U.S. GEOLOGICAL SURVEY

OFR

WATER RESOURCES INVESTIGATIONS REPORT 82-555

Geohydrology of the Central Mesilla Valley, Doña Ana County, New Mexico

Prepared in cooperation with

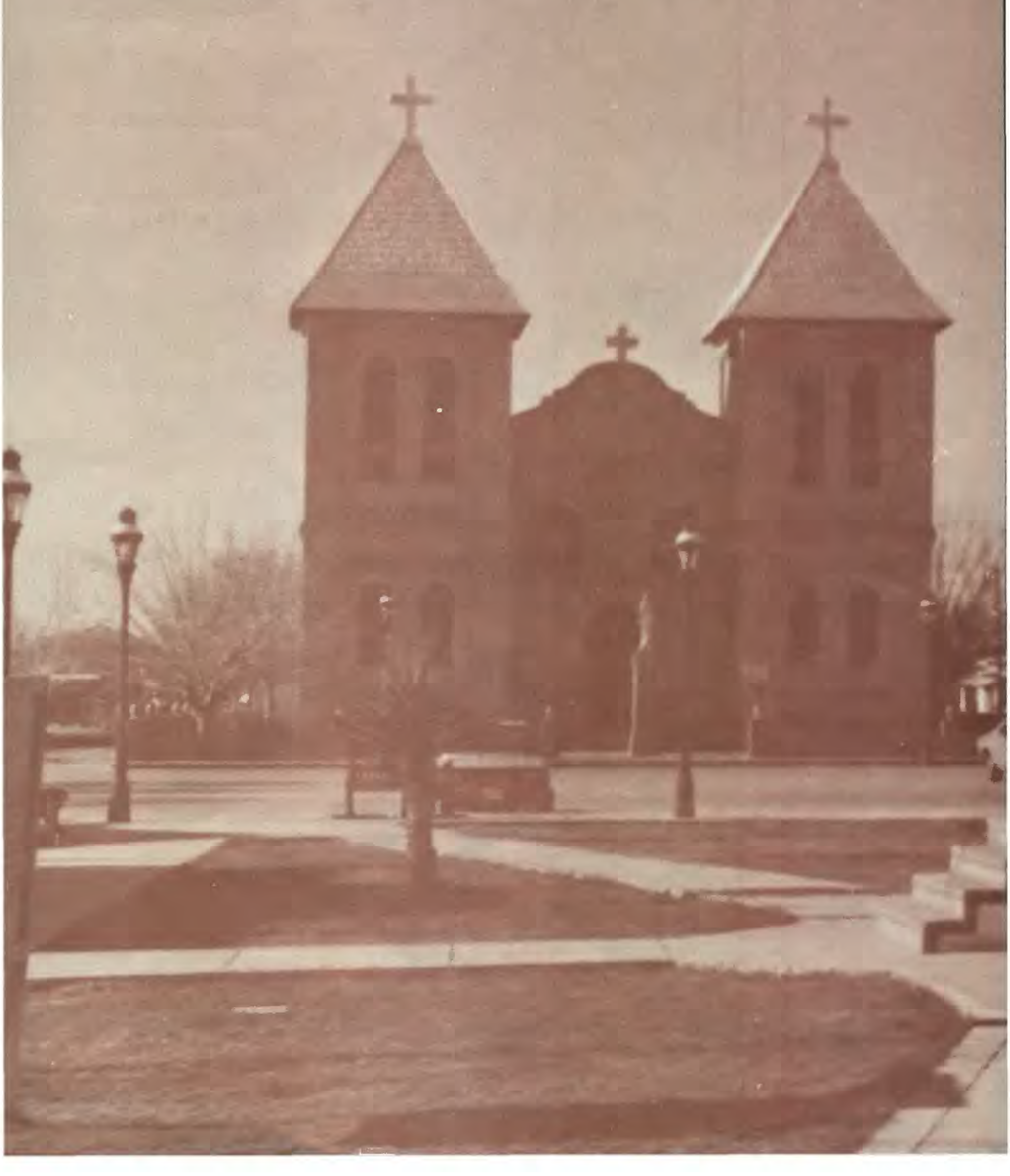
the ELEPHANT BUTTE IRRIGATION DISTRICT

and the NEW MEXICO INTERSTATE STREAM COMMISSION

Prepared in cooperation with

the ELEPHANT BUTTE IRRIGATION DISTRICT

and the NEW MEXICO INTERSTATE STREAM COMMISSION



UNITED STATES DEPARTMENT OF THE INTERIOR

WILLIAM P. CLARK, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

For additional information write to:

District Chief
U.S. Geological Survey
Water Resources Division
505 Marquette NW, Room 720
Albuquerque, New Mexico 87102

For sale by:

Open-File Services Section
Branch of Distribution
U.S. Geological Survey, MS 306
Box 25425, Denver Federal Center
Denver, Colorado 80225
(303) 236-7476

Geohydrology of the Central Mesilla Valley, Doña Ana County, New Mexico

By Clyde A. Wilson and Robert R. White

U.S. GEOLOGICAL SURVEY

WATER RESOURCES INVESTIGATIONS REPORT 82-555

ALBUQUERQUE, NEW MEXICO

1984

Geohydrology of the Central Mesilla Valley, Doña Ana County, New Mexico

CONTENTS

Illustrations

Cover photograph: Mesilla Valley and Organ Mountains from the West Mesa.

Frontispiece: Mesilla Plaza, 1978.

Illustrations - Concluded

Page

Tables

CONVERSION FACTORS

In this report, measurements (except for chemical concentrations) are given in inch-pound units only. The following table contains factors for converting to International System (S.I.) units.

Multiply inch-pound units	By	To obtain S.I. units
foot	0.3048	meter
foot per day	0.3048	meter per day
foot squared per day	0.0929	meter squared per day
foot per mile	0.1894	meter per kilometer
acre-foot	1,233	cubic meter
square mile	2.590	square kilometer
gallon per minute	0.06309	liter per second
gallon per minute per foot	0.2070	liter per second per meter
inch	2.54	centimeter

Chemical concentrations are given only in metric units--milligrams per liter (mg/L) and micrograms per liter (ug/L). Degrees Fahrenheit are converted to degrees Celsius as follows: $C = 5/9 (F-32)$

Geohydrology of the Central Mesilla Valley, Doña Ana County, New Mexico

By Clyde A. Wilson and Robert R. White

ABSTRACT

During the 1970s, many deep irrigation wells were drilled in the central Mesilla Valley, south of Las Cruces, Doña Ana County, New Mexico. These wells have total depths as great as 500 to 700 feet, which is much deeper than the older wells in the area that are typically 100 to 150 feet deep. Before these deep wells were drilled, little was known about water quality and the characteristics of the aquifer below a depth of about 150 feet.

During 1973-75, the Elephant Butte Irrigation District drilled five large-capacity irrigation wells in the Mesilla Valley about 7 miles south of Las Cruces. The installation of these wells provided an opportunity to conduct extensive aquifer tests under relatively undisturbed conditions.

The geologic units in the vicinity of the wells are the flood-plain alluvium of Holocene age and the underlying Santa Fe Group of Miocene to middle Pleistocene age. The alluvium consists mostly of sand and gravel with some clay. The Santa Fe Group is composed of interfingering and alternating beds of clay, silt, sand, and some thin lenses of small-diameter gravel.

Transmissivities obtained from aquifer tests ranged from 10,900 to 21,100 feet squared per day, depending on the parts of the aquifer tested. The horizontal hydraulic conductivity ranged from 48 to 88 feet per day. The storage coefficient was about 0.001. The vertical hydraulic conductivity of confining units ranged from 0.21 to 3.0 feet per day for the entire thickness of the confining unit and from 0.03 to 0.30 foot per day for the clay layers in the confining unit.

Ground-water withdrawals from the five Elephant Butte Irrigation District deep wells totaled 9,453 acre-feet during 1977 and 5,626 acre-feet during 1978. In the same area, an estimated 13,000 acre-feet of water were pumped during 1978 from about 23 recently drilled, privately owned deep irrigation wells and an estimated 27,000 acre-feet were pumped from shallow irrigation wells.

In the area of the five Elephant Butte Irrigation District deep wells, the upper part of the saturated zone contains slightly saline water to a depth of about 100 to 175 feet below the water table. Beneath the slightly saline water is a freshwater zone, which extends to depths greater than 1,200 feet.

Water quality was monitored in the five Elephant Butte Irrigation District wells between 1976 and 1978 by means of laboratory analyses and onsite specific-conductance measurements. Only one of the five wells had a statistically significant change in water quality. Three other wells produced water with elevated specific-conductance values at the beginning of each pumping period.

INTRODUCTION

In 1973, the Elephant Butte Irrigation District (EBID) drilled a well in the central Mesilla Valley that had surface casing cemented to a depth of 286 feet, perforated casing from 310 to 680 feet, and a total depth of 686 feet. This well (EBID well 1) was designed to pump water of better quality than the other irrigation wells in the valley, which typically were 100 to 150 feet deep and were perforated from several tens of feet below the water table to the bottom of the well. Before the completion of EBID well 1, a test hole was drilled at the site to a depth of 1,210 feet. Another test hole was drilled in 1973 to a depth of 704 feet near where EBID well 5 would be drilled 2 years later. (Lithologic logs for these two test holes are given in table 1.)

In 1975, the Irrigation District drilled four more wells of similar construction, although not as deep as the first one. By 1978, private-land owners had drilled more than 30 deep irrigation wells and the City of Las Cruces had drilled 3 municipal-supply wells on the flood plain in the Mesilla Valley. These wells typically had cemented surface casing or unperforated casing to a depth of about 200 feet and perforated casing extending to a depth of 400 to 600 feet.

The drilling of these deep irrigation wells provided an opportunity to determine the aquifer properties and the quality of water at much greater depths than had previously been possible in the Mesilla Valley. Concurrently, measurements could be made in an effort to ascertain the effects of long-term pumping of these deep wells.

The specific purposes of this study were as follows: (1) To estimate aquifer properties, including transmissivity, horizontal and vertical hydraulic conductivity, and storage coefficient; (2) to determine the chemical characteristics of the water in storage; (3) to measure changes in water quality in response to pumping; and (4) to monitor water-level changes.

Most of the ground-water information presented in this report was derived from aquifer tests in the five Irrigation District wells. The advantage of using these wells was that they were the first deep wells drilled in the area, and thus there were, at first, few problems with interference from other wells. Furthermore, the pumping schedule for these wells could be adjusted to some degree to meet the requirements of the aquifer tests.

Appreciation is expressed to the Board of Directors of the Elephant Butte Irrigation District and to Wayne Cunningham, former Treasurer-Manager, for permission to use the Irrigation District wells during this study. Appreciation is also expressed to the New Mexico Interstate Stream Commission and its Chairman, S. E. Reynolds, State Engineer of New Mexico, for supporting this project.

Thanks are due to a number of other people who assisted in this project in various ways. Land owners in the study area allowed access to their wells and provided information. Rick Dulas provided valuable assistance during the early stages of this project. David Marshall, U.S. Geological Survey, Albuquerque, did the statistical analysis of the specific-conductance data. William Tipton of Las Cruces offered helpful comments on many aspects of the Geological Survey study of the Rio Grande Valley of southern New Mexico; in particular, it should be acknowledged that he first suggested the possible existence of a large buried river channel west of Caballo Reservoir.

Description of Study Area

The Rio Grande Valley of southern New Mexico is in the Basin and Range physiographic province. This province consists of generally north-trending parallel mountain ranges separated by alluvial basins. Faulting is common along the margins of the mountain ranges, and volcanic material is abundant.

The Mesilla Basin is an alluvial basin between the Franklin, Organ, and San Andres Mountain ranges to the east (fig. 1), and the East and West Potrillo Mountains, Aden Hills, Sleeping Lady Hills, and Rough and Ready Hills, all of which are located several miles to the west of the study area. The Mesilla Valley, which represents the most recent entrenchment and backfilling cycle of the Rio Grande, is near the eastern margin of the Mesilla Basin.

The five EBID irrigation wells are located in the Mesilla Valley about 7 miles south of Las Cruces (figs. 1 and 2). Four of the five wells discharge directly into the East Side Canal; the fifth well discharges into the Louisiana Lateral, from which water can be discharged into the East Side Canal. Many other large-capacity irrigation wells are near the Irrigation District wells.

Agriculture in the Mesilla Valley depends on irrigation water diverted from the Rio Grande and on supplemental ground water that is pumped by approximately 1,000 privately owned irrigation wells. The Rio Grande Project of the U.S. Bureau of Reclamation stores Rio Grande water in Elephant Butte and Caballo Reservoirs, located upstream from the study area, for controlled release during the irrigation season (usually March to September). The water is released into the river and moves southward through the Rincon Valley (located north of the Mesilla Valley) and to Leasburg Dam which is at the northern end of the Mesilla Valley (fig. 1). At Leasburg Dam, water may be

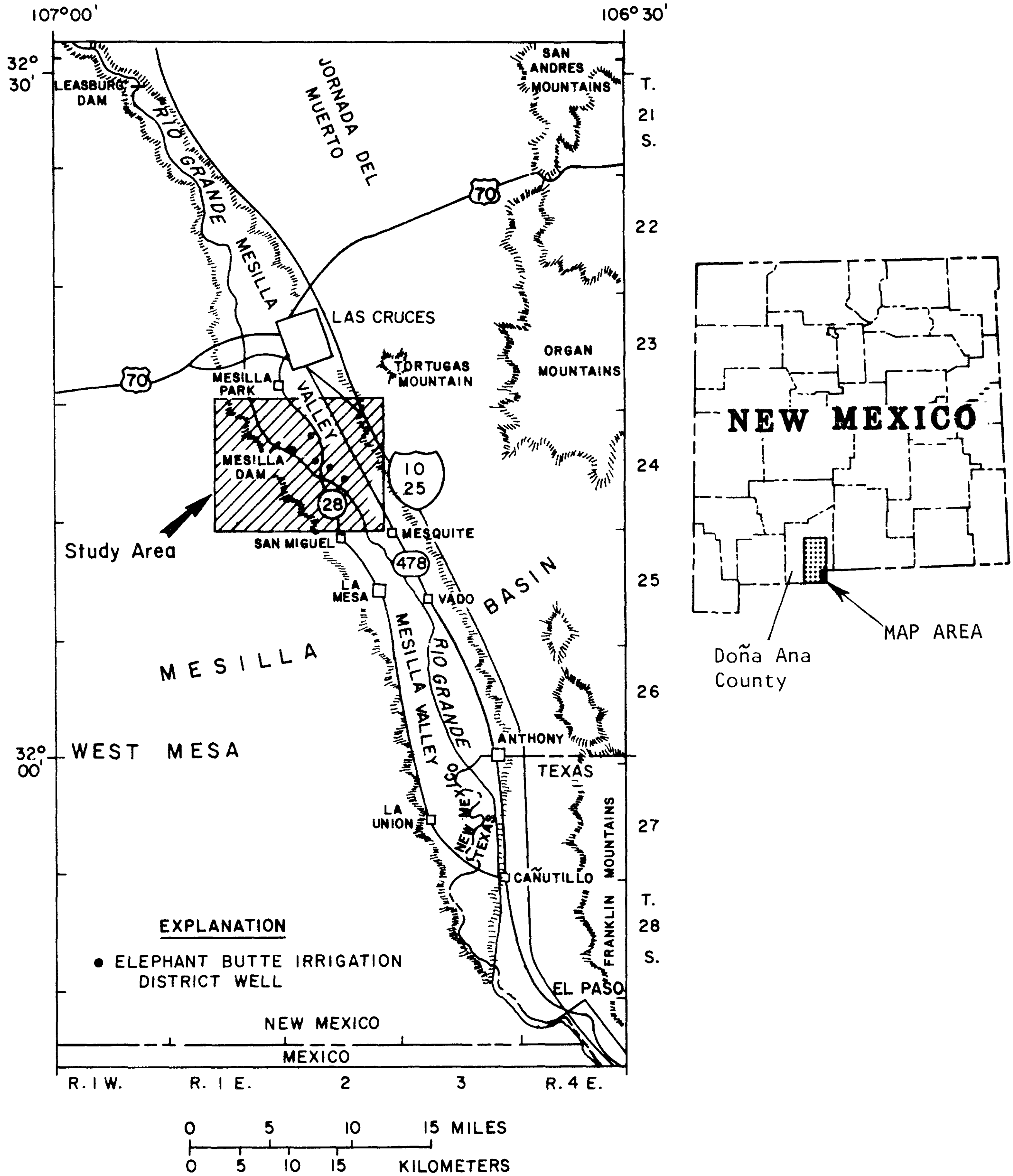


Figure 1.--Mesilla Valley and location of study area.

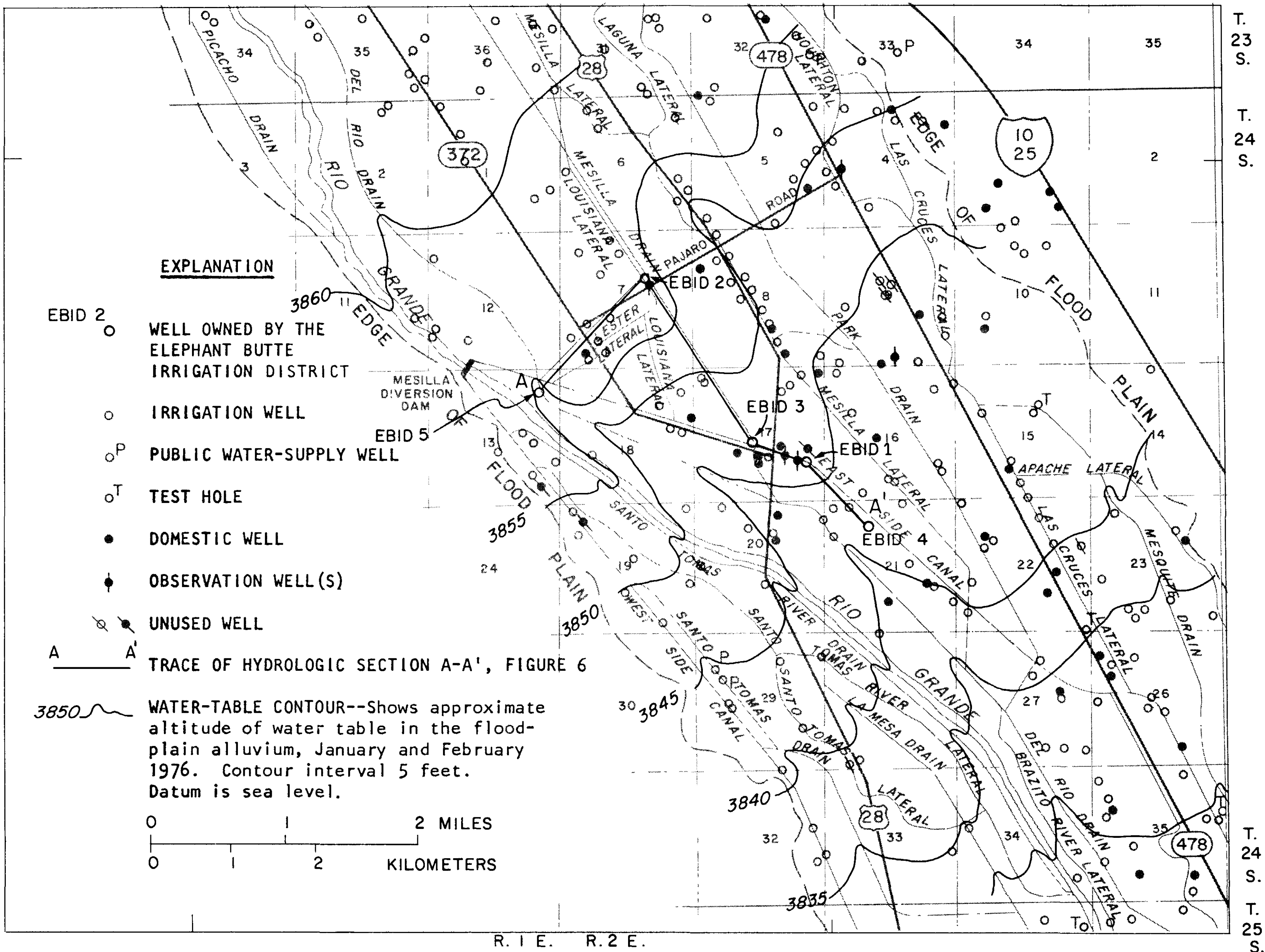


Figure 2.--Location of wells and approximate altitude of the water table in the flood-plain alluvium, January and February 1976.

diverted into the Leasburg Canal. Farther downstream at Mesilla Dam, river water may be diverted into the West Side or East Side Canals. Water in these main canals is released into smaller canals and laterals for distribution to individual farms.

Irrigation water (from the Rio Grande or pumped ground water) applied to the fields is transpired by the plants, lost to the atmosphere by evaporation, or percolates downward to the water table. The irrigation water that moves downward to the water table carries with it much of the residual salt left by transpiration and evaporation processes, resulting in an increase in the salinity of the shallow ground water. Drains designed to intercept the water table are located throughout the area (fig. 2) and contribute a considerable amount of flow to the Rio Grande.

Well-Numbering System

The system of numbering wells in New Mexico is based on the common subdivision of public lands into sections (fig. 3). The well number, in addition to designating the well, locates its position to the nearest 10-acre tract in the land network. The number is divided by periods into four segments. The first segment denotes the township north or south of the New Mexico Base Line, the second denotes the range east or west of the New Mexico Principal Meridian, and the third denotes the section. The fourth segment of the number, which consists of three digits, denotes the 160-, 40-, and 10-acre tracts, respectively, in which the well is situated in the section. For this purpose, the section is divided into four quarters, numbered 1, 2, 3, and 4, for the northwest, northeast, southwest, and southeast quarters, respectively. The first digit of the fourth segment gives the quarter section, which is a tract of 160 acres. Similarly, the quarter section is divided into four 40-acre tracts numbered in the same manner, and the second digit denotes the 40-acre tract. Finally, the 40-acre tract is divided into four 10-acre tracts, and the third digit denotes the 10-acre tract. Thus, well 24S.1E.12.341 is in the NW¼ of the SE¼ of the SW¼ of section 12, Township 24 South, Range 1 East. Letters a, b, c, and d are added to the last segment to designate the second, third, fourth, and fifth wells in the same 10-acre tract. In valley areas where land grants existed when the public lands were subdivided into sections, the section lines have been extended and the artificial sections numbered.

The five irrigation wells owned by the Elephant Butte Irrigation District are referred to in the text of this report by the numbers assigned to the wells by Irrigation District personnel. The EBID number and the corresponding well number in the township and range system are given below:

EBID well 1	24S.2E.17.423a
EBID well 2	24S.2E.7.231
EBID well 3	24S.2E.17.322
EBID well 4	24S.2E.21.123
EBID well 5	24S.1E.13.221a

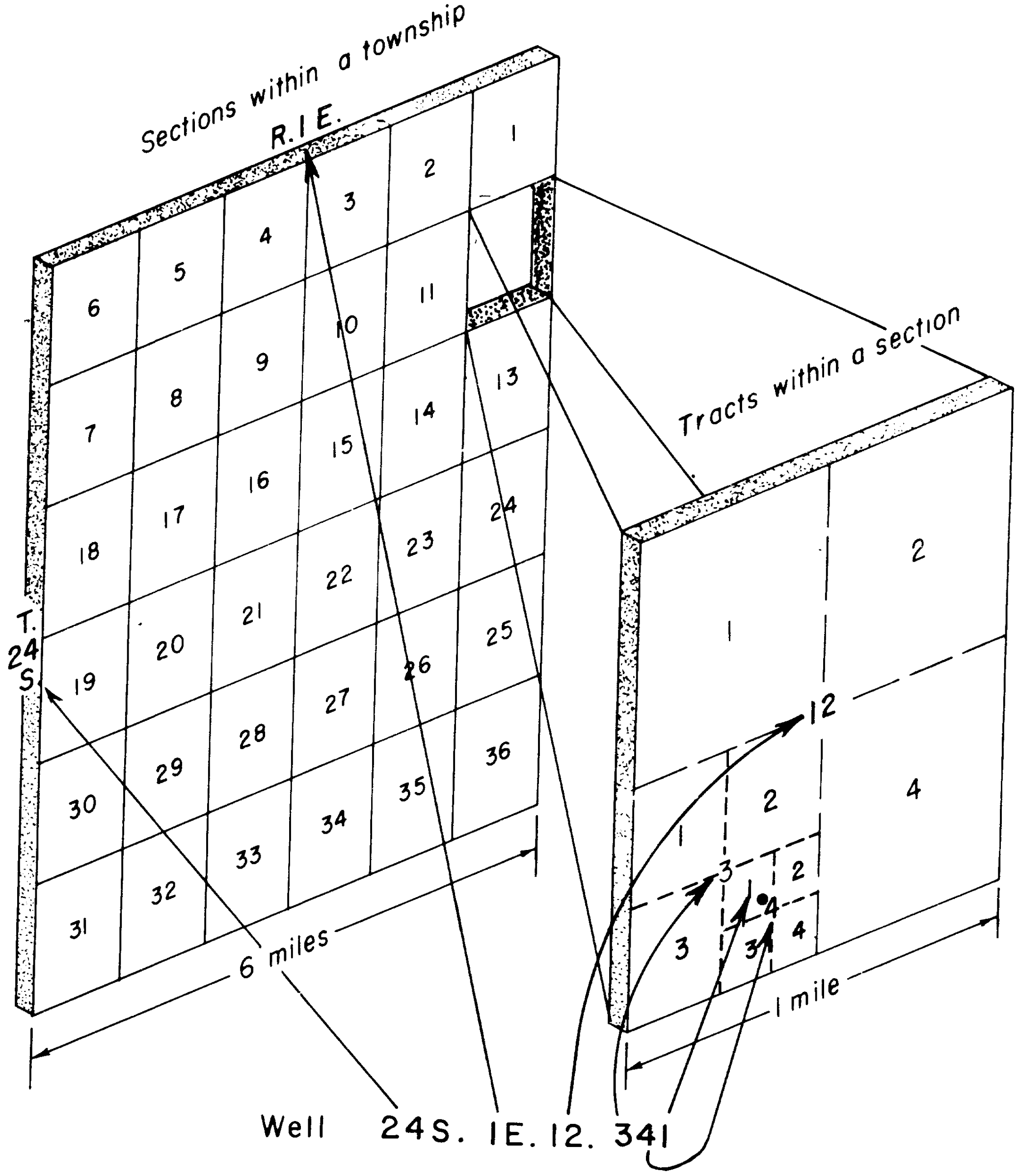


Figure 3.--System of numbering wells in New Mexico.

Design of Irrigation and Observation Wells

All five Irrigation District wells were designed to prevent or retard the downward migration into the pumped zone of the slightly saline water found in the uppermost parts of the aquifer (fig. 4). Typically, a hole 28 to 32 inches in diameter was drilled to a depth of between 140 and 280 feet below land surface (drilling was usually stopped when a thick clay layer was encountered below the slightly saline water zone). Surface casing 24 to 28 inches in diameter was lowered into the hole, and cement was emplaced between the casing and the wall of the hole. The wells were then drilled deeper inside the surface casing to depths ranging from 370 to 686 feet. Mill-slotted casing was set below the base of the surface casing with an unperforated liner extending above the slotted casing to land surface. Small gravel was emplaced in the area between the wall of the lower hole and the slotted casing and extended upward between the unperforated liner and the surface casing to land surface.

Three groups of small-diameter observation wells were constructed near EBID wells 1 and 2 to permit water sampling from discrete intervals in the aquifers and to allow water-level measurements during aquifer tests. Location of the observation wells with respect to the EBID irrigation wells is shown in figure 5. A four-well group of observation wells is located about 100 feet west of EBID well 1, and a two-well group is located about 750 feet west of well 1. A three-well group is located about 100 feet south of EBID well 2. Construction details of the observation wells are shown in figure 4. Additional information for each well, including depth, is listed in table 3 at the end of the report. The observation wells have 5-foot lengths of well screen set at selected depths in the aquifer. This screened section was gravel packed, and a sealing fill of crusher fines (powdered rock) was placed on top of the gravel to prevent the movement of water from the overlying zones into the screened zone. Water samples were obtained by suction pump or by jetting with compressed air.

Most of the privately owned wells drilled for irrigation have 14-, 16-, or 18-inch-diameter steel casing that is gravel packed in a hole of about 22- to 26-inches in diameter. These irrigation wells commonly are from less than 100 to about 150 feet deep, but some of the wells drilled after the mid-1970s are about 600 feet deep. Perforations are usually milled slots in the casing; the slotted portion of the casing is set from several tens of feet below the water table to the bottom of the hole. In the deeper and more recently drilled irrigation wells, the top of the perforated casing is set from 100 to more than 200 feet below the water table in an effort to "blank-out" the upper zone of slightly saline water.

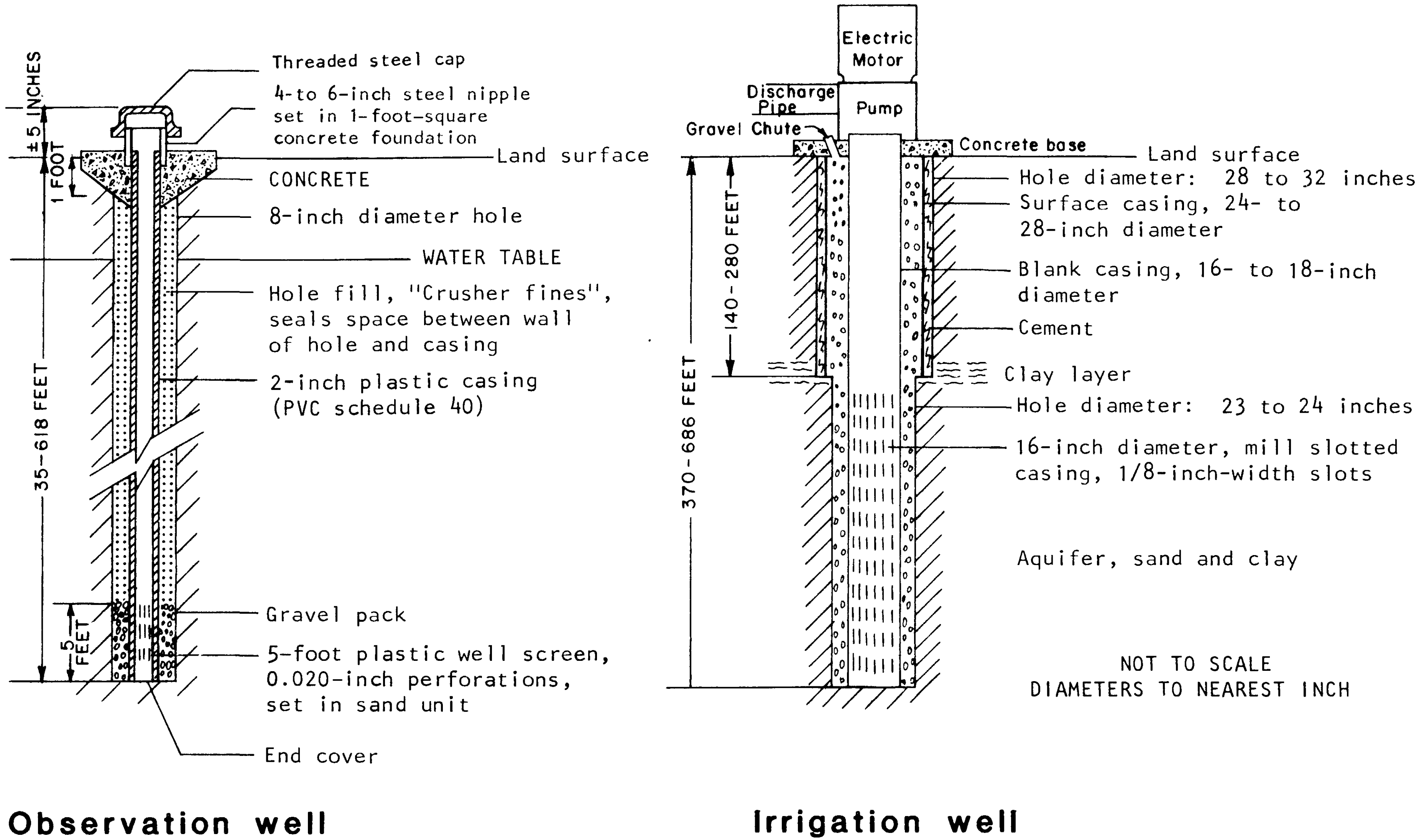


Figure 4.--Construction details of Elephant Butte Irrigation District irrigation wells and nearby observation wells.

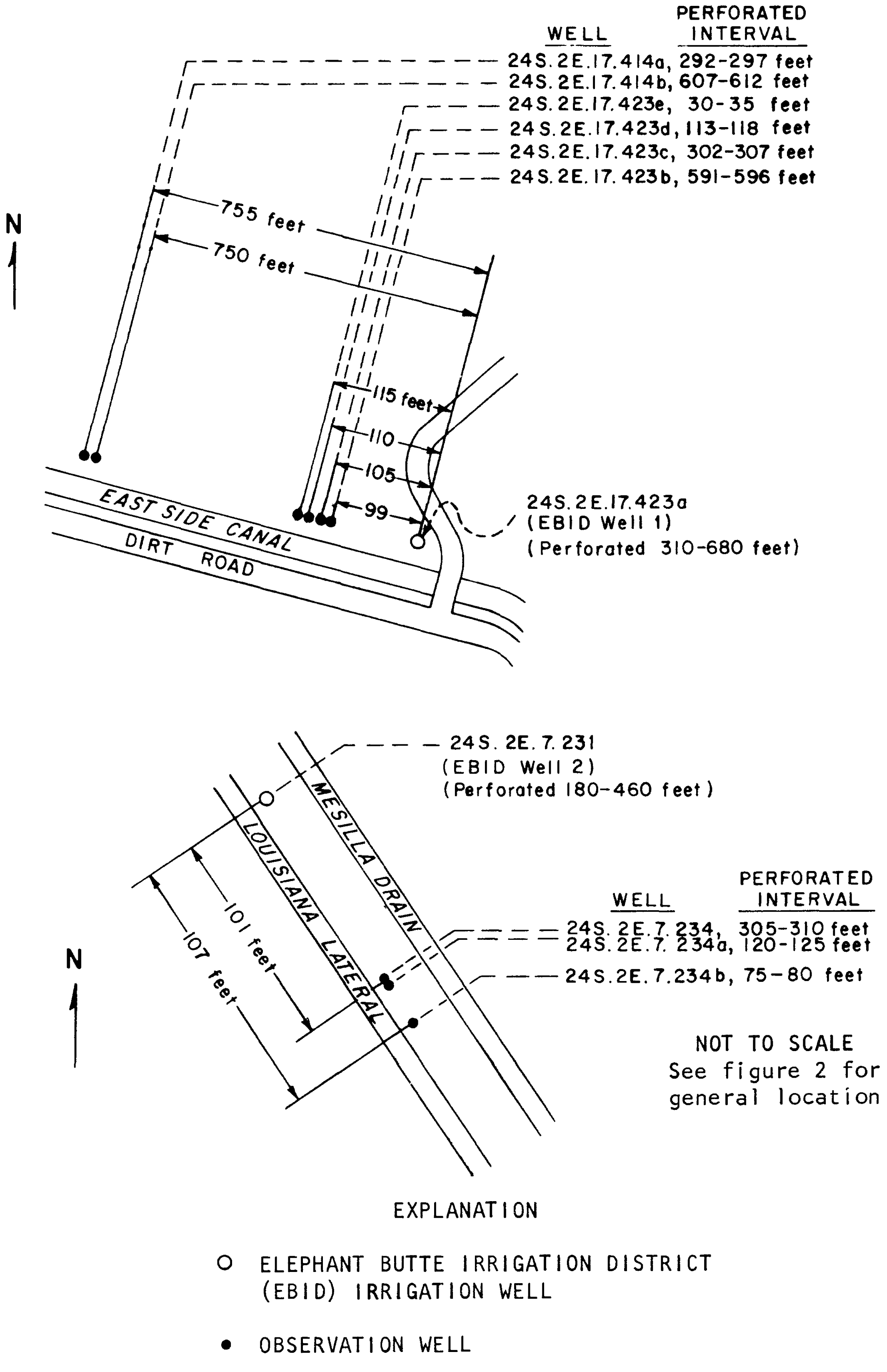


Figure 5.--Location of observation wells.

GEOHYDROLOGY OF THE AQUIFERS

Geologic units that constitute the aquifers in the vicinity of the Irrigation District wells are the flood-plain alluvium of Holocene age and the underlying Santa Fe Group of Miocene to middle Pleistocene age. Two lithologic logs made while drilling the test holes at the sites for EBID wells 1 and 5 are shown in table 1; these are considered typical of the stratigraphic section in the central Mesilla Valley. The hydrologic section (fig. 6) shows traces of the spontaneous-potential and the single-point resistance or short-normal resistivity logs made during drilling of EBID test holes or wells. Resistivity logs for test holes 24S.2E.17.423 and 24S.1E.13.221 were made in the small-diameter test holes by a commercial well-logging company before EBID wells 1 and 5 were drilled. Single-point resistance logs for EBID wells 2, 3, and 4 were made in the uncased wells; the large diameter of the holes caused a loss of detail in the log. All geophysical logs show the heterogeneous nature of the alternating, interfingering, and discontinuous sedimentary units.

The flood-plain alluvium is a water-table (unconfined) aquifer consisting of alternating and interfingering layers of clay, silt, sand, and gravel. The sand and gravel units constitute the major part of the thickness. The sands and gravels are mostly subangular to well rounded and siliceous; sand grains are mostly colorless quartz. Rock types and minerals in the gravels are quartz, rhyolite, andesite, basalt, quartzite, chert, tuff, and minor amounts of granite. The alluvium has gravel as large as several inches in diameter.

The thickness of the flood-plain alluvium generally is less than 80 feet. However, recent studies using geophysical logs show that the thickness exceeds 100 feet in places. The lower part of the flood-plain alluvium commonly is coarse gravel. The contact between the alluvium and the underlying Santa Fe Group usually is placed where the coarse gravel rests on a layer of clay, sand, or at some locations, small gravel.

The Santa Fe Group in the study area is a leaky-confined aquifer, composed of interfingering and alternating beds of clay, silt, sand, and occasional thin beds of small gravel (usually ½-inch diameter or less). The sand is very fine to medium grained, well rounded, colorless quartz, with a varying percentage of dark siliceous minerals. The sand and clay units are discontinuous; correlation of particular units for any distance is very difficult.

The thickness of the Santa Fe Group in this area is unknown; test hole 24S.2E.17.423 did not penetrate the complete thickness of the Santa Fe Group when drilling ended at a depth of 1,210 feet. However, the total thickness of the Santa Fe Group in the study area probably exceeds 2,000 feet (Wilson, White, Orr, and Roybal, 1981, plate 8).

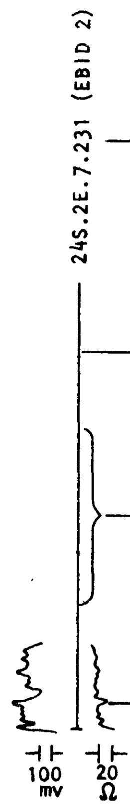
EXPLANATION

Qal	FLOOD-PLAIN ALLUVIUM OF QUATERNARY AGE--Contains clay, silt, sand, and gravel
QTs	SANTA FE GROUP OF MIOCENE TO MIDDLE PLEISTOCENE AGE--Contains mostly clay, silt, sand, and small amounts of gravel
----	APPROXIMATELY LOCATED GEOLOGIC CONTACT

ESTIMATED CONCENTRATIONS OF DISSOLVED SOLIDS IN GROUND WATER IN MILLIGRAMS PER LITER

- Less than 500
- 500 to 1000
- 1000 to 3000

——— APPROXIMATE CONTACT BETWEEN WATER-QUALITY ZONES--All contacts between water-quality zones are gradational



WELL NUMBER

WELL IN SECTION--Line dashed if well is projected into section at right angle

DS=310 mg/L DISSOLVED SOLIDS (DS) OF WATER SAMPLE IN MILLIGRAMS PER LITER (mg/L) FOR INDICATED INTERVAL--DS from chemical analysis indicated by =. DS derived from multiplying specific conductance by 0.65 shown by ≊.

BOREHOLE GEOPHYSICAL LOGS SHOWN FOR ELEPHANT BUTTE IRRIGATION DISTRICT WELLS--Short normal or single-point resistivity appears to right, spontaneous-potential to left. Scale given below each log. Millivolts (mv); ohms (Ω). Ohms per square meter per meter (Ω-m).

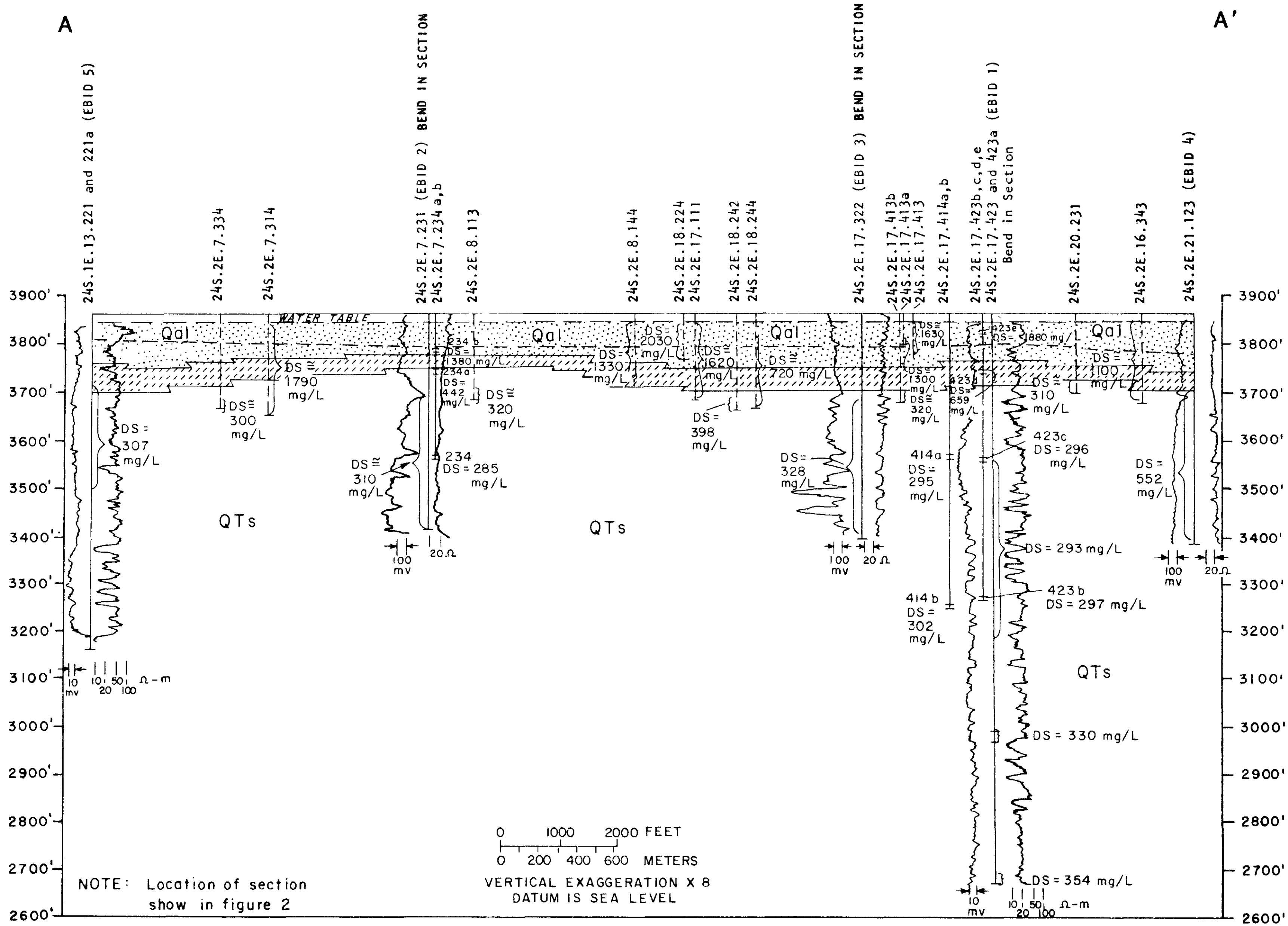


Figure 6.--Approximate water-quality zones before 1976.

GROUND-WATER MOVEMENT, WITHDRAWALS, AND WATER-LEVEL FLUCTUATIONS

Movement

Ground water in the flood-plain alluvium of the Mesilla Valley moves southeastward down the valley; the water table has an average gradient of about 4 feet per mile. However, the direction of ground-water movement at a given location depends on nearby influences such as the Rio Grande, major canals, drains, the amount of irrigation water applied to nearby fields, and pumpage from irrigation wells.

The approximate altitude of the water table in the flood-plain alluvium in January 1976 for the area around the EBID wells is shown in figure 2. This was the non-irrigation season, and flow in the Rio Grande was due mostly to drain flow. During non-irrigation periods, the river flow in this area is intermittent, and there is no flow in canals or laterals. In 1976, large flows occurred in the Del Rio Drain and smaller flows in the La Mesa, Mesquite, Santo Tomas, and Santo Tomas River Drains; no flow occurred in the Mesilla and Park Drains.

Water-level contours in figure 2 show the river to be losing water to the aquifer, and the aquifer to be furnishing water to some drains. Control points used in contouring were measured water levels in shallow wells and measured or estimated water levels in drains and in the river. During the irrigation season, water lost from the river and canals causes a rise in the water table. When the water table is high enough to intercept the drains, the drains transport water to the river at some point downstream.

Some of the recharge to that interval of the Santa Fe Group from which the deep irrigation wells withdraw water (the zone at depths of about 140 to 600 feet below land surface) eventually will come from the ground water in the overlying flood-plain alluvium. This recharge moves downward in sands and around clay layers, and horizontally through sands toward the cones of depression caused by pumpage.

Ground-Water Withdrawals

Prior to 1976, ground-water withdrawals in the vicinity of the Irrigation District wells were almost exclusively from shallow wells completed in the flood-plain alluvium and the uppermost part of the Santa Fe Group. Most irrigation wells were from less than 100 to about 150 feet deep; three were reported to be as deep as 350 feet.

The five Irrigation District wells were first pumped (other than during development and short production tests) to furnish irrigation water during July 12-29, 1976, and supplied a total of 983 acre-feet of ground water. In 1977, the five wells were pumped intermittently during February and early March and continuously (except for maintenance shutdowns) from about March 12 through August 26. Total ground water withdrawn was 9,453 acre-feet. In

1978, the wells were again pumped intermittently during February and early March and continuously (except for maintenance shutdowns) from March 14 through May 1, June 2 through July 25, and July 27 through August 9. Ground-water withdrawals in 1978 totaled 5,626 acre-feet.

During the 1977 irrigation season, several privately owned irrigation wells were drilled in the area to depths exceeding 400 feet. Ground-water withdrawals from these new wells were small for that year. Additional privately owned deep wells were drilled in late 1977 and in 1978. During 1978, an estimated 13,000 acre-feet of water were pumped from about 23 privately owned deep wells. Most of the ground water used for crop irrigation in the area is still pumped from shallow wells; these withdrawals are estimated to have been about 27,000 acre-feet in 1978.

The average yield of the five EBID wells during the 1978 pumping season is given below.

24S.2E.17.423a (EBID well 1) - 3,020 gallons per minute
24S.2E.7.231 (EBID well 2) - 2,170 gallons per minute
24S.2E.17.322 (EBID well 3) - 2,480 gallons per minute
24S.2E.21.123 (EBID well 4) - 2,650 gallons per minute
24S.1E.13.221a (EBID well 5) - 2,090 gallons per minute

The privately owned deep irrigation wells near the EBID area have yields from 1,500 to nearly 3,000 gallons per minute; the average yield is about 2,300 gallons per minute. The average discharge for irrigation wells in the entire Mesilla Valley, regardless of depth or construction, is about 1,500 gallons per minute (Wilson, White, Orr, and Roybal, 1981, p. 42).

Land subsidence may occur where ground-water withdrawals from confined aquifers cause major declines in the potentiometric surface and release of water from clay lenses within the aquifer. Poland, Lofgren, Ireland, and Pugh (1975, p. H39-H44) discuss land subsidence in California and show definite evidence that large decreases in artesian head increases the effective stress in the aquifer system, causing compaction of sediments and correlative land subsidence. Conversely, temporary declines in water level would probably not result in permanent land subsidence (Ferris and others, 1962, p. 78-80). During pumping of the deep irrigation wells in the Mesilla Valley, some elastic compression may occur. If water-level declines are large, water may move out of the clay layers, causing some compaction of the clay. It is believed, however, that land subsidence will not be significant in the central Mesilla Valley unless the magnitude of ground-water withdrawal becomes much greater than occurred during the late 1970s.

Water-Level Fluctuations

Changes in the depth to water in wells reflect daily, seasonal, or long-term effects on the ground-water system. Daily changes may be caused by the effects of barometric-pressure changes, earth tides, and the pumping of nearby wells. Seasonal changes are due to the effects of recharge from applied irrigation water and canal and river seepage and the effects of long-term well pumpage. Long-term water-level changes may be caused by several years of below-normal or above-normal surface-water availability and effects of regional pumpage.

Long-term water-level fluctuations in shallow irrigation wells are influenced mostly by the amount of surface water available for irrigation. The shallow aquifer is recharged by seepage from the river and canals, and by infiltration of irrigation water applied in excess of crop requirements. Consequently, the greatest amount of recharge occurs during years of adequate surface-water supply. The 1957-78 surface-water allotments and water-level changes in well 24S.2E.4.313, a 160-foot-deep irrigation well perforated in the alluvium and the Santa Fe Group, are shown in figure 7. The water-level measurements in this well were first made in 1957 following a 7-year drought. From 1958 to 1963, a large amount of surface water was available, and the water level in the well rose about 15 feet. Heavy pumping in 1964 caused a rapid decline in the water level of about 5 feet.

The longest record of water-level measurements in a deep well in the study area is for EBID well 1. A hydrograph of this well for 1973-78 is shown in figure 8. Only small fluctuations occurred during 1973-76 when the well was rarely pumped. As a result of the large ground-water withdrawals during the 1977 irrigation season, the water level declined about 4.9 feet from January 1977 to January 1978 (table 5). Water-level measurements in the other four EBID wells show declines similar to that of EBID well 1. For the same period (January 1977 - January 1978), the hydrograph for shallow well 24S.2E.4.313 (fig. 7) shows a 2-foot decline.

It is not known if, over a period of 10 to 20 years, static water levels in the deeper wells will recover completely during the non-irrigation season to previous static levels. During this study (1976-78), the water-level recovery in the EBID wells after each irrigation season indicated that pumpage from the deeper aquifer has not resulted in a continuous and rapid decline of water levels in wells that withdraw water from the deeper aquifer. These preliminary measurements indicate water-level responses similar to those in the shallower irrigation wells.

Hydrographs for the four observation wells located in a group near EBID well 1 are shown in figure 9; the location of the wells is shown in figure 5. The depth to static water level generally was greater in wells with a deeper screened interval during the years that measurements were made for this study. As an example, the depth to water in well 24S.2E.17.423d (screened interval: 113 to 118 feet) was 9.1 feet below land surface on September 1976 (table 5). On the same date, the depth to water in well 24S.2E.17.423b (screened interval: 591-596 feet) was 16.0 feet. The two wells are about 10 feet apart (fig. 5).

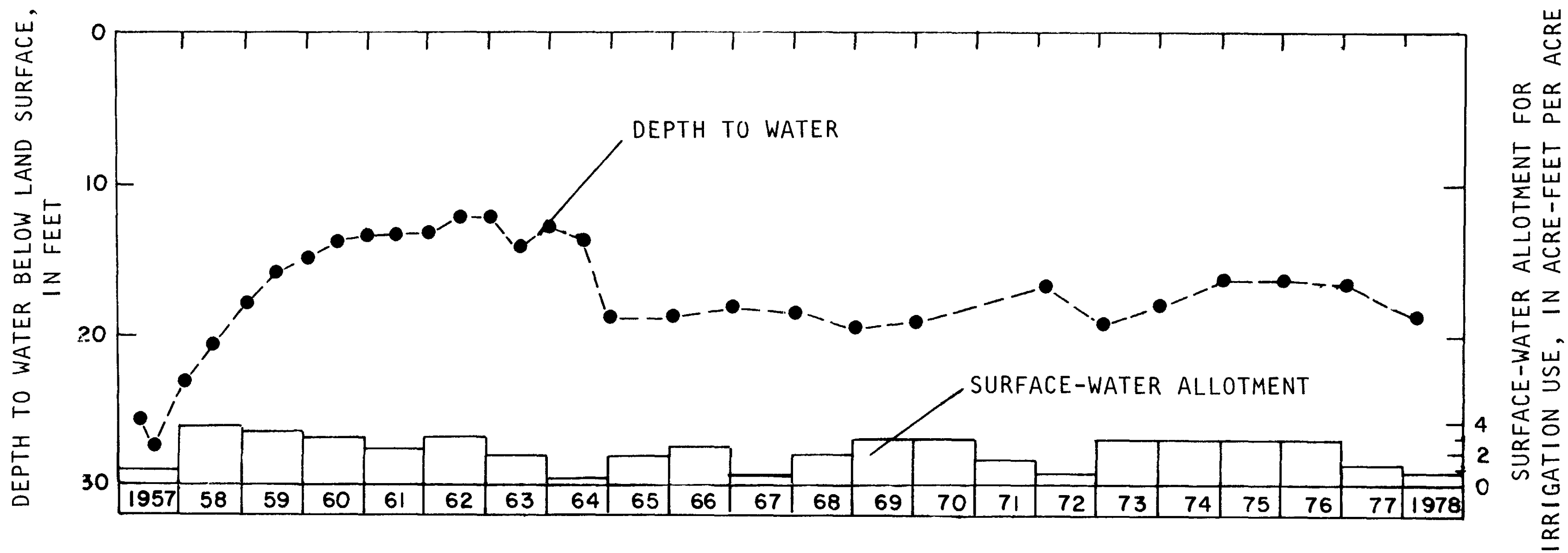


Figure 7.--Water levels (nonpumping) in well 24S.2E.4.313 and volume of surface water available for irrigation, 1957-78.

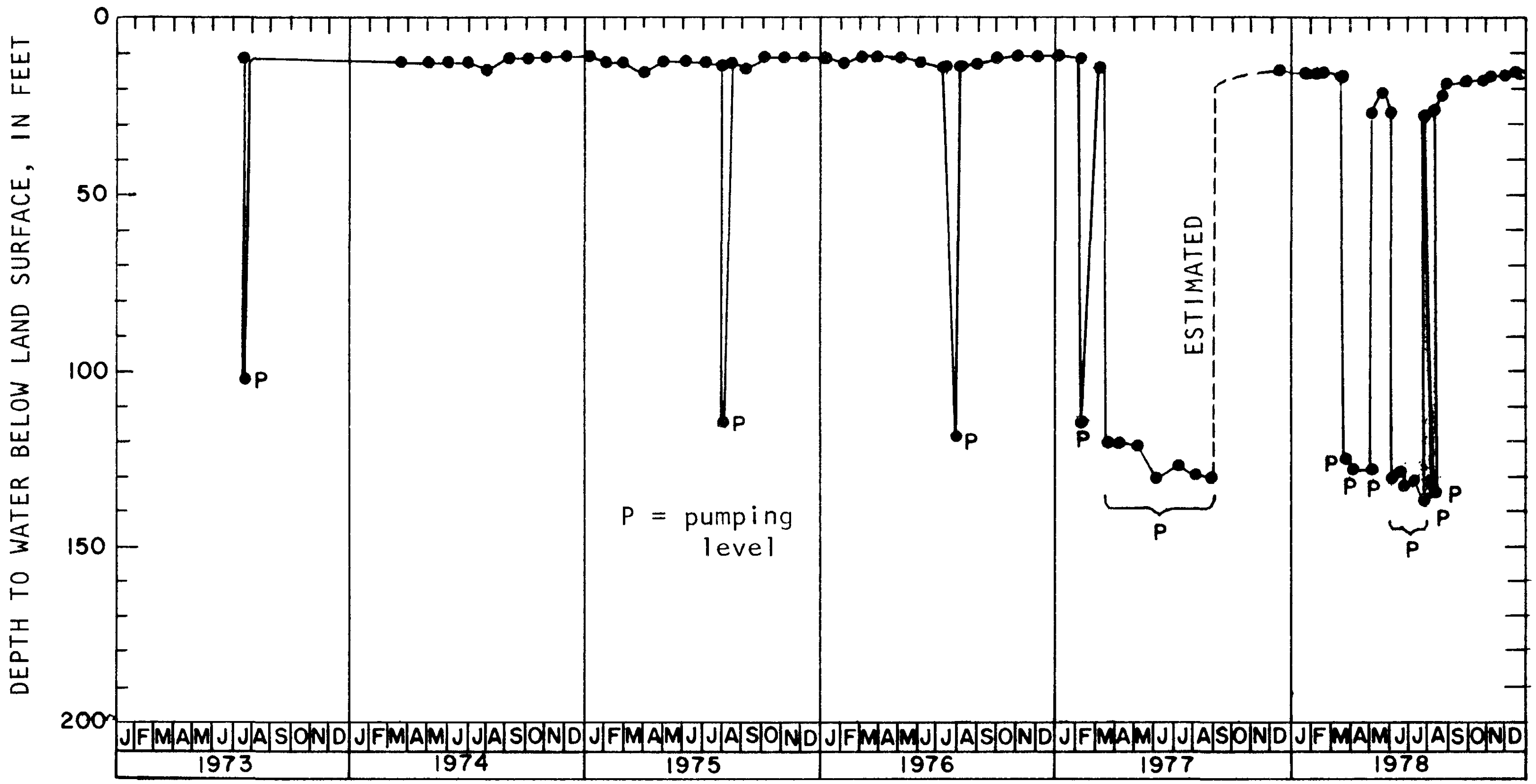


Figure 8.--Selected water-level measurements in EBID well 1, 1973-78.

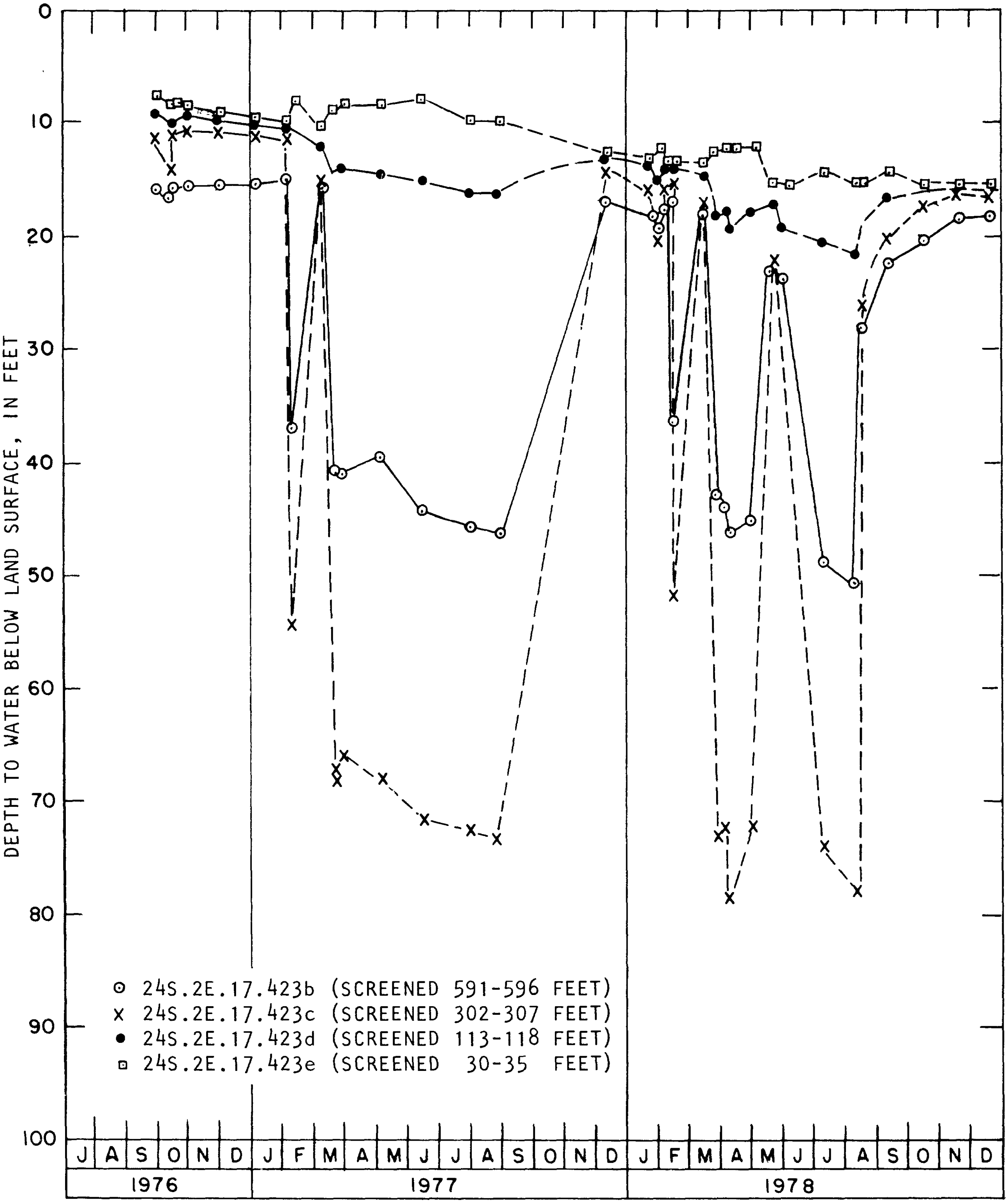


Figure 9.--Water levels in observation wells located near EBID well 1, 1976-78.

The decrease in hydraulic head with greater depth of screen setting is indicated by almost all static measurements. Under static conditions, the water level in well 24S.2E.17.423c (screened interval: 302-307 feet) is at a higher level than the water level in well 24S.2E.17.423b (screened interval: 591-596 feet). However, when EBID well 1 (screened interval: 310-680 feet) is pumping, the reverse occurs, and the water level in well 24S.2E.17.423b is higher. The same relative difference in hydraulic head with depth of screened interval also occurs in observation wells 24S.2E.17.414a and 24S.2E.17.414b when EBID well 1 is pumping.

Two observation wells in a group located 100 feet south of EBID well 2 had a similar relationship of lower hydraulic head with deeper screened interval when the wells were drilled in 1976 (table 5). Initially, the static water level in well 24S.2E.7.234 (screened interval: 305-310 feet) was about 1 foot lower than the water level in well 24S.2E.7.234a (screened interval: 120-125 feet). However, for several months after the 1977 and 1978 irrigation seasons, the hydraulic-head relationship in these two wells was reversed, with the deeper well having a higher water level; during these 2 years there was little surface water available for irrigation, and the large amount of ground water withdrawn caused a general decline in the water table in the Mesilla Valley.

When aquifer tests were conducted, water-level measurements were also made in selected nearby privately owned wells to determine the effect of pumping. These measurements are listed in tables 3 and 5. Water levels in shallow wells generally declined less than 1 foot when the deep wells were pumping.

The cemented surface casing used in the construction of the five Irrigation District wells prevents (or at least, greatly restricts) water in the shallow aquifer from entering the wells and minimizes the drawdown in nearby shallow wells when the EBID wells are pumping. Consequently, the drawdown in shallow wells resulting from the pumping of deep wells is much less than occurs in wells that are perforated at the same depths as the pumped well.

During the aquifer test conducted during February 4-12, 1977 (EBID well 1 pumping), water-level measurements were made in the four unpumped Irrigation District wells and in nearby observation wells. The resulting drawdown in each observation well after about 4 days of pumping is shown in figure 10. The graph shows the great distance that the cone of depression extends from a deep pumping well that is perforated in a leaky-confined aquifer such as the Santa Fe Group. In comparison, the cone of depression caused by pumping the shallow irrigation wells is not nearly as large because water in the aquifer (flood-plain alluvium) is unconfined. Water pumped from storage in an unconfined aquifer is derived mostly from gravity drainage of water in the cone of depression. In a leaky-confined aquifer, however, the aquifer is usually not dewatered; the water released from storage is contributed solely by expansion of the water and compression of the aquifer, and water-level changes are an indication of pressure changes in the aquifer.

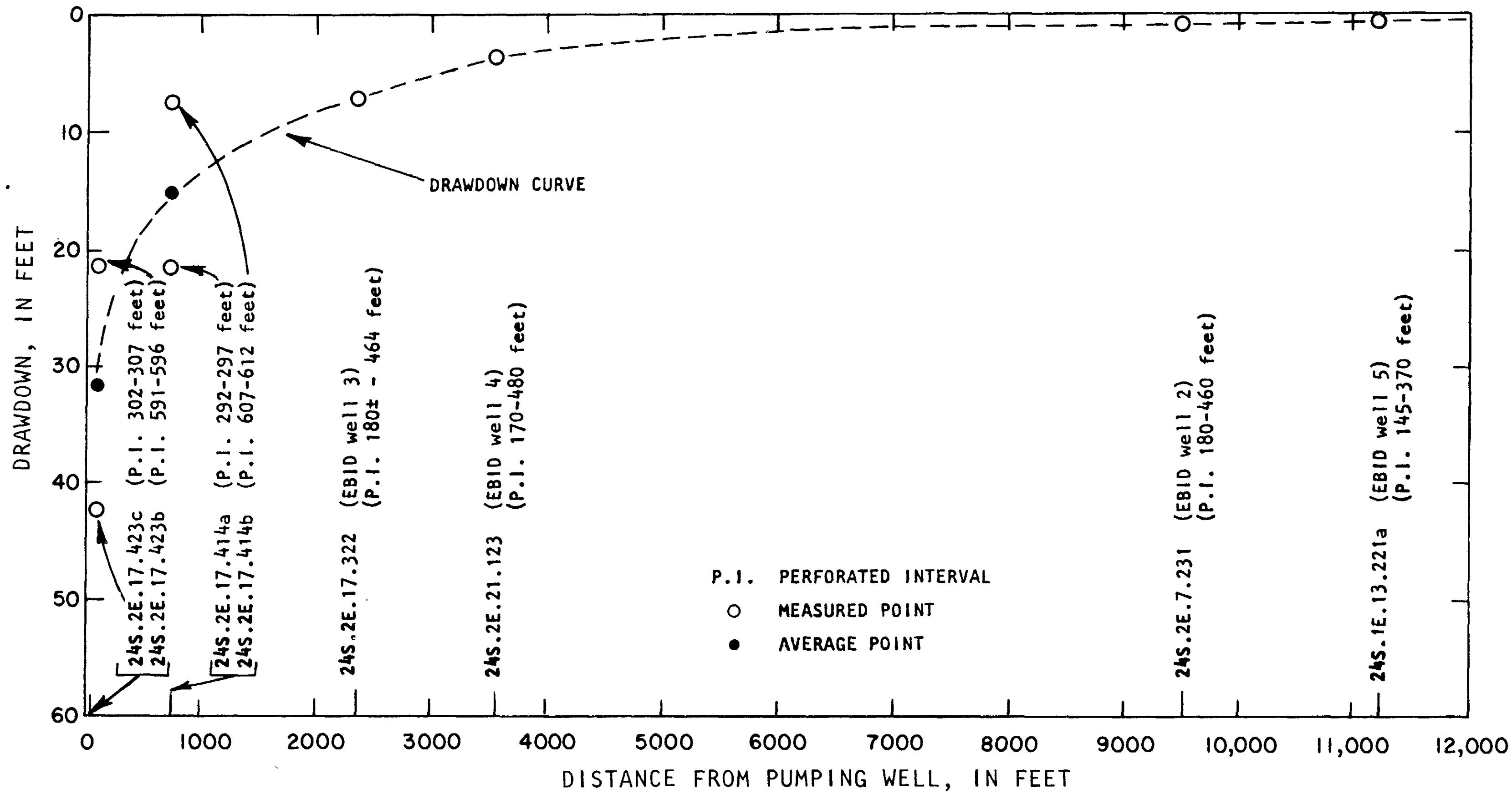


Figure 10.--Measured drawdown after 4 days at various distances from EBID well 1, pumping 3,400 gallons per minute.

RESULTS OF AQUIFER TESTS

Aquifer tests are commonly used to determine the two principal characteristics of an aquifer, namely, its ability to transmit and to store water. These characteristics are referred to as the transmissivity and the storage coefficient. Definition of these characteristics and the basic theories and assumptions of aquifer tests may be found in Ferris and others (1962) and Lohman (1972).

Aquifer tests involving the EBID irrigation wells and nearby observation wells were conducted during several pumping periods. EBID well 1 was pumped during July 21-24, 1973, after completion of construction, but the test was not conclusive because of erratic pumping rates. All five irrigation wells were pumped on July 31 and August 1, 1975, and from July 12 to July 29, 1976. Measurements of discharge, water level, and specific conductance were made. The small-diameter observation wells drilled and constructed in August and September 1976 were used during some of the aquifer tests conducted in February and March 1977 and in February and March 1978. Measurements of drawdown, discharge, specific conductance, and power consumption were made for the EBID wells at approximately weekly intervals during the irrigation seasons in 1977 and 1978. During periods of testing, additional water-level measurements were made in selected nearby privately owned wells. Not all tests made during a particular period are considered valid. Interference from other pumping wells and interrupted pumping schedules were two problems encountered during the tests.

Various methods were used to analyze the measurements made during aquifer tests. Values of transmissivity and horizontal hydraulic conductivity derived by using water-level drawdown in the pumped well are given in table 2, part I. Values of vertical hydraulic conductivity were estimated by a method in which the drawdown effects in observation wells completed in the pumped interval of the aquifer are compared with the drawdown effects in the observation wells completed above or below the pumped interval (table 2, part II).

Single-Well Aquifer Tests

Aquifer tests involving measurements of drawdown and discharge in the pumping well were made in all five EBID wells. The tests were planned to avoid or minimize effects of outside interference. However, several tests had extraneous effects, such as pumps in nearby wells being turned on, power failure or variation, and pump-maintenance problems.

The results of the single-well aquifer tests that were conducted during periods of least interference are shown in table 2, part I. The test measurements were analyzed using semilogarithmic plots, as described by Cooper and Jacob (1946) and Ferris and others (1962, p. 98-100). An example of the plot and analysis is illustrated in figure 11, which shows drawdown in EBID well 1 during the February 1977 test. Drawdown measurements made during the

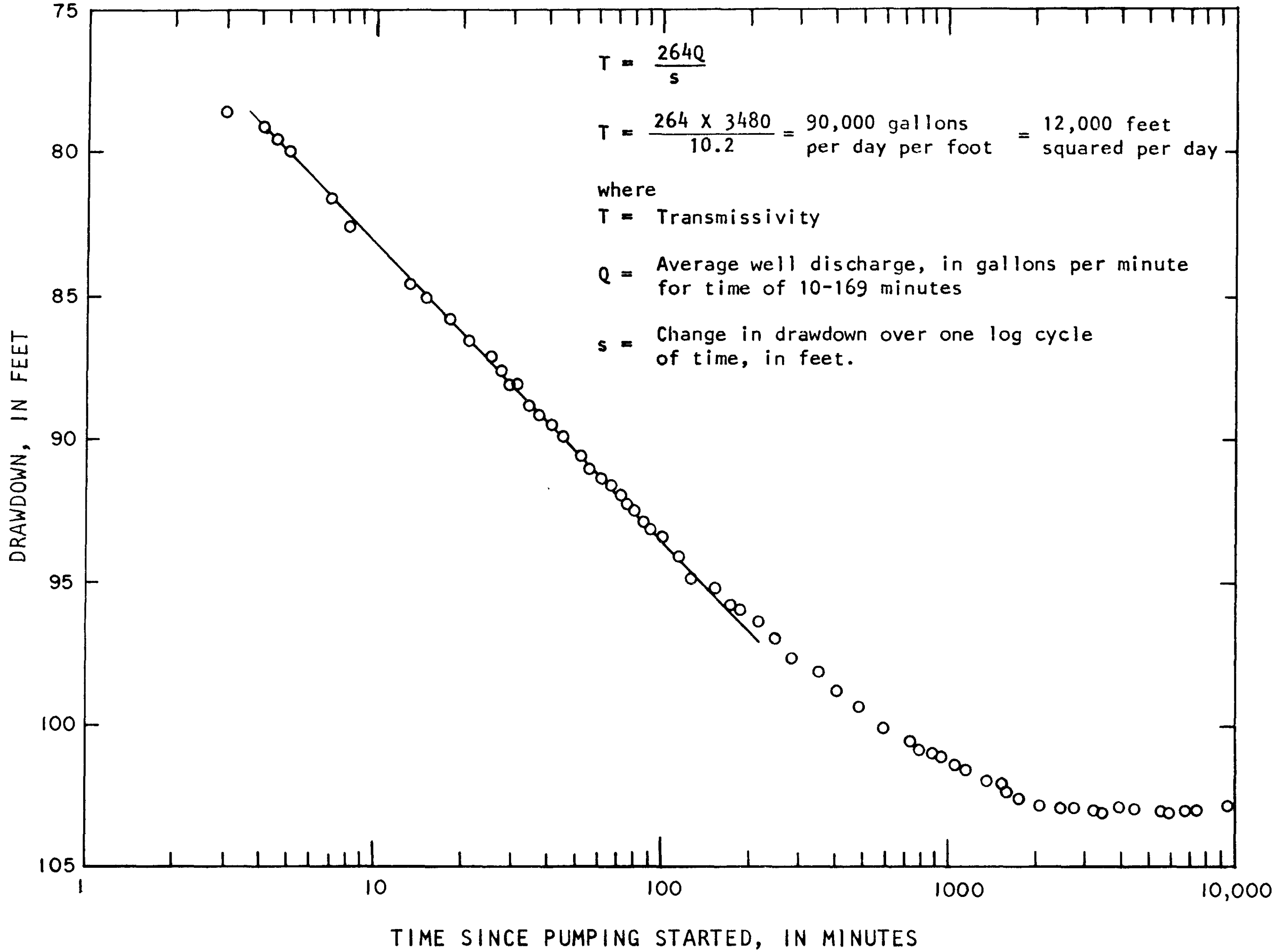


Figure 11.--Drawdown in EBID well 1, February 4-11, 1977.

early part of the pumping test are believed to be most representative of aquifer response to pumping stress; the effects of water movement to the pumped zone through or around the clay layers from areas above or below are then minimal, as is the effect of water moving out of clay layers into the stressed zone. After pumping began, the water level in EBID well 1 declined for 1 to 2 days; thereafter, "leakage" from above and below the perforated interval caused a stabilization of the water level.

Two or three aquifer tests were conducted for each of the five Irrigation District wells (table 2, part I). Transmissivities derived from single-well tests ranged from 10,900 to 21,100 feet squared per day, and hydraulic conductivities ranged from 48 to 88 feet per day. The average hydraulic conductivity derived from these tests for all five wells was 67 feet per day, and the median was 61 feet per day. Greater values of transmissivity were calculated for tests on EBID wells 4 and 5 (except for the 1973 test on well 1), probably due to the greater hydraulic conductivity of sands in the upper part of the perforated intervals in these wells. Aquifer tests for EBID well 1 had the lowest average hydraulic conductivity of the five Irrigation District wells tested. This well is perforated from 310 to 680 feet, whereas the other EBID wells are perforated considerably above this part of the aquifer. Apparently, a decrease in hydraulic conductivity occurs with depth.

Multiple-Well Aquifer Tests

Drawdown measurements in observation and EBID irrigation wells were obtained during the aquifer tests. During each test, a selected EBID well was pumped, and the drawdown was measured in nearby EBID irrigation wells and in the small-diameter observation wells. Analysis of these measurements was complicated by the differences in the perforated intervals in the observation and irrigation wells and in the pumped well. Drawdown measurements made in the small-diameter observation wells, which have a 5-foot screened interval, may not be representative of the stress created in the entire perforated interval of the pumping well. Clay layers in a heterogeneous aquifer affected by pumping stress may delay or prevent uniform response of water-level changes as measured in a well screened in only a small part of the aquifer.

The aquifer in the upper part of the Santa Fe Group in this area contains many alternating layers of sand and clay. The aquifer is considered to respond to pumping stress as a leaky confined aquifer, which has vertical water movement and may have water released from clay layers within or adjacent to the pumped zone. Electric logs indicate that the upper part of the Santa Fe Group in this area is composed of about 60 percent sand layers and about 40 percent clay layers.

A mass plot of water-level measurements during an aquifer test conducted in February 1977, when EBID well 1 was pumped, is shown in figure 12. The separation of curves in figure 12 is caused by heterogeneities in the aquifer, vertical leakage, and differences in the perforated interval in different wells. The following analysis is therefore subject to the problems of applying simplified type curves to a complex aquifer.

Analyzing the mass plot shown in figure 12 with leaky-aquifer type curves (Lohman, 1972, p. 30-34 and plate 3; Hantush, 1960; Cooper, 1963) gave an average transmissivity of 16,700 feet squared per day based on the plots for wells 24S.2E.17.322 (EBID well 3), 24S.2E.21.123 (EBID well 4), 24S.2E.17.423b, and 24S.2E.17.414b (an example of these calculations is on the page facing figure 12). The hydraulic conductivity (assuming 250 feet of sand thickness) was 67 feet per day. The storage coefficient was 0.001. In matching the curves, more confidence was placed in the two curves representing drawdown in EBID wells 3 and 4 because their perforated intervals are in common with most of the perforated interval in the pumped well.

Shallow irrigation wells that are perforated in the flood-plain alluvium and uppermost part of he Santa Fe Group were not tested. Specific capacities (discharge per unit drawdown) were used to estimate transmissivity values for these wells that are completed in sediments above the perforated intervals of the Irrigation District wells. The resultant estimates of transmissivity ranged from about 10,000 to 20,000 feet squared per day.

Tests to Estimate Vertical Hydraulic Conductivity

The aquifer tests involving the Irrigation District wells were used to estimate the vertical hydraulic conductivity for the semipervious confining layers (clays) above or below the aquifer intervals in which the EBID wells are perforated. The results are given in table 2, part II. Drawdown measurements were made simultaneously in observation wells screened in the pumped zone as well as above and below the pumped zone. The method described by Neuman and Witherspoon (1972) was used to analyze the data. An example of a curve plot is shown in figure 12 (EBID well 1 pumping). Observation well 24S.2E.17.423c is screened just above the upper part of the zone screened in EBID well 1, whereas observation well 24S.2E.17.423d is screened more than 150 feet above the pumped zone. The ratio of simultaneous drawdown measurements in the aquifer and in the confining layers was used to compute the hydraulic diffusivity (K/S) of the confining layers (assuming instantaneous drawdown within the sands). The vertical hydraulic conductivity of the confining layers was then determined from the diffusivity value and the specific storage of the confining layers.

Immediately after pumping started, the water level in observation wells screened above or below the pumped zone rose from several inches to more than a foot. This rise continued for a few minutes to several hours, and then the water level began to decline. In calculations of drawdown, the initial or static water level in the observation well was assumed to be the top of the upsurge. Neuman and Witherspoon (1972, p. 1,291) suggest that measurements made during the early phases of the test are less affected by leakage from storage and therefore are more representative of the actual vertical hydraulic conductivity. The values of vertical hydraulic conductivity listed in table 2, part II, were calculated by using drawdown measurements during the earliest times at which steady decline began to occur after the initial upsurge.

Example of calculations for figure 12

Example of calculation of transmissivity, storage coefficient, and vertical hydraulic conductivity for EBID well 1 (fig. 12), using type curves from Lohman (1972, p. 31 and plate 3).

$$T = \frac{Q}{4\pi s} \cdot L(u,v) = \frac{3370 \times 1440 \times 1}{4 \times 3.14 \times 3.1 \times 7.48}$$

$T = 16{,}700\ ft^2/day$

$$S = 4T \frac{t/r^2}{1/u} = 4 \times 16{,}700 \times \frac{1.62 \times 10^{-8}}{1.0}$$

$S = 0.001$

EBID well 3

$$K' = 4 \times T \times \frac{v^2}{r^2} \times b' = 4 \times 16{,}700 \times \frac{(.19)^2}{(2300)^2} \times 265$$

$K' = 0.12\ ft/d$

EBID well 4

$$K' = 4 \times T \times \frac{v^2}{r^2} \times b' = 4 \times 16{,}700 \times \frac{(.4)^2}{(3400)^2} \times 265$$

$K' = 0.25\ ft/d$

WHERE:

T = transmissivity, in ft^2/day;
Q = average well discharge in gal/min (3370);
S = average drawdown at match point, in feet (3.1);
$L(u,v)$ = Leakance function from type curve = 1;
t = time at match point, in minutes;
r = distance from pumping well to observation well, in feet;
S = storage coefficient;
$1/u$ = function from type curve = 1;
K' = vertical hydraulic conductivity of the confining beds, based on curves for EBID wells 3 and 4;
b' = thickness of confining beds, assumed equal to thickness from water table to base of lowest clay in confining unit, = 265 feet;
v = leakance function from type curve match, = 0.19 for EBID well 3 and 0.4 for EBID well 4;
7.48 = conversion from gallons to cubic feet; and
1,440 = conversion from day to minutes.

Example (referenced to figure 12) of calculation of vertical hydraulic conductivity using methods described by Neuman and Witherspoon (1972, p. 1284-1298).

$$\frac{s'}{s} = \frac{\text{drawdown in well 24S.2E.17.423d}}{\text{drawdown in well 24S.2E.17.423c}} = \frac{.05}{21.2}$$ at a time of 18 minutes [$t/r^2 = 1.04 \times 10^{-6}$]

$$t_D = \frac{9.28 \times 10^{-5} Tt}{r^2 S} = \frac{9.28 \times 10^{-5} \times 125{,}000 \times 18}{(102.5)^2 \times .001} = 20$$

Where: t_D = dimensionless time factor for pumped aquifer;
T = transmissivity, assumed 125,000 (gal/day)/ft (16,700 ft^2/day) based on other aquifer tests;
r = average distance between pumping well and observation well; and
S = storage coefficient, assumed .001, from other aquifer tests.

$t_D' = 6.2 \times 10^{-2}$

Where: t_D' = dimensionless time factor for unpumped zone, found from value of t_D in figure 3 of Neuman and Witherspoon (1972, p. 1289)

$$\alpha' = \frac{1.077 \times 10^{-4}\, t_D' Z^2}{t} = \frac{1.077 \times 10^{4} \times 6.2 \times 10^{-2} \times (78)^2}{18} = 2.26 \times 10^5\ (gal/day)/ft$$

Where: α' = hydraulic diffusivity of unpumped zone in (gal/day)ft;
Z = vertical coordinate, assumed to be 40 percent of total thickness of confining unit, representing the average percentage of clay beds.

$$K' = \alpha' Ss' = 2.26 \times 10^5 \times 10^{-5} = 2.26\ (gal/day)/ft^2 = 0.30\ ft/day$$

Where: K' = average vertical hydraulic conductivity of confining units in the unpumped zone between the perforated intervals of the observation well and the pumped well; and
Ss' = specific storage of clay in the unpumped zone, assumed to be = 10^{-5}/ft.

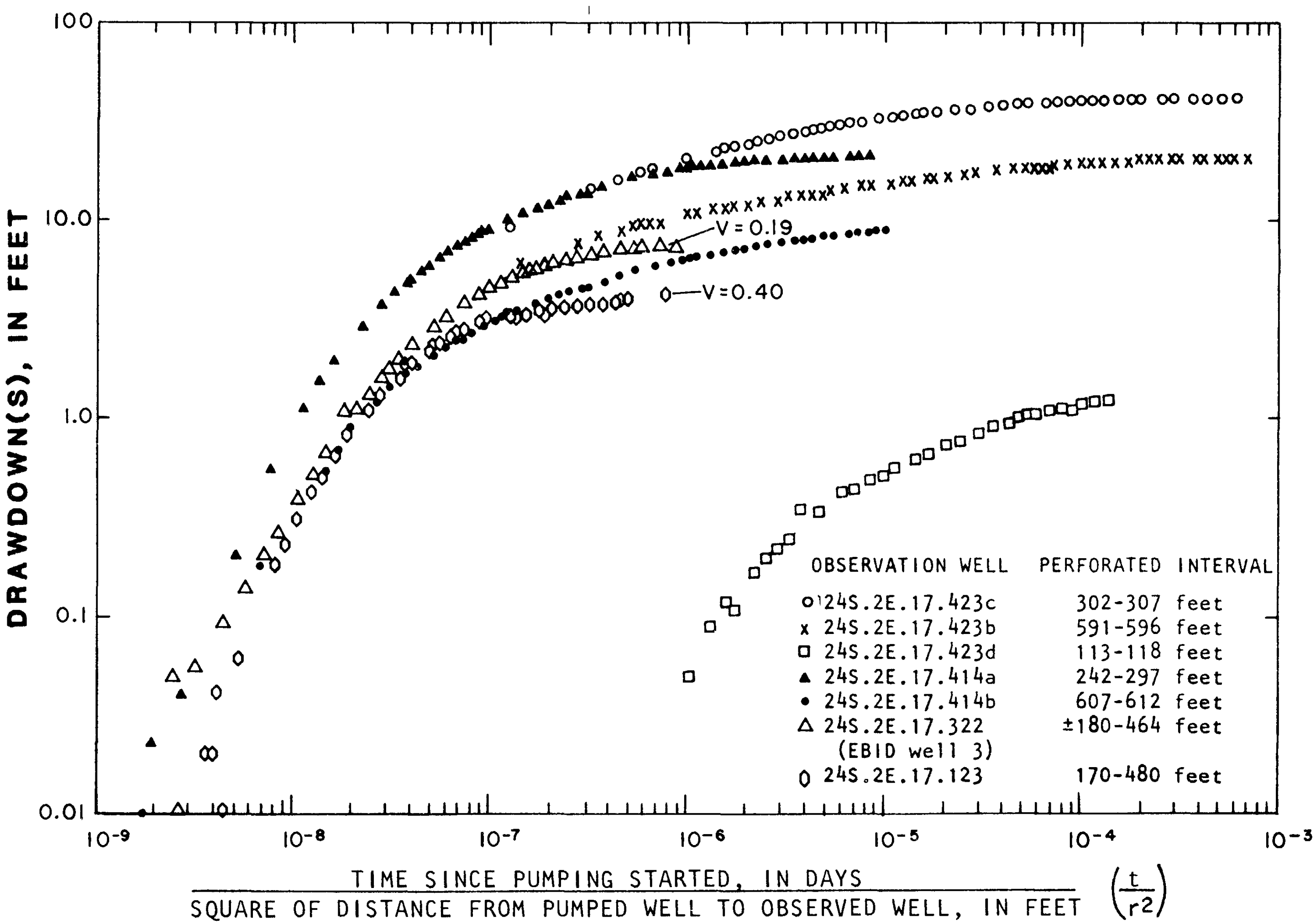


Figure 12.--Logarithmic plot of drawdown in observation wells during an aquifer test of EBID well 1, February 4-11, 1977.

The Neuman and Witherspoon method was designed for aquifers that have a discrete confining layer. The irregular and interfingering clay layers in the Santa Fe Group sediments complicate the calculation of vertical hydraulic conductivity. Two values of vertical hydraulic conductivity for each aquifer test are given in table 2, part II. The first value given was calculated assuming that the thickness of the confining unit was equal to the entire thickness of sediments between the top of the perforated interval in the pumping well and the bottom of the perforated interval in the observation well (or in one case, the bottom of the perforated interval in the pumping well (EBID well 3) and the top of the perforated interval in a deep observation well (24S.2E.17.414b)). The second value given was calculated assuming that the confining unit was 40 percent of the thickness as described above (because clay represents about 40 percent of the section). The first method is considered to give an estimate of the effective vertical hydraulic conductivity of the entire confining unit (including clay, sand, and gravel), whereas the second value is thought to more closely represent the vertical hydraulic conductivity of the clays in the section.

Values of vertical hydraulic conductivity of the confining unit (table 2, part II) range from 0.21 to 3.0 feet per day for the entire thickness of the confining unit and from 0.03 to 0.30 foot per day for just the clay layers in the confining unit. These values are consistent with the values of 0.12 foot per day and 0.25 foot per day (fig. 12) determined by leaky-aquifer methods described in Lohman (1972, p. 31 and plate 3). However, the wide range in results produced by the Neuman and Witherspoon method shows that the irregular occurrence of the clay layers makes it difficult to calculate a definitive value for the vertical hydraulic conductivity of the clay. In addition to the problem of determining an appropriate thickness of the confining layer for use in these calculations, another problem existed in the determination of a specific-storage value for the clay layers. Specific storage may be determined by laboratory tests on core samples or onsite with extensometers, but neither method was used during this study. Specific storage of the clay layers in the central Mesilla Valley was assumed to be 10^{-5} $foot^{-1}$, which is thought to be a representative value. Laboratory determinations of specific-storage values for confining layers were reported by Neuman and Witherspoon (1972, p. 1296-1297) to be 1.0×10^{-4} $foot^{-1}$ and 2.4×10^{-4} $foot^{-1}$ and by Miller and others (1978, p. 95) to be 1.8×10^{-5} $foot^{-1}$ and 2.2×10^{-6} $foot^{-1}$. If a specific-storage value of 10^{-6} $foot^{-1}$ had been used in this study, the values of vertical hydraulic conductivity that are presented in table 2, part II, would have been an order of magnitude lower.

A comparison of the estimated vertical hydraulic conductivity with the horizontal hydraulic conductivity indicates a much higher rate of ground-water movement in the horizontal direction than in the vertical direction in the Santa Fe Group. The numerous clay layers in the aquifer interfinger but are generally not continuous over long distances (more than 1 or 2 miles). The vertical hydraulic conductivity of sand units is unknown, but it is many times greater than the vertical hydraulic conductivity of clay layers.

WATER QUALITY

Throughout the Rio Grande Valley of southern New Mexico, chemical quality is the dominant concern in the use of ground water for irrigation. Virtually everywhere on the flood plain of the Mesilla Valley, ground water is available in sufficient quantity to meet irrigation needs; however, in many places the quality of water limits the type of crops that can be grown. In the area of the EBID wells, ground water of excellent quality is available in large quantities. A water-quality problem does exist, however, in that a layer of slightly saline water overlies the freshwater everywhere in this area. Deep wells that pump freshwater may eventually produce water of inferior quality due to the downward movement of slightly saline water. This section of the report identifies the zones of slightly saline water and freshwater in the central Mesilla Valley and discusses ways to minimize the downward movement of slightly saline water into the freshwater zone.

Water quality was monitored by collecting water samples for laboratory analyses and by measuring specific conductance of samples at frequent intervals from the five EBID wells, nearby privately owned irrigation wells, and the groups of observation wells near the EBID wells. A great deal of reliance was placed upon measurements of specific conductance because the results are reliable and immediately available. Specific conductance measures the capability of the water to transmit an electric current and is expressed as micromhos per centimeter at 25° Celsius (micromhos). Larger specific conductance values indicate greater salinity. In the study area, a close estimate of the dissolved-solids concentration of the water in milligrams per liter can be made by multiplying the specific conductance by 0.65.

Specific-conductance measurements were often taken several times a day during the first few days of pumping of the EBID wells and once a week during long-term pumping. An effort was made to use the same calibrated conductance meter for a series of measurements so that small changes could be detected. However, there was an unavoidable change in conductance meters in August 1977, which complicated the analysis of the data. Periodically, samples were collected for laboratory specific-conductance measurements and less frequently for complete laboratory analysis (table 4). The groups of observation wells were sampled several times a year.

A general classification of water quality based on the dissolved-solids concentration is given in the following table (adapted from Winslow and Kister, 1956, p. 5):

Description	Dissolved-solids concentration (milligrams per liter)	Equivalent specific conductance (micromhos per centimeter at 25° Celsius) (dissolved solids ÷ 0.65)
Fresh	Less than 1,000	Less than 1,540
Slightly saline	1,000 to 3,000	1,540 to 4,620
Moderately saline	3,000 to 10,000	4,620 to 15,400
Very saline	10,000 to 35,000	--
Brine	More than 35,000	--

This classification is used in the delineation of water-quality zones in this report.

During this study (1976-78), the specific conductance of water from the Rio Grande at the streamflow-gaging station downstream from Elephant Butte Dam (station number 08361000) ranged from about 600 to 900 micromhos during the irrigation season (U.S. Geological Survey, 1977-79). These specific-conductance values are approximately equal to a dissolved-solids range of 390 to 585 milligrams per liter.

Water-Quality Zones

Slightly-Saline Water Zone

Throughout the Mesilla Valley, there is a layer of slightly saline water near the land surface. In the area of the Irrigation District wells, the slightly saline water extends from the water table to a depth of about 100 to 150 feet.

The slightly saline water zone occupies the flood-plain alluvium aquifer and the upper part of the Santa Fe Group. The zone of slightly saline water is mostly a result of evapotranspiration. When water is used for irrigation, some is transpired by the crop, some percolates to the water table, and some is lost to evaporation. Salts that are left in the soil by evapotranspiration may be flushed down to the water table by the next irrigation flooding. However, the flushing process also occurs naturally. Before the Rio Grande Valley was placed under cultivation, the flood plain was covered by a thick growth of phreatophytes (known locally as "bosque"). As seasonal floods covered the flood plain, the same process of salt concentration took place then as with crop irrigation now.

The quality of the shallow water at any given place and time depends on a number of factors. The most important determinant is the location with respect to the river or a major unlined canal. Shallow wells near surface-water channels generally produce water with less than 1,000 milligrams per liter dissolved solids, indicating that some recharged river water is being pumped from the well. Conversely, shallow wells that are located in irrigated fields a few hundred yards or more from the river or a canal generally yield slightly saline water. The quality of water pumped from shallow wells may change somewhat with time, depending on the nature of recharge to the aquifer.

Water in the slightly saline zone may exceed a dissolved-solids concentration of 2,000 milligrams per liter. The ion with the highest concentration is usually sulfate. Many of the older irrigation wells are perforated from the water table to depths of 100-200 feet; therefore, the water pumped is a mixture from layers containing water of different quality.

Freshwater Zone

Below the slightly saline zone is a much thicker zone of freshwater. A water sample taken at a depth of 1,177-1,193 feet in test hole 24S.2E.17.423 contained 354 milligrams per liter dissolved solids (table 4). Another water sample, taken at a depth of 1,707-1,727 feet in a test hole (25S.2E.3.224a) located about 8 miles south of the study area, contained 580 milligrams per liter dissolved solids (Wilson, White, Orr, and Roybal, 1981, p. 436).

A hydrologic section through the study area that delineates the zones containing fresh and slightly saline water is shown in figure 6. In this section, the freshwater zone is divided into two parts. There is a thin transition zone of freshwater having a dissolved-solids concentration of 500 to 1,000 milligrams per liter below the slightly saline water zone and below the transition zone is a zone of freshwater containing less than 500 milligrams per liter dissolved solids. Wilson, White, Orr, and Roybal (1981, plate 8, section G-G') show that the zone containing less than 500 milligrams per liter dissolved solids extends to a depth of about 1,500 feet, and from this depth to about 2,500 feet, the aquifer contains freshwater having a dissolved-solids concentration of 500 to 1,000 milligrams per liter.

Two observation wells located only 6 feet apart demonstrate the substantial difference in water quality between the slightly saline zone and the freshwater zone. Observation well 24S.2E.7.234 is screened at a depth of 305-310 feet and observation well 24S.2E.7.234b is screened at 75-80 feet (these wells are approximately 100 feet from EBID well 2). A water sample collected on August 7, 1976, from the 310-foot well had a dissolved-solids concentration of 285 milligrams per liter. During the same week, water from the 80-foot well had a dissolved-solids concentration of 1,380 milligrams per liter (table 4). Bicarbonate is the predominant anion in the freshwater zone, whereas sulfate is generally the predominant anion in the slightly saline zone. The analysis for the water from observation well 24S.2E.7.234 (310 feet deep) is very similar to analyses for deep observation wells located about 100 feet from EBID well 1, showing that the water quality in the freshwater zone is uniform throughout the area where the EBID wells are located.

Water-Quality Changes

Elephant Butte Irrigation District Wells

Water-quality changes in the study area can be related to the amount of pumping by the deep irrigation wells. Because of a 3.0 acre-foot surface-water allotment in 1976, the Irrigation District wells were pumped for only 17 days in July. Prior to this time, the wells had only been test pumped, so the pumping period in July provided an opportunity to collect water-quality data from the aquifer under nearly undisturbed conditions.

The surface-water irrigation allotment for 1977 was 1.25 acre-feet, and as a consequence, there was a large demand for supplemental water from the Irrigation District wells. The wells were turned on in mid-March and were pumped continuously, except for repairs and maintenance, until late August.

In 1978, the surface-water allotment was 0.75 acre-foot. The Irrigation District well pumps were initially started on March 23 but were turned off for the month of May. Because of the low reservoir storage, no surface water was released during May; the wells were not pumped because it was expected that seepage losses in the East Side Canal would be excessive. The wells were turned on June 2 and pumped until August 9.

EBID well 1 (24S.2E.17.423a)

Water from EBID well 1 had a specific conductance of 460 micromhos when sampled in 1976; the specific conductance ranged from 450 to 480 micromhos for the 3 years of this study (figs. 13, 14, and 15, and table 5). Laboratory analyses of water samples from this well in July 1973 (just after it was drilled) and in August 1977 show that all chemical-constituent concentrations remained essentially constant (table 4).

Selected specific-conductance measurements relative to total pumping time in hours for the five EBID wells are shown in figure 16. Measurements made within the first 48 hours of any pumping period were deleted to avoid the fluctuations observed in some wells during this period. The measurements are differentiated according to the two specific-conductance meters that were predominantly used.

A statistical analysis of the specific-conductance data indicates that no significant change has occurred in the specific-conductance values of water from EBID well 1 (taking into account the two different meters used). The statistical method used was an "F" test, and the results indicate that the slope of the plotted values for each meter equals zero (at 99 percent level of probability). In other words, a value of specific conductance at any time can be estimated by a simple average of previous values.

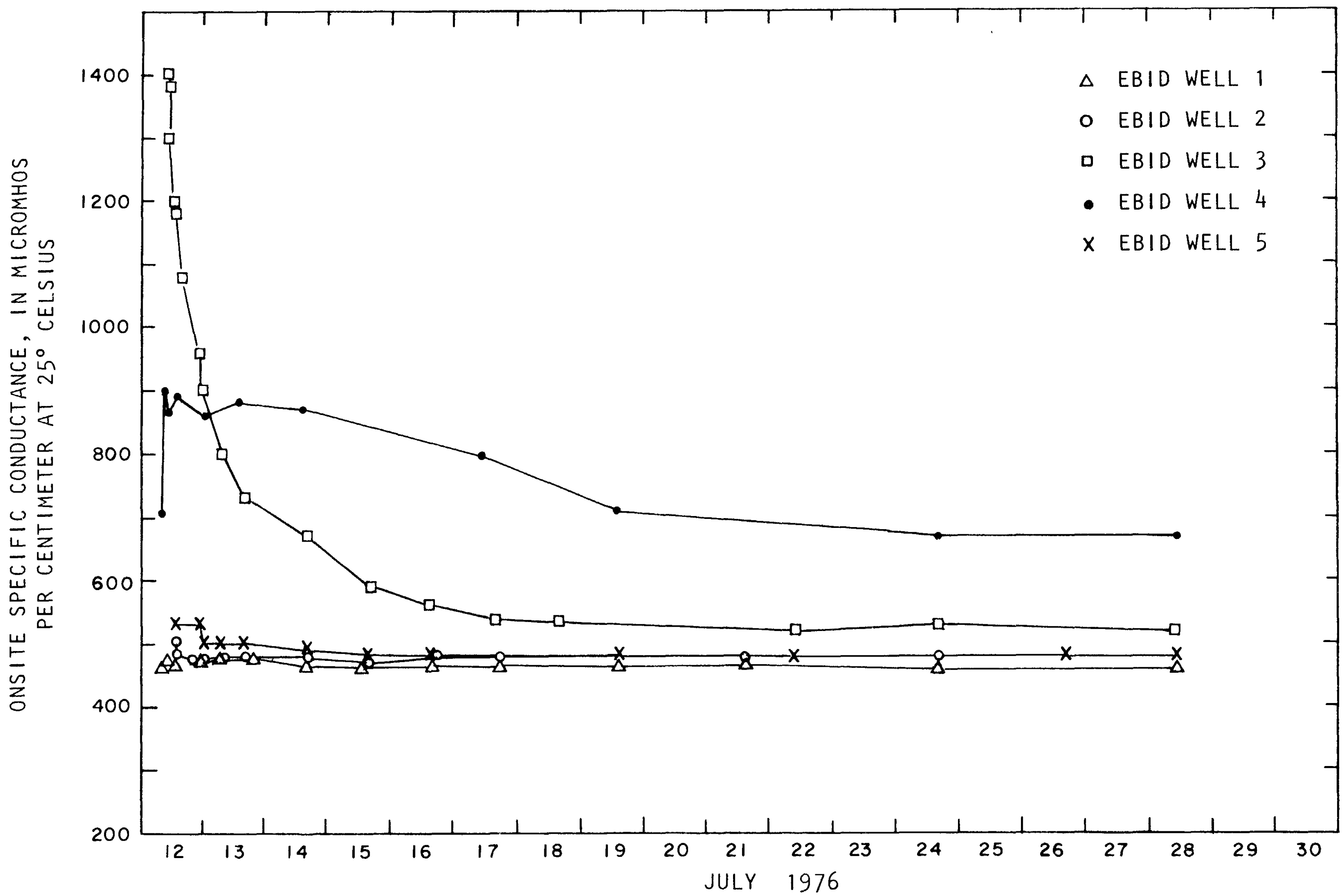


Figure 13.--Selected onsite specific conductances of water from Elephant Butte Irrigation District wells, 1976 irrigation season.

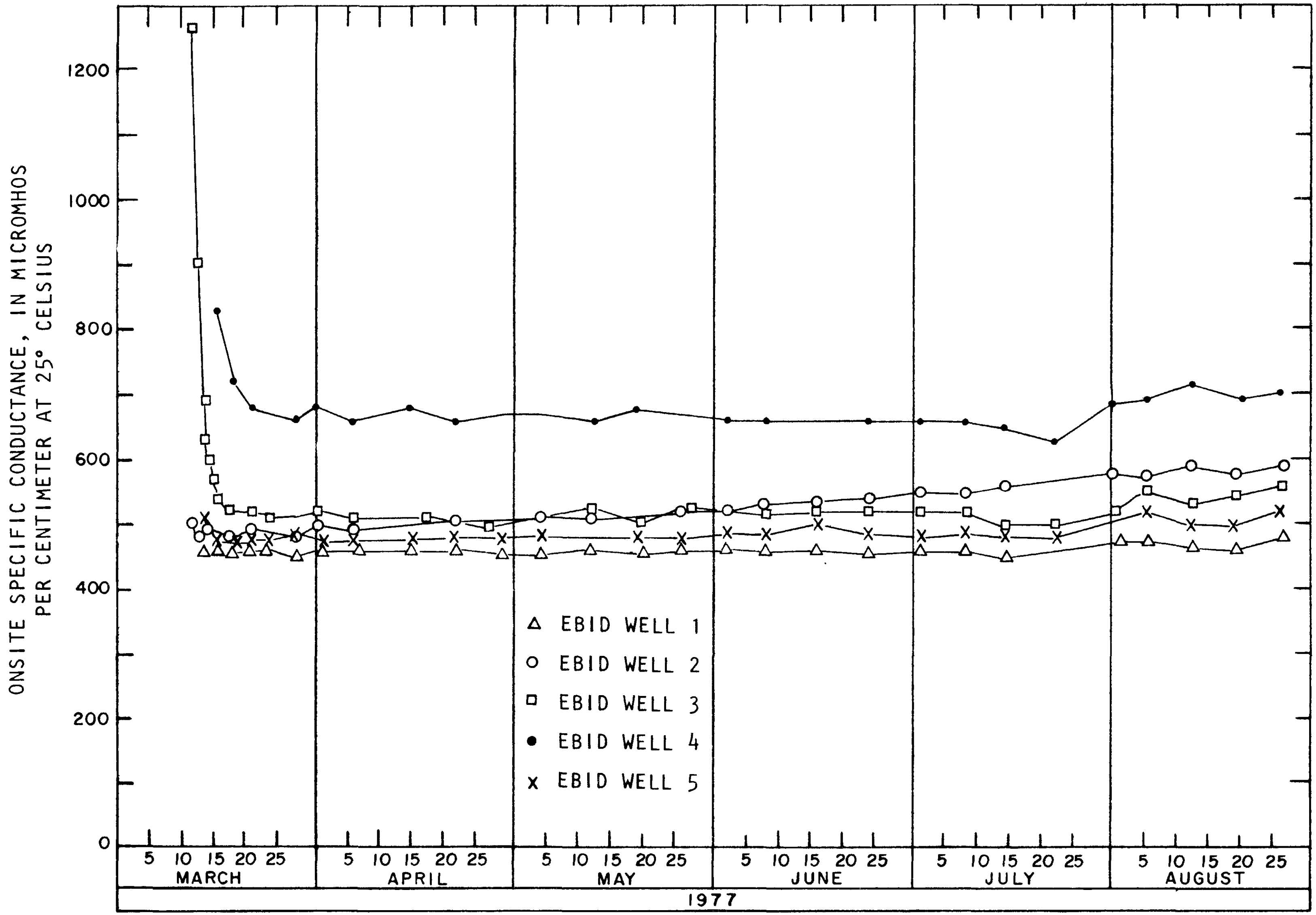


Figure 14.--Selected onsite specific conductances of water from Elephant Butte Irrigation District wells, 1977 irrigation season.

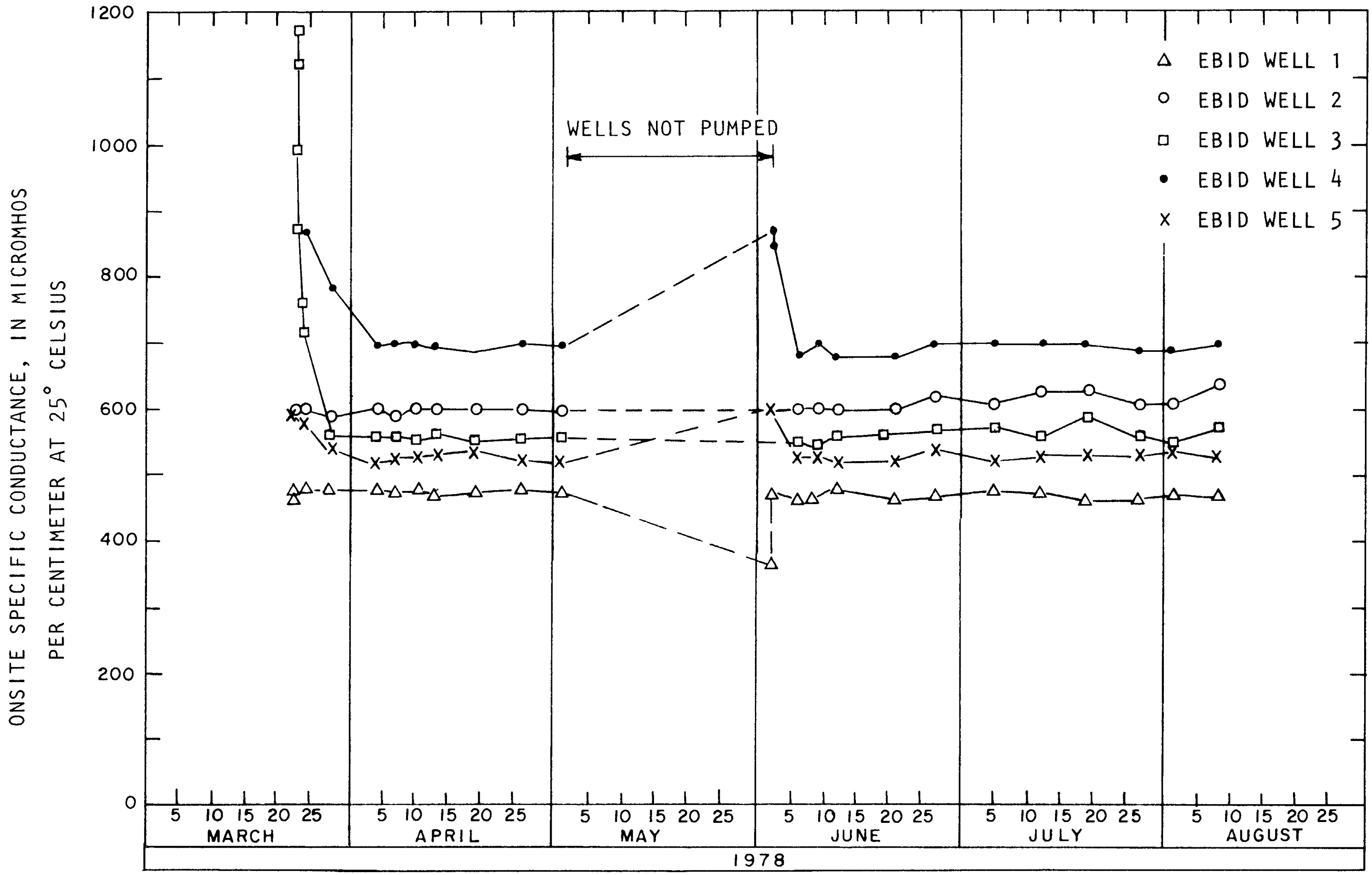


Figure 15.--Selected onsite specific conductances of water from Elephant Butte Irrigation District wells, 1978 irrigation season.

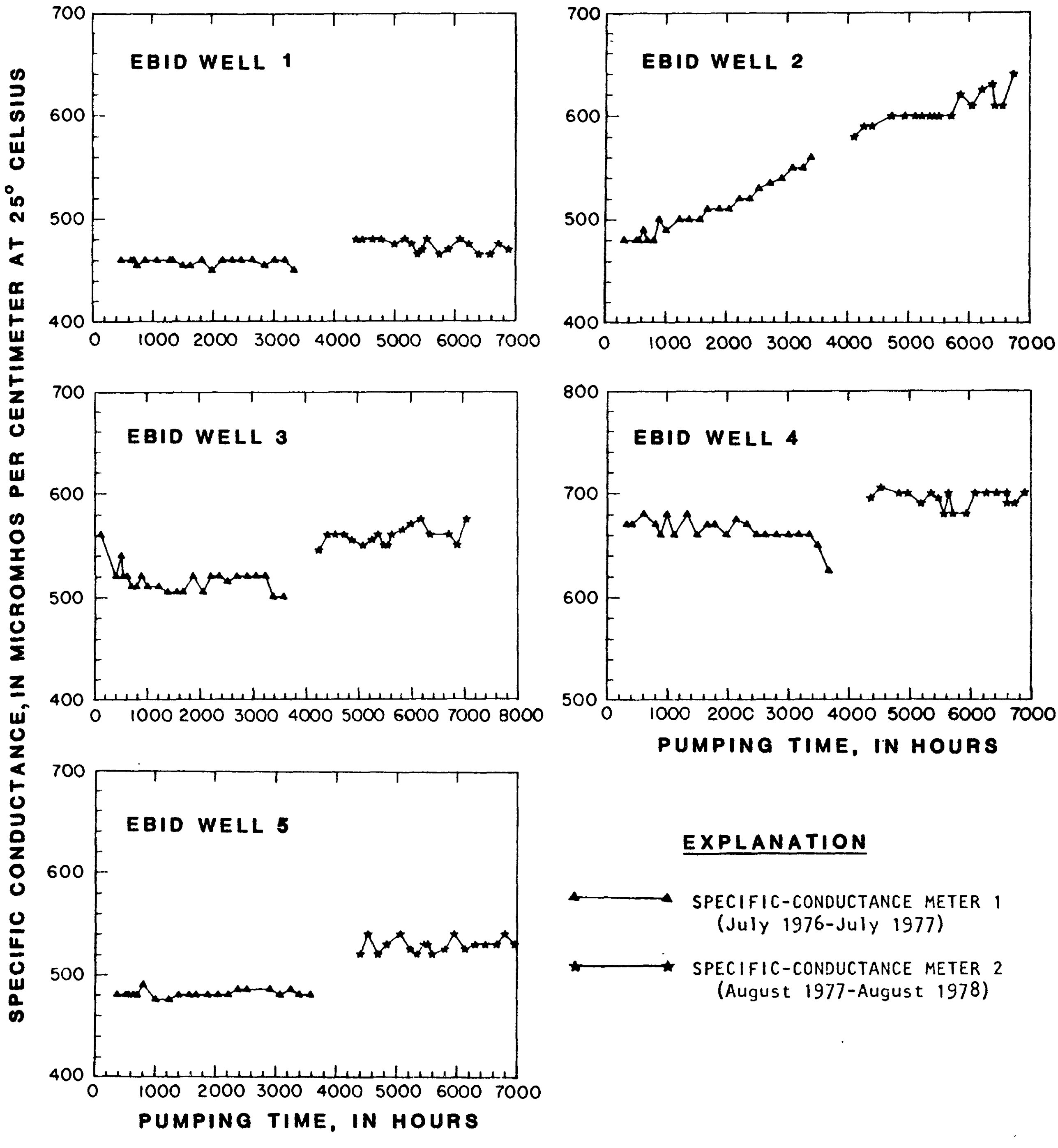


Figure 16.--Selected measurements of specific conductance of water from Elephant Butte Irrigation District wells.

EBID well 2 (24S.2E.7.231)

EBID well 2, located beside the Louisiana Lateral, produced water with a specific conductance of 470-480 micromhos during the July 1976 pumping period (fig. 13). This was approximately equal to the specific conductance of water from EBID well 1. However, EBID well 2 demonstrated significant changes in water quality during the 1977 pumping period (fig. 14). The initial specific conductance for this well, after the pump was started on March 12, 1977, was 500 micromhos. After approximately 5 hours of pumping, the specific conductance dropped to 480 micromhos, where it remained for 2 weeks. Then the specific conductance slowly began to rise, eventually reaching a value of 590 micromhos on August 26, 1977, just before the pump was turned off for the year. When this pump was turned on in 1978, the specific conductance was approximately the same as at the end of the 1977 season, indicating that the deterioration in water quality was irreversible (at least during this short time period). By the end of the 1978 pumping period, specific conductance of water from the well had risen to 640 micromhos (fig. 15).

The increase in specific conductance relative to total pumping time for EBID well 2 is shown in figure 16. An analysis of the data shown in figure 16 indicates that the changes are statistically significant and are not due to the change in meters. This well is the only one of the five EBID wells for which it can be shown that significant long-term increases in specific-conductance values have occurred. Because of a lack of confining layers, slightly saline water seems to have moved downward into the cone of depression in the potentiometric surface around the pumping well.

EBID well 3 (24S.2E.17.322)

The specific conductance of water from EBID well 3 showed marked changes at the beginning of each pumping period (figs. 13, 14, and 15). On July 12, 1976, the well water had a specific conductance of 1,400 micromhos when pumping began and maintained this value for 35 minutes. The conductance then decreased slowly and eventually reached a value of 520 micromhos after about 10 days of pumping. This pattern of change resembles a logarithmic function when graphed. The cemented surface casing for EBID well 3 was set to a depth of about 170 feet in the first major clay layer found in drilling. There are some relatively thin clay layers above this layer, but the 8- to 10-foot-thick clay layer where the surface casing was set was considered to present a barrier to the downward movement of slightly saline water. However, the measurements made during 1976 and subsequent years show that some water of inferior quality is moving into the perforated interval of the well. One possible explanation for this movement is that the cement may not completely seal the surface casing to the wall of the hole. Another explanation may be that the clay layer is discontinuous and ends a short distance from the well. A third alternative may be that a sand layer in the upper part of the screened interval already may have contained water of inferior quality when the well was completed. Whatever the mechanism by which water of inferior quality enters the well, it appears that the water moves into the casing through perforations near the top, moves downward inside the casing, and then into the formation where the hydraulic head is lower. A similar situation has been reported in South Carolina (Zack, 1977, p. 76-79).

Measurements of water levels in wells in this area show that the hydraulic head generally decreased with depth in the aquifer during the period of this study (tables 3 and 5). As a consequence, there was a constant hydraulic-head difference between the top and the bottom of the screened interval in EBID well 3. In many deep wells, the head difference is of little consequence because the water in the aquifer is about the same quality throughout the screened interval. However, in wells like EBID well 3, where inferior quality water seems to be entering the top of the screen, the downward movement of water in the well bore can result in quality changes. The difference in hydraulic head may be significant in a well when a nearby deep well is pumping (particularly if the pumping well is screened at a somewhat deeper interval, as for example, when EBID well 3 is idle and EBID well 1 is pumping). The pumping could cause a large hydraulic-head decrease in that part of the aquifer screened in the lower part of the unpumped well. This process eventually forms an envelope of inferior-quality water around the well casing, and this water must be pumped out before the better quality water is available.

A significant amount of water with elevated specific conductance had to be pumped out of EBID well 3 at the beginning of the July 1976 test. It took about 10 days for the specific conductance of the water to drop from 1,400 micromhos to 520 micromhos. The well pumped 40.6 million gallons during this 10-day period, and it was calculated that about 10 percent, or 4 million gallons, represented water of 1,400 micromhos conductance that had moved down the well bore while the pump was off. This 4 million gallons of water, when averaged over a 1-year period, is equal to a constant inflow down the well bore of about 8 gallons per minute.

Water from EBID well 3 had a maximum specific conductance of 1,260 micromhos on the first day of pumping in 1977, and eventually decreased to 500 micromhos in May (fig. 14). The specific conductance of water from this well then slowly rose to 560 micromhos between May and August.

In 1978, water from EBID well 3 had a maximum specific conductance of 1,170 micromhos on the first day of pumping. The specific conductance eventually decreased to 550 micromhos (fig. 15). During July and early August, the specific conductance slowly began to rise, peaking at 590 micromhos and ending the pumping season at 575 micromhos.

Selected specific-conductance measurements relative to total pumping time in hours are shown in figure 16. An analysis of this information, neglecting the elevated values characteristic of the first 2 days of pumping, indicates that no statistically significant change occurred in the specific conductance for EBID well 3. Thus, there was little or no downward movement of slightly saline water in the aquifer caused by pumping of the well. However, the large specific-conductance values at the beginning of each pumping period for this well (figs. 13-15, table 5) indicate that water of inferior quality was continually moving into the well casing. When the well was not pumping, this inferior quality water moved downward in the well casing and then flowed out into the part of the aquifer screened in the lower part of the well.

EBID well 4 (24S.2E.21.123)

EBID well 4 pumped water that also demonstrated considerable fluctuations in specific conductance, but with a somewhat different pattern than EBID well 3. In July 1976, the first specific-conductance measurement taken had a value of 710 micromhos (fig. 13). The conductance rose to 900 micromhos after 25 minutes of pumping, then slowly declined to 670 micromhos after about 12 days of pumping. The specific-conductance measurements for this well at the end of the pumping period were much higher than for the other four EBID wells. The higher values indicate that the top of the well screen is in some sand layers that contain water of inferior quality. The fluctuations in specific conductance also indicate that while the well was not pumping, water moved in and out of the casing because of the decrease in hydraulic head with depth in the aquifer and the hydraulic-head differences caused by nearby wells being pumped.

In 1977, EBID well 4 was not sampled immediately after the pump was started, but after 4 days of pumping the specific conductance was 830 micromhos (fig. 14). The conductance decreased slowly in a pattern similar to that of EBID well 3 and eventually stabilized at about 660 micromhos. In the last month of the 1977 pumping season, the conductance of water from this well began to rise and was 705 micromhos when pumping ceased for the year.

In 1978, the pump in EBID well 4 was started on March 23, and after the pumping hiatus in May, it was restarted on June 2. In both cases the conductance began at about 880 micromhos and eventually stabilized between 680 and 700 micromhos (fig. 15).

Selected specific-conductance measurements relative to total pumping time in hours for EBID well 4 are shown in figure 16. An analysis of this information, neglecting the elevated values at the start of pumping, indicates that no statistically significant change occurred in the specific conductance of water from this well. However, as in EBID well 3, the large specific-conductance values at the beginning of each pumping period (fig. 13-15, table 5) for this well indicate that water of inferior quality was continually moving into the upper part of the well screen, down the casing, and outward into the part of the aquifer screened in the lower part of the well.

EBID well 5 (24S.1E.13.221a)

Water from EBID well 5 had an initial specific conductance in 1976 of 530 micromhos; however, the conductance decreased to 480 micromhos within 3 days (fig. 13). In 1977, the conductance was 510 micromhos on the first day of pumping and had declined to 480 micromhos by the third day (fig. 14). During the last month of the 1977 pumping season, the conductance of water from this well slowly rose and eventually reached a value of 520 micromhos (however, a different meter that gave slightly higher readings was used at the end of the season).

When EBID well 5 was started on March 23 for the 1978 irrigation season, the water had a specific conductance of 590 micromhos (fig. 15). The conductance decreased over a period of about 10 days to a level of 520 micromhos. When the pumps were started on June 2, after the pumping hiatus in May, the conductance was 600 micromhos; however, it quickly dropped to 530 micromhos, and after some fluctuations it was at this level at the end of the pumping season.

Selected specific-conductance measurements relative to total pumping time in hours for EBID well 5 are shown in figure 16. An analysis of this information, neglecting the elevated values at the start of pumping, indicates that no statistically significant change occurred in the specific conductance of water from this well. However, as in EBID wells 3 and 4, the elevated specific-conductance values at the beginning of each pumping period for this well (figs. 13-15, table 5) indicate that a relatively small quantity of water, slightly inferior to that normally pumped, moved down the casing and outward into the aquifer screened in the lower part of the well.

Observation wells

For observation well 24S.2E.17.423b (screened interval: 591-596 feet) near EBID well 1, most of the laboratory specific-conductance values of the water ranged from 470 to 480 micromhos for the 3 years of record (table 4). There did not appear to be any change in water quality occurring at this depth. For observation well 24S.2E.17.423c (screened interval: 302-307 feet), nine of ten laboratory specific-conductance readings of the water were between 470 and 480 micromhos. Analyses of water samples taken in 1976 and 1977 from these two wells showed that the water from depths of 591-596 feet and 302-307 feet was very similar in concentrations of chemical constituents.

Water samples collected from 1976 to 1978 from observation well 24S.2E.17.423d (screened interval: 113-118 feet) had specific-conductance values ranging from 1,060 to 1,220 micromhos. No trend can be discerned in the conductivity data or in the laboratory analyses.

Water from observation well 24S.2E.17.423e (screened interval: 30-35 feet) showed a decrease in specific conductance from 2,700 to 745 micromhos between late summer 1976 and late summer 1978. Almost all chemical constituents showed a corresponding decrease in concentration: Bicarbonate decreased from 243 to 190 milligrams per liter; chloride from 370 to 100 milligrams per liter; and sulfate from 760 to 130 milligrams per liter (values are for samples collected on September 10, 1976, and August 29, 1977; table 4). However, fluoride remained constant at 0.6 milligram per liter. The measured quality changes in this well were due to water seeping into the aquifer from the East Side Canal; the August 29, 1977, analysis was very similar to an analysis of canal water on the same date. In February 1978, when there was no surface water in the nearby canal, the conductance of water from this well was 1,240 micromhos. On May 1, with water in the canal, the conductance was 904 micromhos and eventually reached a low of 745 micromhos on September 13, 1978.

Water produced from observation well 24S.2E.17.414b (about 750 feet from EBID well 1; screened interval: 607-612 feet) demonstrated some minor fluctuations in specific conductance but no significant changes. Between August 1976 and August 1977, the specific conductance appeared to increase from 460 micromhos to 485 micromhos; however, the laboratory analyses for dissolved solids for the same period provided the almost identical values of 302 and 303 milligrams per liter. During the test pumping of EBID well 1 in February 1977, laboratory specific-conductance readings over a 2-week period for this observation well were 505, 485, and 476 micromhos. These variations in specific conductance are thought not to be related to actual changes in water quality, but rather to the progressive removal of drilling mud and chemicals used in development. Each time this well was sampled (by air jetting), the maximum discharge increased somewhat, apparently because the well underwent additional development. Specific-conductance measurements made in 1978 were fairly consistent, ranging between 476 and 485 micromhos.

Laboratory analyses of water from wells 24S.2E.17.423b and 24S.2E.17.414b are almost identical (the wells are about 600 feet deep and are about 650 feet apart). Differences in the concentrations of iron and phosphate may be attributed to the methods of sampling (air jetting with an iron pipe) and development (hexa-meta-phosphate added to some wells).

Water from observation well 24S.2E.17.414a (screened interval: 292-297 feet) shows a constant specific conductance from its installation in September 1976 until 1978. Both onsite and laboratory specific-conductance readings ranged from 465 to 480 micromhos. Laboratory analyses of water samples collected in September 1976 and August 1977 showed a slight change in dissolved-solids concentration from 295 to 286 milligrams per liter.

Observation well 24S.2E.7.234 (screened interval: 305-310 feet), located 101 feet from EBID well 2, produced water with minor fluctuations in quality in 1977 but no particular trend. In 1978, the specific-conductance measurements fell within the narrow range of 449 to 458 micromhos.

Water from observation well 24S.2E.7.234a (screened interval: 120-125 feet) showed substantial changes caused by the pumping of EBID well 2. In August 1976, the specific conductance of water from this well was about 680 micromhos; in the late summer of 1977, it was about 980 micromhos; and in September 1978, it was 1,216 micromhos. This increase in specific conductance indicated that water of inferior quality was moving downward in the aquifer in response to the reduction in hydraulic head during pumping at the depth at which EBID well 2 is screened. The electric log run in the well after drilling shows very few clay layers that would retard the downward movement of water above a depth of 120 feet.

Water from observation well 24S.2E.7.234b (screened interval: 75-80 feet) was slightly saline in all analyses. The dissolved-solids concentration was 1,380 milligrams per liter in August 1976 and 1,350 milligrams per liter in August 1977.

Private Wells Near the Elephant Butte Irrigation District Wells

Since the installation of the five EBID wells, there have been many other deep wells drilled in the same area. Few, if any, of these wells have cemented surface casing as a means of excluding the slightly saline water near the surface. Instead, blank casing of the same diameter as the perforated casing is installed from the surface to a depth of about 150-250 feet.

Most privately owned irrigation wells pump only when the owner is irrigating his fields, usually 1 week in every 3 or 4 during the spring and summer when there is a shortage of surface water. Sufficient data have not been collected for these wells to allow an accurate determination of the effectiveness of their design. There is a possibility that slightly saline water can move downward through the gravel pack into the perforated interval. However, the quantity of water involved is likely to be small. In some wells, the drilling mud, which remains in the gravel in the blanked-off section, restricts the vertical movement of water in the gravel pack.

If the perforated interval is not deep enough below the base of the slightly saline water zone, inferior quality water will enter the well bore. A well (24S.2E.17.214) that fits this category was drilled in the winter of 1977-78 about 0.5 mile north of EBID well 1. This 420-foot-deep well has blank casing down to only 120 feet and thus is screened in the lower part of the slightly saline zone. Specific-conductance measurements of water from this well (table 3) varied between 1,600 and 800 micromhos, depending on how long the well had been pumping, indicating that a condition existed similar to that of EBID well 3, and that slightly saline water moved into the well and down the well bore into the freshwater part of the formation.

Many of the privately owned deeper wells in the study area belong to one farm that occupies two areas south and northwest of the EBID wells. More than a dozen of these wells were drilled in 1977. The wells have 18-inch-diameter blank casing, usually extending to depths of 230-250 feet. Some of these wells show no significant changes with time in the specific conductance of the water pumped. For example, water from well 24S.1E.2.212a maintained a specific conductance of 480 micromhos during the 1977 and 1978 irrigation seasons; measurements of water from well 24S.2E.19.111 were between 650 and 700 micromhos; measurements of water pumped by well 24S.2E.19.422 were between 550 and 600 micromhos; and for well 24S.2E.29.224, specific-conductance measurements of water had a slight variation between 560 and 580 micromhos. Other wells of the same design showed changes in specific conductance. Water from well 24S.1E.1.114 increased in conductance from 560 to 710 micromhos between April and September 1978. Another deep well (23S.1E.35.444, drilled in 1976), of similar design but with only 160 feet of blank casing, had a slow deterioration in water quality over three pumping seasons; specific conductance was 400 micromhos in February 1976, 600 micromhos in July 1977, 740 micromhos in July 1978, and 860 micromhos in September 1978.

A number of other deep irrigation wells in the Mesilla Valley are outside the study area. One of these wells (26S.3E.6.442), located at the Berino natural-gas pumping station about 20 miles south of Las Cruces, was one of the first deep wells drilled in the Mesilla Valley (in 1971). The perforated interval in this well is between 307 and 597 feet. Specific conductance was 780 micromhos on October 4, 1972, and 790 micromhos on August 9, 1978. This well has 40 feet of cemented surface casing, but the main deterrent against the entry of overlying slightly saline water is the 307 feet of blank casing.

A deep well (26S.3E.35.141) near the town of Anthony (about 20 miles south of the study area), with a perforated interval between 500 and 800 feet, had a specific conductance of 720 micromhos on October 17, 1972, and 800 micromhos on August 9, 1978. The perforations in the well casing begin at a depth of 500 feet because the slightly saline layer is much thicker here than in the study area.

In the Mesilla Valley north of the study area, the City of Las Cruces drilled three wells similar in design to the EBID wells. Two of these wells have cemented surface casing to a depth of 400-450 feet while the other has cemented surface casing to about 250 feet. No significant change in water quality in these wells occurred during the time of this study.

CONCLUSIONS

1. The aquifer in which the five EBID wells are perforated is part of the Santa Fe Group and consists of interfingering and alternating beds of sand, silt, and clay, with occasional thin layers of small-diameter gravel. Transmissivities of the parts of the aquifer in which the five EBID wells are perforated, as determined from single-well and multiple-well aquifer tests, range from 10,900 feet squared per day around EBID well 3 to 21,100 feet squared per day about EBID well 4. Average hydraulic conductivities for the aquifer range from 48 to 88 feet per day. The vertical hydraulic conductivity of the confining layers for that part of the aquifer screened in the EBID wells ranges from 0.21 to 3.0 feet per day for the entire thickness of the confining unit and from 0.03 to 0.30 foot per day for only the clay layers in the confining unit.

2. During 1977, the five EBID irrigation wells pumped 9,453 acre-feet of water, and during 1978 they pumped 5,626 acre-feet. In the same area, it is estimated that 13,000 acre-feet of water were pumped in 1978 by about 23 privately owned deep irrigation wells.

Water levels in the five Irrigation District wells were at a lower level in January 1978 than in January 1977, indicating a decline caused by the large ground-water withdrawals in the 1977 irrigation season. Water-level declines also occurred in shallow irrigation wells in the same area. Water levels in these shallow wells generally decline during periods of heavy pumpage and recover during periods of less pumpage and large surface-water irrigation allotments. The trend of water-level changes in the deep irrigation wells has not been established, but preliminary measurements indicate water-level responses similar to those in the shallow irrigation wells.

3. The specific conductance (in micromhos per centimeter at 25° Celsius) of water pumped by the five EBID wells as measured onsite during the final week of pumping for the 1976, 1977, and 1978 irrigation seasons is given in the following table:

Well	July 24-28, 1976	Aug. 26, 1977	Aug. 8, 1978
EBID well 1	460	480	470
EBID well 2	480	590	640
EBID well 3	520	560	575
EBID well 4	670	705	700
EBID well 5	480	520	530

Onsite specific-conductance measurements were used as the primary water-quality determinant because of the large number of measurements needed to plot short-term trends. An unavoidable change in conductance meters in the middle of the 1977 irrigation season complicated an interpretation of the results; however, a statistical analysis of the specific-conductance measurements, taking into account the change in meters, indicates that EBID well 2 (24S.2E.7.231) was the only one of the five EBID wells to produce water with a statistically significant change in specific conductance.

4. Three of the EBID wells, well 3 (24S.2E.17.322), well 4 (24S.2E.21.123), and to a lesser extent, well 5 (24S.1E.13.221a), produce water with elevated specific-conductance values at the beginning of each pumping period. In each case, the uppermost part of the well screen allows entry of inferior quality water into the well casing. Because there is a decrease in hydraulic head with depth in the area, this inferior quality water moves down the well casing and into that part of the aquifer screened by the lower part of the well (when the well is not pumping).

5. Irrigation wells constructed with cemented surface casing or blank well casing set in a thick clay layer at depths approximately 200 feet or more below land surface produce water with the smallest specific conductance. Cemented surface casing may offer better protection than blank casing against downward movement of water from the slightly saline water zone.

REFERENCES

Anderson, K. E., 1973, Water well handbook: Missouri Water Well & Pump Contractors Assn., Inc., 281 p.

Conover, C. S., 1954, Ground-water conditions in the Rincon and Mesilla Valleys and adjacent areas in New Mexico: U.S. Geological Survey Water-Supply Paper 1230, 200 p.

Cooper, H. H., Jr., 1963, Type curves for nonsteady radial flow in an infinite leaky artesian aquifer, in Bentall, Ray, compiler, Shortcuts and special problems in aquifer tests: U.S. Geological Survey Water-Supply Paper 1545-C, p. C48-C55.

Cooper, H. H., and Jacob, C. E., 1946, A generalized graphical method for evaluating formation constants and summarizing well-field history: American Geophysical Union Transactions, v. 27, no. 4, p. 526-534.

Ferris, J. G., Knowles, D. B., Brown, R. H., and Stallman, R. W., 1962, Theory of aquifer tests: U.S. Geological Survey Water-Supply Paper 1536-E, 174 p.

Goddard, E. N., Trask, P. D., DeFord, R. K., Rove, O.N., Singewald, J. T., Jr., and Overbeck, R. M., 1951, Rock color chart: Geological Society of America.

Hantush, M. S., 1960, Modification of the theory of leaky aquifers: Journal of Geophysical Research, v. 65, no. 11, p. 3713-3725.

Hohn, C. H., 1981, Estimating water flow from pipes: New Mexico State University Cooperative Extension Service Guide A-104, 2 p.

King, W. E., and Hawley, J. W., 1975, Geology and ground-water resources of the Las Cruces area, New Mexico, in Guidebook of the Las Cruces Country, 1975: New Mexico Geological Society Guidebook, 26th annual field conference, p. 195-204.

King, W. E., Hawley, J. W., Taylor, A. M., and Wilson, R. P., 1971, Geology and ground-water resources of central and western Doña Ana County, New Mexico: New Mexico Institute of Mining and Technology, State Bureau of Mines and Mineral Resources, Hydrologic Report 1, 64 p.

Leggat, E. R., Lowry, M. E., and Hood, J. W., 1962, Ground-water resources of the lower Mesilla Valley, Texas and New Mexico: Texas Water Commission Bulletin 6203, 191 p.

Lester, P. A., 1977, History of the Elephant Butte Irrigation District: unpublished MA thesis, New Mexico State University, 121 p.

Lohman, S. W., 1972, Ground-water hydraulics: U.S. Geological Survey Professional Paper 708, 70 p.

Mendieta, H. B., 1974, Reconnaissance of the chemical quality of surface waters of the Rio Grande Basin, Texas: Texas Water Development Board Report 180, 109 p.

Miller, J. A., Hughes, G. H., Hull, R. W., Vecchioli, John, and Seaber, P. R., 1978, Impact of potential phosphate mining on the hydrology of Osceola National Forest, Florida: U.S. Geological Survey Water-Resources Investigations Report 78-6, 159 p.

Neuman, S. P., and Witherspoon, P. A., 1972, Field determination of the hydraulic properties of leaky multiple aquifer systems: Water Resources Research, v. 8, no. 5, p. 1284-1298.

Poland, J. F., Lofgren, B. E., Ireland, R. L., and Pugh, R. G., 1975, Land subsidence in the San Joaquin Valley, California as of 1972: U.S. Geological Survey Professional Paper 437-H, 78 p.

Richardson, G. L., Gebhard, T. G., Jr., and Brutsaert, W. F., 1972, Water-table investigation in the Mesilla Valley: New Mexico State University Engineering Experiment Station Technical Report No. 76, 206 p.

U.S. Geological Survey, 1977-79, Water resources data for New Mexico, water years 1976-78: U.S. Geological Survey Water-Data Reports NM-76-1 to NM-78-1 (published annually).

Wilson, C. A., White, R. R., Orr, B. R., and Roybal, R. G., 1981, Water Resources of the Rincon and Mesilla Valleys and adjacent areas, New Mexico: New Mexico State Engineer Technical Report 43, 514 p.

Winslow, A. G., and Kister, L. R., Jr., 1956, Saline water resources of Texas: U.S. Geological Survey Water-Supply Paper 1365, 105 p.

Zack, Allen, 1977, The occurrence, availability and chemical quality of ground water, Grand Strand area and surrounding parts of Harry and Georgetown Counties, South Carolina: South Carolina Water Resources Commission Report No. 8, 100 p.

Table 1.—Lithologic logs from test holes 24S.1E.13.221 and 24S.2E.17.423
[See Goddard and others (1951) for rock color terms]

	Thickness (feet)	Depth (feet)
Test hole 24S.1E.13.221		
Sand, fine to coarse-grained,sub-angular to well-rounded siliceous grains, with grayish-red (10R 4/2) clay and small-size gravel of igneous origin. Estimate 70 percent sand	44	44
Sand and gravel, estimate 50 percent of each. Sand mostly coarse- and very coarse grained. Small-size gravel comprised mostly of igneous pebbles.	11	55
Gravel with coarse-grained sand. Estimate 95 percent gravel, mostly of igneous origin. Base of flood-plain alluvium at 66 feet	11	66
Clay, pale reddish-brown (10R 5/4), with sand and some small-size gravel	44	110
Sand, medium-grained, sub-angular to well-rounded siliceous grains, with thin lenses of reddish-brown (10R 5/4) calcareous clay	230	340
Clay, sandy, pale reddish-brown (10R 5/4), calcareous	10	350
Sand, fine to very coarse, sub-angular to well-rounded siliceous grains, with pale reddish-brown (10R 5/4) calcareous clay and many caliche fragments. Estimate 60 percent sand	113	463
Sand, very fine to medium-grained, with pale reddish-brown (10R 5/4) calcareous clay and many caliche fragments. Estimate more than 50 percent sand.	241	704

Note: From 66 feet to bottom of hole, lithology is typical of Santa Fe Group.

Table 1.—Lithologic logs from test holes 24S.1E.13.221 and 24S.2E.17.423 - Continued

	Thickness (feet)	Depth (feet)
Test hole 24S.2E.17.423		
Sand, fine to coarse quartz grains, with moderate brown (5YR 3/4) clay. Estimate 60 percent sand	22	22
Gravel, coarse	4	26
Sand, fine-grained, silty	4	30
Clay, sandy, moderate brown (5YR 3/4)	10	40
Sand, fine to medium-grained, with clay and small-size gravel. Estimate 60 percent sand	5	45
Sand, medium to coarse, sub-angular quartz grains and gravel composed mostly of igneous pebbles. Probable base of flood-plain alluvium at 66 feet	21	66
Clay	7	73
Sand, medium-grained with thin layers of clay and small-size gravel. Overall color of pale brown (5YR 5/2). Estimate 80 percent sand	39	112
Clay, sandy and silty, pale brown (5YR 5/2)	32	144
Sand, medium to very coarse grained, mostly sub-angular quartz grains, estimate 90 percent sand	26	170
Clay, sandy, light brown (5YR 6/4)	8	178
Sand, medium to coarse-grained, with thin lenses of gravel and some clay layers	88	266
Sand, fine to medium-grained, clayey, light brown (5YR 6/4)	14	280
Clay, sandy, light brown (5YR 6/4) to light brownish-gray (5YR 6/1)	8	288
Sand, fine to very coarse quartz grains, with minor amounts of clay and gravel. Estimate 50-80 percent sand.	118	406
Clay, sandy	18	424

Table 1.—Lithologic logs from test holes 24S.1E.13.221 and 24S.2E.17.423 - Concluded

	Thickness (feet)	Depth (feet)
Test hole 24S.2E.17.423		
Sand, fine to coarse-grained, with clay and some small gravel	54	478
Sand, fine to coarse-grained with light brownish-gray (5YR 6/1) and pale yellowish-brown (10YR 6/2) clay layers.	94	572
Sand, medium to very coarse grained, sub-angular quartz and igneous rock grains. Some clay and small gravel. Estimate 70 percent sand	22	594
Gravel, sand, and some clay. Fine gravel, medium to very coarse grained sand and pale yellowish-brown (10YR 6/2) clay. Estimate sand and gravel over 60 percent. Mostly thin lenses of each type of sediment.	318	912
Sand, fine to coarse-grained, with thin to thick layers of light brownish-gray (5YR 6/1) to pale yellowish-brown (10YR 6/2) clay and few thin gravel lenses. Sand mostly quartz grains. Probably over 50 percent sand.	298	1,210

Note: From 66 feet to bottom of hole, lithology is typical of Santa Fe Group.

Table 2.--Summary of hydraulic properties of the Santa Fe Group in the vicinity of the Elephant Butte Irrigation District wells

EXPLANATION

Transmissivity.--Values are given to three significant figures.

Average hydraulic conductivity.--Obtained by dividing the transmissivity by the appropriate sand thickness. [Values are given to two significant figures.]

Sand thickness.--Total thickness of sand that is estimated to be transmitting water to the perforated interval. Obtained from borehole geophysical logs (resistivity).

Length of test.--Duration of pumping test, in hours.

Tested interval (listed in Part II).--The vertical distance between the top of the perforated interval in the pumping well and the bottom of the perforated interval in the observation wells (except for the test using EBID well 3, in which the tested interval is from the bottom of the perforated interval in the pumping well to the top of the perforated interval in the observation well).

Total thickness of confining unit.--Assumed to be the difference between the two values given as the tested interval.

Assumed horizonal transmissivity, hydraulic conductivity, and storage coefficient (listed in Part II).--All were used in calculating the vertical hydraulic conductivity. They are based on values obtained during the single- and multiple-well tests.

Remarks column.--Contains such items as the time interval upon which the transmissivity value is based.

Table 2. Summary of hydraulic properties of the Santa Fe Group in the vicinity of the Elephant Butte Irrigation District wells - Continued

PART I.--SINGLE-WELL AQUIFER TESTS

Pumping well number	Date test began	Perforated interval (feet)	Sand thickness (feet)	Total length (hours)	Transmissivity ft^2/day	Transmissivity (gal/day)/ft	Average hydraulic conductivity ft/day	Average hydraulic conductivity (gal/day)/ft	Remarks
24S.1E.13.221a (EBID well 5)	07-31-75	±145-370	170	26.0	13,600	102,000	80	600	Analyzed data for times of 2 to 658 minutes.
	07-12-76	±145-370	170	24.5	14,200	106,000	83	620	Analyzed data for times of 3 to 275 minutes.
	03-15-77	±145-370	170	1.7	14,200	106,000	83	620	Analyzed data for times of 3 to 100 minutes.
24S.2E.7.231 (EBID well 2)	07-31-76	180-460	200	21.5	13,500	101,000	68	500	Analyzed data for times of 3 to 50 minutes.
	03-12-77	180-460	200	144.2	12,200	91,100	61	460	Analyzed data for times of 2 to 35 minutes.
	02-22-78	180-460	200	5.0	12,300	92,200	61	460	Analyzed data for times of 2 to 35 minutes.
24S.2E.17.322 (EBID well 3)	07-12-76	180-464	190	30.3	10,900	81,600	57	430	Analyzed data for times of 1 to 793 minutes.
	03-12-77	180-464	190	13.9	11,600	86,900	61	460	Analyzed data for times of 1 to 15 minutes.

Table 2. Summary of hydraulic properties of the Santa Fe Group in the vicinity of the Elephant Butte Irrigation District wells - Continued

PART I.--SINGLE-WELL AQUIFER TESTS - concluded

Pumping well number	Date test began	Perforated interval (feet)	Sand thickness (feet)	Total length (hours)	Transmissivity ft^2/day	Transmissivity (gal/day)/ft	Average hydraulic conductivity ft/day	Average hydraulic conductivity (gal/day)/ft	Remarks
24S.2E.17.423a (EBID well 1)	07-24-73	310-680	250	55.0	17,400	130,000	64	480	Step-drawdown test.
	07-12-76	310-680	250	384.0	12,900	96,400	52	390	Analyzed data for times of 2 to 175 minutes.
	02-04-77	310-680	250	164.0	12,000	90,100	48	360	Analyzed data for times of 4 to 186 minutes.
	02-16-78	310-680	250	7.2	12,600	92,100	50	380	Analyzed data for times of 3 to 430 minutes.
24S.2E.21.123 (EBID well 4)	07-31-75	±170-480	240	28.5	21,100	158,000	88	660	Analyzed data for times of 2-1/2 to 229 minutes.
	07-12-76	±170-480	240	385.1	20,100	150,000	84	620	Analyzed data for times of 2-1/2 to 1,808 minutes.

Table 2. Summary of hydraulic properties of the Santa Fe Group in the vicinity of the Elephant Butte Irrigation District wells - Concluded

PART II.--ESTIMATED VERTICAL HYDRAULIC CONDUCTIVITY FROM AQUIFER TESTS

Pumping well	EBID well 1	EBID well 1	EBID well 2	EBID well 2	EBID well 2	EBID well 3
Perforated interval of pumping well (feet)	310-680	310-680	180-460	180-460	180-460	180-464
Observation wells	24S.2E.17.423c 24S.2E.17.423d	24S.2E.17.423c 24S.2E.17.423d	24S.2E.7.234 24S.2E.7.234b	24S.2E.7.234 24S.2E.7.234b	24S.2E.7.234 24S.2E.7.234a	24S.2E.17.414a 24S.2E.17.414b
Perforated interval of observation wells (feet)	302-307 113-118	302-307 113-118	305-310 75-80	305-310 75-80	305-310 120-125	292-297 607-612
Date of test	02-04-77	02-16-78	02-10-77	02-22-78	02-22-78	03-08-77
Tested interval (feet)	118-310	118-310	80-180	80-180	125-180	464-607
Total thickness of confining unit (feet)	192	192	100	100	55	143
Total thickness of clay in confining unit (assumed 40 percent of above) (feet)	78	78	40	40	22	57
Assumed transmissivity of aquifer (feet squared per day)	16,700	16,700	13,000	13,000	13,000	16,700
(gallons per day per foot)	125,000	125,000	95,000	95,000	95,000	125,000

Assumed horizontal hydraulic conductivity of aquifer (feet per day)	67	67	64	64	64	67
(gallons per day per foot)	500	500	480	480	480	500
Assumed storage coefficient of aquifer	0.001	0.001	0.001	0.001	0.001	0.001
Time since pumping began (minutes) (for Neuman and Witherspoon (1972) calculations)	18	21.25	22	14.5	7.75	168
Vertical hydraulic conductivity of total thickness of confining unit:						
(feet per day)	3.0	1.25	0.46	0.63	0.36	0.21
(gallons per day per square foot)	22.5	9.34	3.43	4.68	2.69	1.57
Vertical hydraulic conductivity of clay layers in confining unit (assumed 40 percent of total thickness)						
(feet per day)	0.30	0.21	0.07	0.10	0.06	0.03
(gallons per day per square foot)	2.26	1.54	0.55	0.75	0.43	0.21

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells

EXPLANATION

Well number.--See explanation of numbering system in text. Well locations shown on figure 2.

Main geologic unit.--Main unit penetrated and furnishing water to well: Qal, flood-plain alluvium; QTs, Santa Fe Group; ?, questionable.

Altitude.--Altitudes were extrapolated from U.S. Geological Survey topographic maps. Datum is sea level.

Depth of well.--Reported by well driller or well owner, or in rare instances, measured during this study: ±, approximate depth; +, depth greater than figure listed; ?, questionable.

Water level.--Measured depth to water below land surface: R, reported depth; A, pumping water level. See table 5 for additional measurements.

Yield.--R, reported; other values are measured. See table 5 for additional measurements.

Specific capacity.--Yield divided by drawdown. E, estimated value based on assumed static water level.

Onsite specific conductance.--Measured in field with portable meter. See table 5 for additional measurements.

Lift and power.--T, turbine pump; J, jet pump; S, submersible pump; NG, natural gas; LP, liquid gas; E, electric; N, none.

Use of water.--I, irrigation; D, domestic; N, not used; Ind, industrial; P, public supply.

Remarks.--Driller's name given where known; csg, casing diameter; PI, perforated interval.

* Chemical analyses of water from the well given in table 4.

** Additional water level, yield, specific conductance, or temperature information listed in table 5.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
23S.1E.35.442	Stahmann Farms, Inc.	80	Qal	3,879	50.7 A	09-27-72
					27.2	10-31-72
					36.1	05-05-75
					19.3	01-13-76
23S.1E.35.444	do.	410	QTs	3,879	22.0 R	02- -76
					88.0 AR	02- -76
					157.7 A	09-16-77
					123.2 A	04-10-78
23S.1E.36.324	J. Richardson	225	Qal	3,881	49.3 A	05-29-73
			QTs		20.8	01-13-76
23S.2E.32.133	-	-	-	3,878	21.8	11-24-72
					48.4 A	02-28-75
					20.0	02-02-76
23S.2E.32.144	Oscar Lytton	225	QTs	3,874	-	-
23S.2E.32.144a	do.	64	Qal	3,875	23.3	11-28-72
23S.2E.32.333	J. Burris	210	QTs	3,877	-	-
23S.2E.32.423	Jornada Water Co., Inc.	320	QTs	3,875	-	-
24S.1E.1.111	Stahmann Farms, Inc.	532	QTs	3,879	117.1 A	04-10-78
24S.1E.1.114	do.	-	QTs	3,877	23.8	03-28-78
					24.4	04-04-78
					93.5 A	04-10-78
					98.7 A	06-01-78

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
1,400	09-27-72	59.8 E	1,800	18	09-27-72	T,E	I	Csg 16-in.
			2,200	19	05-05-75			
			2,000	17.5	10-17-75			
-	-	-	400	-	02- -76	T,E	I	Well No. 3;
2,000R	02- -76	30. E	600	17.5	07-01-77			Csg 16-in;
1,820	09-16-77	13 E	740	17.5	07-12-78			R.L. Guffey & Sons;*
1,500	04-10-78	-	860	17.5	09-28-78			
1,190	05-29-73	44 E	1,900	19	05-29-73	T,NG	I	Csg 16-in.
-	-	-	2,200	18	02-28-75	T,NG	I	-
1,070	02-28-75	36.9	1,800	18	10-02-75			
-	-	-	500	17	11-28-72	-,E	D	-
1,050	06-07-73	-	1,750	19.5	06-07-73	T,NG	I	Csg 16-in.
-	-	-	510	17	11-27-72	S,E	D	-
-	-	-	550	18	11-27-72	T,E	P	Schleffer Drlg. Co;*
-	-	-	560	18	07-01-77	T,E	I	Well No.4; csg 16-in;blank
			660	17.5	04-10-78			0-170ft; slotted 170-532ft
-	-	-	560	17.5	04-10-78	T,E	I	Well No. 5; R.L. Guffey
			580	18	06-01-78			& Sons; csg 18-in.
2,270	04-10-78	32.8	580	18	07-12-78			
2,420	06-01-78		710	18	08-09-78			

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.1E.1.143a	Stahmann Farms, Inc.	599	QTs	3,877	89.8 A	09-16-77
					22.9	02-28-78
					22.9	04-04-78
					96.9 A	04-10-78
24S.1E.1.423	-	-	-	3,872	16.1	02-10-72
					19.8	01-10-78
24S.1E.1.424a	-	180	QTs	3,876	-	-
24S.1E.2.212	Stahmann Farms, Inc.	100	Qal	3,878	53.6 A	09-29-72
			QTs		22.9	10-31-72
24S.1E.2.212a	do.	690	QTs	3,878	25.6	08-19-77
					76.0 A	09-23-77
					22.0	03-28-78
					22.4	04-04-78
24S.1E.11.422	Tony Salopek	590	QTs	3,865	15.0	03-28-78
					15.7	04-04-78
					20.5	04-10-78
24S.1E.12.313	-	-	Qal(?)	3,864	9.0	10-25-72
					5.8	01-14-76
24S.1E.12.341	-	140	Qal	3,864	7.0	10-30-72
			QTs		6.6	01-09-76

Yield									
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
2,140	09-16-77	30 E	510	18	09-16-77	T,E	I	Well No.6; R.L. Guffey & Sons; *
			500	17.5	04-10-78			
			520	17.5	08-09-78			
2,210	04-10-78							
1,790	03-01-73	-	-	-	-	T,NG	I	Csg 16-in.
-	-	-	800	17.5	10-30-72	J,E	D	Pl 175-180 ft.
			480	19	02-22-77			
-	-	-	1,750	17	09-29-72	T,NG	I	Well No. 2.
			1,700	17.5	05-05-75			
			1,700	17	10-17-75			
-	-	-	480	18	09-23-77	T,E	I	Well No.1; R. L. Guffey & Sons.
			480	18	06-01-78			
-	-	-	-	-	-	T,-	I	R. L. Guffey and Sons.
-	-	-	-	-	-	T,NG	I	Csg 18-in.
-	-	-	-	-	-	T,NG	I	Csg 16-in.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.1E.13.221	Elephant Butte Irrigation District	704	QTs	3,862	-	-
24S.1E.13.221a	do.	370	QTs	3,863	11.2	07-31-75
					109.3 A	08-01-75
					13.0	12-22-78
24S.1E.13.234	Stahmann Farms, Inc.	-	-	3,864	84.5 A	09-23-77
					90.6 A	04-10-78
24S.1E.13.411	do.	210	QTs	3,875	18.9	01-15-76
					23.9	03-28-78
					24.4	04-04-78
					104.0 A	04-10-78
24S.1E.13.421	do.	-	-	3,863	52.0 A	05-09-73
					5.7	01-15-76
24S.1E.13.424	do.	-	-	3,862	-	-
24S.1E.13.441	do.	-	-	3,873	17.4	01-15-76
					109.2 A	09-16-77
24S.2E.3.323	A. F. Bowers	300	QTs	3,940	-	-

Yield									
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	500	-	03-15-73	N,N	N	K.C. Wheeler Drlg. Co.; test hole for well 24S.1E.13.221a;Geophysical logs and water sample analyses available;conductances from following intervals, 165-181ft, 354-375ft,522-543ft,627-648ft.
			450		03-15-73			
			470		03-15-73			
			500		03-15-73			
-	-	-	490	21	08-01-75	T,E	I	EBID No.5;R.L.Guffey&Sons; 24-in cemented surface casing; csg 0-135 ft; csg 16-in; blank 0-145 ft; mill slotted 145-370 ft; *; **
2,380	08-01-75	24.2	530	18	08-08-78			
-	-	-	700	20.5	09-23-77	T,E	I	Well No. 26.
1,390	04-10-78	-	720	17.5	04-10-78			
-	-	-	900	18.5	04-10-78	T,E	I	Well No. 8.
570	04-10-78	7.2	-	-	-	-	-	-
1,000	05-09-73	23 E	720	18	05-09-73	T,E	I	Well No. 27; csg 16-in.
			950	20	09-23-77			
			1,260	20	04-10-78			
-	-	-	1,000	17	04-10-78	C,E	I	Well No. 28.
-	-	-	-	-	-	-	-	-
1,350	09-16-77	15 E	800	19	09-16-77	T,D	I	
-	-	-	500	-	12-01-72	J,E	D	-

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.3.332	Hobbs	255	QTs	3,920	-	-
24S.2E.3.343	Salopek	240	QTs	3,920	-	-
24S.2E.3.344	Tony Salopek	240±	QTs	3,924	85.2	11-29-72
24S.2E.3.414	Villa Sol Mobile Homes	350	QTs	3,965	119.8	11-29-72
24S.2E.3.434	do.	550	QTs	3,964	119.8	11-29-72
24S.2E.4.112	-	-	-	3,866	23.8	11-29-72
24S.2E.4.211	Holy Cross Retreat	-	-	3,876	53.2 A 30.4	09-19-72 11-28-72
24S.2E.4.211a	do.	314	QTs	3,877	-	-
24S.2E.4.224	-	-	-	3,920	76.8	11-28-72
24S.2E.4.312	Beyer	300	QTs	3,860	-	-
24S.2E.4.313	-	160	Qal QTs	3,866	16.9 41.7 A 19.0	02-10-72 05-16-72 01-09-73
24S.2E.4.341	-	-	-	3,863	17.2	01-13-76
24S.2E.5.111	Taylor	80	Qal	3,875	23.4	11-27-72
24S.2E.5.232	-	80	Qal	3,876	19.9	11-27-72
24S.2E.5.423	Elmer Beyer	105	QTs	3,867	-	-

Yield									
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	490	19	11-29-72	-	D	F. Johnson.
1,080	09-19-72	-	2,900	19.5	09-19-72	T,E	I	Morrison.
1,550	10-10-72	-	1,600	20.5	10-10-75	T,E	I	*
-	-	-	850	23	08-06-73	S,E	P	R. L. Guffey & Sons.
-	-	-	980	24	08-06-73	S,E	P	R. L. Guffey & Sons.
-	-	-	-	-	-	T,NG	I	-
680	09-19-72	29.8	2,100	18	09-19-72	T,E	I	Csg 16-in; *
-	-	-	560	18	11-28-72	S,E	D	-
-	-	-	-	-	-	T,E	I	-
-	-	-	480	-	11-27-72	-	D	-
-	-	-	-	-	-	-	-	*; **; ***
1,220	05-16-72	49.2	-	18	05-16-72	T,NG	I	-
-	-	-	-	-	-	T,-	I	-
1,470	09-27-72	-	2,100	18	09-27-72	T,NG	I	Csg 16-in.
-	-	-	-	-	-	T,NG	I	Csg 12-in.
-	-	-	1,700	-	11-27-72	-,E	D	-

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.5.433	-	-	-	3,867	15.3	01-13-76
24S.2E.6.223	-	80	Qal	3,877	22.6	11-27-72
24S.2E.6.422	Benny Lopez	100	Qal QTs	3,871	-	-
24S.2E.6.424	S. W. Bell	123	QTs	3,870	-	-
24S.2E.6.441	-	124	Qal QTs	3,869	23.2 18.4	10-31-72 01-14-76
24S.2E.7.114	Frank Salopek	166	Qal QTs	3,872	18.8	10-30-72
24S.2E.7.122	do.	-	Qal QTs?	3,872	19.6 15.4	10-30-72 01-14-76
24S.2E.7.124	do.	200±	Qal QTs	3,869	18.8 15.3	02-22-78 04-10-78
24S.2E.7.231	Elephant Butte Irrigation District	460	QTs	3,870	16.0 100.4 A 22.1	07-31-75 08-01-75 12-22-78
24S.2E.7.234	U.S. Geological Survey	310	QTs	3,871	18.4 24.6	09-30-76 12-22-78

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	-	-	-	I,-	I	-
-	-	-	-	-	-	T,NG	I	Csg 16-in.
900	05-12-75	-	1,900	19.5	05-12-75	T,NG	I	Csg 14-in.
1,500 R	-	-	-	-	-	T,-	I	Csg 14-in. perforated 106-123 ft.
-	-	-	-	-	-	T,NG	I	Csg 16-in.
-	-	-	-	-	-	T,NG	I	Csg 16-in.
-	-	-	-	-	-	T,NG	I	Csg 18-in. with 16-in liner.
-	-	-	-	-	-	T,-	I	-
- 2,680	- 08-01-75	- 31.7	- 470 640	- - 18.5	- 08-01-75 08-08-78	T,E	I	EBID No.2; R.L. Guffey & Sons; 24-in. cemented surface csg 0-170ft; csg 16-in.; blank 0-180ft; mill slotted 180-460 ft; *; **
-	-	-	510 450	- 20	02-16-77 09-13-78	N,N	O	Johnson Drlg. Co.; csg 2-in. PVC; screened 305-310 ft; *; **

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.7.234a	U.S. Geological Survey	310 (125)	QTs	3,871	17.3 25.3	09-30-76 12-22-78
24S.2E.7.234b	do.	80	QTs	3,871	16.8 25.7	09-30-76 12-22-78
24S.2E.7.314	Tony Salopek	220	Qal QTs	3,869	15.6 10.7 21.0 24.2	10-31-72 01-14-76 03-28-78 04-04-78
24S.2E.7.331	do.	-	-	3,865	-	-
24S.2E.7.334	do.	200	QTs	3,867	14.7	10-10-72
24S.2E.7.334a	do.	-	-	3,864	-	-
24S.2E.7.341	do.	462	QTs	3,865	68.8 A 18.7 25.2	02-08-78 02-22-78 03-27-78
24S.2E.8.113	Ramona Enriquez	180	Qal QTs	3,867	-	-

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	680	19.5	08-20-76	N,N	O	Johnson Drlg. Co.;csg 2-in. PVC; screened 120-125 ft; csg installed in same hole as well 24S.2E.7.234 with "crusher fines" used as grout between screened intervals; *; **
			1,170	19.5	09-13-78			
-	-	-	2,000	21	08-09-76	N,N	O	Johnson Drlg. Co.; csg 2-in. PVC; screened 75-80 ft; *; **
			1,750	20	09-13-76			
940	03-25-75	-	2,750	18.5	03-25-75	T,E	I	-
			1,800	-	09-05-75			
1,950	03-25-75	-	1,330	19.0	03-25-75	T,E	I	-
1,500	02-08-78							
-	-	-	460	18.5	10-10-72	T,E	D	Cemented csg 0-100 ft; csg 6-in.
			480	-	02-08-78			
1,600	03-25-75	-	2,050	19.5	03-25-75	T,E	I	-
2,950	02-08-78	59 E	540	18	02-08-78	T,E	I	R. L. Guffey & Sons; csg 16-in; blank 0-150ft; mill slotted 150-464 ft; *; **
			540	18	06-01-78			
			540	18.5	07-11-78			
			540	18.5	08-18-78			
-	-	-	490	-	11-27-72	J,E	D	Floyd Johnson, driller.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.8.114	Chaves	214	Qal	3,867	48.8 A	09-29-72
			QTs		20.5	10-31-72
					55.5 A	05-12-75
24S.2E.8.141	do.	-	Qal	3,865	50.4 A	09-29-72
			QTs		19.7	10-31-72
24S.2E.8.144	A. A. Enriquez	-	-	3,864	13.4	01-08-76
24S.2E.8.411	Ramona Enriquez	-	-	3,863	-	-
24S.2E.8.413a	Fred Huff	-	-	3,862	-	-
24S.2E.8.413b	do.	147	Qal	3,862	-	-
			QTs			
24S.2E.8.434	W. A. Buchanan	140	QTs	3,863	-	-
24S.2E.8.434a	U.S. Bureau of Reclamation	18	QTs	3,862	-	-
24S.2E.8.444	-	-	-	3,858	13.1	01-09-76
24S.2E.9.142	L'eggs Products, Inc	510	QTs	3,859	31.2	06-28-73
24S.2E.9.142a	do.	118	Qal	3,859	18.2	03-09-72
			QTs		20.9	02-26-73
					18.5	02-20-74
					16.2	01-07-75

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
1,390	09-29-72	49.1	1,300	18	09-29-72	T,NG	I	Csg 18-in.
			1,360	18.5	04-22-75			
1,030	05-07-75	-	1,250	18.5	05-07-75			
1,500	09-29-72	48.9	1,950	18	09-29-72	T,NG	I	Csg 18-in.
1,840	06-19-75		1,750	19.5	06-19-75			
2,100	03-31-75	-	2,500	18.5	03-31-75	T,NG	I	Csg 20-in; *
1,860	05-07-75		2,000	18.5	05-07-75			
			2,000	19.5	06-19-75			
-	-	-	500	-	11-27-72	-,E	D	Floyd Johnson; *
-	-	-	1,020	21	05-08-73	J,E	D	-
-	-	-	1,400	21	05-08-73	T,NG	I	J. Morrison; *
-	-	-	680	21	05-08-73	-,E	D	Schieffer Drlg. Co.
-	-	-	-	-	-	N,N	O	Observation well #13; Records available from Bureau of Reclamation.
-	-	-	-	-	-	T,-	I	-
-	-	-	-	-	-	T,E	Ind	*
-	-	-	-	-	-	N,N	N	-

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level	
					Depth below land surface (feet)	Date measured
24S.2E.9.142b	L'eggs Products, Inc.	40	Qal	3,859	20.1	09-29-72
24S.2E.9.311	Ramona Enriquez	60	Qal	3,860	17.8	11-27-72
					13.6	01-14-76
24S.2E.9.333a	J. O. Charles	145	Qal	3,858	16.7	11-27-72
			QTs		17.1	04-30-73
24S.2E.9.344	Pearl Crossett	60	Qal	3,856	-	-
24S.2E.9.414	Bob Black	50	Qal	3,859	-	-
24S.2E.9.424	-	-	-	3,859	19.4	11-29-72
					16.6	01-13-76
					16.4	03-04-76
24S.2E.9.433	U.S. Bureau of Reclamation	-	QTs	3,858	-	-
24S.2E.9.434a	Frank Salopek	-	QTs	3,857	13.1	02-24-72
					12.9	02-02-76
24S.2E.9.442	Fox	140	Qal	3,858	36.2 A	01-24-74
			QTs		37.0 A	02-15-74
24S.2E.10.122	John Salopek	240	QTs	3,922	119.8 A	09-19-72
					80.8	11-29-72
24S.2E.10.213	do.	240	QTs	3,922	131.0 A	09-19-72
					80.3	11-29-72
					78.5	01-13-76

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	-	-	-	S,E	Ind	-
-	-	-	-	-	-	T,NG	I	-
-	-	-	-	-	-	T,NG	I	Schieffer Drlg. Co.; csg 16-in; *
-	-	-	1,650	-	04-30-73	J,E	D	-
-	-	-	2,450	-	01-02-74	J,E	D	-
-	-	-	-	-	-	T,NG	I	Csg 18-in.
-	-	-	-	-	-	N,N	O	Observation well No. 14; Records available from Bureau of Reclamation.
-	-	-	-	-	-	T,NG	I	-
1,070 1,280	01-24-74 02-15-74	51 E	1,720 1,800	18 18	01-24-74 02-15-74	T,NG	I	Csg 16-in.
1,300	09-19-72	33	2,650	20.5	09-19-72	T,E	I	Bill Greenwood; csg 16-in.
1,590	09-19-72	31	2,050	21	09-19-72	T,E	I	Bill Greenwood; csg 16-in.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.10.214	John Salopek	-	QTs	3,934	86.8	01-13-76
24S.2E.10.312	-	-	-	3,873	33.1 30.4	11-29-72 01-13-76
24S.2E.10.314	M. A. Romney	80	Qal	3,860	-	-
24S.2E.14.122	Mrs. C. K. Priestley	512	QTs	3,923	101.2 143.8 A 101.1	03-08-72 09-18-72 03-31-76
24S.2E.15.132	Charlie Bird	114	Qal QTs	3,856	34.2 A 13.8	01-02-74 01-13-76
24S.2E.15.231	do.	120	Qal QTs	3,855	-	-
24S.2E.15.231a	U.S. Geological Survey	704	QTs	3,855	20.6	04-05-74
24S.2E.15.324	Bullard	150	Qal QTs	3,856	53.0 A	05-02-73
24S.2E.15.342	do.	150	QTs	3,855	-	-
24S.2E.16.111	J. O. Charles	130	QTs	3,857	-	-
24S.2E.16.224	Fox	190	Qal QTs	3,856	-	-

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	-	-	-	T,-	I	-
-	-	-	-	-	-	T,D	I	Csg 16-in.
-	-	-	1,000	-	01-02-74	J,E	D	-
-	-	-	-	-	-	-	-	Csg 16-in; slotted
1,290	09-18-72	30	1,390	24	09-18-72	T,E	I	160-512 ft; *
1,130	01-02-74	61	1,830	18	01-02-74	T,E	I	Csg 16-in.
1,030	01-02-74	-	1,900	18	01-02-74	T,E	I	Csg 16-in.
-	-	-	670	19.5	04-05-74	N,N	N	Test hole; water samples
			580	19.5	04-05-74			taken at following
			480	17	04-05-74			intervals, 287-308 ft,
								463-484 ft, 671-692 ft; *
1,580	05-02-73	43 E	1,140	19	05-02-73	T,NG	I	Csg 14-in.
-	-	-	730	-	01-02-74	J,E	D	Csg 4-in.
-	-	--	2,000	20	04-30-73	J,E	D	-
1,350	02-15-74	-	870	18	02-15-74	T,NG	I	Csg 16-in; slotted
			980	18.5	03-31-75			90-190 ft; Floyd Johnson.
			1,200	20	09-16-77			

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.16.322	David Salopek	307	QTs	3,856	-	-
24S.2E.16.343	Jess Richardson	187	Qal QTs	3,856	-	-
24S.2E.16.431	F. J. Crowson	150	Qal QTs	3,856	48.5 A 14.0	10-03-72 01-13-76
24S.2E.16.431a	Crowson and Koenig	450	QTs	3,856	43.0 A	03-19-77
24S.2E.16.442	-	136	Qal QTs	3,856	19.4 15.0	04-30-73 01-13-76
24S.2E.17.111	John Salopek	180	Qal QTs	3,864	17.2 13.2	11-27-72 01-09-76
24S.2E.17.111a	do.	380	QTs	3,864	18.8 104.5 A 31.9	02-22-78 04-08-78 06-01-78
24S.2E.17.214	David Salopek	420	QTs	3,862	17.5 89.4 A 81.0 A	02-07-78 04-10-78 06-01-78
24S.2E.17.221a	Mrs. Paula Singh	-	Qal QTs?	3,864	37.6 A 19.4	08-11-72 11-27-72
24S.2E.17.222	do.	90	QTs	3,858	-	-

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	540	21	05-08-73	-,E	D	Schieffer Drlg. Co.; perforated 250-307 ft; *
-	-	-	1,700	18	10-03-72	T,-	I	-
1,530	10-03-72	50	1,700	18	10-03-72	N,N	N	Abandoned.
1,120 1,760 2,000	03-09-77 03-10-77 02-10-78	-	510 520 460 780	18.5 19 18.5 18	03-09-77 06-29-77 02-10-78 04-10-78	T,NG	I	Csg 16-in; blank 0-200ft; mill slotted 200-450 ft.
-	-	-	-	-	-	T,D	I	Csg 18-in.
910	10-03-72	-	2,500	18	10-03-72	N,N	N	Csg 16-in; abandoned.
- 2,630	- 04-08-78	- 31	- 760 620	- 18 18.5	- 04-08-78 08-11-78	- T,E	- I	R.L. Guffey & Sons; csg 16-in; blank 0 to about 150 ft; mill slotted 150± ft - 380 ft; **
- 2,830	- 04-10-78	- 39	- 1,600 800 1,050	- 18 18 18	- 04-10-78 06-21-78 06-21-78	- T,-	- I	R.L. Guffey & Sons; csg 16-in; blanked 0 to about 120 ft; mill slotted 120± ft to bottom; **
1,400	08-11-72	77	1,250	19	08-11-72	T,-	I	-
-	-	-	2,000	21	04-30-73	J,E	D	-

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.17.223	David Salopek	300	QTs	3,864	19.8 18.0	10-03-72 11-27-72
24S.2E.17.321	K. Sutherlin	-	-	3,860	-	-
24S.2E.17.322	Elephant Butte Irrigation District	464	QTs	3,860	14.6 107.6 A 19.0	07-31-75 08-01-75 12-22-78
24S.2E.17.412	David Salopek	-	-	3,860	-	-
24S.2E.17.413	J. & K. Sutherlin	90	Qal QTs	3,858	43.3 A 10.4 13.6	05-08-73 03-08-74 12-22-78
24S.2E.17.413a	Reldon Beck	60	Qal	3,860	-	-
24S.2E.17.413b	do.	180	QTs	3,860	-	-
24S.2E.17.414a	U.S. Government	312	QTs	3,858	10.8 16.2	09-10-76 12-22-78
24S.2E.17.414b	do.	618	QTs	3,858	16.7 18.8	09-10-76 12-22-78

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	920	18.5	03-08-77	T,E	I	Csg 16-in; blank 0-150 ft;
			810	19	06-21-78			slotted 150-300 ft; **
-	-	-	1,900	21	05-08-73	-,E	D	-
-	-	-	-	-	-	T,E	I	EBID No. 3; R.L. Guffey &
3,050	08-01-75	33	550	20	08-01-75			Sons; 24-in cemented
			575	18.5	08-08-78			surface csg 0-170± ft; csg
								16-in;blank 0-180± ft;mill
								slotted 180± - 464ft;*;**
-	-	-	1,450	20	05-02-73	-,E	D	-
1,560	05-08-73	50	2,500	20	05-07-73	T,-	I	**
-	-	-	2,000	-	05-02-73	J,E	I	-
-	-	-	500	-	05-02-73	J,E	D	-
-	-	-	460	17.5	09-17-76	N,N	O	Johnson Drlg. Co.; csg
			470	19	09-13-78			2-in PVC; screened
								292-297 ft; *; **
-	-	-	460	20	08-26-78	N,N	O	Johnson Drlg. Co.; csg
			470	19	09-13-78			2-in PVC; screened
								607-612 ft; *; **

Table 3. Records of selected wells in vicinity of Elephant [te Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.17.423	Elephant Butte Irrigation District	1,210	QTs	3,858	-	-
24S.2E.17.423a	do.	686	QTs	3,858	11.4 103.0 A 16.2	07-21-73 07-25-73 12-22-78
24S.2E.17.423b	U.S. Government	599	QTs	3,858	16.0 18.3	09-30-76 12-22-78
24S.2E.17.423c	do.	310	QTs	3,858	11.3 16.4	09-30-76 12-22-78
24S.2E.17.423d	do.	121	QTs	3,858	9.1 15.4	09-30-76 12-22-78
24S.2E.17.423e	do.	35	Qal	3,858	7.8 15.4	09-30-76 12-22-78

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	900	19	02-27-73	-	-	K.C. Wheeler Drlg. Co.; test hole for well 24S.2E.17.423a; geophysical logs and water sample analyses available; conductances from following intervals, 106-126 ft, 316-336 ft, 652-672 ft, 883-905 ft, 1,177-1,197 ft; *
			560	19	02-27-73			
			530	20	02-27-73			
			510	18.5	02-27-73			
			540	18.	02-27-73			
-	-	-	470	19	08-01-75	T,E	I	R.L. Guffey & Sons; 26-in cemented surface csg 0-286 ft; csg 18-in blank 0-310 ft; 16-in mill slotted 310-680 ft; *; **; EBID well 1.
3,600	07-25-73	39	470	19	08-08-78			
-	-	-	460	20	09-17-76	N,N	O	Johnson Drlg. Co.; csg 2-in PVC; screened 591-596 ft; *; **
			470	22	09-13-78			
-	-	-	460	18	09-10-76	N,N	O	Johnson Drlg. Co.; csg 2-in PVC; screened 302-307 ft; *; **
			480	23.5	09-13-78			
-	-	-	980	18	09-10-76	N,N	D	Johnson Drlg. Co.; csg 2-in PVC; screened 113-118 ft; *; **
			1,110	21	09-13-78			
-	-	-	2,600	17.5	09-10-76	N,N	O	Johnson Drlg. Co.; csg 2-in PVC; screened 30-35 ft; *; **
			730	26	09-13-78			

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.17.424	Jess Richardson	400	QTs	3,858	10.9	05-02-73
					14.0	02-08-77
24S.2E.18.224	John Salopek	90	Qal	3,862	17.2	11-27-72
			QTs		13.8	01-14-76
					20.1	03-27-78
					19.7	04-04-78
24S.2E.18.242	do.	220	QTs	3,862	26.2	03-27-78
					28.3 A	03-27-78
					37.2	04-08-78
24S.2E.18.243	J. & K. Sutherlin	176	Qal	3,864	16.0	02-10-72
			QTs		18.8	04-10-78
24S.2E.18.244	do.	199	Qal	3,864	12.8	07-30-75
			QTs		46.7 A	07-30-75
					20.2	05-23-78
24S.2E.18.312	-	-	-	3,863	8.0	01-15-76
24S.2E.19.111	Stahmann Farms, Inc.	558	QTs	3,860	93.1 A	08-16-77
					19.1	09-16-77
					98.5 A	07-12-78
24S.2E.19.112	do.	104	Qal	3,862	9.4	02-24-72
			QTs		10.2	02-26-73
					8.9	02-19-74
					7.5	01-07-75
24S.2E.19.114	do.	121	Qal	3,862	-	-
			QTs			

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	520		05-02-73	T,E	D	Boyd Drlg. Co.; csg 4-in; *; **
2,020	10-03-72	-	2,600	18	10-03-72	T,NG	I	Csg 18-in; *
-	-	-	630	18	10-03-72	J,E	D	*
-	-	-	1,020	20	06-29-77	T,E	I	Csg 16-in; **
2,240 2,300	07-30-75 04-19-78	66	1,100 1,550 1,900	22 19 19.5	07-30-75 06-29-77 04-19-78	T,E	I	Schleffer Drlg. Co.; csg 16-in; blank 0-40 ft; mill slotted 40-199 ft; *; **
2,570	06-05-75	-	950	18.5	06-05-75	T,E	I	-
2,510	08-16-77	34	650 700 690	18 18 18.5	08-16-77 07-12-78 08-18-78	T,E	I	Well No. 18; R.L. Guffey & Sons; csg 18-in; **
-	-	-	-	-	-	N,N	N	Abandoned.
-	-	-	-	-	-	T,-	I	Well No. 10.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.19.143	-	558	QTs	3,862	17.0	09-16-77
					18.0	03-27-78
					19.6	04-04-78
					99.2 A	04-10-78
24S.2E.19.222	-	-	-	3,857	9.6	01-15-76
24S.2E.19.233	Stahmann Farms, Inc.	-	-	3,858	-	-
24S.2E.19.413	do.	93	QTs	3,860	-	-
24S.2E.19.422	do.	577	QTs	3,855	79.2 A	08-26-77
					16.5	09-16-77
					22.9	04-04-78
					101.5 A	04-10-78
					95.9 A	07-12-78
24S.2E.19.441	do.	-	-	3,857	-	-
24S.2E.20.123	-	-	-	3,856	10.6	01-15-76
24S.2E.20.212	M. L. Roberts	-	-	3,857	-	-
24S.2E.20.213	do.	121	Qal QTs	3,857	-	-
24S.2E.20.231	T. B. White	168	QTs	3,856	-	-
24S.2E.20.234	New Mexico State Univ.	-	-	3,854	10.1	05-08-73
24S.2E.20.411	Stahmann Farms, Inc.	77	QTs	3,855	-	-

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	-	-	-	T,E	I	Well No. 11; R. L. Guffey & Sons.
2,190	04-10-78	28	730	18	04-10-78			
-	-	-	-	-	-	T,-	I	-
-	-	-	1,480 1,480	19 18	09-16-77 04-10-78	T,-	I	Well No. 19.
-	-	-	1,000	21	04-10-78	T,-	I	Well No. 12.
1,740	08-26-77	28	600 590	18.5 18	08-26-78 04-10-78	T,-	I	Well No. 20; R.L. Guffey & Sons; csg 18-in; **
1,990 2,450	04-10-78 09-08-78	20.	575 550 600	18.5 18.5 18	07-12-78 08-18-78 09-08-78			
1,880	09-23-77	-	770	19	09-23-77	T,NG	I	-
1,660	06-05-75	-	1,440	19	06-05-75	T,NG	I	-
-	-	-	620	-	05-02-73	C,E	D	*
-	-	-	1,750	20	05-02-73	C,E	I	-
-	-	-	480	19	10-10-72	J,E	D	Morales & Sons.
-	-	-	-	-	-	T,NG	I	-
-	-	-	950 1,050	18 20	03-31-75 08-18-78	T,NG	I	Well No. 29.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.21.112	A. Mestas	126	Qal QTs	3,855	35.5 A 14.7 14.0	10-03-72 03-18-74 02-16-78
24S.2E.21.122	Jess Richardson	300	QTs	3,854	-	-
24S.2E.21.123	Elephant Butte Irrigation District	480	QTs	3,855	10.3 81.6 A 15.0	07-31-75 08-01-75 12-22-78
24S.2E.21.131	New Mexico State Univ.	-	-	3,853	8.9	05-08-73
24S.2E.21.211	Jess Richardson	300	Qal? QTs	3,856	49.3 A	10-03-72
24S.2E.21.233	Mrs. W. H. Wheatley	120	Qal QTs	3,850	16.7	10-03-72
24S.2E.21.324	New Mexico State Univ.	175	QTs	3,849	-	-
24S.2E.21.421	Mrs. W. H. Wheatley	140	QTs	3,850	-	-
24S.2E.21.423	do.	160	Qal? QTs	3,850	10.5	01-12-76
24S.2E.21.433	New Mexico State Univ.	197?	Qal? QTs	3,849	14.3 9.8	05-02-73 01-13-76

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)		Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
1,430	10-03-72	84		1,230	19	10-03-72	T,LP	I	**
-	-	-		500	18.5	10-05-72	S,E	D	Schelffer Drlg. Co.; *
-	-	-		-	-	-	T,E	I	EBID No. 4; R.L. Guffey & Sons; 24-in cemented surface; csg 0-160 ft; csg 16-in; blank 0-170ft; mill slotted 170-480 ft; *; **
3,140	08-01-75	44		700	21	08-01-75			
				700	19	08-08-78			
-	-	-		-	-	-	T,NG	I	-
2,320	10-03-72	75	E	1,800	18	10-03-72	T,NG	I	Csg 16-in, blank 0-60 ft; slotted 60-300 ft.
				1,950	19	08-01-77			
380	10-09-72	-		900	19	10-09-72	T,E	I	Schieffer Drlg. Co.; csg 16-in; blank 0-51 ft; slotted 51-116 ft.
-	-	-		620	18	05-02-73	J,E	D	R. L. Guffey & Sons.
-	-	-		860	19	05-07-73	-,E	D	-
-	-	-		960	21	05-07-73	T,E	I	-
-	-	-		-	-	-	T,E	I	R. L. Guffey & Sons.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.22.132	Jess Richardson	196	Qal QTs	3,853	15.7 12.3	05-02-73 01-13-76
24S.2E.22.132a	Jess Richardson	-	QTs	3,854	-	-
24S.2E.22.141	Jess Richardson	-	Qal?	3,854	-	-
24S.2E.22.211	-	-	-	3,852	9.8	01-13-76
24S.2E.22.232	Everett Farms	200	Qal? QTs	3,851	13.5 10.2	05-02-73 01-13-76
24S.2E.22.242	U.S. Bureau of Reclamation	-	-	3,850	-	-
24S.2E.22.311	Campbell	191	QTs	3,851	42.0 A	05-08-73
24S.2E.22.331	Smith	130	Qal QTs	3,850	9.4	01-12-76
24S.2E.22.414	Jess Richardson	350	QTs	3,851	-	-
24S.2E.22.421	Everett Farms	242	QTs	3,851	-	-
24S.2E.23.112	-	90?	Qal	3,853	24.7 A 13.0	01-02-74 01-13-76
24S.2E.23.232	Ruben Gonzales	137	QTs	3,858	-	-

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	2,400	18	05-07-73	T,NG	I	Csg 18-in.
-	-	-	620	18.5	05-07-73	S,E	D	-
-	-	-	2,800	19	05-07-73	S,E	I	-
-	-	-	-	-	-	T,-	I	-
-	-	-	-	-	-	T,NG	I	R. L. Guffey & Sons.
-	-	-	-	-	-	N,N	O	Observation well No. 10; Records available from Bureau of Reclamation.
1,230	05-08-73	45 E	2,000	19	05-08-73	T,NG	I	R. L. Guffey & Sons; csg 18-in; blank 0-66 ft; slotted 66-191 ft.
-	-	-	970 1,100	18.5 18.5	08-11-72 09-07-75	T,NG	I	Csg 18-in.
-	-	-	610	19	10-05-72	J,E	D	Schieffer Drlg. Co.
-	-	-	950	18	05-02-73	C,E	D	Schieffer Drlg. Co.
2,320	01-02-74	198	3,000	17.5	01-02-74	T,NG	I	Csg 16-in.
-	-	-	1,200	-	05-09-73	J,E	D	Schieffer Drlg. Co.; perforated 127-137 ft.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.23.341	-	140	Qal QTs	3,848	12.6 15.7	02-24-72 04-04-78
24S.2E.26.113	Kenneth Walker	150	QTs	3,848	-	-
24S.2E.26.132	Fred Warren	45	Qal	3,846	-	-
24S.2E.26.134	Victor Koenig	356	QTs	3,845	12.2 57.0 A 12.2	09-06-72 10-16-72 01-12-76
24S.2E.26.322	-	-	-	3,843	11.4	01-09-76
24S.2E.27.214	-	-	-	3,849	-	-
24S.2E.27.231	B. Mitamura	-	-	3,848	12.2	01-12-76
24S.2E.27.243	do.	-	-	3,848	-	-
24S.2E.27.243a	do.	-	-	3,848	39.0 A 11.0	09-29-75 01-12-76
24S.2E.27.432	-	85	Qal	3,845	43.3 A 12.6	08-11-72 01-09-76
24S.2E.28.334	U.S. Bureau of Reclamation	-	Qal	3,851	-	-

Yield: Rate (gallons per minute)	Yield: Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	-	-	-	T,-	I	-
-	-	-	3,100	19.5	12-05-74	-,-	D	-
-	-	-	1,600	18.5	12-05-74	-,-	D	-
-	-	-	820 940	19.5 20.5	10-16-72 08-18-78	T,D	I	R. L. Guffey & Sons; csg 16-in; blank 0-150 ft; mill slotted 150-356 ft.
900	04-22-75	-	1,000	18.5	04-22-75	T,LP	I	Csg 16-in.
1,820 1,500	11-14-73 09-29-75	-	1,340 1,120 1,000	18.5 19.0 19.0	11-14-73 03-31-75 09-29-75	T,NG	I	Csg 16-in.
1,300	05-12-75	-	900	21.0	05-12-75	T,LP	I	-
-	-	-	2,200	-	05-02-73	J,E	D	-
2,400	09-29-75	86	1,200	19.5	09-29-75	T,NG	I	-
1,890 1,470	08-11-72 05-07-75	63	1,950 2,200	19 18.5	08-11-72 05-07-75	T,NG	I	-
-	-	-	-	-	-	N,N	O	Observation well No. 8; records available from Bureau of Reclamation.

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level: Depth below land surface (feet)	Water level: Date measured
24S.2E.29.114	Stahmann Farms, Inc.	608	QTs	3,857	20.8	09-23-77
24S.2E.29.213	do.	83	Qal	3,859	-	-
24S.2E.29.224	do.	606	QTs	3,855	20.7	08-19-77
					70.5 A	09-20-77
					75.8 A	06-01-78
24S.2E.29.312	do.	563	QTs	3,856	18.3	03-28-78
					17.1	04-04-78
					95.6 A	04-10-78
24S.2E.29.423	do.	506	QTs	3,854	24.7	08-16-77
					70.8 A	09-16-77
					19.5	03-27-78
					18.0	04-04-78
					83.8 A	04-10-78
24S.2E.29.434	Sutherlin	-	-	3,852	-	-
24S.2E.32.244	do.	-	-	3,850	-	-
24S.2E.32.424	Stahmann Farms, Inc.	559	QTs	3,845	71.2 A	04-10-78
24S.2E.33.313	do.	90	Qal	3,845	-	-

Yield									
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	-	-	-	T,E	D	R.L. Guffey & Sons; csg 12 3/4-in; blank 0-150 ft; 8 5/8-in csg, 150-603 ft with screened intervals at 393-493ft,513-523ft,533-553 ft, 573-583 ft, 593-603 ft.
-	-	-	2,200	18	09-16-77	T,NG	I	Well No. 22.
			2,200	17.5	04-10-78			
-	-	-	-	-	-	T,E,	I	Well No. 24; R.L. Guffey & Sons; csg 18-in; **
2,530	09-20-77	51	560	18.5	09-20-77			
2,450	06-01-78		580	18	04-10-78			
			560	18.5	07-12-78			
-	-	-	600	19	09-02-77	T,E,	I	Well No. 14; R.L. Guffey & Sons.
2,000	04-10-78	26	600	18.5	04-10-78			
-	-	-	-	-	-	T,E	I	Well No. 25; R.L. Guffey & Sons.
2,620	09-16-77	57	600	19	09-16-77			
2,340	04-10-78	36	615	18.5	04-10-78			
2,140	10-10-72	-	760	23	10-10-72	T,NG	I	Csg 14-in.
-	-	-	800	22	10-10-72	T,NG	I	-
2,040	04-10-78	-	580	19	04-10-78	T,E	I	WellNo.15;R.L.Guffey&Sons.
-	-	-	870	22	09-23-77	T,-	I	-
			870	20.5	04-10-78			

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Continued

					Water level	
Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Depth below land surface (feet)	Date measured
24S.2E.33.422	Sutherlin	582	QTs	3,841	18.3	04-04-78
					28.3	04-10-78
					19.5	04-19-78
					18.4	04-26-78
					25.3	06-01-78
24S.2E.34.133	-	-	-	3,844	9.0	0:-12-76
24S.2E.34.442	-	-	-	3,838	11.8	02-15-72
					13.1	02-26-73
					10.4	02-20-74
					9.3	01-08-75
					9.2	01-09-76
24S.2E.35.114	Victor Koenig	370	QTs	3,843	11.4	09-06-72
					67.0 A	09-19-72
					9.9	01-09-76
24S.2E.35.132	Ed Foreman	80	Qal	3,842	-	-
24S.2E.35.212	-	-	-	3,843	8.7	01-09-76
24S.2E.35.342	A. Ruiz	185	QTs	3,838	-	-
24S.2E.35.441	-	190	QTs	3,840	-	-

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	-	-	-	T,E	I	R.L. Guffey & Sons; csg 16-in; blank 0-250 ft, mill slotted 250-582 ft.
-	-	-	-	-	-	T,E	I	-
-	-	-	-	-	-	T,-	I	-
-	-	-	-	-	-	-	-	R.L. Guffey & Sons; csg
2,180	09-19-72	39	540	19	09-06-72	T,NG	I	18-in; blank 0-150 ft;
			550	19.5	08-02-77			slotted 150-370 ft; *
-	-	-	3,000	-	12-04-74	-,-	D	-
-	-	-	-	-	-	T,-	I	-
-	-	-	600	-	12-04-74	-,-	D	-
-	-	-	1,500	-	01-24-74	-,E	D	-

Table 3. Records of selected wells in vicinity of Elephant Butte Irrigation District wells - Concluded

Well number	Owner	Depth of well (feet)	Main geologic unit	Altitude of land surface (feet)	Water level	
					Depth below land surface (feet)	Date measured
24S.2E.35.443	N. Clayshulte	365	QTs	3,841	11.8	09-06-72
24S.2E.36.131	U.S. Geological Survey	823	QTs	3,841	-	-
					14.2	07-18-75
					16.4	07-18-75
					14.9	07-17-75
					15.8	07-17-75

* Chemical analyses of water from the well given in table 4.

** Additional water level, yield, specific conductance, or temperature information listed in table 5.

Yield								
Rate (gallons per minute)	Date measured	Specific capacity (gallons per minute per foot)	Onsite specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Date measured	Lift and power	Use of water	Remarks
-	-	-	950	19	07-08-77	T,NG	I	R.L. Guffey & Sons; csg 16-in; blank 0-140 ft; mill slotted 140-365 ft.
-	-	-	1,150	21.0	07-18-75	N,N	N	Test Hole; R. L. Guffey & Sons; borehole geophysical logs available; * water samples taken at following intervals: 257-277 ft., 392-412 ft., 507-527 ft., and 745-765 ft.
			700	21.25	07-18-75			
			670	22.0	07-17-75			
			560	23.25	07-17-75			

Table 4. Chemical analyses of water from selected wells in vicinity of the Elephant Butte Irrigation District wells

[mg/L, milligrams per liter; ug/L, micrograms per liter; specific conductance in micromhos per centimeter at 25° Celsius]

Location Number	Date of sample	Time	Main Geo-logic unit	Total depth of well (ft)	Depth to top of sample inter-val (ft)	Depth to bot-tom of sample inter-val (ft)	Dis-solved silica (SiO_2) (mg/L)	Total iron (Fe) (ug/L)	Dis-solved iron (Fe) (ug/L)	Dis-solved man-ganese (Mn) (ug/L)	Dis-solved cal-cium (Ca) (mg/L)	Dis-solved mag-ne-sium (Mg) (mg/L)	Dis-solved sodium (Na) (mg/L)	Dis-solved po-tas-sium (K) (mg/L)
23S.1E.35.444	09-16-77	1400	QTs	410 R	-	-	-	-	-	-	-	-	-	-
23S.2E.32.423	11-27-72	-	QTs	320 R	-	-	24	260	9	120	64	11	45	3.3
24S.1E.1.143a	09-16-77	1430	QTs	599	-	-	-	-	-	-	-	-	-	-
24S.1E.13.221a EBID well 5	08-04-75	1455	QTs	370	145	370	23	-	20	-	47	6.6	47	3.3
	05-04-77	1530	QTs	370	145	370	-	-	-	-	-	-	-	-
	08-01-77	1005	QTs	370	145	370	-	-	-	-	-	-	-	-
	08-26-77	1605	QTs	370	145	370	25	-	-	-	51	7.4	46	3.1
	03-28-78	1015	QTs	370	145	370	-	-	-	-	-	-	-	-
	04-26-78	1605	QTs	370	145	370	-	-	-	-	-	-	-	-
	07-06-78	1010	QTs	370	145	370	-	-	-	-	-	-	-	-
	08-08-78	1730	QTs	370	145	370	-	-	-	-	-	-	-	-
24S.2E.3.344	10-10-72	-	QTs	240±R	-	-	38	-	-	-	130	27	190	20
24S.2E.4.211 *	11-28-72	-	-	-	-	-	-	470	-	-	-	-	-	-
24S.2E.4.313	05-16-72	-	QTs Qal	160R	-	-	30	540	30	-	220	36	130	7.8
24S.2E.7.231 EBID well 2	02-12-77	0810	QTs	460	180	460	-	-	-	-	-	-	-	-
	05-04-77	1410	QTs	460	180	460	-	-	-	-	-	-	-	-
	08-01-77	0940	QTs	460	180	460	-	-	-	-	-	-	-	-
	08-26-77	1615	QTs	460	180	460	23	-	-	-	67	8.8	45	3.4
	02-22-78	1400	QTs	460	180	460	-	-	-	-	-	-	-	-
	03-28-78	0945	QTs	460	180	460	-	-	-	-	-	-	-	-
	04-26-78	1430	QTs	460	180	460	-	-	-	-	-	-	-	-
	07-06-78	0845	QTs	460	180	460	-	-	-	-	-	-	-	-
	08-08-78	1630	QTs	460	180	460	-	-	-	-	-	-	-	-
24S.2E.7.234	08-07-76	1700	QTs	310	305	310	22	-	10	70	41	6.3	48	3.6
	02-03-77	1641	QTs	310	305	310	-	-	-	-	-	-	-	-
	05-04-77	1415	QTs	310	305	310	-	-	-	-	-	-	-	-
	08-27-77	1046	QTs	310	305	310	24	-	-	-	45	6.3	39	3.3
	08-30-77	1100	QTs	310	305	310	24	-	-	-	47	6.7	39	3.3
	02-01-78	1410	QTs	310	305	310	-	-	-	-	47	7.3	38	-
	05-01-78	1631	QTs	310	305	310	-	-	-	-	-	-	-	-
	07-07-78	1006	QTs	310	305	310	-	-	-	-	-	-	-	-
	09-13-78	1520	QTs	310	305	310	-	-	-	-	-	-	-	-
24S.2E.7.234a	08-20-76	1746	QTs	310	120	125	24	-	180	140	69	10	66	4.2
	02-03-77	1629	QTs	310	120	125	-	-	-	-	-	-	-	-
	02-15-77	1650	QTs	310	120	125	-	-	-	-	50	8.4	79	-
	05-04-77	1450	QTs	310	120	125	-	-	-	-	95	14	68	-
	08-27-77	1100	QTs	310	120	125	25	-	-	-	120	18	68	4.8
	08-30-77	1123	QTs	310	120	125	6.3	-	-	-	110	18	75	4.8
	02-01-78	1428	QTs	310	120	125	-	-	-	-	110	17	69	-
	05-01-78	1648	QTs	310	120	125	-	-	-	-	-	-	-	-
	07-07-78	0930	QTs	310	120	125	-	-	-	-	-	-	-	-
	09-13-78	1536	QTs	310	120	125	26	-	20	600	150	22	79	5.4
24S.2E.7.234b	08-09-76	1800	QTs	80	75	80	27	-	90	1,600	210	33	220	9.2
	02-03-77	1607	QTs	80	75	80	-	-	-	-	-	-	-	-
	02-14-77	1615	QTs	80	75	80	-	-	-	-	130	32	280	-
	05-04-77	1435	QTs	80	75	80	-	-	-	-	180	34	220	-
	08-30-77	1142	QTs	80	75	80	31	-	-	-	210	33	200	8.0
	02-01-78	1442	QTs	80	75	80	-	-	-	-	-	-	-	-
	05-01-78	1700	QTs	80	75	80	-	-	-	-	-	-	-	-
	07-07-78	0908	QTs	80	75	80	-	-	-	-	-	-	-	-
	09-13-78	1540	QTs	80	75	80	29	-	20	1,200	190	29	190	8.0
24S.2E.8.144	06-19-75	-	-	-	-	-	26	-	0	-	160	27	240	8.0

Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Dissolved sulfate (SO_4) (mg/L)	Dissolved chloride (Cl) (mg/L)	Dissolved fluoride (F) (mg/L)	Dissolved nitrite plus nitrate (N) (mg/L)	Dissolved ortho phosphorus (P) (mg/L)	Phosphate dissolved ortho (mg/L)	Dissolved solids (residue at 180°C) (mg/L)	Dissolved solids (sum of constituents) (mg/L)	Hardness (Ca,Mg) (mg/L)	Noncarbonate hardness (mg/L)	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos)	pH (units)	Dissolved boron (H) (ug/L)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	680	-	-
180	0	81	50	0.4	0.09	0.01	0.03	-	368	210	57	32	1.4	595	8.1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	513	-	-
155	0	62	41	0.3	0.01	0	0	303	307	140	17	41	1.7	494	7.1	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	511	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	505	-	-
160	0	65	45	0.3	-	-	-	-	322	160	27	38	1.6	512	8.1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	532	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	526	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	535	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	544	-	-
229	0	320	230	0.7	2.0	-	-	-	1,080	440	250	47	4.0	1,620	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
282	0	510	160	0.5	0.29	-	-	-	1,238	700	600	29	2.1	1,580	7.5	180
-	-	-	-	-	-	-	-	-	-	-	-	-	-	496	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	523	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	580	-	-
170	0	84	53	0.4	0.02	-	-	-	369	200	64	32	1.4	585	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	605	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	593	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	601	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	626	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	651	-	-
148	4	50	36	0.5	0.08	0.08	0.25	-	285	130	0	44	1.8	-	9.1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	455	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	500	-	-
160	0	45	30	0.4	0.05	-	-	-	272	140	7	37	1.4	452	8.1	-
160	0	47	43	0.4	0.04	-	-	-	289	150	14	36	1.4	447	8.0	-
150	0	47	36	-	-	-	-	-	-	150	24	-	1.4	455	8.1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	449	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	458	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	456	-	-
176	0	110	70	0.5	0.09	0.28	0.86	-	442	210	69	40	2.0	680	7.8	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	745	-	-
180	0	100	62	-	-	-	-	-	-	160	12	-	2.7	667	7.9	-
200	0	160	85	-	-	-	-	-	-	300	130	-	1.7	884	7.8	-
220	0	170	110	0.3	0.11	-	-	-	626	370	190	28	1.6	985	7.8	-
220	0	200	100	0.1	0.03	-	-	-	623	350	170	32	1.7	981	7.8	-
200	0	200	96	-	-	-	-	-	-	340	180	-	1.6	996	7.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,080	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,160	-	-
-	-	270	110	0.4	0.30	-	-	-	761	470	-	27	1.6	1,216	7.9	-
382	0	530	150	0.3	0.10	1.8	5.5	-	1,380	660	350	42	3.7	2,000	7.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,900	-	-
270	0	560	160	-	-	-	-	-	-	460	280	-	5.7	1,950	7.3	-
350	0	550	180	-	-	-	-	-	-	590	300	-	3.9	1,840	7.6	-
390	0	530	150	0.3	0.01	-	-	-	1,350	660	340	39	3.4	1,900	7.7	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,880	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,810	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,800	-	-
-	-	470	130	0.5	0.04	-	-	-	1,204	590	-	41	3.4	1,817	8.2	-
327	-	550	150	0.5	.50	-	0.50	-	1,330	510	240	50	4.6	2,000	-	290

Table 4. Chemical analyses of water from selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Location Number	Date of sample	Time	Main Geo-logic unit	Total depth of well (ft)	Depth to top of sample inter-val (ft)	Depth to bot-tom of sample inter-val (ft)	Dis-solved silica (SiO_2) (mg/L)	Total iron (Fe) (ug/L)	Dis-solved iron (Fe) (ug/L)	Dis-solved man-ganese (Mn) (ug/L)	Dis-solved cal-cium (Ca) (mg/L)	Dis-solved mag-ne-sium (Mg) (mg/L)	Dis-solved sodium (Na) (mg/L)	Dis-solved po-tas-sium (K) (mg/L)
24S.2E.8.411	11-27-72	-	-	-	-	-	24	20	9	180	58	7.8	47	3.5
24S.2E.8.413b	05-08-73	-	Qal QTs	147 R	-	-	33	-	9	-	160	25	140	7.4
24S.2E.9.142	05-16-72	-	QTs	510 R	170	510	24	120	20	190	51	11	40	4.4
24S.2E.9.333a	04-30-73	-	Qal QTs	145 R	-	-	30	-	-	-	200	35	220	8.4
24S.2E.14.122	09-18-72	-	QTs	512 R	160	512	47	-	-	-	87	16	210	20
24S.2E.15.231a	04-04-74	-	QTs	704	287	308	34	340	10	10	39	9.4	52	12
	04-04-74	-	QTs	704	463	484	44	2,400	10	190	58	11	45	18
	04-04-74	-	QTs	704	671	692	23	3,900	10	0	8.6	4.2	57	6.8
24S.2E.16.322	05-08-73	-	QTs	307 R	250	307	24	-	-	-	47	9.1	44	3.1
24S.2E.17.322 EBID well 3	08-05-75	1400	QTs	464	180	464	23	-	20	-	54	8.3	42	3.1
	05-04-77	-	QTs	464	180	464	-	-	-	-	-	-	-	-
	08-01-77	-	QTs	464	180	464	-	-	-	-	-	-	-	-
	08-26-77	1600	QTs	464	180	464	24	-	-	-	56	8.6	44	3.0
	03-27-78	1130	QTs	464	180	464	-	-	-	-	-	-	-	-
	04-26-78	1445	QTs	464	180	464	-	-	-	-	-	-	-	-
	07-06-78	0955	QTs	464	180	464	-	-	-	-	-	-	-	-
	08-08-78	1650	QTs	464	180	464	-	-	-	-	-	-	-	-
24S.2E.17.414a	09-17-76	1800	QTs	312	292	297	22	-	40	60	47	7.9	43	3.3
	02-03-77	1517	QTs	312	292	297	-	-	-	-	-	-	-	-
	02-10-77	1407	QTs	312	292	297	-	-	-	-	-	-	-	-
	02-15-77	1553	QTs	312	292	297	-	-	-	-	-	-	-	-
	05-04-77	1100	QTs	312	292	297	-	-	-	-	-	-	-	-
	08-29-77	1156	QTs	312	292	297	24	-	-	-	47	7.3	41	3.0
	02-01-78	1036	QTs	312	292	297	-	-	-	-	-	-	-	-
	07-07-78	-	QTs	312	292	297	-	-	-	-	-	-	-	-
	09-13-78	1005	QTs	312	292	297	-	-	-	-	-	-	-	-
24S.2E.17.414b	08-20-76	1600	QTs	618	607	612	24	-	290	40	49	6.1	46	3.4
	02-03-77	1552	QTs	618	607	612	-	-	-	-	-	-	-	-
	02-10-77	1448	QTs	618	607	612	-	-	-	-	-	-	-	-
	02-16-77	1530	QTs	618	607	612	-	-	-	-	-	-	-	-
	05-04-77	1015	QTs	618	607	612	-	-	-	-	-	-	-	-
	08-29-77	1125	QTs	618	607	612	23	-	-	-	46	7.0	44	2.9
	02-01-78	1015	QTs	618	607	612	-	-	-	-	-	-	-	-
	05-01-78	1122	QTs	618	607	612	-	-	-	-	-	-	-	-
	07-07-78	1529	QTs	618	607	612	-	-	-	-	-	-	-	-
	09-13-78	0946	QTs	618	607	612	-	-	-	-	-	-	-	-
24S.2E.17.423	02-27-73	-	QTs	1,210	883	903	24	5,300	0	10	31	4.2	69	3.6
***	02-18-73	-	QTs	1,210	1,177	1,193	27	2,900	9	0	26	5.2	82	6.5
24S.2E.17.423a EBID well 1	07-25-73	1400	QTs	686	310	680	24	-	10	-	46	7.1	40	2.7
	02-08-77	0900	QTs	686	310	680	-	-	-	-	-	-	-	-
	02-11-77	1058	QTs	686	310	680	-	-	-	-	-	-	-	-
	05-04-77	-	QTs	686	310	680	-	-	-	-	-	-	-	-
	08-01-77	1025	QTs	686	310	680	-	-	-	-	-	-	-	-
	08-26-77	1545	QTs	686	310	680	24	-	-	-	47	7.2	41	2.8
	02-02-78	-	QTs	686	310	680	-	-	-	-	-	-	-	-
	03-28-78	1500	QTs	686	310	680	-	-	-	-	-	-	-	-
	04-26-78	1500	QTs	686	310	680	-	-	-	-	-	-	-	-
	07-06-78	0938	QTs	686	310	680	-	-	-	-	-	-	-	-
	08-08-78	1700	QTs	686	310	680	-	-	-	-	-	-	-	-

Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Dissolved sulfate (SO_4) (mg/L)	Dissolved chloride (Cl) (mg/L)	Dissolved fluoride (F) (mg/L)	Dissolved nitrite plus nitrate (N) (mg/L)	Dissolved ortho phosphorus (P) (mg/L)	Phosphate dissolved ortho (mg/L)	Dissolved solids (residue at 180°C) (mg/L)	Dissolved solids (sum of constituents) (mg/L)	Hardness (Ca,Mg) (mg/L)	Noncarbonate hardness (mg/L)	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos)	pH (units)	Dissolved boron (B) (ug/L)
196	0	56	42	0.4	0.00	0.02	0.06	-	335	180	16	36	1.5	539	8.2	-
343	0	380	110	0.3	0.04	-	-	-	1,030	500	220	37	2.7	1,450	7.7	210
163	0	69	50	0.7	0.00	0.02	0.06	-	331	170	39	33	1.3	546	8.1	-
374	0	620	160	0.6	0.31	-	-	-	1,460	640	340	-	3.8	2,000	7.5	-
390	0	180	170	1.9	0.37	-	-	-	925	280	0	60	5.4	1,420	7.8	-
161	0	63	46	0.7	0.18	0.00	0.00	-	336	140	4	43	1.9	543	8.3	80
147	0	71	80	1.1	0.01	0.01	0.03	-	401	190	70	31	1.4	664	7.9	70
54	7	60	39	0.9	0.10	0.00	0.00	-	234	39	0	72	4.0	393	9.1	90
172	0	60	47	0.3	0.0	-	-	-	319	150	14	38	1.5	522	7.6	-
167	0	65	50	0.3	0.01	0.00	0.00	327	328	170	32	35	1.4	543	7.2	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	529	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	525	-	-
160	0	66	43	0.3	0.11	-	-	-	324	180	44	35	1.4	578	8.1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	553	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	553	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	571	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	579	-	-
162	0	54	37	0.3	0.06	0.01	0.03	-	295	150	17	38	1.5	465	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	474	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	475	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	471	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	480	-	-
170	0	45	34	0.3	0.06	-	-	-	286	150	8	37	1.5	471	7.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	476	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	477	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	477	-	-
154	0	58	39	0.3	0.01	0.04	0.12	-	302	150	21	40	1.6	460	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	505	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	485	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	476	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	480	-	-
160	0	57	44	0.3	0.01	-	-	-	303	140	12	39	1.6	485	7.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	476	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	484	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	477	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	485	-	-
135	5	95	42	0.5	0.11	0.02	0.06	-	341	95	0	60	3.1	528	8.5	-
168	0	74	50	0.8	0.00	0.01	0.03	-	354	86	0	65	3.8	576	8.1	-
162	0	54	39	0.1	0.00	-	-	-	293	140	11	37	1.5	477	8.0	80
-	-	-	-	-	-	-	-	-	-	-	-	-	-	474	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	475	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	468	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	485	-	-
160	0	49	39	0.3	0.08	-	-	-	290	150	16	37	1.5	467	7.8	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	480	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	472	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	469	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	473	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	483	-	-

Table 4. Chemical analyses of water from selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Location Number	Date of sample	Time	Main Geo-logic unit	Total depth of well (ft)	Depth to top of sample inter-val (ft)	Depth to bot-tom of sample inter-val (ft)	Dis-solved silica (SiO_2) (mg/L)	Total iron (Fe) (ug/L)	Dis-solved iron (Fe) (ug/L)	Dis-solved man-ganese (Mn) (ug/L)	Dis-solved cal-cium (Ca) (mg/L)	Dis-solved mag-ne-sium (Mg) (mg/L)	Dis-solved sodium (Na) (mg/L)	Dis-solved po-tas-sium (K) (mg/L)
24S.2E.17.423b	09-17-76	1600	QTs	599	591	596	24	-	10	10	43	7.0	48	3.4
	02-03-77	1440	QTs	599	591	596	-	-	-	-	-	-	-	-
	02-15-77	1300	QTs	599	591	596	-	-	-	-	-	-	-	-
	05-04-77	1312	QTs	599	591	596	-	-	-	-	-	-	-	-
	08-29-77	-	QTs	599	591	596	25	-	-	-	46	7.2	43	3.0
	02-01-78	1315	QTs	599	591	596	-	-	-	-	-	-	-	-
	06-01-78	1435	QTs	599	591	596	-	-	-	-	-	-	-	-
	07-07-78	1900	QTs	599	591	596	-	-	-	-	-	-	-	-
	09-13-78	1148	QTs	599	591	596	-	-	-	-	-	-	-	-
24S.2E.17.423c	09-10-76	-	QTs	310	302	307	22	-	0	40	48	7.7	40	2.9
	02-03-77	1304	QTs	310	302	307	-	-	-	-	-	-	-	-
	02-10-77	1023	QTs	310	302	307	-	-	-	-	-	-	-	-
	02-14-77	1515	QTs	310	302	307	-	-	-	-	49	7.4	40	-
	05-04-77	1200	QTs	310	302	307	-	-	-	-	50	7.3	41	-
	08-27-77	0929	QTs	310	302	307	23	-	-	-	48	7.5	42	3.3
	08-29-77	1423	QTs	310	302	307	22	-	-	-	50	7.2	41	2.8
	02-01-78	1143	QTs	310	302	307	-	-	-	-	49	7.7	40	-
	05-01-78	1501	QTs	310	302	307	-	-	-	-	-	-	-	-
	07-07-78	-	QTs	310	302	307	-	-	-	-	-	-	-	-
	09-13-78	1300	QTs	310	302	307	-	-	-	-	-	-	-	-
24S.2E.17.423d	09-10-76	-	QTs	121	113	118	24	-	10	300	120	18	75	5.0
	02-03-77	1114	QTs	121	113	118	-	-	-	-	-	-	-	-
	02-10-77	1102	QTs	121	113	118	-	-	-	-	-	-	-	-
	02-14-77	1220	QTs	121	113	118	-	-	-	-	130	26	83	-
	05-04-77	1245	QTs	121	113	118	-	-	-	-	130	26	85	-
	08-27-77	0948	QTs	121	113	118	26	-	-	-	130	23	83	5.2
	08-29-77	1504	QTs	121	113	118	25	-	-	-	140	22	78	2.0
	02-01-78	1120	QTs	121	113	118	-	-	-	-	130	22	79	-
	05-01-78	1520	QTs	121	113	118	-	-	-	-	-	-	-	-
	07-07-78	1625	QTs	121	113	118	-	-	-	-	-	-	-	-
	09-13-78	1330	QTs	121	113	118	24	-	50	21	140	21	78	5.0
24S.2E.17.423e	09-10-76	1210	Qal	35	30	35	17	-	10	690	330	55	210	13
	02-03-77	1008	Qal	35	30	35	-	-	-	-	-	-	-	-
	02-10-77	1313	Qal	35	30	35	-	-	-	-	-	-	-	-
	02-14-77	1140	Qal	35	30	35	-	-	-	-	-	-	-	-
	05-04-77	1140	Qal	35	30	35	-	-	-	-	-	-	-	-
	08-29-77	1517	Qal	35	30	35	12	-	-	-	70	11	84	7.3
	02-01-78	1059	Qal	35	30	35	-	-	-	-	-	-	-	-
	05-01-78	1530	Qal	35	30	35	-	-	-	-	-	-	-	-
	07-07-78	1615	Qal	35	30	35	-	-	-	-	-	-	-	-
	09-13-78	1405	Qal	35	30	35	-	-	-	-	-	-	-	-
24S.2E.17.424	05-02-73	-	QTs	400?R	-	-	23	-	-	-	48	7.2	41	3.0
24S.2E.18.224	10-03-72	-	Qal	90 R	-	-	29	-	9	-	310	44	300	10
24S.2E.18.242	10-03-72	-	QTs	220 R	-	-	25	-	-	-	71	10	48	3.8
24S.2E.20.212	05-02-73	-	QTs	-	-	-	-	-	-	-	65	10	-	-
24S.2E.21.122	10-05-72	-	-	300 R	-	-	24	-	9	120	48	8.0	47	3.0
24S.2E.21.123 EBID well 4	08-04-75	1435	QTs	480	170	480	24	-	10	-	100	19	57	4.2
	05-04-77	-	QTs	480	170	480	-	-	-	-	-	-	-	-
	08-01-77	1045	QTs	480	170	480	-	-	-	-	-	-	-	-
	08-26-77	1550	QTs	480	170	480	25	-	-	-	78	12	50	3.3
	03-28-78	1420	QTs	480	170	480	-	-	-	-	-	-	-	-
	04-26-78	1510	QTs	480	170	480	-	-	-	-	-	-	-	-
	07-06-78	0920	QTs	480	170	480	-	-	-	-	-	-	-	-
	08-08-78	1712	QTs	480	170	480	-	-	-	-	-	-	-	-

Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Dissolved sulfate (SO_4) (mg/L)	Dissolved chloride (Cl) (mg/L)	Dissolved fluoride (F) (mg/L)	Dissolved nitrite plus nitrate (N) (mg/L)	Dissolved ortho phosphorus (P) (mg/L)	Phosphate dissolved ortho (mg/L)	Dissolved solids (residue at 180°C) (mg/L)	Dissolved solids (sum of constituents) (mg/L)	Hardness (Ca,Mg) (mg/L)	Noncarbonate hardness (mg/L)	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos)	pH (units)	Dissolved boron (B) (ug/L)
159	0	54	38	0.3	0.10	0.30	0.92	-	297	140	6	43	1.8	460	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	477	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	471	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	489	-	-
160	0	50	34	0.3	0.04	-	-	-	288	140	13	39	1.6	474	7.8	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	466	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	471	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	472	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	475	-	-
163	0	58	37	0.3	0.01	0.02	0.06	-	296	150	18	36	1.4	460	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	474	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	476	-	-
170	0	46	33	-	-	-	-	-	-	150	13	-	1.4	456	7.7	-
170	0	47	36	-	-	-	-	-	-	160	15	-	1.4	475	7.8	-
170	0	43	41	0.2	0.16	-	-	-	293	150	11	37	1.5	471	7.8	-
170	0	46	39	0.3	0.24	-	-	-	293	150	15	36	1.4	472	7.7	-
170	0	42	34	-	-	-	-	-	-	150	13	-	1.4	475	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	472	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	477	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	480	-	-
246	0	200	94	0.4	0.20	0.04	0.12	-	659	370	170	30	1.7	1,060	8.1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,120	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,160	-	-
240	0	240	110	-	-	-	-	-	-	430	230	-	1.7	1,180	7.8	-
270	0	260	110	-	-	-	-	-	-	430	210	-	1.8	1,220	7.8	-
210	0	240	110	0.3	0.09	-	-	-	721	420	250	30	1.8	1,129	7.7	-
220	0	240	100	0.2	0.04	-	-	-	719	440	260	28	1.6	1,154	7.7	-
250	0	240	100	-	-	-	-	-	-	420	210	-	1.7	1,148	7.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,090	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,190	-	
-	-	230	120	0.4	0.76	-	-	-	722	440	-	28	1.6	1,160	8.0	-
243	0	760	370	0.6	0.00	0.03	0.09	-	1,880	1,100	850	30	2.8	2,700	8.0	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,070	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,030	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	839	-	-
190	0	130	100	0.6	0.13	-	-	-	509	220	64	44	2.5	808	7.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,240	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	904	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	897	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	745	-	-
174	0	50	38	0.2	0.00	-	-	-	296	150	7	37	1.5	489	7.9	-
418	-	880	250	0.4	0.96	-	-	-	2,030	950	610	40	4.2	2,760	7.8	320
178	0	85	67	0.3	0.03	-	-	-	398	220	72	32	1.4	639	8.1	-
175	0	78	64	-	-	-	-	-	-	200	60	-	-	631	7.7	-
167	0	58	44	0.4	0.06	0.02	0.06	-	315	150	16	40	1.7	502	8.3	-
222	0	160	78	0.3	0.08	0.01	0.03	564	552	330	150	27	1.4	883	7.1	50
-	-	-	-	-	-	-	-	-	-	-	-	-	-	709	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	710	-	-
190	0	110	56	0.3	0.15	-	-	-	429	240	88	30	1.4	689	7.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	779	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	698	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	706	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	713	-	-

Table 4. Chemical analyses of water from selected wells in vicinity of the Elephant Butte Irrigation District wells - Concluded

Location Number	Date of sample	Time	Main Geo- logic unit	Total depth of well (ft)	Depth to top of sample inter- val (ft)	Depth to bot- tom of sample inter- val (ft)	Dis- solved silica (SiO_2) (mg/L)	Total iron (Fe) (ug/L)	Dis- solved iron (Fe) (ug/L)	Dis- solved man- ganese (Mn) (ug/L)	Dis- solved cal- cium (Ca) (mg/L)	Dis- solved mag- ne- sium (Mg) (mg/L)	Dis- solved sodium (Na) (mg/L)	Dis- solved po- tas- sium (K) (mg/L)
24S.2E.35.114	09-06-72	-	QTs	370	150	370	29	-	9	-	39	10	54	8.0
24S.2E.36.131	07-18-75	1330	QTs	823	257	277	40	-	20	180	67	14	120	29
	07-18-75	1000	QTs	823	392	412	39	-	30	130	45	12	61	19
	** 07-17-75	1735	QTs	823	507	527	36	-	20	50	40	10	66	14
	07-17-75	1100	QTs	823	745	765	27	-	40	30	24	5.9	74	12

* Total Mn - 220 ug/L.
** Trace element values in ug/L - dissolved arsenic-5; dissolved Barium- < 200; dissolved cadmium-1; hexavalent chromium-0; dissolved lead- <1; total lead- <100; dissolved selenium-0; dissolved silver-0; dissolved zinc-0; copper-2; manganese-50.
*** Total Mn - 140 ug/L.

Main geologic unit - Qal, floodplain alluvium; QTs, Santa Fe Group.

Most specific-conductance values listed were measured in the laboratory. In a few cases, where laboratory measurements were not available, specific-conductance values measured at the well site are listed. Many additional onsite specific-conductance values are listed in tables 3 and 5.

Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Dissolved sulfate (SO_4) (mg/L)	Dissolved chloride (Cl) (mg/L)	Dissolved fluoride (F) (mg/L)	Dissolved nitrite plus nitrate (N) (mg/L)	Dissolved ortho phosphorus (P) (mg/L)	Phosphate dissolved ortho (mg/L)	Dissolved solids (residue at 180°C) (mg/L)	Dissolved solids (sum of constituents) (mg/L)	Hardness (Ca,Mg) (mg/L)	Noncarbonate hardness (mg/L)	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos)	pH (units)	Dissolved boron (H) (ug/L)
172	-	57	49	0.7	0.01	-	-	-	331	140	0	44	2.0	538	8.1	100
170	0	140	160	1.9	0.13	0.01	0.03	-	657	230	86	50	3.5	1,090	7.1	100
160	0	67	80	1.5	0.05	0.01	0.03	-	404	160	31	42	2.1	649	7.3	90
161	0	69	68	1.0	0.15	0.03	0.09	387	384	140	9	47	2.4	619	7.3	70
168	0	63	41	1.0	0.12	0.00	0.00	-	331	84	0	62	3.5	518	7.3	110

Table 5. Records of water level, specific conductance, water temperature and discharge for selected wells in the vicinity of the Elephant Butte Irrigation District wells.

[See table 3 for additional information on wells]

EXPLANATION

Water level.--Measured depth to water below land surface. Values followed by "A" refer to pumping water level.

Discharge.--Measured in gallons per minute by the trajectory method (Anderson, 1973, p. 156; Hohn, 1981).

Specific conductance.--Specific conductance measured onsite with portable meter.

Remarks.--Indicates special pumping periods such as beginning and end of the general period when the District wells were turned on in order to pump water for irrigation use.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
			24S.1E.13.221a (EBID well 5)			
07-31-75	1145	11.2	-	-	-	Prior to pumping.
08-01-75	1347	109.3A	490	21	2,380	After pumping 26 hours.
07-12-76	1530	12.7	-	-	-	Prior to pumping.
07-12-76	1542	96.0A	530	18	-	-
07-12-76	2005	104.7A	530	18	2,405	-
07-13-76	0025	105.7A	500	18	2,470	-
07-15-76	1550	107.7A	480	18	2,360	-
07-13-76	0025	105.7A	500	18	2,470	-
07-28-76	1055	110.0A	480	18.5	2,320	After pumping 15.8 days.
02-04-77	1324	9.5	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1631	10.1	-	-	-	After 24S.2E.17.423a pumped 4.1 days.
03-14-77	1430	10.8	-	-	-	Prior to pumping.
03-14-77	1502	96.8A	510	18	2,620	Begin 1977 pumping season. Measurement after 24 minutes of pumping.
03-16-77	1600	108.4A	480	18	2,290	-
03-18-77	1445	108.6A	480	17.5	2,320	-
03-21-77	1645	108.0A	480	18	2,320	-
03-24-77	1510	108.2A	480	18	2,290	-
03-28-77	1630	109.1A	490	18	2,380	-
04-01-77	1305	109.5A	470	18	2,320	-
04-06-77	1100	109.1A	475	18	2,250	-
04-15-77	1400	111.4A	475	18	2,240	-
04-22-77	1040	111.1A	480	18	2,210	-
04-29-77	1415	108.8A	480	18	2,300	-
05-04-77	1310	110.6A	480	18	2,190	-
05-12-77	1520	-	480	18	2,210	-
05-19-77	1020	111.8A	480	18	2,150	-
05-26-77	1410	110.7A	480	18	2,160	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
06-02-77	0950	111.5A	485	18	2,100	-
06-08-77	1425	112.5A	485	18.5	2,100	-
06-16-77	1010	111.5A	500	18	2,130	-
06-24-77	1010	111.8A	485	18	2,070	-
07-01-77	1100	109.8A	480	18	2,100	-
07-08-77	1440	110.3A	485	18	2,170	-
07-14-77	1545	112.7A	480	18	2,130	-
07-22-77	1150	112.7A	480	18	2,100	-
08-01-77	1005	112.2A	510	18	2,150	Different conductance meter.
08-05-77	0930	113.1A	520	18	2,150	-
08-12-77	1100	-	500	18.5	2,130	-
08-19-77	1035	110.0A	500	19	2,190	Another change in conductance meter.
08-26-77	1000	110.8A	520	18	2,080	End 1977 pumping season.
12-09-77	1520	12.2	-	-	-	-
01-24-78	0940	15.0	-	-	-	-
03-16-78	1505	12.9	-	-	-	-
03-23-78	0812	-	590	17.5	-	1978 pumping season started 03-23-78.
03-24-78	1010	108.4A	580	18	2,210	-
03-28-78	1015	108.4A	540	18	2,210	-
04-04-78	1835	110.4A	520	18	2,170	-
04-10-78	1230	112.6A	530	17.5	2,080	-
04-19-78	1600	110.7A	540	18	2,140	-
04-26-78	1605	107.3A	525	18	2,240	-
05-01-78	1200	107.7A	520	18	2,210	Off at 1600.
05-02-78	1410	23.1	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
05-08-78	1615	19.6	-	-	-	-
05-23-78	1415	17.6	-	-	-	-
06-01-78	1115	31.5	-	-	-	Most private deep wells in area pumping.
06-02-78	0915	-	600	18	2,130	Pumping started at 0700.
06-06-78	1200	110.7A	530	18	2,080	-
06-09-78	1425	-	530	18	-	-
06-12-78	1630	111.5A	520	18	2,080	-
06-21-78	1100	111.4A	525	18	2,020	-
06-27-78	1630	111.1A	540	17.5	2,040	-
07-05-78	1530	-	525	18.5	2,040	-
07-06-78	1015	109.3A	-	-	2,060	-
07-12-78	1048	112.8A	530	18	1,930	-
07-19-78	1020	112.9A	530	18	1,910	-
07-25-78	1000	27.6	-	-	-	-
07-27-78	0850	110.5A	530	18	1,990	-
08-01-78	1535	-	540	18	1,940	-
08-08-78	1730	108.7A	530	18	2,150	End 1978 pumping season on 08-09-78.
08-28-78	1535	16.9	-	-	-	-
09-28-78	0920	14.2	-	-	-	-
10-27-78	1000	14.1	-	-	-	-
11-02-78	1350	13.7	-	-	-	-
11-21-78	1100	13.3	-	-	-	-
12-15-78	1300	13.5	-	-	-	-
12-22-78	1635	13.0	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
				24S.2E.4.313		
02-10-72	-	16.9	-	-	-	-
05-16-72	-	41.7A	-	18	1,220	-
01-23-73	-	19.3	-	-	-	-
01-23-74	-	18.0	-	-	-	-
01-07-75	-	16.5	-	-	-	-
01-14-76	-	16.6	-	-	-	-
01-27-77	-	16.9	-	-	-	
01-09-78	-	19.0	-	-	-	-
				24S.2E.7.124		
02-22-78	1000	18.8	-	-	-	-
02-22-78	1445	20.0	-	-	-	-
03-27-78	1125	22.3	-	-	-	-
03-28-78	0930	22.4	-	-	-	-
04-10-78	1530	23.4	-	-	-	-
				24S.2E.7.231 (EBID well 2)		
07-31-75	1515	16.0	-	-	-	Prior to pumping.
08-01-75	1237	100.4A	470	-	2,680	After pumping 21.4 hours.
07-12-76	-	15.4	-	-	-	Prior to pumping.
07-12-76	1215	-	470	-	2,660	-
07-24-76	1740	100.7A	480	18.5	2,470	After pumping 12.3 days.
02-04-77	1332	15.3	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1639	16.3	-	-	-	After well 24S.2E.17.423a pumped 4.1 days.
03-12-77	1345	16.6	-	-	-	Prior to pumping; 1977 pumping season begins.
03-12-77	1439	90.5A	500	18	2,710	-
03-12-77	1925	97.5A	480	18	2,580	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
03-13-77	0700	98.8A	480	17	2,500	-
03-14-77	1330	99.2A	490	18	2,480	-
03-16-77	1455	102.4A	480	18	2,380	-
03-18-77	1435	100.6A	480	18	2,380	-
03-21-77	1630	100.7A	490	18	2,400	
03-24-77	1400	100.9A	480	18.5	2,360	-
03-28-77	1545	101.3A	480	18	2,340	-
04-01-77	1230	100.6A	500	18	2,460	-
04-06-77	0930	100.9A	490	18	2,350	-
04-15-77	1430	101.8A	500	18	2,320	-
04-22-77	0930	102.0A	500	18.5	2,300	-
04-29-77	1400	101.3A	500	18.5	2,320	-
05-04-77	1410	99.2A	510	18.5	2,340	-
05-12-77	1510	-	510	18	2,290	-
05-19-77	0915	101.3A	510	18	2,330	-
05-26-77	1400	101.1A	520	18	2,280	-
06-02-77	0910	101.7A	520	18	2,280	-
06-08-77	1410	102.3A	530	18	2,230	-
06-16-77	0950	102.0A	535	18	2,250	-
06-24-77	0900	102.3A	540	18	2,230	-
07-01-77	0955	101.5A	550	18	2,280	-
07-08-77	1330	101.2A	550	18.5	2,230	-
07-14-77	1400	101.0A	560	18	2,270	-
07-22-77	1000	102.8A	-	18	2,230	-
08-01-77	0930	102.6A	580	18	2,290	Different conductance meter.
08-05-77	0915	104.2A	575	18.5	2,290	-
08-12-77	0900	103.6A	590	18	2,200	-
08-19-77	1055	103.5A	580	18.5	2,210	Another change in conductance meter.
08-26-77	0915	102.9A	590	18	2,240	End of 1977 pumping season.
12-09-77	1500	19.6	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
01-06-78	1530	19.6	-	-	-	-
01-24-78	0930	20.2	-	-	-	-
02-22-78	0930	20.9	-	-	-	Prior to pumping.
02-22-78	1035	93.0A	620	18	-	-
02-22-78	1431	99.1A	610	18	2,360	After pumping 5.0 hours.
03-16-78	1520	23.6	-	-	-	-
03-24-78	1450	101.8A	600	18	2,240	1978 pumping season begins 03-23-78.
03-28-78	0945	102.2A	590	18	2,230	-
04-04-78	1820	104.1A	600	18	-	-
04-10-78	1535	102.6A	600	18	2,230	Well off from 0930 to 1230.
04-19-78	1450	104.1A	600	18	2,160	-
04-26-78	1450	102.7A	600	18.5	2,210	-
05-01-78	1145	103.5A	600	18	2,160	-
05-02-78	1320	28.4	-	-	-	-
05-08-78	1515	17.5	-	-	-	-
05-23-78	1350	24.0	-	-	-	-
06-01-78	1015	30.0	-	-	-	-
06-06-78	1145	104.2A	600	18.5	2,180	-
06-09-78	1300	103.6A	600	19	-	-
06-12-78	1450	-	600	19	2,170	-
06-21-78	0915	105.1A	600	18	2,100	-
06-27-78	1515	104.3A	620	18	2,160	-
07-05-78	1543	-	610	18.5	2,130	-
07-06-78	0850	104.9A	-	-	-	-
07-12-78	1020	106.6A	625	18.5	2,100	-
07-19-78	0920	106.4A	630	18.5	2,130	-
07-25-78	0940	28.5	-	-	-	-
07-27-78	0835	105.2A	610	18.5	2,100	-
08-01-78	1640	-	610	19	2,070	-
08-08-78	1630	105.6A	640	18.5	2,180	1978 pumping season ends 08-09-78.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
08-28-78	1610	26.8	-	-	-	-
09-28-78	0950	23.9	-	-	-	-
10-27-78	1015	23.4	-	-	-	-
11-02-78	1335	23.1	-	-	-	-
11-21-78	0900	22.6	-	-	-	-
12-15-78	1345	22.4	-	-	-	-
12-22-78	1520	22.1	-	-	-	-
				24S.2E.7.234		
09-30-76	-	18.4	-	-	-	-
02-04-77	1333	17.7	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-09-77	1058	18.5	-	-	-	After 24S.2E.17.423a pumped for 4.9 days.
03-12-77	1345	19.0	-	-	-	Prior to pumping well 24S.2E.7.231; start 1977 pumping season.
03-14-77	1331	48.2	-	-	-	After pumping 24S.2E.7.231 for 2.0 days.
03-21-77	1635	50.0	-	-	-	-
03-24-77	1410	51.1	-	-	-	-
03-28-77	1545	51.4	-	-	-	-
04-01-77	1245	50.4	-	-	-	-
04-06-77	0950	50.7	-	-	-	-
04-22-77	0931	52.6	-	-	-	-
05-04-77	1330	52.1	-	-	-	-
06-16-77	-	54.8	-	-	-	-
08-01-77	-	55.2	-	-	-	-
08-27-77	0950	55.3	-	-	-	End 1977 pumping season 08-26-77.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
12-09-77	1500	22.0	-	-	-	-
01-06-78	1530	22.0	-	-	-	-
01-24-78	0920	22.6	-	-	-	-
02-01-78	1340	23.6	-	-	-	-
02-08-78	0955	24.4	-	-	-	-
02-21-78	1605	23.2	-	-	-	-
02-22-78	1016	23.2	-	-	-	Prior to pumping well 24S.2E.7.231.
02-22-78	1521	49.0	-	-	-	After pumping well 24S.2E.7.231 for 5.0 hours.
03-16-78	1529	26.0	-	-	-	-
03-28-78	0955	53.8	-	-	-	Start 1978 pumping season on 03-23-78.
04-04-78	1125	56.4	-	-	-	-
04-10-78	1540	55.3	-	-	-	-
05-01-78	1545	57.2	-	-	-	-
05-23-78	1400	26.3	-	-	-	-
06-01-78	1000	32.5	-	-	-	-
07-06-78	0838	60.0	-	-	-	-
08-08-78	1644	60.2	-	-	-	End 1978 pumping season 08-09-78.
09-13-78	1450	27.9	-	-	-	-
10-27-78	1025	25.7	-	-	-	-
11-21-78	0915	24.9	-	-	-	-
12-22-78	1525	24.6	-	-	-	-
				24S.2E.7.234a		
09-30-76	-	17.3	-	-	-	-
02-04-77	1334	17.4	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-09-77	1056	17.5	-	-	-	Start 1977 pumping season; after pumping well 24S.2E.17.423a 4.9 days.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
03-12-77	1346	18.2	-	-	-	Prior to pumping well 24S.2E.7.231.
03-14-77	1328	18.2	-	-	-	After 24S.2E.7.231 pumped 2.0 days.
03-21-77	1634	18.4	-	-	-	-
03-24-77	1411	18.6	-	-	-	-
03-28-77	1550	17.6	-	-	-	-
04-01-77	1245	23.2	-	-	-	-
04-06-77	0947	22.6	-	-	-	-
04-22-77	0932	22.0	-	-	-	-
05-04-77	1330	23.2	-	-	-	-
06-16-77	-	26.8	-	-	-	-
08-01-77	-	28.2	-	-	-	-
08-27-77	0950	28.8	-	-	-	End 1977 pumping season 08-26-77.
12-09-77	1500	22.4	-	-	-	-
01-06-78	1530	22.2	-	-	-	-
01-24-78	0920	22.3	-	-	-	-
02-01-78	1414	22.6	-	-	-	-
02-08-78	0955	23.1	-	-	-	-
02-21-78	1604	22.7	-	-	-	-
02-22-78	1017	22.7	-	-	-	Prior to pumping well 24S.2E.7.231.
02-22-78	1520	24.9	-	-	-	After pumping well 24S.2E.7.231 for 5.0 hours.
03-16-78	1527	23.2	-	-	-	-
03-28-78	0958	26.4	-	-	-	Start 1978 pumping season on 02-23-78.
04-04-78	1132	27.7	-	-	-	-
04-10-78	1541	27.4	-	-	-	-
05-01-78	1543	29.2	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
05-23-78	1400	25.5	-	-	-	-
06-01-78	1000	27.0	-	-	-	-
07-06-78	0835	32.2	-	-	-	-
08-08-78	1643	33.8	-	-	-	End 1978 pumping season 08-09-78.
09-13-78	1451	28.4	-	-	-	-
10-27-78	1026	26.7	-	-	-	-
11-21-78	0915	25.7	-	-	-	-
12-22-78	1526	25.3	-	-	-	-
				24S.2E.7.234b		
09-30-76	-	16.9	-	-	-	-
02-04-77	1336	17.2	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-09-77	1053	17.2	-	-	-	After pumping well 24S.2E.17.423a for 4.9 days.
03-12-77	1347	17.7	-	-	-	Start 1977 pumping season; prior to pumping well 24S.2E.7.231.
03-14-77	1327	18.0	-	-	-	After 24S.2E.7.231 pumped 2.0 days.
03-21-77	1633	18.4	-	-	-	-
03-28-77	1555	18.8	-	-	-	-
04-06-77	0945	19.2	-	-	-	-
04-22-77	0933	20.2	-	-	-	-
05-04-77	1330	20.8	-	-	-	-
06-16-77	-	22.8	-	-	-	-
08-01-77	-	24.7	-	-	-	-
08-27-77	0950	25.6	-	-	-	End 1977 pumping season 08-26-77.
12-09-77	1500	22.8	-	-	-	-
01-06-78	1530	21.5	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
01-24-78	0920	22.4	-	-	-	-
02-01-78	1432	22.5	-	-	-	-
02-08-78	0955	22.6	-	-	-	-
02-21-78	1600	22.8	-	-	-	-
02-22-78	1015	21.0	-	-	-	Prior to pumping well 24S.2E.7.231.
02-22-78	1512	21.0	-	-	-	After pumping well 24S.2E.7.231 for 5.0 hours.
03-16-78	1525	22.6	-	-	-	-
03-28-78	1000	23.1	-	-	-	Start 1978 pumping season on 03-23-78.
04-04-78	1132	23.6	-	-	-	-
04-10-78	1542	24.0	-	-	-	-
05-01-78	1542	25.4	-	-	-	-
05-23-78	1400	25.5	-	-	-	-
06-01-78	1000	25.6	-	-	-	-
07-06-78	0840	28.2	-	-	-	-
08-08-78	1640	30.4	-	-	-	End 1978 pumping season 08-09-78.
09-13-78	1452	28.6	-	-	-	-
10-27-78	1027	27.1	-	-	-	-
11-21-78	0915	25.3	-	-	-	-
12-22-78	1527	25.7	-	-	-	-
				24S.2E.17.111a		
02-22-78	0940	18.8	-	-	-	-
02-22-78	1510	19.0	-	-	-	-
03-27-78	1100	30.2	-	-	-	-
04-04-78	0955	31.8	-	-	-	-
04-04-78	-	19.4	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
04-08-78	-	104.5A	760	18	2,630	-
04-10-78	-	105.1A	660	18	2,630	-
04-19-78	-	35.0	-	-	-	-
04-26-78	-	31.0	-	-	-	-
05-01-78	-	31.8	-	-	-	-
05-02-78	-	27.8	-	-	-	-
05-08-78	-	21.4	-	-	-	-
06-01-78	-	31.9	-	-	-	-
06-21-78	-	-	600	18	-	-
08-11-78	-	-	620	18.5	-	-
				24S.2E.17.214		
02-07-78	1125	17.5	-	-	-	-
02-07-78	1605	17.5	-	-	-	-
02-08-78	0925	17.7	-	-	-	-
03-27-78	-	38.7	-	-	-	-
04-04-78	-	33.2	-	-	-	-
04-10-78	-	89.4A	1,600	18	2,830	-
04-13-78	-	-	970	18	-	-
04-19-78	-	33.9	-	-	-	-
04-26-78	-	33.2	-	-	-	-
05-01-78	-	-	1,600	18	-	-
05-23-78	-	22.9	-	-	-	-
06-01-78	-	81.0A	800	18.5	2,920	-
06-02-78	-	-	1,010	18	-	-
06-21-78	-	-	1,050	18	-	-
				24S.2E.17.223		
10-03-72	-	19.8	-	-	-	-
11-27-72	-	18.0	-	-	-	-
03-08-77	-	-	920	18.5	-	-
03-11-77	-	-	820	17.5	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
08-01-77	0	0	980	19.5	-	-
03-28-78	1525	-	790	18.5	-	-
04-10-78	1420	-	860	18.5	-	-
06-21-78	-	-	810	19.0	-	-
			24S.2E.17.322 (EBID well 3)			
07-31-75	0716	14.6	-	-	-	Prior to pumping.
08-01-75	1255	107.6A	550	20	3,050	After pumping 21.7 hours.
07-12-76	1024	14.8	-	-	-	Prior to pumping.
07-12-76	1026	77.1A	1400	18	-	After pumping 1 minute.
07-12-76	1100	93.5A	1400	18	-	-
07-12-76	1421	102.6A	1180	19	2,960	-
07-13-76	0734	108.2A	800	18	2,710	-
07-14-76	1600	111.8A	670	18	2,880	-
07-16-76	1435	109.1A	560	18	2,790	-
07-28-76	0930	110.1A	520	18	2,860	After pumping 16 days.
02-04-77	1309	14.2	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1012	21.6	-	-	-	After well 24S.2E.17.423a pumped 3.8 days.
03-12-77	1608	17.2	-	-	-	Prior to pumping; begin 1977 pumping season.
03-12-77	1640	94.3A	1,260	18	-	After pumping 24 minutes.
03-14-77	1345	107.1A	630	18	2,985	-
03-16-77	1515	111.0A	540	18	2,730	-
03-18-77	1500	112.9A	520	18	2,630	After pumping 5.9 days.
03-21-77	1700	111.0A	520	18	2,710	-
03-24-77	1425	111.4A	510	18.5	2,680	-
03-28-77	1640	110.7A	510	18	2,720	-
04-01-77	1155	111.1A	520	17.5	2,790	-
04-06-77	1000	108.5A	510	18	2,830	-
04-15-77	1415	110.8A	510	18	2,710	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
04-22-77	0950	110.5A	505	18	2,730	-
04-29-77	1430	112.2A	505	18.5	2,660	-
05-04-77	0945	112.6A	505	18.5	2,730	-
05-12-77	1530	-	520	18	2,640	-
05-20-77	1400	111.5A	505	18	2,710	-
05-26-77	1425	110.8A	520	18	2,700	-
06-02-77	0920	113.6A	520	18	2,610	-
06-08-77	1440	111.7A	515	19.5	2,590	-
06-16-77	0915	112.6A	520	18	2,630	-
06-24-77	0920	113.2A	520	18	2,640	-
07-01-77	1045	111.7A	520	18	2,710	-
07-08-77	1350	110.9A	520	18	2,720	-
07-14-77	1440	112.7A	500	19	2,630	-
07-22-77	1030	113.2A	500	18	2,710	-
08-01-77	1000	112.8A	520	18	2,720	Different conductance meter.
08-05-77	1050	114.1A	550	18.5	2,670	-
08-12-77	0930	115.9A	535	18.5	2,620	-
08-19-77	0950	114.3A	545	18.5	2,660	Another change in conductance meter.
08-26-77	1100	114.7A	560	18	2,620	End of 1977 pumping season.
12-09-77	1445	17.0	-	-	-	-
01-06-78	1555	18.1	-	-	-	-
01-24-78	0950	18.4	-	-	-	-
02-07-78	1610	18.0	-	-	-	-
02-16-78	0840	17.6	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1400	19.4	-	-	-	-
02-16-78	1633	20.5	-	-	-	After pumping well 24S.2E.17.423a 6.2 hours.
03-16-78	1444	20.6	-	-	-	-
03-23-78	0749	-	1,120	18	-	Begin 1978 pumping season 03-23-78 at 0630.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
03-23-78	0830	-	1,170	18	-	-
03-23-78	1052	-	1,120	18	-	-
03-23-78	1605	-	990	18.5	-	-
03-24-78	1600	110.9A	715	18	2,600	-
03-28-78	1130	114.3A	560	18	2,570	-
04-04-78	1800	113.1A	560	18	2,600	-
04-10-78	1300	118.2A	555	18	2,470	-
04-19-78	1430	113.6A	550	18.5	2,530	-
04-26-78	1445	112.2A	555	18.5	2,580	-
05-01-78	1130	113.1A	560	18	2,580	Off at 1600.
05-02-78	1340	29.0	-	-	-	-
05-08-78	1525	22.0	-	-	-	-
05-23-78	1300	24.0	-	-	-	-
06-01-78	1045	33.4	-	-	-	-
06-06-78	1125	115.0A	550	18.5	2,510	-
06-09-78	1350	-	550	18.5	-	-
06-12-78	1530	115.2A	560	19	2,470	-
06-21-78	1040	120.0A	565	18.5	2,350	-
06-27-78	1530	116.7A	570	18	2,450	-
07-05-78	1515	-	575	18.5	2,460	-
07-06-78	0957	114.5A	-	-	2,480	-
07-12-78	0920	117.8A	560	19	2,410	-
07-19-78	0855	119.2A	590	19	2,340	-
07-25-78	0925	28.65	-	-	-	-
07-27-78	0910	116.0A	560	18.5	2,480	-
08-01-78	1630	-	550	19	2,300	-
08-08-78	1650	116.8A	575	18.5	2,420	End 1978 pumping season 08-09-78.
08-28-78	1550	21.3	-	-	-	-
09-28-78	1000	19.8	-	-	-	-
10-27-78	1050	19.7	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
11-02-78	1400	19.4	-	-	-	-
11-22-78	1440	18.8	-	-	-	-
12-15-78	1400	18.7	-	-	-	-
12-22-78	1425	19.0	-	-	-	-
				24S.2E.17.413		
05-08-73	-	43.3A	2,500	20	1,560	-
03-18-74	-	10.4	-	-	-	-
03-30-74	-	9.9	-	-	-	-
04-29-74	-	8.9	-	-	-	-
05-29-74	-	9.4	-	-	-	-
06-27-74	-	7.8	-	-	-	-
07-29-74	-	10.0	-	-	-	-
09-03-74	-	7.4	-	-	-	-
10-02-74	-	8.4	-	-	-	-
10-30-74	-	8.0	-	-	-	-
12-02-74	-	8.4	-	-	-	-
01-07-75	-	8.6	-	-	-	-
01-29-75	-	8.7	-	-	-	-
02-28-75	-	9.2	-	-	-	-
03-28-75	-	9.1	-	-	-	-
04-30-75	-	9.0	-	-	-	-
06-02-75	-	8.7	-	-	-	-
07-03-75	-	8.6	-	-	-	-
07-31-75	0733	8.2	-	-	-	Prior to pumping nearby wells.
08-01-75	1404	8.4	-	-	-	After pumping nearby wells.
08-04-75	-	8.2	-	-	-	-
09-05-75	-	7.8	-	-	-	-
10-02-75	-	8.2	-	-	-	-
11-03-75	-	8.8	-	-	-	-
12-04-75	-	9.2	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
01-02-76	-	9.5	-	-	-	-
02-02-76	-	9.6	-	-	-	-
03-30-76	-	9.2	-	-	-	-
05-06-76	-	8.6	-	-	-	-
06-02-76	-	7.9	-	-	-	-
07-01-76	-	7.4	-	-	-	-
07-13-76	0935	7.6	-	-	-	Nearby wells pumping.
07-28-76	0945	7.8	-	-	-	After pumping nearby wells about 15 days; water in canal.
08-02-76	-	7.8	-	-	-	-
08-30-76	-	8.8	-	-	-	-
09-30-76	-	8.0	-	-	-	-
11-01-76	-	8.3	-	-	-	-
12-01-76	-	8.6	-	-	-	-
01-06-77	-	9.0	-	-	-	-
02-04-77	1306	9.2	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-10-77	0806	9.2	-	-	-	After well 24S.2E.17.423a pumped 5.7 days.
03-08-77	-	9.8	-	-	-	-
02-08-78	-	12.2	-	-	-	-
02-16-78	0855	12.2	-	-	-	-
02-16-78	1405	12.2	-	-	-	-
02-16-78	1618	12.2	-	-	-	-
03-28-78	1130	13.3	-	-	-	-
04-04-78	0925	13.2	-	-	-	-
04-10-78	1440	13.4	-	-	-	-
09-08-78	-	14.1	-	-	-	-
11-21-78	1045	13.8	-	-	-	-
12-15-78	1445	13.7	-	-	-	-
12-22-78	1620	13.6	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
			24S.2E.17.414a			
09-10-76	-	10.8	-	-	-	-
10-14-76	-	13.0	-	-	-	-
02-04-77	1341	11.4	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1614	33.0	-	-	-	After 24S.2E.17.423a pumped 4 days.
03-21-77	1705	50.0	-	-	-	Start 1977 pumping season on 03-12-77.
03-38-77	1032	48.4	-	-	-	-
05-04-77	0831	50.7	-	-	-	-
08-27-77	0910	55.8	-	-	-	End 1977 pumping season on 08-26-77.
12-09-77	1430	14.0	-	-	-	-
01-24-78	1020	15.7	-	-	-	-
02-01-78	1018	22.6	-	-	-	-
02-07-78	1057	15.4	-	-	-	-
02-08-78	0926	15.4	-	-	-	-
02-16-78	0842	14.8	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1646	30.4	-	-	-	After pumping well 24S.2E.17.423a.
03-16-78	1433	17.2	-	-	-	-
03-28-78	1455	57.0	-	-	-	Start 1978 pumping season on 03-23-78.
04-04-78	1105	54.5	-	-	-	-
04-10-78	1305	62.4	-	-	-	-
05-01-78	0914	54.0	-	-	-	-
05-23-78	1309	22.0	-	-	-	-
06-01-78	0900	30.0	-	-	-	-
07-05-78	1328	57.0	-	-	-	-
08-08-78	1721	61.2	-	-	-	End 1978 pumping season on 08-09-78.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
09-13-78	0847	19.9	-	-	-	-
10-27-78	1101	16.8	-	-	-	-
11-22-78	1450	16.0	-	-	-	-
12-22-78	1546	16.2	-	-	-	-
				24S.2E.17.414b		
09-10-76	-	16.7	-	-	-	-
10-14-76	-	16.8	-	-	-	-
02-04-77	1409	15.6	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1613	24.4	-	-	-	After 24S.2E.17.423a pumped 4.1 days.
03-21-77	1704	27.2	-	-	-	Start 1977 pumping season on 03-12-77.
03-28-77	1030	27.8	-	-	-	-
05-04-77	0830	27.0	-	-	-	-
08-27-77	0910	33.0	-	-	-	End 1977 pumping season on 08-26-77.
12-09-77	1430	17.6	-	-	-	-
01-24-78	1020	18.5	-	-	-	-
02-01-78	0916	19.0	-	-	-	-
02-07-78	1059	18.1	-	-	-	-
02-08-78	0925	18.0	-	-	-	-
02-16-78	0840	17.6	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1645	23.3	-	-	-	After pumping well 24S.2E.17.423a.
03-16-78	1436	18.2	-	-	-	-
03-28-78	1450	29.2	-	-	-	Start 1978 pumping season on 03-23-78.
04-04-78	1100	30.4	-	-	-	-
04-10-78	1300	32.4	-	-	-	-
05-01-78	0913	32.2	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
05-23-78	1308	22.8	-	-	-	-
06-01-78	0900	23.4	-	-	-	-
07-05-78	1320	35.3	-	-	-	-
08-08-78	1721	38.0	-	-	-	End 1978 pumping season on 08-09-78.
09-13-78	0846	22.8	-	-	-	-
10-27-78	1100	21.0	-	-	-	-
11-22-78	1450	19.1	-	-	-	-
12-22-78	1545	18.8	-	-	-	-
			24S.2E.17.423a (EBID well 1)			
07-21-73	1138	11.4	-	-	-	Prior to pumping.
07-25-73	0700	103.0A	-	-	3,600	Pumped at different rates for 3 days; but at steady rate for previous 15 hours.
03-18-74	-	12.7	-	-	-	-
03-30-74	-	13.2	-	-	-	-
04-29-74	-	12.3	-	-	-	-
05-29-74	-	12.4	-	-	-	-
06-27-74	-	12.7	-	-	-	-
07-29-74	-	14.5	-	-	-	-
09-03-74	-	11.3	-	-	-	-
10-02-74	-	11.8	-	-	-	-
10-30-74	-	11.7	-	-	-	-
12-02-74	-	11.7	-	-	-	-
01-07-75	-	11.6	-	-	-	-
01-29-75	-	12.2	-	-	-	-
02-28-75	-	12.5	-	-	-	-
03-28-75	-	15.9	-	-	-	-
04-30-75	-	12.4	-	-	-	-
06-02-75	-	12.7	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
07-03-75	-	13.0	-	-	-	-
07-31-75	0803	13.2	-	-	-	Prior to pumping.
08-01-75	1155	115.0A	470	19	3,780	After pumping 21 hours.
08-04-75	-	13.0	-	-	-	-
09-05-75	-	14.2	-	-	-	-
10-02-75	-	11.8	-	-	-	-
11-03-75	-	11.6	-	-	-	-
12-04-75	-	11.4	-	-	-	-
01-02-76	-	11.4	-	-	-	-
02-02-76	-	13.2	-	-	-	-
03-08-76	-	11.6	-	-	-	-
03-30-76	-	11.5	-	-	-	-
05-06-76	-	11.8	-	-	-	-
06-02-76	-	12.9	-	-	-	-
07-01-76	-	14.2	-	-	-	-
07-12-76	0950	13.8	-	-	-	Prior to pumping.
07-28-76	0950	119.3A	460	19	3,360	After pumping 16 days.
08-02-76	-	13.3	-	-	-	-
09-07-76	-	12.8	-	-	-	-
09-30-76	-	11.6	-	-	-	-
10-18-76	-	11.3	-	-	-	-
11-01-76	-	11.0	-	-	-	-
12-01-76	-	10.8	-	-	-	-
01-06-77	0	10.9	-	-	-	-
02-02-77	1545	11.7	-	-	-	-
02-03-77	1610	11.7	-	-	-	Prior to pumping.
02-11-77	1028	114.6A	460	18.5	3,280	After pumping 6.8 days.
03-08-77	-	14.3	-	-	-	-
03-14-77	1405	20.5	-	-	-	Begin 1977 pumping season.
03-16-77	1525	121.2A	460	18.5	3,160	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
03-18-77	1505	123.8A	455	18.5	3,130	-
03-24-77	1430	121.3A	460	18.5	3,140	-
04-01-77	1130	121.6A	460	18.5	3,240	-
04-06-77	1030	25.6	-	-	-	-
04-15-77	1505	121.8A	460	18.5	3,160	-
04-22-77	1005	117.6A	460	18.5	2,980	Well off 5 days previous.
04-29-77	1445	120.9A	455	19	2,920	-
05-04-77	0925	120.9A	455	19	2,920	-
05-12-77	1540	-	460	19	2,880	-
05-19-77	1040	113.6A	450	19	2,570	-
05-26-77	1430	128.0A	460	19	3,160	Pump bowls adjusted.
06-02-77	0930	130.4A	460	18.5	3,100	-
06-08-77	1450	127.9A	460	19	3,190	-
06-16-77	0840	128.4A	460	18.5	3,200	-
06-24-77	0935	129.7A	455	19	3,110	-
07-01-77	1010	127.8A	460	18.5	3,170	-
07-08-77	1410	127.0A	460	18.5	3,070	-
07-14-77	1500	129.7A	450	19	3,080	-
07-22-77	1100	128.7A	440	19	3,050	-
08-01-77	1025	129.4A	475	19	3,130	Different conductance meter.
08-05-77	1040	130.6A	475	19	3,100	-
08-12-77	1000	128.2A	465	19	3,010	-
08-19-77	0925	130.5A	460	19	3,070	Another change in conductance meter.
08-26-77	1030	131.0A	480	19	3,010	End of 1977 pumping season.
12-09-77	1430	14.4	-	-	-	-
01-24-78	1005	15.8	-	-	-	-
02-07-78	1032	15.4	-	-	-	-
02-08-78	0905	15.4	-	-	-	-
02-14-78	1130	15.0	-	-	-	-
02-15-78	1330	15.0	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
02-16-78	0815	14.8	-	-	-	Prior to pumping.
02-16-78	1645	114.5A	480	18	3,360	After pumping 6.4 hours.
03-16-78	1410	16.3	-	-	-	-
03-24-78	1520	125.0A	480	18.5	3,220	Begin 1978 pumping season on 03-23-78.
03-28-78	1500	128.9A	480	18.5	3,160	-
04-04-78	1730	128.0A	480	18.5	3,160	-
04-10-78	1315	131.5A	480	19	3,100	-
04-19-78	1410	128.7A	475	19	3,100	-
04-26-78	1500	127.4A	480	19	3,070	-
05-01-78	1030	127.8A	475	18.5	2,990	-
05-02-78	1345	27.0	-	-	-	Many private deep wells in area pumping.
05-08-78	1535	20.6	-	-	-	-
05-23-78	1320	21.8	-	-	-	-
06-01-78	0840	27.0	-	-	-	Most private deep wells in area pumping.
06-02-78	0737	-	360	19	-	After 10 seconds of pumping.
06-02-78	0738	-	420	19.5	-	After 1 minute of pumping.
06-02-78	0739	-	470	19	-	After 2 minutes of pumping.
06-06-78	1035	130.7A	465	19	2,950	-
06-09-78	1350	-	470	19	-	-
06-12-78	1540	129.8A	480	19.5	3,040	-
06-21-78	0945	133.9A	465	19	2,950	-
06-27-78	1540	133.7A	470	19	2,960	-
07-05-78	1458	-	480	20	2,960	-
07-06-78	0940	132.0A	-	-	2,950	-
07-12-78	0935	133.7A	475	19.5	2,890	-
07-19-78	0910	136.7A	465	19	2,860	-
07-25-78	0920	27.9	-	-	-	-
07-27-78	0930	131.4A	465	19	2,950	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
08-01-78	1620	-	475	19	2,860	-
08-08-78	1700	135.2A	470	19	2,920	End of 1978 pumping season on 08-09-78.
08-28-78	1600	19.6	-	-	-	-
09-28-78	1005	18.0	-	-	-	-
10-27-78	1115	17.4	-	-	-	-
11-02-78	1410	17.0	-	-	-	-
11-21-78	1000	16.2	-	-	-	-
12-15-78	1410	15.8	-	-	-	-
12-22-78	1603	16.2	-	-	-	-
				24S.2E.17.423b		
09-30-76	-	16.0	-	-	-	-
10-13-76	-	16.6	-	-	-	-
10-18-76	-	16.0	-	-	-	-
10-19-76	-	16.1	-	-	-	-
11-01-76	-	15.7	-	-	-	-
12-01-76	-	15.5	-	-	-	-
01-06-76	-	15.3	-	-	-	-
02-04-77	1330	15.2	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1605	36.4	-	-	-	After 24S.2E.17.423a pumped for 4.1 days.
03-08-77	-	16.2	-	-	-	-
03-21-77	1545	40.4	-	-	-	Begin 1977 pumping season on 03-12-77.
03-24-77	1435	41.0	-	-	-	-
03-28-77	1000	40.9	-	-	-	-
05-04-77	0910	39.6	-	-	-	-
06-16-77	0850	44.3	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
08-01-77	1030	45.8	-	-	-	-
08-27-77	0850	46.2	-	-	-	End 1977 pumping season on 08-26-77.
12-09-77	1430	17.0	-	-	-	-
01-24-78	1007	18.1	-	-	-	-
02-01-78	1150	19.4	-	-	-	-
02-07-78	1044	17.8	-	-	-	-
02-08-78	0912	17.6	-	-	-	-
02-16-78	0959	17.2	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1729	36.4	-	-	-	After pumping well 24S.2E.17.423a for 7.2 hours.
03-16-78	1423	18.0	-	-	-	-
03-28-78	1510	43.0	-	-	-	Begin 1978 pumping season on 03-23-78.
04-04-78	1045	44.0	-	-	-	-
04-10-78	1320	46.4	-	-	-	-
05-01-78	1040	45.2	-	-	-	-
05-23-78	1315	22.8	-	-	-	-
06-01-78	0850	24.0	-	-	-	-
07-05-78	-	48.0	-	-	-	-
08-08-78	1707	50.8	-	-	-	End 1978 pumping season on 08-09-78.
09-13-78	0915	22.1	-	-	-	-
10-27-78	1110	20.3	-	-	-	-
11-21-78	1515	18.5	-	-	-	-
12-22-78	1555	18.3	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
				24S.2E.17.423c		
09-30-76	-	11.3	-	-	-	-
10-13-76	-	14.1	-	-	-	-
10-18-76	-	11.0	-	-	-	-
10-19-76	1016	12.3	-	-	-	-
10-19-76	1400	13.6	-	-	-	-
11-01-76	-	10.8	-	-	-	-
12-01-76	-	10.8	-	-	-	-
01-06-77	-	11.0	-	-	-	-
02-04-77	0935	11.8	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1606	54.5	-	-	-	After 24S.2E.17.423a pumped 4.1 days.
03-08-77	-	15.1	-	-	-	-
03-21-77	1550	67.2	-	-	-	Begin 1977 pumping season on 03-21-77.
03-24-77	1438	68.1	-	-	-	-
03-28-77	1001	66.2	-	-	-	-
05-04-77	0910	68.2	-	-	-	-
06-16-77	0850	71.7	-	-	-	-
08-01-77	1030	72.8	-	-	-	-
08-27-77	0851	73.4	-	-	-	End 1977 pumping season on 08-26-77.
12-09-77	1430	14.3	-	-	-	-
01-24-78	1007	15.9	-	-	-	-
02-01-78	1125	22.1	-	-	-	-
02-07-78	1046	15.6	-	-	-	-
02-08-78	0913	15.6	-	-	-	-
02-14-78	1132	15.2	-	-	-	-
02-15-78	1333	15.0	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
02-16-78	1015	15.0	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1730	51.9	-	-	-	After pumping well 24S.2E.17.423a for 7.2 hours.
03-16-78	1410	17.4	-	-	-	-
03-28-78	1513	73.3	-	-	-	Begin 1978 pumping season on 03-23-78.
04-04-78	1047	72.6	-	-	-	-
04-10-78	1320	78.8	-	-	-	-
05-01-78	1043	72.2	-	-	-	-
05-23-78	1315	22.3	-	-	-	-
06-01-78	0850	29.1	-	-	-	-
07-05-78	-	74.5	-	-	-	-
08-08-78	1706	77.8	-	-	-	-
09-13-78	0916	20.0	-	-	-	-
10-27-78	1111	17.2	-	-	-	-
11-22-78	1515	16.2	-	-	-	-
12-22-78	1556	16.4	-	-	-	-
				24S.2E.17.423d		
09-30-76	-	9.1	-	-	-	-
10-13-76	-	10.0	-	-	-	-
10-18-76	-	9.2	-	-	-	-
11-01-76	-	9.4	-	-	-	-
12-01-76	-	9.8	-	-	-	-
01-06-77	-	10.2	-	-	-	-
02-04-77	0936	10.5	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-06-77	1255	11.0	-	-	-	After 24S.2E.17.423a pumped 1.9 days.
02-08-77	1610	11.1	-	-	-	After 24S.2E.17.423a pumped 4.1 days.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
02-11-77	1032	11.1	-	-	-	After 24S.2E.17.423a pumped 6.7 days.
03-08-77	-	11.1	-	-	-	-
03-21-77	1552	14.2	-	-	-	Begin 1977 pumping season on 03-12-77.
03-24-77	1439	14.2	-	-	-	-
03-28-77	1003	14.0	-	-	-	-
05-04-77	0910	14.6	-	-	-	-
06-16-77	0850	15.1	-	-	-	-
08-01-77	1030	16.2	-	-	-	-
08-27-77	0851	16.3	-	-	-	End 1977 pumping season on 08-26-77.
12-09-77	1430	13.2	-	-	-	-
01-24-78	1007	13.8	-	-	-	-
02-01-78	1102	15.4	-	-	-	-
02-07-78	1047	14.0	-	-	-	-
02-08-78	0914	14.0	-	-	-	-
02-14-78	1135	14.0	-	-	-	-
02-15-78	1336	14.0	-	-	-	-
02-16-78	1014	14.0	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1731	13.8	-	-	-	After pumping well 24S.2E.17.423a for 7.2 hours.
03-16-78	1410	14.8	-	-	-	-
03-28-78	1516	18.4	-	-	-	Begin 1978 pumping season on 03-23-78.
04-04-78	1051	17.9	-	-	-	-
04-10-78	1322	19.5	-	-	-	-
05-01-78	1045	18.0	-	-	-	-
05-23-78	1315	17.2	-	-	-	-
06-01-78	0853	19.2	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
07-05-78	-	20.7	-	-	-	-
08-08-78	1705	21.6	-	-	-	End 1978 pumping season on 08-09-78.
09-13-78	0917	16.5	-	-	-	-
10-27-78	1112	15.9	-	-	-	-
11-22-78	1515	15.5	-	-	-	-
12-22-78	1557	15.4	-	-	-	-
				24S.2E.17.423e		
09-30-76	-	7.8	-	-	-	-
10-13-76	-	8.3	-	-	-	-
10-18-76	-	8.0	-	-	-	-
10-19-76	-	8.2	-	-	-	-
11-01-76	-	8.6	-	-	-	-
12-01-76	-	9.2	-	-	-	-
01-06-77	-	9.8	-	-	-	-
02-04-77	0937	10.0	-	-	-	Prior to pumping well 24S.2E.17.423d.
02-11-77	1035	8.1	-	-	-	After 24S.2E.17.423d pumped for 7.8 days; water in canal beside well.
03-08-77	-	10.4	-	-	-	-
03-21-77	1553	9.0	-	-	-	Begin 1977 pumping season 03-12-77; water in canal.
03-28-77	1004	8.6	-	-	-	Water in canal.
05-04-77	0910	8.4	-	-	-	Water in canal.
06-16-77	0850	8.0	-	-	-	Water in canal.
08-01-77	1030	9.9	-	-	-	Water in canal.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
8-27-77	0851	9.8	-	-	-	Water in canal; end 1977 pumping season on 08-26-77.
12-09-77	1430	12.9	-	-	-	-
01-24-78	1007	13.2	-	-	-	-
02-01-78	1052	12.4	-	-	-	-
02-07-78	1048	13.4	-	-	-	-
02-08-78	0915	13.4	-	-	-	-
02-16-78	0834	13.4	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1653	13.4	-	-	-	After pumping well 24S.2E.17.423a for 6.6 hours.
03-16-78	1410	13.6	-	-	-	Water in canal; begin 1978 pumping season 03-23-78.
03-28-78	1518	12.8	-	-	-	Water in canal.
04-04-78	1053	12.4	-	-	-	Water in canal.
04-10-78	1324	12.4	-	-	-	Water in canal.
05-01-78	1050	12.3	-	-	-	Water in canal.
05-23-78	1315	15.2	-	-	-	Water in canal.
06-01-78	0855	15.7	-	-	-	Water in canal.
07-05-78	-	14.8	-	-	-	Water in canal.
08-08-78	1704	15.4	-	-	-	End 1978 pumping season on 08-09-78; water in canal.
09-13-78	0918	14.5	-	-	-	-
10-27-78	1113	15.6	-	-	-	-
11-22-78	1515	15.4	-	-	-	-
12-22-78	1558	15.4	-	-	-	-
				24S.2E.17.424		
05-02-73	-	10.9	520	-	-	-
07-22-73	0805	9.6	-	-	-	Prior to pumping well 24S.2E.17.423.
07-25-73	0825	14	-	-	-	After pumping well 24S.2E.17.423a for 3 days.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
07-31-75	0815	7.5	-	-	-	Prior to pumping EBID wells.
08-01-75	1305	18.6	-	-	-	After pumping EBID wells.
07-13-76	0930	20.5	-	-	-	-
07-21-76	1540	23.4	-	-	-	-
07-28-76	1010	22.4	-	-	-	-
02-04-77	1415	7.9	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1616	14.0	-	-	-	After pumping well 24S.2E.17.423a for 4.1 days.
				24S.2E.18.243		
02-10-72	-	16.0	-	-	-	-
01-23-73	-	15.6	-	-	-	-
01-23-74	-	14.1	-	-	-	-
01-07-75	-	12.4	-	-	-	-
01-09-76	-	13.1	-	-	-	-
02-04-77	1318	13.1	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-10-77	0812	13.4	-	-	-	After 24S.2E.17.423a pumped 5.7 days.
01-10-78	-	18.4	-	-	-	-
03-28-78	1125	18.6	-	-	-	-
04-04-78	0945	17.6	-	-	-	-
04-10-78	1432	18.8	-	-	-	-
				24S.2E.18.244		
07-30-75	1015	12.8	-	-	-	Prior to pumping.
07-30-75	1410	46.7A	1,100	22	2,240	After pumping for 178 minutes.
07-31-75	0737	12.9	-	-	-	Prior to pumping of nearby wells.
08-01-75	1400	13.5	-	-	-	After pumping nearby wells.
02-04-77	1313	12.9	-	-	-	Prior to pumping well 24S.2E.17.423a.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
02-10-77	0810	13.3	-	-	-	After pumping well 24S.2E.17.423a for 5.7 days.
02-07-78	1615	16.4	-	-	-	-
02-16-78	0850	16.4	-	-	-	-
02-16-78	1629	16.4	-	-	-	-
03-28-78	1120	19.8	-	-	-	-
04-04-78	0940	20.3	-	-	-	-
04-10-78	1430	20.8	-	-	-	-
05-23-78	1340	20.2	-	-	-	-
				24S.2E.19.111		
08-16-77	-	93.1A	650	18	2,510	With test pump.
09-16-77	-	19.1	-	-	-	-
03-27-78	-	17.8	-	-	-	-
04-04-78	0837	18.9	-	-	-	-
04-10-78	-	101.7A	690	18	2,320	-
07-12-78	-	98.5A	700	18	-	-
08-18-78	-	-	690	18.5	-	-
				24S.2E.19.422		
08-26-77	-	79.2A	600	18.5	600	Test pump used.
09-16-77	-	16.5	-	-	-	-
02-07-78	-	15.9	-	-	-	-
02-08-78	-	16.0	-	-	-	-
02-16-78	-	15.2	-	-	-	-
03-27-78	-	21.8	-	-	-	-
04-04-78	0842	22.9	-	-	-	-
04-10-78	-	101.5A	590	18	1,990	-
04-19-78	-	23.8	-	-	-	-
04-26-78	-	22.1	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
05-23-78	-	21.5	-	-	-	-
06-01-78	-	94.2A	580	18.5	2,080	-
06-21-78	-	29.2	-	-	-	-
07-12-78	-	95.9A	575	18.5	-	-
08-18-78	-	-	550	18.5	-	-
09-08-78	-	-	600	18	2,450	-
				24S.2E.20.411		
03-31-75	-	-	950	18	-	-
10-17-75	-	-	1,000	18	-	-
09-16-77	-	-	1,000	17.5	-	-
04-10-78	-	-	1,000	19	-	-
08-18-78	-	-	1,050	20	-	-
				24S.2E.21.112		
10-03-72	-	35.5A	1,230	19	1,430	-
03-18-74	-	14.7	-	-	-	-
05-29-74	-	9.5	-	-	-	-
06-27-74	-	7.6	-	-	-	-
09-03-74	-	7.3	-	-	-	-
10-02-74	-	7.6	-	-	-	-
10-30-74	-	8.4	-	-	-	-
12-02-74	-	8.4	-	-	-	-
01-07-75	-	10.0	-	-	-	-
01-29-75	-	10.2	-	-	-	-
02-28-75	-	11.0	-	-	-	-
03-28-75	-	13.2	-	-	-	-
04-30-75	-	10.0	-	-	-	-
06-02-75	-	9.8	-	-	-	-
07-03-75	-	8.6	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
07-31-75	0827	7.8	-	-	-	Prior to pumping nearby wells.
08-01-75	0215	8.2	-	-	-	After pumping nearby wells; water in canal.
08-04-75	-	8.0	-	-	-	-
09-05-75	-	6.8	-	-	-	-
10-02-75	-	7.4	-	-	-	-
11-03-75	-	9.2	-	-	-	-
12-04-75	-	10.2	-	-	-	-
01-02-76	-	10.8	-	-	-	-
02-02-76	-	10.4	-	-	-	-
03-08-76	-	10.4	-	-	-	-
03-30-76	-	9.9	-	-	-	-
05-06-76	-	10.4	-	-	-	-
06-02-76	-	9.6	-	-	-	-
07-01-76	-	7.2	-	-	-	Prior to pumping nearby wells.
07-12-76	1650	8.1	-	-	-	-
07-21-76	1610	8.6	-	-	-	-
07-28-76	1035	9.1	-	-	-	After pumping nearby wells for about 16 days; water in canal.
08-02-76	-	8.9	-	-	-	-
08-30-76	-	7.9	-	-	-	-
09-30-76	-	7.8	-	-	-	-
11-01-76	-	9.0	-	-	-	-
12-01-76	-	9.8	-	-	-	-
01-06-77	-	10.4	-	-	-	-
02-04-77	1256	14.1	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-09-77	0948	10.8	-	-	-	After pumping well 24S.2E.17.423a; 4.8 days; water in canal.

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
02-07-78	1545	14.1	-	-	-	-
02-16-78	0827	14.1	-	-	-	-
02-16-78	1340	14.1	-	-	-	-
02-16-78	1606	14.0	-	-	-	-
			24S.2E.21.123 (EBID well 4)			
07-31-75	0840	10.3	-	-	-	Prior to pumping.
08-01-75	1323	81.6A	700	21	3,140	After pumping 28.5 hours.
07-12-76	0910	10.0	-	-	-	Prior to pumping.
07-12-76	0913	66.1A	710	19	-	-
07-12-76	0937	72.4A	900	19	-	-
07-24-76	1700	83.6A	670	18.5	3,090	-
07-28-76	1020	82.9A	670	19	3,050	After pumping 16 days.
02-04-77	1302	13.2	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-08-77	1621	15.0	-	-	-	After pumping well 24S.2E.17.423a for 4.1 days.
03-16-77	1535	86.4A	830	18.5	2,790	Begin 1977 pumping season on 03-12-77.
03-18-77	1520	87.2A	720	18.5	2,830	-
03-21-77	1600	86.9A	680	18.5	2,790	-
03-24-77	1445	86.2A	670	18.75	2,880	-
03-28-77	0935	87.2A	660	18.5	2,880	-
04-01-77	1115	85.6A	680	18	2,910	-
04-06-77	1045	84.2A	660	19	2,960	-
04-15-77	1500	87.7A	680	18.5	2,830	-
04-22-77	1025	87.1A	660	19	2,830	-
04-29-77	1515	87.8A	670	19	2,830	-
05-04-77	1005	89.2A	670	19	2,810	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
05-12-77	1555	-	660	19	2,810	-
05-19-77	1110	89.8A	675	19	2,790	-
05-26-77	1450	89.1A	670	18.5	2,740	-
06-02-77	0940	91.4A	660	19	2,700	-
06-08-77	1500	88.3A	660	18	2,830	-
06-16-77	0930	89.2A	660	19	2,730	-
06-24-77	0945	89.0A	660	19	2,700	-
07-01-77	1020	88.4A	660	18.5	2,790	-
07-08-77	1420	86.5A	660	18.5	2,810	-
07-14-77	1530	88.4A	650	19.5	2,770	-
07-22-77	1130	88.4A	625	19	2,810	-
08-01-77	1045	87.2A	695	19	2,860	Different conductance meter.
08-05-77	1030	89.0A	695	19	2,790	-
08-12-77	1030	92.2A	715	19	2,680	-
08-19-77	0940	87.4A	695	19	2,740	-
08-26-77	1040	90.0A	705	19	2,750	End 1977 pumping season on 08-26-77.
12-09-77	1415	13.0	-	-	-	-
01-24-78	1000	14.6	-	-	-	-
02-07-78	1550	15.0	-	-	-	-
02-16-78	0820	14.0	-	-	-	Prior to pumping well 24S.2E.17.423a.
02-16-78	1345	14.5	-	-	-	-
02-16-78	1608	15.0	-	-	-	After pumping well 24S.2E.17.423a for 5.8 hours.
03-16-78	1450	17.9	-	-	-	-
03-24-78	1530	89.3A	875	19	2,730	Begin 1978 pumping season on 03-23-78.
03-28-78	1420	89.2A	780	19	2,750	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Continued

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
04-04-78	1745	92.0A	700	19	2,710	-
04-10-78	1330	92.1A	700	19	2,660	-
04-19-78	1400	91.1A	690	19	2,750	-
04-26-78	1510	92.6A	700	19	2,730	-
05-01-78	1100	92.3A	695	19	2,710	-
05-02-78	1350	26.2	-	-	-	-
05-08-78	1555	21.6	-	-	-	-
05-23-78	1330	21.2	-	-	-	-
06-01-78	0920	28.8	-	-	-	-
06-02-78	0850	-	870	20	-	Well on 30 seconds.
06-06-78	1050	93.0A	680	19	2,580	-
06-09-78	1355	-	700	19	-	-
06-12-78	1600	93.0A	680	19	2,640	-
06-21-78	1000	89.4A	680	19	2,650	-
06-27-78	1550	92.8A	700	19	2,640	-
07-05-78	1507	-	700	19	2,580	-
07-06-78	0920	±94.4A	-	-	-	-
07-12-78	0947	94.5A	700	19	2,620	-
07-19-78	0835	96.0A	700	19	2,570	-
07-25-78	0900	27.7	-	-	-	-
07-27-78	0940	92.5A	690	19.5	2,580	-
08-01-78	1600	-	690	19.5	2,560	Oil on water. Difficult to measure water level.
08-08-78	1712	-	700	19	2,620	End 1978 pumping season on 08-09-78.
08-28-78	1605	17.4	-	-	-	-
09-28-78	1015	15.7	-	-	-	-
10-27-78	1120	15.5	-	-	-	-
11-02-78	1425	15.2	-	-	-	-
11-21-78	1020	14.8	-	-	-	-
12-15-78	1420	14.6	-	-	-	-
12-22-78	1608	15.0	-	-	-	-

Table 5. Records of water levels, specific-conductance values, temperatures, and discharge measurements for selected wells in vicinity of the Elephant Butte Irrigation District wells - Concluded

Date	Hour	Water level (feet)	Specific conductance (micromhos at 25° Celsius)	Temperature (degrees Celsius)	Discharge (gallons per minute)	Remarks
				24S.2E.23.341		
02-24-72	-	12.6	-	-	-	-
02-26-73	-	14.4	-	-	-	-
02-20-74	-	12.3	-	-	-	-
01-08-75	-	11.3	-	-	-	-
01-09-76	-	11.1	-	-	-	-
01-09-78	-	12.4	-	-	-	-
04-04-78	-	15.7	-	-	-	-
				24S.2E.26.134		
10-16-72	-	-	820	19.5	-	-
04- -73	-	-	850	-	-	-
05-12-75	-	-	890	20.	-	-
09-29-75	-	-	920	20.	-	-
06-29-77	-	-	800	19.5	-	-
08-18-78	-	-	940	20.5	-	-
				24S.2E.29.224		
08-19-77	-	20.7	-	-	-	-
09-16-77	-	18.7	-	-	-	-
09-20-77	-	70.5A	560	18.5	2,530	-
03-27-78	-	18.7	-	-	-	-
04-04-78	0850	19.4	-	-	-	-
04-10-78	-	84.0A	580	18	2,340	-
04-19-78	-	20.6	-	-	-	-
04-26-78	-	20.2	-	-	-	-
06-01-78	-	78.3A	560	18.5	2,450	-
07-12-78	-	-	560	18.5	-	-