

GROUND WATER REPORT NO. 24

STATE OF OREGON

WATER RESOURCES DEPARTMENT

JAMES E. SEXSON

DIRECTOR

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

BY

WILLIAM S. BARTHOLOMEW



SALEM, OREGON

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CONTENTS

	Page
Definition of Terms	X
Well Numbering System	XXX
I. Introduction:	
A. Location	1
B. Purpose	2
C. Ground Water Development	3
II. Geologic Setting	5
A. Climate	5
B. Physiography	6
C. Stratigraphy	7
1. Columbia River Basalt	8
2. Fanglomerate	10
3. Older Alluvium	11
4. Recent Alluvial Gravels	11
D. Geologic Structure	12
III. Occurrence of Ground Water	13
A. Aquifer Units	14
1. Sedimentary Gravel	14
2. The Basalt Formation	15
B. Ground Water Recharge	17
C. Ground Water Discharge	20
IV. Ground Water Level Decline	21
V. Use of Ground Water	23
A. Domestic and Stock Water	23
B. Irrigation Water Rights	23
C. Effects of Continued Ground Water Use	24
VI. Conclusions	25
VII. Recommendations	26
VIII. References	29
IX. Records of Wells	30

FIGURES

	Page
Figure 1: Precipitation and Cumulative Departure from Average Precipitation in percent: 1917- 1974 (Hermiston, Oregon)	6

TABLES

	Page
Table 1: Chronologic list of water rights by dates of priority of wells developing ground water from basalt aquifers.	30
Table 2: Chronologic list of currently used irrigation wells by date of construction	4

ILLUSTRATIONS

	Page
Diagram of Well Numbering System	XXX
Plate 1: Well Location, Priority, and Boundary Map . .	In Pocket

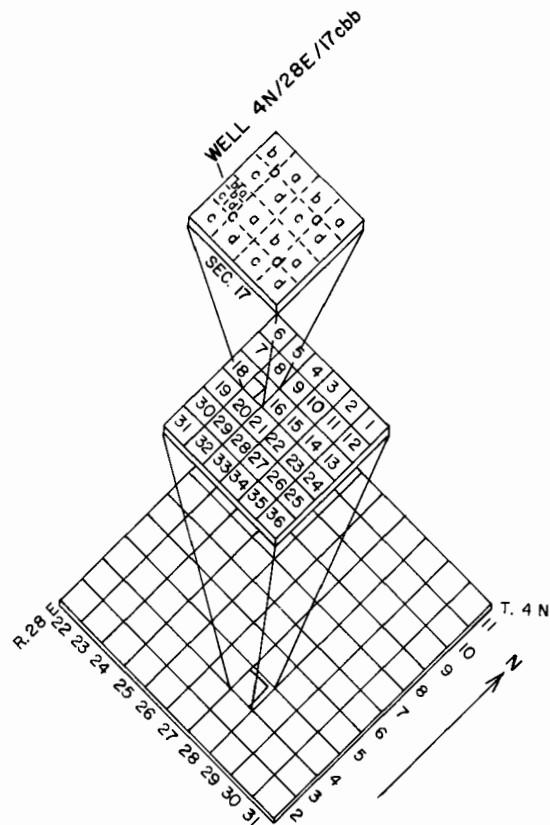
DEFINITIONS OF SELECTED GROUND-WATER AND GEOLOGIC TERMS

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. Syncline - 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 released 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

The well - and spring - numbering system used in Oregon is based on the rectangular system used for subdivision of public land. Each well number indicates the geographic location of the well and describes the township, range, and section. For example, the well number 4N/28E17cbb indicates a well located within Township 4 North, Range 28 East, and Section 17. The letters indicate the well location within the section as shown in figure 1. The first letter (c) represents the quarter section (160 acres), the second letter (b) the quarter-quarter section (40 acres), the third letter (b) the 10-acre tract. If more than one well is located within a 10-acre tract, a series number is added following the third letter to distinguish each well.



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

I. INTRODUCTION

A. Location

The Butter Creek Area lies along the eastern and southern borders of the Ordinance critical ground water area in Morrow and Umatilla Counties, Oregon. The area encompasses approximately 234 square miles. Base maps for the area have been compiled from 7½ minute topographic maps prepared by the U. S. Geological Survey for the Umatilla, Hermiston, Ordinance, Service Butte, Service Buttes NW, Strawberry Canyon NE, Strawberry Canyon SE, Butter Creek Junction, and Vey Ranch quadrangles. The northern portion of the Butter Creek area lies parallel to and west of the Hermiston City limits. The proposed critical area boundary is shown on Plate 1. The southern portion of the area is much wider and contains most of the deep basalt wells located north of the Willamette Baseline within Ranges 26, 27, and west half of Range 28 East.

A regional geologic study of the entire Columbia Slope was undertaken in 1951 by the U. S. Geological Survey. See Hogensen - Geology and Ground Water of the Umatilla River Basin, Oregon - U. S. Geological Survey Water Supply Paper 1620, published 1964. R. C. Newcomb of the U. S. Geological Survey completed a tectonic structure map, I-587, in 1970. In 1971, a second report was prepared by James H. Robison of the U. S. Geological Survey in cooperation with the Oregon State Engineer. See Hydrologic Atlas HA-387, Hydrology of Basalt Aquifers in

the Hermiston - Ordinance Area, Umatilla and Morrow Counties, Oregon, published 1971.

B. Purpose

Water levels in domestic and irrigation wells located within the Butter Creek ground water area have been declining since 1958. Some well owners have found it necessary to deepen wells and lower pump settings during the last few years. Continued overdraft of the basalt aquifers has made a significant reduction in the amount of stored ground water within the area. Pumping lifts in some of the deeper wells are now approaching 600 feet. The Ground Water Act of 1955, and particularly paragraphs 8 and 9 of ORS 537.525, recognizes and declares the State Legislative Policy:

(8) "Depletion of ground water supplies below economic levels, impairment of natural quality of ground water by pollution and wasteful practices in connection with ground water be prevented or controlled within practical limits."

(9) "Whenever wasteful use of ground water, impairment of or interference with existing rights to appropriate surface water, declining ground water levels, interference among wells, overdrawing of the ground water supplies, or pollution of the ground water exists or impends, controlled use of the ground water concerned be authorized and imposed under voluntary joint action by the Director of the Water Resources Department and the ground water users concerned whenever possible, but by the Director of the Water Resources Department by the police power of the State when such joint action is not taken or is ineffective."

ORS 537.730 of the Ground Water Act provides for the initiation of a proceeding for the determination of a critical ground water area. The Director of the Water Resources Department may initiate such a proceeding whenever he has reason to believe that: (a) ground water levels in the area in question are declining or have declined excessively; or (b) the wells of two or more ground water claimants or appropriators

within the area in question interferes substantially with one another; or (c) the available ground water supply in the area in question is being or is about to be overdrawn; or (d) the purity of the ground water in the area in question has been or reasonably may be expected to become polluted to an extent contrary to the public welfare, health, and safety. The State Engineer established a net of water level observation wells within the critical area during the years of 1958 through 1972. Periodic water level data has been collected in 37 wells within the study area since 1958.

This report presents local geology and ground water information to be used by the Water Resources Department in a proceeding for the determination of the proposed Butter Creek critical ground water area.

C. Ground Water Development

The development of the ground water in the basalt aquifers in the Butter Creek ground water area began in the year 1925 with the construction of a well, 125 feet deep, in Section 34, Township 2 North, Range 27 East. During the late 1940's and the early 1950's, six additional wells were constructed along the small narrow valley areas adjacent to Butter Creek. The first deep well (well No. 11) was constructed in the area in 1952 to a depth of 554 feet. The well was deepened to 840 feet in 1961 and reportedly began flowing during April of that year. Following the construction of this well, the area along Butter Creek developed rapidly. By 1960, a total of 15 irrigation wells were completed. Ten more wells were added during the years between 1960 to 1966. During the next two years, 1967 and 1968, twenty-five new wells were drilled thereby doubling the total number of irrigation wells in the area. An

TABLE

CHRONOLOGIC LIST OF CURRENTLY
USED IRRIGATION WELLS BY DATE
OF CONSTRUCTION

(Numbers are the well numbers of the
wells described in the back of this report)
(Underlined numbers are the wells in the north
part of the ground-water area in Townships 4
and 5 North, Range 28 East)

Year	Wells in Basalt
1925	1
1949	<u>2</u>
1950	
1951	3, 5, 7
1952	6
1953	9, 13, 13A
1954	
1955	
1956	15
1957	4, 11A
1958	12
1959	14
1960	16
1961	
1962	17, 18, <u>21</u> , 49
1963	19
1964	20, 23, 25, 33
1965	
1966	<u>29</u>
1967	<u>25</u> *, 28, <u>30</u> , <u>31</u> , 34, 37, 38, 46
1968	3*, 32, <u>35</u> , <u>35A</u> , 36A, 41, 42, 44, 45, 47, 48, 51, 55, <u>56</u> , 59, 71
1969	50, 53, 53A, 54, 57, <u>58</u> , <u>78</u>
1970	49*, 50*, 52, 63
1971	52A, 62, 62A, 64, 72
1972	62B, 68, 71*, <u>74</u> , <u>77</u>
1973	

*Wells that have been deepened

average of 5 wells per year were added between 1968 and 1972 bringing the total number of wells to 72. These wells range in depth from 665 feet to 1500 feet.

In the northern part of the Butter Creek ground water area, in the west half of Townships 4 and 5 North, Range 28 East, twelve wells currently develop ground water from the basalt aquifers. Wells penetrating into the basalt in this area range from 59 feet to 785 feet in depth. The major ground water development has taken place in the southern part of the area, in Townships 1 and 2 North, Ranges 26 and 27 East, during the years between 1968 and 1972. In the overall Butter Creek ground water area, approximately sixty-six wells currently develop ground water from the aquifers within the basalts. In addition, five sumps are in use and develop water from the shallow gravels along the banks of Butter Creek.

II. GEOLOGIC SETTING

A. Climate

The climate for this portion of the "Columbia Slope" is described as mild and semi-arid. The meager precipitation of six to nine inches per year occurs during the winter and spring months. The average number of frost free days is reported to vary from 158 to 184 days. Hogensen reports that evaporation records at Hermiston for the years of 1947 through 1954 show a winter evaporation of 4 inches or less per year. The average annual pan evaporation at Hermiston is approximately 45 inches per year. This converts to a direct surface evaporation of about $(45 \times .7) = 31.5$ inches per year.

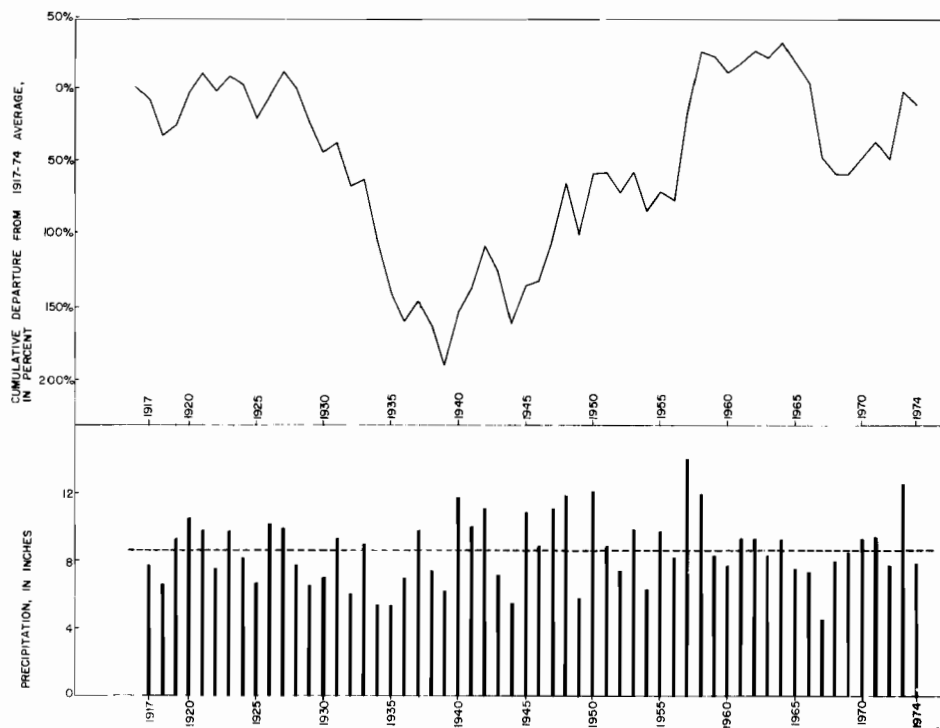


Figure 1

Precipitation and Cumulative Departure from Average Precipitation
in percent: 1917-1974 (Hermiston, Oregon)

B. Physiography

The Butter Creek critical ground water area extends from the Columbia River southward with rising gentle slopes marked by low terraces, rounded hills, and small stream valleys that drain northward away from the base of the Blue Mountains. The Butter Creek critical area gently rises from an altitude of about 250 feet near the Columbia River at Irrigon to an elevation in excess of 1800 feet near the base line separating Townships 1 North and 1 South. The Willamette base line forms the southern boundary of the Butter Creek critical area. The majority of irrigated land within the Butter Creek area stands at elevations between

680 and 1700 feet above sea level. Butter Creek provides the main drainage within the critical area. Two intermittent streams lying further to the west form parallel drainages which occupy Sand Hollow and Little Juniper Canyons.

C. Stratigraphy

The oldest and most dominant geologic formation within the Butter Creek critical area is exposed locally in the hills along the southern portion of the critical area at elevations generally above 1500 feet. Here the extensive series of Miocene basalt rock are exposed at land surface. The formation is known as the Columbia River Group and is the thickest and most extensive rock unit within the critical area. The basalt rocks are resistant to weathering and therefore control the topography of the area.

Three sedimentary units overlie the basalt surface. The older sedimentary material is described as fanglomerate which is composed of silt and basaltic conglomerate layed down in Pliocene time following a moderate folding of the Columbia River basalt surface. Much of the fanglomerate material is composed of eroded basalt from higher elevations which have been water deposited with surface slope debris at lower elevations. Below an elevation of approximately 750 feet, the fanglomerate is itself overlain by Pleistocene glacial lake deposits (glaciofluvial deposits). These materials are made up of poorly sorted sand, gravel, and interbedded silt which were water deposited during flood stages of the Columbia River. The maximum thickness of the older alluvial deposits in the Ordance critical area is approximately 200 feet. In the northern portion of the Butter Creek area the gravel deposits are thinner, averaging about 140 feet near Buck corners.

1. Columbia River Basalt

The Columbia River basalt formation is composed of a thick series of accordantly layered basaltic lavas. This formation underlies the entire critical area at depth. The thickness of the Columbia River basalt is in excess of 2500 feet and may exceed 5,000 feet in some areas of the Columbia Plateau. Columbia River basalts are made up of individual lava flows which were poured out one upon the other over a broad area of Washington, Oregon, and Idaho. Individual lava flows in this formation vary from 10 to 150 feet in thickness. Most of the lava flows were very fluid and moved rapidly over distances from 1 to 12 miles. The lavas poured out from numerous cracks and fissures within the Columbia basin. Individual out pourings formed rivers and lakes of molten rock which cooled rapidly. The extensive out pourings of this lava obscured earlier buried surfaces and formed a broad lava plain covering more than 50,000 square miles of Oregon, Washington, and Idaho.

During the quiet periods of volcanic activity, local streams became impounded upon the basalt surface. In such areas, local interbeds of clay, silt, sand and gravel were layed down by the local streams. These sedimentary interbeds are quite common within the Columbia River Group. Robison (1971) has estimated that the sedimentary interbeds constitute 4 to 30 percent of the total thickness of the Columbia River basalt formation. A number of these sedimentary interbeds stand above the regional water table. However, where saturated below the regional water table, sand and gravel interbeds form good water yielding zones to wells. The deepest water well within the Butter Creek area penetrates the Columbia River basalt formation for a depth of 1500 feet. The well is identified as Grieb Well No. 3.

Individual lava flows within the Columbia River formation differ in physical characteristics. Varying rock textures are due in part to the chemical composition, the magma temperature, and local environmental conditions at the time of deposition. The water bearing properties of a particular lava flow are also determined in part by the rate of lava weathering, and the general gas and liquid content of the individual lava flow. Basaltic lavas of the Columbia River formation often contained intrapped gases. When a lava flow reached the land surface, gas bubbles often formed in the liquid magma and created porous, scoraceous interflow zones between successive layers of lava. Subsequent weathering and erosion of the scoraceous surface often created porous, permeable zones between the layered lava rocks. The top and bottom surfaces of some of the individual flows have formed very permeable contact zones. Where these zones have become saturated below the regional water table, they form high yielding aquifer units within the Columbia River formation. Most of the ground water movement is parallel to the bedding planes of the individual lava flows, therefore the lateral or horizontal permeability between flows is often very high.

Thick lava flows commonly develop a columnar jointing within individual flows. The columns are generally five-sided (pentagonal) pillars or columns which stand perpendicular to the top and the bottom of the individual lava flow. Rectangular and diced jointing also serve to divide some of the basaltic lava formations into angular blocks having dimensions of one to twenty-four inches on a side. When these jointing systems are open and well developed, they provide some permeable zones in which ground water can move vertically through the dense rock formation. It is common, however, that overlying silt cover and rock

weathering have closed, to some degree, the fractures and joints which reduces the vertical permeability of the basalt.

The thickness of the Columbia River Group is estimated to be in excess of 2500 feet within the critical ground water area and it is the most widespread and productive aquifer within the Butter Creek critical area. Limited amounts of ground water are developed from the younger Butter Creek gravel deposits.

Older rock units that underlie the Columbia River basalt formation are not exposed in the area. However, they are believed to be equivalent of the Clarno formation which is exposed 15 to 20 miles south of the Butter Creek area. These materials are tightly compacted sediments and contain a variety of volcanic tuffaceous clay and ash deposits and an occasional lava flow. The formation offers very low yields to wells and is considered nonproductive for other than domestic and stock water supplies.

2. Fanglomerate

The fanglomerate as described by Hogenson (1964) and Robison (1971) is composed of a heterogeneous mixture of poorly sorted silt, sand, and clay materials. The fanglomerate made up of rock chips, silt, sand, and slope washed debris was derived from the weathered surface of the Columbia River basalt. In most places, these deposits are tightly cemented. Permeable layers of silt or sand are rare. The formation generally stands above the regional water table. Due to low permeability, the low annual precipitation, and high topographic position, the fanglomerate is not an important source of ground water within the critical area. The formation may support a few dug wells offering generally less than 5 gallons per minute.

3. Older Alluvium

The older alluvium is composed of coarse sand and gravel sediments laid down by the Columbia River during flood stages in Pleistocene time. The sand and gravels were water deposited in a shallow lake and stream environment on the underlying basalt surface. Their thickness varies from 0 to a maximum of about 200 feet which occurs in the center of the Ordinance ground water area in Townships 4 North, Range 27 East, W. M. The sand and gravel deposits are poorly sorted and become progressively thinner to the south. At an elevation of approximately 750 feet the gravels lens out against the underlying fanglomerate.

A very small area of approximately 10 to 11 square miles of the older alluvium occurs within the Butter Creek critical area. These gravels lie along the east side of Butter Creek for a distance of approximately 6 miles along the eastern boundary of the critical area. Two wells, in Section 28, Township 3 North, Range 28 East, owned by Mr. Ernest Betz penetrate completely through the older alluvium at depths of 130 feet and 105 feet respectively. The static water level in the alluvial gravels was reported to be approximately 55 feet below land surface. In contrast, the static water level in the basalt aquifers dropped to a depth of 275 feet upon completion of the Betz wells to depths of 636 feet and 830 feet. As presently constructed, these wells permit the cascading of water from the 55 foot water level zone to the 270 foot water level. The wells should be repaired to prevent the loss of water from the upper gravel zone.

4. Recent Alluvial Gravels

Poorly sorted, medium-grained sand and gravels have been deposited over the flood plain of the Butter Creek drainage. The flood

plain is approximately 1 mile wide and extends for a distance of approximately 12 miles northward from Butter Creek junction. Generally the alluvium is very thin and contains a large amount of reworked wind-blown silt and loess deposits which reduce the permeability of this formation. Ground-water yields from this deposit are sufficient only for domestic and stock water purposes. A few sumps have been constructed and are used for irrigation of small acreages located on the valley floor.

D. Geologic Structure

The basalt formations of the Umatilla lowlands have been broadly folded by an east-west trending syncline or trough which parallels the Columbia River drainage near Irrigon, Oregon. Newcomb (1967), described the Dalles-Umatilla syncline over a distance of more than 160 miles along the Columbia River. This broad gentle fold is crossed by several smaller structures having north-south trending axes. The main cross structure within the Butter Creek ground water area is the Service Butte anticline which forms the eastern boundary of the proposed critical area. Much of the basalt surface is concealed beneath the alluvial gravel cover; therefore, only the broad regional structures can be observed. The gentle northward slope of the basalt surface is approximately 100 feet to the mile in the upland areas. The dip flattens to about 30 feet per mile on lower lands adjacent to the Columbia River.

Tectonic structures such as folds and faults in the basalt rocks often form barriers to the movement of ground water in this rock unit. Stratigraphic changes also interrupt ground water movement and form barriers in the basalt aquifers. The basalt rocks are very competent formations and tend to rupture along the axis of major folds. Several poorly defined folds and/or faulted areas occur within the Butter Creek

critical area. These structures are orientated in the northwest-southeast direction. One of these faulted areas has disrupted and offset the Butter Creek drainage in the vicinity of the Butter Creek Junction within Township 2 North, Range 27 East, W. M. The smaller fold has been mapped immediately west and adjacent to the lower Butter Creek drainage. This fold parallels the Service Butte fold and extends from Butter Creek Junction along the west side of Butter Creek to the Columbia River. There is some evidence that these folds separate the Butter Creek basalt aquifers from the more westerly basalt units within the Ordnance critical ground water area. Hydrologic boundaries, however, are not precisely defined. Therefore, control area boundaries have been used to define the Butter Creek and Ordnance critical ground water areas.

III. OCCURRENCE OF GROUND WATER

The Columbia River basalt formations contain the most productive aquifers in the Butter Creek area. Deep wells in these rock formations are often capable of yielding from 500 to 4,000 gallons per minute. Large irrigation wells were drilled in the area during the late 1950's and were located along the Butter Creek valley floor. The first deep wells on the Columbia Slope were constructed in 1941 at the Umatilla Army Depot at Ordnance. Subsequent municipal and industrial wells have been drilled immediately east and west of the critical area near Hermiston and in neighboring cities of Umatilla, Irrigon, and Boardman.

Drilling records of many of these wells are on file with the Water Resources Department at Salem, Oregon and the U. S. Geological Survey office at Portland, Oregon. Water level changes in observation wells of the area are shown on hydrographs of the respective wells in appendix A of this report. Robinson (1971) identified three main ground

water zones in the basalt aquifers. The uppermost basalt aquifers extend to depths of about 200 feet. An intermediate water bearing zone occurs between the depths of 200 feet and 400 feet. The deeper zone includes the aquifers below 400 feet in depth.

Fractured and scoriaceous interflow zones often separate individual basalt flows from one another. These contact zones are usually open, permeable areas and serve as aquifers in areas where they are saturated. Ground water moves freely through tabular interflow zones parallel to bedding planes. The dense central portion of each flow usually restricts the vertical permeability and creates confined and partially confined aquifers. The early wells drilled along Butter Creek encountered ground water under artesian pressure and some wells flowed at land surface. Continued construction of irrigation wells in the area during the last 10 years has resulted in diminishing artesian pressures by as much as 108 pounds per square inch or 250 feet of head.

A. Aquifer Units

Two aquifers units make up the ground water storage reservoirs of the area. Basalt aquifers of the Columbia River Group form the dominate ground water body within the Butter Creek area. A second unit of small local deposits of sand and gravel occur along the flood plain of Butter Creek and the lower portion of the Umatilla River north of Hermiston.

1. Sedimentary gravel and sand deposits in the Butter Creek area are usually thin, generally less than 30 feet. Therefore, they do not constitute a large ground water reservoir area and cannot be relied on as a dependable ground water source. The water table in the gravel is in balance with local stream levels. In the upper reaches of Butter

Creek the gravels are so thin that they cannot sustain the base flow of the stream during the dry summer season; therefore, the stream bed goes dry and the deposits have little significance as a year around ground water source.

2. The basalt formation in the Butter Creek area underlies the entire Columbia Slope to a depth of more than 2,500 feet. Ground water occurs in the saturated interflow zones (contact zones) that separate one lava flow from the other. These rudely tabular zones contain broken, rubbly, scoraceous rock that have formed as gas charged (inflated), porous, contact zones at the upper and lower surface of each lava flow. Vesicles (gas holes) and interconnecting fractures provide thin permeable zones between some of the lava units. The thickness and areal extent of these water bearing zones are quite variable. Stratigraphic changes often disrupt, pinch out, overlap, or terminate at the boundaries of an individual flow and create discontinuous aquifer zones throughout the basalt formation.

Water laid silt, clay, sand, and gravel form thin sedimentary interbeds between some basalt flows. Two of these interbeds have been identified in the wells located along the Butter Creek drainage. These beds were penetrated at depths of 170 to 220 feet and varied in thickness from 10 feet to more than 240 feet. These interbedded deposits have been identified as the Rattle Snake and Selah members of the Ellensburg formation near the top of the Columbia River group. The most extensive gravel interbeds were encountered west of Butter Creek in an irrigation well, 1461 feet deep, between the depths of 203 feet and 440 feet below land surface. The static water level of this well was reported to be 344 feet below land surface at the time of construction. One of the

gravel units penetrated by the well is partially saturated and serves as an aquifer unit within the basalt formations.

Tight, poorly permeable silt and clay interbeds at depths of 14 feet to 170 feet, provide a confining layer for wells near Township 2 North, Range 27 East, Sections 1, 2, 11, and 12. Shallow artesian wells have been constructed in this area. Deeper confined zones also occur in the basalt formations. The tabular, separate water bearing zones are typical of all basalt aquifers of the Pacific north-west.

Structural deformation of the basalts have directly influenced the occurrence of ground water. The flowing of artesian wells and the excessive pumping levels common in wells in various areas of the Columbia Slope are a reflection of the structure, petrographic composition and stratigraphic conditions of the underlying basaltic rocks.

Ground water in the basalts moves down the hydraulic gradient in the tabular water bearing zones. In downwarped low areas (synclines) water accumulates and is stored. In upland areas on broad anticline folds ground water moves down dip and away from these structures. Sharp folds and faulting of basalt rocks create barriers to ground water movement. The eastern boundary of the Butter Creek area is located along the north-south axis of the Service Butte anticlinal fold. This fold is very abrupt and is thought to be faulted over most of its length between Service Butte and the Columbia River. This structure may form an effective hydraulic barrier to the movement of ground water. No hydrologic barrier has been identified along the western boundary of the area adjacent to the Bombing Range Road. However, water levels west of the boundary suggests that such a boundary exists. The limited number of wells make a finite location of the structure difficult at this time.

Due to the initial dip of 1 to 2 degrees toward the north and northwest, ground water in the basalt interflow zones moves northward away from the Blue Mountain uplands. Structural barriers disrupt this regional movement and create local artesian conditions such as originally found along Butter Creek.

Perched ground water is often encountered on impervious basalt layers that stand above the regional water table. It is common for drillers to report cascading ground water in many of the wells constructed in this area. Water level data is often very erratic between wells of different depths, making comparison of water levels difficult.

Newcomb (1959, Page 14) has reported that the Columbia River basalts over their regional extent have an average yield, to 10 or 12 inch diameter wells, of about 1 gallon per minute per foot of penetration below the regional water table. The maximum yields in the Butter Creek basalt wells are reported to be 3,200 to 4,000 gpm. Moderate well yields range from about 800 to 1500 gpm in this area. The specific capacity of larger wells varies from 40 to 155 gallons per minute per foot of drawdown. Highly transmissive zones between lava flows make up less than 10 percent of the formation thickness and varies considerable from well to well. The well yield and related specific capacity of the average basalt well therefore, is very unpredictable.

Many drilling and production records of the older wells drilled into the basalt are not available today. Only a small number of wells out of 60 to 80 wells drilled in the Butter Creek Basalt formations are considered inadequate for irrigation use.

B. Ground Water Recharge

Very limited ground water recharge may occur in the basalt

formation where lava flows have been exposed in upland areas. In some cases the tilted beds of lava approach land surface where they receive infiltration water directly from rainfall, saturated surface gravels, or streams that cross porous contact zones.

Within the Butter Creek critical area, the basalts have a very shallow dip of 1 to 2 degrees to the north. In the upland areas the basalt slopes about 100 feet to the mile to the north. Many of the lava flows received limited recharge from the Butter Creek drainage above Pine City. Below Pine City, the dip flattens to about 30 feet per mile, less than 1 degree slope. Pressure gradients in the basalt aquifers created some flowing artesian wells during the early development of ground water in the Butter Creek area. Most of the aquifers in the Butter Creek critical area are confined or partially confined aquifers. Subsequent pumping of closely spaced, artesian wells has reduced artesian pressures and has caused a severe water level decline. For a more detailed discussion of aquifer characteristics in the Columbia River basalt, see U. S. Geological Survey Water Supply Paper 1620, page 41 - Aquifer Constants as described by Hogenson.

Water bearing characteristics of the basalt aquifers vary from place to place. Some of the zones pinch out, some overlap each other, and some become non-porous where they have been folded or faulted by structural changes. Massive, dense lava flows commonly do not allow adequate vertical permeability and they prevent water from moving to the regional water table. Vertical separation of ground water zones within the basalt is quite common. This separation of ground water zones is shown by the perched nature of the various layered seeps and springs that occur in exposed canyons and hillside outcrops and by cascading

water zones in drilled wells.

Precipitation in amounts of less than 10 inches per year does not provide adequate recharge to the Butter Creek basalt aquifers. Abrupt changes in the static water levels during the drilling of basalt wells is a direct indication of the layered separation of perched ground water zones. In perched ground water areas, water cascades down the well bore to porous zones located at greater depths in uncased wells. Comparison of water levels in wells can only be made in wells of similar depth in order to obtain meaningful water level data. Water levels in wells located in recharge areas usually decline as the well is deepened to greater depths. Therefore, water levels in a shallow well and a deep well are usually not comparable.

Age dating of the ground water aquifers of the Ordinance basalt aquifers has shown that the shallower water bearing zones are younger than the deeper zones. Robinson indicated ground water of modern age (1950) was found in shallow aquifers 30 to 70 feet deep. Water in deeper wells of 256 to 453 feet was found to be 6,700 years old. Deeper water zones in a 950 foot deep well was found to contain ground water having a composite age of about 27,000 years.

Water levels in deep basalt wells have an almost flat gradient in the northern part of the critical areas. Some leakage from uncased wells provides a very limited recharge to deep water bearing zones. Water level decline rates have been observed in 24 wells. Substantial water level changes occurred in 1967-68, indicating either a change in storage area characteristics of the ground water reservoir, or an increase in ground water use (discharge), or a reduction in annual recharge to the aquifers. (Robison, (HA-387, USGS 1971) concluded that

"Ground water in the deeper basalt aquifers is receiving little recharge. The complex head relations demonstrate the vertical separation and lateral compartmentation of aquifer units, and the water level fluctuations indicate that the intermediate and deeper zones receive no recharge from local precipitation." Water level data collected to date indicates little or no annual recharge and suggests that classic ground water circulation patterns are not being observed within wells of the proposed critical area.

At present, artificial recharge to wells does not appear to be an economically feasible alternative. Pumping lifts, costs, and distance of transport of water from the Columbia River for well recharge are not attractive to owners of the deep basalt wells in the Butter Creek area. However, the direct use of imported surface water offers the best and most effective remedy to this problem.

C. Ground Water Discharge

The pumping of large capacity irrigation wells within the Butter Creek critical area constitutes the major ground water use. Water levels in the basalts are relatively deep averaging about 315 feet below land surface. The deepest water levels observed are approximately 455 to 460 feet and the shallowest water levels are 250 to 270 feet below land surface. The regional water table of the area has a very flat gradient of generally less than 10 feet per mile indicating high permeability and/or very low recharge. Basalt aquifers with deep water levels are not hydrologically connected with the Columbia River. The river is perched on the basalt surface.

Since large yielding irrigation wells within the Butter Creek area have caused a sustained water level decline, it is necessary that

pumpage of ground water be reduced or that an outside source for water be provided to balance the present ground water withdrawal.

IV. GROUND WATER LEVEL DECLINE

A balance exists in nature between annual recharge and annual discharge to a ground water flow system. Only minor variations occur in the amount of ground water in storage within an unused aquifer.

The water table is not a stationary water surface, rather it is a continuously adjusting surface that fluctuates in response to changes in recharge, discharge, pumping effects, and barometric pressure changes. Water level measurements were made in selected observation wells within the Butter Creek area in 1960. As new wells were constructed, they were added to the observation net. Today, we are measuring water levels in about 37 of the 79 wells operating in the proposed critical area. The most reliable data is collected during the winter season during a quiet period of non-use. Relatively few wells of the area have adequate measuring ports or usable air lines that facilitate accurate water level measurements. Hydrographs indicating the season changes in water levels for 24 observed wells are included in this report. (See records of wells page 30.)

Two artesian wells No. 13 and No. 14 have hydrographs that show no water pressure decline during the period of 1960 through 1966. However, in 1967, water levels made an abrupt 12 foot decline. The wells have continued to decline to about 23 feet below land surface in 1975. Similar changes in development of the Butter Creek basalt aquifers began in the early 1950's. Flowing wells ceased to flow and water levels began to decline in 1960. The decline average 5 to 7 feet per year in some remote wells. Wells located near large irrigation projects

decline about 10 to 12 feet per year up to about 1968. A marked increase in water level decline of about 20 feet per year has occurred since 1968 in closely spaced well fields. Irrigation wells located along the western boundary of the Butter Creek area in Township 2 North, Range 26 East, Morrow County have water level declines of 14 to 22 feet per year over the past 3 years.

Approximately 72 irrigation wells are located within the Butter Creek area. Fourteen water right applications for 14 wells were made between 1950 and 1959 in the subject area. Twenty-five filings for 27 wells were made between 1960 and 1968. Since 1968, 37 applications for ground water rights have been received and 29 wells have been completed within the area. Sixty-two permits have been issued in the Butter Creek area; the last permit was issued for a June 24, 1970 priority. Sixteen applications have been held subsequent to the 1970 date pending the completion of the critical ground water area determination. Applicants were advised on numerous occasions that wells should not be constructed within the Butter Creek or Ordinance ground water areas. Twenty wells listed within the 79 water right applications have not been constructed to date. Under present overdraft conditions, it is expected that these wells will not be authorized under the existing applications or permits.

The rate of decline is partially related to the rate of individual well yields. The highest rate of water level decline, 29.5 feet per year has occurred in well No. 53 which has the highest rate of pumpage in the area (4,000 gpm). This rapid water level decline has been observed in the area southwest of Butter Creek Junction for the past 3 years. Well No. 11, in Section 1 of Township 2 North, Range 27 East, was flowing in 1960; it has experienced an average water level decline

of 26 feet per year and the water level now stands near 232 feet below land surface. The pumping lift in this well is approaching 600 feet. Water level declines must be controlled by reducing the annual amount of ground water being pumped.

V. USE OF GROUND WATER

Ground water uses within the Butter Creek area generally fall into three categories: (1) domestic and stock water, (2) irrigation uses, and (3) municipal. Other uses such as industrial, manufacturing, and food processing have not, as yet, been established in the area.

A. Domestic and Stock Water

Domestic and stock watering uses, though very important, do not appropriate a significant amount of ground water from the basalt aquifers. Household water and stock water is almost always supplied by small diameter wells capable of pumping from 5 to 25 gallons per minute. Some of the wells develop shallow water-bearing gravel deposits adjacent to local stream channels and do not exceed 100 feet in depth. Other wells must be drilled deep into the basalt formations to depths of 200 feet or more. One domestic well at the D. O. Nelsen Ranch house near the western boundary of the proposed critical area has been drilled to 503 feet.

B. Irrigation Water Rights

Irrigation water uses are by far the largest and most important water uses affecting the total changes in ground water storage within the proposed critical ground water area. At present, there is one claim to a vested water right filed as a well registration under ORS 537.605. This registration has a claimed date of priority listed at 1925. All subsequent water rights within the area were filed as applications for

permits to appropriate ground water. The first application was made on April 13, 1950. Since that date, 62 permits have been issued. The last application for ground water use within the Butter Creek area to be accepted was dated February 2, 1972. A total of 36 certificates of water rights have been issued. Thirty-four certificates are for basalt aquifer wells and two certificates are for shallow gravel sumps along Butter Creek. Water rights within the proposed critical area are listed on Table 1 of this report.

The duty of water allowed for water rights within the Butter Creek-Ordinance area is $1/80$ th c.f.s., and is not to exceed 3.0 acre feet per acre per irrigation season. If all of the existing water rights of the area were exercised to their maximum allowable water use each season, it would require about 56,300 acre feet of water annually.

Water right applications have not been accepted for ground water use from the deep basalt aquifers of the Butter Creek area since February 2, 1972. Three applications for shallow basalt wells were accepted for the northernmost portion of the Butter Creek area located near the Columbia River.

C. Effects of Continued Ground Water Use

The withdrawal of ground water from deep wells in the Butter Creek area reduces the quantity of water available to neighboring water users. Some irrigation wells in this area are not equipped with totalizing water meters. Therefore, the total amount of water used each year can only be estimated at this time. Ground water storage estimates have been made based on aquifer areas and changes in water levels. Storage estimates assist in evaluating the potential use of water from the Butter Creek basalts. Accurate metered data on annual water use will be

needed to improve estimates of ground water storage.

Water level decline and meager annual precipitation (recharge) combined with the total amount of ground water use in the area indicate that a ground water mining situation has developed in the Butter Creek area. It is necessary to restrict all ground water withdrawals to the duty of water allowed under the water rights of record within the critical area. It is also important to establish a reasonable length for the annual irrigation season.

At the present rate of water use, water levels in wells will continue the annual decline. Some wells will have to be deepened in order to maintain production yields. Pumping lifts are now approaching 500 feet in some of the deeper wells. Increased pumping costs will reduce the economic advantages to the wells owners of the area. Any economic growth and development based on the mining of ground water resources within the area will suffer severe reversals when ground water withdrawals become no longer feasible. The use of ground water must be managed to assure optimum development and beneficial use within the capacity of the existing water resources. Therefore, ground water pumpage within the proposed critical area must be substantially reduced and controlled.

VI. CONCLUSIONS

A. The average annual recharge is not sufficient to maintain stablized ground water levels at present rates of withdrawal. A ground water mining situation now exists within the Butter Creek area. Water levels in wells constructed into the basalt aquifers of the Butter Creek critical area will continue to decline. Unless there is an increase in the amount of annual recharge or a reduction in ground water withdrawals,

new low water level positions will be established each year until such time that it will become impossible to obtain the present amount of ground water being withdrawn. The ultimate failure of some wells will occur.

B. Accurate pumpage information describing the total amount of ground water withdrawn annually from the Butter Creek critical ground water reservoir is required. Water meter data is necessary to make quantitative estimates of the ground water storage capacity within the critical area aquifers. Therefore, totalizing water meters must be installed on all wells used for non-exempted ground water appropriation. Each water well owner should maintain a record of pumpage to be reported to the Water Resources Department annually.

C. The estimated thickness of at least 2,000 feet and the tabular bedding of the Columbia River Basalt Group suggest that there may be additional aquifer zones lying at depths below and separated from the presently developed aquifers within the study area. Extensive casing and cement grouting procedures will be required for deeper well exploration projects. Perhaps 2,000 feet of grouted casing will be necessary to separate lower water bearing zones from the presently developed aquifer system.

D. To insure the preservation of the public welfare, safety, and health, it is necessary that the rights to appropriate ground water and their respective priorities be acknowledged and protected and that reasonably stable ground water levels be determined and maintained.

VII. RECOMMENDATIONS

A. The Butter Creek area defined in this report as being within Morrow and Umatilla Counties, Oregon should be declared a critical

ground water area.

B. The layered series of basalt rock aquifers of the Columbia River Group located within the critical area boundaries should be closed to further ground water development except for individual domestic and stock watering purposes.

C. All production wells in use other than wells defined in ORS 527.545, should be equipped with totalizing water meters. Well owners should maintain an accurate accounting of the total amount of water pumped from each well. Individual pumping records should be forwarded to the Water Resources Department at the close of each years irrigation season.

D. All wells operating in violation of ORS 537.535 (without water right permits) should be regulated and controlled by the Watermaster.

E. Ground water appropriations from wells in the critical area aquifers should be regulated and controlled as provided by ORS 527.735 and 537.745. The Watermaster should regulate the control works of all wells within the critical area so that the rate and total quantity of ground water withdrawn does not exceed that allowed under their ground water rights, certificates, or permits. The procedure for distribution and ground water regulation should be set forth in ORS 540.040.

F. If agriculture growth and land irrigation practices are to continue in the area, it will be necessary to import irrigation water from outside sources such as the Columbia and Umatilla Rivers so that ground water withdrawals can be reduced.

G. All proposed wells not yet constructed under the terms of existing water right applications and permits should not be constructed or used to appropriate ground water.

H. All applications to appropriate ground water from the Butter Creek deep basalt aquifers that are pending at this time as shown on Table 1 should be canceled. Permits should not be issued for these applications listed as follows:

List. No.	Name	Application No.
61	V. James Stockard	G-5023
63	Nelson and Tucker	G-5194
65	Wm. J. Doherty	G-5404
66	Wm. J. Doherty	G-5407
68	Taylor Bros. Farms	G-5467
68A	Taylor Bros. Farms	
68B	Taylor Bros. Farms	
68C	Taylor Bros. Farms	
69	Orval Matheny	G-5468
70	Porter Peringer	G-5594
71	Fritz Cutsforth	G-5609
72	Fritz Cutsforth	G-5679
73	Merle and Villa R. Abney	G-5715

I. Permits should be issued for the four shallow basalt wells located near the Columbia River under the following listed applications:

List No.	Name	Application No.
67	Marion R. Chaves	G-5432
74	Lon WadeKamper	G-5805
77	John L. King	G-6101
78	Phillip D. Hay	G-6576

J. The Butter Creek area should be closed to further construction of wells extending into the shallow or deep basalt aquifers, except for wells to be used for stock watering purposes or for watering any lawn or non-commercial garden not exceeding $\frac{1}{2}$ acre in area for single domestic purposes only. Each domestic well should be limited to tracts of land not less than 10 acres in area.

K. Wells developing water from the basalt aquifers in the Butter Creek ground water area within Township 1 North and Township 2 North, Ranges 26 and 27 East and the west half of Range 28 East, of Township 1 North, Township 2 North, and Township 3 North should be limited collectively to a total annual diversion of not more than 27,000 acre feet of water. This total allowable diversion of water should be distributed on the basis of water right priority for wells in the area.

L. Those wells developing ground water from basalt aquifers within the west half of Range 28 East of Townships 4 North, and 5 North, do not materially affect ground water withdrawals from wells located to the south within Township 1 North, and Township 2 North, Ranges 26 and 27 East and the west half of Range 28 East of Townships 1 North, 2 North, and 3 North and therefore, should be excluded from distribution based on relative priority dates.

VIII. REFERENCES

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- Lohman, S. W., 1972, Ground-water hydraulics: U. S. Geological Survey Prof. Paper 708, 70 p.
- Newcomb, R. G., 1961, Storage of ground water behind subsurface dams in the Columbia River basalt, Washington, Oregon, and Idaho: U. S. Geological Survey Prof. Paper 283-A, 15 p.
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- Robinson, J. H., 1971, Hydrology of basalt aquifers in the Hermiston-Ordinance area, Umatilla and Morrow Counties, Oregon: U. S. Geological Survey Hydrologic Investigations Atlas HA-387.
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IX.

RECORDS OF WELLS

Basalt Aquifers

Records of Wells

Report Well Number 1

Owner: B. P. Doherty Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 34, T. 2N., R. 27E.

Depth: 125(rpt) feet. Diameter: 6 inches. Depth cased: 25 feet.

Approximate altitude of land surface at well: 1040 ft. Year constructed: 1925

Yield: Reported at 200 gallons per minute.

Remarks: _____

Generalized Log:

No Log

Description and status of water right:

Ground Water Registration Permit GR-4066 with a reported date of beneficial use of 1925 for the appropriation of 0.11 cubic foot per second (49 gallons per minute) for the irrigation of 10.0 acres.

Records of Wells

Report Well Number 2

Owner: Allan C. & Florine Langenwalter Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 16 T. 4N., R. 28E

Depth: 282 feet. Diameter: 8 inches. Depth cased: 110 feet.

Approximate altitude of land surface at well: 500 ft. Year constructed: NR

Yield: Not reported

Remarks: _____

Generalized Log:

No Log

Description and status of water right:

Water Right Certificate 24264 with a priority of April 31, 1950 for the appropriation of 0.02 cubic foot per second (9 gallons per minute for the irrigation of 1.6 acres.

Records of Wells

Report Well Number 3, (8)

Owner: Oscar D. McCarty Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 14, T. 2 N., R. 27 E.

Depth: 785* feet. Diameter: 12 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 900 ft. Year constructed: 1951*

Yield: Tested at 1330 gallons per minute with 35 feet of drawdown in 1951.

Remarks: _____

Generalized Log:

Sand, gravel, and shale 0 - 88 feet
Basalt 88 - 280 feet
Basalt 280 - 785 feet (Deepening)

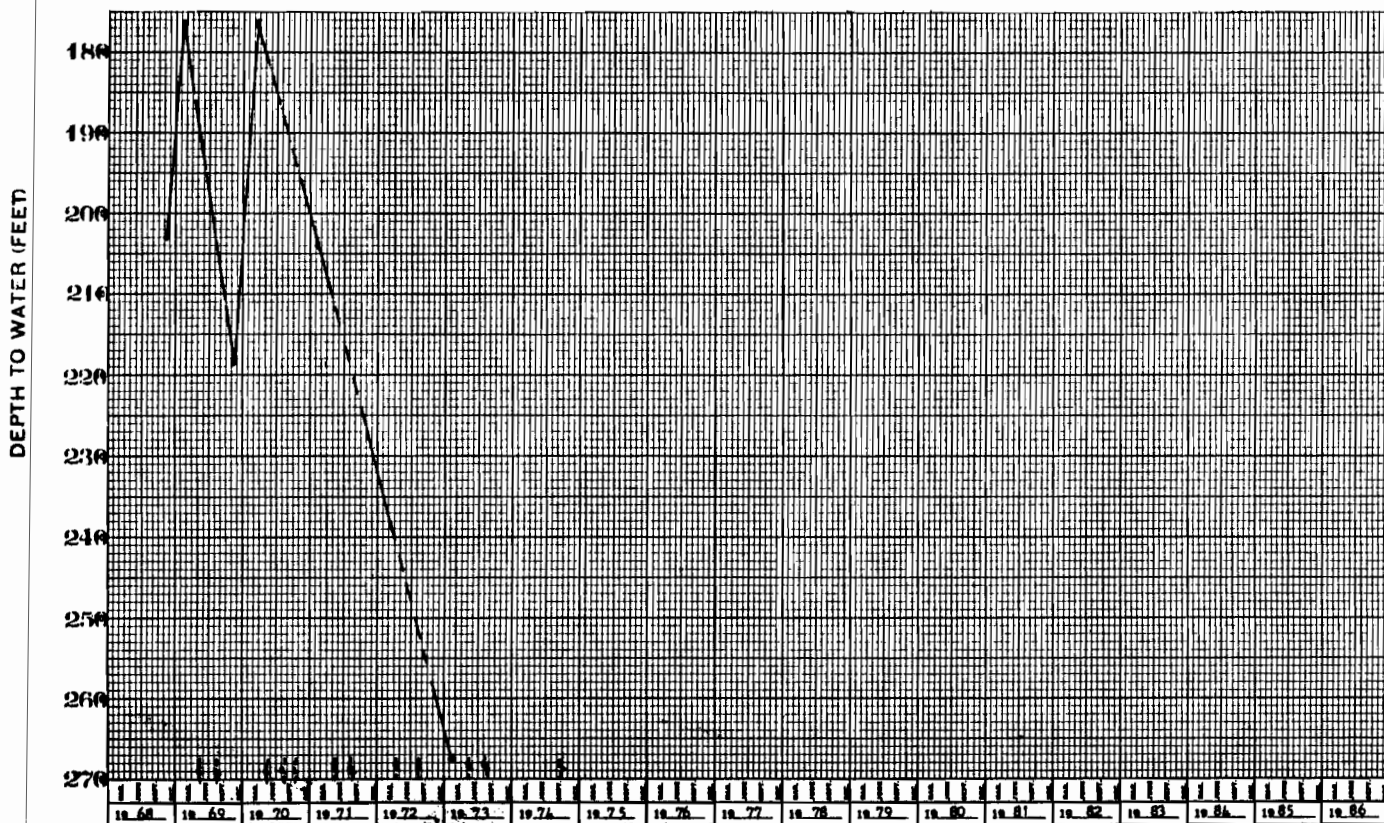
*Well deepened from 280 feet to 785 feet in 1968.

Description and status of water right:

Water Right Certificate 24271, with a priority of March 4, 1952 for the appropriation of 4.44 cubic feet per second (1,993 gallons per minute) for the irrigation of 111.7 acres and the supplemental irrigation of 288.3 acres.

Water Right Certificate 24273 with a priority of April 9, 1953 for the appropriation of 1.97 cubic feet per second (884 gallons per minute) for the irrigation of 157.4 acres.

Hydrograph:



Records of Wells

Report Well Number 4, (24)Owner: John F. Kilkinney Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 27, T. 2 N., R. 27 E.Depth: 598 feet. Diameter: 16 inches. Depth cased: 29 feet.Approximate altitude of land surface at well: 990 ft. Year constructed: 1957Yield: Tested at 780 gallons per minute with 150 feet of drawdown.

Remarks: _____

Generalized Log:

Gravel and clay	0 - 30 feet
Basalt, some shale interbeds	30 - 598 feet

Water Level:

Reported to be 50 feet below land
surface on 1/7/57
Measured at 125 feet below land
surface on 3/13/69

Description and status of water right:

Water Right Certificate 31201 with a priority of April 18, 1952 for the appropriation of 0.38 cubic foot per second (171 gallons per minute) for the supplemental irrigation of 30.0 acres.

Water Right Certificate 38846 with a priority of January 22, 1965 for the appropriation of 0.60 cubic foot per second (269 gallons per minute) for the supplemental irrigation of 137.8 acres.

Records of Wells

Report Well Number 5Owner: Tucker Echo Ranch Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 28, T. 2 N., R. 27 E.Depth: 263 feet. Diameter: 12 inches. Depth cased: 32.5 feet.Approximate altitude of land surface at well: 990 ft. Year constructed: NRYield: Not reported

Remarks: _____

Generalized Log:

Gravel, cemented gravel	0 - 31 feet
Basalt	30 - 263 feet

Water Level:

Measured at 57 feet below land
surface 3/7/58

Description and status of water right:

Water Right Certificate 31096 with a priority of May 7, 1952 for the appropriation of 1.96 cubic feet per second (880 gallons per minute) for the irrigation of 48.7 acres and the supplemental irrigation of 132.4 acres.

Records of Wells

Report Well Number 6Owner: Earl W. Wattenberger Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 10, T. 1 N., R. 27 E.Depth: 243* feet. Diameter: 8 inches. Depth cased: NR feet.Approximate altitude of land surface at well: 1115 ft. Year constructed: 1952*Yield: Reported at 200 gallons per minute with 55 feet of drawdown

Remarks: _____

Generalized Log:Water Level:

Sand and gravel 0 - 29 feet

Basalt 20 - 120 feet

Basalt 120 - 243 feet (Deepening)

Measured at 9 feet below land surface on 1/25/61

Reported to be 21 feet below land surface on 2/25/67

Description and status of water right:

Water Right Certificate 26072 with a priority of November 14, 1952, for the appropriation of 0.24 cubic foot per second (108 gallons per minute) for the supplemental irrigation of 19.0 acres.

Records of Wells

Report Well Number 7Owner: Robert J. Kilkenney Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 29, T. 1 N., R. 26 E.Depth: 360(rpt) feet. Diameter: 8 inches. Depth cased: NR feet.Approximate altitude of land surface at well: 1340 ft. Year constructed: NRYield: Not reported

Remarks: _____

Generalized Log:Water Level:

No Log

Measured at 35.38 feet below land surface on 11/30/71

Description and status of water right:

Water Right Certificate 29143 with a priority of December 17, 1952 for the appropriation of 0.08 cubic foot per second (36 gallons per minute) for the irrigation of 6.3 acres.

Records of Wells

Report Well Number 8, (3)Owner: Oscar D. McCarty Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 14, T. 2 N., R. 27 E.Depth: 785* feet. Diameter: 12 inches. Depth cased: NR feet.Approximate altitude of land surface at well: 900 ft. Year constructed: 1951*Yield: Tested at 1330 gallons per minute with 35 feet of drawdown in 1951.

Remarks: _____

Generalized Log:Water Level:Sand, gravel, and
shale

0 - 88 feet

Basalt

88 - 280 feet

Basalt

280 - 785 feet (Deepening)

Reported to be 200 feet below land
surface 9/26/68Measured at 267.50 feet below land
surface on 2/20/73

*Well deepened from 280 feet to 785 feet in 1968.

Description and status of water right:

Water Right Certificate 24271, with a priority of March 4, 1952 for the appropriation of 4.44 cubic feet per second (1,993 gallons per minute) for the irrigation of 111.7 acres and the supplemental irrigation of 288.3 acres.

Water Right Certificate 24273 with a priority of April 9, 1953 for the appropriation of 1.97 cubic feet per second (884 gallons per minute) for the irrigation of 157.4 acres.

Records of Wells

Report Well Number 9Owner: Erwin E. Rauch Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 18, T. 1 N., R. 26 E.Depth: 300(rpt) feet. Diameter: 8 inches. Depth cased: NR feet.Approximate altitude of land surface at well: 1150 ft. Year constructed: NRYield: Not reported

Remarks: _____

Generalized Log:

No Log

Description and status of water right:

Water Right Certificate 30193 with a priority of June 24, 1954 for the appropriation of 0.06 cubic foot per second (27 gallons per minute) for the irrigation of 4.5 acres.

Hydrograph

Records of Wells

Report Well Number 10Owner: Fred and Tresa Davis Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 19, T. 3N., R. 28E.Depth: - feet. Diameter: - inches. Depth cased: - feet.Approximate altitude of land surface at well: 675 ft. Year constructed: NRYield: Not reportedRemarks: Davis Well No. 1Generalized Log:

Well No. 1 Sump:

100 feet x 20 feet x 7 feet deep

Description and status of water right:

Water Right Certificate 35811 with a priority of November 21, 1956 for the appropriation of 1.50 cubic feet per second (673 gallons per minute) from Wells No. 1 and No. 2 for the irrigation and supplemental irrigation of 120.0 acres.

Records of Wells

Report Well Number 10AOwner: Fred and Tresa Davis Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 19, T. 3 N., R. 28E.Depth: - feet. Diameter: - inches. Depth cased: - feet.Approximate altitude of land surface at well: 675 ft. Year constructed: NRYield: Not reportedRemarks: Davis Well No. 2Generalized Log:

Well No. 2 Sump:

90 feet x 20 feet x 7 feet deep

Description and status of water right:

Water Right Certificate 35811 with a priority of November 21, 1956 for the appropriation of 1.50 cubic feet per second (673 gallons per minute) from Wells No. 1 and No. 2 for the irrigation and supplemental irrigation of 120.0 acres.

Owner: Clausie Ammon et al Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 1, T. 2 N., R. 27 E.

Depth: 840* feet. Diameter: 15 inches. Depth cased: 140 feet.

Approximate altitude of land surface at well: 805 ft. Year constructed: 1952*

Yield: Tested at 1000 gallons per minute with 20 feet of drawdown.

Remarks: Ammon Well No. 1 (abandoned)

Generalized Log:

Soil, gravel	0 - 14 feet
Clay, shale	14 - 170 feet
Basalt	170 - 554 feet
No log	554 - 840 feet

*Well deepened from 554 feet to 840 feet in 1961.

Description and status of water right:

Water Right Certificate 28601 with a priority of January 21, 1957 for the appropriation of 4.0 cubic feet per second (1,795 gallons per minute) from Wells No. 1 and No. 2 for the irrigation of 198.5 acres and the supplemental irrigation of 220.8 acres.

Hydrograph:



Records of Wells

Report Well Number 11AOwner: Clausie Ammon et al Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 2, T. 2N., R. 27EDepth: 886 feet. Diameter: 12 inches. Depth cased: 77 feet.Approximate altitude of land surface at well: 810 ft. Year constructed: 1957Yield: Tested at 1600 gallons per minute with 90 feet of drawdown.Remarks: Ammon Well No. 2Generalized Log:

Soil, gravel	0 - 19 feet
Clay, shale	19 - 184 feet
Basalt	184 - 886 feet

Water Level:

Reported to be flowing 1/26/61
Measured at 240.8 feet below land
surface 2/11/75

Description and status of water right:

Water Right Certificate 28601 with a priority of January 21, 1957 for the appropriation of 4.0 cubic feet per second (1,795 gallons per minute) from Wells No. 1 and No. 2 for the irrigation of 198.5 acres and the supplemental irrigation of 220.8 acres.

Records of Wells

Report Well Number 12Owner: A. J. Vey Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 24, T. 1N., R. 27E.Depth: 777 feet. Diameter: 12 inches. Depth cased: 54.6 feet.Approximate altitude of land surface at well: 1284 ft. Year constructed: 1958Yield: Unknown (Artesian flow reported at approximately 700 gpm in 1958)Remarks: Vey Well No. 4Generalized Log:

Clay, sand, and gravel	0 - 27 feet
Basalt	27 - 777 feet

Water Level:

Reportedly flowing 5/23/58

Description and status of water right:

Water Right Certificate 34196 with a priority of October 14, 1957 for the appropriation of 1.60 cubic feet per second (718 gallons per minute) for the supplemental irrigation of 128.0 acres.

Records of Wells

Report Well Number 13

Owner: Antone J. Vey Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 28, T. 1 N., R. 28 E.

Depth: 500 feet. Diameter: 12 inches. Depth cased: 29.5 feet.

Approximate altitude of land surface at well: 1400 ft. Year constructed: 1953

Yield: 1000 gallons per minute with 20 feet of drawdown.

Remarks: Vey Well No. 3

Generalized Log:

Gravel, silt, and	
clay	0 - 20 feet
Basalt	20 - 500 feet

Description and status of water right:

Water Right Certificate 26092 with a priority of February 11, 1958 for the appropriation of 1.02 cubic feet per second (458 gallons per minute) from Wells No. 2 and No. 3 for the supplemental irrigation of 81.5 acres.

Hydrograph:



Records of Wells

Report Well Number 13A

Owner: Antone J. Vey Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 28, T. 1 N., R. 28 E.

Depth: 365 feet. Diameter: 12 inches. Depth cased: 16 feet.

Approximate altitude of land surface at well: 1400 ft. Year constructed: 1953

Yield: Unknown (Artesian flow reported at 1200 gpm in 1953)

Remarks: Vey Well No. 2

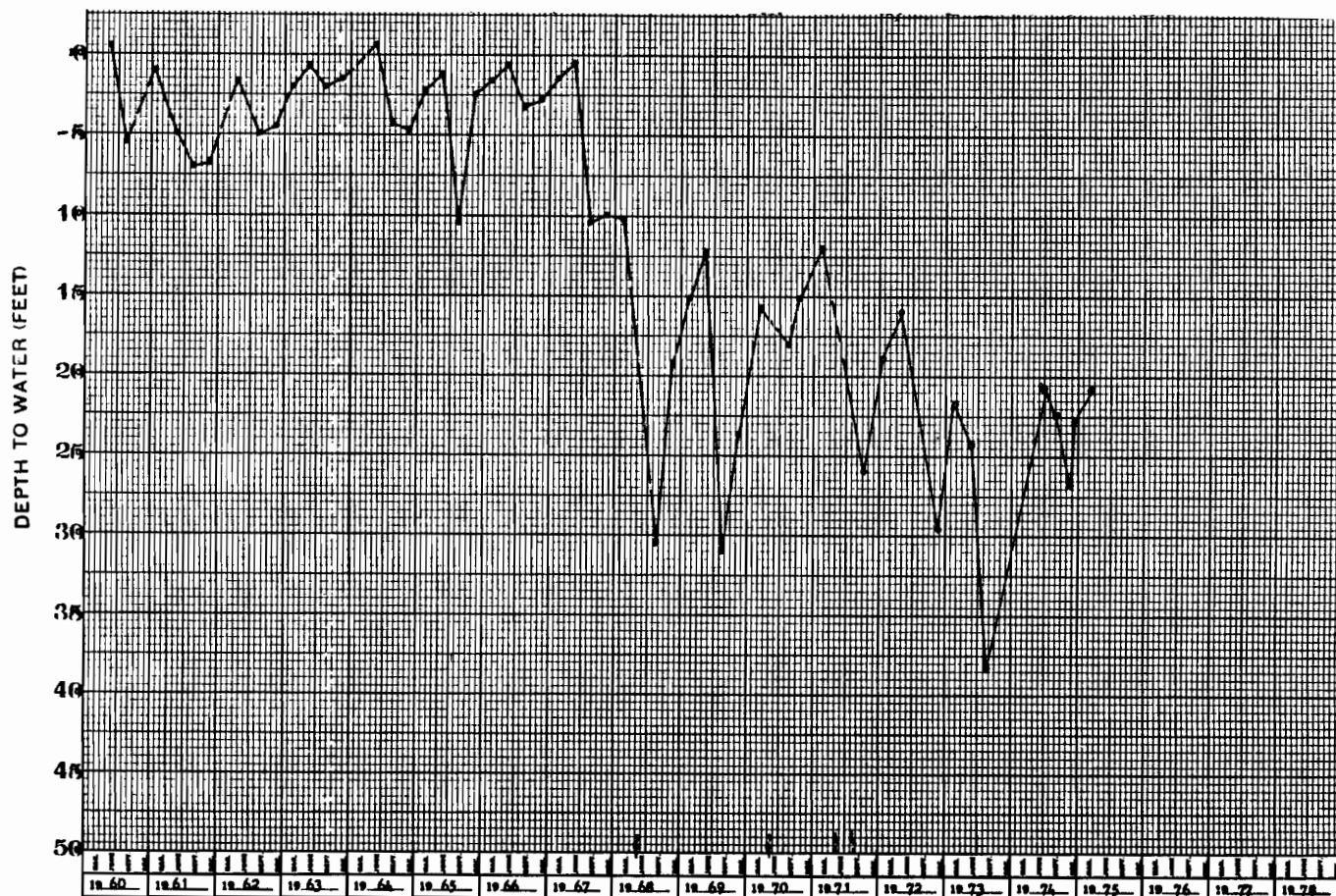
Generalized Log:

Cemented gravel	0 - 10 feet
Basalt	10 - 365 feet

Description and status of water right:

Water Right Certificate 26092 with a priority of February 11, 1958 for the appropriation of 1.02 cubic feet per second (458 gallons per minute) from Wells No. 2 and No. 3 for the supplemental irrigation of 81.5 acres.

Hydrograph:



Records of Wells

Report Well Number 14

Owner: Maynard F. Aaby and
Clarence L. Hanson

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 12, T. 2 N., R. 27 E.

Depth: 959 feet. Diameter: 12 inches. Depth cased: 178 feet.

Approximate altitude of land surface at well: -. Year constructed: 1959

Yield: Tested at 889 gallons per minute with 12 feet of drawdown.

Remarks: _____

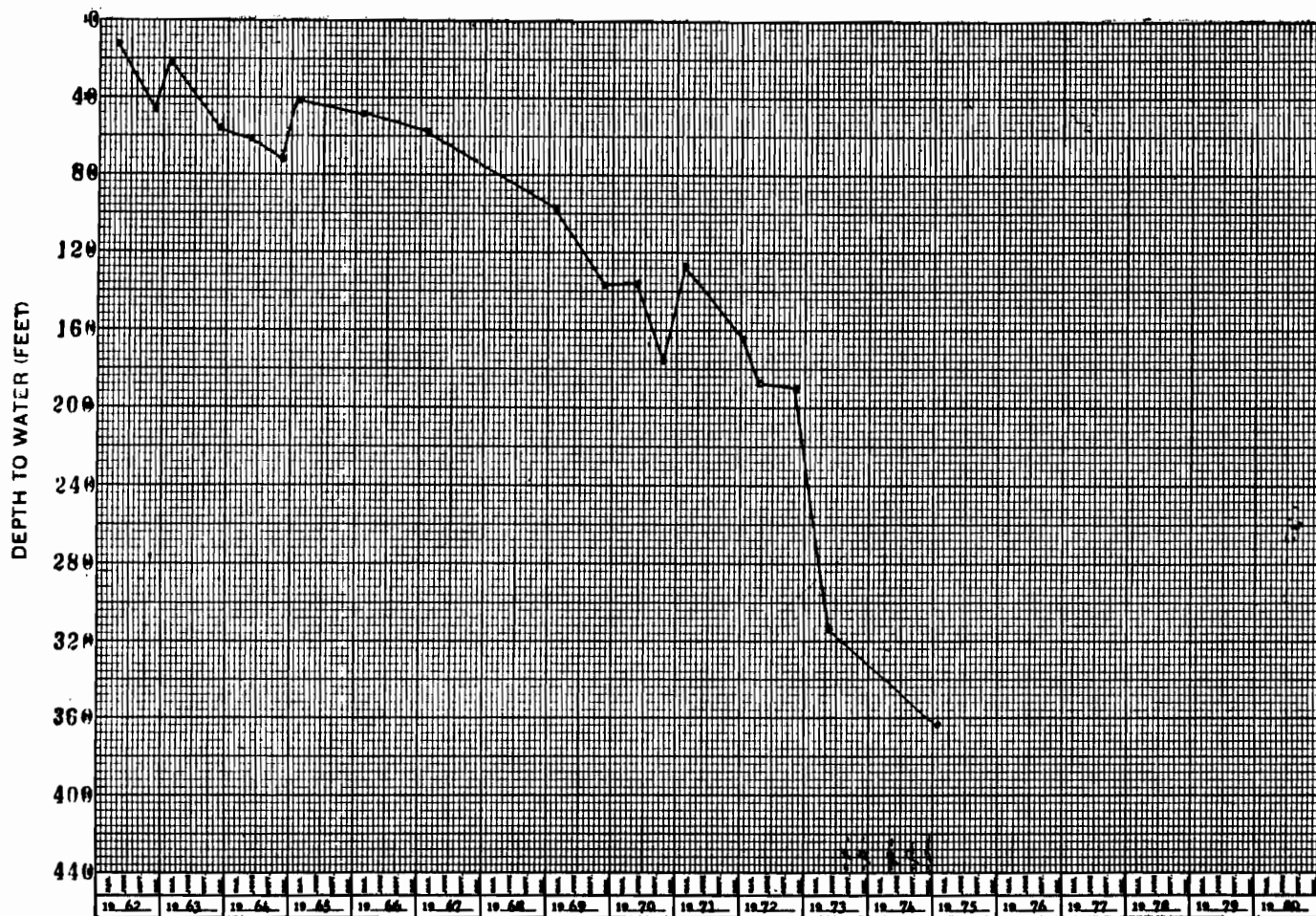
Generalized Log:

Soil	0 - 13 feet
Gravel and shale	13 - 60 feet
Rock	60 - 91 feet
Shale	91 - 159 feet
Basalt with clay interbeds	159 - 959 feet

Description and status of water right:

Water Right Certificate 30742 with a priority of February 21, 1959 for the appropriation of 2.5 cubic feet per second (1122 gallons per minute) for the irrigation of 54.5 acres and the supplemental irrigation of 274.0 acres.

Hydrograph:



Records of Wells

Report Well Number 15Owner: Harry J. Andrews Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 18, T. 3N., R. 28E.Depth: 875 feet. Diameter: 12 inches. Depth cased: 57 feet.Approximate altitude of land surface at well: 655 ft. Year constructed: 1956Yield: Tested at 800 gallons per minute with 350 feet of drawdown.

Remarks: _____

Generalized Log:

Soil	0 - 9 feet
Gravel, clay	9 - 163 feet
Basalt	163 - 875 feet

Water Level:

Reported to be 60 feet below land surface on 1/1/56
Measured at 278 feet below land surface on 12/6/73

Description and status of water right:

Water Right Certificate 32696 with a priority of September 2, 1960 for the appropriation of 0.94 cubic feet per second (422 gallons per minute) for the irrigation of 30.0 acres.

WN

Records of Wells

Report Well Number 16Owner: George B. Wallace Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 25, T. 3N., R. 27E.Depth: 591 feet. Diameter: 12 inches. Depth cased: 184 feet.Approximate altitude of land surface at well: 750 ft. Year constructed: 1960Yield: Not reported.

Remarks: _____

Generalized Log:

Gravel, clay	0 - 173 feet
Basalt	173 - 591 feet

Water Level:

Reported to be 240 feet below land surface on 7/17/60

Description and status of water right:

Water Right Certificate 32592 with a priority of September 21, 1960 for the appropriation of 0.96 cubic foot per second (431 gallons per minute) for the irrigation of 2.0 acres and the supplemental irrigation of 199.3 acres.

Records of Wells

Report Well Number 17

Owner: Earl W. Wattenberger Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 10, T. 1 N., R. 27 E.

Depth: 120 feet. Diameter: 8 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 1130 ft. Year constructed: 1962

Yield: 300 gallons per minute

Remarks: _____

Generalized Log:

Sand, boulders	0 - 38 feet
Basalt	38 - 120 feet

Description and status of water right:

Water Right Certificate 34283 with a priority of February 5, 1962 for the appropriation of 0.78 cubic foot per second (350 gallons per minute) for the irrigation of 17.6 acres and the supplemental irrigation of 64.8 acres.

Hydrograph:



Records of Wells

Report Well Number 18

Owner: Sarvis Springs Farm Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 26, T. 2 N., R. 27 E.

Depth: 932 feet. Diameter: 12 inches. Depth cased: 77 feet.

Approximate altitude of land surface at well: 1180 ft. Year constructed: 1962

Yield: Tested at 1200 gallons per minute with 18 feet of drawdown.

Remarks: _____

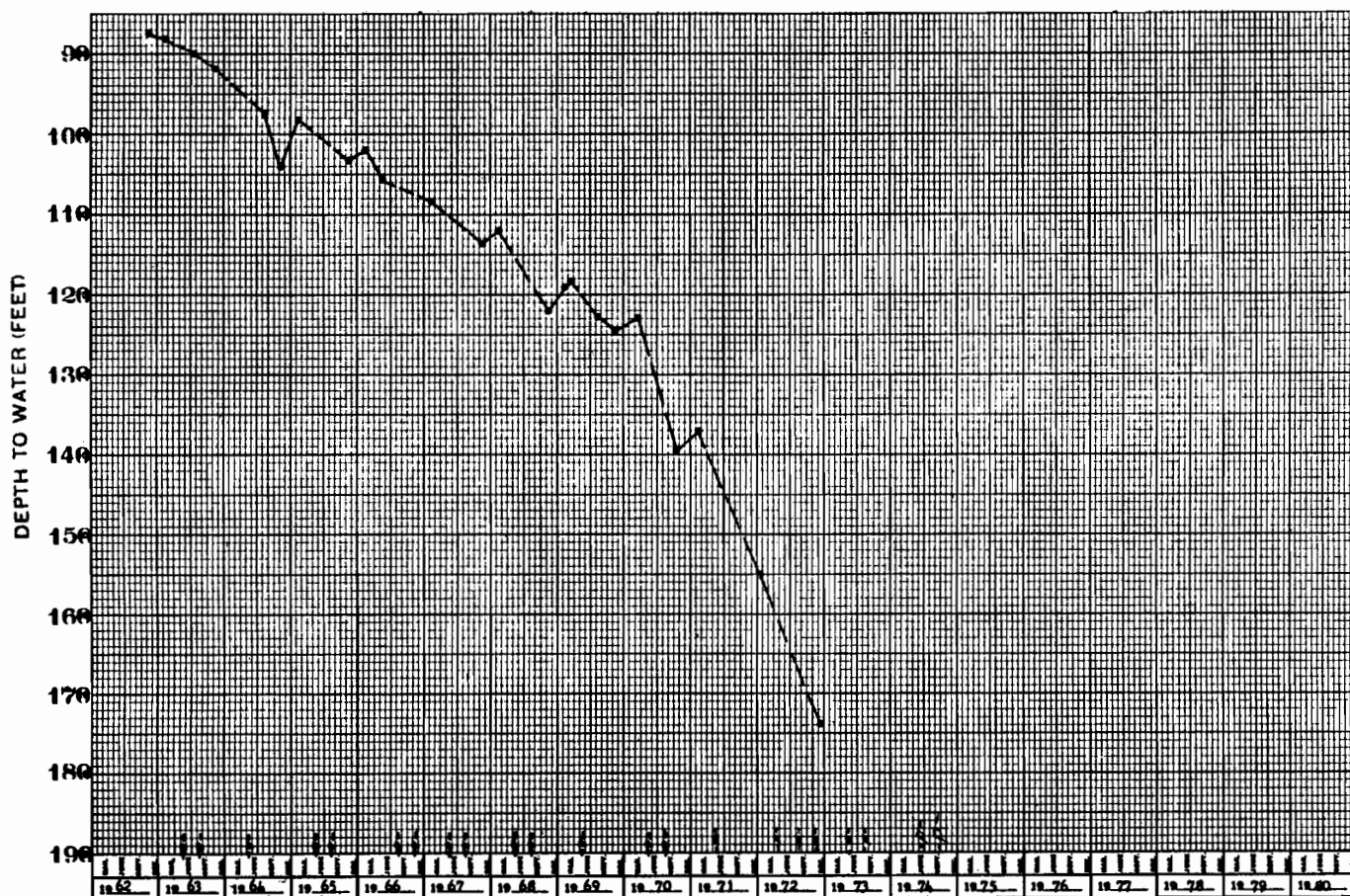
Generalized Log:

Gravel, clay	0 - 25 feet
Basalt	25 - 932 feet

Description and status of water right:

Water Right Certificate 36022 with a priority of October 8, 1962 for the appropriation of 2.68 cubic feet per second (1203 gallons per minute) for the irrigation of 347.4 acres.

Hydrograph:



Records of Wells

Report Well Number 19Owner: Kenneth Turner Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 26, T. 1 N., R. 26 E.Depth: 230 feet. Diameter: 8 inches. Depth cased: 24 feet.Approximate altitude of land surface at well: 1450 ft. Year constructed: 1963Yield: Not reported.

Remarks: _____

Generalized Log:

Soil	0 - 4 feet
Shale and clay	4 - 24 feet
Basalt	24 - 230 feet

Water Level:

Reported to be 112 feet below land surface on 2/14/63

Description and status of water right:

Water Right Certificate 35394 with a priority of April 24, 1963 for the appropriation of 0.54 cubic foot per second (242 gallons per minute) for the irrigation of 64.7 acres.

Records of Wells

Report Well Number 20, (27)Owner: Edward B. Wattenberger Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 3, T. 1 N., R. 27 E.Depth: 259* feet. Diameter: 10 inches. Depth cased: 18 feet.Approximate altitude of land surface at well: 1120 ft. Year constructed: 1964*Yield: Tested at 575 gallons per minute with 110 feet of drawdown.

Remarks: _____

Generalized Log:

Gravel and clay	0 - 13 feet
Basalt with sand interbeds	13 - 259*feet

Water Level:

Reported to be 3 feet 9 inches below land surface on 1/31/66

*Well deepened from 129 to 259 in 1966.

Description and status of water right:

Water Right Certificate 34284 with a priority of November 8, 1963 for the appropriation of 1.11 cubic feet per second (498 gallons per minute) for the irrigation of 13.2 acres and the supplemental irrigation of 77.8 acres.

Water Right Certificate 38714 with a priority of April 1, 1966 for the appropriation of 0.62 cubic foot per second (278 gallons per minute) for the irrigation of 6.6 acres and the supplemental irrigation of 42.1 acres.

Records of Wells

Report Well Number 21Owner: City of Umatilla Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 19, T. 5 N., R. 28 E.Depth: 785(rpt) feet. Diameter: 16(rpt) inches. Depth cased: 400 feet.Approximate altitude of land surface at well: 490 ft. Year constructed: NRYield: Not reported.

Remarks: _____

Generalized Log:

No Log

Description and status of water right:

Water Right Certificate 34523 with a priority date of December 24, 1963 for the appropriation of 2.0 cubic feet per second (898 gallons per minute) for municipal use.

Records of Wells

Report Well Number 22Owner: Fred E. Davis Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 19, T. 3 N., R. 28 E.Depth: - feet. Diameter: - inches. Depth cased: - feet.Approximate altitude of land surface at well: 670 ft. Year constructed: NRYield: Reported at 410 gallons per minute.

Remarks: _____

Generalized Log:

Well No. 3:

Sump 150 feet x 30 feet x 35 feet deep

Description and status of water right:

Water Right Certificate 35783 with a priority of February 24, 1964 for the appropriation of 0.84 cubic foot per second (377 gallons per minute) for the supplemental irrigation of 120.0 acres.

Records of Wells

Report Well Number 23Owner: Raymond M. Porter Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 23, T. 1 N., R. 27 E.Depth: 215 feet. Diameter: 10 inches. Depth cased: 66 feet.Approximate altitude of land surface at well: 1260 ft. Year constructed: 1964Yield: Tested at 1000 gallons per minute with 16 feet of drawdown.

Remarks: _____

Generalized Log:

Soil, clay	0 - 46 feet
Basalt	46 - 215 feet

Water Level:

Reported to be 28 feet below land surface on 10/28/64

Description and status of water right:

Water Right Certificate 34384 with a priority of December 17, 1964 for the appropriation of 1.24 cubic feet per second (557 gallons per minute) for the irrigation of 21.2 and the supplemental irrigation of 78.1 acres.

Records of Wells

Report Well Number 24, (4)Owner: Michael J. Kilkenny Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 27, T. 2 N., R. 27 E.Depth: 598 feet. Diameter: 16 inches. Depth cased: 29 feet.Approximate altitude of land surface at well: 990 ft. Year constructed: 1957Yield: Tested at 780 gallons per minute with 150 feet of drawdown.

Remarks: _____

Generalized Log:

Gravel and clay	0 - 30 feet
Basalt, some shale interbeds	30 - 598 feet

Water Level:

Reported to be 50 feet below land surface on 1/7/57
Measured at 125 feet below land surface on 3/13/69

Description and status of water right:

Water Right Certificate 31201 with a priority of April 18, 1952 for the appropriation of 0.38 cubic foot per second (171 gallons per minute) for the supplemental irrigation of 30.0 acres.

Water Right Certificate 38846 with a priority of January 22, 1965 for the appropriation of 0.60 cubic foot per second (269 gallons per minute) for the supplemental irrigation of 137.8 acres.

Records of Wells

Report Well Number 25

Owner: George Luciani Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 3, T. 1 N., R. 27 E.

Depth: 220* feet. Diameter: 10 inches. Depth cased: 38 feet.

Approximate altitude of land surface at well: 1135 ft. Year constructed: 1964*

Yield: Tested at 180 gallons per minute with 12 feet of drawdown.

Remarks: _____

Generalized Log:

Sand, gravel and boulders	0 - 36 feet
Basalt	36 - 107 feet
Basalt*	107 - 220 feet (Deepening)

*Deepened from 107 feet to 220 feet in 1967.

Description and status of water right:

Water Right Certificate 38584 with a priority of June 28, 1965 for the appropriation of 0.29 cubic foot per second (130 gallons per minute) for the irrigation of 22.8 acres.

Hydrograph:



Owner: Henry F. Walker Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 8, T. 3 N., R. 28 E.

Depth: 437* feet. Diameter: 12 inches. Depth cased: 165-205(10") feet.

Approximate altitude of land surface at well: 660 ft. Year constructed: 1966

Yield: Tested at 100 gallons per minute with 68 feet of drawdown.

Remarks: Walker Well No. 1 (Unused)

Generalized Log:

Soil	0 - 6 feet
Clay and gravel	6 - 198 feet
Basalt	198 - 250 feet
Basalt with some clay interbeds	250 - 437 feet (Deepening)

*Well deepened from 250 to 437 feet in 1967.

Description and status of water right:

Ground Water Permit G-3255 with a priority of January 26, 1966 for the appropriation of 1.33 cubic feet per second (597 gallons per minute) from Well No. 2 and 1.90 cubic feet per second (853 gallons per minute) from Well No. 1 for the irrigation of 258 acres.

Hydrograph:



Records of Wells

Report Well Number 26AOwner: Henry F. Walker Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 8, T. 3 N., R. 28 E.Depth: 216 feet. Diameter: 12 inches. Depth cased: 100 feet.Approximate altitude of land surface at well: 660 ft. Year constructed: 1966Yield: Bailer tested at 50 gallons per minute with 15 feet of drawdown.Remarks: Walker Well No. 2 (Abandoned)Generalized Log:

Soil	0 - 6 feet
Silt and clay	6 - 40 feet
Gravel	40 - 165 feet
Clay and gravel	165 - 200 feet
Basalt	200 - 216 feet

Water Level:

Reported to be 70 feet below land surface on 2/18/66

Description and status of water right:

Ground Water Permit G-3255 with a priority of January 26, 1966 for the appropriation of 1.33 cubic feet per second (597 gallons per minute) from Well No. 2 and 1.90 cubic feet per second (853 gallons per minute) from Well No. 1 for the irrigation of 258 acres.

Records of Wells

Report Well Number 27. (20)Owner: Edward B. Wattenberger Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 3, T. 1 N., R. 27 E.Depth: 259* feet. Diameter: 10 inches. Depth cased: 18 feet.Approximate altitude of land surface at well: 1120 ft. Year constructed: 1964*Yield: Tested at 575 gallons per minute with 110 feet of drawdown.

Remarks: _____

Generalized Log:

Gravel and clay	0 - 13 feet
Basalt with sand interbeds	13 - 259 feet*

Water Level:

Reported to be 3 feet 9 inches below land surface on 1/31/66

*Well deepened from 129 feet to 259 feet in 1966.

Description and status of water right:

Water Right Certificate 34284 with a priority of November 8, 1963 for the appropriation of 1.11 cubic feet per second (498 gallons per minute) for the irrigation of 13.2 acres and the supplemental irrigation of 77.8 acres.

Water Right Certificate 38714 with a priority of April 1, 1966 for the appropriation of 0.62 cubic foot per second (278 gallons per minute) for the irrigation of 6.6 acres and the supplemental irrigation of 42.1 acres.

Records of Wells

Report Well Number 28

Owner: Leo Ashbeck Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 10, T. 1 N., R. 27 E.
 Depth: 227 feet. Diameter: 12 inches. Depth cased: 33 feet.
 Approximate altitude of land surface at well: 1220 ft. Year constructed: 1967
 Yield: Tested at 2000 gallons per minute with 12 feet of drawdown.
 Remarks: _____

Generalized Log:Water Level:

Clay 0 - 32 feet
 Basalt 32 - 227 feet

Reported to be 90 feet below land
 surface on 12/8/67
 Measured at 170.62 feet below land
 surface on 12/19/74

Description and status of water right:

Ground Water Permit G-3164 with a priority of May 27, 1966 for the appropriation
 of 3.63 cubic feet per second (1629 gallons per minute) for the irrigation of
 290.0 acres.

Records of Wells

Report Well Number 29

Owner: Robert M. Kinney Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 21, T. 4 N., R. 28 E.
 Depth: 347 feet. Diameter: 12 inches. Depth cased: 158 feet.
 Approximate altitude of land surface at well: 555 ft. Year constructed: 1966
 Yield: Tested at 700 gallons per minute with 20 feet of drawdown.
 Remarks: _____

Generalized Log:Water Level:

Sand and gravel 0 - 158 feet
 Basalt with sand
 and clay interbeds 158 - 347 feet

Reported to be 122 feet below land
 surface on 10/5/66

Description and status of water right:

Water Right Certificate 38597 with a priority of July 5, 1966 for the appro-
 priation of 1.33 cubic feet per second (597 gallons per minute) for the
 irrigation of 106.6 acres.

Records of Wells

Report Well Number 30, (40)Owner: Proudfoot Ranches Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 30, T. 4 N., R. 28 E.Depth: 721 feet. Diameter: 16 inches. Depth cased: 100 feet.Approximate altitude of land surface at well: 562 ft. Year constructed: 1967Yield: Tested at 2020 gallons per minute with 31 feet of drawdown.

Remarks: _____

Generalized Log:

Sand and gravel	0 - 35 feet
Clay	35 - 86 feet
Sand, clay gravel	86 - 179 feet
Basalt	179 - 721 feet

Water Level:

Reported to be 132 feet below land surface on 7/3/67

Description and status of water right:

Ground Water Permit G-3492 with a priority of September 29, 1966 for the appropriation of 1.59 cubic feet per second (714 gallons per minute) for the supplemental irrigation of 127.0 acres.

Ground Water Permit G-3895 with a priority of November 13, 1967 for the appropriation of 2.42 cubic feet per second (1087 gallons per minute) for the irrigation of 63.4 acres and the supplemental irrigation of 128.6 acres.

Records of Wells

Report Well Number 31Owner: Rose Mueller Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 32, T. 4 N., R. 28 E.Depth: 200 feet. Diameter: 16 inches. Depth cased: 140 feet.Approximate altitude of land surface at well: 550 ft. Year constructed: 1967Yield: Tested at 1200 gallons per minute with 121 feet of drawdown.

Remarks: _____

Generalized Log:

Soil	0 - 5 feet
Gravel with sand and clay interbeds	5 - 138 feet
Basalt	138 - 200 feet

Water Level:

Reported to be 39 feet below land surface on 4/28/67

Description and status of water right:

Water Right Certificate 38388 with a priority of December 8, 1966 for the appropriation of 0.86 cubic foot per second (386 gallons per minute) for the supplemental irrigation of 68.5 acres.

Records of Wells

Report Well Number 32Owner: Michael J. Kilkenny Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 22, T. 2 N., R. 27 E.Depth: 778 feet. Diameter: 12 inches. Depth cased: 142 feet.Approximate altitude of land surface at well: 920 ft. Year constructed: 1968Yield: Air tested at 700 gallons per minute.

Remarks: _____

Generalized Log:

Gravel and clay	0 - 138 feet
Basalt	138 - 778 feet

Water Level

Reported to be 171 feet below land surface on 2/23/68

Description and status of water right:

Water Right Certificate 38847 with a priority of January 13, 1967 for the appropriation of 2.64 cubic feet per second (1185 gallons per minute) for the irrigation 362.2 acres.

Owner: William J. Doherty Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 10, T. 1N., R. 26E.

Depth: 376 feet. Diameter: 10 inches. Depth cased: 18.5 feet.

Approximate altitude of land surface at well: 1140 ft. Year constructed: 1964

Yield: Tested at 800 gallons per minute with 17 feet of drawdown.

Remarks: _____

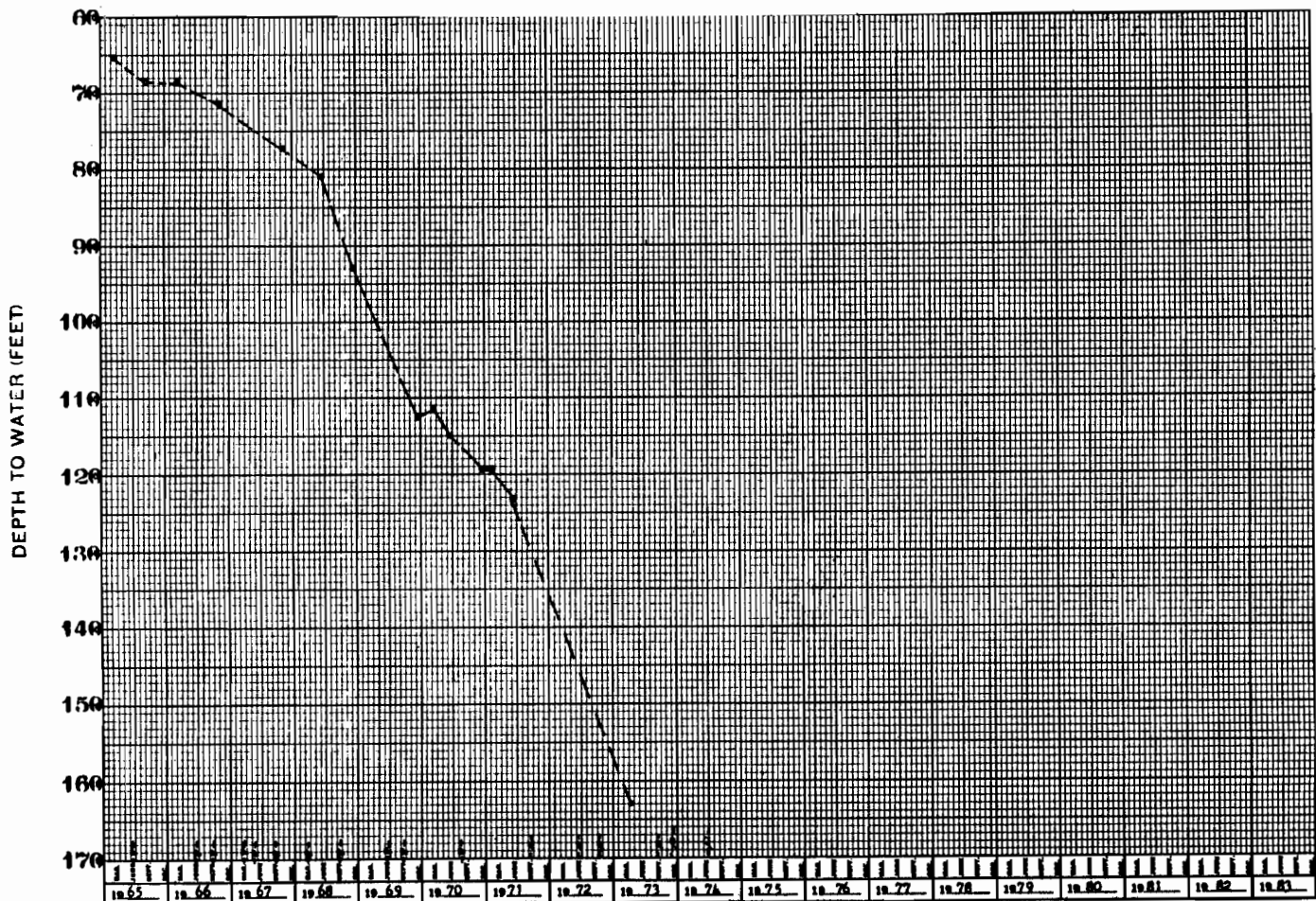
Generalized Log:

Soil and gravel 0 - 18 feet
Basalt with interbeds
of sand and boulders 18 - 376 feet

Description and status of water right:

Water Right Certificate 38473 with a priority of March 13, 1967 for the appropriation of 0.45 cubic foot per second (202 gallons per minute) for the irrigation of 36.3 acres.

Hydrograph:



Records of Wells

Report Well Number 34

Owner: Ernest A. Betz Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 28, T. 3 N., R. 28 E.

Depth: 636 feet. Diameter: 16 inches. Depth cased: 130 feet.

Approximate altitude of land surface at well: 711 ft. Year constructed: 1967

Yield: Tested at 880 gallons per minute with no recorded drawdown.

Remarks: _____

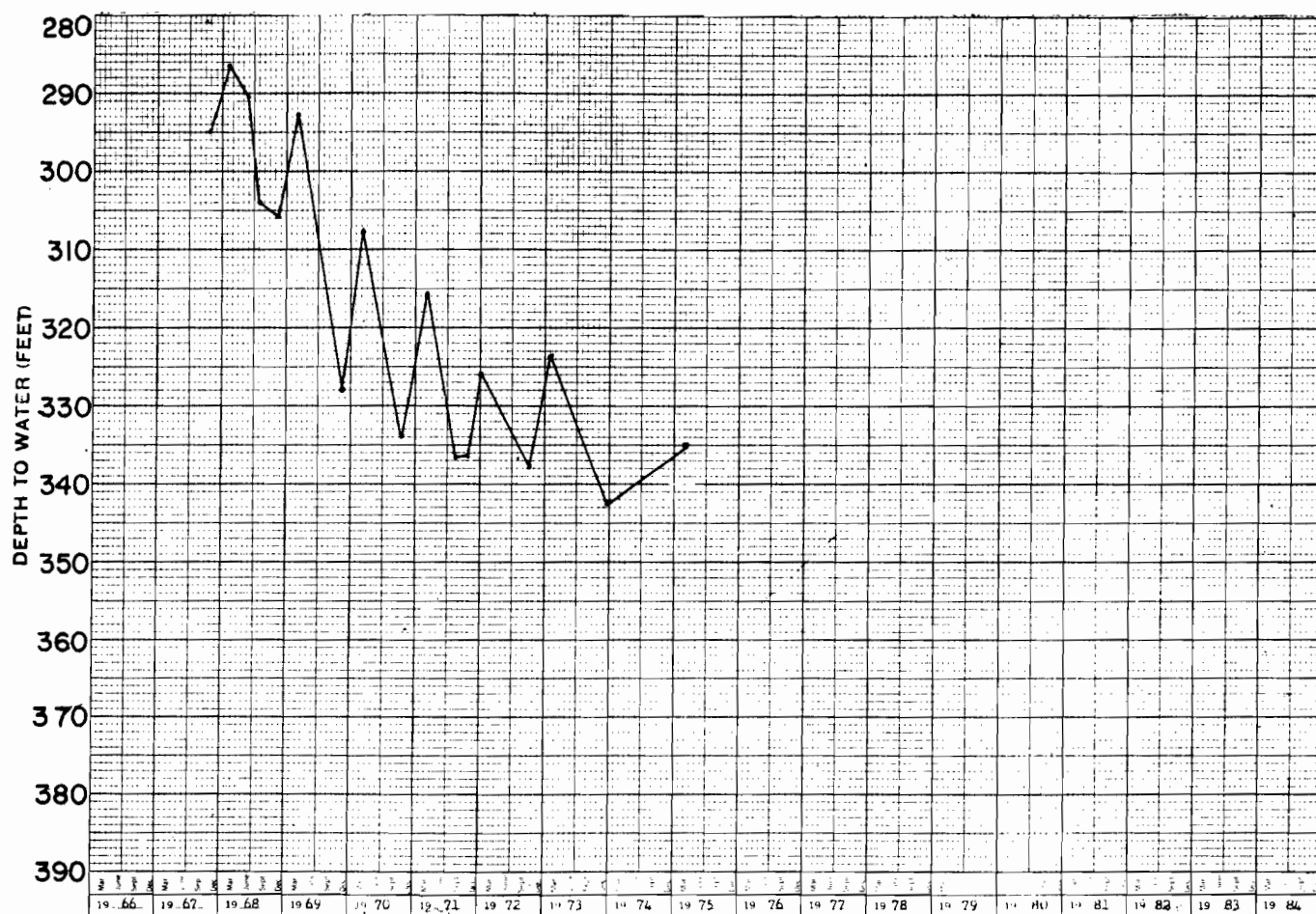
Generalized Log:

Sand, gravel, clay 0 - 130 feet
Basalt 130 - 636 feet

Description and status of water right:

Water Right Certificate 36675 with a priority of March 21, 1967 for the appropriation of 1.57 cubic feet per second (705 gallons per minute) for the irrigation of 125.6 acres.

Hydrograph:



Records of Wells

Report Well Number 35Owner: Stone Machinery Co. Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 18, T. 3 N., R. 28 E.Depth: 1095 feet. Diameter: 16 inches. Depth cased: 214 feet.Approximate altitude of land surface at well: 642 ft. Year constructed: 1968Yield: Tested at 2190 gallons per minute with 40 feet of drawdown.Remarks: Stone Machinery Co. Well No. 1Generalized Log:

Soil	0 - 5 feet
Gravel	5 - 15 feet
Clay	15 - 160 feet
Basalt with clay interbeds	160 - 1095 feet

Water Level:Reported to be 232 feet below land
surface on 12/20/68Description and status of water right:

Ground Water Permit G-3530 with a priority of May 24, 1967 for the appropriation of 4.5 cubic feet per second (2020 gallons per minute) from Well No. 1 and 6.0 cubic feet per second (2694 gallons per minute) from Well No. 2 for the irrigation and supplemental irrigation of 480.0 acres.

Records of Wells

Report Well Number 35A

Owner: Stone Machinery Co. Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 6, T. 3N., R. 28E.

Depth: 1136 feet. Diameter: 16 inches. Depth cased: 237 feet.

Approximate altitude of land surface at well: 670 ft. Year constructed: 1968

Yield: Tested at 1700 gallons per minute with 202 feet of drawdown.

Remarks: Stone Machinery Co. Well No. 2

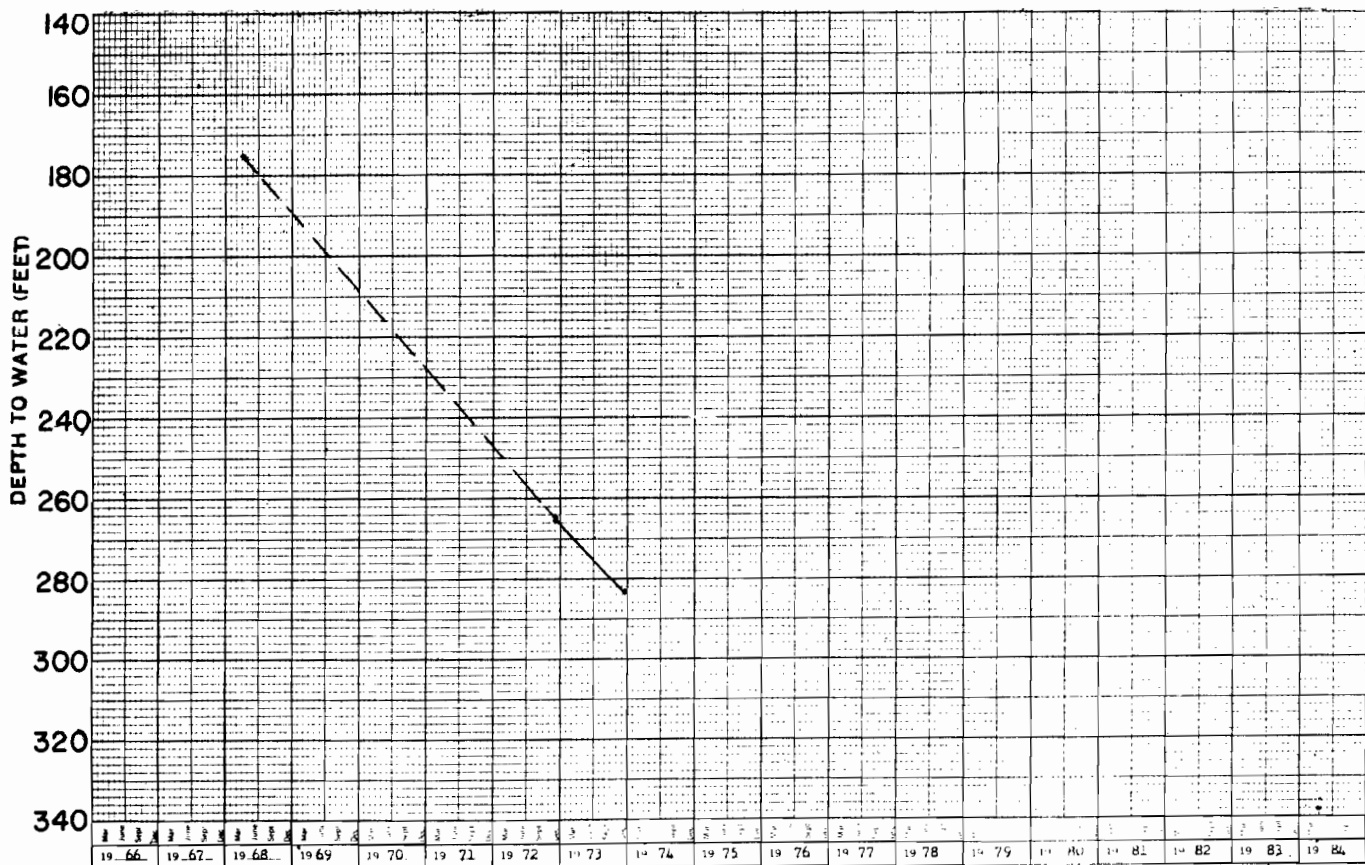
Generalized Log:

Sand 0 - 55 feet
Clay and gravel with
interbedded clay 55 - 230 feet
Sand 230 - 238 feet
Basalt with some clay
interbeds 238 - 1136 feet

Description and status of water right:

Ground Water Permit G-3530 with a priority of May 24, 1967 for the appropriation of 4.5 cubic feet per second (2020 gallons per minute) from Well No. 1 and 6.0 cubic feet per second (2694 gallons per minute) from Well No. 2 for the irrigation and supplemental irrigation of 480.0 acres.

Hydrograph:



Records of Wells

Report Well Number 36

Owner: G. R. D. & H. Grieb Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 28, T. 2 N., R. 26 E.

Depth: 549 feet. Diameter: 16 inches. Depth cased: 150 feet.

Approximate altitude of land surface at well: 1080 ft. Year constructed: 1968

Yield: Air tested at 800 gallons per minute.

Remarks: Grieb Well No. 1 (Unused)

Generalized Log:

Gravel and clay 0 - 150 feet
Basalt 150 - 549 feet

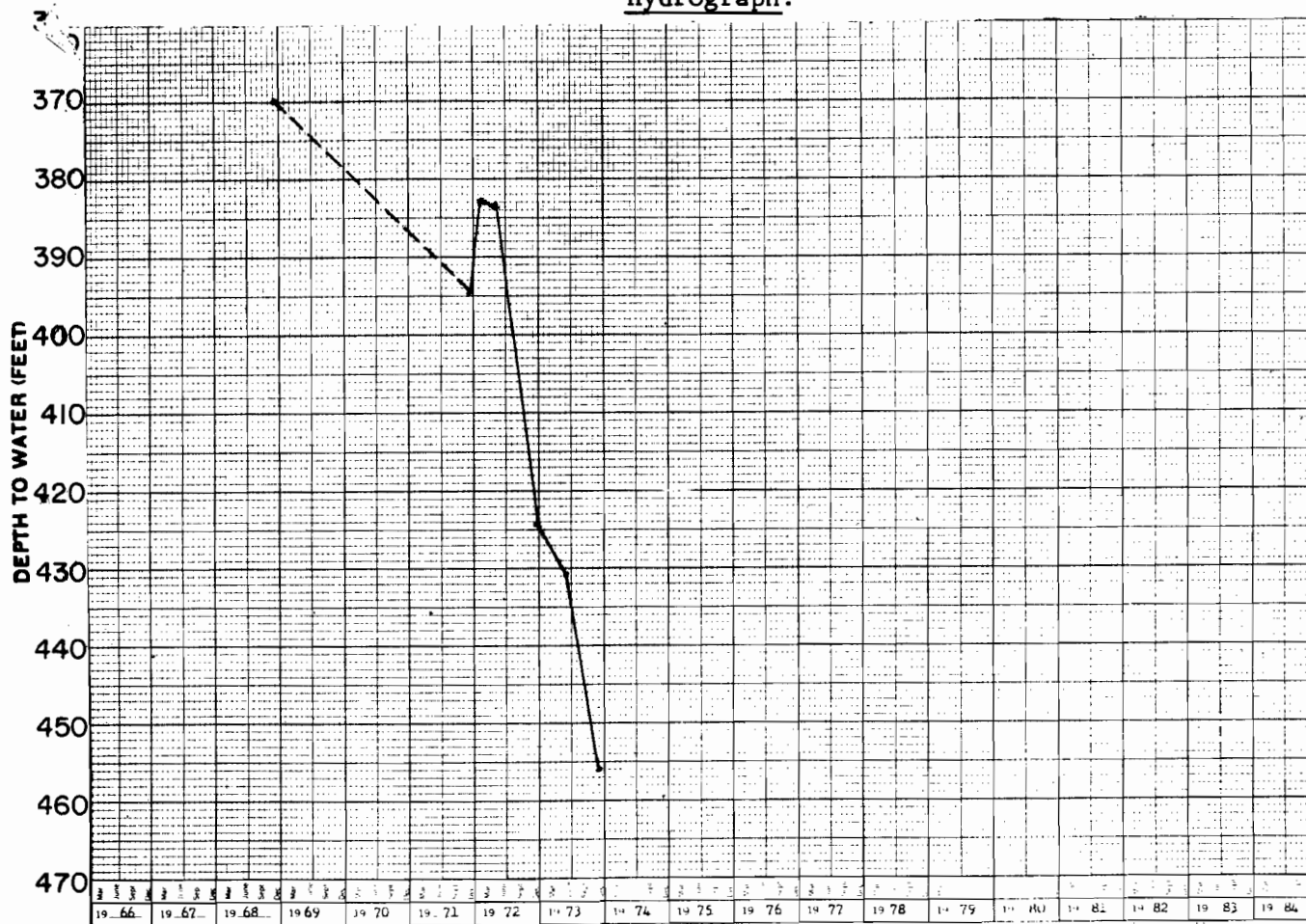
G-3999

2 W/265-2800

Description and status of water right:

Permit G-3792 with a priority of July 19, 1967 for the appropriation of 7 cubic feet per second (3142 gallons per minute) and March 7, 1968 for 7 cubic feet per second (3142 gallons per minute) from Wells No. 1 and No. 2 for the irrigation of 3356.0 acres being 7 cubic feet per second from each well.

Hydrograph:



Records of Wells

Report Well Number 36A

Owner: G. R. D. & H. Grieb Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 29, T. 2 N., R. 26 E.

Depth: 1004* feet. Diameter: 16 inches. Depth cased: 152 feet.

Approximate altitude of land surface at well: 1060 ft. Year constructed: 1968*

Yield: _____

Remarks: Grieb No. 2

Generalized Log:

Gravel and clay	0 - 150 feet
Basalt	150 - 914 feet
Basalt	914 - 1004 feet (Deepening)

G-3999

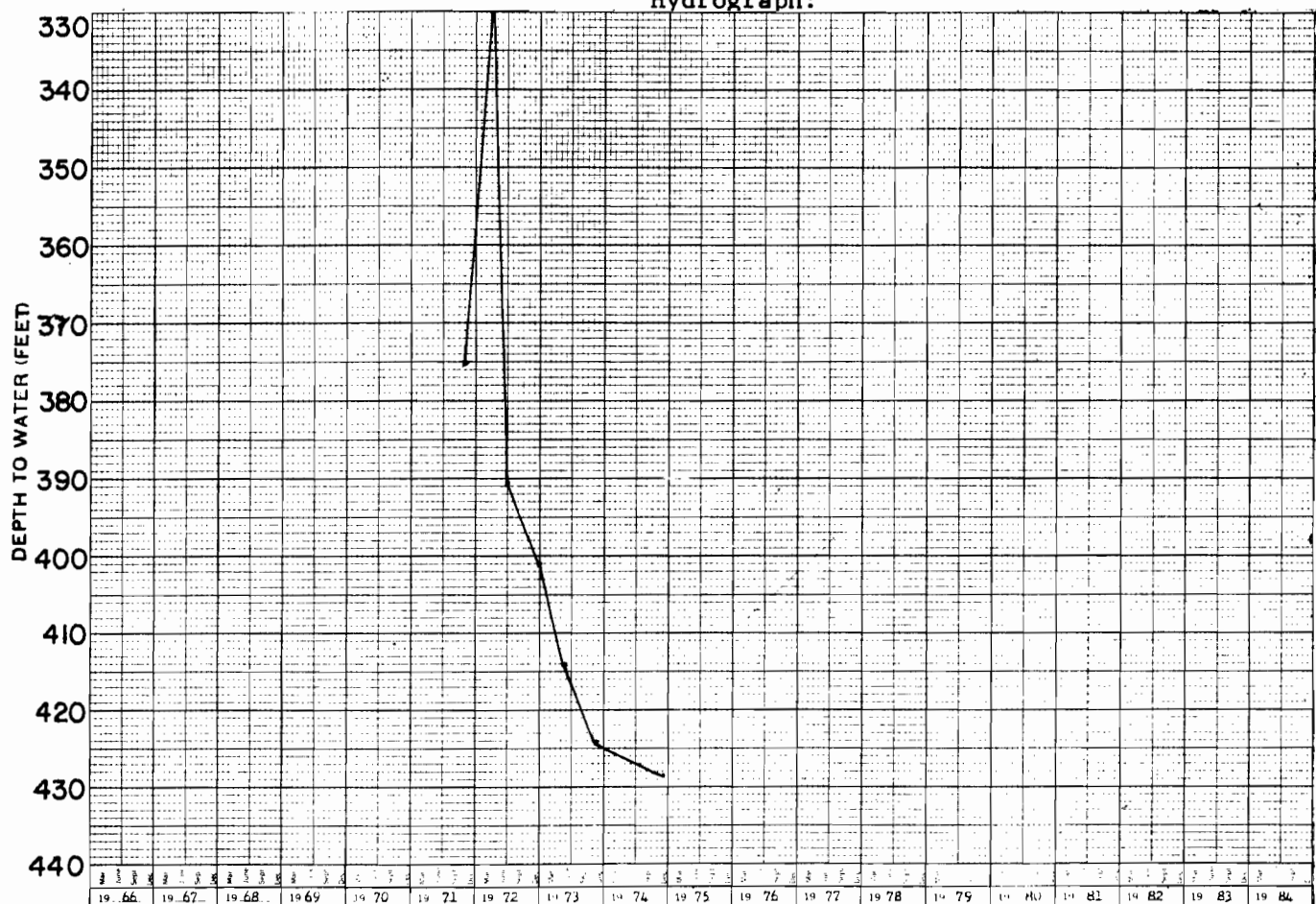
2 1/26528cc

* Well deepened in 1971 from 914 feet to 1004 feet.

Description and status of water right:

Permit G-3792 with a priority of July 19, 1967 for the appropriation of 7.0 cubic feet per second (3142 gallons per minute) and March 7, 1968 for 7.0 cubic feet per second (3142 gallons per minute) from Wells No. 1 and No. 2 for the irrigation of 3356.0 acres being 7.0 cubic feet per second from each well.

Hydrograph:



Records of Wells

Report Well Number 37Owner: Delwin O. Nelson Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 20, T. 2 N., R. 26 E.Depth: 1000 feet. Diameter: 16 inches. Depth cased: 123 feet.Approximate altitude of land surface at well: 985 ft. Year constructed: 1967Yield: Tested at 2880 gallons per minute with 134 feet of drawdown.Remarks: Nelson-Tucker Well No. 1Generalized Log:

Gravel and clay	0 - 93 feet
Basalt	93 - 1000 feet

Water Level:

Reported to be 166 feet below land surface on 7/18/69
Measured at 324 feet below land surface on 12/2/71

Description and status of water right:

Permit G-3777 with a priority of August 7, 1967 for the appropriation of 6.25 cubic feet per second (2805 gallons per minute) for the irrigation of 3612.4 acres.

Owner: Thomas and Janie Ashbeck Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 27, T. 2 N., R. 27E.

Depth: 240 feet. Diameter: 8 inches. Depth cased: 34 feet.

Approximate altitude of land surface at well: 1,000 ft. Year constructed: 1967

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

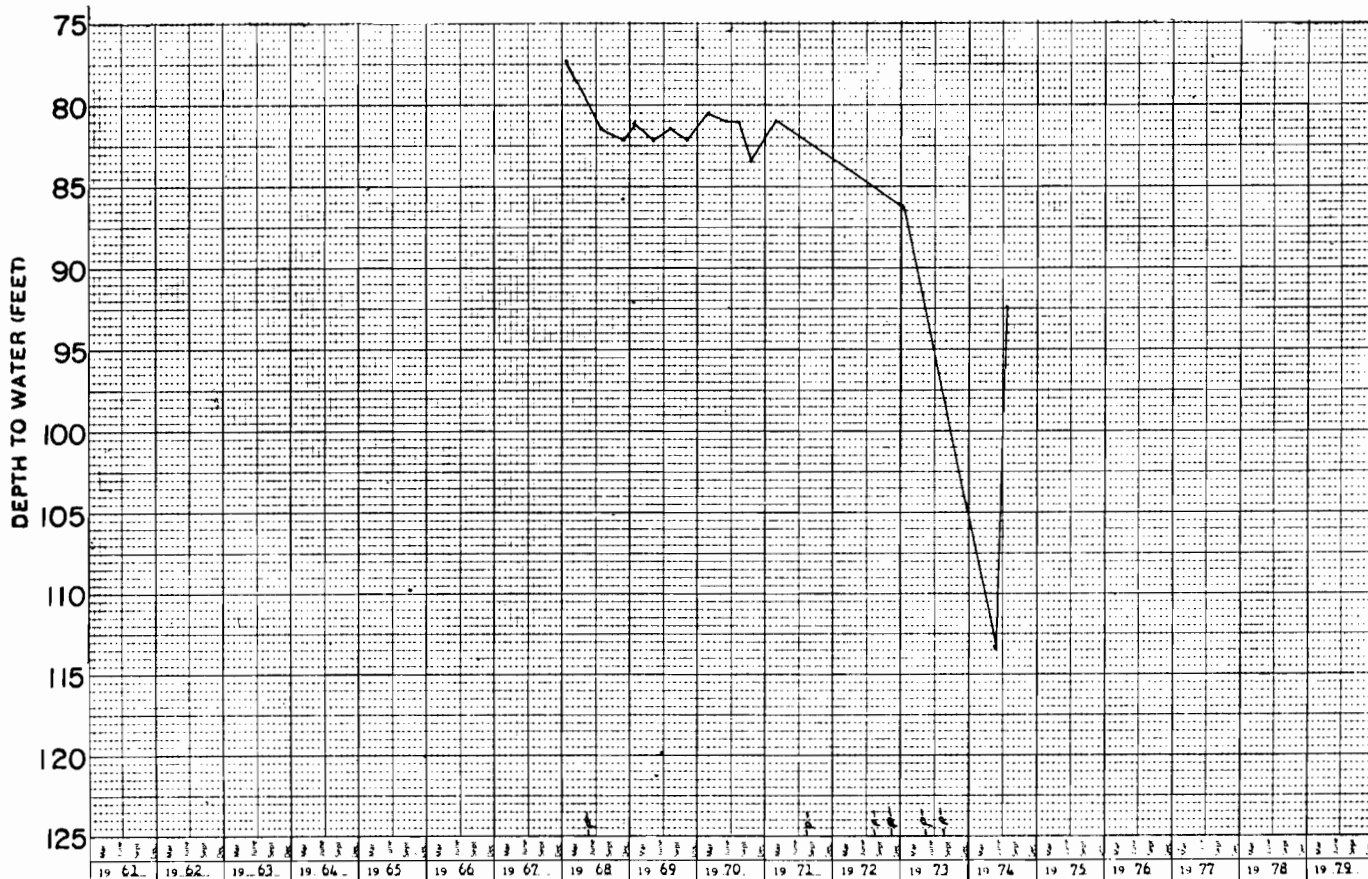
Remarks: _____

Generalized Log:

Gravel and Boulders 0 - 34 feet
Basalt 34 - 240 feet

Description and status of water right:

Water Right Certificate 38855 with a priority of September 11, 1967 for the appropriation of 0.16 cubic foot per second (72 gallons per minute) for the supplemental irrigation of 12.6 acres.



Records of Wells

Report Well Number 39Owner: John & Nellie Madison Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 24, T. 3 N., R. 27 E.Depth: - feet. Diameter: - inches. Depth cased: - feet.Approximate altitude of land surface at well: 710 ft. Year constructed: NRYield: Not reported.

Remarks: _____

Generalized Log:

Sump: 25 feet x 40 feet x 28 feet deep

Description and status of water right:

Permit G-3834 with a priority of September 15, 1967 for the appropriation of 2.7 cubic feet per second (1212 gallons per minute) for the irrigation of 239.55 acres and the supplemental irrigation of 246.61 acres.

Records of Wells

Report Well Number 40 (30)Owner: Proudfoot Ranches Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 30, T. 4 N., R. 28 E.Depth: 721 feet. Diameter: 16 inches. Depth cased: 100 feet.Approximate altitude of land surface at well: 562 ft. Year constructed: 1967Yield: Tested at 2020 gallons per minute with 31 feet of drawdown.

Remarks: _____

Generalized Log:Water Level:

Sand and gravel	0 - 35 feet
Clay	35 - 86 feet
Sand, clay, gravel	86 - 179 feet
Basalt	179 - 721 feet

Reported to be 132 feet below land surface on 7/3/67

Description and status of water right:

Permit G-3492 with a priority of September 29, 1966 for the appropriation of 1.59 cubic feet per second (683 gallons per minute) for the supplemental irrigation of 127.0 acres.

Permit G-3895 with a priority of November 13, 1967 for the appropriation of 2.42 cubic feet per second (1087 gallons per minute) for the irrigation of 63.4 acres and the supplemental irrigation of 128.6 acres.

Records of Wells

Report Well Number 41

Owner: Ernest A. Betz Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 28, T. 3 N., R. 28

Depth: 830 feet. Diameter: 16 inches. Depth cased: 105 feet.

Approximate altitude of land surface at well: 690 ft. Year constructed: 1968

Yield: Tested at 780 gallons per minute with 125 feet of drawdown

Remarks: _____

Generalized Log:

Gravel and clay 0 - 105 feet
Basalt with some
clay interbeds 105 - 830 feet

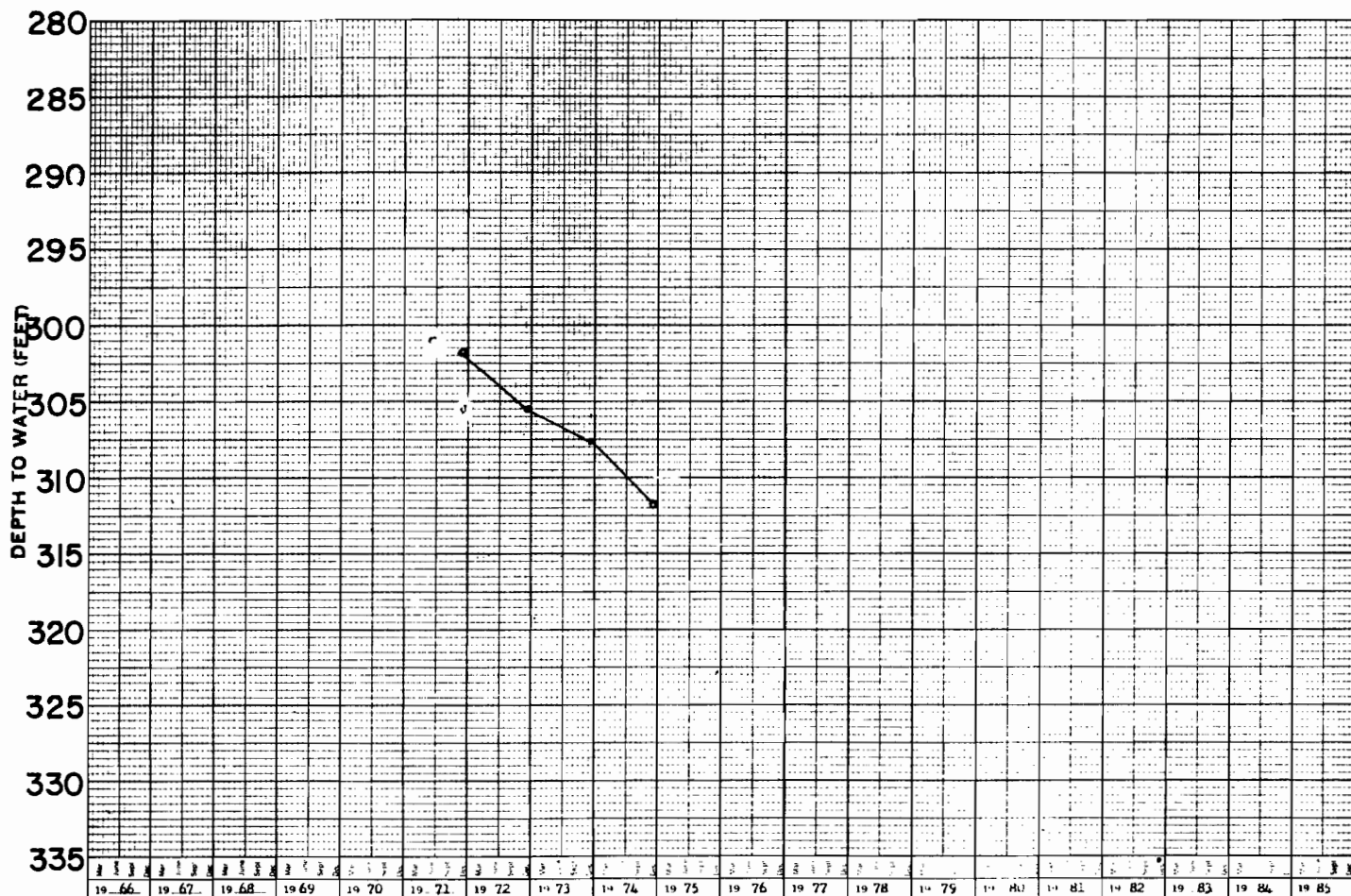
G-4165

3N/28E-28 a/a

Description and status of water right:

Water Right Certificate 36676 with a priority of December 18, 1967 for the appropriation of 1.57 cubic feet per second (705 gallons per minute) for the irrigation of 125.6 acres.

Hydrograph:



Records of Wells

Report Well Number 42Owner: Clyde L. Nobles Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 21, T. 5 N., R. 28 E.Depth: 59(rpt) feet. Diameter: 6(rpt) inches. Depth cased: 39(rpt) feet.Approximate altitude of land surface at well: 430 ft. Year constructed: NRYield: Not reported.

Remarks: _____

Generalized Log:

No Log (Basalt)

Description and status of water right:

Permit No. 4059 with a priority of March 27, 1968 for the appropriation of 0.33 cubic feet per second (148 gallons per minute) for the irrigation of 71.0 acres and the supplemental irrigation of 85.0 acres.

Records of Wells

Report Well Number 43Owner: William C. Cox Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 31, T. 4 N., R. 28 E.Depth: 400 feet. Diameter: 10 inches. Depth cased: 120 feet.Approximate altitude of land surface at well: 575 ft. Year constructed: 1968Yield: Not reported.

Remarks: _____

Generalized Log:Water Level:

Sand	0 - 18 feet
Sandy clay	18 - 30 feet
Clay	30 - 102 feet
Basalt with some clay interbeds	102 - 400 feet

Reported to be 40 feet below land
surface on 2/19/68

Description and status of water right:

Water Right Certificate 38859 with a priority of February 15, 1968 for the appropriation of 0.32 cubic foot per second (144 gallons per minute) for the irrigation of 15.2 acres.

Records of Wells

Report Well Number 44

Owner: Charles Daly Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 21, T. 1 N., R. 27 E.
 Depth: 420 feet. Diameter: 10 inches. Depth cased: 29 feet.
 Approximate altitude of land surface at well: 1380 ft. Year constructed: 1968
 Yield: Tested at 750 gallons per minute with 90 feet of drawdown.
 Remarks: _____

Generalized Log:

Clay 0 - 25 feet
 Basalt with some
 clay interbeds 25 - 420 feet

Water Level:

Reported to be 36 feet below land
 surface on 5/16/68
 Measured at 42 feet below land
 surface 12/19/74

Description and status of water right:

Permit G-4097 with a priority of April 23, 1968 for the appropriation of 1.43 cubic feet per second (642 gallons per minute) for the irrigation of 23.5 acres and the supplemental irrigation of 91.0 acres.

Records of Wells

Report Well Number 45

Owner: Grieb Farms Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 4, T. 1 N., R. 26 E.
 Depth: 1167 feet. Diameter: 16 inches. Depth cased: 130 feet.
 Approximate altitude of land surface at well: 1130 ft. Year constructed: 1968
 Yield: Tested at 2200 gallons per minute with 120 feet of drawdown.
 Remarks: Grieb Well No. 3

Generalized Log:

Soil 0 - 10 feet
 Boulders and rock 10 - 122 feet
 Basalt 122 - 1167 feet

Water Level:

Reported to be 300 feet below land
 surface on 10/25/68

Description and status of water right:

Permit G-4150 with a priority of May 23, 1968 for the appropriation of 7.0 cubic feet per second (3142 gallons per minute) for the supplemental irrigation of 960.0 acres.

Records of Wells

Report Well Number G+ 4486
IN/27E-266cd

Owner: William J. Healy Location: SW $\frac{1}{2}$ NW $\frac{1}{2}$, Sec. 26, T. 1 N., R. 27 E.
Depth: 250 feet. Diameter: 12 inches. Depth cased: 25 feet.
Approximate altitude of land surface at well: 1460 ft. Year constructed: 1967
Yield: Tested at 900 gallons per minute with 98 feet of drawdown.
Remarks: Healy Well No. 2

Generalized Log:

Soil 0 - 16 feet
Gravel 16 - 19 feet
Basalt 19 - 250 feet

Water Level:

Reported to be 50 feet below land surface on 7/16/68
Measured at 149 feet below land surface on 12/18/74

Description and status of water right:

Permit G-4225 with a priority of July 10, 1968 for the appropriation of 1.79 cubic feet per second (803 gallons per minute) for the irrigation of 35.5 acres and the supplemental irrigation of 143.0 acres.

Records of Wells

Report Well Number WN 47

Owner: Jasper E. Myers Location: SW $\frac{1}{2}$ NE $\frac{1}{2}$, Sec. 21, T. 1 N., R. 27 E.
Depth: 450 feet. Diameter: 14 inches. Depth cased: 30 feet.
Approximate altitude of land surface at well: 1312 ft. Year constructed: 1968
Yield: Tested at 2400 gallons per minute with 14 feet of drawdown.
Remarks: _____

Generalized Log:

Soil and gravel 0 - 14 feet
Basalt 14 - 450 feet

Water Level:

Reported to be 125 feet below land surface on 11/12/68
Measured at 163 feet below land surface on 12/19/74

Description and status of water right:

Permit G-4248 with a priority of July 24, 1968 for the appropriation of 5.7 cubic feet per second (2559 gallons per minute) for the irrigation of 311.6 acres and the supplemental irrigation of 144.0 acres.

Records of Wells

Report Well Number 48

Owner: Kenneth Turner Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 26, T. 1N., R. 26E.

Depth: 479 feet. Diameter: 14 inches. Depth cased: 20 feet.

Approximate altitude of land surface at well: 1510 ft. Year constructed: 1968

Yield: Tested at 2000 gallons per minute with 50 feet of drawdown.

Remarks: _____

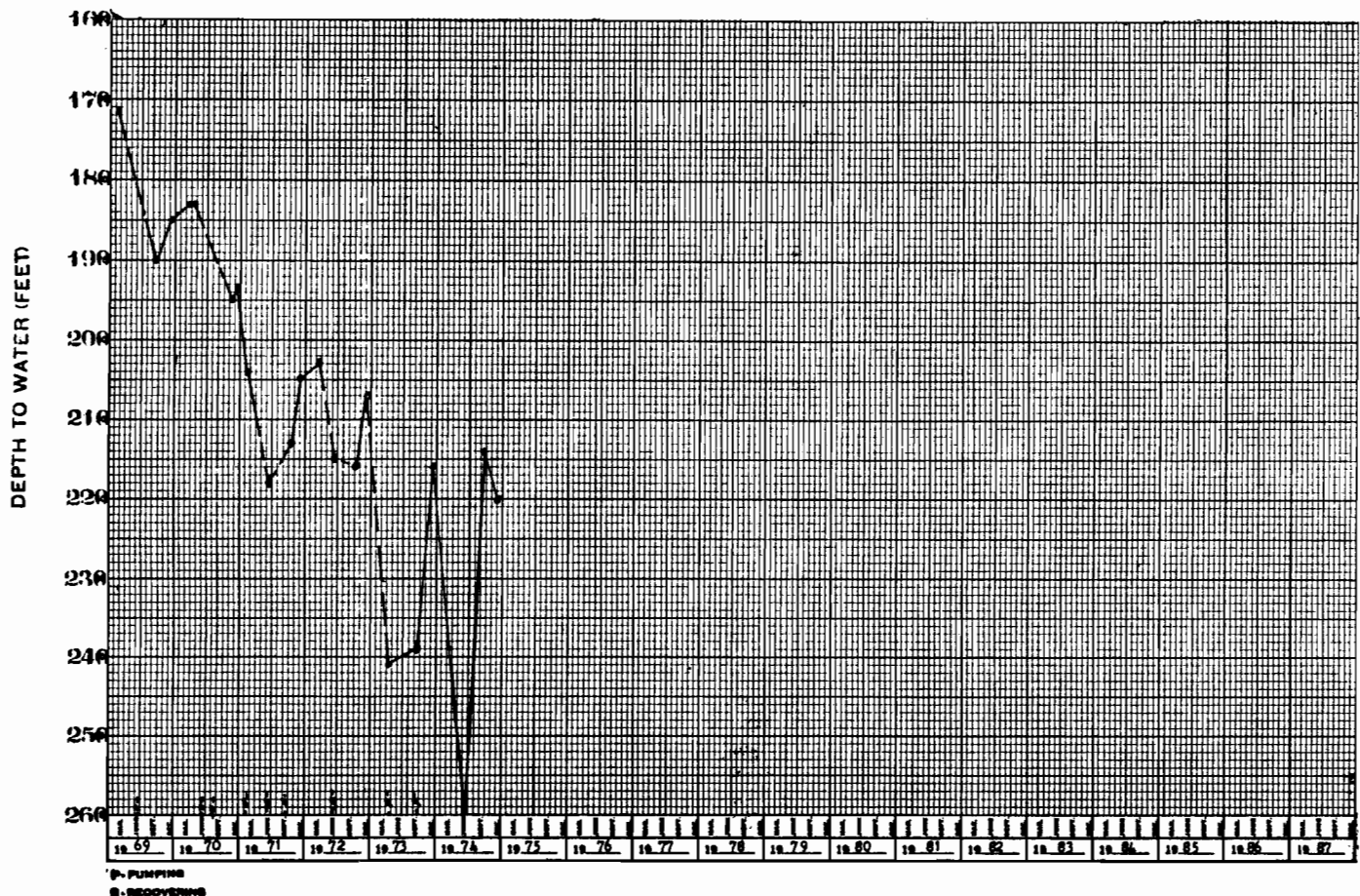
Generalized Log:

Soil	0 - 3 feet
Basalt with cinder interbeds	3 - 479 feet

Description and status of water right:

Water Right Certificate 39079 with a priority of July 25, 1968 for the appropriation of 4.44 cubic feet per second (1993 gallons per minute) for the irrigation of 548.9 acres and the supplemental irrigation of 36.7 acres.

Hydrograph:



Records of Wells

Report Well Number 49

Owner: William J. Healy Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 27, T. 1 N., R. 27 E.

Depth: 116* feet. Diameter: 8 inches. Depth cased: 20 feet.

Approximate altitude of land surface at well: 1400 ft. Year constructed: 1962

Yield: Bailed at 40 gallons per minute with 40 feet of drawdown in 1962. Tested at 60 gallons per minute with 28 feet of drawdown in 1970 after deepening.

Remarks: Healy Well No. 1

Generalized Log:

Water Level:

Gravel and clay 0 - 17 feet

Basalt 17 - 29 feet

Clay and boulders? 29 - 37 feet

Basalt 37 - 65 feet

Basalt 65 - 116 feet

*Well deepening in 1970 from 65 feet to 116 feet.

Reported to be 67 feet below land surface on 11/14/70

Measured at 64 feet below land surface on 12/18/74

Description and status of water right:

Permit G-4226 with a priority of July 29, 1968 for the appropriation of 0.21 cubic foot per second (94 gallons per minute) for the supplemental irrigation of 17.0 acres.

G-4557 ZN/26E-6accf

Records of Wells

Report Well Number 50

Owner: Jerald E. Rea Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 6, T. 2 N., R. 26 E.

Depth: 1097* feet. Diameter: 16 inches. Depth cased: NR feet.

Approximate altitude of land surface at well: 850 ft. Year constructed: NR

Yield: Not reported

Remarks: _____

Generalized Log:

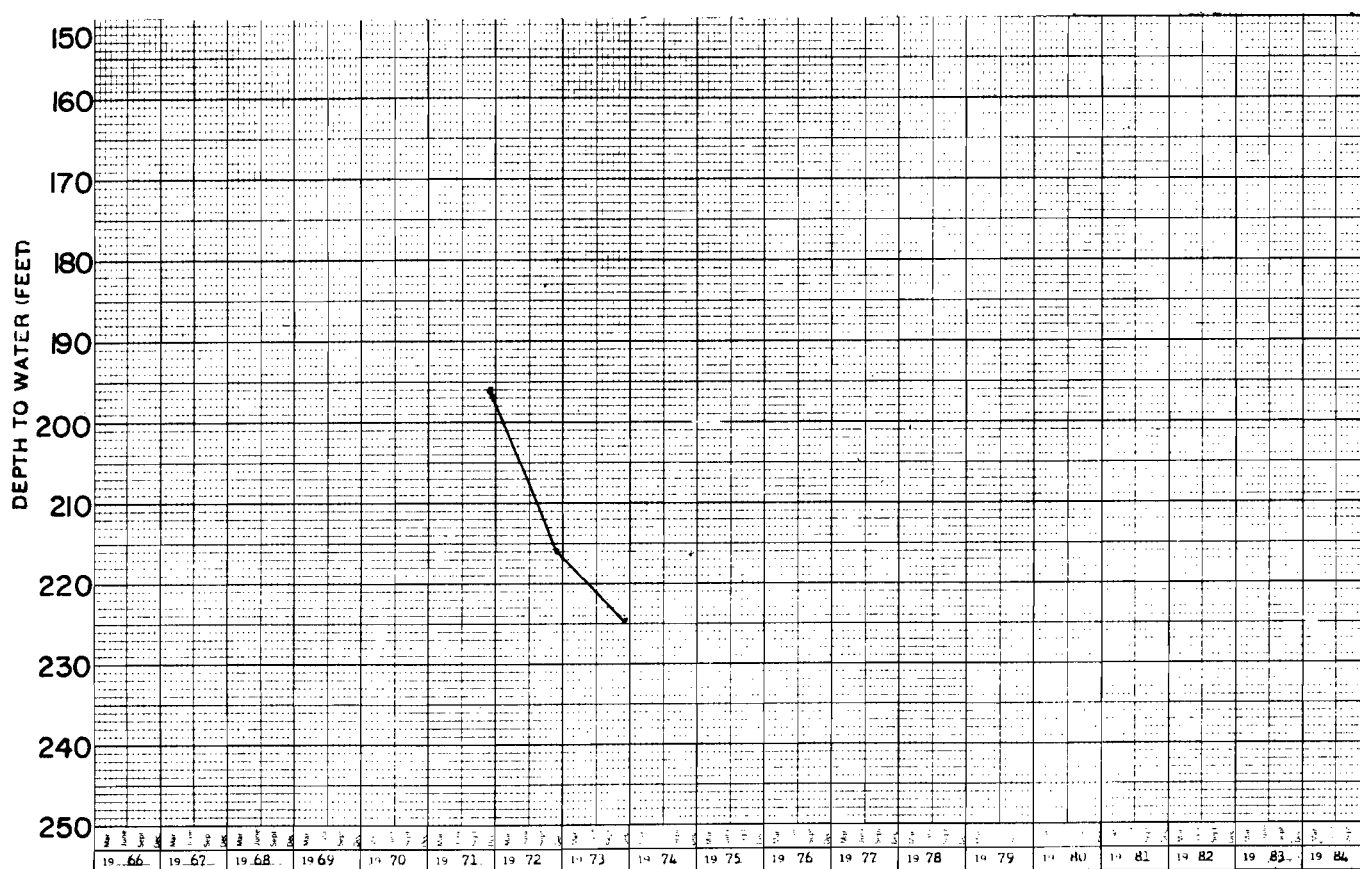
No Log 0 - 714 feet
Basalt, with some
clay interbeds 714 - 830 feet (Deepening)
Basalt 830 - 1097 feet (Deepening)

*Well deepened from 714 feet to 1097 feet in 1970.

Description and status of water right:

Permit G-4281 with a priority of August 15, 1968 for the appropriation of 4.0 cubic feet per second (1796 gallons per minute) for the irrigation of 668.7 acres.

Hydrograph:



Owner: Larry Hanson Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 7, T. 2 N., R. 28 E.

Depth: 690* feet. Diameter: 16 inches. Depth cased: 120 feet.

Approximate altitude of land surface at well: 855 ft.. Year constructed: 1968

Yield: Tested at 2690 gallons per minute with 95 feet of drawdown.

Remarks: _____

Generalized Log:

Sand and gravel 0 - 27 feet

Clay 27 - 119 feet

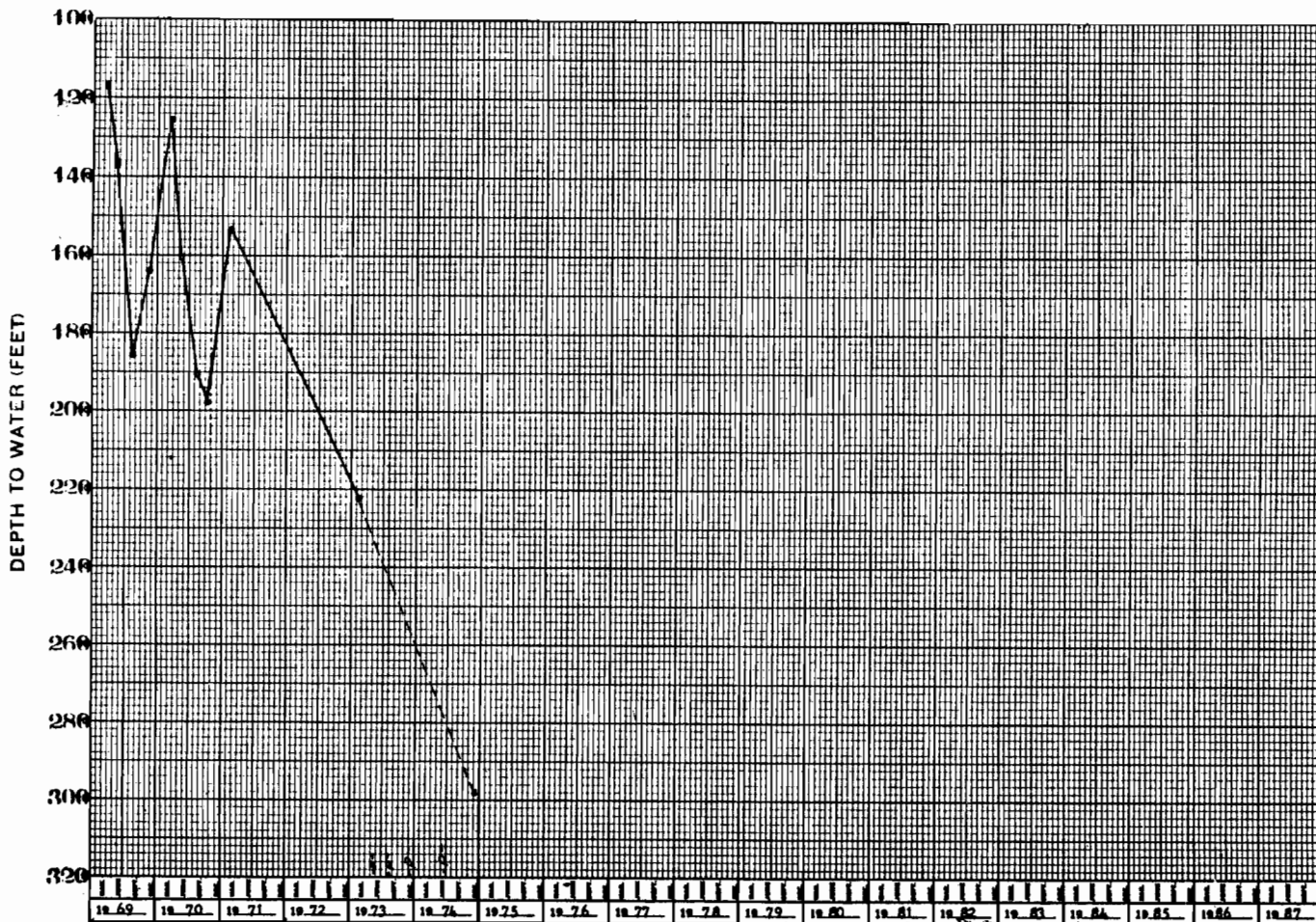
Basalt with clay
interbeds 119 - 690 feet

*Observation well (702 feet deep) lies approximately 2 feet to the west of the
production well (690 feet deep).

Description and status of water right:

Permit G-4049 with a priority of September 3, 1968 for the appropriation of
5.57 cubic feet per second (2500 gallons per minute) for the irrigation of
946.4 acres.

Hydrograph:



Records of Wells

Report Well Number 52, (60)

Owner: Porter-Peringer, Inc. Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 8, T. 2 N., R. 27 E.

Depth: 1251 feet. Diameter: 16 inches. Depth cased: 170 feet.

Approximate altitude of land surface at well: 1055 ft. Year constructed: 1970

Yield: Reported to yield approximately 700 gallons per minute.

Remarks: Porter-Peringer Well No. 1

Generalized Log:

Gravel and clay 0 - 150 feet
Basalt with clay and
gravel interbeds 150 - 1251 feet

Water Level:

Reported to be 371 feet below land
surface on 6/11/70

Description and status of water right:

Permit G-4325 with a priority of September 18, 1968 for the appropriation of 17.84 cubic feet per second (8007 gallons per minute) from 4 wells being 4.46 cubic feet per second (2002 gallons per minute) from each well for the irrigation of 6463.9 acres.

Permit G-4739 with a priority of September 30, 1969 for the appropriation of 13.36 cubic feet per second (5996 gallons per minute) from 4 wells, being 3.34 cubic feet per second (1499 gallons per minute) from each well for the supplemental irrigation of 6463.9 acres.

The proposed locations of wells approved under Permits G-4325 and G-4739 are as follows:

- Well No. 1 - NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 4, Township 2 North, Range 27 East, W.M.
- Well No. 2 - SE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 3, Township 2 North, Range 27 East, W.M.
- Well No. 3 - SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 10, Township 2 North, Range 27 East, W.M.
- Well No. 4 - SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 16, Township 2 North, Range 27 East, W.M.

Wells No. 1 and No. 2 were not constructed in permitted locations under the terms of the aforesaid permits but were actually constructed in the following locations:

- Well No. 1 - NE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 8, Township 2 North, Range 27 East, W.M.
- Well No. 2 - NE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 7, Township 2 North, Range 27 East, W.M.

Wells No. 3 and No. 4 have not been constructed.

Records of Wells

Report Well Number 52A (60A)Owner: Porter-Peringer, Inc. Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 7, T. 2 N., R. 27 E.Depth: 1461 feet. Diameter: 16 inches. Depth cased: 464 feet.Approximate altitude of land surface at well: 1030 ft. Year constructed: 1971Yield: Tested at 2650 gallons per minute with 62 feet of drawdown.Remarks: Porter-Peringer Well No. 2Generalized Log:

Sand, gravel, and
clay 0 - 440 feet
Basalt with some
clay interbeds 440 - 1039 feet

Water Level:

Reported to be 352 feet below land
surface on 1/7/71

Description and status of water right:

Permit G-4325 with a priority of September 18, 1968 for the appropriation of 17.84 cubic feet per second (8007 gallons per minute) from 4 wells being 4.46 cubic feet per second (2002 gallons per minute) from each well for the irrigation of 6463.9 acres.

Permit G-4739 with a priority of September 30, 1969 for the appropriation of 13.36 cubic feet per second (5996 gallons per minute) from 4 wells being 3.34 cubic feet per second (1499 gallons per minute) from each well, for the supplemental irrigation of 6463.9 acres.

The proposed locations of the wells approved under permits G-4325 and G-4739 are as follows:

- Well No. 1 - NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 4, Township 2 North, Range 27 East, W.M.
- Well No. 2 - SE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 3, Township 2 North, Range 27 East, W.M.
- Well No. 3 - SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 10, Township 2 North, Range 27 East, W.M.
- Well No. 4 - SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 16, Township 2 North, Range 27 East, W. M.

Wells No. 1 and No. 2 were not constructed in permitted locations under the terms of the aforesaid permits, but were actually constructed in the following locations:

- Well No. 1 - NE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 8, Township 2 North, Range 27 East, W.M.
- Well No. 2 - NE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 7, Township 2 North, Range 27 East, W.M.

Wells No. 3 and No. 4 have not been constructed.

Records of Wells

Report Well Number 53Owner: Campbell Ranch, Inc. Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 5, T. 1N., R. 27E.Depth: 892 feet. Diameter: 16 inches. Depth cased: 88 feet.Approximate altitude of land surface at well: 1272 ft. Year constructed: 1969Yield: Tested at 3000 gallons per minute with 100 feet of drawdown.Remarks: Campbell No. 1Generalized Log:

Gravel and clay 0 - 88 feet
Basalt, some clay and
sand interbeds 88 - 917 feet

Water Level:

Reported to be 238 feet below land
surface on 5/15/69

Description and status of water right:

Permit G-4354 with a priority of October 7, 1968 for the appropriation of 31.83 cubic feet per second (14286 gallons per minute) from three wells for the irrigation of 2545.7 acres being 10.61 cubic feet per second (4762 gallons per minute) from each well.

6-4629 2N/27E-32acd

Records of Wells

Report Well Number 53A

Owner: Campbell Ranch Inc. Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 32, T. 2N., R. 27E.

Depth: 936 feet. Diameter: 16 inches. Depth cased: 241 feet.

Approximate altitude of land surface at well: 1210 ft. Year constructed: 1969

Yield: Tested at 4000 gallons per minute with 35 feet of drawdown.

Remarks: Cambell Ranch No. 2

Generalized Log:

Soil 0 - 6 feet

Gravel 6 - 25 feet

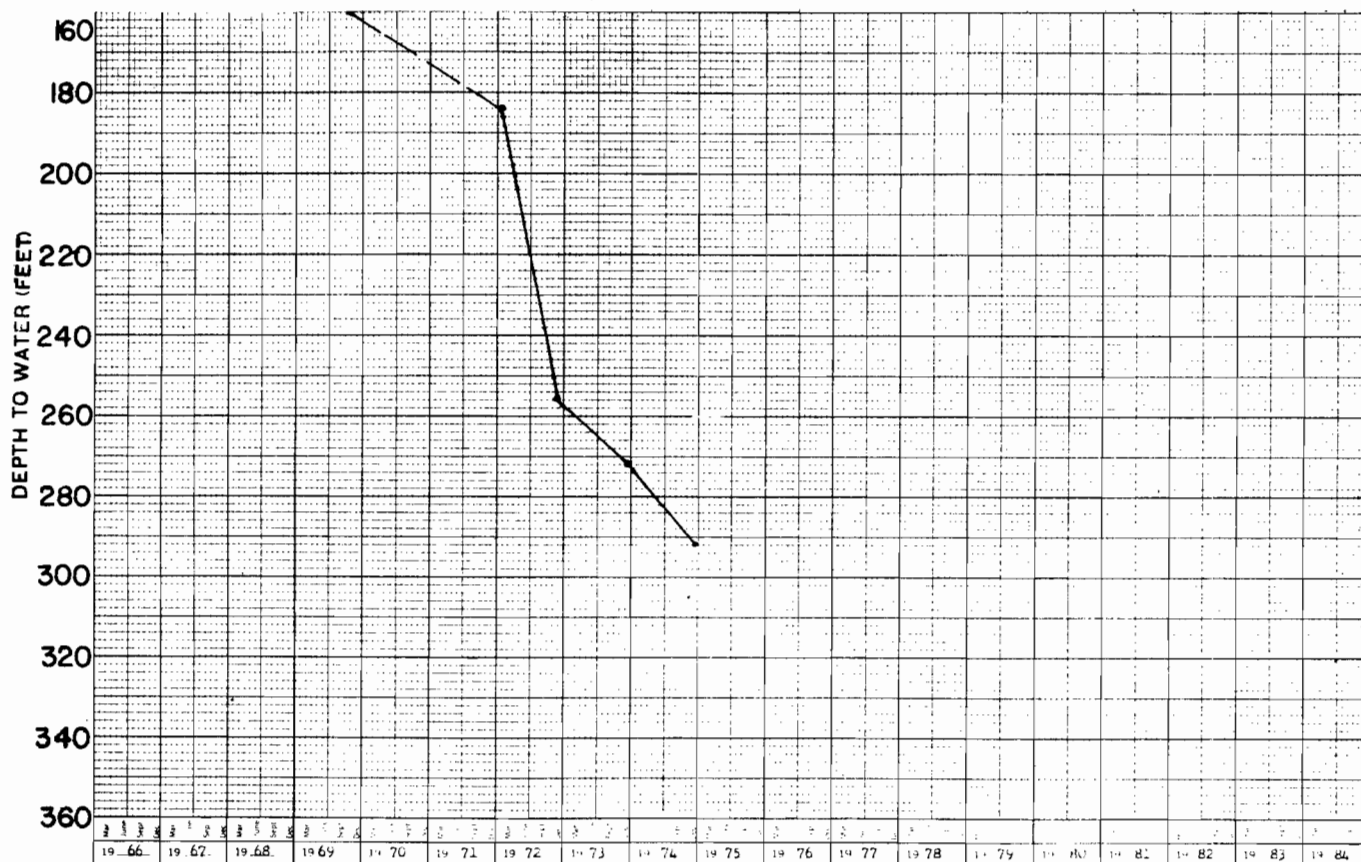
Clay, clay and
gravel 25 - 241 feet

Basalt with some
clay interbeds 241 - 936 feet

Description and status of water right:

Permit G-4354 with a priority of October 7, 1968 for the appropriation of 31.83 cubic feet per second (14286 gallons per minute) from three wells for the irrigation of 2545.7 acres being 10.61 cubic feet per second (4762 gallons per minute) from each well.

Hydrograph:



Records of Wells

Report Well Number 53BOwner: Campbell Ranch, Inc. Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 5, T. 1 N., R. 27E.Depth: - feet. Diameter: - inches. Depth cased: - feet.Approximate altitude of land surface at well: 1235 ft. Year constructed: -

Yield: _____

Remarks: Campbell Well No. 3 (Not drilled)Generalized Log:

No Log

Description and status of water right:

Permit G-4354 with a priority of October 7, 1968 for the appropriation of 31.83 cubic feet per second (14286 gallons per minute) from three wells for the irrigation of 2545.7 acres being 10.61 cubic feet per second (4762 gallons per minute) from each well.

Records of Wells

Report Well Number 54Owner: Grieb Farms Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 5, T. 1 N., R. 26 E.Depth: 1500 feet. Diameter: 16 inches. Depth cased: 100 feet.Approximate altitude of land surface at well: 1105 ft. Year constructed: 1969Yield: Tested at 3060 gallons per minute with 80 feet of drawdown.Remarks: Grieb Well No. 4Generalized Log:Water Level:

Soil	0 - 8 feet
Boulders	8 - 16 feet
Basalt	16 - 1500 feet

Reported to be 203 feet below land surface on 5/20/69

Description and status of water right:

Permit G-4473 with a priority of November 29, 1968 for the appropriation of 7.00 cubic feet per second (3142 gallons per minute) for the supplemental irrigation of 640.0 acres.

Records of Wells

Report Well Number 55Owner: Stanley Tucker Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 20, T. 2 N., R. 27 E.Depth: 1103 feet. Diameter: 16 inches. Depth cased: 227 feet.Approximate altitude of land surface at well: 1135 ft. Year constructed: 1968Yield: Tested at 2400 gallons per minute with 50 feet of drawdown.

Remarks: _____

Generalized Log:Water Level:

Soil	0 - 5 feet
Gravel	5 - 20 feet
Clay, clay and gravel, boulders	20 - 105 feet
Cemented gravel	105 - 225 feet
Basalt	225 - 1103 feet

Reported to be 385 feet below land surface on 8/30/68
Measured at 376 feet below land surface on 3/13/69

Description and status of water right:

Permit G-4477 with a priority of December 16, 1968 for the appropriation of 5.60 cubic feet per second (2513 gallons per minute) for the irrigation of 3680.0 acres.

Records of Wells

Report Well Number 56Owner: Herman T. Schultz Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 8, T. 4 N., R. 28 E.Depth: 265 feet. Diameter: 10 inches. Depth cased: 84.7 feet.Approximate altitude of land surface at well: 505 ft. Year constructed: 1968Yield: Bailed at 75 gallons per minute with 5 feet of drawdown.

Remarks: _____

Generalized Log:Water Level:

Sandy soil	0 - 4 feet
Gravel and boulders	4 - 35 feet
Basalt with some interbedded clay	65 - 265 feet

Reported to be 60 feet below land surface on 7/29/68

Description and status of water right:

Water Right Certificate 38739 with a priority of January 21, 1969 for the appropriation of 0.15 cubic foot per second (67 gallons per minute) for the supplemental irrigation of 12.1 acres.

Records of Wells

Report Well Number 57Owner: Nelson and Tucker Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 17, T. 2 N., R. 26 E.Depth: 1103 feet. Diameter: 16 inches. Depth cased: 242 feet.Approximate altitude of land surface at well: 920 ft. Year constructed: 1969Yield: Tested at 2513 gallons per minute with 194 feet of drawdown.Remarks: Nelson and Tucker No. 2Generalized Log:

Soil	0 - 10 feet
Cemented gravel	10 - 45 feet
Clay	45 - 113 feet
Basalt with interbedded clay and gravel	113 - 1103 feet

Water Level:

Reported to be 171 feet below land
surface on 9/15/69
Measured at 352 feet below land
surface on 9/10/73

Description and status of water right:

Permit G-4504 with a priority of February 10, 1969 for the appropriation of
6.69 cubic feet per second (3003 gallons per minute) for the supplemental
irrigation of 3612.43 acres.

Records of Wells

Report Well Number 58Owner: Harold L. Rosenbaum Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 8, T. 4 N., R. 28 E.Depth: 215* feet. Diameter: 8 inches. Depth cased: NR feet.Approximate altitude of land surface at well: 490 ft. Year constructed: NRYield: Bailed at 40 gallons per minute with 6 feet of drawdown.

Remarks: _____

Generalized Log:

No log	0 - 108 feet
Basalt	108 - 215 feet*

Water Level:

Reported to be 38 feet below land
surface in 8/26/68

*Well deepened in 1968 from 108 feet to 215 feet.

Description and status of water right:

Water Right Certificate No. 38289 with a priority of February 28, 1969 for
the appropriation of 0.02 cubic foot per second (9 gallons per minute) for
the irrigation of 1.6 acres.

Records of Wells

Report Well Number 59Owner: Currin Brothers Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 26, T. 1 N., R. 2 E.Depth: 200 feet. Diameter: 6 inches. Depth cased: 70 feet.Approximate altitude of land surface at well: 1460 ft. Year constructed: 1968Yield: Not reported.

Remarks: _____

Generalized Log:

Soil	0 - 8 feet
Clay and gravel	8 - 19 feet
Basalt	19 - 200 feet

Water Level:

Reported to be 40 feet below land
surface on 4/15/68
Measured at 147.07 feet below land
surface on 12/18/74

Description and status of water right:

Permit G-4712 with a priority of September 16, 1969 for the appropriation of 1.17 cubic feet per second (525 gallons per minute) for the irrigation of 39.0 acres and the supplemental irrigation of 54.5 acres.

Owner: Porter-Peringer, Inc. Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 8, T. 2 N., R. 27 E.Depth: 1251 feet. Diameter: 16 inches. Depth cased: 170 feet.Approximate altitude of land surface at well: 1055 ft. Year constructed: 1970Yield: Reported to yield approximately 700 gallons per minute.Remarks: Porter-Peringer Well No. 1Generalized Log:

Gravel and clay 0 - 150 feet
Basalt with clay and
gravel interbeds 150 - 1251 feet

Water Level:

Reported to be 371 feet below land
surface on 6/11/70

Description and status of water right:

Permit G-4325 with a priority of September 18, 1968 for the appropriation of 17.84 cubic feet per second (8007 gallons per minute) from 4 wells being 4.46 cubic feet per second (2002 gallons per minute) from each well for the irrigation of 6463.9 acres.

Permit G-4739 with a priority of September 30, 1969 for the appropriation of 13.36 cubic feet per second (5996 gallons per minute) from 4 wells, being 3.34 cubic feet per second (1499 gallons per minute) from each well for the supplemental irrigation of 6463.9 acres.

The proposed locations of wells approved under Permits G-4325 and G-4739 are as follows:

- Well No. 1 - NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 4, Township 2 North, Range 27 East, W.M.
- Well No. 2 - SE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 3, Township 2 North, Range 27 East, W.M.
- Well No. 3 - SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 10, Township 2 North, Range 27 East, W.M.
- Well No. 4 - SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 16, Township 2 North, Range 27 East, W.M.

Wells No. 1 and No. 2 were not constructed in permitted locations under the terms of the aforesaid permits but were actually constructed in the following locations:

- Well No. 1 - NE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 8, Township 2 North, Range 27 East, W.M.
- Well No. 2 - NE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 7, Township 2 North, Range 27 East, W.M.

Wells No. 3 and No. 4 have not been constructed.

Owner: Porter-Peringer Inc. Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 7, T. 2 N., R. 27 E.Depth: 1461 feet. Diameter: 16 inches. Depth cased: 464 feet.Approximate altitude of land surface at well: 1030 ft. Year constructed: -Yield: Tested at 2650 gallons per minute with 62 feet of drawdown.Remarks: Porter-Peringer Well No. 2Generalized Log:

Sand, gravel, and
clay 0 - 440 feet
Basalt with some
clay interbeds 440 - 1039 feet

Water Level:

Reported to be 352 feet below land
surface on 1/7/71

Description and status of water right:

Permit G-4739 with a priority of September 30, 1969 for the appropriation of 13.36 cubic feet per second (5996 gallons per minute) from 4 wells being 3.34 cubic feet per second (1499 gallons per minute) from each well, for the supplemental irrigation of 6463.9 acres.

Permit G-4325 with a priority of September 18, 1968 for the appropriation of 17.84 cubic feet per second (8007 gallons per minute) from 4 wells being 4.46 cubic feet per second (2002 gallons per minute) from each well for the irrigation of 6463.9 acres.

The proposed locations of wells approved under Permits G-4325 and G-4739 are as follows:

- Well No. 1 - NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 4, Township 2 North, Range 27 East, W.M.
- Well No. 2 - SE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 3, Township 2 North, Range 27 East, W.M.
- Well No. 3 - SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 10, Township 2 North, Range 27 East, W.M.
- Well No. 4 - SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 16, Township 2 North, Range 27 East, W.M.

Wells No. 1 and No. 2 were not constructed in premitted locations under the terms of the aforesaid permits but were actually constructed in the following locations:

- Well No. 1 - NE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 8, Township 2 North, Range 27 East, W.M.
- Well No. 2 - NE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 7, Township 2 North, Range 27 East, W.M.

Wells No. 3 and No. 4 have not been constructed.

Records of Wells

Report Well Number 61Owner: V. James Stockard Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 12, T. 2 N., R. 27 E.Depth: Proposed 500 feet. Diameter: Proposed 8 inches. Depth cased: Proposed 50 feet.Approximate altitude of land surface at well: 880 ft. Year constructed: -

Yield: _____

Remarks: Stockard Well No. 2Generalized Log:

Not Drilled

Description and status of water right:

Application G-5023 with a filing date of October 27, 1969 for the appropriation of 0.28 cubic foot per second (126 gallons per minute) for the irrigation of 21.7 acres.

Records of Wells

Report Well Number 62Owner: Lawrence D., Rosella, & Corrine Lindsay Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 23, T. 2 N., R. 26 E.Depth: 1145 feet. Diameter: 16 inches. Depth cased: 188 feet.Approximate altitude of land surface at well: 960 ft. Year constructed: 1971Yield: Tested at 3260 gallons per minute with 34 feet of drawdown.Remarks: Lindsay Well No. 1Generalized Log:Water Level:

Sand and gravel	0 - 80 feet
Sand and boulders	80 - 109 feet
Clay and gravel	109 - 167 feet
Basalt	167 - 1145 feet

Measured at 301 feet below land surface on 9/22/71

Description and status of water right:

Permit G-4918 with a priority date of February 3, 1970 for the appropriation of 30.0 cubic feet per second (13465 gallons per minute) from 7 wells for the irrigation of 6394.07 acres.

Records of Wells

Report Well Number 62AOwner: Lawrence D., Rosella, & Corrine Lindsay Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 10, T. 2 N., R. 26 E.Depth: 1104 feet. Diameter: 16 inches. Depth cased: 226 feet.Approximate altitude of land surface at well: 920 ft. Year constructed: 1971Yield: Tested at 3298 gallons per minute with 108 feet of drawdown.Remarks: Lindsay Well No. 2Generalized Log:Water Level:

Sand and gravel	0 - 60 feet
Cemented gravel	60 - 225 feet
Basalt	225 - 1104 feet

Measured at 309 feet below land
surface on 10/8/71

Description and status of water right:

Permit G-4918 with a priority date of February 3, 1970 for the appropriation of 30.0 cubic feet per second (13465 gallons per minute) from 7 wells for the irrigation of 6394.07 acres.

Records of Wells

Report Well Number 62B

Owner: Lawrence D., Rosella, & Corrine Lindsay Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 3, T. 2 N., R. 26 E.
Depth: 1265 feet. Diameter: 16 inches. Depth cased: 211 feet.
Approximate altitude of land surface at well: 810 ft. Year constructed: 1972
Yield: Tested at 1618 gallons per minute with 22 feet of drawdown.
Remarks: Lindsay Well No. 3

Generalized Log:

Sand and gravel 0 - 50 feet
Clay 50 - 88 feet
Clay and gravel 88 - 202 feet
Basalt with some
clay interbeds 202 - 1265 feet

Water Level:

Reported at 428 feet below land
surface on 8/14/72

Description and status of water right:

Permit G-4918 with a priority date of February 3, 1970 for the appropriation of 30.0 cubic feet per second (13465 gallons per minute) from 7 wells for the irrigation of 6394.07 acres.

Lindsay Well No. 4 - 2N/26E-11cdd
Lindsay Well No. 5 - 2N/26E-9bdd
Lindsay Well No. 6 - 2N/26E-2caa
Lindsay Well No. 7 - 2N/26E-5dbb

Under construction 1/31/74 - Well No. 62C
Not drilled - Well No. 62D
Not drilled - Well No. 62E
Not drilled - Well No. 62F

Records of Wells

Report Well Number 62C

Owner: Lawrence D., Rosella, & Corrine Lindsay Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 11, T. 2 N., R. 26 E.

Depth: 1200 feet. Diameter: 16 inches. Depth cased: - feet.

Approximate altitude of land surface at well: 890 ft. Year constructed: -

Yield: -

Remarks: Lindsay Well No. 4 Under construction 1/31/74. Reported to be 1200 feet deep 11/8/74 but not completed.

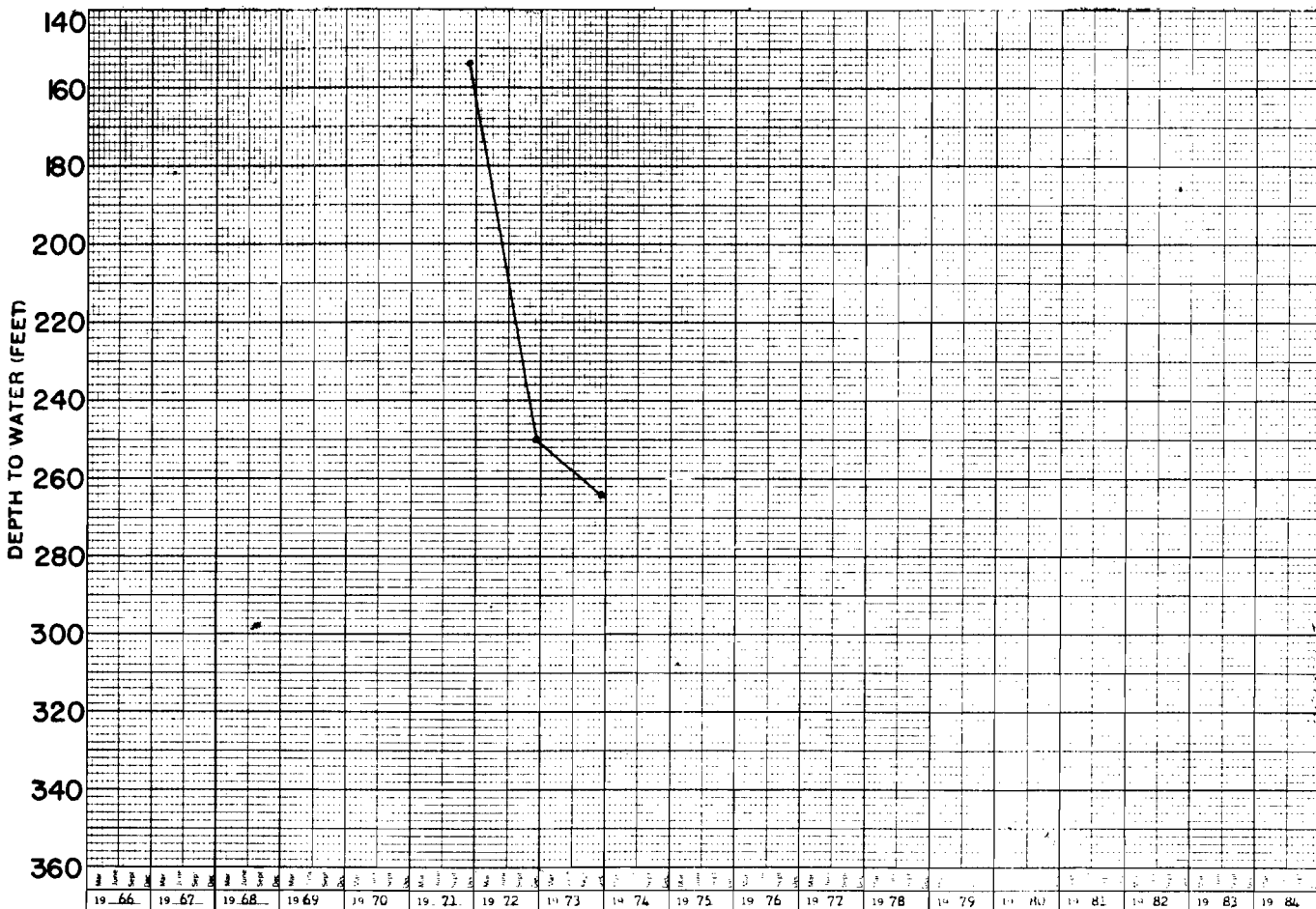
Generalized Log:

No Log

Description and status of water right:

Permit G-4918 with a priority date of February 3, 1970 for the appropriation of 30.0 cubic feet per second (13465 gallons per minute) from 7 wells for the irrigation of 6394.07 acres.

Hydrograph:



Records of Wells

Report Well Number 63

Owner: Nelson and Tucker Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 18, T. 2 N., R. 26 E.

Depth: 1145 feet. Diameter: 16 inches. Depth cased: 232 feet.

Approximate altitude of land surface at well: 930 ft. Year constructed: 1970

Yield: Tested at 2000 gallons per minute with 175 feet of drawdown.

Remarks: Nelson and Tucker Well No. 3

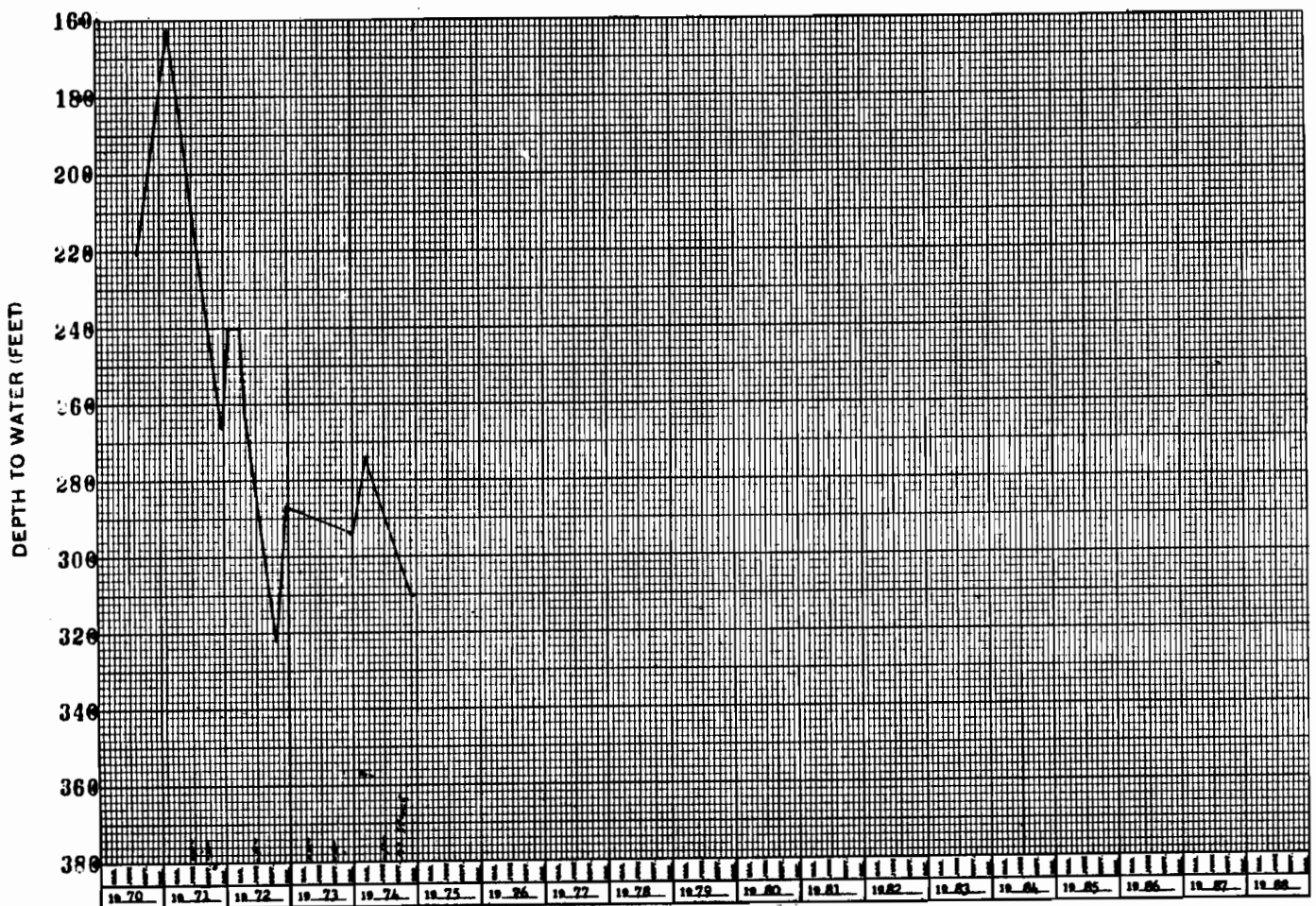
Generalized Log:

Soil	0 - 6 feet
Clay and gravel	6 - 116 feet
Basalt	116 - 120 feet
Clay and gravel	120 - 195 feet
Basalt with clay interbeds	195 - 1145 feet

Description and status of water right:

Application G-5194 with a filing date of May 20, 1970 for the appropriation of 6.69 cubic feet per second (3003 gallons per minute) for the supplemental irrigation of 3612.43 acres.

Hydrograph:



G-5235

1N/26E-8 d b d

Records of Wells

Report Well Number 64Owner: William J. Doherty Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 8, T. 1 N., R. 26 E.Depth: 1053 feet. Diameter: 16 inches. Depth cased: 158 feet.Approximate altitude of land surface at well: 1200 ft. Year constructed: 1971Yield: Tested at 2500 gallons per minute with 79 feet of drawdown.

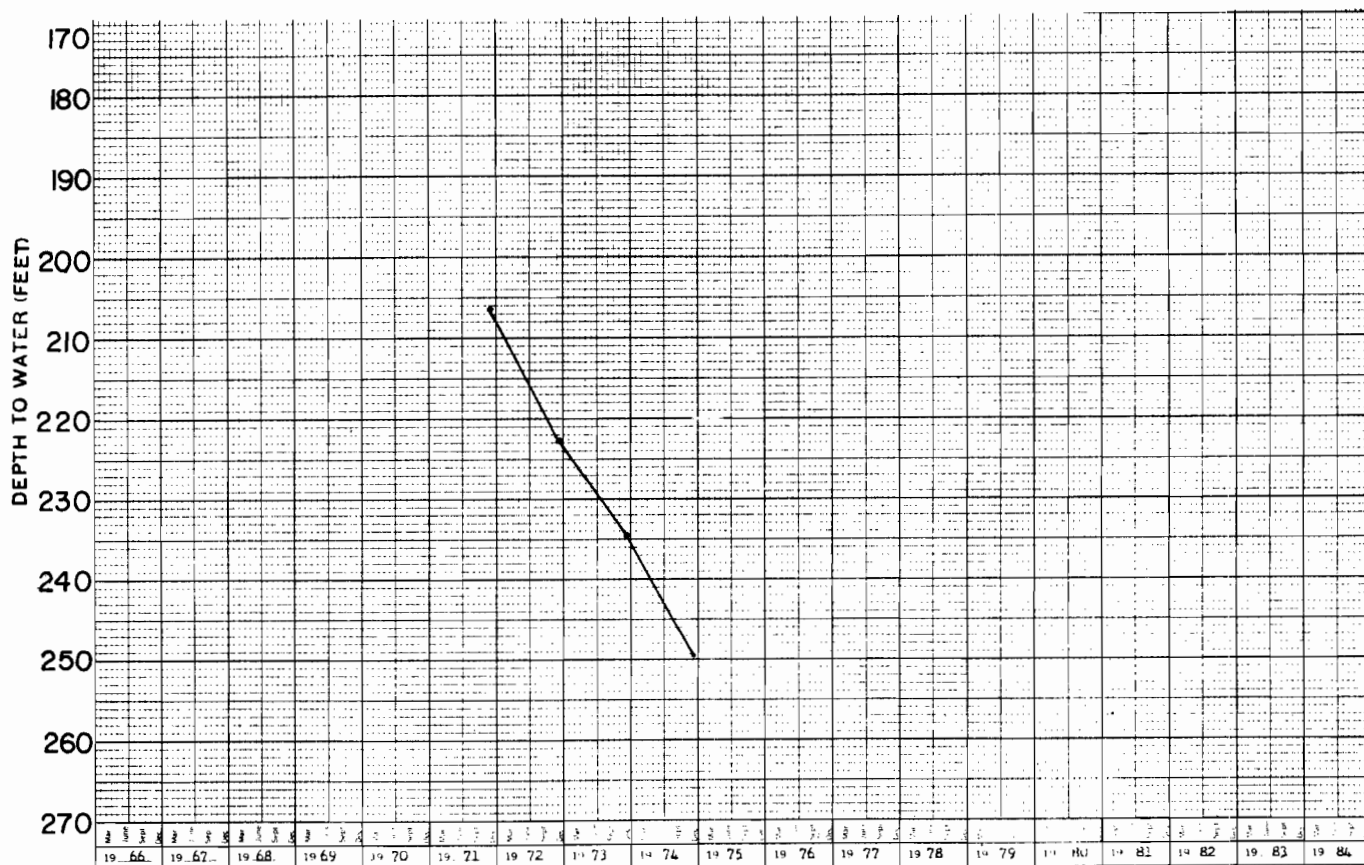
Remarks: _____

Generalized Log:

Soil	0 - 4 feet
Gravel	4 - 153 feet
Basalt with some clay interbeds	153 - 1053 feet

Description and status of water right:

Permit G-5092 with a priority of June 24, 1970 for the appropriation of 6.68 cubic feet per second (2998 gallons per minute) for the irrigation of 640.0 acres.

Hydrograph:

Records of Wells

Report Well Number 65

Owner: William J. Doherty Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 4, T. 1 N., R. 26 E.

Proposed
Depth: 1000 feet. Diameter: Proposed 16 inches. Depth cased: Proposed 200 feet.

Approximate altitude of land surface at well: 1185 ft. Year constructed: -

Yield: _____

Remarks: Doherty Well No. 3

Generalized Log:

Not Drilled

Description and status of water right:

Application G-5404 with a filing date of January 25, 1971 for the appropriation of 40.0 cubic feet per second (17960 gallons per minute) for the irrigation of 1015 acres.

Records of Wells

Report Well Number 66

Owner: William J. Doherty Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 3, T. 1 N., R. 26 E.

Proposed Proposed Proposed
Depth: 1000 feet. Diameter: 16 inches. Depth cased: 200 feet.

Approximate altitude of land surface at well: 1185 ft. Year constructed: _____

Yield: _____

Remarks: Doherty Well No. 4

Generalized Log:

Not drilled

Description and status of water right:

Application G-5407 with a filing date of January 25, 1971 for the appropriation of 40.0 cubic feet per second (17,960 gallons per minute) for the irrigation of 753 acres.

Records of Wells

Report Well Number 67

Owner: Marion R. Chaves Location: SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 32, T. 5 N., R. 28E.

Proposed Proposed Proposed
Depth: 120 feet. Diameter: 16 inches. Depth cased: 50 feet.

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

Yield: Not reported.

Remarks: Chaves Well No. 2

Generalized Log:

No Log (Basalt)

Description and status of water right:

Application No. G-5432 with a filing date of February 22, 1971 for the appropriation of 1.0 cubic feet per second (449 gallons per minute) for the irrigation of 80.0 acres.

Records of Wells

Report Well Number 68Owner: Taylor Bros. Farms Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 15, T. 2 N., R. 26E.Depth: 1145 feet. Diameter: 16 inches. Depth cased: 236 feet.Approximate altitude of land surface at well: 950 ft. Year constructed: 1972Yield: 3000 gallons per minute with 268 feet of drawdownRemarks: Taylor Bros. Well No. 1Generalized Log:Water Level:

Sand	0 - 17 feet
Interbedded clay and gravel	17 - 224 feet
Basalt	224 - 1145 feet

Reported to be 247 feet below land
surface on 5/11/72Description and status of water right:

Application G-5467 with a filing date of March 25, 1971 for the appropriation of 32.0 cubic feet per second (14,363 gallons per minute) from four wells for the irrigation of 2560.0 acres.

Taylor Bros. Farms Well No. 2 - Not drilled	2N/26E-16bdd
Taylor Bros. Farms Well No. 3 - Not drilled	2N/26E-21dbb
Taylor Bros. Farms Well No. 4 - Constructed June 1972 to a depth of 152 feet (to be abandoned)	2N/26E-22dbb

Well No. 2: proposed location SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 16, Township 2 North, Range 26 East.
(not drilled)Well No. 3: proposed location NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 21, Township 2 North, Range 26 East.
(not drilled)Well No. 4: located NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 22, Township 2 North, Range 26 East.
(constructed June 1972 to a depth of 152 feet)

Report Well Number 68A

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

Approximate altitude of land surface at well: 952 ft . Year constructed: -

Yield: _____

Remarks: Taylor Bros. Well No. 2 (Not drilled)

Not drilled

Application G-5467 with a filing date of March 25, 1971 for the appropriation of 32.0 cubic feet per second (14,363 gallons per minute) from four wells for the irrigation of 2560.0 acres.

Report Well Number 68B

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

Approximate altitude of land surface at well: 1000 ft . Year constructed: -

Yield: _____

Remarks: Taylor Bros. Well No. 3 (Not drilled)

Not drilled

Application G-5467 with a filing date of March 25, 1971 for the appropriation of 32.0 cubic feet per second (14,363 gallons per minute) from four wells for the irrigation of 2560.0 acres.

Records of Wells

Report Well Number 68COwner: Taylor Bros. Farms Location: NW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 22, T. 2 N., R. 26E.Depth: 152 feet. Diameter: 16 inches. Depth cased: 107 feet.Approximate altitude of land surface at well: 1022 ft. Year constructed: 1972Yield: NoneRemarks: Taylor Bros. Well No. 4 (To be abandoned)Generalized Log:Water Level:

Soil	0 - 6 feet
Gravel	6 - 11 feet
Clay	11 - 22 feet
Gravel	22 - 69 feet
Clay and gravel	69 - 152 feet

Reported to be dry 7/1/72

Description and status of water right:

Application G-5467 with a filing date of March 25, 1971 for the appropriation of 32.0 cubic feet per second (14.363 gallons per minute) from four wells for the irrigation of 2560.0 acres.

Records of Wells

Report Well Number 69Owner: Orval Matheny Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 35, T. 2 N., R. 26E.Proposed Proposed Proposed
Depth: 500 feet. Diameter: 12 inches. Depth cased: 120 feet.Approximate altitude of land surface at well: 1100 ft. Year constructed: _____

Yield: _____

Remarks: _____

Generalized Log:

Not drilled

Description and status of water right:

Application G-5468 with a filing date of March 26, 1971 for the appropriation of 1.78 cubic feet per second (799 gallons per minute) for the irrigation of 160.0 acres.

Records of Wells

Report Well Number 70Owner: Porter-Peringer Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 16, T. 2 N., R. 27 E.Depth: 1000 feet. Diameter: 12 inches. Depth cased: 180 feet.Approximate altitude of land surface at well: 1100 ft. Year constructed: _____

Yield: _____

Remarks: _____

Generalized Log:

Not drilled

11x 0.61 5075 2m x
G. 633
15/266-1 dad

Description and status of water right:

Application G-5594 with a filing date of August 9, 1971 for the appropriation of 7.78 cubic feet per second (3,492 gallons per minute) for the irrigation of 618.8 acres and the supplemental irrigation of 834.5 acres.

Records of Wells

Report Well Number 71Owner: Fritz Cutsforth Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 35, T. 1 N., R. 26 E.Depth: 508* feet. Diameter: 14 inches. Depth cased: 70 feet.Approximate altitude of land surface at well: 1600 ft. Year constructed: 1968*Yield: Tested at 1500 gallons per minute with 82 feet of drawdownRemarks: Cutsforth Well No. 2Generalized Log:Water Level:

Soil 0 - 8 feet
Basalt with some inter-bedded clay 8 - 508 feet

Reported to be 17 feet below land surface on 1/18/72
Measured at 0.37 feet below land surface on 12/17/74

*Well deepened from 246 feet to 508 feet in 1972.

Description and status of water right:

Application G-5609 with a filing date of August 30, 1971 for the appropriation of 5.41 cubic feet per second (2428 gallons per minute) for the irrigation of 418.5 acres.

G-5679

1N/26E-36 550

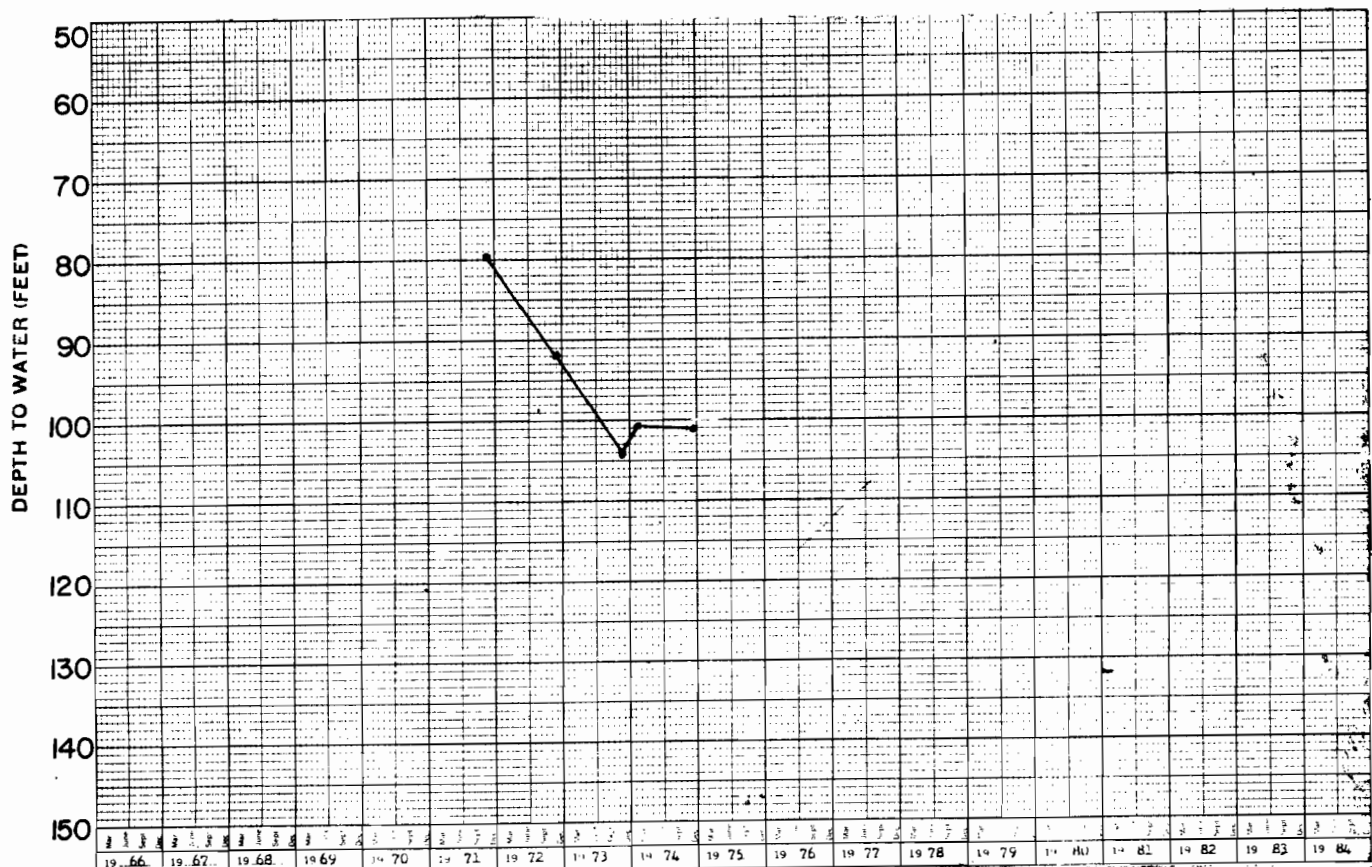
Records of Wells

Report Well Number 72Owner: Fritz Cutsforth Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 36, T. 1N., R. 26E.Depth: 665 feet. Diameter: 18 inches. Depth cased: 68 feet.Approximate altitude of land surface at well: 1690 ft. Year constructed: 1971Yield: Tested at 2000 gallons per minute with 220 feet of drawdown.Remarks: Cutsforth Well No. 3Generalized Log:

Basalt	0 - 40 feet
Clay?	40 - 61 feet
Cemented gravel	61 - 74 feet
Basalt	74 - 665 feet

Description and status of water right:

Application G-5679 with a filing date of December 2, 1971 for the appropriation of 4.45 cubic feet per second (1997 gallons per minute) for the irrigation of 320.0 acres.

Hydrograph:

Records of Wells

Report Well Number 73Owner: Merle and Villa R. Abney Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 17, T. 2 N., R. 28E.Depth: 800 feet. Diameter: 16 inches. Depth cased: 105 feet.Approximate altitude of land surface at well: 1100 ft. Year constructed: _____

Yield: _____

Remarks: Abney Well No. 2Generalized Log:

Not completed (approximate depth
300 feet)

Description and status of water right:

Application G-5715 with a filing date of February 2, 1972 for the appropriation of 5.6 cubic feet per second (2513 gallons per minute) for the irrigation of 480.0 acres and the supplemental irrigation of 366.36 acres.

Records of Wells

Report Well Number 74Owner: Lon G. Wadekamper Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 7, T. 4 N., R. 28 E.Depth: 286 feet. Diameter: 8 inches. Depth cased: 80* feet.Approximate altitude of land surface at well: 535 ft. Year constructed: 1972Yield: Tested at 50 gallons per minute with 140 feet of drawdown.

Remarks: _____

Generalized Log:Water Level:

Sand and gravel	0 - 18 feet
Clay	18 - 69 feet
Basalt with clay interbeds	69 - 286 feet

Reported to be 19 feet below land
surface on 9/15/72

Description and status of water right:

Ground Water Application G-5805 with a filing date of May 22, 1972 for the appropriation of 0.11 cubic foot per second (49 gallons per minute) for the irrigation of 10 acres and the supplemental irrigation of 68 acres.

*Perforated 70 - 80 feet

Records of Wells

Report Well Number 75Owner: Ammon Brothers Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 2, T. 2N., R. 27E.Depth: 18 feet. Diameter: - inches. Depth cased: - feet.Approximate altitude of land surface at well: 805 ft. Year constructed: -Yield: Not reported.

Remarks: _____

Generalized Log:

Sump

Description and status of water right:

Ground Water Application G-5865 with a filing date of August 7, 1972 for the appropriation of 1.45 cubic feet per second (651 gallons per minute) for the irrigation of 35.0 acres and the supplemental irrigation of 80.0 acres.

Records of Wells

Report Well Number 76Owner: Jerry E. Myers Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 11, T. 2 N., R. 27E.

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

Approximate altitude of land surface at well: 870 ft Year constructed: NR

Yield: _____

Remarks: _____

Generalized Log:

Sump: 30 feet x 100 feet x 20 feet deep

Description and status of water right:

Ground Water Application G-5974 with a filing date of January 10, 1973 for the appropriation of 2.23 cubic feet per second (1001 gallons per minute) for the irrigation of 93 acres and the supplemental irrigation of 386.0 acres.

Records of Wells

Report Well Number 77Owner: John L. King Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec. 17, T. 4 N., R. 28E.Depth: 203 feet. Diameter: 8 inches. Depth cased: 95 feet.Approximate altitude of land surface at well: 504 ft. Year constructed: 1972Yield: Air tested at 100 gallons per minute with 139 feet of drawdown.

Remarks: _____

Generalized Log:Water Level:

Soil	0 - 2 feet	Reported to be 44 feet below land
Gravel	2 - 26 feet	surface on 12/30/72
Gravel and clay	26 - 43 feet	
Clay	43 - 77 feet	
Basalt	27 - 203 feet	

Description and status of water right:

Ground Water Application G-6101 with a filing date of May 1, 1973 for the appropriation of 0.05 cubic foot per second (22 gallons per minute) for the irrigation of 4.35 acres.

Records of Wells

Report Well Number 78Owner: Phillip D. Hay Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 33, T. 5 N., R. 28 E.Depth: 315 feet. Diameter: 10 inches. Depth cased: 20 feet.Approximate altitude of land surface at well: 520 ft. Year constructed: 1969Yield: Air tested at 400 gallons per minute with 80 feet of drawdown.

Remarks: _____

Generalized Log:Water Level:

Soil	0 - 1 feet	Reported to be 100 feet below land
Boulders and gravel	1 - 8 feet	surface on 3/11/69
Basalt	8 - 315 feet	

Description and status of water right:

Application No. G-6576 with a filing date of June 24, 1974 for the appropriation of 1.75 cubic feet per second (785 gallons per minute) for the irrigation of 80.0 acres and the supplemental irrigation of 50 acres.

BUTTERCREEK GROUND WATER AREA

TABLE 1

No.	Record Holder	Priority Date	Appli. No.	Permit No.	Cert. No.	Well location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Rights ac. ft.	Well Depth	Remarks
77	H. P. Doherty	1925	GR-4142	GR-4066		2N/27E-34bdc	0.11	10.0	30.0	30.0	125 (rpt.)	No log
78	Allen C. & Florine Langenwalter	4/13/50	U-357	U-331	24264	4N/28E-16abb	0.02	1.6	4.8	34.8	282	No log
79	Oscar D. McCarty	3/4/52	U-468	U-425	24271	2N/27E-14ccb	4.44	111.7 Prim. 288.3 Supp.	335.1	369.9	280	Well deepened to 785 in 1968
80	John F. Kilkenny	4/18/52	U-489	U-441	31201	2N/27E-27bcc	0.38	30.0 Supp.			598	Well No. 1
81	Tucker Echo Ranch	5/7/52	U-496	U-450	31096	2N/27E-28add	1.96	48.7 Prim. 132.4 Supp.	146.1	516.0	263	
82	Earl W. Wattenberger	11/14/52	U-540	U-495	26072	1N/27E-10aab	0.24	19.0 Supp.			120	Well deepened to 243 2/67
83	Robert J. Kilkenny	12/17/52	U-546	U-515	29143	1N/26E-29bdd	0.08	6.3	18.9	534.9		No log
84	Oscar D. McCarty	4/9/53	U-587	U-536	24273	2N/27E-14ccb	1.97	157.4	472.2	1007.1	280	Same as U-468, Deepened from 280 to 785, 9/68
85	Erwin E. Rauch	6/24/54	G-40	G-1440	30193	1N/26E-18ddd	0.06	4.5	13.5	1020.6	300	No log
86	Fred and Tresa Davis	11/21/56	G-515	G-438	35811	3N/28E-19acb	1.50	120.0 Prim. & Supp.	360.0			Well No. 1, Sump
87	Claudia Ammon et al	1/21/57	G-547	G-434	28601	3N/28E-19bdb	4.0	198.5 Prim. 220.8 Supp.	595.5	1616.1	840	Well No. 2, Sump
88						2N/27E-1bdd						Well No. 1 (abandoned)
89	A. J. Vey	10/14/57	G-784	G-681	34196	2N/27E-2daa	1.60				886	Well No. 2
90	Antone J. Vey	2/11/58	G-858	G-823	26092	1N/27E-24ddd	1.02	128.0 Supp. 81.5 Supp.			777	Well No. 4
91						1N/28E-28baa					500	Well No. 3
92	Maynard F. Aaby and Clarence L. Hanson	2/21/59	G-1350	G-1227	30742	1N/28E-28bbc	2.5	54.5 Prim. 274.0 Supp.	163.5	1779.6	365	Well No. 2
93	Harry J. Andrews	9/2/60	G-1836	G-1685	32696	2N/27E-12bbb	0.94	30.0 Prim.	90.0	1869.6	875	
94	George B. Wallace	9/21/60	G-1845	G-1688	32592	3N/27E-25ddc	0.96	2.0 Prim. 199.3 Supp.	6.0	1875.6	591	
95	Earl W. Wattenberger	2/5/62	G-2226	G-2047	34283	1N/27E-10acb	0.78	17.6 Prim. 64.8 Supp.	52.8	1928.4	120	
96	Sarvis Springs Farm	10/8/62	G-2461	G-2276	36022	2N/27E-26cbd	2.68	347.4	1042.2	2970.6	932	
97	Kenneth Turner	4/24/63	G-2605	G-2409	35394	1N/26E-26bcc	0.54	64.7	194.1	3164.7	230	
98	Edward B. Wattenburger	11/8/63	G-2730	G-2528	34284	1N/27E-3dbb	1.11	13.2 Prim. 77.8 Supp.	39.6	3204.3	129	Deepened from 129 to 259, 2/66
99	City of Umatilla	12/24/63	G-2755	G-2560	34523	5N/28E-19aaa	2.0				785	Municipal
100	Fred E. Davis	2/24/64	G-2786	G-2597	35783	3N/28E-19bad	0.84	120.0 Supp.				Well No. 3, Sump
101	Raymond M. Porter	12/17/64	G-3002	G-2797	34384	1N/27E-23dad	1.24	21.2 Prim. 78.1 Supp.	63.6	3267.9	215	
102	Michael J. Kilkenny	1/22/65	G-3019	G-2809	38846	2N/27E-27bcc	0.60	137.8 Supp.			598	Well No. 1
103	George Luciani	6/28/65	G-3149	G-2966	38584	1N/27E-3aac	0.29	22.8 Supp.			107	Deepened from 107 to 220, 3/67
104	Henry F. Walker	1/26/66	G-3355	G-3255		3N/28E-8adb	1.90	258.0	774.0	4041.9	437	Well No. 1
105						3N/28E-8dbd	1.33				216	Well No. 2
106	Edward B. Wattenburger	4/1/66	G-3442	G-3101	38714	1N/27E-3dbb	0.62	6.6 Prim. 42.1 Supp.	19.8	4061.7	129	Deepened from 129 to 259, 2/66
107	Leo Ashbeck	5/27/66	G-3516	G-3164		1N/27E-10dcc	3.63	290.0	870.0	4931.7	227	
108	Robert M. Kinney	7/5/66	G-3565	G-3113	38597	4N/28E-21cac	1.33	106.6	319.8	5251.5	347	
109	Proudfoot Ranches	9/29/66	G-3688	G-3492		4N/28E-30ddd	1.59	127.0 Supp.			721	
110	Rose Mueller	12/8/66	G-3749	G-3541	38388	4N/28E-32acb	0.86	68.5 Supp.			200	
111	Michael J. Kilkenny	1/13/67	G-3772	G-3558	38847	2N/27E-22bbd	2.64	362.2	1086.6	6338.1	778	
112	Wm. J. Doherty	3/13/67	G-3841	G-3474	38473	1N/26E-10aab	0.45	36.3	108.9	6447.0	376	
113	Ernest A. Betz	3/21/67	G-3859	G-3635	36675	3N/28E-28eab	1.57	125.6	376.8	8823.8	636	
114	Stone Machinery Co.	5/24/67	G-3939	G-3530		3N/28E-18abd	4.5	480.0	1440.0	8263.8	1095	Well No. 1
115						3N/28E-6dcc	6.0				1136	Well No. 2
116	G. R. D. and H. Grieb	7/19/67	G-3999	G-3792		2N/26E-28cdd	7.0	3356.0	10068.0	18331.8	549	Well No. 1 (Unused)
117		for 7 cfs 3/7/68				2N/26E-29ced	7.0				1004	Well No. 2
118	Delwin O. Nelson	8/7/67	G-4025	G-3777		2N/26E-20dbb	6.25	3612.43	10837.2	29169.0	1000	Deepened from 914 to 1004, 3/71
119	Thomas & Jessie Ashbeck	9/11/67	G-4073	G-3816	38855	2N/27E-27cbc	0.16	12.6 Supp.			240	Well No. 1
120	John F. and Nellie Madison	9/15/67	G-4080	G-3834		3N/27E-24dad	2.70	239.55 Prim. 246.61 Supp.	718.6			Sump
121	Proudfoot Ranches	11/13/67	G-4135	G-3895		4N/28E-30ddd	2.42	63.4 Prim. 128.6 Supp.	190.2	29359.2	721	

BUTTERCREEK GROUND WATER AREA

TABLE 1 Continued

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
41	Ernest A. Betz	12/18/67	G-4165	G-4048	36676	3N/28E-28ada	1.57	125.6	376.8	29736.0	830	
42	Clyde J. Nobles	3/27/68	G-4297	G-4059		5N/28E-21cdc	0.33	71.0 Prim. 85.0 Supp.	213.0	30309.0	59	Well No. 1 No log
43	William C. Cox	2/15/68	G-4234	G-3996	38859	4N/28E-31acd	0.32	15.2 Prim.	45.6	29281.6	400	
44	Charles Daly	4/23/68	G-4340	G-4097		1N/27E-21ddd	1.43	23.5 Prim. 91.0 Supp.	70.5	29852.1	420	
45	Grieb Farms	5/23/68	G-4403	G-4150		1N/26E-4baa	7.0	960.0 Supp.			1167	Well No. 3
46	William J. Healy	7/10/68	G-4486	G-4225		1N/27E-26bcd	1.79	35.5 Prim. 143.0 Supp.	106.5	29958.6	250	Well No. 2
47	Jasper E. Myers	7/24/68	G-4506	G-4248		1N/27E-21acd	5.70	311.6 Prim. 144.0 Supp.	934.8	30893.4	450	
48	Kenneth Turner	7/25/68	G-4516	G-4255	39079	1N/26E-26ccc	4.44	548.9 Prim. 36.7 Supp.	1646.7	32540.1	479	
49	William J. Healy	7/29/68	G-4518	G-4226		1N/27E-27bdd	0.21	17.0 Supp.			116	Well No. 1
50	Jerald E. Bea	8/15/68	G-4557	G-4281		2N/26E-6acc	4.0	668.7	2006.1	34546.2	1097	Deepened from 714 to 1097 in 1970
51	Larry Hanson	9/3/68	G-4581	G-4049		2N/28E-7aad	5.57	946.4	2839.2	37385.4	690	
52	Porter-Peringer, Inc.	9/18/68	G-4601	G-4325		2N/27E-4dbd	17.84	6463.9	19391.7	56777.1		Well No. 1
52-A				Permitted Locations		2N/27E-3cda						Not drilled
52-B						2N/27E-10bdb						Not drilled
52-C						2N/27E-16adc						Not drilled
52-D						2N/27E-8dab					1251	Well No. 1
52-E						2N/27E-7aaa					1461	Well No. 2
53	Campbell Ranch, Inc.	10/7/68	G-4629	G-4354		1N/27E-5ccb	31.83	2545.7	7637.1	64414.2	892	Well No. 1
53-A						2N/27E-32acd					936	Well No. 2
53-B						1N/27E-5baa						Not drilled
54	Grieb Farms	11/29/68	G-4704	G-4473		1N/26E-5bba	7.00	640.0 Supp.			1500	Well No. 4
55	Stanley Tucker	12/16/68	G-4726	G-4477		2N/27E-20caa	5.60	3680.0	11040.0	75454.2	1103	
56	Herman T. Schultz	1/21/69	G-4770	G-4493	38739	4N/28E-8dcb	0.15	12.1 Supp.			265	
57	Nelson and Tucker	2/10/69	G-4782	G-4504		2N/26E-17aba	6.69	3612.43 Supp.			1103	Well No. 2
58	Harold L. Rosenbaum	2/28/69	G-4800	G-4525	38289	4N/28E-8ddd	0.02	1.6	4.8	75459.0	215	
59	Curran Brothers	9/16/69	G-4994	G-4712		1N/27E-26bcd	1.17	39.0 Prim. 54.5 Supp.	117.0	75576.0	200	
60	Porter-Peringer, Inc.	9/30/69	G-5007	G-4739		2N/27E-4dbd	13.36	6463.9 Supp.				Not drilled
60-A				Permitted Locations		2N/27E-3cda						Well No. 1
60-B						2N/27E-10bdc						Well No. 2
60-C						2N/27E-16adc						Well No. 3
60-D						2N/27E-8dab						Well No. 4
60-E						2N/27E-7aaa					1251	Well No. 1
60-F						2N/27E-12bdb					1461	Well No. 2
61	V. James Stockard	10/27/69	G-5023			2N/27E-23cad	0.28	21.7	65.1	75641.1		Well No. 2
62	Lawrence D., Rosella and Corrine Lindsay	2/3/70	G-5096	G-4918		2N/26E-10cdb	30.0	6394.07	19182.2	94823.3	1145	Well No. 1
62-A						2N/26E-3bcb					1104	Well No. 2
62-B						2N/26E-11cdd					1265	Well No. 3
62-C						2N/26E-9bdd						No log
62-D						2N/26E-2caa						Well No. 4
62-E						2N/26E-5dbb						Well No. 5
62-F						2N/26E-18daa	6.69	3612.43 Supp.				Well No. 6
63	Nelson and Tucker	5/20/70	G-5194			1N/26E-8dbd	6.68	640.0	1920.0	96743.3	1053	Well No. 3
64	William J. Doherty	6/24/70	G-5235	G-5092		1N/26E-4cdc	40.0	1015.0	3045.0	99788.3		Well No. 4
65	Wm. J. Doherty	1/25/71	G-5404			1N/26E-3ccd	40.0	753.0	2259.0	102047.3		Well No. 3
66	Wm. J. Doherty	1/25/71	G-5407			5N/28E-32bdc	1.00	80.0	240.0	102743.1		Well No. 2
67	Marion R. Chaves	2/22/71	G-5432			2N/26E-15bdd	32.0	2560.0	7680.0	109727.3		Well No. 1
68	Taylor Bros. Farms	3/25/71	G-5467			2N/26E-16bdd						Well No. 2
68-A						2N/26E-21dbb						Well No. 3
68-B						2N/26E-22dbb					152	Well No. 4
68-C						2N/26E-35cbc	1.78	160.0	480.0	110207.3		Not drilled
69	Orval Matheny	3/26/71	G-5468			2N/27E-16cab	7.78	618.8 Prim. 834.5 Supp.	1856.4	112063.7		Not drilled
70	Porter-Peringer, Inc.	8/9/71	G-5594									
71	Fritz Cutsforth	8/30/71	G-5609			1N/26E-35deb	5.41	418.5	1255.5	113319.2	508	Well No. 2, Deepened from 246 to 508, 1972
72	Fritz Cutsforth	12/2/71	G-5679			1N/26E-36edb	4.45	320.0	960.0	114279.2	665	Well No. 3

-001-

BUTTERCREEK GROUND WATER AREA

TABLE 1 Continued

No.	Record Holder	Priority Date	Appli. No.	Permit No.	Cert. No.	Well Location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Rights ac. ft.	Well Depth	Remarks
73.	Merle and Villa R. Abney	2/2/72	G-5715			2N/28E-17ccd	5.6	480.0 Prim. 366.36 Supp.	1440.0	115719.2	Not drilled	Well No. 2
74.	Lon G. Wadekamper	5/22/72	G-5805			4N/28E-7acc	0.11	10.0 Prim. 68.0 Supp.	30.0	115749.2	286	
75.	Ammon Brothers	8/7/72	G-5865			2N/27E-2daa	1.45	35.0 Prim. 80.0 Supp.				Sump
76.	Jerry E. Myers	1/10/73	G-5974			2N/27E-11ccd	2.23	93.0 Prim. 386.0 Supp.				Sump
77.	John L. King	5/1/73	G-6101			4N/28E-17aba	0.05	4.35	13.1	115762.3	203	
78.	Phillip D. Hay	6/24/74	G-6576			5N/28E-33adb	1.75	80.0 Prim. 50.0 Supp.	240.0	116002.3	315	

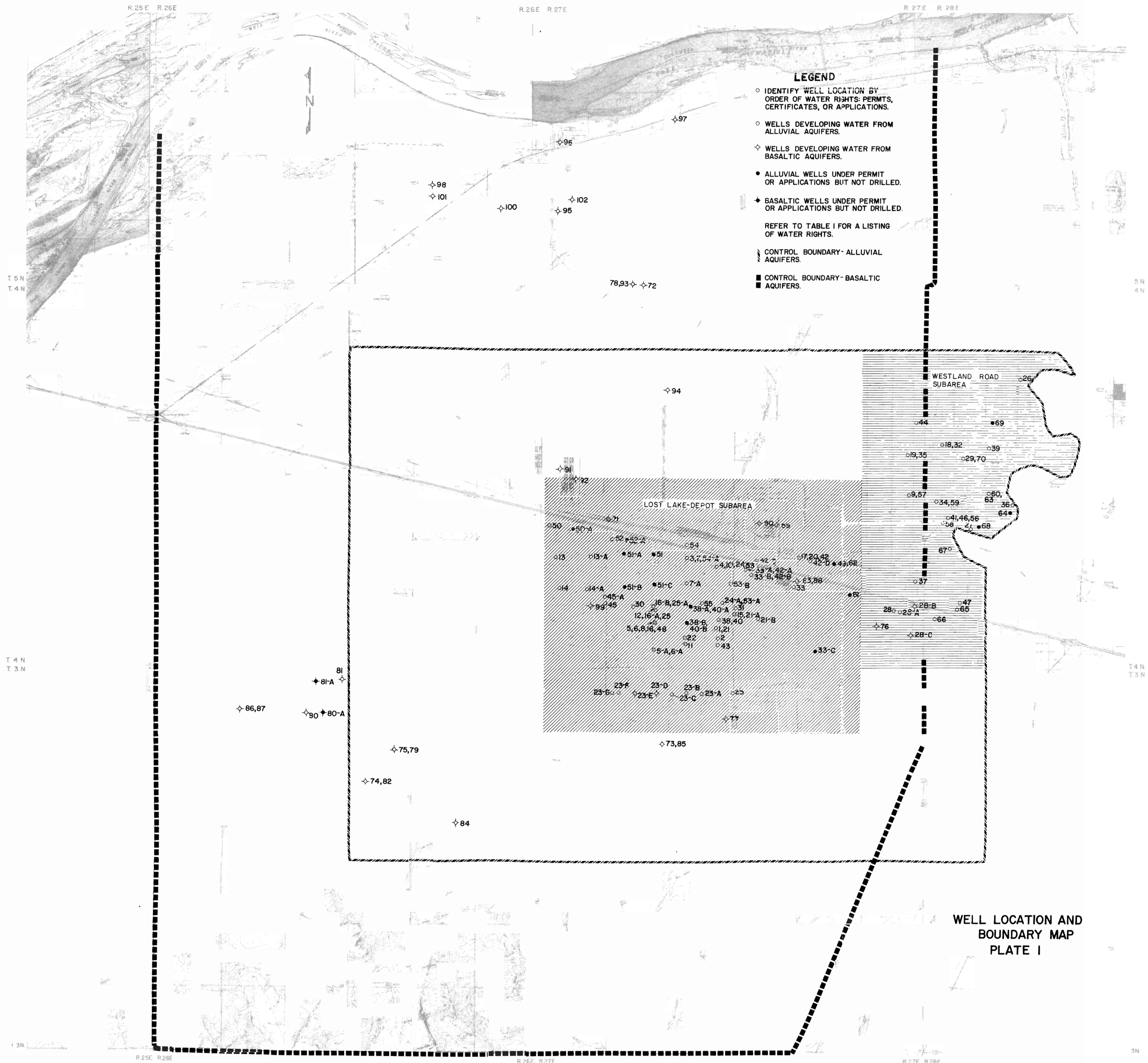
WELLS DEVELOPING WATER FROM ALLUVIAL AQUIFERS WITHIN THE BUTTERCREEK GROUND WATER AREA AND NOT INCLUDED WITHIN THE ORDNANCE GROUND WATER AREA

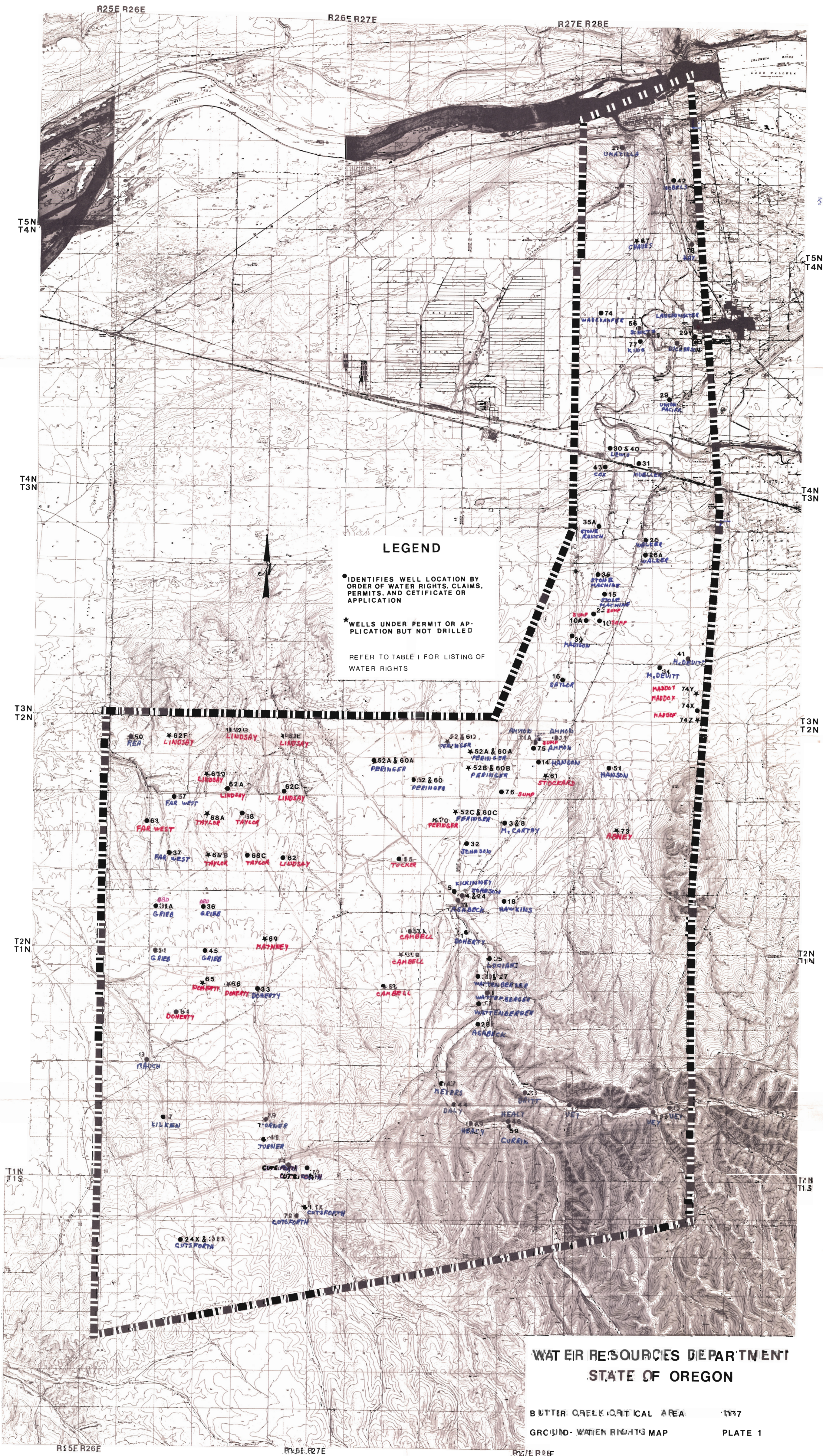
TABLE 2

Record Holder	Priority Date	Appli. No.	Permit No.	Cert. No.	Well Location	Permitted Diversion cfs	Acreage	Max. Allow. ac. ft.	Cum. Allow. ac. ft.	Well Depth	Remarks
William T. Turner	8/11/60	G-1824	G-1675	34391	4N/28E-28abc	1.05	84.7	254.1		128	Well No. 1
Rose Mueller	1/18/67	G-3782	G-3567	38389	4N/28E-33acd	0.58	46.6	Supp.			Sump
Howard S. & Verna G. Stone	5/23/68	G-4404	G-4151	38860	4N/28E-33ccd	0.15	12.0		36.0	143	Jensen Well No. 1
Leonard H. Williams	9/27/68	G-4613	G-4337		4N/28E-28acc	1.18	94.5		283.5	200	
L. H. Williams	9/2/70	G-5304	G-5044		4N/28E-29ccc	1.8	232.5		697.5	128	Well No. 1
Leonard H. Williams	8/16/71	G-5599	G-5045	39547	4N/28E-28acc	0.83	66.6		199.8	200	
Leonard H. Williams	8/25/72	G-5879			4N/28E-29bda	2.0	232.5	Supp.		130	Well No. 3
James E. Wood	11/14/72	G-5940	G-5000		4N/28E-28dcb	1.11	89.0		267.0	190	
LaVerne A. Boylan	9/27/73	G-6310			4N/28E-33dba	0.062	8.0		24.0	100	
Double M. Ranch	1/21/74	G-6409			4N/28E-33daa	0.25	25.0			98	Proposed

ORDNANCE GROUND WATER AREA

OREGON STATE ENGINEER
R.26E R.27E

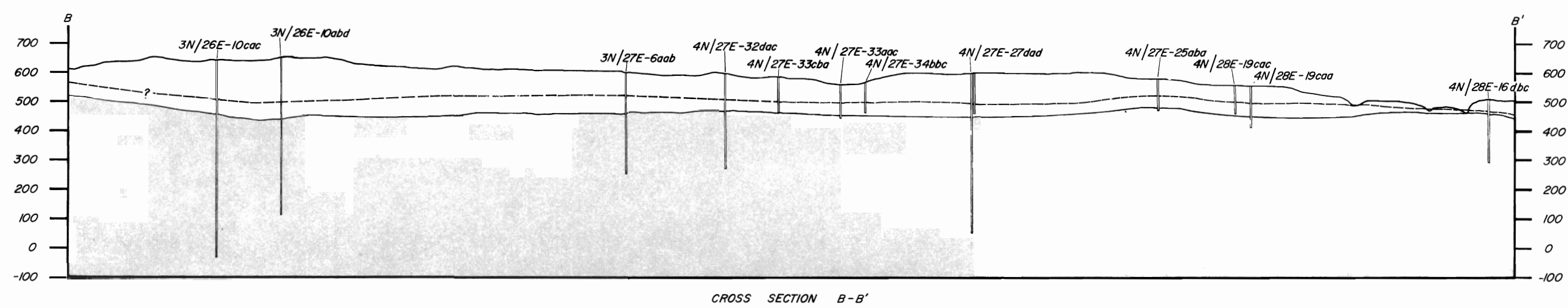
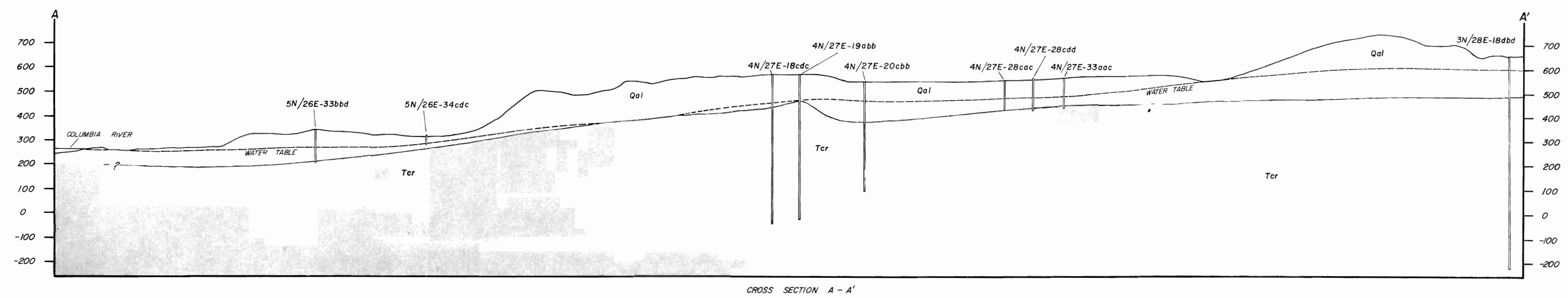




LEGEND

- IDENTIFIES WELL LOCATION BY ORDER OF WATER RIGHTS, CLAIMS, PERMITS, AND CETIFICATE OR APPLICATION
 - ★ WELLS UNDER PERMIT OR APPLICATION BUT NOT DRILLED
- REFER TO TABLE I FOR LISTING OF WATER RIGHTS

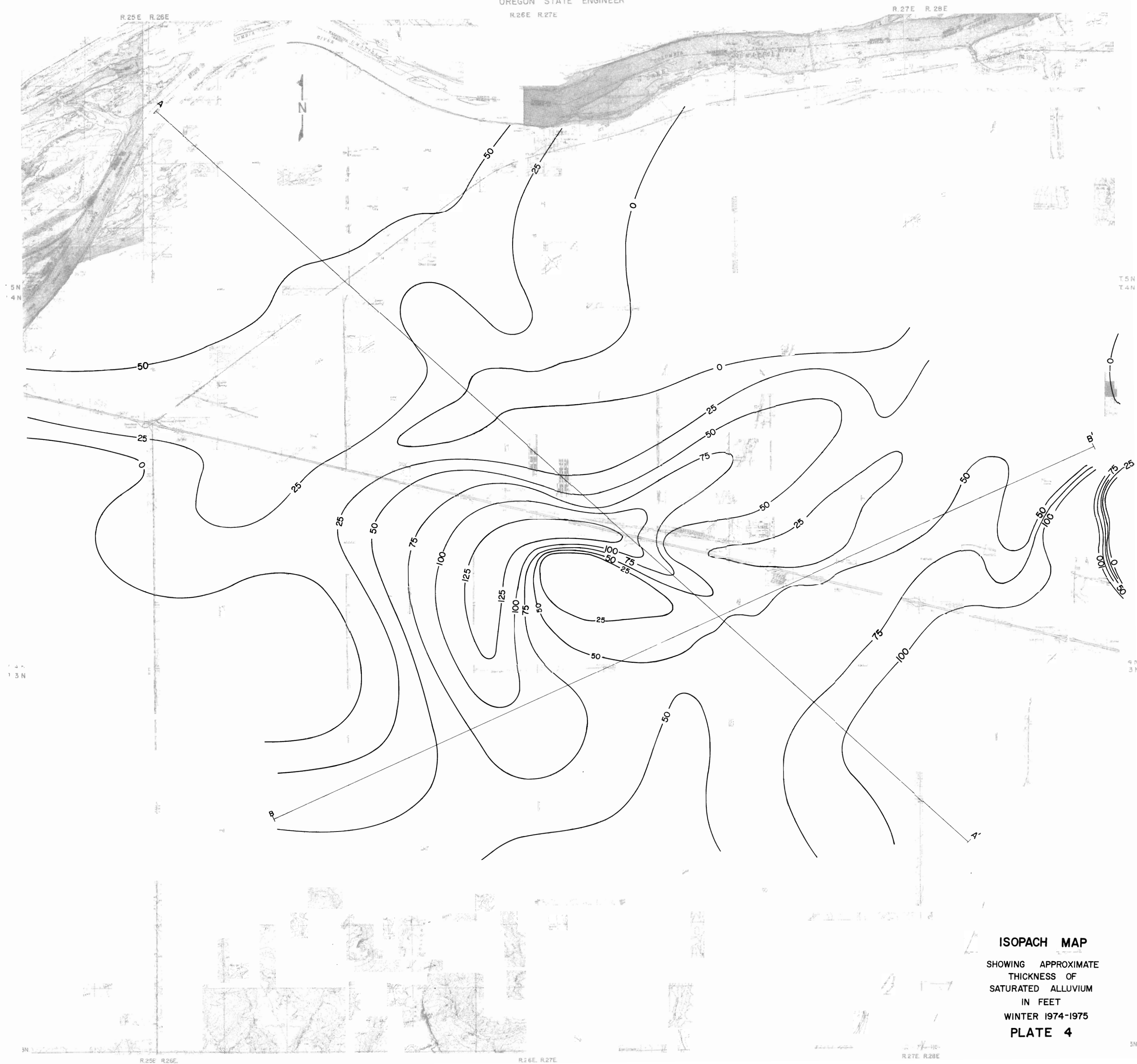
WATER RESOURCES DEPARTMENT
STATE OF OREGON



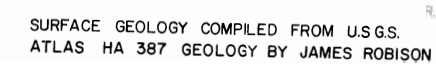
GEOLOGIC CROSS SECTIONS A-A' AND B-B'
 VERTICAL SCALE EXAGGERATED X 15
 PLATE 5

ORDNANCE GROUND WATER AREA

OREGON STATE ENGINEER
R.26E R.27E



OREGON STATE ENGINEER
R.26E R.27E



ORDNANCE GROUND WATER AREA

OREGON STATE ENGINEER
R.26E R.27E

