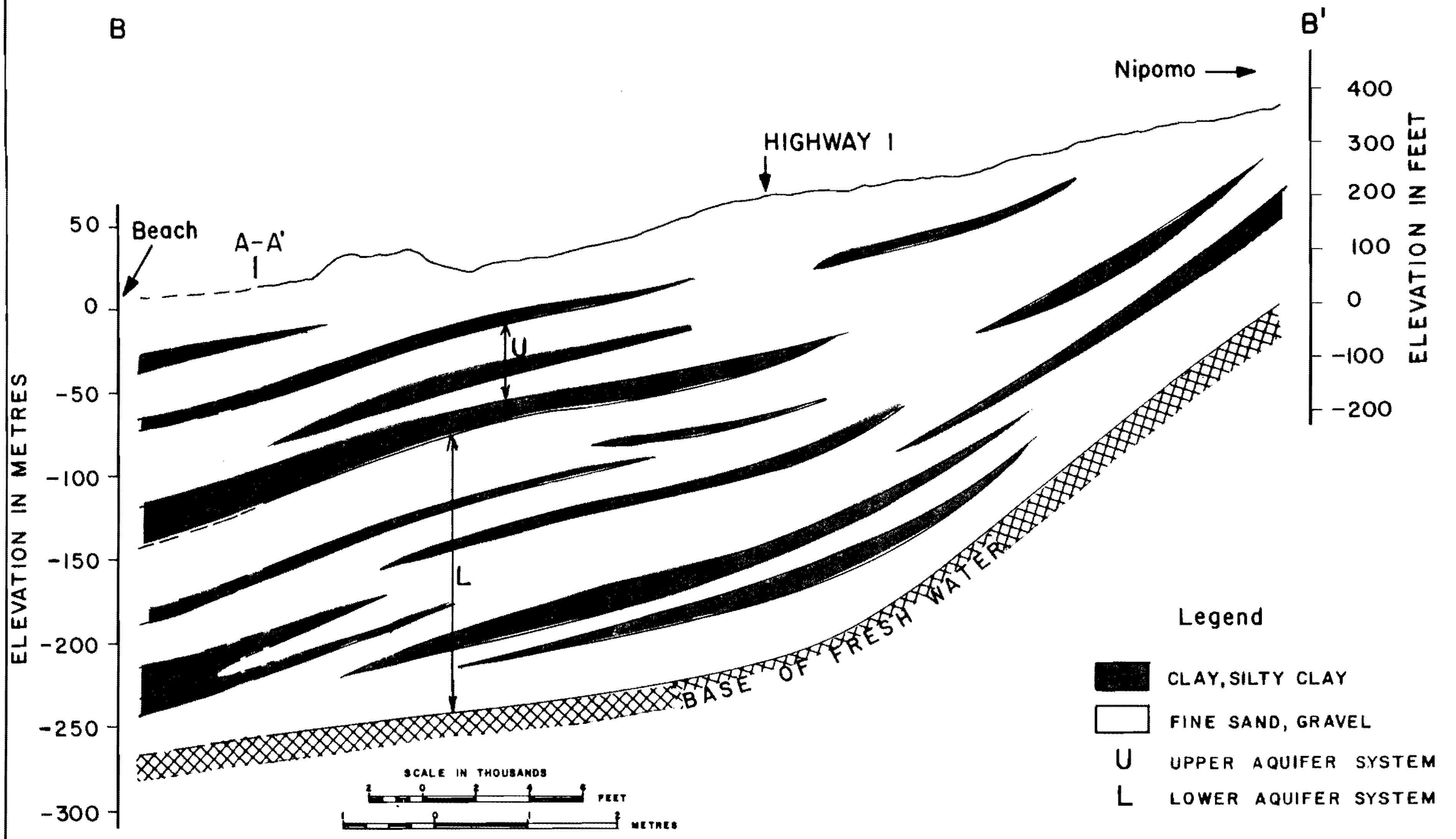

Figure 7 - GENERALIZED CROSS-SECTION B-B'

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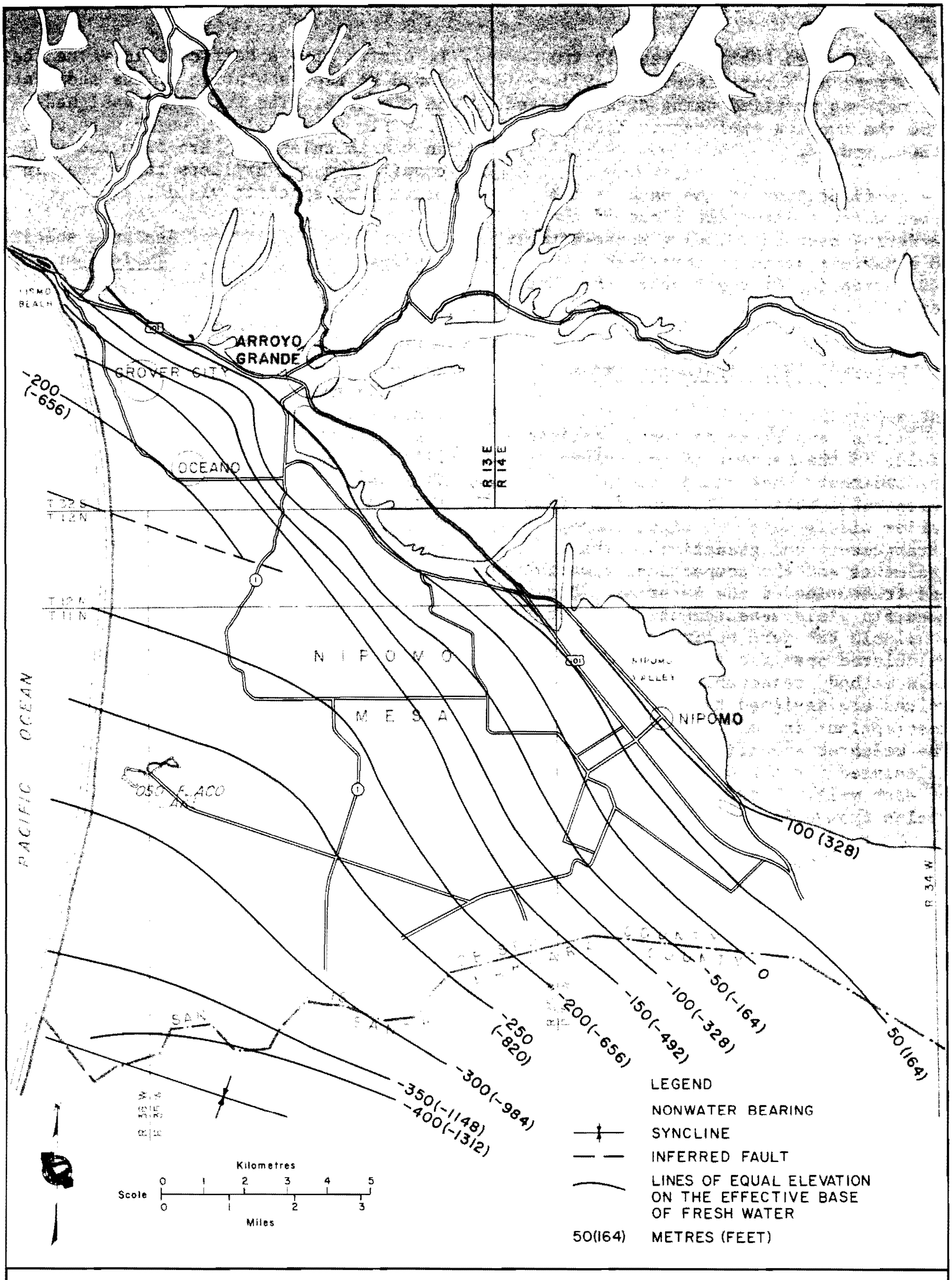

Figure 8 – EFFECTIVE BASE OF FRESH WATER

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Grande and Paso Robles Areas" by the Department of Water Resources, 1971. The map was modified using data obtained from the two new exploratory holes, PSBO-1 and -2.

The configuration of the base of the fresh water follows the slope of the bordering bedrock, dipping southwesterly to a maximum depth of more than 400 metres (1,300 feet) under the Santa Maria River channel.

Water-yielding Characteristics

The available water supply in the sediments, expressed as their specific yield, is the percent of the volume of the sediments that can be occupied by extractable water. The specific yield varies widely with the size, shape, arrangement, and gradation of the sediments and the compaction, cementation, and fracturing of the material. Direct specific yield measurements were not available but were estimated by the calculated specific yield method. In this method, reasonable specific yield values are assigned to lithologic descriptions in well drillers' logs and the weighted specific yield value calculated for the penetrated sediments of each well. Then the weighted specific yields from selected wells are averaged to arrive at a specific yield value that would be representative of the sediments in the area. The following assigned specific yield values, which were used in the calculations, are from the USGS compilation of "drillers terms used in estimating specific yield".

Sediment	Assigned specific yield (percent)
Clay	3
Shale	"
Soil	5
Silty clay	"
Clay and sand	"
Sandy silt	"
Sandy clay	"
Silt	"
Clay and gravel	7
Clay, sand, and gravel	"
Sand, gravel, clay	10
Gravel	18
Gravel and sand	"
Sand	20
Sand and gravel	"

In the Arroyo Grande Plain-Tri-Cities Mesa area the average weighted specific yield of 20 selected wells was 11.25, in Nipomo Mesa the average specific yield of 32 selected wells was 14, and and in the Santa Maria Valley the average specific yield of 12 selected wells was 15.

IV. GROUND WATER

An important component of the study was an estimate of the amount of ground water in storage in the study area, its distribution, its quality, and the amount of replenishment to the ground water supply.

The basin can be subdivided into three storage areas on the basis of different inflow-outflow patterns and topographical differences. These three areas (Figure 9) are the Arroyo Grande Plain-Tri-Cities Mesa, Nipomo Mesa, and the Santa Maria Valley.

Water Levels

With the advent of ground water pumping there has been a long-term lowering of water levels in wells. In recent years this trend has slowed and in some areas water levels have risen. Most notably, water levels in the Arroyo Grande Plain-Tri-Cities Mesa area have risen since 1969 when the pumping of ground water for urban use was largely discontinued in favor of water from Lopez Reservoir.

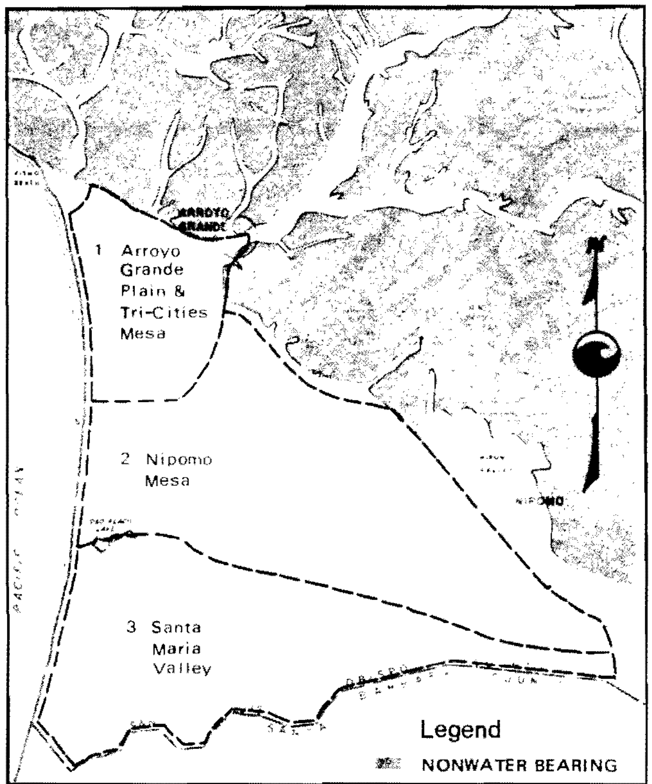

Figure 9 – GROUND WATER BASIN SUBDIVISIONS

To illustrate water level changes over the study area, ground water level contour maps for 1965 and 1975 are shown in Figures 10 and 11.

In the Arroyo Grande Plain-Tri-Cities Mesa area, hydrographs of wells 32S/13E-29M4 and -30K14 (Figures 12 and 13) show that water levels had declined to near sea level in 1968 but by 1973 had risen 4.6 metres (15 feet) above sea level. There was a slight decline in 1975 because of below average rainfall, but overall there was a net increase in water levels of 3 metres (9.2 feet) between 1967 and 1975.

In the Arroyo Grande Valley upstream from Arroyo Grande there was little change in the ground water levels between 1971 and 1974. The average annual depth to water in 12 wells ranged from 10 to 11 metres (33 to 36 feet) during this period.

In Nipomo Mesa, wells 11N/35W-7R1 and -11J1 (Figures 14 and 15) show that the water levels in the central and western parts of the mesa are behaving differently. Well -7R1, in the western part of the mesa approximately 3.2 kilometres (2 miles) from the beach, shows that the water level elevation in this part of Nipomo Mesa was as low as 2.74 metres (9 feet) above sea level between 1961 and 1967 and 6 metres (20 feet) above sea level in 1974. It showed a general rise in water levels until 1975 when rainfall was below average. Well -11J1, located in the central portion of the mesa about 9.6 kilometres (6 miles)

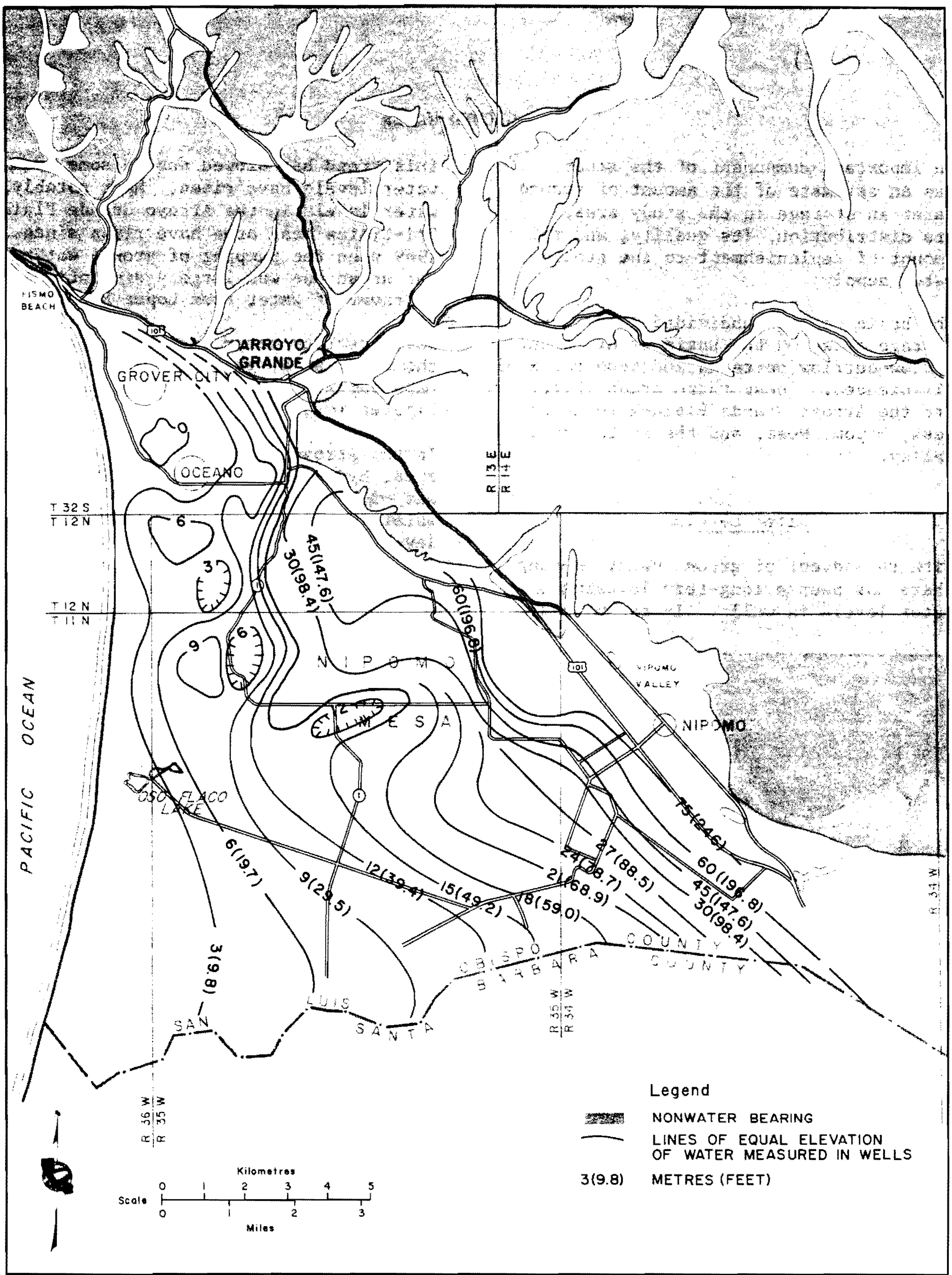

Figure 10 - WATER LEVELS, FALL 1965

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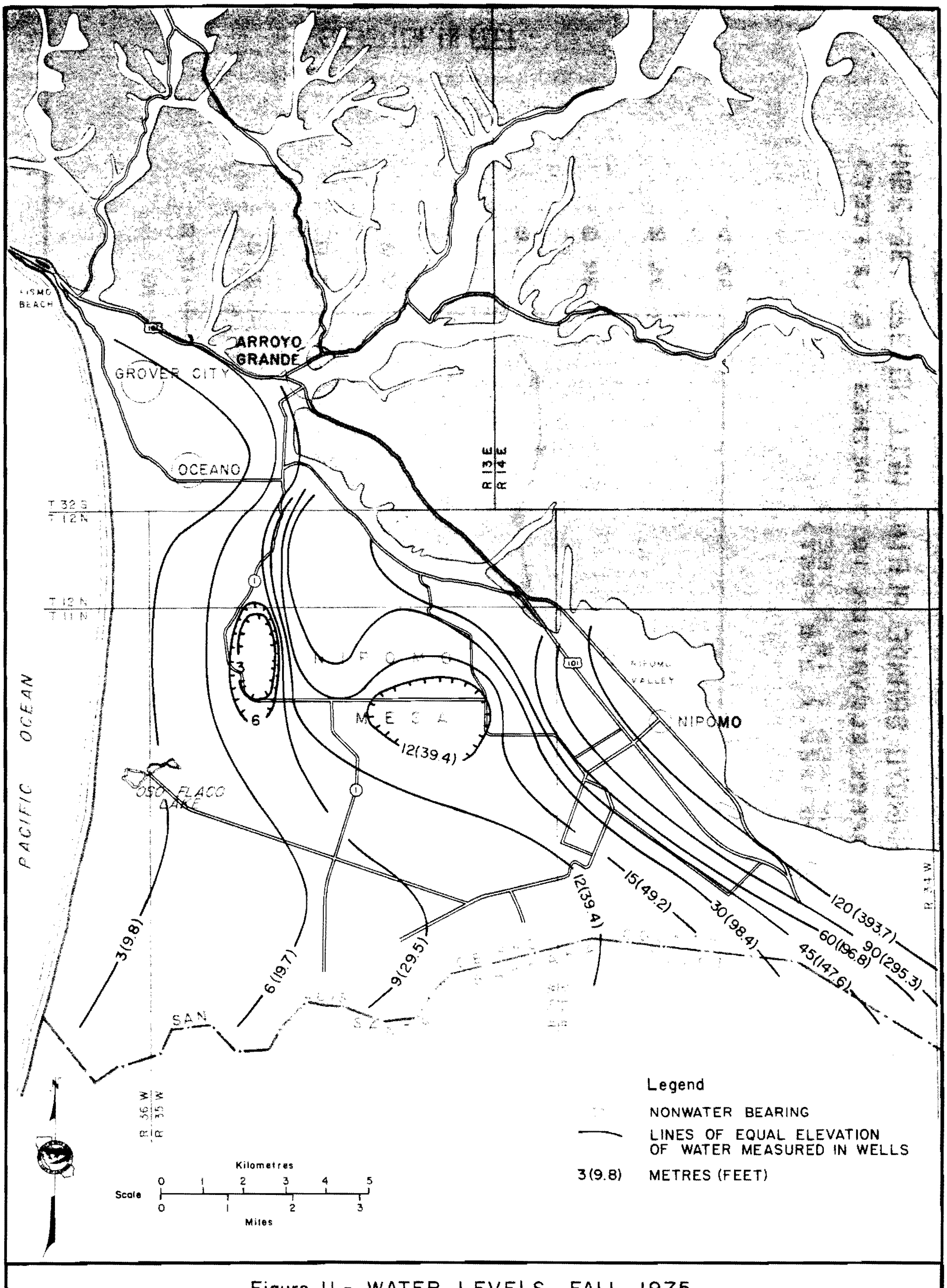

Figure 11 - WATER LEVELS, FALL 1975

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

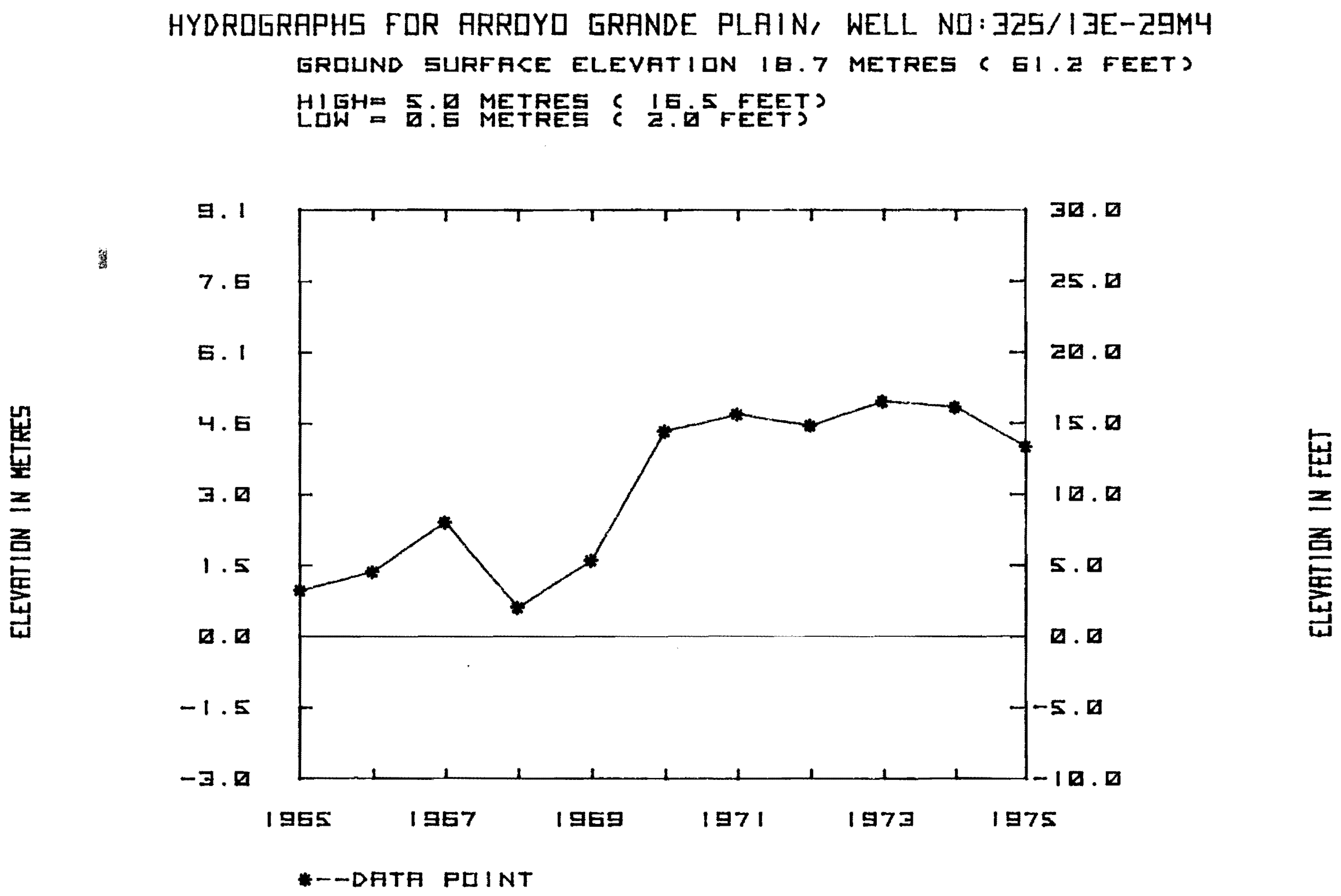

Figure 12. HYDROGRAPH: ARROYO GRANDE PLAIN, WELL NO. 32S/13E-29M4

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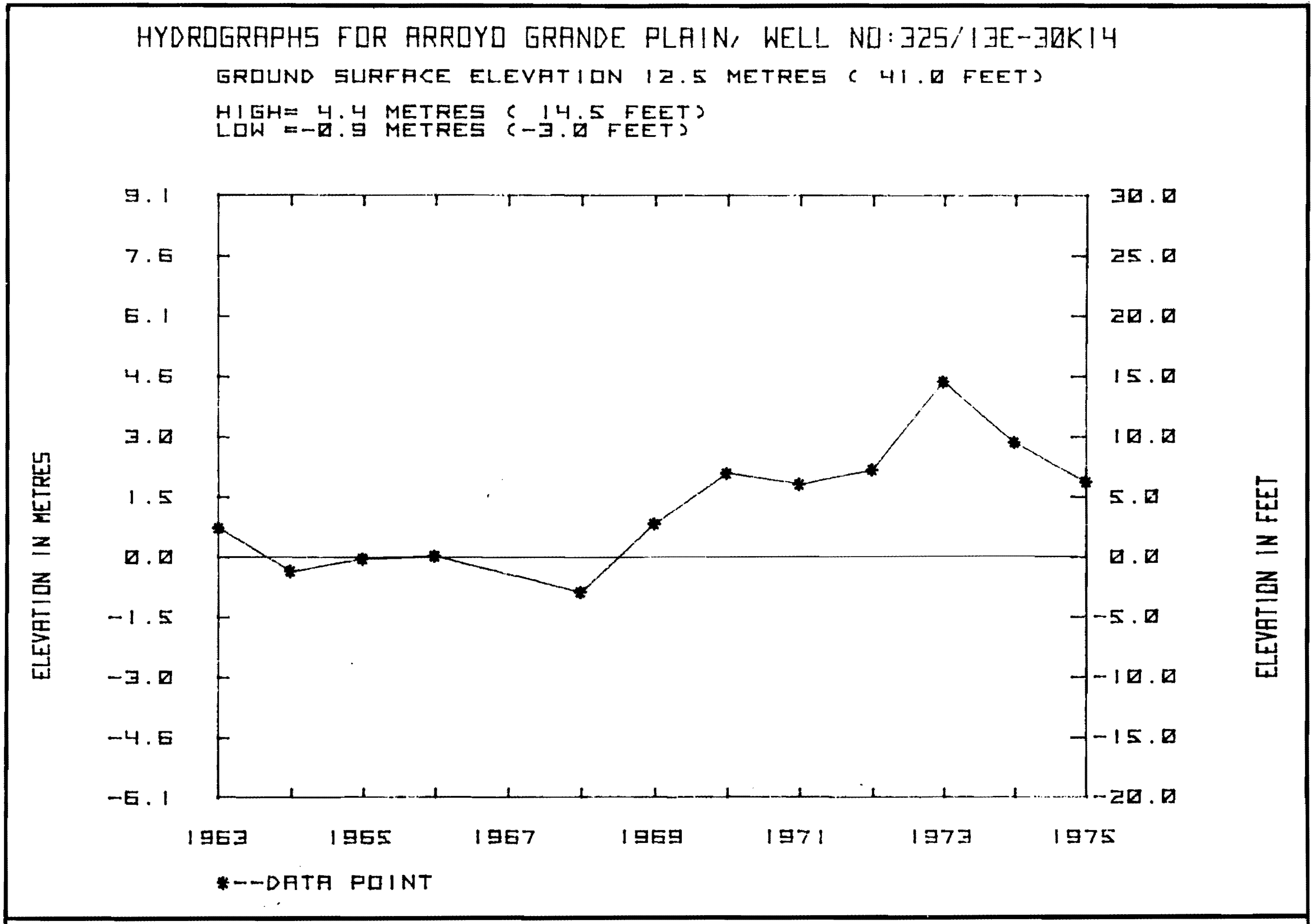


Figure 13. HYDROGRAPH: ARROYO GRANDE PLAIN, WELL NO. 32S/13E-30K14

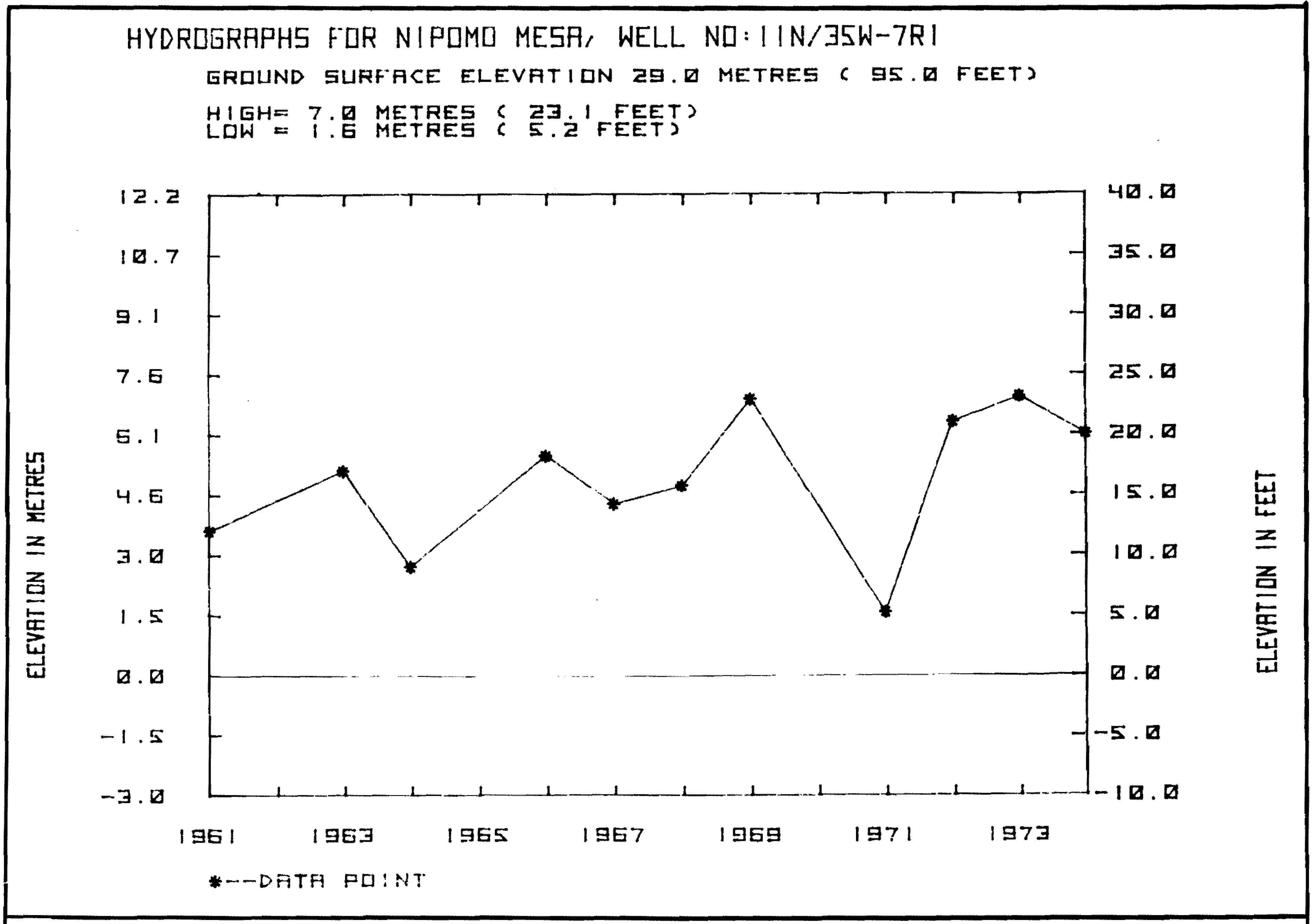


Figure 14. HYDROGRAPH: NIPOMO MESA, WELL NO. 11N/35W-7R1

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

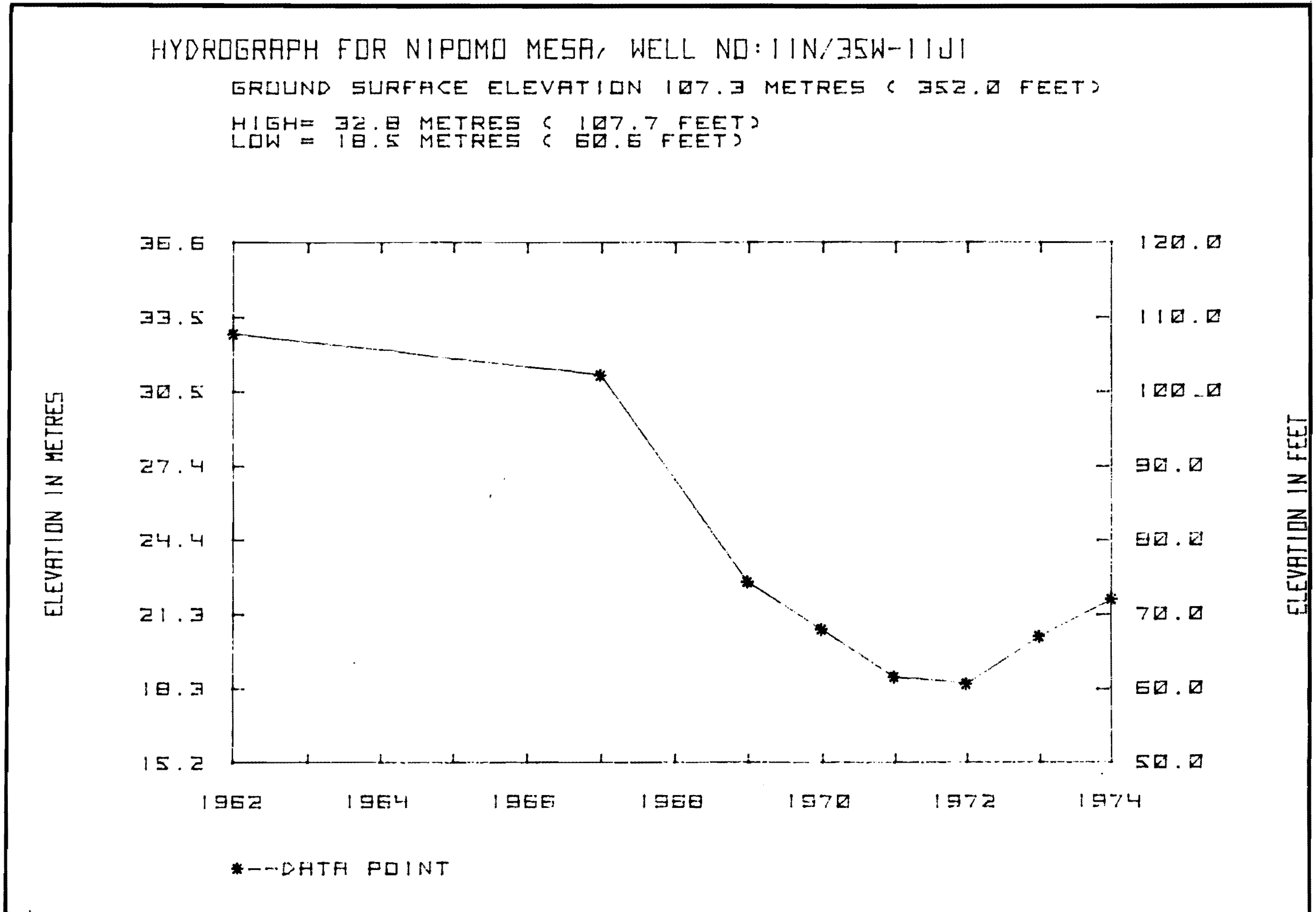


Figure 15. HYDROGRAPH: NIPOMO MESA WELL NO. 11N/35W-11J1

from the ocean, showed a decline in water level elevations from 32.6 metres (107 feet) in 1962 to 18 metres (60 feet) in 1972. There has been a partial recovery as a result of heavy rainfall in 1974.

Historically, water levels in the Santa Maria Valley declined steadily. From 1967 to 1972, they rose, probably due to spreading operations at Twitchell Reservoir and above average rainfall. Levels have declined somewhat since 1972. The two wells below illustrate the recent pattern of water levels in the valley.

Well 11N/35W-28M1 (Figure 16) shows a low water level measurement of 4.1 metres (13.5 feet) above sea level in 1967 and 11.4 metres (37.5 feet) in 1972, a gain of 7.3 metres (24 feet).

Well 11N/35W-33G1 (Figure 17) shows a low water level measurement of 6.6 metres (21.7 feet) above sea level in 1967 and 13.3 metres (43.6 feet) in 1972, a gain of 6.7 metres (21.9 feet).

Storage

Storage calculations were based on the volume of saturated sediments as determined from water level measurements in wells. Water in storage during 1965, 1967, 1970, and 1975 is shown in Table 7. Calculations in the Arroyo Grande Plain-Tri-Cities Mesa are for 1965, 1970, and 1975 to show the differences in storage conditions before and after operations began at Lopez Reservoir.

The Arroyo Grande Plain-Tri-Cities Mesa area shows a significant increase in the amount of ground water in storage since local communities started using water from Lopez Reservoir in place of local ground water for most of their urban supply. Also, regulating flow in Arroyo Grande Creek by controlling the release of water at Lopez Dam provided greater opportunity for stream seepage and contributed to the ground water in storage. The effect of decreasing pumping in the Arroyo Grande Plain-Tri-Cities Mesa area is shown by the sharp increase in the ground water in storage between 1965 and 1970. In 1965 there were 3.4 cubic hectometres (2,700 acre-feet) in storage and 10.4 cubic hectometres (8,400 acre-feet) in storage in 1970.

Until 1969, when Lopez Reservoir became the source for the urban water supply, the ground water in the Arroyo Grande Plain-Tri-Cities Mesa area provided for both agricultural and municipal water demands. The amount of ground water extracted exceeded replenishment and

TABLE 7
GROUND WATER IN STORAGE
ARROYO GRANDE AREA

Area	Average specific yield (percent)	Area in hectares (acres)	Storage above sea level in cubic hectometres (acre-feet) 1965	1967	1970	1975	Storage below sea level in cubic hectometres (acre-feet)
Arroyo Grande Plain-Tri-Cities Mesa	11.25	2 930 (7,200)	3.40 (2,700)	--	10.40 (8,400)	10.50 (8,500)	505 (410,000)
Nipomo Mesa	14.00	8,550 (21 100)	--	240 (194,000)	--	212 (172,000)	1 250 (1,000,000)
Santa Maria Valley	15.00	7 285 (18 000)	--	59.7 (48,400)	--	56.2 (45,600)	2 874 (2,330,000)

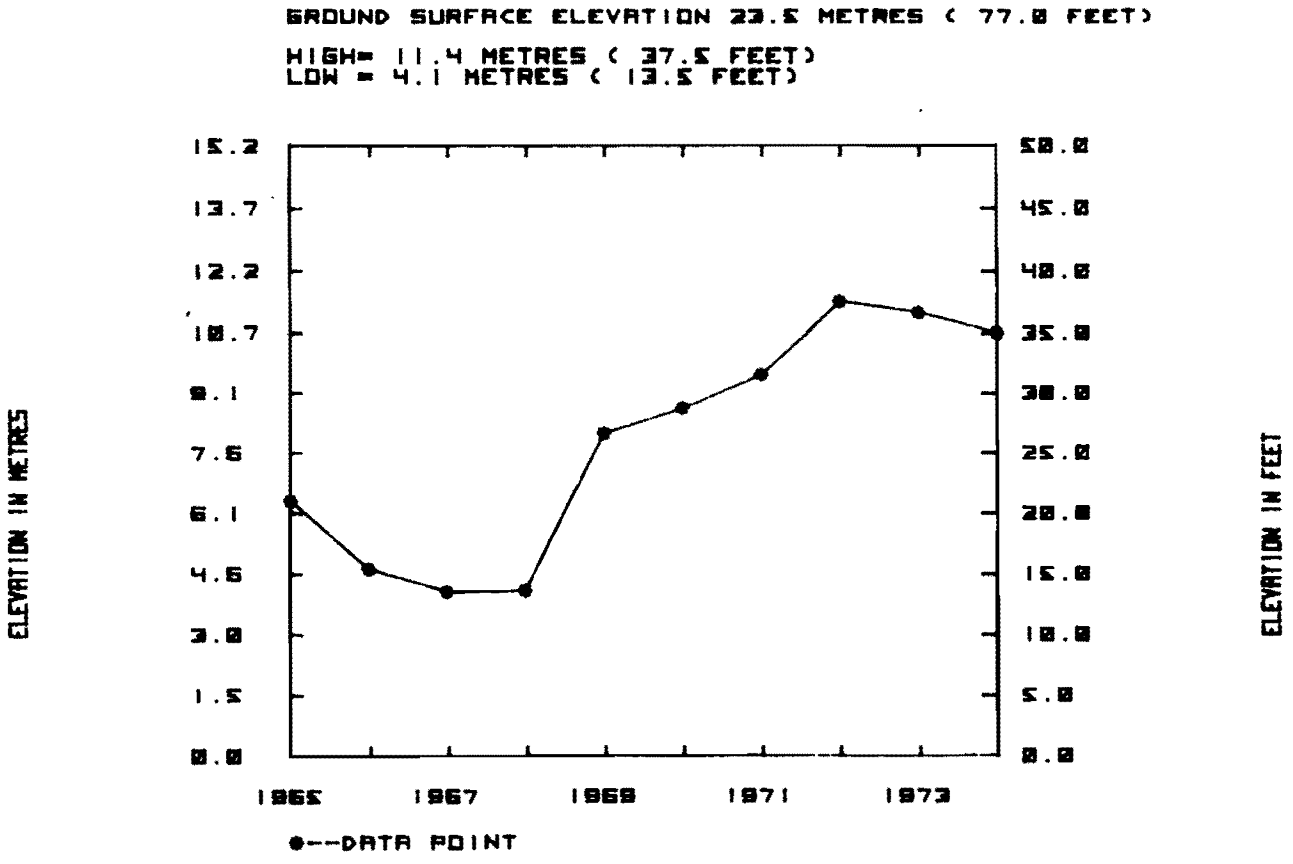


Figure 16. HYDROGRAPH: SANTA MARIA VALLEY, WELL NO. 11N/35W-28M1

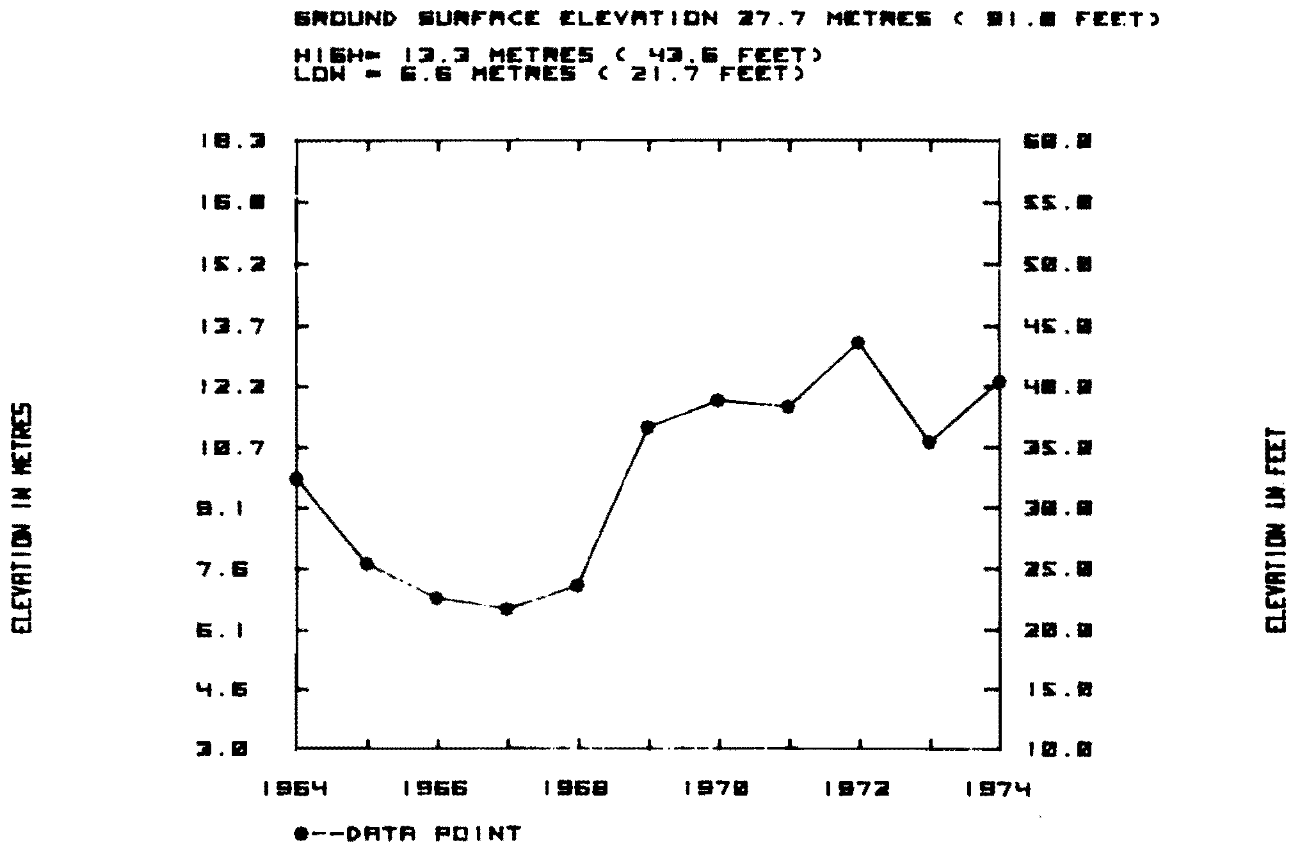


Figure 17. HYDROGRAPH: SANTA MARIA VALLEY, WELL NO. 11N/35W-33G1

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 10/9 the water levels were depressed to near sea level. In 1969 extraction for urban use was about 3.5 cubic hectometres (2,800 acre-feet). Since 1969, with most of the urban supply coming from Lopez Reservoir, the water levels measured in wells show that the water in storage has increased. However, the water supply allocated to the separate communities from Lopez Reservoir is not sufficient to meet the water demands in every case, and the communities continue their dependency upon ground water to meet their demands. According to the population growth projections and the current unit water use, the demand on the ground water reservoir will again exceed the replenishment to the Arroyo Grande Plain-Tri-Cities Mesa area in 1990 or soon after.

Storage in the Arroyo Grande Valley upstream from Arroyo Grande was calculated under hydrologic conditions prevailing since the construction of Lopez Dam. The water-bearing sediments in the valley cover an area of approximately 810 hectares (2,000 acres) and have an estimated average thickness of 30 metres (100 feet). During 1971 to 1974 the saturated portion of these sediments ranged from 19.5 to 20.4 metres (64 to 67 feet). Based upon an estimated specific yield of 14 percent, the water in storage in the valley during this period was 19.7 to 21 cubic hectometres (16,000 to 17,000 acre-feet).

Pismo Beach, which is outside the study area, also obtains some of its water supply from wells in the Arroyo Grande Area. However, since 1970-71 the community's water demand has been met by its entitlement from Lopez Reservoir, and only a negligible amount of ground water from the Arroyo Grande ground water basin has been used. Pismo Beach has drawn its full entitlement from Lopez in 1975-76 and 1976-77 and may draw more water from the Arroyo Grande area in the future.

The Nipomo Mesa showed a decrease in the amount of ground water in storage above sea level between 1967 and 1975. In 1967, 240 cubic hectometres (194,000 acre-feet) were in storage and, in 1975, 212 cubic hectometres (172,000 acre-feet), a reduction of 28 cubic hectometres (22,000 acre-feet), for an average reduction of 3.4 cubic hectometres (2,750 acre-feet) per year. The loss of ground water in storage between these two sampling periods shows only a difference for these two periods and does not represent a steady year to year decline. During the interim years, the amount of water in storage fluctuated according to the amount of rainfall. Generally, 432 millimetres (17 inches) or more of precipitation during one season increased the water in storage while less rainfall resulted in a decrease.

The Santa Maria Valley shows only a slight reduction in ground water in storage above sea level. In 1967, there were an estimated 59.7 cubic hectometres (48,400 acre-feet) in storage and in 1975, there were 56.2 cubic hectometres (45,600 acre-feet) in storage. There was a decrease of 3.5 cubic hectometres (2,800 acre-feet). This amounts to an average annual storage decrease of 0.44 cubic hectometre (350 acre-feet).

However, the portion of the Santa Maria Valley within San Luis Obispo County is a small part of the valley and the amount of water in storage at any time will be determined by the ground water resources management practices in the entire valley. Currently, the ground water in the valley moves northwesterly into San Luis Obispo County from Santa Barbara County, but can migrate southward out of the study area if the flow from the upper valley decreases or pumping in Santa Barbara County reverses the gradient.

Ground Water Quality

The mineral quality of the ground water in the Arroyo Grande study area is generally acceptable for domestic and agricultural uses. However, water in the deeper aquifers generally has a higher mineral concentration than does water in the upper aquifers. Therefore, as more water is pumped from the deeper aquifers and used for agriculture the mineral concentration in the irrigation return water and thus in the receiving water in the upper aquifers will increase at a faster rate than if only water from the upper aquifers were used. This may be contrary to the Regional Board's strategy in implementing the State Water Resources Control Board's water quality control plan, which is, in part, based on the State Board's nondegradation policy. The strategy is to minimize increase of mineral concentrations in the ground water. If the local ground water is used to its full potential, there could be an adequate water supply to delay the possible curtailment of agricultural operations and the need to finance and construct importation facilities.

A problem that requires attention is the high nitrate concentrations commonly found in ground water in the Arroyo Grande Plain-Tri-Cities Mesa area.

High nitrates in drinking water have been linked to infant methemoglobinemia (blue babies), a disease characterized by certain blood changes and a bluish discoloration of the skin due to blood oxygen deficiency. Many authorities attribute the disease to high nitrate concentrations in water used for preparing feeding formula. Because of this health threat, the State Department of Health Services has specified a limiting concentration of 10 mg/l for nitrogen.* This concentration of nitrogen equals 45 mg/l nitrate. Nitrate is most commonly the only significant nitrogen compound found in ground water. Because of the importance of nitrate, it receives added attention in this discussion.

Sea water intrusion is an important factor to ground water management in the study area because it is a key limiting factor as to how much ground water--especially water in the offshore aquifer--can be safely and economically used. Conversely, the amount of ground water in the onshore and offshore aquifers will significantly influence the location, timing, and magnitude of sea water intrusion.

For convenience of data retrieval, compilation, and discussion, the study area is divided into three areas in conformance with the Department's system for areal designation of hydrologic units. These are: Arroyo Grande hydrologic subarea, Nipomo Mesa hydrologic subarea, and Santa Maria Valley hydrologic subunit within San Luis Obispo County (Figure 18). Appendix B contains a printout of all quality data available during the study.

Arroyo Grande Hydrologic Subarea

In the Arroyo Grande hydrologic subarea, according to the frequency of observations, TDS concentration is mainly in the 250 mg/l to 1 250 mg/l range, although the 1 250 mg/l to 1 750 mg/l range is not uncommon (Appendix B). Nitrate usually exceeds 45 mg/l and total hardness predominantly exceeds 250 mg/l. However, at times, the nitrate concentration is within the drinking water standards.* Sulfate concentrations of 250 mg/l, the recommended limit for acceptable drinking water, are often exceeded, but chloride, fluoride, and boron constitute insignificant problems.

In the subarea, wells in the Arroyo Grande Valley upstream of Highway 101 typically draw from the Recent alluvium. In well 32S/13E-12Q2 (Figure 19) the TDS concentration has remained essentially unchanged although nitrate has increased.

However, there appears to be progressive downstream deterioration of the quality of water in the Recent alluvium. This is reflected in the water quality for 32S/13E-12Q2, 32S/13E-14R2, 32S/13E-23F1, and 32S/13E-22Q1 (Appendix B).

* Title 17, California Administrative Code, "Domestic Water Supplies Quality and Monitoring".

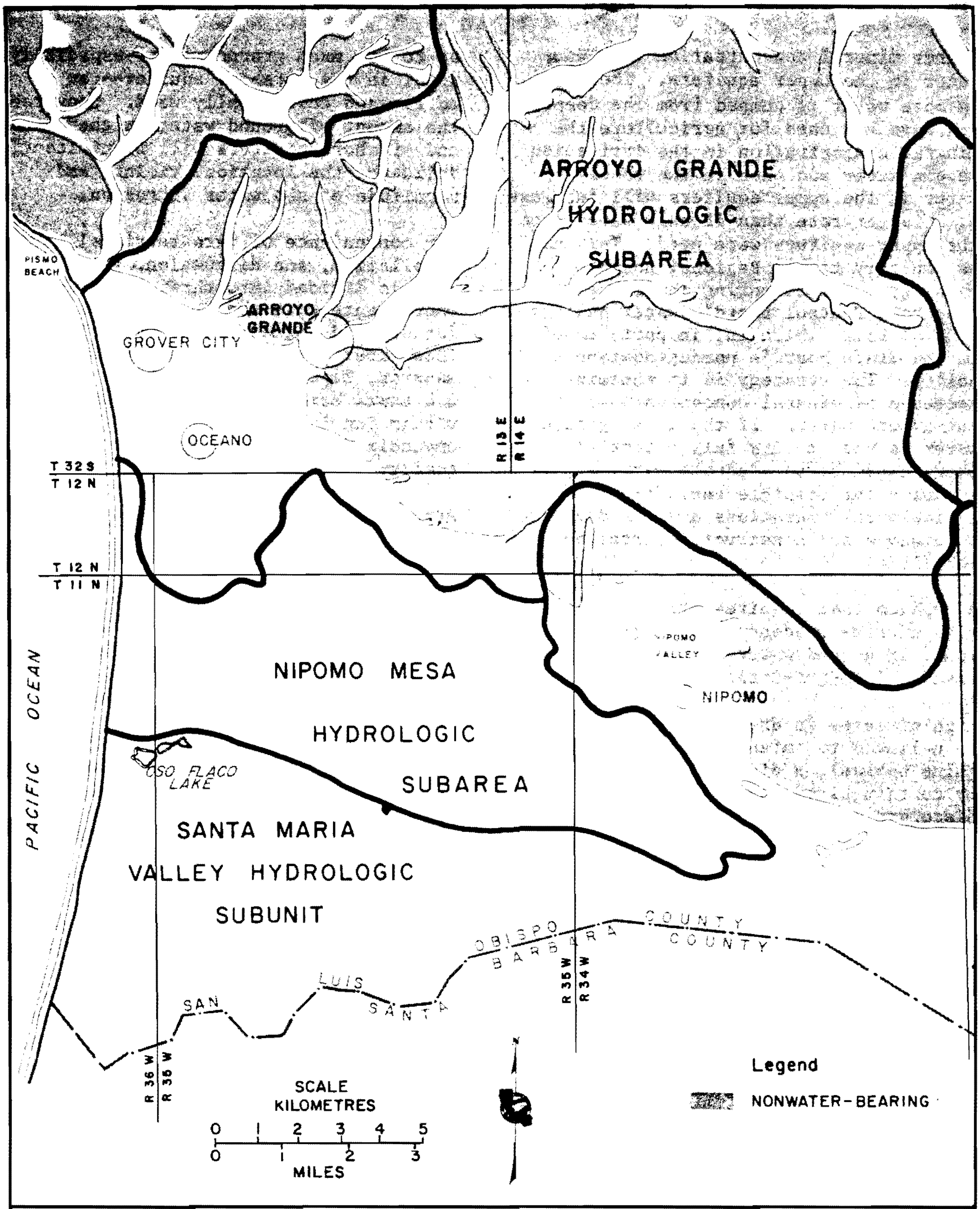


Figure 18 - HYDROLOGIC AREA BOUNDARIES

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

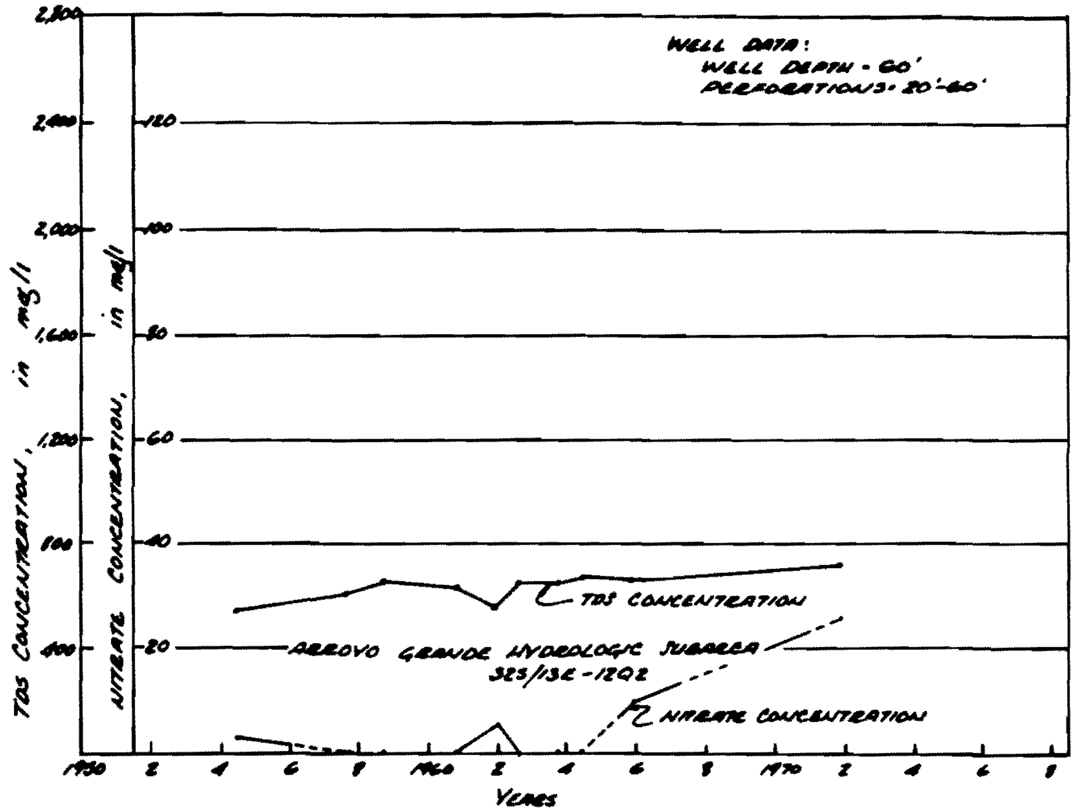


Figure 19 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 32S/13E-12Q2

In the Tri-Cities Mesa, wells primarily draw from the Paso Robles Formation. Wells 32S/13E-28E1 (Figure 20), 32S/13E-29E2 (Figure 21), 32S/13E-29G1 and -29G2 (Figure 22), and 32S/13E-30H2 (Figure 23) are typical of such wells. Except for well 32S/13E-28E1, nitrate concentrations reach levels of concern exceeding 45 mg/1. The Paso Robles Formation is subject to vertical recharge and is therefore affected by irrigation return water and subsurface sewage disposals.

In the Arroyo Grande Plain, wells are primarily extracting from either the Recent alluvium or the Paso Robles Formation. The quality of ground water in the Recent alluvium, as typified by observations in wells 32S/13E-31J3, 32S/13E-31H7, 32S/13E-33K3, and 12N/35W-29N1, is of marginal quality (Appendix B). TDS concentration is about 1 500 mg/1, while nitrate ranges as high as 160 mg/1 and sulfate about 650 mg/1.

The water in the Paso Robles Formation is of better quality. Wells 32S/13E-31F1, 32S/13E-31F3, and 32S/13E-31F4 are representative wells in this formation. TDS concentrations range from about 600 mg/1 in -31F4, a deeply perforated well, to about 1 100 mg/1 in -31F3 (Appendix B). Nitrate concentration is generally low.

Nipomo Mesa Hydrologic Subarea

The amount of ground water quality data in the Nipomo Mesa hydrologic subarea is substantially less than in the Arroyo Grande subarea. Available data indicate that ground water is generally of good quality. Total hardness is the principal problem, frequently exceeding 250 mg/1 (Appendix B), TDS concentration is largely less than 500 mg/1 and infrequently exceeds 1 000 mg/1 (Appendix B). Chloride, sulfate, fluoride, and boron do not cause concern.

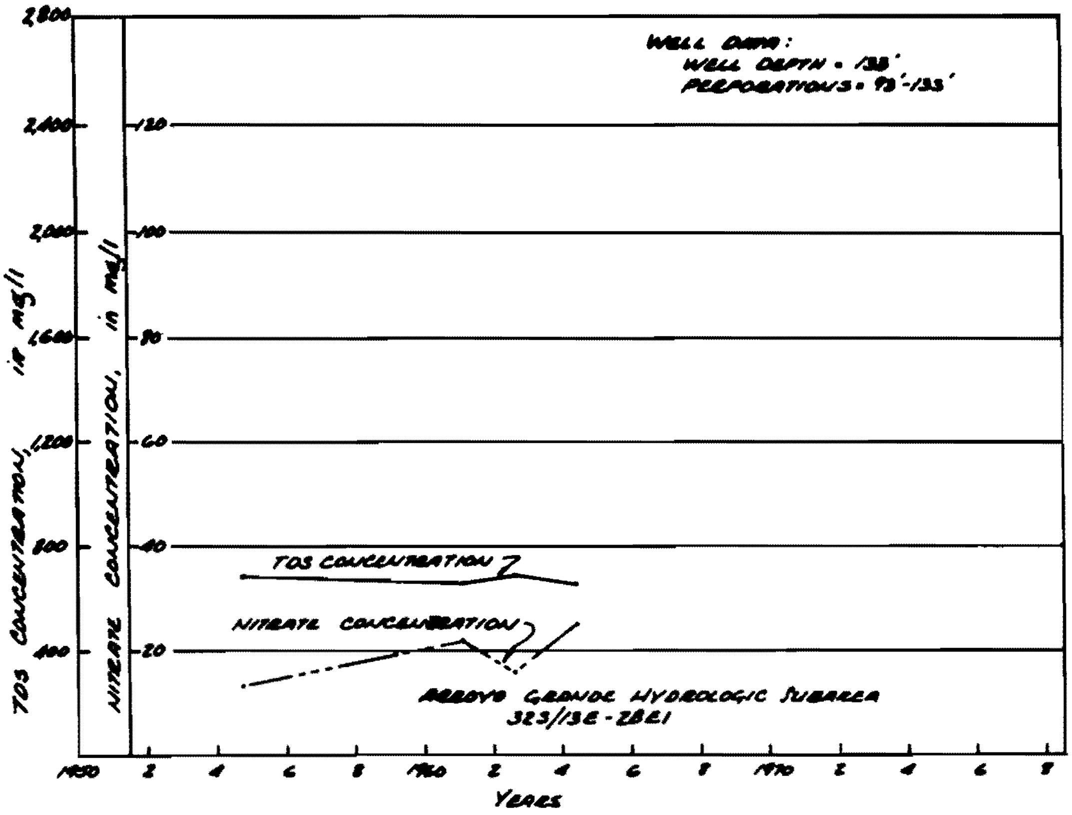


Figure 20 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 32S/13E-28E1

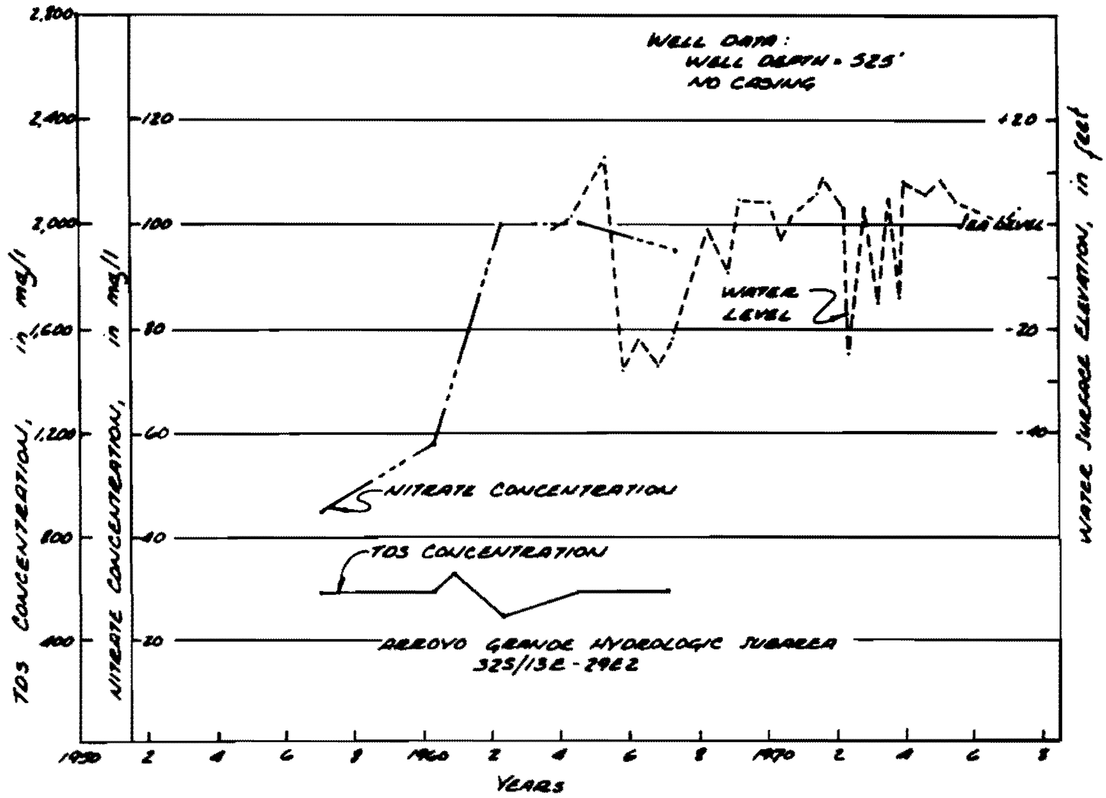


Figure 21 TDS AND NITRATE CONCENTRATION AND WATER LEVEL CHANGES IN WELL NO. 32S/13E - 29E2

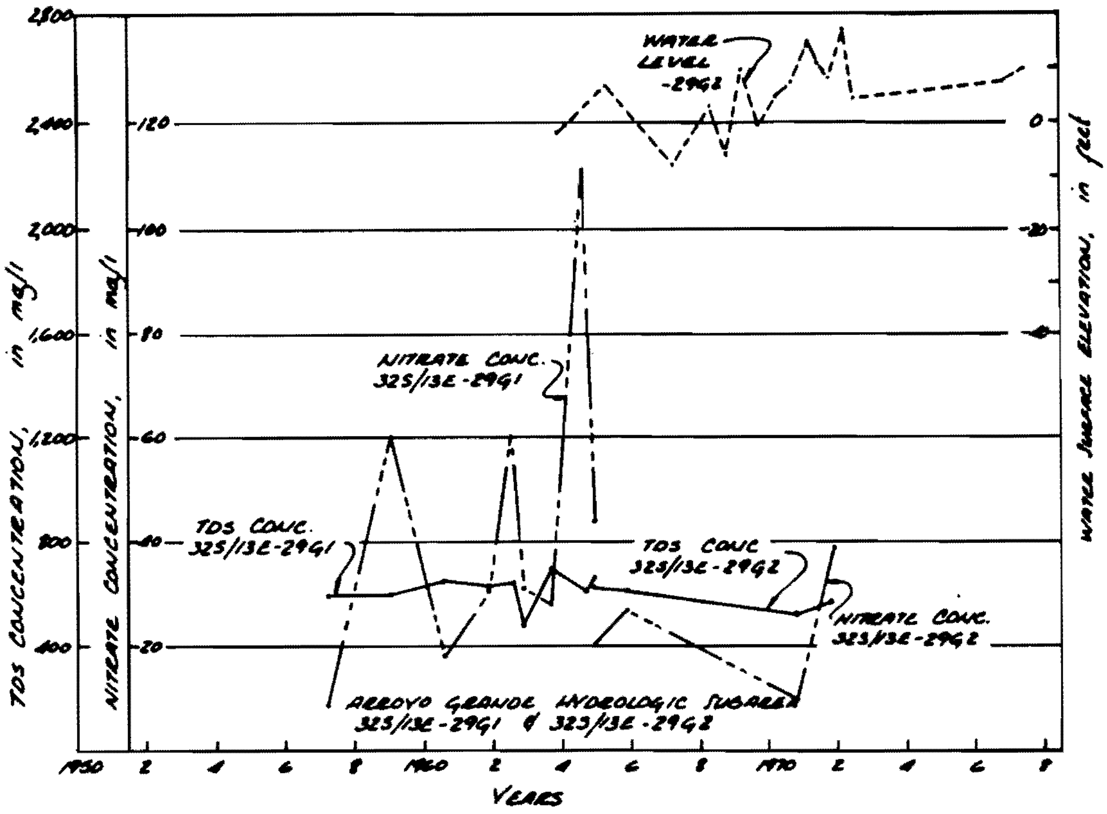


Figure 22 TDS AND NITRATE CONCENTRATION AND WATER LEVEL CHANGES IN WELLS NOS. 32S/13E-29G1 AND G2

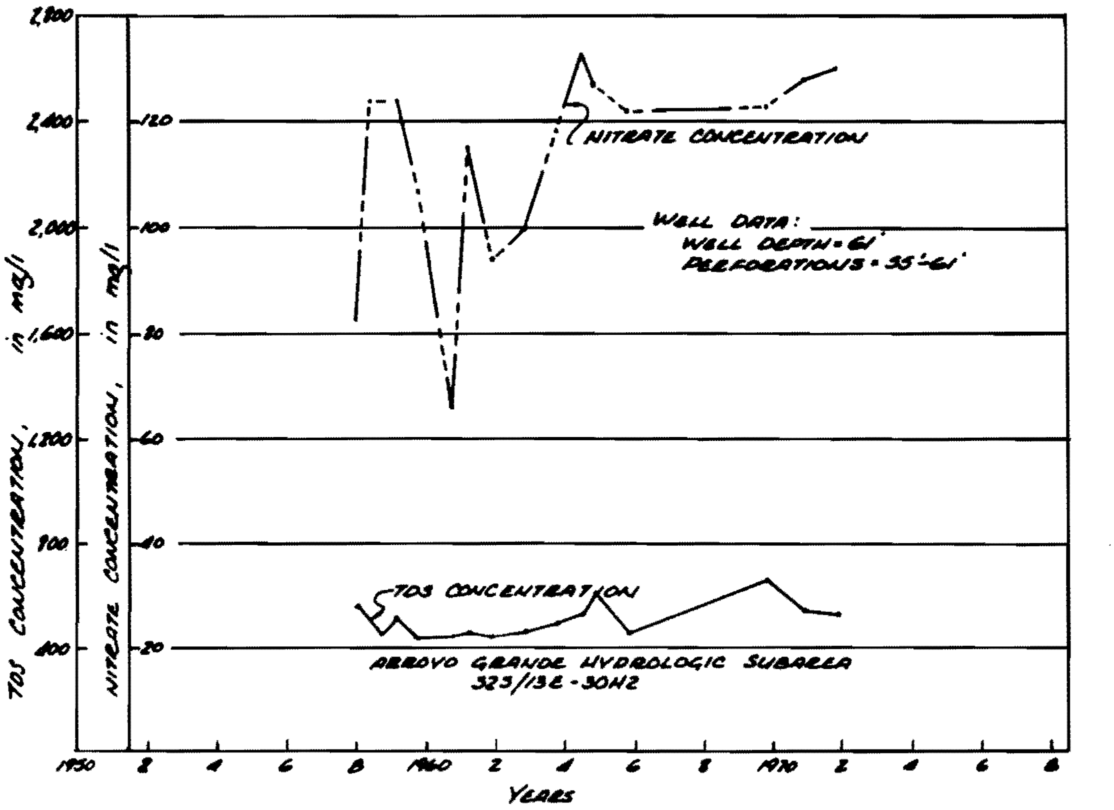


Figure 23 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 32S/13E-30H2

However, in isolated shallow wells, nitrate concentrations have exceeded 45 mg/1.

Wells mainly draw from the Paso Robles Formation. Wells 11N/35W-5L1 (Figure 24), 11N/35W-7R1 (Figure 25), 11N/35W-9P1 (Figure 26), and 11N/35W-12E1 and -12E2 (Figure 27), which have the longest water quality data records, show no clear degrading trend in either TDS or nitrate concentrations. However, ground water from the deeper zones has higher TDS concentrations.

Santa Maria Valley Hydrologic Subunit

The Santa Maria Valley subunit is mainly in Santa Barbara County; only a small part of the subunit is north of the Santa Maria River and therefore in San Luis Obispo County. The TDS concentration of ground water in the San Luis Obispo County portion of this subunit is mainly in the 500 mg/1 to 1 000 mg/1 range, with observations less frequently in the 1 000 mg/1 to 1 500 mg/1 range (Appendix B). Sulfate and total hardness are the principal problems, frequently exceeding 250 mg/1 and 400 mg/1, respectively. Chloride, nitrate, fluoride, and boron are infrequent problems (Appendix B).

Well 10N/35W-4C1 (Figure 28) is just across the line in Santa Barbara County. Wells 11N/35W-18M1 (Figure 30) and 11N/35W-19E2 (Figure 31), about 1.6 kilometres (1 mile) from the coast, have shown erratic quality patterns but little long-term changes. However, the nitrate concentration in well 11N/35W-18M1 increased unusually in 1973; a sampling error is possible. Further inland, in well 11N/35W-26M1 (Figure 32), both TDS and nitrate concentrations increased from 1965 through 1968, while the long-term

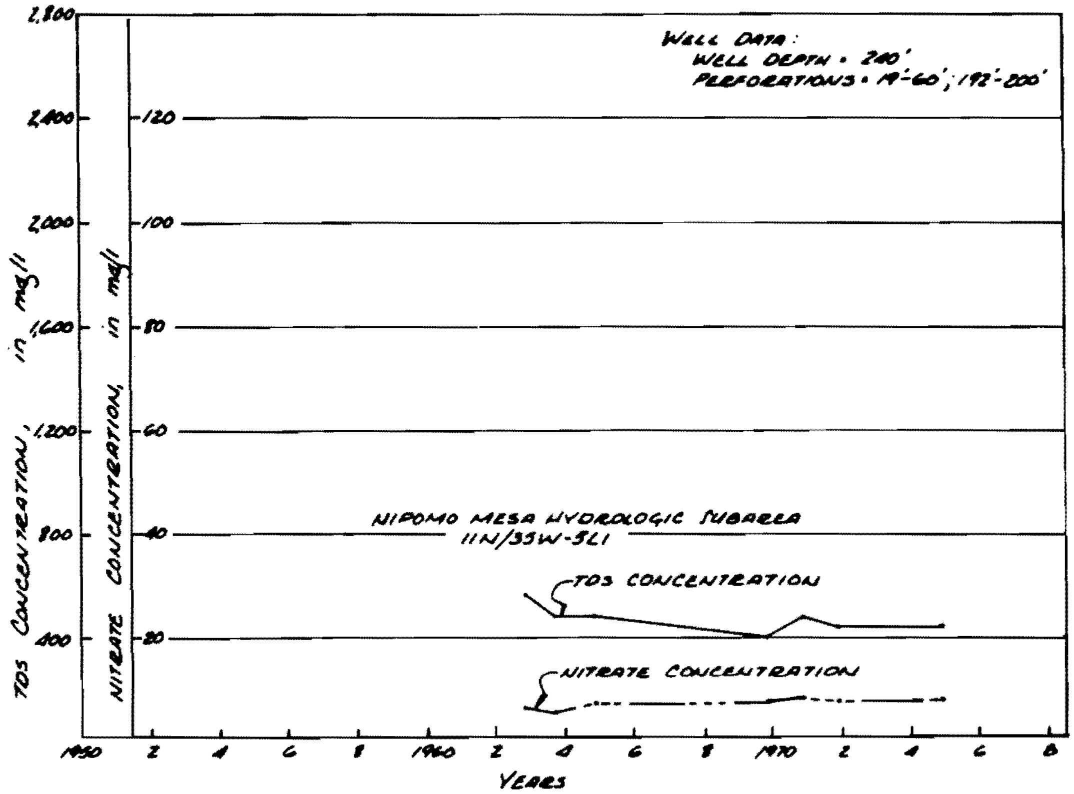


Figure 24 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/35W-5L1

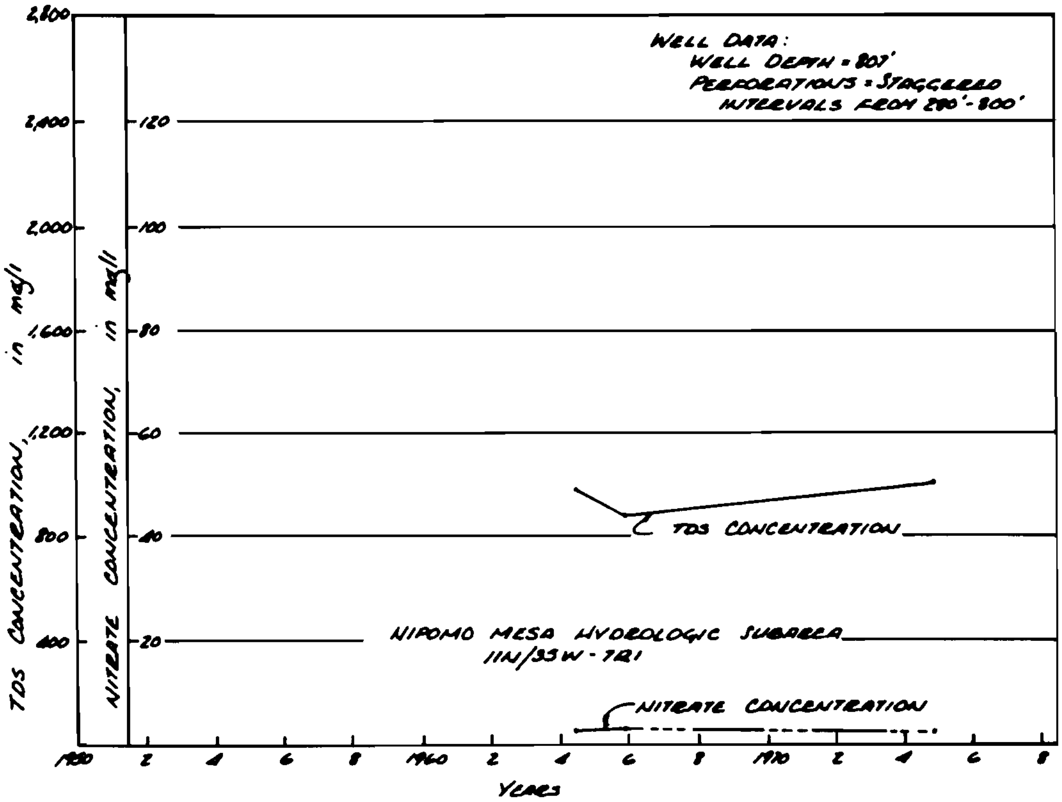


Figure 25 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/35W-7R1

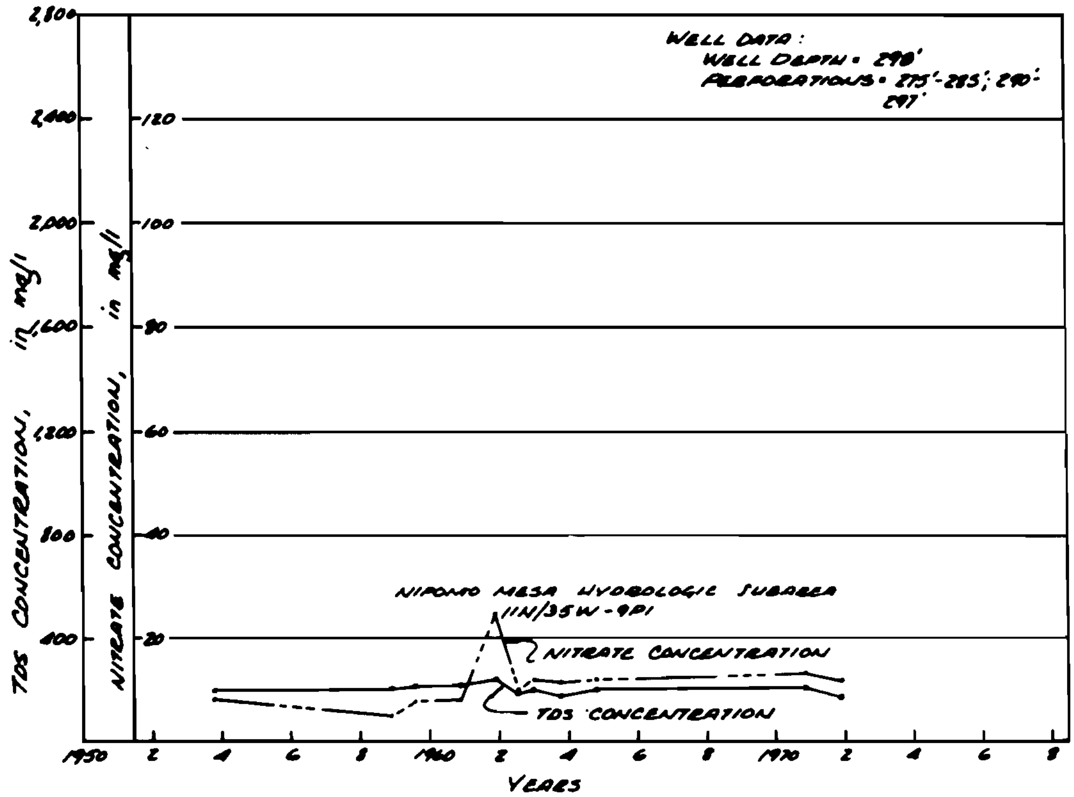


Figure 26 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/35W-9P1

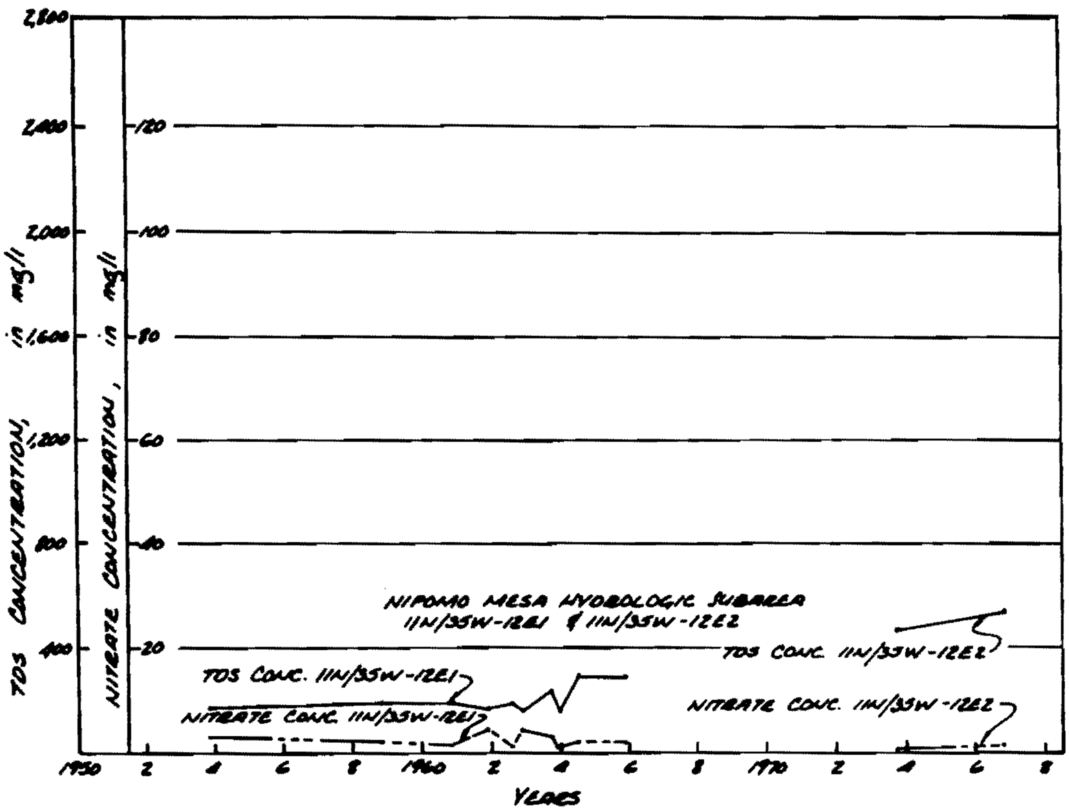


Figure 27 TDS AND NITRATE CONCENTRATION CHANGES IN WELLS NOS. 11N/35W-12E1 AND 12E2

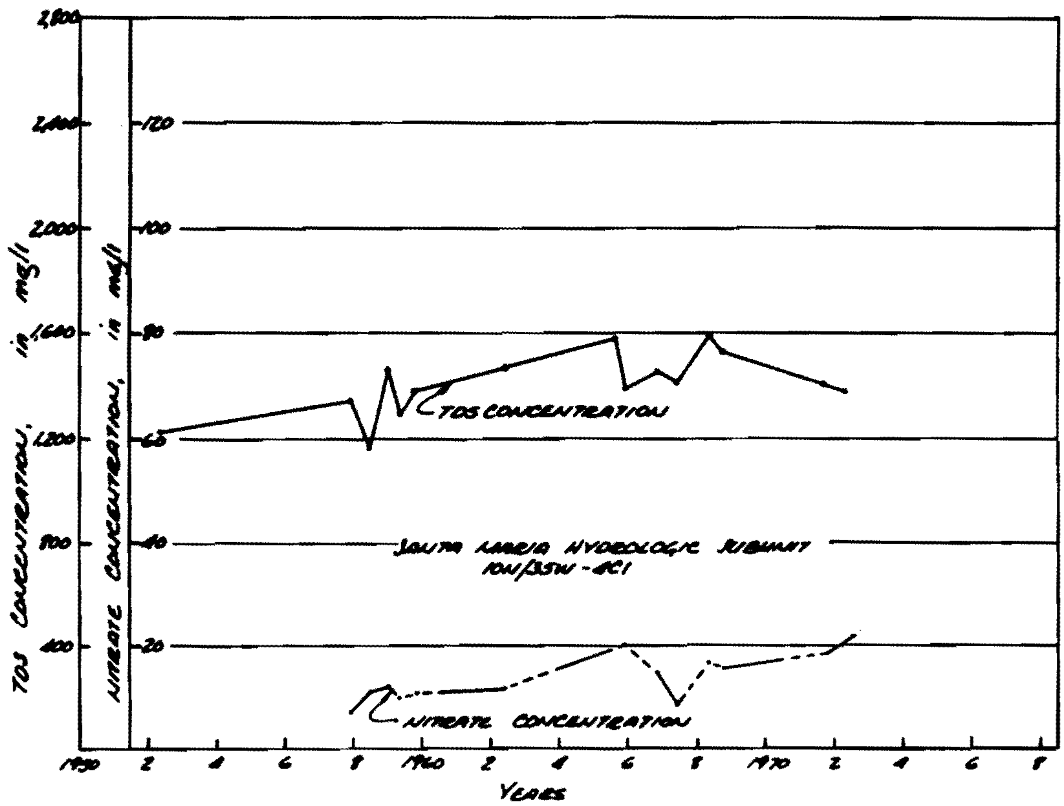


Figure 28 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 10N/35W-4C1

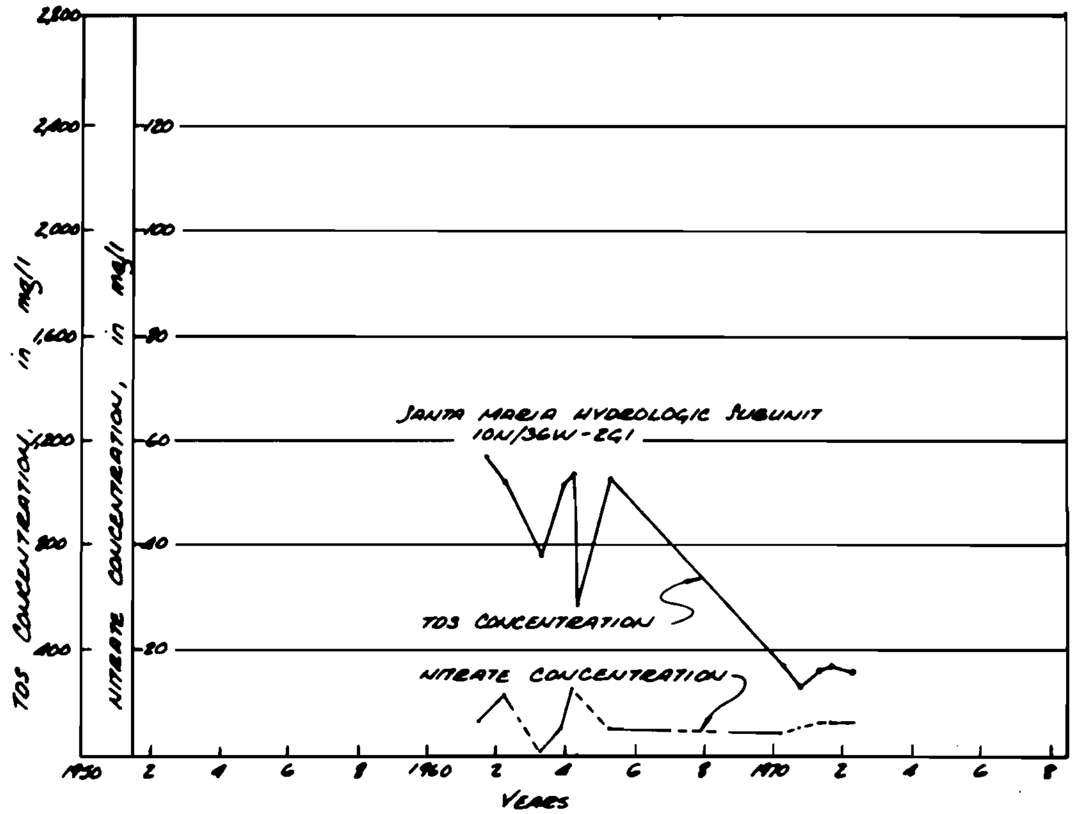


Figure 29 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 10N/36W-2G1

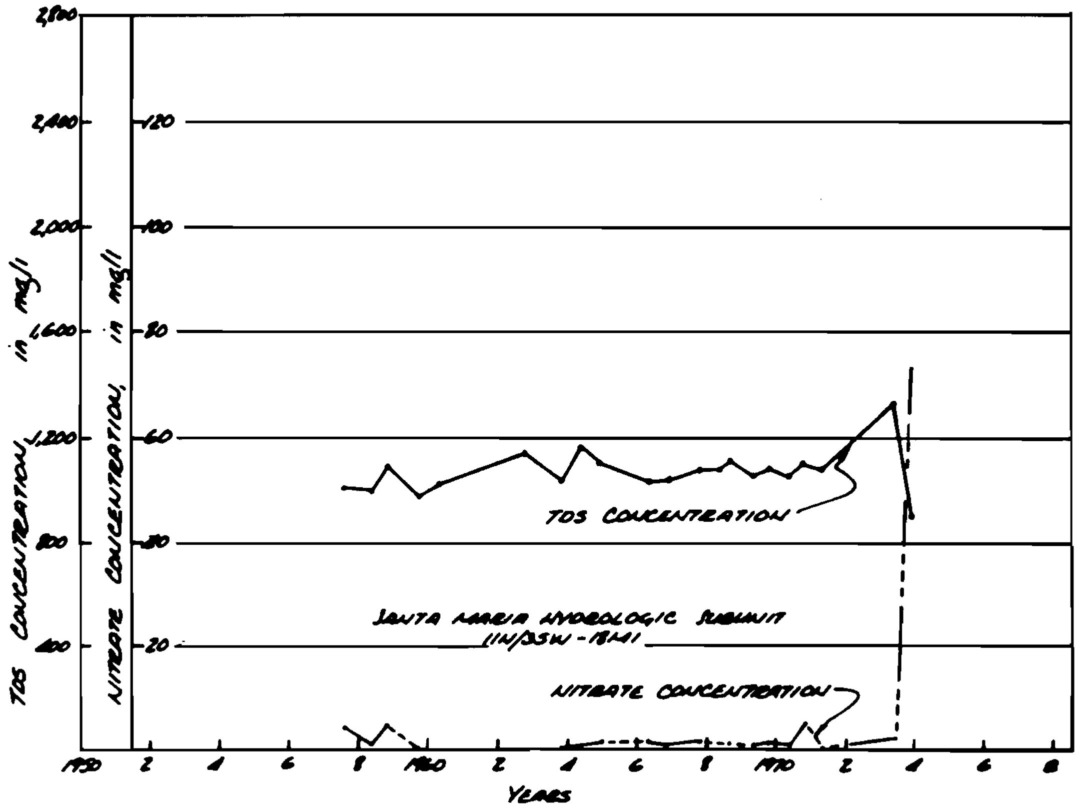


Figure 30 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/35W-18M1

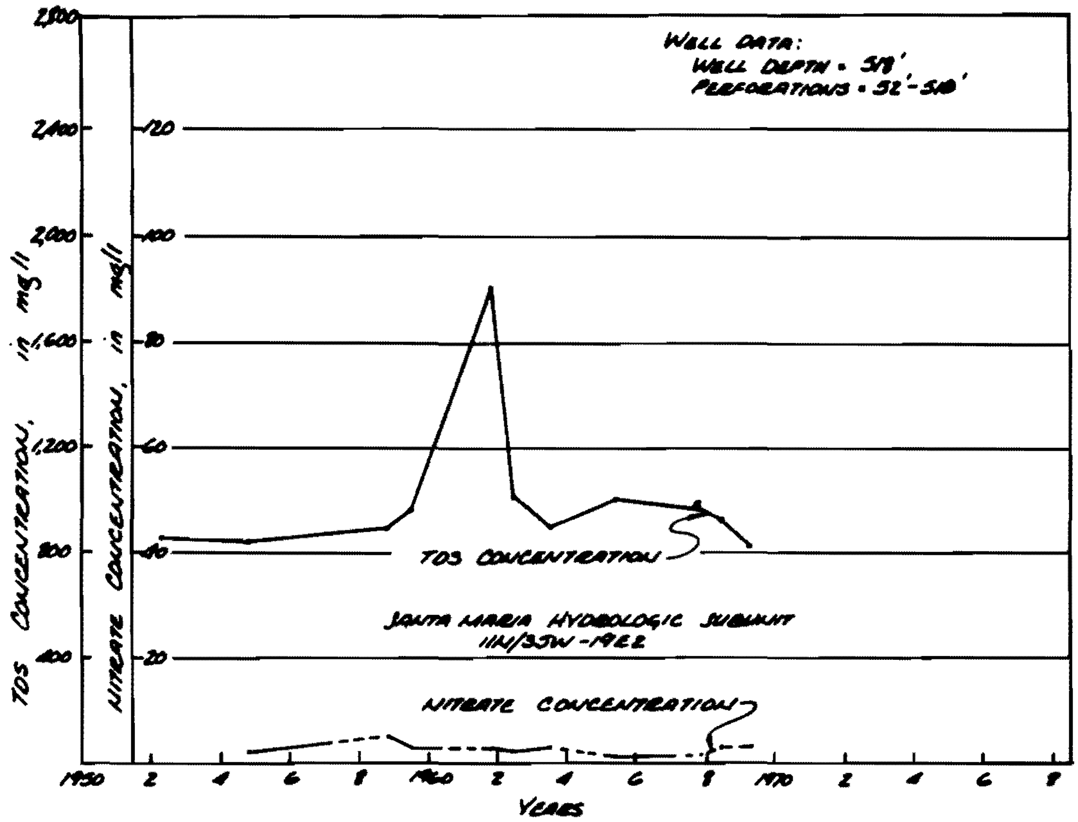


Figure 31 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/35W-19E2

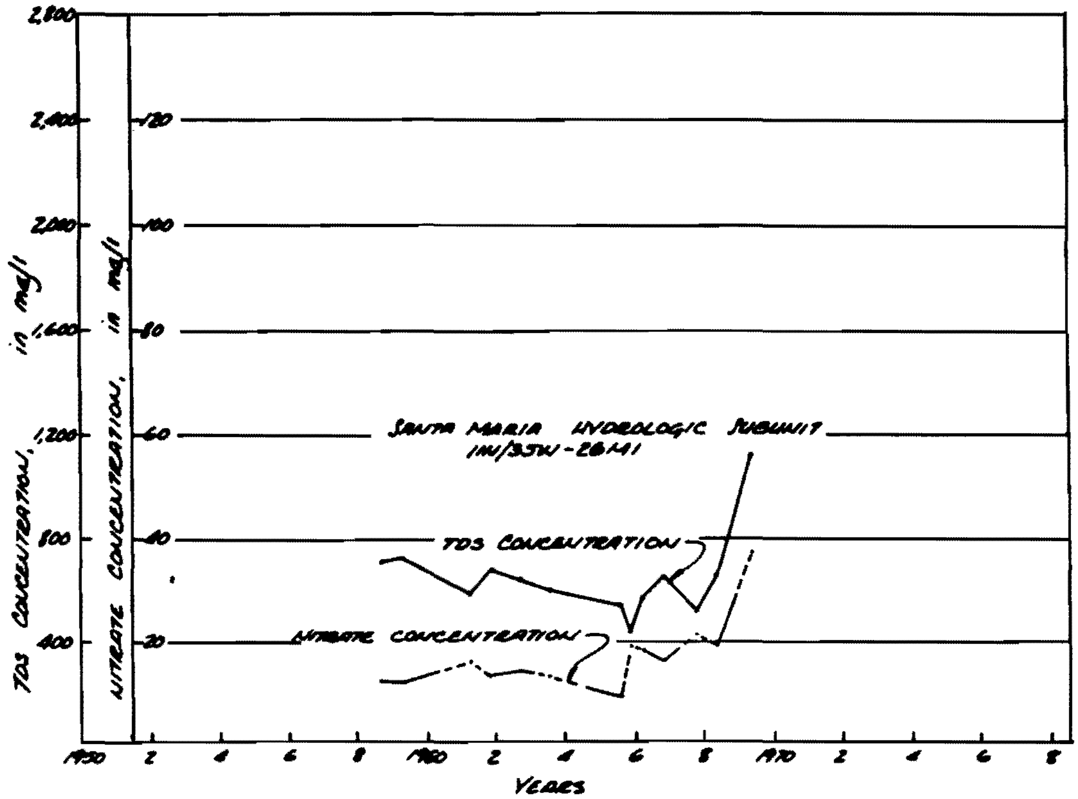


Figure 32 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/35W-26M1

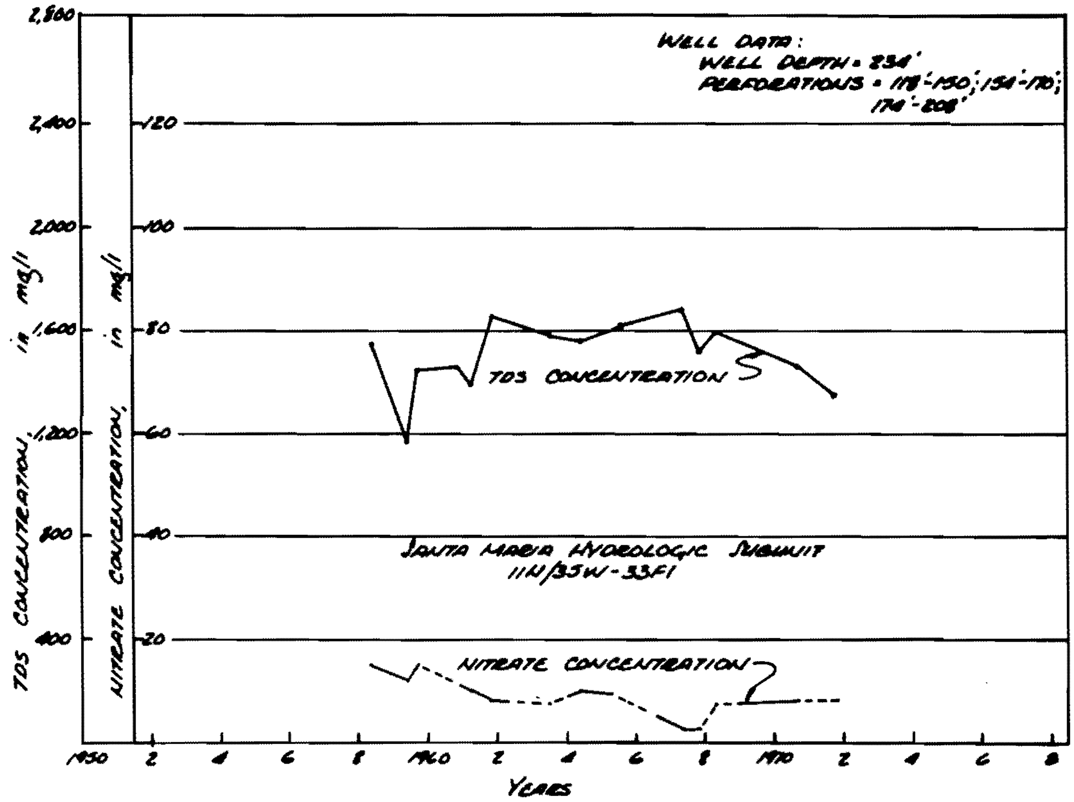


Figure 33 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/35W-33F1

quality in 11N/35W-33F1 (Figure 33) has been relatively unchanged.

Some wells near the Santa Maria River show water quality deterioration and some show improvement. In well 10N/35W-4C1 (Figure 28), both TDS and nitrate concentrations have slowly increased, while the TDS concentration in well 10N/36W-2G1 (Figure 29) has substantially decreased. Well 11N/36W-13R1 (Figure 34), another well near the coast, has not shown a changing trend in water quality.

Sea Water Intrusion

Intrusion of sea water into fresh water aquifers can threaten the loss of valuable fresh water contained in the aquifers as well as the valuable storage and transmission capabilities of the ground water basins themselves (Appendix C). Consequently, when several wells in the Pismo-Guadalupe area showed increasing chloride concentrations and sea water intrusion was suspected, the Department and the San Luis Obispo County Flood Control and Water Conservation District cooperatively studied the problem.*

The study, which was completed in 1969, found that shallow coastal ground water, less than 30 metres (100 feet) deep in Recent tidal and fluvial deposits and in upper Paso Robles beds north of Arroyo Grande Creek, contained chloride concentrations from 100 to 1 630 mg/1. However, historic ground water levels precluded sea water intrusion. The chloride sources were attributed to:

* "Sea Water Intrusion: Pismo-Guadalupe Area", California Department of Water Resources, Bulletin 63-3, February 1970.

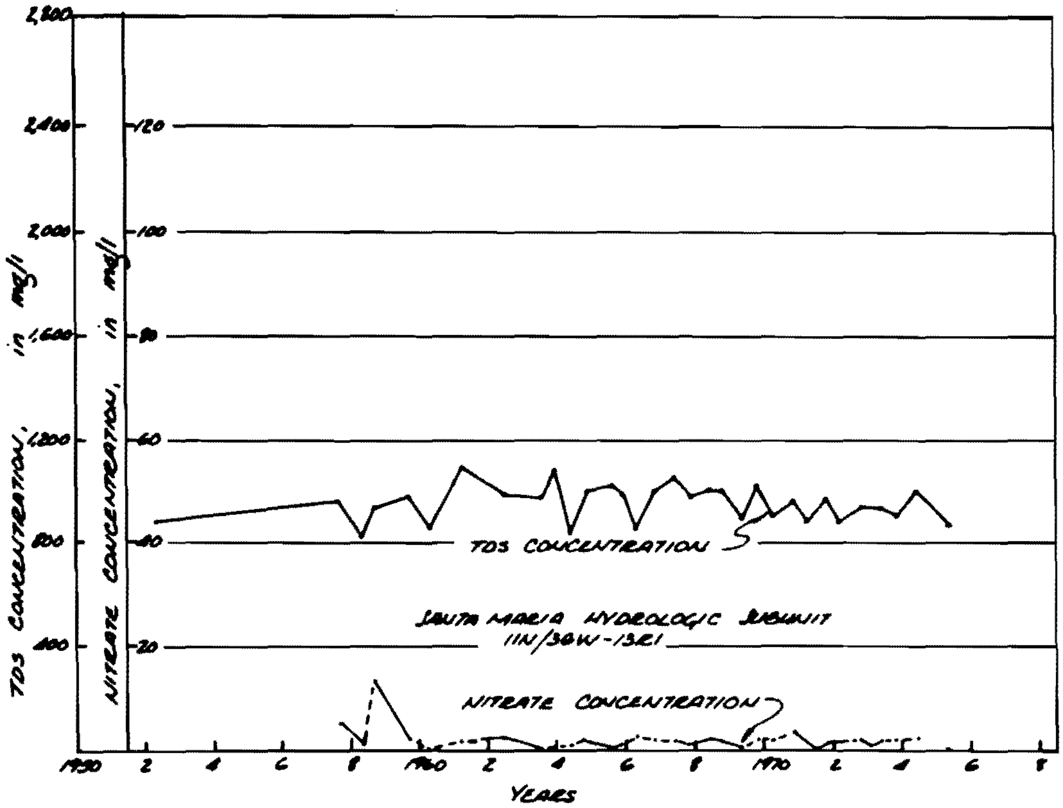


Figure 34 TDS AND NITRATE CONCENTRATION CHANGES IN WELL NO. 11N/36W-13R1

"(a) The natural salinity of the geologic environment (former tidal marshes and sloughs),

"(b) Salt concentration by evaporation,

"(c) Downward percolation of sea water entering tidal channels at times of extremely high tides."

The study found that water levels at the coast were then above sea level. However, the potential for sea water intrusion in the Paso Robles and Careaga aquifers existed; water levels in the southern part of the Arroyo Grande subarea and in the Santa Maria hydrologic subunit persistently declined during 1951-68 due to pumping. Nevertheless, the study concluded that sea water intrusion was an immediate onshore problem at the time.

In connection with the 1969 sea water intrusion study, 32 piezometers were constructed. Table 8 presents relevant data for these piezometers. A number of these piezometers were sampled in 1976 for mineral analyses. Table 9 compares the 1976 chloride concentrations in water from different depths in four holes with chloride concentrations observed in 1967. On the basis of these comparative observations, the basic conclusion of the 1969 study is still applicable--sea water intrusion is not an onshore problem at present.

Analyses from the two test holes, PSBO-1 and -2, in Nipomo Mesa, which were drilled especially for this study, are presented in Table 10. The results show no signs of sea water intrusion. The locations of these monitoring holes are shown on Figure 5.

Nevertheless, sea water intrusion cannot be discounted as a potential ground

TABLE 8
DESCRIPTION OF PIEZOMETERS*

Field number	State well number	Depth of hole, in feet	Length of casing,* in feet	Depth of perforations, in feet	Formation tapped
POO-1A	32S/12E-24B3	964	435	270-435	Careaga sand
POO-1B	32S/12E-24B2	964	145	120-145	Paso Robles
POO-1C	32S/12E-24B1	964	65	48-65	Alluvium
POO-2A	32S/12E-24R3	848	390	300-390	Careaga sand
POO-2B	32S/12E-24R2	848	100	75-100	Paso Robles
POO-2C	32S/12E-24R1	848	60	30-60	Paso Robles
POO-3A	32S/13E-30F3	802	372	305-372	Careaga sand
POO-3B	32S/13E-30F2	802	100	75-100	Paso Robles
POO-3C	32S/13E-30F1	802	55	15-30 40-55	Paso Robles
POO-4A	32S/13E-30N2	873	255	175-255	Paso Robles
POO-4B	32S/13E-30N3	873	135	60-135	Paso Robles
POO-4C	32S/13E-30N1	873	40	15-40	Alluvium
POO-5A	32S/13E-31F4	906	565	480-565	Careaga sand
POO-5B	32S/13E-31F3	906	260	240-260	Paso Robles
POO-5C	32S/13E-31F2	906	152	132-152	Paso Robles
OFO-1A	11N/36W-13K6	1,165	400	320-400	Paso Robles
OFO-1B	11N/36W-13K5	1,165	270	230-270	Paso Robles
OFO-1C	11N/36W-13K4	215	203	120-203	Paso Robles
OFO-1D	11N/36W-13K3	215	90	70-90	Alluvium
OFO-1E	11N/36W-13K2	215	45	30-45	Alluvium
GO-1A	10N/36W-2Q1	671	671	568-671	Paso Robles
GO-1B	10N/36W-2Q2	671	535	467-535	Paso Robles
GO-1C	10N/36W-2Q3	448	444	397-444	Paso Robles
GO-1D	10N/36W-2Q4	448	378	291-378	Paso Robles
GO-1E	10N/36W-2Q5	448	246	185-246	Alluvium
GO-1F	10N/36W-2Q6	448	176	130-176	Alluvium
GO-1G	10N/36W-2Q7	47	47	19-47	Alluvium
GO-2A	11N/36W-35J2	629	615	527-615	Paso Robles
GO-2B	11N/36W-35J3	629	495	247-495	Paso Robles
GO-2C	11N/36W-35J4	629	228	175-228	Alluvium
GO-2D	11N/36W-35J5	138	138	74-138	Alluvium
GO-2E	11N/36W-35J6	37	37	14-37	Recent sand dune

*From "California Department of Water Resources Bulletin 63-3 Sea-Water Intrusion: Pismo-Guadalupe Area, February 1970."

water management problem. The conclusion reached in the 1969 study that sea water intrusion is occurring offshore and may, in time, reach coastal wells remains valid. Intrusion is probably advancing landward from different salt water forebays at different rates in each confined aquifer. It will likely reach the coast first in shallow aquifers that are subject to heavy pumping and that crop out closer to the shore.

Replenishment

Most of the recharge to the study area originates as precipitation within the boundaries of the study area and its watershed. Rainfall on the basin may percolate to ground water. That on the watershed may run off to the study area to infiltrate and percolate to ground water or may directly infiltrate the weathered layer of the nonwater-bearing rock and migrate to the study area as subsurface flow. A significant amount of recharge also enters the study area as underflow in the Santa Maria Valley.

Because there are no data on infiltration rates or permeability of the sediments, estimates on replenishment to the study area are based upon information such as water levels in wells, long-term average precipitation, reasonable permeability factors of sediments, and local ground water conditions.

The estimated replenishment to the basin is based upon the area's average annual precipitation and calculations of subsurface inflow and outflow based on the 1975 water levels.

TABLE 9
SELECTED CONSTITUENTS IN THE SEA WATER INTRUSION MONITORING HOLES IN 1967 AND 1975 ARROYO GRANDE AREA

Hole number	Depth sampled in metres (feet)	Date sampled	EC	Cl (in mg/l)	TDS (in mg/l)	Dominant ions anions	Dominant ions cations
GO-2	160.6–187.5	9-28-67	1090	28	811	Ca	SO_4
	(527–615)	6-4-76	1072	27	795	Ca	SO_4
	75.3–150.9	9-28-67	1367	54	1031	Ca	SO_4
	(247–495)	6-4-76	1059	59	1059	Ca	SO_4
	53.3–69.5	9-28-67	1533	66	1177	Ca	SO_4
	(175–228)	6-4-76	1650	71	1256	Ca	SO_4
	22.5–42.1	9-28-67	1341	45	1029	Ca	SO_4
	(74–138)	6-4-76	1394	51	1043	Ca	SO_4
	4.3–11.3	4-20-67	848	94	546	Ca	HCO_3
	(14–37)	6-4-76		94	623	Ca	SO_4 HCO_3
GO-1	173.1–204.5	5-12-67	1129	30	900	Ca	SO_4
	(568–671)	5-21-76	977	26	700	Ca	SO_4
	142.3–163.0	5-12-67	989	23	766	Ca	SO_4
	(467–535)	5-21-76	1072	32	808	Ca	SO_4
	121.0–135.3	5-28-67	950	22	738	MgCa	SO_4
	(394–444)	5-21-76	977	24	727	Ca	SO_4
	88.7–115.2	5-28-67	1006	24	797	Ca	SO_4
	(291–378)	5-21-76	1038	31	754	Ca	SO_4
	56.4–75.0	5-27-67	1277	55	989	Ca	SO_4
	(185–246)	5-21-76	1278	64	943	Ca	SO_4
	40.0–53.1	5-26-67	1336	61	1047	Ca	SO_4
	(130–176)	5-21-76	1107	42	813	Ca	SO_4
	5.8–14.3	5-26-67	1126	138	780	Ca	HCO_3
	(19–47)	6-4-76	1028	89	683	Ca	HCO_3
OFO-1	97.6–121.9	10-2-67	1248	44	944	Ca	SO_4
	(340–400)	6-7-76	1279	40	970	Ca	SO_4
	70.1–82.3	10-2-67	1212	45	881	CaNa	SO_4
	(230–270)	6-7-76	1249	41	938	Ca	SO_4
	36.6–61.9	10-2-67	951	36	665	Ca	SO_4
	(120–203)	6-7-76	948	38	655	Ca	SO_4
	21.3–27.4	10-3-67	898	62	583	Ca	HCO_3
	(70–90)	6-7-76	Sample destroyed in transit				
	9.1–13.7	10-3-67	1169	136	707	Na	HCO_3
	(30–45)	6-7-76	943	80	564	Ca	HCO_3
POO-5	146.3–172	9-28-67	1010	83	570	Ca	SO_4
	(480–565)	5-26-76	971	96	599	Ca	HCO_3
	73.2–79.2	9-28-67	1386	48	1089	Ca	SO_4
	(240–260)	5-26-76	1087	51	1087	Ca	SO_4
	40.2–46.3	9-28-67	1283	44	949	Ca	SO_4
	(132–152)	5-26-76	1394	50	1069	Ca	SO_4

TABLE 10
SELECTED CONSTITUENTS IN TEST HOLES IN NIPOMO MESA
JUNE 8, 1976

Hole and depth of the sample	EC	pH	Ca	Mg	Na	K	HCO_3	SO_4	Cl	NO_3	Total dissolved solids in mg/l
			Milligrams per litre / Milliequivalents per litre								
PSBO - 1											
227 - 237	1212	7.9	130 / 6.49	48 / 3.92	72 / 3.12	3.5 / .09	223 / 3.66	423 / 8.81	38 / 1.06	0.6 / .01	936
535 - 545	1301	8.0	94 / 4.69	44 / 3.59	118 / 5.14	6.6 / .17	392 / 6.43	184 / 3.83	126 / 3.55	0.0 / .00	820
PSBO - 2											
280 - 290	1209	8.0	139 / 6.94	47 / 3.86	72 / 3.13	3.5 / .09	219 / 3.59	439 / 9.15	40 / 1.13	1.4 / .02	920
450 - 460	1258	7.7	129 / 6.44	52 / 4.27	90 / 3.92	4.6 / .12	184 / 3.02	488 / 10.15	48 / 1.35	1.4 / .02	1015
720 - 730	1170	7.8	89 / 4.44	43 / 3.53	98 / 4.26	5.9 / .15	293 / 4.80	235 / 4.89	94 / 2.65	0.4 / .61	813

The following data on replenishment are summarized in Table 11. Total replenishment to the Arroyo Grande Plain-Tri-Cities Mesa area is estimated to be 9.03 to 10.26 cubic hectometres (7,320 to 8,320 acre-feet). Of this amount, 2.96 cubic hectometres (2,400 acre-feet) is attributed to deep percolation of rain on the area; 0.27 cubic hectometre (220 acre-feet) to subsurface flow through the alluvium in Arroyo Grande and Los Berros Creeks; 0.62 cubic hectometre (500 acre-feet) to underflow from Nipomo Mesa and San Luis Hills, 2.47 to 3.70 cubic hectometres (2,000 to 3,000 acre-feet) to percolation of surface flow in the Arroyo Grande Creek; 2.10 cubic hectometres (1,700 acre-feet) to irrigation return water; and 0.61 cubic hectometre (500 acre-feet) to deep percolation of urban water used outdoors.

Outflow from the Arroyo Grande Plain-Tri-Cities Mesa area is estimated to be about 7.53 cubic hectometres (6,100 acre-feet). Of this amount, 6.54 cubic hectometres (5,300 acre-feet) is attributed to applied irrigation water; 0.74 cubic hectometre (600 acre-feet) to pumpage for urban supplies; and 0.25 cubic hectometre (200 acre-feet) to subsurface flow to the ocean.

Under these conditions, the ground water supply available in the Arroyo Grande Plain-Tri-Cities Mesa area would be increased by 1.75 to 2.98 cubic hectometres (1,420 to 2,420 acre-feet) annually.

Recharge to the Arroyo Grande Valley upstream from Arroyo Grande comes from subsurface seepage from the bordering highlands and infiltration of precipitation and of streamflow in Arroyo Grande Creek. The amount of replenishment from these sources was not determinable with the available data, however, changes in the water levels in the valley over the years

TABLE II
SUMMARY ESTIMATED INFLOW AND OUTFLOW TO THE GROUND WATER BASIN IN THE ARROYO GRANDE STUDY AREA

Arroyo Grande Plain – Tri-Cities Mesa

Category of inflow	Cubic hectometres	Acre-feet
Deep percolation of precipitation	2.96	2,400
Subsurface seepage	0.89	720
Infiltration in Arroyo Grande Creek	2.47 to 3.70	2,000 to 3,000
Irrigation and urban water return	2.71	2,200
Total	9.03 to 10.26	7,320 to 8,320
Category of outflow		
Applied irrigation	6.54	5,300
Urban supply	0.74	600
Subsurface outflow to ocean	0.25	200
Total	7.53	6,100

Nipomo Mesa

Category of inflow	Cubic hectometres	Acre-feet
Deep percolation of precipitation	4.07	3,300
Subsurface seepage	0.62	500
Irrigation and urban water return	1.23	1,000
Total	5.92	4,800
Category of outflow		
Applied irrigation	2.47	2,000
Urban supply	0.37	300
Industry cooling water	0.80	650
Subsurface outflow	4.07	3,300
Total	7.71	6,250

Santa Maria Valley (S.L.O. County)

Category of inflow	Cubic hectometres	Acre-feet
Deep percolation of precipitation	9.87	8,000
Subsurface seepage	24.05	19,500
Irrigation return	11.10	9,000
Total	45.02	36.500
Category of outflow		
Applied irrigation	35.77	29,000
Outflow to ocean	9.87	8,000
Total	45.64	37,000

SUMMARY OF WATER MANAGEMENT CONCEPTS

When, over an extended period, extractions exceed replenishments in a ground water basin, a declining trend of ground water levels is indicated: The basin is said to be in overdraft.

Under these circumstances, water managers very often adopt a safe yield operation, and ground water extractions are limited to just the safe yield amount. (A safe yield amount is defined as the average annual amount of ground water that can be extracted over a long-time period without reducing the amount of ground water in storage over that period.) Usually, the basin is replenished artificially with both local surface water and imported water to increase the safe yield amount.

This mode of basin management requires control of extractions through either adjudication or mutual agreement of ground water pumpers. At the same time, to help meet the demand, other sources of supply, such as surface water and imported water, are needed. These sources are usually more expensive than local ground water.

The elimination of overdrafting a basin requires careful consideration of the geohydrologic, environmental, economic, and social consequences. A long-term water management plan, including water conservation and waste water reclamation, has to be developed to ensure adequate supplies of water at a reasonable cost and with acceptable environmental consequences.

have been small, indicating that the inflow and outflow are near equilibrium for the prevailing hydrologic conditions. The Arroyo Grande Creek has a stabilizing influence on the ground water levels in the valley. The creek is apparently a losing stream in the upper reaches of the valley and a gaining stream in the lower reaches. Thus, infiltration in the creek channel contributes to the ground water in storage in the upper reaches of the valley and, downstream, the creek channel serves as a drain for rising ground water.

Estimated replenishment to Nipomo Mesa is 5.92 cubic hectometres (4,800 acre-feet). Of this amount, 4.07 cubic hectometres (3,300 acre-feet) is attributed to deep percolation of precipitation, 0.62 cubic hectometre (500 acre-feet) to subsurface seepage from the nonwater-bearing sediments upstream, 0.98 cubic hectometre (800 acre-feet) to irrigation return, and 0.25 cubic hectometre (200 acre-feet) to waste water and percolating urban water used outdoors.

Estimated outflow from Nipomo Mesa is 7.71 cubic hectometres (6,250 acre-feet). Of this amount, 4.07 cubic hectometres (3,300 acre-feet) is attributed to subsurface outflow to the ocean, to the Arroyo Grande Plain, and to the Santa Maria Valley; 0.37 cubic hectometre (300 acre-feet) is attributed to extraction by the community of Nipomo; 0.80 cubic hectometre (650 acre-feet) to extraction by industry for cooling water which is then discharged to the ocean; and 2.47 cubic hectometres (2,000 acre-feet) to extraction for irrigation. Under these conditions, the ground water in storage would be reduced by 1.79 cubic hectometres (1,450 acre-feet) annually.

Estimated replenishment to the portion of Santa Maria Valley within San Luis Obispo County is 45.02 cubic hectometres (36,500 acre-feet). Of this amount, 9.87 cubic hectometres (8,000 acre-feet) is attributed to deep percolation of precipitation, 11.10 cubic hectometres (9,000 acre-feet) to irrigation return, 2.84 cubic hectometres (2,300 acre-feet) to underflow seepage from Nipomo Mesa, and 21.22 cubic hectometres (17,200 acre-feet) to underflow from the Santa Maria Valley south of the San Luis Obispo County boundary.

Estimated outflow from the Santa Maria Valley (San Luis Obispo County) is

45.64 cubic hectometres (37,000 acre-feet). Of this amount, approximately 9.87 cubic hectometres (8,000 acre-feet) is attributed to outflow to the ocean and 35.77 cubic hectometres (29,000 acre-feet) to irrigation water. Under these conditions, the ground water in storage would be reduced by 0.62 cubic hectometre (500 acre-feet) annually.

There is a difference in the amount of water that is available from ground water sources as indicated by the water level measurements and by the estimated flow into and out of the basin. Such differences in results of the two measurements are to be expected when data are distributed unevenly and when estimations of hydrologic conditions are applied over large areas. Although these inconsistencies are not large, a continuing program for collecting and reviewing ground water data is mandatory to update and improve understanding of the basin and its available ground water supply.

V. OFFSHORE AQUIFERS

The probability that the confined aquifers under the land surface in the study area extend some distance offshore is indicated by the regional geology and by information from the seismic profile obtained in a 1973 USGS survey offshore.

These aquifers are believed to contain fresh water because ground water levels in the forebay areas are not thought to have been below sea level for any extended period. Therefore, to evaluate this potential water supply, a major portion of this study was directed toward defining the amount of water in storage, the physical dimensions and characteristics of the aquifers, and the potential of developing this water supply.

There is no direct subsurface geologic or water quality information on the offshore area; therefore, the existence and the probable character of the offshore aquifer system are inferred from the regional geology and the geologic information developed during this study.

First, along the California coast, large creeks and rivers, such as the Arroyo Grande Creek and the Santa Maria River, typically deposit thick sections of sediments offshore. These deposits can extend for several kilometres offshore and can be hundreds of metres thick. The sediments form aquifers and aquicludes and are in hydraulic continuity with onshore forebay areas. Because these forebay areas have probably been above sea level for sometime and have maintained a seaward hydraulic gradient in the ground water, the aquifers offshore probably contain fresh water. Second, the geology offshore can be constructed by extending the geology on land into the area offshore.

The shape and size of the offshore aquifer systems result largely from the structural geologic features that extend from the land to the offshore area. A syncline gives the basin depth and provides a relatively stable depositional environment in which the strata could form in extensive undisturbed layers. The general shape and location of the syncline was recognized in the 1970 sea water intrusion investigation. The large size and the character of the syncline imply that the structure extends for some distance offshore.

The study area lies on the longer north limb of an asymmetrical syncline. The axis of the syncline trends northwestward offshore near the south boundary of the study area, intersecting the shore near the Santa Maria River. The north limb extends about 13 kilometres (8 miles) at the shoreline and underlies the north side of Santa Maria Valley and the Nipomo Mesa. The south limb is shorter, being about 1.6 to 3.2 kilometres (1 to 2 miles) in width.

The north and south limbs of the syncline are intersected by longitudinal faults that may or may not be barriers to the flow of ground water. The fault on the north limb of the syncline was suggested by the lack of correlation between the E-logs of POO-5 and PSBO-1. To further substantiate the existence of the fault, an E-log from an oil well between POO-5 and PSBO-1 was found to contain similarities that correlate with POO-5, indicating that the beds from the north were dipping more sharply southward than was suggested by correlations between wells to the south. The fault across the south limb is suggested by the alignment of sharp folds onshore with faults and folds offshore.

By projecting the geology on the land into the offshore area, a theoretical offshore aquifer system can be constructed, which is a continuation westward of the system below the land surface. The

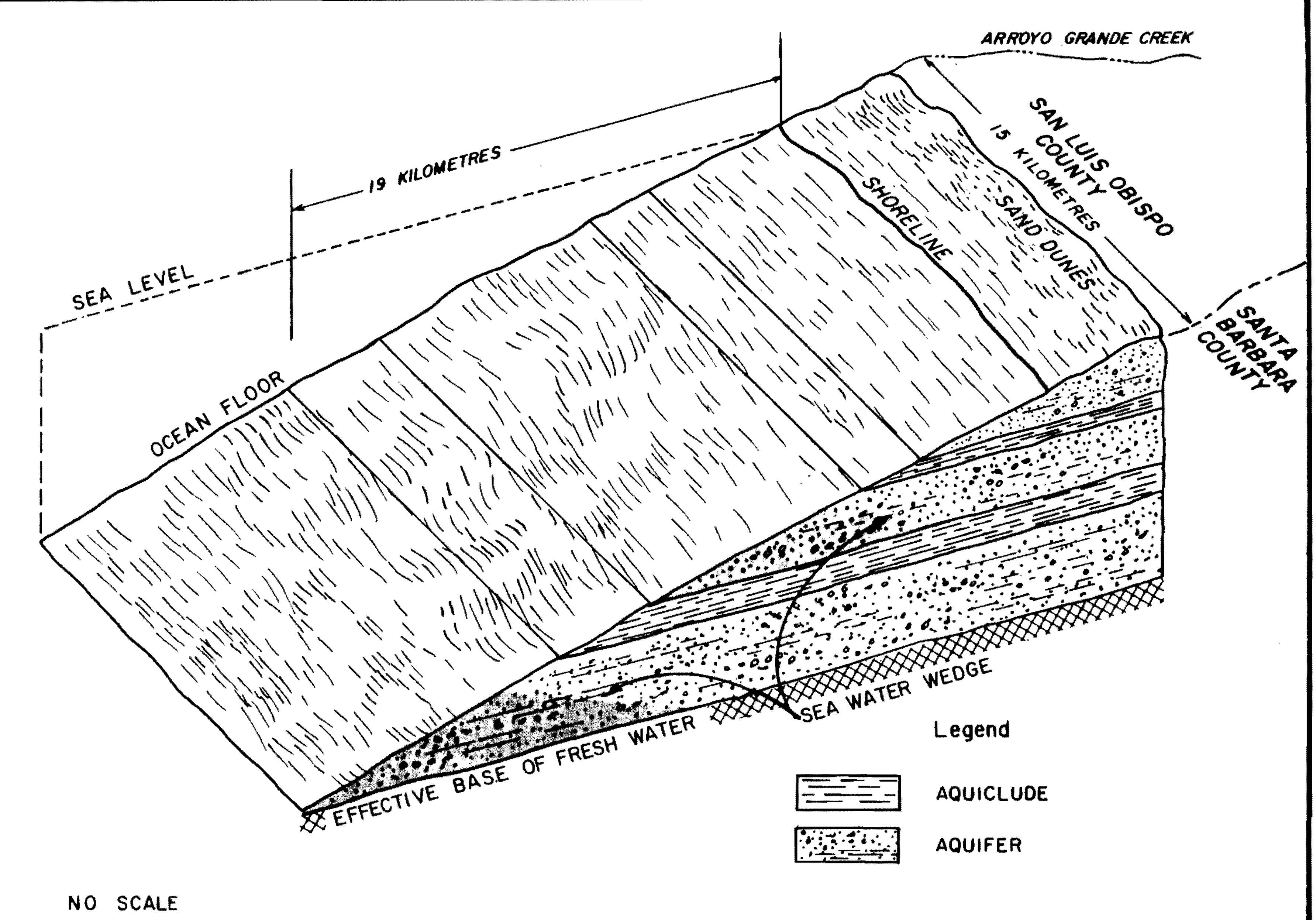


Figure 35 - CONCEPTUAL DRAWING OF THE OFFSHORE AQUIFERS

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

concept of the offshore aquifer is shown in Figure 35. The cross section on the beach showed that there were two aquifer systems and that if these aquifers were projected westward offshore without a dip to where they surface on the ocean floor they would have the following dimensions: The upper aquifer would measure 15 kilometres (9 miles) along the beach from Arroyo Grande Creek to Santa Maria River and 10 kilometres (6 miles) seaward from the beach. It would have an average thickness of 60 metres (190 feet). The lower aquifer would measure the same distance along the beach and 19 kilometres (12 miles) seaward at its furthest point, and it would have an average thickness of 130 metres (430 feet). The aquifers are thickest at the south end near the San Luis Obispo County line.

The overall configuration of the sedimentation and of the confined aquifers offshore is based upon reasonable geologic assumptions, but, locally, the sedimentary picture can be different. The main concern is that the confining layers separating the sea water from the fresh water aquifers may be leaky, permitting the sea water to mix with the fresh water. If such a condition exists, the lower aquifer, lying below an aquifer and under its own thick confining clay layer, would not be nearly as vulnerable to sea water intrusion from above as the upper aquifer.

Quantity and Quality

There was no direct on-site information available on the water-bearing character of the sediments offshore. Therefore, to expedite estimating the ground water in storage offshore, the calculated specific yield and the lithologic description of the sediments penetrated by wells on the beach were considered representative of the offshore sediments.

The sea water intrusion monitoring holes and the two new county exploratory holes show that there are at least two confined aquifer systems separated by an 18-metre (60-foot) clay layer. The upper layer is confined by a less prominent clay stratum that may not be more than 6 metres (20 feet) thick in some places. The calculated specific yields for the upper and lower aquifers are 9 and 8 percent, respectively.

There is an estimated 3 700 cubic hectometres (3,000,000 acre-feet) of water in storage offshore between Arroyo Grande Creek and the San Luis Obispo County line, with about 600 cubic hectometres (500,000 acre-feet) in the upper aquifer and 3 100 cubic hectometres (2,500,000 acre-feet) in the lower aquifer.

However, not all the water in offshore storage is fresh. A sea water wedge exists in aquifers exposed on the ocean floor due to the differential in density between that of sea water and fresh water (Appendix C). The higher density sea water encroaches at the bottom of the aquifer as a wedge, with the toe approaching the land first. The extent of sea water encroachment into the aquifer is a function of the hydraulic gradient within the aquifer and the thickness of the aquifer. If the seaward hydraulic gradient were 3 metres (10 feet) per 4.8 kilometres (3 miles) in the vicinity of hole GO-2, the sea water wedge in the upper aquifer would extend landward 2.4 kilometres (1.5 miles) and in the lower aquifer, 8.5 kilometres (5.3 miles). With a similar hydraulic gradient the wedge would be shorter to the north where the aquifers are not as thick.

The quality of the fresh water offshore cannot be determined but may be similar to that in wells near the beach. Because the water from deeper sediments in this area is generally higher in TDS concentration, the quality could also deteriorate with distance offshore.

Potential Use of Water

Because the geology and water quality sampling along the beach give strong indications that there could be substantial amounts of fresh water in confined aquifers offshore, consideration should be given to the recovery and use of this water. However, before a decision to use it is made, the method of use, approach in using it, consequences of the use and actions needed after the use should be given careful thought.

The use of offshore fresh water does not require any specific offshore facility. It simply requires that: (1) ground water be used as needed; and (2) if new wells are developed, they be perforated in either the upper or lower aquifers to minimize intermixing of water between aquifers.

This will, in time, result in lowering the piezometric head in the Paso Robles Formation, which will induce the landward movement of offshore fresh water. This fresh water constitutes, along with the water that percolates to the onshore ground water basin, the water supply that can be used for a certain period of time.

The test holes drilled for the investigation, along with the test holes drilled earlier for a sea water intrusion study, form a monitoring system to detect encroachment of the sea water wedge. Because the movement of ground water is slow, when sea water appears in the monitoring holes, adequate time will still be available to take remedial action before the sea water wedge affects the quality of water in the production wells. For example, in the case of Ventura County a sea water intrusion front moved at the rate of about 1.6 kilometres (1 mile) per 10 years.

As new wells are drilled and more ground water is used, additional data such as specific capacity, transmissivity, and water level change will become available. The data can be analyzed and the plan of use can be refined with experience.

If the fresh water moves landward as predicted, the sea water wedge will come closer to shore. In time, it will be observed in the monitoring wells.

As the piezometric pressure declines in the Paso Robles Formation, wells located in fringe areas would "go dry." To ensure continued water supplies to the area overlying the Paso Robles Formation, provision would have to be made for making ground water available from adjacent areas.

The use of offshore fresh water necessarily requires that water levels onshore be lowered (planned decrease in storage). An institutional mechanism may have to be established to protect the advantages that existing ground water pumpers are expected to enjoy.

When the sea water wedge reaches the production wells, another supply must be available so that a substantial reduction could take place in the use of ground water. This would restore the piezometric head, which would reverse the ground water movement. Then the amount of ground water used each year in the area would have to be maintained at an amount equal to or less than average annual replenishment.

Developing new water supplies must be an important part of long-term basin management planning and should be arrived at only after thoroughly considering all alternatives. Additional water supplies to this area could be obtained from the State Water Project, the Nacimiento Reservoir, desalination, treated waste water, bottled water, or a combination of the sources. An effective water conservation program could decrease demands.

The use of offshore fresh water could delay the need to finance facilities for an additional water supply. The questions of how much and how long the offshore ground water could be relied upon as a supply cannot be answered precisely with the available data. However, useful operational information could be obtained during actual use of the ground water. If 25 to 50 percent of the water in storage offshore is recoverable fresh water, the aquifer could provide 925 to 1 850 cubic hectometres (750,000 to 1,500,000 acre-feet) of water to the onshore basin and to the local water supply.

At the projected rate of ground water usage, the replenishment to the area and the water that is estimated to be in storage in the basin appear sufficient to meet water demands to year 2000.

The offshore water returning to the onshore portion of the study area would not be expected to become part of the water supply until sometime after year 2000. However, the timing of the arrival of offshore fresh water and of sea water depends upon the pumping practices in the basin. Concentrated heavy pumping of wells in shallow aquifers would bring offshore water onshore sooner. Dispersing production wells and pumping from the deeper aquifers would delay the appearance of sea water onshore.

For those persons wishing more information, a bibliography of selected references is contained in Appendix D.

APPENDIX A

LITHOLOGS AND ELECTRIC LOGS
OF TEST HOLES PSBO-1 AND PSBO-2

PSBO-1

GO INTERNATIONAL — **INDUCTION ELECTRICAL LOG**

FILING NO.

COMPANY SAN LUIS OBISPO COUNTY(ENG.DEPT.)
WELL TEST WELL #1
FIELD PISMO STATE BEACH
COUNTY SAN LUIS OBISPO STATE CALIFORNIA
LOCATION: N/A

Other Services

SEC N/A TWP N/A RGE N/A

Permanent Datum G.L. Elev. 22.5
Log Measured from K.B., 3 Ft Above Permanent Datum
Drilling Measured from K.B.

Elevations: KB N/A, DF, GL N/A

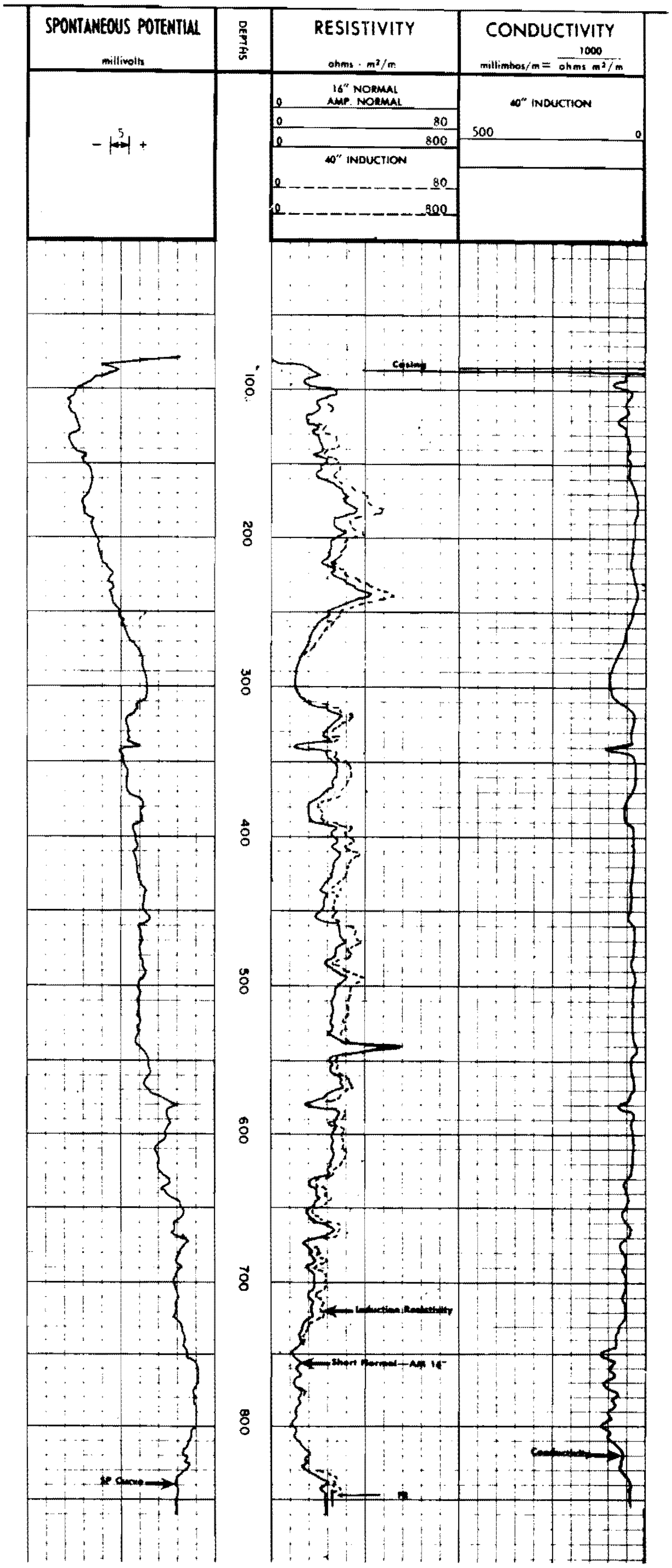
Date	11/1[illegible]
Run No.	ONE
Depth—Driller	[illegible]
Depth—Logger	[illegible] −3' = 846
Bottom Logged Interval	[illegible]
Top Logged Interval	[illegible]
Casing—Driller	12 @ [illegible]
Casing—Logger	[illegible]
Bit Size	9 [illegible]
Type Fluid in Hole	GEL BASE
Density and Viscosity	N/A, N/A
pH and Fluid Loss	N/A, N/A cc
Source of Sample	N/A
Rm @ Meas. Temp.	[illegible] °F
Rmf @ Meas. Temp.	[illegible] °F
Rmc @ Meas. Temp.	[illegible] °F
Source of Rmf and Rmc	M, M
Rm @ BHT	[illegible] °F
Time Since Circ.	[illegible]
Max. Rec. Temp. Deg. F.	[illegible] °F
Equip. No. and Location	[illegible]
Recorded By	GENTRY
Witnessed By	MR. BRITTON

Equipment Data: Run No. ONE; Tool Type 6FF40; Tool Position FREE; S O; Tool No. 56; Elec. No.; Panel No. 44; Other

Scale Changes: Type Log; Depth; Scale Up Hole; Scale Down Hole

Changes in Mud Type or Additional Samples: Date; Sample No.; Depth Driller; Type Fluid in Hole; Dens.; Visc.; pH; Fluid Loss; Source of Sample; Rm @ Meas Temp; Rmf @ Meas Temp; Rmc @ Meas Temp; Source Rmf Rmc; Rm @ BHT; Rmf @ BHT; Rmc @ BHT

Remarks: N/A:INFORMATION NOT AVAILABLE



LITHOLOG OF EXPLORATORY HOLE
PISMO STATE BEACH OBSERVATION NO. 1 (PSBO-1)

State Well Numbers: 12N/36W - 36L1 - 36L2 (hole contains 2 piezometers)

Hole diameter: 8 inches

Depth Interval in feet	Description of Sediments
0- 44	Dune Sand.
44- 78	Gravel and coarse sand. Dark minerals, sea shells.
78- 105	Silty clay. Soft organic clay.
105-125	Silty sand and silty clay. Organic clay and shells.
125-140	Silty clay. Organic clay.
140-240	Medium sand and gravel. Brown iron stained sand and gravel and light brown clay stringers.
240-260	Fine sand, gravel and clay. Brown sand, gravel and clay.
260-310	Silty clay. Black silty clay, some large gravel.
310-370	Fine sand and silty clay. White sand and gravel, black silty clay.
370-380	Sand and gravel. White sand and gravel, pebbles to 3/4-inch.
380-400	Clay and gravel. Soft tan clay and white gravel.
400-460	Coarse sand and gravel. White sand and gravel.
460-490	Medium sand. Green sand.
490-550	Fine sand and gravel. Blue-gray sand and gravel, some olive and brown clays.
550-630	Fine sand and gravel and shells. Blue sand and gravel.
630-755	Silty clay and shells. Plastic olive clay.
755-830	Silty clay. Olive clay, some shell fragments.
830-847	Sand clay. Olive clay, some shell fragments.

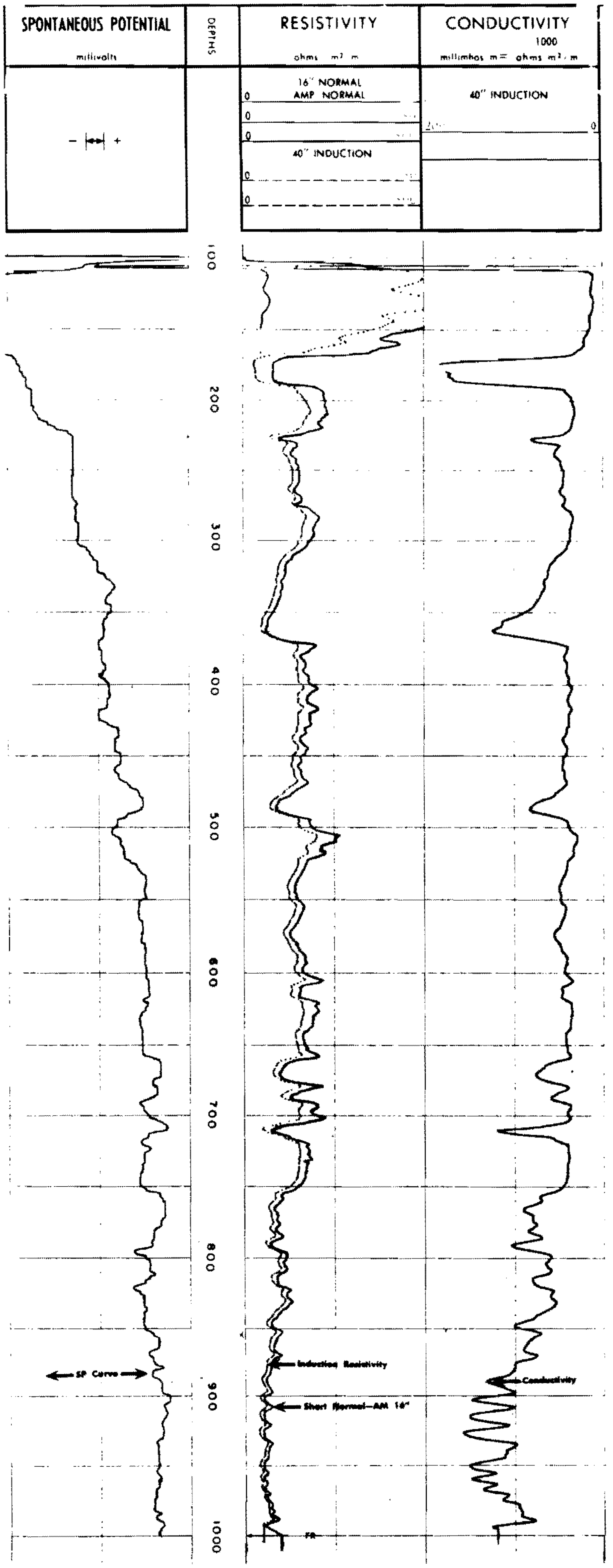
PSBO-2

GO INTERNATIONAL — INDUCTION ELECTRICAL LOG

FILING NO.	
COMPANY	SAN LUIS OBISPO COUNTY ENG. DEPT.
WELL	TEST WELL #2
FIELD	PISMO STATE BEACH
COUNTY	SAN LUIS OBISPO
STATE	CALIFORNIA
LOCATION	N/A
SEC	N/A
TWP	[illegible]
RGE	N/A
Other Services	
Permanent Datum	G.L.
Elev.	19.5
Log Measured from	[illegible] Ft Above Permanent Datum
Drilling Measured from	G.L.
Elevations: KB	N/A
DF	
GL	N/A

Date	12/1972			
Run No.	ONE			
Depth—Driller	[illegible]			
Depth—Logger	[illegible]			
Bottom Logged Interval	[illegible]			
Top Logged Interval	[illegible]			
Casing—Driller	[illegible] @ [illegible]	@	@	@
Casing—Logger	[illegible]			
Bit Size	[illegible]			
Type Fluid in Hole	[illegible]			
Density and Viscosity	N/A			
pH and Fluid Loss	N/A cc	cc	cc	cc
Source of Sample	[illegible]			
Rm @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	N/A			
Rm @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	[illegible]			
Max. Rec. Temp. Deg. F	°F	°F	°F	
Equip. No. and Location	[illegible]			
Recorded By	[illegible]			
Witnessed By	N/A			

Changes in Mud Type or Additional Samples	Date; Sample No.; Depth-Driller; Type Fluid in Hole; Dens. / Visc.; pH / Fluid Loss; Source of Sample; Rm @ Meas. Temp.; Rmf @ Meas. Temp.; Rmc @ Meas. Temp.; Source Rmf / Rmc; Rm @ BHT; Rmf @ BHT; Rmc @ BHT
Scale Changes	Type Log; Depth; Scale Up Hole; Scale Down Hole
Equipment Data	Run No.; Tool Type; Tool Position; S.O.; Tool No.; Elec. No.; Panel No.; Other
Remarks	[illegible]



LITHOLOG OF EXPLOR.TORY HOLE, (PSBO-2)

State Well Numbers: 11N/36W - 12C1, 12C2, 12C3 (hole contains 3 piezometers)

Hole diameter: 10 inches

Depth Interval in feet	Description of Sediments
0- 98	Fine Sand. Reddish-brown dune sand.
98-102	Silty clay. Dark grey silty clay.
102-168	Fine to medium sand. Reddish-brown sand 102 to 150 feet; white and black sand from 150 to 168 feet; some stringers of clay.
168-170	Sand and clay. 70 percent buff to red sand/30 percent clay; some gravel.
170-190	Clay. Buff to light brown clay with some gravel from 170 to 172 feet; blue-green sticky clay from 172 to 190 feet.
190-225	Fine to coarse sand. 70 percent fine reddish brown sand/ 30 percent coarse white sand.
225-275	Fine sand and clay. Fine white sand with stringers of soft yellow sandy clay.
275-310	Fine sand, gravel and sandy clay. 80 percent fine sand and gravel/20 percent yellow sandy clay.
310-330	Silty clay and fine sand. 60 percent olive clay/40 percent fine white sand and gravel.
330-375	Clay and fine sand. 80 percent olive clay/20 percent white sand.
375-395	Clay, sand and gravel. Yellow clay, white sand and gravel.
395-455	Gravel and sand. 80 percent white gravel/20 percent white and grey iron stained sand.
455-470	Gravel and sand. 90 percent fine white sand/10 percent white and grey coarse sand. Iron stained sediments.
470-480	Fine sand and clay. 90 percent fine sand/10 percent dark grey clay.
480-530	Clay. shells, gravel and sand. 50 percent olive clay/up to 40 percent shells/blue and black gravel and sand.

Depth Interval in feet	Description of Sediments
530-600	Clay. Mushy to plastic olive clay, many shell fragments.
600-620	Gravel and clay. Blue-green gravel and clay.
620-660	Fine sand and gravel. Blue sand and gravel; traces of silty light blue clay; many shell fragments.
660-670	Shells and sand. 90 percent shell fragments/10 percent blue sand.
670-700	Clay. Stiff, silty, olive clay; a few shell fragments.
700-720	Sandy clay and coarse sand. 85 percent sandy olive clay/ 15 percent green sand and gravel.
720-750	Sandy clay and gravel. Olive sandy clay; blue and green gravel and sand.
750-760	Gravel and sand. Light blue gravel and sand; some shell fragments.
760-1000	Silty clay. Stiff, silty olive clay.

APPENDIX B

GROUND WATER QUALITY DATA

APPENDIX B
GROUND WATER QUALITY DATA

MINERAL ANALYSES OF GROUND WATER

DATE / TIME	SAMPLER / LAB	TEMP	FIELD / LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F / SIO2	TDS / SUM	TH / NCH	SAR	REM
					MINERAL CONSTITUENTS IN	MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE								MILLIGRAMS PER LITER					
	T	CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-10	SAN LUIS OBISPO HYDRO UNIT																	
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																	
	T-10.C1	ARROYO GRANDE HYDRO SUBAREA																	
	31S/14E-31K01 M																		
06/03/64					90	43	27	2.0	0	383	122	18	2.4	.04	.5	526	402		
	5050		7.6	789	4.49	3.54	1.17	.05	.00	6.28	2.54	.51	.04		30.0	523	89	0.6	
					49	38	13	1		67	27	5							
	31S/14E-31N02 M																		
10/21/71	5117	61.0F			93	47	28	2.0	0	327	183	17	1.6	.03	.3	565	425		
1045	5050	16.1C	8.2	851	4.64	3.87	1.22	.05	.00	5.36	3.81	.48	.03		--	532	158	0.6	
					47	40	12	1		55	39	5							
	31S/14E-32G03 M																		
06/03/64		59 F			78	43	40	2.0	0	296	157	32	1.5	.03	.5	554	372		
	5050	15 C	8.0	838	3.89	3.54	1.74	.05	.00	4.85	3.27	.90	.02		--	499	120	0.9	
					42	38	19	1		54	36	10							
10/28/71	5117	60.0F			74	30	22	1.4	0	276	101	18	.4	.02	.4	400	300		
1000	5050	15.5C	8.2	618	3.69	2.47	.96	.04	.00	4.52	2.10	.51	.01		--	383	82	0.5	
					52	34	13	1		63	29	7							
	32S/12E-24J01 M																		
09/28/61					33	17	52	4.0	0	43	56	64	96.0	.07	.1	404	151		F
	5050		7.8	580	1.65	1.40	2.26	.10	.00	.70	1.17	1.80	1.55		30.0	373	118	1.8	
					30	26	42	2		13	22	34	10						S
	32S/12E-24K01 M																		
09/28/61					145	65	333	7.0	0	442	162	603	8.1	.03	.2	1677	630		
	5050		7.9	2445	7.24	5.35	14.49	.18	.00	7.24	3.37	17.00	.13		33.0	1573	268	5.8	
					27	20	53	1		26	12	61							
07/13/62					158	58	312	6.0	0	445	192	550	.0	.08	.1	1514	633		
	5801		7.8	2600	7.88	4.77	13.57	.15	.00	7.29	4.00	15.51	.00		32.0	1527	268	5.4	
					30	18	51	1		27	15	58							
11/02/67		62 F			81	51	109	8.0	0	482	95	107	3.0	.14	.2	748	412		
1415	5050	17 C	8.1	1197	4.04	4.19	4.74	.20	.00	7.90	1.98	3.02	.05		--	691	17	2.1	
					31	32	36	2		61	15	23							
	32S/12E-24P01 M																		
06/16/65		67 F			69	63	160	6.0	0	341	110	268	33.0	.12	.1	898	431		
	5801	19 C	7.9	1500	3.44	5.18	6.96	.15	.00	5.59	2.29	7.56	.53		--	877	152	3.4	N
					22	33	44	1		35	14	47	3						
01/18/66		63 F			113	47	137	3.0	0	187	87	345	67.0	.08	.2	1082	476		
	5050	17 C	7.6	1687	5.64	3.87	5.96	.08	.00	3.06	1.81	9.73	1.08		--	891	323	2.7	
					36	25	38	1		20	12	62	7						
03/10/67		67 F			106	89	664	21	0	984	48	871	5.5	.70	--	2410	631		
	5050	19 C	8.2	4280	5.29	7.32	28.88	.54	.00	16.13	1.00	24.56	.09		--	2289	0	11.5	
					13	17	69	1		39	2	59							
09/27/67		62 F			43	22	79	4.0	0	92	77	96	112	.04	.2	557	198		
	5050	17 C	7.7	826	2.15	1.81	3.44	.10	.00	1.51	1.60	2.71	1.81		--	479	123	2.4	
					29	24	46	1		20	21	36	24						
	32S/12E-24R02 M																		
06/16/65		64 F			61	40	45	2.0	0	226	132	64	10.0	.10	.1	500	317		
	5801	18 C	7.9	745	3.04	3.29	1.96	.05	.00	3.70	2.75	1.80	.16		--	465	132	1.1	N
					36	39	24	1		44	33	21	2						
01/18/66		62 F			75	23	45	2.0	0	203	[illegible]	71	9.5	.00	.2	458	282		
	5050	17 C	8.1	758	3.74	1.89	1.96	.05	.00	3.33	1.96	2.00	.15		--	419	115	1.2	
					49	25	26	1		45	26	27	2						
03/09/67		63 F			77	46	55	3.0	0	216	75	141	23.0	.00	--	581	381		
	5050	17 C	7.9	1060	3.84	3.78	2.39	.08	.00	3.54	1.56	3.98	.37		--	526	204	1.2	
					38	37	24	1		37	17	42	4						S
09/27/67		62 F			82	30	53	3.0	0	206	85	121	29.0	.00	.2	580	328		
	5050	17 C	7.9	912	4.09	2.47	2.31	.08	.00	3.38	1.77	3.41	.47		--	504	159	1.3	
					46	28	26	1		37	20	38	5						
	32S/12E-24R03 M																		
06/16/65		66 F			116	52	63	3.0	0	403	168	103	5.0	.08	.2	748	504		
	5801	19 C	7.7	1160	5.79	4.28	2.74	.08	.00	6.61	3.50	2.90	.08		--	708	173	1.2	N
					45	33	21	1		50	27	22	1						
01/19/66		67 F			110	45	50	3.0	0	376	167	54	1.0	.00	.2	640	460		
	5050	19 C	7.8	1051	5.49	3.70	2.18	.08	.00	6.16	3.48	1.52	.02		--	615	152	1.0	
					48	32	19	1		55	31	14							
09/26/67		70 F			80	46	44	3.0	0	339	163	32	.0	.03	.2	612	389		
	5050	21 C	7.6	922	3.99	3.78	1.91	.08	.00	5.56	3.39	.90	.00		--	535	111	1.0	
					41	39	20	1		56	34	9							
	32S/13E-01G01 M																		
09/30/54		68 F			92	46	28	2.0	0	382	132	24	5.0	.00	.2	[illegible]56*	419		
	5786	20 C	8.2	865	4.59	3.78	1.22	.05	.00	6.26	2.75	.68	.08		--	517	106	0.6	
					48	39	13	1		64	28	7	1						
03/02/61					102	51	32	2.0	6.0	413	137	34	.0	.08	.2	578*	464		
	580[illegible]		8.3	890	5.09	4.19	1.39	.05	.20	6.77	2.85	.96	.00		26.0	593	116	0.6	C
					47	39	13		2	63	26	9							
10/17/66		59 F			106	29	31	3.0	0	366	144	26	1.8	.00	--	549	384		
845	5050	15 C	8.3	958	5.29	2.38	1.35	.08	.00	6.00	3.00	.73	.03		--	521	84	0.7	
					54	26	15	1		61	31	7							
06/20/68					101	56	32	2.0	0	450	132	34	.	.09	.5	578	483		
1115	5050		7.6	934	5.04	4.61	1.39	.05	.00	7.38	2.75	.96	.01		--	579	114	0.6	
					45	42	13			66	25	9							

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN					MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE				MILLIGRAMS PER LITER					
	7	CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-10	SAN LUIS OBISPO HYDRO UNIT																	
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																	
	7-10.C1	ARROYO GRANDE HYDRO SUBAREA																	
	32S/13E-01M01	M																	
06/03/64					103	50	29	2.0	26	338	147	29	.5	.03	.6	614	463		
	5050		8.5	887	5.14	4.11	1.26	.05	.87	5.54	3.06	.82	.01		--	553	142	0.6	
					49	39	12		8	54	30	8							
	32S/13E-04N01	M																	
08/28/63		70 F			7.0	3.0	40	1.0	0	30	9.0	53	3.6	.05	1.4	200	30		E
1115	5801	21 C	6.2	220	.35	.25	1.74	.03	.00	.49	.19	1.49	.06		63.0	194	6	3.2	
					15	11	73	1		22	9	67	3						
	32S/13E-08J01	M																	
03/03/61					42	12	72	2.0	0	103	43	135	.0	.03	1.8	374*	155		
	5801		6.8	685	2.10	.99	3.13	.05	.00	1.69	.90	3.81	.00		45.0	402	70	2.5	
					33	16	50	1		26	14	60							
	32S/13E-11M01	M																	
06/11/54		68 F			9.0	3.0	30	1.0	0	49	8.0	35	.0	.10	1.0	207*	35		E
	5786	20 C	7.3	267	.45	.25	1.31	.03	.00	.80	.17	.99	.00		--	110	0	2.2	TC
					22	12	64	1		41	9	51							
	32S/13E-12C01	M																	
07/01/54		65 F			135	62	33	2.0	0	462	239	37	5.0	.10	.1	938*	592		E
	5786	18 C	7.4	1190	6.74	5.10	1.44	.05	.00	7.57	4.98	1.04	.08		--	740	214	0.6	T
					51	38	11			55	36	8	1						S
03/02/61					133	64	34	2.0	0	468	232	38	.0	.10	.2	734*	595		
	5801		7.4	1120	6.64	5.26	1.48	.05	.00	7.67	4.83	1.07	.00		29.0	762	212	0.6	C
					49	39	11			57	36	8							
08/24/62		64 F			186	23	34	2.0	0	490	187	36	.0	.10	.2	766	559		E
	5801	18 C	7.5	1065	9.28	1.89	1.48	.05	.00	8.03	3.89	1.02	.00		32.0	741	157	0.6	C
					73	15	12			62	30	8							
06/03/64					100	63	30	2.0	0	410	172	35	3.0	.09	.5	676	509		
	5050		8.1	992	4.99	5.18	1.31	.05	.00	6.72	3.58	.99	.05		--	607	173	0.6	
					43	45	11			59	32	9							
10/21/71	5117	66.0F			114	62	33	2.0	0	471	170	31	4.3	.07	.3	690	540		
1200	5050	18.9C	8.0	1056	5.69	5.10	1.44	.05	.00	7.72	3.54	.87	.07		--	648	154	0.6	
					46	42	12			63	29	7	1						
	32S/13E-12C04	M																	
06/03/64					101	68	40	2.0	0	290	300	46	.0	.10	.5	808	532		E
	5050		8.0	1103	5.04	5.59	1.74	.05	.00	4.75	6.25	1.30	.00		--	700	294	0.8	
					41	45	14			39	51	11							
	32S/13E-12M01	M																	
06/03/64		64 F			263	108	49	2.0	0	540	644	62	.5	.17	.7	1544	1101		E
	5050	18 C	7.1	1889	13.12	8.88	2.13	.05	.00	8.85	13.41	1.75	.01		--	1394	658	0.6	C
					54	37	9			37	56	7							
	32S/13E-12Q02	M																	
06/11/54		68 F			106	37	44	1.0	0	341	83	57	3.1	.15	.4	550*	417		
	5786	20 C	7.5	950	5.29	3.04	1.91	.03	.00	5.59	1.73	1.61	.05		--	499	137	0.9	
					52	30	19			62	19	18	1						S
08/29/57					79	41	51	1.0	0	325	123	57	.0	.53	.2	611	366		
	5800		7.9	895	3.94	3.37	2.22	.03	.00	5.33	2.56	1.61	.00		23.0	535	99	1.2	
					41	35	23			56	27	17							
09/29/58					76	44	47	1.0	0	337	122	52	.0	.24	.3	648	371		E
	5800		7.7	883	3.79	3.62	2.04	.03	.00	5.52	2.54	1.47	.00		33.0	541	95	1.1	
					40	38	22			58	27	15							
09/22/59					--	--	--	--	0	319	--	60	--	--	--		378		
	5800		7.4	880					.00	5.23		1.69			--				
																			S
10/06/60		66 F			79	45	46	1.0	0	331	139	51	.0	.30	.9	594*	382		
	5801	19 C	7.5	974	3.94	3.70	2.00	.03	.00	5.43	2.89	1.44	.00		25.0	549	111	1.0	
					41	38	21			56	30	15							
11/06/61		59 F			92	45	43	1.0	0	317	152	57	5.6	.05	.6	565	415		
	5050	15 C	8.0	841	4.59	3.70	1.87	.03	.00	5.20	3.16	1.61	.09		30.0	582	155	0.9	C
					45	36	18			52	31	16	1						
08/24/62					92	45	45	1.0	0	317	167	50	.0	.09	.7	638	415		
	5050		7.6	927	4.59	3.70	1.96	.03	.00	5.20	3.48	1.41	.00		37.0	593	155	1.0	
					45	36	19			52	34	14							
10/09/62		67 F			95	46	47	1.0	15	308	179	47	.0	.14	.4	640	426		E
1130	5801	19 C	8.4	880	4.74	3.78	2.04	.03	.50	5.05	3.73	1.33	.00		29.0	611	149	1.0	C
					45	36	19		5	48	35	13							
09/25/63		66 F			89	52	49	1.0	0	317	187	60	.5	.07	.7	650	436		
1345	5050	19 C	8.1	965	4.44	4.28	2.13	.03	.00	5.20	3.89	1.69	.01		36.0	630	176	1.0	
					41	39	20			48	36	16							
06/03/64					92	48	46	1.0	0	287	188	71	.0	.08	.7	674	427		
	5050		7.1	984	4.59	3.95	2.00	.03	.00	4.70	3.91	2.00	.00		--	587	192	1.0	
					43	37	19			44	37	19							
10/07/65		62 F			102	51	48	1.0	0	334	173	76	10.0	.06	.7	660	464		
1305	5050	17 C	8.2	967	5.09	4.19	2.09	.03	.00	5.47	3.60	2.14	.16		--	625	191	1.0	
					45	37	18			48	32	19	1						
10/20/71	5117	58.0F			111	58	48	.9	0	366	215	47	25.8	.06	.4	724	516		
1530	5050	14.4C	8.2	1083	5.54	4.77	2.09	.02	.00	6.00	4.48	1.33	.42		--	686	216	0.9	
					45	38	17			49	37	11	3						

MINERAL ANALYSES OF GROUND WATER

T — CENTRAL COASTAL DRAINAGE PROVINCE
T-10 — SAN LUIS OBISPO HYDRO UNIT
T-10.C — ARROYO GRANDE HYDRO SUBUNIT
T-10.CI — ARROYO GRANDE HYDRO SUBAREA

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN					MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE				MILLIGRAMS PER LITER					
	32S/13E-13C02 M																		
06/03/64		64 F			87	73	60	3.0	0	508	163	50	6.0	.23	.4	750	517		E
	5050	16 C	8.2	1059	4.34	6.00	2.61	.08	.00	8.33	3.39	1.41	.10		40.0	732	101	1.1	C
					33	46	20	1		63	26	11	1						
10/17/66	5117	62 F			111	63	58	3.0	0	511	178	49	5.5	.20	--	709*	537		
1000	5050	17 C	8.3	1210	5.54	5.18	2.52	.10	.00	8.38	3.71	1.38	.09		--	720	117	1.1	
					42	39	19	1		62	27	10	1						
	32S/13E-14R01 M																		
10/28/71	5117	60.0F			106	58	78	4.7	0	500	154	69	8.0	.28	.2	735	503		
1030	5050	15.5C	8.1	1128	5.29	4.77	3.39	.12	.00	8.20	3.21	1.95	.13		--	724	93	1.5	
					39	35	25	1		61	24	14	1						
	32S/13E-14R02 M																		
06/20/68					89	65	67	4.0	0	547	116	55	1.0	.28	.4	682	490		
1200	5050		7.5	1110	4.44	5.35	2.91	.10	.00	8.97	2.42	1.55	.02		--	666	41	1.3	
					35	42	23	1		69	19	12							
	32S/13E-15K01 M																		
06/18/64					35	17	88	3.0	0	57	41	175	6.0	.08	.4	403	158		
	5801		6.7	650	1.75	1.40	3.83	.08	.00	.93	.85	4.94	.10		--	393	111	3.1	
					25	20	54	1		14	12	72	1						S
06/28/68					36	18	79	3.0	0	52	46	175	12.0	.03	.5	571	164		E
1320	5050		6.5	776	1.80	1.48	3.44	.08	.00	.85	.96	4.94	.19		--	395	122	2.7	T
					26	22	51	1		12	14	71	3						
	32S/13E-15L01 M																		
06/18/64		73 F			25	9.0	45	3.0	0	117	19	55	.0	.05	.1	244	100		
	5801	23 C	7.7	380	1.25	.74	1.96	.08	.00	1.92	.40	1.55	.00		--	214	4	2.0	
					31	18	49	2		50	10	40							
	32S/13E-19J02 M																		
03/06/64					12	4.0	48	2.0	0	30	2.0	46	69.0	.05	.1	248	47		E
830	5801		7.0	290	.60	.33	2.09	.05	.00	.49	.04	1.30	1.11		21.0	219	22	3.1	
					20	11	68	2		17	1	44	38						
10/23/67					19	9.0	58	3.0	0	24	15	65	115	.10	.1	258	85		
1840	5050		7.2	514	.95	.74	2.52	.08	.00	.39	.31	1.83	1.85		--	296	65	2.7	
					22	17	59	2		9	7	42	42						
	32S/13E-19L01 M																		
03/06/64					24	8.0	50	1.0	0	45	37	50	76.0	.02	.1	198	93		
1655	5801		7.1	400	1.20	.66	2.18	.03	.00	.74	.77	1.41	1.23		26.0	204	56	2.3	T
					29	16	54	1		18	19	34	30						
	32S/13E-19N01 M																		
09/29/54		79 F			23	9.0	47	1.0	0	22	41	57	75.0	.03	.1	292*	95		
	5786	26 C	6.9	454	1.15	.74	2.04	.03	.00	.36	.85	1.61	1.21		--	264	77	2.1	
					29	19	52	1		9	21	40	30						
08/29/57					22	15	64	2.0	0	22	58	73	86.0	.70	.0	336	117		
	5800		6.5	596	1.10	1.23	2.78	.05	.00	.36	1.21	2.06	1.39		23.0	354	99	2.6	
					21	24	54	1		7	24	41	28						
02/06/58					18	13	53	1.0	0	22	33	69	75.0	.00	.2	353	99		
	5800		6.3	511	.90	1.07	2.31	.03	.00	.36	.69	1.95	1.21		30.0	303	81	2.3	
					21	25	54	1		9	16	46	29						
02/18/59					27	18	53	1.0	0	18	59	67	89.0	.03	.0	353	142		E
	5050		6.5	475	1.35	1.48	2.31	.03	.00	.30	1.23	1.89	1.44		33.0	356	127	1.9	
					26	29	45	1		6	25	39	30						S
09/22/59		78 F			26	17	65	1.0	0	24	58	75	114	.30	.0	407	135		
	5800	26 C	7.3	620	1.30	1.40	2.83	.03	.00	.39	1.21	2.12	1.84		27.0	395	116	2.4	
					23	25	51	1		7	22	38	33						
09/20/60					32	18	79	2.0	0	25	96	78	67.0	.10	.0	456*	154		
	5801		6.4	716	1.60	1.48	3.44	.05	.00	.41	2.00	2.20	1.08		11.0	395	134	2.8	
					24	23	52	1		7	35	39	19						S
03/02/61					38	17	72	2.0	0	26	80	84	133	.10	.0	490*	165		
	5801		6.3	725	1.90	1.40	3.13	.05	.00	.43	1.67	2.37	2.15		26.0	465	144	2.4	
					29	22	48	1		6	25	36	32						
	32S/13E-19P01 M																		
03/07/64					17	6.0	38	2.0	0	35	5.0	46	54.0	.05	.1	211	67		E
1000	5801		7.3	300	.85	.49	1.65	.05	.00	.57	.10	1.30	.87		26.0	211	39	2.0	
					28	16	54	2		20	4	46	31						S
	32S/13E-19Q01 M																		
03/06/64					22	10	62	2.0	0	39	36	66	80.0	.05	.1	336	96		E
1100	5801		6.5	450	1.10	.82	2.70	.05	.00	.64	.75	1.86	1.29		11.0	308	64	2.8	
					24	18	58	1		14	17	41	28						
	32S/13E-19R01 M																		
03/06/64					43	16	73	2.0	0	18	74	76	155	.07	.1	449	174		E
940	5801		6.8	630	2.15	1.32	3.18	.05	.00	.30	1.54	2.14	2.50		1.0	449	159	2.4	
					32	20	47	1		5	24	33	39						S
	32S/13E-20M01 M																		
03/04/64					23	8.0	35	80	0	123	14	92	20.0	.05	.1	337	91		
1610	5801		7.1	500	1.15	.66	1.52	2.05	.00	2.02	.29	2.59	.32		5.0	338	0	1.6	
					21	12	28	38		39	6	50	6						
	32S/13E-20M03 M																		
03/04/64		68 F			28	29	78	1.0	0	28	85	82	142	.05	.1	542	189		E
1650	5801	20 C	7.1	700	1.40	2.38	3.39	.03	.00	.46	1.77	2.31	2.29		27.0	486	166	2.5	
					19	33	47			7	26	34	34						S
06/17/64		63 F			26	28	74	1.0	0	28	77	85	133	.05	.1	470	180		E
	5801	17 C	6.7	650	1.30	2.30	3.22	.03	.00	.46	1.60	2.40	2.15		--	438	157	2.4	
					19	34	47			7	24	34	33						S

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
	T		CENTRAL COASTAL DRAINAGE PROVINCE																
	T-10		SAN LUIS OBISPO HYDRO UNIT																
	T-10.C		ARROYO GRANDE HYDRO SUBUNIT																
	T-10.C1		ARROYO GRANDE HYDRO SUBAREA																
	32S/13E-20N01 M																		
06/17/64					71	40	60	3.0	0	170	135	78	116	.10	.1	630	342		
	5801		7.2	908	3.54	3.29	2.61	.08	.00	2.79	2.81	2.20	1.87		--	587	202	1.4	
					37	35	27	1		29	29	23	19						
	32S/13E-20N05 M																		
03/05/64					29	19	70	2.0	0	38	93	63	107	.05	.1	450	151		E
940	5801		7.0	608	1.45	1.56	3.05	.05	.00	.62	1.94	1.78	1.73		28.0	430	120	2.5	
					24	26	50	1		10	32	29	29						
10/25/67					45	33	115	2.0	0	37	105	187	132	.05	.1	697	248		
1115	5050		7.3	1114	2.25	2.71	5.00	.05	.00	.61	2.19	5.27	2.14		--	638	218	3.2	
					22	27	50			6	21	52	21						
	32S/13E-22C01 M																		
03/03/61					20	14	48	2.0	0	108	41	55	.0	.26	.8	288*	108		E
	5801		6.8	390	1.00	1.15	2.09	.05	.00	1.77	.85	1.55	.00		50.0	283	19	2.0	
					23	27	49	1		42	20	37							
06/20/68					14	8.0	45	2.0	0	95	15	54	1.0	.19	.9	276	68		E
1300	5050		7.0	376	.70	.66	1.96	.05	.00	1.56	.31	1.52	.02		--	186	0	2.4	T
					21	20	58	1		46	9	45	1						
	32S/13E-22P01 M																		
03/83/61					297	134	98	4.0	0	621	822	121	.0	.21	.2	1938*	1293		F
	5801		7.5	2200	14.82	11.02	4.26	.10	.00	10.18	17.11	3.41	.00		27.0	1809	784	1.2	C
					49	36	14			33	56	11							
	32S/13E-22Q01 M																		
06/04/64		64 F			290	131	93	4.0	0	555	719	115	102	.20	.8	1873	1263		E
	5050	18 C	7.6	2163	14.47	10.77	4.05	.10	.00	9.10	14.97	3.24	1.65		35.0	1762	808	1.1	C
					49	37	14			31	52	11	6						
	32S/13E-22R01 M																		
06/04/64		64 F			235	147	82	7.0	0	752	586	99	4.6	.16	.6	1673	1192		E
	5050	18 C	7.8	2020	11.73	12.09	3.57	.18	.00	12.33	12.16	2.79	.07		47.0	1576	575	1.0	C
					43	44	13	1		45	44	10							
06/20/68					234	141	80	6.0	0	714	567	115	1.5	.14	.6	1666	1165		F
1230	5050		7.4	2014	11.68	11.60	3.48	.15	.00	11.70	11.80	3.24	.02		--	1496	579	1.0	C
					43	43	13	1		44	44	12							
	32S/13E-23A01 M																		
11/09/50					163	73	64	8.0	0	566	25	52	.5	.04	--	934	707		
	5000		8.0	1370	8.13	6.00	2.78	.20	.00	9.28	.52	1.47	.01		38.0	702	243	1.0	T
					48	35	16	1		82	5	13							S
	32S/13E-23F01 M																		
08/24/62					159	159	78	4.0	0	669	488	116	.0	.24	.4	1530	1051		E
	5801		7.4	1900	7.93	13.08	3.39	.10	.00	10.96	10.16	3.27	.00		31.0	1364	503	1.0	C
					32	53	14			45	42	13							
06/04/64		64 F			213	117	92	3.0	0	724	469	102	8.0	.24	.5	1432	1013		F
	5050	18 C	7.3	1827	10.63	9.62	4.00	.08	.00	11.87	9.76	2.88	.13		42.0	1402	419	1.3	C
					44	40	16			48	40	12	1						
10/17/66		60 F			216	112	82	5.0	0	628	516	102	7.4	.30	--	1520	1008		E
1230	5050	16 C	8.1	2020	10.78	9.21	3.57	.13	.00	10.29	10.74	2.88	.12		--	1349	685	1.1	
					46	39	15	1		43	45	12							
06/20/66					213	122	83	3.0	0	637	518	126	.5	.19	.5	1544	1034		F
1215	5050		7.5	1941	10.63	10.03	3.61	.08	.00	10.44	10.78	3.55	.01		--	1379	511	1.1	C
					44	41	15			42	44	14							
	32S/13E-23F02 M																		
03/03/61					200	106	82	3.0	0	614	436	117	.0	.23	.3	1368*	936		F
	5801		7.7	1840	9.98	8.72	3.57	.08	.00	10.06	9.08	3.30	.00		27.0	1273	432	1.2	C
					45	39	16			45	40	15							
	32S/13E-23R01S M																		
09/19/62		75 F			54	46	70	11	0	426	69	43	1.8	.10	.4	563	324		
	5000	24 C	7.8	860	2.69	3.78	3.05	.28	.00	6.98	1.44	1.21	.03		38.0	542	0	1.7	
					27	39	31	3		72	15	13							
	32S/13E-24A02 M																		
06/04/64		64 F			166	57	64	1.0	0	440	329	59	.0	.18	.4	980	649		F
	5801	18 C	7.7	1240	8.28	4.69	2.78	.03	.00	7.21	6.85	1.66	.00		27.0	920	288	1.1	C
					52	30	18			46	44	11							
	32S/13E-24D01 M																		
06/04/64		66 F			174	60	82	5.0	0	529	308	71	.0	.16	.4	960	681		F
	5801	19 C	7.7	1360	8.68	4.93	3.57	.13	.00	8.67	6.41	2.00	.00		31.0	991	247	1.4	C
					50	28	21	1		51	38	12							
	32S/13E-24D01S M																		
06/04/64		64 F			155	114	93	2.0	0	647	344	104	5.6	.20	.7	1239	856		E
	5050	18 C	7.8	1656	7.73	9.38	4.05	.05	.00	10.60	7.16	2.93	.09		40.0	1176	326	1.4	C
					36	44	19			51	34	14							S
	32S/13E-27Q03 M																		
06/20/68					276	131	108	4.0	0	628	734	126	1.5	.14	.6	1918	1228		F
1300	5050		7.1	2225	13.77	10.77	4.70	.10	.00	10.29	15.28	3.55	.02		--	1689	713	1.3	C
					47	37	16			35	52	12							
	32S/13E-28A01 M																		
08/24/62		66 F			205	164	109	6.0	0	714	650	115	.0	.14	.2	1854	1187		E
	5801	19 C	7.3	2160	10.23	13.49	4.74	.15	.00	11.70	13.53	3.24	.00		26.0	1626	601	1.4	C
					36	47	17	1		41	48	11							
'6/17/64					230	106	152	6.0	0	681	585	118	3.3	.02	.7	1694	1011		F
	5050		7.6	2177	11.48	8.72	6.61	.15	.00	11.16	12.18	3.33	.05		--	1535	452	2.1	C
					43	32	25	1		42	46	12							

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE: CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	MILLIGRAMS PER LITER: B	F SIO2	TDS SUM	TH NCH	SAR	REM
	T CENTRAL COASTAL DRAINAGE PROVINCE																		
	T-10 SAN LUIS OBISPO HYDRO UNIT																		
	T-10.C ARROYO GRANDE HYDRO SUBUNIT																		
	T-10.C1 ARROYO GRANDE HYDRO SUBAREA																		
	32S/13E-28B01 M																		
10/28/71	5117	60.0F			220	99	81	3.5	0	529	538	89	2.6	.08	.4	1382	956		E
1130	5050	15.5C	7.9	1786	10.98	8.14	3.52	.09	.00	8.67	11.20	2.51	.04		--	1293	523	1.1	C
					48	36	15			39	50	11							
	32S/13E-28E01 M																		
09/29/54		73 F			105	58	47	2.0	0	422	177	51	13.6	.00	.1	692*	501		
	5786	23 C	7.4	1020	5.24	4.77	2.04	.05	.00	6.92	3.69	1.44	.22		--	661	155	0.9	
					43	39	17			56	30	12	2						
03/03/61					112	52	53	2.0	0	411	176	60	22.0	.10	.1	660*	494		
	5801		7.5	1070	5.59	4.28	2.31	.05	.00	6.74	3.66	1.69	.35		24.0	703	157	1.0	
					46	35	19			54	29	14	3						
08/23/62		66 F			105	51	52	2.0	0	417	167	56	16.0	.09	.1	692	472		
	5801	19 C	7.4	1020	5.24	4.19	2.26	.05	.00	6.83	3.48	1.58	.26		22.0	676	130	1.0	
					45	36	19			56	29	13	2						S
06/17/64		66 F			108	52	49	2.0	0	390	157	55	25.0	.16	.4	684	484		
	5050	19 C	7.7	1041	5.39	4.28	2.13	.05	.00	6.39	3.27	1.55	.40		--	640	164	1.0	
					45	36	18			55	28	13	3						
	32S/13E-28E05 M																		
03/03/61					40	28	52	1.0	0	135	127	40	45.0	.00	.1	422*	215		
	5801		6.8	630	2.00	2.30	2.26	.03	.00	2.21	2.64	1.13	.73		18.0	417	105	1.5	
					30	35	34			33	39	17	11						
06/17/64					106	53	50	2.0	0	392	157	56	26.0	.20	.4	705	483		
	5050		7.8	1061	5.29	4.36	2.18	.05	.00	6.42	3.27	1.58	.42		--	643	162	1.0	
					45	37	18			55	28	14	4						
	32S/13E-28L01 M																		
10/07/69	5117				72	39	46	2.0	0	157	198	54	33.0	.04	.2	586	340		
	5050		7.8	860	3.59	3.21	2.00	.05	.00	2.57	4.12	1.52	.53		--	521	212	1.1	
					41	36	23	1		29	47	17	6						
10/14/70	5117	61 F			77	39	50	2.0	0	167	201	57	53.0	.04	.3	611	353		
1320	5050	16 C	8.0	877	3.84	3.21	2.18	.05	.00	2.74	4.18	1.61	.85		--	561	216	1.2	
					41	35	23	1		29	45	17	9						
	32S/13E-29H01 M																		
10/07/69	5117				60	39	49	2.0	0	218	122	54	33.0	.04	.3	529	310		
1000	5050		7.9	802	2.99	3.21	2.13	.05	.00	3.57	2.54	1.52	.53		--	466	132	1.2	
					36	38	25	1		44	31	19	6						
10/29/71	5117	60 F			82	40	54	2.2	0	289	152	52	37.5	.06	.2	583	369		
1430	5050	16 C	8.2	880	4.09	3.29	2.35	.06	.00	4.74	3.16	1.47	.60		--	562	132	1.2	
					42	34	24	1		48	32	15	6						
	32S/13E-29C02 M																		
11/07/74	5117	64.0F			73	35	46	2.7	13	178	119	53	80.0	.00	.3	506	327		
1145	5064	17.8C	8.6	833	3.64	2.88	2.00	.07	.43	2.92	2.48	1.49	1.29		--	509	159	1.1	
					42	34	23	1	5	34	29	17	15						
	32S/13E-29D01 M																		
09/29/54		81 F			97	49	44	3.0	0	412	144	31	2.5	.05	.1	583*	444		
	5786	27 C	7.8	934	4.84	4.03	1.91	.08	.00	6.75	3.00	.87	.04		--	573	106	0.9	
					45	37	18	1		63	28	8							
03/05/57		66 F			67	42	44	4.0	0	343	112	27	.0	.06	.0	481	340		
	5000	19 C	7.4	787	3.34	3.45	1.91	.10	.00	5.62	2.33	.76	.00		16.0	481	59	1.0	
					38	39	22	1		65	27	9							
03/03/61					108	44	43	3.0	0	434	149	34	.0	.13	.0	642*	451		
	5801		7.3	980	5.39	3.62	1.87	.08	.00	7.11	3.10	.96	.00		29.0	624	95	0.9	
					49	33	17	1		64	28	9							
06/17/64					108	46	42	3.0	0	421	143	32	6.0	.05	.3	626	459		
	5050		7.6	971	5.39	3.78	1.83	.08	.00	6.90	2.98	.90	.10		--	587	114	0.9	
					49	34	17	1		63	27	8	1						
	32S/13E-29D02 M																		
05/09/61		70 F			51	19	48	2.0	0	69	77	63	115	.25	.1	466*	205		F
	5801	21 C	7.4	620	2.54	1.56	2.09	.05	.00	1.13	1.60	1.78	1.85		29.0	436	149	1.5	
					41	25	33	1		18	25	28	29						
06/17/64		66 F			48	19	61	2.0	0	69	62	81	116	.08	.1	478	198		F
	5801	19 C	7.1	650	2.40	1.56	2.65	.05	.00	1.13	1.29	2.28	1.87		--	423	142	1.9	
					36	23	40	1		17	20	35	28						
	32S/13E-29D03 M																		
03/03/61					27	11	46	2.0	0	50	35	46	95.0	.06	.0	320*	113		
	5801		7.2	480	1.35	.90	2.00	.05	.00	.82	.73	1.30	1.53		29.0	316	72	1.9	
					31	21	47	1		19	17	30	35						
06/17/64					32	15	51	2.0	0	46	41	68	95.0	.50	.2	408	142		F
	5050		7.6	575	1.60	1.23	2.22	.05	.00	.75	.85	1.92	1.53		--	327	104	1.9	
					31	24	44	1		15	17	38	30						
	32S/13E-29D04 M																		
10/07/69	5117				79	43	44	3.0	0	275	127	52	38.0	.00	.2	592	374		
1100	5050		7.8	891	3.94	3.54	1.91	.08	.00	4.51	2.64	1.47	.61		--	521	140	1.0	
					42	37	20	1		49	29	16	7						
10/29/71	5117	71 F			80	38	47	2.4	0	244	122	55	73.5	.04	.2	547	356		
1435	5050	22 C	7.4	862	3.99	3.11	2.04	.06	.00	4.00	2.54	1.55	1.19		--	538	156	1.1	
					43	34	22	1		43	27	17	13						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP		FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
						MINERAL CONSTITUENTS IN					MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE				MILLIGRAMS PER LITER					
	T	CENTRAL COASTAL DRAINAGE PROVINCE																		
	T-10	SAN LUIS OBISPO HYDRO UNIT																		
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																		
	T-10.C1	ARROYO GRANDE HYDRO SUBAREA																		
	32S/13E-29E01 M																			
03/08/55						89	42	44	--	0	305	116	35	12.0	--	.2		395		
	5060			7.4		4.44	3.45	1.91		.00	5.00	2.42	.99	.19		--	488	145	1.0	
						45	35	19			58	28	12	2						S
12/12/56	5868					64	31	42	4.0	0	171	96	51	91.0	.10	.3	583	287		
	5868			7.1		3.19	2.55	1.83	.10	.00	2.80	2.00	1.44	1.47		34.0	497	147	1.1	
						42	33	24	1		36	26	19	19						
02/06/57						80	34	42	--	0	226	112	42	35.0	--	.2		340		
	5060			7.3		3.99	2.80	1.83		.00	3.70	2.33	1.18	.56		--	456	155	1.0	
						46	32	21			48	30	15	7						S
05/12/60						67	29	54	3.0	0	115	155	62	78.0	.02	.2	593	286		E
	5868			7.2	785	3.34	2.38	2.35	.08	.00	1.88	3.23	1.75	1.26		37.0	542	192	1.4	
						41	29	29	1		23	40	22	16						
11/11/60						67	31	50	3.0	0	141	160	57	5.0	.08	.2	585*	295		E
	5999			7.9	763	3.34	2.55	2.18	.08	.00	2.31	3.33	1.61	.08		35.0	477	179	1.3	
						41	31	27	1		32	45	22	1						S
03/03/61						70	34	53	3.0	0	122	131	62	144	.13	.2	610*	315		E
	5801			7.2	865	3.49	2.80	2.31	.08	.00	2.00	2.73	1.75	2.32		27.0	584	215	1.3	
						40	32	27	1		23	31	20	26						
04/16/62	5868	70	F			67	32	58	3.0	0	147	123	63	108	.20	.2	536	299		
	5868	21	C	7.0	932	3.34	2.63	2.52	.08	.00	2.41	2.56	1.78	1.74		30.0	556	178	1.5	
						39	31	29	1		28	30	21	20						
07/03/64						69	33	58	3.0	0	124	134	72	118	.10	.2	563	308		
	5868			7.6	930	3.44	2.71	2.52	.08	.00	2.03	2.79	2.03	1.90		29.0	577	206	1.4	
						39	31	29	1		23	32	23	22						
01/26/67	5060	77	F			70	35	58	3.0	0	111	134	76	135	.07	.2	601	319		
	5060	25	C	7.4	952	3.49	2.88	2.52	.08	.00	1.82	2.79	2.14	2.18		35.0	601	228	1.4	
						39	32	28	1		20	31	24	24						
	32S/13E-29E02 M																			
12/12/56	5868					65	32	43	2.0	0	220	100	46	45.0	.10	.1	587	294		
	5868			7.2		3.24	2.63	1.87	.05	.00	3.61	2.08	1.30	.73		34.0	475	113	1.1	
						42	34	24	1		47	27	17	9						
02/06/57						76	35	41	--	0	222	105	44	34.0	--	.1		334		
	5060			7.8		3.79	2.88	1.78		.00	3.64	2.19	1.24	.55		--	444	152	1.0	
						45	34	21			48	29	16	7						S
05/12/60						71	34	44	3.0	0	197	121	56	58.0	.04	.2	589	317		E
	5868			7.0	834	3.54	2.80	1.91	.08	.00	3.23	2.52	1.58	.94		33.0	517	156	1.1	
						42	34	23	1		39	30	19	11						
08/03/60						--	--	--	--	0	171	--	91	--	--	--		332		
	5801			8.2	790					.00	2.80		2.57			--				
																				S
09/08/60						--	--	--	--	0	110	--	59	--	--	--		296		
	5801			7.3	865					.00	1.80		1.66			--				
																				S
11/11/60						67	33	48	2.0	0	209	122	53	.1	.06	--	658*	303		E
	5999			6.8	786	3.34	2.71	2.09	.05	.00	3.43	2.54	1.49	.00		35.0	463	131	1.2	T
						41	33	26	1		46	34	20							S
04/16/62	5868	70	F			60	34	55	2.0	0	111	143	66	100	.10	.1	500	290		
	5868	21	C	6.5	916	2.99	2.80	2.39	.05	.00	1.82	2.98	1.86	1.61		29.0	544	199	1.4	
						36	34	29	1		22	36	22	19						
07/03/64						82	37	57	3.0	0	179	136	82	100	.20	.1	595	357		
	5868			7.4	1013	4.09	3.04	2.48	.08	.00	2.93	2.83	2.31	1.61		29.0	614	210	1.3	
						42	31	26	1		30	29	24	17						
01/26/67	5060	77	F			79	39	53	3.0	0	206	127	68	95.0	.07	.2	598	358		
	5060	25	C	7.2	980	3.94	3.21	2.31	.08	.00	3.38	2.64	1.92	1.53		32.0	597	189	1.2	
						41	34	24	1		36	28	20	16						
	32S/13E-29E03 M																			
06/01/59	5868					83	43	38	3.0	0	301	111	46	46.0	.04	.2		384		
	5868			7.3	870	4.14	3.54	1.65	.08	.00	4.93	2.31	1.30	.74		36.0	554	138	0.8	
						44	38	18	1		53	25	14	8						
05/12/60						81	37	42	3.0	0	210	128	69	50.0	.01	.2	628	354		E
	5868			7.1	888	4.04	3.04	1.83	.08	.00	3.44	2.66	1.95	.81		33.0	546	182	1.0	
						45	34	20	1		39	30	22	9						
11/11/60						74	35	48	3.0	0	205	136	63	37.0	.04	.1	598*	329		E
	5999			7.0	806	3.69	2.88	2.09	.08	.00	3.36	2.83	1.78	.60		34.0	531	161	1.2	
						42	33	24	1		39	33	21	7						
04/16/62	5868	72	F			74	36	52	3.0	0	169	139	62	98.0	.10	.1	743	333		E
	5868	22	C	7.0	948	3.69	2.96	2.26	.08	.00	2.77	2.89	1.75	1.58		31.0	578	194	1.2	T
						41	33	25	1		31	32	19	18						
06/17/64		66	F			69	47	58	3.0	0	191	134	73	107	.13	.1	644	366		E
	5801	19	C	7.6	900	3.44	3.87	2.52	.08	.00	3.13	2.79	2.06	1.73		--	585	209	1.3	
						35	39	25	1		32	29	21	18						
07/03/64						82	38	32	3.0	0	182	133	72	59.0	.20	.2	566	361		
	5868			7.4	977	4.09	3.13	1.39	.08	.00	2.98	2.77	2.03	.95		26.0	535	212	0.7	
						47	36	16	1		34	32	23	11						
01/26/67	5060	77	F			76	39	57	3.0	0	176	136	77	105	.11	.2	615	350		
	5060	25	C	6.8	1000	3.79	3.21	2.48	.08	.00	2.88	2.83	2.17	1.69		35.0	615	206	1.3	
						40	34	26	1		30	30	23	18						
10/29/71	5117	58	F			63	35	50	2.0	0	139	156	58	78.0	.04	.2	520	301		
1445	5050	14	C	7.9	796	3.14	2.88	2.18	.05	.00	2.28	3.25	1.64	1.26		--	510	187	1.3	
						38	35	26	1		27	39	19	15						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY	PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
						MINERAL CONSTITUENTS IN	MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE								MILLIGRAMS PER LITER					
	T		CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-10		SAN LUIS OBISPO HYDRO UNIT																	
	T-10.C		ARROYO GRANDE HYDRO SUBUNIT																	
	T-10.C1		ARROYO GRANDE HYDRO SUBAREA																	
	32S/13E-29E05	M																		
06/17/64		66	F			62	28	56	3.0	0	97	84	69	156	.08	.2	558	270		E
	5801	19	C	7.1	755	3.09	2.30	2.44	.08	.00	1.59	1.75	1.95	2.52		--	506	190	1.5	
						39	29	31	1		20	22	25	32						
	32S/13E-29F01	M																		
10/24/67		66	F			88	43	60	3.0	0	240	145	81	94.5	.00	.3	684	397		
1130	5050	19	C	7.6	1049	4.39	3.54	2.61	.08	.00	3.93	3.02	2.28	1.52		--	633	200	1.3	
						41	33	25	1		37	28	21	14						
	32S/13E-29G01	M																		
11/13/50						90	43	37	3.0	0	361	131	32	10.0	.01	--	558	402		
	5000			7.5	872	4.49	3.54	1.61	.08	.00	5.92	2.73	.90	.16		34.0	558	106	0.8	
						46	36	17	1		61	28	9	2						
03/06/57		65	F			102	45	38	3.0	0	383	146	35	8.7	.01	.2	591	440		
	5000	18	C	7.4	945	5.09	3.70	1.65	.08	.00	6.28	3.04	.99	.14		25.0	591	126	0.8	
						48	35	16	1		60	29	9	1						
02/18/59		64	F			80	39	36	2.0	0	211	150	53	60.0	.08	.2	601	360		E
	5050	18	C	7.9	842	3.99	3.21	1.57	.05	.00	3.46	3.12	1.49	.97		30.0	554	187	0.8	
						45	36	18	1		38	35	16	11						
09/22/59		68	F			--	--	--	--	0	235	--	56	--	--	--		364		
	5800	20	C	8.0	824					.00	3.85		1.58			--				
																				S
08/03/60						99	46	38	2.0	0	332	153	41	18.0	.11	.3	651*	436		
	5801			7.2	939	4.94	3.78	1.65	.05	.00	5.44	3.19	1.16	.29		24.0	584	164	0.8	
						47	36	16			54	32	12	3						S
10/06/60		66	F			--	--	--	--	0	371	--	45	--	--	--		439		
	5050	19	C	7.8	903					.00	6.08		1.27			--				
																				S
11/17/61		64	F			103	49	34	2.0	0	357	144	43	31.0	.02	.4	627	459		
	5050	18	C	7.4	948	5.14	4.03	1.48	.05	.00	5.85	3.00	1.21	.50		26.0	608	166	0.7	
						48	38	14			55	28	11	5						
08/23/62		64	F			77	33	41	4.0	0	176	143	54	60.0	.05	.4	638	328		E
	5801	18	C	7.4	810	3.84	2.71	1.78	.10	.00	2.88	2.98	1.52	.97		24.0	523	184	1.0	
						46	32	21	1		34	36	18	12						
10/16/62		64	F			79	43	43	2.0	0	285	132	60	31.0	.09	.2	480	374		
1400	5801	18	C	7.3	820	3.94	3.54	1.87	.05	.00	4.67	2.75	1.69	.50		21.0	551	141	1.0	
						42	38	20	1		49	29	18	5						
09/25/63		66	F			104	45	42	3.0	0	361	146	44	28.0	.08	1.1	705	445		E
1510	5050	19	C	7.2	937	5.19	3.70	1.83	.08	.00	5.92	3.04	1.24	.45		34.0	624	149	0.9	
						48	34	17	1		56	29	12	4						
09/22/64						73	46	42	2.0	0	188	152	37	111	.12	.2	612	371		
	5801			7.7	960	3.64	3.76	1.83	.05	.00	3.08	3.16	1.04	1.79		--	556	217	0.9	
						39	41	20	1		34	35	11	20						
10/13/64						82	40	42	2.0	0	261	136	48	44.0	.06	.4	670	369		E
	5050			7.6	869	4.09	3.29	1.83	.05	.00	4.28	2.83	1.35	.71		37.0	559	155	1.0	
						44	36	20	1		47	31	15	8						
	32S/13E-29G02	M																		
02/18/59		64	F			110	53	33	3.0	0	415	165	32	3.9	.09	.2	661	493		
	5050	18	C	8.1	984	5.49	4.36	1.44	.08	.00	6.80	3.44	.90	.06		31.0	635	153	0.6	
						48	38	13	1		61	31	8	1						
06/17/64		64	F			102	50	39	2.0	0	390	146	44	25.5	.15	.5	642	460		
	5050	18	C	8.2	952	5.09	4.11	1.70	.05	.00	6.39	3.04	1.24	.41		--	600	141	0.8	
						46	38	16			58	27	11	4						
09/22/64						74	59	46	2.0	0	344	160	46	20.0	.55	.1	640	427		E
	5801			7.6	900	3.69	4.85	2.00	.05	.00	5.64	3.33	1.30	.32		--	577	145	1.0	
						35	46	19			53	31	12	3						
10/07/65		60	F			99	46	40	2.0	0	350	148	43	27.0	.12	.4	610	436		
1335	5050	16	C	7.9	938	4.94	3.78	1.74	.05	.00	5.74	3.08	1.21	.44		--	577	149	0.8	
						47	36	17			55	29	12	4						
10/23/70	5117					60	48	39	3.0	0	253	160	40	10.0	.02	.4	522	347		
	5050			7.8	788	2.99	3.95	1.70	.08	.00	4.15	3.33	1.13	.16		--	486	148	0.9	
						34	45	19	1		47	38	13	2						
10/26/71	5117	60.0F				81	39	48	2.1	0	245	159	54	39.0	.04	.2	571	363		
0800	5050	15.5C		7.6	858	4.04	3.21	2.09	.05	.00	4.02	3.31	1.52	.63		--	543	162	1.1	
						43	34	22	1		42	35	16	7						
	32S/13E-29G13	M																		
10/07/69	5117					60	46	41	3.0	0	180	153	57	42.0	.05	.3	572	339		
945	5050			7.8	848	2.99	3.78	1.78	.08	.00	2.95	3.19	1.61	.68		--	491	191	1.0	
						35	44	21	1		35	38	19	8						
	32S/13E-29P01	M																		
11/12/52						66	17	33	2.0	0	181	98	32	2.6	.02	--	374	235		
	5000			7.5	559	3.29	1.40	1.44	.05	.00	2.97	2.04	.90	.04		35.0	375	86	0.9	
						53	23	23	1		50	34	15	1						S
	32S/13E-30F01	M																		
05/28/65		64	F			339	22	205	10	124	0	192	596	23.0	.12	.1	2032	937		E
	5801	16	C	11.4	2620	16.92	1.81	8.92	.26	4.13	.00	4.00	16.81	.37		--	1511	731	2.9	T
						61	6	32	1	14		16	66	1						S
03/10/67		65	F			213	87	232	6.0	0	138	437	541	26.0	.00	--	1960	890		E
	5050	18	C	7.7	2790	10.63	7.15	10.09	.15	.00	2.26	9.10	15.26	.42		--	1610	777	3.4	
						38	26	36	1		8	14	56	2						S

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP		FIELD LABORATORY PH	EC	MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER, MILLIEQUIVALENTS PER LITER, PERCENT REACTANCE VALUE									MILLIGRAMS PER LITER					
						CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
	T			CENTRAL COASTAL DRAINAGE PROVINCE																
	T-10			SAN LUIS OBISPO HYDRO UNIT																
	T-10.C			ARROYO GRANDE HYDRO SUBUNIT																
	T-10.C1			ARROYO GRANDE HYDRO SUBAREA																
	32S/13E-30F02 M																			
05/28/65		63	F			75	43	52	3.0	0	262	140	59	31.0	.10	.1	552	364		
	5801	17	C	8.1	865	3.74	3.54	2.26	.08	.00	4.29	2.91	1.66	.50		--	532	150	1.2	N
						39	37	23	1		46	31	18	5						S
01/20/66		66	F			94	38	47	2.0	0	280	152	68	27.0	.08	.2	580	391		
	5050	19	C	7.6	970	4.69	3.13	2.04	.05	.00	4.59	3.16	1.92	.44		--	566	162	1.0	
						47	32	21	1		45	31	19	4						
03/10/67		64	F			89	39	51	3.0	0	281	152	64	26.0	.00	--	650	383		
	5050	18	C	8.0	997	4.44	3.21	2.22	.08	.00	4.61	3.16	1.80	.42		--	562	152	1.1	
						45	32	22	1		46	32	18	4						
09/27/67		65	F			88	40	49	3.0	0	286	153	58	30.0	.05	.2	636	384		
	5050	18	C	7.6	932	4.39	3.29	2.13	.08	.00	4.69	3.19	1.64	.48		--	562	150	1.1	
						44	33	22	1		47	32	16	5						
	32S/13E-30F03 M																			
05/28/65		68	F			109	54	49	4.0	0	378	188	73	.0	.15	.2	688	494		
	5801	20	C	8.0	1060	5.44	4.44	2.13	.10	.00	6.20	3.91	2.06	.00		--	663	184	1.0	N
						45	37	18	1		51	32	17							
01/19/66		68	F			109	40	49	4.0	0	321	182	69	1.0	.05	.3	642	437		
	5050	20	C	7.8	1047	5.44	3.29	2.13	.10	.00	5.26	3.79	1.95	.02		--	612	174	1.0	
						50	30	19	1		48	34	18							
04/10/67	5050	70	F			87	37	45	3.0	0	265	178	48	1.1	.00	--	600	370		
	5050	21	C	8.2	958	4.34	3.04	1.96	.08	.00	4.34	3.71	1.35	.02		--	529	152	1.0	
						46	32	21	1		46	39	14							
09/26/67		70	F			76	47	44	3.0	0	283	181	43	.0	.03	.3	613	383		
	5050	21	C	7.6	903	3.79	3.87	1.91	.08	.00	4.64	3.77	1.21	.00		--	533	151	1.0	
						39	40	20	1		48	39	13							
	32S/13E-30H01 M																			
02/06/58						26	21	60	2.0	0	27	79	59	104	.00	.4	450	152		
	5800			6.3	648	1.30	1.73	2.61	.05	.00	.44	1.64	1.66	1.68		30.0	394	130	2.1	
						23	30	46	1		8	30	31	31						S
09/29/58						34	22	63	1.0	0	22	93	58	145	.14	.1	425	176		
	5050			6.2	636	1.70	1.81	2.74	.03	.00	.36	1.94	1.64	2.34		35.0	462	158	2.1	
						27	29	44			6	31	26	37						
02/18/59		64	F			31	18	62	1.0	0	18	94	53	133	.02	.1	448	152		E
	5050	18	C	6.1	587	1.55	1.48	2.70	.03	.00	.30	1.96	1.49	2.15		34.0	435	137	2.2	
						27	26	47	1		5	33	25	36						
09/22/59		66	F			34	21	62	2.0	0	12	79	65	163	.32	.0	460	172		
	5800	19	C	7.0	714	1.70	1.73	2.70	.05	.00	.20	1.64	1.83	2.63		26.0	458	162	2.1	
						28	28	44	1		3	26	29	42						
02/24/60		61	F			--	--	--	--	0	22	--	60	138	--	--		184		
	5050	16	C	6.3	699					.00	.36		1.69	2.23		--				
											8		39	52						S
09/20/60		65	F			35	22	62	1.0	0	16	97	58	155	.00	.1	492*	178		
	5801	18	C	6.6	725	1.75	1.81	2.70	.03	.00	.26	2.02	1.64	2.50		26.0	464	165	2.0	
						28	29	43			4	31	26	39						
03/02/61		65	F			37	25	56	1.0	0	19	92	61	150	.28	.0	516*	196		F
	5801	18	C	6.5	690	1.85	2.06	2.44	.03	.00	.31	1.92	1.72	2.42		27.0	459	180	1.7	
						29	32	38			5	30	27	38						
	32S/13E-30H02 M																			
02/06/58		60	F			47	36	37	2.0	0	128	64	103	83.0	.00	.4	568	266		F
	5800	16	C	7.3	730	2.35	2.96	1.61	.05	.00	2.10	1.33	2.90	1.34		30.0	465	161	1.0	
						34	42	23	1		27	17	38	17						S
09/29/58						56	30	43	2.0	0	98	80	65	124	.18	.2	460	263		
	5050			7.4	690	2.79	2.47	1.87	.05	.00	1.61	1.67	1.83	2.00		30.0	478	183	1.2	
						39	34	26	1		23	23	26	28						
02/18/59						62	29	45	2.0	0	101	89	69	124	.03	.1	515	274		F
	5050			7.4	699	3.09	2.38	1.96	.05	.00	1.66	1.85	1.95	2.00		33.0	503	191	1.2	
						41	32	26	1		22	25	26	27						
09/22/59						47	25	40	2.0	0	85	55	64	107	.46	.2	440	221		
	5800			7.3	652	2.35	2.06	1.74	.05	.00	1.39	1.15	1.80	1.73		26.0	408	151	1.2	
						38	33	28	1		23	19	30	29						
02/20/60		62	F			--	--	--	--	0	90	--	59	110	--	--		238		
	5050	17	C	7.3	700					.00	1.48		1.66	1.77		--				
											30		34	36						S
09/20/60						45	20	40	2.0	0	152	54	50	66.0	.12	.2	452*	195		
	5801			7.8	693	2.25	1.64	1.74	.05	.00	2.49	1.12	1.41	1.06		32.0	384	70	1.2	
						40	29	31	1		41	18	23	17						S
03/02/61						51	26	42	2.0	0	96	65	65	115	.10	.1	462*	234		
	5801			7.3	700	2.54	2.14	1.83	.05	.00	1.57	1.35	1.83	1.85		26.0	439	156	1.2	
						39	33	28	1		24	20	28	28						
11/09/61		68	F			50	24	41	2.0	0	113	50	71	94.0	.06	.2	448	224		
	5050	20	C	7.4	664	2.50	1.97	1.78	.05	.00	1.85	1.04	2.00	1.52		34.0	422	131	1.2	
						40	31	28	1		29	16	31	24						
10/10/62		70	F			53	23	47	2.0	0	95	62	73	100	.08	.2	474	227		E
1530	5801	21	C	7.5	630	2.64	1.89	2.04	.05	.00	1.56	1.29	2.06	1.61		27.0	434	149	1.4	
						40	29	31	1		24	20	32	25						
09/26/63		65	F			57	21	54	2.0	0	102	73	68	118	.05	.3	500	229		
1500	5050	18	C	7.2	734	2.84	1.73	2.35	.05	.00	1.67	1.52	1.92	1.90		37.0	480	145	1.6	
						41	25	34	1		24	22	27	27						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN	MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE								MILLIGRAMS PER LITER					
	T	CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-10	SAN LUIS OBISPO HYDRO UNIT																	
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																	
	T-10.C1	ARROYO GRANDE HYDRO SUBAREA																	
	32S/13E-30H02 M											CONTINUED							
06/17/64		66 F			59	28	58	3.0	0	110	87	73	133	.05	.1	536	262		
	5801	19 C	7.6	770	2.94	2.30	2.52	.08	.00	1.80	1.81	2.06	2.15		--	495	172	1.6	
					38	29	32	1		23	23	26	27						
10/13/64					53	27	58	3.0	0	94	88	71	127	.06	.1	610	243		E
	5801		7.9	690	2.64	2.22	2.52	.08	.00	1.54	1.67	2.00	2.05		--	465	166	1.6	T
					35	30	34	1		21	23	28	28						
10/07/65		60 F			52	26	52	2.0	0	86	81	76	122	.03	.3	463	237		
1140	5050	16 C	7.8	778	2.59	2.14	2.26	.05	.00	1.41	1.69	2.14	1.97		--	453	166	1.5	
					37	30	32	1		20	23	30	27						
10/21/66		58 F			--	--	--	--	0	85	--	73	83.0	--	--				
1300	5050	14 C	7.9	810					.00	1.39		2.06	1.34		--				
										29		43	28						S
10/07/69	5117				60	29	60	3.0	0	82	108	84	123	.06	.3	662	269		E
	5050		7.7	864	2.99	2.38	2.61	.08	.00	1.34	2.25	2.37	1.98		--	507	202	1.6	T
					37	30	32	1		17	28	30	25						
10/20/70	5117	64 F			59	28	64	2.0	0	92	109	80	128	.07	.3	551	263		
1300	5050	18 C	8.0	864	2.94	2.30	2.78	.05	.00	1.51	2.27	2.26	2.06		--	515	187	1.7	
					36	29	34	1		19	28	28	25						
10/25/71	5117	64.0F			55	29	70	2.8	0	99	127	70	130	.06	.1	525	256		
1330	5050	17.8C	7.2	822	2.74	2.38	3.05	.07	.00	1.62	2.64	1.97	2.10		--	533	175	1.9	
					33	29	37	1		19	32	24	25						
	32S/13E-30K01 M																		
06/10/65					53	24	62	2.0	0	78	83	84	125	.07	.0	594	231		E
1100	5050		7.2	810	2.64	1.97	2.70	.05	.00	1.28	1.73	2.37	2.02		--	471	167	1.8	T
					36	27	37	1		17	23	32	27						
	32S/13E-30K04 M																		
04/24/51					76	36	34	--	0	235	100	36	5.8	--	.1	595	338		
	5060		7.3		3.79	2.96	1.48		.00	3.85	2.08	1.02	.09		--	403	145	0.8	T
					46	36	18			55	30	14	1						S
	32S/13E-30K05 M																		
04/24/51					98	44	41	--	0	283	166	37	2.8	--	.1	753	426		
	5060		7.4		4.89	3.62	1.78		.00	4.64	3.46	1.04	.05		--	528	194	0.9	T
					48	35	17			50	38	11	1						S
06/10/65		69 F			85	39	56	3.0	0	175	149	80	108	.06	.2	700	373		
1440	5050	21 C	7.7	1005	4.24	3.21	2.44	.08	.00	2.87	3.10	2.26	1.74		--	606	229	1.3	
					43	32	24	1		29	31	23	17						
	32S/13E-30K06 M																		
11/13/50					93	24	48	2.0	0	296	130	42	24.0	.02	--	545	331		
	5000		8.1	872	4.64	1.97	2.09	.05	.00	4.85	2.71	1.18	.39		36.0	545	88	1.1	
					53	23	24	1		53	30	13	4						S
04/24/51					84	39	38	--	0	250	123	39	5.7	--	.1	655	370		
	5060		7.4		4.19	3.21	1.65		.00	4.10	2.56	1.10	.09		--	452	165	0.9	T
					46	35	18			52	33	14	1						S
08/03/60					87	41	54	1.0	0	196	142	100	62.0	.13	.2	663*	386		
830	5801		7.6	998	4.34	3.37	2.35	.03	.00	3.21	2.96	2.82	1.00		25.0	609	225	1.2	
					43	33	23			32	30	28	10						
10/31/62					49	86	79	4.0	0	217	158	184	67.0	.13	.2	904	476		E
1000	5801		8.2	1140	2.45	7.07	3.44	.10	.00	3.56	3.29	5.19	1.08		27.0	761	298	1.6	
					19	54	26	1		27	25	40	8						
10/05/67		74 F			98	44	82	3.8	0	215	165	143	85.0	.08	.3	801	426		
	5050	23 C	8.0	1235	4.89	3.62	3.57	.08	.00	3.52	3.44	4.03	1.37		--	726	250	1.7	
					40	30	29	1		28	28	33	11						
	32S/13E-30K10 M																		
06/10/65					68	32	60	3.0	0	94	134	83	128	.05	.2	670	301		E
	5050		7.4	930	3.39	2.63	2.61	.08	.00	1.54	2.79	2.34	2.06		--	554	224	1.5	
					39	30	30	1		18	32	27	24						
	32S/13E-30K17 M																		
10/29/71	5117	60 F			80	39	62	2.8	0	94	159	96	148	.04	.2	638	360		
1600	5050	16 C	7.5	984	3.99	3.21	2.70	.07	.00	1.54	3.31	2.71	2.40		--	634	283	1.4	
					40	32	27	1		15	33	27	24						
	32S/13E-30L01 M																		
11/09/61		64 F			98	46	41	1.0	0	336	138	53	27.0	.04	.2	605	434		
	5050	18 C	8.0	925	4.89	3.78	1.78	.03	.00	5.51	2.87	1.49	.44		35.0	604	158	0.9	
					47	36	17			53	28	14	4						
10/16/62		65 F			102	45	47	2.0	0	345	137	69	13.0	.07	.2	604	440		
1015	5801	18 C	7.2	950	5.09	3.70	2.04	.05	.00	5.65	2.85	1.95	.21		25.0	610	157	1.0	
					47	34	19			53	27	18	2						
09/26/63		68 F			94	51	50	3.0	0	327	132	85	25.0	.06	.3	730	444		E
1430	5050	20 C	7.4	991	4.69	4.19	2.18	.08	.00	5.36	2.75	2.40	.40		37.0	638	176	1.0	
					42	38	20	1		49	25	22	4						
10/13/64					96	54	52	2.0	0	309	144	111	22.0	.11	.1	814	462		E
	5801		8.2	1080	4.79	4.44	2.26	.05	.00	5.06	3.00	3.13	.35		--	633	209	1.1	T
					42	38	20			44	26	27	3						
	32S/13E-30L02 M																		
09/29/54		96 F			92	41	40	3.0	0	353	124	43	20.0	.20	.1	580*	398		F
	5786	36 C	7.5	761	4.59	3.37	1.74	.08	.00	5.79	2.58	1.21	.32		--	537	109	0.9	C
					47	34	18	1		58	26	12	3						
08/29/57					76	40	41	2.0	0	317	115	51	4.7	.30	.1	637	354		E
	5800		7.8	901	3.79	3.29	1.78	.05	.00	5.20	2.39	1.44	.08		20.0	506	94	0.9	T
					43	37	20	1		57	26	16	1						

MINERAL ANALYSES OF GROUND WATER

T CENTRAL COASTAL DRAINAGE PROVINCE
T-10 SAN LUIS OBISPO HYDRO UNIT
T-10.C ARROYO GRANDE HYDRO SUBUNIT
T-10.C1 ARROYO GRANDE HYDRO SUBAREA

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
32S/13E-30L02 M												CONTINUED							
02/06/58		62 F			70	47	39	2.0	0	311	95	52	22.0	.10	.0	590	368		
	5800	17 C	7.2	855	3.49	3.87	1.70	.05	.00	5.10	1.98	1.47	.35		31.0	511	113	0.9	
					38	42	19	1		57	22	17	4						
09/29/58					--	--	--	--	0	332	—	46	--	--	--		397		
	5050		7.4	831					.00	5.44		1.30			--				
																			S
02/18/59					72	35	45	2.0	0	217	103	59	67.0	.03	.1	529	324		E
	5050		7.4	741	3.59	2.88	1.96	.05	.00	3.56	2.14	1.66	1.08		38.0	528	146	1.1	
					42	34	23	1		42	25	20	13						
09/22/59		65 F			85	43	40	1.0	0	315	115	57	28.0	.18	.1	645	389		E
	5800	18 C	7.1	865	4.24	3.54	1.74	.03	.00	5.16	2.39	1.61	.45		28.0	552	131	0.9	
					44	37	18			54	25	17	5						
02/24/60		65 F			90	44	48	2.0	0	290	125	85	35.0	.12	.3	590	406		
	5050	18 C	7.3	950	4.49	3.62	2.09	.05	.00	4.75	2.60	2.40	.56		30.0	602	168	1.0	
					44	35	20			46	25	23	5						
09/20/60					92	45	42	2.0	0	350	134	50	22.0	.15	.0	686*	415		E
	5801		7.3	945	4.59	3.70	1.83	.05	.00	5.74	2.79	1.41	.35		13.0	572	128	0.9	
					45	36	18			56	27	14	3						
03/02/61					139	72	60	3.0	0	281	160	255	16.0	.10	.0	1064*	644		
	5801		7.1	1530	6.94	5.92	2.61	.08	.00	4.61	3.33	7.19	.26		25.0	868	413	1.0	
					45	38	17	1		30	22	47	2						
06/17/64		66 F			102	48	52	2.0	0	305	140	97	26.0	.30	.4	658	452		
	5050	19 C	7.5	1057	5.09	3.95	2.26	.05	.00	5.00	2.91	2.74	.42		--	617	202	1.1	
					45	35	20			45	26	25	4						S
10/07/65		61 F			113	53	46	3.0	0	298	151	130	24.0	.04	.3	725	500		
1010	5050	16 C	8.0	1156	5.64	4.36	2.00	.08	.00	4.88	3.14	3.67	.39		--	667	256	0.9	
					47	36	17	1		40	26	30	3						
10/21/66		68 F			--	--	--	--	0	316	--	134	19.0	--	--				
1500	5050	26 C	8.2	1240					.00	5.18		3.78	.31		--				
										56		41	3						S
10/05/67		64 F			116	54	56	3.0	0	291	145	163	29.0	.06	.3	842	512		
	5050	18 C	7.8	1246	5.79	4.44	2.44	.08	.00	4.77	3.02	4.60	.47		--	709	273	1.1	
					45	35	19	1		37	23	36	4						
10/20/70	5117	61 F			136	68	88	3.0	0	290	206	213	45.0	.07	.4	986	619		
1345	5050	16 C	8.1	1512	6.79	5.59	3.83	.08	.00	4.75	4.29	6.01	.73		--	902	382	1.5	
					42	34	24			30	27	38	5						S
11/08/74	5117	62.0F			106	51	56	2.3	0	231	157	129	80.0	.54	.5	758	473		
0900	5064	16.7C	8.3	1208	5.29	4.19	2.44	.06	.00	3.79	3.27	3.64	1.29		--	695	285	1.1	
					44	35	20	1		32	27	30	11						
32S/13E-30N01 M																			
06/11/65		65 F			46	44	102	3.0	24	224	178	116	8.0	.22	.6	676	296		
	5801	18 C	8.6	1100	2.30	3.62	4.44	.08	.80	3.67	3.71	3.27	.13		--	631	73	2.6	N
					22	35	43	1	7	32	32	28	1						S
01/22/66		68 F			112	3.0	93	25	19	0	365	115	3.0	.08	.5	683	292		
	5050	20 C	10.3	1112	5.59	.25	4.05	.64	.63	.00	7.60	3.24	.05		--	735	261	2.4	
					53	2	38	6	5		66	28							S
04/13/67		62 F			41	48	94	37	10	92	278	132	1.7	.00	--	696	300		
	5050	17 C	8.7	1158	2.05	3.95	4.09	.95	.33	1.51	5.79	3.72	.03		--	687	208	2.4	
					19	36	37	9	3	13	51	33							S
09/27/67		64 F			30	38	67	33	0	138	153	100	1.5	.12	.5	531	232		
	5050	18 C	8.3	864	1.50	3.13	2.91	.84	.00	2.26	3.19	2.82	.02		--	490	119	1.9	
					18	37	35	10		27	38	34							
32S/13E-30N02 M																			
06/16/65		67 F			119	90	75	5.0	0	245	498	55	.0	.15	.1	1020	668		E
	5801	19 C	7.9	1320	5.94	7.40	3.26	.13	.00	4.02	10.37	1.55	.00		--	963	466	1.3	N C
					36	44	19	1		25	65	10							S
01/21/66		67 F			148	63	71	5.0	0	232	483	54	.0	.12	.5	1069	629		E
	5050	19 C	7.5	1376	7.39	5.18	3.09	.13	.00	3.80	10.06	1.52	.00		--	938	439	1.2	
					47	33	20	1		25	65	10							S
04/13/67		67 F			137	64	71	4.0	0	220	486	50	1.4	.10	--	1050	605		E
	5050	19 C	8.2	1370	6.84	5.26	3.09	.10	.00	3.61	10.12	1.41	.02		--	922	425	1.3	
					45	34	20	1		24	67	9							
09/27/67		67 F			147	63	68	5.0	0	242	484	48	.0	.11	.5	1048	627		E
	5050	19 C	7.6	1353	7.34	5.18	2.96	.13	.00	3.97	10.08	1.35	.00		--	934	428	1.2	
					47	33	19	1		26	65	9							
10/11/72	5050	64 F		1350	126	62	64	3.6	0	335	218	116	48.0	.08	.3	882	568		
1600	5050	18 C	7.7	1295	6.29	5.10	2.78	.09	.00	5.49	4.54	3.27	.77		--	802	295	1.2	
					44	36	19	1		39	32	23	5						
32S/13E-30N03 M																			
06/11/65		64 F			97	75	57	3.0	0	423	231	73	.0	.08	.1	804	551		E
	5801	18 C	8.1	1145	4.84	6.17	2.48	.08	.00	6.93	4.81	2.06	.00		--	744	204	1.1	N
					36	45	18	1		50	35	15							
01/22/66		65 F			132	59	54	3.0	0	410	250	57	1.0	.08	.5	804	572		
	5050	18 C	7.5	1226	6.59	4.85	2.35	.08	.00	6.72	5.21	1.61	.02		--	758	236	1.0	
					48	35	17	1		50	38	12							
04/13/67		64 F			121	43	56	3.0	0	318	238	62	.6	.00	--	778	479		
	5050	18 C	8.1	1220	6.04	3.54	2.44	.08	.00	5.21	4.96	1.75	.01		--	680	219	1.1	
					50	29	20	1		44	42	15							

MINERAL ANALYSES OF GROUND WATER

T
T-10 CENTRAL COASTAL DRAINAGE PROVINCE
T-10.C SAN LUIS OBISPO HYDRO UNIT
T-10.C1 ARROYO GRANDE HYDRO SUBUNIT
ARROYO GRANDE HYDRO SUBAREA

CONTINUED

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F / SIO2	TDS / SUM	TH / NCH	SAR	REM
32S/13E-30N03 M																			
09/27/67	5050	65 F / 18 C	7.9	933	65 / 3.24 / 32	55 / 4.52 / 45	51 / 2.22 / 22	3.0 / .08 / 1	0 / .00	234 / 3.84 / 38	246 / 5.12 / 51	41 / 1.16 / 11	.0 / .00	.05	.3 / --	661 / 576	388 / 196	1.1	E
10/11/72	5050 / 5050	64.0F / 17.8C	7.8	1300 / 1310	145 / 7.24 / 46	62 / 5.10 / 33	74 / 3.22 / 21	4.0 / .10 / 1	0 / .00	243 / 3.98 / 26	493 / 10.26 / 66	47 / 1.33 / 9	.8 / .01	.15	.4 / --	1038 / 945	617 / 418	1.3	E
32S/13E-30P01 M																			
11/12/50	5000		7.8	796	96 / 4.79 / 56	26 / 2.14 / 25	37 / 1.61 / 19	1.0 / .03	0 / .00	330 / 5.41 / 62	105 / 2.19 / 25	32 / .90 / 10	15.0 / .24 / 3	.02	-- / 37.0	512 / 511	347 / 76	0.9	
03/03/61	5801		7.5	910	94 / 4.69 / 47	43 / 3.54 / 36	38 / 1.65 / 17	2.0 / .05 / 1	0 / .00	324 / 5.31 / 53	110 / 2.29 / 23	76 / 2.14 / 21	20.0 / .32 / 3	.04	.1 / 27.0	574* / 569	412 / 146	0.8	
08/23/62	5801		7.7	950	104 / 5.19 / 47	49 / 4.03 / 37	40 / 1.74 / 16	2.0 / .05	0 / .00	321 / 5.26 / 48	119 / 2.48 / 23	106 / 2.99 / 27	13.0 / .21 / 2	.06	.2 / 25.0	694 / 616	461 / 198	0.8	E
10/30/62 1105	5801	64 F / 18 C	7.5	960	100 / 4.99 / 46	47 / 3.87 / 36	42 / 1.83 / 17	3.0 / .08 / 1	0 / .00	320 / 5.24 / 49	120 / 2.50 / 23	99 / 2.79 / 26	15.0 / .24 / 2	.14	.2 / 29.0	682 / 612	443 / 181	0.9	E
01/20/66	5050		7.4	1099	106 / 5.29 / 47	48 / 3.95 / 35	43 / 1.87 / 17	2.0 / .05	0 / .00	306 / 5.02 / 45	134 / 2.79 / 25	105 / 2.96 / 26	27.0 / .44 / 4	.04	.4 / --	653 / 616	462 / 211	0.9	
10/04/67 900	5050		7.4	1099	104 / 5.19 / 46	48 / 3.95 / 35	49 / 2.13 / 19	3.0 / .08 / 1	0 / .00	294 / 4.82 / 42	147 / 3.06 / 27	108 / 3.05 / 27	35.0 / .56 / 5	.04	.4 / --	736 / 639	457 / 216	1.0	
32S/13E-30P02 M																			
10/06/67 1130	5050	64 F / 18 C	7.0	1143	88 / 4.39 / 38	50 / 4.11 / 36	67 / 2.91 / 25	2.0 / .05	0 / .00	154 / 2.52 / 22	209 / 4.35 / 38	102 / 2.88 / 25	115 / 1.85 / 16	.05	.3 / --	765 / 709	425 / 299	1.4	
32S/13E-30P03 M																			
09/28/61	5050		7.9	780	94 / 4.69 / 48	45 / 3.70 / 38	30 / 1.31 / 13	2.0 / .05 / 1	0 / .00	281 / 4.61 / 47	139 / 2.89 / 30	51 / 1.44 / 15	49.0 / .79 / 8	.08	.3 / 29.0	603 / 577	420 / 189	0.6	E C
32S/13E-30Q02 M																			
06/10/65	5050		7.5	1082	89 / 4.44 / 41	43 / 3.54 / 33	62 / 2.70 / 25	3.0 / .08 / 1	0 / .00	168 / 2.75 / 25	185 / 3.85 / 35	91 / 2.57 / 24	104 / 1.68 / 15	.05	.2 / --	793 / 660	399 / 262	1.4	E
32S/13E-30Q04 M																			
06/10/65 740	5050		7.4	1018	81 / 4.04 / 40	39 / 3.21 / 32	65 / 2.83 / 28	2.0 / .05	0 / .00	137 / 2.25 / 22	156 / 3.25 / 32	94 / 2.65 / 26	118 / 1.90 / 19	.05	.2 / --	733 / 622	363 / 250	1.5	E
32S/13E-30R01 M																			
02/06/58	5800	61 F / 16 C	7.1	772	48 / 2.40 / 33	32 / 2.63 / 36	52 / 2.26 / 31	2.0 / .05 / 1	0 / .00	113 / 1.85 / 28	67 / 1.39 / 21	78 / 2.20 / 33	73.0 / 1.18 / 18	.00	.0 / 30.0	530 / 438	252 / 159	1.4	S
10/06/58	5050	65 F / 18 C	7.4	748	65 / 3.24 / 40	30 / 2.47 / 30	54 / 2.35 / 29	3.0 / .08 / 1	0 / .00	159 / 2.61 / 33	99 / 2.06 / 26	74 / 2.09 / 26	78.0 / 1.26 / 16	.00	.3 / 35.0	470 / 516	286 / 155	1.4	
02/18/59	5050		7.3	680	65 / 3.24 / 43	29 / 2.38 / 31	46 / 1.91 / 25	3.0 / .08 / 1	0 / .00	186 / 3.05 / 40	96 / 2.00 / 26	57 / 1.61 / 21	62.0 / 1.00 / 13	.15	.2 / 33.0	489 / 481	281 / 129	1.1	E
09/22/59	5800	66 F / 19 C	7.5	847	63 / 3.14 / 38	30 / 2.47 / 30	61 / 2.65 / 32	3.0 / .08 / 1	0 / .00	124 / 2.03 / 24	106 / 2.21 / 27	78 / 2.20 / 27	115 / 1.85 / 22	.42	.0 / 29.0	585 / 546	281 / 179	1.6	
02/24/60	5050	65 F / 18 C	7.3	892	87 / 4.34 / 48	32 / 2.63 / 29	46 / 2.00 / 22	2.0 / .05 / 1	0 / .00	159 / 2.61 / 29	122 / 2.54 / 28	82 / 2.31 / 26	98.0 / 1.58 / 17	.03	.3 / 32.0	560 / 579	349 / 218	1.1	
09/20/60	5801		7.7	1005	99 / 4.94 / 49	41 / 3.37 / 34	38 / 1.65 / 16	2.0 / .05	0 / .00	227 / 3.72 / 37	150 / 3.12 / 31	79 / 2.23 / 22	62.0 / 1.00 / 10	.03	.1 / 21.0	792* / 604	416 / 230	0.8	E T
03/02/61	5801		7.4	900	82 / 4.09 / 44	41 / 3.37 / 37	39 / 1.70 / 18	2.0 / .05 / 1	0 / .00	155 / 2.54 / 26	139 / 2.89 / 30	85 / 2.40 / 25	109 / 1.76 / 19	.38	.2 / 28.0	606* / 602	373 / 246	0.9	S
11/09/61	5050	59 F / 15 C	7.2	980	90 / 4.49 / 45	41 / 3.37 / 34	48 / 2.09 / 21	3.0 / .08 / 1	0 / .00	212 / 3.47 / 35	150 / 3.12 / 31	73 / 2.06 / 21	85.0 / 1.37 / 14	.07	.3 / 34.0	459 / 628	393 / 220	1.1	
08/23/62	5801		7.0	740	56 / 2.79 / 39	23 / 1.89 / 26	56 / 2.44 / 34	3.0 / .08 / 1	0 / .00	80 / 1.31 / 19	103 / 2.14 / 31	72 / 2.03 / 29	94.0 / 1.52 / 22	.05	.4 / 28.0	618 / 474	234 / 169	1.6	E T
10/10/62 1430	5801	66 F / 19 C	7.4	700	56 / 2.79 / 40	21 / 1.73 / 25	55 / 2.39 / 34	2.0 / .05 / 1	0 / .00	82 / 1.34 / 20	101 / 2.10 / 31	71 / 2.00 / 29	87.0 / 1.40 / 20	.05	.2 / 26.0	488 / 459	226 / 159	1.6	
09/26/63 1230	5050	73 F / 23 C	7.2	791	57 / 2.84 / 36	27 / 2.22 / 28	62 / 2.70 / 34	3.0 / .08 / 1	0 / .00	76 / 1.25 / 16	114 / 2.37 / 31	68 / 1.92 / 25	128 / 2.06 / 27	.05	.3 / 38.0	565 / 534	253 / 191	1.7	E S
06/17/64	5050		7.2	806	58 / 2.89 / 37	26 / 2.14 / 28	61 / 2.65 / 34	3.0 / .08 / 1	0 / .00	71 / 1.16 / 15	117 / 2.44 / 32	70 / 1.97 / 26	123 / 1.98 / 26	.28	.3 / --	533 / 493	252 / 194	1.7	
10/07/65 1110	5050	61 F / 16 C	7.8	781	51 / 2.54 / 35	25 / 2.06 / 28	59 / 2.57 / 35	3.0 / .08 / 1	0 / .00	73 / 1.20 / 16	123 / 2.56 / 35	68 / 1.92 / 26	106 / 1.71 / 23	.02	.3 / --	474 / 471	230 / 170	1.7	

Values in constituent columns: milligrams per liter / milliequivalents per liter / percent reactance value.

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN				MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE					MILLIGRAMS PER LITER					
	T	CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-10	SAN LUIS OBISPO HYDRO UNIT																	
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																	
	T-10.C1	ARROYO GRANDE HYDRO SUBAREA																	
	32S/13E-30R01 M											CONTINUED							
10/07/69	5117				59	27	63	3.0	0	82	136	73	108	.00	.3	554	258		
1400	5050		7.9	828	2.94	2.22	2.74	.08	.00	1.34	2.83	2.06	1.74		--	509	191	1.7	
					37	28	34	1		17	36	26	22						
10/25/71	5117	64.0F			65	32	62	2.4	0	84	140	76	145	.04	.2	572	294		
1430	5050	17.8C	7.2	863	3.24	2.63	2.70	.06	.00	1.38	2.91	2.14	2.34		--	566	225	1.6	
					38	30	31	1		16	33	24	27						
	32S/13E-30R02 M																		
03/02/61					57	25	63	2.0	0	59	106	67	175	.04	.0	556*	245		E
	5801		7.1	780	2.84	2.06	2.74	.05	.00	.97	2.21	1.89	2.82		29.0	553	197	1.8	
					37	27	36	1		12	28	24	36						
06/17/64					69	30	61	2.0	0	88	122	76	156	.40	.2	629	296		E
	5050		7.1	896	3.44	2.47	2.65	.05	.00	1.44	2.54	2.14	2.52		--	560	224	1.5	
					40	29	31	1		17	29	25	29						
10/21/66		64 F			--	--	--	--	0	63	--	72	131	--	--				
	5050	18 C	8.1	904					.00	1.03		2.03	2.11		--				
										20		39	41						S
10/14/70	5117	62 F			64	29	69	3.0	0	66	145	77	134	.02	.2	613	279		
1500	5050	17 C	7.4	896	3.19	2.36	3.00	.08	.00	1.08	3.02	2.17	2.16		--	553	225	1.8	
					37	28	35	1		13	36	26	26						
	32S/13E-30R11 M																		
06/17/64					55	21	63	2.0	0	69	121	61	120	.10	.1	580	224		E
	5801		7.8	710	2.74	1.73	2.74	.05	.00	1.13	2.52	1.72	1.94		--	477	167	1.8	
					38	24	38	1		15	34	24	27						
	32S/13E-31B01 M																		
06/03/53					107	37	73	4.0	0	258	183	91	89.9	.10	.0	795*	419		E
	5786		7.3	1114	5.34	3.04	3.18	.10	.00	4.23	3.81	2.57	1.45		--	712	208	1.6	
					46	26	27	1		35	32	21	12						S
03/03/61					107	55	67	3.0	0	250	210	99	107	.15	.0	872*	493		E
	5801		7.1	1180	5.34	4.52	2.91	.08	.00	4.10	4.37	2.79	1.73		27.0	798	288	1.3	
					42	35	23	1		32	34	21	13						
	32S/13E-31B03 M																		
10/30/62		64 F			126	67	118	3.0	12	363	286	145	50.0	.16	.2	942	590		
1330	5801	18 C	8.4	1440	6.29	5.51	5.13	.08	.40	5.95	5.95	4.09	.81		22.0	1008	273	2.1	
					37	32	30		2	35	35	24	5						
	32S/13E-31B04 M																		
06/04/65					91	51	82	2.0	0	219	181	103	117	.07	.3	786	437		
	5050		7.4	1214	4.54	4.19	3.57	.05	.00	3.59	3.77	2.90	1.89		--	735	257	1.7	
					37	34	29			30	31	24	16						
	32S/13E-31B05 M																		
06/05/65					87	42	80	2.0	0	178	159	103	121	.08	.3	760	390		
	5050		7.4	1140	4.34	3.45	3.48	.05	.00	2.92	3.31	2.90	1.95		--	682	244	1.8	
					38	30	31			26	30	26	18						
	32S/13E-31B06 M																		
06/05/65					89	51	76	2.0	0	208	178	101	115	.07	.3	786	432		
	5050		7.6	1185	4.44	4.19	3.31	.05	.00	3.41	3.71	2.85	1.85		--	714	261	1.6	
					37	35	28			29	31	24	16						
	32S/13E-31B07 M																		
06/05/65					66	55	70	1.0	0	162	199	93	81.0	.02	.3	696	391		
	5050		7.4	1081	3.29	4.52	3.05	.03	.00	2.66	4.14	2.62	1.31		--	645	258	1.5	
					30	42	28			25	39	24	12						
	32S/13E-31B09 M																		
07/27/65					96	50	76	3.0	17	195	184	99	113	.10	.3	817	445		F
	5050		8.4	1162	4.79	4.11	3.31	.08	.57	3.20	3.83	2.79	1.82		--	736	257	1.6	
					39	33	27	1	5	26	31	23	15						
	32S/13E-31B10 M																		
06/05/65					97	47	78	3.0	0	215	178	100	120	.06	.3	819	436		
	5050		7.5	1193	4.84	3.87	3.39	.08	.00	3.52	3.71	2.82	1.94		--	729	260	1.6	
					40	32	28	1		29	31	24	16						
	32S/13E-31B12 M																		
06/05/65					90	42	36	2.0	0	262	138	49	59.0	.02	.4	560	397		
	5050		8.0	907	4.49	3.45	1.57	.05	.00	4.29	2.87	1.38	.95		--	545	183	0.8	
					47	36	16	1		45	30	15	10						
	32S/13E-31B13 M																		
07/27/65					105	52	60	3.0	0	253	183	96	90.0	.08	.3	790	476		
	5050		8.2	1140	5.24	4.28	2.61	.08	.00	4.15	3.81	2.71	1.45		--	713	269	1.2	
					43	35	21	1		34	31	22	12						
	32S/13E-31C01 M																		
10/30/62		65 F			66	62	325	41	0	479	36	523	.0	.35	.2	1468	420		E
1200	5801	18 C	7.9	1950	3.29	5.10	14.14	1.05	.00	7.85	.75	14.75	.00		3.0	1292	27	6.9	C
					14	22	60	4		34	3	63							
04/14/65					82	98	670	40	0	520	336	960	1.0	.45	.9	2509	608		
	5050		7.5	4255	4.09	8.06	29.15	1.02	.00	8.52	7.00	27.07	.02		--	2443	182	11.8	
					10	19	69	2		20	16	64							
01/22/66		63 F			100	108	708	45	0	551	355	1008	3.7	.55	.8	2592	694		
	5050	17 C	7.8	4543	4.99	8.88	30.80	1.15	.00	9.03	7.39	28.43	.06		--	2599	242	11.7	S
					11	19	67	3		20	16	63							
10/04/67		64 F			100	115	752	47	0	517	410	1101	3.0	.55	.7	2871	723		
	5050	18 C	7.9	4780	4.99	9.46	32.71	1.20	.00	8.47	8.54	31.05	.05		--	2783	290	12.2	
					10	20	68	2		18	18	65							

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	MILLIGRAMS PER LITER B	F SIO2	TDS SUM	TH NCH	SAR	REM
	T T-10 T-10.C T-10.C1				CENTRAL COASTAL DRAINAGE PROVINCE SAN LUIS OBISPO HYDRO UNIT ARROYO GRANDE HYDRO SUBUNIT ARROYO GRANDE HYDRO SUBAREA														
	32S/13E-31F01 M																		
09/28/61	5050		8.2	1175	76 3.79 33	67 5.51 48	47 2.04 18	3.0 .08 1	0 .00	323 5.29 46	227 4.73 41	50 1.41 12	3.7 .06 1	.10	.3 35.0	676 668	465 201	0.9	
11/02/62 1700	5801	61 F 16 C	7.5	1190	134 6.69 48	64 5.26 37	47 2.04 14	3.0 .08 1	0 .00	483 7.92 57	232 4.83 35	41 1.16 8	.0 .00	.10	.2 29.0	808 788	598 202	0.8	
07/08/63	5050		8.1	1050	92 4.59 38	67 5.51 45	46 2.00 16	3.0 .08 1	0 .00	378 6.20 52	220 4.58 38	43 1.21 10	1.2 .02	.08	.3 32.0	741 690	505 195	0.9	E
07/27/65	5050		8.1	1163	131 6.54 47	64 5.26 38	46 2.00 14	3.0 .08 1	0 .00	454 7.44 54	242 5.04 37	42 1.18 9	.0 .00	.05	.4 --	820 751	590 218	0.8	E
07/18/66 1500	5050	60 F 16 C	8.0	1082	93 4.64 38	66 5.43 45	47 2.04 17	3.0 .08 1	0 .00	346 5.67 47	242 5.04 42	47 1.33 11	1.0 .02	.03	.4 --	676 669	504 220	0.9	
10/03/67 1400	5050	64 F 18 C	7.6	1187	129 6.44 48	60 4.93 36	48 2.09 15	3.0 .08 1	0 .00	444 7.28 54	242 5.04 37	41 1.16 9	.6 .01	.04	.4 --	822 742	569 205	0.9	
	32S/13E-31F02 M																		
05/12/65	5801		8.1	1370	128 6.39 41	73 6.00 39	67 2.91 19	4.0 .10 1	0 .00	354 5.80 37	394 8.20 53	52 1.47 10	.0 .00	.11	.1 --	1006 892	620 330	1.2	E N
01/21/66	5050		8.1	1298	138 6.89 47	62 5.10 34	62 2.70 18	4.0 .10 1	0 .00	338 5.54 38	364 7.58 52	48 1.35 9	1.0 .02	.08	.5 --	952 845	600 323	1.1	E
04/13/67	5050	66 F 19 C	8.2	1330	136 6.79 46	63 5.18 35	62 2.70 18	3.0 .08 1	0 .00	347 5.69 39	372 7.75 53	46 1.30 9	1.5 .02	.40	-- --	958 855	599 314	1.1	E
09/28/67	5050	69 F 21 C	7.8	1283	136 6.79 45	66 5.43 36	60 2.61 17	4.0 .10 1	0 .00	354 5.80 39	374 7.79 52	44 1.24 8	.5 .01	.07	.4 --	949 859	611 321	1.1	E
10/11/72	5050 5050	64.0F 17.8C	7.7	1350 1371	157 7.83 48	64 5.26 32	74 3.22 20	4.1 .10 1	0 .00	231 3.79 23	534 11.12 68	47 1.33 8	1.2 .02	.15	.4 --	1089 995	655 465	1.3	E
	32S/13E-31F03 M																		
05/14/65	5801		8.0	1370	133 6.64 40	78 6.41 38	82 3.57 21	4.0 .10 1	0 .00	234 3.84 23	545 11.35 68	57 1.61 10	.0 .00	.12	.1 --	1160 1014	653 461	1.4	E N C
01/21/66	5050	72 F 22 C	7.4	1438	158 7.88 48	63 5.18 32	72 3.13 19	4.0 .10 1	0 .00	225 3.69 23	521 10.85 68	50 1.41 9	1.0 .02	.13	.4 --	1055 980	654 469	1.2	E
04/13/67	5050	69 F 21 C	7.9	1430	102 5.09 32	92 7.57 47	73 3.18 20	4.0 .10 1	0 .00	231 3.79 25	481 10.01 66	48 1.35 9	1.5 .02	.10	-- --	1060 915	634 444	1.3	E S
09/28/67	5050	67 F 19 C	7.5	1386	157 7.83 48	62 5.10 32	72 3.13 19	4.0 .10 1	0 .00	242 3.97 25	514 10.70 67	48 1.35 8	1.0 .02	.12	.4 --	1089 977	647 448	1.2	E
10/11/72	5050 5050	70.0F 21.1C	7.8	1350 1286	147 7.34 48	65 5.35 35	59 2.57 17	3.6 .09 1	0 .00	332 5.44 35	430 8.95 58	36 1.02 7	.7 .01	.12	.3 --	980 905	634 363	1.0	E
	32S/13E-31F04 M																		
05/12/65	5801		7.7	1000	58 2.89 26	47 3.87 35	94 4.09 37	3.0 .08 1	0 .00	329 5.39 49	144 3.00 28	89 2.51 23	.0 .00	.15	.1 --	628 597	338 69	2.2	N
01/21/66	5050	78 F 26 C	7.4	997	76 3.79 37	32 2.63 26	86 3.74 36	4.0 .10 1	0 .00	327 5.36 52	126 2.62 26	80 2.26 22	.0 .00	.16	.3 --	548 565	321 53	2.1	
04/13/67	5050	75 F 24 C	8.0	1010	60 2.99 29	40 3.29 32	90 3.92 38	3.0 .08 1	0 .00	330 5.41 53	118 2.46 24	83 2.34 23	1.0 .02	.10	-- --	570 557	314 44	2.2	
09/28/67	5050		7.8	934	69 3.44 35	35 2.88 29	80 3.48 35	3.0 .08 1	0 .00	327 5.36 53	122 2.54 25	75 2.12 21	.0 .00	.13	.3 --	569 545	316 48	2.0	
10/11/72	5050 5050	74.0F 23.3C	7.8	900 890	76 3.79 39	33 2.71 28	74 3.22 33	2.8 .07 1	0 .00	320 5.24 54	124 2.58 26	69 1.95 20	.2 .00	.14	.2 --	536 536	326 63	1.8	
	32S/13E-31H01 M																		
09/26/61	5801		7.7	1500	166 8.28 46	88 7.24 40	55 2.39 13	1.0 .03	0 .00	399 6.54 37	404 8.41 47	74 2.09 12	50.0 .81 5	.10	.4 26.0	1296* 1040	777 449	0.9	E
07/07/64	5801		8.4	1640	108 5.39 29	114 9.38 51	80 3.48 19	3.0 .08	7.0 .23 1	440 7.21 40	334 6.95 39	128 3.61 20	.0 .00	.17	.1 --	1206 991	739 367	1.3	E
07/27/65	5050	69 F 21 C	8.5	1686	198 9.88 48	99 8.14 39	62 2.70 13	2.0 .05	34 1.13 6	348 5.70 28	460 9.58 47	93 2.62 13	85.0 1.37 7	.02	.6 --	1375 1204	902 560	0.9	E C

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP		FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
						MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE									MILLIGRAMS PER LITER					
	T	CENTRAL COASTAL DRAINAGE PROVINCE																		
	T-10	SAN LUIS OBISPO HYDRO UNIT																		
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																		
	T-10.C1	ARROYO GRANDE HYDRO SUBAREA																		
	32S/13E-31H02 M																			
07/27/65		68	F			131	91	60	1.0	0	259	402	82	99.0	.06	.4	1135	702		E
	5050	20	C	8.0	1466	6.54	7.48	2.61	.03	.00	4.25	8.37	2.31	1.60		--	993	489	1.0	
						39	45	16			26	51	14	10						
	32S/13E-31H03 M																			
10/30/62		64	F			133	85	53	1.0	0	445	281	85	31.0	.13	.2	1074	682		E
1430	5801	18	C	8.2	1280	6.64	6.99	2.31	.03	.00	7.29	5.85	2.40	.50		28.0	916	317	0.9	C
						42	44	14			45	36	15	3						
10/07/65		60	F			148	74	61	1.0	0	408	291	89	48.0	.12	.6	995	675		E
1215	5050	16	C	7.7	1403	7.39	6.09	2.65	.03	.00	6.69	6.06	2.51	.77		--	913	340	1.0	
						46	38	16			42	38	16	5						
07/18/66		61	F			166	88	65	1.0	0	425	343	99	70.0	.09	.6	1036	777		
1510	5050	16	C	8.2	1570	8.28	7.24	2.83	.03	.00	6.97	7.14	2.79	1.13		--	1041	428	1.0	
						45	39	15			39	40	15	6						
10/19/66						--	--	--	--	0	410	--	80	53.0	--	--				
1535	5050			8.3	1440					.00	6.72		2.26	.85		--				
											68		23	9						S
10/07/69	5117					132	85	62	1.0	0	356	315	105	75.0	.10	.4	1119	679		E
1600	5050			7.9	1422	6.59	6.99	2.70	.03	.00	5.83	6.56	2.96	1.21		--	950	388	1.0	
						40	43	17			35	40	18	7						
10/20/70	5117	63	F			170	87	69	1.0	0	436	338	111	84.0	.01	.5	1179	783		E
1020	5050	17	C	7.8	1598	8.48	7.15	3.00	.03	.00	7.15	7.04	3.13	1.35		--	1074	424	1.1	
						45	38	16			38	38	17	7						
10/28/71	5117	62	F			173	83	74	1.3	0	488	310	98	87.6	.08	.3	1100	773		E
1230	5050	17	C	8.0	1563	8.63	6.83	3.22	.03	.00	8.00	6.45	2.76	1.41		--	1067	373	1.2	
						46	37	17			43	35	15	8						
	32S/13E-31H04 M																			
09/26/61		69	F			128	74	159	1.0	0	320	276	259	89.0	.10	.4	1210	624		
	5050	21	C	8.2	2180	6.39	6.09	6.92	.03	.00	5.24	5.75	7.30	1.44		32.0	1175	362	2.8	
						33	31	36			27	29	37	7						
10/30/62		64	F			126	75	190	1.0	0	361	307	268	42.0	.15	.2	1338	623		E
1400	5801	18	C	7.3	1800	6.29	6.17	8.27	.03	.00	5.92	6.39	7.56	.68		24.0	1211	327	3.3	
						30	30	40			29	31	37	3						
	32S/13E-31H07 M																			
07/18/66		67	F			194	82	92	4.0	38	365	368	146	91.0	.06	.6	1249	822		
1400	5050	19	C	8.5	1788	9.68	6.74	4.00	.10	1.27	5.98	7.66	4.12	1.47		--	1195	459	1.4	
						47	33	19		6	29	37	20	7						
10/05/67		69	F			216	95	116	5.0	0	495	421	172	142	.06	.6	1562	930		E
1400	5050	21	C	7.8	2097	10.78	7.81	5.05	.13	.00	8.11	8.77	4.85	2.30		--	1411	524	1.7	
						45	33	21	1		34	36	20	10						
10/20/70	5117	59	F			183	115	118	4.0	0	548	431	106	162	.15	.6	1485	930		E
1030	5050	15	C	7.5	2013	9.13	9.46	5.13	.10	.00	8.98	8.97	2.99	2.61		--	1389	481	1.7	
						38	40	22			38	38	13	11						
	32S/13E-31J01 M																			
07/07/64						51	102	50	1.0	0	397	229	52	12.0	.05	.1	808	547		
	5801			7.9	1170	2.54	8.39	2.18	.03	.00	6.51	4.77	1.47	.19		--	692	221	0.9	
						19	64	17			50	37	11	1						
	32S/13E-31J02 M																			
09/26/61		64	F			200	122	59	2.0	0	464	534	99	65.0	.07	.4	1419	1001		E
	5050	18	C	7.6	1750	9.98	10.03	2.57	.05	.00	7.60	11.12	2.79	1.05		30.0	1339	621	0.8	C
						44	44	11			34	49	12	5						
07/13/62		66	F			174	75	51	2.0	6.0	462	331	68	27.0	.05	.1	1042	743		E
	5801	19	C	8.8	1388	8.68	6.17	2.22	.05	.20	7.57	6.89	1.92	.44		26.0	987	354	0.8	C
						51	36	13		1	44	40	11	3						
10/30/62		64	F			137	91	50	2.0	0	466	327	62	29.0	.13	.2	1108	717		E
1450	5801	18	C	8.2	1280	6.84	7.48	2.18	.05	.00	7.64	6.81	1.75	.47		25.0	952	334	0.8	C
						41	45	13			46	41	10	1						
07/08/63						127	57	43	1.0	0	394	242	50	11.0	.01	.4	816	552		E
	5050			7.7	1110	6.34	4.69	1.87	.03	.00	6.46	5.04	1.41	.18		25.0	750	229	0.8	
						49	36	14			49	39	11	1						
07/2[illegible]						156	75	51	2.0	12	408	301	59	58.0	.04	.5	1070	698		E
	5050			8.3	1359	7.78	6.17	2.22	.05	.40	6.69	6.27	1.66	.94		--	915	343	0.8	
						48	38	14		3	42	39	10	6						
	32S/13E-31J03 M																			
07/18/66		58	F			222	135	82	2.0	0	397	644	131	126	.08	.6	1595	1110		E
1340	5050	14	C	7.9	2166	11.08	11.10	3.57	.05	.00	6.51	13.41	3.69	2.03		--	1537	784	1.1	
						43	43	14			25	52	14	8						
	32S/13E-31K01 M																			
09/26/61						186	132	89	9.0	0	635	494	124	9.3	.10	.4	1447	1008		
	5050			8.1	2340	9.28	10.86	3.87	.23	.00	10.41	10.29	3.50	.15		17.0	1373	487	1.2	
						38	45	16	1		43	42	14	1						
	32S/13E-32A01 M																			
06/11/54						77	38	39	1.0	0	243	117	53	63.0	.00	.2	704*	349		E
	5786			7.4	868	3.84	3.13	1.70	.03	.00	3.98	2.44	1.49	1.02		--	507	150	0.9	T
						44	36	20			45	27	17	11						
08/29/57						40	22	31	1.0	0	125	59	43	43.0	.65	.1	372	191		
	5800			7.7	550	2.00	1.81	1.35	.03	.00	2.05	1.23	1.21	.69		23.0	324	88	1.0	
						39	35	26	1		40	24	23	13						
02/06/58						10	21	22	1.0	0	70	21	35	33.0	.00	.7	240	112		
	5800			7.5	351	.50	1.73	.96	.03	.00	1.15	.44	.99	.53		28.0	205	54	0.4	
						16	54	30	1		37	14	32	17						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN				MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE					MILLIGRAMS PER LITER					
	T		CENTRAL COASTAL DRAINAGE PROVINCE																
	T-10		SAN LUIS OBISPO HYDRO UNIT																
	T-10.C		ARROYO GRANDE HYDRO SUBUNIT																
	T-10.C1		ARROYO GRANDE HYDRO SUBAREA																
	32S/13E-32A01 M											CONTINUED							
09/29/58					--	--	--	--	0	100	--	38	--	--	--		197		
	5050		7.4	548					.00	1.64		1.07			--				
																			S
02/18/59		63 F			54	24	42	2.0	0	95	53	35	167	.04	.1	513	233		E
	5050	17 C	7.3	649	2.69	1.97	1.83	.05	.00	1.56	1.10	.99	2.69		29.0	453	155	1.2	
					41	30	28	1		25	17	16	42						
09/22/59		68 F			50	22	44	2.0	0	102	124	51	50.0	.29	.1	451	216		
	5600	20 C	7.7	654	2.50	1.81	1.91	.05	.00	1.67	2.58	1.44	.81		26.0	419	132	1.3	
					40	29	30	1		26	40	22	12						S
02/26/60		67 F			58	27	48	1.0	0	71	155	51	88.0	.00	.3	480	256		
	5050	19 C	7.2	743	2.89	2.22	2.09	.03	.00	1.16	3.23	1.44	1.42		34.0	497	198	1.3	
					40	31	29			16	45	20	20						
09/20/60					69	34	44	2.0	0	163	176	55	48.0	.05	.0	724*	312		E
	5801		7.0	842	3.44	2.80	1.91	.05	.00	2.67	3.66	1.55	.77		12.0	520	179	1.1	T
					42	34	23	1		31	42	18	9						S
03/02/61					66	34	42	2.0	0	69	170	56	92.0	.15	.0	558*	300		E
	5801		6.8	750	3.19	2.80	1.83	.05	.00	1.13	3.54	1.58	1.48		29.0	523	243	1.1	
					41	36	23	1		15	46	20	19						
11/17/61		67 F			80	34	39	2.0	0	113	151	57	124	.01	.2	576	340		
	5050	19 C	7.1	830	3.99	2.80	1.70	.05	.00	1.85	3.14	1.61	2.00		38.0	581	247	0.9	
					47	33	20	1		22	37	19	23						
08/23/62		63 F			69	36	42	2.0	0	62	--	--	150	.06	.1	551	320		
	5801	17 C	6.7	825	3.44	2.96	1.83	.05	.00	1.02			2.42		27.0		269	1.0	
					42	36	22	1											S
10/16/62		64 F			72	36	46	1.0	0	49	158	57	172	.07	.2	560	328		
1200	5801	18 C	6.7	840	3.59	2.96	2.00	.03	.00	.80	3.29	1.61	2.77		27.0	593	288	1.1	
					42	34	23			9	39	19	33						
09/26/63		64 F			71	34	46	2.0	0	39	180	56	138	.05	.3	590	317		E
1140	5050	18 C	7.5	832	3.54	2.80	2.00	.05	.00	.64	3.75	1.58	2.23		40.0	586	285	1.1	
					42	33	24	1		8	46	19	27						
06/04/64					70	38	46	2.0	0	39	185	56	144	.06	.3	560	331		
	5050		7.1	822	3.49	3.13	2.00	.05	.00	.64	3.85	1.58	2.32		41.0	601	299	1.1	
					40	36	23	1		8	46	19	28						S
10/07/65		60 F			77	38	50	2.0	0	53	194	76	128	.10	.2	630	349		
1320	5050	16 C	7.6	935	3.84	3.13	2.18	.05	.00	.87	4.04	2.14	2.06		--	591	305	1.2	
					42	34	24	1		10	44	23	23						
	32S/13E-32C02 M																		
06/17/64		64 F			33	30	36	2.0	0	209	57	40	.5	.21	.2	290	206		
	5050	18 C	7.9	555	1.65	2.47	1.57	.05	.00	3.43	1.19	1.13	.01		--	301	35	1.1	
					29	43	27	1		60	21	20							
	32S/13E-32D01 M																		
07/28/65		70 F			83	38	39	2.0	0	199	131	59	89.0	.04	.3	528	364		
	5050	21 C	7.9	885	4.14	3.13	1.70	.05	.00	3.26	2.73	1.66	1.44		--	539	201	0.9	
					46	35	19	1		36	30	18	16						
	32S/13E-32D02 M																		
09/19/56		73 F			87	38	28	2.0	0	314	111	39	23.6	.00	.2	494*	374		
	5788	23 C	7.6	813	4.34	3.13	1.22	.05	.00	5.15	2.31	1.10	.38		--	483	116	0.6	
					50	36	14	1		58	26	12	4						
09/09/59					91	41	33	2.0	0	276	94	59	87.0	.00	.5		396		
	5050		7.2	815	4.54	3.37	1.44	.05	.00	4.52	1.96	1.66	1.40		27.0	570	170	0.7	
					48	36	15	1		47	21	17	15						
04/25/64		73 F			81	39	34	2.0	0	229	124	53	55.0	.11	.3	527	363		E
	5050	23 C	7.2	752	4.04	3.21	1.48	.05	.00	3.75	2.58	1.49	.89		35.0	536	175	0.8	
					46	37	17	1		43	30	17	10						
02/01/66		73 F			87	39	39	3.0	0	236	132	54	73.0	.09	.1	576	378		
	5050	23 C	7.3	908	4.34	3.21	1.70	.08	.00	3.87	2.75	1.52	1.18		33.0	576	184	0.9	
					47	34	18	1		42	30	16	13						
	32S/13E-32D03 M																		
09/09/59					98	43	33	2.0	0	322	106	45	71.0	.00	.5		422		
	5050		7.3	855	4.89	3.54	1.44	.05	.00	5.28	2.21	1.27	1.15		28.0	586	158	0.7	
					49	36	15	1		53	22	13	12						
11/10/60					104	36	34	2.0	0	320	120	41	41.0	.11	.2		408		
1100	5868		7.1	863	5.19	2.96	1.48	.05	.00	5.24	2.50	1.16	.66		32.0	587	146	0.7	
					54	31	15	1		55	26	12	7						
03/23/62					100	36	40	3.0	0	289	129	43	54.0	.15	.1		398		
	5868		7.2	923	4.99	2.96	1.74	.08	.00	4.74	2.69	1.21	.87		30.0	577	161	0.9	
					51	30	18	1		50	28	13	9						S
04/25/64		73 F			81	37	31	2.0	0	244	125	43	.1	.06	.4	506	358		
	5050	23 C	7.2	731	4.04	3.04	1.35	.05	.00	4.00	2.60	1.21	.00		31.0	470	154	0.7	
					48	36	16	1		51	33	15							S
07/28/65					83	38	35	2.0	0	198	130	53	89.0	.06	.3	561	364		
	5050		8.1	866	4.14	3.13	1.52	.05	.00	3.25	2.71	1.49	1.44		--	527	201	0.8	
					47	35	17	1		37	30	17	16						
02/15/66		73 F			89	41	36	2.0	0	267	133	43	65.0	.09	.1	574	391		
	5050	23 C	7.3	892	4.44	3.37	1.57	.05	.00	4.38	2.77	1.21	1.05		33.0	573	172	0.8	
					47	36	17	1		47	29	13	11						
10/24/66		62 F			--	--	--	--	0	297	--	43	32.0	--	--				
	5050	17 C	8.3	951					.00	4.87		1.21	.52		--				
										74		18	8						S

MINERAL ANALYSES OF GROUND WATER

MINERAL CONSTITUENTS IN: MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE — MILLIGRAMS PER LITER

DATE TIME	SAMPLER LAB	TEMP		FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
	T																			
	T-10																			
	T-10.C																			
	T-10.C1																			
	CENTRAL COASTAL DRAINAGE PROVINCE / SAN LUIS OBISPO HYDRO UNIT / ARROYO GRANDE HYDRO SUBUNIT / ARROYO GRANDE HYDRO SUBAREA																			
	32S/13E-32D03 M												CONTINUED							
10/29/71	5117	60	F			86	39	40	2.1	0	243	150	51	48.0	.03	.3	561	375		
1500	5850	16	C	7.9	840	4.29	3.21	1.74	.05	.00	3.98	3.12	1.44	.77		--	536	176	0.9	
						46	35	19	1		43	34	15	8						
	32S/13E-32D04 M																			
12/31/59						86	38	30	2.0	0	281	112	44	35.0	.03	.4	526	371		
	5050			7.7	823	4.29	3.13	1.31	.05	.00	4.61	2.33	1.24	.56		36.0	521	141	0.7	
						49	36	15	1		53	27	14	6						
	32S/13E-32D09 M																			
10/03/61	5999					113	53	27	1.8	--	435	152	35	.8	.07	.3	684	505		
	5868			7.3	1026	5.64	4.36	1.17	.05		7.13	3.16	.99	.01		39.0			0.5	
						50	39	10			63	28	9							
11/08/74	5117	64.0	F			60	52	32	2.0	2.1	210	205	40	.8	.02	.4	535	367		
1000	5064	17.8	C	8.5	844	2.99	4.28	1.39	.05	.07	3.44	4.27	1.13	.01		--	497	188	0.7	
						34	49	16	1	1	39	48	13							
	32S/13E-32D10 M																			
09/09/59						107	52	33	2.0	--	406	140	42	19.0	.00	.5		483		
	5868			7.2	960	5.34	4.28	1.44	.05		6.65	2.91	1.18	.31		28.0			0.7	
						48	39	13			60	26	11	3						
11/10/60						121	49	35	2.2	0	436	169	33	3.5	.05	.2		504		
1200	5868			6.9	1030	6.04	4.03	1.52	.06	.00	7.15	3.52	.93	.06		32.0	659	146	0.7	
						52	35	13	1		61	30	8	1						
03/23/62						120	43	40	3.2	0	422	171	33	2.0	.31	.2	644	483		
	5868			7.0	1052	5.99	3.54	1.74	.08	.00	6.92	3.56	.93	.03		25.0	648	131	0.8	
						53	31	15	1		60	31	8							
08/15/62						101	49	38	2.5	0	348	158	42	38.0	.10	.3	609	454		
	5868			7.1	959	5.04	4.03	1.65	.06	.00	5.70	3.29	1.18	.61		31.0	631	169	0.8	
						47	37	15	1		53	31	11	6						
04/25/64				7.7		94	44	34	2.1	--	302	143	44	40.0	.28	.3	572	417		
					863	4.69	3.62	1.48	.05		4.95	2.98	1.24	.65		31.0			0.7	
						48	37	15	1		50	30	13	7						
08/13/64	5050					89	56	43	2.0	0	348	154	45	34.0	.10	.1	640	450		F
	5801			8.0	900	4.44	4.61	1.87	.05	.00	5.70	3.21	1.27	.55		--	594	168	0.9	C
						40	42	17			53	30	12	5						
02/04/66	5868	73	F			91	40	39	3.0	0	254	137	51	71.0	.12	.1	587	392		
	5868	23	C	7.7	915	4.54	3.29	1.70	.08	.00	4.16	2.85	1.44	1.15		31.0	588	186	0.9	
						47	34	18	1		43	30	15	12						
	32S/13E-32E02 M																			
06/17/64		64	F			57	31	79	2.0	0	59	142	87	150	.26	.2	618	270		
	5050	18	C	7.7	928	2.84	2.55	3.44	.05	.00	.97	2.96	2.45	2.42		--	577	221	2.1	
						32	29	39	1		11	34	28	28						
	32S/13E-32E13 M																			
02/19/64		67	F			86	63	35	2.0	0	405	178	32	.0	.09	.1	656	474		
1100	5801	19	C	7.3	940	4.29	5.18	1.52	.05	.00	6.64	3.71	.90	.00		30.0	625	142	0.7	
						39	47	14			59	33	8							
	32S/13E-32F15 M																			
10/26/67	5050					61	31	57	2.0	--	39	110	104	147	.12	.1	639	280		E
1045	5050			7.5	890	3.04	2.55	2.48	.05		.64	2.29	2.93	2.38		--			1.5	
						37	31	31	1		8	28	36	29						
	32S/13E-32H01 M																			
03/05/57		64	F			160	76	53	2.0	0	418	311	69	74.0	.09	.3		712		
1700	5000	18	C	8.2	1410	7.98	6.25	2.31	.05	.00	6.85	6.48	1.95	1.19		21.0	972	369	0.9	
						48	38	14			42	39	12	7						
08/29/57						150	75	57	2.0	0	394	299	75	82.5	.50	.2	1032	684		E
	5800			7.7	1469	7.49	6.17	2.48	.05	.00	6.46	6.23	2.12	1.33		22.0	957	360	0.9	
						46	38	15			40	39	13	8						
09/29/58						158	73	57	2.0	0	364	280	90	126	.14	.5	975	695		E
	5050			7.8	1317	7.88	6.00	2.48	.05	.00	5.97	5.83	2.54	2.03		30.0	995	396	0.9	C
						48	37	15			36	36	16	12						
02/16/59						165	74	48	2.0	0	403	313	66	110	.04	.3	1043	717		E
	5050			7.5	1315	8.23	6.09	2.09	.05	.00	6.61	6.52	1.86	1.77		31.0	1007	386	0.8	C
						50	37	13			39	39	11	11						
09/22/59		65	F			171	82	59	2.0	0	422	346	61	125	.34	.4	1146	764		F
	5800	18	C	7.0	1567	8.53	6.74	2.57	.05	.00	6.92	7.20	1.72	2.02		26.0	1080	418	0.9	
						48	38	14			39	40	10	11						
10/06/60		72	F			133	63	57	1.0	0	348	259	73	67.0	.05	.5	1022*	591		E
	5801	22	C	7.4	1355	6.64	5.18	2.48	.03	.00	5.70	5.39	2.06	1.08		22.0	846	306	1.0	
						46	36	17			40	38	14	8						
11/09/61		64	F			64	28	45	1.0	0	76	147	57	106	.02	.2	485	275		
	5050	18	C	8.0	729	3.19	2.30	1.96	.03	.00	1.25	3.06	1.61	1.71		32.0	517	212	1.2	
						43	31	26			16	40	21	22						
08/23/62						106	52	49	2.0	0	271	--	--	92.0	.06	.2	808	479		E
	5801			7.3	1060	5.29	4.28	2.13	.05	.00	4.44			1.48		23.0		257	1.0	
						45	36	18												S
10/15/62		66	F			108	47	52	2.0	0	265	179	66	104	.11	.2	682	463		
1500	5801	19	C	7.4	1040	5.39	3.87	2.26	.05	.00	4.34	3.73	1.86	1.68		24.0	712	246	1.1	
						47	33	20			37	32	16	14						
09/26/63		71	F			135	66	62	2.0	0	312	232	99	112	.08	.5	950	609		E
1120	5050	22	C	7.3	1314	6.74	5.43	2.70	.05	.00	5.11	4.83	2.79	1.81		36.0	897	353	1.1	
						45	36	18			35	33	19	12						S

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
	T T-10 T-10.C T-10.C1	CENTRAL COASTAL DRAINAGE PROVINCE SAN LUIS OBISPO HYDRO UNIT ARROYO GRANDE HYDRO SUBUNIT ARROYO GRANDE HYDRO SUBAREA																	
	32S/13E-32H01 M											CONTINUED							
06/04/64	5050		7.7	1252	130 6.49 44	66 5.43 37	63 2.74 19	2.0 .05	0 .00	307 5.03 35	230 4.79 33	85 2.40 17	136 2.19 15	.08	.6 35.0	860 898	596 345	1.1	
10/07/65 1250	5050	67 F 19 C	8.2	828	79 3.94 44	37 3.04 34	43 1.87 21	2.0 .05 1	0 .00	200 3.28 37	166 3.46 39	52 1.47 17	42.0 .68 8	.04	.5 --	540 519	349 185	1.0	
	32S/13E-32L02 M																		
11/11/50	5000		7.5	1010	116 5.79 49	55 4.52 38	35 1.52 13	2.0 .05	0 .00	455 7.46 64	151 3.14 27	33 .93 8	2.9 .05	.01	-- 39.0	658 658	516 143	0.7	S
07/07/64	5801	69 F 21 C	8.1	1046	56 2.79 23	91 7.48 63	36 1.57 13	2.0 .05	0 .00	414 6.79 57	192 4.00 34	37 1.04 9	.0 .00	.05	.2 --	724 618	514 174	0.7	
10/26/71 1545	5117 5050	61 F 16 C	7.7	1239	112 5.59 42	55 4.52 34	72 3.13 23	3.1 .08 1	0 .00	258 4.23 32	163 3.39 25	165 4.65 35	67.5 1.09 8	.05	.3 --	792 765	506 294	1.4	
	32S/13E-32L05 M																		
07/07/64	5801		8.0	880	53 2.64 28	61 5.02 53	40 1.74 18	2.0 .05 1	0 .00	232 3.80 41	121 2.52 27	57 1.61 17	80.0 1.29 14	.05	.2 --	610 528	383 193	0.9	
	32S/13E-32L08 M																		
06/17/64	5050		8.0	1007	114 5.69 48	58 4.77 40	33 1.44 12	2.0 .05	0 .00	444 7.28 63	148 3.08 27	39 1.10 10	1.2 .02	.11	.3 --	637 614	523 159	0.6	S
	32S/13E-32L14 M																		
02/17/64 1420	5801		7.8	1120	107 5.34 39	61 5.02 36	76 3.31 24	5.0 .13 1	0 .00	423 6.93 50	216 4.50 32	75 2.12 15	21.0 .34 2	.09	.2 30.0	774 799	518 172	1.5	C
	32S/13E-32L18 M																		
02/18/64 900	5801		8.0	1500	154 7.68 41	86 7.07 38	89 3.87 21	4.0 .10 1	0 .00	486 7.97 42	288 6.00 32	123 3.47 19	85.0 1.37 7	.14	.1 27.0	1144 1095	738 339	1.4	E C
	32S/13E-32M01 M																		
07/07/64	5801		8.1	1200	77 3.84 28	98 8.06 58	46 2.00 14	2.0 .05	0 .00	446 7.31 52	233 4.85 34	59 1.66 12	22.0 .35 2	.08	.1 --	844 756	595 230	0.8	E
	32S/13E-32M04 M																		
07/18/66 1330	5050	62 F 17 C	8.3	1207	138 6.89 49	65 5.35 38	43 1.87 13	2.0 .05	22 .73 5	395 6.47 46	231 4.81 34	60 1.69 12	24.0 .39 3	.05	.4 --	773 779	612 252	0.8	
	32S/13E-32P01 M																		
07/07/63	5801		7.7	1280	128 6.39 28	162 13.32 59	67 2.91 13	1.0 .03	0 .00	574 9.41 41	519 10.81 47	89 2.51 11	18.0 .29 1	.12	.2 --	1398 1266	986 515	0.9	E C
	32S/13E-33A03 M																		
06/24/64	5801		7.9	2000	212 10.58 42	137 11.27 45	78 3.39 13	2.0 .05	0 .00	598 9.80 38	545 11.35 44	119 3.36 13	81.0 1.31 5	.12	.2 --	1614 1468	1093 603	1.0	E C S
	32S/13E-33E03 M																		
06/18/64	5801		8.0	1360	138 6.89 42	85 6.99 43	54 2.35 14	2.0 .05	0 .00	376 6.16 38	300 6.25 39	60 1.69 10	125 2.02 13	.15	.2 --	1042 949	695 386	0.9	E
	32S/13E-33F01 M																		
10/21/53	5050	62 F 17 C	8.4	1106	136 6.79 47	68 5.59 39	46 2.00 14	1.0 .03	--	464 7.60 56	231 4.81 36	35 .99 7	5.6 .09 1	.12	.3 --	821*	619	0.8	E
06/19/64	5801	60 F 16 C	7.6	1370	90 4.49 28	113 9.29 57	55 2.39 15	3.0 .08	0 .00	472 7.74 48	288 6.00 38	53 1.49 9	46.0 .74 5	.17	.2 --	934 880	690 302	0.9	
	32S/13E-33G01 M																		
06/04/64	5050	64 F 18 C	7.5	1761	226 11.28 49	105 8.64 38	69 3.00 13	3.0 .08	0 .00	534 8.75 38	498 10.37 46	100 2.82 12	50.0 .81 4	.09	.9 35.0	1385 1349	997 559	1.0	E C
	32S/13E-33K01 M																		
06/04/64	5050	64 F 18 C	7.4	1931	240 11.98 47	126 10.36 40	74 3.22 13	3.0 .08	0 .00	588 9.64 38	540 11.24 45	110 3.10 12	71.0 1.15 5	.08	.8 37.0	1599 1490	1118 636	1.0	E C S
	32S/13E-33K03 M																		
06/04/64	5050	64 F 18 C	7.9	1867	229 11.43 47	116 9.54 39	74 3.22 13	2.0 .05	0 .00	567 9.29 39	510 10.62 44	105 2.96 12	62.0 1.00 4	.08	.9 34.0	1524 1411	1049 584	1.0	E C
10/22/71 0945	5117 5050	58.0F 14.4C	8.2	2201	253 12.62 47	133 10.94 40	79 3.44 13	1.8 .05	0 .00	491 8.05 30	606 12.62 47	126 3.55 13	160 2.58 10	.09	.6 --	1693 1600	1178 776	1.0	E C
	32S/13E-33M02 M																		
06/18/64	5801	62 F 17 C	8.1	1730	208 10.38 45	117 9.62 42	67 2.91 13	2.0 .05	0 .00	562 9.21 40	481 10.01 44	74 2.09 9	93.0 1.50 7	.10	.6 --	1444 1318	1001 540	0.9	E C
07/18/66 1300	5050	59 F 15 C	8.0	1914	212 10.58 48	105 8.64 39	61 2.65 12	2.0 .05	0 .00	423 6.93 32	501 10.43 47	85 2.40 11	138 2.23 10	.08	.8 --	1411 1312	962 615	0.9	E

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE									MILLIGRAMS PER LITER					
T T-10 T-10.C T-10.CI		CENTRAL COASTAL DRAINAGE PROVINCE SAN LUIS OBISPO HYDRO UNIT ARROYO GRANDE HYDRO SUBUNIT ARROYO GRANDE HYDRO SUBAREA																	
32S/13E-33M02 M												CONTINUED							
06/05/67 1500	5050		8.0	1713	221 11.03 49	108 8.88 40	56 2.44 11	1.0 .03	0 .00	517 8.47 38	433 9.02 41	89 2.51 11	130 2.10 10	.06	.8 --	1329 1292	996 572	0.8	E C
06/02/71 1900	5050 5060	64 F 18 C	8.2	1798	214 10.68 64	44 3.62 22	55 2.39 14	1.9 .05	0 .00	195 3.20 19	424 8.83 53	72 2.03 12	160 2.58 16	.01	.6 --	1288* 1067	715 555	0.9	E
32S/13E-34G01 M																			
08/23/62	5801		7.1	1975	240 11.98 48	120 9.87 40	71 3.09 12	1.0 .03	0 .00	366 6.00 24	730 15.20 60	144 4.06 16	.0 .00	.14	.6 30.0	1706 1516	1093 793	0.9	E C
32S/13E-34G02 M																			
06/24/64	5801	64 F 18 C	7.4	1650	121 6.04 31	77 6.33 33	162 7.05 36	2.0 .05	0 .00	352 5.77 30	403 8.39 44	167 4.71 24	25.0 .40 2	.18	.4 --	1044 1130	619 330	2.8	
32S/13E-34Q01 M																			
10/30/67 1510	5050 5050		7.7	841	38 1.90 26	20 1.64 22	89 3.87 52	1.0 .03	--	56 .92 12	22 .46 6	106 2.99 40	195 3.15 42	.16	.1 --	615*	177	2.9	E
32S/14E-07J01 M																			
06/04/64	5050	68 F 20 C	7.5	1372	112 5.59 33	86 7.07 42	94 4.09 24	3.0 .08	0 .00	483 7.92 48	263 5.48 33	105 2.96 18	7.2 .12 1	.24	.7 43.0	976 951	634 237	1.6	E C
32S/14E-07K01 M																			
06/04/64	5050		7.0	1623	145 7.24 37	103 8.47 43	90 3.92 20	8.0 .20 1	0 .00	493 8.08 40	403 8.39 42	123 3.47 17	14.0 .23 1	.24	.7 53.0	1210 1182	786 382	1.4	E C
32S/14E-08N01 M																			
06/04/64	5050		7.2	1783	159 7.93 35	135 11.10 49	82 3.57 16	2.0 .05	0 .00	511 8.38 37	503 10.47 47	121 3.41 15	9.4 .15 1	.16	.7 52.0	1407 1315	952 533	1.2	E C
32S/14E-17N02 M																			
03/02/61	5801		7.2	1150	75 3.74 30	79 6.50 53	47 2.04 17	1.0 .03	0 .00	496 8.13 67	102 2.12 17	60 1.69 14	15.0 .24 2	.23	.2 35.0	726* 658	512 106	0.9	
32S/14E-18F03 M																			
06/04/64	5801		7.5	1525	110 5.49 28	116 9.54 49	105 4.57 23	--	0 .00	695 11.39 59	205 4.27 22	106 2.99 15	50.0 .81 4	.40	.2 30.0	1084 1064	752 182	1.7	E
32S/14E-18F04 M																			
06/04/64	5801		7.7	1350	115 5.74 35	83 6.83 41	91 3.96 24	--	0 .00	610 10.00 60	179 3.73 22	85 2.40 14	28.0 .45 3	.22	.2 30.0	934 911	629 129	1.6	
32S/14E-18P01 M																			
03/02/61	5801		7.5	1260	125 6.24 44	68 5.59 39	54 2.35 17	2.0 .05	0 .00	433 7.10 50	258 5.37 38	57 1.61 11	12.0 .19 1	.20	.3 29.0	898* 818	592 237	1.0	E
32S/14E-19A01 M																			
06/04/64	5801	64 F 18 C	7.6	1020	66 3.29 26	80 6.58 53	59 2.57 21	1.0 .03	0 .00	451 7.39 60	165 3.44 28	50 1.41 11	8.4 .14 1	.13	.2 32.0	724 683	494 124	1.2	E C
11/06/74 1345	5117 5064	62.0F 16.7C	8.9	980	91 4.54 40	54 4.44 39	52 2.26 20	1.2 .03	32 1.07 10	329 5.39 48	146 3.04 27	46 1.30 12	25.0 .40 4	.11	.5 --	621 609	446 126	1.1	
32S/14E-19D01 M																			
03/02/61	5801		7.7	1225	126 6.29 43	69 5.67 39	58 2.52 17	1.0 .03	0 .00	453 7.42 51	259 5.39 37	60 1.69 12	12.0 .19 1	.13	.2 30.0	1064* 838	598 227	1.0	E T
32S/14E-19D03 M																			
06/04/64	5801		7.7	2750	208 10.38 32	163 13.41 41	198 8.61 27	--	0 .00	487 7.98 25	245 5.10 16	642 18.10 56	59.0 .95 3	.22	.2 35.0	2150 1790	1190 791	2.5	E
11N/35W-06C01 S																			
11/03/60	5050	69 F 21 C	8.0	1025	118 5.89 51	39 3.21 28	55 2.39 21	3.0 .08 1	0 .00	217 3.56 31	331 6.89 60	35 .99 9	4.2 .07 1	.12	.7 41.0	758 733	455 277	1.1	E
08/22/62 1300	5050		7.6	850	85 4.24 46	31 2.55 27	56 2.44 26	3.0 .08 1	0 .00	181 2.97 32	232 4.83 52	49 1.38 15	9.5 .15 2	.10	.4 42.0	580 597	340 191	1.3	
12N/35W-27M01 S																			
08/23/62	5801	62 F 17 C	7.1	760	39 1.95 27	32 2.63 36	60 2.61 36	3.0 .08 1	0 .00	143 2.34 32	37 .77 10	150 4.23 57	2.0 .03	.07	.2 30.0	488 423	229 112	1.7	
06/24/64	5801		7.1	760	43 2.15 27	35 2.88 36	65 2.83 36	3.0 .08 1	0 .00	135 2.21 28	35 .73 9	169 4.77 60	12.0 .19 2	.08	.2 --	572 428	252 141	1.8	E T
12N/35W-28L01 S																			
10/30/67 1550	5050	66 F 19 C	7.0	319	12 .60 21	9.0 .74 26	33 1.44 51	2.0 .05 2	0 .00	16 .26 10	4.0 .08 3	26 .73 27	102 1.65 61	.00	.1 --	234 196	67 54	1.8	E

MINERAL ANALYSES OF GROUND WATER

T CENTRAL COASTAL DRAINAGE PROVINCE
T-10 SAN LUIS OBISPO HYDRO UNIT
T-10.C ARROYO GRANDE HYDRO SUBUNIT
T-10.C1 ARROYO GRANDE HYDRO SUBAREA

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
	12N/35W-29L01 S																		
10/22/71 1130	5117 5050	60.0F 15.5C	8.0	1789	184 9.18 44	101 8.31 40	80 3.48 17	2.1 .05	0 .00	406 6.65 32	463 9.64 46	112 3.16 15	94.5 1.52 7	.06	.5 --	1317 1236	874 542	1.2	E
	12N/35W-29M01 S																		
11/12/50	5000		7.4	1430	156 7.78 45	72 5.92 34	79 3.44 20	6.0 .15 1	0 .00	496 8.13 48	320 6.66 39	74 2.09 12	.2 .00	.06	-- 36.0	988 987	686 279	1.3	S
	12N/35W-29N01 S																		
06/18/64	5050	62 F 17 C	7.2	1727	206 10.28 50	91 7.48 36	66 2.87 14	2.0 .05	0 .00	423 6.93 35	480 9.99 50	112 3.16 16	.0 .00	.00	.7 --	1474 1165	889 542	1.0	E T S
	12N/35W-29N02 S																		
03/02/61	5801		7.5	1460	158 7.89 43	89 7.32 40	69 3.00 16	2.0 .05	0 .00	407 6.67 37	389 8.10 45	120 3.38 19	.0 .00	.10	.3 29.0	1172* 1056	761 427	1.1	E C
07/08/63	5050		8.0	1860	204 10.18 42	135 11.10 46	67 2.91 12	3.0 .08	0 .00	412 6.75 28	611 12.72 53	158 4.46 19	.0 .00	.01	.6 24.0	1554 1405	1065 727	0.9	E C
	12N/35W-29N03 S																		
07/12/62 1100	5801	69 F 21 C	7.5	705	49 2.45 33	27 2.22 30	62 2.70 36	4.0 .10 1	0 .00	200 3.28 45	84 1.75 24	75 2.12 29	4.0 .06 1	.10	.2 35.0	428 438	234 70	1.8	S
	12N/35W-29R03 S																		
10/16/73 1300	5117 5050	65.0F 18.3C	7.2	250	4.6 .23 12	2.3 .19 10	35 1.52 77	1.2 .03 2	0 .00	42 .69 33	8.6 .18 9	24 .68 33	33.0 .53 25	.02	.2 --	173 129	21 0	3.3	T
	12N/35W-30K03 S																		
10/22/71 1230	5117 5050	59.0F 15.0C	8.0	2347	272 13.57 48	137 11.27 40	78 3.39 12	2.6 .07	0 .00	461 7.56 27	737 15.34 55	134 3.78 13	90.0 1.45 5	.09	.5 --	1836 1677	1242 865	1.0	E C
	12N/35W-30M01 S																		
09/26/61	5050	64 F 18 C	8.0	1985	165 8.23 40	117 9.62 47	63 2.74 13	3.0 .08	0 .00	610 10.00 48	365 7.60 37	106 2.99 14	3.1 .05	.01	.4 33.0	1214 1155	893 393	0.9	
07/13/62	5801	67 F 19 C	7.7	1600	151 7.53 40	105 8.64 46	61 2.65 14	5.0 .13 1	0 .00	600 9.83 52	355 7.39 39	59 1.66 9	.0 .00	.00	.1 30.0	1140 1061	809 317	0.9	E
06/19/64	5801	61 F 16 C	7.8	1775	89 4.44 20	178 14.64 66	70 3.05 14	3.0 .08	0 .00	563 9.23 41	487 10.14 45	109 3.07 14	.0 .00	.17	.2 --	1334 1213	955 493	1.0	E C
	12N/35W-30M02 S																		
11/08/74 1120	5117 5064	60.0F 15.5C	8.2	1633	152 7.58 41	102 8.39 45	57 2.48 13	2.0 .05	0 .00	298 4.88 26	491 10.22 55	98 2.76 15	52.0 .84 4	.07	.8 --	1144 1101	799 555	0.9	E
	12N/35W-30P02 S																		
10/20/70 1130	5117 5050	60 F 16 C	7.8	2128	230 11.48 43	153 12.58 47	58 2.52 9	3.0 .08	0 .00	503 8.24 31	693 14.43 54	128 3.61 13	38.0 .61 2	.07	.9 --	1705 1550	1204 792	0.7	E N C
	12N/35W-31H01 S																		
03/02/61	5801	70 F 21 C	7.5	1020	91 4.54 41	39 3.21 29	71 3.09 28	4.0 .10 1	0 .00	275 4.51 40	217 4.52 40	81 2.28 20	.0 .00	.20	.2 32.0	516* 670	388 162	1.6	T S
08/23/62	5801	72 F 22 C	7.6	988	97 4.84 46	35 2.88 27	64 2.78 26	5.0 .13 1	0 .00	254 4.16 38	232 4.83 44	67 1.89 17	.0 .00	.12	.4 31.0	718 656	386 178	1.4	E
06/19/64	5801	70 F 21 C	7.6	980	64 3.19 31	47 3.87 38	72 3.13 30	4.0 .10 1	0 .00	246 4.03 40	198 4.12 41	69 1.95 19	3.0 .05	.18	.2 --	638 578	353 152	1.7	
	12N/35W-32D01 S																		
03/02/61	5801	69 F 21 C	7.6	790	67 3.34 38	28 2.30 26	68 2.96 34	4.0 .10 1	0 .00	268 4.39 51	96 2.00 23	77 2.17 25	.0 .00	.26	.1 38.0	492* 510	282 63	1.8	
	12N/35W-32N01 S																		
11/01/67 935	5050		7.2	426	6.0 .30 8	8.0 .66 17	66 2.87 74	2.0 .05 1	0 .00	52 .85 22	9.0 .19 5	87 2.45 62	27.0 .44 11	.04	.2 --	246 231	48 6	4.2	
	12N/35W-34C03 S																		
10/21/71 1515	5117 5050	61.0F 16.1C	8.1	1176	101 5.04 39	64 5.26 41	59 2.57 20	3.5 .09 1	0 .00	380 6.23 48	167 3.48 27	103 2.90 23	16.7 .27 2	.04	.4 --	752 701	515 204	1.1	
10/16/73 1340	5117 5050	61.0F 16.1C	8.4	1234	98 4.89 38	66 5.43 42	59 2.57 20	3.9 .10 1	9.6 .32 2	366 6.00 46	161 3.35 26	102 2.88 22	25.0 .40 3	.00	.4 --	789 704	517 200	1.1	
	12N/35W-34G04 S																		
06/24/64	5801	64 F 18 C	7.6	1160	104 5.19 43	55 4.52 37	55 2.39 20	3.0 .08 1	0 .00	377 6.18 50	183 3.81 31	74 2.09 17	18.0 .29 2	.08	.2 --	730 677	486 177	1.1	

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE									MILLIGRAMS PER LITER					
T		CENTRAL COASTAL DRAINAGE PROVINCE																	
T-10		SAN LUIS OBISPO HYDRO UNIT																	
T-10.C		ARROYO GRANDE HYDRO SUBUNIT																	
T-10.C1		ARROYO GRANDE HYDRO SUBAREA																	
12N/35W-35E01 S																			
08/23/62	5801	62 F 17 C	7.5	1035	97 4.59 40	56 4.61 40	49 2.13 19	3.0 .08 1	0 .00	388 6.36 52	181 3.77 31	69 1.95 16	7.0 .11 1	.05	.4 30.0	786 678	460 142	1.0	E S
12N/35W-35E03 S																			
06/24/64	5801	66 F 19 C	7.4	1100	94 4.69 39	59 4.85 40	57 2.48 20	3.0 .08 1	0 .00	366 6.00 49	197 4.10 34	71 2.00 16	5.0 .08 1	.10	.2 --	716 666	477 177	1.1	
12N/35W-35H02 S																			
08/23/62	5801		7.3	1040	156 7.78 64	24 1.97 16	51 2.22 18	4.0 .10 1	0 .00	403 6.61 54	183 3.81 31	65 1.83 15	3.0 .05	.05	.4 29.0	762 713	488 157	1.0	E
07/17/64	5801	64 F 18 C	8.2	1090	110 5.49 42	60 4.93 38	60 2.61 20	4.0 .10 1	0 .00	418 6.85 53	194 4.04 31	71 2.00 15	4.0 .06	.03	.1 --	770 709	521 179	1.1	E
12N/35W-35J01 S																			
08/23/62	5801		7.1	350	12 .60 18	5.0 .41 13	50 2.18 67	3.0 .08 2	0 .00	61 1.00 31	9.0 .19 6	72 2.03 63	.0 .00	.05	.6 32.0	268 213	51 1	3.1	E T
T-10.C2		NIPOMO MESA HYDRO SUBAREA																	
11N/34W-17N03 S																			
08/22/62 830	5801	66 F 19 C	8.0	234	10 .50 23	5.0 .41 19	28 1.22 56	1.0 .03 1	0 .00	58 .95 41	15 .31 13	34 .96 41	6.0 .10 4	.03	.1 29.0	152 157	46 0	1.8	S
07/17/64	5801		7.1	220	13 .65 29	2.0 .16 7	32 1.39 62	1.0 .03 1	0 .00	51 .84 38	7.0 .15 7	35 .99 45	15.0 .24 11	.00	.1 --	168 130	41 0	2.2	E T
11N/34W-18D01 S																			
08/21/62 935	5050	70 F 21 C	7.0	221	10 .50 25	3.0 .25 12	29 1.26 62	1.0 .03 1	0 .00	41 .67 33	3.0 .06 3	42 1.18 59	6.0 .10 5	.01	.1 52.0	160 166	38 4	2.1	E
11N/34W-18H03 S																			
08/21/62 850	5050		7.4	937	70 3.49 34	35 2.88 28	90 3.92 38	4.0 .10 1	0 .00	322 5.28 51	125 2.60 25	89 2.51 24	.5 .01	.08	.3 38.0	590 610	319 55	2.2	
11N/34W-18P01 S																			
10/26/71 1530	5117 5050	63.0F 17.2C	8.1	869	62 3.09 33	34 2.80 30	79 3.44 37	3.1 .08 1	0 .00	279 4.57 48	120 2.50 26	87 2.45 26	.0 .00	.03	.1 --	535 523	294 66	2.0	
11N/34W-18P02 S																			
03/23/71 1650	5000 5050	73.4F 23.0C	7.5	778	53 2.64 33	24 1.97 25	73 3.18 40	5.0 .13 2	0 .00	238 3.90 50	88 1.83 23	75 2.12 27	.0 .00	.04	.1 --	444 435	232 36	2.1	
09/28/71 1240	5000 5050	75.2F 24.0C	8.0	879	59 2.94 33	31 2.55 28	78 3.39 38	2.7 .07 1	0 .00	257 4.21 47	115 2.39 27	83 2.34 26	1.0 .02	.05	.2 --	547 496	277 64	2.0	
11N/34W-19F01 S																			
08/21/62 1000	5050		7.5	1005	97 4.84 43	43 3.54 32	63 2.74 24	3.0 .08 1	0 .00	212 3.47 31	278 5.79 52	62 1.75 16	6.0 .10 1	.10	.5 40.0	720 696	419 246	1.3	E
11N/34W-19Q01 S																			
09/17/58	5050		8.6	1025	100 4.99 44	45 3.70 33	58 2.52 22	3.0 .08 1	12 .40 4	177 2.90 26	291 6.06 54	64 1.80 16	8.9 .14 1	.06	.2 40.0	743 709	435 270	1.2	E
04/21/59	5800		8.0	1051	98 4.89 43	45 3.70 32	64 2.78 24	3.0 .08 1	0 .00	212 3.47 31	284 5.91 52	66 1.86 16	3.0 .05	.81	.3 24.0	755 692	430 256	1.3	E
09/11/59	5800		7.6	1085	99 4.94 43	45 3.70 32	64 2.78 24	3.0 .08 1	0 .00	214 3.51 31	282 5.87 52	66 1.86 16	6.0 .10 1	.18	.3 32.0	770 702	432 257	1.1	E
04/06/60	5800		8.0	1082	98 4.89 42	47 3.87 34	62 2.70 23	3.0 .08 1	0 .00	215 3.52 30	289 6.02 52	68 1.92 17	6.0 .10 1	.12	.4 31.0	770 710	438 262	1.3	E
10/13/60 1545	5050		8.3	925	89 4.44 45	36 2.96 30	56 2.44 25	2.0 .05 1	4.0 .13 1	194 3.18 32	220 4.58 46	67 1.89 19	6.9 .11 1	.08	.5 25.0	610 601	370 205	1.3	
10/05/61	5801		7.6	755	74 3.69 46	26 2.14 26	51 2.22 27	2.0 .05 1	0 .00	185 3.03 38	148 3.08 38	65 1.83 23	6.0 .10 1	.14	.3 30.0	544* 493	292 140	1.3	E
06/14/62	5801		8.1	800	--	--	52 2.26 29	--	0 .00	186 3.05	--	62 1.75	--	--	-- --		282	1.3	S
09/20/62	5801	64 F 29 C	8.1	780	72 3.59 42	33 2.71 31	52 2.26 26	3.0 .08 1	0 .00	195 3.20 37	176 3.66 42	64 1.80 21	4.0 .06 1	.13	.2 27.0	584 527	315 155	1.3	E

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB		TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
						MINERAL CONSTITUENTS IN				MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE					MILLIGRAMS PER LITER					
	T	CENTRAL COASTAL DRAINAGE PROVINCE																		
	T-10	SAN LUIS OBISPO HYDRO UNIT																		
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																		
	T-10.C2	NIPOMO MESA HYDRO SUBAREA																		
	11N/34W-20E03 S																			
05/21/71	5050					52	28	66	3.0	0	232	95	71	.0	.05	.1	473	245		
	5050			7.9	781	2.59	2.30	2.87	.08	.00	3.80	1.98	2.00	.00		--	429	55	1.8	
						33	29	37	1		49	25	26							
	11N/34W-20J01 S																			
08/22/62						94	62	122	3.0	0	393	232	137	1.0	.06	.4	900	490		
	5050			7.4	1350	4.69	5.10	5.31	.08	.00	6.44	4.83	3.86	.02		44.0	888	168	2.4	
						31	34	35	1		43	32	25							
	11N/34W-28E01 S																			
07/11/62						32	18	49	3.0	0	68	6.0	125	27.0	.00	.1	375	154		
	5801			6.9	590	1.60	1.48	2.13	.08	.00	1.11	.12	3.53	.44		39.0	332	99	1.7	
						30	28	40	2		21	2	68	8						
	11N/35W-01N01 S																			
07/11/62						13	5.0	39	1.0	0	58	.0	61	8.0	.05	.1	190	53		
1300	5801			6.9	310	.65	.41	1.70	.03	.00	.95	.00	1.72	.13		33.0	189	6	2.3	
						23	15	61	1		34		61	5						
	11N/35W-02G01 S																			
08/01/62						9.0	4.0	36	2.0	0	31	10	51	6.0	.00	.4	162	39		
1440	5801			6.7	250	.45	.33	1.57	.05	.00	.51	.21	1.44	.10		39.0	172	14	2.5	
						19	14	65	2		23	9	64	4						
	11N/35W-03C01 S																			
08/01/62						8.0	2.0	35	2.0	0	34	3.0	52	6.0	.02	.1	154	28		
1015	5801			6.8	250	.40	.16	1.52	.05	.00	.56	.06	1.47	.10		33.0	158	0	2.9	
						19	6	71	2		26	3	67	5						
	11N/35W-04R01 S																			
08/21/62						10	2.0	38	2.0	0	51	9.0	55	3.0	.03	.4	166	33		
1630	5801			7.2	275	.50	.16	1.65	.05	.00	.84	.19	1.55	.05		25.0	169	0	2.9	
						21	7	70	2		32	7	59	2						S
	11N/35W-05006 S																			
11/01/67						3.0	7.0	82	1.0	0	56	9.0	101	28.0	.05	.3	264	37		
1200	5050			7.1	485	.15	.58	3.57	.03	.00	.92	.19	2.85	.45		--	259	0	5.9	
						3	13	82	1		21	4	65	10						
	11N/35W-05L01 S																			
10/19/62			70 F			64	24	48	3.0	0	168	148	48	6.0	.12	.2	570	258		E
1430	5801		21 C	7.4	690	3.19	1.97	2.09	.08	.00	2.75	3.08	1.35	.10		36.0	460	121	1.3	
						44	27	29	1		38	42	19	1						
09/27/63			70 F			59	27	52	3.0	0	166	159	49	5.0	.08	.3	475	258		
1250	5050		21 C	8.1	704	2.94	2.22	2.26	.08	.00	2.72	3.31	1.38	.08		48.0	484	122	1.4	
						39	30	30	1		36	44	18	1						
10/15/64			69 F			60	28	47	3.0	0	157	158	53	6.7	.03	.2	485	265		
	5050		21 C	7.8	711	2.99	2.30	2.04	.08	.00	2.57	3.29	1.49	.11		--	433	136	1.3	
						40	31	28	1		34	44	20	1						
10/11/65			69 F			57	27	50	3.0	0	151	156	52	6.0	.06	.3	430	253		
830	5050		21 C	8.0	700	2.84	2.22	2.18	.08	.00	2.47	3.25	1.47	.10		--	425	130	1.4	
						39	30	30	1		34	45	20	1						
10/18/66			68 F			--	--	--	--	0	141	--	49	6.6	--	--				
900	5050		20 C	8.2	711					.00	2.31		1.38	.11		--				
											61		36	3						S
10/18/66	5117		68 F			--	--	--	--	0	141	--	49	6.6	--	--		237		
0900	5050		20 C	8.2	711					.00	2.31		1.38	.11		--				
											61		36	3						S
10/08/69	5117					55	26	43	2.0	0	139	150	51	7.0	.06	.3	396	245		
	5050			7.6	690	2.74	2.14	1.87	.05	.00	2.28	3.12	1.44	.11		--	402	130	1.2	
						40	31	28	1		33	45	21	2						
10/19/70	5117		68 F			56	25	50	3.0	0	140	147	51	8.0	.06	.2	480	243		
1035	5050		20 C	8.1	692	2.79	2.06	2.18	.08	.00	2.29	3.06	1.44	.13		--	409	128	1.4	
						39	29	31	1		33	44	21	2						
10/26/71	5117		68.0F			56	26	48	2.6	0	145	153	50	7.0	.06	.1	440	247		
1200	5050		20.0C	7.9	670	2.79	2.14	2.09	.07	.00	2.38	3.19	1.41	.11		--	414	128	1.3	
						39	30	29	1		34	45	20	2						
11/04/74	5117		70.0F			53	26	48	2.8	0	144	150	48	7.2	.03	.2	441	239		
1535	5064		21.1C	7.3	752	2.64	2.14	2.09	.07	.00	2.36	3.12	1.35	.12		--	406	121	1.4	
						38	31	30	1		34	45	19	2						
	11N/35W-05L02 S																			
11/01/67						5.0	5.0	56	1.0	0	40	12	69	12.0	.03	.2	222	33		
1530	5050			7.0	363	.25	.41	2.44	.03	.00	.66	.25	1.95	.19		--	180	0	4.2	
						8	13	78	1		22	8	64	6						
	11N/35W-05N01 S																			
11/06/61						9.0	6.0	42	1.0	0	37	5.0	50	48.0	.04	.2	220	47		
	5050			7.1	315	.45	.49	1.83	.03	.00	.61	.10	1.41	.77		42.0	221	17	2.7	
						16	18	65	1		21	3	49	27						
03/15/75	5117		70 F			112	42	65	3.5	0	215	349	38	3.1	.13	.4	809	454		E
1220	5064		21 C	8.0	1070	5.59	3.45	2.83	.09	.00	3.52	7.27	1.07	.05		--	718	276	1.3	
						47	29	24	1		30	61	9							
	11N/35W-05N02 S																			
07/12/62						9.0	7.0	69	2.0	0	53	16	86	28.0	.10	.2	270	52		
950	5801			6.9	475	.45	.58	3.00	.05	.00	.87	.33	2.43	.45		31.0	274	8	4.2	
						11	14	74	1		21	8	60	11						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN				MILLIGRAMS PER LITER MILLIEQUIVALENTS PER LITER PERCENT REACTANCE VALUE					MILLIGRAMS PER LITER					
	T	CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-10	SAN LUIS OBISPO HYDRO UNIT																	
	T-10.C	ARROYO GRANDE HYDRO SUBUNIT																	
	T-10.C2	NIPOMO MESA HYDRO SUBAREA																	
	11N/35W-06H01 S																		
07/12/62					9.0	8.0	70	4.0	0	50	22	86	27.0	.10	.1	302	56		
1000	5801		6.9	475	.45	.66	3.05	.10	.00	.82	.46	2.43	.44		32.0	283	15	4.1	
					11	15	72	2		20	11	59	11						
	11N/35W-07A01 S																		
10/29/53		75 F			121	46	62	4.0	0	223	360	46	1.9	.32	.2	858*	491		E
	5050	24 C	7.8	1070	6.04	3.78	2.70	.10	.00	3.65	7.50	1.30	.03		--	751	309	1.2	
					48	30	21	1		29	60	10							
04/05/54					122	43	60	--	0	228	355	39	--	--	--		482		
	5999		7.5		6.09	3.54	2.61		.00	3.74	7.39	1.10			41.0	772	295	1.2	
					50	29	21			31	60	9							
11/06/61					124	50	64	3.0	0	232	386	41	2.0	.14	.4	860	515		E
	5050		7.7	1148	6.19	4.11	2.78	.08	.00	3.80	8.04	1.16	.03		44.0	828	325	1.2	
					47	31	21	1		29	62	9							
07/12/62					110	46	62	4.0	0	222	360	41	.0	.20	.2	808	464		
905	5801		7.5	1180	5.49	3.78	2.70	.10	.00	3.64	7.50	1.16	.00		23.0	755	282	1.3	
					45	31	22	1		30	61	9							
	11N/35W-07R01 S																		
06/18/64		70 F			138	50	66	3.0	0	232	421	46	2.3	.15	.5	986	550		E
	5050	21 C	7.5	1241	6.89	4.11	2.87	.08	.00	3.80	8.77	1.30	.04		--	841	360	1.2	
					49	29	21	1		27	63	9							
10/08/65		70 F			125	49	70	4.0	0	178	443	43	2.8	.18	.4	880	514		E
1500	5050	21 C	8.0	1178	6.24	4.03	3.05	.10	.00	2.92	9.22	1.21	.05		--	825	368	1.3	
					46	30	23	1		22	69	9							
11/07/74	5117	73.0F			138	60	76	3.4	0	234	477	43	2.4	.17	.5	1005	591		E
1355	5064	22.8C	7.9	1359	6.89	4.93	3.31	.09	.00	3.84	9.93	1.21	.04		--	915	399	1.4	
					45	32	22	1		26	66	8							
	11N/35W-08J01 S																		
11/02/67					6.0	4.0	39	1.0	0	37	6.0	50	20.0	00	.1	157	32		
1240	5950		7.1	275	.30	.33	1.70	.03	.00	.61	.12	1.41	.32		--	144	1	3.0	
					13	14	72	1		25	5	57	13						
	11N/35W-09G01 S																		
10/13/65					42	24	45	2.0	0	139	107	56	4.0	.06	.2	381	204		
1145	5050		7.8	626	2.10	1.97	1.96	.05	.00	2.28	2.23	1.58	.06		--	348	90	1.4	
					35	32	32	1		37	36	26	1						
	11N/35W-09K01 S																		
07/12/62					13	6.0	38	2.0	0	62	6.0	53	6.0	.05	.2	206	57		
	5801		6.9	308	.65	.49	1.65	.05	.00	1.02	.12	1.49	.10		37.0	192	6	2.2	
					23	17	58	2		37	4	55	4						
	11N/35W-09K02 S																		
10/11/73	5117	67.0F			12	5.6	32	2.3	0	48	3.7	56	13.0	.00	.0	209	54		E
1545	5050	19.4C	6.9	283	.60	.46	1.39	.06	.00	.79	.08	1.58	.21		--	149	14	1.9	T
					24	18	55	2		30	3	59	8						S
	11N/35W-09K04 S																		
11/07/74	5117	60.0F			9.5	7.3	34	2.3	0	54	6.7	52	9.2	.00	.1	126	54		
1410	5064	15.5C	6.9	316	.47	.60	1.48	.06	.00	.89	.14	1.47	.15		--	148	9	2.0	
					18	23	57	2		34	5	55	6						
	11N/35W-09P01 S																		
10/28/53					6.0	5.0	40	3.0	0	43	7.0	50	8.1	.07	.1	198	36		E
	5050		7.8	256	.30	.41	1.74	.08	.00	.70	.15	1.41	.13		--	140	1	2.9	T
					12	16	69	3		29	6	59	5						
10/02/58					4.0	10	27	2.0	0	51	.0	55	5.0	.20	.0	204	51		
	5800		7.3	356	.20	.82	1.17	.05	.00	.84	.00	1.55	.08		16.0	144	9	1.6	TC
					9	37	52	2		34		63	3						S
07/27/59					11	5.0	34	2.0	0	43	4.0	53	8.0	.16	.0	213	48		E
	5800		6.6	286	.55	.41	1.48	.05	.00	.70	.08	1.49	.13		36.0	174	13	2.1	
					22	16	59	2		29	3	62	5						
10/06/60		70 F			12	18	34	2.0	0	49	7.0	52	8.0	.03	.2	220*	104		E
	5801	21 C	7.2	289	.60	1.48	1.48	.05	.00	.80	.15	1.47	.13		36.0	193	64	1.5	
					17	41	41	1		31	6	58	5						S
11/17/61		67 F			26	12	33	2.0	0	113	3.0	57	25.0	.02	.1	237	115		
	5050	19 C	7.6	352	1.30	.99	1.44	.05	.00	1.85	.06	1.61	.40		38.0	252	22	1.3	
					34	26	38	1		47	2	41	10						
07/12/62					11	5.0	34	2.0	0	48	2.0	52	8.0	.00	.1	190	48		
	5801		6.8	285	.55	.41	1.48	.05	.00	.79	.04	1.47	.13		36.0	174	9	2.1	
					22	16	59	2		33	2	60	5						
10/11/62		68 F			16	4.0	35	4.0	0	58	11	48	7.0	.05	.2	206	57		E
1230	5801	20 C	7.2	265	.80	.33	1.52	.10	.00	.95	.23	1.35	.11		30.0	186	9	2.0	
					29	12	55	4		36	9	51	4						
09/27/63		70 F			10	7.0	35	2.0	0	56	3.0	52	9.5	.02	.2	180	54		
1045	5050	21 C	7.3	292	.50	.58	1.52	.05	.00	.92	.06	1.47	.15		45.0	191	8	2.1	
					19	22	57	2		35	2	57	6						
12/06/63					14	3.0	36	2.0	0	47	15	48	4.4	.05	.1	179	48		E
1345	5801		7.0	250	.70	.25	1.57	.05	.00	.77	.31	1.35	.07		32.0	178	9	2.3	
					27	10	61	2		31	12	54	3						
10/15/64					12	6.0	33	2.0	0	48	8.0	53	12.0	.00	.0	207	55		E
	5050		7.2	289	.60	.49	1.44	.05	.00	.79	.17	1.49	.19		--	150	15	1.9	T
					23	19	56	2		30	6	56	7						
10/11/65		65 F			12	5.0	34	2.0	0	49	11	50	11.0	.01	.1	206	51		E
900	5050	18 C	7.8	293	.60	.41	1.48	.05	.00	.80	.23	1.41	.18		--	149	11	2.1	T
					24	16	58	2		31	9	56	7						

MINERAL ANALYSES OF GROUND WATER

T CENTRAL COASTAL DRAINAGE PROVINCE
T-10 SAN LUIS OBISPO HYDRO UNIT
T-10.C ARROYO GRANDE HYDRO SUBUNIT
T-10.C2 NIPOMO MESA HYDRO SUBAREA

MINERAL CONSTITUENTS IN: MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE; B, F, SIO2, TDS, TH: MILLIGRAMS PER LITER

DATE TIME	SAMPLER LAB		TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
		11N/35W-09P01 S											CONTINUED							
10/18/66			67 F			--	--	--	--	0	69	--	47	10.0	--	--				
1000	5050		19 C	7.9	329					.00	1.13		1.33	.16		--				
											43		51	6						S
10/19/70	5117		68 F			11	7.0	35	2.0	0	44	14	50	13.0	.00	.0	210	56		
1230	5050		20 C	7.9	304	.55	.58	1.52	.05	.00	.72	.29	1.41	.21		--	154	21	2.0	T
						20	21	56	2		27	11	54	8						
10/26/71	5117		66.0F			11	6.4	35	2.1	--	46	11	50	12.0	.00	.0	171	54		
1230	5050		18.9C	7.2	290	.55	.53	1.52	.05		.75	.23	1.41	.19		--			2.1	
						21	20	57	2		29	9	55	7						
		11N/35W-10M01 S																		
08/21/62			72 F			9.0	4.0	39	2.0	0	51	3.0	53	5.0	.02	.1	160	39		
1230	5050		22 C	6.9	270	.45	.33	1.70	.05	.00	.84	.06	1.49	.08		44.0	184	0	2.7	
						18	13	67	2		34	2	60	3						
06/18/64						9.0	4.0	36	2.0	0	52	2.0	51	6.5	.00	.1	180	39		
	5050			7.3	280	.45	.33	1.57	.05	.00	.85	.04	1.44	.10		--	136	0	2.5	T
						19	14	65	2		35	2	59	4						
		11N/35W-10R01 S																		
08/22/62			70 F			7.0	2.0	35	2.0	0	32	4.0	48	7.0	.01	.1	150	26		
1115	5050		21 C	7.0	229	.35	.16	1.52	.05	.00	.52	.08	1.35	.11		45.0	166	0	3.0	
						17	8	73	2		25	4	66	5						
06/18/64						7.0	3.0	32	1.0	0	31	5.0	47	7.5	.00	.0	168	30		E
	5050			7.9	236	.35	.25	1.39	.03	.00	.51	.10	1.33	.12		--	118	5	2.6	T
						17	12	69	1		25	5	65	6						
10/12/73	5117		69.0F			5.4	2.8	32	1.6	0	24	7.8	44	8.2	.00	.0	161	25		
1555	5050		20.5C	6.6	241	.27	.23	1.39	.04	.00	.39	.16	1.24	.13		--	114	6	2.8	TC
						14	12	72	2		20	8	65	7						
11/08/74	5117		71.0F			4.8	2.6	32	2.0	0	22	5.8	45	8.8	.00	.3	153	22		
1435	5064		21.6C	7.2	232	.24	.21	1.39	.05	.00	.36	.12	1.27	.14		--	112	5	2.9	T
						13	11	74	3		19	6	67	7						
		11N/35W-10R02 S																		
11/08/74	5117		62.0F			15	9.7	34	2.0	0	51	36	46	17.0	.00	.3	232	78		
1450	5064		16.7C	7.5	350	.75	.80	1.48	.05	.00	.84	.75	1.30	.27		--	185	36	1.7	T
						24	26	48	2		27	24	41	9						
		11N/35W-11B01 S																		
08/01/62						11	2.0	30	1.0	0	44	2.0	46	3.0	.00	.1	156	36		
1530	5801			6.9	243	.55	.16	1.31	.03	.00	.72	.04	1.30	.05		39.0	156	0	2.2	
						27	8	64	1		34	2	62	2						
06/18/64			72 F			10	4.0	26	1.0	0	41	4.0	45	2.5	.00	.3	176	42		E
	5050		22 C	7.6	232	.50	.33	1.13	.03	.00	.67	.08	1.27	.04		--	113	8	1.8	T
						25	17	57	2		33	4	62	2						
		11N/35W-11J01 S																		
08/01/62						9.0	4.0	31	1.0	0	48	4.0	46	4.0	.00	.1	164	39		
1600	5801			6.8	240	.45	.33	1.35	.03	.00	.79	.08	1.30	.06		41.0	164	0	2.2	
						21	15	63	1		35	4	58	3						
06/18/64			72 F			9.0	5.0	30	1.0	0	37	5.0	48	6.5	.00	.1	192	43		E
	5050		22 C	6.8	254	.45	.41	1.31	.03	.00	.61	.10	1.35	.10		--	123	13	2.0	T
						20	19	60	1		28	5	63	5						
10/12/73	5117		78.0F			11	2.8	30	1.2	0	36	3.7	49	9.3	.00	.2	188	39		E
1435	5050		25.5C	6.5	233	.55	.23	1.31	.03	.00	.59	.08	1.38	.15		--	125	10	2.1	T
						26	11	62	1		27	4	63	7						
		11N/35W-12E01 S																		
10/29/53			68 F			6.0	7.0	32	1.0	0	52	6.0	44	3.0	.00	.3	173	44		E
	5050		20 C	7.3	236	.30	.58	1.39	.03	.00	.85	.12	1.24	.05		--	125	2	2.1	T
						13	25	60	1		38	5	55	2						
09/29/58						9.0	5.0	30	1.0	0	50	10	44	2.1	.00	.3	189	43		E
	5050			6.7	246	.45	.41	1.31	.03	.00	.82	.21	1.24	.03		40.0	166	2	2.0	
						20	19	60	1		36	9	54	1						
07/27/59						--	--	--	--	0	46	--	48	--	--	--		45		
	5800			6.8	254					.00	.75		1.35			--				
																				S
10/06/60			72 F			10	6.0	27	1.0	0	49	7.4	46	1.6	.00	.2	186*	50		E
	5601		22 C	7.0	256	.50	.49	1.17	.03	.00	.80	.15	1.30	.03		39.0	162	10	1.7	
						23	22	53	1		35	7	57	1						
11/17/61			65 F			8.0	6.0	28	1.0	0	43	5.0	46	4.3	.01	.3	170	45		E
	5050		19 C	7.6	236	.40	.49	1.22	.03	.00	.70	.10	1.30	.07		50.0	169	10	1.8	
						19	23	57	1		32	5	60	3						
07/11/62			64 F			15	6.0	35	2.0	0	63	7.0	54	1.0	.02	.1	190	62		
	5801		18 C	6.8	313	.75	.49	1.52	.05	.00	1.03	.15	1.52	.02		38.0	189	11	1.4	
						27	17	54	2		38	6	56	1						
10/10/62						11	4.0	29	1.0	0	49	4.0	46	4.2	.00	.5	158	44		
1600	5050			7.1	257	.55	.33	1.26	.03	.00	.80	.08	1.30	.07		50.0	173	4	1.9	
						25	15	58	1		36	4	58	3						
09/27/63			77 F			21	6.0	39	2.0	0	73	11	60	3.1	.14	.2	242	77		E
1100	5801		25 C	7.1	339	1.05	.49	1.70	.05	.00	1.20	.23	1.69	.05		38.0	218	17	1.9	
						32	15	52	2		38	7	53	2						
12/06/63						11	4.0	32	1.0	0	52	7.0	44	.9	.03	.2	166	44		E
1400	5801			7.1	230	.55	.33	1.39	.03	.00	.85	.15	1.24	.01		34.0	164	2	2.1	
						24	14	60	1		38	7	55							
06/18/64			71 F			27	10	42	2.0	0	83	17	82	2.0	.06	.3	295	109		
	5050		22 C	6.9	447	1.35	.82	1.83	.05	.00	1.36	.35	2.31	.03		--	223	41	1.8	T
						33	20	45	1		34	9	57	1						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
					MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE									MILLIGRAMS PER LITER					
	T / T-10 / T-10.C / T-10.C2	CENTRAL COASTAL DRAINAGE PROVINCE / SAN LUIS OBISPO HYDRO UNIT / ARROYO GRANDE HYDRO SUBUNIT / NIPOMO MESA HYDRO SUBAREA																	
	11N/35W-12E01 S											CONTINUED							
10/08/65		71 F			37	13	48	2.0	0	127	30	84	2.2	.05	.2	290	146		
1440	5050	22 C	8.2	528	1.85	1.07	2.09	.05	.00	2.08	.62	2.37	.04		--	279	42	1.7	
					37	21	41	1		41	12	46	1						
	11N/35W-12E02 S																		
10/12/73	5117	66.0F			51	25	65	2.7	0	224	59	95	.1	.00	.0	474	228		
1500	5050	18.9C	7.8	706	2.54	2.06	2.83	.07	.00	3.67	1.23	2.68	.00		--	408	47	1.9	
					34	27	38	1		48	16	35							
	11N/35W-13C01 S																		
08/02/62					10	6.0	31	2.0	0	49	2.0	42	19.0	.02	.1	170	50		
	5801		6.8	260	.50	.49	1.35	.05	.00	.80	.04	1.18	.31		43.0	179	10	1.9	
					21	21	56	2		34	2	51	13						
11/08/74	5117	70.0F			28	13	39	2.0	0	121	39	52	16.0	.00	.5	294	125		
1555	5064	21.1C	8.0	474	1.40	1.07	1.70	.05	.00	1.98	.81	1.47	.26		--	248	25	1.5	
					33	25	40	1		44	18	33	6						S
	11N/35W-13D01 S																		
07/11/62		72 F			81	47	96	4.0	0	348	171	111	.0	.10	.1	752	396		
	5801	22 C	7.6	1145	4.04	3.87	4.18	.10	.00	5.70	3.56	3.13	.00		36.0	717	111	2.1	
					33	32	34	1		46	29	25							
06/18/64		74 F			77	50	91	3.0	0	322	174	106	1.5	.00	.1	724	398		
	5050	23 C	7.5	1143	3.84	4.11	3.96	.08	.00	5.28	3.62	2.99	.02		--	661	134	2.0	
					32	34	33	1		44	30	25							
	11N/35W-14Q01 S																		
08/22/62					138	71	78	3.0	0	283	461	55	29.0	.17	.6	1020	637		E
1050	5050		8.1	1344	6.89	5.84	3.39	.08	.00	4.64	9.60	1.55	.47		37.0	1011	405	1.3	C
					43	36	21			29	59	10	3						
06/18/64					40	19	42	2.0	0	132	75	56	8.5	.05	.1	395	178		
	5050		7.9	568	2.00	1.56	1.83	.05	.00	2.16	1.56	1.58	.14		--	307	70	1.4	T
					37	29	34	1		40	29	29	3						
	11N/35W-17D01 S																		
11/06/61					150	56	67	4.0	0	239	471	45	3.5	.16	.6	1025	605		E
	5050		7.6	1300	7.49	4.61	2.91	.10	.00	3.92	9.81	1.27	.06		45.0	959	409	1.2	
					50	31	19	1		26	65	8							
07/12/62		72 F			139	57	64	3.0	0	235	460	45	2.0	.20	.2	980	582		E
930	5801	22 C	7.7	1270	6.94	4.69	2.78	.08	.00	3.85	9.58	1.27	.03		36.0	922	389	1.2	
					48	32	19	1		26	65	9							
	11N/35W-21K01 S																		
11/12/74	5117	68.0F			139	58	50	4.3	0	173	500	45	1.5	.20	.6	1032	587		E
1430	5064	20.0C	8.2	1372	6.94	4.77	2.18	.11	.00	2.84	10.41	1.27	.02		--	883	444	0.9	
					50	34	16	1		20	72	9							S
	11N/35W-22D01 S																		
08/21/62					88	21	52	3.0	0	144	240	38	1.0	.02	.3	545	306		E
1200	5050		7.4	776	4.39	1.73	2.26	.08	.00	2.36	5.00	1.07	.02		35.0	550	188	1.3	
					52	20	27	1		28	59	13							
	11N/35W-24D01 S																		
08/21/62					4.0	3.0	29	1.0	0	32	2.0	39	6.5	.01	.1	130	23		
1100	5050		7.9	191	.20	.25	1.26	.03	.00	.52	.04	1.10	.10		40.0	140	0	2.7	
					11	14	72	2		30	2	63	6						
	12N/34W-31M01 S																		
07/11/62					182	83	55	2.0	0	434	405	109	.0	.07	.2	1190	796		E
1130	5801		9.0	1550	9.08	6.83	2.39	.05	.00	7.11	8.43	3.07	.00		34.0	1083	440	0.4	
					49	37	13			38	45	16							
	12N/35W-29R01 S																		
08/21/62					7.0	3.0	35	1.0	0	32	4.0	25	49.0	.02	.1	155	30		
1400	5050		7.0	236	.35	.25	1.52	.03	.00	.52	.08	.71	.79		36.0	178	4	2.8	
					16	12	71	1		25	4	34	38						
04/14/64					8.0	2.0	36	1.0	0	37	4.0	23	46.0	.07	.2	174	28		F
1000	5801		6.2	205	.40	.16	1.57	.03	.00	.61	.08	.65	.74		31.0	169	0	3.0	
					19	7	73	1		29	4	31	36						
06/18/64					8.0	2.0	34	1.0	0	28	3.0	27	52.0	.11	.1	177	28		F
	5050		7.4	240	.40	.16	1.49	.03	.00	.46	.06	.76	.84		--	141	5	2.8	T
					19	8	71	1		22	3	36	40						
	12N/35W-29R03 S																		
10/08/69	5117				7.0	3.0	37	.0	0	50	9.0	26	34.0	.04	.2	117	30		
	5050		7.7	252	.35	.25	1.61	.00	.00	.82	.17	.73	.55		--	140	0	2.9	
					16	11	73			36	7	32	24						
10/26/71	5117	52.0F			4.0	3.5	37	1.0	0	46	10	26	31.5	.04	.1	155	25		
1115	5050	11.1C	7.0	244	.20	.29	1.61	.03	.00	.75	.21	.73	.51		--	136	0	3.3	
					9	14	76	1		36	10	33	23						
	12N/35W-32F01 S																		
11/02/67					55	31	68	3.0	0	225	106	81	13.0	.08	.3	487	265		
815	5050		7.8	796	2.74	2.55	2.96	.08	.00	3.69	2.21	2.28	.21		--	468	80	1.8	
					33	31	36	1		44	26	27	3						
	12N/35W-32P01 S																		
06/19/64					13	4.0	65	2.0	0	63	11	76	20.0	.15	.2	210	49		
	5801		7.6	370	.65	.33	2.83	.05	.00	1.03	.23	2.14	.32		--	222	0	4.0	
					17	9	73	1		28	6	58	9						
11/01/67					6.0	4.0	58	2.0	0	46	9.0	69	27.0	.02	.1	216	32		
1055	5050		7.4	380	.30	.33	2.52	.05	.00	.75	.19	1.95	.44		--	198	0	4.5	
					9	10	79	2		23	6	59	13						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB		TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
						MINERAL CONSTITUENTS IN					MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE				MILLIGRAMS PER LITER					
		T		CENTRAL COASTAL DRAINAGE PROVINCE																
		T-10		SAN LUIS OBISPO HYDRO UNIT																
		T-10.C		ARROYO GRANDE HYDRO SUBUNIT																
		T-10.C2		NIPOMO MESA HYDRO SUBAREA																
		12N/35W-33J01 S																		
08/21/62			70 F			7.0	5.0	32	2.0	0	31	.0	47	14.0	.00	.2	182	38		E
1450	5801		21 C	6.6	242	.35	.41	1.39	.05	.00	.51	.00	1.33	.23		48.0	178	13	2.3	
						16	19	63	2		25		64	11						
06/18/64						8.0	5.0	28	2.0	0	29	3.0	46	17.0	.04	.0	206	41		E
	5050			7.1	244	.40	.41	1.22	.05	.00	.48	.06	1.30	.27		--	123	17	1.9	T
						19	20	59	2		23	3	62	13						
10/31/67			68 F			4.0	6.0	28	2.0	0	24	4.0	44	17.0	.00	.1	162	35		E
1100	5050		20 C	7.0	229	.20	.49	1.22	.05	.00	.39	.08	1.24	.27		--	117	15	2.1	T
						10	25	62	3		20	4	63	14						
		12N/35W-33R01 S																		
11/03/67						9.0	7.0	36	2.0	0	50	9.0	51	14.0	.00	.1	181	52		
1240	5050			7.3	293	.45	.58	1.57	.05	.00	.82	.19	1.44	.23		--	153	11	2.2	
						17	22	59	2		31	7	54	9						
		12N/35W-34N01 S																		
08/21/62						120	7.0	44	2.0	0	36	4.0	76	20.0	.00	.1	250	329		
1515	5801			6.6	368	5.99	.58	1.91	.05	.00	.59	.08	2.14	.32		37.0	328	299	1.1	TC
						70	7	22	1		19	3	68	10						S
		T-12		SANTA MARIA-CUYAMA HYDRO UNIT																
		T-12.A		SANTA MARIA HYDRO SUBUNIT																
		10N/34W-03A02 S																		
05/28/74	5000		61.7F		850	91	41	48	2.3	7.8	184	265	40	6.5	.15	.6	665	397		E
1200	5064		16.5C	8.5	907	4.54	3.37	2.09	.06	.26	3.02	5.52	1.13	.10		--	592	232	1.1	
						45	33	21	1	3	30	55	11	1						
		10N/34W-03P02 S																		
05/07/58						185	71	88	4.0	0	325	496	77	60.0	.14	.5	1220	754		E
	5050			8.0	1527	9.23	5.84	3.83	.10	.00	5.33	10.33	2.17	.97		30.0	1171	487	1.4	C
						49	31	20	1		28	55	12	5						
04/21/59			61 F			98	46	59	3.0	0	252	283	40	12.0	1.11	.6	752	434		E
	5800		16 C	8.2	1015	4.89	3.78	2.57	.08	.00	4.13	5.89	1.13	.19		18.0	684	227	1.2	
						43	33	23	1		36	52	10	2						
10/05/61						157	40	63	3.0	0	295	355	60	27.0	.22	.4	962*	556		F
	5801			7.0	1240	7.83	3.29	2.74	.08	.00	4.84	7.39	1.69	.44		21.0	871	314	1.2	
						56	24	20	1		34	51	12	3						5
06/13/62			61 F			122	83	67	4.0	0	315	399	69	47.0	.26	.2	1136	647		E
1345	5801		16 C	7.8	1430	6.09	6.83	2.91	.10	.00	5.16	8.31	1.95	.76		22.0	968	388	1.1	
						38	43	18	1		32	51	12	5						
07/18/63			62 F			126	50	68	3.0	0	242	391	42	16.0	.20	.6	880	520		E
1200	5050		17 C	7.3	1176	6.29	4.11	2.96	.08	.00	3.97	8.14	1.18	.26		29.0	844	322	1.3	
						47	31	22	1		29	60	9	2						
10/06/64						126	60	72	3.0	0	276	405	46	17.0	.20	.3	890	561		E
	5801			8.1	1250	6.29	4.93	3.13	.08	.00	4.52	8.43	1.30	.27		--	865	335	1.3	
						44	34	22	1		31	58	9	2						
07/08/65						137	59	66	3.0	0	267	396	50	22.0	.22	.6	911	585		E
	5050			7.7	1290	6.84	4.85	2.87	.08	.00	4.38	8.24	1.41	.35		--	865	366	1.2	
						47	33	20	1		30	57	10	2						
04/12/66			62 F			145	55	68	3.0	0	271	396	54	26.0	.11	.6	1025	588		E
1310	5050		17 C	7.5	1335	7.24	4.52	2.96	.08	.00	4.44	8.24	1.52	.42		--	880	364	1.2	
						49	31	20	1		30	56	10	3						
05/16/69	5000		64 F			67	40	51	3.0	0	171	237	33	10.0	.14	.6	581	332		E
1000	5050		18 C	8.2	810	3.34	3.29	2.22	.08	.00	2.80	4.93	.93	.16		--	525	192	1.2	
						37	37	25	1		32	56	11	2						
09/24/69	5000		63 F			83	49	44	3.0	0	221	264	24	14.0	.12	.6	640	409		E
1210	5050		17 C	7.8	884	4.14	4.03	1.91	.08	.00	3.62	5.50	.68	.23		--	590	228	0.9	
						41	40	19	1		36	55	7	2						
04/01/70	5000		62 F			92	41	47	2.0	0	226	268	22	7.0	.13	.6	610	398		
845	5050		17 C	7.8	912	4.59	3.37	2.04	.05	.00	3.70	5.54	.62	.11		--	588	213	1.0	
						46	34	20			37	56	6	1						
03/30/71	5000		60.8F			102	46	42	3.5	0	218	290	34	12.0	.12	.5	704	445		E
1420	5050		16.0C	8.0	978	5.09	3.78	1.83	.09	.00	3.57	6.04	.96	.19		--	637	265	0.9	
						47	35	17	1		33	56	9	2						
09/13/71	5000		63 F			98	45	47	1.9	12	179	293	39	13.5	.11	.5	705	428		E
1525	5050		17 C	8.3	975	4.89	3.70	2.04	.05	.40	2.93	6.10	1.10	.22		--	638	263	1.0	
						46	35	19		4	27	57	10	2						
03/10/72	5000		61.7F			106	49	53	2.7	0	238	303	44	9.8	.12	.5	721	466		E
1220	5050		16.5C	8.0	993	5.29	4.03	2.31	.07	.00	3.90	6.31	1.24	.16		--	685	271	1.1	
						45	34	20	1		34	54	11	1						
05/15/73	5000		61 F			105	48	51	2.8	0	243	293	39	6.8	.04	.7	705	460		
1635	5050		16 C	8.1	1021	5.24	3.95	2.22	.07	.00	3.98	6.10	1.10	.11		--	665	261	1.0	
						46	34	19	1		35	54	10	1						
		10N/34W-04N01 S																		
10/23/69	5000		62 F			122	64	55	5.0	0	276	350	40	39.0	.16	.7	928	568		E
1345	5050		17 C	7.8	1253	6.09	5.26	2.39	.13	.00	4.52	7.29	1.13	.63		--	811	342	1.0	
						44	38	17	1		33	54	8	5						

MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
	Y	CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-12	SANTA MARIA-CUYAMA HYDRO UNIT																	
	T-12.A	SANTA MARIA HYDRO SUBUNIT																	
	10N/35W-04C01 S											CONTINUED							
04/23/53					--	--	--	--	--	--	--	58	--	--	--		775		
	5050			1660								1.64			--				
																			S
12/00/53					--	--	--	--	--	--	--	60	--	--	--		692		
	5999			1700								1.69			--				
																			S
12/17/53					--	--	--	--	--	--	--	60	--	--	--		692		
	5000			1700								1.69			--				
																			S
05/00/55					--	--	--	--	--	--	--	56	--	--	--		784		
	5999			1640								1.58			--				
																			S
05/20/55					--	--	--	--	--	--	--	56	--	--	--		784		
	5000			1640								1.58			--				
																			S
03/00/56					--	--	--	--	--	--	--	63	--	--	--		682		
	5999			1510								1.78			--				
																			S
04/00/57					209	94	99	4.0	0	321	--	60	--	--	--		909		
	5999		7.2	1740	10.43	7.73	4.31	.10	.00	5.26		1.69			--		666	1.4	
					46	34	19												S
11/21/57					175	88	84	4.0	0	201	709	66	7.6	.17	.0	1350	799		E
	5050		7.5	1710	8.73	7.24	3.65	.10	.00	3.29	14.76	1.86	.12		27.0	1259	635	1.3	
					44	37	19	1		16	74	9	1						
05/07/58					216	86	101	4.0	0	329	695	83	10.7	.58	.4	1167	893		
	5800		7.2	1824	10.78	7.07	4.39	.10	.00	5.39	14.47	2.34	.17		22.0	1380	623	1.5	C
					48	32	20			24	65	10	1						
11/19/58					206	91	96	5.0	0	310	709	68	12.0	.16	.8	1472	889		E
	5050		7.8	1694	10.28	7.48	4.18	.13	.00	5.08	14.76	1.92	.19		25.0	1365	635	1.4	C
					47	34	19	1		23	67	9	1						
04/21/59		61 F			190	83	98	4.0	0	235	706	76	10.0	.23	.4	1291	816		E
	5800	16 C	7.7	1684	9.48	6.83	4.26	.10	.00	3.85	14.70	2.14	.16		29.0	1312	623	1.5	C
					46	33	21			18	71	10	1						
09/11/59		61 F			212	89	91	4.0	0	321	687	74	11.0	.20	.7	1385	896		E
	5800	16 C	7.3	1831	10.58	7.32	3.96	.10	.00	5.26	14.30	2.09	.18		28.0	1354	633	1.3	
					48	33	18			24	66	10	1						
06/14/62		61 F			155	119	84	4.0	0	306	695	70	12.0	.23	.4	1480	877		E
	5801	16 C	8.0	1770	7.73	9.79	3.65	.10	.00	5.02	14.47	1.97	.19		22.0	1312	626	1.2	C
					36	46	17			23	67	9	1						
07/09/65					221	97	99	4.0	0	349	721	74	19.0	.21	.6	1581	951		E
	5050		7.9	1887	11.03	7.98	4.31	.10	.00	5.72	15.01	2.09	.31		--	1407	665	1.4	C
					47	34	18			25	65	9	1						
11/08/65		62 F			197	89	98	4.0	0	277	708	69	20.0	.28	.7	1400	858		E
1300	5050	17 C	7.9	1776	9.83	7.32	4.26	.10	.00	4.54	14.74	1.95	.32		--	1321	631	1.5	C
					46	34	20			21	68	9	1						
10/19/66		60 F			245	54	99	4.0	0	297	691	72	16.0	.20	--	1460	834		E
1250	5050	16 C	8.3	1920	12.23	4.44	4.31	.10	.00	4.87	14.39	2.03	.26		--	1327	590	1.5	
					58	21	20			23	67	9	1						S
05/23/67		60 F			151	92	106	4.0	0	229	635	97	8.5	.23	.5	1626	756		E
1120	5050	16 C	7.8	1746	7.53	7.57	4.61	.10	.00	3.75	13.22	2.74	.14		--	1206	568	1.7	
					38	38	23	1		19	67	14	1						
05/03/68		63 F			224	95	109	4.0	0	345	752	73	17.0	.20	.6	1600	950		E
1250	5050	17 C	8.3	1960	11.18	7.81	4.74	.10	.00	5.65	15.66	2.06	.27		--	1444	668	1.5	C
					47	33	20			24	66	9	1						
09/20/68		63 F			223	94	100	4.0	0	339	741	73	16.3	.20	.8	1542	944		E
1110	5050	17 C	7.6	1886	11.13	7.73	4.35	.10	.00	5.56	15.43	2.06	.26		--	1418	666	1.4	C
					48	33	19			24	66	9	1						
09/13/71	5000	63 F			191	90	93	2.7	0	290	674	87	19.5	.20	.6	1420	845		E
1325	5050	17 C	7.8	1752	9.53	7.40	4.05	.07	.00	4.75	14.03	2.45	.31		--	1300	609	1.4	C
					45	35	19			22	65	11	1						S
03/09/72	5000	61 F			192	87	95	3.9	0	315	641	72	21.8	.20	.5	1377	837		E
1335	5050	16 C	8.0	1670	9.58	7.15	4.13	.10	.00	5.16	13.35	2.03	.35		--	1268	579	1.4	C
					46	34	20			25	64	10	2						
05/15/75	5000	60.8F		2100	146	81	108	3.9	0	156	662	91	20.0	.22	.6	1350	735		EX
1100	5066	16.0C	8.1	1689	7.29	6.66	4.70	.10	.00	2.56	13.78	2.57	.32		--	1189	570	1.8	
					39	36	25	1		13	72	13	2						S
	10N/35W-05J01 S																		
10/00/27					126	50	96	--	--	214	443	45	31.0	--	--		520		
	5999				6.29	4.11	4.18			3.51	9.22	1.27	.50		--			1.8	
					43	28	29			24	64	9	3						
05/00/51					--	--	--	--	--	--	--	66	--	--	--		545		
	5999			1270								1.86			--				
																			S
12/00/53					144	62	77	4.0	0	212	--	68	--	--	--		615		
	5999		7.7	1340	7.19	5.10	3.35	.10	.00	3.47		1.92			--		441	1.4	
					46	32	21	1											S
12/17/53					144	62	77	4.0	0	212	--	68	--	--	--		615		
	5050		7.7	1340	7.19	5.10	3.35	.10	.00	3.47		1.92			--		441	1.4	
					46	32	21	1											S

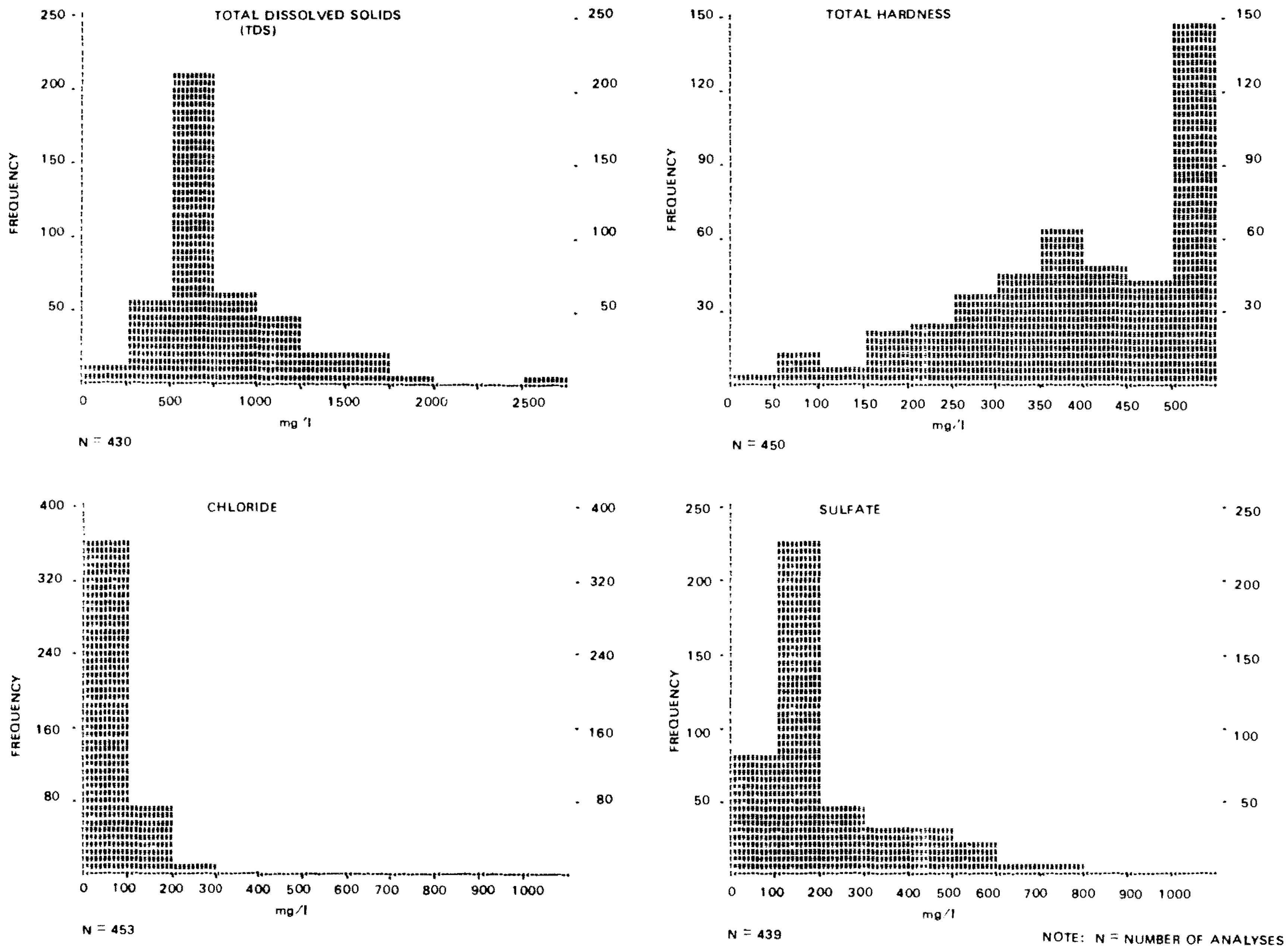
MINERAL ANALYSES OF GROUND WATER

DATE TIME	SAMPLER LAB	TEMP	FIELD LABORATORY	PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
						MINERAL CONSTITUENTS IN MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE									MILLIGRAMS PER LITER					
	T		CENTRAL COASTAL DRAINAGE PROVINCE																	
	T-12		SANTA MARIA-CUYAMA HYDRO UNIT																	
	T-12.A		SANTA MARIA HYDRO SUBUNIT																	
	10N/35W-05J01 S												CONTINUED							
05/19/54						--	--	--	--	--	--	--	64	--	--	--		55		
1206	5050				1270								1.80			--				
																				S
09/00/54						--	--	--	--	--	--	--	63	22.0	--	--		620		
	5999				1388								1.78	.35		--				
																				S
04/00/57						146	69	81	3.0	0	243	--	64	--	--	--		649		
	5999			7.1	1360	7.29	5.67	3.52	.08	.00	3.98		1.80			--		449	1.4	
						44	34	21												S
04/05/57						146	69	81	3.0	0	243	--	64	--	--	--		646		
	5050			7.1	1360	7.29	5.67	3.52	.08	.00	3.98		1.80			--		449	1.4	
						44	34	21												S
05/07/58						140	66	80	3.0	0	242	467	71	25.2	.10	.6	1075	630		E
	5050			7.8	1381	6.99	5.59	3.48	.08	.00	3.97	9.72	2.00	.41		25.0	998	431	1.4	
						43	35	22			25	60	12	3						
09/17/58						144	70	71	4.0	0	226	473	71	22.0	.09	.4	1048	648		E
	5050			8.0	1388	7.19	5.76	3.09	.10	.00	3.70	9.85	2.00	.35		26.0	992	463	1.2	
						45	36	19	1		23	62	13	2						
05/26/59		62	F			132	65	78	3.0	0	200	483	67	27.0	.46	.3	1065	597		
	5800	17	C	7.8	1589	6.59	5.35	3.39	.08	.00	3.28	10.06	1.89	.44		23.0	977	433	1.4	
						43	35	22	1		21	64	12	3						
11/17/60		58	F			140	68	76	3.0	0	236	491	67	17.0	.31	1.0	946*	630		
	5801	14	C	7.9	1378	6.99	5.59	3.31	.08	.00	3.87	10.22	1.89	.27		16.0	994	436	1.3	
						44	35	21	1		24	63	12	2						
10/09/61						--	--	--	--	0	242	--	69	--	--	--		640		
	5801			7.2	1360					.00	3.97		1.95			--				
																				S
06/14/62		62	F			123	75	78	6.0	0	235	475	71	23.0	.09	.4	1016	616		
1800	5801	17	C	8.1	1480	6.14	6.17	3.39	.15	.00	3.85	9.89	2.00	.37		24.0	991	423	1.4	
						39	39	21	1		24	61	12	2						
09/20/62		63	F			132	73	70	3.0	0	232	475	67	22.0	.20	.6	1124	630		E
	5801	17	C	8.1	1330	6.59	6.00	3.05	.08	.00	3.80	9.89	1.89	.35		25.0	981	440	1.2	
						42	38	19	1		24	62	12	2						
07/19/63		62	F			145	70	82	4.0	0	254	481	70	24.0	.20	.7	1100	651		E
1130	5050	17	C	7.2	1414	7.24	5.76	3.57	.10	.00	4.16	10.01	1.97	.39		28.0	1029	442	1.4	
						43	35	21	1		25	61	12	2						
	10N/35W-06A01 S																			
02/06/64		62	F			78	148	156	4.0	0	496	591	76	9.8	.60	.8	1455	804		E
	5050	17	C	8.1	1800	3.89	12.17	6.78	.10	.00	8.13	12.30	2.14	.16		23.0	1328	397	2.4	C
						17	53	29			36	54	9	1						
	10N/35W-06A03 S																			
02/06/64		62	F			127	49	70	3.0	0	254	379	46	2.4	.16	.6	878	519		E
	5050	17	C	8.2	1130	6.34	4.03	3.05	.08	.00	4.16	7.89	1.30	.04		15.0	816	311	1.3	
						47	30	23	1		31	59	10							
	10N/35W-07F01 S																			
10/17/41		64	F			126	53	69	4.0	0	247	398	48	3.0	--	.0	896	533		
	5999	18	C			6.29	4.36	3.00	.10	.00	4.05	8.29	1.35	.05		32.0	854	330	1.3	
						46	32	22	1		29	60	10							
06/00/42						--	--	--	--	--	--	--	49	--	--	--		650		
	5999				1190								1.38			--				
																				S
08/00/48						--	--	--	--	--	--	--	56	--	--	--		420		
	5999				1280								1.58			--				
																				S
05/00/51						--	--	--	--	--	--	--	57	--	--	--		604		
	5999				1280								1.61			--				
																				S
08/00/51						--	--	--	--	--	--	--	60	--	--	--		607		
	5999				1310								1.69			--				
																				S
04/00/52						221	14	79	4.0	0	258	466	64	--	--	--		609		
	5999			8.0	1340	11.03	1.15	3.44	.10	.00	4.23	9.70	1.80			--	975	398	1.4	
						70	7	22	1		27	62	11							
07/00/52						--	--	--	--	12	236	--	68	--	--	--				
	5999			8.4	1380					.40	3.87		1.92			--				
																				S
04/00/53						--	--	--	--	--	--	--	60	--	--	--		585		
	5999				1310								1.69			--				
																				S
04/23/53						--	--	--	--	--	--	--	60	--	--	--		585		
	5000				1310								1.69			--				
																				S
09/20/54		66	F			149	63	80	4.0	0	256	456	69	4.6	.24	.3		632		
	5000	18	C	7.2	1260	7.44	5.18	3.48	.10	.00	4.16	9.49	1.95	.07		35.0	986	423	1.4	C
						46	32	21	1		27	61	12							S
09/21/55		62	F			163	75	63	3.0	0	259	498	78	7.1	.07	.5	1125*	716		E
	5050	17	C	8.0	1490	8.13	6.17	2.74	.08	.00	4.25	10.37	2.20	.11		--	1015	503	1.0	
						47	36	16			25	61	13	1						
03/00/56						167	71	84	3.0	13	242	--	79	--	--	--		709		
	5999			8.4	1450	8.33	5.84	3.65	.08	.43	3.97		2.23			--		489	1.4	
						47	33	20												S

MINERAL ANALYSES OF GROUND WATER

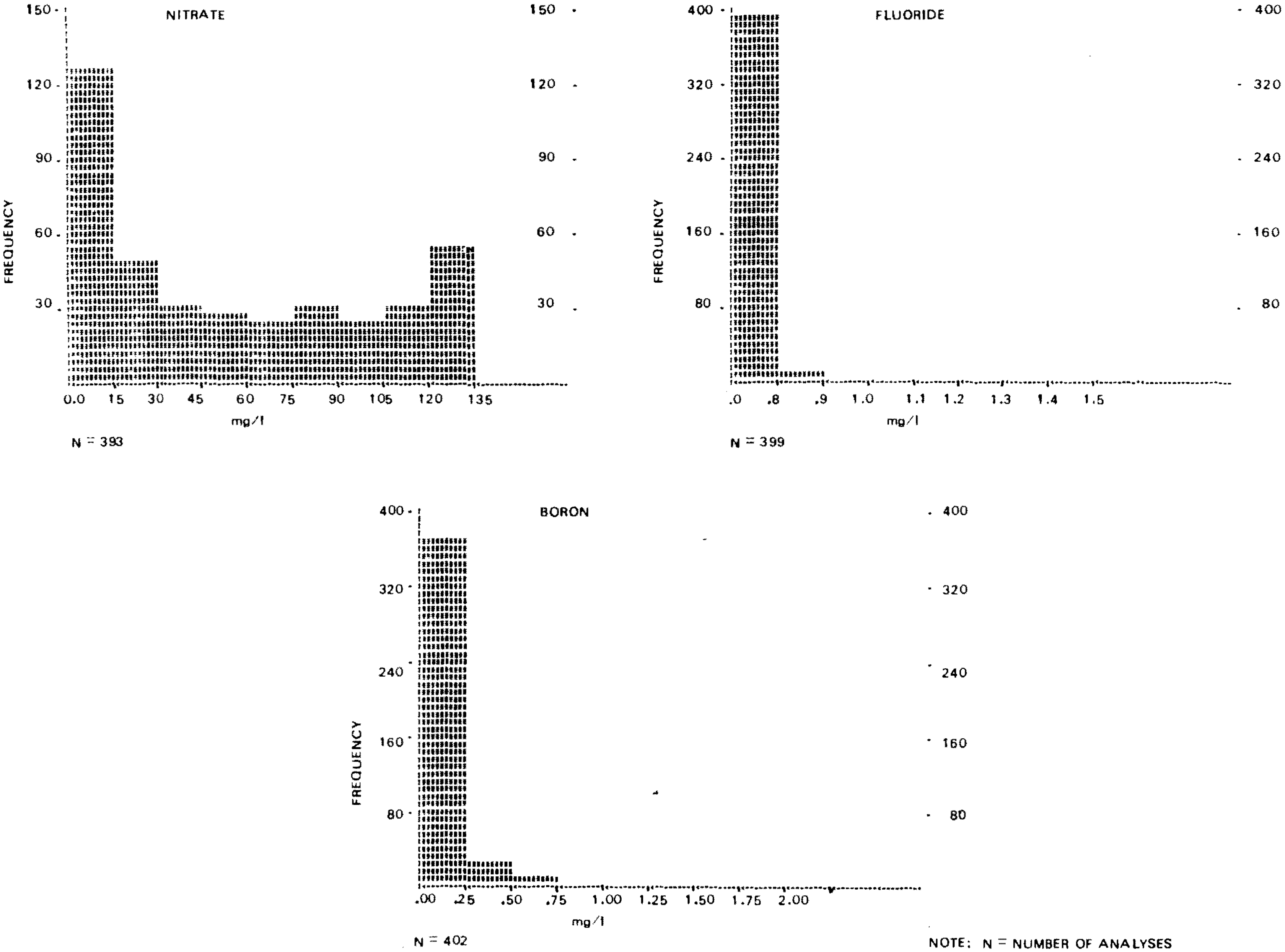
DATE TIME	SAMPLER LAB	TEMP		FIELD LABORATORY PH	EC	CA	MG	NA	K	CO3	HCO3	SO4	CL	NO3	B	F SIO2	TDS SUM	TH NCH	SAR	REM
						MINERAL CONSTITUENTS IN					MILLIGRAMS PER LITER / MILLIEQUIVALENTS PER LITER / PERCENT REACTANCE VALUE				MILLIGRAMS PER LITER					
	T				CENTRAL COASTAL DRAINAGE PROVINCE															
	T-12				SANTA MARIA-CUYAMA HYDRO UNIT															
	T-12.A				SANTA MARIA HYDRO SUBUNIT															
	10N/35W-07F01 S												CONTINUED							
08/29/57		62	F			164	76	84	3.0	0	260	542	91	4.9	.65	.1	1142	722		
	5800	17	C	7.6	1635	8.18	6.25	3.65	.08	.00	4.26	11.28	2.57	.08		21.0	1114	509	1.4	
						45	34	20			23	62	14							
11/21/57						141	87	71	3.0	0	162	553	89	3.7	.06	.0	1232	710		E
	5050			7.6	1470	7.04	7.15	3.09	.08	.00	2.66	11.51	2.51	.06		37.0	1064	577	1.2	
						41	41	18			16	69	15							S
09/17/58						169	79	88	4.0	0	246	586	100	3.0	.20	.2	1196	747		E
	5800			7.9	1631	8.43	6.50	3.83	.10	.00	4.03	12.20	2.82	.05		21.0	1171	545	1.4	
						45	34	20	1		21	64	15							
11/11/60						198	84	86	3.0	0	281	663	102	1.5	.28	.4	1318*	840		E
	5801			7.5	1669	9.88	6.91	3.74	.08	.00	4.61	13.79	2.88	.02		25.0	1281	609	1.3	C
						48	34	18			22	66	14							
10/09/61						297	35	89	3.0	0	282	660	108	4.1	.27	.2	1524*	886		E
	5801			7.1	1745	14.82	2.88	3.87	.08	.00	4.62	13.74	3.05	.07		27.0	1362	655	1.3	C
						68	13	18			22	66	14							
06/15/62		63	F			231	89	76	7.0	0	293	697	116	6.0	.23	.6	1558	943		E
1015	5801	17	C	7.8	1830	11.53	7.32	3.31	.18	.00	4.80	14.51	3.27	.10		28.0	1394	703	1.1	C
						52	33	15	1		21	64	14							
09/20/62		64	F			222	89	83	3.0	0	287	689	116	4.0	.24	.4	1470	921		E
1400	5801	18	C	7.4	1780	11.08	7.32	3.61	.08	.00	4.70	14.34	3.27	.06		28.0	1375	686	1.2	C
						50	33	16			21	64	15							
07/19/63		64	F			236	103	100	4.0	0	305	777	120	6.1	.20	.7	1610	1013		E
1300	5050	18	C	7.5	1988	11.78	8.47	4.35	.10	.00	5.00	16.18	3.38	.10		33.0	1529	763	1.4	C
						48	34	18			20	66	14							
05/07/64		65	F			247	103	101	4.0	0	288	782	135	3.0	.21	.6	1675	1041		E
945	5050	18	C	8.0	2045	12.33	8.47	4.39	.10	.00	4.72	16.28	3.81	.05		--	1517	805	1.4	C
						49	33	17			19	65	15							
07/09/65		64	F			250	111	98	4.0	0	311	795	131	5.0	.17	.6	1736	1081		E
	5050	18	C	7.6	2100	12.48	9.13	4.26	.10	.00	5.10	16.55	3.69	.08		--	1547	826	1.3	C
						48	35	16			20	65	15							S
04/13/66		63	F			228	114	73	3.0	10	195	795	129	6.6	.23	.7	1706	1039		E
1400	5874	17	C	8.2	2380	11.38	9.38	3.18	.08	.33	3.20	16.55	3.64	.11		--	1455	862	1.0	
						47	39	13		1	13	69	15							
05/23/67		59	F			220	117	95	4.0	0	213	847	132	5.0	.22	.7	1766	1031		E
1200	5050	15	C	8.2	2089	10.98	9.62	4.13	.10	.00	3.49	17.63	3.72	.08		--	1525	856	1.3	
						44	39	17			14	71	15							
05/03/68		65	F			250	113	110	5.0	0	310	841	124	6.7	.20	.3	1760	1089		E
1340	5050	18	C	8.2	2200	12.48	9.29	4.79	.13	.00	5.08	17.51	3.50	.11		--	1602	835	1.5	C
						47	35	18			19	67	13							
03/31/70	5000	63	F			308	133	139	4.0	0	348	1073	144	5.5	.28	1.5	2140	1316		E
900	5050	17	C	7.3	2546	15.37	10.94	6.05	.10	.00	5.70	22.34	4.06	.09		--	1978	1031	1.7	C
						47	34	19			18	69	13							
09/08/70	5000	62	F			255	126	129	4.0	0	219	998	140	6.0	.21	.8	1900	1155		E
920	5050	17	C	7.8	2283	12.72	10.36	5.61	.10	.00	3.59	20.78	3.95	.10		--	1766	975	1.7	C
						44	36	19			13	73	14							
09/13/71	5000	65	F			279	129	119	3.9	0	312	985	134	6.0	.18	.7	2036	1230		E
1100	5050	18	C	8.2	2314	13.92	10.61	5.18	.10	.00	5.11	20.51	3.78	.10		--	1809	972	1.5	C
						47	36	17			17	70	13							
05/15/73	5000	63	F			266	133	120	4.5	0	181	1064	140	5.8	.18	.7	1973	1212		E
1230	5050	17	C	7.6	2382	13.27	10.94	5.22	.12	.00	2.97	22.15	3.95	.09		--	1822	1063	1.5	C
						45	37	18			10	76	14							
	10N/35W-07P01 S																			
10/00/27						113	48	68	--	0	226	342	48	22.0	--	--	882	480		
	5999					5.64	3.95	2.96		.00	3.70	7.12	1.35	.35		8.0	760	295	1.4	
						45	31	24			30	57	11	3						
06/00/42						--	--	--	--	--	--	--	69	--	--	--		650		
	5999				1300								1.95			--				
																				S
09/00/55		62	F			163	75	63	3.0	0	259	498	78	7.0	.07	--	1125	716		E
	5999	17	C	8.0	1498	8.13	6.17	2.74	.08	.00	4.25	10.37	2.20	.11		--	1014	503	1.0	
						47	36	16			25	61	13	1						
08/00/57		62	F			164	76	84	3.0	0	260	542	91	5.0	.65	--	1142	722		
	5999	17	C	7.6	1635	8.18	6.25	3.65	.08	.00	4.26	11.28	2.57	.08		21.0	1114	509	1.4	
						45	34	20			23	62	14							
	10N/35W-08D01 S																			
04/25/52						195	81	95	5.0	0	304	656	100	--	--	--		820		
	5000			8.2	1790	9.73	6.66	4.13	.13	.00	4.98	13.62	2.82			--	1279	571	1.4	
						47	32	20	1		23	66	13							S
10/16/52		75	F			--	--	--	--	0	258	--	95	--	--	--				
	5000	24	C	8.1	1700					.00	4.23		2.68			--				
																				S
	10N/35W-09F01 S																			
06/00/42		62	F			--	--	--	--	--	--	--	159	--	--	--		825		
	5999	17	C		1820								4.48			--				
																				S
08/11/55		67	F			280	114	174	5.0	0	332	1010	148	7.7	.39	.3		1168		
	5000	19	C	7.6	2650	13.97	9.38	7.57	.13	.00	5.44	21.03	4.17	.12		28.0	1930	896	2.2	C
						45	30	24			18	68	14							
11/01/55		59	F			--	--	184	--	--	--	--	153	--	--	--		1190		
	5000	15	C		2510			8.00					4.31			--			2.1	
								25												S

APPENDIX B (continued)

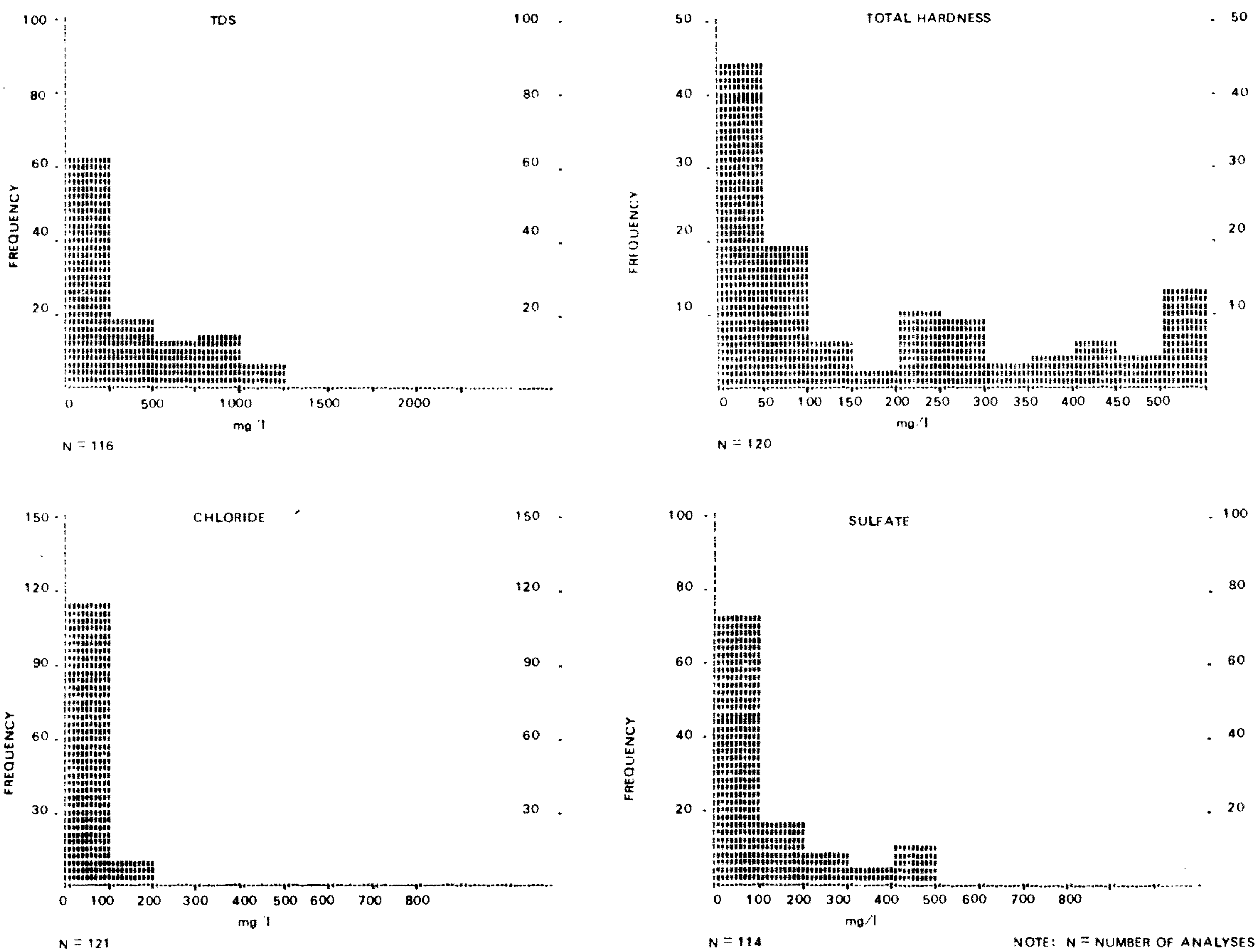


NOTE: N = NUMBER OF ANALYSES

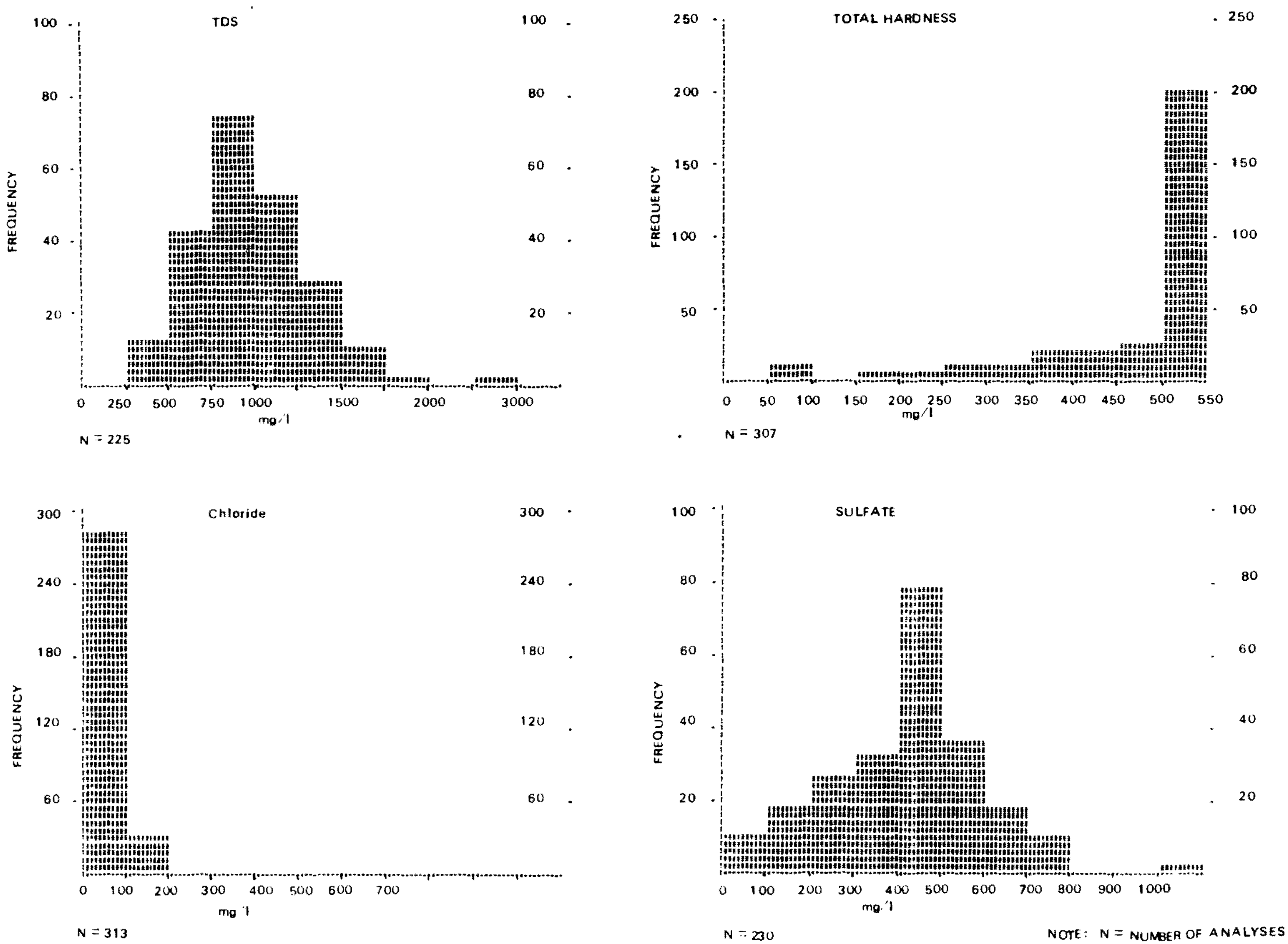
TDS, TOTAL HARDNESS, CHLORIDE, AND SULFATE HISTOGRAMS FOR THE ARROYO GRANDE HYDROLOGIC SUBAREA



NITRATE, FLUORIDE, AND BORON HISTOGRAMS FOR THE ARROYO GRANDE HYDROLOGIC SUBAREA

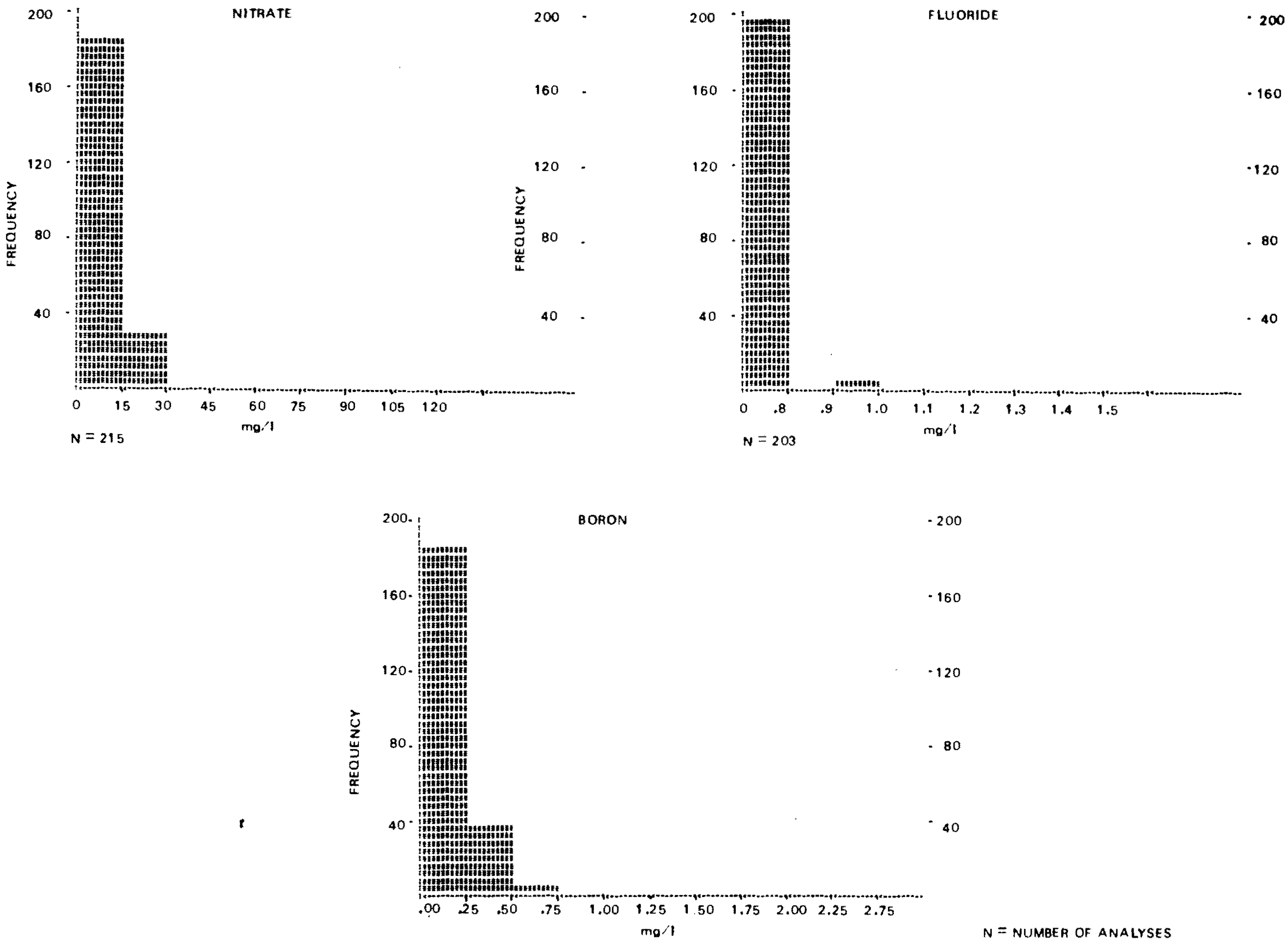


TDS, TOTAL HARDNESS, CHLORIDE, AND SULFATE HISTOGRAMS FOR THE NIPOMO MESA HYDROLOGIC SUBAREA



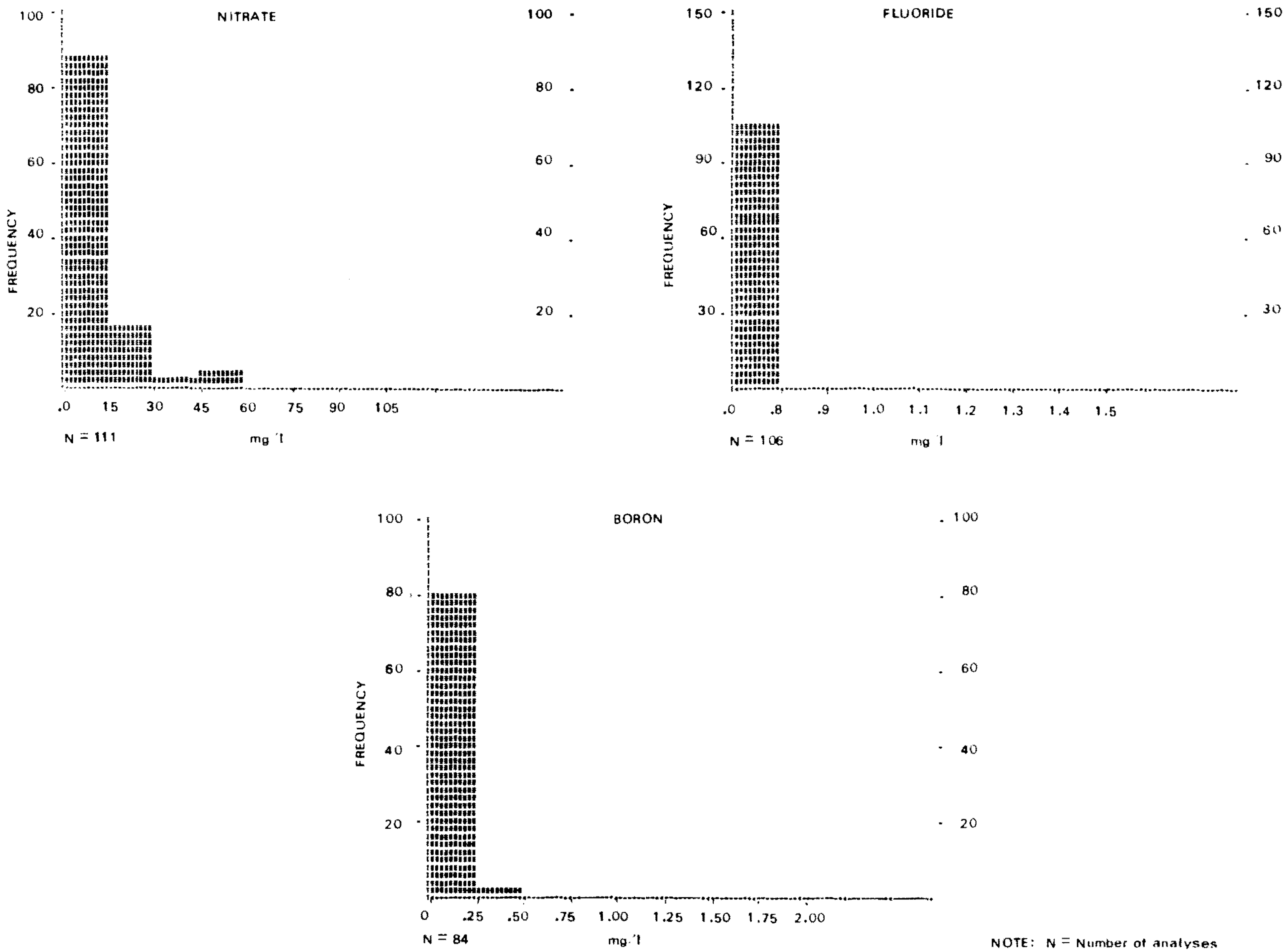
NOTE: N = NUMBER OF ANALYSES

TDS, TOTAL HARDNESS, CHLORIDE, AND SULFATE HISTOGRAMS FOR THE SAN LUIS OBISPO COUNTY PORTION OF THE SANTA MARIA HYDROLOGIC SUBUNIT



NITRATE, FLUORIDE, AND BORON HISTOGRAMS FOR THE SAN LUIS OBISPO COUNTY PORTION OF THE SANTA MARIA HYDROLOGIC SUBUNIT

APPENDIX B (continued)



NOTE: N = Number of analyses

NITRATE, FLUORIDE, AND BORON HISTOGRAMS FOR THE NIPOMO MESA HYDROLOGIC SUBAREA

APPENDIX C

PHYSICAL CHARACTERISTICS OF SEA WATER INTRUSION

Appendix C
PHYSICAL CHARACTERISTICS OF SEA WATER INTRUSION

Intrusion of sea water into aquifers is governed by physical laws which are relatively simple in theory but difficult in application because of inherent complexities of ground water basins.

Physical Characteristics of Sea Water Intrusion

Two fundamental conditions must exist before a ground water basin can be intruded by sea water. First, the water-bearing materials forming the basin must be in hydraulic continuity with the ocean. Second, the normal seaward gradient of the ground water must be reversed or, at least, must be too flat to counteract the greater density of sea water. A discussion of these conditions and the physical laws governing sea water intrusion occurrence and behavior follows.

First Condition

Ground water supplies in coastal basins in California are stored mainly in the larger alluvium-filled valleys. This valley fill, which extends to variable depths, is composed of unconsolidated alluvial fan, floodplain, and shallow marine deposits. These deposits extend to many hundreds of feet below sea level along the coast and may extend for some distance beneath the floor of the Pacific Ocean.

Geologic evidence indicates that confined aquifers along the seaward margins of these coastal ground water basins either may be in direct contact with the ocean floor near the shoreline or may extend beneath the floor in contact with sea water at some distance offshore.

Second Condition

Sea water can intrude only when its pressure head exceeds that of the fresh ground water. This condition usually results when ground water levels are lowered to or below sea level by excessive pumping of wells. In other words, when the hydraulic gradient within a coastal basin slopes seaward, ground water moves toward the ocean. Conversely, when the slope is reversed, sea water moves landward. It should be noted that, under extremely low seaward gradients of the fresh water, both movements can take place simultaneously.

In practice, the slope of the hydraulic gradient is determined from measurements of depth to water in observation wells.

Physical Laws

Fresh water weighs less than sea water. Therefore, when the two come in contact within a permeable formation, the lighter fresh water tends to float on the heavier sea water.

The floating body of fresh water conforms to Archimedes' law of buoyancy, which states that any floating object will displace its own weight of the medium in which it floats. This principle, as applied to the relationship between fresh and sea water in ground water, is commonly known as the Ghyben-Herzberg principle. It was described by W. Badon Ghyben in 1869 and applied to water supply problems by Alexander Herzberg in 1901.

Because sea water weighs 1.025 times as much as fresh water, the relationship between water table elevation above sea level (h) and depth to the sea water-fresh water interface (H) may be developed by simple algebra as follows:

$$
\begin{aligned}
(H + h) &= 1.025H \qquad \text{(Equation C-1)} \\
h &= 1.025H - H \\
h &= H(1.025 - 1) \\
h &= 0.025H \\
h &= \frac{1}{40} H
\end{aligned}
$$

This equation indicates that a body of fresh water, floating upon sea water within a porous medium, adjusts in elevation until the depth of its lower surface, measured below sea level datum, is 40 times the height of its upper surface above this datum. Thus the floating body of fresh water assumes a shape such that its depth below sea level is everywhere 40 times its surface elevation above sea level.

The minimum elevation of the fresh water level required to prevent sea water intrusion is determined by this principle.

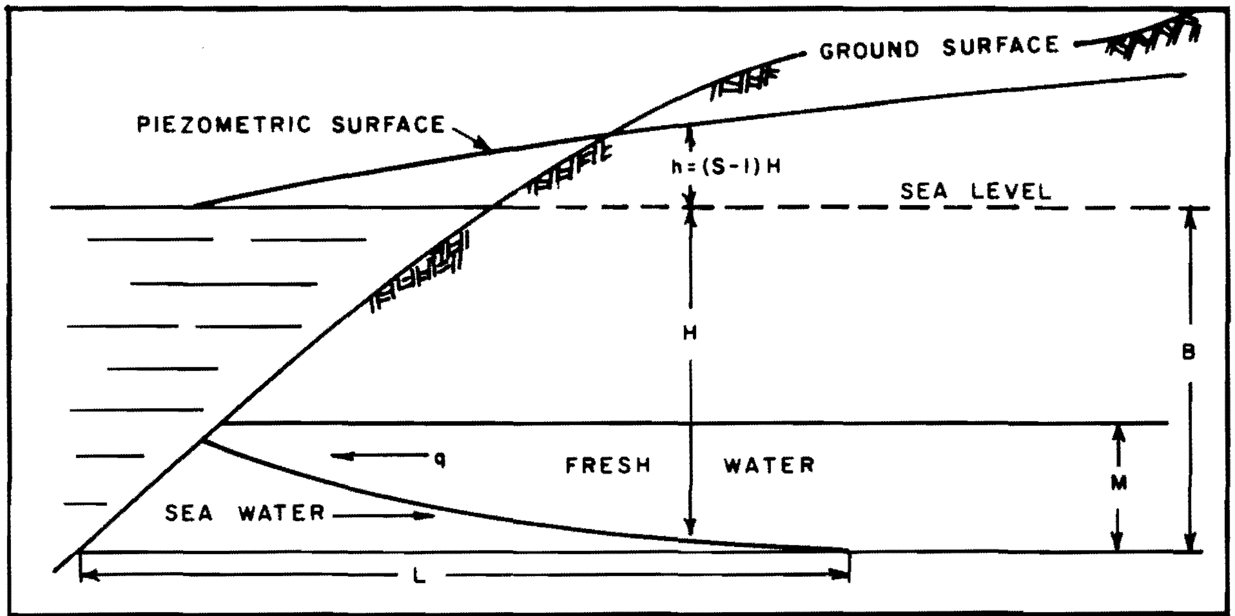


Figure 36 - SCHEMA OF A SECTION THROUGH A CONFINED AQUIFER

A theoretical sea water front assumes the shape of an included surface that always slopes landward. Because of its shape, this prism of ocean water has been called the sea water wedge.

In theory, this wedge can be held in a stationary postion, or in equilibrium with the freshwater body, by maintaining the fresh water level at the proper elevation above mean sea level.

Figure 36 shows an idealized section through a confined aquifer subject to sea water intrusion. B represents the distance below sea level to the lowest level which must be protected. M represents the thickness of a confined aquifer, L is the length of the sea water wedge, and q represents flow.

Under equilibrium conditions, there is no energy gradient within the saline wedge to provide movement. The pressure at a point on the sea water side of the saline water-freshwater interface is equivalent to that produced by a column of sea water extending from that point up to sea level. To produce the same pressure on the freshwater side of the interface, the freshwater column, because of the lower density of fresh water, must extend above sea level.

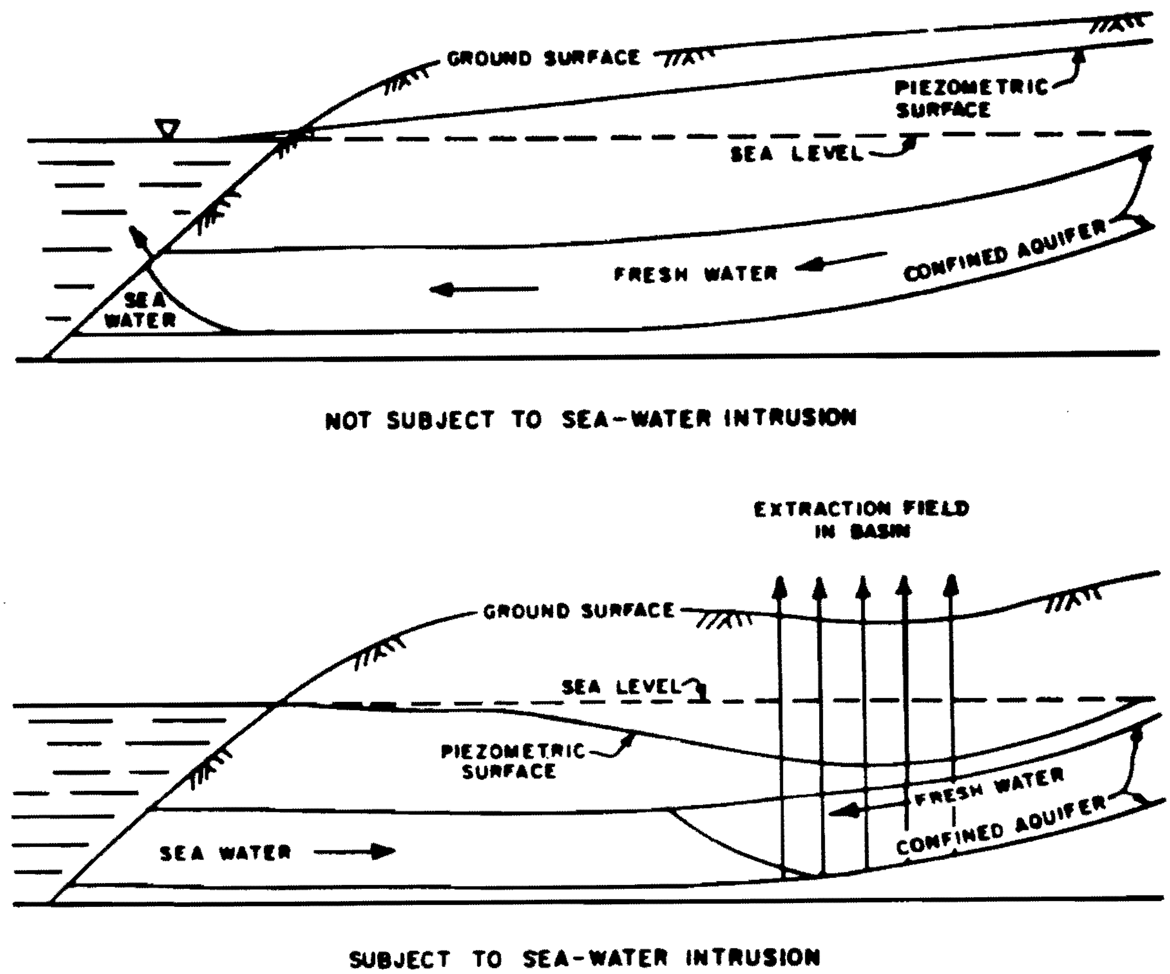


Figure 37. HYDRAULIC CONDITIONS IN A CONFINED AQUIFER IN CONTINUITY WITH THE OCEAN

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

Advance and retreat of the wedge commence at the toe. The position of the upper end of the interface remains fixed at the shoreline until all fresh water near the coast is depleted to sea level, at which time the upper end of the interface commences its advance and the entire wedge moves as a body.

If, on its landward advance, the toe of the wedge extends into a water level depression, an upwelling of sea water occurs. The configuration of this upwelling conforms to the dictates of equation C-1. Where the depression is conical, as in the depression created by a pumping well, the upwelling of saline waters assumes the shape of an image cone. The surface of this cone theoretically becomes 40 times as high from the original interface as the depth to the pumping depression surface from the original water surface.

The hydraulic conditions for the movement of a sea water wedge within a confined aquifer are indicated in the schematic illustrations of Figure 37, and those within an unconfined aquifer are shown on Figure 38. By reasoning similar to that developed in the preceding paragraphs, it can be demonstarted that the relationship H = 40h holds true.

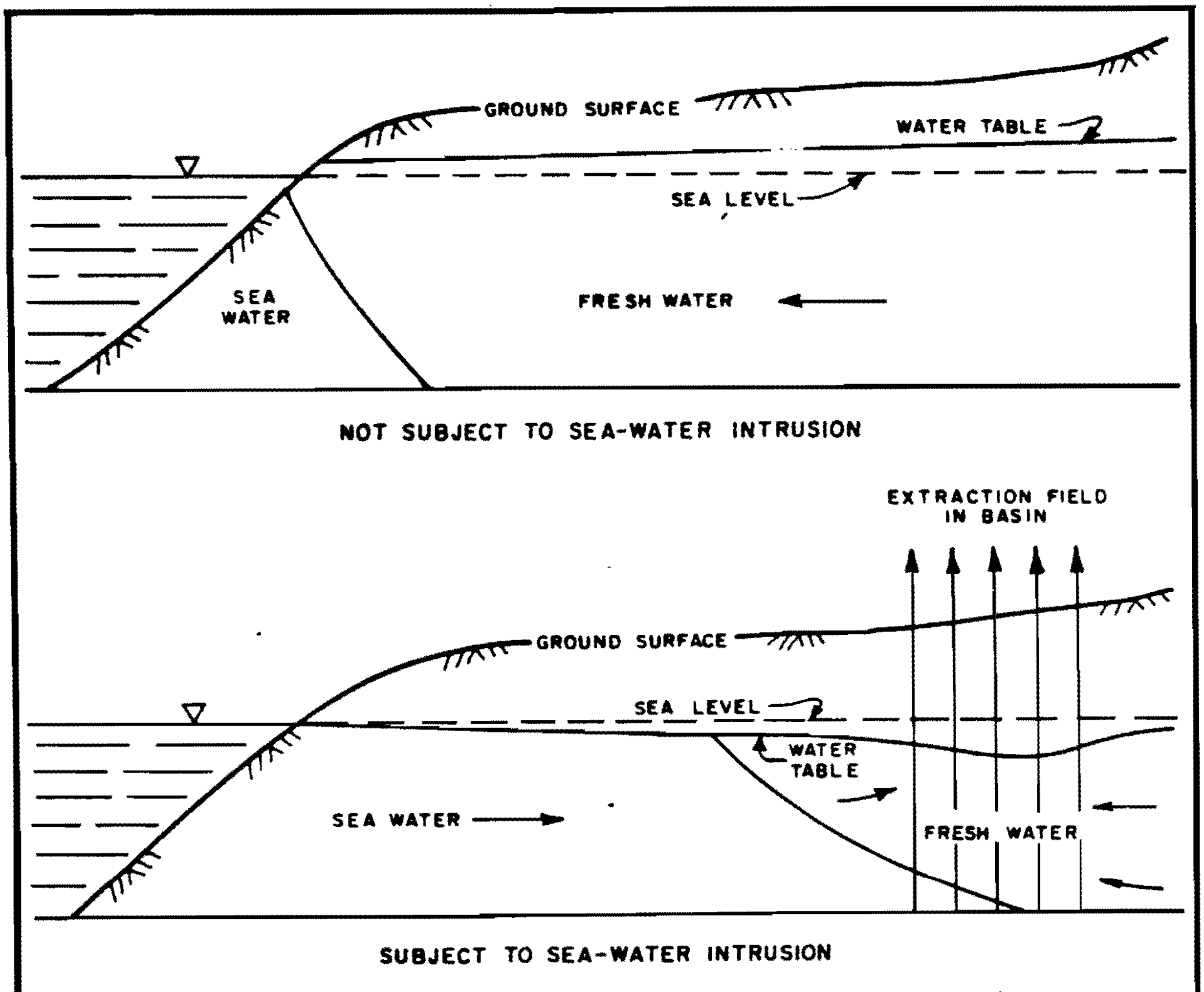


Figure 38. HYDRAULIC CONDITIONS IN AN UNCONFINED AQUIFER IN CONTINUITY WITH THE OCEAN

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1979

APPENDIX D

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