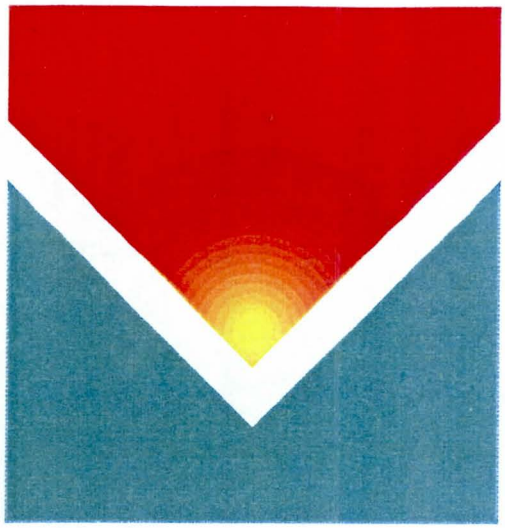

CITY OF
MESA

NORTHWEST WATER RECLAMATION PLANT

Hydrologic Conditions Report For the Recharge Site

May 15, 1987

Prepared by:
Kenneth D. Schmidt and Associates
Groundwater Consultants

Prepared for:
Black & Veatch

Submitted to:
The City of Mesa

HYDROGEOLOGIC CONDITIONS AT THE NORTHWEST WATER RECLAMATION PLANT RECHARGE SITE

Prepared for:

BLACK AND VEATCH
Phoenix, Arizona

Prepared by:

KENNETH D. SCHMIDT AND ASSOCIATES
Groundwater Quality Consultants
Phoenix, Arizona

May 1987

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4120 NORTH 20TH STREET, SUITE F
PHOENIX, ARIZONA 85016

May 15, 1987

Mr. Brad Hemken
Black and Veatch
3020 East Camelback
Phoenix, Arizona 85016

Re: City of Mesa Northwest
Water Reclamation Facility

Dear Brad,

Submitted herewith is our hydrogeologic report on the proposed Northwest Water Reclamation Facility recharge and extraction project.

Sincerely yours,

Ken Schmidt

Kenneth D. Schmidt

KDS/d

cc: Karl Kohlhoff, City of Mesa

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HYDROGEOLOGIC CONDITIONS AT THE NORTHWEST WATER RECLAMATION PLANT RECHARGE SITE

INTRODUCTION

This report was prepared as part of a submittal by the City of Mesa to obtain several permits for the recharge and recovery of effluent from the City of Mesa Northwest Water Reclamation Plant (WRP). These permits include:

Groundwater Quality (ADHS)

Reclaimed Wastewater Reuse (ADHS)

Underground Storage and Recovery Project (ADWR)

Recovery Wells (ADWR)

The City of Mesa Wastewater Treatment Facility (WWTF) is located in the northeast quarter of Section 18, T1N/R5E. This facility is located just south of the Salt River, between Evergreen Road on the west and the extension of Dobson Road on the east. The original primary treatment plant at the site was constructed in 1949, and secondary treatment facilities were added in 1963. In 1974 a treatment component for sulfide control was added. Historically, the effluent was disposed by irrigation of crops on a 130-acre site south and west of the WWTF, and by percolation from ponds west of the WWTF.

A new facility (the Northwest WRP) is in the process of being designed, and will replace the original facility in about 1989 (Black & Veatch 1986). Design flows for the Northwest WRP are shown in Table 1. The initial capacity (average dry weather

TABLE 1 - DESIGN FLOWS FOR THE NORTHWEST WATER RECLAMATION PLANT

Flow (mgd)	1990	2000	2010	2035
Average Dry Weather	8.0	12.0	12.0	16.0
Peak Dry Weather	8.5	14.0	13.5	19.0
Peak Wet Weather	10.1	12.9	14.9	18.7

From Black & Veatch (1986)

flow) of the Northwest WRP is 8 mgd and the ultimate capacity is 16 mgd. Treatment processes planned include sulfide control with iron chloride, primary sedimentation, activated sludge with nitrification-denitrification, disinfection, and tertiary filtration. Effluent that is not re-used directly would be recharged in a 35-acre area in the north half of the northwest quarter of Section 18, T1N/R5E. Amounts of recharge could eventually be small if direct re-use options are developed to the maximum extent possible. For purposes of this report, two alternative rates of recharge of the effluent from the Northwest WRP are considered: 1) four mgd, and 2) eight mgd. These are the most likely rates based on existing information.

Substantial information is available on groundwater conditions in the vicinity. The plant is located within the investigation boundary for the Indian Bend Wash Superfund Remedial Investigation. Detailed groundwater studies have been conducted in this area, particularly at the Motorola, Inc. facility southeast of McDowell and Hayden Roads, about two miles north of the Northwest WRP. In addition, detailed hydrogeologic studies have been undertaken at the Motorola, Inc. Center near Dobson and Broadway Roads, about two miles southeast of the Northwest WRP.

GROUNDWATER CONDITIONS

The Northwest WRP is located in the East Basin of the Salt River Valley.

Soils

Adams (1974) mapped soils in this part of the Salt River Valley. The topsoil in the area proposed for the percolation ponds was classified as "Alluvial land". This topsoil comprises recently deposited stream channel deposits of the Salt River. Much of the topsoil has been excavated for gravel processing in the area where the ponds would be located.

Well Inventory

Wells within one mile of the plant were inventoried in January 1987 (Appendix A and Plate 1). The boundary of the well inventory was McKellips Road on the north, McClintock Drive on the west, Longmore Street on the east, and Main Street on the south. Records of wells drilled and drillers logs were collected from the Arizona Department of Water Resources (ADWR). The ADWR groundwater site inventory of July 30, 1986 and the well registry report of December 31, 1986 were used in this inventory, as well as a field reconnaissance. Seven active wells were found within one mile of the proposed ponds. There were no public-supply wells within one mile of the proposed ponds. The closest active public-supply well (City of Tempe No. 7) is 5,700 feet southwest of the proposed ponds. There were two domestic wells about one-quarter mile southwest of the ponds and three irrigation wells within one mile and to the south or southeast of the ponds. There were two wells for gravel processing to the southwest and within about one-quarter mile of the proposed ponds and two

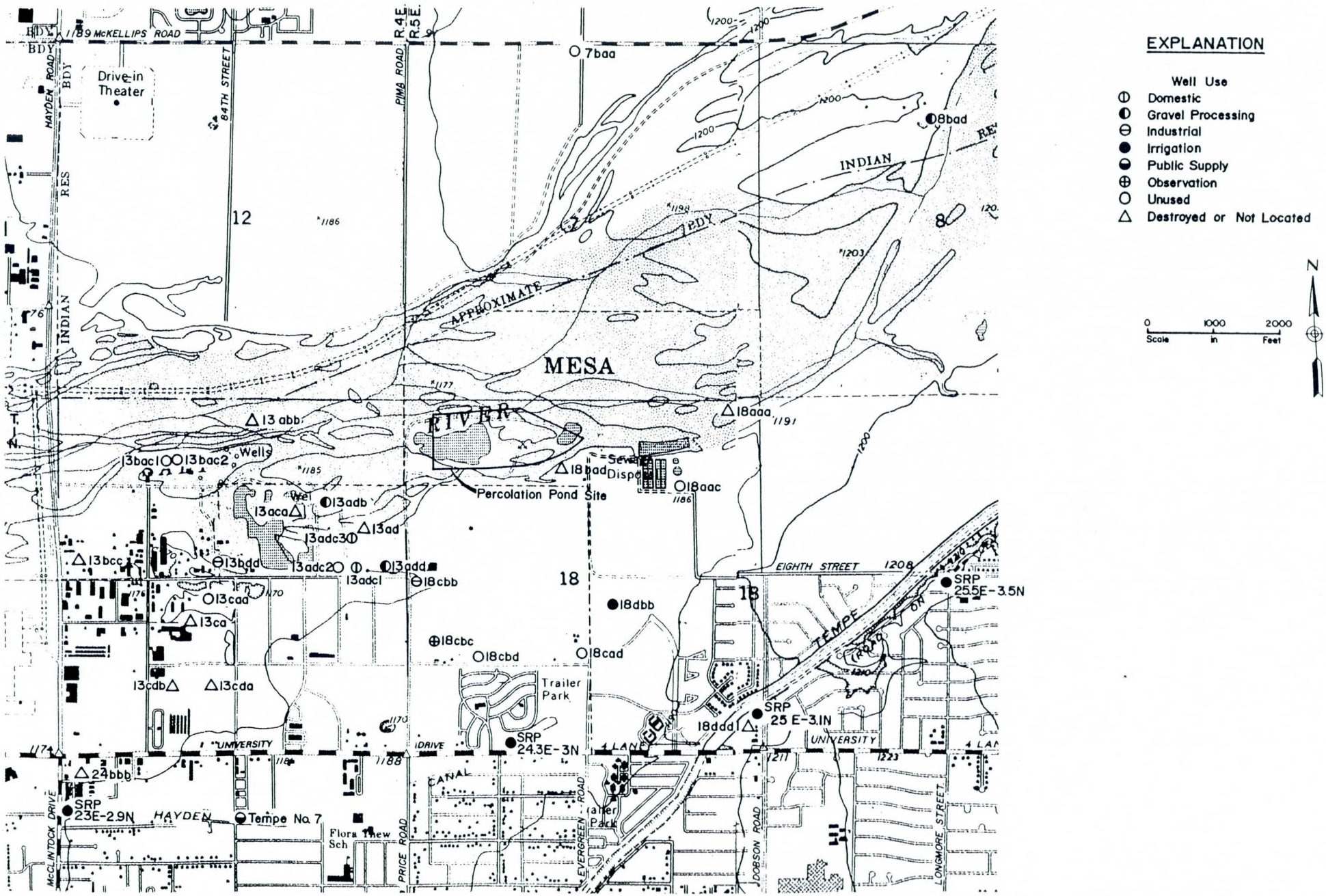


PLATE 1 - LOCATION OF WELLS IN THE VICINITY OF THE NORTHWEST WRP

industrial wells to the southwest and within one mile of the proposed ponds.

Depths of active wells as of January 1987 ranged from 300 to 800 feet, and depths of most large-capacity wells were 500 feet or more (Appendix A). There were a number of wells in the area that were unused, and most of these were less than 300 feet deep.

Subsurface Geology

Drillers logs are available for about two dozen wells in the vicinity, and copies of these logs are provided in Appendix B. Regional subsurface geologic conditions in the Salt River Valley were described by the U.S. Bureau of Reclamation (1977). Hydrogeologic studies as part of the Indian Bend Wash Superfund Remedial Investigation and at the Motorola, Inc. Center in Mesa have indicated that three major geologic units are present in the vicinity. The uppermost deposits, extending to a depth of about 125 to 150 feet, comprise the Upper Alluvial Unit. These strata are primarily boulders, cobbles, gravel, and sand, deposited by the ancestral Salt River. The under-lying deposits of the Middle Alluvial Unit are finer-grained, and extend to a depth of about 550 to 750 feet. These deposits are normally clay, sandy clay, and mixtures of fine sand, silt, and clay, but some relatively thin sand strata may be interbedded with the fine-grained deposits. The under-lying deposits of the Lower Alluvial Unit are slightly to moderately cemented gravel and sand, which extend to a depth exceeding 1,200 feet in the vicinity. Two subsurface geologic cross sections were developed during this study (Plate 2).

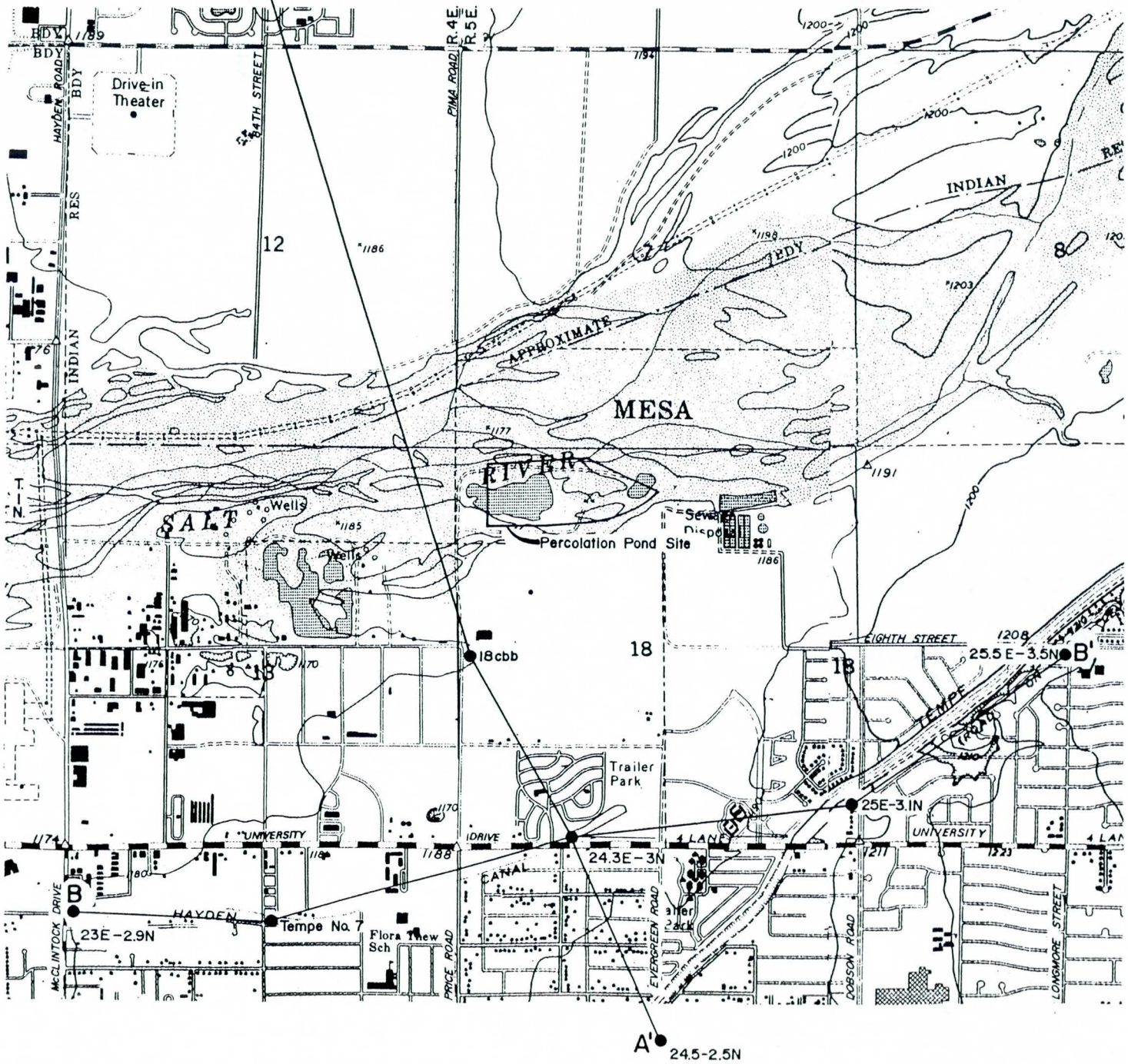


PLATE 2 - LOCATION OF SUBSURFACE GEOLOGIC CROSS-SECTIONS

Cross Section A-A' (Plate 3) extends from north to south, just west of the proposed percolation ponds. The north end of this cross section is near 84th Street and McKellips Road, and the south end is near Evergreen Road and Main Street. This section indicates that the deposits of the Upper Alluvial Unit thicken to the south. Near the proposed percolation ponds, these deposits are believed to be about 140 feet thick. When deposits of the Upper Alluvial Unit are saturated, they comprise a prolific aquifer. Deposits of the Middle Alluvial Unit in the vicinity often function as a confining bed, because of their low vertical permeability (Kenneth D. Schmidt and Associates 1986a). In the vicinity of the proposed percolation ponds, sandy clay or clayey sand is predominant in the Middle Alluvial Unit. Some sand strata are present in this unit at some locations, such as at Well (A-1-5)18cbb and SRP Well 24.5E-2.5N. These sand strata are commonly from 20 to 50 feet thick.

The top of the deposits of the Lower Alluvial Unit deepens to the north along Cross Section A-A'. Near the proposed percolation ponds, the top of these deposits is estimated to be about 550 feet below the land surface. Deposits of the Lower Alluvial Unit comprise a prolific aquifer and are tapped by many large-capacity wells in the area. Many large-capacity wells in the vicinity were drilled deep enough to tap several hundred feet of this unit, for purposes of adequate water production.

Cross Section B-B' (Plate 4) extends from west to east, about three-quarters of a mile south of the proposed percolation

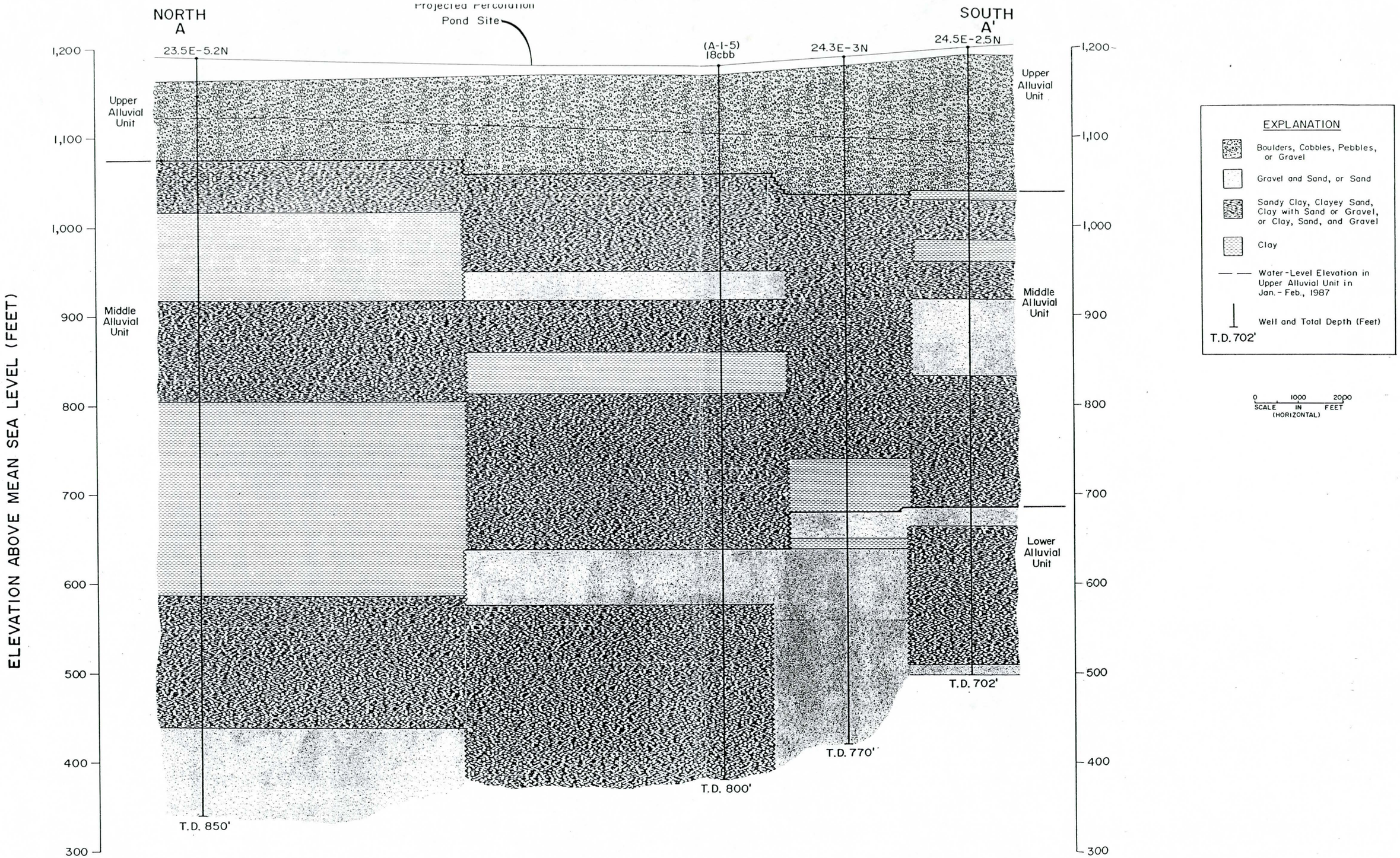


PLATE 3-SUBSURFACE GEOLOGIC CROSS-SECTION A-A'

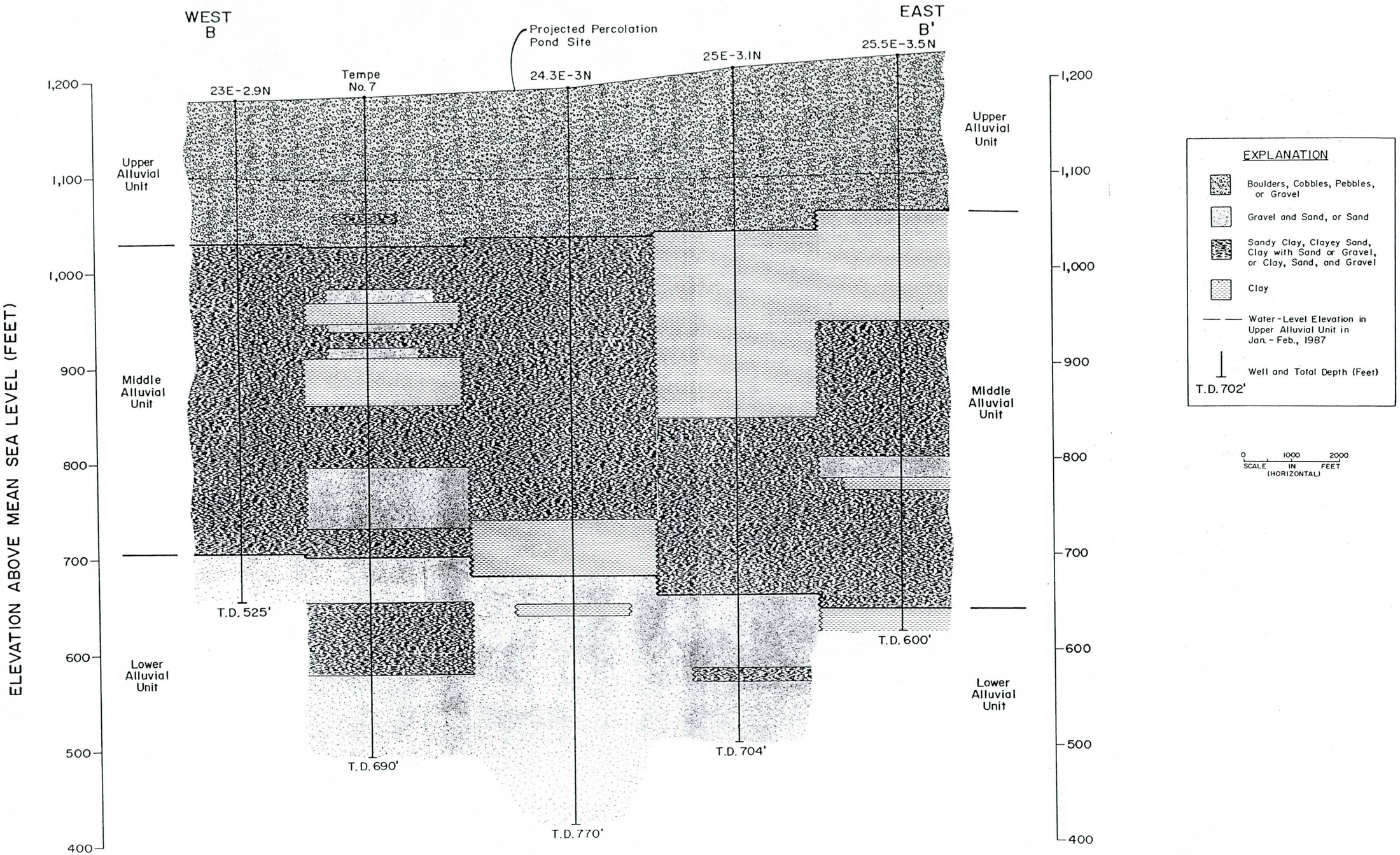


PLATE 4-SUBSURFACE GEOLOGIC CROSS-SECTION B-B'

ponds. The west end of this section is near McClintock Road and University Drive and the east end is near Longmore Street and the Tempe Canal. The Upper Alluvial Unit thickens to the east along this section. Deposits of the Middle Alluvial Unit become finer grained to the east along this section, from predominantly sandy clay west of SRP Well 25E-3.1N to clay farther east. The top of the Lower Alluvial Unit becomes progressively deeper to the east. Estimated water levels in the Upper Alluvial Unit are shown on both cross sections.

Water Levels

Water-level measurements were collected from the Salt River Project (SRP), the City of Tempe, the U.S. Geological Survey, and the ADWR. Depth to water in six SRP wells in the vicinity was measured as part of this investigation in January 1987. In addition, depth to water was measured in five other wells in the vicinity, including the well at the City of Mesa WWTF. Water-level measurements that were used in this evaluation are presented in Appendix C. Depth to water in the Upper Alluvial Unit near the proposed percolation ponds depends highly on amounts of streamflow in the Salt River and pumpage. Water levels rise during periods of streamflow in the river, and usually decline during periods of no flow. In January-February 1987, depth to water in wells in the vicinity of the Northwest WRP ranged from 77 to 140 feet. The shallowest depths were for shallow wells near the Salt River.

Water-level Elevations

Water-level elevations for January-February, 1987 are shown in Plate 5. Water-level elevation contours and the inferred direction of groundwater flow are based on measurements in wells about 250 feet deep or less. The contours and flow directions thus primarily indicate conditions in the Upper Alluvial Unit. The water-level elevation beneath the proposed percolation ponds was about 1,105 feet above sea level in January-February 1987. The direction of groundwater flow was to the south in the vicinity of the proposed ponds in January-February, 1987. This direction of flow is considered typical of that to be expected in the future in the vicinity of the percolation ponds. The direction of groundwater flow is from the Salt River to the south and southeast, where numerous large-capacity wells are present along the Tempe Canal and to the west. Water-level elevations in composite wells (tapping more than one geologic unit) were normally 20 to 50 feet lower than those in water from wells tapping only the Upper Alluvial Unit. This is indicative of a downward head gradient in the area.

Depth to Water

Long-term water-level hydrographs were prepared for two Salt River Project wells (Plate 6). SRP Well 24.5E-2.5N is located near Main Street and the Tempe canal, about one and one-half miles south of the proposed ponds. This well is perforated from 150 to 685 feet in depth, and primarily taps deposits of the Middle Alluvial Unit and the upper part of the Lower Alluvial

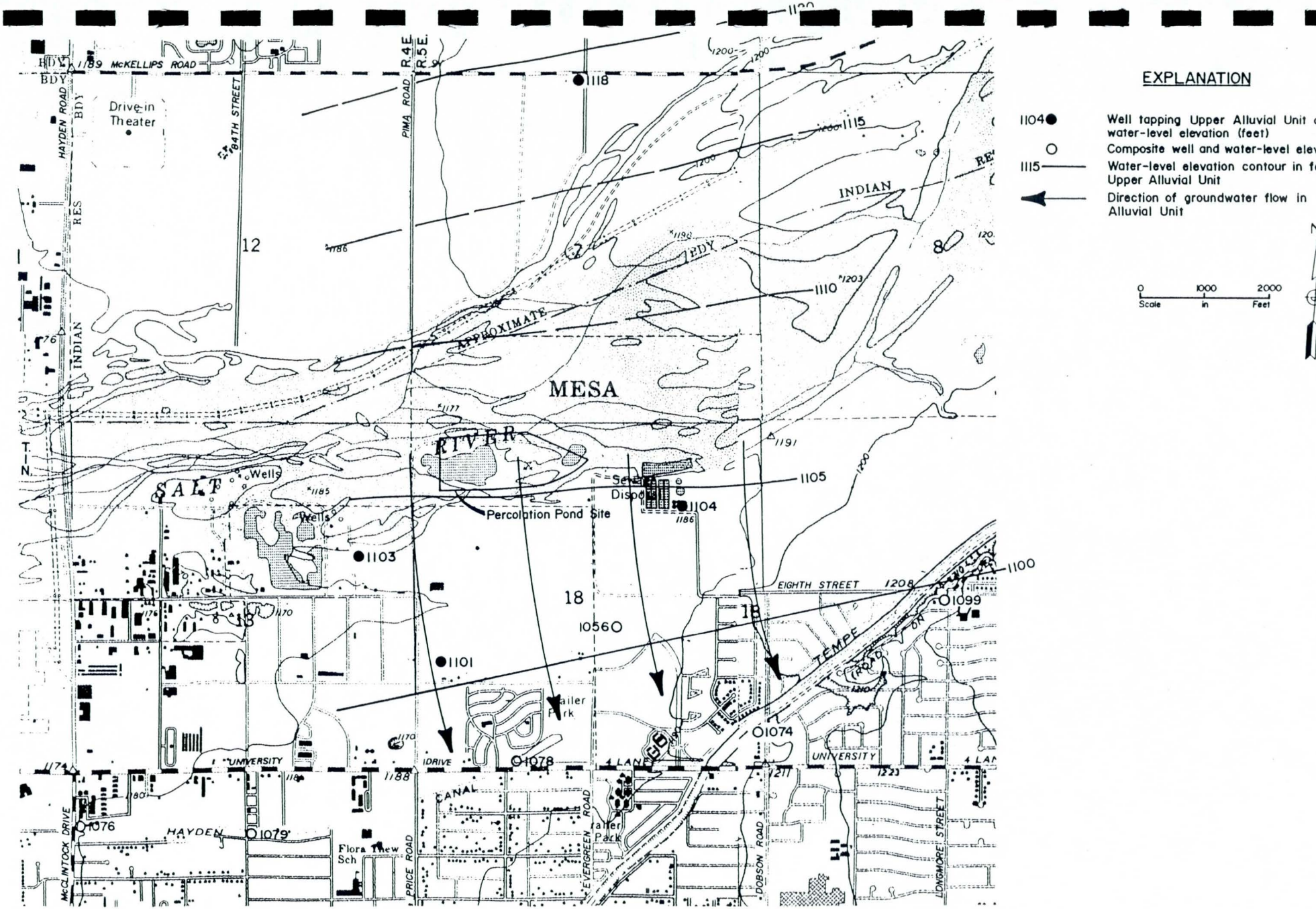


PLATE 5 - WATER-LEVEL ELEVATIONS IN WELLS IN THE VICINITY OF THE NORTHWEST WRP (JANUARY-FEBRUARY 1987)

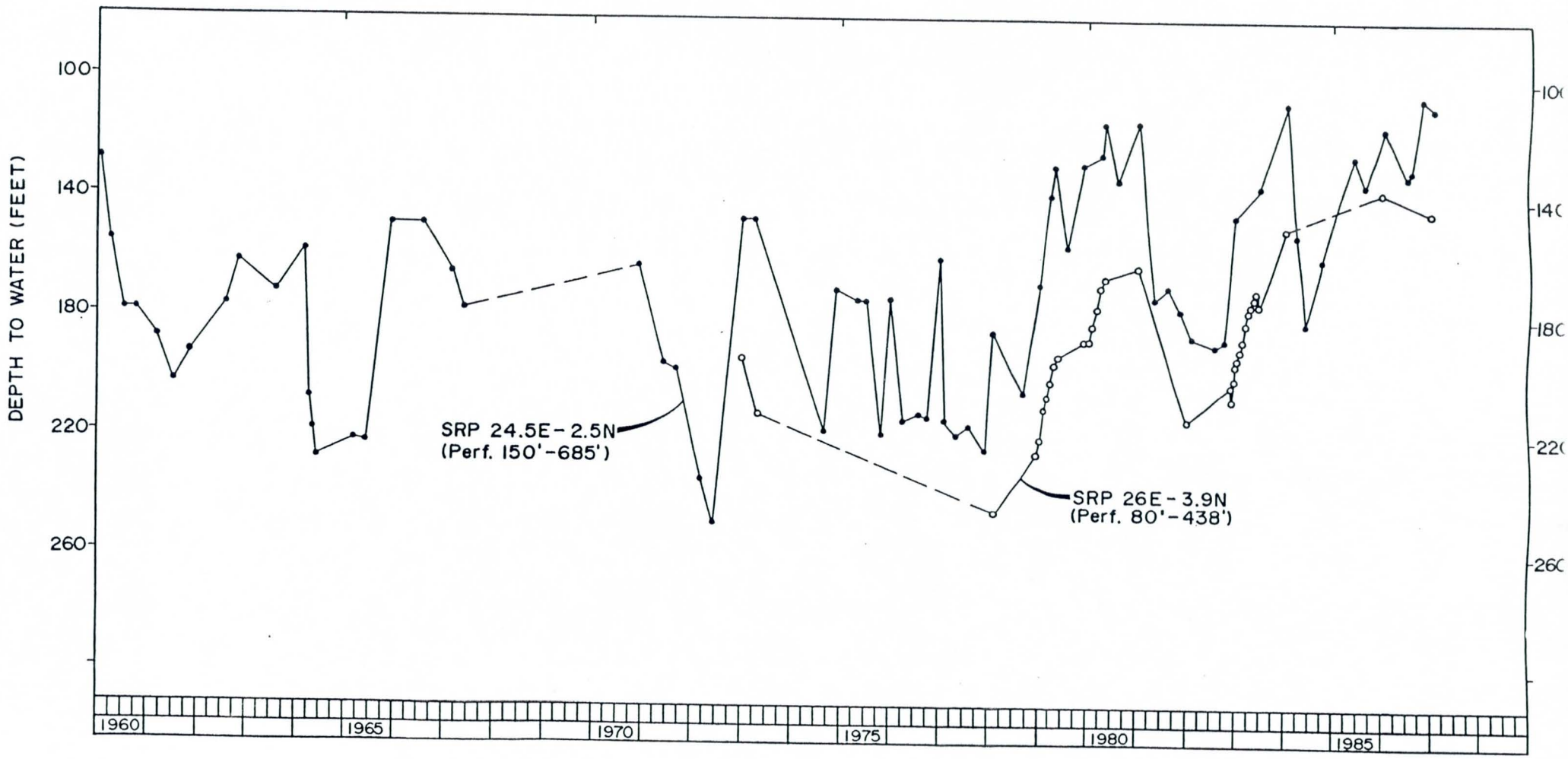


PLATE 6-WATER-LEVEL HYDROGRAPHS FOR TWO COMPOSITE WELLS

Unit. Water-level measurements for this well are available since 1960. SRP Well 26E-3.9N is located near Alma School Road (one-half mile east of Longmore Street) and the Tempe Canal, about two miles southeast of the proposed ponds. This well is perforated from 80 to 438 feet in depth and taps the Upper Alluvial Unit and part of the Middle Alluvial Unit.

Depth to water in these two wells is closely related to the availability of water in the Salt and Verde Rivers. When abundant water from these rivers is available, pumpage from SRP wells in the vicinity is minimal, and water levels rise. On the other hand, when river flows are low, the SRP wells are heavily pumped, and water levels decline. Water levels in both wells were relatively constant from 1960 until the late 1970's. Since the late 1970's, water levels in these wells have risen. This trend is due to the above normal releases of water down the Salt River, and the small amount of pumping of SRP wells since 1978 (discussed later). During non-pumping periods of SRP wells prior to 1979, depth to water in SRP Well 24.5E-2.5N normally ranged from 130 to 180 feet. However, since 1979 the shallowest water levels in this well ranged from about 105 to 135 feet. These water-level hydrographs indicate that there is no long-term overdraft in the vicinity of the Northwest WTP. In the recent decade, there has been a surplus of water from the Salt and Verde Rivers and a net recharge to the groundwater.

Water-level measurements in wells solely tapping the Upper Alluvial Unit and closer to the Salt River are particularly useful in evaluating shallow groundwater conditions near the

proposed percolation ponds. A water-level hydrograph for such a well is shown in Plate 7. Well (A-1-5)7baa is located near McKellips Road and Evergreen Road, about one mile north of the proposed ponds. This well is 235 feet deep, and a continuous water-level recorder was installed in this well in 1972. From 1972-78, the shallowest water levels in Well 7baa were about 70 feet deep. Since 1979, depth to water has been 50 feet or less during four different time periods. The shallowest water level has been 47 feet deep. Depth to water in Well (A-1-4) 13adc3, located about one-quarter mile southwest of the proposed ponds, was the same as that in Well 7baa on February 19, 1987. This indicates that the shallowest water-level elevation expected in the future beneath the percolation ponds is about 30 feet above that in January-February, 1987, or 1,137 feet above mean sea level.

Pumpage

Pumpage measurements were collected from the SRP, City of Tempe, and ADWR (Appendix D). On the long term, there is significant pumpage in the vicinity from SRP wells, and several gravel plant and industrial wells. For SRP wells, annual values of pumpage for a particular year are of limited value in this evaluation, because of the substantial variation in pumpage from year to year. Thus pumpage for SRP wells was evaluated over the past two decades. The annual pumpage from Salt River Project wells in the vicinity from 1978 to 1985 ranged from 81 to 5,053 acre-feet, and averaged 1,106 acre-feet. Pumpage from SRP wells

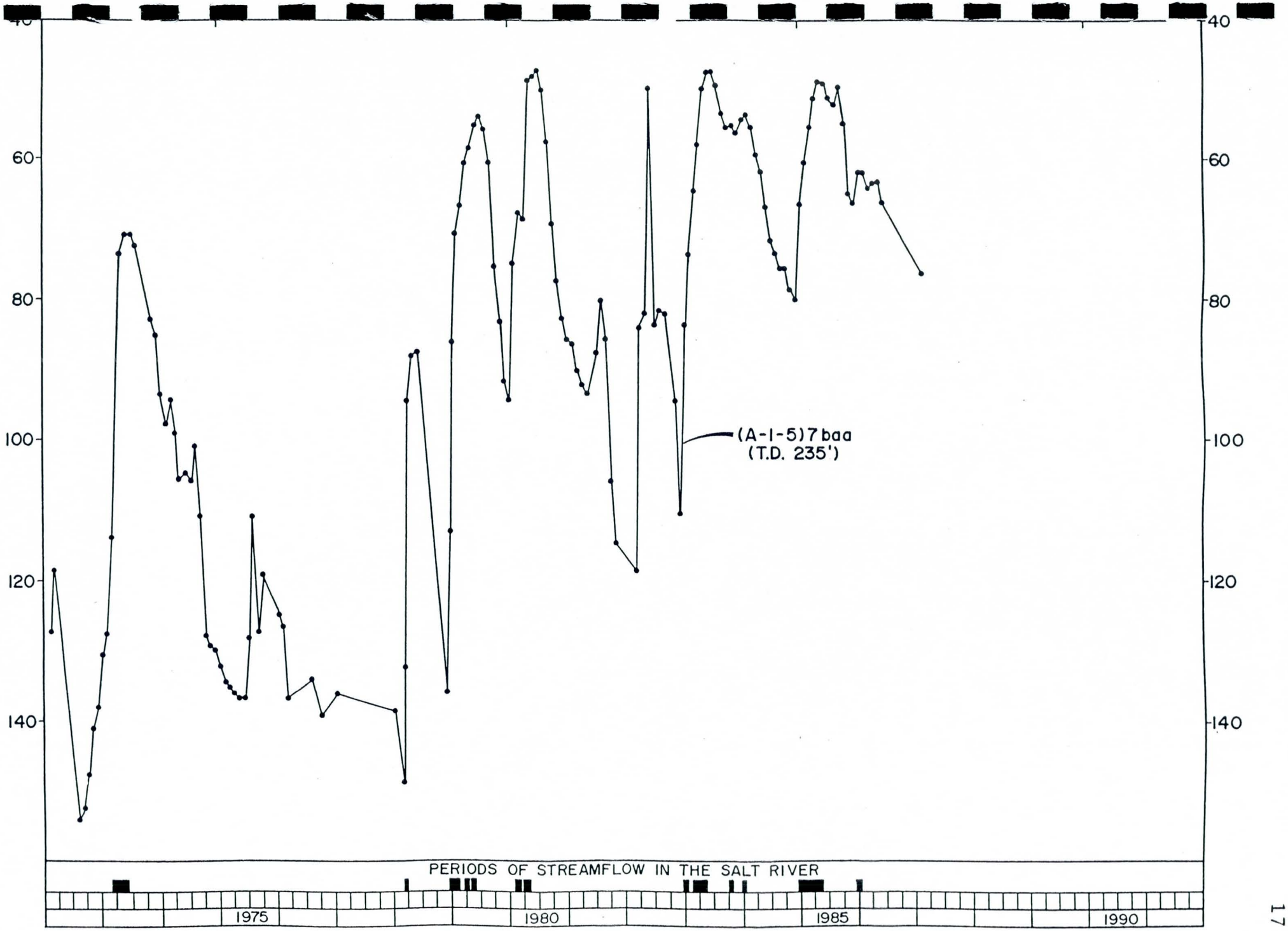


PLATE 7 - WATER-LEVEL HYDROGRAPH FOR WELL (A-1-5)7baa

in the vicinity was relatively low compared to previous periods, because of an abundance of water in the Salt and Verde Rivers. From 1965 to 1972, annual pumpage of SRP wells ranged from 1,033 to 8,799 acre-feet and averaged 6,085 acre-feet. This period was one of much less availability of water from the Salt and Verde River.

Annual amounts of pumpage for 1984 and 1985 from non-Salt River Project wells in the vicinity are tabulated in Appendix D. This pumpage was about 1,240 acre-feet in 1984, of which 398 acre-feet was for public supply, 435 acre-feet for industrial use, and 395 acre-feet was for gravel processing. These values are believed to be more representative than those for 1985, which were substantially lower, except for public supply. Future pumping for this purpose is projected to be much lower than in 1984, due to City of Tempe water service plans.

The pumpage records indicate that during periods of low runoff, most of the pumpage in the vicinity is from the SRP wells. However, during periods of abundant runoff, the pumpage is relatively evenly divided between SRP and other users. During periods of low runoff, a total annual pumpage in the range of 7,000 to 10,000 acre-feet can be expected. During periods of high runoff, a total annual pumpage in the range of 2,000 acre-feet can be expected.

Recharge

Mann and Rohne (1983) discussed recharge from streamflow in the Salt River near Phoenix. They evaluated recharge for a

period of substantial streamflow in the river. From March 1978 to June 1980, the total loss in streamflow between Granite Reef and Gillespie Dams was at least 474,000 acre-feet. This averaged more than 6,400 acre-feet per mile of stream channel. More specific losses were determined in the reach between Granite Reef Dam and Hayden Road, which includes the part of the channel adjacent to the proposed percolation ponds. A loss of 638 acre-feet of water per day was measured in this 15.4-mile reach in May 1979. The rate of recharge was equivalent to about 41 acre-feet per day per mile, or about 1,240 acre-feet per month per mile. Considering the wetted area of the channel, the average infiltration rate in this reach was about 1.3 feet per day.

On the long-term, most of the recharge to groundwater in the vicinity is derived from seepage of streamflow in the Salt River, canal seepage, and deep percolation of irrigation return flow. Amounts of recharge are sufficient to maintain an approximate stability in water levels on the long-term.

Aquifer Characteristics

Aquifer tests of 24 hours in duration were conducted at six SRP wells in the vicinity during Summer 1979, as part of the Salt River Valley groundwater model studies. Table 2 summarizes the results of these aquifer tests, which are believed to be representative of deposits tapped by many large-capacity wells in the vicinity. Specific capacities ranged from 24 to 119 gpm per foot. Aquifer transmissivities ranged from 75,000 to 165,000 gpd per foot, and averaged 105,000 gpd per foot. Three of these

TABLE 2 - RESULTS OF AQUIFER TEST
FOR SALT RIVER PROJECT WELLS

Well No.	Pumping Rate (gpm)	Static Level (feet)	Pumping Level (feet)	Specific Capacity (gpm/ft)	Transmissivity (gpd/ft)	Perforated Interval (feet)
23E-2.9N	3,700	118	147	119	165,000	150-457
24.3E-3N	2,300	131	228	24	80,000	145-720
24.5E-2.5N	2,700	125	186	45	76,000	160-685
25E-3.1N	2,300	161	223	37	75,000	170-682
25.5E-3.5N	3,700	199	243	85	128,000	150-585
26E-3.9N	2,200	194	230	63	107,000	80-438

Data from ADWR computer printout for Salt River Valley groundwater model study. Duration of the tests was for 24 hours.

wells were less than 590 feet deep and tapped only the Upper Alluvial Unit and Middle Alluvial Unit. For the shallower wells that produced most of their water from the Upper Alluvial Unit, the transmissivity averaged 133,000 gpd per foot. At the remaining wells, which produced most of their water from the upper part of the Lower Alluvial Unit, transmissivity averaged 77,000 gpd per foot.

Permeability of the Recent Alluvial Unit has been previously determined at a site near the Sky Harbor Airport, about eight miles west of the proposed percolation ponds and on the north side of the Salt River. An average transmissivity of 93,000 gpd per foot and a permeability of 2,000 gpd per square foot for the upper 50 feet of saturated deposits was determined from short-term aquifer tests at this site (Kenneth D. Schmidt and Associates, 1986b). Long-term measurement at the West Tunnel dewatering project (north of the Salt River at Central Avenue) indicated a transmissivity of 244,000 gpd per foot and average permeability of 1,900 gpd per square foot for the uppermost 150 feet of saturated deposits (Kenneth D. Schmidt and Associates, 1986c).

Short-term aquifer tests have been conducted at five monitor wells tapping the Upper Alluvial Unit at the Motorola, Inc. Center, at Dobson and Broadway Roads (Kenneth D. Schmidt and Associates 1986a). Water-level measurements and corrected recovery plots for these aquifer tests are presented in Appendix E. Table 3 summarizes the results of these tests. Transmissivity ranged from about 70,000 to 220,000 gpd per foot, and

TABLE 3 - RESULTS OF AQUIFER TEST FOR MONITOR WELLS TAPPING THE UPPER ALLUVIAL UNIT

Well	Date	Pumping Rate (gpm)	Static Level (feet)	Pumping Level (feet)	Specific Capacity (gpm/ft)	Transmissivity (gpd/ft)	Permeability (gpd/sq ft)
MW-2	10/31/85	124	107.7	109.7	62	82,000	2,000
MW-9	6/24/86	130	99.6	100.2	225	115,000	2,500
MW-11	9/15/86	129	111.0	115.3	30	107,000	1,700
MW-12	11/20/86	115	115.1	118.3	36	217,000	3,300
MW-14	1/12/87	119	127.3	132.9	22	70,000	1,300

Results are from Motorola, Inc. Mesa BIC Remedial Investigation. Duration of the tests was four hours for MW-9 and MW-11, and eight hours for the other wells.

averaged about 120,000 gpd per foot. Permeability ranged from 1,300 to 3,300 gpd per square foot, and averaged 2,200 gpd per square foot. The thickness of saturated deposits of the Upper Alluvial Unit at the time of the tests ranged from about 40 to 65 feet.

Storage coefficient has not been determined in the vicinity of the percolation ponds. However, interpretation of the results of the West Tunnel dewatering project indicated a storage coefficient of about 0.3 (Kenneth D. Schmidt and Associates, 1986c). Based on the particle size of the saturated deposits of the Upper Alluvial Unit, a storage coefficient (specific yield) of 0.25 is believed to be applicable at the Northwest WRP.

Groundwater Quality

Information on regional groundwater quality in the Salt River Valley was presented by Schmidt (1978) and Smith, et al (1982). Additional information is available on the quality of shallow groundwater in the vicinity of Country Club Road and the Salt River, as part of the Maricopa Association of Governments (MAG) 205J Program (Kenneth D. Schmidt and Associates, 1986d). Those studies were conducted near the Tri-Cities landfill, about four miles east of the Northwest WRP.

Inorganic Chemical Constituents

Table 4 contains the results of inorganic chemical analyses of water from Salt River Project wells and a City of Tempe well in the vicinity. These samples were collected after about 24

TABLE 4 - INORGANIC CHEMICAL ANALYSES OF WATER FROM SALT RIVER PROJECT AND CITY OF TEMPE WELLS

Constituent (mg/l)	23E.-2.9N	24.3E-3N	24.5E-2.5N	25E-3.1N	25.5E-3.5N	26E-3.9N	Tempe No. 7
Calcium	56	71	93	60	25	38	55
Magnesium	21	28	34	24	26	16	22
Sodium	202	200	220	166	181	152	174
Potassium	5	5	6	5	4	4	4
Carbonate	0	0	0	0	10	12	10
Bicarbonate	391	330	375	300	142	166	262
Chloride	196	246	290	200	258	210	194
Sulfate	85	78	92	71	44	37	74
Nitrate	21	53	49	26	29	23	27
Fluoride	0.6	0.2	0.4	0.3	0.6	0.6	0.2
Boron	0.4	0.4	0.4	0.3	0.4	0.2	-
pH	7.7	7.8	7.3	7.2	8.4	8.4	8.2
Electrical Conductivity (micromhos/cm @ 25°C)	1,350	1,480	1,610	1,190	1,140	980	1,240
Total Dissolved Solids	780	860	1,015	735	650	575	695
Iron	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Manganese	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	-	<0.5	<0.5	<0.5	-	-	-
Cadmium	-	<0.005	<0.005	<0.005	-	-	-
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-
Selenium	-	<0.005	<0.005	<0.005	-	-	-
Silver	-	<0.01	<0.01	<0.01	-	-	-
Total Organic Carbon	-	<3	16	<3	-	-	-
Temperature (°F)	-	72	71	71	-	-	70
Date	7/7/83	10/10/86	7/8/86	7/9/86	7/11/86	8/26/86	2/4/86
Laboratory	SRP	BC Labs	BC Labs	BC Labs	SRP	SRP	BC Labs

hours of continuous pumping. Total dissolved solids (TDS) contents ranged from about 600 to 1,000 mg/l, and water was usually of the sodium chloride type. Nitrate contents in water from two of the SRP wells exceeded the maximum contaminant level (MCL) of 45 mg/l, but water from these wells is not used directly for drinking water. Contents of other inorganic chemical constituents in the Primary Drinking Water Standards were less than MCLs. Except for high nitrate contents in water from some wells, the inorganic chemical quality of water from these large-capacity wells was suitable for drinking water.

Graf (1987) sampled water from five other wells in the study area in February 1986 for analyses of inorganic chemical constituents by the ADHS laboratory (Table 5). TDS contents ranged from about 500 to 900 mg/l, and water from most wells was of the sodium chloride or sodium bicarbonate chloride type. Nitrate contents ranged from 2 to 27 mg/l. Contents of other inorganic chemical constituents in the Primary Drinking Water Standards were less than the MCLs. Ammonia-nitrogen contents were all less than 0.1 mg/l and Kjeldahl nitrogen contents were all 0.5 mg/l or less. Well 13bac2 apparently tapped the Upper and Middle Alluvial Units. Wells 13bdd and 18cbb tapped the Middle and Lower Alluvial Units, whereas information on perforated intervals of the other two wells was not available.

As part of this investigation, water from five wells in the vicinity of the Northwest WRP was sampled during February 1987 (Table 6). TDS contents ranged from about 500 to 1,000 mg/l, and water from most wells was of the sodium chloride or sodium

TABLE 5 - INORGANIC CHEMICAL ANALYSES
OF WATER FROM PRIVATE WELLS

	A-1-4				A-1-5
Constituent (mg/l)	13adc1	13adc3	13bac1	13bdd	18cbb
Calcium	39	38	50	68	96
Magnesium	14	14	26	31	42
Sodium	125	119	132	206	179
Potassium	4	4	6	5	7
Carbonate	0	0	0	0	0
Bicarbonate	217	211	139	295	217
Chloride	135	130	256	260	356
Sulfate	30	32	23	124	52
Nitrate	8	9	2	19	27
Ammonium-N	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	0.5	0.3	0.4	0.5	0.3
Fluoride	0.2	0.2	0.3	0.3	0.3
pH	7.2	7.4	7.9	7.7	7.5
Electrical conductivity (micromhos/cm @ 25°C)	905	880	1,160	1,510	1,670
Total Dissolved Solids	500	470	605	855	915
Iron	0.1	0.1	0.3	<0.1	0.1
Manganese	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	0.04	0.03	<0.02	<0.02	<0.02
Barium	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	<0.005	<0.005	<0.005	<0.005	<0.005
Date	2/4/86	2/5/86	2/5/86	2/5/86	2/4/86
Perforated Interval (feet)	-	-	497 T.D.	740 T.D.	400-790

Sampled by ADHS (Graf, 1987) and by ADHS Laboratory, Phoenix, Arizona.

TABLE 6 - INORGANIC CHEMICAL ANALYSES OF WATER
FROM WELLS NEAR THE NORTHWEST WRP

	A-1-4		A-1-5		
	13adb	13add	8daa	18aac	18dbb
Constituent (mg/l)					
Calcium	46	57	36	74	98
Magnesium	16	19	14	27	47
Sodium	120	149	143	169	128
Potassium	4	4	4	7	5
Carbonate	0	0	0	0	0
Bicarbonate	236	293	244	344	198
Chloride	135	170	139	192	321
Sulfate	58	55	64	71	67
Nitrate	6	19	9	61	36
Fluoride	0.3	0.3	0.3	0.3	0.2
Boron	0.2	0.3	0.2	0.3	0.2
pH	7.8	7.8	7.8	7.2	7.7
Electrical Conductivity (micromhos/cm @ 25°C)	880	1,050	960	1,330	1,440
Total Dissolved Solids	520	625	555	795	960
Iron	<0.05	<0.05	0.05	<0.05	<0.05
Manganese	<0.01	<0.01	0.02	<0.01	0.04
Arsenic	0.03	0.04	<0.01	0.04	<0.01
Barium	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	<0.005	<0.0005	<0.005	<0.005	<0.005
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	7	4	4	<3	<3
Date	2/10/87	2/10/87	2/23/87	2/18/87	2/10/87
Perforated Interval (feet)	250 T.D.	100-380	300 T.D.	266 T.D.	499 T.D.

Analyses by BC Laboratories, Inc. of Bakersfield, California.

bicarbonate chloride type. Nitrate contents ranged from 6 to 61 mg/l, and were less than the MCL of 45 mg/l, except at Well (A-1-5)18aac. This well is located at the existing City of Mesa Wastewater Treatment facility. Contents of other inorganic chemical constituents in the Primary Drinking Water Standards were less than the MCLs. Arsenic contents were detectable at 0.03 mg/l or greater in water from three of these wells. Wells 13add and 18dbb probably draw some water from the Middle Alluvial Unit, whereas all of the wells apparently tap the Upper Alluvial Unit.

The results of the past sampling programs indicate that a zone of high nitrate content is present in groundwater south of the existing facility, extending south to near the Tempe Canal. Arsenic contents exceeding 0.02 mg/l are present in groundwater south of the Salt River, west and east of the proposed percolation ponds.

Trace Organic Chemicals

Water from four Salt River Project wells and one City of Tempe well in the vicinity has been sampled and analyzed for EPA Method 601 analyses (volatile halocarbons). These water samples were collected and analyzed as part of groundwater studies at the Motorola, Inc. Center (Table 7). Volatile halocarbons were not detected in water from these wells, except for SRP Well 24.5E-2.5N, located near Main Street and the Tempe Canal. Trichloroethylene (TCE) contents in water from this well ranged from 0.5 to 2.7 ppb during 1983 to 1986. These contents are below the

TABLE 7 - VOLATILE ORGANIC CHEMICAL CONSTITUENTS
IN WATER FROM LARGE-CAPACITY WELLS

Well No.	Date Sampled	Time Pumped	VOC Content (ppb) TCE	PCE	1,2-DCA	F-113
24.3E-3N	10/10/86	1 day	<0.5	<0.5	<0.5	<0.5
24.5E-2.5N	7/6/83	1 day	1	<1	<1	<1
	6/5/84	1 month	2.7	0.7	<0.5	0.9
	6/25/85	1 day	1.3	<0.5	<0.5	<0.5
	7/8/86	1 day	0.5	<0.5	0.9	<0.5
25E-3.1N	7/9/86	1 day	<0.5	<0.5	<0.5	<0.5
25.5E-3.5N	7/11/86	1 day	<0.5	<0.5	<0.5	<0.5
Tempe No. 7	2/14/86	1 day	<0.5	<0.5	<0.5	<0.5
State Action Level	-	-	5.0	3.0	1.0	N.A.

Analyses by California Analytical Laboratories, Inc. of Sacramento, California.
Contents of other VOC were less than detection limits (normally 0.5 ppb).

state action level for TCE, which is 5.0 ppb. Tetrachloroethylene (PCE) 1,2-dichloroethane (DCA), and Freon-113 have been detected at least once, but all contents were less than 1 ppb, and normally less than the detection limits. The state action levels for PCE and 1,2-DCE are 3.0 ppb and 1.0 ppb, respectively, and there is no such level for Freon-113.

The ADHS sampled water from nine wells in the study area during February 4-5, 1986 for analyses of VOC by EPA Method 601. These wells were as follows:

City of Tempe No. 7	(A-1-4)13bac1
(A-1-4)13adb	13bdd
13adc3	
13adc1	(A-1-5)18cbb
13add	18dbb

Analyses by the ADHS chemical laboratory indicated that detectable VOC were found only in water from two wells. A TCE content of 2.3 ppb was found in water from Well (A-1-5)18cbb. This well is located about one-half mile south of the proposed percolation ponds, and is perforated from 400 to 790 feet in depth. Four VOC were detected in Well (A-1-4)13bdd, which is located about one mile west of the proposed ponds and is 740 feet deep. A TCE content of 13 ppb was found in water from this well. VOC contents were not detectable in water from wells tapping solely the Upper Alluvial Unit.

Water from the five other wells sampled in February 1987 was also analyzed for EPA Method 601 and 602 (volatile aromatics)

analyses by APPL, Inc. of Fresno, California (Appendix G). VOC contents were not detectable except in water from Well (A-1-5) 18dbb and (A-1-5)8daa. 1,1,1-trichloroethane (1,1,1-TCA) was detected at 0.8 ppb in water from Well (A-1-5)18dbb. This content is below the state action level for 1,1,1-TCA of 200 ppb. A sample collected from this well by Graf (1987) in February 1986 indicated no detectable VOC. Wells (A-1-4)13adb and 13add were also sampled by Graf (1987) in February 1986 and no detectable VOC contents were present.

SURFACE WATER CONDITIONS

Streamflow

Small flows are present in the Salt River for short periods in the Phoenix urban area due to storm sewers that discharge to the river. Amounts of water flowing down the Salt River since 1965 near Tempe are summarized in Appendix F. These records were compiled by Graf (1985) from U.S. Geological Survey measurements. Additional information is provided on total amounts of spills from Granite Reef since measurements began in 1935. From 1941 to 1965, there were no significant spills due to the development of additional water storage facilities. Thus for almost 25 years, there were no significant flows down the Salt River.

Chemical Quality

Smith, et al (1982) provided information on the inorganic chemical quality of surface water at the Granite Reef Diversion

Dam. Water samples have been taken at this location since 1929. TDS contents have ranged from about 125 mg/l to 800 mg/l, and have averaged about 400 mg/l. During winter months, water at Granite Reef has a low TDS, characteristic of flows from the Verde River. During years of high flow, the water is of the calcium bicarbonate type and of low salinity. Based on sampling of water diverted from major canals at several water treatment plants in the Phoenix Urban Area, contents of inorganic chemical constituents in the Primary Drinking Water Standards are normally well below the MCLs. Water in the Salt River is believed to normally be of excellent chemical quality for drinking water.

CHEMICAL COMPOSITION OF EFFLUENT

Table 8 contains the results of inorganic chemical analysis of sewage effluent from the City of Mesa Wastewater Treatment Facility. The sample was collected from a holding pond in December 1984 and analyzed by Arizona Testing Laboratories. Results of this sampling were previously provided to ADHS with the Notice of Disposal. The effluent had a total dissolved solids (TDS) content of 610 mg/l and was of the sodium bicarbonate-chloride type. Contents of all of the inorganic chemical constituents in the Primary Drinking Water Standards were less than the maximum contaminant levels (MCLs). Nitrogen in sewage effluent is normally present in forms other than nitrate. Black & Veatch (1986) characterized the nitrogen content of sewage influent to the City of Mesa WWTF. The total nitrogen content has averaged about 38 mg/l in recent years, and

TABLE 8 - INORGANIC CHEMICAL ANALYSIS OF EFFLUENT FROM CITY OF MESA WWTF

Constituent	Concentration (mg/l)
Calcium	42
Magnesium	20
Sodium	138
Bicarbonate	290
Sulfate	63
Chloride	160
Nitrate	8
Fluoride	0.7
pH	7.8
Total Dissolved Solids	610
Iron	0.3
Manganese	<0.05
Arsenic	<0.01
Barium	<0.5
Cadmium	<0.005
Chromium	<0.01
Lead	<0.02
Mercury	<0.001
Selenium	<0.005
Silver	<0.02
Date	12/19/84

Analysis by Arizona Testing Laboratories of Phoenix.

almost all of this has been in the organic nitrogen and ammonia nitrogen forms. Of the total nitrogen, in the influent, about two-thirds was ammonia. The sample collected in December 1984 was also analyzed for pesticides in the Primary Drinking Water Standards, DBCP, ethylene dibromide (EDB), and total trihalomethanes. Contents of all of these constituents were less than detection limits. Analyses of acid compounds in the EPA priority pollutant list indicated that the only detectable constituent was 2,4-dimethylphenol at 1.3 ppb. Analyses of volatile halocarbons in the priority pollutant list indicated that the only detectable constituents were methylene chloride (2.3 ppb) and benzene (5.1 ppb). Analyses of base/neutral compounds in the priority pollutant list indicated that the only detectable constituent was di-n-octylphthalate (114 ppb). These constituents are commonly found at such low levels in sewage effluent.

As part of this investigation, additional samples of effluent were collected on a weekly basis during March, 1987. The samples were collected to better define concentrations of volatile halocarbons and volatile aromatics in the effluent. The samples were collected in the appropriate containers and shipped by Federal Express to APPL, Inc. in Fresno, California for analyses by EPA Methods 601 and 602. The samples were collected at a point prior to entry into the aeration pond, on the following dates: March 9, March 17, March 23, and March 30, 1987. The results are provided in Appendix G. No volatile halocarbons or volatile aromatics were detected in any of the samples. Detection limits were 0.5 ppb except for xylenes, which

was 1.0 ppb. These results indicated that the sample collected in December 1984 was probably atypical of the effluent in terms of benzene and methylene chloride.

PROJECTED IMPACT OF EFFLUENT RECHARGE ON GROUNDWATER

According to the design engineers, the nitrogen removal process in the Northwest WRP will be designed to produce an effluent with a total nitrogen content of 5.0 mg/l or less. Percolation of the effluent using the Bouwer process is expected to remove about one-half of the remaining nitrogen. Thus, the total nitrogen content of recharged effluent should be less than 3.0 mg/l. If all of this is converted to nitrate, the nitrate content in the recharged effluent would be about 10 mg/l or less, which is lower than that in water from most wells in the vicinity (Tables 4-6).

TDS of the recharged effluent should be close to that of the present effluent from the City of Mesa WWTF, or about 600 mg/l. TDS contents in water from SRP and City of Tempe wells (Table 4) in the vicinity ranged from about 700 to 1,000 mg/l in 1986. TDS contents in water from wells tapping only the Upper Alluvial Unit in the vicinity (Table 6) ranged from 520 to 960 mg/l in February 1987.

Analyses of effluent for constituents in the EPA priority pollutant list indicated that the methylene chloride content of 2.3 ppb exceeded the ADHS action level of 1.0 ppb. The benzene content of 5.1 ppb exceeded the ADHS action level of 2.0 ppb.

The trickling filter used at the existing facility likely acts to reduce contents of volatile trace organics in the influent. Additional sampling is being performed to gather more data on volatile halocarbons and volatile aromatics in the effluent from the City of Mesa WWTF.

Studies of percolation of chlorinated effluent at the City of Phoenix 23rd Avenue Wastewater Treatment Facility by Bouwer, et al (1981) indicated significant removals of some trace organics during pond storage and percolation. Contents of volatile aromatics were normally reduced about 20 to 50 percent while in the ponds, and another 70 to 98 percent during percolation. Losses of these constituents in the ponds were ascribed primarily to volatilization. Losses of non-halogenated hydrocarbons during percolation were ascribed to microbial decomposition. Sorption and chemical transformations may be other important processes in the reductions during percolation. Experience at the 23rd Avenue effluent percolation site indicates that contents of trihalomethanes in the recharged chlorinated effluent are below standards proposed for drinking water from groundwater sources.

Overall, no adverse impact on groundwater is expected, particularly if total nitrogen contents in the effluent are kept below 5.0 mg/l.

EVALUATION OF POTENTIAL MOUND BUILDUP

Past experience with basin recharge of effluent is available in the Salt River Valley for the Flushing Meadows Project,

downstream of the City of Phoenix 91st Avenue Wastewater Treatment Facility, and for the 23rd Avenue facility. Past experience with basin recharge of excellent quality canal water is available in the San Joaquin Valley at the Leaky Acres Project (City of Fresno) and the Arvin-Edison Water Storage District facilities in Kern County. The first two of these projects involved recharge into deposits of the Upper Alluvial Unit, adjacent to the Salt River. At the Flushing Meadows project, depth to water prior to recharge was about 10 feet, and at the 23rd Avenue site was about 20 to 50 feet. Recharge of sewage effluent in basins at hydraulic loading rates of up to 400 feet per year resulted in no significant mound buildup in either case. The total basin area for the 23rd Avenue site was 30 acres. The estimated mound due to effluent recharge in this area was less than one foot high (Bouwer, et al, 1981). Recharge rates equal to or exceeding that proposed for the Northwest WRP were used in four of these projects. Even though the depth to water at the Flushing Meadows and 23rd Avenue sites was less than at the Northwest WRP, no significant mound buildup (that would constrain infiltration) occurred in either case. For the Northwest WRP, recovery wells are to be used to re-capture recharged effluent. Pumping of these wells will also prevent an excessive mound buildup.

Calculations were made on the potential for a mound buildup, in the absence of recovery well pumpage. Information on the mound buildup at the 23rd Avenue effluent recharge site indicated that the vertical permeability of the deposits of the Upper

Alluvial Unit was only about two percent of the horizontal permeability. The high horizontal permeabilities act to minimize the mound buildup. Field studies at all four of the recharge projects previously referenced have validated the high horizontal permeabilities of the alluvial deposits. As water levels rise beneath the percolation ponds, two factors tend to counterbalance this rise. First, the hydraulic gradient increases. Second, the saturated thickness of the deposits of the Upper Alluvial Unit increases, which results in an increased transmissivity. The increased hydraulic gradient and transmissivity both enhance the horizontal movement of recharged water from beneath the site to downgradient areas.

A recharge rate of 4 mgd is equal to about 4,500 acre-feet per year, and a recharge rate of 8 mgd is equal to about 9,000 acre-feet per year. The average hydraulic loading rate would be about 130 feet per year, and 260 feet per year, respectively. Calculations were made of the resulting horizontal groundwater flow from the proposed percolation ponds at the Northwest WRP. The hydraulic gradient as of January-February, 1987 (10 feet per mile) and an initial saturated thickness of 70 feet for the Upper Alluvial Unit was used for this evaluation. A horizontal permeability of 2,000 gpd per square foot was used. The amount of groundwater flow beneath a one-half mile width of percolation pond area oriented parallel to the Salt River was calculated to be about 800 acre-feet per year. If there was a 30 foot rise in water level beneath the ponds due to recharge of effluent, the hydraulic gradient could be increased to 40 feet per mile and the

transmissivity to 200,000 gpd per foot. The new groundwater flow rate would be about 4,500 acre-feet per year. Thus a water-level rise of about 30 feet beneath the ponds could result in the horizontal movement of virtually all of the effluent recharged at the 4 mgd rate, even without installing recovery wells.

If the water level were raised 50 feet, the hydraulic gradient could be increased to 60 feet per mile and the transmissivity to 240,000 gpd per foot. The new groundwater flow rate would be about 8,100 acre-feet per year. Thus a water-level rise of slightly more than 50 feet beneath the ponds could result in the horizontal movement of virtually all of the effluent recharged at the 8 mgd rate, even without installing recovery wells.

PROPOSED RECOVERY WELLS

For a recovery of 4 mgd of recharged effluent, a well capacity of about 3,000 gpm would be necessary. For a recovery of 8 mgd of recharge, a well capacity of about 6,000 gpm would be necessary. For large-capacity wells tapping the Upper Alluvial Unit, sustained pumping rates of 1,500 gpm are considered possible. For purposes of this project, three recovery wells, each pumping 1,000 gpm, and perforated from about 90 to 150 feet in depth, would be used for the 4 mgd recovery program. The well spacing would be about 800 feet. For the 8 mgd recovery program, six recovery wells (constructed as above) would be used, each pumping at 1,000 gpm. The well spacing would then be about 400 feet.

GROUNDWATER MONITORING PLAN FOR NORTHWEST WATER RECLAMATION PLANT

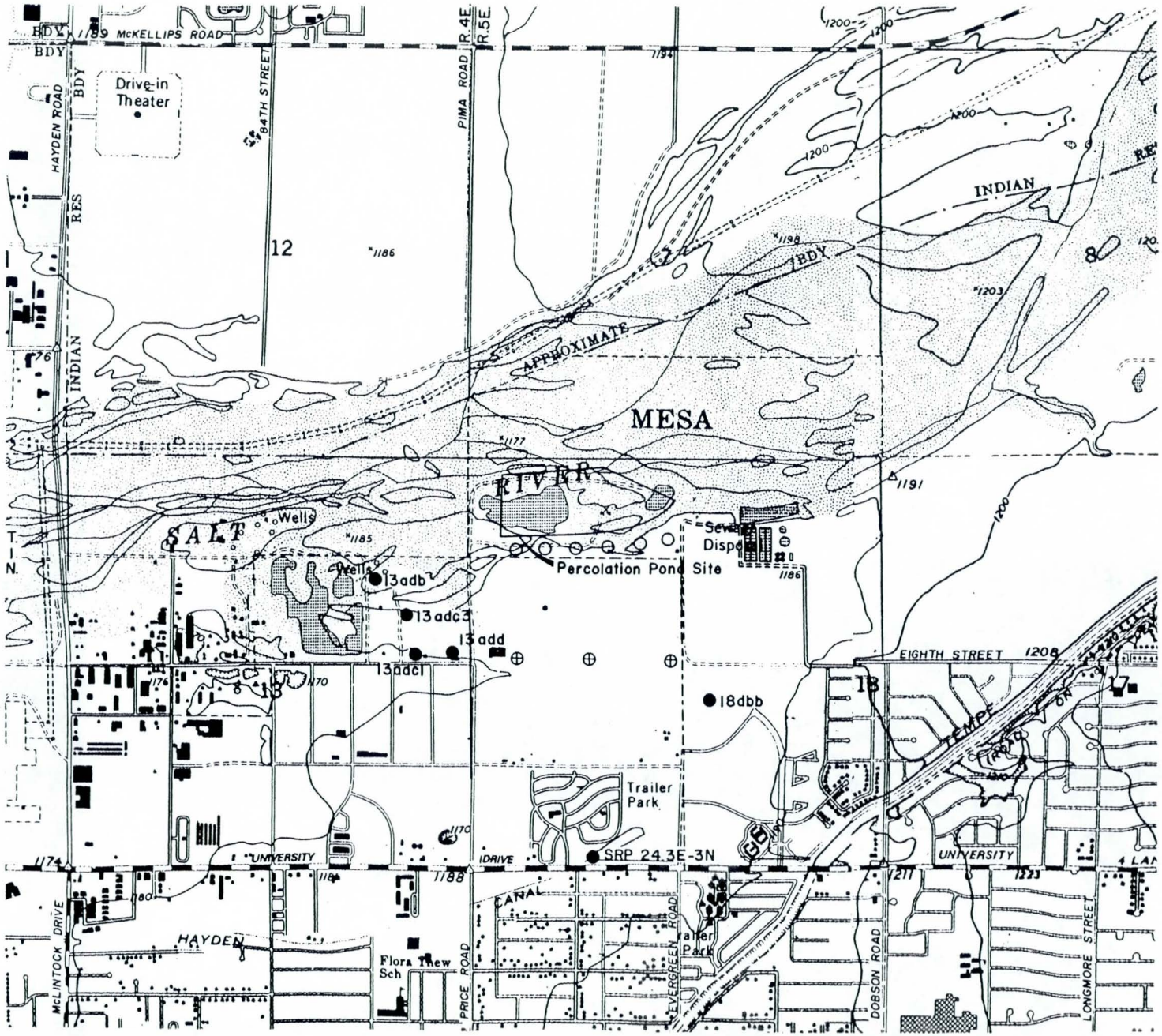
This plan was prepared as part of a submittal by the City of Mesa to obtain a groundwater discharge permit from the Arizona Department of Health Services (ADHS). The following major components are included, pursuant to Chapter 3 of the ADHS draft guidelines:

1. The number and location of monitoring points.
2. Monitoring instrumentation.
3. Constituents to be monitored and frequency.
4. Method of sampling, sampling protocols, sample preservation, transportation, chain of custody, and QA/QC procedures.
5. Name of laboratory which will be doing the analyses and documentation of the laboratory's capability to produce legally valid data.

Monitoring Points

The points to be monitored are at wells tapping shallow saturated strata downgradient of the Northwest Water Reclamation facility. Because of the coarse, permeable nature of the shallow alluvial deposits and the relatively shallow depth to water, no monitoring of the vadose zone is proposed.

The wells proposed for groundwater monitoring are shown in Plate 8. Included are extraction wells, monitor wells, and several existing wells. The locations were chosen to best



EXPLANATION

- ○ Proposed extraction well
- ⊕ Proposed monitor well
- ● Existing well to be sampled

0 1000 2000
Scale in Feet

N

PLATE 8 - LOCATION OF WELLS PROPOSED FOR MONITORING PROGRAM

characterize groundwater quality in the vicinity of the facility. It was assumed that groundwater flow will continue to be to the south in the future.

Extraction Wells

Each of six extraction wells would be drilled to a total depth of about 160 feet by the reverse rotary method. These wells would be drilled along the south edge of the proposed percolation ponds. A 24-inch diameter conductor casing would first be installed and cemented to a depth of 20 feet, pursuant to ADWR requirements. A pilot hole would then be drilled to a depth of about 180 feet (to the top of the Middle Alluvial Unit), and the hole electric logged. Drill cuttings would be logged by a geologist. A 14-inch diameter casing would be used in a 20-inch diameter hole. Horizontal louvered perforated casing would be installed from about 100 to 160 feet in depth, and the well gravel packed up to the land surface. The wells would be developed by air-lifting and pumping and surging.

Monitor Well Drilling

Each of three monitor wells would be drilled to a total depth of about 160 feet by the cable-tool method. These wells would be located just north of Eighth Street. A twenty-foot long, ten-inch diameter steel conductor casing would first be installed, pursuant to ADWR regulations for the surface seal. Eight-inch diameter, 0.277-inch wall steel casing would then be driven to total depth. The highest expected water level is about

50 feet deep and the lowest is about 100 feet deep. Pre-perforated casing would be installed, with perforations extending from about 70 to 160 feet in depth. Previous experience with similar monitor wells in these deposits indicates that an artificial gravel pack is unnecessary in order to produce sediment-free water. Drill cuttings would be logged by a geologist. The wells would be developed by bailing. Each monitor well would be equipped with a permanent submersible pump, capable of pumping 30 gpm, for routine monitoring. A concrete pump base would be placed around the conductor casing, and a steel cover, with a lock would be placed over the top of the well to control access. A diagram of such a monitor well is provided in Plate 9.

Aquifer Tests

Twenty-four hour aquifer tests would be performed at all of the extraction wells. A test pump capable of pumping at least 1,500 gpm would be temporarily installed in the well to be tested. The pumped water would be piped a sufficient distance from the well so as to not interfere with the test. The pumping rate and total pumpage would be measured with a totalizing flowmeter and an orifice plate. Water levels in completed extraction wells nearest to each new well would be used as observation wells.

Standard methodology will be applied for the aquifer tests. A one inch diameter PVC access tube will be installed in the pumped well to allow water-level measurements. No glue or solvents would be used in connecting this pipe.

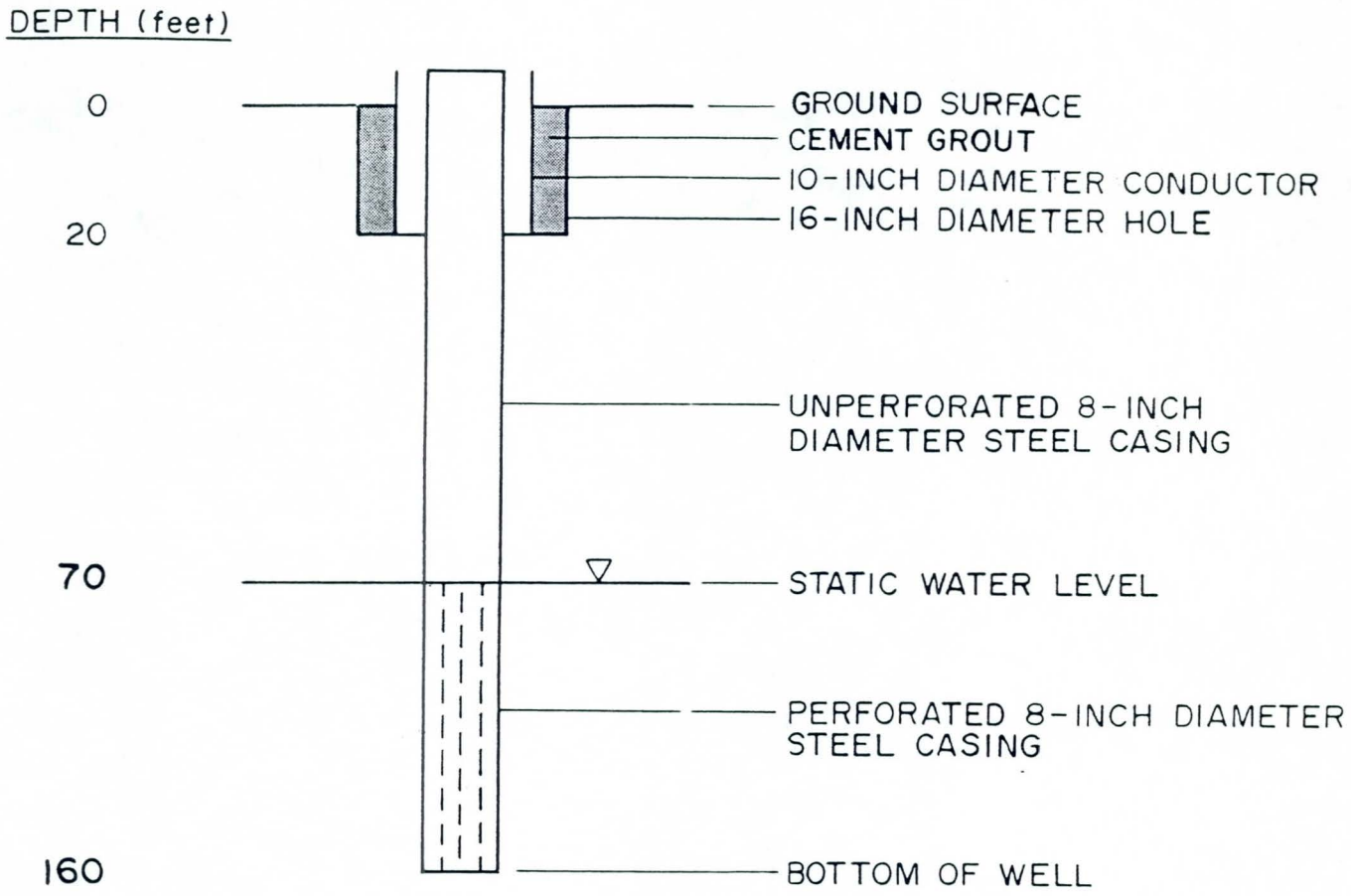


PLATE 9-SCHEMATIC DIAGRAM OF A MONITOR WELL

Monitoring Instrumentation

Powers Electric Products Co. two-line electric sounders, or equivalent, would be used to measure water levels. The elevations of the measuring points of each monitor well would be precisely determined by surveying. The sounders would be carefully calibrated with a steel tape prior to each measurement round.

Submersible pumps, capable of pumping 30 gpm, would be installed in each monitor well with a normal pump rig. Two-inch diameter steel pipe would be used for the pump column, and no solvents or similar materials would be used in connecting this pipe. A rubber hose, about 100 feet long, would be used to convey water away from the well. For the extraction wells, permanent deep well turbine pumps will be installed. The design pump capacity is about 1,000 gpm.

Taylor pocket thermometers (with one degree divisions), or equivalent, would be used to measure the water temperature. A Hach portable digital pH meter (Model No. 19000), or equivalent, would be used to measure the pH. This instrument would be standardized and calibrated following directions in the owners manual. A Hach portable electrical conductivity meter (Model No. 16300), or equivalent, would be used to measure the electrical conductivity. This instrument would be calibrated pursuant to the owners manual. The accuracy of the flowmeters for the pump tests would be checked with the orifice plate readings. During normal water sampling periods for the monitor wells, the pumping rate would be measured several times by timing the filling of a five or ten- gallon container.

Constituents and Frequency of Monitoring

All of the extraction and monitor wells would be sampled on a quarterly schedule. The first sample taken on the quarterly schedule will be for comprehensive analyses. Samples from the monitor wells will be obtained by pumping the monitor wells at least for two hours at about 30 gpm. Extraction wells will be sampled during routine pumping if in use. Otherwise, they will be pumped for at least four hours prior to sample collection. Private wells will be sampled during routine pumping. The pumped water will be frequently monitored for electrical conductivity, temperature, and pH. A list of constituents to be tested for is presented in Table 9. During the routine monitoring after the first sampling round, samples will be analyzed for the following constituents:

Major cations and anions
Total dissolved solids, electrical conductivity, and pH
Iron, manganese, and arsenic
Organic-nitrogen and Ammonia-nitrogen
Total organic carbon
Volatile Halocarbons and Aromatics (EPA Methods 601 and 602)

The EPA Method 601 and 602 analyses would be by APPL, Inc. of Fresno, California. Should the comprehensive analysis indicate the presence of other pollutants at significant levels, they may be added to the list for routine monitoring.

TABLE 9 - LIST OF CONSTITUENTS TO BE DETERMINED IN INITIAL SAMPLES

Inorganics	Organics
Major Cations	Total Organic Carbon
Major Anions	Volatile Organic Chemicals (EPA Method 624)
Fluoride	Acids-Base Neutrals (EPA Method 625)
Boron	
pH	
Electrical Conductivity	
Total Dissolved Solids (180°C)	
Iron	
Manganese	
Organic Nitrogen	
Ammonia Nitrogen	
Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Inorganic chemical and total organic carbon determinations would be by BC Laboratories, Inc. of Bakersfield, California. EPA Methods 624 and 625 analyses would be by California Analytical Laboratories, Inc. of Sacramento, California.

Six private wells would be sampled on a semi-annual basis, if owners allow. These are the closest active wells that are potentially downgradient of the ponds. The wells are:

(A-1-4)13adb

(A-1-4)13adc1

(A-1-4)13adc3

(A-1-4)13add

(A-1-5)18dbb

SRP 24.3E-3N

Water from the six private wells would be sampled semi-annually for the shorter list of constituents.

Sampling Methodology and Quality Assurance

This part of the monitoring plan explains the methods and procedures to be implemented during the monitoring program. They include field measurement and sampling procedures, sample containers, sample preservation, sample shipment, sample documentation and chain-of-custody.

Groundwater Sampling

Water samples will be collected from monitor wells using submersible pumps.

The sampling procedure for groundwater is divided into three parts: 1) measurements before pumping, 2) measurements during pumping, and 3) sample collection. All information pertinent to sampling and measurements will be recorded in a field notebook or on appropriate forms.

Measurements Before Pumping. Depth to water in each monitor and extraction well will be measured twice before pumping commences. Static levels in private wells will be measured if possible.

Measurements During Pumping. Water level, pumping rate, temperature, electrical conductivity (EC), and pH will be periodically measured (i.e., every 10 minutes) during pumping of the wells. The pumped water will be considered representative of the groundwater when these measurement readings have stabilized. At that time, after at least one hour of pumping, a sample will be collected. Experience with existing monitor wells in the vicinity indicates that one hour of pumping is adequate to obtain a representative water sample. Extraction wells may have to be pumped more than four hours, if they are not in routine use at the time of sampling.

Sample Collection

Water samples will be collected for analyses of both organic and inorganic constituents.

Purgeable Organics. The samples for purgeable organics (EPA Methods 601, 602, and 624) will be collected in the manner described below:

- The monitor and extraction wells will have permanent taps for the purpose of collecting a water sample. Samples from private wells will be taken as close to the well head as possible.
- The tap or spigot will be allowed to run for several minutes before collecting samples.

- The required sample containers are: two 40 ml glass vials with a Teflon septum and screw top, for each method of analysis.
- When sampling for purgeables, the filled sample vials would have no headspace. In addition, turbulence in the water stream to be sampled would be minimized. The vial would be filled until it overflows, to eliminate any air bubbles, and the Teflon-lined cap replaced.
- The vial would be turned upside down and tapped to check for air bubbles. If there are any bubbles, the vial would be re-filled and checked for air bubbles again. This procedure would be repeated until an acceptable sample is obtained.
- A chain-of-custody seal would be placed on each container.
- The sample would be labeled, packaged, and placed into an ice chest to maintain the water samples at $4^{o}C$ or less.
- The appropriate sample transmittal forms will be completed.

Other Trace Organics. The samples for analysis of acid and base/neutral organics (EPA Method 625) will be collected in the manner described in the following section.

- The tap or spigot will be allowed to run several minutes before collecting samples.
- The required sample containers are: two one-liter amber glass bottles.
- The containers would be filled until they overflow, then capped.
- A chain-of-custody seal would be placed on each container.

- The sample would be labeled and packaged, and then placed in an ice chest, to maintain the samples at 4°C or less.
- The appropriate sample transmittal forms will be completed.

Inorganic Chemicals and Organic Carbon. The samples for analyses of inorganic chemical constituents and organic carbon will be collected in the manner described in the following:

- The tap or spigot will be allowed to run for several minutes before collecting the sample.
- The required sample bottles are: one liter untreated polyethylene, one liter polyethylene treated with nitric acid, one liter polyethylene treated with sulfuric acid, and 100 ml amber glass bottle treated with phosphoric acid.
- The untreated polyethylene bottle will be rinsed twice with the water to be sampled, then filled until it overflows, then capped.
- The treated bottles will be filled with the sample to near the top, then capped.
- A chain-of-custody seal will be placed on each container.
- The samples will be labeled and packaged.
- The appropriate sample transmittal form will be completed.

Sample Containers, Preservatives, and Holding Times

The containers, preservatives, and holding times for the trace organic analyses are in Table 10. Samples for inorganic constituents other than metals and nitrogen forms are collected in one-liter polyethylene bottles. For determination of metals,

TABLE 10 - CONTAINERS, PRESERVATIVES AND HOLDING TIMES FOR TRACE ORGANIC CHEMICALS

EPA Analysis Method	Minimum Volume (ml)	Container	Preservative	Holding Time (days)
601	10	two 40 ml glass vials	cool, 4°C, no bubbles	7
602	10	two 40 ml glass vials	cool, 4°C, no bubbles	7
624	10	two 40 ml glass vials	cool, 4°C, no bubbles	7
625	500	four one-liter amber glass bottle	cool, 4°C,	5 to extract 30 to analyze

the bottle is pre-treated with nitric acid. Samples for nitrogen forms are collected in polyethylene bottles treated with sulfuric acid. Samples for organic carbon are collected in amber glass bottles treated with phosphoric acid. Holding times for specific constituents are shown in Table 11. The sample containers are obtained from the laboratory which will analyze the samples.

Sample Shipment

Samples in glass containers will be packaged in bubble pack material to minimize breakage. Samples will be packaged and shipped to the laboratory within one day of sample collection. Samples for parameters that must be kept cool will be shipped with blue ice to maintain the temperature at $4^{o}C$ or less during shipment, with over-nite delivery. Appropriate forms (i.e., sample transmittal and chain-of-custody form) will be placed into zip-lock plastic bags accompanying each ice chest. Chain-of-custody seals will be placed on the sample containers. The ice chests will be taped closed.

Sample and Measurement Documentation

A field notebook and appropriate forms will be used to record information pertaining to samples and measurements collected during the investigation. The information typically recorded in the notebook and forms will include well number, name of site, date and time collected, name of personnel (including affiliation), and measurement values.

TABLE 11 - CONTAINERS, PRESERVATIVES AND HOLDING TIMES FOR INORGANIC CHEMICALS AND ORGANIC CARBON

Measurement	Vol. Req (ml)	Preservative	Holding Time
Electrical Conductivity	100	Cool, 4°C	28 days
pH	25	None Req.	Analyze Immediately
Total Diss. Solids (180°C)	100	Cool, 4°C	7 days
Total Metals	100	HNO_3 to pH <2	6 months
Total Mercury	100	HNO_3 to pH <2	28 days
Carbonate and Bicarbonate	100	Cool, 4°C	14 days
Chloride	50	None Req.	28 days
Fluoride	300	None Req.	28 days
Nitrogen Forms	100	Cool, 4°C H_2SO_4 to pH <2	48 hours
Sulfate	50	Cool, 4°C	28 days
Organic Carbon	25	Cool, 4°C H_2SO_4 or H_3PO_4 to pH <2	28 days
Boron	100	Cool, 4°C	28 days

Amber glass bottles are used for organic carbon samples, all others are polyethylene.

Sample bottles would be labeled immediately after the sample is collected (i.e., labels are supplied by laboratory). Water quality field, temperature, electrical conductivity, and pH, parameter measurements will be recorded.

Samples collected for organic or inorganic analysis will be accompanied by an analysis request form during shipment to the laboratories.

Sample Chain-of-Custody Procedures

To document sample possession, chain-of-custody procedures are followed after collection and identification of the sample. The chain-of-custody procedure is divided into three parts: field custody, transfer of custody, and laboratory custody.

Field Chain-of-Custody.

- A chain-of-custody seal is placed on each sample container after the sample is collected.
- The field sampler is personally responsible for the care and custody of the samples collected until they are transferred or dispatched properly.
- A field notebook would be maintained by the field sampler to provide a daily record of significant events, observations, and measurements during field investigations.

Transfer of Custody and Shipment.

- Samples are accompanied by a Chain-of-Custody Record. When transferring samples, the individuals relinquishing and

receiving will sign, date, and note the time on the record. This record documents sample custody transfer.

- Samples are packaged properly for shipment and dispatched to the appropriate laboratory for analysis, with a separate Chain-of-Custody Record accompanying each shipment. Shipping containers are sealed with custody seals for shipment to the laboratory. Two seals would be placed on each shipping container (cooler), one at the front and one at the back to allow the recipient of the container to make a determination if the container had been opened during transit. Clear tape would be placed over the custody seals to ensure that they are not accidentally broken during shipment.

Laboratory Chain-of-Custody. All samples are held under internal chain-of-custody in the Sample Control Room, using the appropriate storage technique (ambient, refrigeration, frozen). Samples are distributed by the Sample Custodian to Staff Chemists who maintain samples under their control and relinquish samples to storage when their analytical tasks are completed.

Quality Control

Quality control for field activities include duplicate samples, replicate measurements, blanks, and calibrated equipment.

Water Samples. Duplicate samples will be collected to check for precision of the analysis. The frequency for collecting

duplicate samples will be one duplicate per sampling round. The duplicate sample would be collected, packaged, sealed and analyzed in an identical manner as the other samples. It would not be identified as a duplicate sample. In this way, the identity of the duplicate sample would be unknown to the laboratory personnel performing the analysis.

Blank water samples would be used when collecting samples for trace inorganic analysis. Analysis of the blank water sample is a check against cross-contamination during collection, transportation, and within the laboratory. The blank would remain with the samples in the ice chest, except during sample collection when it would be near the sample bottles and point of collection. The blank samples would be used at a frequency of one per sampling round.

Field Measurements. The field measurements use replicate measurements, calibration of equipment, and comparing previously collected data to determine the internal quality of the data collected.

Analytical Laboratories

Names, addresses, and phone numbers of analytical laboratories to be used for this program are as follows:

1. BC Laboratories, Inc. (BC Labs)
   4100 Pierce Road
   Bakersfield, California 93308

   805-327-4911

2. California Analytical Laboratories, Inc.
2544 Industrial Boulevard
West Sacramento, California 95691

916-372-1393

3. APPL, INC.
4167 North Motel Drive
Fresno, California 93711

209-275-2175

Inorganics and TOC

BC Laboratories, Inc. would provide the containers and perform the analyses for the inorganic chemical constituents and total organic carbon. This laboratory is certified in Arizona and Ken Schmidt has maintained a continuous working relationship with this laboratory since 1964. BC Labs has provided extensive analytical services to many Arizona clients since the late 1960's. They are considered to be a superior inorganic chemical laboratory.

EPA Method 624 and 625 Analyses

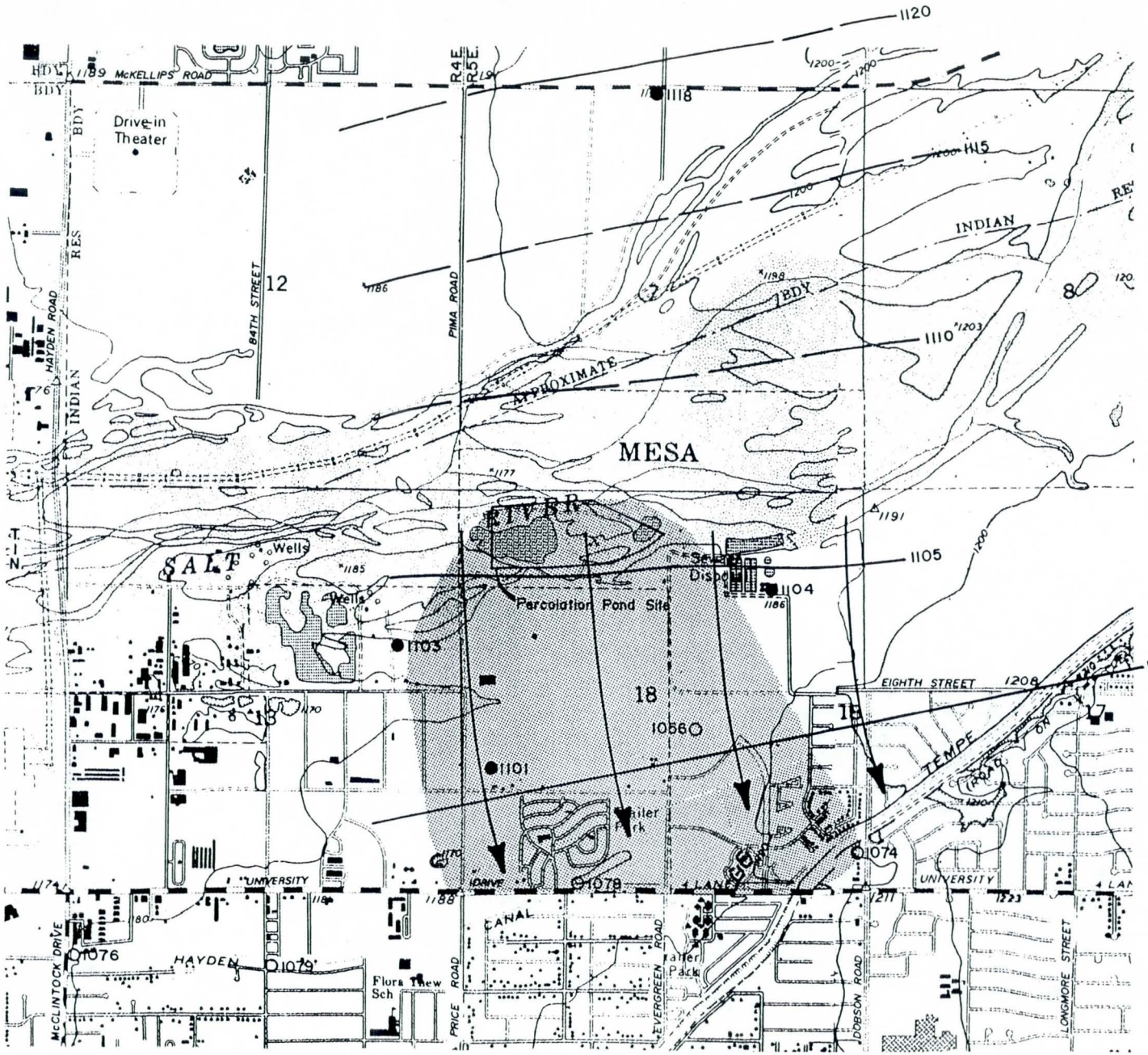
California Analytical Laboratories, Inc. is an EPA contract laboratory. They are highly qualified and experienced in trace organic chemical determinations. Their GC/MS work is acknowledged in California to be the foremost in the state. They are providing or have provided analytical services at several Superfund or potential Superfund projects in Arizona and at numerous ones in California. A summary of their QA/QC procedures has been previously presented. Ken Schmidt has had a working relationship with this laboratory since 1981.

EPA Method 601 and 602 Analyses

Agricultural and Priority Pollutant Laboratory (APPL), Inc. is a certified laboratory in Arizona. They are specialists in pesticide and volatile organic (GC) analyses. They have provided extensive analytical services for the MAG 205J program and for the City of Mesa. Ken Schmidt has had a working relationship with this laboratory since 1984.

DISCHARGE IMPACT ASSESSMENT

The discharge impact area is expected to be limited to the area east of Price Road, west of Dobson Road, and north of University Drive. This is because extraction wells will be used to recover most of the recharged effluent. A potential discharge impact area is delineated in Plate 10. The extent of a potential impact on groundwater is highly controlled by the configuration of the percolation ponds, the direction of the groundwater flow, the rate of groundwater flow, and the extent of extraction well pumpage. The average water-level slope down-gradient of the ponds (in the absence of the dewatering project) is about ten feet per mile. The average rate of groundwater flow, assuming a permeability of 2,200 gpd per square foot and a porosity of 0.40, is about 500 feet per year (Appendix H). If contaminants reached the groundwater beneath the percolation ponds, they could move a distance of one-half mile in about five years, if no extraction was being done. There should be no impacts based on any existing water use, however, because water sampling has shown no contami-



EXPLANATION

- 1104● Well tapping Upper Alluvial Unit and water-level elevation (feet)
- O Composite well and water-level elevation (feet)
- 1115 —— Water-level elevation contour in feet for Upper Alluvial Unit
- ◀—— Direction of groundwater flow in Upper Alluvial Unit
- ▒ Projected Maximum Discharge Impact Area

N

0 1000 2000
Scale in Feet

PLATE 10- PROJECTED MAXIMUM DISCHARGE IMPACT AREA

nants in the groundwater from past disposal practices, with the possible exception of nitrate. Nitrogen management practices at the proposed facility would minimize the potential for contributing nitrate to the groundwater There are two domestic wells and two gravel processing wells southwest of and within one-half mile of the ponds. Although these wells are apparently not within the projected impact area, they would be included in a routine monitoring program. An alternative source of drinking water is available from the City of Mesa for the two domestic wells. The nearest downgradient well is used for irrigation and is about one-half mile downgradient of the ponds.

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APPENDIX A

WELL INVENTORY

TABLE A - CONSTRUCTION DATA FOR WELLS IN THE VICINITY OF THE NORTHWEST WRP

Location	Local No.	Well Use	Date Drilled	Depth Drilled (feet)	Casing Diameter (inches)	Cased Depth (feet)	Perforated Interval (feet)
(A-1-4)13abb	Kachina Redi-Mix	X	1960	450	12	400	-
13aca	Kachina Redi-Mix	X	1960	400	12	350	-
13ad	Arneson	X	-	200	16	180	-
13adb	Tri-City Ready-Mix	G	2/63	300	10	250	-
13adc1	Brock	D	-	-	-	-	-
13adc2	AAA Auto Wrecking	U	9/7/47	84	8	84	-
13adc3	AAA Auto Wrecking	D	-	-	-	-	-
13add	Nesbitt (CPM)	G	7/17/73	400	12	400	100-115
							160-380
13bac1	Kachina Redi-Mix	U	5/8/81	499	12	350	-
13bac2	Kachina Redi-Mix	U	5/9/81	497	12	398	
					10	497	401-497
13bcc	APS	X	1959	740	20	740	-
13bdd	APS-2	Ind	5/59	740	-	740	-
13ca	Griffith	X	1944	98	8	98	-
13caa	Horst	U	1949	200	8	200	180-200
13cda	Black	X	2/45	112	14	90	60-90
13cdb	Black	X	2/45	112	14	-	-
24abc	City of Tempe No. 7	P	5/16/61	690	24	81	200-675
					20	690	688-690
24bbb	SRP 23E-3N	X	7/5/24	150	18	-	48-140
24bbc	SRP 23E-2.9N	I	10/7/57	525	20	472	150-457
(A-1-5)7baa	Salt River Indian Com.	U	-	235	20	-	-
8bad	Calmat	G	12/20/73	495	20	234	
					18	495	234-495

Continued:

TABLE A - CONSTRUCTION DATA FOR WELLS IN THE VICINITY OF THE NORTHWEST WRP, (continued)

Location	Local No.	Well Use	Date Drilled	Depth Drilled (feet)	Casing Diameter (inches)	Cased Depth (feet)	Perforated Interval (feet)
(A-1-5)17caa	SRP 25.5E-3.5N	I	1/55	600	20	598	150-585
18aaa	Tempe Sand & Gravel	X	7/9/59	240	12	221	130-210
18aac	Mesa WWTP	U	10/49	275	12	266	-
18bad	Bayless	X	7/41	96	24	96	20-96
18cad	-	U	-	-	-	-	-
18cbb	APS-3	Ind	6/15/59	800	20	400	400-790
					16	800	
18cbc	ADOT	O	-	-	-	-	-
18cbd	Turner	U	5/30/47	166	6	166	-
18cdc	SRP 24.3E-3N	I	10/31/51	770	20	734	145-720
18dbb	V&P Nursery	I	7/1/81	515	8	499	-
18ddd1	-	X	5/13/29	230	20	-	45-177
18ddd2	SRP 25E-3.1N	I	3/26/49	704	20	702	170-682

Well Use:
D = Domestic
G = Gravel Plant
I = Irrigation
Ind = Industrial
O = Observation
P = Public Supply
U = Unused
X = Destroyed or not located

Information from the Arizona Department of Water Resources (ADWR) Driller's Logs, Groundwater Site Inventory and Well Registry Report.

APPENDIX B

DRILLER'S LOGS

SRP 23.5E-5.5N

REPORT OF WELL DRILLED IN CRITICAL AREA

Report of Well Drilled in Critical Area is required to be made and filed with the State Land Commissioner upon completion of the construction of such well, pursuant to Section 10, Chapter 5, House Bill No. 2, Eighteenth Legislature, Sixth Special Session, 1948.

23½E

1. Owner SALT RIVER VALLEY WATER USERS' ASSOCIATION, by J. F. Griswold, Secretary, Phoenix, Arizona
   Name / Address
2. Lessee or Operator _____ _____
   Name / Address
3. Driller Roscoe Moss Los Angeles, Calif.
   Name / Address
4. Location of Well: Twp. 1 N Rge. 4 E Sec. 1 Legal Subdivision NE ¼ SE ¼ SW ¼
   10 acre subdivision
   It is _____ yards _____ from the nearest irrigation well.
   if less than ¼ mile / direction
5. Purpose of use IRRIGATION
6. Place of use: Twp. _____ Rge. _____ Section(s) _____, _____ Acres _____
   Legal Subdivision
7. If well is part of Irrigation District, Association, or Company, omit 6 and give name of project:
   ~~XXXXXXXXXXXXXXXXXXXX~~ S.R.V.W.U.A.

DESCRIPTION OF WELL

8. Total depth of hole 850 ft. 9. Type of Casing Hard red steel
10. Diameter and length of casing: 20 in. from 0 ft. to 840 ft; _____ in. from _____ ft. to _____ ft;
    _____ in. from _____ ft. to _____ ft; _____ in. from _____ ft. to _____ ft.
11. Method of sealing at reduction points Not Reduced
12. Perforated from 300 ft. to 820 ft; from _____ ft. to _____ ft; from _____ ft. to _____ ft.
13. Size of cuts 5/8 x 4-1/2 Number of cuts per foot 10 per 12 inches
14. If screen was installed: Length _____ ft. Diameter _____ in. Type _____
15. Method of drilling California Cable Tool
    drilled, dug, driven, bored, etc.
16. Date completed July 6, 1952
    Month / Year
17. Depth to water 60 ft.
    (If flowing well, so state)
18. Describe points from which depth measurements were made Ground Surface
    Sea-level elevation _____ (If available)
19. Method of flow regulation if flowing well _____

REPORT OF PUMP INSTALLATION AND TEST

20. Tested well capacity _____ Method of measurement _____
    gallons per minute / weir, orifice, meter, etc.
21. Depth immediately prior to capacity test, from land surface to static water level _____ ft.
22. Non-flowing well: Drawdown _____ ft. measured after _____ hours of continuous operation,
    (at least 4)
    and while pump is still operating.
23. Flowing well: Shut-in pressure _____ ft. above the land surface, or _____ pounds per square inch at the land surface.
24. Kind of Pump _____
    turbine, centrifugal, etc.
25. Kind of Power _____
    electric, natural gas, etc.
26. Horsepower Rating of Motor _____
27. Permittee J. F. Griswold Secty. Salt River Valley Water Users' Association
    Signature

DO NOT WRITE IN THIS SPACE OFFICE RECORD		
Received	8-4-52	by lec
Filed	8-4-52	by lec
File No.	(A-1-4) 1 cda	
Cross-referenced (Name)		by
Cross-referenced (Basin)		by
Cross-referenced		by

(A-1-4) 1 cda
SRP 23, 5E - 5, 5N

Indicate depth at which water was first encountered, and the depth and thickness of water-bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (feet)	TO (feet)	DESCRIPTION OF FORMATION MATERIAL
0	5	Top soil
5	7	Sand, gravel and boulders
7	12	Soil
12	26	Soft clay
26	50	Clay and boulders
50	116	Sand, gravel and boulders
116	173	Clay and gravel
173	192	Sticky clay
192	272	Hard clay and caliche
272	385	Clay and some gravel
385	604	Hard and sticky clay
604	635	Caliche and gravel
635	750	Clay, caliche and boulders
750	810	Cemented boulders
810	833	Sticky clay and cemented boulders
833	843	Granite boulders
843	850	Hard red clay and rock

RECEIVED JUL 1952 PURCHASING DEPT

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

RECEIVED AUG 2 1952 STATE LAND DEPT

Driller Roscoe Moss Company
Name

4360 Worth Street, Los Angeles, Calif
Address

Date July 26, 1952

NOTE: Report and Log are to be completed by the permittee and driller, and mailed by the permittee to the Ground Water Division of the State Land Department immediately upon completion of the well and pumping test.

(A-1-4).13 adb

RECORDED BY: ZELLICK

A.D.W.R.
SITE SCHEDULE

WELL NO (A-1-4)13 ADB

SITE ID 332557111534201

GENERAL SITE DATA T- A SITE TYPE: W RELIABILITY: G TOPO SETTING: G

SOURCE OF DATA: A-DWR LATITUDE: 332557 LONGITUDE: 1115342 ACCY: 2

LOCAL ID: A-01-04 13ADB LAND NET: NW SE 1/4 SE 1/4 13 T1N R8E G&SRB&M

ADWR CNTL. NO: 55-8 ALTITUDE: 1181.10 METHOD: 4 ACCY: 5

BASIN - USGS: SRV ADWR: ESR AMA: PHX STATE: 04 COUNTY: 013

SITE USE - 1ST: W 2ND: 3RD: WATER USE - 1ST: W 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: 300 DEPTH OF WELL: 300 SOURCE: 4 GEOHYDRO UNIT:

CONSTRUCTION DATA T- 4 EVENT NO.: 100 DRILLER:

DATE COMPLETED: 02/00/1963 METHOD OF CONSTN: FINISH: SOURCE: 0

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MAIL:

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MAIL:	TYPE:	LEN:	WID:

LIFT DATA T- 4 SEQ NO: 1

DATE: 09/08/1982 TYPE: TURB TYPE OF POWER: E INTAKE SETTING: HORSEPOWER: 15

POWER COMPANY: METER NUMBER:

LOG DATA:

T-	LOG TYPE:	BEGIN DEPTH:	END DEPTH:	SOURCE OF DATA:

OTHER SITE ID NUMBERS T- SEQ NO:

OTHER ID: ASSIGNER:

OWNER'S NAME T- 4 SEQ NO: 1 DATE: 09/08/1982

LAST: ~~CONCRETE~~ ZELLICK FIRST: TRUCKING MI:

(A-1-4)13a db

FLOW/DISCHARGE T= SEQ NO:

DATE MEASURED: DISCHARGE: SOURCE: METHOD OF MEASUREMENT:

PRODUCTION LEVEL: SOURCE OF DATA: STATIC LEVEL: METHOD OF MEASUREMENT:

PERIOD: SPEC CAPACITY: DRAWDOWN:

REMARKS T=

SEQ. NR: DATE:

SITE INVENTORY DATA T= A SEQ NO:

DATE: 10/08/1982 NAME: HEDGEHOG MOCK

WATER LEVEL DATA T= SEQ NO:

DATE: WATER LEVEL: METHOD: REMARK: SOURCE:

MEASURING POINT DATA T= SEQ NO:

DATE: MP HEIGHT: DESCRIPTION:

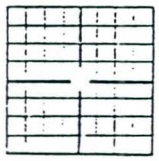
FIELD WATER QUALITY T= A SEQ NO:

DATE: 10/08/1982 S.P. COND.: (MICROMHOS/CM) 1020. FLUORIDE: (MG./L.) 0.5 TEMPERATURE: (DEG. C)

SPRINGS T=

SPRING NAME:

TYPE: PERMANENCE: IMPROVEMENTS: FLOW VARIABILITY:



(A-1-4) 13adc1

REMICK

RECORDED BY:

A.D.W.R.
SITE SCHEDULE

WELL NO: (A-1-4)13ADC1
formerly 13AA

SITE ID: 332547111115342901

GENERAL SITE DATA T- M SITE TYPE: RELIABILITY: TOPO SETTING: 4

SOURCE OF DATA: LATITUDE: LONGITUDE: ACCY:

LOCAL ID: LAND NET: S T R M

ADWR CNTL. NO: ALTITUDE: METHOD: ACCY:

BASIN - USGS: ADWR: ESR AMA: PHX STATE: COUNTY:

SITE USE - 1ST: H 2ND: 3RD: WATER USE - 1ST: 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: DEPTH OF WELL: SOURCE: GEOHYDRO UNIT:

CONSTRUCTION DATA T- M EVENT NO.: 1/00 DRILLER: PANIA R JACOBS

DATE COMPLETED: 04/00/1947 METHOD OF CONSTN: D FINISH: V SOURCE: D

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:
A	11			48	V

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:

LIFT DATA T- SEQ NO:

DATE: / / TYPE: TYPE OF POWER: INTAKE SETTING: HORSEPOWER:

POWER COMPANY: METER NUMBER:

LOG DATA:

T-	LOG TYPE:	BEGIN DEPTH:	END DEPTH:	SOURCE OF DATA:
T-	LOG TYPE:	BEGIN DEPTH:	END DEPTH:	SOURCE OF DATA:

OTHER SITE ID NUMBERS T- SEQ NO:

OTHER ID: ASSIGNER:

OWNER'S NAME T- SEQ NO: DATE: / /

LAST: FIRST: MI:

(C. 681)

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

NATIONAL GW SURVEY OF WELLS

MASTER CARD

Record by: LEE (REG. OF WELL 1/52) Source of data: SUD Date: 11/71 Map: TEMPE 7½

State: AZ 04 County (or town): MARICOPA 07

Latitude: 33 25 47 N (N) S — Longitude: 111 53 42 — Sequential number: 1

Lat-long accuracy: 2 — T. 1 (N) S, R 4 (E) W, Sec 13, SW ¼, SE ¼, NE ¼, G&SR B & M

Local well number: A-01-04-13ADC — Other number:

Local use: SRV — Owner or name: PAUL R. JACOBS

Owner or name: — Address: 302 MILL AVE, TEMPE

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist: P

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other: U

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed: U

DATA AVAILABLE: Well data — Freq. W/L meas.: — Field aquifer char.

Hyd. lab. data:

Qual. water data; type:

Freq. sampling: — Pumpage inventory: yes / no, period:

Aperture cards: yes

Log data:

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD — Depth well: 30 ft — 30 Meas. (REPT) accuracy: 6

Depth cased: (first perf.) ft — Casing type: 4X4' WOOD CRIBBING; Diam. in

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., screen, (S) sd. pt., (T) shored, (W) open hole, (Z) other

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other

Date Drilled: 4/47 — 9 4 7 — Pump intake setting: ft

Driller: OWNER (name), SAME AS ABOVE (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple, (cent.), (M) multiple, (turb.), (N) none, (P) piston, (R) rot, submerg, (S) curb, (T) other, (Z) Deep / Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 100 — Trans. or meter no.

Descrip. MP — ft above below LSD, Alt. MP

Alt. LSD: 1189 — 1 1 8 9 — Accuracy: (source)

Water Level ft above below MP; Ft above below LSD — Accuracy:

Date meas: — Yield: 400 gpm — Method determined: T

Drawdown: 4 ft — 4 — Accuracy: REPT 6 — Pumping period hrs

QUALITY OF WATER DATA: Iron ppm — Sulfate ppm — Chloride ppm — Hard. ppm

Sp. Conduct K x 10^6 — Temp. °F — Date sampled

Taste, color, etc.

Well No. (A-1-4) 13 2dc

Well No. (A-1-4)13 adc 1

Latitude-longitude 33 d 25 m 47 s (N) 111 d 53 m 42 s

GEOLOGIC CARD

[ ] AS ON MASTER CARD (19) Physiographic Province: BASIN & RANGE [22] (20 21) Section: SONORAN

DESERT [B] (22) Drainage Basin: [ ] (23 25) Subbasin: [ ] (26)

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Φ) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat [ ] (27)

MAJOR AQUIFER: _____ system, _____ series [ ] (28 29) _____ aquifer, formation, group [ ] (30 31)

Lithology: _____ [ ] (32 33) Origin: _____ [ ] (34) Aquifer Thickness: _____ ft

[ ] (35 37) Length of well open to: _____ ft [ ] (38 40) Depth to top of: _____ ft [ ] (41 43)

MINOR AQUIFER: _____ system, _____ series [ ] (44 45) _____ aquifer, formation, group [ ] (46 47)

Lithology: _____ [ ] (48 49) Origin: _____ [ ] (50) Aquifer Thickness: _____ ft

[ ] (51 53) Length of well open to: _____ ft [ ] (54 56) Depth to top of: _____ ft [ ] (57 59)

Intervals Screened: _____

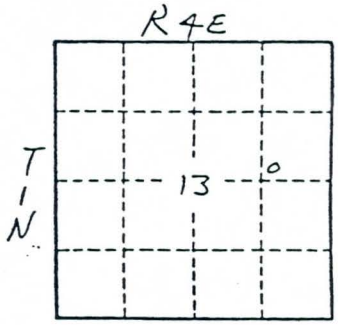
Depth to consolidated rock: _____ ft [ ] (60 63) Source of data: _____ [ ] (64)

Depth to basement: _____ ft [ ] (65 68) Source of data: _____ [ ] (69)

Surficial material: _____ [ ] (70 71) Infiltration characteristics: _____ [ ] (72)

Coefficient Trans: _____ gpd/ft [ ] (73 75) Coefficient Storage: _____ [ ] (76 78)

Coefficient Perm: _____ gpd/ft^2; Spec cap: _____ gpm/ft; Number of geologic cards: [ ] (79)



Well No. (A-1-4)13adc

GPO 869-201

REGISTRATION OF WELL (Deepened)

EXCERPT OF 1945 GROUNDWATER LAW (A-1-4) 13 adc2

Registration of Existing Wells is required of all persons owning or operating wells for irrigation or drainage purposes in accordance with Section 5, Chapter 12, Senate Bill No. 3, First Special Session, 1945. Section 8 of the law provides a penalty for failure to furnish the reports or refusal to cooperate with the State Land Commissioner.

1. OWNER Paul R.Jacobs
Name
302 Mill Ave.Tempe Ariz.
Address

2. LESSEE OR OPERATOR
Name
Address

3. DRILLER Dodge Black
Name
Rt.1 Box 126 Tempe Ariz.
Address

4. LOCATION OF WELL: Twp. 1N Rge. 4E Section 13 SW ¼ SE ¼ NE ¼
10-acre subdivision

DESCRIPTION OF WELL

5. Total depth of hole 84 ft.

6. Type of casing Tubeing Welded

7. Diameter and length of casing 8 in. from Surface to bottom to , in. from to

8. Perforated from none to , from to , from to , from to

9. Size of cuts none Number cuts per foot none

10. If screen was installed: Length ft. Diam. in. Type

11. Method of construction drilled
drilled, dug, driven, bored, jetted, etc.

12. Date completed Sept.7,1947 Deepened
Month Year Month Year

13. Depth of water when drilled 25 ft.
If flowing well, so state.

14. Present depth to water 60 ft. Date of measurement Jan.1 ,1952
If flowing well, so state.

15. Describe point from which depth measurements were made, and give sea-level elevation if available
Top of casing

16. If flowing well, state method of flow regulation

DISCHARGE DATA

17. Well discharge 400 gal.per min.(when drilled) ;now 70 gal.per min.
gal. per min. or cu. ft. per sec. or miner's inches.

18. Method of discharge measurement Orifice
weir, orifice, current meter, etc.

19. Drawdown 10 ft.when drilled

20. Annual discharge in acre-feet or number of hours pumped: 1944 none a.f. or hrs. 1945 none or hrs.

21. Purpose of use irrigation

22. Place of use: Twp. 1N Rge. 4E Section 13 E½,NE¼ except E.330 ft Acres 60
(See 23) Legal subdivision
Twp. Rge. Section Acres
Legal subdivision

23. If well is part of irrigation system or Irrigation District, Association or Company, omit 23 and give name of project.
Name of Project

EQUIPMENT DATA
ORIGINAL

24. Kind of pump 6" centrifugal
turbine, centrifugal, etc.

25. Kind of power gas engin
electric, natural gas, etc.

26. Horsepower rating of motor 100

DO NOT WRITE IN THIS SPACE

OFFICE RECORD

Received 1-29-52 by lec

Filed ~~1-28-52~~ by ~~lec~~

File No. (A-1-4) 13 adc

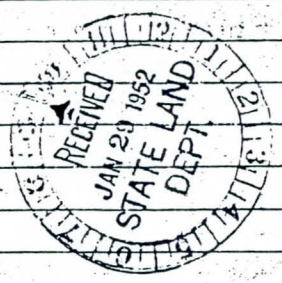
(See Other Side)

LOG OF WELL

(A-1-4) 13 adc 2

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL



I hereby certify that I have read the foregoing statements, and that each and all of the items therein contained are true to the best of my knowledge and belief.

X Paul R Clark
Owner, Operator or Driller

302 Mill Ave, Tempe Ariz
Address

Date Jan. 26, 1952

(A-1-4).13adc3

RECORDED BY: REMICK

A.D.W.R.
SITE SCHEDULE

WELL NO: (A-1-4)13ADC 3

SITE ID 352551111533901

GENERAL SITE DATA T- A SITE TYPE: M RELIABILITY: 4 TOPO SETTING: G

SOURCE OF DATA: ADWR LATITUDE: 332551 LONGITUDE: 1114533 9 ACCY: 2

LOCAL ID: A-01-04 13ADC3 LAND NET: SW SE NE SEC 13 T1 0N R1 0E G M

ADWR CNTL. NO: 55-634457 ALTITUDE: 1182. METHOD: M ACCY: 5

BASIN - USGS: SRV ADWR: ESR AMA: PHX STATE: 04 COUNTY: 013

SITE USE - 1ST: W 2ND: 3RD: WATER USE - 1ST: H 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: DEPTH OF WELL: SOURCE: GEOHYDRO UNIT:

CONSTRUCTION DATA T- EVENT NO.: DRILLER:

DATE COMPLETED: / / METHOD OF CONSTN: FINISH: SOURCE:

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:

LIFT DATA T- H SEQ NO: 1

DATE: 09/08/1982 TYPE: S TYPE OF POWER: E INTAKE SETTING: HORSEPOWER:

POWER COMPANY: METER NUMBER:

LOG DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

OTHER SITE ID NUMBERS T- SEQ NO:

OTHER ID: ASSIGNER:

OWNER'S NAME T- H SEQ NO: 1 DATE: 09/09/1982

LAST: AUTO INSURANCE INC FIRST: AAA MI:

(A-1-4) 13adc

FLOW/DISCHARGE T- SEQ NO:

DATE MEASURED: DISCHARGE: SOURCE: METHOD OF MEASUREMENT:

PRODUCTION LEVEL: SOURCE OF DATA: STATIC LEVEL: METHOD OF MEASUREMENT:

PERIOD: SPEC CAPACITY: DRAWDOWN:

REMARKS T-

SEQ. NR: DATE:

SITE INVENTORY DATA T- A SEQ NO: 1

DATE: 09/08/1992 NAME: WHEDLEY AND MACK

WATER LEVEL DATA T- A SEQ NO: 1

DATE: 09/08/1992 (11 29 1992) WATER LEVEL: 83.4 (89.6) METHOD: V (V) REMARK: SOURCE: A (A)

MEASURING POINT DATA T- A SEQ NO: 1

DATE: 09/08/1992 MP HEIGHT: 1.3 DESCRIPTION: MSP

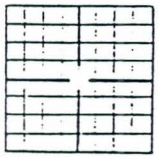
FIELD WATER QUALITY T- A SEQ NO: 1

DATE: 09/08/1992 S.P. COND.: (MICROMHOS/CM) 1214. FLUORIDE: (MG./L.) 0.3 TEMPERATURE: (DEG. C)

SPRINGS T-

SPRING NAME:

TYPE: PERMANENCE: IMPROVEMENTS: FLOW VARIABILITY:



STATE OF ARIZONA

REPORT OF WELL DRILLER

This report should be prepared by the driller in all detail and filed with the State Land Commissioner following completion of the well.

1. OWNER Nesbitt Contracting Co., Inc. (Name)
P.O. Box 1269, Mesa, Arizona, 85201 (Address)

2. Lessee or Operator (Name)
(Address)

3. DRILLER Moss-Weber, Inc. (Name)
P.O. Box 21305, Phoenix, Arizona, 85036 (Address)

4. Location of well: Twp. 1 N Rge. 4 E Section 13 SE ¼ SE ¼ NE ¼ (10-acre subdivision)

5. Intention to Drill File No. A (1-4) 13 add Permit No. 35-36710

DESCRIPTION OF WELL

6. Total depth of hole 400 ft.

7. Type of casing Mild Steel

8. Diameter and length of casing 12 in. from +1 to -400, ____ in. from ____ to ____, ____ in. from ____ to ____

9. Method of sealing at reduction points N/A

10. Perforated from 100' to 115', from 160' to 380', from ____ to ____, from ____ to ____

11. Size of cuts 3/8" x 4" Number of cuts per foot 6

12. If screen was installed: Length N/A ft. Diam. ____ in. Type ____

13. Method of construction Drilled (drilled, dug, driven, bored, jetted, etc.)

14. Date started June (Month) 18 (Day) 1973 (Year)

15. Date completed July (Month) 17 (Day) 1973 (Year)

16. Depth of water ____ ft. (If flowing well, so state.)

17. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Level

18. If flowing well, state method of flow regulation

19. REMARKS:

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

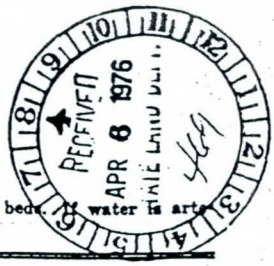
Received 4-6-76 by dfe

Filed 4-19-76 by dfe

File No. A(1-4)13 add

(Well Log to Appear on Reverse Side)

(A-1-4) 13 a d d



LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	12	Sandy top soil
12	120	Sand & gravel
120	200	Brown silt
200	265	Red conglomerate & sand
265	400	Red silt

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Clarence Lehman
Name

P.O. Box 21305, Phoenix, AZ., 85036
Address

Date 29 March 1976

2-73

(A-1-4) 13 bac ≡ 1

A 010 040 13 BAC WR 600560 FILE TYPE: REGISTRATION L WELL TYPE: NON-EXEMPT
DATE ISSUED: 06 08 983 PLANNED PUMP CAP:

NAME: KACHINA REDI-MIX IN CARE OF:
1976 E PIMA ST
TEMPE AZ 85281

ACCURACY: NOT VERIFIED WATER USES: INDUSTRIAL
AREA: PHOENIX AMA
SUB-BASIN:
WATERSHED: SALT RIVER WELL USES: WATER PRODUCTION
COUNTY: MARICOPA
OWNER: CORPORATION DRILLER:

WELL DPTH: 400 FT CASE DIAM: 12 IN CASE DPTH: 350 FT METH DET:
PUMP CAP: 500 GPM FINISH: STEEL ACRES IRR: YIELD: 500 GPM
DRAW DOWN: WATER LVL: 100 FT LIFT: POWER:
DATE COMPLETED: 05 08 981
POU #1: POU #2:

STATUS: DATA OWN LOG R CRT R PQ NBR: IPQ STATUS:

ENTER - READ NEXT RECORD CLEAR TO RETURN TO SELECTION CRITERIA

STATE OF ARIZONA (A-1-4)13-DAC-2 DEPARTMENT OF WATER RESOURCES

WELL DRILLER REPORT

This report should be prepared by the driller in all detail and filed with the Department within 30 days following completion of the well.

1. Owner Kachina Redi-Mix
Name
1976 Pima St Tempe AZ 85281
Address

2. Lessee or Operator Weber Pump, Inc.
Name
P. O. Box 26729, Tempe, AZ 85282
Address

3. Driller Benny Kramer Weber Pump Inc.
Name
P. O. Box 26729, Tempe, AZ 85282
Address

4. Location of well: TWP-in RGE 4E Sect. 13 SW¼xNE¼xNW¼

Permit No. 55-87355
(if issued)

DESCRIPTION OF WELL

5. Total depth of hole 490' ft.

6. Type of Casing 12" ID 10" ID

7. Diameter and length of casing 12 in. from 0 to 398, 10 in from 394 to 497.

8. Method of sealing at reduction points

9. Perforated from 401 to 497, from to, from to

10. Size of cuts ¼x2" Horiz Number of cuts per foot 48

11. If screen was installed: Length ft. Diam in. Type

12. Method of construction Cable Tool
drilled, dug, driven, bored, jetted, etc.

13. Date started 3 (Month) 26 (day) 81 (year)

14. Date completed 5 (Month) 9 (day) 81 (year)

15. Depth to water 178 ft. (If flowing well, so state.)

16. Describe point from which depth measurements were made, and give sea-level elevation if available. 1' from surface

17. If flowing well, state method of flow regulation

18. REMARKS:

DO NOT WRITE IN THIS SPACE
OFFICE RECORD
Registration No. 55-87355
Received By
Entered 5-27-81 By JER
File No. A(1-4)13bac

(Well log to appear on Reverse side)

(A-1-4) 13 bac2

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	160	Sand, Gravel & Boulders
160	350	Clay to Boulders
350	497	Cemented Conglomerate
First water encountered 72'		

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Benny Kramer

Driller Weber Pump, Inc.
Name

P. O. Box 26729
Address

Tempe, AZ 85282

Date

(A-1-4) 13 6dd

RECORDED BY: REMICK

A.D.W.R.
SITE SCHEDULE

WELL NO: (A-1-4) 13 BDD

SITE ID 332548111154093 01

GENERAL SITE DATA T- A SITE TYPE: W RELIABILITY: C TOPO SETTING: T

SOURCE OF DATA: ADWR LATITUDE: 332548 LONGITUDE: 1111540 93 ACCY: 2

LOCAL ID: A-01-04 13BDD LAND NET: SE SE NW SEC 13 TWP 01N RNG 04E BASE: GR

ADWR CNTL. NO: 55-613077 ALTITUDE: 1170. METHOD: M ACCY: 5

BASIN - USGS: SRV ADWR: ESR AMA: PHX STATE: 04 COUNTY: 013

SITE USE - 1ST: W 2ND: 3RD: WATER USE - 1ST: E 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: 740. DEPTH OF WELL: 740. SOURCE: A GEOHYDRO UNIT:

CONSTRUCTION DATA T- A EVENT NO.: 100 DRILLER:

DATE COMPLETED: / / 1959 METHOD OF CONSTN: FINISH: SOURCE: A

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:
A	1		740.	20.	S

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:

LIFT DATA T- A SEQ NO: 1

DATE: ~~12/6/1960~~ 12 23 1960 TYPE: T TYPE OF POWER: E INTAKE SETTING: HORSEPOWER: 250.

POWER COMPANY: METER NUMBER:

LOG DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

OTHER SITE ID NUMBERS T- A SEQ NO: 1

OTHER ID: ~~CCT-11001~~ CCC FILLO POWER PLANT ASSIGNER: APD

OWNER'S NAME T- A SEQ NO: 1 DATE: ~~12/13/1959~~

LAST: APS FIRST: MI:

(A-1-4).13 caa

RECORDED BY: REMICK

A.D.W.R.
SITE SCHEDULE

WELL NO: (A-1-4)13CAA

SITE ID 332542111541024Q1

GENERAL SITE DATA T- M SITE TYPE: [ ] RELIABILITY: [ ] TOPO SETTING: G

SOURCE OF DATA: [ ] LATITUDE: [ ] LONGITUDE: [ ] ACCY: 2

LOCAL ID: [ ] LAND NET: [ ] S [ ] T [ ] R [ ] M

ADWR CNTL. NO: [ ] ALTITUDE: 1169.0 METHOD: [ ] ACCY: [ ]

BASIN - USGS: [ ] ADWR: EPAS AMA: PHX STATE: [ ] COUNTY: [ ]

SITE USE - 1ST: W 2ND: [ ] 3RD: [ ] WATER USE - 1ST: U 2ND: [ ] 3RD: [ ]

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: [ ] DEPTH OF WELL: [ ] SOURCE: [ ] GEOHYDRO UNIT: [ ]

CONSTRUCTION DATA T- C EVENT NO.: 100 DRILLER: [ ]

DATE COMPLETED: [ ] METHOD OF CONSTN: [ ] FINISH: [ ] SOURCE: [ ]

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:
A	1		2400		S

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:
P	1		2000	18.0	S	P		

LIFT DATA T- M SEQ NO: 1

DATE: 12/20/1971 TYPE: [ ] TYPE OF POWER: [ ] INTAKE SETTING: [ ] HORSEPOWER: [ ]

POWER COMPANY: A COE METER NUMBER: EPA 09/09/92 P, W

LOG DATA:

T-	LOG TYPE:	BEGIN DEPTH:	END DEPTH:	SOURCE OF DATA:
T-	LOG TYPE:	BEGIN DEPTH:	END DEPTH:	SOURCE OF DATA:

OTHER SITE ID NUMBERS T- [ ] SEQ NO: [ ]

OTHER ID: [ ] ASSIGNER: [ ]

OWNER'S NAME T- O SEQ NO: 1 DATE: 12/20/1971

LAST: HORST FIRST: [ ] MI: [ ]

6428
(8)

Well No. (A-1-4) 13 caa

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by: B. Wallace Source of data: Field Date: 3-72 Map: Tempe 7½

State: Ariz 04 County (or town): Maricopa 07

Latitude: 33 25 42 N (dd mm ss) Longitude: 111 54 07 (degrees min sec) Sequential number: 1

Lat-long accuracy: 2 T. 1 N S, R. 4 E W, Sec. 13, NE ¼, NE ¼, SW ¼ G&SR, B & M

Local well number: A-01-04-13CAA Other number:

Local use: STOCK Owner or name: Mr H.J. Horst

Owner or name: Address: Rt. 1 Box 126 Tempe Ariz

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist: P

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Ind, (N) P S, (P) Rec, (S) Stock, (T) Inactit, (U) Unused, (V) Repressure, (W) Recharge, (X) Dessal-P S, (Y) Dessal-other, (Z) Other: H

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (O) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdrawl, (X) Waste, (Z) Destroyed: W

DATA AVAILABLE: Well data; Freq. W/L meas.: ; Field aquifer char.

Hyd. lab. data:

Qual. water data; type:

Freq. sampling: ; Pumpage inventory: yes / no, period:

Aperture cards: yes

Log data:

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 200 ft 200 Meas. rept accuracy: RLP 6

Depth cased: (first perf.) 180 ft 180 Casing type: Steel ; Diam. 8 in 08

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other: P

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other: C

Date Drilled: 1949 (?) 9 4 9 Pump intake setting: ft

Driller: (name) (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other: S Deep / Shallow: D

Power (type): diesel, elec, nat gas, LP gasoline, hand, gas, wind; H.P. 5 Trans. or meter no.

Descrip. MP: Hole in cover 1.0 ft above / below LSD, Alt. MP

Alt. LSD: 1170 Accuracy: (source) Topo map 10ft contours 4

Water Level: 90 ft above / ~~below~~ MP; Ft above / below LSD Accuracy:

Date meas: Yield: gpm Method determined:

Drawdown: ft Accuracy: Pumping period hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10^6 Temp. °F Date sampled

Taste, color, etc.

Well No. (A-1-4) 13 caa

Well No. (A-1-4) 13 caa

Latitude-longitude 33 d 25 m 42 s N 111 d 54 m 02 s

DROGEOLOGIC CARD

SAME AS ON MASTER CARD (1) Physiographic Province: Basin & Range [72] (19-20) Section: Sonoran

Desert [B] (22) Drainage Basin: Gila River [6 0 N] (23-25) Subbasin: Salt River [ ] (26)

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Φ) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat [✓] (27)

MAJOR AQUIFER: _____ system, _____ series [ ] (28-29) _____ aquifer, formation, group [ ] (30-31)

Lithology: _____ [ ] (32-33) Origin: _____ [ ] (34) Aquifer Thickness: _____ ft

[ ] (35-37) Length of well open to: _____ ft [ ] (38-40) Depth to top of: _____ ft [ ] (41-43)

MINOR AQUIFER: _____ system, _____ series [ ] (44-45) _____ aquifer, formation, group [ ] (46-47)

Lithology: _____ [ ] (48-49) Origin: _____ [ ] (50) Aquifer Thickness: _____ ft

[ ] (51-53) Length of well open to: _____ ft [ ] (54-56) Depth to top of: _____ ft [ ] (57-59)

Intervals Screened: _____

Depth to consolidated rock: _____ ft [ ] (60-63) Source of data: _____ [ ] (64)

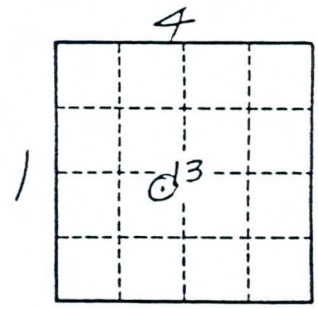
Depth to basement: _____ ft [ ] (65-68) Source of data: _____ [ ] (69)

Surficial material: _____ [ ] (70-71) Infiltration characteristics: _____ [ ] (72)

Coefficient Trans: _____ gpd/ft [ ] (73-75) Coefficient Storage: _____ [ ] (76-78)

Coefficient Perm: _____ gpd/ft^2; Spec cap: _____ gpm/ft; Number of geologic cards: [ ] (79)

Perf 180ft to 200ft.



Well No. (A-1-4) 13 caa

GPO 869-201

FORM W-3—1M—10-51

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

(A-1-4)-13 cda

EXCERPT OF 1945 GROUNDWATER LAW

Report of Well Driller must be prepared by the driller in all detail and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, First Special Session, 1945. This report should be in the mail within 30 days following completion of the well. Section 8 of the law provides: "Any person (includes any individual, firm, public or private corporation, or governmental agency) who shall fail or refuse to make any of the reports, give the notices required, or fail to cooperate with the State Land Commissioner or his representative, under the provisions of this Act, shall be guilty of a misdemeanor and shall be fined a sum not exceeding One Hundred Dollars."

1. OWNER DODGE BLACK
Name
Route 1 Box 126 Tempe ARIZONA
Address

2. Lessee or Operator
Name
Address

3. DRILLER DODGE BLACK
Name
Route 1 Box 126 Tempe ARIZONA
Address

4. Location of well: Twp. 1 N Rge. 4 E Section 13 (NE¼ of SE¼ of SW¼)
G. & S.R. B. & M. 10-acre subdivision
NE¼-SE-SW

5. Intention to Drill File No.

DESCRIPTION OF WELL

6. Total depth of hole 112 ft.

7. Type of casing pipe

8. Diameter and length of casing 14 in. from to , in. from to , in. from to

9. Method of sealing at reduction points ✓

10. Perforated from 50 to 90 ft, from to , from to , from to

11. Size of cuts ½ in. Number cuts per foot 10

12. If screen was installed: Length ft. Diam. in. Type

13. Method of construction DRILLED
drilled, dug, driven, bored, jetted, etc.

14. Date completed Feb. 1945
Month Year

15. Depth to water 60 ft.
If flowing well, so state.

16. Describe point from which depth measurements were made, and give sea-level elevation if available Top of Ground

17. If flowing well, state method of flow regulation

18. REMARKS: Western Turbine Pump. powered by Gasoline Engine 35 H.P.

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 8-22-52 by leo

Filed 8-22-52 by leo

File No. (A-1-4) 13 ~~cdb~~ cda

(Well Log to Appear on Reverse Side)

LOG OF WELL (A-1-4)13cda

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
1	20	Soil
20	50	Sand & Boulders
50	80	Water Bearing Sand & Gravel
80	100	Light Clay
100	112	Water Bearing Sand & Gravel

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Ardyl Black
Name

Route 1 Box 126 Tempe Arizona
Address

Date

(A-1-4) 13 cdb

RECORDED BY: DENNICK

A.D.W.R.
SITE SCHEDULE

WELL NO: (A-1-4)13CDB

SITE ID 332530111554401

GENERAL SITE DATA T- M SITE TYPE: RELIABILITY: TOPO SETTING: 8

SOURCE OF DATA: LATITUDE: LONGITUDE: ACCY:

LOCAL ID: LAND NET: S T R

ADWR CNTL. NO: ALTITUDE: METHOD: ACCY:

BASIN - USGS: ADWR: ESR AMA: PHX STATE: COUNTY:

SITE USE - 1ST: 2 2ND: 3RD: WATER USE - 1ST: 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: DEPTH OF WELL: SOURCE: D GEOHYDRO UNIT:

CONSTRUCTION DATA T- M EVENT NO.: 1 DRILLER: DODGE BLACK

DATE COMPLETED: 02/00/1945 METHOD OF CONSTN: FINISH: SOURCE: D

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:
M					

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:
M			900	14	S	P		

LIFT DATA T- SEQ NO:

DATE: / / TYPE: 2 TYPE OF POWER: INTAKE SETTING: HORSEPOWER:

POWER COMPANY: METER NUMBER:

LOG DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

OTHER SITE ID NUMBERS T- SEQ NO:

OTHER ID: ASSIGNER:

OWNER'S NAME T- SEQ NO: DATE: / /

LAST: FIRST: MI:

FORM 9-1642B
(DEC. 68)

Well No. (A-1-4) 13cdb

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

Field checked by BLW date 12-71 lat/long chk

MASTER CARD

Record by BELLINOFF (— 8-22-52) Source of data REPT OF WELL DRILLER Date 11/52 Map TEMPE 7.5'

State ARIZONA 04 County (or town) MARICOPA 13

Latitude: 33 25 30 N Longitude: 111 54 10 Sequential number: 1

Lat-long accuracy: 2 T. 1 N. R 4 E. Sec 13. NW ¼ SE ¼ SW ¼ G & SR B & M

Local well number: A-01-04 13CDB Other number:

Local use: SRV Owner or name: DODGE BLACK

Owner or name: Address: TEMPE, ARIZ.

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — P

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other ABANDONED — U

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — U

DATA AVAILABLE: Well data Freq. W/L meas.: Field aquifer char.

Hyd. lab. data:

Qual. water data; type:

Freq. sampling: Pumpage inventory: yes no, period:

Aperture cards: yes

Log data: DRILLER'S — D

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 112 ft 112 Meas. rept LOG accuracy 3

Depth cased: (first perf.) 60 ft 60 Casing type: PIPE ; Diam. 14 in 14

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — P

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other

Date Drilled: FEB. 1945 945 Pump intake setting: ft

Driller: DODGE BLACK (name, address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — Deep / Shallow

Power (type): diesel, elec, gas, gasoline, hand, nat gas, LP gas, wind; H.P. Trans. or meter no.

Descrip. MP ft above/below LSD, Alt. MP

Alt. LSD: 1173 Accuracy: (source) TOPO 3

Water Level 60 ft above/below MP; Ft above/below LSD Accuracy: REPORTED

Date meas: Yield: WEIR 600 gpm Method determined

Drawdown: 30 ft Accuracy: Pumping period hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10[6] Temp. °F Date sampled

Taste, color, etc.

Well No. (A-1-4) 13cdb

Well No. (A-1-4) 13 cdb

Latitude-longitude 33, 25, 30 (N) (S) 111, 54, 10
d m s d m s

HYDROGEOLOGIC CARD

NAME AS ON MASTER CARD | Physiographic Province: | 22 | Section:

D | Drainage Basin: | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Φ) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat

MAJOR AQUIFER: system, series | aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ft

Length of well open to: ft | Depth to top of: ft

MINOR AQUIFER: system, series | aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ft

Length of well open to: ft | Depth to top of: ft

Intervals Screened: PERF. 60' TO 90'

Depth to consolidated rock: ft | Source of data:

Depth to basement: ft | Source of data:

Surficial material: | Infiltration characteristics:

Coefficient Trans: gpd/ft | Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

ABANDONED APRIL 1963 P.C. BRIGGS

13

Well No. (A-1-4) 13 cdb

GPO 869-201

(A-1-4) 13 c d b

1	20	Soil
20	50	Sand and boulders
50	60	Water bearing sand and gravel
60	100	Light clay
100	112	Water bearing sand and gravel

Town 09

LAT TUDE

LONGITUDE 111° 07' 12"

PLOTTED BY

CHECKED BY

(A-1-4) 24 abc

RECORDED BY: RELLICK

A.D.W.R.
SITE SCHEDULE

WELL NO: A-1-4)24ABC

Tempe #7

SITE ID 332514111535801

GENERAL SITE DATA T- A SITE TYPE: W RELIABILITY: C TOPO SETTING: V

SOURCE OF DATA: AOWC LATITUDE: 332514 LONGITUDE: 1115358 ACCY: 2

LOCAL ID: A-01-04 24ABC LAND NET: SWNWNW S24 T1N R4E 14

ADWR CNTL. NO: 55-628168 ALTITUDE: 1182. METHOD: M ACCY: 5

BASIN - USGS: SRV AOWR: ERV AMA: PHX STATE: 04 COUNTY: 013

SITE USE - 1ST: W 2ND: 3RD: WATER USE - 1ST: A 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: 690. DEPTH OF WELL: 690. SOURCE: D GEOHYDRO UNIT:

CONSTRUCTION DATA T- A EVENT NO.: 100 DRILLER: ROSCOE MASSIS

DATE COMPLETED: 05/16/1961 METHOD OF CONSTN: C FINISH: A SOURCE: D

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:
A	1		681.	24.	S
A	2		688.	20.	S

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:
A	1	290.	675.	20.	S	2	2.12	0.19
A	2	688.	690.			X		

LIFT DATA I- A SEQ NO:

DATE: 04/09/1962 TYPE: T TYPE OF POWER: E INTAKE SETTING: HORSEPOWER: 200.

POWER COMPANY: METER NUMBER:

LOG DATA:

T- A	LOG TYPE: D	BEGIN DEPTH:	END DEPTH: 690.	SOURCE OF DATA: D	
I-	LOG TYPE:	BEGIN DEPTH:	END DEPTH:	SOURCE OF DATA:	

OTHER SITE ID NUMBERS T- A SEQ NO: 1

OTHER ID: NO 7 ASSIGNER: CITY OF TEMPE

OWNER'S NAME T- A SEQ NO: 1 DATE: 05/16/1961

LAST: TEMPE FIRST: CITY OF MI:

No. of gallons per minute pumped when Test first started 1000

No. of gallons per minute pumped when Test completed 3000

Draw down at completion of Test 70 ft.

Hours Testing Well 48

Formation: Mention size of water gravel—

0	ft. to	4	ft.	Top soil
4	" "	7	"	Sandy soil
7	" "	120	"	Gravel and boulders
120	" "	130	"	Sandy clay and gravel
130	" "	155	"	Gravel and boulders
155	" "	165	"	Sand and clay
165	" "	200	"	Sandy clay and sand
200	" "	215	"	Tight sand and gravel
215	" "	235	"	Clay
235	" "	242	"	Cement, sand
242	" "	260	"	Clay with sand and gravel embedded
260	" "	270	"	Cemented sand
270	" "	305	"	Clay
305	" "	310	"	Sand
310	" "	320	"	Clay
320	" "	325	"	Gravel
325	" "	355	"	Clay, gravel, embedded
355	" "	360	"	Cemented sand and gravel
360	" "	385	"	Clay, gravel, embedded
385	" "	450	"	Tight conglomerate
450	" "	480	"	Sand and gravel, embedded in clay
480	" "	505	"	Tight sand and gravel
505	" "	525	"	Tight sand and gravel, conglomerate
525	" "	600	"	Tight sand, gravel embedded ikn clay
600	" "	680	"	Conglomerate
680	" "	690	"	Tight mountain rock
	" "		"	
	" "		"	
	" "		"	
	" "		"	
	" "		"	
	" "		"	
	" "		"	

[redacted]ing [redacted]s of [redacted]k we[redacted] off, [redacted] how[redacted]

NO. 7

(A-1-4)24ABC

332510111535801

(A-1-4)24 bbb SB

FORM W-2 10-46 JAHN-TYLER

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REGISTRATION OF WELL

Registration of well existing as of Oct. 3, 1945 is hereby made and filed with the State Land Commissioner as required by Section 5, Chapter 72 Senate Bill No. 3, Seventeenth Legislature, First Special Session 1945.

1. Owner SALT RIVER VALLEY WATER USERS' ASSOCIATION
Name
Phoenix, Arizona
Address

2. Lessee or Operator
Name
Address

3. Driller E. N. BROWN DRILLING COMPANY
Name
Phoenix, Arizona
Address

4. Location of well: Twp. 1N Rge. 4E Section 24 NW ¼ NW ¼ NW ¼
23E - 3N
10-acre subdivision

DESCRIPTION OF WELL

5. Total depth of hole 150 ft.

6. Type of casing stovepipe

7. Diameter and length of casing 18 in. from to in. from to in. from to

8. Method of sealing at reduction points

9. Perforated from 48 to 140 from to from to from to

10. Size of cuts 3/4 x 4" Number cuts per foot 10 holes per 10 inches

11. If screen was installed: Length ft. Diam in. Type

12. Method of construction drilled
drilled, dug, driven, bored, jetted, etc.

13. Date completed July 5, 1924 Deepened
Month Year Month Year

14. Depth to water when drilled ft.
If flowing well, so state.

15. Present depth to water 34.5 ft. Date of measurement December 26, 1945
If flowing well, so state.

16. Describe point from which depth measurements were made, and give sea-level elevation if available pumphouse floor - 1,178.5'

17. If flowing well, state method of flow regulation

DISCHARGE DATA

18. Well discharge 2559 g.p.m.
gal. per min. or cu. ft. per sec. or miner's inches.

19. Method of discharge measurement weir
weir, orifice, current meter, etc.

20. Drawdown 58.43 ft.

21. Annual discharge in acre-feet, or number of hours pumped: 1944 3,014 a.f. or hrs. 1945 3,368 a.f. or hrs.

22. Purpose of use Irrigation

23. Place of use: (See 24) Twp. Rge. Section Acres
Legal subdivision
Twp. Rge. Section Acres
Legal subdivision

24. If well is part of irrigation system of Irrigation District, Association or Company, omit 23 and give name of project.
SALT RIVER VALLEY WATER USERS' ASSOCIATION
Name of Project

(A-1-4)24 bbb

EQUIPMENT DATA

25. Kind of pump turbine
turbine, centrifugal, etc.

26. Kind of power electric
electric, natural gas, etc.

27. Horsepower rating of motor 75

DO NOT WRITE IN THIS SPACE

OFFICE RECORD

Received 2-1-46 by LJ

Filed 2-5-46 by LJ

File No. (A-1-4)24 bbb

Cross-referenced (Name) by

Cross-referenced (Basin) by

Cross-referenced by

LOG OF WELL

(A-1-4) 24bbb

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	5	Top soil
5	110	Gravel and boulders, cemented
110	150	" " " (water bearing)

I hereby certify that I have read the foregoing statements, and that each and all of the items therein contained are true to the best of my knowledge and belief.

SALT RIVER VALLEY WATER USERS' ASSOCIATION

By H. J. Lawson

H. J. Lawson

General Superintendent and Chief Engineer

Phoenix, Arizona

Address

Date February 1, 1946

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

EXCERPT OF 1945 GROUNDWATER LAW

Report of Well Driller must be prepared by the driller in all detail and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, First Special Session, 1945. This report should be in the mail within 30 days following completion of the well. Section 8 of the law provides: "Any person (includes any individual, firm, public or private corporation, or governmental agency) who shall fail or refuse to make any of the reports, give the notices required, or fail to cooperate with the State Land Commissioner or his representative, under the provisions of this Act, shall be guilty of a misdemeanor and shall be fined a sum not exceeding One Hundred Dollars."

23E-3N

1. OWNER SALT RIVER VALLEY WATER USERS' ASSOCIATION
Name
c/o J. F. Griswold, Secretary P. O. Box 1980, Phoenix, Arizona
Address

2. Lessee or Operator
Name
Address

3. DRILLER ROSCOE MOSS CO.
Name
LOS ANGELES, CALIFORNIA
Address

4. Location of well: Twp. 1 North Rge. 4 East Section 24 NW ¼ NW ¼ NW ¼
10-acre subdivision

5. ~~Location No.~~ File No. (A-1-4)24 bbb Permit No. S-393
Appln. No. S-406

DESCRIPTION OF WELL

6. Total depth of hole 525 ft.

7. Type of casing Kai-well double well casing.

8. Diameter and length of casing 20 in. from 0 to 472, in. from to, in. from to

9. Method of sealing at reduction points

10. Perforated from 150 to 457, from to, from to, from to

11. Size of cuts 1/2 x 4 to 5 Number of cuts per foot 10 per 14 inches

12. If screen was installed: Length ft. Diam. in. Type

13. Method of construction Drilled Calif Cable Tool Type Rig
drilled, dug, driven, bored, jetted, etc.

14. Date started August 22, 1957
Month Day Year

15. Date completed October 7, 1957
Month Day Year

16. Depth of water 80 ft.
If flowing well, so state.

17. Describe point from which depth measurements were made, and give sea-level elevation if available
Ground Surface.

18. If flowing well, state method of flow regulation

19. REMARKS:

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 10-25-57 by [illegible]

Filed 10-25-57 by [illegible]

File No. (A-1-4) 24 bbb

(Well Log to Appear on Reverse Side)

WD FORM G-301
REV. 4-27-53
1

2M 5-54

(A-1-4)24bbc

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	6	Top soil
6	150	Gravel and boulders
150	175	Sandy clay and gravel
175	310	Sandy clay
310	475	Sandy clay and gravel
475	500	Sand, gravel and boulders
500	525	~~Exx~~ Red granite rock

14005

RECEIVED OCT 28 1957 STATE LAND DEPT.

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

ROSCOE MOSS COMPANY

Driller J. D. Sauer Secretary
Name

4360 Worth St, Los Angeles, Calif
Address

Date October 24, 1957

RECEIVED OCT 30 1957 STATE WATER RIGHTS BOARD

(A-1-5) 76aa

RECORDED BY: REMICK

A.D.W.R.
SITE SCHEDULE

WELL NO: (A-1-5)7BAA

SITE ID 332703111153006

GENERAL SITE DATA T- M SITE TYPE: RELIABILITY: TOPO SETTING:

SOURCE OF DATA: LATITUDE: LONGITUDE: ACCY:

LOCAL ID: LAND NET: S R M

ADWR CNTL. NO: ALTITUDE: METHOD: ACCY:

BASIN - USGS: ADWR: ESQ AMA: PMX STATE: COUNTY:

SITE USE - 1ST: U 2ND: 3RD: WATER USE - 1ST: U 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: TEMPE MAP SCALE: 24000

DEPTH OF HOLE: DEPTH OF WELL: SOURCE: S GEOHYDRO UNIT:

CONSTRUCTION DATA T- A EVENT NO.: 190 DRILLER:

DATE COMPLETED: / / METHOD OF CONSTN: FINISH: SOURCE: S

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:
				20.	S

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:

LIFT DATA T- SEQ NO:

DATE: / / TYPE: TYPE OF POWER: INTAKE SETTING: HORSEPOWER:

POWER COMPANY: METER NUMBER:

LOG DATA:

T-	LOG TYPE:	BEGIN DEPTH:	END DEPTH:	SOURCE OF DATA:

OTHER SITE ID NUMBERS T- SEQ NO:

OTHER ID: ASSIGNER:

OWNER'S NAME T- A SEQ NO: 1 DATE: 03/00/1972

LAST: INDIAN TRIBE FIRST: SALT RIVER MI:

FLOW/DISCHARGE T- SEQ NO:

DATE MEASURED: / / DISCHARGE: SOURCE: METHOD OF MEASUREMENT:

PRODUCTION LEVEL: SOURCE OF DATA: STATIC LEVEL: METHOD OF MEASUREMENT:

PERIOD: SPEC CAPACITY: DRAWDOWN:

REMARKS T- A

SEQ. NR:	DATE:	
1	/ /	BEING DEEPENED 09/13/1982
	/ /	
	/ /	

SITE INVENTORY DATA T- A SEQ NO: 1

DATE: 09/13/1982 NAME: MOCK PA

WATER LEVEL DATA T- A SEQ NO: 8

DATE: 01/24/1983 WATER LEVEL: 1641.0 METHOD: V REMARK: SOURCE: A

used USGS mL 1-7 add meth V 3-7

MEASURING POINT DATA T- A SEQ NO: 1

DATE: 02/21/1966 MP HEIGHT: 1.0 DESCRIPTION: HOPE, NM

FIELD WATER QUALITY T- A SEQ NO: 1

DATE: 09/07/1966 S.P. COND.: (MICROMHOS/CM) 1400. FLUORIDE: (MG./L.) TEMPERATURE: (DEG. C)

SPRINGS T-

SPRING NAME:

TYPE: PERMANENCE: IMPROVEMENTS: FLOW VARIABILITY:

Recorded By: Short Form Well No.: (A-1-3) 7 DAA

te ID: 33 27 93 1 1 1 6 3 0 0 1 T=

2/6/85

eneral Site Data

ADWR Control No.: Basin - USGS: ADWR: AMA:

Site Use: Water Use:

Topo Quad: Scale:

Depth of Hole: Depth of Well: Source:

Lift Data T= Seq. No.:

Date: Lift: Power: Meter No.: Power Co.: Horsepower:

Account No.: Divider: Source: Method: Power:

wner's Name T= Seq. No.: Date:

Last: First: MI:

Site Inventory Data T= Seq. No.:

te: Name:

ter-Level Data T= A Seq. No.: 039

Date: 11/29/1984 Water Level: 81.11 Method: V Remark: Source: A

Measuring Point Data T= Seq. No.:

te: MP Height: Description:

Record by R. Wallace Source of data Field Date 3-72 Map Mesa 4 hwy 15

State Arizona 04 County (or town) Maricopa 07

Latitude: 332703N Longitude: 1115300 Sequential number: 1

Lat-long accuracy: 2 T. 1 S, R. 5 E, Sec 7 NE ¼, NE ¼, NW ¼ G. & SR. B & M

Local well number: A-01-05-07BAA Other number:

Local use: SRV Owner or name: Salt River Tribe

Owner or name: Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist F

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other U

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed U

DATA AVAILABLE: Well data Freq. W/L meas.: Field aquifer char.

Hyd. lab. data:

Qual. water data; type:

Freq. sampling: Pumpage inventory: yes no, period:

Aperture cards: yes

Log data:

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: * 235 ft 235 Meas. rept accuracy micro 0

Depth cased: (first perf.) ft Casing type: Steel; Diam. 20 in 20

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd roc., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other

Date Drilled: Pump intake setting: ft

Driller: name, address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other N Deep Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. Trans. or meter no.

Descrip. MP Top of casing W. side 1.5 ft above below LSD, Alt. MP

Alt. LSD: 1194 1194 Accuracy: (source) topo map 10 ft intervals 4

Water Level ft above below MP; Ft above below LSD Accuracy:

Date meas: Yield: gpm Method determined

Drawdown: ft Accuracy: Pumping period hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10[6] Temp. °F Date sampled

Taste, color, etc.

Well No. (A-1-5) 7baa

* measured depth with sounder and weight

FORM

235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235 235

M M

Latitude-longitude 33 d 27 m 03 s (E) 111 d 53 m 00 s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1–19)

Physiographic Province: Basin & Range (20–21) 22

Section: Sonoran

Desert (23) B

Drainage Basin: Gila River (23–25) 610 N

Subbasin: Salt River (26)

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Φ) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — (27) V

MAJOR AQUIFER: _____ system, _____ series (28–29) _____ aquifer, formation, group (30–31)

Lithology: _____ (32–33) Origin: _____ (34) Aquifer Thickness: _____ ft

(35–37) Length of well open to: _____ ft (38–40) Depth to top of: _____ ft (41–43)

MINOR AQUIFER: _____ system, _____ series (44–45) _____ aquifer, formation, group (46–47)

Lithology: _____ (48–49) Origin: _____ (50) Aquifer Thickness: _____ ft

(51–53) Length of well open to: _____ ft (54–56) Depth to top of: _____ ft (57–59)

Intervals Screened: _____

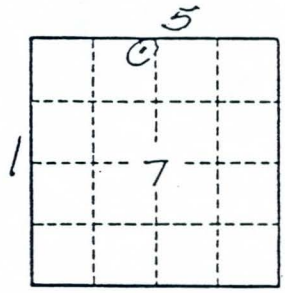
Depth to consolidated rock: _____ ft (60–63) Source of data: _____ (64)

Depth to basement: _____ ft (65–68) Source of data: _____ (69)

Surficial material: _____ (70–71) Infiltration characteristics: _____ (72)

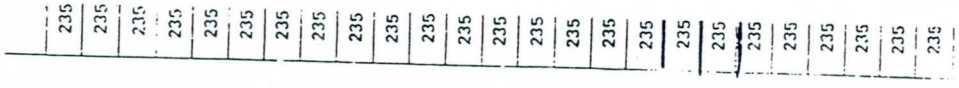
Coefficient Trans: _____ gpd/ft (73–75) Coefficient Storage: _____ (76–78)

Coefficient Perm: _____ gpd/ft^2; Spec cap: _____ gpm/ft; Number of geologic cards: _____ (79)



Well No. (A-1-5) 76aa

GPO 869-201



(A-1-5) 8 bad

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

RECEIVED
JUL 7 1978
STATE LAND DEPT.
314

REPORT OF WELL DRILLER

8- In [illegible] C.J.D.

This report should be prepared by the driller in all detail and filed with the State Land Commissioner following completion of the well.

1. OWNER Arizona Sand and Rock (Now Calmat of Az.)
Name

Address

2. Lessee or Operator
Name

Address

3. DRILLER Moss-Weber, Inc.
Name

P.O. Box 21305, Phoenix, Arizona, 85036
Address

4. Location of well: Twp. 1N Rge. 5E Section 8 SE ¼ NE ¼ NW ¼
10-acre subdivision

5. Intention to Drill File No. Permit No.

DESCRIPTION OF WELL

6. Total depth of hole 495 ft.

7. Type of casing Mild Steel

8. Diameter and length of casing 20 in. from 0' to 234', 18 in. from 218' to 495', in. from to

9. Method of sealing at reduction points Swaged from 18" to 20"

10. Perforated from 234 to 495', from to , from to , from to

11. Size of cuts 1/4" x 1½" Number of cuts per foot 66 (Presumabed)

12. If screen was installed: Length ft. Diam. in. Type

13. Method of construction Drilled
drilled, dug, driven, bored, jetted, etc.

14. Date started November 5 1973
Month Day Year

15. Date completed December 20 1973
Month Day Year

16. Depth of water 179 ft.
If flowing well, so state.

17. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Level

18. If flowing well, state method of flow regulation

19. REMARKS:

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 7-7-78 by jp

Filed 8-10-78 by jp

File No. A(1-5)8bad
35-36249

(Well Log to Appear on Reverse Side)

LOG OF WELL

(A-1-5) 8 bad

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	150	Sand, gravel & boulders
150	390	Clay & boulders
390	420	Cemented sandstone
420	495	Red granite

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Edward Seibel
Name

P.O. Box 21305, Phoenix, AZ, 85036
Address

Date 4/14/76

2-73

(A-1-5)17 Caa
25½E-3½N

FORM W-2 2M 12-47 JAHN-TYLER

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

Report of Well Driller is required to be made and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, Seventeenth Legislature, First Special Session, 1945. A separate report shall be made for each well and filed within 30 days after completion of the well.

1. Owner Salt River Valley Water Users' Association
Name
Phoenix, Arizona.
Address

2. Lessee or Operator
Name
Address

3. Driller Roscoe Moss Company (Driller J. O. Evans)
Name
4360 Worth Street, Los Angeles, California.
Address

4. Location of well: Twp. 1-North Rge. 5-East Section 17 Maricopa County SE ¼ NE ¼ SW ¼
10-acre subdivision

DESCRIPTION OF WELL

5. Total depth of hole 600' ft.

6. Type of casing Hard red steel

7. Diameter and length of casing 20 in. from 0 to 598, ____ in. from ____ to ____, ____ in. from ____ to ____

8. Method of sealing at reduction points Not Reduced

9. Perforated from 150 to 585, from ____ to ____, from ____ to ____, from ____ to ____

10. Size of cuts 5/8 x 4½ Number cuts per foot 10 per 12 inches

11. If screen was installed: Length ____ ft. Diam. ____ in. Type ____

12. Method of construction Drilled Calif Type Cable Tool
drilled, dug, driven, bored, jetted, etc.

13. Date completed October 5, 1950
Month Year

14. Depth to water 82' ft.
If flowing well, so state.

15. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Surface.

16. If flowing well, state method of flow regulation

DISCHARGE DATA

17. Well discharge 5/3/51: 3570 GPM
gal. per min. or cu. ft. per sec. or miner's inches.

18. Method of discharge measurement pitot tube
weir, orifice, current meter, etc.

19. Drawdown 23 ft.

20. Purpose of use Irrigation

21. Place of use: (See 22) Twp. ____ Rge. ____ Section ____ Legal subdivision ____ Acres ____

22. Purpose of use

Twp. ____ Rge. ____ Section ____ Legal subdivision ____ Acres ____

22. If well is part of irrigation system of Irrigation District, Association or Company, omit 23 and give name of project.

Name of Project

(A-1-5)17 caa

EQUIPMENT DATA

23. Kind of pump turbine
turbine, centrifugal, etc.

24. Kind of power electric
electric, natural gas, etc.

25. Horsepower rating of motor 200

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 10-23-50 by kb
Filed 12-15-50 by kb
File No. (A-1-5)17 daa
Cross-referenced (Name) ____ by ____
Cross-referenced (Basin) ____ by ____
Cross-referenced ____ by ____

LOG OF WELL

(A-1-5)17 caa

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	25	Cemented gravel and boulders
25	130	Hard clay and boulders
130	160	Clay and gravel
160	275	Clay
275	320	Hard clay and streaks of cement
320	418	Hard clay and some gravel
418	440	Packed sand and fine gravel
440	452	Clay
452	482	Hard clay gravel and caliche
482	516	Hard clay and cemented gravel
516	528	Gravel and streaks of cement
528	575	Hard clay and packed s[illegible]
575	585	Clay
585	600	Hard clay

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

RECEIVED
OCT 23 1950
STATE LAND DEPT.
OF ARIZONA

Driller Roscoe Moss Company
Name

4360 Worth Street, Los Angeles
Address

Date October 20, 1950

REPORT OF WELL DRILLER

(A-1-5)18 aaa

This report should be prepared by the driller in all detail and filed with the State Land Commissioner following completion of the well.

1. OWNER Tempe Sand & Gravel Co., Inc.
Name
P. O. Box 6403, Phoenix, Arizona
Address

2. Lessee or Operator
Name
Address

3. DRILLER Weber Well Drilling Co.
Name
P. O. Box 5354, Phoenix, Arizona
Address

4. Location of well: Twp. 1 N. Rge. 5 E. Section 18 NE ¼ NE ¼ NE ¼
10-acre subdivision

5. Intention to Drill File No. (A-1-5)18 aaa Permit No.

DESCRIPTION OF WELL

6. Total depth of hole 240' ft. 24

7. Type of casing 12" plate pipe

8. Diameter and length of casing 12 in. from 0 to 221, in. from to , in. from to

9. Method of sealing at reduction points

10. Perforated from 130 to 210, from to , from to , from to

11. Size of cuts 1/2 x 3-1/2 Number of cuts per foot 6

12. If screen was installed: Length ft. Diam. in. Type

13. Method of construction drilled
drilled, dug, driven, bored, jetted, etc.

14. Date started 6/19/59
Month Day Year

15. Date completed 7/9/59
Month Day Year

16. Depth of water 95 ft.
If flowing well, so state.

17. Describe point from which depth measurements were made, and give sea-level elevation if available

surface

18. If flowing well, state method of flow regulation

19. REMARKS:

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received FEB. 19, 1960 by RWJ
Filed FEB. 26, 1960 by RWJ
File No. (A-1-5)18 aaa

(Well Log to Appear on Reverse Side)

WD FORM G-301
REV. 4-27-53

LOG OF WELL

(A-1-5) 18aaa

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	109	boulders
109	136	sand
136	210	clay
210	240	clay, pea gravel

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Weber Well Drilling Co.
Name

P. O. Box 5354, Phoenix
Address

Date 2/18/60

RECEIVED JUN 15 1959 STATE LAND DEPT.

RECEIVED FEB 19 1960 STATE LAND DEPT.

2/19/

(A-1-5) 18aac

RECORDED BY:

A.D.W.R.
SITE SCHEDULE

WELL NO: (A-1-5) 18 AAC

SITE ID

GENERAL SITE DATA T= SITE TYPE: RELIABILITY: TOPO SETTING:

SOURCE OF DATA: LATITUDE: LONGITUDE: ACCY:

LOCAL ID LAND NET: S T R

ADWR CNTL. NO: ALTITUDE: METHOD: ACCY:

BASIN - USGS: ADWR: AMA: STATE: COUNTY:

SITE USE - 1ST: 2ND: 3RD: WATER USE - 1ST: 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: MAP SCALE:

DEPTH OF HOLE: 275.0 DEPTH OF WELL: 275.0 SOURCE: GEOHYDRO UNIT:

CONSTRUCTION DATA T= EVENT NO.: DRILLER:

DATE COMPLETED: / / 1949 METHOD OF CONSTR: FINISH: SOURCE:

T=	SEQ NO:	HOLE - TOP:	BOT:	DIA:

T=	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:

1-19-94
pac

T=	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:

LIFT DATA T= SEQ NO:

DATE: / / TYPE: TYPE OF POWER: INTAKE SETTING: HORSEPOWER:

POWER COMPANY: METER NUMBER:

LOG DATA:

T= LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

T= LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

OTHER SITE ID NUMBERS T= SEQ NO:

OTHER ID: ASSIGNER:

OWNER'S NAME T= SEQ NO: DATE: / /

LAST: MESA FIRST: City of MI:

(A-1-5)18aac

FLOW/DISCHARGE T- SEQ NO:

DATE MEASURED: DISCHARGE: SOURCE: METHOD OF MEASUREMENT:

PRODUCTION LEVEL: SOURCE OF DATA: STATIC LEVEL: METHOD OF MEASUREMENT:

PERIOD: SPEC CAPACITY: DRAWDOWN:

REMARKS T-

SEQ. NR: DATE:

SITE INVENTORY DATA T- A SEQ NO:

DATE: 10/01/1982 NAME: TRAVIS 13C

WATER LEVEL DATA T- W SEQ NO: 12

DATE: 01/04/1993 WATER LEVEL: 295.1 METHOD: V REMARK: SOURCE: S
used SLP to WL's 2-11

MEASURING POINT DATA T- SEQ NO:

DATE: MP HEIGHT: DESCRIPTION:

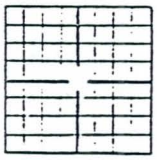
FIELD WATER QUALITY T- SEQ NO:

DATE: S.P. COND.: (MICROMHOS/CM) FLUORIDE: (MG./L.) TEMPERATURE: (DEG. C)

SPRINGS T-

SPRING NAME:

TYPE: PERMANENCE: IMPROVEMENTS: FLOW VARIABILITY:



Not Poss... need loca...

FORM W-2—1M—10-61 no dirt filed. (A-1-5) 18 bad

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REGISTRATION OF WELL

EXCERPT OF 1945 GROUNDWATER LAW

Registration of Existing Wells is required of all persons owning or operating wells for irrigation or drainage purposes in accordance with Section 5, Chapter 12, Senate Bill No. 3, First Special Session, 1945. Section 8 of the law provides a penalty for failure to furnish the reports or refusal to cooperate with the State Land Commissioner.

1. OWNER Henry R. and Mary A. Bayless (Name)
   R2. Box 20H Hood River, Oregon. (Address)
2. LESSEE OR OPERATOR ______ (Name)
   ______ (Address)
3. DRILLER W. S. Williams (Name)
   1518 E. Garfield st. Phoenix, Arizona (Address)
4. LOCATION OF WELL: Twp. 1N. Rge. 5E Section 18 SE ¼ NE ¼ NW ¼ (10-acre subdivision)

DESCRIPTION OF WELL

5. Total depth of hole 96 ft.
6. Type of casing 10 gage, Stove pipe
7. Diameter and length of casing 24 in. from top to bottom in. from ___ to ___, ___ in. from ___ to ___
8. Perforated from 20 ft to Bottom from ___ to ___, from ___ to ___, from ___ to ___
9. Size of cuts ½ inch Number cuts per foot 10 cuts
10. If screen was installed: Length ___ ft. Diam ___ in. Type no screen
11. Method of construction drilled (drilled, dug, driven, bored, jetted, etc.)
12. Date completed July (Month) 1941 (Year) Deepened ___ (Month) ___ (Year)
13. Depth of water when drilled 14 ft.
    If flowing well, so state.
14. Present depth to water 60 ft. Date of measurement Oct. 28, 1953
    If flowing well, so state.
15. Describe point from which depth measurements were made, and give sea-level elevation if available top of the ground.
16. If flowing well, state method of flow regulation ______

DISCHARGE DATA

17. Well discharge 3200 gal. per min. (gal. per min. or cu. ft. per sec. or miner's inches.)
18. Method of discharge measurement weir box. (weir, orifice, current meter, etc.)
19. Drawdown 60 ft.
20. Annual discharge in acre-feet or number of hours pumped: 1944 ___ a.f. or ___ hrs. 1945 ___ a.f. or ___ hrs. Cover 120 acres for 5 mo.
21. Purpose of use irrigation
22. Place of use: Twp. 1N. Rge. 5E Section 18 ______ (Legal subdivision) Acres 160
    (See 23)
    Twp. ___ Rge. ___ Section ___ ______ (Legal subdivision) Acres ___
23. If well is part of irrigation system or Irrigation District, Association or Company, omit 23 and give name of project.
    ______ (Name of Project)

EQUIPMENT DATA

24. Kind of pump Turbine (turbine, centrifugal, etc.)
25. Kind of power gasoline Motor (electric, natural gas, etc.)
26. Horsepower rating of motor 125

DO NOT WRITE IN THIS SPACE

OFFICE RECORD

Received 11-2-53 by KLC

Filed 11-2-53 by KLC

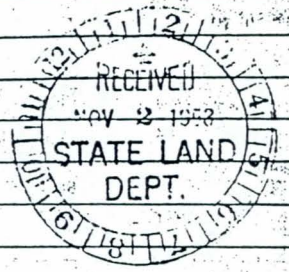
File No. (A-1-5) 18 bad

(D) ...

(See Other Side)

Indicate depth at which water was first encountered, and the depth and thickness of water bearing ... sian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
~~0~~		
1	12	top soil
12	46	Sand, gravel and boulders



I hereby certify that I have read the foregoing statements, and that each and all of the items therein contained are true to the best of my knowledge and belief.

Mary A. Bayless. owner
Owner, Operator or Driller

R.2. Box 204, Hood River. Oregon.
Address

Date.....

(A-1-5) 18bad

REPORT OF WELL DRILLER

(A-1-5) 18 cbb

This report should be prepared by the driller in all detail and filed with the State Land Commissioner following completion of the well.

1. OWNER Arizona Public Service Company (Name)
P. O. Box 2591 - Phoenix, Arizona (Address)

2. Lessee or Operator same (Name)
(Address)

3. DRILLER Dodge Black (Name)
1311 East 8th Street - Tempe, Arizona (Address)

4. Location of well: Twp. 1N Rge. 5E Section 18 NW ¼ NW ¼ SW ¼ (10-acre subdivision)

5. Intention to Drill File No. Permit No.

DESCRIPTION OF WELL

6. Total depth of hole 800 ft.

7. Type of casing steel

8. Diameter and length of casing 20 in. from 1 to 400, 16 in. from 400 to 800, in. from to

9. Method of sealing at reduction points

10. Perforated from 790 to 400, from to, from to, from to

11. Size of cuts 1/2 x 4' Number of cuts per foot 6

12. If screen was installed: Length ft. Diam in. Type

13. Method of construction drilled (drilled, dug, driven, bored, jetted, etc.)

14. Date started March (Month) 15 (Day) 1959 (Year)

15. Date completed June (Month) 15 (Day) 1959 (Year)

16. Depth of water 180 ft. (If flowing well, so state.)

17. Describe point from which depth measurements were made, and give sea-level elevation if available ground level

18. If flowing well, state method of flow regulation

19. REMARKS: cement bottom of 20'
drilled out from bottom

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 7-21-59 by RWT
Filed 7-22-59 by RWT
File No. (A-1-5) 18 cbb

(Well Log to Appear on Reverse Side)

WD FORM G-301
REV. 4-27-53

LOG OF WELL (A-1-5)18 cbb

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
1	10	Silt and sand
10	110	Sand and gravel
110	120	Water gravel
120	230	Light sandy clay
230	260	Packed sand
260	320	Light sandy clay
320	365	Heavy clay and water
365	385	Loose silt
385	450	Silt and clay
450	470	Light silt clay
470	540	Clay and gravel
540	600	Decomposed granite
600	660	Light sandy clay and gravel
660	800	Clay and decomposed granite

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller Name Judge Black

1311 East 8th Ave Tempe Arizona
Address

Date 7/10/59

REPORT OF WELL DRILLER

(A-1-5) 18 cdc

EXCERPT OF 1945 GROUNDWATER LAW

Report of Well Driller must be prepared by the driller in all detail and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, First Special Session, 1945. This report should be in the mail within 30 days following completion of the well. Section 8 of the law provides: "Any person (includes any individual, firm, public or private corporation, or governmental agency) who shall fail or refuse to make any of the reports, give the notices required, or fail to cooperate with the State Land Commissioner or his representative, under the provisions of this Act, shall be guilty of a misdemeanor and shall be fined a sum not exceeding One Hundred Dollars."

1. OWNER S. R. V. W. U. A.
Name
P. O. Box 1980, Phoenix, Arizona
Address

2. Lessee or Operator
Name
Address

3. DRILLER Roscoe Moss Co.
Name
1360 Worth St., Los Angeles, California
Address

4. Location of well: Twp. 1 N Rge. 5 E Section 18 SW ¼ SE ¼ SW ¼
10-acre subdivision

5. Intention to Drill File No. (A-1-5)18 cdc

DESCRIPTION OF WELL

6. Total depth of hole 770 ft.

7. Type of casing Hard red steel

8. Diameter and length of casing: 20 in. from 0 to 734 in. from to , in. from to

9. Method of sealing at reduction points

10. Perforated from 145 to 720 , from to , from to , from to

11. Size of cuts 5/8 x 4-1/2 Number cuts per foot 10 per 12 inches

12. If screen was installed: Length ft. Diam in. Type

13. Method of construction Drilled Calif Type Cable Tool
Note: drilled, dug, driven, bored, jetted, etc.

14. Date completed October 31, 1951 (Date should be October 31, 1951)
Month Year

15. Depth to water 72 ft.
If flowing well, so state.

16. Describe point from which depth measurements were made, and give sea-level elevation if available
Ground Surface.

17. If flowing well, state method of flow regulation

18. REMARKS:

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 7-29-53 by ZLC
Filed 7-29-53 by ZLC
File No. (A-1-5) 18 cdc

(Well Log to Appear on Reverse Side)

LOG OF WELL

(A-1-5)18 cdc

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	7	Top soil
7	155	Sand and boulders
155	450	Sandy clay and caliche
450	510	Clay and hard caliche
510	538	Tight gravel and sandstone
538	550	Tough sticky clay
550	770	Tight gravel and clay with granite.

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

Driller ROSCOE MOSS COMPANY
Name

4360 Worth Street, Los Angeles, Calif.
Address

Date July 28, 1953.

(A-1-5)18 DBA

WATER DIVISION
STATE OF ARIZONA

REPORT OF WELL DRILLER

This report should be prepared by the driller in all detail and filed with the State Land Commissioner following completion of the well.

1. OWNER V F NURSERY
   Name
   629 No. Roosevelt Mesa, Az.
   Address
2. Lessee or Operator D & R DRILLING
   Name
   P.O. BOX # 338 Queen Creek, Az. 85242
   Address
3. DRILLER D & R DRILLING
   Name
   P.O. BOX # 338 Queen creek, Az. 85242
   Address
4. Location of well: Twp. 1N Rge. 5E Section 18 N2 NW SE ¼ ¼ ¼
   10-acre subdivision
5. Intention to Drill File No. AN 1-518D-BA Permit No. 5940

DESCRIPTION OF WELL

6. Total depth of hole 515 ft.
7. Type of casing STEEL
8. Diameter and length of casing 8 in. from 0 to 499, ____ in. from ____ to ____, ____ in. from ____ to ____
9. Method of sealing at reduction points NONE
10. Perforated from NONE to ____, from ____ to ____, from ____ to ____, from ____ to ____
11. Size of cuts NONE Number of cuts per foot ____
12. If screen was installed: Length ____ ft. Diam. ____ in. Type ____
13. Method of construction DRILL
    drilled, dug, driven, bored, jetted, etc.
14. Date started X& 4-27 81
    Month Day Year
15. Date completed 7-1-81
    Month Day Year
16. Depth of water 235 ft.
    If flowing well, so state.
17. Describe point from which depth measurements were made, and give sea-level elevation if available GROUND LEVEL
18. If flowing well, state method of flow regulation ____
19. REMARKS: GRAVEL PACK FROM XXXX 515 BACK TO 490

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received ____ by ____
Filed 4-2-82 by LP
File No. A(1-5)18 DBA
55-584071

(Well Log to Appear on Reverse Side)

WD FORM G-301
REV. 4-27-63

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

FROM (FEET)	TO (FEET)	DESCRIPTION OF FORMATION MATERIAL
0	15	Sand & gravel
15	25	Sand & boulders
25	50	Sand, gravel & boulders
50	60	Sand , gravel & boulders
60	145	Sand & gravel
145	170	Sand
170	190	Sand & clay
190	217	Conglomert
217	250	Sand & gravel
250	300	Conglomert
300	345	Sand & gravel
345	390	Sand, clay & gravel
390	455	Conglomert
455	490	Sand, clay & gravel
490	515	Conglomert
		1st. Water @ 132 ft., next water @ 235 ft., depth and thickness of water beds unkown.

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

AUG 1981
DEPARTMENT OF WATER RESOURCES

Driller C. Frank Briggs
Name

D. R. Drilling
PO Box 338 Quien Creek, Ariz.
Address

Date 7-31-81

(A-1-5) 18ddd 1

SRP 25E-3.1N

FORM W-2 10-45 JAHN-TYLER

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

REGISTRATION OF WELL

Registration of well existing as of Oct. 3, 1945 is hereby made and filed with the State Land Commissioner as required by Section 5, Chapter 12, Senate Bill No. 3, Seventeenth Legislature, First Special Session 1945.

1. Owner SALT RIVER VALLEY WATER USERS' ASSOCIATION
Name of
Phoenix, Arizona
Address

2. Lessee or Operator
Name
Address

3. Driller Roscoe Moss Company
Name
Phoenix, Arizona
Address

4. Location of well: Twp. 1N (25E-3N) Rge. 5E Section 18 SE¼ SE¼ SE¼
10-acre subdivision

DESCRIPTION OF WELL

5. Total depth of hole 230 ft.

6. Type of casing stovepipe

7. Diameter and length of casing 20 in. from to in. from to in. from to

8. Method of sealing at reduction points

9. Perforated from 45 to 177 from to from to from to

10. Size of cuts 3/4 x 4 Number cuts per foot twelve

11. If screen was installed: Length ft. Diam. in. Type

12. Method of construction drilled
drilled, driven, bored, jetted, etc.

13. Date completed May 13, 1929 Deepened
Month Year Month Year

14. Depth to water when drilled 36.25 ft.
If flowing well, so state.

15. Present depth to water 50.1 ft. Date of measurement January 9, 1946
If flowing well, so state.

16. Describe point from which depth measurements were made, and give sea-level elevation if available pumphouse floor - 1,211.9'

17. If flowing well, state method of flow regulation

DISCHARGE DATA

18. Well discharge 1742 g.p.m.
gal. per min. or cu. ft. per sec. or miner's inches.

19. Method of discharge measurement weir
weir, orifice, current meter, etc.

20. Drawdown 119.82 ft.

21. Annual discharge in acre-feet, or number of hours pumped: 1944 1,963 a.f. or hrs. 1945 2,612 a.f. or hrs.

22. Purpose of use irrigation

23. Place of use: Twp. Rge. Section Legal subdivision Acres
(See 24)
Twp. Rge. Section Legal subdivision Acres

24. If well is part of irrigation system of Irrigation District, Association or Company, omit 23 and give name of project.
SALT RIVER VALLEY WATER USERS' ASSOCIATION
Name of Project

(A-1-5)18ddd

EQUIPMENT DATA

25. Kind of pump Turbine
turbine, centrifugal, etc.

26. Kind of power electric
electric, natural gas, etc.

27. Horsepower rating of motor 87

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 2-1-46 by LJ
Filed 2-5-46 by LJ
File No. (A-1-5)18 ddd
Cross-referenced (Name) by
Cross-referenced (Basin) by
Cross-referenced by

(A-1-5)18 ddd 2

FORM W-8 2M 12-47 JAHN-TYLER

LAND DEPARTMENT
WATER DIVISION
STATE OF ARIZONA

Well 25-E-3-N

REPORT OF WELL DRILLER

Report of Well Driller is required to be made and filed with the State Land Commissioner as required by Section 7, Chapter 12, Senate Bill No. 3, Seventeenth Legislature, First Special Session, 1945. A separate report shall be made for each well and filed within 30 days after completion of the well.

1. Owner Salt River Valley Water Users' Association
Name
Phoenix, Arizona.
Address

2. Lessee or Operator
Name
Address

3. Driller Robison and Mason (For Roscoe Moss Company)
Name
4360 Worth Street, Los Angeles, California.
Address

4. Location of well: Twp. 1-North Rge. 5-East Section 18 SE ¼ SE ¼ SE ¼
10-acre subdivision

DESCRIPTION OF WELL

5. Total depth of hole 704' ft.

6. Type of casing Hard Red Steel Casing

7. Diameter and length of casing 20 in. from 0 to 702 in. from to in. from to

8. Method of sealing at reduction points Not Reduced

9. Perforated from 170 to 682 from to from to from to

10. Size of cuts 5/8 x 4½ Number cuts per foot 10 per 12 inches

11. If screen was installed: Length ft. Diam. in. Type

12. Method of construction Drilled Wichita Falls Spudder
drilled, dug, driven, bored, jetted, etc.

13. Date completed March 26, 1949
Month Year

14. Depth to water 85' ft.
If flowing well, so state.

15. Describe point from which depth measurements were made, and give sea-level elevation if available Ground Surface.

16. If flowing well, state method of flow regulation

DISCHARGE DATA

17. Well discharge 4290 g.p.m.
gal. per min. or cu. ft. per sec. or miner's inches.

18. Method of discharge measurement pitot tube
weir, orifice, current meter, etc.

19. Drawdown 37 ft.

20. Purpose of use Irrigation

21. Place of use: Twp. Rge. Section Legal subdivision Acres
(See 22)

22. ~~Purpose of use~~

Twp. Rge. Section Legal subdivision Acres

22. If well is part of irrigation system of Irrigation District, Association or Company, omit 23 and give name of project.

Name of Project

(A-1-5)18 ddd

EQUIPMENT DATA

23. Kind of pump Turbine
turbine, centrifugal, etc.

24. Kind of power Electric
electric, natural gas, etc.

25. Horsepower rating of motor 200

DO NOT WRITE IN THIS SPACE
OFFICE RECORD

Received 1/24/50 by kb
Filed 2/24/50 by kb
File No. (A-1-5)18 ddd
Cross-referenced (Name) by
Cross-referenced (Basin) by
Cross-referenced by

(A-1-5)18ddd2

LOG OF WELL

Indicate depth at which water was first encountered, and the depth and thickness of water bearing beds. If water is artesian, indicate depth at which encountered, and depth to which it rose in well.

From (feet)	To (feet)	Description of formation material
0	12	Cemented boulders
12	135	Cemented gravel and boulders
135	145	Loose gravel
145	150	Cemented gravel
150	170	Loose gravel
170	305	Clay
305	310	Cemented gravel
310	365	Clay
365	400	Clay, with sand and gravel
400	440	Clay and gravel
440	490	Clay and sand hard
490	510	Clay and sand and shells
510	515	Sand, hard
515	520	Clay
520	550	Sandy clay and gravel
550	570	Cemented sand
570	575	Sand loose
575	585	Gravel
585	590	Sandy clay
590	620	Gravel and sand
620	625	Clay
625	640	Sand, clay and gravel
640	660	Cemented gravel
660	675	Gravel with cemented streaks
675	704	Cemented gravel

I hereby certify that this well was drilled by me (or under my supervision), and that each and all of the statements herein contained are true to the best of my knowledge and belief.

JAN 24 1950

STATE LAND DEPT. OF ARIZONA

Driller Robidon and Mason (For Roscoe Moss Co)
Name

Address

Date January 20, 1950

(A-1-5) 19 6dd

RECORDED BY: _____ A.D.W.R. SITE SCHEDULE WELL NO: A-1-5 19800

SRP 24.5E-2.5N

SITE ID:

GENERAL SITE DATA T- SITE TYPE: RELIABILITY: TOPO SETTING:

SOURCE OF DATA: LATITUDE: LONGITUDE: ACCY:

LOCAL ID: LAND NET: S T R

ADWR CNTL. NO: ALTITUDE: METHOD: ACCY:

BASIN - USGS: ADWR: AMA: STATE: COUNTY:

SITE USE - 1ST: 2ND: 3RD: WATER USE - 1ST: 2ND: 3RD:

TOPOGRAPHIC QUADRANGLE: MAP SCALE:

DEPTH OF HOLE: 764. DEPTH OF WELL: SOURCE: GEOHYDRO UNIT:

CONSTRUCTION DATA T- EVENT NO.: DRILLER:

DATE COMPLETED: 05/12/1949 METHOD OF CONSTN: FINISH: SOURCE:

T-	SEQ NO:	HOLE - TOP:	BOT:	DIA:
			764.	20.

T-	SEQ NO:	CASING - TOP:	BOT:	DIA:	MATL:

Rec 1-17-84 Rick

T-	SEQ NO:	PERF - TOP:	BOT:	DIA:	MATL:	TYPE:	LEN:	WID:
		1610.	685.					

LIFT DATA T- SEQ NO:

DATE: / / TYPE: TYPE OF POWER: INTAKE SETTING: HORSEPOWER:

POWER COMPANY: METER NUMBER:

LOG DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

T- LOG TYPE: BEGIN DEPTH: END DEPTH: SOURCE OF DATA:

OTHER SITE ID NUMBERS T- SEQ NO:

OTHER ID: ASSIGNER:

OWNER'S NAME T- SEQ NO: DATE: / /

LAST: SRP FIRST: MI:

FLOW/DISCHARGE T- SEQ NO:

DATE MEASURED: / / DISCHARGE: SOURCE: METHOD OF MEASUREMENT:

PRODUCTION LEVEL: SOURCE OF DATA: STATIC LEVEL: METHOD OF MEASUREMENT:

PERIOD: SPEC CAPACITY: DRAWDOWN:

REMARKS T-

SEQ. NR: DATE:

/ /

/ /

/ /

SITE INVENTORY DATA T- A SEQ NO: 1

DATE: 01/13/1983 NAME: MURRAY BA

WATER LEVEL DATA T- SEQ NO:

DATE: / / WATER LEVEL: METHOD: REMARK: SOURCE:

MEASURING POINT DATA T- SEQ NO:

DATE: / / MP HEIGHT: DESCRIPTION:

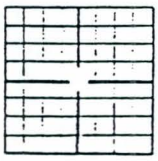
FIELD WATER QUALITY T- SEQ NO:

DATE: / / S.P. COND.: (MICROMHOS/CM) FLUORIDE: (MG./L.) TEMPERATURE: (DEG. C)

SPRINGS T-

SPRING NAME:

TYPE: PERMANENCE: IMPROVEMENTS: FLOW VARIABILITY:



(A-1-5)19bdd

FORM 9-1642B
(DEC. 66)

Well No. (A-1-5) 19CCC2

19 BDD

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by LEC (REPORT OF WELL DRILLER 6/49) Source of data SLD Date 7/71 Map TEMPE 7½

State AZ 12 [04] County (or town) MARICOPA [07]

Latitude: [33 24 57 N] deg min sec N/S Longitude: [111 52 52] degrees min sec Sequential number: [1]

Lat-long accuracy: [2] T. 1 N/S, R 5 E/W, Sec 19, SW ¼, SW ¼, NE ¼ G&SR EB & M

Local well number: A-01-05-19ACC2 Other number: 24.5 N

Local use: SRV Owner or name: SRVWUA

Owner or name: Address: PHOENIX

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [U]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other [I]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: [ ] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [ ]

Freq. sampling: [ ] Pumpage inventory: yes / no, period: [ ]

Aperture cards: [ ] yes

Log data: DRILLER'S LOG [D]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 702 ft [7 0 2] Meas. rept accuracy: DRILLER'S LOG [3]

Depth cased: (first perf.) 160 ft [1 6 0] Casing type: ; Diam. 20 in [2 0]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [P]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [ ]

Date Drilled: [ ] Pump intake setting: [ ] ft

Driller: BJ. ROGERS FOR RM. CO. ,

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple, (cent.), (M) multiple, (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [T] Deep / Shallow [D]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. [5] Trans. or meter no.

Descrip. MP ft above/below LSD, Alt. MP

Alt. LSD: 1202 [1 2 0 2] Accuracy: (source)

Water Level 65 ft above/below MP; Ft above/below LSD [6 5] Accuracy: REPORTED [G]

Date meas: 5/12/49 [5 4 9] Yield: gpm Method determined

Drawdown: ft Accuracy: Pumping period hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10^6 Temp. °F Date sampled

Taste, color, etc.

Well No. (A-1-5) 19CCC2

bdd

Latitude-longitude 33 d 24 m 57 s N 111 d 52 m 52 s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1–19) Physiographic Province: BASIN & RANGE (20–21) 22 Section: SONORAN

DESERT (22) B Drainage Basin: (23–25) Subbasin: (26)

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Q) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat (27)

MAJOR AQUIFER: system, series (28–29) aquifer, formation, group (30–31)

Lithology: (32–33) Origin: (34) Aquifer Thickness: ft

(35–37) Length of well open to: ft (38–40) Depth to top of: ft (41–43)

MINOR AQUIFER: system, series (44–45) aquifer, formation, group (46–47)

Lithology: (48–49) Origin: (50) Aquifer Thickness: ft

(51–53) Length of well open to: ft (54–56) Depth to top of: ft (57–59)

Intervals Screened:

Depth to consolidated rock: ft (60–63) Source of data: (64)

Depth to basement: ft (65–68) Source of data: (69)

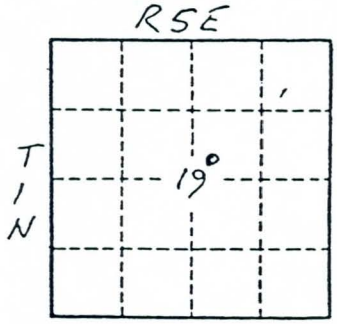
Surficial material: (70–71) Infiltration characteristics: (72)

Coefficient Trans: gpd/ft (73–75) Coefficient Storage: (76–78)

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards: (79)

CASED TO 704'? (TYPED OVER 702)
PERFORATED 160'–685'

1-19-82: MOL. FORM (R=12.1) SENT TO TUCSON



Well No. (A-1-5) 19ccc2

GPO 869-201

(A-1-5)19 ~~sec~~ bdd

S.R.V.W.U.A.

0	to 3	soil	
3	7	caliche	
7	17	boulders	
17	73	cemented boulders	
73	74	loose boulders	
74	94	boulders and sand	
94	108	sand and boulders, loose	
108	140	sand and boulders	
140	161	sand and gravel	
161	170	clay	Clay 161-170
170	190	sandy clay	Sandy clay 170-190
190	215	clay and sand	
215	240	clay	
240	282	clay and cemented gravel	
282	300	cemented gravel, streaks of sand	
300	326	sand and gravel	
326	338	cemented gravel with clay and sand	
338	353	cemented sand and gravel	
353	368	cemented sand and gravel with clay	
368	510	cemented gravel and clay	
510	515	clay	
515	535	gravel	
535	690	clay and cemented gravel	
690	702	cemented gravel	

APPENDIX C

WATER-LEVEL MEASUREMENTS

TABLE C-1 WATER-LEVEL MEASUREMENTS FOR SELECTED WELLS
IN JANUARY-FEBRUARY 1987

Well Location	Local No.	Perforated Interval (feet)	Land Surface Elevation (feet)	Date	Depth to Water (feet)	Water-Level Elevation (feet)
(A-1-4)13adc	-	-	1,180	2/19/87	76.8	1,103
24abc	Tempe No. 7	200-690	1,181	2/4/87	102.3	1,079
24bbc	SRP 23E-2.9N	150-457	1,176	1/13/87	100.8	1,076
(A-1-5)7baa	-	T.D. 235	1,194	2/19/87	76.5	1,118
17dbb	SRP 25.5E-3.5N	150-585	1,214	1/13/87	115.0	1,099
18aac	-	T.D. 266	1,188	2/19/87	84.5	1,104
18cbc	-	-	1,182	2/19/87	81.0	1,101
18cdc	SRP 24.3E-3N	145-720	1,191	1/13/87	112.3	1,078
18dbb	-	T.D. 515	1,187	2/23/87	131.3	1,056
18ddd	SRP 25E-3.1N	170-682	1,213	1/13/87	139.0	1,074

TABLE C-2 - WATER-LEVEL MEASUREMENTS FOR SRP WELL 24.5E-2.5N

Date	Depth to Water (feet)	Date	Depth to Water (feet)
4/1/60	155	2/25/77	215
7/20/60	179	5/5/77	220
10/24/60	179	8/10/77	217
3/3/61	188	12/2/77	225
7/28/61	203	2/78	185
11/6/61	193	9/5/78	206
8/29/62	177	1/79	169
11/8/62	162	4/11/79	139
7/2/63	172	5/16/79	129
4/3/64	208	8/15/79	156
5/28/64	219	12/20/79	128
6/15/64	228	4/29/80	125
3/15/65	222	5/12/80	114
6/29/65	223	8/21/80	134
8/30/66	149	1/81	114
3/15/67	165	4/1/81	174
6/5/67	178	8/24/81	170
12/31/70	163	11/20/81	178
6/1/71	196	2/22/82	187
9/20/71	198	8/4/82	190
3/2/72	235	10/7/82	188
6/29/72	250	7/6/83	136
1/73	147	4/13/84	152
4/73	147	6/8/84	182
9/26/74	219	10/3/84	160
12/17/74	171	6/25/85	125
5/16/75	175	9/11/85	134
7/11/75	175	1/14/86	116
11/7/75	220	7/8/86	132
1/2/76	174	8/8/86	130
4/22/76	215	10/29/86	112.4
8/18/76	213	1/13/87	109.4
10/12/76	214		

Water-level information from the Salt River Project and the Arizona Department of Water Resources.

TABLE C-3 - WATER-LEVEL MEASUREMENTS FOR SRP WELL 26E-3.9N

Date	Depth to Water (feet)	Date	Depth to Water (feet)
1/73	194	12/9/82	203
4/73	213	12/23/82	201
2/78	246	1/6/83	197
12/26/78	226	1/27/83	194
1/23/79	221	2/10/83	193
2/27/79	211	2/24/83	188
3/29/79	207	3/10/83	185
4/24/79	202	3/24/83	182
5/29/79	196	4/14/83	180
6/05/79	193	4/28/83	176
12/20/79	188	5/19/83	174
1/30/80	188	5/26/83	173
2/26/80	183	6/2/83	171
3/19/80	177	6/9/83	176
4/30/80	170	1/84	150
5/21/80	167	1/86	137
1/81	163	1/13/87	143.8
1/82	215	12/31/85	66.5

Water-Level information from the Salt River Project and the Arizona Department of Water Resources.

TABLE C-4 - WATER-LEVEL MEASUREMENTS FOR WELL (A-1-5)7baa

Date	Depth to Water (feet)	Date	Depth to Water (feet)
2/23/72	127.2	3/2/78	148.6
3/14/72	118.4	3/28/78	132.5
8/31/72	155.7	4/22/78	94.4
9/30/72	152.6	5/19/78	88.0
10/25/72	147.4	6/6/78	87.9
11/23/72	141.0	12/16/78	135.5
12/31/72	138.1	1/2/79	113.0
1/25/73	130.4	1/21/79	86.2
2/26/73	127.4	2/23/79	71.9
3/21/73	114.0	3/25/79	66.7
5/30/73	73.6	4/30/79	60.9
6/21/73	70.8	5/17/79	58.5
7/15/73	70.7	6/19/79	55.2
8/7/73	72.4	7/21/79	54.3
11/14/73	82.8	8/8/79	56.0
12/7/73	85.2	9/19/79	60.9
1/31/74	93.5	10/31/79	75.6
2/17/74	97.8	11/25/79	83.6
3/22/74	94.4	12/30/79	91.8
4/22/74	99.3	1/6/80	94.5
5/18/74	105.4	2/27/80	75.0
6/9/74	104.8	3/18/80	68.0
7/15/74	105.9	4/13/80	68.8
8/20/74	100.9	5/20/80	48.9
9/25/74	110.8	6/25/80	48.3
10/31/74	127.7	7/9/80	47.4
11/27/74	129.1	8/6/80	50.2
12/26/74	129.9	9/30/80	57.8
1/23/75	132.2	10/23/80	69.6
2/28/75	134.3	11/30/80	77.4
3/25/75	135.0	12/25/80	82.9
4/10/75	135.8	1/31/81	85.8
5/22/75	136.4	2/25/81	86.5
6/17/75	136.5	3/27/81	90.2
7/27/75	128.0	4/28/81	92.2
8/30/75	111.0	5/27/81	93.5
9/25/75	127.2	7/25/81	87.7
10/21/75	119.2	8/26/81	80.2
1/27/76	124.7	9/22/81	85.9
2/7/76	126.5	10/30/81	106.0
3/9/76	136.4	11/14/81	114.8
8/11/76	134.0	3/31/82	118.7
10/13/76	139.2	4/30/82	84.2
1/6/77	136.1	5/24/82	82.1
1/26/78	138.7	6/19/82	50.0

Continued:

TABLE C-4 - WATER-LEVEL MEASUREMENTS FOR WELL (A-1-5)7baa
(Continued)

Date	Depth to Water (feet)	Date	Depth to Water (feet)
7/31/82	83.9	8/8/84	73.7
8/14/82	81.8	9/21/84	75.7
10/9/82	82.3	10/1/84	76.0
11/1/82	94.7	11/1/84	78.8
12/31/82	110.7	12/31/84	80.2
1/31/83	83.8	1/31/85	66.8
2/28/83	74.0	2/28/85	60.4
3/31/83	64.8	3/31/85	55.8
4/30/83	58.2	4/30/85	51.5
5/30/83	50.8	5/24/85	49.2
6/30/83	47.9	6/2/85	49.5
7/08/83	47.9	7/1/85	51.7
8/01/83	49.7	8/24/85	52.6
9/06/83	54.0	9/19/85	50.0
10/31/83	55.4	10/1/85	55.1
11/1/83	55.4	11/1/85	65.1
12/1/83	56.6	12/31/85	66.5
1/31/84	54.5	1/27/86	62.1
2/14/84	54.0	2/1/86	62.2
3/1/84	55.9	3/1/86	64.6
4/1/84	60.0	4/30/86	63.9
5/1/84	62.1	5/6/86	63.7
6/1/84	67.1	6/1/86	66.2
7/1/84	71.9	2/19/87	76.5

Water-level Information from the U.S. Geological Survey (Data is Provisional) and the Arizona Department of Water Resources.

APPENDIX D

PUMPAGE RECORDS

TABLE D-1 - AMOUNT OF GROUNDWATER PUMPED
(ACRE-FEET) FROM SRP WELLS (1965-1985)

Year	23E-2.9N	24.3E-3N	25E-3.1N	25.5E-3.5N
1965	2,314	642	1,939	2,431
1966	1,172	786	467	1,272
1967	2,123	1,899	1,645	3,132
1968	653	145	33	202
1969	854	305	1,655	1,435
1970	2,016	1,353	1,693	2,294
1971	2,063	1,611	2,108	2,947
1972	1,228	1,458	1,738	3,069
1973	144	115	45	0
1974	103	1,481	1,493	0
1975	403	610	1,333	11
1976	338	1,030	1,101	1,861
1977	524	1,696	691	301
1978	28	52	122	120
1979	240	60	14	15
1980	71	38	9	6
1981	257	1,407	1,873	1,516
1982	14	192	360	236
1983	54	13	13	9
1984	154	885	735	272
1985	16	11	8	46

Information from Salt River Project

TABLE D-2 - PUMPAGE FROM NON-SRP WELLS NEAR THE NORTHWEST WRP

State No.	ADWR Registration No.	Well No.	ANNUAL PUMPAGE (acre-feet) 1984	1985
(A-1-4) 13abb	800559	Kachina Redi-Mix	0	0
13aca	800561	Kachina Redi-Mix	0	0
13adb	800535	Tri-City Ready-Mix	151	208
13adc1	634457	Brock	-	-
13adc3	-	AAA Auto Wrecking	-	-
13add	628942	Nesbitt	52	53
13bac1	800560	Kachina Redi-Mix	192	18
13bac2	87355	Kachina Redi-Mix	-	-
13bcc	613077	AZ Public Service	0	0
13bdd	-	AZ Public Service	-	-
24abc	628168	City of Tempe No. 7	398	39
(A-1-5) 8bad	611457	Calmat	-	-
18aac	629617	Mesa WWTP	8	6
18cbb	613076	AZ Public Service	435	0
18dbb	-	V&P Nursery	-	-

Information from the Arizona Department of Water Resources Grandfathered Rights and Irrigation Districts Printout of February 24, 1987.

APPENDIX E

AQUIFER TEST MEASUREMENTS AND GRAPHICAL PLOTS

TABLE E-1 - DRAWDOWN MEASUREMENTS FOR MONITOR WELL NO. 2

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
10/31/85	6:00 a.m.	107.66	1,031,990
	6:01	107.71	
	6:02	108.63	
	6:03	108.71	
	6:04	108.78	
	6:05	108.94	
	6:06	108.92	
	6:07	108.93	
	6:08	108.93	
	6:09	109.00	
	6:10	108.99	1,032,955
	6:11	108.99	
	6:12	109.01	
	6:13	109.02	
	6:14	109.03	
	6:15	109.04	1,033,580
	6:16	109.07	
	6:17	109.09	
	6:18	109.06	
	6:19	109.09	
	6:20	109.09	
	6:22	109.11	1,034,450
	6:24	109.11	
	6:25	-	1,034,822
	6:26	109.14	
	6:28	109.14	
	6:30	109.13	1,035,442
	6:32	109.19	
	6:34	109.18	
	6:35	-	1,036,067
	6:36	109.19	
	6:38	109.21	
	6:40	109.15	1,036,690
	6:42	109.24	
	6:44	109.22	
	6:45	-	1,037,313
	6:46	109.25	
	6:48	109.23	
	6:50	109.24	1,037,939
	6:52	109.25	

Continued:

TABLE E-1 - DRAWDOWN MEASUREMENTS
FOR MONITOR WELL NO. 2 (continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
10/31/85	6:54 a.m.	109.26	
	6:55	-	1,038,561
	6:56	109.26	
	6:58	109.27	
	7:00	109.29	1,039,185
	7:07	109.31	
	7:10	109.31	1,040,430
	7:15	109.32	
	7:20	109.28	1,041,679
	7:25	109.33	
	7:30	109.31	1,042,926
	7:35	109.40	
	7:40	109.35	
	7:41	-	1,044,296
	7:45	109.39	
	7:50	109.33	1,045,417
	7:55	109.41	
	8:00	109.40	1,046,662
	8:10	109.41	
	8:20	109.43	
	8:30	109.44	
	8:33	-	1,050,775
	8:40	109.44	
	8:50	109.44	
	9:00	109.49	
	9:03	-	1,054,513
	9:20	109.49	
	9:40	109.51	
	10:00	109.52	1,061,616
	10:20	109.55	
	10:40	109.55	
	11:00	109.58	1,069,090
	11:20	109.59	
	11:45	109.61	
	12:05 p.m.	109.61	
	12:10	-	1,077,815
	12:20	109.61	
	12:40	109.62	
	1:00	109.64	
	1:20	109.63	
	1:21	109.63	
	1:40	109.66	
	2:00	109.66	1,091,575

Monitor Well No. 2 was the pumped well.

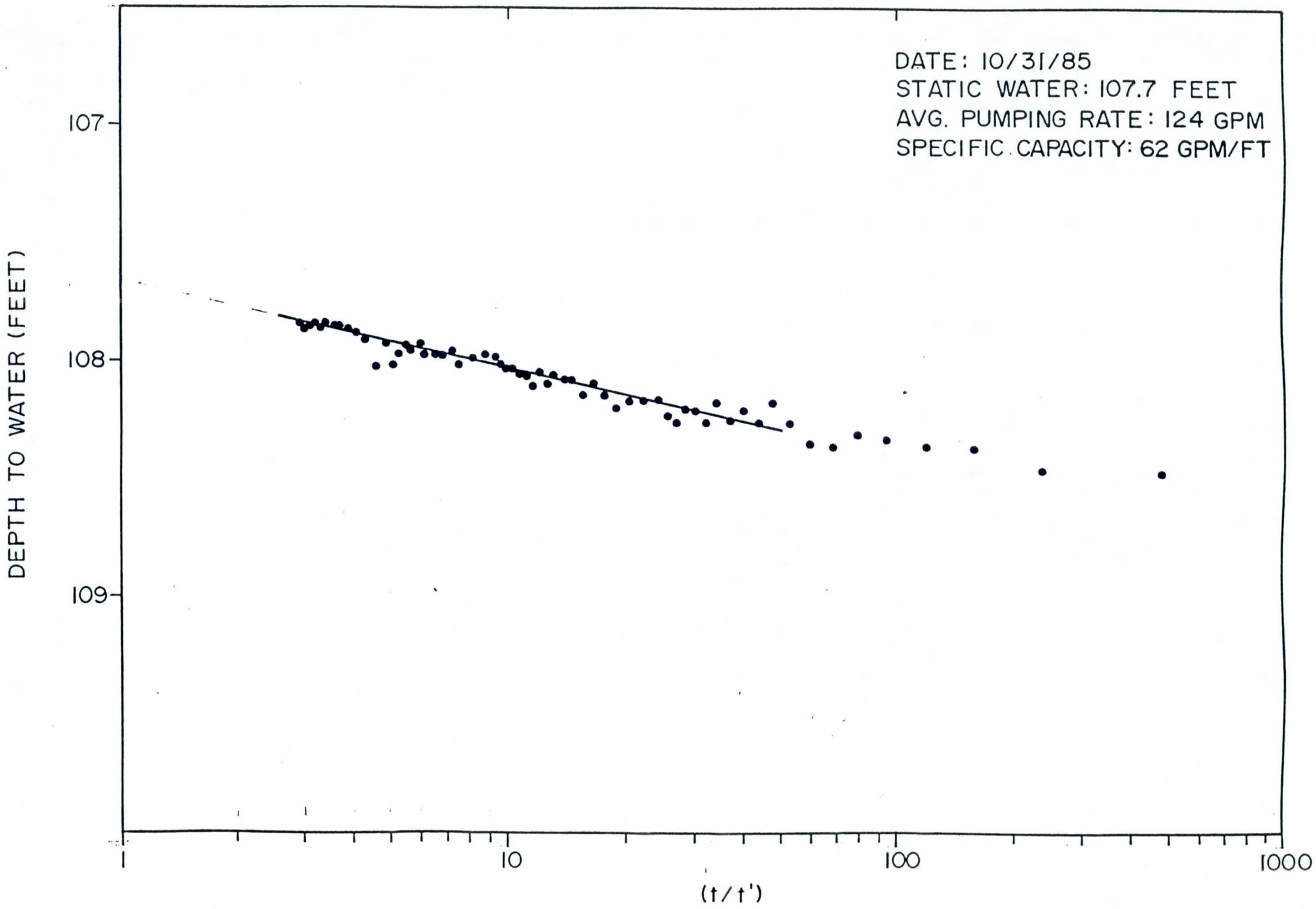


FIGURE E-1-CORRECTED RECOVERY FOR MW-2

TABLE E-2 - RECOVERY MEASUREMENTS FOR MONITOR WELL NO. 2

Date	Time	Depth to Water (feet)	Date	Time	Depth to Water (feet)
10/31/85	2:00 p.m.	109.66	10/31/85	2:46 p.m.	108.07
	2:01	108.49		2:48	108.06
	2:02	108.47		2:50	108.04
	2:03	108.38		2:52	108.04
	2:04	108.37		2:54	108.02
	2:05	108.34		2:56	107.99
	2:06	108.32		2:58	107.99
	2:07	108.37		3:00	107.98
	2:08	108.36		3:05	107.99
	2:09	108.27		3:12	108.02
	2:10	108.19		3:15	107.96
	2:11	108.27		3:20	107.98
	2:12	108.22		3:25	107.98
	2:13	108.26		3:30	107.98
	2:14	108.19		3:35	107.93
	2:15	108.27		3:40	107.96
	2:16	108.22		3:45	107.94
	2:17	108.22		3:50	107.98
	2:18	108.27		3:55	108.02
	2:19	108.24		4:00	107.93
	2:20	108.17		4:10	108.03
	2:22	108.17		4:20	107.91
	2:24	108.18		4:30	107.88
	2:26	108.21		4:40	107.86
	2:28	108.15		4:50	107.85
	2:30	108.10		5:00	107.85
	2:32	108.15		5:10	107.84
	2:34	108.09		5:20	107.85
	2:36	108.09		5:30	107.84
	2:38	108.07		5:40	107.85
	2:40	108.10		5:50	107.86
	2:42	108.05		6:00	107.84
	2:42	108.11			

TABLE E-3 - DRAWDOWN MEASUREMENTS FOR MONITOR WELL NO. 9

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
6/24/86	9:18 a.m.	99.60	15,642
	9:19	100.04	
	9:20	100.13	
	9:21	100.00	
	9:22	100.06	
	9:23	100.11	
	9:25	100.05	
	9:26	100.05	
	9:27	100.14	
	9:28	100.12	17,025
	9:29	100.12	
	9:30	100.25	
	9:32	100.17	
	9:33	100.31	
	9:34	100.20	
	9:35	100.17	
	9:36	100.23	
	9:37	100.20	
	9:38	100.18	18,380
	9:40	100.23	
	9:42	100.22	
	9:44	100.25	
	9:46	100.24	
	9:48	100.23	19,675
	9:51	100.27	
	9:53	100.25	
	9:55	100.27	
	9:57	100.28	
	9:58	-	20,960
	9:59	100.28	
	10:04	100.24	
	10:08	-	22,200
	10:09	100.27	
	10:14	100.18	
	10:19	-	23,680
	10:21	100.32	
	10:31	-	25,160
	10:32	100.30	
	10:40	-	26,450
	10:42	100.31	
	10:54	100.36	
	10:55	-	28,350
	11:03	-	29,500

Continued:

TABLE E-3 - DRAWDOWN MEASUREMENTS
FOR MONITOR WELL NO. 9 (continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
6/24/86	11:05 a.m.	100.39	
	11:13	-	30,710
	11:15	100.35	
	11:23	-	32,130
	11:25	100.31	
	11:33	-	33,395
	11:35	100.30	
	11:44	-	34,820
	11:45	100.30	
	11:54	100.35	36,045
	12:05 p.m.	-	37,540
	12:06	100.25	
	12:15	-	38,860
	12:16	100.35	
	12:25	-	40,090
	12:26	100.35	
	12:33	-	41,220
	12:34	100.35	
	12:44	-	42,580
	12:45	100.25	
	12:56	-	44,125
	12:57	100.28	
	1:05	-	45,335
	1:06	100.25	
	1:18	100.18	
	1:24	100.18	47,680

Monitor Well No. 9 was the pumped well.

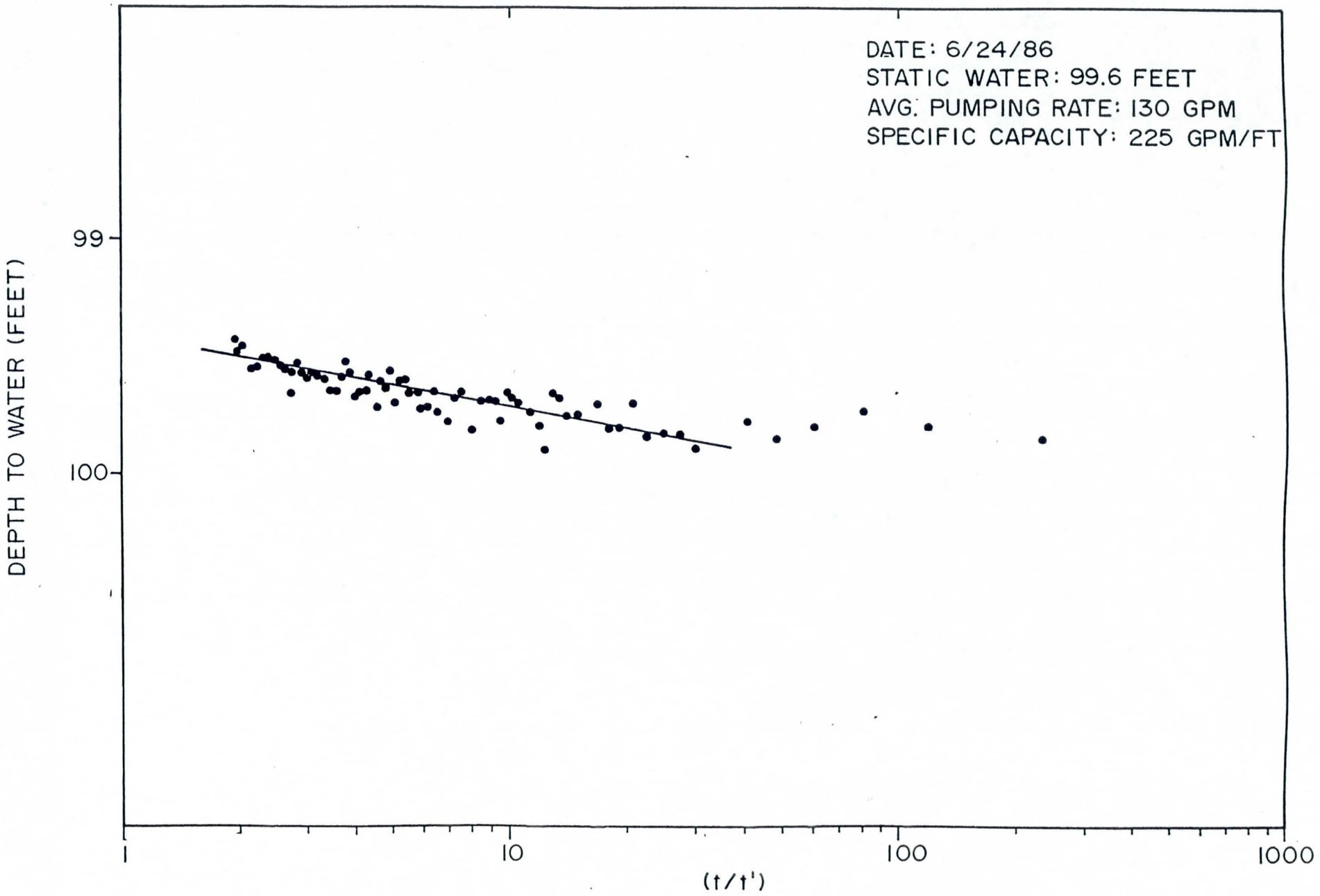


FIGURE E-2-CORRECTED RECOVERY FOR MW-9

TABLE E-4 - RECOVERY MEASUREMENTS FOR MONITOR WELL NO. 9

Date	Time	Depth to Water (feet)	Date	Time	Depth to Water (feet)
6/24/86	1:24 p.m.	100.18	6/24/86	2:18 p.m.	99.60
	1:25	99.85		2:20	99.60
	1:26	99.80		2:22	99.70
	1:27	99.74		2:24	99.56
	1:28	99.80		2:26	99.64
	1:29	99.85		2:28	99.61
	1:30	99.78		2:30	99.72
	1:32	99.89		2:34	99.58
	1:33	99.83		2:36	99.65
	1:34	99.78		2:38	99.66
	1:35	99.84		2:40	99.65
	1:36	99.70		2:42	99.68
	1:37	99.80		2:44	99.67
	1:38	99.81		2:46	99.57
	1:39	99.70		2:48	99.52
	1:41	99.75		2:50	99.59
	1:42	99.75		2:52	99.59
	1:43	99.68		2:54	99.65
	1:44	99.66		2:59	99.65
	1:45	99.90		3:04	99.60
	1:46	99.79		3:10	99.58
	1:47	99.74		3:15	99.57
	1:49	99.70		3:21	99.59
	1:50	99.67		3:26	99.57
	1:51	99.65		3:32	99.52
	1:52	99.78		3:37	99.57
	1:53	99.69		3:42	99.65
	1:54	99.69		3:48	99.55
	1:56	99.69		3:54	99.53
	1:58	99.82		4:04	99.52
	2:00	99.65		4:14	99.50
	2:02	99.67		4:24	99.50
	2:04	99.78		4:35	99.54
	2:06	99.74		4:46	99.55
	2:08	99.65		4:56	99.48
	2:10	99.72		5:05	99.45
	2:12	99.73		5:15	99.48
	2:14	99.66		5:25	99.43
	2:16	99.66			

TABLE E-5 - DRAWDOWN MEASUREMENTS FOR MONITOR WELL NO. 11

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
9/15/86	8:00 a.m.	110.97	48,358
	8:01	113.57	
	8:02	113.99	
	8:03	114.25	
	8:04	114.44	48,850
	8:05	114.48	
	8:06	114.53	
	8:07	114.58	
	8:08	114.60	
	8:09	114.65	
	8:10	114.70	
	8:11	114.64	49,743
	8:12	114.70	
	8:14	114.69	
	8:15	114.84	
	8:16	114.89	50,380
	8:17	114.90	
	8:18	114.89	
	8:19	114.91	
	8:20	114.95	
	8:21	-	51,024
	8:22	114.96	
	8:24	114.99	
	8:25	-	51,554
	8:26	115.02	
	8:28	115.01	
	8:30	115.01	
	8:31	-	52,315
	8:32	115.04	
	8:34	115.02	
	8:35	-	52,832
	8:36	115.06	
	8:38	115.08	
	8.40	115.05	
	8:41	-	53,610
	8:42	115.07	
	8:45	115.09	54,289
	8:46	115.09	
	8:48	115.09	

Continued:

TABLE E-5 - DRAWDOWN MEASUREMENTS
FOR MONITOR WELL NO. 11 (continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
9/15/86	8:50 a.m.	115.10	
	8:51	-	54,962
	8:52	115.10	
	8:54	115.10	
	8:56	115.09	
	8:57	-	55,669
	8:58	115.11	
	9:00	115.10	
	9:01	-	56,185
	9:02	115.02	
	9:04	115.13	
	9:05	-	56,700
	9:06	115.13	
	9:08	115.12	
	9:10	115.13	
	9:11	-	57,411
	9:12	115.13	
	9:14	115.14	
	9:15	-	57,989
	9:16	115.13	
	9:18	115.15	
	9:20	115.14	
	9:21	-	58,697
	9:22	115.13	
	9:24	115.16	
	9:25	-	59,276
	9:26	115.16	
	9:28	115.15	
	9:30	115.17	
	9:31	-	60,048
	9:32	115.17	
	9:34	115.16	
	9:35	-	60,563
	9:36	115.17	
	9:38	115.18	
	9:40	115.17	
	9:41	-	61,270
	9:42	115.18	
	9:44	115.20	
	9:45	-	61,848
	9:46	115.18	
	9:48	115.19	

Continued:

TABLE E-5 - DRAWDOWN MEASUREMENTS FOR MONITOR WELL NO. 11 (continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
9/15/86	9:50 a.m.	115.19	
	9:51	-	62,752
	9:55	115.17	
	9:56	115.23	63,273
	9:57	115.20	
	10:00	115.19	64,050
	10:06	115.22	64,860
	10:13	115.24	65,710
	10:15	115.27	
	10:21	115.23	66,690
	10:25	115.27	
	10:31	115.28	67,950
	10:35	115.26	68,580
	10:37	115.23	
	10:41	115.29	69,250
	10:45	115.27	69,860
	10:51	115.28	70,540
	10:56	115.31	
	11:00	115.28	71,840
	11:05	115.30	72,400
	11:11	115.30	73,130
	11:21	115.36	74,380
	11:25	115.36	74,920
	11:30	115.36	
	11:47	115.35	77,880
	11:56	115.36	78,990
	12:13 p.m.	115.33	81,170
	12:17	115.34	81,582

Monitor Well No. 11 was the pumped well.

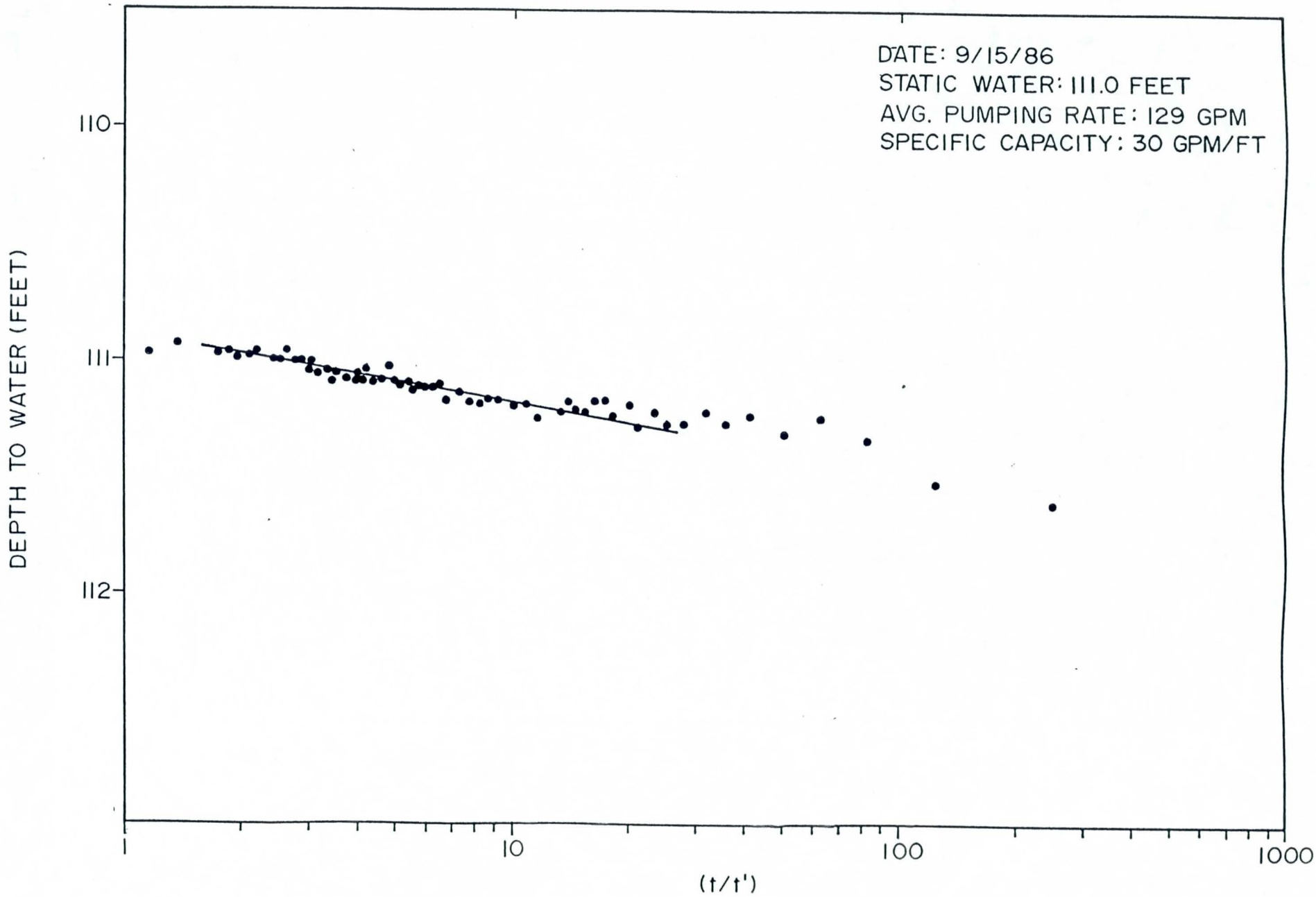


FIGURE E-3-CORRECTED RECOVERY FOR MW-11

TABLE E-6 - RECOVERY MEASUREMENTS FOR MONITOR WELL NO. 11

Date	Time	Depth to Water (feet)	Date	Time	Depth to Water (feet)
9/15/86	12:17 p.m.	115.34	9/15/86	1:19 p.m.	111.10
	12:18	112.63		1:21	111.03
	12:19	111.54		1:23	111.06
	12:20	111.35		1:25	111.09
	12:21	111.26		1:27	111.09
	12:22	111.33		1:29	111.10
	12:23	111.25		1:31	111.08
	12:24	111.28		1:33	111.04
	12:25	111.22		1:35	111.09
	12:26	111.27		1:37	111.06
	12:27	111.28		1:39	111.09
	12:28	111.22		1:41	111.07
	12:29	111.29		1:43	111.08
	12:30	111.19		1:45	111.08
	12:31	111.24		1:47	111.08
	12:32	111.17		1:49	111.05
	12:33	111.17		1:51	111.06
	12:34	111.22		1:53	111.06
	12:35	111.21		1:55	111.09
	12:36	111.18		1:57	111.06
	12:37	111.23		1:59	111.04
	12:40	111.25		2:01	111.03
	12:42	111.19		2:04	111.06
	12:44	111.20		2:07	111.06
	12:47	111.17		2:09	111.04
	12:49	111.17		2:14	111.01
	12:51	111.19		2:17	111.04
	12:53	111.18		2:25	111.00
	12:56	111.14		2:32	111.00
	12:59	111.17		2:43	110.96
	1:01	111.11		2:54	111.00
	1:03	111.12		3:02	111.00
	1:05	111.13		3:36	110.96
	1:07	111.12		3:52	110.98
	1:09	111.12		4:22	110.99
	1:11	111.13		4:52	110.96
	1:13	111.10		5:27	110.97
	1:15	111.11		10:00	110.93
	1:17	111.07	9/16/86	6:50 a.m.	110.97

TABLE E-7 - DRAWDOWN MEASUREMENTS
FOR MONITOR WELL NO. 12

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
11/20/86	9:00 a.m.	115.07	83,321
	9:01	117.41	
	9:02	117.74	
	9:03	117.96	
	9:04	117.99	
	9:05	117.93	
	9:06	117.94	
	9:07	118.01	
	9:08	118.05	
	9:09	118.24	
	9:11	117.99	84,730
	9:12	118.08	
	9:13	118.04	
	9:14	118.06	
	9:15	118.10	
	9:18	118.19	
	9:19	118.18	
	9:20	118.32	
	9:21	118.35	
	9:22	118.32	
	9:23	118.24	
	9:24	118.25	
	9:25	118.23	
	9:26	118.29	
	9:27	118.28	
	9:28	118.38	
	9:30	118.27	86,970
	9:32	118.23	
	9:34	118.35	
	9:36	118.28	
	9:38	118.21	
	9:40	118.22	
	9:42	118.28	
	9:45	118.33	
	9:47	118.34	
	9:49	118.28	
	9:51	118.35	
	9:53	118.22	
	9:55	118.25	
	9:57	118.25	
	9:59	118.30	
	10.00	-	90,300
	10:02	118.23	

Continued:

TABLE E-7 - DRAWDOWN MEASUREMENTS FOR MONITOR WELL NO. 12 (continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
11/20/86	10:04 a.m.	118.27	
	10:06	118.29	
	10:08	118.28	
	10:10	118.27	
	10:15	118.27	
	10:20	118.30	
	10:25	118.27	
	10:30	118.30	
	10:31	-	93,870
	10:35	118.31	
	10:40	118.24	
	10:45	118.27	
	10:52	118.25	
	11:00	118.22	
	11:11	118.31	97,340
	11:15	118.24	
	11:20	118.25	
	11:30	118.23	
	11:31	-	100,770
	11:45	118.24	
	12:00 p.m.	118.24	
	12:01	-	104,240
	12:30	118.21	
	12:31	-	107,650
	1:00	118.25	
	1:01	-	111,050
	1:31	-	114,570
	2:03	118.24	
	2:05	-	118,420
	2:33	-	121,080
	2:59	118.27	
	3:30	-	128,180
	4:00	118.25	
	4:02	-	135,130
	4:56	-	138,040
	4:57	118.26	
	5:08	118.26	

Monitor Well No. 12 was the pumped well.

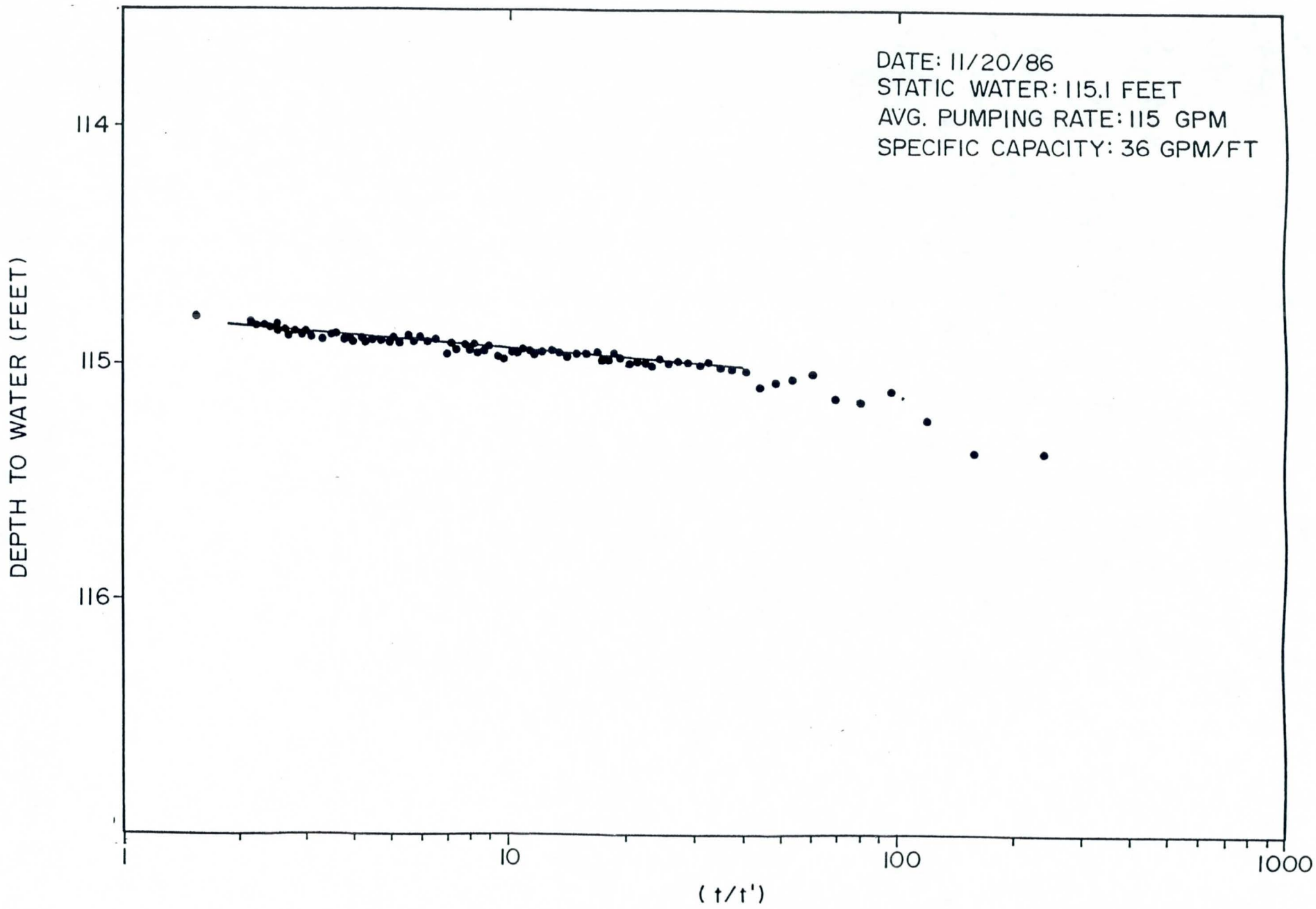


FIGURE E-4-CORRECTED RECOVERY FOR MW-12

TABLE E-8 - RECOVERY MEASUREMENTS FOR MONITOR WELL NO. 12

Date	Time	Depth to Water (feet)	Date	Time	Depth to Water (feet)
11/20/86	5:08 p.m.	118.26	11/20/86	5:58 p.m.	114.95
	5:10	115.38		6:00	114.95
	5:11	115.38		6:02	114.98
	5:12	115.24		6:04	114.97
	5:13	115.11		6:06	114.94
	5:14	115.16		6:08	114.93
	5:15	115.15		6:10	114.94
	5:16	115.04		6:12	114.95
	5:17	115.07		6:14	114.92
	5:18	115.08		6:16	114.94
	5:19	115.10		6:18	114.92
	5:20	115.03		6:20	114.96
	5:21	115.02		6:22	114.94
	5:22	115.02		6:24	114.93
	5:23	114.99		6:26	114.92
	5:24	115.01		6:28	114.96
	5:25	114.99		6:33	114.90
	5:26	114.99		6:38	114.91
	5:27	115.00		6:43	114.89
	5:28	114.98		6:48	114.91
	5:29	115.01		6:53	114.88
	5:30	114.99		6:58	114.91
	5:31	114.99		7:03	114.89
	5:32	115.00		7:08	114.91
	5:33	114.98		7:13	114.90
	5:34	114.97		7:18	114.90
	5:35	114.95		7:23	114.90
	5:36	114.98		7:28	114.90
	5:37	114.98		7:33	114.91
	5:38	114.95		7:38	114.89
	5:40	114.96		7:43	114.89
	5:42	114.96		7:48	114.90
	5:44	114.97		7:53	114.89
	5:46	114.95		7:58	114.89
	5:48	114.94		8:08	114.87
	5:50	114.95		8:18	114.87
	5:52	114.96		8:28	114.89
	5:54	114.94		8:38	114.88
	5:56	114.94		8:48	114.88

Continued:

TABLE E-8 - RECOVERY MEASUREMENTS
FOR MONITOR WELL NO. 12 (Continued)

Date	Time	Depth to Water (feet)
11/20/86	8:58 p.m.	114.86
	9:08	114.87
	9:18	114.86
	9:28	114.86
	9:38	114.87
	9:48	114.85
	9:58	114.85
	10:08	114.86
	10:18	114.83
	10:28	114.84
	10:38	114.84
	10:48	114.83
	10:58	114.83
	11:08	114.82
	11:18	114.83
	11:28	114.83
	11:38	114.82
	11:48	114.82
11/21/86	7:25 a.m.	114.82

TABLE E-9 - DRAWDOWN MEASUREMENTS FOR MONITOR WELL NO. 14

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
1/12/87	7:20 a.m.	127.32	139,914
	7:21	130.93	
	7:22	132.02	
	7:23	132.19	
	7:24	132.37	
	7:25	132.46	140,520
	7:26	132.45	
	7:27	132.45	
	7:28	132.53	
	7:29	132.46	
	7:30	132.55	141,132
	7:31	132.59	
	7:32	132.56	
	7:33	132.50	
	7:34	132.54	
	7:35	132.52	141,740
	7:36	132.53	
	7:37	132.53	
	7:38	132.61	
	7:39	132.55	
	7:40	132.55	142,343
	7:41	132.54	
	7:42	132.53	
	7:43	132.61	
	7:44	132.58	
	7:45	132.62	
	7:46	132.60	
	7:47	132.60	
	7:48	132.57	
	7:49	132.57	
	7:50	132.58	143,553
	7:51	132.58	
	7:52	132.56	
	7:54	132.57	
	7:55	-	144,162
	7:56	132.61	
	7:58	132.63	
	8:00	132.89	144,763
	8:02	132.69	
	8:04	132.63	
	8:05	-	145,362
	8:06	132.62	
	8:08	132.63	

Continued:

TABLE E-9 - DRAWDOWN MEASUREMENTS
FOR MONITOR WELL NO. 14 (Continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
1/12/87	8:10 a.m.	132.66	145,963
	8:12	132.61	
	8:14	132.62	
	8:15	-	146,562
	8:16	132.61	
	8:18	132.66	
	8:20	132.66	
	8:21	-	147,283
	8:22	132.71	
	8:24	132.66	
	8:26	132.68	147,882
	8:28	132.65	
	8:30	132.71	148,363
	8:32	132.71	
	8:34	132.70	
	8:35	-	148,965
	8:36	132.70	
	8:38	132.72	
	8:40	132.75	149,565
	8:42	132.69	
	8:44	132.70	
	8:46	132.69	150,285
	8:48	132.68	
	8:50	132.71	150,764
	8:52	132.71	
	8:54	132.74	
	8:56	132.75	151,486
	8:58	132.70	
	9:00	132.72	151,963
	9:02	132.72	
	9:04	132.70	
	9:06	132.82	152,683
	9:08	132.70	
	9:10	132.71	153,163
	9:12	132.72	
	9:14	132.70	
	9:16	132.70	
	9:18	132.73	
	9:20	132.72	154,362
	9:25	132.80	
	9:30	132.74	155,563
	9:35	132.74	
	9:40	132.74	156,760
	9:45	132.77	

Continued

TABLE E-9 - DRAWDOWN MEASUREMENTS
FOR MONITOR WELL NO. 14 (Continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
1/12/87	9:50 a.m.	132.76	157,960
	9:55	132.75	
	10:00	132.75	159,180
	10:05	132.78	
	10:10	132.76	160,430
	10:15	132.80	
	10:20	132.78	161,600
	10:25	132.79	
	10:30	132.77	162,885
	10:35	132.77	
	10:40	132.77	164,080
	10:45	132.78	
	10:50	132.79	165,280
	10:55	132.78	
	11:00	132.79	166,480
	11:05	132.76	
	11:10	132.79	167,665
	11:15	132.77	
	11:20	132.76	168,765
	11:25	132.83	
	11:30	132.77	169,945
	11:35	132.78	
	11:40	132.75	171,195
	11:45	132.77	
	11:50	132.77	172,340
	11:55	132.78	
	12:00 p.m.	132.77	173,535
	12:05	132.77	
	12:10	132.78	174,735
	12:15	132.76	
	12:20	132.76	175,935
	12:25	132.76	
	12:30	132.77	177,130
	12:35	132.76	
	12:40	132.75	178,310
	12:45	132.76	
	12:50	132.76	179,520
	12:55	132.77	
	1:00	132.77	180,725
	1:05	132.78	
	1:10	132.78	181,925
	1:15	132.77	

Continued:

TABLE E-9 - DRAWDOWN MEASUREMENTS FOR MONITOR WELL NO. 14 (Continued)

Date	Time	Depth to Water (feet)	Total Pumpage (gallons)
1/12/87	1:20 p.m.	132.81	183,085
	1:25	132.77	
	1:30	132.79	184,300
	1:35	132.79	
	1:40	132.80	185,470
	1:45	132.79	
	1:50	132.78	186,680
	1:55	132.81	
	2:00	132.80	187,870
	2:05	132.79	
	2:10	132.80	189,080
	2:15	132.79	
	2:20	132.79	190,265
	2:25	132.80	
	2:30	132.79	191,475
	2:35	132.78	
	2:40	132.80	192,660
	2:45	132.82	
	2:50	132.80	193,825
	2:55	132.80	
	3:00	132.81	195,060
	3:05	132.81	
	3:10	132.81	196,240
	3:15	132.81	196,240
	3:20	132.82	197,415
	3:25	132.82	
	3:30	132.84	198,610
	3:35	132.82	
	3:40	132.82	199,850
	3:50	132.82	201,000
	4:00	132.83	202,210
	4:10	132.85	203,405
	4:27	132.85	
	4:30	132.85	205,512

Monitor Well No. 14 was the pumped well.

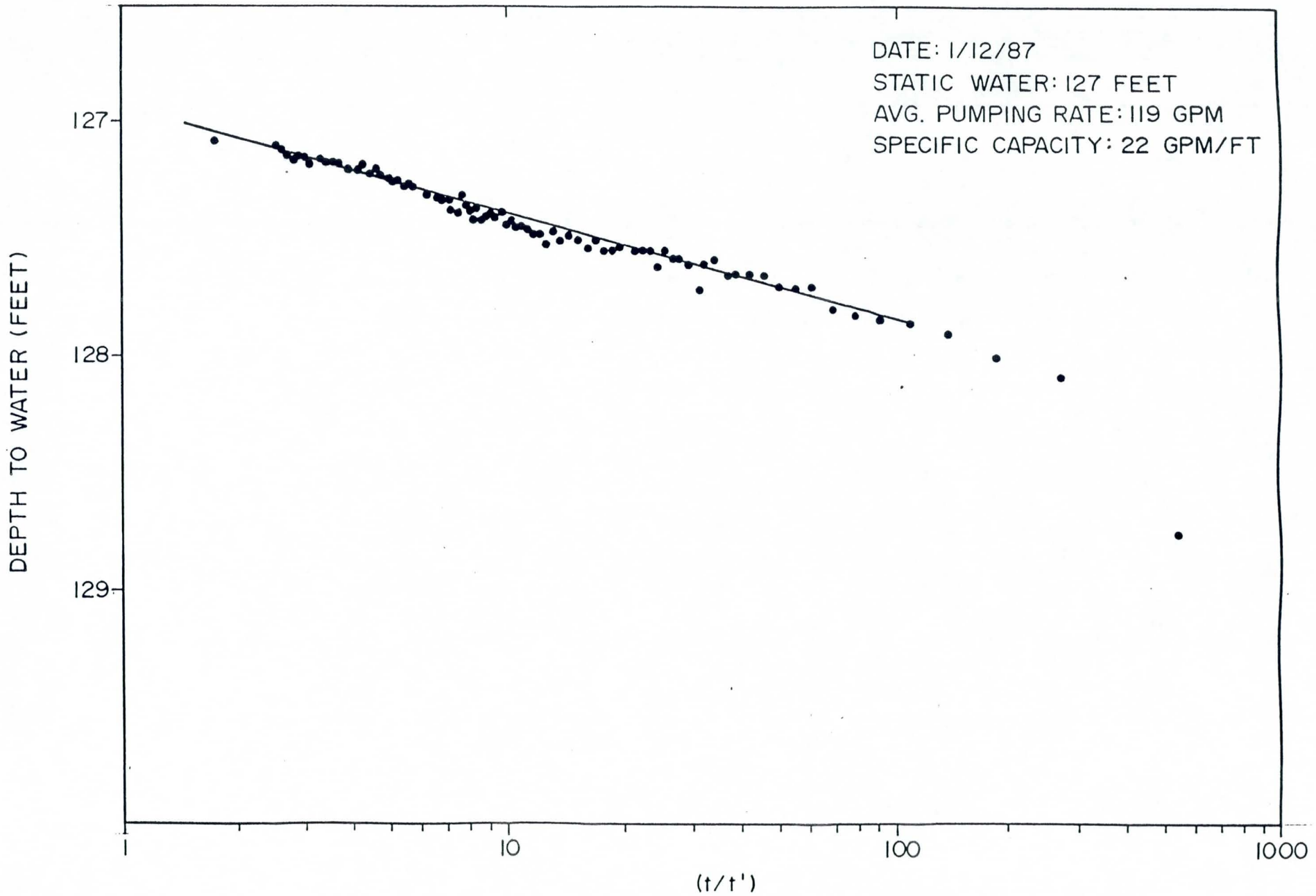


FIGURE E-5-CORRECTED RECOVERY FOR MW-14

TABLE E-10 - RECOVERY MEASUREMENTS FOR MONITOR WELL NO. 14

Date	Time	Depth to Water (feet)	Date	Time	Depth to Water (feet)
1/12/87	4:30 p.m.	132.85	1/12/87	5:16 p.m.	127.52
	4:31	128.77		5:18	127.48
	4:32	128.09		5:20	127.48
	4:33	128.01		5:22	127.46
	4:34	127.90		5:24	127.45
	4:35	127.86		5:26	127.45
	4:36	127.85		5:28	127.43
	4:37	127.83		5:30	127.44
	4:38	127.80		5:32	127.39
	4:39	127.71		5:34	127.41
	4:40	127.71		5:36	127.39
	4:41	127.71		5:38	127.41
	4:42	127.66		5:40	127.42
	4:43	127.65		5:42	127.38
	4:44	127.66		5:44	127.42
	4:45	127.66		5:46	127.38
	4:46	127.59		5:48	127.36
	4:47	127.61		5:50	127.32
	4:48	127.77		5:52	127.35
	4:49	127.61		5:54	127.38
	4:50	127.58		5:56	127.38
	4:51	127.58		5:58	127.34
	4:52	127.55		6:00	127.33
	4:53	127.62		6:02	127.34
	4:54	127.55		6:04	127.33
	4:55	127.55		6:06	127.31
	4:56	127.55		6:08	127.26
	4:57	127.54		6:10	127.32
	4:58	127.55		6:12	127.32
	4:59	127.54		6:14	127.30
	5:00	127.55		6:16	127.29
	5:02	127.55		6:18	127.29
	5:04	127.51		6:20	127.28
	5:06	127.54		6:25	127.27
	5:08	127.51		6:30	127.28
	5:10	127.49		6:35	127.25
	5:12	127.51		6:40	127.25
	5:14	127.47		6:45	127.24

Continued:

TABLE E-10 - RECOVERY MEASUREMENTS
FOR MONITOR WELL NO. 14, (continued)

Date	Time	Depth to Water (feet)	Date	Time	Depth to Water (feet)
1/12/87	6:50 p.m.	127.23	1/12/87	8:30 p.m.	127.16
	6:55	127.20		8:40	127.18
	7:00	127.22		8:50	127.15
	7:05	127.23		9:00	127.15
	7:10	127.18		9:10	127.16
	7:15	127.20		9:20	127.16
	7:25	127.21		9:30	127.14
	7:35	127.20		9:40	127.13
	7:45	127.19		9:50	127.12
	7:50	127.18		10:00	127.14
	8:00	127.17		10:10	127.10
	8:10	127.17		10:20	127.10
	8:20	127.16	1/13/87	6:45 a.m.	127.09

APPENDIX F

STREAM FLOW RECORDS

TABLE F-1 - GRANITE REEF DIVERSION DAM
SPILLS GREATER THAN 50,000 ACRE-FEET

Year	Spillage (Acre-Feet)
1/80 - 5/80	1,200,672
12/78 - 5/79	2,792,669
5/78	591,006
12/72 - 5/73	1,271,744
2/68 - 4/68	106,466
12/65 - 3/66	551,504
2/41 - 5/41	879,393
3/38	210,752
2/37 - 3/37	404,695
1/35 - 4/35	88,858

From Smith, et al (1982).

TABLE F-2 - PERIODS OF FLOW AND PEAK MEAN DAILY DISCHARGES FOR THE SALT RIVER IN PHOENIX, 1965 TO PRESENT*

Year	Period of Flow	Duration (Days)	Maximum Mean Daily Discharge (Cubic Feet Per Second)
1965	Apr 21 - Apr 25	5	1,120**
	Dec 22 -	10	
1966	- Jan 11	11	50,700
1968	Feb 16 - Apr 22	38	2,430**
1973	Feb 22 - Feb 28	7	4,080
	Mar 03 - Mar 08	6	1,540
	Mar 12 - May 21	71	21,800
1978	Mar 01 - Mar 29	29	80,000
	Dec 18 -	14	
1979	- Feb 15	46	129,000
	Mar 12 - Apr 17	37	68,000
	May 01 - Jun 01	32	380
1980	Jan 30 - Feb 11	13	7,170
	Feb 14 - Mar 10	26	132,000
	Mar 27 - May 15	20	2,300
1982	Dec 12 - Dec 18	7	Not yet available
	Dec 25 -	7	
1983	- Jan 09	9	Not yet available
	Feb 05 - May 05	91	Not yet available
	Oct 02 - Oct 23	22	35,720
	Dec 26 -	6	
1984	- Jan 18	18	9,280
	Dec 18 -	14	
1985	- May 10	130	Not yet available
	TOTAL:	669	

*Data provided by USGS Water Resources Division, Phoenix Subdistrict Office, from gaging stations located on the Salt River at Jointhead Dam (near 50th St.) and on the Salt River at 24th Street Bridge.

**No continuous record. Figure shown is the largest discharge measured with current meter during the flood event.

From Graf (1986)

TABLE F-3 - PERIODS OF FLOW AND MAXIMUM MEAN DAILY STREAMFLOW AT GRANITE REEF DAM FOR THE SALT RIVER

Year	Period of Flow	Duration (days)	Maximum Mean Daily Streamflow* (cfs)
1965	4/20 - 4/23	4	3,590
	12/22 - 12/31	8	
1966	1/1 - 1/11	11	64,000
	2/12 - 3/4	21	2,308
	8/17 - 8/19	3	193
	9/13	1	1,963
1967	7/17	1	414
	12/14 - 12/20	6	2,950
1968	2/14 - 2/19	6	3,703
	2/25 - 3/1	6	2,957
	3/8 - 3/15	8	3,319
	4/9 - 4/23	15	1,521
1972	10/4 - 10/5	2	272
	10/7 - 10/8	2	5,310
	10/18 - 10/21	4	9,086
	11/17	1	346
	11/22 - 11/25	4	592
	12/10 - 12/15	6	1,045
1973	12/28 - - 1/7	11	5,470
	2/21 - 2/27	7	4,380
	3/3 - 3/7	5	1,776
	3/12 - 5/29	79	22,273
	7/14 - 7/15	2	351
1974	8/3	1	268
1975	7/13	1	124
1976	2/9	1	468
	4/14	1	108
	10/23	1	260
1978	1/17	1	118
	2/11	1	230
1978	3/1 - 3/8	8	95,800
	3/12 - 4/10	30	6,963
	7/22 - 7/23	2	152
	8/3 - 8/4	2	216
1979	12/17 - - 6/3	169	110,000

Continued:

TABLE F-3 - PERIODS OF FLOW AND MAXIMUM MEAN DAILY STREAMFLOW AT GRANITE REEF DAM FOR THE SALT RIVER (Continued)

Year	Period of Flow	Duration (days)	Maximum Mean Daily Streamflow* (cfs)
1980	1/30 - 6/2	124	137,725
	7/1	1	183
1982	3/13 - 4/1	18	8,970
	12/1	1	581
1983	12/10 - - 6/16	188	30,000
	8/16 - 8/17	2	271
	9/28 - 11/12	46	39,878
1984	12/25 - - 1/19	26	11,200
	10/3	1	528
1985	12/22 - - 5/31	161	25,604
	9/18	1	163
	10/16	1	136
	11/26 - 11/27	2	142
1986	12/9 - - 1/17	39	1,730
	2/2	1	113
	3/17 - 3/18	2	312
	3/28 - 4/8	12	930

* For streamflow of 100 cfs or greater.

Information from the Salt River Project, October 31, 1986.

APPENDIX G

VOC ANALYSES

APPL, INC.

AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC.

4167 NORTH MOTEL DRIVE, SUITE 102 • FRESNO, CALIFORNIA 93722 • PHONE (209) 275-2175

Kenneth D. Schmidt & Associates
4120 N. 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/23/87
Report Date: 03/16/87

Sample I.D. No: City of Mesa
2/23/87 8:17 am (A-1-5) 8 daa
APPL Sample No: A005-13163W

Date Received: 02/24/87
Date Extracted: 02/09/87

Method 601 (Purgeable halocarbon) Results:

Compound	Concentration µg/l	Detection Limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.5
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested by Pamela Cooper

Checked by Diane Anderson

Kenneth D. Schmidt & Associates
4120 N. 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/23/87
Report Date: 03/16/87

Sample I.D. No: City of Mesa
2/23/87 8:17 am (A-1-5) 8 daa
APPL Sample No: A005-13163W

Date Received: 02/24/87
Date Extracted: 02/09/87

Method 602 (Purgeable aromatic) Results:

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	3	0.5
Toluene	1	0.5
Xylenes	65	1.0

* ND = None Detected

Tested By Pamela Cooper
Checked By Diane Anderson

APPL, INC.

AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC.

4167 NORTH MOTEL DRIVE, SUITE 102 • FRESNO, CALIFORNIA 93722 • PHONE (209) 275-2175

Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/18/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-5) Date Received: 02/19/87
18 aqc 2/18/87, 4:00 pm
APPL Sample No: A005-13115W Date Extracted: 02/22/87

Method 601 Results

Compound	Concentration µg/l	Detection limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.1
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested by Pamela Cooper

Checked by Diane Anderson

Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/18/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-5) 18 aqc 2/18/87, 4:00 pm
Date Received: 02/19/87
APPL Sample No: A005-13115W
Date Extracted: 02/22/87

Method 602 Results

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By Pamela Cooper
Checked By Diane Anderson

APPL, INC.

AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC.

4167 NORTH MOTEL DRIVE, SUITE 102 • FRESNO, CALIFORNIA 93722 • PHONE (209) 275-2175

Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/10/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-4) 13 add 10:21 am, 2/10/87
APPL Sample No: A005-13029W

Date Received: 02/11/87
Date Extracted: 02/14/87

Method 601 Results

Compound	Concentration µg/l	Detection limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.1
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested by Pamela Cooper

Checked by Diane Anderson

Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/10/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-4) Date Received: 02/11/87
13 add 10:21 am / 2/10/87
APPL Sample No: A005-13029W / Date Extracted: 02/14/87

Method 602 Results

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By Pamela Cooper
Checked By Diane Anderson

APPL, INC.

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Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/10/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-4) 13 adb 11:42 am
APPL Sample No: A005-13031W

Date Received: 02/11/87 2/10/87
Date Extracted: 02/14/87

Method 601 Results

Compound	Concentration µg/l	Detection limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.1
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested by Pamela Cooper

Checked by Diane Anderson

Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/10/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-4) 13 adb 11:42 am, 2/10/87
APPL Sample No: A005-13031W

Date Received: 02/11/87
Date Extracted: 02/14/87

Method 602 Results

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By Pamela Cooper
Checked By Diane Anderson

APPL, INC.

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Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/10/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-5) 18 dbb 1:17 pm, 2/10/87
APPL Sample No: A005-13032W

Date Received: 02/11/87
Date Extracted: 02/14/87

Method 601 Results

Compound	Concentration µg/l	Detection limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.1
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	0.8	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested by James Cooper
Checked by Diane Anderson

Kenneth D. Schmidt & Associates
4120 North 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 02/10/87
Report Date: 02/27/87

Sample I.D. No: City of Mesa(A-1-5) Date Received: 02/11/87
18 dbb 1:17 pm, 2/10/87
APPL Sample No: A005-13032W Date Extracted: 02/14/87

Method 602 Results

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By Pamela Cooper

Checked By Diane Anderson

APPL, INC.

AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC.

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Kenneth D. Schmidt & Associates
4120 N. 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/09/87, 3:15 pm
Report Date: 03/18/87

Sample I.D. No: City of Mesa WWTF Effluent
APPL Sample No: A005-13299W

Date Received: 03/10/87
Date Extracted: 02/11/87

Method 601 (Purgeable halocarbon) Results:

Compound	Concentration µg/l	Detection Limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.5
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
1,1,2,2-tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested by Pamela Cooper
Checked by Diane Anderson

Kenneth D. Schmidt & Associates
4120 N. 20th Street, Suite F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/09/87, 3:15 pm
Report Date: 03/18/87

Sample I.D. No: City of Mesa WWTF Effluent
APPL Sample No: A005-13299W

Date Received: 03/10/87
Date Extracted: 02/11/87

Method 602 (Purgeable aromatic) Results:

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By James Cooper
Checked By Diane Anderson

APPL, INC.

AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC.

4167 NORTH MOTEL DRIVE, SUITE 102 • FRESNO, CALIFORNIA 93722 • PHONE (209) 275-2175

Kenneth D. Schmidt & Associates
4120 N 20th Street, #F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/16/87
Report Date: 03/24/87

Sample I.D. No: City of Mesa WWTF effluent
3/16/87, 2:05pm
APPL Sample No: A005-13438W

Date Received: 03/17/87
Date Extracted: 03/20/87

Method 601 Results (Purgeable halocarbons):

Compound	Concentration µg/l	Detection limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.5
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	0.5
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Trichlorofluoromethane	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested By Pamela Cooper

Checked By Diane Anderson D

Kenneth D. Schmidt & Associates
4120 N 20th Street, #F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/16/87
Report Date: 03/24/87

Sample I.D. No: City of Mesa WWTF effluent
3/16/87, 2:05 pm
APPL Sample No: A005-13438W

Date Received: 03/17/87
Date Extracted: 03/20/87

Method 602 Results (Purgeable aromatics):

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By Pamela Cooper
Checked By Diane Anderson

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Kenneth D. Schmidt & Associates
4120 N. 20th Street #F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/23/87, 4:00 PM
Report Date: 04/10/87

Sample I.D. No: City of Mesa Effluent Recharge WWTF Effluent
Date Received: 03/25/87

APPL Sample No: A005-13544W
Date Extracted: 04/01/87

Method 601 Results (Purgeables):

Compound	Concentration µg/l	Detection limit µg/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.5
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Trichlorofluoromethane	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested By Sameer Coopr

Checked By Diane Anderson

Kenneth D. Schmidt & Associates
4120 N. 20th Street #F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/24/87, 4:00 pm
Report Date: 04/10/87

Sample I.D. No: City of Mesa Effluent Recharge WWTF Effluent
Date Received: 03/25/87

APPL Sample No: A005-13544W
Date Extracted: 04/01/87

Method 602 Results (Aromatics):

Compound	Concentration µg/l	Detection limit µg/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By: Pamela Cooper

Checked By: Diane Andersen

APPL, INC.

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Kenneth D. Schmidt & Associates
4120 N. 20th Street #F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/30/87 5:25 PM
Report Date: 04/10/87

Sample I.D. No: City of Mesa Effluent Recharge WWTF Effluent
APPL Sample No: A005-13579W

Date Received: 03/31/87
Date Extracted: 04/09/87

Method 601 Results (Purgeables):

Compound	Concentration ug/l	Detection limit ug/l
Bromodichloromethane	ND*	0.5
Bromoform	ND	0.5
Bromomethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Chlorobenzene	ND	0.5
Chloroethane	ND	0.5
2-chloroethylvinyl ether	ND	0.5
Chloroform	ND	0.5
Chloromethane	ND	0.5
Dibromochloromethane	ND	0.5
1,2-dichlorobenzene	ND	0.5
1,4-dichlorobenzene	ND	0.5
1,3-dichlorobenzene	ND	0.5
1,1-dichloroethane	ND	0.5
1,2-dichloroethane	ND	0.5
1,1-dichloroethene	ND	0.5
trans-1,2-dichloroethene	ND	0.5
1,2-dichloropropane	ND	0.5
cis-1,3-dichloropropene	ND	0.5
trans-1,3-dichloropropene	ND	0.5
Methylene chloride	ND	5.0
1,1,2,2-tetrachloroethane	ND	0.5
Tetrachloroethene	ND	0.5
1,1,1-trichloroethane	ND	0.5
1,1,2-trichloroethane	ND	0.5
Trichloroethene	ND	0.5
Trichlorofluoromethane	ND	0.5
Vinyl chloride	ND	0.5

* ND = None Detected

Tested By Pamela Cooper
Checked By Diane Anderson

Kenneth D. Schmidt & Associates
4120 N. 20th Street #F
Phoenix, Arizona 85016
Attn: James Angell

Sample Date: 03/30/87, 5:25 PM
Report Date: 04/10/87

Sample I.D. No: City of Mesa Effluent Recharge WWTF Effluent
Date Received: 03/31/87

APPL Sample No: A005-13579W
Date Extracted: 04/09/87

Method 602 Results (Aromatics):

Compound	Concentration ug/l	Detection limit ug/l
Benzene	ND*	0.5
Chlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
Ethyl benzene	ND	0.5
Toluene	ND	0.5
Xylenes	ND	1.0

* ND = None Detected

Tested By Pamela Cooper
Checked By Diane Anderson

APPENDIX H

DISCHARGE IMPACT AREA CALCULATION

DISCHARGE IMPACT AREA CALCULATION

Darcy's Law was used, as follows:

$$v = \frac{PI}{\theta}$$

Where v = Rate of groundwater flow

P = Permeability

I = Water-level slope

θ = Porosity

$$v = \frac{2{,}200 \text{ gpd/ft}^2}{7.48 \text{ gal/ft}^3} \times \frac{10 \text{ ft/mile}}{5{,}280 \text{ ft/mile}} \times \frac{1}{0.4}$$

v = 510 feet per year