GROUND WATER REPORT NO. 23

STATE OF OREGON

WATER RESOURCES DEPARTMENT

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GROUND-WATER CONDITIONS AND DECLINING WATER LEVELS IN THE ORDNANCE AREA, MORROW AND UMATILLA COUNTIES OREGON

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DEFINITIONS OF SELECTED GROUND-WATER AND GEOLOGIC TERMS

1. Alluvium - detrital deposits of sand, silt, gravel, or clay laid down in river beds, flood plains, lakes, and fans at the foot of mountain slopes.

2. Anticline - an up-turned fold in which strata dip away in opposite directions from a common ridge or axis.

3. Aquifer - a formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

4. Artesian or confined water - ground water that is under sufficient pressure to rise above the level at which it is encountered by a well but which does not necessarily rise to or above land surface.

5. Drawdown - the amount the water level in a well is lowered by pumping.

6. Fanglomerate - a cemented heterogeneous mixture of detrital materials originally deposited in an alluvial fan.

7. Hydraulic conductivity - the volume of water at the existing kinematic viscosity that will move in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow.

8. Hydraulic gradient - the change in static head per unit of distance in a given direction.

9. Permeability - the capacity of a rock or soil for transmitting fluid. The degree of permeability depends upon the size and shape of the pores, the size and shape of their interconnection and the extent of their interconnection.

10. Porosity - the ratio of the aggregate volume of interstices in a rock or soil to its total volume, usually expressed as a decimal fraction or as a percentage.

11. Porous - containing voids, pores, interstices, or other openings that may or may not interconnect.

12. Potentiometric head - the level to which water will rise in tightly cased wells.

13. Static Water Level - the level at which water will stand in tightly cased wells when not pumping.

14. Snycline - a fold in rocks in which strata dip inward from both sides toward the axis of the fold.

15. Storage Coefficient - the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head.

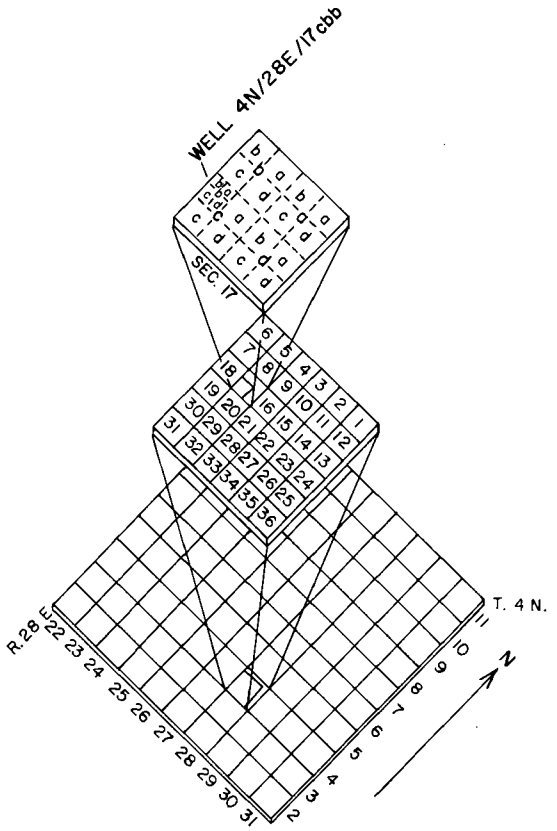
16. Transmissivity - the rate at which water of the prevailing kinematic viscosity is transmitted through a unit width of the aquifer under a unit hydraulic gradient. Usually expressed as gallons per day per foot, or square feet per day.

17. Unconfined ground water - water in an aquifer that has a water table and is free to rise and fall in response to changes in storage.

18. Water Table - that surface of an unconfined water body at which the pressure is atmospheric and which represents the upper surface of the zone of saturation.

19. Zone, saturated - that part of the water-bearing material in which all voids are ideally filled with water under pressure greater than atmospheric.

20. Zone, unsaturated - the zone between the land surface and the water table that is dry or that contains water liquid under less than atmospheric pressure and water vapor, air, or other gasses generally at atmospheric pressure.



Well Numbering System

GROUND WATER CONDITIONS AND DECLINING WATER LEVELS IN WELLS OF THE ORDNANCE AREA, MORROW AND UMATILLA COUNTIES, OREGON

by
William B. McCall

I. INTRODUCTION

A. Purpose of Report

The purpose of this report is to acquaint the individual landowners, well owners, water well contractors, drillers, and other interested parties or public agencies with the existing ground water conditions in the area. The report presents pertinent information on wells developing water from the basalt aquifers and gravel deposits and describes ground-water levels, thickness of saturated alluvium, and ground-water rights in the Ordnance area.

Water levels in wells developing water from basaltic aquifers in the Ordnance area of Morrow and Umatilla Counties of Oregon began declining excessively during the early 1960's. Wells developing water from shallow gravel aquifers overlying the basalts in the area registered slight declines in water levels beginning in 1964. A hearing was held by the Oregon State Engineer on June 3, 1966 on the question of the determination of a critical ground water area. State Engineer's Ground Water Report No. 11 was prepared and presented at the hearing as a part of the record. The report, and evidence and testimony gathered at that hearing resulted in the conclusion by the State Engineer that some curtailment of

withdrawals of water from basaltic aquifers below a depth of 400 feet was necessary to prevent further excessive water level declines. Thereafter, the State Engineer refused to issue permits for ground water appropriation for wells extending to depths greater than 400 feet within the Ordnance area. It was further concluded that the ground water supply in the gravel aquifers overlying the basalt was limited in quantity, but that serious problems with declining water levels had not developed at that time.

Subsequent to the State Engineer's hearing and the resulting closure of the basaltic aquifer system, the decline of water levels in wells developing water from the shallow gravel aquifer system has increased to an average rate of approximately 1.6 feet per year. Due to the limited thickness of this aquifer system and the limited quantity of recoverable ground water in the system, it has become necessary to collect and evaluate evidence on the question of the determination of a critical ground water area within the shallow gravel system.

B. Location of the Area

The Ordnance ground water area lies within the Umatilla lowlands bordering the Columbia River in north-central Oregon within the northeast corner of Morrow County and the northwest corner of Umatilla County. The Ordnance basalt ground water area includes all of Township 3 North, Range 26 East; all of Township 3 North, Range 27 East except that part draining directly into Butter Creek; all of Township 4 North, Range 26 East and Township 4 North, Range 27 East; and that part of Township 5 North, Range 26 East and Township 5 North, Range 27 East lying south of the Columbia River.

The Ordnance gravel ground water area includes Sections 1, 2, 3, 10, 11, 12, 13, 14, and 15 of Township 3 North, Range 26 East; Section 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, and 36 of Township 4

North, Range 26 East; the north one-half of Township 3 North, Range 27 East; all but Sections 1 through 6 of Township 4 North, Range 27 East; Sections 6, 7, and 18 of Township 3 North, Range 28 East; and Sections 7, 18, 31, and those areas of Sections 8, 9, 16, 17, 19, 20, and 30 of Township 4 North, Range 28 East, lying to the west of the Umatilla River.

C. Previous Investigations

A regional geologic investigation of the entire Columbia Slope was undertaken in 1951 by the U. S. Geological Survey. The resulting report is entitled "Geology and Ground Water of the Umatilla River Basin, Oregon", Geological Survey Supply Paper 1620, by G. M. Hogenson, 1964. In 1966, the Oregon State Engineer published Ground Water Report No. 11 entitled "A Brief Description of the Ground-Water Conditions in the Ordnance Area, Morrow and Umatilla Counties, Oregon", by Jack E. Sceva. In 1971, a second report was prepared by the U. S. Geological Survey in cooperation with the Oregon State Engineer. See Hydrologic Atlas HA-387, "Hydrology of Basalt Aquifers in the Hermiston - Ordnance Area, Umatilla and Morrow Counties, Oregon", by James H. Robison.

II. GEOLOGIC SETTING

A. Physiography

The Ordnance area occupies the north central portion of a broad, gently rolling, slightly dissected, lowland plain which rises along gentle slopes from the Columbia River to the rounded hills and small valleys of the Blue Mountains to the south. The elevations within the report area rise from an altitude of about 250 feet near the Columbia River at Irrigon to about 1,000 feet near the southern border of the report area along the south base line of Township 3 North. The majority of lands irrigated from

wells within the area lie between elevations of 500 to 650 feet above mean sea level. The Ordnance basalt ground water area encompasses approximately 175 square miles; the Ordnance gravel ground water area occupies approximately 82 square miles (See Plate 1).

B. Stratigraphy

The broad plain of the report area is everywhere underlain by a thick sequence of basaltic lava flows of Miocene (11-25 million years) and Pliocene (1-11 million years) age known as the Columbia River Group. At most places in the area, these rocks lie buried beneath sedimentary deposits of Pliocene and Pleistocene (1 million years) age. Above an elevation of about 750 feet, near the southern boundary of the area, Pliocene fanglomerate directly overlies the basaltic lavas (See Plate 2). These sediments are composed of a heterogeneous mixture of tightly cemented sand, silt, and clay with embedded basaltic rock debris derived as slope wash from the weathering of basaltic rocks on upland slopes to the south. Below the 750 foot elevation, the older alluvium (glaciofluviotile deposits), consists of lenticular, poorly sorted deposits of sand, gravel, silt, and clay laid down by the ancestral Columbia River during various flood stages in Pleistocene time. Some of the clay and silt deposits at or near the base of the alluvial sediments are probably lacustrine in origin, laid down in shallow lakes that were formed during periods of downstream damming of the river by ice and debris. The sediments contain a small percentage of erratic boulders and pebbles of granitic and quartzitic composition which were ice-rafted into the area during periods of flooding. The thickness of the stream and lake deposits in the area averages approximately 50 to 100 feet and attains a maximum of about 200 feet.

Basalt of the Columbia River Group underlies all of the Ordnance

ground water area. However, except for a small area along the Columbia River in Sections 15 and 16, Township 5 North, Range 27 East, the basalt surface is completely covered by alluvium. The Columbia River Group is a series of accordantly layered basaltic lavas poured out one upon another over a 50,000 square mile area of Washington, Oregon, and Idaho to depths in excess of 4,000 feet. The basalt is known to exceed 2,500 feet in thickness in nearby areas, although only about 1,500 feet has been penetrated by wells locally. Individual lava flows in this formation vary from about 10 to 150 feet in thickness and commonly extend laterally for about 1 to 12 miles. Typically, the flows are a hard, dense, non-porous, olivine basalt near the base grading upward to coarser grained, vesicular, and scoriaceous zones near the top. The flows commonly display columnar jointing patterns consisting of polygonal or hexagonal shaped, roughly vertical, columns that developed along cooling joints. Diameters of the columns may vary from a few inches to several feet near the bottom of individual flows but usually become progressively smaller near the top. Rectangular or diced jointing is also common to some flows in the area. This type of jointing separates the basaltic rocks of the flows into angular blocks having dimensions of about 1 to 24 inches on a side. Almost all of the jointing patterns within the basalts are relatively tight and are only rarely open and well developed. Vertical permeability, therefore, is believed to be quite low.

The basalts making up the Columbia River Group issued forth as a very fluid lava from numerous fissures that opened up in the Columbia basin. Individual out pouring of lava spread out as streams and lakes of molten rock which eventually cooled to form broad lava plains. At times,

soil zones, stream channels, and lakes formed by impounded streams developed on the lava plains only to be buried by successive flows of lava. Sediments deposited upon the lava surface include clay, silt, and sand and gravel which now occur as local interbeds, as much as 100 feet thick, between flows of basalt. These sedimentary interbeds are quite common within the Columbia River Group and have been estimated by Robinson (1971) to constitute 4 to 30 percent of the total thickness. Where penetrated by wells drilled into the basalt below the regional water table, the coarser grained sediments form extremely good water yielding zones.

C. Structure

The topography of the Ordnance area is largely controlled by the tectonic structure of the underlying basaltic rock. The basalt dips almost imperceptibly along gentle slopes from the uplands of the Blue Mountain anticline, several miles to the southeast of the area, to the east-west trending, 160-mile-long, Dalles-Umatilla syncline described by Newcomb (1967). The Columbia River lies in the axial trough and follows the axis of the syncline at the north boundary of the report area. The Ordnance ground water area occupies part of the gently dipping south limb of the syncline. Structural dips trend to the northwest within the basalts of the report area and average approximately 30 feet to the mile.

The Service anticline, shown on Plate 2 of this report, lies approximately 3 miles to the east, and generally parallels the eastern boundary of the Ordnance ground water area. The anticline is an upturned structural fold in the basaltic rocks extending northward from Service Buttes to Sillusi Butte in Washington across the Columbia River from Umatilla. It is believed that the structure serves as a barrier to

the movement of ground water from up-slope areas to the southeast.

Well data and topography indicate that a small northeast-southwest trending anticline is present beneath the alluvial cover located approximately 3 miles west of Hermiston. The axial trace of this structure generally parallels the Service Buttes anticline. Well data also suggest the existence of a down-warped, northeast-southwest trending fold in the basalt in Townships 3 and 4 North, Range 26 East, and a moderately deep depression in the south half of Section 19 and part of Section 20, Township 4 North, Range 27 East (See Plate 2). An anomalous high area on the basalt surface lies a short distance to the north of this depression. These features are probably structural in origin, the result of local faulting of the basaltic rocks.

III. OCCURRENCE OF GROUND WATER

A. Stream and Lake Sediments

Ground water within the stream and lake deposits overlying the basalt of the Columbia River Group has been extensively developed by shallow wells in the report area. The amount of acreage irrigated by wells developing water from these alluvial aquifers is more than double the acreage irrigated from deep basalt wells in the overall Ordnance ground water area.

1. Lost Lake-Depot Area

Shallow wells producing from the alluvium are concentrated mostly in the north half of Township 3 North, Range 27 East and in the south half of Township 4 North, Range 27 East, herein termed the Lost Lake-Depot area. Here, the gravel interbeds in the alluvium are moderately thick and are in places highly permeable. The capacities of wells in this

particular area range from 400 to 3,000 gallons per minute and average about 1,800 gallons per minute. The occurrence of permeable gravel lenses in the alluvial sediments, however, is irregular in both horizontal and vertical distribution. A number of wells with yields of less than 100 gallons per minute have been constructed in the area. The alluvium in this highly developed area ranges in thickness from approximately 80 feet to 170 feet with an average thickness of about 100 to 125 feet. The saturated portion of the alluvial sediments, or that part lying below the water table, is about 25 feet thick throughout the developed area. However, because of structural or erosional features in the underlying basalt, the saturated alluvium ranges from a low of approximately 15 feet to a high of 125 feet in some areas (See Plate 4). To the north, south, and to the west of the Lost Lake-Depot area, the saturated alluvium becomes progressively thinner and finer grained with a noteable horizontal discontinuance of permeable lenses of gravel. In parts of Townships 3 and 4 North, Range 26 East, and in parts of Township 4 North, Ranges 27 and 28 East, the stream and lake sediments stand above the water table and are not a source of water. Along the Columbia River, in the northern part of the Ordnance ground water area, and especially in Township 5 North, Range 26 East, the ground water in the alluvial sediments is partly in hydraulic connection with the river and is generally free to rise and fall with fluctuations of the pool level of Lake Umatilla behind John Day Dam.

2. Westland Road Area

Another area of major development of ground water in the stream and lake sediments is in Township 4 North, Range 28 East, west of the Umatilla River, and along the east range line of the northeast quarter of

Township 4 North, Range 27 East, and part of the west half of Township 3 North, Range 28 East, termed the Westland Road area in this report (See Plate 1). Here, the alluvium is approximately 100 to 150 feet thick and contains thick lenses of permeable gravel. In general, the lower one-half of the alluvium in this area is saturated with water. Large quantities of ground water have been developed from shallow wells in the area for agricultural and for industrial purposes. The well records at the end of this report describe eight wells that range in depth from 93 to 137 feet that have capacities of 1,000 gallons per minute or more (Wells No. 18, 19, 29, 34, 39, 41, 58, and 67). Two of these wells, No. 34 and No. 39, have reported capacities of 3,000 gallons per minute. The relatively thick and highly permeable lenses of open gravel that underlie the Westland Road area apparently lens out within short lateral distances and do not extend into the finer grained sediments lying between this developed area and the Lost Lake-Depot area. Wells constructed into alluvial deposits between the two highly productive areas have encountered only fine-grained sediments of clay, silt, and sand with relatively minor amounts of gravel. The hydraulic conductivity between the two areas is believed to be very low.

The ground water table within the stream and lake sediments in the overall Ordnance gravel ground-water area slopes rather gently in a general northwesterly direction. The ground-water gradient averages about 50 feet per mile in areas where the sediments are poorly permeable. In areas of greater permeability, containing abundant gravel deposits, the gradient flattens to approximately 12 feet per mile (See Plate 3).

Recharge to the alluvial sediments is derived partly from precipitation infiltrating directly into the sediments and percolating

downward to the water table. Precipitation averages about 8.5 inches per year, and occurs mainly during the late fall, winter, and spring months. Pan evaporation rates as measured during past years in Hermiston are high, averaging about 45 inches per year. This is the equivalent of about 31.5 inches of field evaporation. These periods of high evaporation, however, occur in the hot dry summer months and in the early fall when measurable precipitation is extremely rare. Evaporation during the winter months is assumed to be very low, probably less than 4 inches per year. It is estimated that less than one-fourth of the total annual precipitation is able to recharge the ground-water body within the alluvial sediments after soil moisture deficiencies have been replaced. Recharge to the alluvial aquifers may greatly exceed this amount during those years when extremely heavy periods of precipitation occur over relatively short periods of time. For example, during the months of November and December, 1973, over 7 inches of precipitation fell over the area. Water level measurements of shallow gravel wells obtained during February 1975 showed that the water levels in some of the wells had not declined as in past years. In other shallow wells, a rise in water levels of 1 to 3 feet was measured. A few of the wells in the area experienced slight water level declines during this same period which may be due to a variance in horizontal permeability or to heavy pumping just prior to water level measurements.

Irrigation water imported into the Lost Lake-Depot area by the High Line Canal of the Westland Irrigation District is a source of moderate recharge to the alluvial aquifers in this area. Some recharge also undoubtedly occurs in years when there is surface runoff from the hills lying to

the south. Moderate recharge to the alluvial sediments in the Westland Road area occurs as ditch leakage from surface water imported into the area, and as percolating water from flood irrigation in a few local areas.

Beginning in the early 1960's, water level data have been collected on a quarterly basis from four wells constructed into the alluvium (See hydrographs of wells No. 1, 3, 16-B, and 33 at the back of this report). In addition, the water levels in 27 shallow wells in the Lost Lake-Depot and the Westland Road areas, and 16 wells in the shallow gravels near the Columbia River have been measured yearly since 1971. The water level measurements in gravel wells in the Lost Lake-Depot and the Westland Road areas show an average water level decline of slightly over 1.6 feet per year. Shallow wells in the lowland areas near the Columbia River generally have not experienced a decline in water levels.

The hydrographs of observation wells numbers 1, 3, and 16-B, show a significant change in the rate of water level decline in the early months of 1972. The rate of decline prior to this time was in the order of 0.5 to 1.0 feet per year; therafter, the decline rate increased to about 3.0 feet per annum in wells No. 1 and 3, and to approximately 7.0 feet per annum in well No. 16-B. Well No. 33 showed a decrease in the rate of decline during this same period, probably because of decreased use of the well.

The long term decline of water levels in wells drilled into the alluvial sediments in Township 4 North, Ranges 27 and 28 East is a clear indication that artificial discharge from the aquifer by the withdrawal of ground water from wells is exceeding natural recharge to the aquifer. The use of ground water in the area is definitely in a "mining" situation.

A serious water level problem has developed in the wells producing water from the alluvial sediments in the Lost Lake-Depot and the Westland Road areas. The continual decline of water levels over a long period of time has considerably reduced the amount of water in storage in the alluvial aquifers. Water levels in the alluvial aquifer underlying the Lost Lake-Depot area have declined in the order of 12 to 29 feet during the past 10 years. The majority of these wells have less than 25 feet of saturated alluvium remaining. The seriousness of the matter is further compounded by the fact that lenses of permeable gravel are haphazardly distributed throughout the area. Some wells have gravel lenses only in the upper vertical section of the saturated sediments, and have considerably less than 25 feet of permeable aquifer remaining (See well reports of wells numbers 5, 15, 33, 33-A, 42-C, 42-D at the back of this report). Water level measurements of representative wells in the Westland Road area during the past 3 to 4 years have shown an average rate of water level decline of 1.6 feet per year, similar to the declines observed in shallow wells in Township 4 North, Range 27 East. These wells, however, have approximately 50 feet of saturated alluvium remaining and have a much longer life expectancy then most of the wells to the southwest.

Graphs of U. S. Weather Bureau precipitation records for Hermiston and cumulative departure curves (Figure 1, Page 13) show a rising trend in precipitation between the years of 1940 and 1964, a falling trend from 1964 to 1969, and another rising trend that began in 1969. Representative hydrographs of gravel wells in the area show an increase in the rate of decline of water levels in the stream and lake deposits during this last rising trend. Therefore, excessive pumpage of ground water and not

contemporary precipitation patterns is responsible for the decline of water levels.

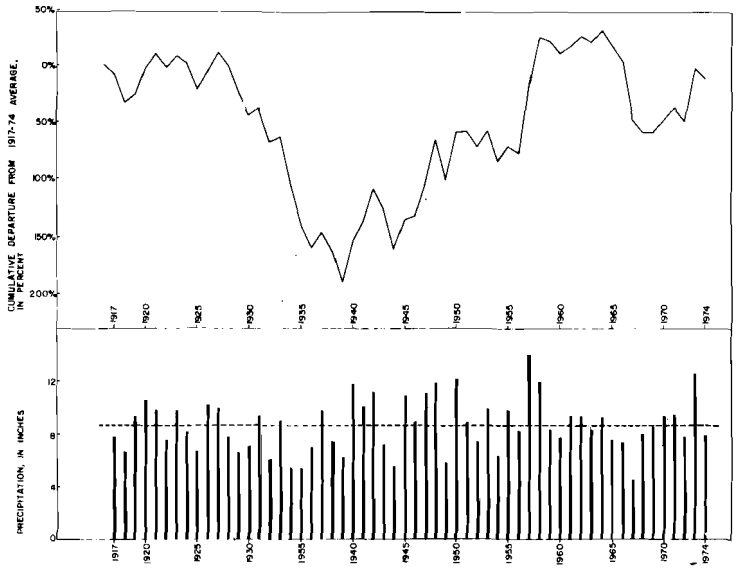


Figure 1

Precipitation at Hermiston, Oregon, during water years of each year 1917 - 1974 and cumulative departure from average precipitation in percent.

It is evident that the decline of water levels in the alluvial sediments is the result of a ground water overdraft by shallow wells in the area. Continued excessive withdrawal of ground water will result in the ultimate failure of some wells developing water from the alluvial aquifer. In order to prevent further depletion of the ground water reservoir, it will be necessary to substantially reduce the amount of ground water withdrawals by shallow gravel wells or to replenish the aquifer by importing water into the area from the Columbia River for direct recharge or for irrigation purposes.

B. Ordnance Basalt Aquifers

The basalt of the Columbia River Group everywhere underlies the Ordnance ground water area. These rocks contain the most wide-spread aquifers in the area and are often capable of yielding 1,000 gallons per minute or more to most properly constructed wells (Robison, 1971). Ground-water aquifers in the basaltic rocks are in the form of thin tabular bodies, usually in the broken and rubbly contact zones between individual flows of basalt. The contact zones are at places porous and permeable in a horizontal direction. The compact center parts of most flows are relatively impermeable and under natural conditions do not permit water to move freely between aquifers. Ground water in the horizontal porous zones, therefore, is confined.

In addition to the vertical separation, the tabular ground-water bodies generally are not continuous over great horizontal distances. Interruptions of the permeability in the horizontal water-bearing zones by structural faults and folds and by stratigraphic features, such as the lensing out of individual flows, has produced an areal compartmentation of the hydrologic system in the basaltic rocks. As a result, the potentiometric head relationships among the various water bearing zones in the area are varied and complex with each zone having its own potentiometric head. For this reason, water level elevations in the basaltic aquifers cannot be realistically depicted in graphic map form.

The overall porosity of the basalt formation is low. The percent of open space available for the storage of water in the formation is probably less than one percent, or only about 1/20th that of the overlying

gravels. On the basis of the reported specific capacities (gallons per minute per foot of drawdown), of the deep basalt wells in the area, the transmissivity of the basalt is estimated to range from 10,000 $feet^2$ to 50,000 $feet^2$ per day. Because of the relatively high transmissivities and low storage coefficients of the basalt in the area, the hydraulic effects from the pumping of wells can extend over great distances within individual aquifers.

A serious water level decline has occurred in most of the deep wells in the Ordnance area during the past several years. This decline has been in the order of 5 to 7 feet per year. (See hydrographs of wells No.'s 72, 75, 78, 80, 81, 83, 87, 91, and 92). The decline of water levels in shallow basalt wells, or those wells less than 400 feet deep, has been much less. These wells have shown a rate of water level decline of about 1.6 to 2.0 feet per year, similar to the decline of water levels in the shallow wells producing from the overlying alluvial sediments. The difference in the rates of water level decline between the shallow wells developing water from the upper zones in the basalt and the deep basalt wells indicates that the deep and shallow zones are hydraulically separated. Some recharge to the upper basalt zones probably occurs by the slow downward leakage of water into weathered and fractured zones of the basalt from the overlying alluvial sediments.

There appears to be very little recharge to the deep basalt zone in the area. Carbon-14 dating of the ground water in the deep basalt zone, in the shallow basalt zone, and in the shallow gravel aquifer by the United States Geological Survey (Robison, 1971) indicated an age of at least 27,000 years since water in the deep basalt zone last made contact

with the atmosphere. Water from the shallow basalt zone showed an age of 6,700 years, while the water obtained from the shallow gravel aquifer had a very recent or modern age (1950). These reported ages, along with known aquifer characteristics, indicate that the water in the aquifer units in the basalt is largely or entirely ancient water and that the aquifers do not receive measurable recharge from local precipitation or from sources outside the area. In addition, the vertical separation and compartmentation of the aquifer units in the basalt, and the continual decline of water levels in wells producing from the basalt, further suggest that the water withdrawn by deep wells in the area is not being substantially replenished. Minor recharge to the basalt, however, does occur in the form of cascading water from the overlying gravel aquifer in a few improperly cased wells. Uncased wells that penetrate more than one aquifer unit may also permit the movement of water between aquifers to some degree although this has not been demonstrated by actual current meter tests conducted by staff members of the State Engineer's office in two of the deep wells. Hydrographs of wells in the area show a seasonal fluctuation of water levels and indicate a lateral movement of water in the basalt. This lateral movement of water is in response to temporary pumping cones surrounding pumping wells and to reduced potentiometric pressures in confined aquifers caused by the withdrawal of water. The continued overdraft of ground water from the aquifer units in the basalt and the continual decline of water levels will not result in a significant increase in the rate of natural recharge to the ground water body.

Continued withdrawal of water from deep wells in the area in amounts presently being withdrawn will result in the continual decline of water levels at approximately the same or perhaps increased rates in

future years. At present, the pumping levels in the deep production wells are relatively low and range from approximately 175 feet in Well No. 78 to about 275 feet below land surface in Well No. 80. Most of the deep wells in the area have pumping lifts of approximately 220 to 240 feet.

IV. GROUND WATER DEVELOPMENT

A. Stream and Lake Sediments

The State Engineer records show that the first irrigation well drilled in the Ordnance area to develop ground water from the stream and lake sediments was constructed in 1950. The development of ground water in the alluvial sediments progressed rapidly until 1973 with the construction of approximately sixty drilled shallow irrigation and industrial wells and three dug wells or sumps. Of the drilled wells, approximately forty-seven are presently in use or are available for use (See Table 1).

B. Basalt

The development of ground water in the Ordnance basalt area began in 1941 with the construction of three wells tapping the upper basalt ground water aquifers when the Umatilla Army Depot was built at Ordnance. The first deep basalt well was constructed during the following year by the Umatilla Housing Autority to supply water for the community of Ordnance (Sceva, 1966). In 1945, a well penetrating the shallow basalt reservoir was constructed by the Oregon-Washington Railroad for general railroad use. Two addition wells were drilled into the deep basalt at the Army Depot in 1950 for fire protection, which were followed by another in 1954. The first deep well for irrigation use (Well No. 75) was constructed in 1956. In the late 1950's and early 1960's, the area developed rapidly with the construction of seven deep irrigation wells and

TABLE 1 - CHRONOLOGIC LIST OF CURRENTLY USED IRRIGATION AND INDUSTRIAL WELLS BY DATE OF CONSTRUCTION

(Numbers are the well numbers of the wells described in the back of this report)

Year	Wells in Gravel (Wells in Ordnance gravel ground water area only)	Wells in gravel and upper basalt flows	Deep wells in basalt (over 500 feet in depth)
1941		89, 90, 94	
1942			83
1943			
1944			
1945			
1946			
1947			
1948		28	
1949			
1950	1		91, 92
1951		28-B	
1952		76	
1953			
1954	3, 4, 5, 6		72
1955	7-A	77	
1956	12	98	75
1957			78
1958			74
1959			84
1960	16-B, 17		73, 80, 81
1961			86
1962	23-C, 28-A		
1963	23, 23-B		
1964	18, 19, 23-E, 23-F		
1965	22, 23-A		
1966	24-A, 33, 33-A	23-D	
1967	29	28-C	
1968	9, 30, 33-B, 34, 39, 43	95, 96, 97	
1969	13, 13-A, 14, 14-A, 38, 41, 42-C, 44		
1970	42-D, 45, 53-B	100	
1971	52	99, 101	
1972	55	102	
1973	37, 45-A, 50, 54, 67		

one deep fire protection well.

At the present time there are eight wells developing ground water from the deep basalt reservoir for agricultural purposes in the area. Three deep basalt wells and three wells tapping the upper basalt aquifers have water right certificates for fire protection use at the Umatilla Army Depot. In addition, one deep well and one shallow basalt well in the depot compound are used to supply water for general domestic purposes. A total of twelve wells of record have been constructed in the deep basalt aquifers at Ordnance.

V. GROUND WATER USE

A. Alluvial Aquifers

1. Lost Lake-Depot Area

There are approximately thirty-nine wells in the Lost Lake-Depot area developing ground water from the shallow gravel aquifer. The State Engineer records show that fourteen water right certificates have been issued covering 1070.4 acres of irrigated land. Seventeen permits have been issued for the irrigation of 3849.0 acres and eight applications for the appropriation of ground water to irrigate an additional 2073.5 acres have been received. Permits for the appropriation of ground water in the area have not been issued since December 6, 1971. For the past three years prospective applicants have been advised of the pending investigation and advised that additional permits for the appropriation of ground water for the area may not be approved by the State Engineer.

2. Westland Road Area

Approximately sixteen drilled wells and three dug wells or sumps develop water for irrigation or industrial purposes from the shallow

gravel aquifer in the Westland Road area. Eight water right certificates covering the irrigation of 723.7 acres in the area have been issued and twelve permits for the irrigation of 821.9 acres have been approved. In addition, two permits for the combined appropriation of 6.6 cubic feet per second for industrial use have been issued. At present, ten applications have been received for the irrigation of 378.2 acres in the area.

B. Basalt Aquifers

Twenty-three ground water certificates have been issued for industrial, irrigation, and municipal use in the Ordnance basalt ground water area for the appropriation of ground water from wells tapping the upper and the deep basalt flows; ten water right permits have been issued. Subsequent to the State Engineer's Ordnance Critical Ground Water Area hearing in Hermiston on June 3, 1965, the State Engineer has not accepted any new applications for the appropriation of ground water from the deep basalt aquifers in the area. Since the date of the hearing, nine applications for the appropriation of ground water from the upper basalt flows have been received and six permits have been issued. Permits for the use of shallow basalt wells in the area have not been issued since April 26, 1971. The total number of acres under permitted and certified water rights for the appropriation of water for irrigation purposes from the deep basalt aquifers in the area is 2336.7 acres; irrigated acreage under permitted and certified water rights from wells tapping the shallow basalt aquifers totals 915.5 acres. In addition, the City of Irrigon shallow basalt well has a permitted diversion of 1.0 cubic foot per second for municipal use and well No. 83 has a certified right for the use of 2.0 cubic feet per second for stock raising purposes.

Certified rights for wells in the Umatilla Army Depot permits the diversion of 6.19 cubic feet per second from the deep basalt aquifers for fire protection and 0.5 cubic foot per second for domestic use. The wells in the compound deriving water from the upper basalt units have certified rights for the appropriation of 2.02 cubic feet per second for fire protection, 0.78 cubic feet per second for domestic use, and 0.34 cubic feet per second for irrigation use. The use for fire protection in the Depot area is limited to maintaining the fire suppression systems and to periods of actual fire emergency.

VI. CONCLUSIONS

1. The decline of water levels in wells developing water from the shallow alluvial sediments overlying the basalt in the Lost Lake-Depot area (Section 2, 3, 4, 5, and 6 of Township 3 North, Range 27 East and Sections 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35 of Township 4 North, Range 27 East) has developed into a serious water level decline problem. The amount of annual withdrawal of water by wells in the area greatly exceeds the amount of annual recharge to the aquifer system. As a result of the decline of water levels, only about 25 feet of the alluvium remains in a saturated condition for use by most wells in the area.

2. Without some curtailment of withdrawals of ground water from the alluvial sediments in the Lost Lake-Depot area, water levels in the gravel wells will continue to decline with the ultimate failure of many of the wells in the very near future.

3. The water levels in the shallow gravel wells in the Westland Road area (that part of the W½ of Township 4 North, Range 28

East, west of the Umatilla River, and part of the NE¼ and SE¼ of Township 4 North, Range 27 East), have shown a rate of decline similar to the shallow wells in the Lost Lake-Depot area. The saturated alluvium underlying this area, however, is approximately 50 thick. The slope of the water table and the lensing out of permeable units in the alluvial sediments between this area and the Lost Lake-Depot area indicates that the hydraulic conductivity between the two areas is very low.

4. The withdrawals of water from the shallow gravel wells in the Westland Road area in quantities presently being used have not shown a marked hydraulic influence upon shallow wells in the Lost Lake-Depot area. However, development of ground water in the Westland Road area by additional wells could produce a change in the hydraulic gradient and result in increased depletion in the quantity of ground water in the Lost Lake-Depot area.

5. Wells producing from the shallow gravel aquifer near the Columbia River in Township 5 North, Ranges 26 and 27 East, have not shown appreciable water level declines. The withdrawals of ground water from these wells have no hydraulic effect upon the shallow gravel wells in the Lost Lake-Depot and the Westland Road areas.

6. Aquifer units in the deep basalt zones received little or no recharge. Water levels in the deep basalt wells have shown a continual decline of 5 to 7 feet per annum over the past several

years. Pumping lifts in these wells, however, are relatively low. Some curtailment of withdrawals of water may become necessary in the future.

7. The shallow zones in the basalt formation above a general depth of 400 feet are hydraulically separated from the deep basalt zones but are at least partly hydraulically connected to the shallow gravel aquifer system.

VII. RECOMMENDATIONS

A. Ordnance Gravel Ground Water Area

1. The Ordnance shallow gravel ground water area, as delineated on Plate 1 of this report, should be declared a "Critical Ground Water Area".

2. The area should be closed to further development for wells extending into the alluvial sediments except for wells to be used for stock watering purposes or for watering any lawn or noncommercial garden not exceeding one-half acre in area for single family domestic purposes only. Each well should be limited to tracts of land not less than 10 acres in area.

3. Wells developing water from the alluvial sediments in the Lost Lake-Depot subarea (as delineated on Plate 1 of this report) should be limited collectively to a total annual diversion of not more than 9,000 acre feet of water. This total allowable diversion of water should be distributed on the basis of water right priority for wells in the subarea.

4. Withdrawals from wells developing water from the alluvial sediments in the delineated area of the entire Ordnance shallow gravel ground

water area, should be regulated within the limits of their water rights and the quantity allowed for appropriation computed on the acreage actually being irrigated.

5. All wells authorized to continue use under their ground water rights in the Ordnance gravel ground water area that develope water from the alluvial sediments should be equipped with totalizing water meters of a type approved by the Water Resources Department and should be provided with adequate, usuable, measuring ports or systems so that water level measurements can be made at any time.

6. All meters, measuring systems, and control valves should be subject to inspection and approval by the Water Resources Department.

7. Ground-water appropriation from all irrigation wells authorized to continue use under their ground water rights should be restricted to use only during a standard irrigation season as set by the Water Resources Department.

8. Withdrawals from all wells authorized to continue use under their ground water rights in the entire Ordnance gravel ground water area should be monitored and regulated closely by the Water Resources Department throughout each pumping season.

9. If the above control provisions do not effectively reduce the rate of water level declines, further curtailment should be made on the basis of water right priority.

B. <u>Ordnance Basalt Ground Water Area</u>

1. The Ordnance basalt ground water area, as delineated on Plate 1 of this report, should be declared a "Critical Ground Water Area".

2. The area should be closed to further development for wells extending into the shallow or deep basalt reservoirs except for wells to be used for stock watering purposes or for watering any lawn or noncommerical garden not exceeding one-half acre in area for single family domestic purposes only. Each well should be limited to tracts of land not less than 10 acres in area.

3. Withdrawals from wells developing water from the delineated area of the Ordnance basalt ground water area should be regulated within the limits of their water rights and the quantity allowed for appropriation computed on the acreage actually being irrigated.

4. All wells authorized to continue use of water under their water rights in the Ordnance basalt ground water area developing water from the shallow or deep basalt reservoirs should be equipped with totalizing water meters of a type approved by the Water Resources Department and should be provided with adequate, usuable, measuring ports or systems so that water level measurements can be made at any time.

5. All meters, measuring systems, and control valves should be subject to inspection and approval by the Water Resources Department.

6. Withdrawals from all wells authorized to continue use under their ground water rights in all areas of the entire Ordnance basalt ground water area should be monitored and regulated closely throughout each pumping season.

7. If the above control provisions do not effectively reduce the rate of water level declines, further curtailment should be made on the basis of water right priority.

8. Withdrawals from all wells authorized to continue use under their ground water rights should be restricted to use only during a standard irrigation season as set by the Water Resources Department.

9. Pending applications numbered G-5437 and G-5565 (Wells numbered 100 and 101 in this report), for the appropriation of water for irrigation use from the shallow basalt aquifer system in Sections 25 and 26, Township 5 North, Range 26 East, W. M., will not harm existing rights and should be approved. The approved permits for these applications should contain provisions limiting each well to a depth not to exceed 400 feet.

C. Improperly Constructed Wells

1. All existing wells, including improperly abandoned wells in the Ordnance gravel ground water area and in the Ordnance basalt ground water area extending into the shallow or deep basalt reservoirs, should have water-tight casing extending at least 5 feet into firm, solid, unfractured rock. The casing should be pressure grouted into the rock with cement grout to prevent the downward leakage of ground water from the alluvial sediments into the basalt reservoirs. All improperly cased wells should be repaired to conform to this requirement or should be permanently abandoned in conformance with Oregon's Well Construction Standards.

VIII. REFERENCES

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IX.

RECORDS OF WELLS

Alluvial Aquifers

Records of Wells

Report Well Number 1 (21)

Owner: M. M. McDole

Location: SE¼ NE¼, Sec. 33, T. 4 N., R. 27 E

Depth: 96 feet. Diameter: 12 inches. Depth cased: 96 feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: 1950

Yield: Reportedly tested at 1000 gallons per minute.

Remarks: McDole Well No. 1

Generalized Log:

Sand	0 - 36 feet
Gravel	36 - 65 feet
Sand and gravel	65 - 95 feet
Clay	95 - 96 feet

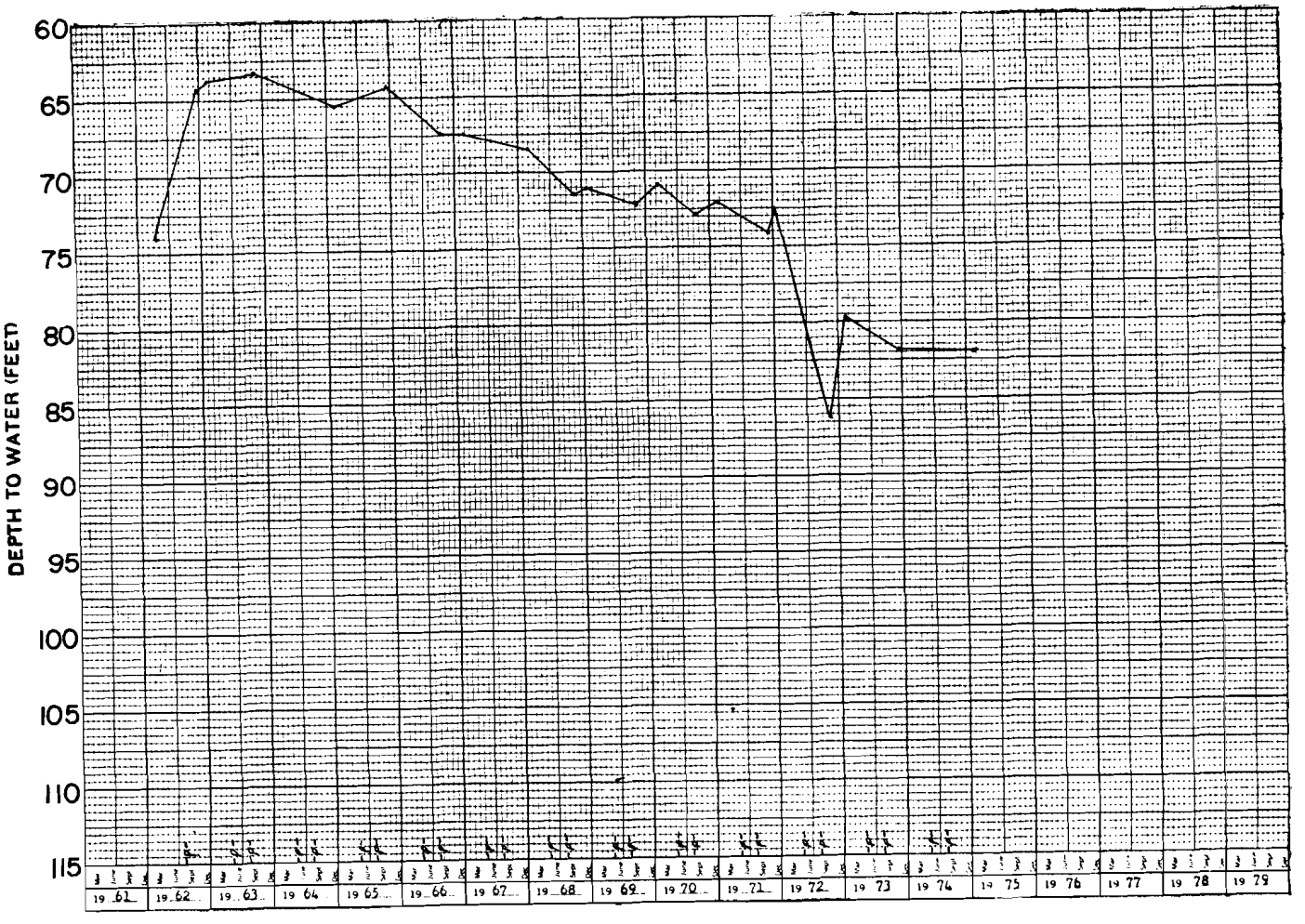
Water Level:

Measured at 63 feet below land surface on 12/1/54

Description and status of water right:

Water Right Certificate 20685 with a priority of June 2, 1950 for the appropriation of 1.0 cubic foot per second for the irrigation of 79.9 acres.

Hydrograph:



Records of Wells Report Well Number 2

Owner: M. M. McDole Location: NW¼ SE¼, Sec. 33, T. 4N., R. 27E.

Depth: NR feet. Diameter: NR inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: NR

Yield: Not reported.

Remarks: McDole Well No. 5 (Change Point of Diversion from a well within the N½ SE¼ of said Section 33 to a well within the NW¼ SE¼ of said Section 33.) Sp. Or., Vol. 20, P. 67 (2343)

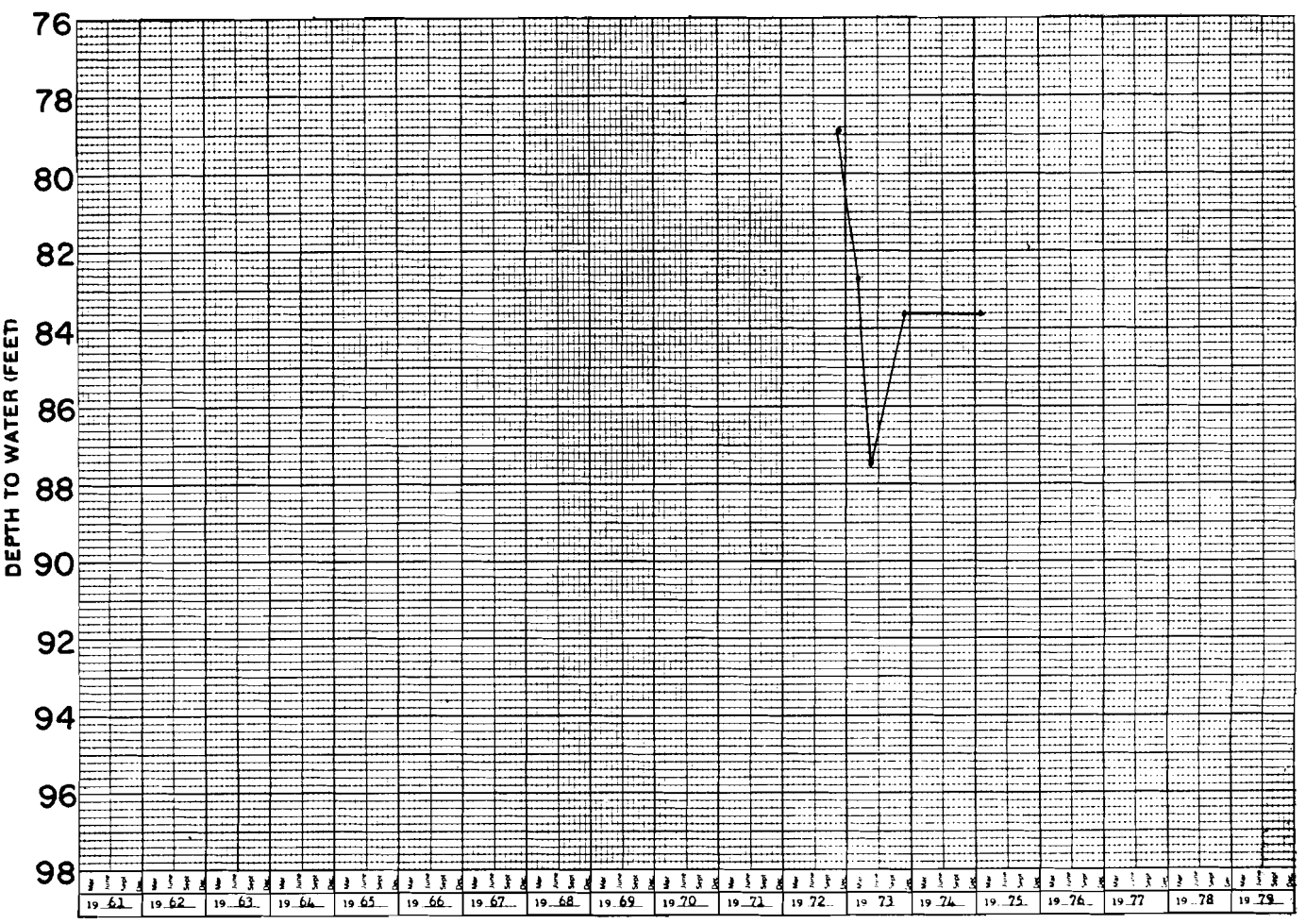
Generalized Log:

No log

Description and status of water right:

Water Right Certificate 40855 with a priority of November 1, 1950 for the appropriation of 0.987 cubic foot per second for the irrigation of 79.0 acres.

Hydrograph:



Records of Wells Report Well Number 3 (7) (54-A)

Owner: Scott Chapman Location: SE¼ NW¼, Sec. 28, T. 4N., R. 27E.

Depth: 119 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1954

Yield: Tested at 820 gallons per minute with no drawdown.

Remarks: Chapman Well No. 1

Generalized Log:

Sand and gravel	0 - 21 feet
Boulders	21 - 31 feet
Clay with gravel lenses	31 - 72 feet
Gravel	72 - 119 feet

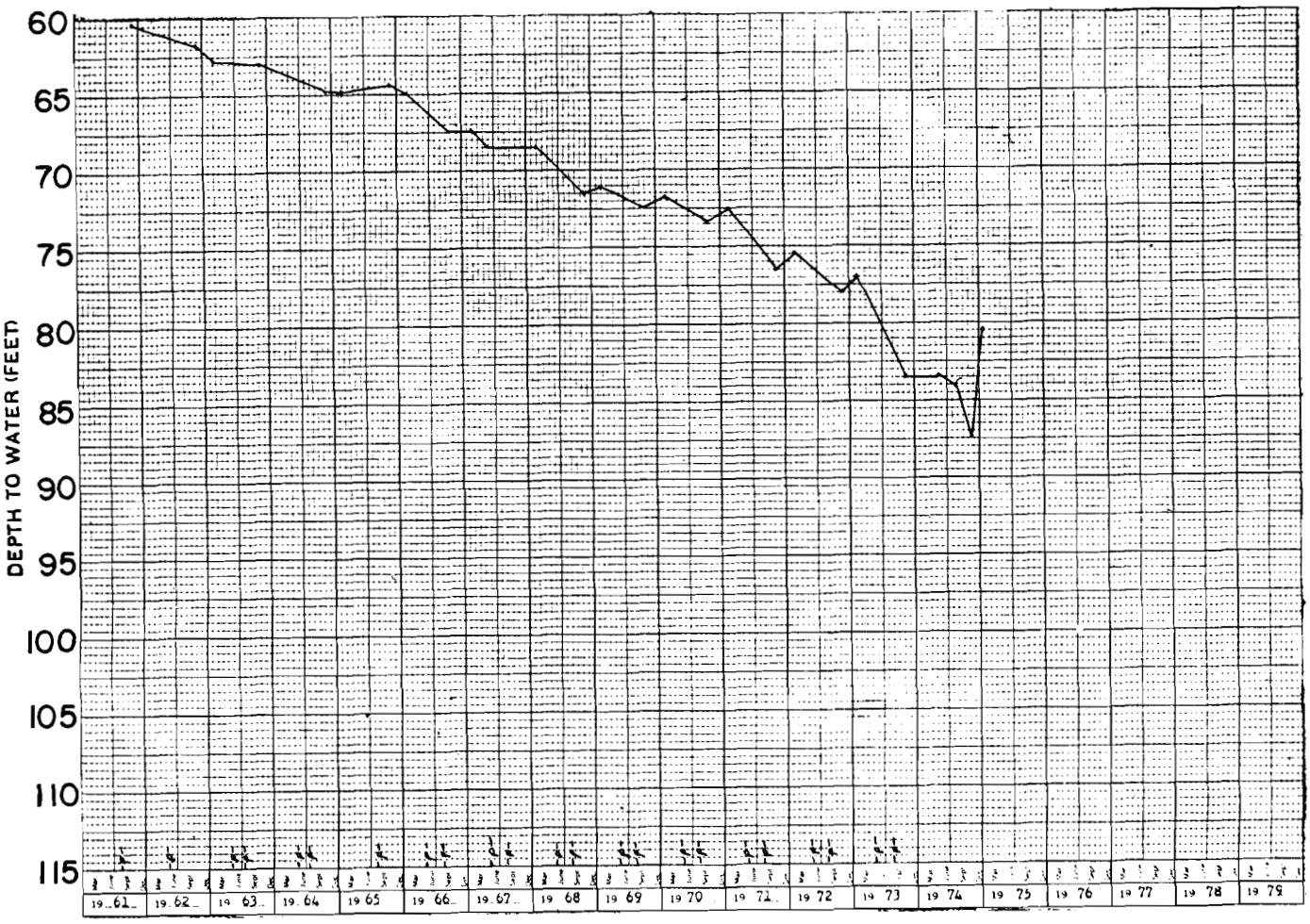
Water Level:

Measured at 60.6 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 26073 with a priority of December 15, 1952 for the appropriation of 1.0 cubic foot per second for the irrigation of 80.0 acres.

Hydrograph:



Records of Wells Report Well Number 4 (10) (24) (53)

Owner: Sylvanus F. Hoyt Location: SW¼ NE¼, Sec. 28, T. 4N., R. 27E.

Depth: 126 feet. Diameter: 12 inches. Depth cased: 126 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1954

Yield: Reported to pump about 1250 gallons per minute.

Remarks: Hoyt Well No. 1

Generalized Log:

Gravel and boulders	0 - 38 feet
Clay	38 - 73 feet
Gravel	73 - 126 feet

Water Level:

Measured at 72.0 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 26192 with a priority of December 15, 1952 for the appropriation of 1.0 cubic foot per second for the irrigation of 80.0 acres.

Records of Wells Report Well Number 5 (6) (8) (16) (48)

Owner: Georgia G. Holzapfel Location: SW¼ NE¼, Sec. 32, T. 4N., R. 27E.

Depth: 123 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 583 ft. Year constructed: 1954

Yield: Not reported.

Remarks: Holzapfel Well No. 1

Generalized Log:

Sandy loam	0 - 6 feet
Sand	6 - 36 feet
Gravel	36 - 100 feet
Gravel and clay	100 - 123 feet

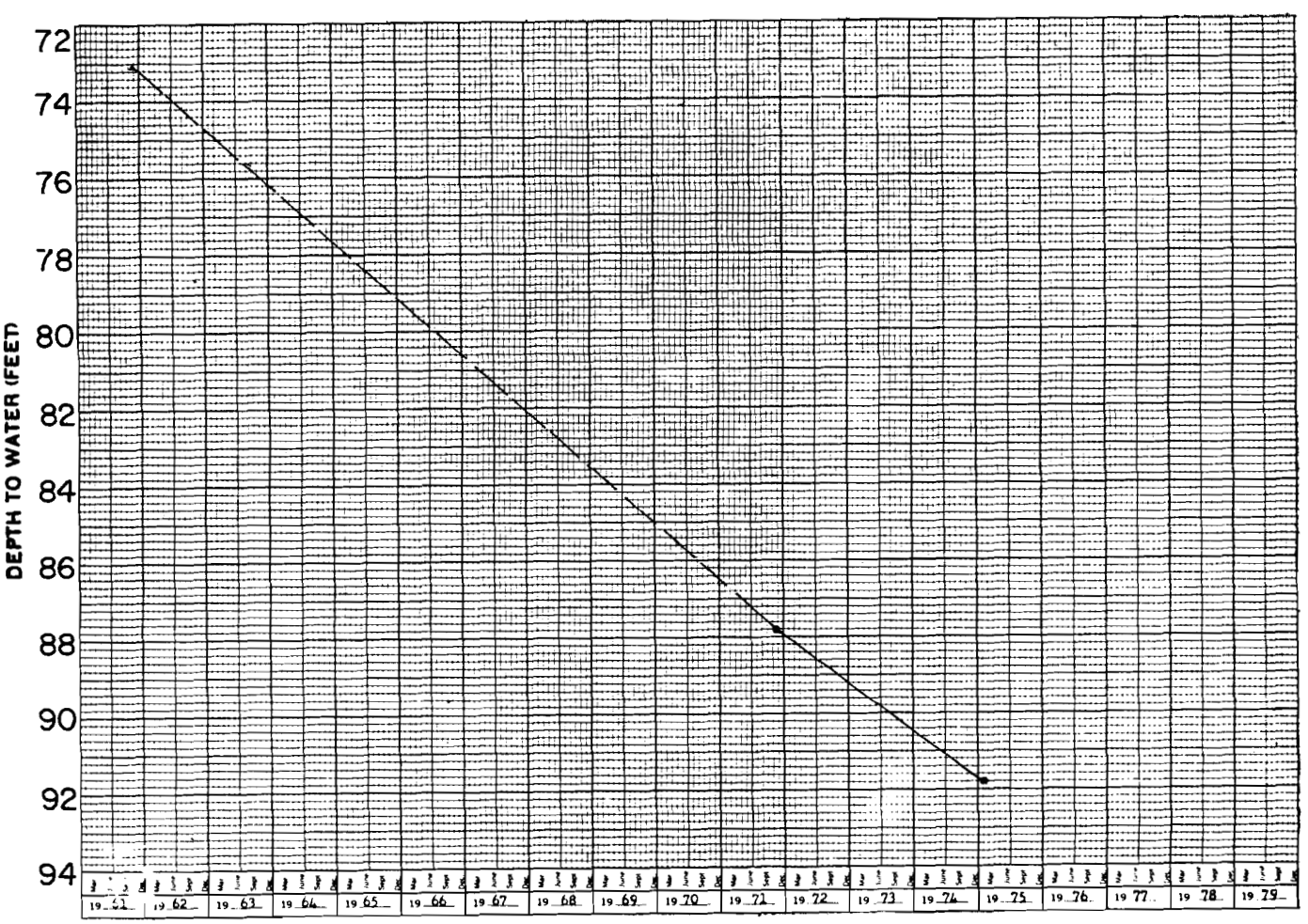
Water Level:

Measured at 73.5 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 22888 with a priority of March 16, 1953 for the appropriation of 0.61 cubic foot per second for the irrigation of 49.0 acres.

Hydrograph:



Records of Wells Report Well Number 5-A (6-A)

Owner: Georgia G. Holzapfel Location: NE¼ SE¼, Sec. 32, T. 4N., R. 27E.

Depth: 310 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 589 ft. Year constructed: 1953

Yield: Not reported.

Remarks: Holzapfel Well No. 2 (Abandoned)

Generalized Log:

Sandy loam	0 - 6 feet
Sand	6 - 26 feet
Gravel	26 - 63 feet
Gravel and clay	63 - 90 feet
Clay	90 - 110 feet
Basalt	110 - 157 feet
Clay	157 - 187 feet
Basalt	187 - 310 feet

Water Level:

Measured at 75.9 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 22888 with a priority of March 16, 1953 for the appropriation of 0.61 cubic feet per second for the irrigation of 49.0 acres.

Records of Wells Report Well Number 6 (5) (8) (16) (48)

Owner: Roy Gail Holzapfel Location: SW¼ NE¼, Sec. 32, T. 4N., R. 27E.

Depth: 123 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 583 ft. Year constructed: 1954

Yield: Not reported.

Remarks: Holzapfel Well No. 1

Generalized Log:

Sand loam	0 - 6 feet
Sand	6 - 36 feet
Gravel	36 - 100 feet
Gravel and clay	100 - 123 feet

Water Level:

Measured at 73.5 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 22889 with a priority of March 16, 1953 for the appropriation of 0.61 cubic feet per second for the irrigation of 49.0 acres.

Records of Wells Report Well Number 6-A (5-A)

Owner: Roy Gail Holzapfel Location: NE¼ SE¼, Sec. 32, T. 4N., R. 27E.

Depth: 310 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 589 ft. Year constructed: 1953

Yield: Not Reported.

Remarks: Holzapfel Well No. 2 (Abandoned)

Generalized Log:

Sandy loam	0 - 6 feet
Sand	6 - 26 feet
Gravel	26 - 63 feet
Gravel and clay	63 - 90 feet
Clay	90 - 110 feet
Basalt	110 - 157 feet
Clay	157 - 187 feet
Basalt	187 - 310 feet

Water Level:

Measured at 75.9 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 22889 with a priority of March 16, 1953 for the appropriation of 0.61 cubic foot per second for the irrigation of 49.0 acres.

Records of Wells Report Well Number 7 (3) (54-A)

Owner: Scott Chapman Location: SE¼ NW¼, Sec. 28, T. 4N., R. 27E.

Depth: 119 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1954

Yield: Tested at 820 gallons per minute with no drawdown.

Remarks: Chapman Well No. 1

Generalized Log:

Sand and gravel	0 - 21 feet
Boulders	21 - 31 feet
Clay with gravel lenses	31 - 72 feet
Gravel	72 - 119 feet

Water Level:

Measured at 60.6 feet below land surface on 11/10/61

Description and status of water right:

Water Right Certificate 30019 with a priority of May 2, 1955 for the appropriation of 2.25 cubic feet per second from wells No. 1 and 2 for the irrigation of 180.3 acres.

Records of Wells Report Well Number 7-A

Owner: Scott Chapman Location: NW¼ SW¼, Sec. 28, T. 4 N., R. 27 E.

Depth: 107 feet. Diameter: 12 inches. Depth cased: 107 feet.

Approximate altitude of land surface at well: 555 ft. Year constructed: 1955

Yield: Tested at 1500 gallons per minute with 3 feet of drawdown.

Remarks: Chapman Well No. 2

Generalized Log:

Sandy Soil	0 - 18 feet
Sand and gravel	18 - 107 feet

Water Level:

Reported to be 48 feet below land surface 2/2/57

Description and status of water right:

Water Right Certificate 30019 with a priority of May 2, 1955 for the appropriation of 2.25 cubic feet per second from wells No. 1 and 2 for the irrigation of 108.3 acres.

Records of Wells Report Well Number 8 (5) (6) (16) (48)

Owner: Georgia Bell Holzapfel Location: SW¼ NE¼, Sec. 32, T. 4 N., R. 27 E.

Depth: 123 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 583 ft. Year constructed: 1954

Yield: Not reported.

Remarks: Holzapfel Well No. 1

Generalized Log:

Sandy loam	0 - 6 feet
Sand	6 - 36 feet
Gravel	36 - 100 feet
Gravel and clay	100 - 123 feet

Water Level:

Measured at 73.5 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 22907 with a priority of July 15, 1955 for the appropriation of 0.23 cubic feet per second for the irrigation of 18.0 acres.

Records of Wells Report Well Number 9 (57)

Owner: Ronald Baker Location: SW¼ NE¼, Sec. 24, T. 4 N., R. 27 E.

Depth: 151 feet. Diameter: 16 inches. Depth cased: 151 feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1968

Yield: Not reported.

Remarks: Baker Well No. 2 (Jackson Well No. 2)

Generalized Log:

Soil	0 - 4 feet
Cemented sand and gravel	4 - 65 feet
Sand and gravel	65 - 126 feet
Sand and gravel with interbedded clay	126 - 151 feet

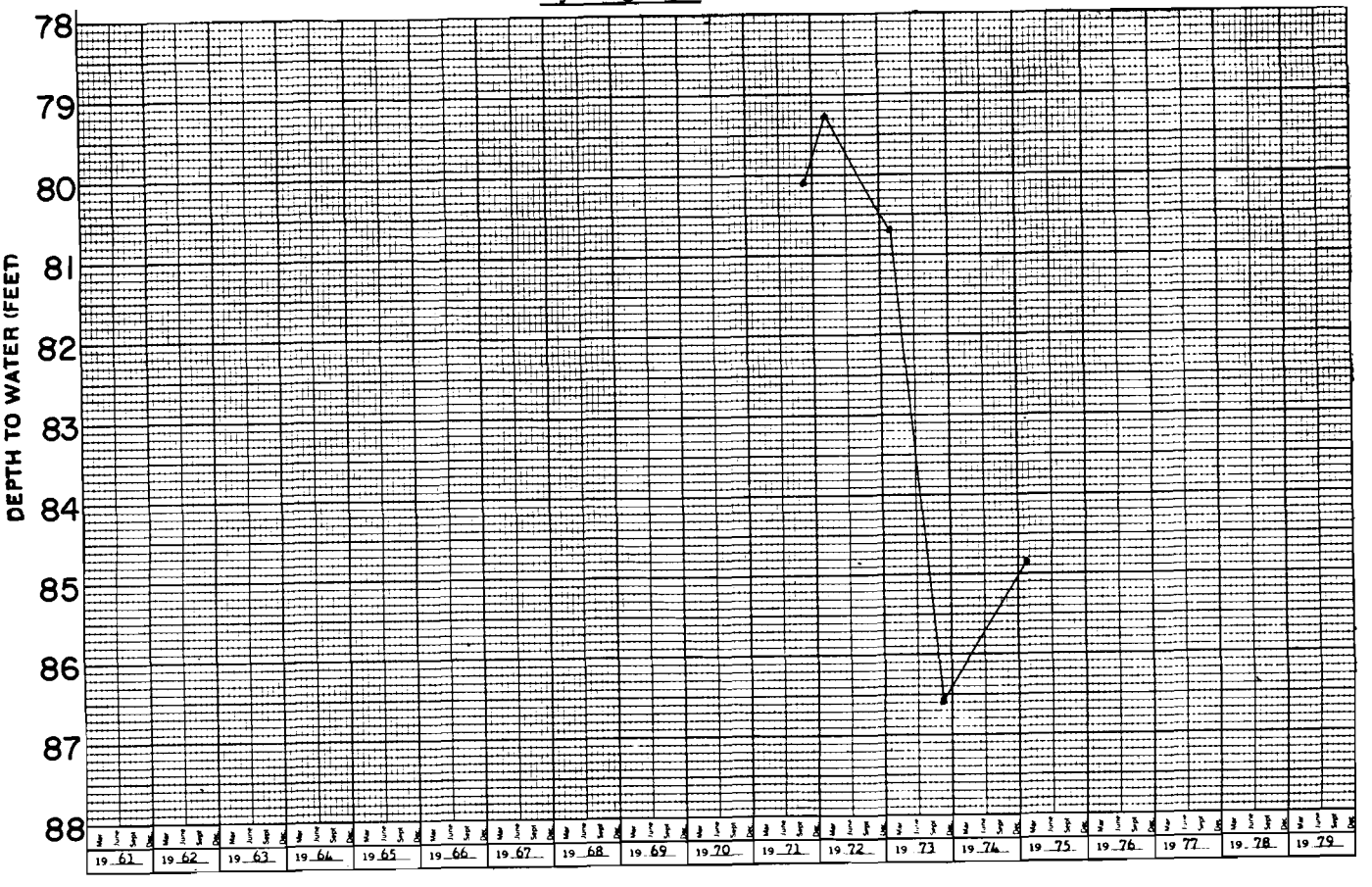
Water Level:

Reported at 75 feet below land surface 3/1/68

Description and status of water right:

Water Right Certificate 31272 with a priority of August 26, 1955 for the appropriation of 3.40 cubic feet per second for the irrigation of 272.2 acres, cancelled by State Engineer's Order, dated February 1, 1972, to change point of diversion from a well 125 feet deep in the NW¼ SE¼ of Section 24, Township 4 North, Range 27 East, W.M., to Baker Well No. 2 as described above, for the irrigation of 272.2 acres. (Spec. Or. V. 21, P.423)

Hydrograph:



Records of Wells Report Well Number 10 (4) (24) (53)

Owner: Sylvanus F. Hoyt Location: SW¼ NE¼, Sec. 28, T. 4 N., R. 27E

Depth: 126 feet. Diameter: 12 inches. Depth cased: 126 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1954

Yield: Reported to pump about 1250 gallons per minute.

Remarks: Hoyt Well No. 1

Generalized Log:

Gravel and boulders	0 - 38 feet
Clay	38 - 73 feet
Gravel	73 - 126 feet

Water Level:

Measured at 72.0 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 26193 with a priority of September 26, 1955 for the appropriation of 0.81 cubic foot per second for the irrigation of 64.6 acres.

Records of Wells Report Well Number 11

Owner: E. F. McDole Location: NW¼ SW¼, Sec. 33, T. 4N., R. 27E

Depth: 111 feet. Diameter: 12 inches. Depth cased: 83 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1956

Yield: Tested at 1000 gallons per minute

Remarks: McDole Well No. 3 (Abandoned)

Generalized Log:

No log

Water Level:

Measured at 71.9 feet below land surface 1/8/61

Description and status of water right:

Water Right Certificate 37054 with a priority of March 26, 1956 for the appropriation of 1.0 cubic feet per second for the irrigation of 80 acres. Water right transferred to Well No. 4 in 1965.

Records of Wells Report Well Number 12 (16-A) (25)

Owner: Georgia Bell Holzapfel Location: NE¼ NE¼, Sec. 32, T. 4 N., R. 27 E

Depth: 106 feet. Diameter: 16 inches. Depth cased: 100 feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1956

Yield: Tested at 1800 gallons per minute.

Remarks: Holzapfel Well No. 3

Generalized Log:

Sand	0 - 38 feet
Gravel	38 - 100 feet
Clay	100 - 106 feet

Water Level:

Reported at 68 feet below land surface 12/10/56

Description and status of water right:

Water Right Certificate 30119 with a priority of December 27, 1956 for the appropriation of 0.54 cubic foot per second for the irrigation of 43.3 acres.

Records of Wells Report Well Number 13

Owner: Clarence W. Ruddell Location: SW¼ NW¼, Sec. 30, T. 4 N., R. 27 E.

Depth: 79 feet. Diameter: 16 inches. Depth cased: 79 feet.

Approximate altitude of land surface at well: 548 ft. Year constructed: 1969

Yield: Tested at 2700 gallons per minute with 11 feet of drawdown.

Remarks: Ruddell Well No. 1

Generalized Log:

Sand	0 - 6 feet
Sand and gravel	6 - 79 feet
Basalt at	79 feet

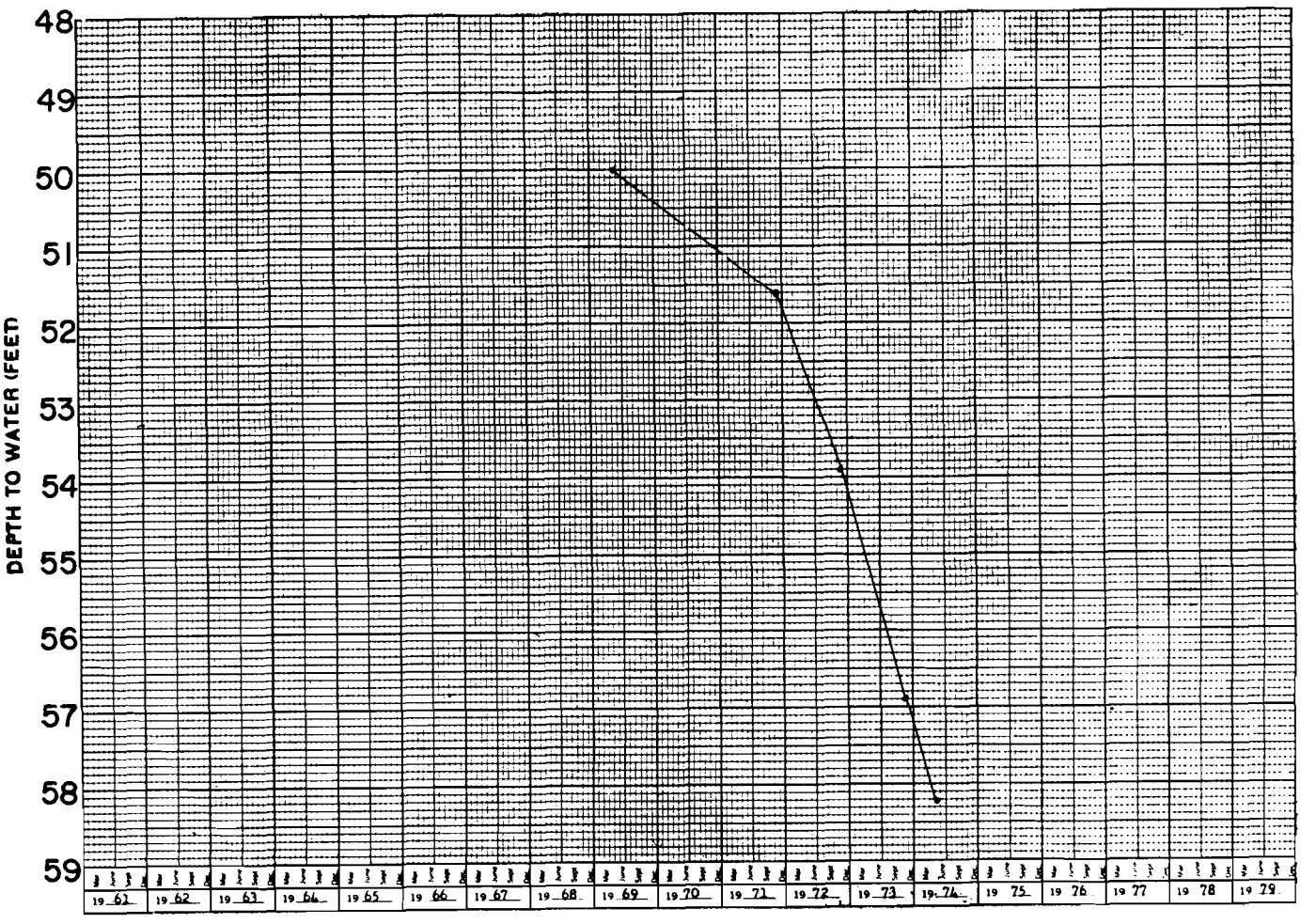
Water Level:

Reported at 50 feet below land surface 5/69

Description and status of water right:

Ground Water Permit G-2952 with a priority of June 19, 1958 for the appropriation of 4.19 cubic feet per second from two wells for the irrigation of 355.25 acres.

Hydrograph:



Records of Wells Report Well Number 13-A

Owner: Clarence W. Ruddell Location: NW¼ NE¼, Sec. 30, T. 4 N., R. 27 E.

Depth: 85 feet. Diameter: 16 inches. Depth cased: 85 feet.

Approximate altitude of land surface at well: 550 ft. Year constructed: 1969

Yield: Tested at 1850 gallons per minute with 5 feet of drawdown after 6 hours.

Remarks: Ruddell Well No. 2

Generalized Log:

Sand	0 - 6 feet
Sand and gravel	6 - 85 feet
Basalt at	85 feet

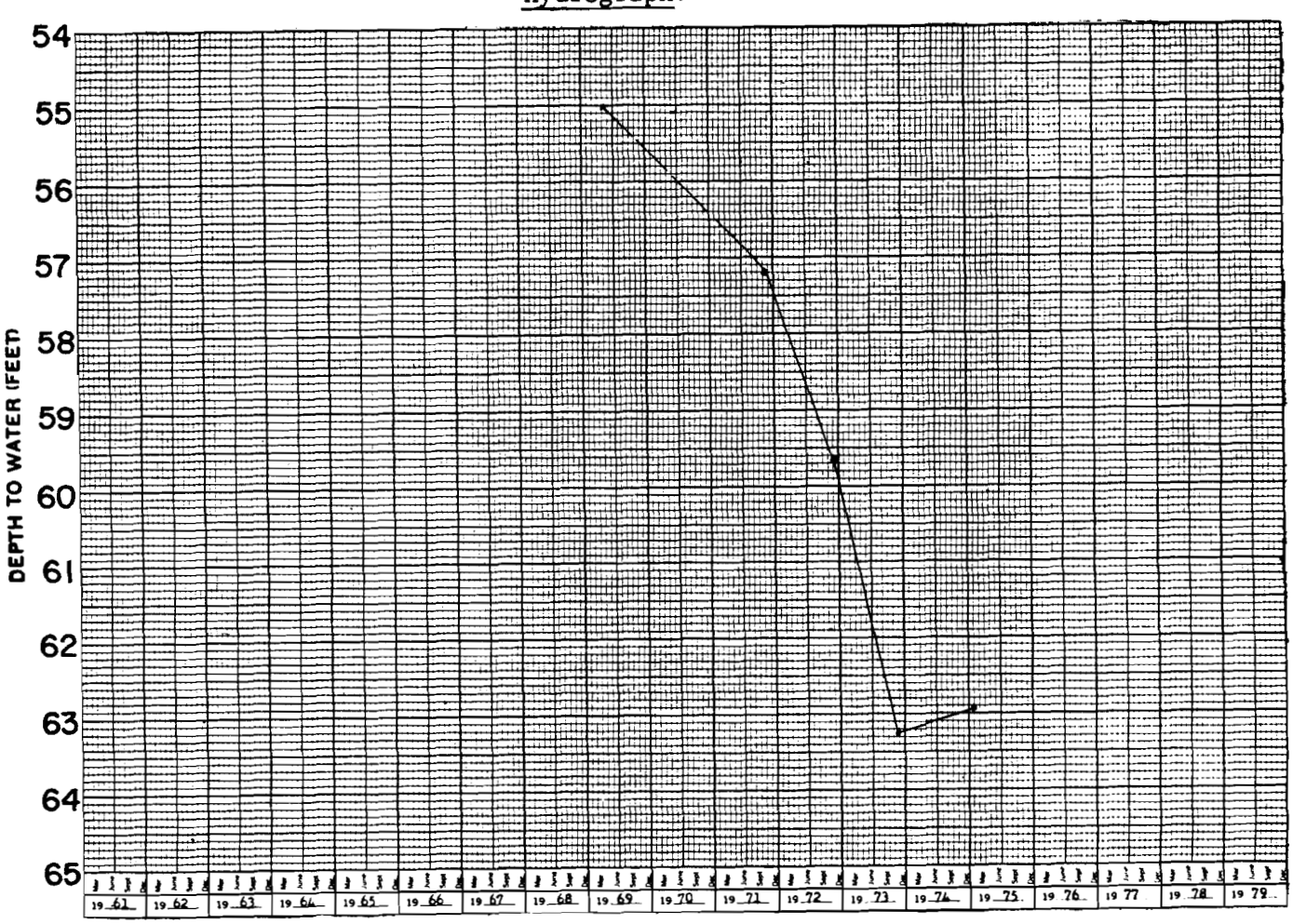
Water Level:

Reported at 55 feet below land surface 5/69

Description and status of water right:

Ground Water Permit G-2952 with a priority of June 19, 1958 for the appropriation of 4.19 cubic feet per second from two wells for the irrigation of 355.25 acres.

Hydrograph:



Records of Wells Report Well Number 14

Owner: Enriqueta S. Ruddell Location: SW¼ SW¼, Sec. 30, T. 4 N., R. 27 E.

Depth: 118 feet. Diameter: 16 inches. Depth cased: 118 feet.

Approximate altitude of land surface at well: 580 ft. Year constructed: 1969

Yield: Tested at 2400 gallons per minute with 4 feet of drawdown.

Remarks: E. Ruddell Well No. 1

Generalized Log:

Sand	0 - 6 feet
Sand and gravel	6 - 118 feet
Basalt at	118 feet

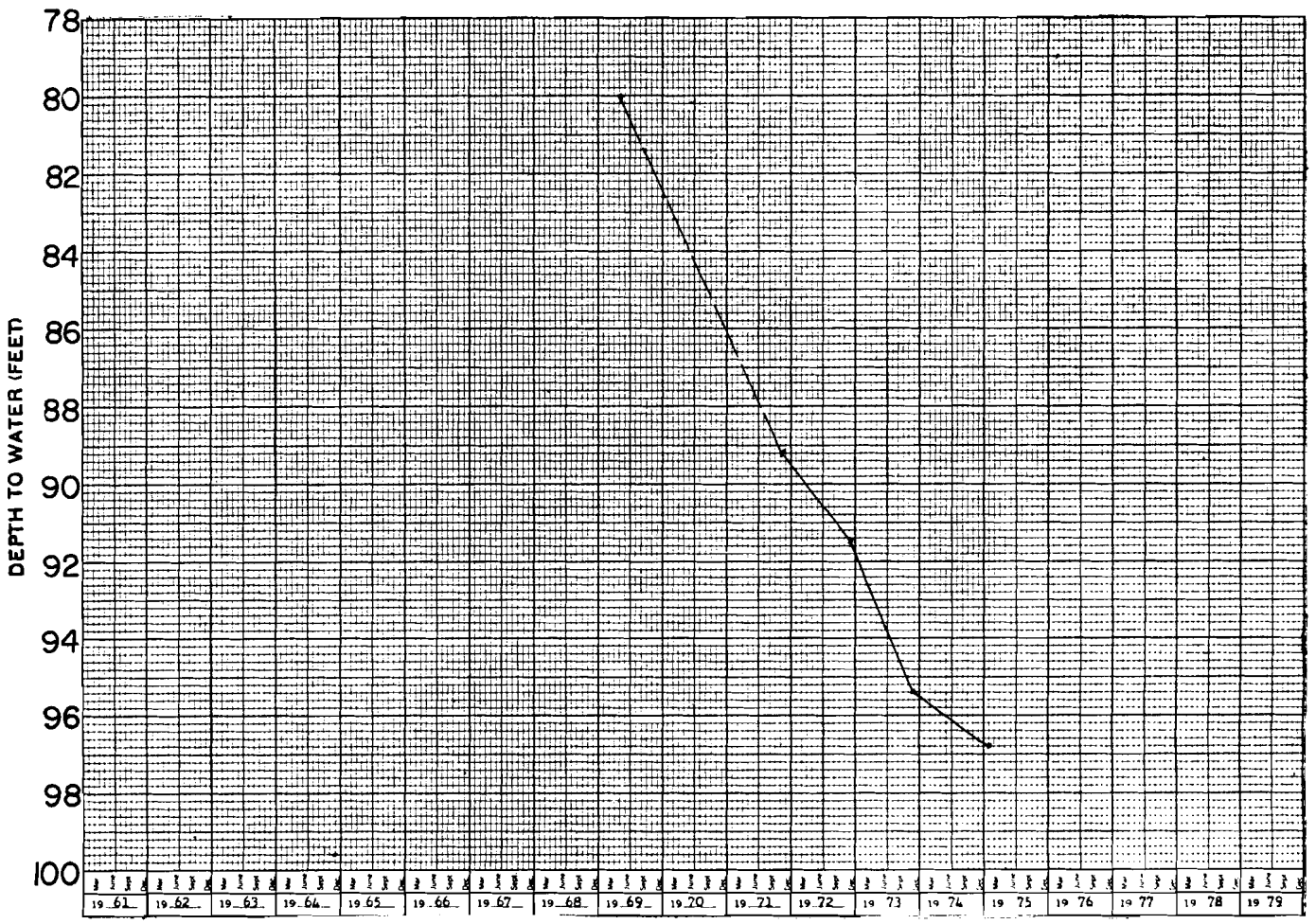
Water Level:

Reported at 80 feet below land surface 5/69

Description and status of water right:

Ground Water Permit G-2953 with a priority of June 19, 1958 for the appropriation of 4.20 cubic feet per second from 2 wells for the irrigation of 335.75 acres.

Hydrograph:



Records of Wells Report Well Number 14-A

Owner: Enriqueta S. Ruddell Location: SW¼ SE¼, Sec. 30, T. 4 N., R. 27E.

Depth: 115 feet. Diameter: 16 inches. Depth cased: 115 feet.

Approximate altitude of land surface at well: 565 ft. Year constructed: 1969

Yield: Tested at 2600 gallons per minute with 10 feet of drawdown.

Remarks: E. Ruddell Well No. 2

Generalized Log:

Sand	0 - 6 feet
Sand and gravel	6 - 115 feet
Basalt at	115 feet

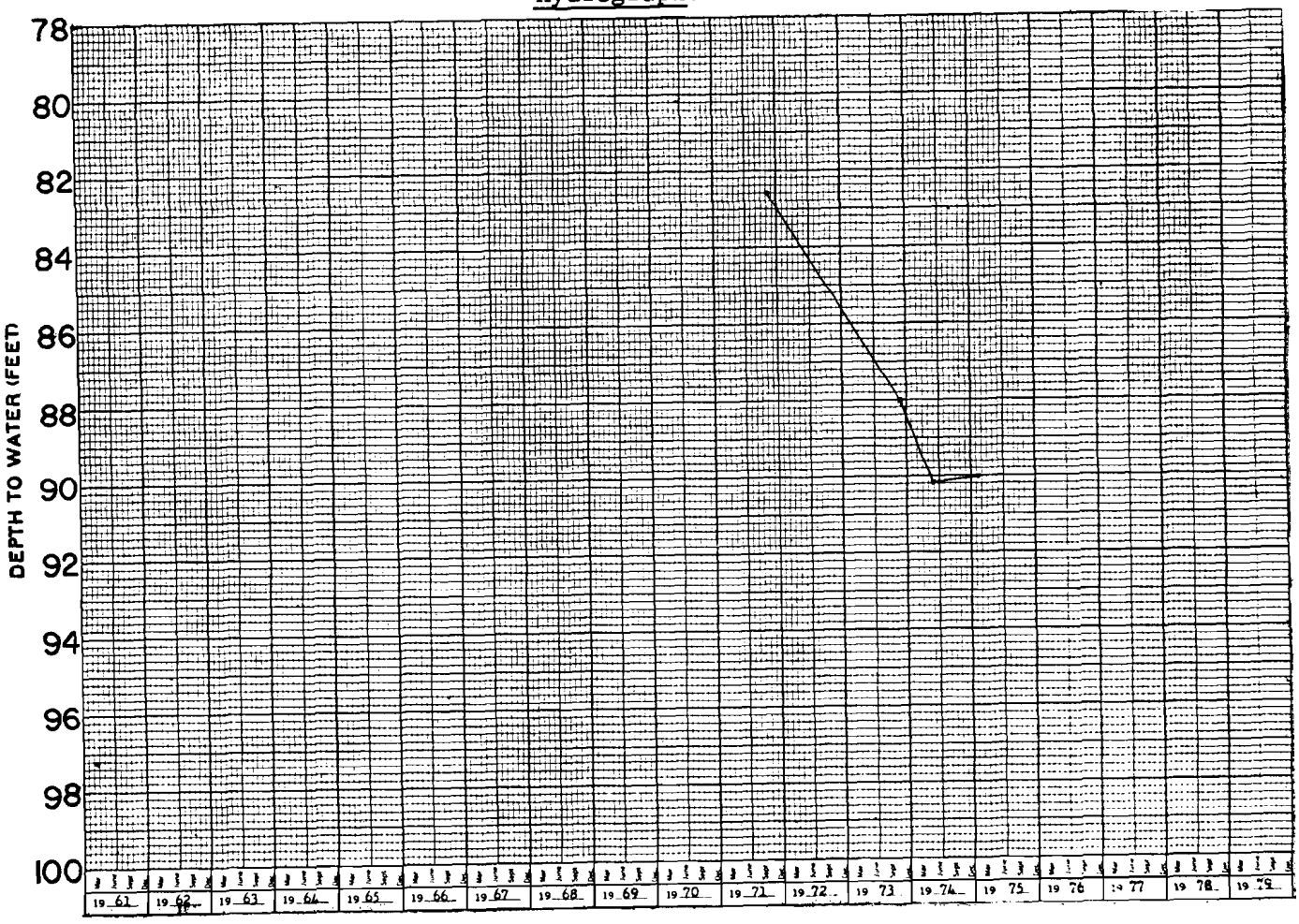
Water Level:

Reported to be 85 feet below land surface 5/69

Description and status of water right:

Ground Water Permit G-2953 with a priority of June 19, 1958 for the appropriation of 4.20 cubic feet per second from 2 wells for the irrigation of 335.75 acres.

Hydrograph:



Records of Wells

Report Well Number 15 (21-A)

Owner: Marvin M. McDole

Location: NW¼ NW¼, Sec. 34, T. 4 N., R. 27 E.

Depth: 97 feet. Diameter: 12 inches. Depth cased: 70 feet.

Approximate altitude of land surface at well: 565 ft. Year constructed: 1958

Yield: Tested at 1100 gallons per minute with no apparent drawdown.

Remarks: McDole Well No. 2 (Abandoned) (Destroyed 1974)

Generalized Log:

Silt	0 - 6 feet
Sand	6 - 31 feet
Gravel	31 - 70 feet
Clay	70 - 85 feet
Sandstone	85 - 97 feet

Water Level:

Reported at 55 feet below land surface 5/15/58

Description and status of water right:

Water Right Certificate 30133 with a priority of August 28, 1958 for the appropriation of 0.95 cubic feet per second for the irrigation of 76.2 acres.

Hydrograph:

Records of Wells Report Well Number 16 (5) (6) (8) (48)

Owner: Ray G. & Georgia B. Holzapfel Location: SW¼ NE¼, Sec. 32, T. 4 N., R.27 E.

Depth: 123 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 583 ft. Year constructed: 1954

Yield: Not reported.

Remarks: Holzapfel Well No. 1

Generalized Log:

Sandy loam	0 - 6 feet
Sand	6 - 36 feet
Gravel	36 - 100 feet
Gravel and clay	100 - 123 feet

Water Level:

Measured at 73.5 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 31098 with a priority of June 28, 1960 for the appropriation of 3.08 cubic feet per second from wells No. 1, 3, and 4 for the irrigation of 111.0 acres and the supplemental irrigation of 159.4 acres.

Records of Wells Report Well Number 16-A (12) (25)

Owner: Roy G. & Georgia B. Holzapfel Location: NE¼ NE¼, Sec. 32, T. 4 N., R. 27 E.

Depth: 106 feet. Diameter: 16 inches. Depth cased: 100 feet.

Approximate altitude of land surface at well: 567 ft. Year constructed: 1956

Yield: Tested at 960 gallons per minute with no apparent drawdown.

Remarks: Holzapfell Well No. 3

Generalized Log:

Sand	0 - 38 feet
Gravel	38 - 100 feet
Clay	100 - 106 feet

Water Level:

Reported at 65 feet below land surface 12/56

Description and status of water right:

Water Right Certificate 31098 with a priority of June 28, 1960 for the appropriation of 3.08 cubic feet per second from wells No. 1, 3, and 4 for the irrigation of 111.0 acres and the supplemental irrigation of 159.4 acres.

Records of Wells Report Well Number 16-A (12) (25)

Owner: Roy G. & Georgia B. Holzapfel Location: NE¼ NE¼, Sec. 32, T. 4 N., R. 27E

Depth: 106 feet. Diameter: 16 inches. Depth cased: 100 feet.

Approximate altitude of land surface at well: 567 ft. Year constructed: 1956

Yield: Tested at 1800 gallons per minute.

Remarks: Holzapfel Well No. 3

Generalized Log:

Sand	0 - 38 feet
Gravel	38 - 100 feet
Clay	100 - 106 feet

Water Level:

Reported at 65 feet below land surface 12/56

Description and status of water right:

Water Right Certificate 31098 with a priority of June 28, 1960 for the appropriation of 3.08 cubic feet per second from wells No. 1, 3, and 4 for the irrigation of 111.0 acres and the supplemental irrigation of 159.4 acres.

Records of Wells Report Well Number 16-B (25-A)

Owner: Roy G. and Georgia B. Holzapfel Location: NW¼ NE¼, Sec.32, T. 4 N., R.27 E.

Depth: 104 feet. Diameter: 16 inches. Depth cased: 103 feet.

Approximate altitude of land surface at well: 566 ft. Year constructed: 1960

Yield: Tested at 1800 gallons per minute with 10 feet of drawdown.

Remarks: Holzapfel Well No. 4

Generalized Log:

Sand and gravel 0 - 104 feet

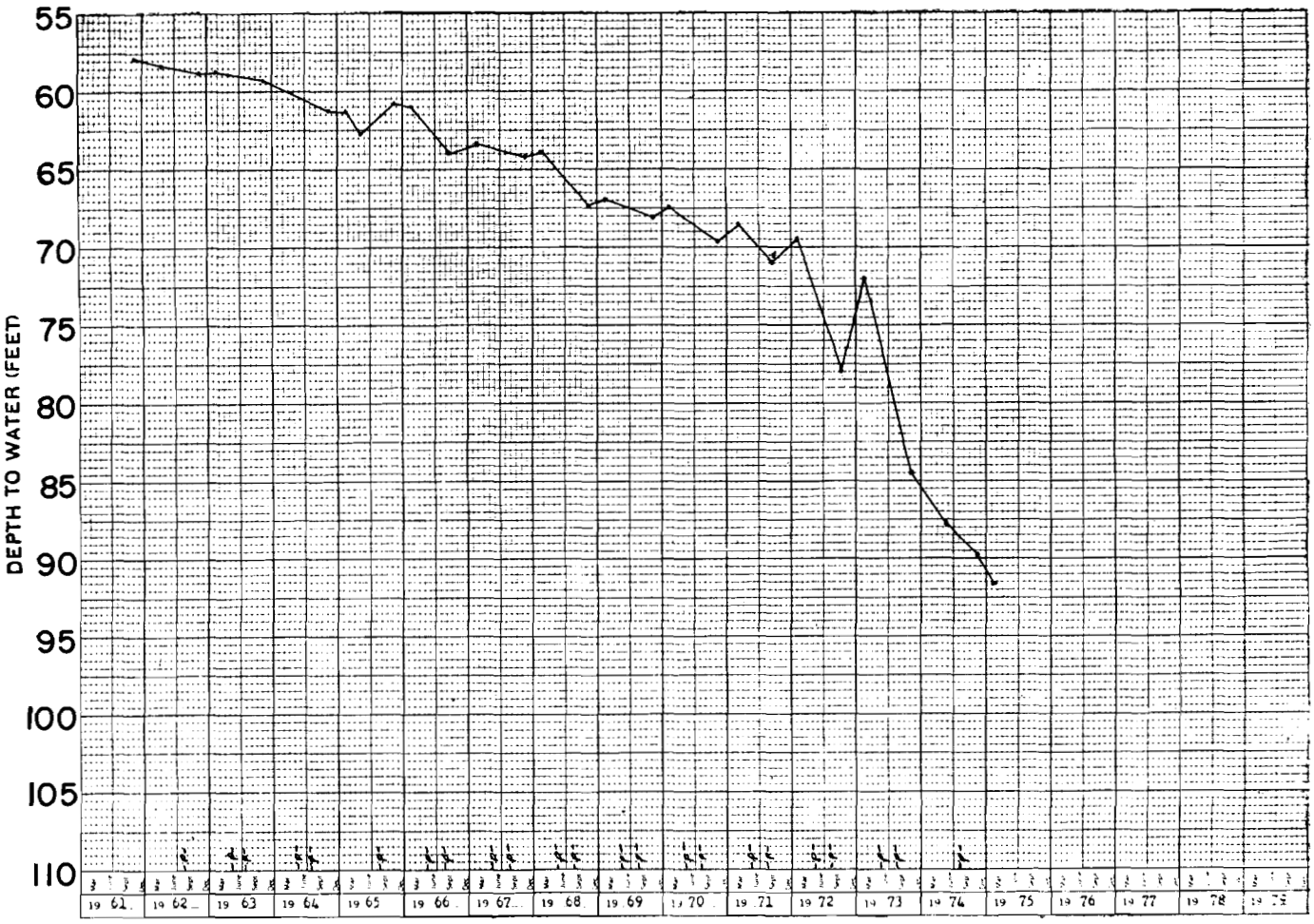
Water Level:

Measured at 57.6 feet below land surface 11/10/61

Description and status of water right:

Water Right Certificate 31098 with a priority of June 28, 1960 for the appropriation of 3.08 cubic feet per second from wells No. 1, 3, and 4 for the irrigation of 111.0 acres and the supplemental irrigation of 159.4 acres.

Hydrograph:



Records of Wells

Report Well Number 17 (20) (42)

Owner: Hansell Bros., Inc. Location: SW¼ NW¼, Sec. 26, T. 4 N., R.27 E.

Depth: 108 feet. Diameter: 16 inches. Depth cased: 108 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1960

Yield: Tested at 2500 gallons per minute.

Remarks: Williams Well No. 1

Generalized Log:

Soil	0 - 5 feet
Cemented gravel	5 - 12 feet
Gravel	12 - 108 feet

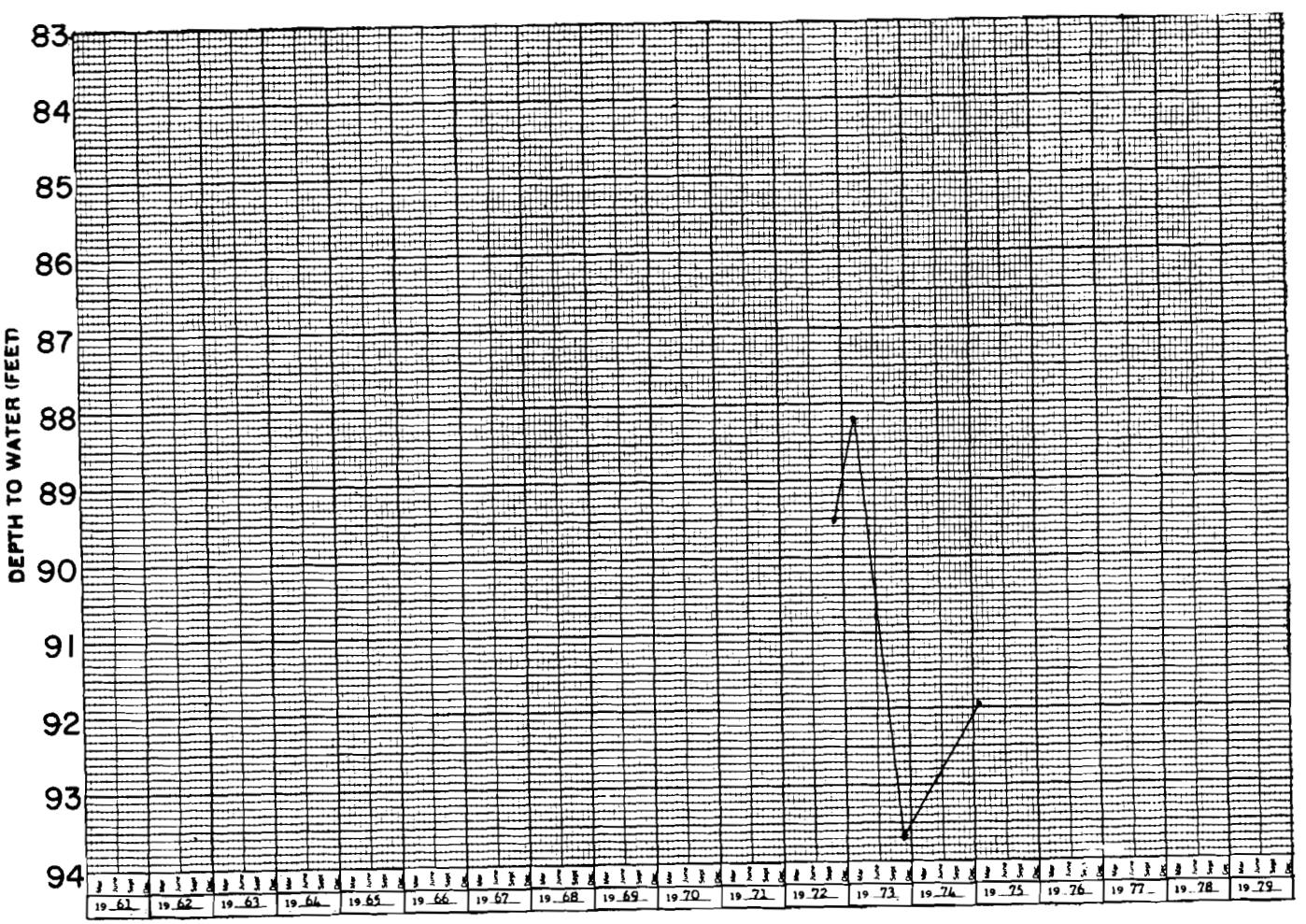
Water Level:

Measured at 73.0 feet below land surface 11/8/61

Description and status of water right:

Permit G-2335 with a priority of January 10, 1963 for the appropriation of 1.32 cubic feet per second for the irrigation of 105.4 acres.

Hydrograph:



Records of Wells Report Well Number 18 (32)

Owner: Thomas E. Huddleston Location: NW¼ SW¼, Sec. 18, T. 4 N., R. 28 E

Depth: 93 feet. Diameter: 16 inches. Depth cased: 90 feet.

Approximate altitude of land surface at well: 545 ft. Year constructed: 1964

Yield: Tested at 1300 gallons per minute with 8 feet of drawdown.

Remarks: Huddleston Well No. 1

Generalized Log:

Sand and silt	0 - 4 feet
Cemented sand and gravel	4 - 30 feet
Sand and gravel	30 - 60 feet
Coarse sand with gravel	60 - 76 feet
Gravel	76 - 90 feet
Basalt	90 - 93 feet

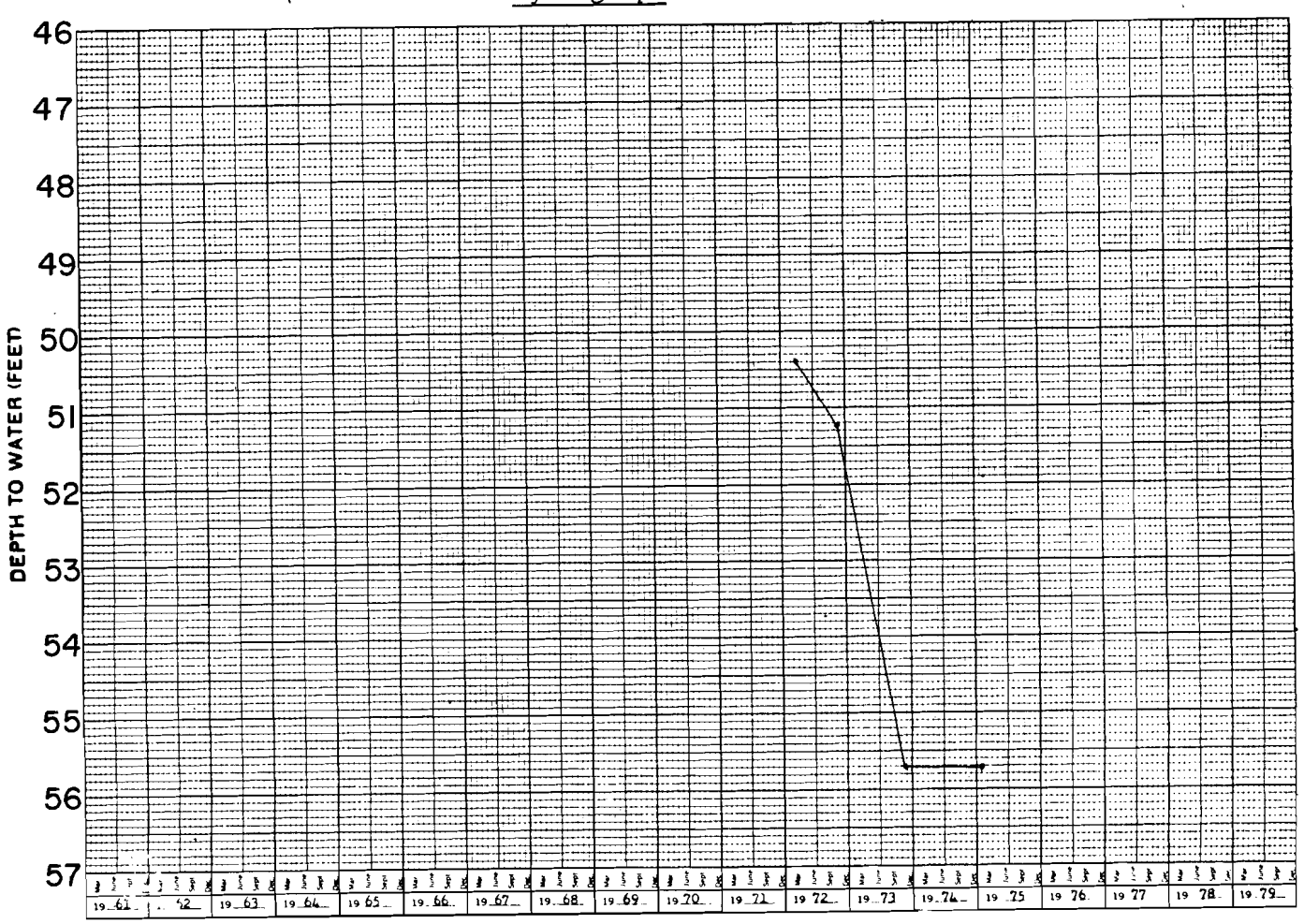
Water Level:

Reported to be 44 feet below land surface 1/9/64

Description and status of water right:

Water Right Certificate 34586 with a priority of January 21, 1964 for the appropriation of 2.34 cubic feet per second for the irrigation of 105.1 acres and the supplemental irrigation of 82.1 acres.

Hydrograph:



Records of Wells

Report Well Number 19 (35)

Owner: Malcolm Skinner

Location: NW¼ SE¼, Sec. 13, T. 4 N., R. 27 E.

Depth: 97 feet. Diameter: 16 inches. Depth cased: 97 feet.

Approximate altitude of land surface at well: 567 ft. Year constructed: 1964

Yield: Tested at 1000 gallons per minute with 15 feet of drawdown.

Remarks:

Generalized Log:

Sand and silt	0 - 4 feet
Sand and gravel	4 - 25 feet
Sand and gravel with interbedded clay	25 - 60 feet
Sand and gravel	60 - 70 feet
Sand	70 - 76 feet
Clay with gravel	76 - 81 feet
Gravel	81 - 97 feet

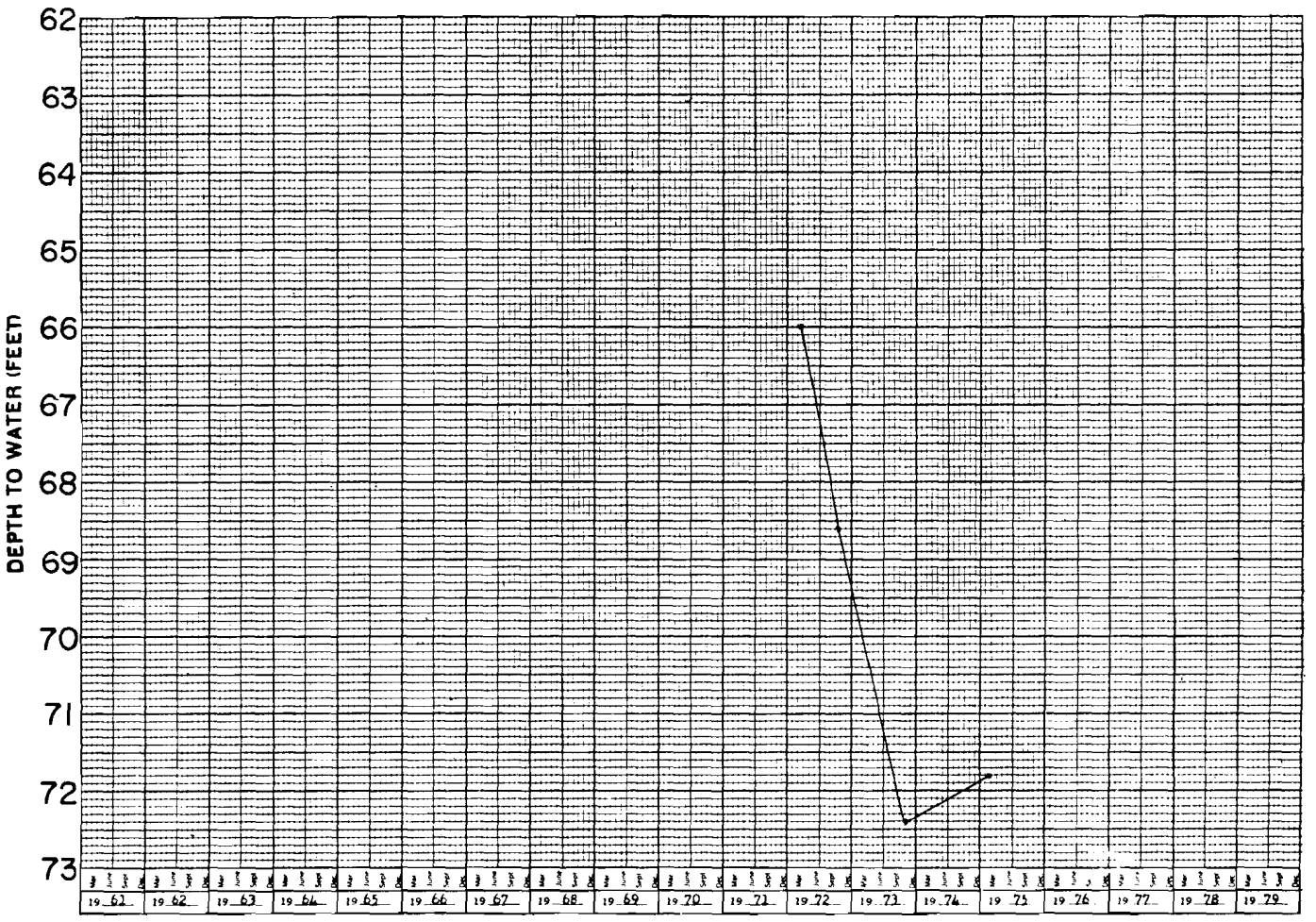
Water Level:

Reported at 60 feet below land surface 1/64

Description and status of water right:

Water Right Certificate 35784 with a priority of March 20, 1964 for the appropriation of 1.93 cubic feet per second for the irrigation of 154.3 acres.

Hydrograph:



Records of Wells Report Well Number 20 (17) (42)

Owner: Hansell Bros., Inc. Location: SW¼ NW¼, Sec. 26, T. 4 N., R. 27 E.

Depth: 108 feet. Diameter: 16 inches. Depth cased: 108 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1960

Yield: Tested at 2500 gallons per minute.

Remarks: Williams Well No. 1

Generalized Log:

Soil	0 - 5 feet
Cemented gravel	5 - 12 feet
Gravel	12 - 108 feet

Water Level:

Measured at 73.0 feet below land surface 11/8/61

Description and status of water right:

Permit G-2694 with a priority of March 31, 1964 for the appropriation of 3.24 cubic feet per second for the irrigation of 259.3 acres.

Records of Wells Report Well Number 21 (1)

Owner: Frances F. McDole Location: SE¼ NE¼, Sec. 33, T. 4 N., R. 27 E.

Depth: 96 feet. Diameter: 12 inches. Depth cased: 96 feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: 1950

Yield: Reportedly tested at 1000 gallons per minute.

Remarks: McDole Well No. 1

Generalized Log:

Sand	0 - 36 feet
Gravel	36 - 65 feet
Sand and gravel	65 - 95 feet
Clay	95 - 96 feet

Water Level:

Measured at 63 feet below land surface on 12/1/54

Description and status of water right:

Permit G-2822 with a priority of April 10, 1964 for the appropriation of 4.82 cubic feet per second from wells No. 1, 2, and 3 for the irrigation of 393.3 acres.

Records of Wells Report Well Number 21-A (15)

Owner: Frances F. McDole Location: NW¼ NW¼, Sec. 34, T. 4 N., R. 27 E.

Depth: 97 feet. Diameter: 12 inches. Depth cased: 70 feet.

Approximate altitude of land surface at well: 565 ft. Year constructed: 1958

Yield: Tested at 1100 gallons per minute with no apparent drawdown.

Remarks: McDole Well No. 2 (Abandoned)

Generalized Log:

Silt	0 - 6 feet
Sand	6 - 31 feet
Gravel	31 - 70 feet
Clay	70 - 85 feet
Sandstone	85 - 97 feet

Water Level:

Reported at 55 feet below land surface 5/15/58

Description and status of water right:

Permit G-2822 with a priority of April 10, 1964 for the appropriation of 4.82 cubic feet per second from wells No. 1, 2, and 3 for the irrigation of 393.3 acres.

Records of Wells Report Well Number 21-B

Owner: Frances F. McDole Location: NE¼ NW¼, Sec. 34, T. 4 N., R. 27 E.

Depth: Rpt. 125 feet. Diameter: NR inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: NR

Yield: Not reported.

Remarks: McDole Well No. 3 (Abandoned) (Destroyed 1974)

Generalized Log:

No log

Water Level:

Measured at 56.03 feet below land surface 12/9/71
Measured at 58.88 feet below land surface 12/4/73

Description and status of water right:

Permit G-2822 with a priority of April 10, 1964 for the appropriation of 4.82 cubic feet per second from wells No. 1, 2, and 3 for the irrigation of 393.3 acres.

Records of Wells Report Well Number 22

Owner: E. F. McDole Location: NW¼ SW¼, Sec. 33, T. 4 N., R. 27 E.

Depth: 97 feet. Diameter: 12 inches. Depth cased: 97 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1965

Yield: Tested at 1300 gallons per minute with 1½ feet of drawdown.

Remarks: McDole Well No. 4

Generalized Log:

Sand	0 - 37 feet
Gravel	37 - 97 feet

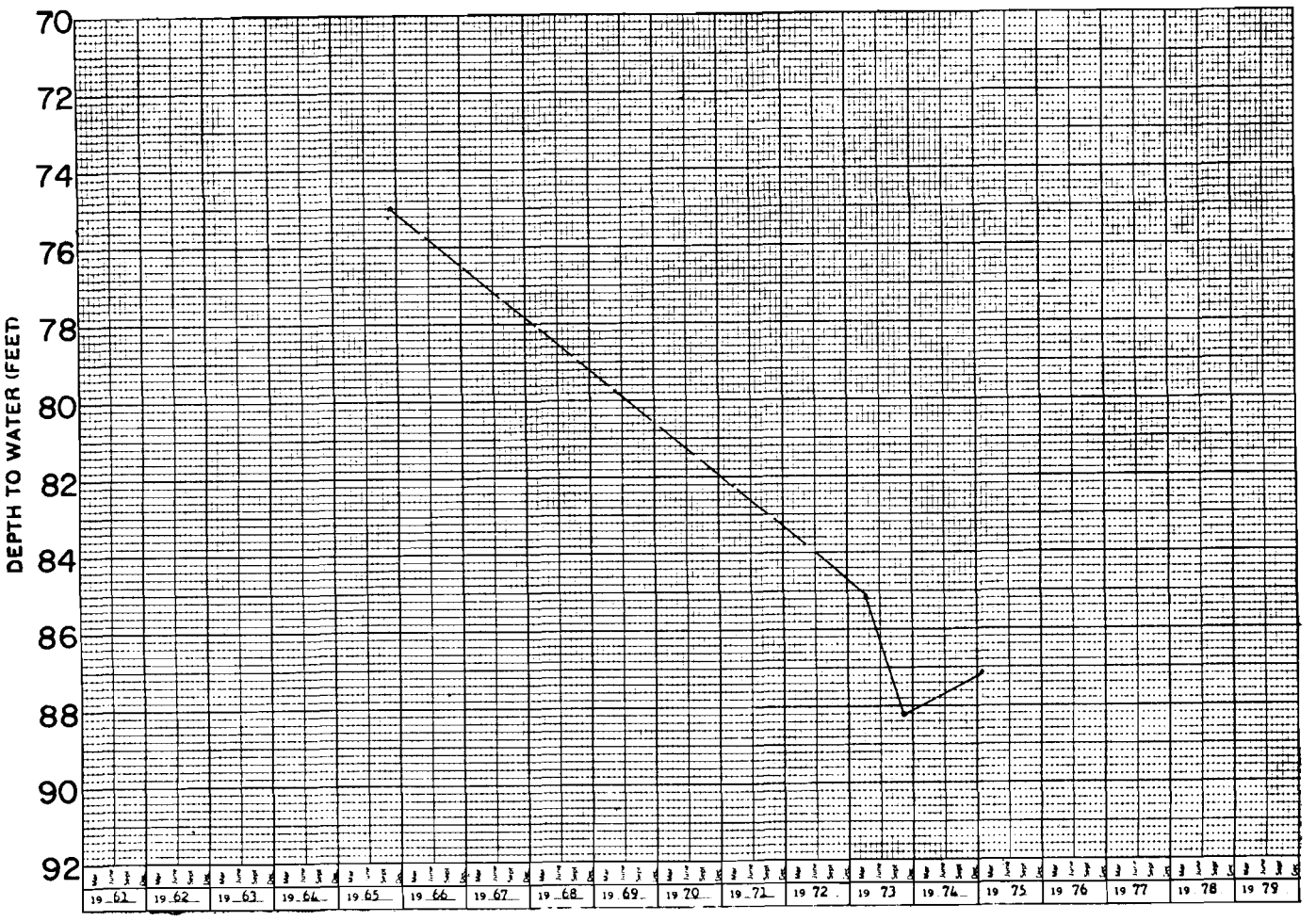
Water Level:

Reported to be at 75 feet below surface on 12/15/65

Description and status of water right:

Water Right Certificate 34281 with a priority of February 4, 1965 for the appropriation of 1.0 cubic feet per second for the irrigation of 80.0 acres.

Hydrograph:



Records of Wells Report Well Number 23

Owner: Clark and Bernice Key Location: SE¼ NE¼, Sec. 4, T. 3N., R. 27E.

Depth: 80 feet. Diameter: 10 inches. Depth cased: 80 feet.

Approximate altitude of land surface at well: 568 ft. Year constructed: 1963

Yield: Tested at 100 gallons per minute with 10 feet of drawdown.

Remarks: Key Well No. 1

Generalized Log:

Soil	0 - 5 feet
Sand and gravel	5 - 40 feet
Clay and gravel	40 - 80 feet

Water Level:

Reported to be 40 feet below land surface 5/5/63

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Records of Wells Report Well Number 23-A

Owner: Clark and Bernice Key Location: SE¼ NE¼, Sec. 4, T. 3 N., R. 27 E.

Depth: 88 feet. Diameter: 12 inches. Depth cased: 88 feet.

Approximate altitude of land surface at well: 579 ft. Year constructed: 1965

Yield: Tested at 500 gallons per minute with 25 feet of drawdown.

Remarks: Key Well No. 2

Generalized Log:

Soil	0 - 5 feet
Sand and gravel	5 - 30 feet
Clay and gravel	30 - 60 feet
Sand	60 - 70 feet
Clay	70 - 88 feet

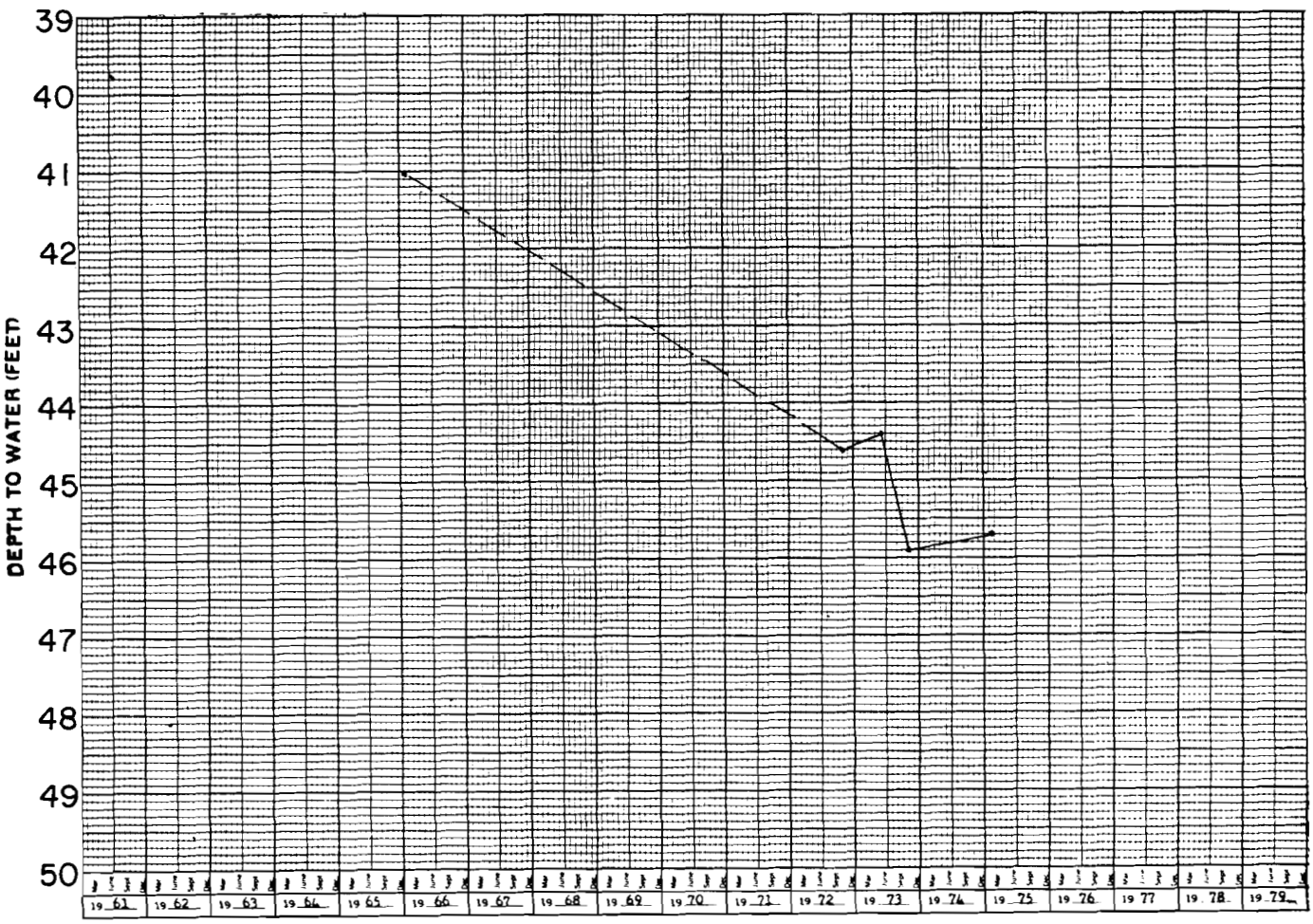
Water Level:

Reported to be 46 feet below land surface 4/10/65

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Hydrograph:



Records of Wells Report Well Number 23-B

Owner: Clark and Bernice Key Location: SE¼ NW¼, Sec. 4, T. 3 N., R. 27 E.

Depth: 108 feet. Diameter: 20 inches. Depth cased: 65 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1963

Yield: Tested at 400 gallons per minute with 30 feet of drawdown.

Remarks: Key Well No. 3 (Abandoned - open casing)

Generalized Log:

Soil	0 - 5 feet
Sand and gravel	5 - 30 feet
Clay and gravel	30 - 70 feet
Gravel	70 - 80 feet
Clay	80 - 108 feet

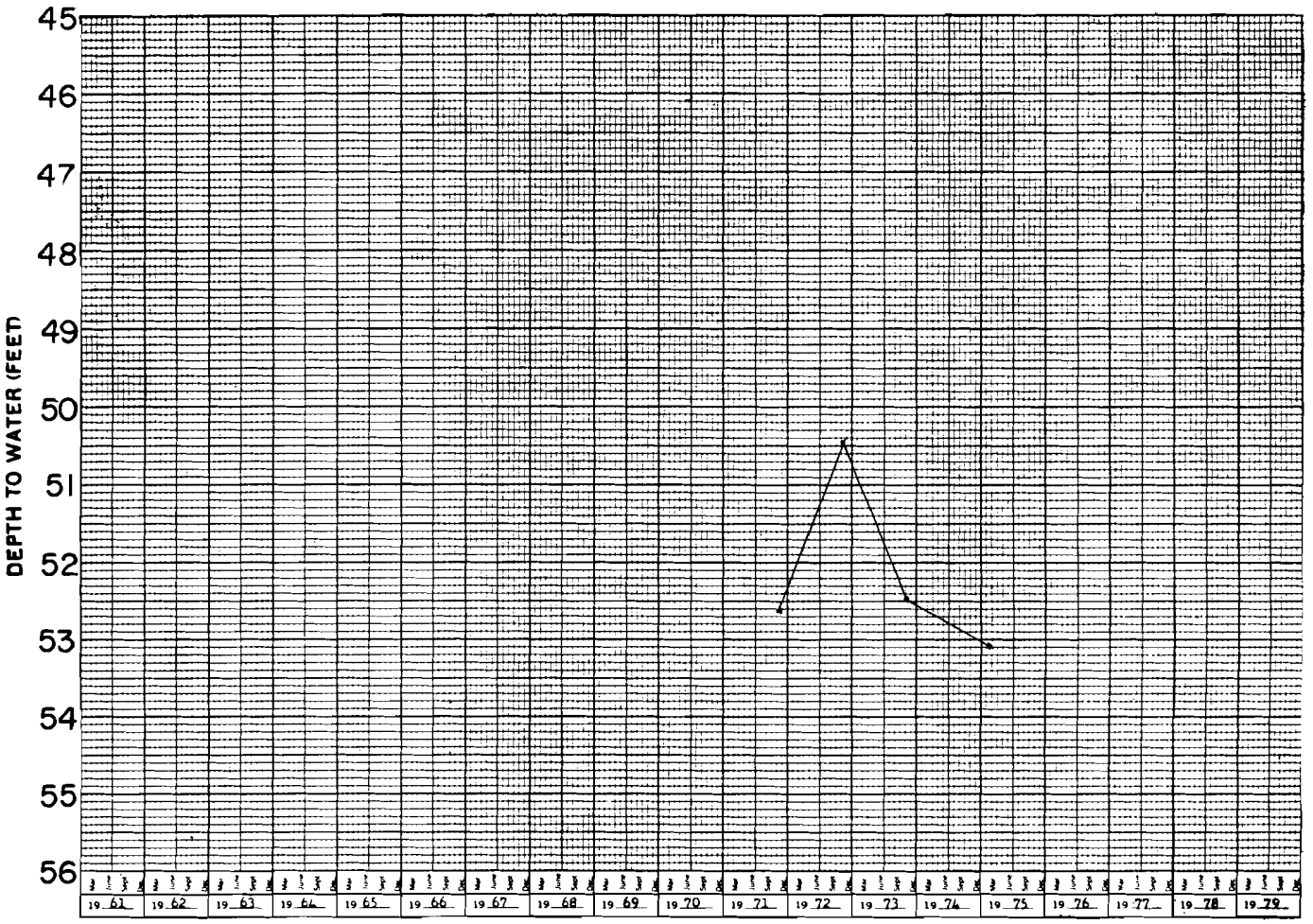
Water Level:

Reported to be 56 feet below land surface 8/63

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Hydrograph:



Records of Wells Report Well Number 23-C

Owner: Clark and Bernice Key Location: SW¼ NW¼, Sec. 4, T. 3 N., R. 27 E.

Depth: 112 feet. Diameter: 10 inches. Depth cased: 112 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1962

Yield: Tested at 200 gallons per minute with 30 feet of drawdown.

Remarks: Key Well No. 4 (Abandoned - open casing)

Generalized Log:

Soil	0 - 5 feet
Sand and gravel	5 - 20 feet
Clay and sand	20 - 40 feet
Sand and gravel	40 - 70 feet
Sand and clay	70 - 112 feet

Water Level:

Reported to be 60 feet below land surface 8/62

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Records of Wells Report Well Number 23-D

Owner: Clark and Bernice Key Location: SE¼ NE¼, Sec. 5, T. 3 N., R. 27 E.

Depth: 400 feet. Diameter: 20 inches. Depth cased: 20"-0 to 60 16"-60 to 100 feet.

Approximate altitude of land surface at well: 595 ft. Year constructed: 1966

Yield: Tested at 350 gallons per minute with 200 feet of drawdown.

Remarks: Key Well No. 5

Generalized Log:

Soil	0 - 5 feet
Sand and gravel	5 - 50 feet
Clay	50 - 80 feet
Sand	80 - 90 feet
Clay	90 - 114 feet
Basalt with clay interbeds	114 - 400 feet

Water Level:

Reported to be 72 feet below land surface 3/66

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Records of Wells Report Well Number 23-E

Owner: Clark and Bernice Key Location: SW¼ NE¼, Sec. 5, T. 3N., R. 27E.

Depth: 200 feet. Diameter: 10 inches. Depth cased: 190* feet.

Approximate altitude of land surface at well: 598 ft. Year constructed: 1964

Yield: Tested at 200 gallons per minute with 80 feet of drawdown.

Remarks: Key Well No. 6

Generalized Log:

Soil	0 - 5 feet
Sand and gravel	5 - 50 feet
Clay	50 - 70 feet
Sand and gravel	70 - 90 feet
Clay	90 - 100 feet
Sand and gravel	100 - 150 feet
Basalt	150 - 200 feet

Water Level:

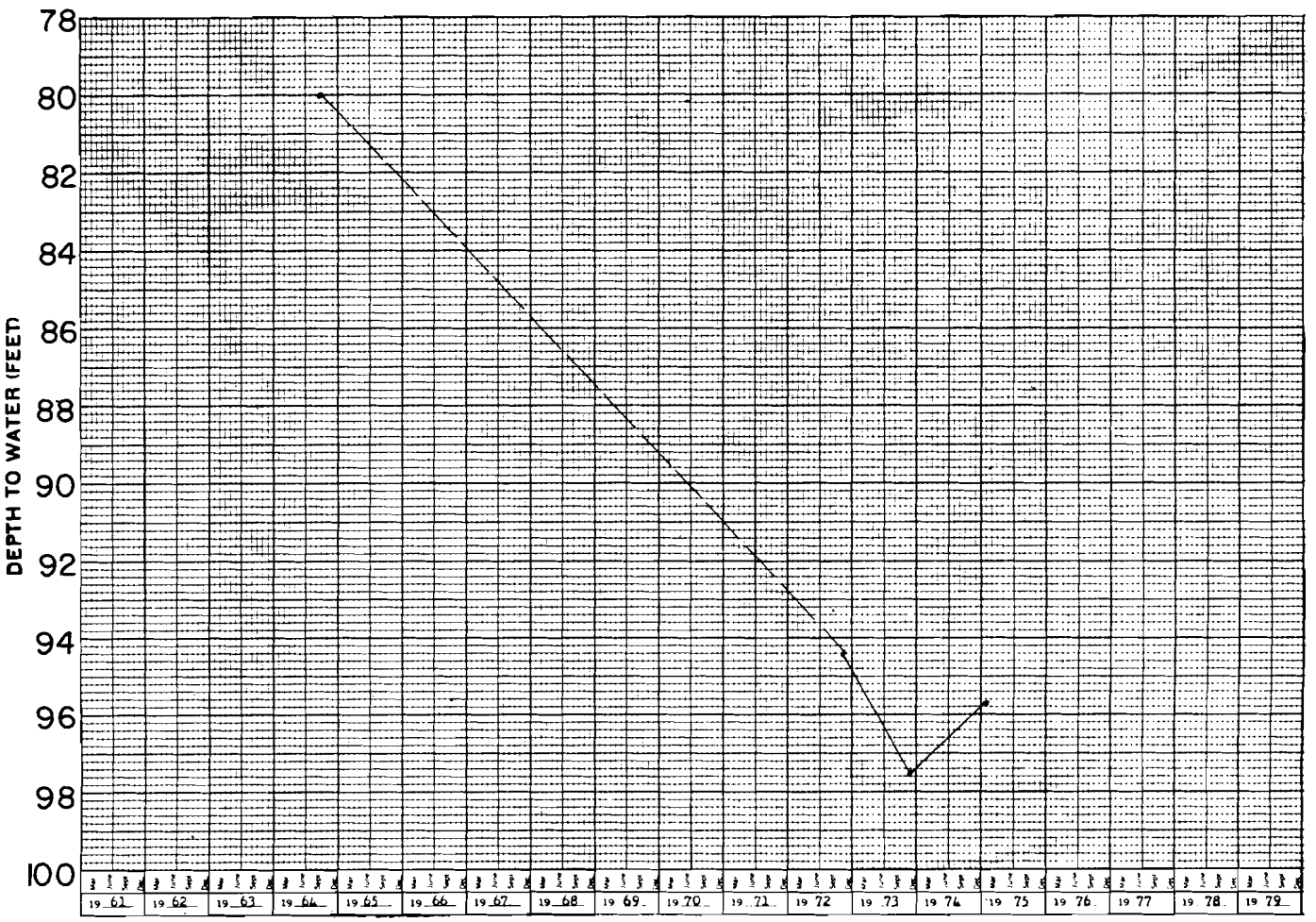
Reported to be 80 feet below land surface 8/20/64

*Casing perforated from 60 to 190 feet

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Hydrograph:



Records of Wells Report Well Number 23-F

Owner: Clark and Bernice Key Location: SE¼ NW¼, Sec. 5, T. 3 N., R. 27 E.

Depth: 145 feet. Diameter: 10 inches. Depth cased: 70 feet.

Approximate altitude of land surface at well: 595 ft. Year constructed: 1964

Yield: Tested at 200 gallons per minute with 80 feet of drawdown.

Remarks: Key Well No. 7

Generalized Log:

Soil	0 - 5 feet
Sand and gravel	5 - 40 feet
Clay	40 - 90 feet
Gravel	90 - 92 feet
Clay	92 - 110 feet
Basalt	110 - 145 feet

Water Level:

Reported to be 95 feet below land surface 10/10/64

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Records of Wells Report Well Number 23-G

Owner: Clark and Bernice Key Location: SW¼ NW¼, Sec. 5, T. 3 N., R. 27 E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 605 ft. Year constructed: -

Yield: -

Remarks: Key Well No. 8 (Abandoned)

Generalized Log:

No log

Description and status of water right:

Permit G-2823 with a priority of April 27, 1965 for the appropriation of 4.0 cubic feet per second from 8 wells for the irrigation of 320.0 acres.

Records of Wells Report Well Number 24 (10) (4) (53)

Owner: Hansell Bros., Inc. Location: SW¼ NE¼, Sec. 28, T. 4 N., R. 27 E.

Depth: 126 feet. Diameter: 12 inches. Depth cased: 126 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1954

Yield: Reported to pump about 1250 gallons per minute.

Remarks: Hoyt Well No. 1

Generalized Log:

Gravel and boulders	0 - 38 feet
Clay	38 - 73 feet
Gravel	73 - 126 feet

Water Level:

Measured at 72.0 feet below land surface 11/10/61

Description and status of water right:

Permit G-3197 with a priority of May 16, 1966 for the appropriation of 2.60 cubic feet per second from 2 wells for the irrigation of 136.8 acres.

Records of Wells

Report Well Number 24-A (53-A)

Owner: Hansell Bros., Inc. Location: SE¼ SE¼, Sec. 28, T. 4 N., R. 27E

Depth: 127 feet. Diameter: 16 inches. Depth cased: 127 feet.

Approximate altitude of land surface at well: 565 ft. Year constructed: 1966

Yield: Tested at 3000 gallons per minute with 58 feet of drawdown.

Remarks: Hansell Well No. B-2 (Braat Well No. 2)

Generalized Log:

Sandy soil	0 - 26 feet
Clay and gravel	26 - 58 feet
Gravel	58 - 105 feet
Clay and gravel	105 - 114 feet
Cemented gravel	114 - 127 feet

*Deepened from 100 feet to 127 feet 10/71

Water Level:

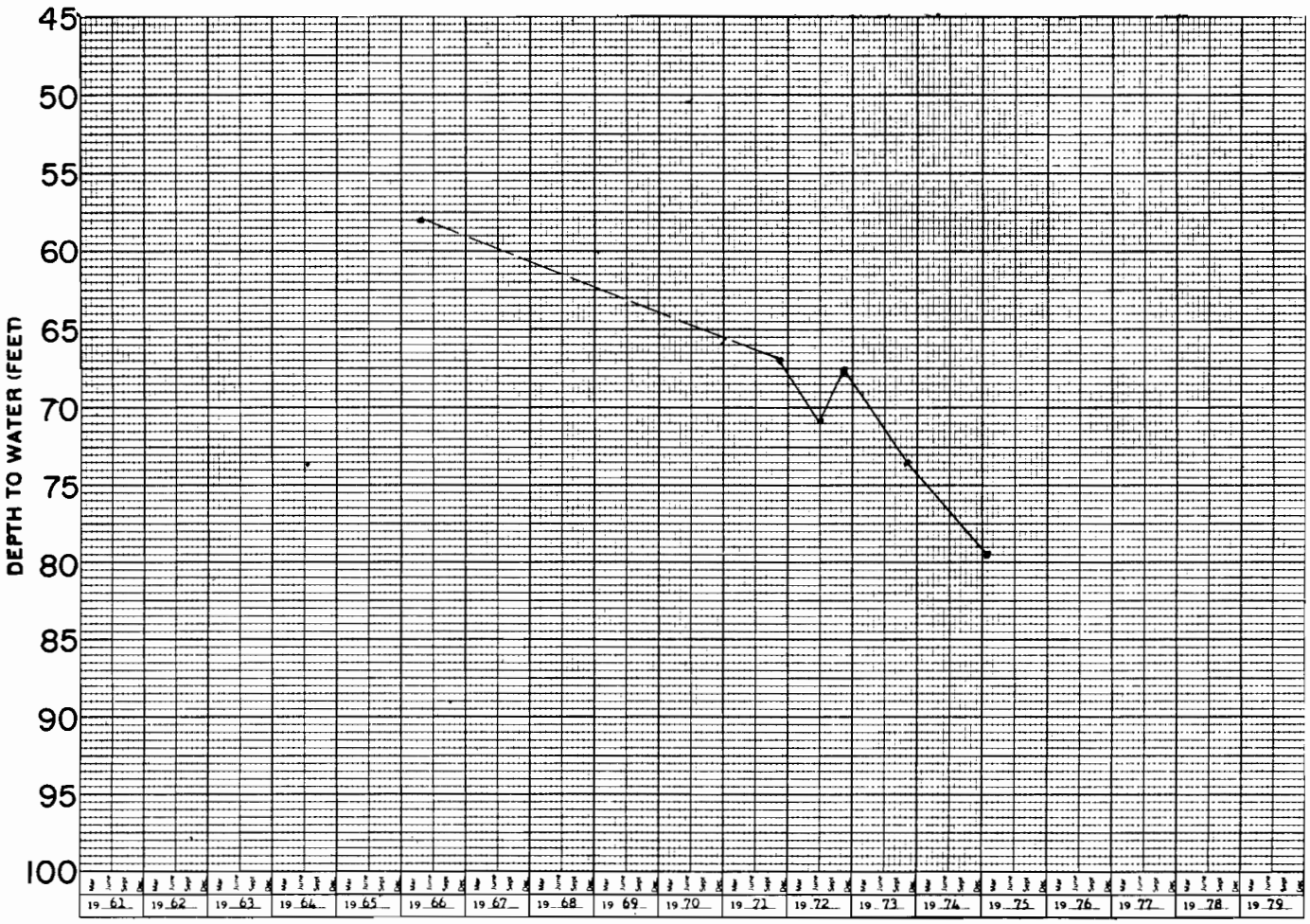
Reported to be 58 feet below land surface 4/4/66

Reported to be 67 feet below land surface 10/13/71

Description and status of water right:

Permit G-3197 with a priority of May 16, 1966 for the appropriation of 2.60 cubic feet per second from 2 wells for the irrigation of 136.8 acres.

Hydrograph:



Records of Wells Report Well Number 25 (12) (16-A)

Owner: Roy Gail Holzapfel Location: NE¼ NE¼, Sec. 32, T. 4 N., R. 27 E.

Depth: 106 feet. Diameter: 16 inches. Depth cased: 100 feet.

Approximate altitude of land surface at well: 568 ft. Year constructed: 1956

Yield: Tested at 1800 gallons per minute with no apparent drawdown.

Remarks: Holzapfel Well No. 3

Generalized Log:

Sand	0 - 38 feet
Gravel	38 - 100 feet
Clay	100 - 106 feet

Water Level:

Reported to be 65 feet below land surface 12/56

Description and status of water right:

Permit G-3629 with a priority of March 20, 1967 for the appropriation of 2.0 cubic feet per second from wells No. 3 and 4 for the irrigation of 160.0 acres.

Records of Wells Report Well Number 25-A (16-B)

Owner: Roy Gail Holzapfel Location: NW¼ NE¼, Sec. 32, T. 4 N., R. 27 E.

Depth: 104 feet. Diameter: 16 inches. Depth cased: 103 feet.

Approximate altitude of land surface at well: 566 ft. Year constructed: 1960

Yield: Tested at 1800 gallons per minute with 10 feet of drawdown.

Remarks: Holzapfel Well No. 4

Generalized Log:

Sand and gravel	0 - 104 feet

Water Level:

Reported to be 60 feet below land surface 5/60
Measured at 57.6 feet below land surface 11/10/61

Description and status of water right:

Permit G-3629 with a priority of March 20, 1967 for the appropriation of 2.0 cubic feet per second from wells No. 3 and 4 for the irrigation of 160.0 acres.

Records of Wells Report Well Number 26

Owner: David C. Ralston Location: SW¼ NE¼, Sec. 8, T. 4 N., R. 28 E.

Depth: 14 feet. Diameter: 24 inches. Depth cased: 14 feet.

Approximate altitude of land surface at well: 508 ft. Year constructed: NR

Yield: Not reported.

Remarks: Shallow dug well

Generalized Log:

Not reported

Description and status of water right:

Water Right Certificate 38390 with a priority of July 13, 1967 for the appropriation of 0.06 cubic foot per second for the irrigation of 4.7 acres.

Records of Wells Report Well Number 27

Owner: Edgar Bloom Location: SE¼ SE¼, Sec. 19, T. 4N., R. 28E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 520 ft. Year constructed: NR

Yield: Not reported.

Remarks: Sump

Generalized Log:

Sump: No log

Water Level:

Measured at 6.68 feet below land surface 3/8/72
Measured at 4.10 feet below land surface 1/8/75

Description and status of water right:

Water Right Certificate with a priority of September 13, 1967 for the appropriation of 0.27 cubic feet per second for the supplemental irrigation of 21.6 acres.

Records of Wells Report Well Number 28

Owner: Dwight H. Hulet (Rpt) Location: NW¼ NE¼, Sec. 36, T. 4 N., R. 27 E.

Depth: 117 feet. Diameter: 6 inches. Depth cased: 117 feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: 1948

Yield: 100 gallons per minute (Reported)

Remarks: Hulet Well No. 1

Generalized Log:

No log

Description and status of water right:

Permit G-3702 with a priority of October 4, 1967 for the appropriation of 1.86 cubic feet per second from 4 wells for the irrigation of 149.8 acres.

Records of Wells Report Well Number 28-A

Owner: Dwight H. Hulet (Rpt) Location: NW¼ NE¼, Sec. 36, T. 4 N., R. 27 E.

Depth: 187 feet. Diameter: 8 inches. Depth cased: 100 feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: 1962

Yield: 200 gallons per minute (reported).

Remarks: Hulet Well No. 2

Generalized Log:

No log

Water Level:

Measured at 52.16 feet below land surface 12/10/71
Measured at 53.77 feet below land surface 12/5/73

Description and status of water right:

Permit G-3702 with a priority of October 4, 1967 for the appropriation of 1.86 cubic feet per second from 4 wells for the irrigation of 149.8 acres.

Records of Wells Report Well Number 28-B

Owner: Dwight H. Hulet Location: NE¼ NE¼, Sec. 36, T. 4 N., R. 27 E.

Depth: 213 (Rpt) feet. Diameter: 8 inches. Depth cased: 80 feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1951 or 1952

Yield: 300 gallons per minute (Reported).

Remarks: Hulet Well No. 3

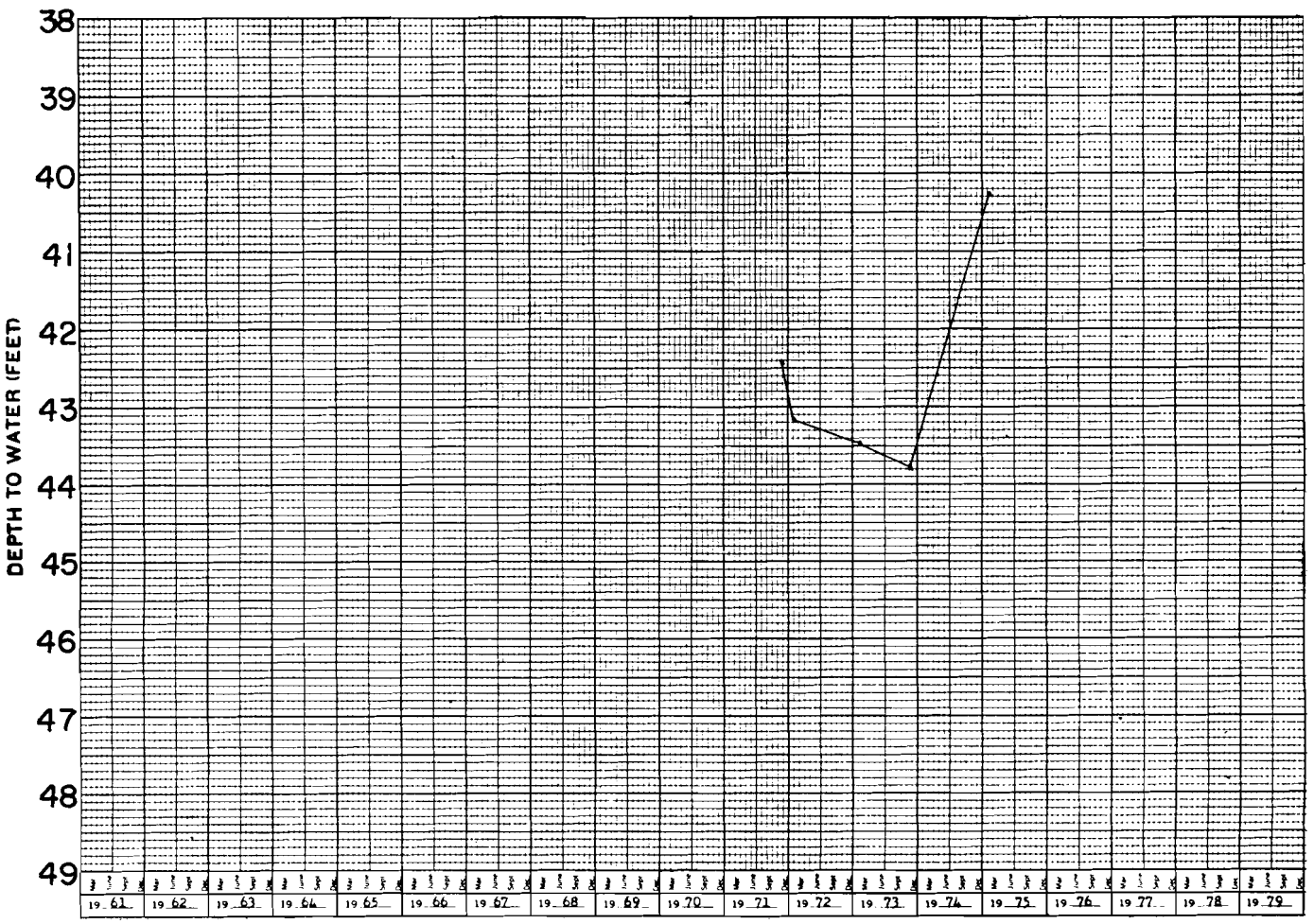
Generalized Log:

No log

Description and status of water right:

Permit G-3702 with a priority of October 4, 1967 for the appropriation of 1.86 cubic feet per second from 4 wells for the irrigation of 149.8 acres.

Hydrograph:



Records of Wells Report Well Number 28-C

Owner: Dwight H. Hulet Location: SE¼ NE¼, Sec. 36, T. 4 N., R. 27 E.

Depth: 185 feet. Diameter: 10 inches. Depth cased: 87 feet.

Approximate altitude of land surface at well: 562 ft. Year constructed: 1967

Yield: 350 gallons per minute (Reported)

Remarks: Hulet Well No. 4

Generalized Log:

Sand	0 - 23 feet
Gravel	23 - 28 feet
Clay	28 - 85 feet
Sand	85 - 86 feet
Basalt	86 - 125 feet
Clay	125 - 165 feet
Basalt	165 - 185 feet

Water Level:

Reported to be 35 feet below land surface on 3/24/67

Description and status of water right:

Permit G-3702 with a priority of October 4, 1967 for the appropriation of 1.86 cubic feet per second from 4 wells for the irrigation of 149.8 acres.

Records of Wells Report Well Number 29 (70)

Owner: Woodrow Walker Location: NW¼ SE¼, Sec. 18, T. 4 N., R. 28 E.

Depth: 102 feet. Diameter: 16 inches. Depth cased: 87.5 feet.

Approximate altitude of land surface at well: 540 ft. Year constructed: 1967

Yield: Tested at 2700 gallons per minute with 8 feet of drawdown.

Remarks: Walker Well No. 1

Generalized Log:

Soil	0 - 7 feet
Sand and gravel	7 - 69 feet
Clay	69 - 70 feet
Sand and gravel	70 - 102 feet

Water Level:

Reported to be 41 feet below land surface 8/28/67

Description and status of water right:

Water Right Certificate 39464 with a priority of October 9, 1967 for the appropriation of 2.88 cubic feet per second for the irrigation of 230.0 acres.

Records of Wells Report Well Number 30

Owner: Roy Gail Holzapfel Location: NE¼ NW¼, Sec. 32, T. 4 N., R. 27 E.

Depth: 111 feet. Diameter: 16 inches. Depth cased: 111 feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: 1968

Yield: Tested at 2000 gallons per minute with no apparent drawdown.

Remarks: Holzapfel Well No. 5

Generalized Log:

Sand and gravel	0 - 111 feet
Basalt at	111 feet

Water Level:

Reported to be 70 feet below land surface 4/68

Description and status of water right:

Permit G-3889 with a priority of November 22, 1967 for the appropriation of 2.0 cubic feet per second for the irrigation of 160.0 acres.

Records of Wells Report Well Number 31

Owner: Marvin and Frances McDole Location: NW¼ NW¼, Sec. 34, T. 4 N., R. 27 E.

Depth: 97 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 572 ft. Year constructed: NR

Yield: Not reported.

Remarks: McDole Well No. 4 (Abandoned)

Generalized Log:

No log

Description and status of water right:

Permit G-3892 with a priority of November 28, 1967 for the appropriation of 4.85 cubic feet per second for the supplemental irrigation of 389.5 acres.

Records of Wells Report Well Number 32 (18)

Owner: Thomas E. Huddleston Location: NW¼ SW¼, Sec. 18, T. 4 N., R. 28 E.

Depth: 93 feet. Diameter: 16 inches. Depth cased: 90 feet.

Approximate altitude of land surface at well: 545 ft. Year constructed: 1964

Yield: Tested at 1300 gallons per minute with 8 feet of drawdown.

Remarks: Huddleston Well No. 1

Generalized Log:

Sand and silt	0 - 4 feet
Cemented sand and gravel	4 - 30 feet
Sand and gravel	30 - 60 feet
Coarse sand with gravel	60 - 76 feet
Gravel	76 - 90 feet
Basalt	90 - 93 feet

Water Level:

Reported to be 44 feet below land surface 1/9/64

Description and status of water right:

Water Right Certificate 38737 with a priority of January 23, 1968 for the appropriation of 0.30 cubic foot per second for the irrigation of 24.0 acres.

Records of Wells

Report Well Number 33

Owner: Hansell Bros., Inc. Location: NE¼ SE¼, Sec. 27, T. 4N., R. 2E.

Depth: 140 feet. Diameter: 16 inches. Depth cased: 125 feet.

Approximate altitude of land surface at well: 600 ft. Year constructed: 1966

Yield: 400 gallons per minute with 6 feet of drawdown.

Remarks: Hansell Well No. 2

Generalized Log:

Soil, gravel and clay	0 - 103 feet
Gravel	103 - 113 feet
Clay	113 - 140 feet

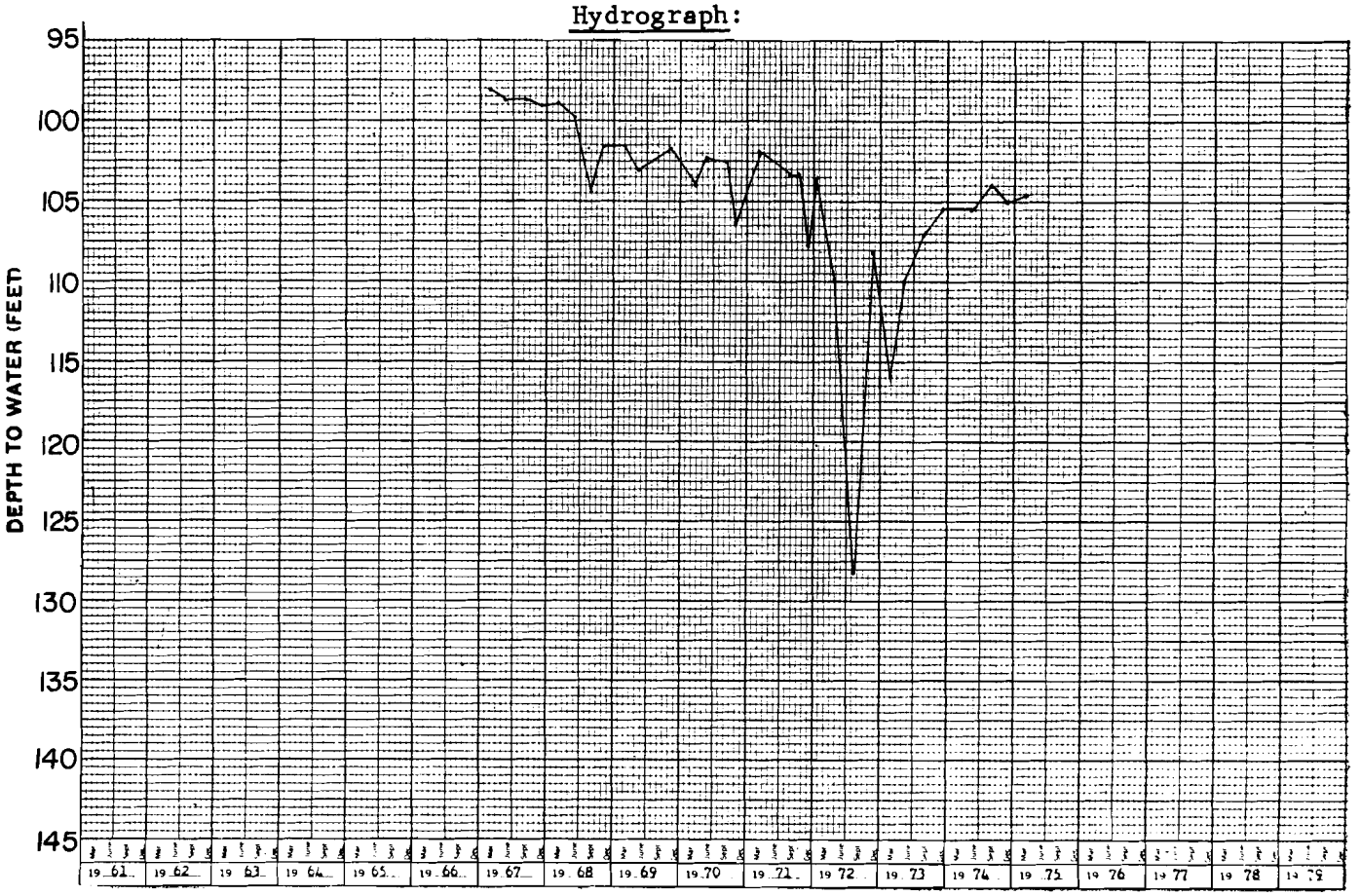
Water Level:

Reported at 100 feet below land surface 9/16/66

Description and status of water right:

Permit G-3822 with a priority of February 15, 1968 for the appropriation of 5.0 cubic feet per second from 4 wells for the irrigation of 320.0 acres, supplemental irrigation of 260.7 acres, and supplemental hog raising from well No. 2 being 4.0 cubic feet per second from well No. 3 and 1.0 cubic foot per second from well No. 2 with any deficiency in the available supply from well No. 3 to be made up by diversion from wells No. 4 and No. 5.

Hydrograph:



Records of Wells

Report Well Number 33-A (42-A)

Owner: Hansell Bros., Inc. Location: SW¼ NW¼, Sec. 27, T. 4 N., R. 27 E.

Depth: 121 feet. Diameter: 16 inches. Depth cased: 113 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1966

Yield: Tested at 2000 gallons per minute with 20 feet of drawdown.

Remarks: Hansell Well No. 3

Generalized Log:

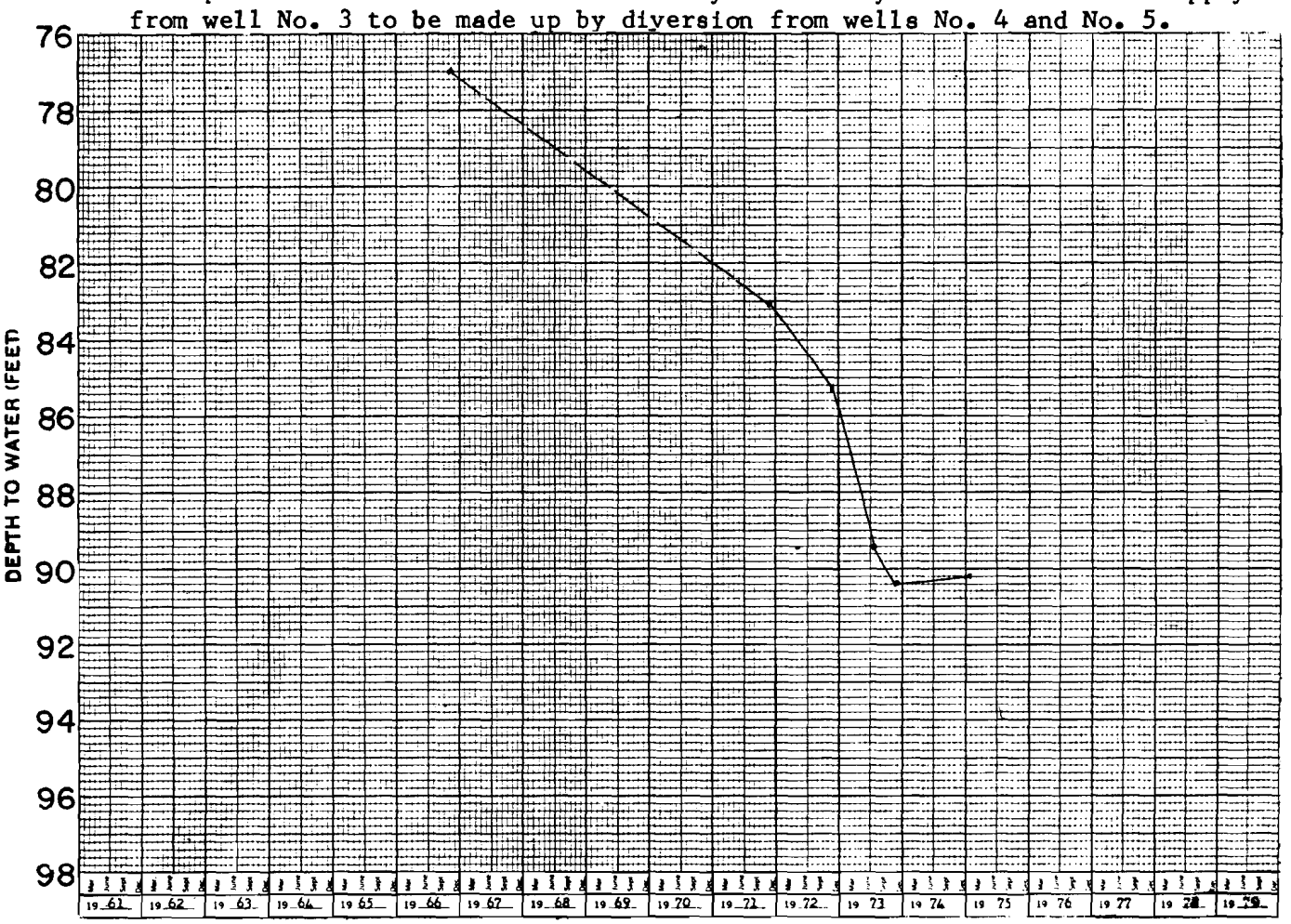
Soil	0 - 4 feet
Sand and gravel	4 - 105 feet
Clay and gravel	105 - 121 feet

Water Level:

Reported to be 77 feet below land surface 11/4/66

Description and status of water right:

Permit G-3822 with a priority of February 15, 1968 for the appropriation of 5.0 cubic feet per second from 4 wells for the irrigation of 320.0 acres, supplemental irrigation of 260.7 acres, and supplemental hog raising from well No. 2 being 4.0 cubic feet per second from well No. 3 and 1.0 cubic foot per second from well No. 2 with any deficiency in the available supply from well No. 3 to be made up by diversion from wells No. 4 and No. 5.



Records of Wells Report Well Number 33-B (42-B)

Owner: Hansell Bros., Inc. Location: NE¼ SW¼, Sec. 27, T. 4 N., R. 27E

Depth: 135 feet. Diameter: 8 inches. Depth cased: 130 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1968

Yield: Not reported.

Remarks: Hansell Well No. 4

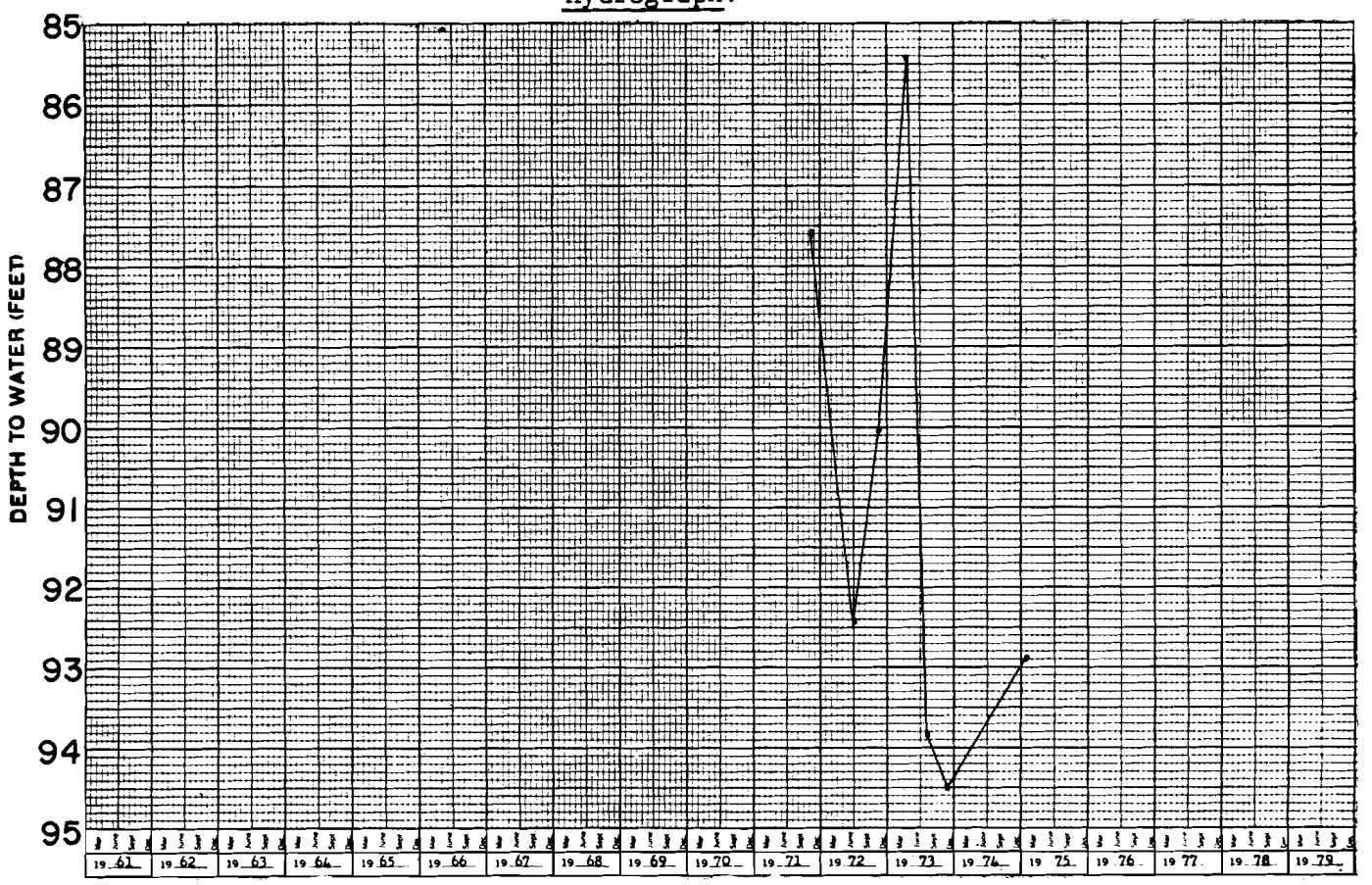
Generalized Log:

Soil	0 - 4 feet
Sand and gravel	4 - 130 feet
Sand	130 - 135 feet

Description and status of water right:

Permit G-3822 with a priority of February 15, 1968 for the appropriation of 3.0 cubic feet per second from 4 wells for the irrigation of 320.0 acres, supplemental irrigation of 260.7 acres, and supplemental hog raising from well No. 2 being 4.0 cubic feet per second from well No. 3 and 1.0 cubic foot per second from well No. 2 with any deficiency in the available supply form well No. 3 to be made up by diversion from wells No. 4 and No. 5.

Hydrograph:



Records of Wells Report Well Number 33-C

Owner: Hansell Bros., Inc. Location: SW¼ SW¼, Sec. 35, T. 4 N., R. 27 E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: -

Yield: -

Remarks: Hansell Well No. 5 (Not drilled)

Generalized Log:

Not drilled

Description and status of water right:

Permit G-3822 with a priority of February 15, 1968 for the appropriation of 5.0 cubic feet per second from 4 wells for the irrigation of 320.0 acres, supplemental irrigation of 260.7 acres, and supplemental hog raising from well No. 2 being 4.0 cubic feet per second from well No. 3 and 1.0 cubic foot per second from well No. 2 with any deficiency in the available supply from well No. 3 to be made up by diversion from wells No. 4 and No. 5.

Records of Wells Report Well Number 34 (59)

Owner: Malcolm Skinner Location: SW¼ NW¼, Sec. 19, T. 4 N., R. 28E

Depth: 128 feet. Diameter: 16 inches. Depth cased: 126 feet.

Approximate altitude of land surface at well: 555 ft. Year constructed: 1968

Yield: Tested at 3000 gallons per minute with 31 feet of drawdown.

Remarks:

Generalized Log:

Soil	0 - 3.5	feet
Cemented sand and gravel	3.5 - 62	feet
Sand and gravel	62 - 126	feet

Water Level:

Reported to be 66 feet below land surface 1/26/68

Measured at 72.86 feet below land surface 1/8/75

Description and status of water right:

Water Right Certificate 38481 with a priority of February 23, 1968 for the appropriation of 2.46 cubic feet per second for the irrigation of 196.5 acres.

Records of Wells Report Well Number 35 (19)

Owner: Malcolm Skinner Location: NW¼ SE¼, Sec. 13, T. 4 N., R. 27E.

Depth: 97 feet. Diameter: 16 inches. Depth cased: 97 feet.

Approximate altitude of land surface at well: 567 ft. Year constructed: 1964

Yield: Tested at 1000 gallons per minute with 15 feet of drawdown.

Remarks:

Generalized Log:

Sand and silt	0 - 4 feet
Sand and gravel	4 - 25 feet
Sand and gravel with interbedded clay	25 - 60 feet
Sand and gravel	60 - 70 feet
Sand	70 - 76 feet
Clay with gravel	76 - 81 feet
Gravel	81 - 97 feet

Water Level:

Reported to be 60 feet below land surface 1/64

Description and status of water right:

Water Right Certificate 38482 with a priority of March 25, 1968 for the appropriation of 0.17 cubic feet per second for the irrigation of 13.8 acres.

Records of Wells Report Well Number 36

Owner: Tom Quick Location: SE¼ NW¼, Sec. 20, T. 4 N., R. 28 E.

Depth: 14 feet. Diameter: 20 inches. Depth cased: 14 feet.

Approximate altitude of land surface at well: 503 ft. Year constructed: NR

Yield: Not reported.

Remarks:

Generalized Log:

No log

Description and status of water right:

Permit G-4067 with a priority of March 28, 1968 for the appropriation of 0.21 cubic foot per second for the irrigation of 17.0 acres.

Records of Wells

Report Well Number 37

Owner: E. T. Johnson

Location: NE¼ SE¼, Sec. 25, T. 4 N., R. 27E

Depth: 88 feet. Diameter: 16 - 10 inches. Depth cased: 58 feet.

Approximate altitude of land surface at well: 560 ft. Year constructed: 1973

Yield: Tested at 300 gallons per minute with 60 feet of drawdown.

Remarks:

Generalized Log:

Sand	0 - 8 feet
Cemented gravel	8 - 12 feet
Sand and gravel	12 - 30 feet
Clay	30 - 40 feet
Sand and clay	40 - 76 feet
Sand	76 - 88 feet
Basalt at	88 feet

Water Level:

Reported to be 30 feet below land surface 6/28/73

Measured at 37.8 feet below land sur surface 1/9/75

Description and status of water right:

Permit G-4171 with a priority of June 3, 1968 for the appropriation of 1.0 cubic foot per second for the irrigation of 80.0 acres.

Records of Wells Report Well Number 38 (40)

Owner: Frances F. McDole Location: NE¼ NE¼, Sec. 33, T. 4 N., R. 27 E.

Depth: 120 feet. Diameter: 16 inches. Depth cased: 114 feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1969

Yield: Not reported.

Remarks: McDole Well No. 5

Generalized Log:

Sand and silt	0 - 30 feet
Gravel	30 - 60 feet
Cemented gravel	60 - 68 feet
Sand and gravel	68 - 114 feet
Basalt	114 - 120 feet

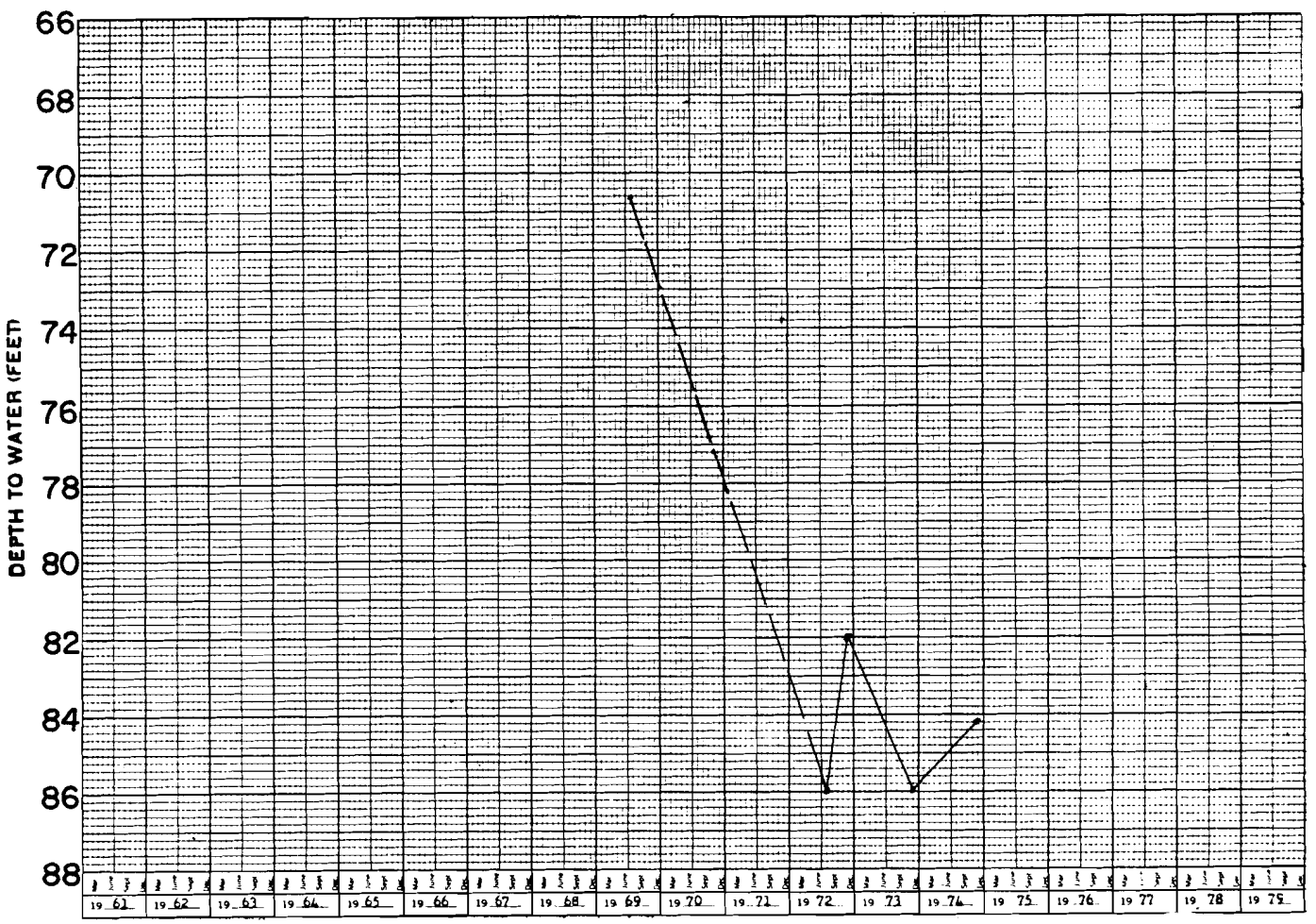
Water Level:

Reported to be 70.6 feet below land surface 7/2/69

Description and status of water right:

Permit G-4395 with a priority of June 21, 1968 for the appropriation of 4.92 cubic feet per second from wells No. 5, 6, and 7 for the irrigation of 393.3 acres.

Hydrograph:



Records of Wells Report Well Number 38-A (40-A)

Owner: Frances F. McDole Location: NE¼ NW¼, Sec. 33, T. 4N., R. 27E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 557 ft. Year constructed: -

Yield: -

Remarks: McDole Well No. 6

Generalized Log:

Not drilled

Description and status of water right:

Permit G-4395 with a priority of June 21, 1968 for the appropriation of 4.92 cubic feet per second from wells No. 5, 6, and 7 for the irrigation of 393.3 acres.

Records of Wells Report Well Number 38-B (40-B)

Owner: Frances F. McDole Location: SE¼ NW¼, Sec. 33, T. 4 N., R. 27 E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: -

Yield: -

Remarks: McDole Well No. 7

Generalized Log:

Not drilled

Description and status of water right:

Permit G-4395 with a priority of June 21, 1968 for the appropriation of 4.92 cubic feet per second from wells No. 5, 6, and 7 for the irrigation of 393.3 acres.

Records of Wells Report Well Number 39

Owner: Howard Gass Location: NW¼ SW¼, Sec. 17, T. 4 N., R. 28E.

Depth: 105 feet. Diameter: 16 inches. Depth cased: 100 feet.

Approximate altitude of land surface at well: 530 ft. Year constructed: 1968

Yield: Tested at 3000 gallons per minute with 21 feet of drawdown.

Remarks:

Generalized Log:

Sand and silt	0 - 4 feet
Gravel and boulders	4 - 28 feet
Cemented sand and gravel	28 - 55 feet
Sand and gravel	55 - 76 feet
Coarse sand	76 - 95 feet
Sand and clay	95 - 105 feet

Water Level:

Reported to be 38 feet below land surface 12/14/68

Description and status of water right:

Permit G-4413 with a priority of November 21, 1968 for the appropriation of 1.35 cubic feet per second for the irrigation of 36.5 acres and the supplemental irrigation of 71.8 acres.

Records of Wells Report Well Number 40 (38)

Owner: Marvin and Frances McDole Location: NE¼ NE¼, Sec. 33, T. 4 N., R. 27 E.

Depth: 120 feet. Diameter: 16 inches. Depth cased: 114 feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1969

Yield: Not reported.

Remarks: McDole Well No. 5

Generalized Log:

Sand and silt	0 - 30 feet
Gravel	30 - 60 feet
Cemented gravel	60 - 68 feet
Sand and gravel	68 - 114 feet
Basalt	114 - 120 feet

Water Level:

Reported to be 70.6 feet below land surface 7/2/69

Description and status of water right:

Application G-5026 with a filing date of October 31, 1969 for the appropriation of 3.0 cubic feet per second for the irrigation of 239.0 acres.

Records of Wells Report Well Number 40-A (38-A)

Owner: Marvin and Frances McDole Location: NE¼ NE¼, Sec. 33, T. 4 N., R. 27 E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 557 ft. Year constructed: -

Yield: -

Remarks: McDole Well No. 6

Generalized Log:

Not drilled

Description and status of water right:

Application G-5026 with a filing date of October 31, 1969 for the appropriation of 3.0 cubic feet per second for the irrigation of 239.0 acres.

Records of Wells Report Well Number 40-B (38-B)

Owner: Marvin and Francis McDole Location: SE¼ NW¼, Sec. 33, T. 4 N., R. 27 E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: -

Yield:

Remarks: McDole Well No. 7

Generalized Log:

Not drilled

Description and status of water right:

Application G-5026 with a filing date of October 31, 1969 for the appropriation of 3.0 cubic feet per second for the irrigation of 239.0 acres.

Records of Wells Report Well Number 41 (46)

Owner: Thurman Martin Location: NE¼ SW¼, Sec. 19, T. 4 N., R. 28 E.

Depth: 99 feet. Diameter: 16 inches. Depth cased: 99 feet.

Approximate altitude of land surface at well: 547 ft. Year constructed: 1969

Yield: Tested at 2000 gallons per minute with 30 feet of drawdown.

Remarks: Martin Well No. 1

Generalized Log:

Soil	0 - 7 feet
Cemented sand and gravel	7 - 63 feet
Gravel	63 - 99 feet

Water Level:

Reported to be 60 feet below land surface 12/2/69

Description and status of water right:

Permit G-4775 with a priority of December 30, 1969 for the appropriation of 1.25 cubic feet per second for the irrigation of 60 acres.

Records of Wells Report Well Number 42 (17) (20)

Owner: Hansell Bros. Inc. Location: SW¼ NW¼, Sec. 26, T. 4 N., R. 27 E.

Depth: 108 feet. Diameter: 16 inches. Depth cased: 108 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1960

Yield: Tested at 2500 gallons per minute.

Remarks: Hansell Well No. 1 (Williams Well)

Generalized Log:

Soil	0 - 5 feet
Cemented gravel	5 - 12 feet
Gravel	12 - 108 feet

Water Level:

Measured at 73.0 feet below land surface 11/8/61

Description and status of water right:

Application G-5209 with a priority of January 9, 1970 for the appropriation of 19.88 cubic feet per second from 5 wells for the irrigation of 697.0 acres and the supplemental irrigation of 893.8 acres.

Records of Wells Report Well Number 42-A (33-A)

Owner: Hansell Bros., Inc. Location: SW¼ NW¼, Sec. 27, T. 4N., R. 27E.

Depth: 121 feet. Diameter: 16 inches. Depth cased: 113 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1966

Yield: Tested at 2000 gallons per minute with 20 feet of drawdown.

Remarks: Hansel Well No. 3

Generalized Log:

Soil	0 - 4 feet
Sand and gravel	4 - 105 feet
Clay and gravel	105 - 121 feet

Water Level:

Reported to be 77 feet below land surface 11/4/66

Description and status of water right:

Application G-5209 with a priority of January 9, 1970 for the appropriation of 19.88 cubic feet per second from 5 wells for the irrigation of 697.0 acres and the supplemental irrigation of 893.8 acres.

Records of Wells Report Well Number 42-B (33-B)

Owner: Hansell Bros., Inc. Location: NE¼ SW¼, Sec. 27, T. 4N., R. 27E.

Depth: 135 feet. Diameter: 8 inches. Depth cased: 130 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1968

Yield: Not reported.

Remarks: Hansell Well No. 4

Generalized Log:

Soil	0 - 4 feet
Sand and gravel	4 - 130 feet
Sand	130 - 135 feet

Water Level:

Reported to be 99 feet below land surface 7/11/68

Description and status of water right:

Application G-5209 with a priority of January 9, 1970 for the appropriation of 19.88 cubic feet per second from 5 wells for the irrigation of 697.0 acres and the supplemental irrigation of 893.8 acres.

Records of Wells Report Well Number 42-C

Owner: Hansell Bros., Inc. Location: SE¼ NW¼, Sec. 27, T. 4 N., R. 27E

Depth: 104 feet. Diameter: 16 inches. Depth cased: 105 feet.

Approximate altitude of land surface at well: 580 ft. Year constructed: 1969

Yield: Not reported.

Remarks: Hansell Well No. 6

Generalized Log:

Sandy soil	0 - 4 feet
Silt and gravel	4 - 84 feet
Gravel	84 - 105 feet
Clay	105 - 109*

*Well plugged back to 104 feet.

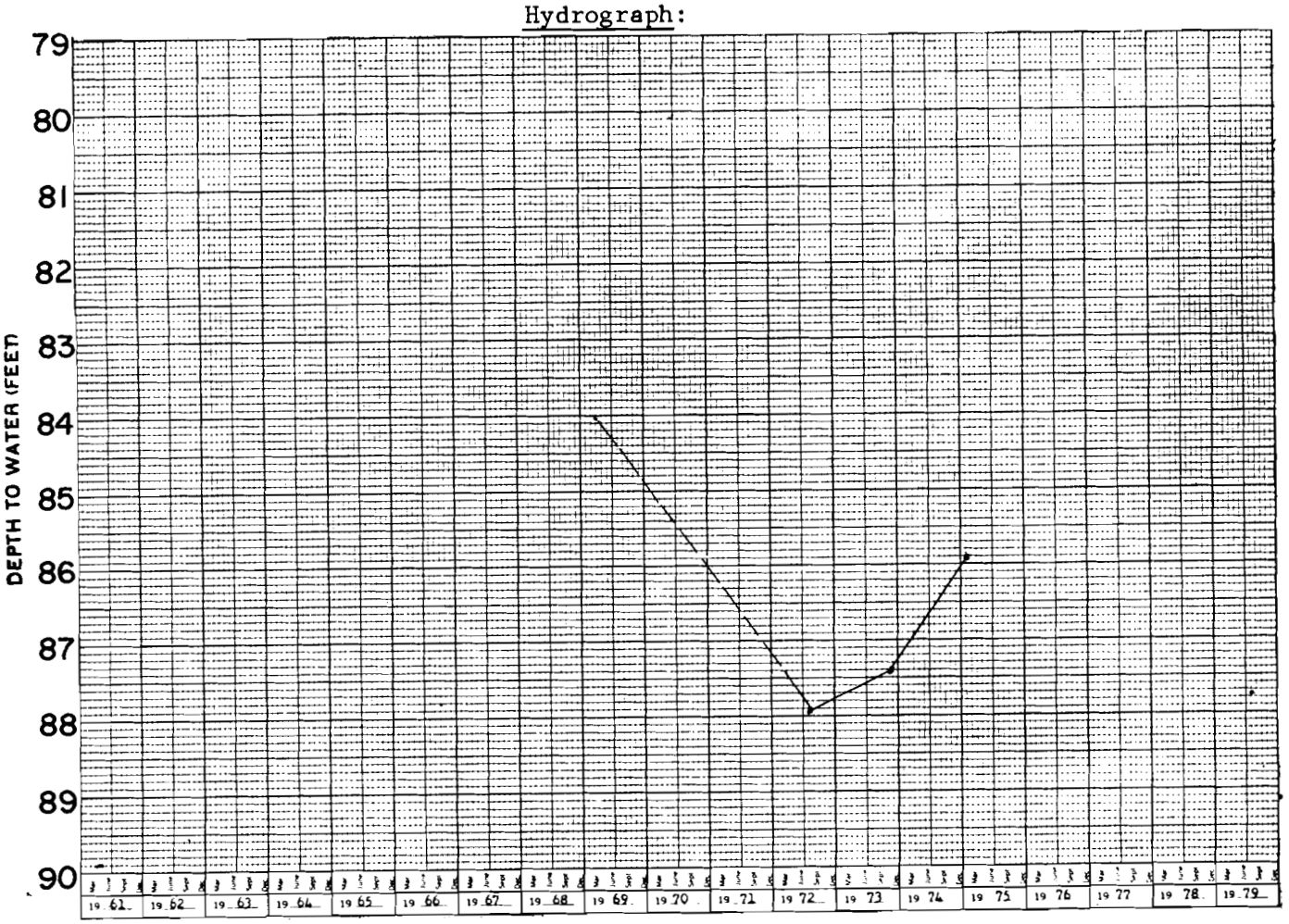
Water Level:

Reported to be 84 feet below land surface 3/26/69

Description and status of water right:

Application G-5209 with a priority of January 9, 1970 for the appropriation of 19.88 cubic feet per second from 5 wells for the irrigation of 697.0 acres and the supplemental irrigation of 893.8 acres.

Hydrograph:



Records of Wells

Report Well Number 42-D

Owner: Hansell Bros., Inc. Location: SW¼ NW¼, Sec. 26, T. 4 N., R. 27E.

Depth: 105 feet. Diameter: 16 inches. Depth cased: 108 feet.

Approximate altitude of land surface at well: 590 ft. Year constructed: 1970

Yield: Tested at 1893 gallons per minute with 12 feet of drawdown.

Remarks: Hansell Well No. 7

Generalized Log:

Soil	0 - 5 feet
Gravel	5 - 107 feet
Clay	107 - 108 feet

*Plugged back to 105 feet.

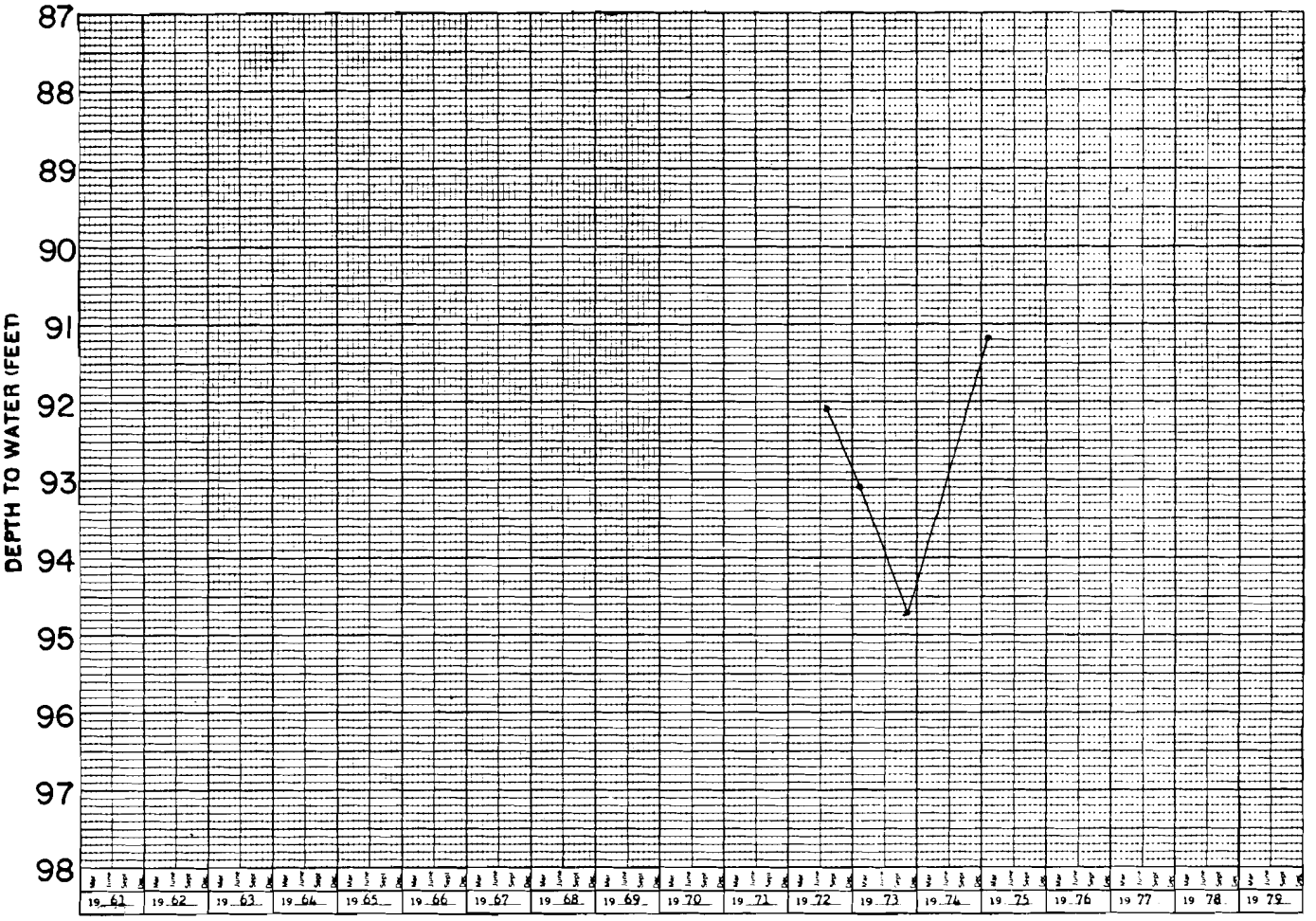
Water Level:

Reported to be 81 feet below land surface 1/30/70

Description and status of water right:

Application G-5209 with a priority of January 9, 1970 for the appropriation of 19.88 cubic feet per second from 5 wells for the irrigation of 697.0 acres and the supplemental irrigation of 893.8 acres.

Hydrograph:



Records of Wells

Report Well Number 43

Owner: Elroy F. McDole Location: NW¼ SE¼, Sec. 33, T. 4 N., R. 27E.

Depth: 113 feet. Diameter: 16 inches. Depth cased: 108 feet.

Approximate altitude of land surface at well: 580 ft. Year constructed: 1968

Yield: Not reported.

Remarks:

Generalized Log:

Sand	0 - 6 feet
Cemented sand and gravel	6 - 48 feet
Sand and gravel	48 - 108 feet
Clay and gravel	108 - 113 feet

Water Level:

Reported to be 66 feet below land surface 6/1/68

Description and status of water right:

Permit G-4821 with a priority of February 20, 1970 for the appropriation of 0.88 cubic feet per second for the irrigation of 70.0 acres.

Records of Wells

Report Well Number 44

Owner: W. M. Huddleston

Location: NE¼ NE¼, Sec. 13, T. 4 N., R. 27 E.

Depth: 101 feet. Diameter: 16 inches. Depth cased: 101 feet.

Approximate altitude of land surface at well: 550 ft. Year constructed: 1969

Yield: Not reported.

Remarks: Huddleston Well No. 2 (Abandoned - open casing)

Generalized Log:

Sand and silt	0 - 5 feet
Boulders and gravel	5 - 25 feet
Cemented sand and gravel	25 - 61 feet
Sandy clay	61 - 68 feet
Gravel	68 - 90 feet
Clay	90 - 100 feet
Basalt	100 - 101 feet

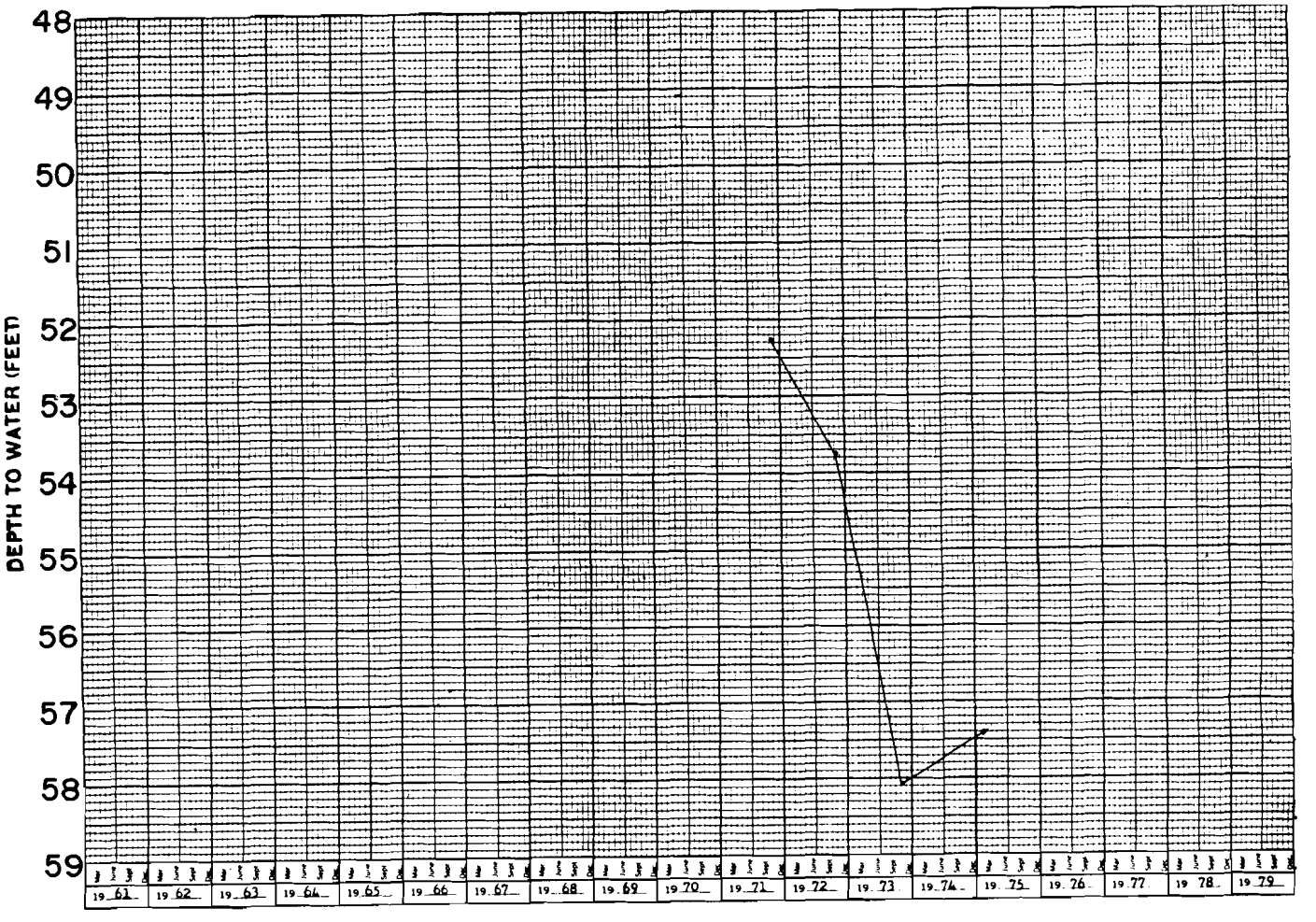
Water Level:

Reported to be 46 feet below land surface 4/23/69

Description and status of water right:

Permit G-4861 with a priority of March 10, 1970 for the appropriation of 0.96 cubic foot per second for the irrigation of 77.0 acres.

Hydrograph:



Records of Wells Report Well Number 45

Owner: Donald Clark Key Location: SW¼ SW¼, Sec. 30, T. 4 N., R. 27E.

Depth: 115 feet. Diameter: 16 inches. Depth cased: 115 feet.

Approximate altitude of land surface at well: 579 ft. Year constructed: 1970

Yield: Tested at 2900 gallons per minute with 10 feet of drawdown.

Remarks: Key Well No. 1

Generalized Log:

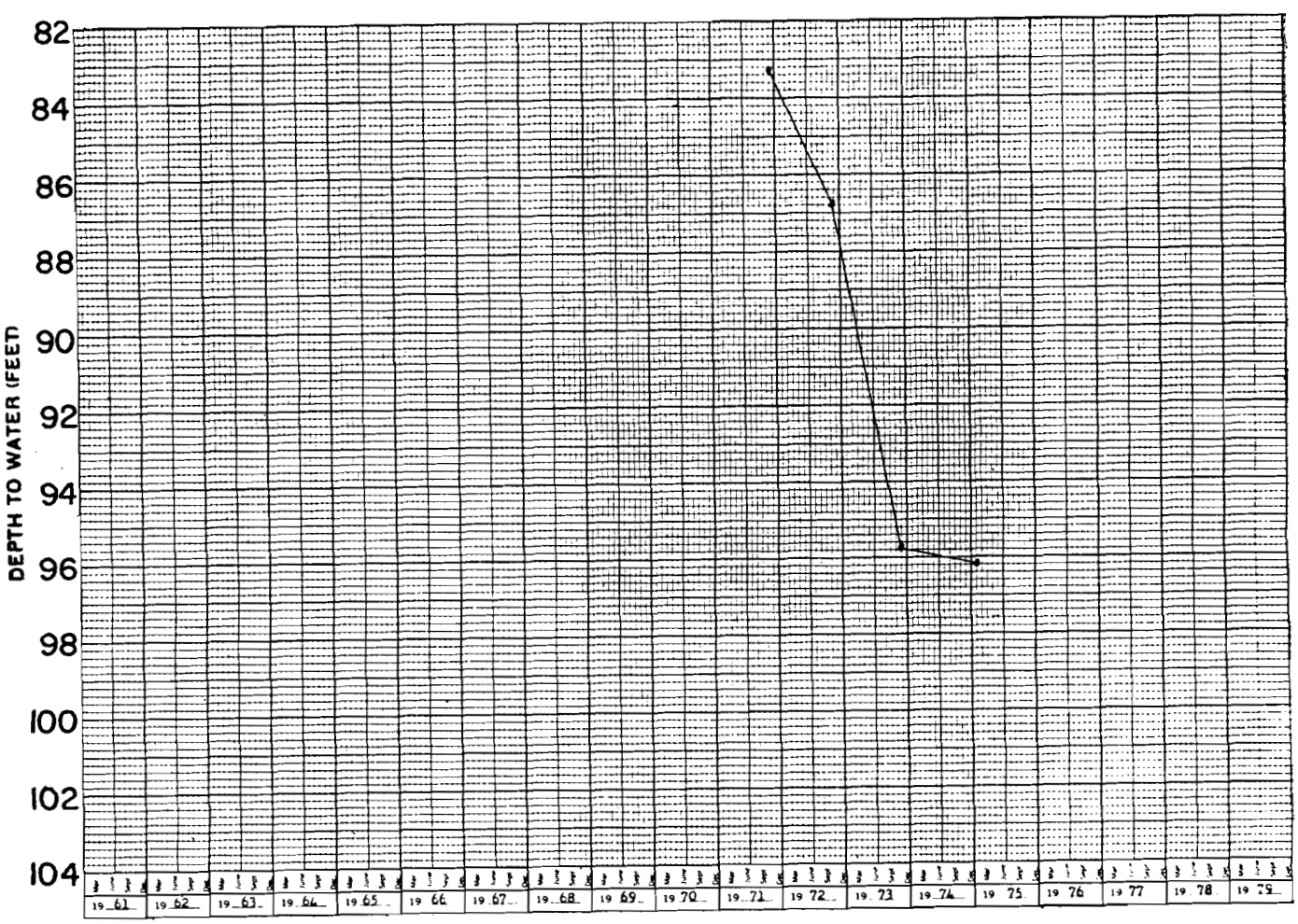
Soil	0 - 5 feet
Sand	5 - 78 feet
Cemented gravel	78 - 80 feet
Sand and gravel	80 - 111 feet
Clay	111 - 114 feet
Basalt	114 - 115 feet

Water Level:

Reported to be 81 feet below land surface 2/24/71

Description and status of water right:

Hydrograph:



Records of Wells Report Well Number 45-A

Owner: Donald Clark Key Location: SE¼ SE¼, Sec. 30, T. 4 N., R. 27E.

Depth: 120 feet. Diameter: 20 inches. Depth cased: 118 feet.

Approximate altitude of land surface at well: 575 ft. Year constructed: 1973

Yield: Tested at 1000 gallons per minute with 30 feet of drawdown.

Remarks: Key Well No. 2

Generalized Log:

Sand	0 - 30 feet
Cemented gravel	30 - 31 feet
Sand	31 - 45 feet
Clay	45 - 51 feet
Sand	51 - 53 feet
Clay and gravel	53 - 81 feet
Sand and gravel with clay interbeds	81 - 118 feet
Basalt	118 - 120 feet

Water Level:

Reported to be 88 feet below land surface 5/20/73

Measured at 97.4 feet below land surface 1/8/75

Description and status of water right:

Permit G-4878 with a priority of March 31, 1970 for the appropriation of 8.0 cubic feet per second for the irrigation of 640.0 acres.

Records of Wells Report Well Number 46 (41)

Owner: Thurman Martin Location: NE¼ SW¼, Sec. 19, T. 4 N., R. 28E

Depth: 99 feet. Diameter: 16 inches. Depth cased: 99 feet.

Approximate altitude of land surface at well: 547 ft. Year constructed: 1969

Yield: Tested at 2000 gallons per minute with 30 feet of drawdown.

Remarks:

Generalized Log:

Soil	0 - 7 feet
Cemented sand and gravel	7 - 63 feet
Gravel	63 - 99 feet

Water Level:

Reported to be 60 feet below land surface 12/2/69

Description and status of water right:

Application G-5362 with a priority of November 16, 1970 for the appropriation of 0.5 cubic feet per second for the irrigation of acres.

Records of Wells Report Well Number 47

Owner: LeRue W. Pollock Location: SW¼ SE¼ Sec. 30, T. 4 N., R. 28E

Depth: 40 (proposed) feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 545 ft. Year constructed: -

Yield:

Remarks:

Generalized Log:

No log

Description and status of water right:

Application G-5397 with a filing date of January 12, 1971 for the appropriation of 0.33 cubic foot per second for the irrigation of 26.0 acres.

Records of Wells Report Well Number 48 (5) (6) (8) (16)

Owner: Georgia Belle Holzapfel Location: SW¼ NE¼, Sec. __, T. 4 N., R. 27 E

Depth: 123 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 583 ft. Year constructed: 1954

Yield: Not reported.

Remarks: Holzapfel Well No. 1

Generalized Log:

Sandy loam	0 - 6 feet
Sand	6 - 36 feet
Gravel	36 - 100 feet
Gravel and clay	100 - 123 feet

Water Level:

Measured at 73.5 feet below land surface 11/10/61

Description and status of water right:

Application G-5449 with a filing date of March 8, 1971 for the appropriation of 2.0 cubic feet per second for the supplemental irrigation of 160.0 acres.

Records of Wells Report Well Number 49 (62)

Owner: Lyle W. Smith Location: SW¼ NE¼, Sec. 26, T. 4 N., R.27 E.

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 595 ft. Year constructed: -

Yield:

Remarks:

Generalized Log:

Not drilled

Description and status of water right:

Permit G-4844 with a priority of March 12, 1971 for the appropriation of 1.4 cubic feet per second for the irrigation of 112.0 acres.

Records of Wells Report Well Number 50

Owner: Clarence W. Ruddell Location: SW¼ SW¼, Sec. 19, T. 4 N., R.27 E

Depth: 112 feet. Diameter: 16 inches. Depth cased: 112 feet.

Approximate altitude of land surface at well: 540 ft. Year constructed: 1973

Yield: Not reported.

Remarks: Ruddell Well No. 1

Generalized Log:

Sand	0 - 107 feet
Clay	107 - 112 feet

Water Level:

Reported to be 50 feet below land surface 3/13/73

Description and status of water right:

Permit G-4931 with a priority of May 11, 1971 for the appropriation of 2.7 cubic feet per second from wells No. 1 and 2 for the irrigation of 219.2 acres.

Records of Wells Report Well Number 50-A

Owner: Clarence W. Ruddell Location: SE¼ SW¼, Sec. 19, T. 4 N., R. 27 E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 540 ft. Year constructed: -

Yield:

Remarks: Ruddell Well No. 2

Generalized Log:

Not drilled

Description and status of water right:

Permit G-4931 with a priority of May 11, 1971 for the appropriation of 2.7 cubic feet per second from wells no. 1 and 2 for the irrigation of 219.2 acres.

Records of Wells Report Well Number 51

Owner: Fred Haskins, Jr. Location: NE¼ NE¼, Sec. 29, T. 4 N., R. 27 E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 556 ft. Year constructed: -

Yield:

Remarks: Haskins Well No. 1

Generalized Log:

Not drilled

Description and status of water right:

Application G-5567 with a filing date of July 9, 1971 for the appropriation of 8.0 cubic feet per second from 4 wells for the irrigation of 640.0 acres.

51-A Well No. 2 NE¼ NW¼ Section 29, Township 4 North, Range 27 East (Not drilled)
51-B Well No. 3 NE¼ SW¼ Section 29, Township 4 North, Range 27 East (Not drilled)
51-C Well No. 4 NE¼ SE¼ Section 29, Township 4 North, Range 27 East, (Not drilled)

Records of Wells Report Well Number 52

Owner: Arnold Braat Location: SW¼ SW¼, Sec. 20, T. 4 N., R. 27 E

Depth: 173 feet. Diameter: 16 inches. Depth cased: 171.5 feet.

Approximate altitude of land surface at well: 540 ft. Year constructed: 1971

Yield: Tested at 2588 gallons per minute with 36 feet of drawdown.

Remarks: Braat Well No. 1

Generalized Log:

Sand	0 - 3	feet
Silt	3 - 21	feet
Sand	21 - 65	feet
Sand and gravel	65 - 171.5	feet
Basalt	171.5 - 173	feet

Water Level:

Reported to be 44 feet below land surface 7/30/71
Measured at 50.5 feet below land surface 1/9/75

Description and status of water right:

Permit G-4932 with a filing date of August 3, 1971 for the appropriation of 6.58 cubic feet per second from wells No. 1 and 2 for the irrigation of 526.6 acres.

Records of Wells Report Well Number 52-A

Owner: Arnold Braat Location: SE¼ SW¼, Sec. 20, T. 4 N., R. 27 E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 548 ft. Year constructed: -

Yield: -

Remarks: Braat Well No. 2

Generalized Log:

Not drilled

Description and status of water right:

Permit G-4932 with a filing date of August 3, 1971 for the appropriation of 6.58 cubic feet per second from wells No. 1 and 2 for the irrigation of 526.6 acres.

Records of Wells Report Well Number 53 (4) (10) (24)

Owner: Hansell Bros., Inc. Location: SW¼ NE¼, Sec. 28, T. 4N., R. 27E

Depth: 126 feet. Diameter: 12 inches. Depth cased: 126 feet.

Approximate altitude of land surface at well: 578 ft. Year constructed: 1954

Yield: Reported to pump about 1250 gallons per minute.

Remarks: Hansell Well No. B-1 (Hoyt Well No. 1)

Generalized Log:

Gravel and boulders	0 - 38 feet
Clay	38 - 73 feet
Gravel	73 - 126 feet

Water Level:

Measured at 72.0 feet below land surface 11/10/61

Description and status of water right:

Application G-5598 with a filing date of August 12, 1971 for the appropriation of 21.5 cubic feet per second from wells No. B-1, B-2, and 3 for the supplemental irrigation of 1724.2 acres.

Records of Wells Report Well Number 53-A (24-A)

Owner: Hansell Bros., Inc. Location: SE¼ SE¼, Sec. 28, T. 4 N., R.27 E

Depth: 127 feet. Diameter: 16 inches. Depth cased: 127 feet.

Approximate altitude of land surface at well: 565 ft. Year constructed: 1966

Yield: Tested at 3000 gallons per minute with 58 feet of drawdown.

Remarks: Hansell Well No. B-2 (Braat Well No. 2)

Generalized Log:

Sandy silt	0 - 26 feet
Clay and gravel	26 - 58 feet
Gravel	58 - 105 feet
Clay and gravel	105 - 114 feet
Cemented gravel	114 - 127 feet

* Deepened from 100 feet to 127 feet 10/71

Water Level:

Reported to be 55 feet below land surface 4/4/66

Reported to be 67 feet below land surface 10/13/71

Description and status of water right:

Application G-5598 with a filing date of August 12, 1971 for the appropriation of 21.5 cubic feet per second from wells No. B-1, B-2, and 3 for the supplemental irrigation of 1724.2 acres.

Records of Wells

Report Well Number 53-B

Owner: Hansell Bros., Inc. Location: NE¼ SE¼, Sec. 28, T. 4 N., R. 27E

Depth: 107 feet. Diameter: 16 inches. Depth cased: 110 feet.

Approximate altitude of land surface at well. 580 ft. Year constructed: 1970

Yield: Not reported.

Remarks: Hansell Well No. 3

Generalized Log:

Soil	0 - 4 feet
Sand and gravel	4 - 89 feet
Gravel	89 - 108 feet
Clay	108 - 110 feet

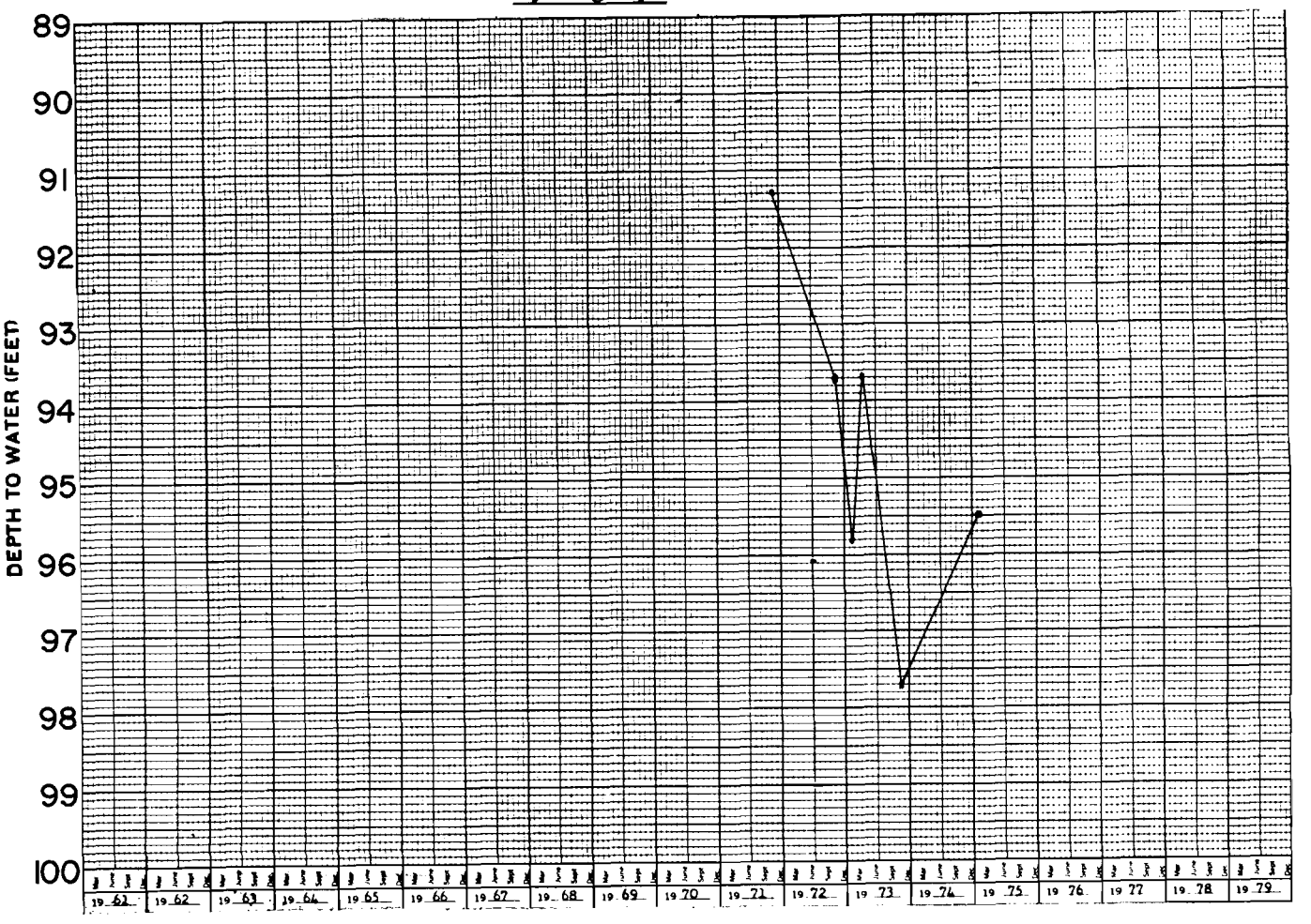
Water Level:

Reported to be 83 feet below land surface 1/2/70

Description and status of water right:

Application G-5598 with a filing date of August 12, 1971 for the appropriation of 21.5 cubic feet per second from wells No. B-1, B-2, and 3 for the supplemental irrigation of 1724.2 acres.

Hydrograph:



Records of Wells Report Well Number 54

Owner: J. W. Aylett Location: NE¼ NW¼, Sec. 28 T. 4 N., R. 27E

Depth: 110 feet. Diameter: 16 inches. Depth cased: 110 feet.

Approximate altitude of land surface at well: 558 ft. Year constructed: 1973

Yield: Not reported.

Remarks: Aylett Well No. 3

Generalized Log:

Sand	0 - 3 feet
Fine gravel	3 - 10 feet
Gravel	10 - 110 feet

Water Level:

Reported to be 77 feet below land surface 8/7/73
Measured at 74.4 feet below land surface 1/7/75

Description and status of water right:

Permit G-4929 with a priority of November 16, 1971 for 0.68 cubic foot per second and a priority of December 3, 1971 for 0.25 cubic foot per second for the appropriation of 0.90 cubic foot per second from two wells, being 0.34 cubic foot per second from Well No. 1 and 0.67 cubic foot per second from Well No. 3 for the irrigation of 72.18 acres.

Records of Wells Report Well Number 54-A (3) (7)

Owner: J. W. Aylett Location: SE¼ NW¼, Sec. 28, T. 4 N., R. 27 E

Depth: 119 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1954

Yield: Tested at 820 gallons per minute with no drawdown.

Remarks: Aylett Well No. 1 (Chapman Well No. 1)

Generalized Log:

Sand and gravel	0 - 21 feet
Boulders	21 - 31 feet
Clay with gravel	31 - 72 feet
Gravel	72 - 119 feet

Water Level:

Measured at 60.6 feet below land surface 11/10/61

Description and status of water right:

Permit G-4929 with a priority of November 16, 1971 for 0.68 cubic foot per second and a priority of December 3, 1971 for 0.25 cubic foot per second for the appropriation of 0.90 cubic foot per second from two wells, being 0.34 cubic foot per second from Well No. 1 and 0.67 cubic foot per second from Well No. 3 for the irrigation of 72.18 acres.

Records of Wells Report Well Number 55

Owner: Elroy F. McDole Location: SE¼ SW¼, Sec. 28, T. 4 N., R. 27 E.

Depth: 124 feet. Diameter: 16 inches. Depth cased: 119 feet.

Approximate altitude of land surface at well: 565 ft. Year constructed: 1972

Yield: Tested at 2350 gallons per minute with 9 feet of drawdown.

Remarks:

Generalized Log:

Soil	0 - 6 feet
Sand	6 - 16 feet
Sand and gravel	16 - 118 feet
Clay	118 - 119 feet
Basalt	119 - 124 feet

Water Level:

Reported to be 72 feet below land surface 3/7/72

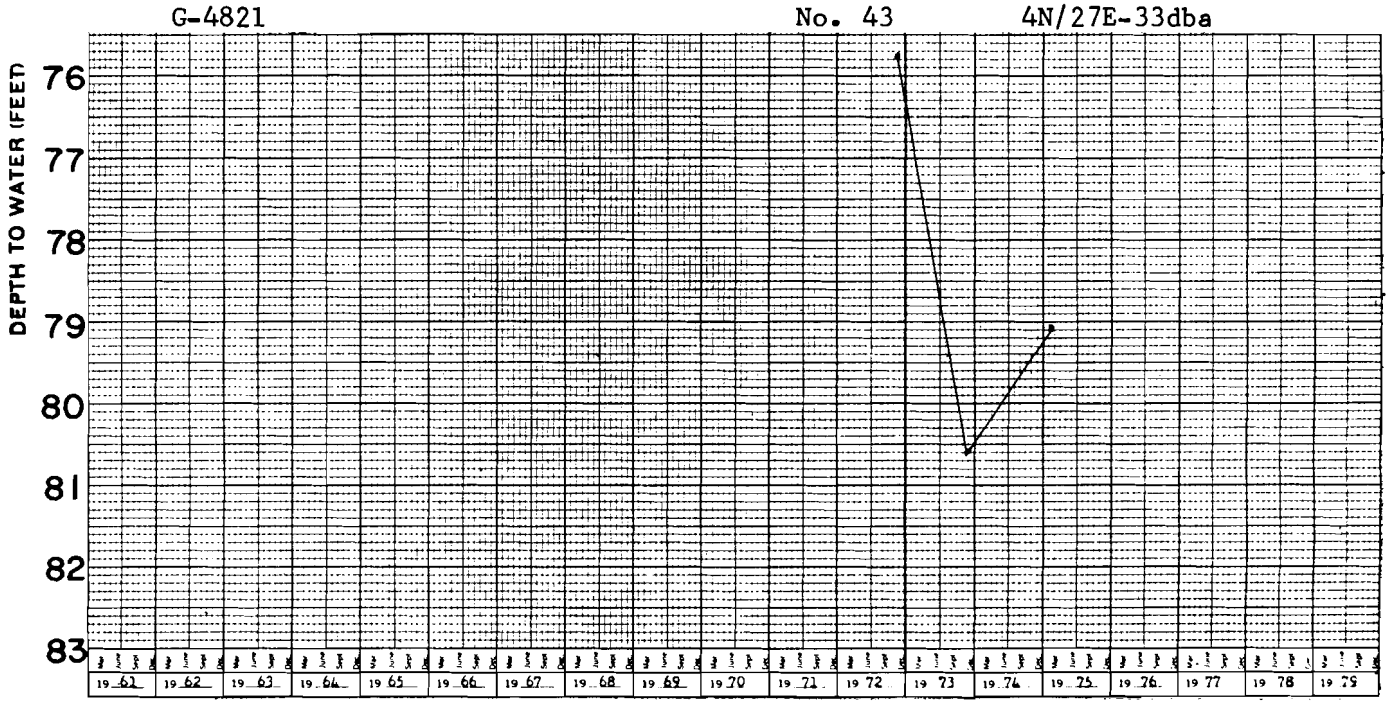
Description and status of water right:

Application G-5684 with a filing date of December 13, 1971 for the appropriation of 4.0 cubic feet per second for the irrigation of 310.0 acres.

Application TR-2649 with a filing date of May 24, 1972 in the name of J. W. Aylett to change point of diversion from 4 wells to the above well for the irrigation of lands covered under Permits U-363, G-190, G-2782, and G-4821.

Moved From Wells:

Permit No.	Well No.	Report Well No.	Location
U-363	McDole Well No. 5	No. 2	4N/27E-33dba
G-190	McDole Well No. 3	No. 11	4N/27E-33cbd
G-2782	McDole Well No. 4	No. 22	4N/27E-33cba
G-4821		No. 43	4N/27E-33dba



Records of Wells Report Well Number 56

Owner: Lamb-Weston, Inc. Location: NE¼ SW¼, Sec. 19, T. 4 N., R. 28 E

Depth: 130 feet. Diameter: 18 inches. Depth cased: 103 feet.

Approximate altitude of land surface at well: 555 ft. Year constructed: 1969

Yield: Tested at 100 gallons per minute with 35 feet of drawdown.

Remarks: Lamb-Weston Well No. 1 (Martin Well No. 1, reamed and deepened in 1972)

Generalized Log:

Sand	0 - 5 feet
Cemented gravel	5 - 25 feet
Boulders and gravel	25 - 40 feet
Clay and gravel	40 - 75 feet
Gravel	75 - 105 feet
Basalt	105 - 118 feet
Clay	118 - 120 feet
Sand	120 - 125 feet
Clay	125 - 127 feet
Basalt	127 - 130 feet

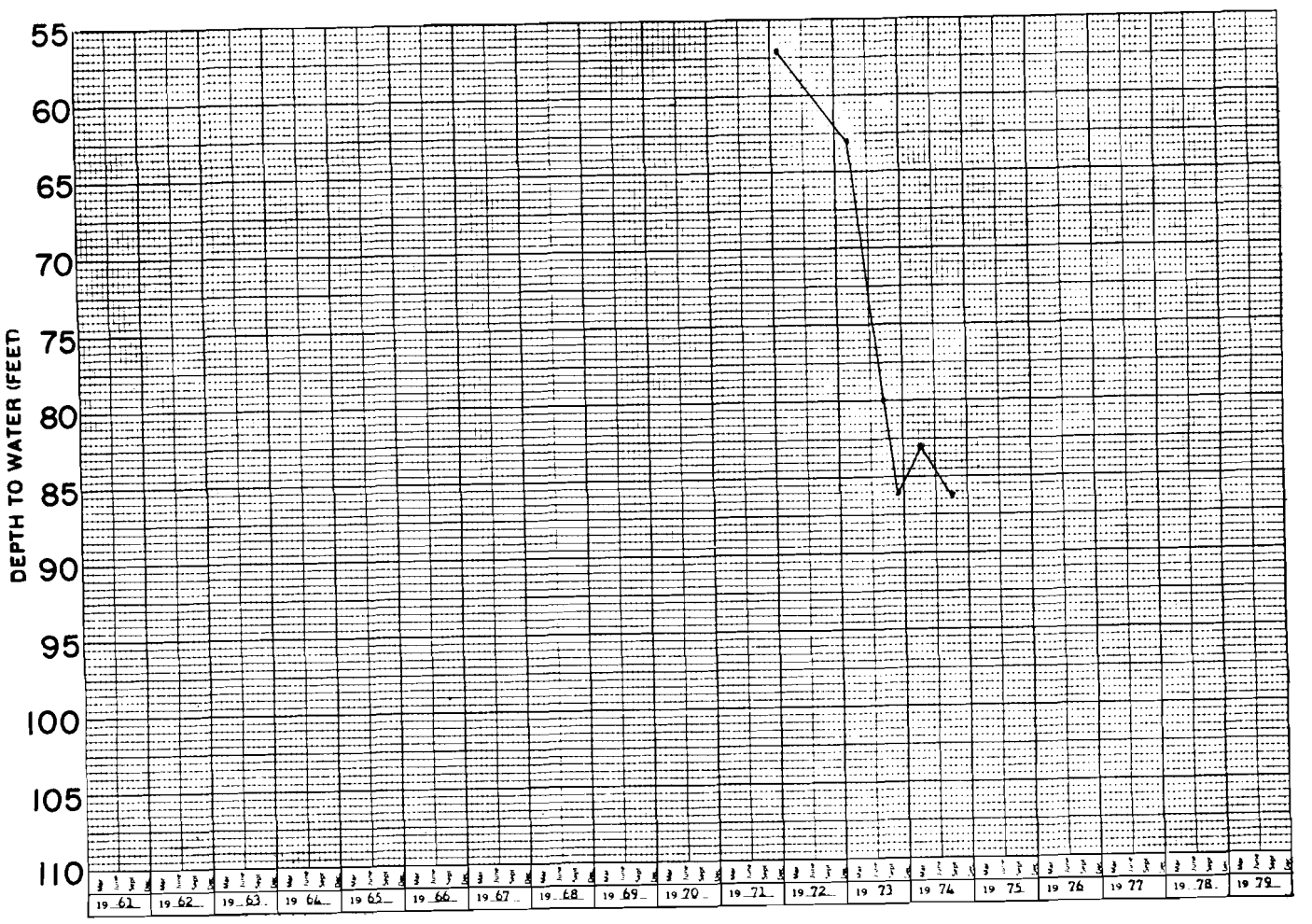
Water Level:

Reported to be 60 feet below land surface 4/25/72

Description and status of water right:

Permit G-4947 with a priority of January 21, 1972 for the appropriation of 3.3 cubic feet per second from Martin Well No. 1 for industrial food processing.

Hydrograph:



Records of Wells Report Well Number 57 (9)

Owner: Ronald Baker Location: SW¼ NE¼, Sec. 24, T. 4N., R. 27E

Depth: 151 feet. Diameter: 16 inches. Depth cased: 151 feet.

Approximate altitude of land surface at well: 570 ft. Year constructed: 1968

Yield: Not reported.

Remarks: Baker Well No. 2 (Jackson Well No. 2)

Generalized Log:

Soil	0 - 4 feet
Cemented sand and gravel	4 - 65 feet
Gravel	65 - 126 feet
Sand and gravel with clay seams	126 - 154 feet

*Well cemented back to 151 feet.

Water Level:

Reported to be 75 feet below land surface 3/1/68

Description and status of water right:

Permit G-4944 with a priority of January 25, 1972 for the appropriation of 0.48 cubic foot per second for the irrigation of 39.4 acres.

Records of Wells Report Well Number 58

Owner: Lamb-Weston, Inc. Location: NE¼ SW¼, Sec. 19, T. 4 N., R. 28E.

Depth: 137 feet. Diameter: 18 inches. Depth cased: 135 feet.

Approximate altitude of land surface at well: 562 ft. Year constructed: 1972

Yield: Tested at 1500 gallons with 25 feet of drawdown.

Remarks: Lamb-Weston Well No. 2 (Martin Well No. 2)

Generalized Log:

Sand	0 - 5 feet
Cemented gravel and boulders	5 - 72 feet
Gravel	72 - 95 feet
Clay and sand	95 - 100 feet
Sand and gravel	100 - 103 feet
Sand	103 - 126 feet
Basalt	126 - 137 feet

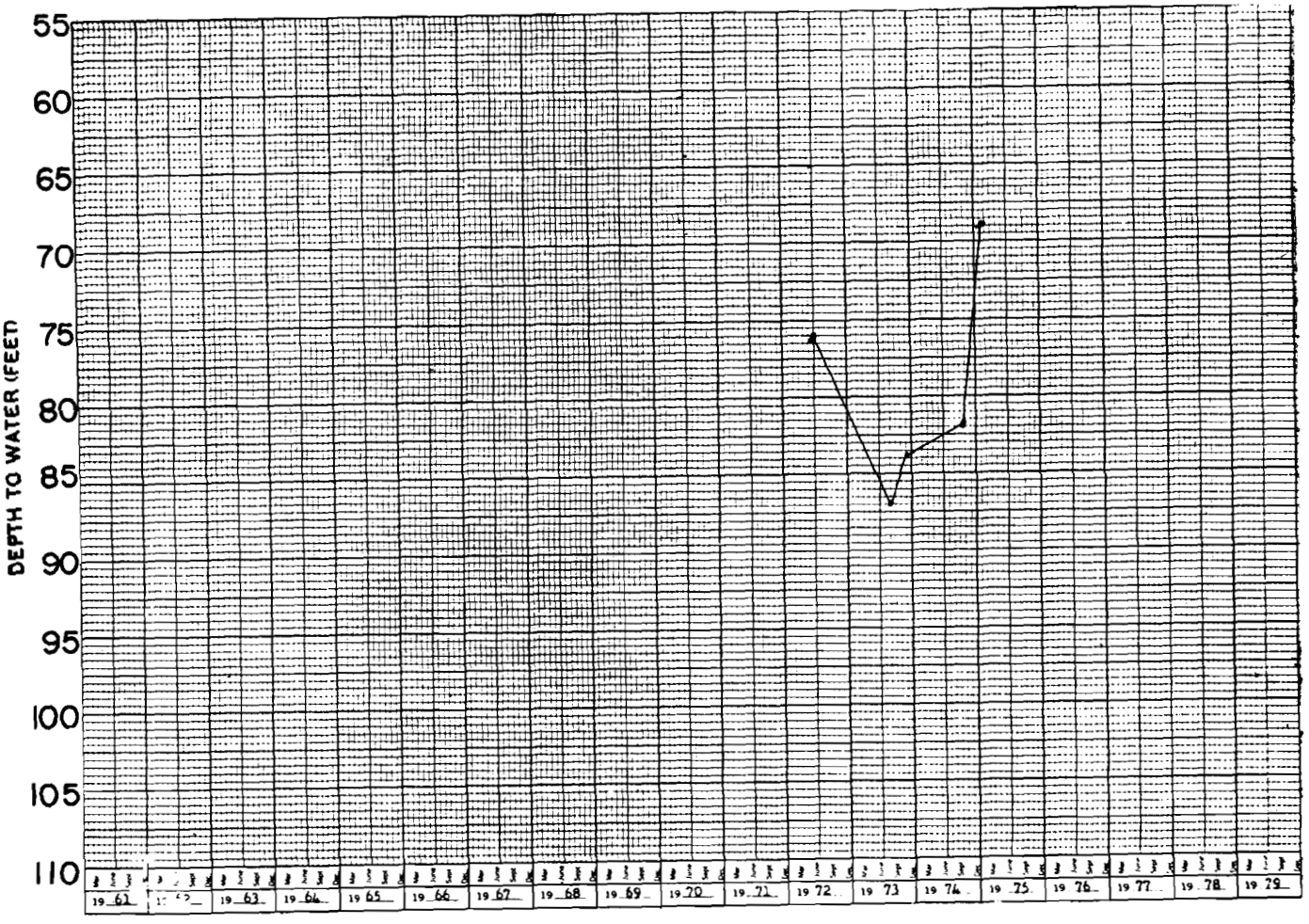
Water Level:

Reported to be 62 feet below land surface 2/7/72

Description and status of water right:

Permit G-4948 with a priority of February 3, 1972 for the appropriation of 3.3 cubic feet per second for industrial food processing.

Hydrograph:



Records of Wells Report Well Number 59 (34)

Owner: Malcolm Skinner Location: SW¼ NW¼, Sec. 19, T. 4N., R. 28E

Depth: 126 feet. Diameter: 16 inches. Depth cased: 126 feet.

Approximate altitude of land surface at well: 555 ft. Year constructed: 1968

Yield: Tested at 3000 gallons per minute with 31 feet of drawdown.

Remarks: Skinner Well No. 2

Generalized Log:

Soil	0 - 3.5	feet
Cemented sand and gravel	3.5 - 62	feet
Sand and gravel	62 - 126	feet

Water Level:

Reported to be 66 feet below land surface 1/26/68
Measured at 72.86 feet below land surface 1/8/75

Description and status of water right:

Permit G-5034 with a priority of February 25, 1972 for the appropriation of 0.125 cubic foot per minute from Well No. 2 for the irrigation of 10.0 acres.

Records of Wells Report Well Number 60 (63)

Owner: Bert H. Quick Location: NW¼ NW¼, Sec. 20, T. 4N., R. 28E

Depth: 60 (Prop.) feet. Diameter: 30 inches. Depth cased: 30 feet.

Approximate altitude of land surface at well: 528. Year constructed: -

Yield: Not reported.

Remarks: Dug Well Quick Well No. 1

Generalized Log:

No log

Description and status of water right:

Permit G-4972 with a priority of March 1, 1972 for the appropriation of 1.0 cubic foot per second from well No. 1 for the irrigation of 80.0 acres.

Records of Wells Report Well Number 61

Owner: John L. King Location: SE¼ SE¼, Sec. 26, T. 4 N., R. 27E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 603 ft. Year constructed: -

Yield: -

Remarks: -

Generalized Log:

Not drilled

Description and status of water right:

Application G-5761 with a filing date of March 24, 1972 for the appropriation of 0.91 cubic feet per second for the irrigation of 72.5 acres.

Records of Wells Report Well Number 62 (49)

Owner: Lyle W. and Jane K. Smith Location: SW¼ NE¼, Sec. 26, T. 4 N., R. 27E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 595 ft. Year constructed: -

Yield:

Remarks:

Generalized Log:

Not drilled

Description and status of water right:

Application G-5932 with a filing date of November 2, 1972 for the appropriation of 1.44 cubic feet per second for the irrigation of 115.0 acres.

Records of Wells Report Well Number 63 (60)

Owner: Bert H. Quick Location: NW¼ NW¼, Sec. 20, T. 4 N., R. 28 E.

Depth: 60 (Prop.) feet. Diameter: 30 inches. Depth cased: 30 feet.

Approximate altitude of land surface at well: 528 ft. Year constructed: -

Yield:

Remarks: Dug Well Quick Well No. 1

Generalized Log:

No log

Description and status of water right:

Application G-5926 with a filing date of November 2, 1972 for the appropriation of 0.5 cubic foot per second for the irrigation of 26.0 acres.

Records of Wells Report Well Number 64

Owner: Benjamin J. Newman Location: NE¼ SW¼, Sec. 20, T. 4 N., R. 28 E

Depth: feet. Diameter: inches. Depth cased: feet.

Approximate altitude of land surface at well: 509 ft. Year constructed:

Yield:

Remarks:

Generalized Log:

No log

Description and status of water right:

Application G-5947 with a filing date of November 29, 1972 for the appropriation of 0.4 cubic foot per second for the irrigation of 31.7 acres.

Records of Wells Report Well Number 65

Owner: LeRue W. Pollock Location: NW¼ NE¼, Sec. 31, T. 4 N., R. 28E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 550 ft. Year constructed: -

Yield: Not reported.

Remarks: Old gravel quarry: 30 feet deep x 800 feet x 109 feet

Generalized Log:

No log

Description and status of water right:

Application G-6023 with a filing date of March 9, 1973 for the appropriation of 0.5 cubic feet per second for the irrigation of 28.0 acres and the supplemental irrigation of 114.1 acres.

Records of Wells Report Well Number 66

Owner: George H. Barton Location: SW¼ NW¼, Sec. 31, T. 4 N., R. 28E

Depth: 191 (Rpt.) feet. Diameter: 16 (Rpt.) inches. Depth cased: 29 (Rpt) feet.

Approximate altitude of land surface at well: 558 ft. Year constructed: NR

Yield: Not reported.

Remarks:

Generalized Log:

No log

Description and status of water right:

Application G-6040 with a filing date of March 15, 1973 for the appropriation of 1.6 cubic feet per second for the irrigation of 127.86 acres.

Records of Wells Report Well Number 67

Owner: Lamb-Weston, Inc. Location: NE¼ NW¼, Sec. 30, T. 4 N., R. 28E

Depth: 90 feet. Diameter: 18 inches. Depth cased: 84.5* feet.

Approximate altitude of land surface at well: 550 ft. Year constructed: 1973

Yield: Tested at 1200 gallons per minute with 17 feet of drawdown.

Remarks: Lamb-Weston Well No. 3

Generalized Log:

Sand	0 - 2 feet
Boulders	2 - 26 feet
Cemented gravel	26 - 43 feet
Gravel	43 - 55 feet
Clay	55 - 60 feet
Sand and gravel	60 - 83 feet
Basalt	83 - 98 feet

Water Level:

Reported to be 40 feet below land surface 3/23/73

*Casing Perforated 45 - 55 feet
60 - 75 feet

Description and status of water right:

Application G-6069 with a filing date of April 23, 1973 for the appropriation of 2.67 cubic feet per second (1200 gallons per minute) for industrial use.

Records of Wells Report Well Number 68

Owner: Edgar S. and Elmo C. Bloom Location: SE¼ SE¼, Sec. 19, T. 4 N., R. 28E

Depth: 90 (Prop.) feet. Diameter: 12 (Prop.) inches. Depth cased: 80 (Prop.) feet.

Approximate altitude of land surface at well: 540 ft. Year constructed: NR

Yield: Not reported.

Remarks: Bloom Well No. 1

Generalized Log:

No log

Description and status of water right:

Application G-6058 with a filing date of April 4, 1973 for the appropriation of 0.35 cubic feet per second for the irrigation of 16.6 acres and the supplemental irrigation of 10.4 acres.

Records of Wells Report Well Number 69

Owner: Mrs. John W. Rice (Prop.) Location: NW¼ NW¼ (Prop.), Sec. 17, T. 4 N., R. 28 E

Depth: 115 ± feet. Diameter: 8 or 10 inches. Depth cased: 20 (Prop.) feet.

Approximate altitude of land surface at well: 532 ft. Year constructed: NR

Yield: Not reported.

Remarks:

Generalized Log:

No log

Description and status of water right:

Application G-6196 with a filing date of June 29, 1973 for the appropriation of 0.84 cubic feet per second (377 gallons per minute) for the irrigation of 67.0 acres.

Records of Wells Report Well Number 70 (29)

Owner: Woodrow Walker Location: NW¼ SE¼, Sec. 18, T. 4 N., R. 28 E

Depth: 102 feet. Diameter: 16 inches. Depth cased: 87.5 feet.

Approximate altitude of land surface at well: _____. Year constructed: 1967

Yield: Tested at 2700 gallons per minute.

Remarks: Walker Well No. 1

Generalized Log:

Soil	0 - 7 feet
Sand and gravel	7 - 69 feet
Clay	69 - 70 feet
Sand and gravel	70 - 102 feet

Water Level:

Reported to be 41 feet below land surface 8/28/67

Description and status of water right:

Application G-6225 with a filing date of July 12, 1973 for the appropriation of 0.7 cubic foot per second (314 gallons per minute) for the irrigation of 55.0 acres.

X.

RECORDS OF WELLS

Basalt Aquifers

Records of Wells Report Well Number 71

Owner: Oregon - Washington RR Location: NW¼ SW¼, Sec. 20, T. 4N., R.27 E

Depth: 457 feet. Diameter: 12 inches. Depth cased: 175 feet.

Approximate altitude of land surface at well: 540 ft. Year constructed: 1945

Yield: Tested at 300 gallons per minute with 3 feet of drawdown.

Remarks:

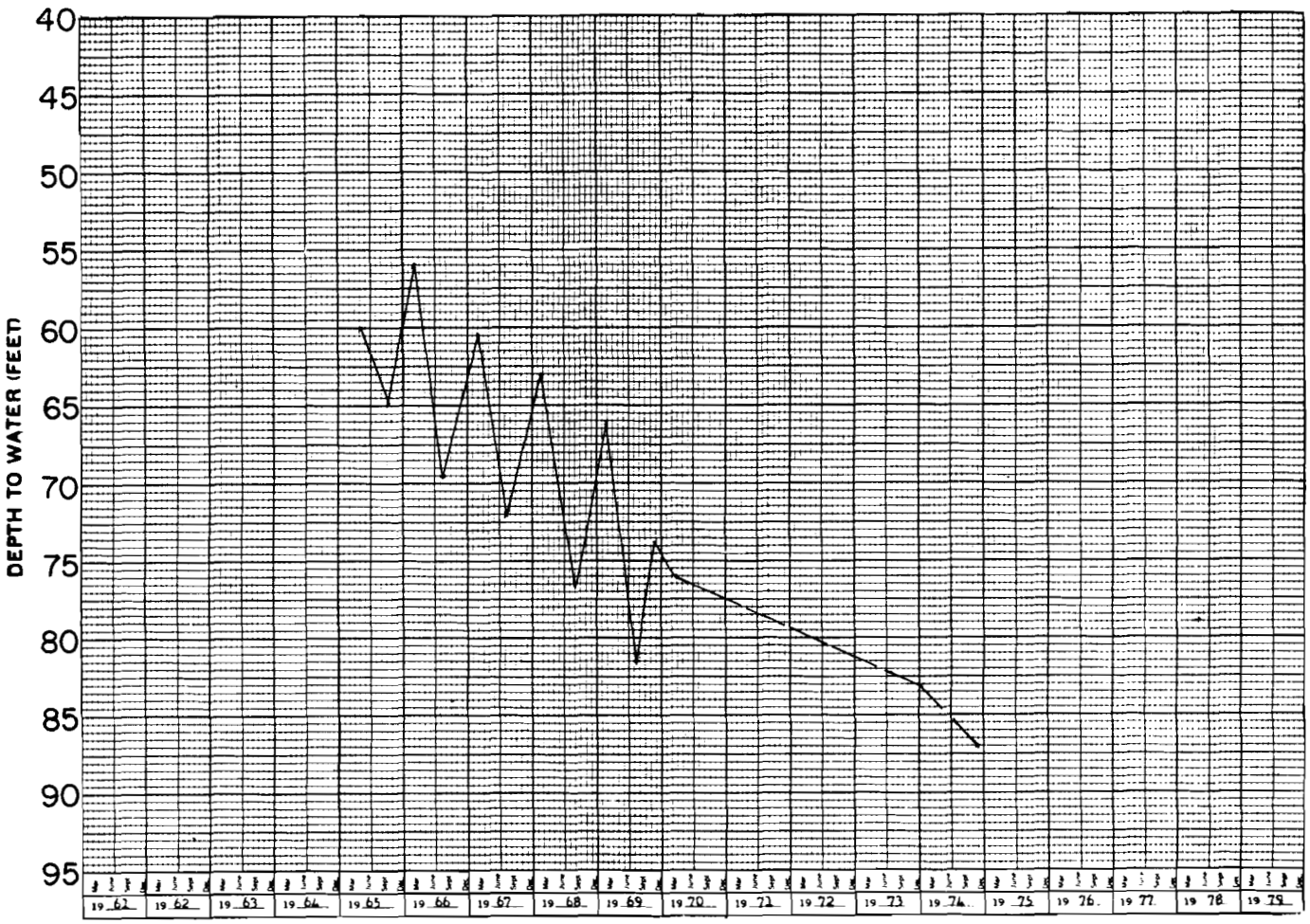
Generalized Log:

Sand and gravel	0 - 170 feet
Basalt	170 - 475 feet

Description and status of water right:

Water Right Certificate 15174 with a priority of April 17, 1946 for the appropriation of 0.67 cubic foot per second for steam locomotive and general railroad use. Right probably forfeited by abandonment.

Hydrograph:



Records of Wells

Report Well Number 72

Owner: Umatilla Army Depot Location: NW¼ NE¼, Sec. 5, T. 4N., R.27 E

Depth: 710 feet. Diameter: 16 inches. Depth cased: ? feet.

Approximate altitude of land surface at well: 545 ft. Year constructed: 1954

Yield: Tested at 1080 gallons per minute with 60 feet of drawdown.

Remarks: Well No. 6

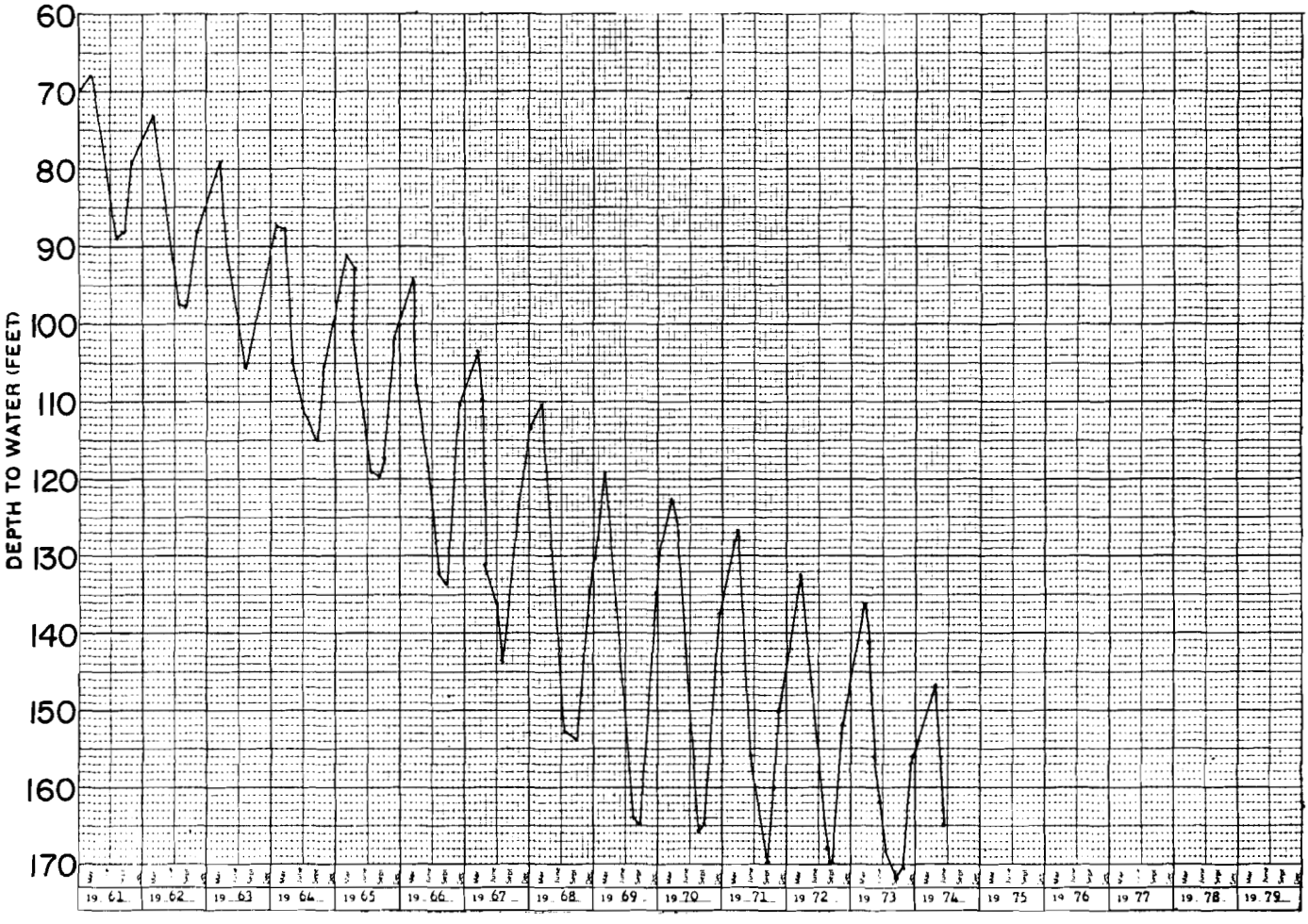
Generalized Log:

Sand, clay and gravel	0 - 141 feet
Basalt	141 - 698 feet
Basalt, red, water-bearing	698 - 710 feet

Description and status of water right:

Water Right Certificate 30524 with a priority of December 19, 1952 for the appropriation of 2.26 cubic feet per second for fire protection and manufacturing.

Hydrograph:



Records of Wells Report Well Number 73 (85)

Owner: Leota Nell Martin Location: NE¼ NE¼, Sec. 8, T. 3N., R. 27E

Depth: 725 feet. Diameter: 12 inches. Depth cased: 123 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1960

Yield: 1,300 gallons per minute with 6 feet of drawdown.

Remarks: Martin Well No. 2

Generalized Log:

Sand and clay	0 - 123 feet
Basalt	123 - 725 feet

Water Level:

Reported at 125 feet below land surface 4/9/63

Description and status of water right:

Water Right Certificate 31097 with a priority of April 3, 1953 for the appropriation of 0.25 cubic foot per second for the irrigation of 20 acres.

Records of Wells Report Well Number 74 (82)

Owner: Ernest R. Cramer Location: SW¼ SW¼, Sec. 10, T. 3N., R.26 E

Depth: 666 feet. Diameter: 12 inches. Depth cased: 173 feet.

Approximate altitude of land surface at well: 630 ft. Year constructed: 1958

Yield: Tested at 1,140 gallons per minute with 22 feet of drawdown.

Remarks: E. R. Cramer Well No. 1

Generalized Log:

Clay, sand and gravel	0 - 172 feet
Basalt	172 - 666 feet

Water Level:

Reported at 155 feet below land surface 1958

Description and status of water right:

Water Right Certificate 31194 with a priority of April 27, 1953 for the appropriation of 0.25 cubic foot per second for the irrigation of 20 acres.

Records of Wells Report Well Number 75 (79)

Owner: Waldo H. Cramer Location: SW¼ NE¼, Sec. 10, T. 3N., R.26 E

Depth: 544 feet. Diameter: 12 inches. Depth cased: 64 feet.

Approximate altitude of land surface at well: 650 ft. Year constructed: 1956

Yield: Tested at 525 gallons per minute with 5½ feet of drawdown.

Remarks: W. H. Cramer Well No. 1

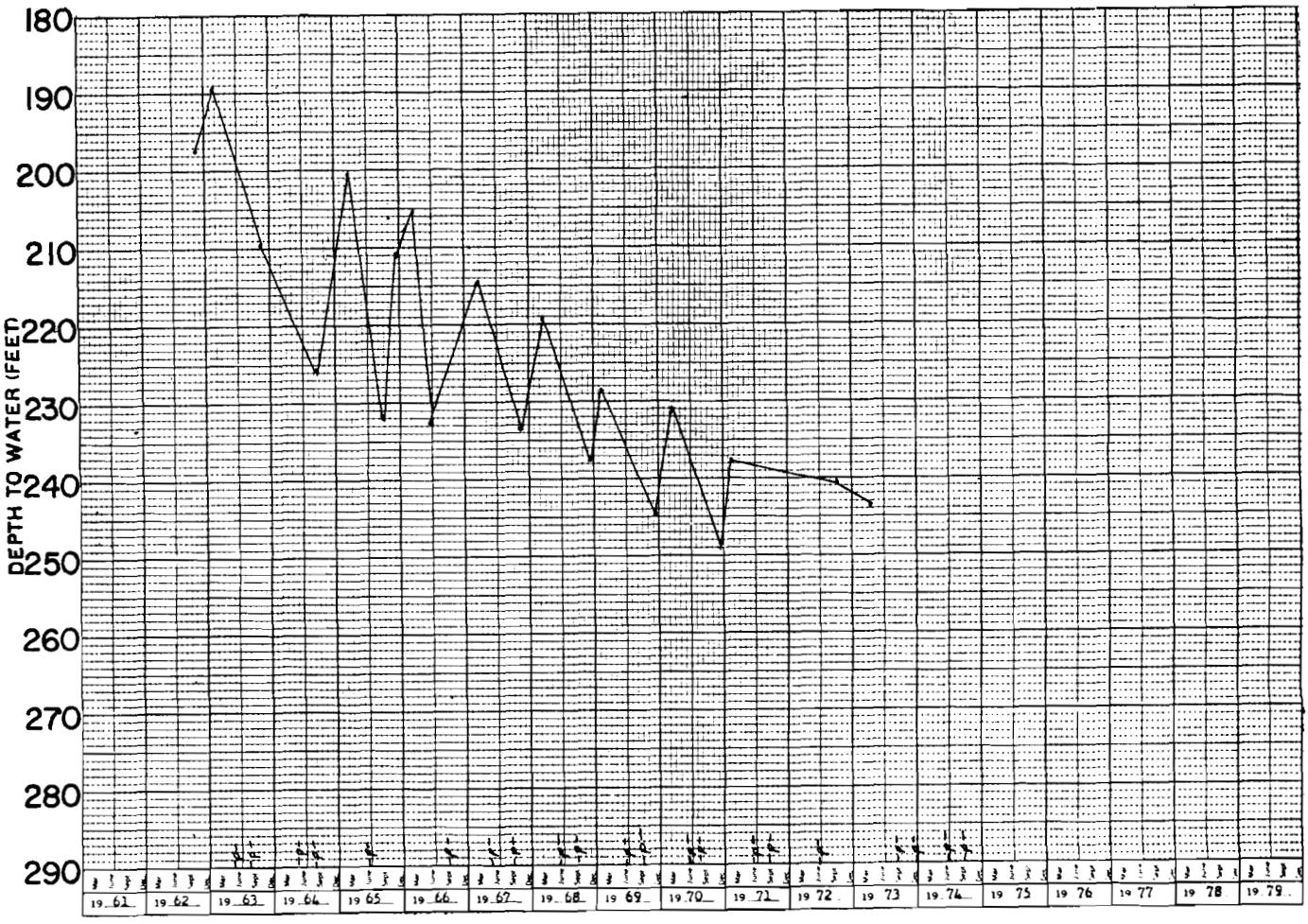
Generalized Log:

Sand and silt	0 - 163 feet
Basalt	163 - 544 feet

Description and status of water right:

Water Right Certificate 31195 with a priority of April 28, 1953 for the appropriation of 0.25 cubic foot per second for the irrigation of 20 acres.

Hydrograph:



Records of Wells Report Well Number 76

Owner: G. W. Redwine Location: SW¼ NW¼, Sec. 36, T. 4N., R. 27 E

Depth: 194 feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 572 ft. Year constructed: 1952

Yield: Tested at 225 gallons per minute.

Remarks:

Generalized Log:

Sand and gravel	0 - 95 feet
Clay	95 - 105 feet
Basalt	105 - 135 feet
Clay interbed	135 - 194 feet

Water Level:

Reported at 55 feet below land surface 1952

Description and status of water right:

Water Right Certificate 23740 with a priority of August 9, 1954 for the appropriation of 0.5 cubic foot per second for the irrigation of 40.0 acres.

Records of Wells Report Well Number 77

Owner: Ernest J. Royster Location: SE¼ SE¼, Sec. 4, T. 3N., R. 27E

Depth: 185 feet. Diameter: 12 inches. Depth cased: 89 feet.

Approximate altitude of land surface at well: 582 ft. Year constructed: 1955

Yield: Tested at 360 gallons per minute.

Remarks:

Generalized Log:

Clay and gravel	0 - 89 feet
Basalt	89 - 185 feet

Water Level:

Measured at 33.5 feet below land surface 11/21/58
Measured at 36.0 feet below land surface 4/12/73

Description and status of water right:

Water Right Certificate 26170 with a priority of August 3, 1955 for the appropriation of 0.93 cubic foot per second for the irrigation of 74.6 acres.

Records of Wells Report Well Number 78 (93)

Owner: Umatilla Army Depot Location: NE¼ NW¼, Sec. 5, T. 4N., R. 27 E

Depth: 682 feet. Diameter: 24 - 20 inches. Depth cased: 197 feet.

Approximate altitude of land surface at well: 520 ft. Year constructed: 1957

Yield: Tested at 1170 gallons per minute with 13.5 feet of drawdown.

Remarks: Well No. 7

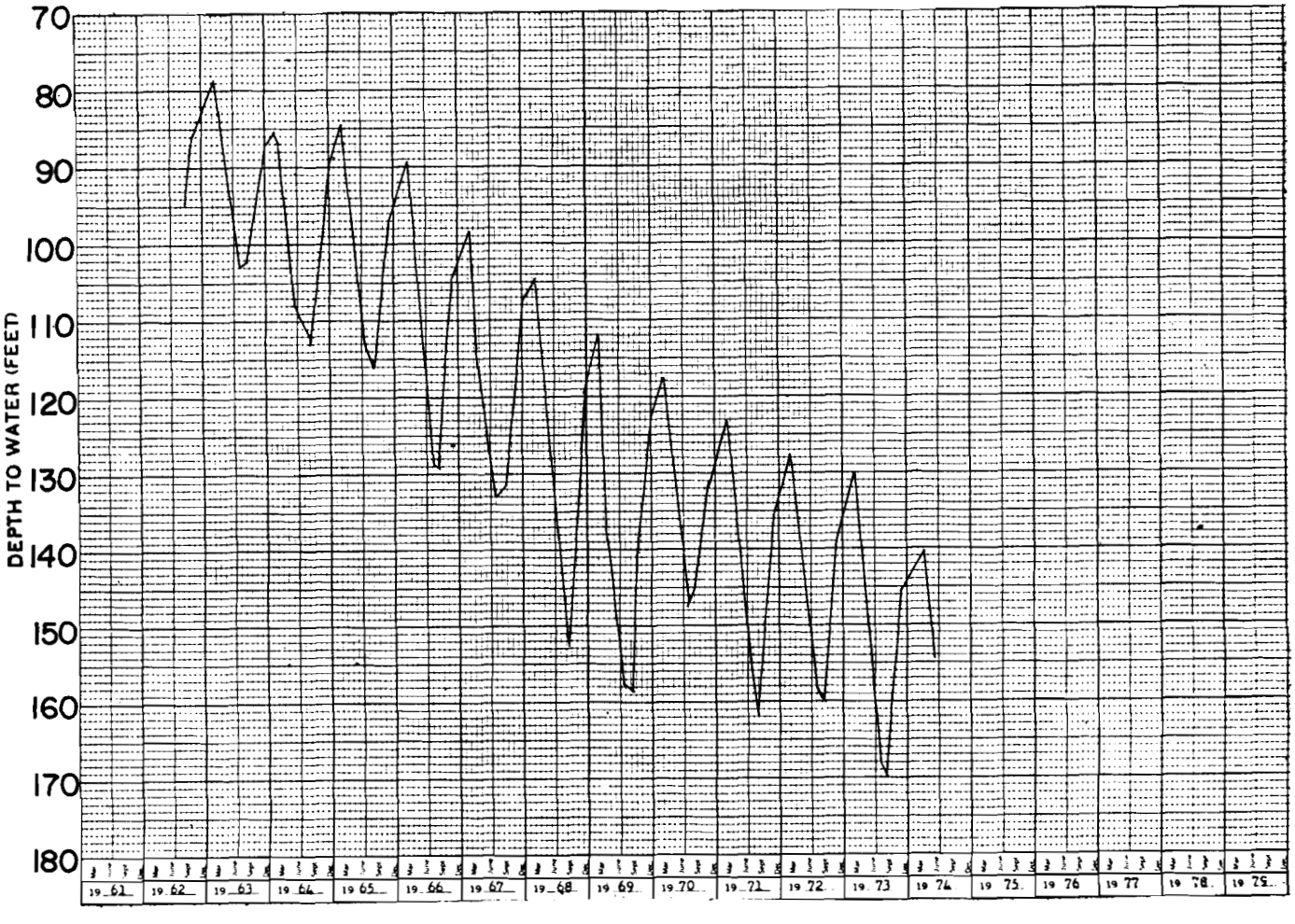
Generalized Log:

Silt, clay and sand	0 - 120 feet
Basalt	120 - 672 feet
Basalt, red, water-bearing	672 - 680 feet
Basalt	680 - 682 feet

Description and status of water right:

Water Right Certificate 30525 with a priority of January 27, 1958 for the appropriation of 0.5 cubic foot per second for domestic use.

Hydrograph:



Records of Wells Report Well Number 79 (75)

Owner: Waldo H. Cramer Location: SW¼ NE¼, Sec. 10, T. 3N., R. 26 E

Depth: 544 feet. Diameter: 12 inches. Depth cased: 64 feet.

Approximate altitude of land surface at well: 650 ft. Year constructed: 1956

Yield: Tested at 525 gallons per minute with 5½ feet of drawdown.

Remarks: W. H. Cramer Well No. 1

Generalized Log:

Sand and silt	0 - 163 feet
Basalt	163 - 544 feet

Description and status of water right:

Water Right Certificate 34382 with a priority of August 27, 1958 for the appropriation of 1.89 cubic feet per second for the irrigation of 151.2 acres.

Records of Wells

Report Well Number 80

Owner: Luther W. Cramer Location: NE¼ SW¼, Sec. 4, T. 3N., R. 26 E.

Depth: 623 feet. Diameter: 12 to 8 inches. Depth cased: 92 feet.

Approximate altitude of land surface at well: 635 ft. Year constructed: 1960

Yield: Tested at 500 gallons per minute with 5 feet of drawdown.

Remarks: L. W. Cramer Well No. 1

Generalized Log:

Silt and clay	0 - 120 feet
Basalt	120 - 623 feet

Description and status of water right:

Permit G-1319 with a priority of March 2, 1959 for the appropriation of 2.25 cubic feet per second and April 7, 1959 for the appropriation of 1.75 cubic feet per second from two wells for the irrigation of 320 acres.

Hydrograph:

Records of Wells Report Well Number 80-A

Owner: Luther W. Cramer Location: NW¼ SE¼, Sec. 4, T. 3N., R. 26 E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 650 ft. Year constructed: -

Yield: -

Remarks: L. W. Cramer Well No. 2

Generalized Log:

Not drilled

Description and status of water right:

Permit G-1319 with a priority of March 2, 1959 for the appropriation of 2.25 cubic feet per second and April 7, 1959 for the appropriation of 1.75 cubic feet per second from two wells for the irrigation of 320 acres.

Records of Wells Report Well Number 81

Owner: Milldred F. Cramer Location: NE¼ NE¼, Sec. 4, T. 3N., R.26 E

Depth: 680 feet. Diameter: 12 to 8 inches. Depth cased: 123 feet.

Approximate altitude of land surface at well: 627 ft. Year constructed: 1960

Yield: Tested at 500 gallons per minute with 12 feet of drawdown.

Remarks: M. F. Cramer Well No. 1

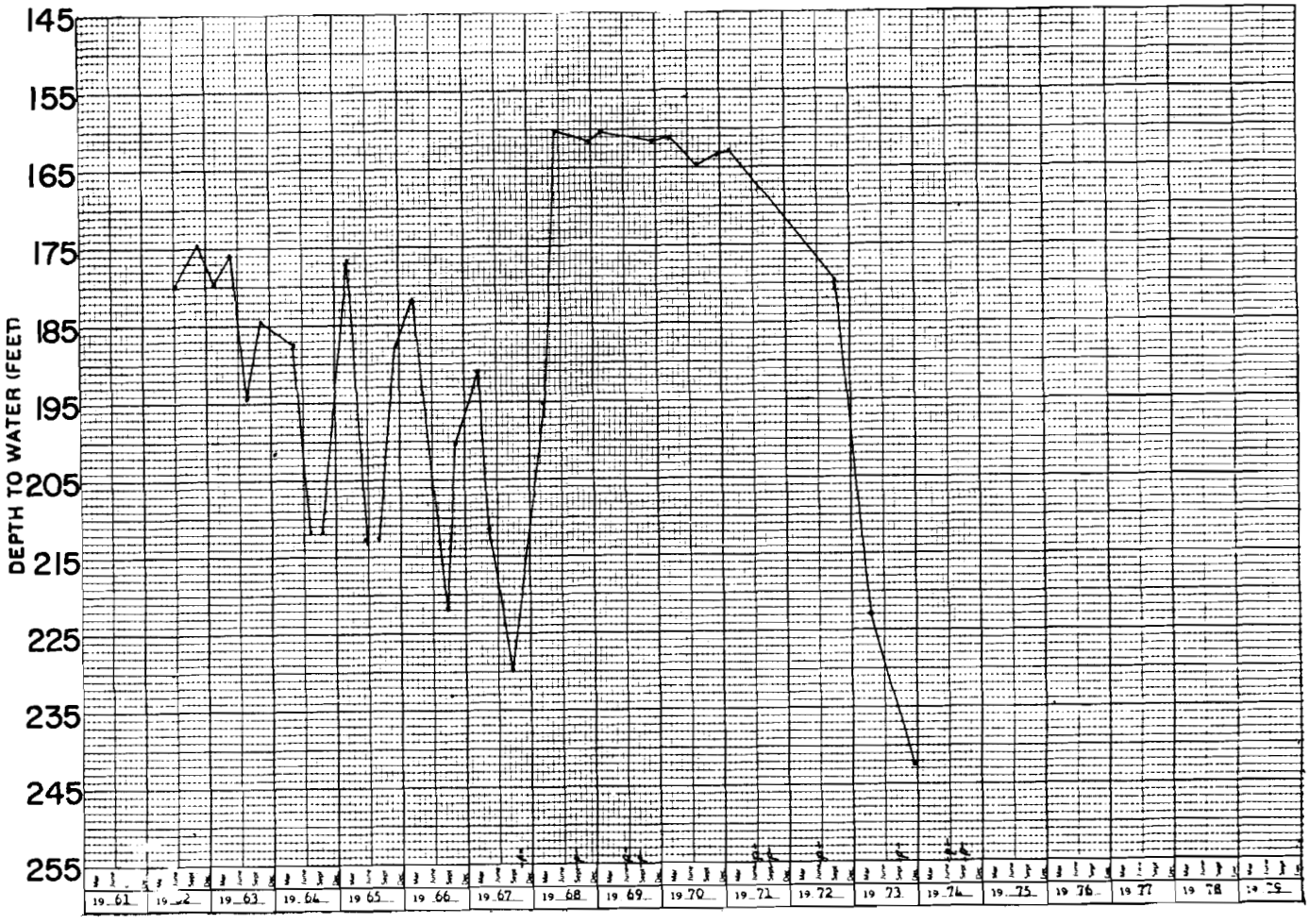
Generalized Log:

Silt and clay	0 - 136 feet
Basalt	136 - 680 feet

Description and status of water right:

Permit G-1284 with a priority of March 6, 1956 for the appropriation of 4.0 cubic feet per second from two wells for the irrigation of 320 acres.

Hydrograph:



Records of Wells Report Well Number 81-A

Owner: Mildred F. Cramer Location: NE¼ NW¼, Sec. 4, T. 3N., R. 26 E

Depth: - feet. Diameter: - inches. Depth cased: - feet.

Approximate altitude of land surface at well: 630 ft. Year constructed: -

Yield: -

Remarks: M. F. Cramer Well No. 2

Generalized Log:

Not drilled

Description and status of water right:

Permit G-1284 with a priority of March 6, 1956 for the appropriation of 4.0 cubic feet per second from two wells for the irrigation of 320 acres.

Records of Wells Report Well Number 82 (74)

Owner: Ernest Cramer Location: SW¼ SW¼, Sec. 10, T. 3N., R. 26 E

Depth: 666 feet. Diameter: 12 inches. Depth cased: 173 feet.

Approximate altitude of land surface at well: 630 ft. Year constructed: 1958

Yield: Tested at 1,140 gallons per minute with 22 feet of drawdown.

Remarks: E. R. Cramer Well No. 1

Generalized Log:

Clay, sand and gravel	0 - 172 feet
Basalt	172 - 666 feet

Water Level:

Reported at 155 feet below land surface 1958

Description and status of water right:

Water Right Certificate 34276 with a priority of March 11, 1959 for the appropriation of 2.68 cubic feet per second for the irrigation of 274.8 acres.

Records of Wells Report Well Number 83 (88)

Owner: Hansell Bros., Inc. Location: NE¼ SE¼, Sec. 27, T. 4N., R.27 E

Depth: 543 feet. Diameter: 16-12-10 inches. Depth cased: 526 feet.

Approximate altitude of land surface at well: 603. Year constructed: 1942

Yield: Tested at 1,200 gallons per minute with 10 feet of drawdown.

Remarks: Hansell Well No. 1

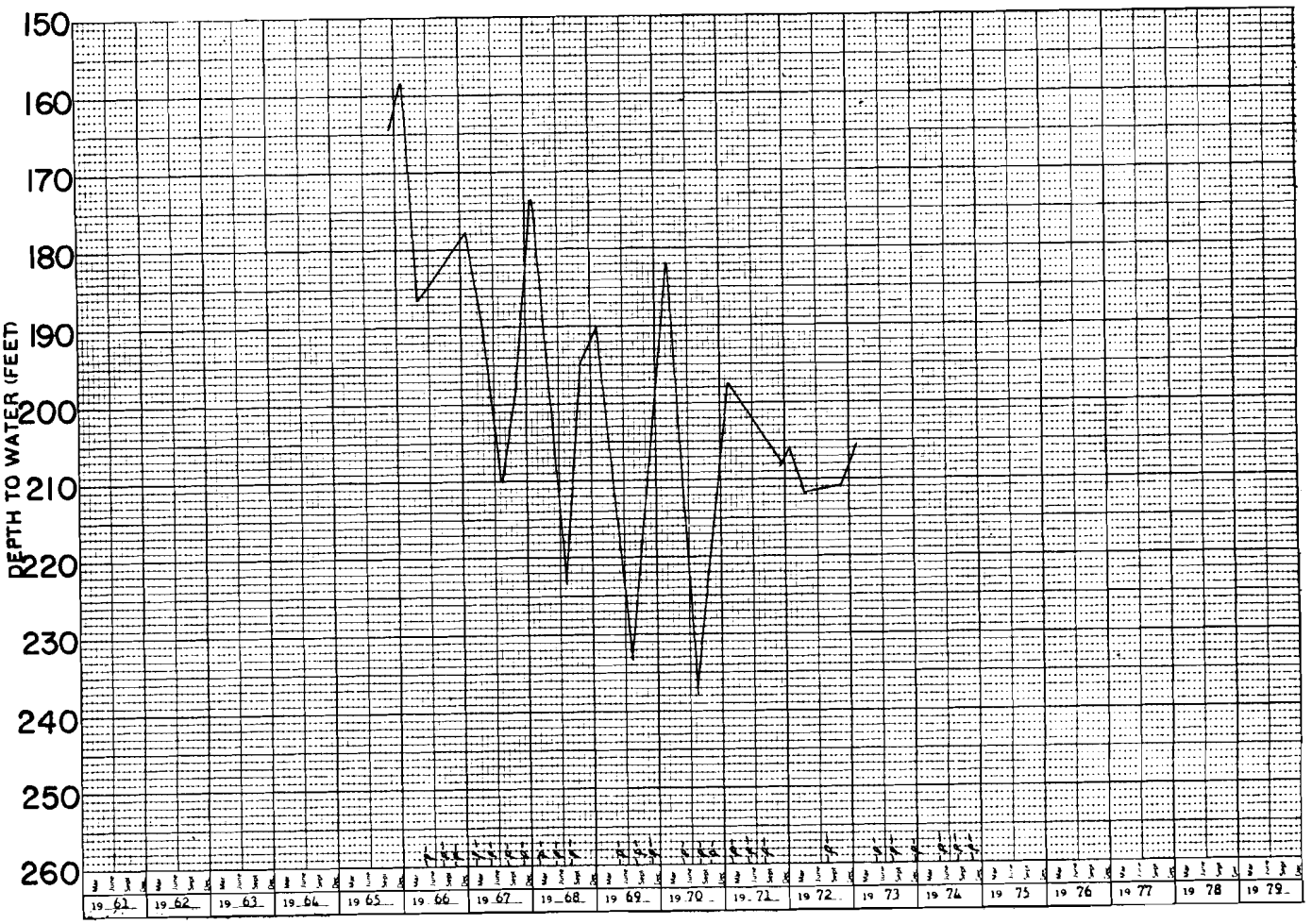
Generalized Log:

Sand and gravel	0 - 146 feet
Basalt with some interbedded sedimentary strata	146 - 543 feet

Description and status of water right:

Water Right Certificate 35395 with a priority of June 28, 1960 for the appropriation of 2.0 cubic feet per second for hog raising and 0.02 cubic foot per second for the irrigation of 1.8 acres.

Hydrograph:



Records of Wells Report Well Number 84

Owner: Frank L. Warren Location: SW¼ NE¼, Sec. 14, T. 3N., R.26 E

Depth: 551 feet. Diameter: 12 inches. Depth cased: 108 feet.

Approximate altitude of land surface at well: 620 ft. Year constructed: 1959?

Yield: Not reported

Remarks:

Generalized Log:

No log

Water Level:

134.0 feet below land surface 6/26/62

Description and status of water right:

Water Right Certificate 34282 with a priority of December 19, 1960 for the appropriation of 4.0 cubic feet per second for the irrigation of 320.0 acres.

Records of Wells Report Well Number 85 (73)

Owner: Leota Nell Martin Location: NE¼ NE¼, Sec. 8, T. 3N., R.27 E

Depth: 725 feet. Diameter: 12 inches. Depth cased: 123 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1960

Yield: 1,300 gallons per minute with 6 feet of drawdown.

Remarks: Martin Well No. 2

Generalized Log:

Sand and clay	0 - 123 feet
Basalt	123 - 725 feet

Water Level:

Reported at 125 feet below land surface 4/9/63

Description and status of water right:

Water Right Certificate 34280 with a priority of October 2, 1961 for the appropriation of 2.68 cubic feet per second for the irrigation of 300.0 acres.

Records of Wells Report Well Number 86 (87)

Owner: Sabre Corporation Location: NW¼ SW¼, Sec. 5, T. 3N., R.26 E

Depth: 950 feet. Diameter: 20 inches. Depth cased: 140 feet.

Approximate altitude of land surface at well: 641 ft. Year constructed: 1961

Yield: Tested at 2,200 gallons per minute.

Remarks: Hellburg Well No. 1

Generalized Log:

Soil and sand	0 - 120 feet
Basalt	120 - 950 feet

Description and status of water right:

Permit G-2049 with a priority of February 8, 1962 for the appropriation of 3.5 cubic feet per second for the irrigation of 322.8 acres. Water Right Certificate 31196 was issued to Otto J. Hellberg for the appropriation of 3.5 cubic feet per second for the irrigation of 322.8 acres in the west half of Section 5, Township 3 North, Range 26 East. An application for change in place of use of irrigation of 161.9 acres in the NW¼ of Section 5 to 160.9 acres in the NE¼ and 1.0 acre in the N½ SE¼ of Section 7, Township 3 North, Range 26 East was approved by order which also provided for the cancellation of Certificate 31196 and the issuance of a new Certificate upon completion of the change.

Records of Wells Report Well Number 87 (86)

Owner: Sabre Corporation Location: NW¼ SW¼, Sec. 5, T. 3N., R. 26 E.

Depth: 950 feet. Diameter: 20 inches. Depth cased: 140 feet.

Approximate altitude of land surface at well: 641 ft. Year constructed: 1961

Yield: Tested at 2,200 gallons per minute.

Remarks: Hellburg Well No. 1

Generalized Log:

Soil and sand	0 - 120 feet
Basalt	120 - 950 feet

Description and status of water right:

Water Right Certificate 33864 with a priority of August 9, 1963 for the appropriation of 2.0 cubic feet per second for the irrigation of 160.0 acres.

Hydrograph:

Records of Wells Report Well Number 88 (83)

Owner: Hansell Bros., Inc. Location: NE¼ SE¼, Sec. 27, T. 4N., R.27 E

Depth: 543 feet. Diameter: 16-12-10 inches. Depth cased: 526 feet.

Approximate altitude of land surface at well: 603 ft. Year constructed: 1942

Yield: Tested at 1,200 gallons per minute with 10 feet of drawdown.

Remarks: Hansell Well No. 1

Generalized Log:

Sand and gravel	0 - 146 feet
Basalt with some interbedded sedimentary strata	146 - 543 feet

Water Level:

Reported at 121 feet below land surface 10/43

Measured at 158 feet below land surface 2/66

Description and status of water right:

Water Right Certificate 35396 with a priority of June 5, 1964 for the appropriation of 3.34 cubic feet per second for the irrigation of 267.0 acres.

Records of Wells Report Well Number 89

Owner: Umatilla Army Depot Location: NW¼ SE¼, Sec. 22, T. 4N., R.27 E

Depth: 360 feet. Diameter: 15-12 inches. Depth cased: 218 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1941

Yield: 750 gallons per minute.

Remarks: Well No. 2

Generalized Log:

Sand and gravel	0 - 155 feet
Basalt	155 - 360 feet

Description and status of water right:

Water Right Certificate 33778 with a priority of January 5, 1975 for the appropriation of 0.78 cubic foot per second for domestic use.

Hydrograph:

Records of Wells Report Well Number 90

Owner: Umatilla Army Depot Location: NE¼ SW¼, Sec. 22, T. 4N., R. 27E

Depth: 327 feet. Diameter: 12 inches. Depth cased: 150 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1941

Yield: 750 gallons per minute with 25 feet of drawdown.

Remarks: Well No. 1

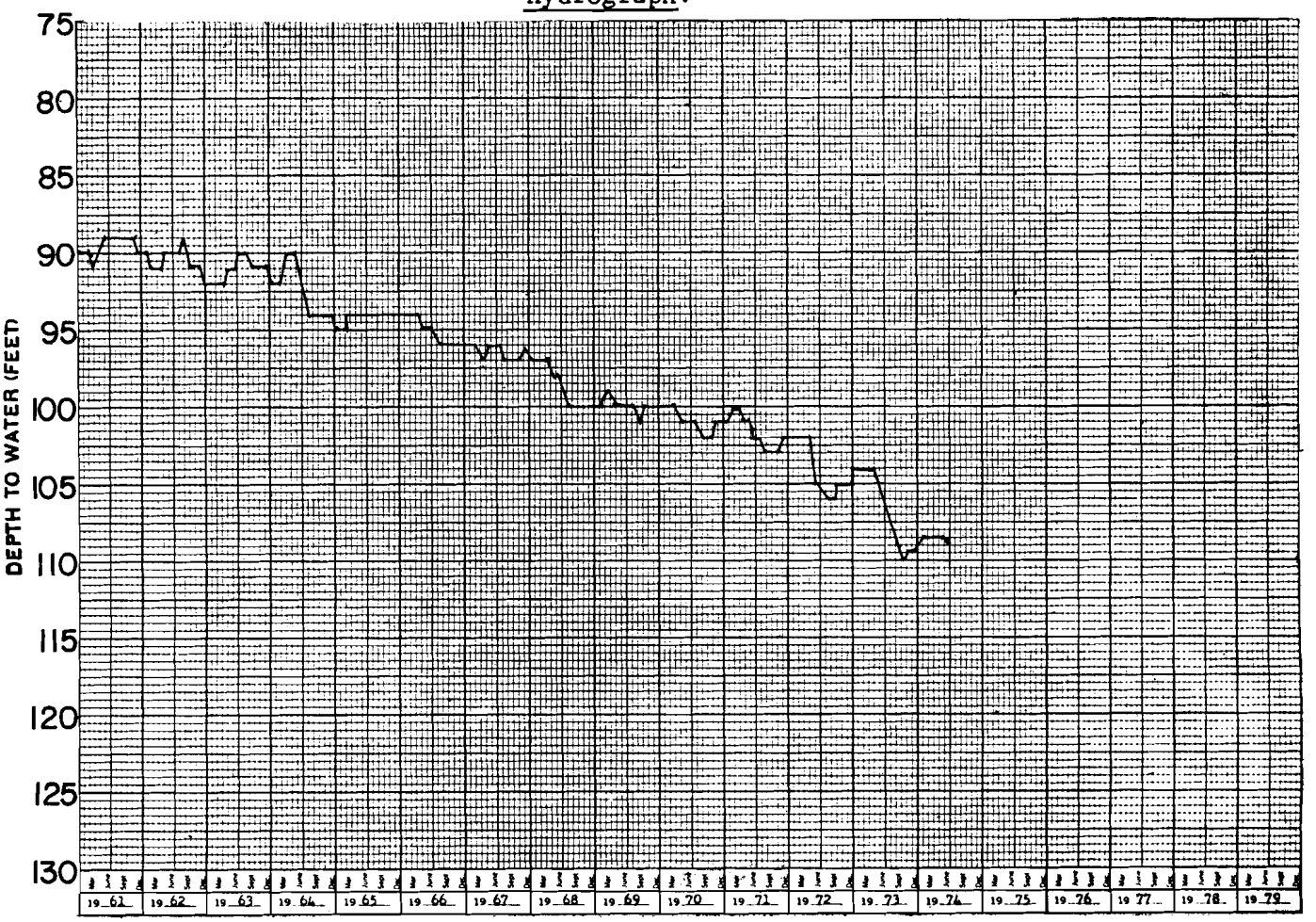
Generalized Log:

Sand and gravel	0 - 157 feet
Basalt	157 - 327 feet

Description and status of water right:

Water Right Certificate 33778 with a priority of January 5, 1965 for the appropriation of 0.34 cubic foot per second for irrigation and 2.00 cubic feet per second for fire protection. The use for fire protection is limited to the maintaining of the fire suppression system and to periods of actual fire emergency.

Hydrograph:



Records of Wells Report Well Number 91

Owner: Umatilla Army Depot Location: SE¼ SW¼, Sec. 18, T. 4N., R. 27 E

Depth: 618 feet. Diameter: 16-12 inches. Depth cased: Unknown feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1950

Yield: 575 gallons per minute with 2 feet of drawdown.

Remarks: Well No. 5

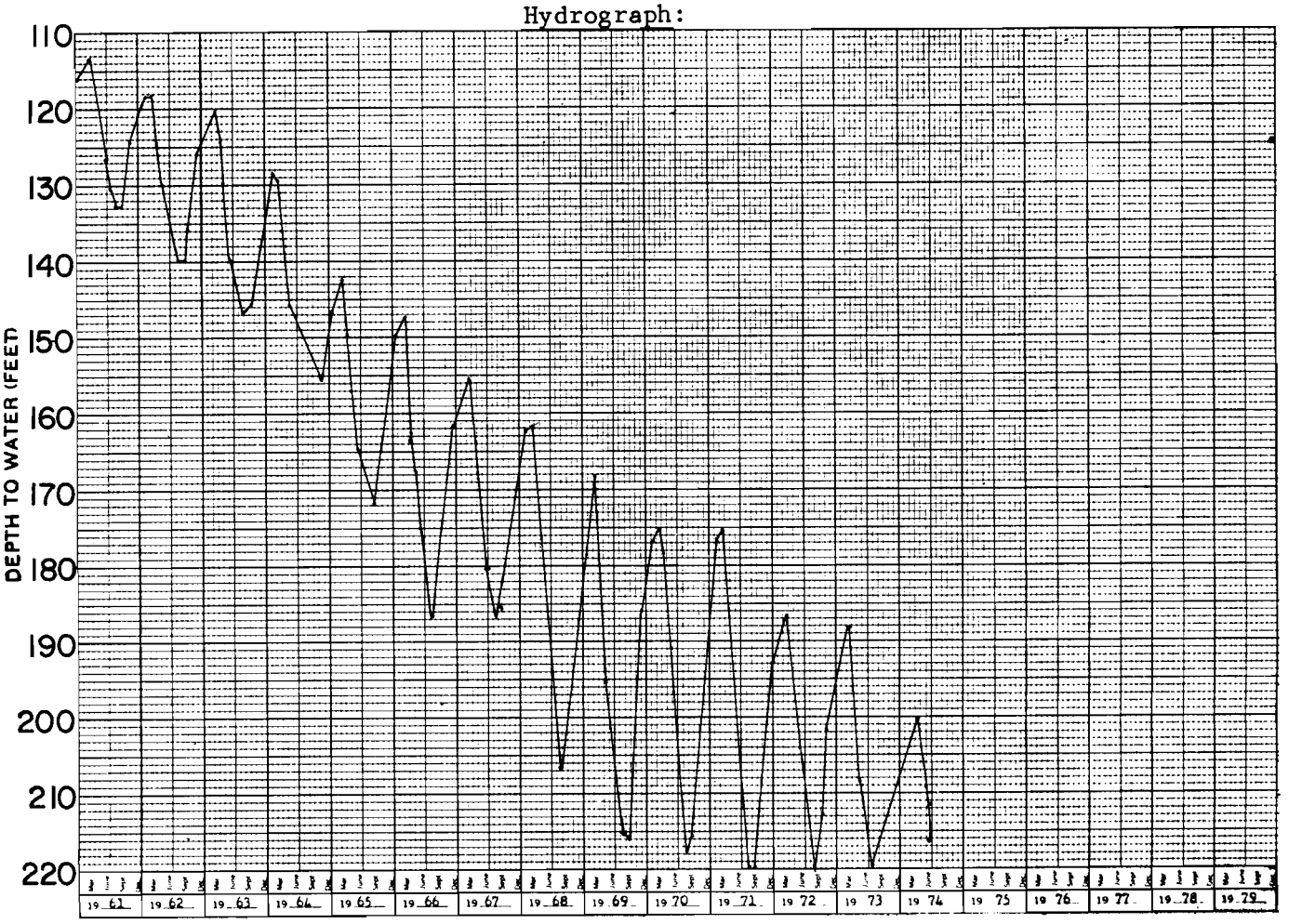
Generalized Log:

Sand, gravel and clay	0 - 140 feet
Basalt	140 - 180 feet
Caly interbed	180 - 200 feet
Basalt	200 - 618 feet

Description and status of water right:

Water Right Certificate 33988 with a priority of January 5, 1965 for the appropriation of 1.11 cubic feet per second for fire protection. Use under this certificate is limited to maintaining the fire suppression system and to periods of actual fire emergency.

Hydrograph:



Records of Wells Report Well Number 92

Owner: Umatilla Army Depot Location: NW¼ NE¼, Sec. 19, T. 4N., R.27 E

Depth: 600 feet. Diameter: 16-12 inches. Depth cased: Unknown feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1950

Yield: 475 gallons per minute with 25 feet of drawdown.

Remarks: Well No. 4

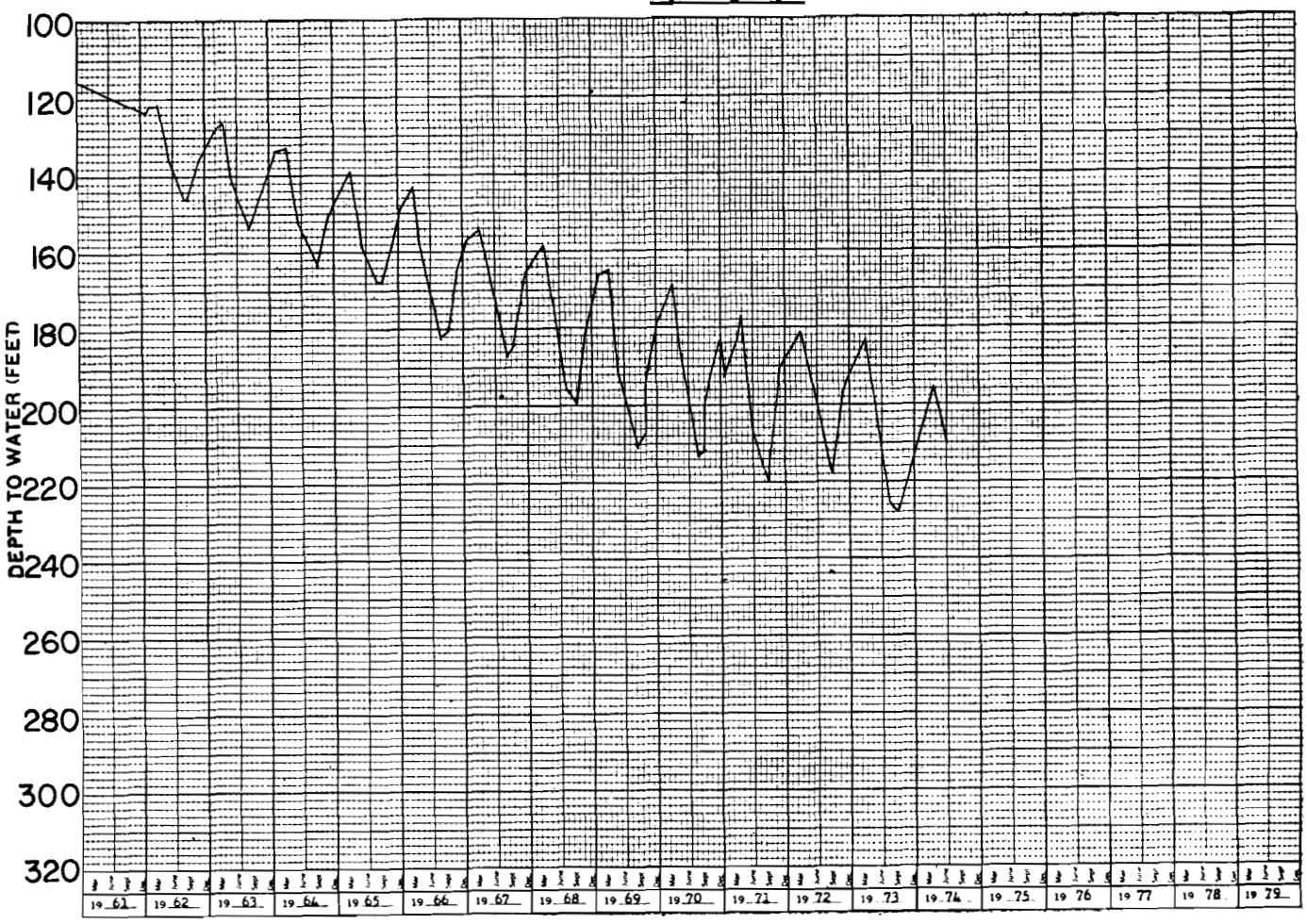
Generalized Log:

Sand and gravel	0 - 115 feet
Basalt with some interbedded sedimentary strata	115 - 600 feet

Description and status of water right:

Water Right Certificate 33765 with a priority of January 5, 1965 for the appropriation of 1.1 cubic feet per second for fire protection. Use under this certificate is limited to maintaining the fire suppression system and to periods of actual fire emergency.

Hydrograph:



Records of Wells Report Well Number 93 (78)

Owner: Umatilla Army Depot Location: NE¼ NW¼, Sec. 5, T. 4N., R.27 E

Depth: 682 feet. Diameter: 24-20 inches. Depth cased: 197 feet.

Approximate altitude of land surface at well: 520 ft. Year constructed: 1957

Yield: Tested at 1170 gallons per minute with 13.5 feet of drawdown.

Remarks: Well No. 7

Generalized Log:

Silt, clay and sand	0 - 120 feet
Basalt	120 - 672 feet
Basalt, red, water-bearing	672 - 680 feet
Basalt	680 - 682 feet

Description and status of water right:

Water Right Certificate 33766 with a priority of January 5, 1965 for the appropriation of 1.72 cubic feet per second for fire protection. Use under the certificate is limited to maintaining the fire suppression system and to periods of actual fire emergency.

Records of Wells Report Well Number 94

Owner: Umatilla Army Depot Location: NE¼ SE¼, Sec. 8, T. 4 N., R. 27E

Depth: 453 feet. Diameter: 16-12 inches. Depth cased: 256 feet.

Approximate altitude of land surface at well: 615 ft. Year constructed: 1941

Yield: Not Reported.

Remarks: Well No. 3

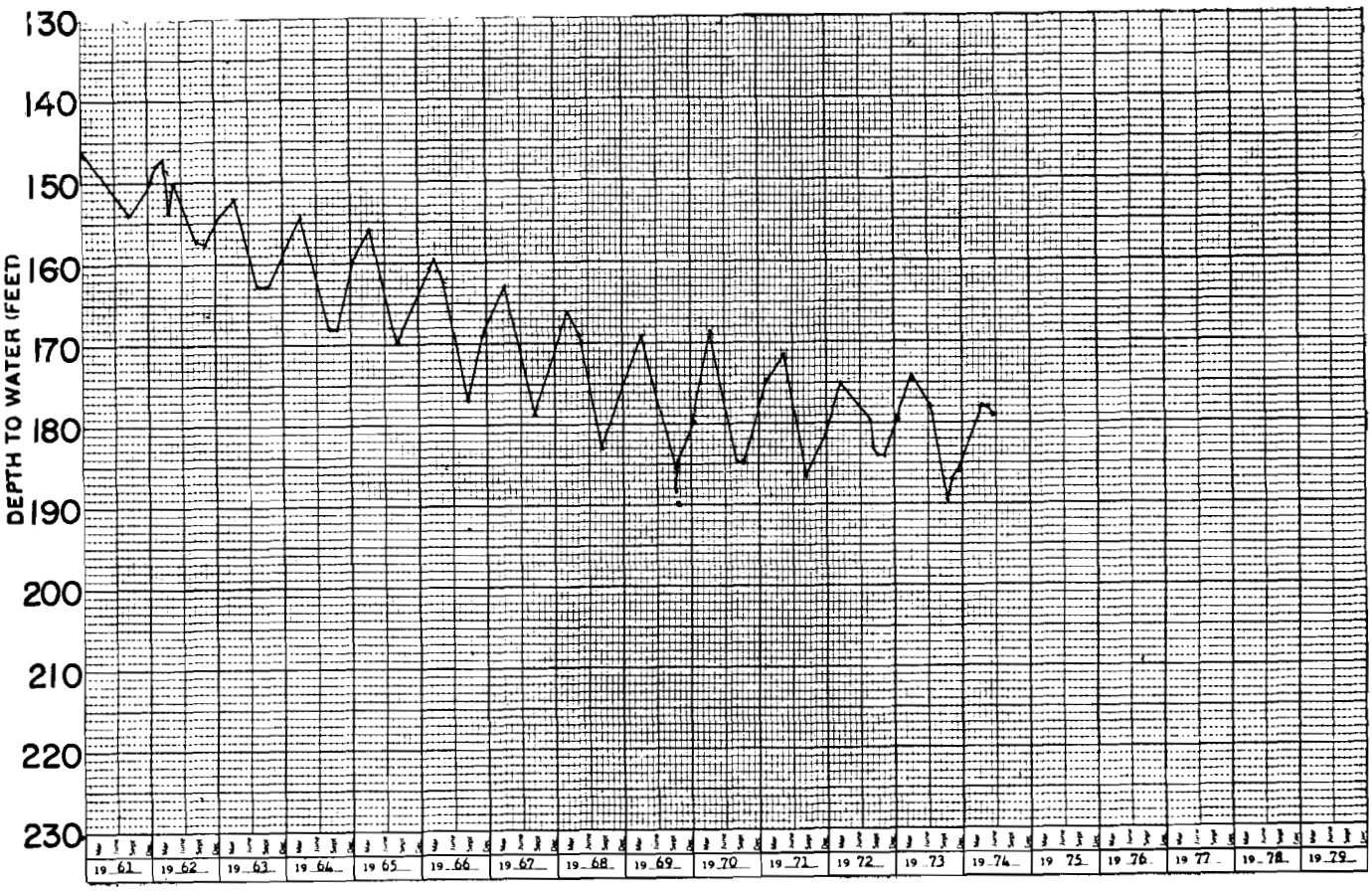
Generalized Log:

Sand and clay	0 - 190 feet
Basalt	190 - 360 feet
Basalt and interbedded sedimentary strata	360- 453 feet

Description and status of water right:

Water Right Certificate 33989 with a priority of January 5, 1965 for the appropriation of 10 gallons per minute for fire protection. Use under this certificate is limited to maintaining the fire suppression system and to periods of actual fire emergency.

Hydrograph:



Records of Wells Report Well Number 95

Owner: C. E. Newquist Location: SW¼ SW¼, Sec. 30, T. 5 N., R. 27 E

Depth: 400 feet. Diameter: 8 inches. Depth cased: 42 feet.

Approximate altitude of land surface at well: 350 ft. Year constructed: 1968

Yield: Not reported

Remarks:

Generalized Log:

Sand, gravel, and clay	0 - 30 feet
Basalt	30 - 90 feet
Shale interbed	90 - 120 feet
Basalt	120 - 194 feet
Basalt?	194 - 400 feet

*Deepening - No log

Description and status of water right:

Permit G-3913 with a priority of December 18, 1967 for the appropriation of 1.5 cubic feet per second for the irrigation of 120.0 acres.

Records of Wells Report Well Number 96

Owner: City of Irrigon Location: SW¼ SW¼, Sec. 19, T. 5 N., R. 27 E

Depth: 317 feet. Diameter: 12-6 inches. Depth cased: 199 feet.

Approximate altitude of land surface at well: 297 ft. Year constructed: 1968

Yield: Tested at 142 gallons per minute with 115 feet of drawdown.

Remarks:

Generalized Log:

Sand and gravel	0 - 73 feet
Basalt	73 - 123 feet
Clay	123 - 164 feet
Basalt	164 - 317 feet

Water Level:

Reported at 38 feet below land surface 11/20/68
Measured at 43.8 feet below land surface 1/10/75

Description and status of water right:

Permit G-4269 with a priority of August 5, 1968 for the appropriation of 1.0 cubic feet per second for municipal use.

Records of Wells Report Well Number 97

Owner: Vern K. Evans Location: SE¼ NE¼, Sec. 20, T. 5N., R. 27E

Depth: 300 feet. Diameter: 8 inches. Depth cased: 28 feet.

Approximate altitude of land surface at well: 300 ft. Year constructed: 1968

Yield: Tested at 60 gallons per minute with 8 feet of drawdown.

Remarks: Evans Well No. 1

Generalized Log:

Sand	0 - 25 feet
Sand and gravel	25 - 28 feet
Basalt	28 - 273 feet
Clay interbed	273 - 300 feet

Description and status of water right:

Permit G-4478 with a priority date of December 27, 1968 for the appropriation of 0.05 cubic foot per second for the irrigation of 4.35 acres.

Records of Wells Report Well Number 98

Owner: R. W. Reppert Location: SW¼ NW¼, Sec. 26, T. 5N., R. 26E

Depth: 235 feet. Diameter: 6 inches. Depth cased: 120 feet.

Approximate altitude of land surface at well: 330 ft. Year constructed: 1956

Yield: Not reported

Remarks:

Generalized Log:

Sand and silt	0 - 65 feet
Sand, gravel and boulders	65 - 120 feet
Basalt	120 - 198 feet
Clay	198 - 219 feet
Basalt	219 - 235 feet

Water Level:

Artesian 1956

Description and status of water right:

Water Right Certificate 38739 with a priority of January 21, 1969 for the appropriation of 0.46 cubic foot per second for the irrigation of 36.5 acres.

Records of Wells

Report Well Number 99

Owner: Fred Andrews

Location: NE¼ NE¼, Sec. 31, T. 4N., R.27 E

Depth: 200 feet. Diameter: 12 inches. Depth cased: 130 feet.

Approximate altitude of land surface at well: 585 ft. Year constructed: 1971

Yield: Not reported

Remarks:

Generalized Log:

Sand	0 - 108 feet
Clay	108 - 132 feet
Basalt	132 - 165 feet
Clay	165 - 190 feet
Basalt	190 - 200 feet

*Casing perforated from 95 to 128 feet

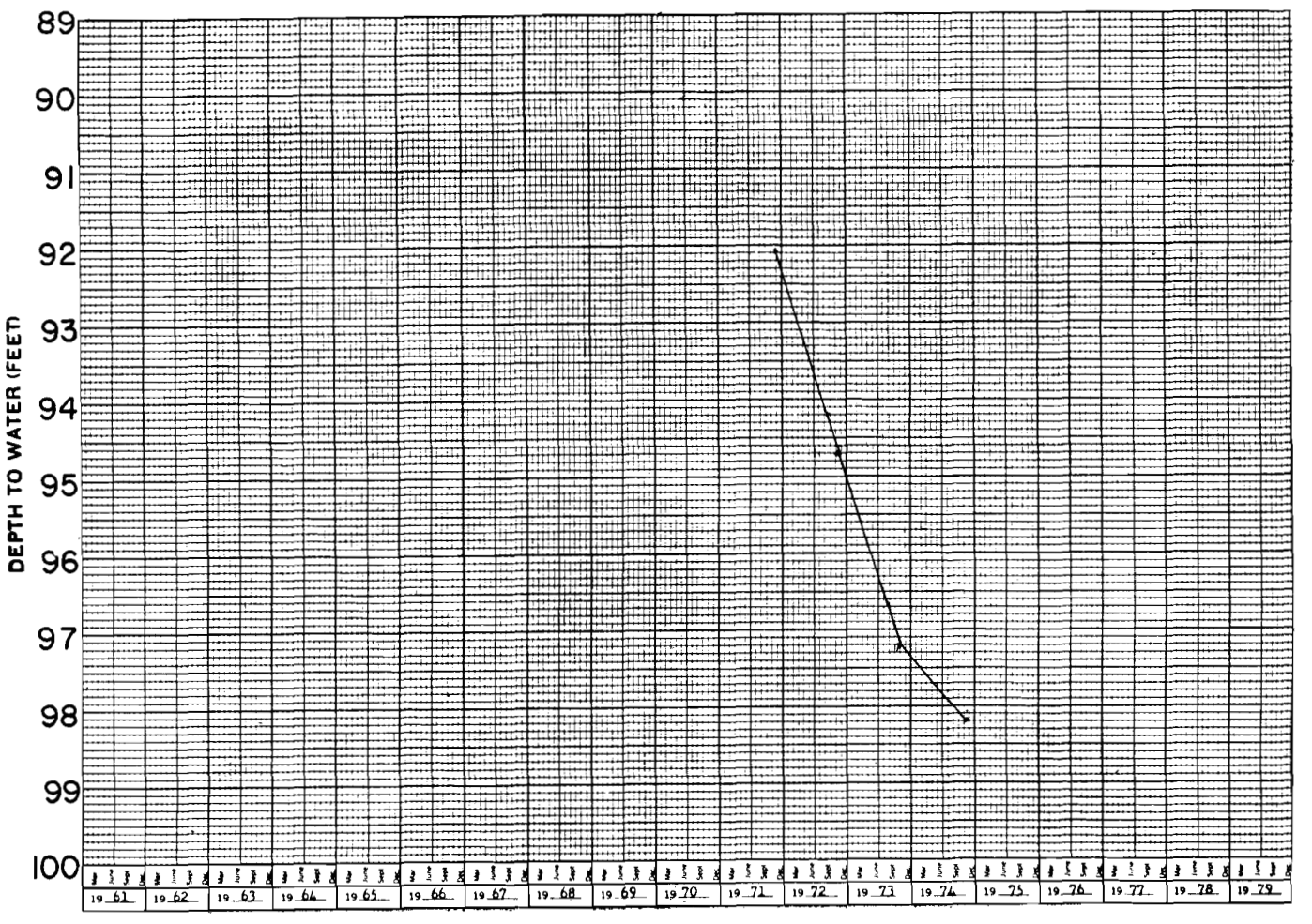
Water Level:

Reported at 90 feet below land surface 1/12/71

Description and status of water right:

Permit G-4833 with a priority of April 29, 1970 for the appropriation of 8.0 cubic feet per second for the irrigation of 640.0 acres.

Hydrograph:



Records of Wells Report Well Number 100

Owner: Avery Taylor Location: SE¼ SW¼ Sec. 25, T. 5N., R. 26 E

Depth: 173 feet. Diameter: 8 inches. Depth cased: 77 feet.

Approximate altitude of land surface at well: 290 ft. Year constructed: 1970

Yield: Not reported.

Remarks: Taylor Well No. 1

Generalized Log:

Sand	0 - 72 feet
Basalt	72 - 105 feet
Basalt, water-bearing	105 - 115 feet
Shale	115 - 138 feet
Basalt	138 - 173 feet

Water Level:

Reported at 16 feet below land surface 12/8/70

Description and status of water right:

Application G-5437 with a filing date of March 1, 1970 for the appropriation of 0.50 cubic foot per second for the irrigation of 26.0 acres.

Records of Wells Report Well Number 101

Owner: Desert Farms, Inc. Location: NW¼ SW¼, Sec. 26, T. 5N., R. 26E

Depth: 250 feet. Diameter: 10-8 inches. Depth cased: 126 feet.

Approximate altitude of land surface at well: 320 ft. Year constructed: 1971

Yield: Not reported.

Remarks: Well yield not sufficient for irrigation. Well used for stock and domestic purposes.

Generalized Log:

Sand, gravel and boulders	0 - 103 feet
Basalt	103 - 183 feet
Clay and shale	183 - 233 feet
Basalt	233 - 250 feet

Water Level:

Reported to be 41 feet below land surface 2/13/71

Description and status of water right:

Application G-5565 with a filing date of July 6, 1971 for the appropriation of 1.51 cubic feet per second for the irrigation of 120.6 acres.

Records of Wells Report Well Number 102

Owner: Wayne H. Schnell Location: NE¼ SW¼, Sec. 30, T. 5 N., R. 27 E

Depth: 300 feet. Diameter: 8 inches. Depth cased: 40 feet.

Approximate altitude of land surface at well: 350 ft. Year constructed: 1972

Yield: Not reported

Remarks: *

Generalized Log:

Sand	0 - 35 feet
Basalt	35 - 300 feet

Water Level:

Reported at 2 feet below land surface 7/28/72

Description and status of water right:

Application G-6201 with a filing date of July 2, 1973 for the appropriation of 1.44 cubic feet of water from the shallow basalt aquifer system for the irrigation of 118.0 acres.

*Permit G-5248 approved October 21, 1974 for the appropriation of 1.44 cubic feet of water from two shallow dug wells in the SW¼ SW¼ and the SE¼ SW¼ of Section 30, Township 5 North, Range 27 East, W. M. The wells produce from the shallow alluvial sediments overlying the basalt and are not to exceed 50 feet in depth.

ORDNANCE GROUND WATER AREA
ALLUVIAL AQUIFERS

TABLE 2

No.	Record Holder	Priority Date	Appl. No.	Permit No.	Cert. No.	Well Location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Rights ac. ft.	Well Depth	Remarks
1.	M. M. McDole	6/2/50	U-365	U-336	20685	4N/27E-33adc	1.0	79.9	239.7	239.7	96	Well No. 1
2.	M. M. McDole	11/1/50	U-398	U-363	20686	4N/27E-33dba	0.987	79.0	237.0	476.7	No log	Well No. 5
3.	Scott Chapman	12/15/52	U-544	U-497	26073	4N/27E-28bdb	1.0	80.0	240.0	716.7	119	Well No. 1
4.	Sylvanus F. Hoyt	12/15/52	U-545	U-498	26192	4N/27E-28acd	1.0	80.0	240.0	956.7	126	
5.	Georgia B. Holzapfel	3/16/53	U-572	U-523	22888	4N/27E-32aca	0.61	49.0	147.0	1103.7	123	Well No. 1
5-A						4N/27E-32dxx					310 (Abn)	Well No. 2
6.	Roy Gail Holzapfel	3/16/53	U-573	U-524	22889	4N/27E-32aca	0.61	49.0	147.0	1250.7	123	Well No. 1
6-A						4N/27E-32dxx					310 (Abn)	Well No. 2
7.	Scott Chapman	5/2/55	U-819	U-725	30019	4N/27E-28bdb	2.25	180.3	540.9	1791.6	119	Well No. 1
7-A						4N/27E-28cbd					107	Well No. 2
8.	Georgia Bell Holzapfel	7/5/55	U-858	U-750	22907	4N/27E-32aca	0.23	18.0	54.0	1845.6	123	Well No. 1
9.	Ronald Baker	8/26/55	G-111	G-73		4N/27E-24aca	3.40	272.2	816.6	2662.2	151	Well No. 2
10.	Sylvanus F. Hoyt	9/26/55	G-139	G-100	26193	4N/27E-28acd	0.81	64.6	193.8	2856.0	126	Well No. 1
11.	E. F. McDole	3/26/56	G-279	G-190	37054	4N/27E-33cbd	1.0	80.0	240.0	3096.0	111 (Abn)	Well No. 3
12.	Georgia Bell Holzapfel	12/27/56	G-534	G-466	30119	4N/27E-32aab	0.54	43.4	130.2	3226.2	106	Well No. 3
13.	Clarence W. Ruddell	6/19/58	G-1011	G-2952		4N/27E-30bca	4.19	335.2	1005.6	4231.8	79	Well No. 1
13-A						4N/27E-30abd					85	Well No. 2
14.	Enriqueta Ruddell	6/19/58	G-1012	G-2953		4N/27E-30cca	4.2	335.75	1007.3	5239.1	118	Well No. 1
14-A						4N/27E-30dca					115	Well No. 2
15.	Marvin M. McDole	8/28/58	G-1222	G-1069	30133	4N/27E-34bbb	0.95	76.2	228.6	5467.7	97 (Abn)	Well No. 2
16.	Roy G. & Georgia B. Holzapfel	6/28/60	G-1777	G-1625	31098	4N/27E-32aca	3.08	111.0 Prim. 159.4 Supp.	333.0	5800.7	123	Well No. 1
16-A						4N/27E-32aab					106	Well No. 3
16-B						4N/27E-32aba					104	Well No. 4
17.	Hansell Bros., Inc.	1/10/63	G-2520	G-2335		4N/27E-26bcb	1.32	105.4	316.2	6116.9	108	Williams well
18.	Thomas E. Huddleston	1/21/64	G-2768	G-2592	34586	4N/28E-18cba	2.34	105.1 Prim. 82.1 Supp.	315.3	6432.2	93	Well No. 1
19.	Malcolm Skinner	3/20/64	G-2809	G-2620	35784	4N/27E-13dbd	1.93	154.3	462.9	6895.1	97	
20.	Hansell Bros., Inc.	3/31/64	G-2818	G-2694		4N/27E-26bcb	3.24	259.3	777.9	7673.0	108	Williams Well
21.	Frances F. McDole	4/10/64	G-2831	G-2822		4N/27E-33adc	4.82	393.3	1179.9	8852.9	96	Well No. 1
21-A						4N/27E-34bbb					97 (Abn)	Well No. 2
21-B						4N/27E-34bac					125 (Abn)	Well No. 3
22.	E. F. McDole	2/4/65	G-3029	G-2782	34281	4N/27E-33cba	1.00	80.0	240.0	9092.9	97	Well No. 4
23.	Clark & Bernice Key	4/27/65	G-3092	G-2823		3N/27E-4add	4.0	320.0	960.0	10052.9	80	Well No. 1
23-A						3N/27E-4acc					88	Well No. 2
23-B						3N/27E-4bdc					108 (Abn)	Well No. 3
23-C						3N/27E-4bcc					112 (Abn)	Well No. 4
23-D						3N/27E-5adc					400	Well No. 5
23-E						3N/27E-5acc					200 (Abn)	Well No. 6
23-F						3N/27E-5bdb					145	Well No. 7
23-G						3N/27E-5bcx					(Abn)	Well No. 8
24.	Hansell Bros., Inc.	5/16/66	G-3408	G-3197		4N/27E-28acd	2.60	136.8	410.4	10463.3	126	Well No. 1
24-A						4N/27E-28ddc					127	Well No. 2
25.	Roy Gail Holzapfel	3/20/67	G-3853	G-3629		4N/27E-32aab	2.0	160.0	480.0	10943.3	106	Well No. 3
25-A						4N/27E-32aba					104	Well No. 4
26.	David C. Ralston	7/13/67	G-3991	G-3745	38390	4N/28E-8acc	0.06	4.7 Supp.				Dug Well
27.	Edgar Bloom	9/13/67	G-4077	G-3868	38856	4N/28E-19ddb	0.27	21.6 Supp.				Sump
28.	Dwight H. Hulet	10/4/67	G-3945	G-3702		4N/27E-36abb	1.86	149.8	449.4	11392.7	117	Well No. 1
28-A						4N/27E-36abb					187	Well No. 2
28-B						4N/27E-36aab					213	Well No. 3
28-C						4N/27E-36adc					185	Well No. 4

ORDNANCE GROUND WATER AREA
ALLUVIAL AQUIFERS
(continued)

TABLE 2

No.	Record Holder	Priority Date	Appl. No.	Permit No.	Cert. No.	Well Location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Rights ac. ft.	Well Depth	Remarks
29.	Woodrow Walker	10/9/67	G-4103	G-3851	39464	4N/28E-18dbd	2.88	230.0	690.0	12082.7	102	Well No. 1
30.	Roy Gail Holzapfel	11/22/67	G-4140	G-3889		4N/27E-32baa	2.0	160.0	480.0	12562.7	111	Well No. 5
31.	Marvin & Frances McDole	11/28/67	G-4144	G-3892		4N/27E-34bbb	4.85	389.5 Supp.			97 (Abn)	Well No. 4
32.	Thomas E. Huddleston	1/23/68	G-4201	G-3966	38737	4N/28E-18cba	0.30	24.0	72.0	12634.7	93	Well No. 1
33.	Hansell Bros., Inc.	2/15/68	G-4231	G-3822		4N/27E-27dad	5.0	320.0 Prim. 260.7 Supp.	960.0	13594.7	140	Well No. 2
33-A						4N/27E-27bcd					121	Well No. 3
33-B						4N/27E-27cab					135	Well No. 4
33-C						4N/27E-35cxx					Not drilled	Well No. 5
34.	Malcolm Skinner	2/23/68	G-4246	G-4006	38481	4N/28E-19bcd	2.46	196.5	589.5	14184.2	126	
35.	Malcolm Skinner	3/25/68	G-4291	G-4039	38482	4N/27E-13dbd	0.17	13.8	41.4	14225.6	97	
36.	Tom Quick	3/28/68	G-4306	G-4067		4N/28E-20bdd	0.21	17.0	51.0	14276.6	14	
37.	E. T. Johnson	6/3/68	G-4427	G-4171		4N/27E-25dab	1.0	80.0	240.0	14516.6	88	
38.	Francis F. McDole	6/21/68	G-4452	G-4395		4N/27E-33aac	4.92	393.3	1179.9	15696.5	120	Well No. 5
38-A						4N/27E-33bab					Not drilled	Well No. 6
38-B						4N/27E-33bdb					Not drilled	Well No. 7
39.	Howard Gass	11/21/68	G-4694	G-4413		4N/28E-17cbb	1.35	36.5 Prim. 71.8 Supp.	109.5	15806.0	105	
40.	Marvin & Frances McDole	10/31/69	G-5026			4N/27E-33aac	3.0	239.0	717.0	16523.0	120	Well No. 5
40-A						4N/27E-33bab					Not drilled	Well No. 6
40-B						4N/27E-33bdb					Not drilled	Well No. 7
41.	Thurman Martin	12/30/69	G-5065	G-4775		4N/28E-19caa	1.25	60.0	180.0	16703.0	99	
42.	Hansell Bros., Inc.	1/9/70	G-5209			4N/27E-26bcb	19.88	697.0 Prim.	2091.0	18784.0	108	Well No. 1
42-A						4N/27E-27bcd		893.8 Supp.			121	Well No. 3
42-B						4N/27E-27cab					135	Well No. 4
42-C						4N/27E-27bda					104	Well No. 6
42-D						4N/27E-26bca					105	Well No. 7
43.	Elroy F. McDole	2/20/70	G-5112	G-4821		4N/27E-33dba	0.88	70.0	210.0	19004.0	113 (Abn)	
44.	W. M. Huddleston	3/10/70	G-5123	G-4861		4N/27E-13aad	0.96	77.0	231.0	19235.0	101	Well No. 2
45.	Donald Clark Key	3/31/70	G-5145	G-4878		4N/27E-30ddd	8.0	640.0	1920.0	21155.0	115	Well No. 1
45-A						4N/27E-30ddd					121	Well No. 2
46.	Thurman Martin	11/16/70	G-5362			4N/28E-19caa	0.5				99	Well No. 2
47.	LeRue W. Pollock	1/12/71	G-5397			4N/28E-30dcc	0.33	26.0	78.0	21233.0	40	Proposed
48.	Georgia Belle Holzapfel	3/8/71	G-5449			4N/27E-32aca	2.0	160.0 Supp.			123	Well No. 1
49.	Lyle W. Smith	3/12/71	G-5460	G-4844		4N/27E-26acb	1.4	112.0	336.0	21569.0	No log	
50.	Clarence W. Ruddell	5/11/71	G-5413	G-4931		4N/27E-19ccb	2.7	219.2	657.6	22226.6	112	Well No. 1
50-A						4N/27E-19cda					Not drilled	Well No. 2
51.	Fred Haskins, Jr.	7/9/71	G-5567			4N/27E-29aac	8.0	640.0	1920.0	24146.6	Not drilled	Well No. 1
51-A						4N/27E-29bac					Not drilled	Well No. 2
51-B						4N/27E-29cac					Not drilled	Well No. 3
51-C						4N/27E-29dac					Not drilled	Well No. 4
52.	Arnold Braat	8/3/71	G-5590	G-4932		4N/27E-20ccc	6.58	526.6	1579.8	25726.4	173	Well No. 1
52-A						4N/27E-20cdc					Not drilled	Well No. 2
53.	Hansell Bros., Inc.	8/12/71	G-5598			4N/27E-28acd	21.5	1724.2 Supp.			126	Well No. 1
53-A						4N/27E-28ddc					127	Well No. 2
53-B						4N/27E-28dad					107	Well No. 3
54.	J. W. Aylett	11/16/71 for 0.68 cfs 12/3/71 for 0.25 cfs	G-5549	G-4929		4N/27E-28bab	0.09	72.18	216.6	25943.0	110	Well No. 3
54-A						4N/27E-28bdb					119	Chapman Well No. 1

ORDNANCE GROUND WATER AREA
ALLUVIAL AQUIFERS
(continued)

TABLE 2

No.	Record Holder	Priority Date	Appl. No.	Permit No.	Cert. No.	Well Location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Rights ac. ft.	Well Depth	Remarks
55.	Elroy F. McDole	12/13/71	G-5684			4N/27E-28cdd	4.0	310.0	930.0	26873.0	124	
56.	Lamb-Weston, Inc.	1/21/72	G-5681	G-4947		4N/28E-19caa	3.3				110	IND
57.	Ronald Baker	1/25/72	G-5710	G-4944		4N/27E-24aca	0.48	39.4	118.2	26991.2	151	Well No. 2
58.	Lamb-Weston, Inc.	2/3/72	G-5720	G-4948		4N/28E-19cac	3.3				137	IND
59.	Malcolm Skinner	2/25/72	G-5734	G-5034		4N/28E-19bcd	0.125	10.0	30.0	27021.2	126	Well No. 2
60.	Bert H. Quick	3/1/72	G-5738	G-4972		4N/28E-20bbc	1.0	80.0	240.0	27261.2		
61.	John L. King	3/24/72	G-5761			4N/27E-26ddx	0.91	72.5	217.5	27478.7		Proposed
62.	Lyle W. & Jane K. Smith	11/2/72	G-5932			4N/27E-26acb	1.44	115.0	345.0	27823.7		Proposed
63.	Bert H. Quick	11/7/72	G-5936			4N/28E-20bbc	0.5	26.0	78.0	27901.7		
64.	Benjamin J. Newman	11/29/72	G-5947			4N/28E-20cab	0.4	31.7	95.1	27996.8	20	
65.	LeRue W. Pollock	3/9/73	G-6023			4N/28E-31abb	0.5	28.0 Prim. 114.1 Supp.	84.0	28080.8		Sump
66.	George H. Barton	3/15/73	G-6040			4N/28E-31bca	1.6	127.86	383.58	28464.7	Proposed 191	
67.	Lamb-Weston, Inc.	4/12/73	G-6069			4N/28E-30bad	2.67				98	IND
68.	Edgar S. & Elmo C. Bloom	6/12/73	G-6058			4N/28E-19dda	0.35	16.6 Prim. 10.4 Supp.	49.8	28514.5	90	
69.	Mrs. John W. Rice	6/29/73	G-6196			4N/28E-17bbd	0.84	67.0	201.0	28715.5	Proposed 115	
70.	Woodrow Walker	7/12/73	G-6225			4N/28E-18dbd	0.7	55.0	165.0	28880.5	102	Well No. 1

ORDNANCE GROUND WATER AREA
BASALT AQUIFERS

TABLE 3

No.	Record Holder	Priority Date	Appl. No.	Permit No.	Cert. No.	Well Location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Rights ac. ft.	Well Depth	Remarks
71.	Oregon-Washington RR	4/17/46	U-199	U-181	15174	4N/27E-20cbc	0.67				457	Indust. not used
72.	Umatilla Army Depot	12/19/52	U-571	U-522	30524	4N/27E-5abb	2.26				710	Mfg. Well No. 6
5.	Georgia Bell Holzapfel	3/16/53	U-572	U-523	22888	4N/27E-32aca	0.61	49.0	147.0	147.0	123	Well No. 1 (Alluvial well)
5-A						4N/27E-32dxx					310	Well No. 2 (Basalt well)
6.	Roy Gail Holzapfel	3/16/53	U-573	U-524	22889	4N/27E-32aca	0.61	49.0	147.0	294.0	123	Well No. 1 (Alluvial well)
6-A						4N/27E-32dxx					310	Well No. 2 (Basalt well)
73.	Leota Nell Martin	4/3/53	U-580	U-530	31097	3N/27E-8aad	0.25	20.0	60.0	354.0	725	Well No. 2
74.	Ernest R. Cramer	4/27/53	U-596	U-549	31194	3N/26E-10cca	0.25	20.0	60.0	414.0	666	Well No. 1
75.	Waldo H. Cramer	4/28/53	U-600	U-551	31195	3N/26E-10aca	0.25	20.0	60.0	474.0	544	Well No. 1
76.	G. W. Redwine	8/9/54	U-736	U-649	23740	4N/27E-36bca	0.50	40.0	120.0	594.0	194	
77.	Ernest J. Royster	8/3/55	G-94	G-48	26170	3N/27E-4ddb	0.93	74.6	223.8	817.8	185	
78.	Umatilla Army Depot	1/27/58	G-848	G-1017	30525	4N/27E-5baa	0.50				682	Well No. 7
79.	Waldo H. Cramer	8/27/58	G-1224	G-1070	34382	3N/26E-10aca	1.89	151.2	453.6	1271.4	544	
80.	Luther W. Cramer	3/2/59	G-1402	G-1319		3N/26E-4cac	2.25 (3/2/59) 1.75 (4/7/59)	320.0	960.0	2231.4	623	Well No. 1
80-A						3N/26E-4dbc					Not drilled	Well No. 2
81.	Mildred F. Cramer	3/6/59	G-1411	G-1284		3N/26E-4aad	4.0	320.0	960.0	3191.4	680	Well No. 1
81-A						3N/26E-4bad					No log	Well No. 2
82.	Ernest Cramer	3/11/59	G-1413	G-1322	34276	3N/26E-cca	2.68	274.8	824.4	4015.8	666	Well No. 1
83.	Hansell Bros.	6/28/60	G-1778	G-1671	35395	4N/27E-27dad	2.02	1.8	5.4	4021.2	543	Well No. 1
84.	Frank L. Warren	12/19/60	G-1896	G-1738	34282	3N/26E-14acd	4.0	320.0	960.0	4981.2	551	
85.	Leota Nell Martin	10/2/61	G-2125	G-1965	34280	3N/27E-8aad	2.68	300.0	900.0	5881.2	725	Well No. 2
86.	Sabre Corporation	2/8/62	G-2229	G-2049		3N/26E-5cbd	3.5	322.8	968.4	6849.6	950	Trans 2377, See S.E. Order Vol. 19, P. 397
87.	Sabre Corporation	8/9/63	G-2678	G-2489	33864	3N/26E-5cbd	2.0	160.0	480.0	7329.6	950	
88.	Hansell Bros.	6/5/64	G-2881	G-2672	35396	4N/27E-27cad	3.34	267.0	801.0	8130.6	543	Well No. 1
89.	Umatilla Army Depot	1/5/65	G-3006	G-2825	33778	4N/27E-22dbc	0.78				360	Well No. 2
90.	Umatilla Army Depot	1/5/65	G-3007	G-2826	33779	4N/27E-22cad	2.00 Fire Protec. 0.34	27.0	81.0	8211.6	327	Well No. 1
91.	Umatilla Army Depot	1/5/65	G-3008	G-2827	33988	4N/27E-18cdb	1.11 Fire Protec.				428	Well No. 5
92.	Umatilla Army Depot	1/5/65	G-3009	G-2828	33765	4N/27E-19abb	1.11 Fire Protec.				600	Well No. 4
93.	Umatilla Army Depot	1/5/65	G-3010	G-2829	33766	4N/27E-5baa	1.72 Fire Protec.				682	Well No. 7
94.	Umatilla Army Depot	1/5/65	G-3011	G-2830	33989	4N/27E-8dad	10 GPM Fire Protec.				453	Well No. 3
23.	Clark & Bernice Key	4/27/65	G-3092	G-2823		3N/27E-4add	4.0	320.0	960.0	9171.6	80	Well No. 1 (Alluvial well)
23-A						3N/27E-4acc					88	Well No. 2 (Alluvial well)
23-B						3N/27E-4bdc					108 (Abn)	Well No. 3 (Alluvial well)
23-C						3N/27E-4bcc					112 (Abn)	Well No. 4 (Alluvial well)
23-D						3N/27E-5adc					400	Well No. 5 (Basalt well)
23-E						3N/27E-5acc					200	Well No. 6 (Basalt well)
23-F						3N/27E-5bdc					145	Well No. 7 (Alluvial well)
23-G						3N/27E-5bcx					(Abn)	Well No. 8

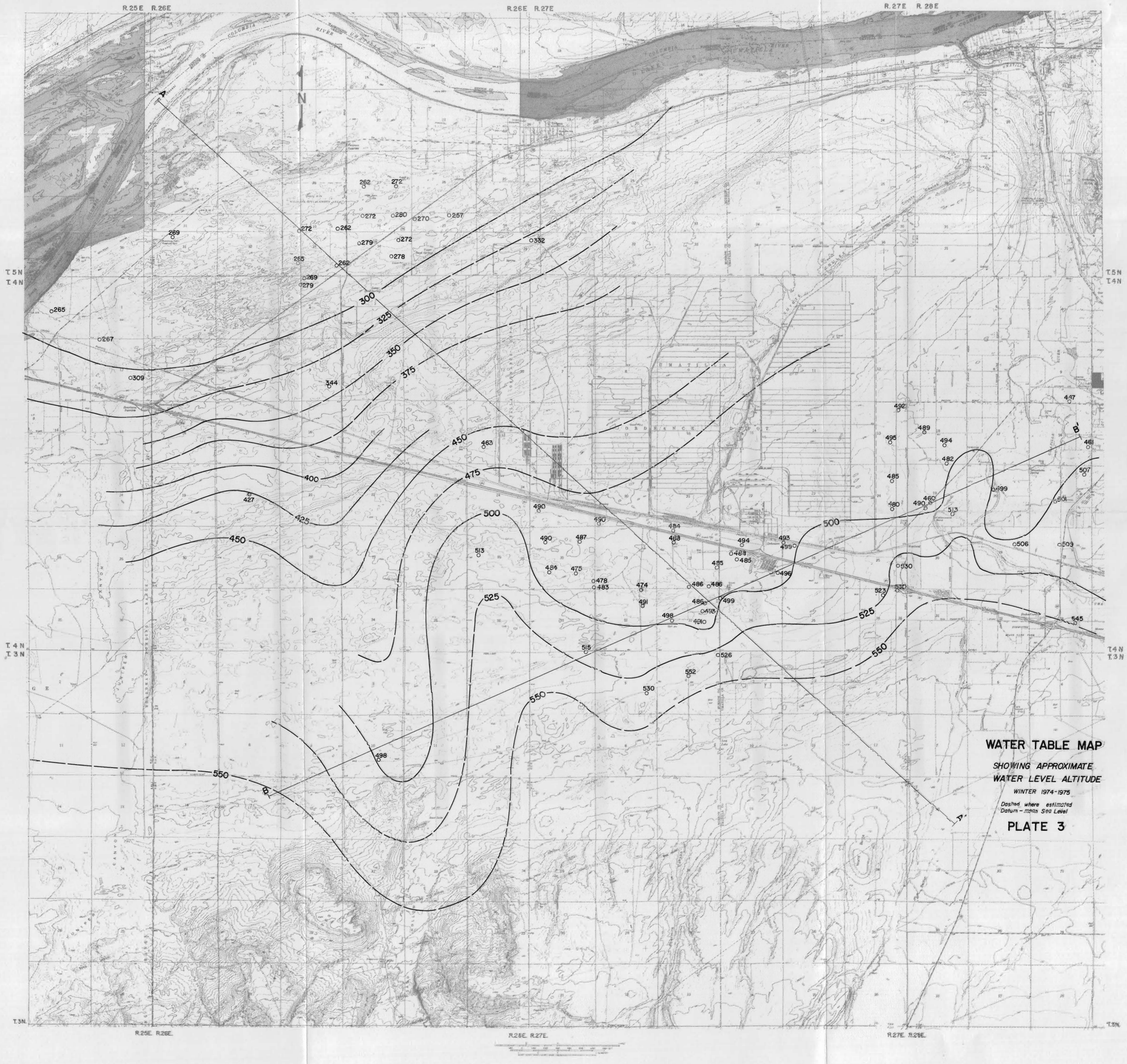
ORDNANCE GROUND WATER AREA
BASALT AQUIFERS
(continued)

TABLE 3

No.	Record Holder	Priority Date	Appl. No.	Permit No.	Cert. No.	Well Location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Rights ac. ft.	Well Depth	Remarks
28.	Dwight H. Hulet	10/4/67	G-3945	G-3702		4N/27E-36abb	1.86	149.8			117	Well No. 1 (Alluvial well)
28-A						4N/27E-36abb					187	Well No. 2 (Alluvial well)
28-B						4N/27E-36aab					213	Well No. 3 (Basalt well)
28-C						4N/27E-36adc					185	Well No. 4 (Alluvial well)
95.	C. E. Newquist	12/18/67	G-4162	G-3913		5N/27E-30ccc	1.50	120.0	360.0	9531.6	400	Deepened from 194 feet
96.	City of Irrigon	8/5/68	G-4534	G-4269		5N/27E-19ccb	1.0				317	MUN
97.	Vern K. Evans	12/27/68	G-4744	G-4478		5N/27E-20add	0.05	4.35	13.1	9544.7	300	Well No. 1
98.	R. W. Reppert	2/18/69	G-4795	G-4520		5N/26E-26bcd	0.46	36.5	109.5	9654.2	235	
99.	Fred Andrews	4/29/70	G-5099	G-4833		4N/27E-31aab	8.0	640.0	1920.0	11574.2	200	
100.	Avery Taylor	3/1/71	G-5437			5N/26E-25cdb	0.5	26.0	78.0	11652.2	173	Well No. 2
101.	Desert Farms, Inc.	7/6/71	G-5565			5N/26E-26cba	1.51	120.6	361.8	12014.0	250	
102.	Wayne H. Schnell	7/2/73	G-6201	G-5248		5N/27E-30cac	1.44	118.0	354.0	12368.0	300	

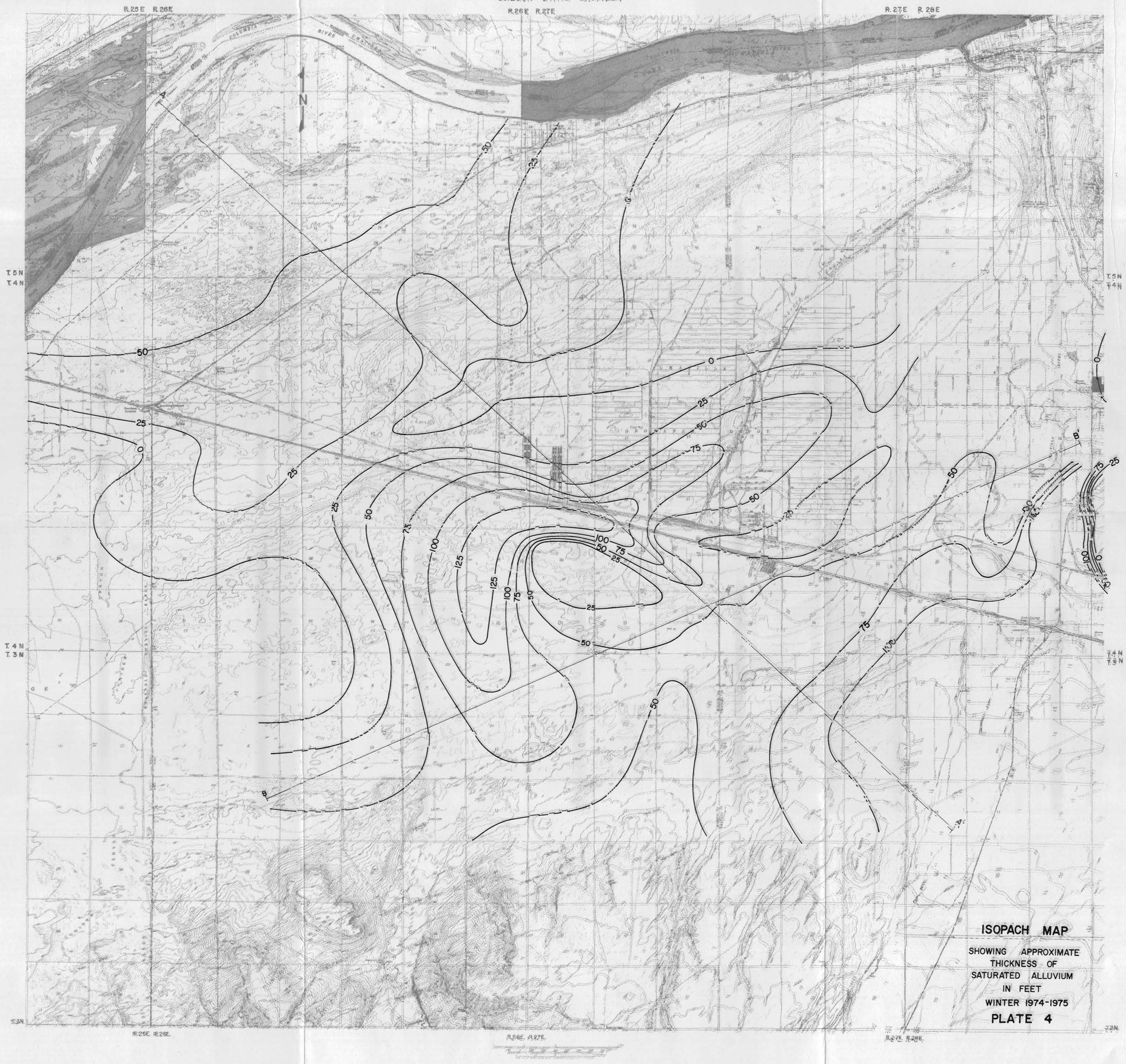
ORDNANCE GROUND WATER AREA

OREGON STATE ENGINEER



ORDNANCE GROUND WATER AREA

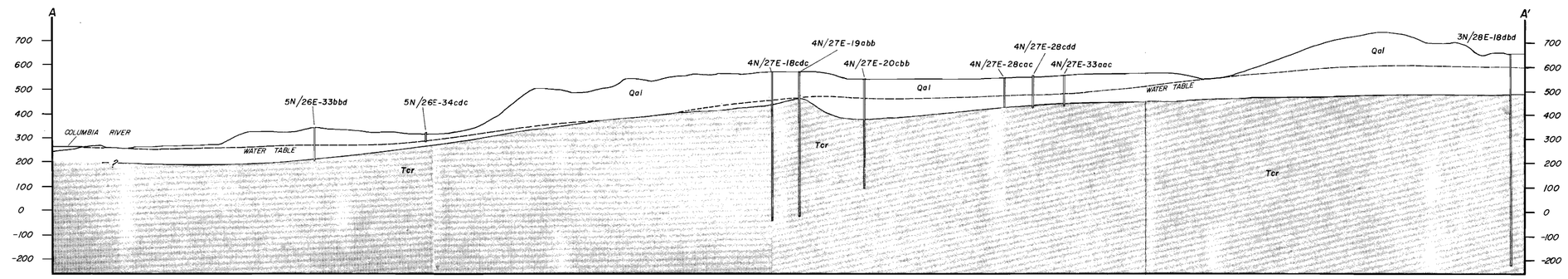
OREGON STATE ENGINEER



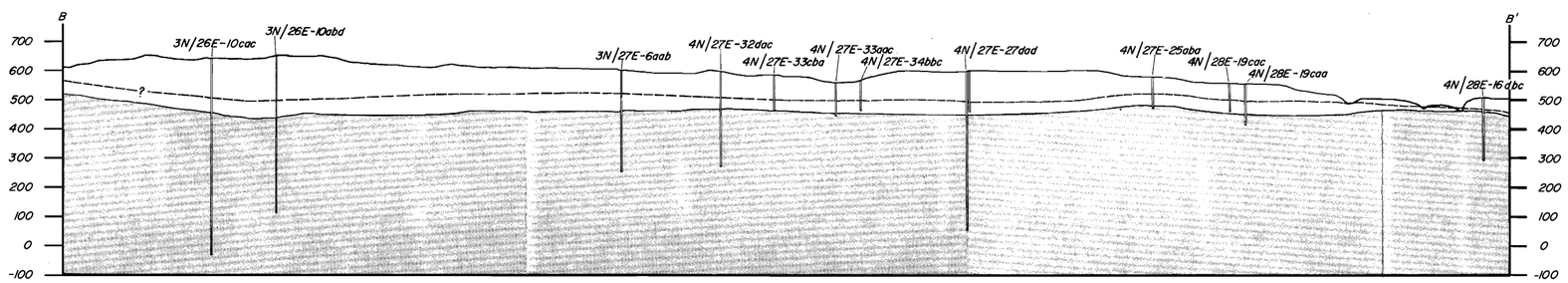
ISOPACH MAP

SHOWING APPROXIMATE THICKNESS OF SATURATED ALLUVIUM IN FEET WINTER 1974-1975

PLATE 4



CROSS SECTION A – A'



CROSS SECTION B-B'

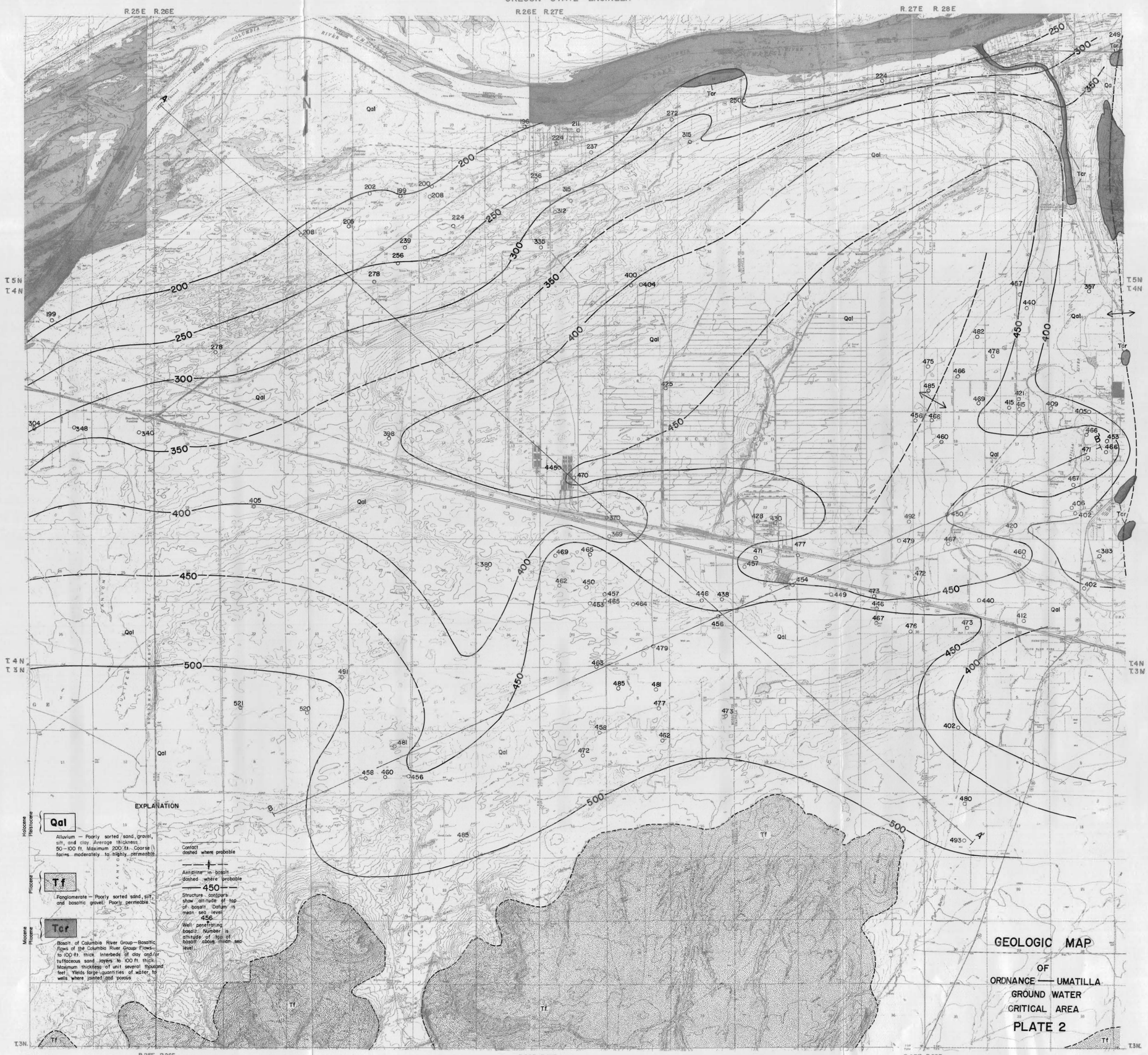
GEOLOGIC CROSS SECTIONS A-A' AND B-B'

VERTICAL SCALE EXAGERATED X 15

PLATE 5

ORDNANCE GROUND WATER AREA

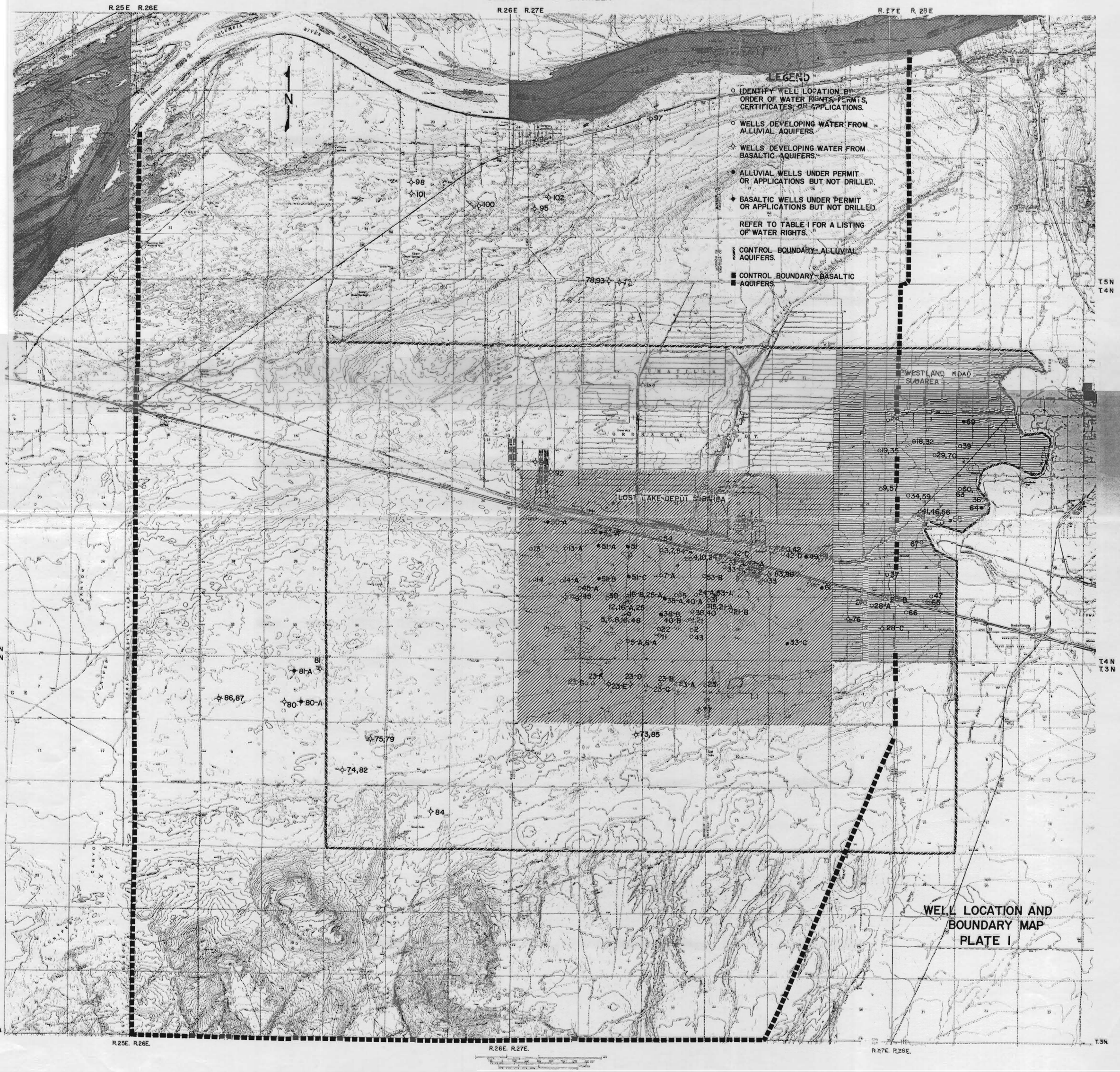
OREGON STATE ENGINEER



SURFACE GEOLOGY COMPILED FROM U.S.G.S.
ATLAS HA 387 GEOLOGY BY JAMES ROBISON

ORDNANCE GROUND WATER AREA

OREGON STATE ENGINEER



WELL LOCATION AND BOUNDARY MAP
PLATE I