WATER RESOURCES DEPARTMENT

GROUND WATER REPORT NO. 28

STATE OF OREGON

WILLIAM H. YOUNG
Director

GROUNDWATER RESOURCES OF THE DALLAS—MONMOUTH AREA, POLK, BENTON, AND MARION COUNTIES, OREGON

BY
JOSEPH B. GONTHIER
U.S. GEOLOGICAL SURVEY

STATE OF OREGON 1859

PREPARED IN COOPERATION WITH
THE UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
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FACTORS FOR CONVERTING INCH-POUND UNITS TO METRIC UNITS

For readers who prefer SI (International System of Units) metric units rather than inch-pound units, the conversion factors for the terms used in this report are listed below:

To convert from	To	Multiply by
	Length	
inch (in.)	millimeter (mm)	25.4
foot (ft)	meter (m)	0.3048
mile (mi)	kilometer (km)	1.609
	Area	
acre	square meter (m^2)	4,047
	square hectometer (hm^2)	0.4047
square mile (mi^2)	square kilometer (km^2)	2.590
	Volume	
acre-foot (acre-ft)	cubic meter (m^3)	1,233
	cubic hectometer (hm^3)	0.001233
cubic foot (ft^3)	cubic meter (m^3)	0.02832
gallon (gal)	liter (L)	3.785
million gallons (Mgal)	cubic meter (m^3)	3,785
	Specific combinations	
cubic foot per second (ft^3/s)	cubic meter per second (m^3/s)	0.02832
foot per day (ft/d)	meter per day (m/d)	0.3048
foot squared per day (ft^2/d)	meter squared per day (m^2/d)	0.0929
gallon per minute (gal/min)	liter per second (L/s)	0.06309
gallon per minute per foot (gal/min)/ft	liter per second per meter (L/s)/m	0.2070
million gallons per day (Mgal/d)	cubic meter per day (m^3/d)	3,785
	cubic meter per second (m^3/s)	0.04381
	Temperature	
degree Fahrenheit (°F)	degree Celsius (°C)	([1])

[1]Temp °C = (temp °F-32)/1.8.

DEFINITIONS OF TERMS

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 or springs.

Confined ground water.--Ground water that is under pressure significantly greater than atmospheric. In a well that taps a confined ground-water body, the static water level is above the top of the aquifer.

Drawdown.--The lowering of the ground-water level caused by well discharge. It is the difference, expressed in feet or meters, between the static water level and the pumping or flowing water level in a well.

Evapotranspiration.--Water transferred to the atmosphere by evaporation from water surfaces and moist soil and by plant transpiration.

Hydraulic conductivity.--The volume of water that will move in a unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow. Hydraulic conductivity has replaced the term "field coefficient of permeability."

Hydraulic gradient.--The change in static head per unit of distance in a given direction. The direction generally is understood to be that of the maximum rate of decrease in head.

Perched ground water.--Ground water separated from an underlying body of ground water by an unsaturated zone.

Potentiometric surface.--A surface that represents the static head. In an aquifer it is defined by the levels at which water stands in tightly cased wells. The water table is a special kind of potentiometric surface. The static head (water level) in a well represents the average nonpumping water level of the water-bearing materials open to the well bore.

Specific capacity.--The rate of discharge of water from a well divided by the drawdown of water level within the well.

Storage coefficient.--The storage coefficient is the volume of water an aquifer releases from or takes into storage per unit area of aquifer per unit change in head.

Transmissivity.--The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient. It is equal to the average hydraulic conductivity times the saturated thickness of the aquifer.

Unconfined ground water.--Ground water in an aquifer that has a water table.

Water table.--The water surface in an unconfined water body, at which the pressure is atmospheric.

GROUND-WATER RESOURCES OF THE DALLAS-MONMOUTH AREA, POLK, BENTON, AND MARION COUNTIES, OREGON

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By Joseph B. Gonthier

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ABSTRACT

The Dallas-Monmouth area is in the west-central Willamette Valley of western Oregon. It comprises a total of about 400 square miles in Polk, Benton, and Marion Counties.

Tertiary consolidated rocks underlie the entire area. These rocks include marine sandstone, siltstone, shale, tuff, basalt, and gabbro. In the lowlands, the consolidated rocks are overlain by unconsolidated deposits of clay, silt, sand, and gravel which reach a maximum thickness of about 125 feet locally.

The consolidated rocks generally are poor water-bearing formations and yield only small quantities of ground water to wells. From 1956 to 1976, about 6 percent of all wells completed in basalt and 14 percent of those completed in marine sedimentary rocks were reported to be "dry holes." The median yield of wells completed in the consolidated rocks was less than 10 gallons per minute, and the maximum reported yield was 200 gallons per minute.

Shallow ground water in the consolidated rocks is generally of good quality, but with increasing depth in these rocks the water contains increasing concentrations of dissolved minerals. It is estimated that about 5 percent of all the wells completed in the consolidated rocks yield poor-quality water.

The best water-bearing units are sand-and-gravel beds in the unconsolidated deposits. Near Independence, the sand-and-gravel beds are hydraulically continuous and exceed a saturated thickness of 10 feet over an area covering several tens of square miles chiefly within the Willamette River flood plain. Properly constructed wells in these deposits can generally obtain yields of 100 to 500 gallons per minute, and large quantities of additional ground water can be developed from this source.

Outside the above area, sand-and-gravel beds generally are less than 10 feet thick, lenticular in shape, local in extent, and generally yield less than 30 gallons per minute to wells. Sand-and-gravel beds probably are absent in the Baskett Slough drainage basin, in the E. E. Wilson Wildlife Management area, and in the Luckiamute and Little Luckiamute River valleys upstream from the U.S. Highway 99W bridge.

INTRODUCTION

Water supplies for a large part of the growing population of the Dallas-Monmouth area in the west-central Willamette Valley are obtained from ground-water sources. In most of the area, these sources yield only small quantities of water to wells, and the use of the water commonly is limited by its poor chemical quality. Moderate-to-large quantities of good water can be obtained from sand-and-gravel aquifers adjacent to and beneath the Willamette River flood plain along the east margin of the study area. Water from this source is widely used for irrigation, municipal, and industrial supplies. With good management, large quantities of additional water can be developed from the sand-and-gravel aquifers.

Purpose and Scope

This study is part of a cooperative program between the U.S. Geological Survey and the Oregon Water Resources Department. The purpose of the study is to describe (1) the hydrogeology of the area, (2) the availability of ground water, (3) the pattern of ground-water movement, (4) the quantity of ground-water withdrawals and use, (5) the quality of ground water, and (6) the ground-water problems, and to suggest solutions where possible.

To accomplish these objectives, approximately 500 wells were field located and inventoried, water samples from selected wells were analyzed, and all available hydrologic and well data were evaluated.

Acknowledgments

Appreciation is expressed for the cooperation of citizens, well owners, and drillers in the area who provided access to wells and data for the study. Public officials, consultants, and municipal and private water company personnel also provided data, assistance, and invaluable discussions of the hydrology of the area.

Previous Studies

Ground-water resources of the area were described briefly in a report by Piper (1942), and parts of the area are included in reports by Price (1967), Foxworthy (1970), and Frank (1974). A ground-water study by Helm and Leonard (1977) covered the lower Santiam River basin which borders part of this study area on the east side of the Willamette River. The geology, ground-water resources, and ground-water quality of the Kings Valley area are covered in a report by Penoyer and Niem (1975). Geologic mapping of the area was completed by Baldwin (1964); Vokes, Myers, and Hoover (1954); and Mundorff (1939).

Location and Geography

The Dallas-Monmouth area (fig. 1) occupies a total of about 400 mi^2 in west-central Willamette Valley in western Oregon. About 305 mi^2 are in Polk County, 90 mi^2 in Benton County, and 5 mi^2 in Marion County. It is bounded on the north by the 45° parallel of latitude and on the west by the 123°30' meridian of longitude. The south boundary is the line separating Tps. 10 and 11 S. in Benton County. The east boundary is the Willamette River, except near Independence and north of Eola.

The area is drained by the Willamette River and its tributaries. All the principal tributaries have headwaters in the Coast Range. From north to south, the principal tributaries are Rickreall Creek, Ash Creek, and the Luckiamute and Little Luckiamute Rivers.

The topography is varied; the eastern half consists of lowland plains separated by rolling hills, and the western half contains rugged forested mountains cut by valleys of the principal streams. The lowest point is on the Willamette River near Eola, at an altitude of about 125 ft; the highest is on Rickreall Ridge in sec. 25, T. 7 S., R. 7 W., near the northwest border, at an altitude of 2,749 ft.

The flood plain of the Willamette River is bounded by a low terrace that ranges from 15 to 40 ft above the flood plain. This terrace marks the east edge of a second broad lowland that covers large areas of the lower valleys of Rickreall and Ash Creeks and the Luckiamute and Little Luckiamute Rivers.

Annual precipitation increases with increasing altitude of the land surface; it is less than 40 in. in the lowland adjacent to the Willamette River and 120 in. or more in the Coast Range foothills in the western part of the area (fig. 2). The graphs (fig. 3) show the range and the monthly distribution of precipitation and temperature at Dallas, Oreg., which is at an altitude of 325 ft. Precipitation is seasonal. The summer is warm and dry, and the late fall and winter are cool and moist. On the average, more than 75 percent of the precipitation occurs during the 5-month period from November through March.

Well- and Spring-Numbering System

Wells and springs are assigned a number based on their location according to the rectangular system for subdivision of public lands (fig. 4). In successive order, the numerals represent the township, range, and section. Thus, well 10S/4W-16bbc is in township 10 south, range 4 west, section 16. The letters following the section number show the location within the section, the first letter designating the quarter section (160 acres), the second letter the quarter-quarter section (40 acres), and the third letter the quarter-quarter-quarter section (10 acres). Well 10S/4W-16bbc is in the SW¼ of the NW¼ of the NW¼ of section 16. Where two or more wells are in the same 10-acre subdivision, serial numbers are added after the third letter. For a spring, a lower case (s) is appended to the number as described.

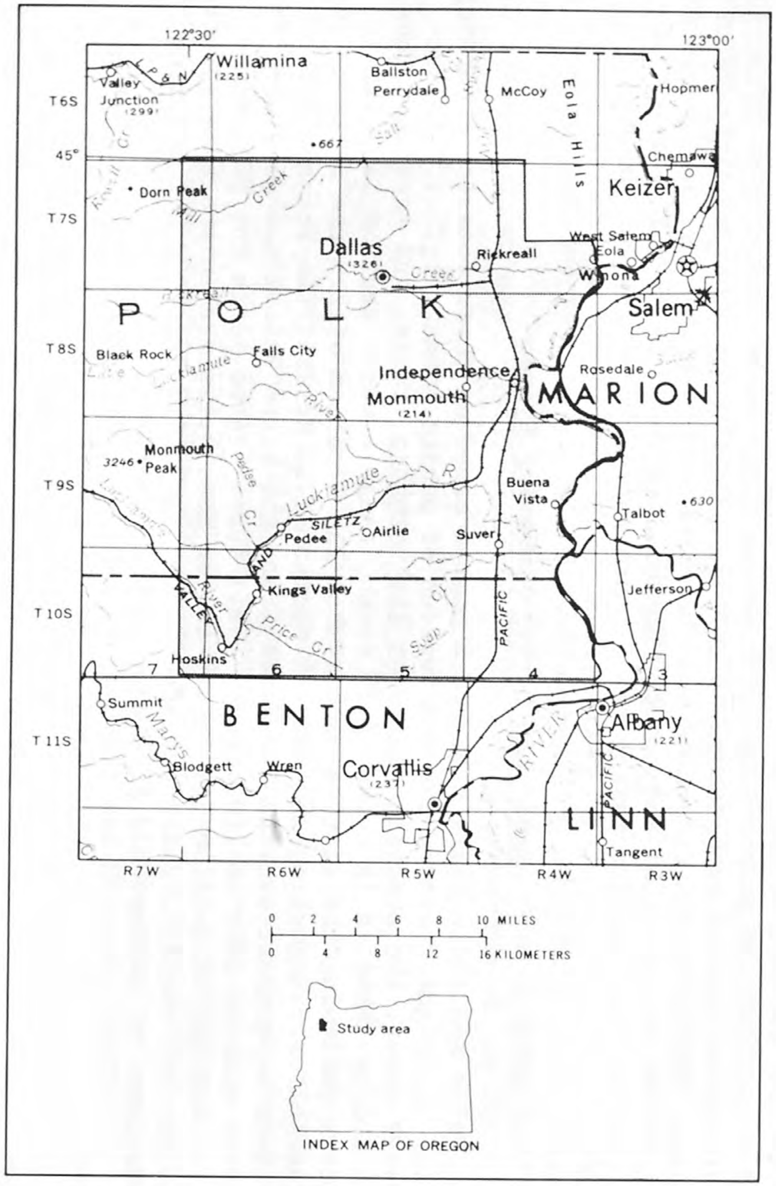

Figure 1. – Location of the Dallas-Monmouth study area.

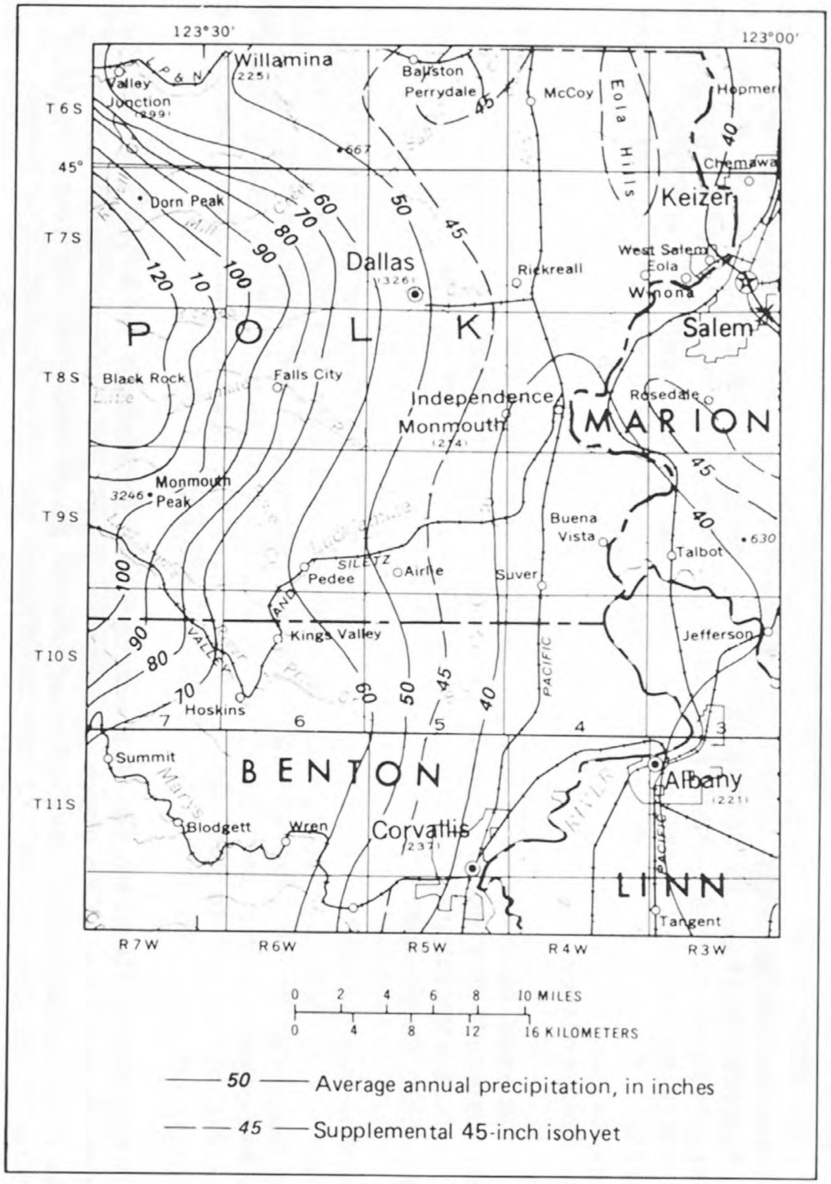

Figure 2. – Annual precipitation, Dallas-Monmouth study area.

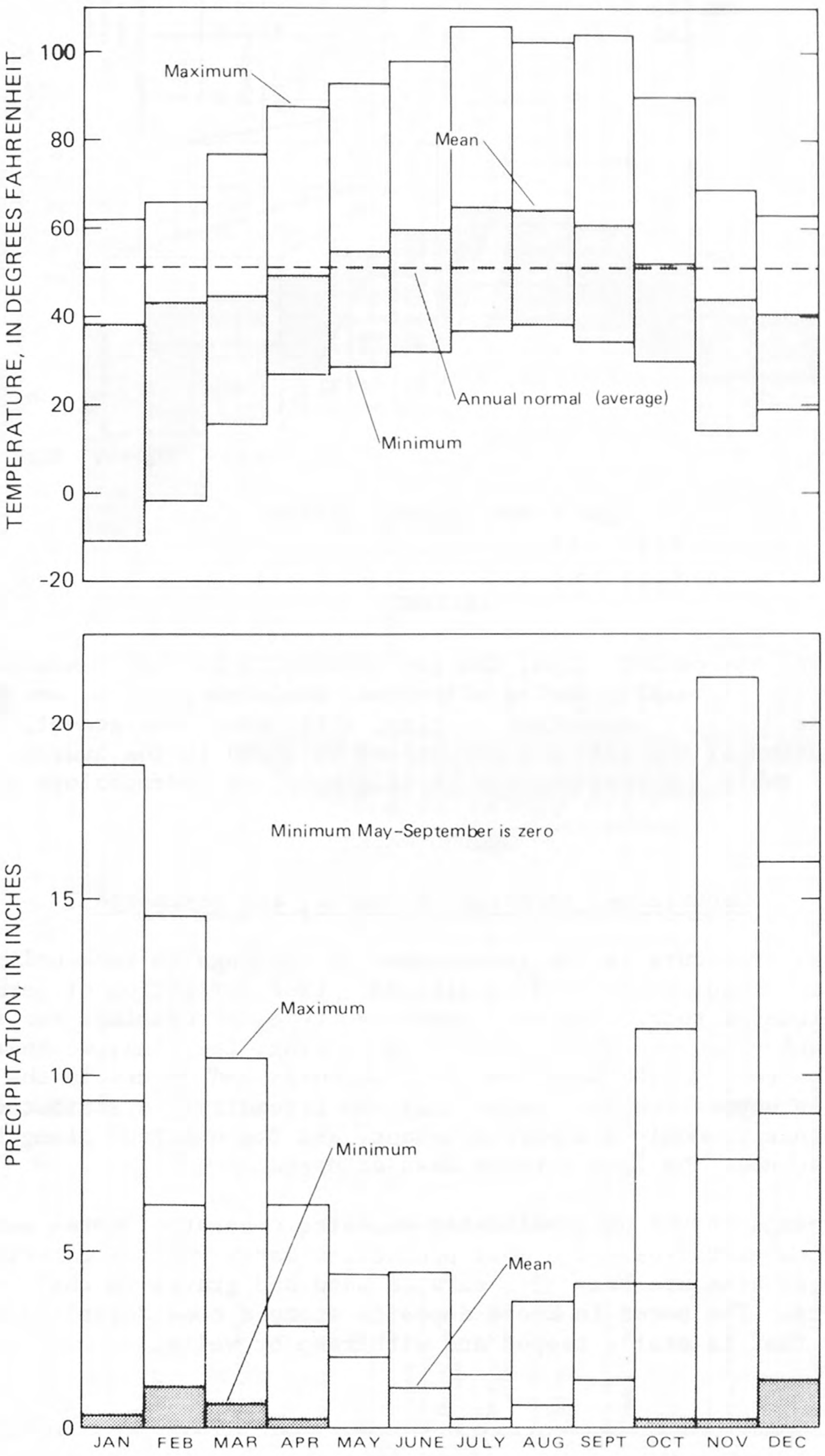

Figure 3. – Average monthly precipitation and temperature at Dallas.

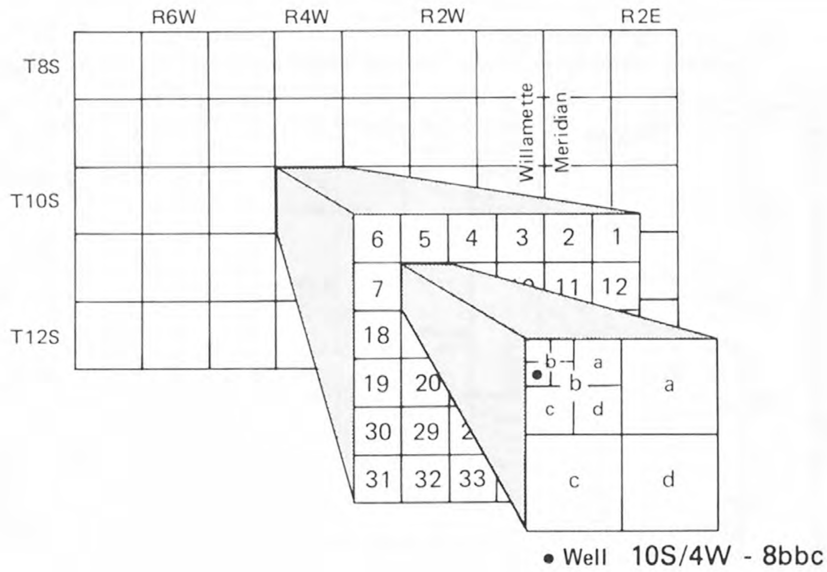

Figure 4.—Well- and spring-numbering system

GEOLOGY

In the Dallas-Monmouth area, the geologic units include consolidated rocks consisting of basalt, marine siltstone, sandstone, shale, and tuff, and unconsolidated deposits consisting of clay, silt, sand, and gravel. The surface distribution of the geologic formations is shown in the hydrogeologic map (pl. 1). Table 1 summarizes the stratigraphy and hydrogeology of the area.

GROUND WATER

Occurrence, Recharge, Movement, and Discharge

Ground water occurs in the interconnected openings in rock units under unconfined, confined, or perched conditions. (See definition of terms, p.vi In the consolidated rocks, the most important types of openings are fractures and joint openings formed as the result of folding, faulting, weathering, or cooling of the rocks. The occurrence of fractures and joints in the consolidated rocks is unpredictable because they are irregularly distributed. Fractures and joints commonly are more abundant, and the openings along them are larger in size near the land surface than at depth.

The openings in the unconsolidated deposits consist of pores between the individual rock particles. The most productive water-bearing materials in the Dallas-Monmouth area are beds of saturated sand and gravel in the unconsolidated deposits. The pores in these deposits store a considerable volume of ground water that is easily tapped and withdrawn by wells.

Table 1.--Summary of stratigraphy and hydrogeology of the Dallas-Monmouth area

System	Series	Geologic unit	Lithology	Estimated thickness range (ft)	Location and extent	Well characteristics: Mean: Depth (ft)	Well characteristics: Mean: Static water-level depth (ft)	Well characteristics: Mean: Yield (gal/min)	Well characteristics: Median: Yield (gal/min)	Well characteristics: Median: Specific capacity [(gal/min)/ft]	Aquifer hydraulic properties: Hydraulic conductivity median (ft/d)	Aquifer hydraulic properties: Coefficient of storage range	Estimated annual recharge range (in.)
Unconsolidated Quaternary rocks	Holocene and Pleistocene	Younger alluvium	Silt and very fine sand 5 to 50 feet thick overlying well-sorted sand and gravel 10 to 45 feet thick	0-55	Willamette River flood plain	45	19	100	--	40	170	0.2	8-15
		Older alluvium	Silt and clay 0 to 45 feet thick overlying poorly sorted sand and gravel interbedded with clay and silt	0-85	Underlies terraces above Willamette River flood plain and valleys of principal tributaries to the Willamette River	70	19	30	15	.59	19	.001-0.2	2-5
		Terrace deposits	Poorly sorted, deeply weathered sand and gravel, silt, clay, and cobbles	0-125	Crops out in two principal areas--near Dallas and near Adair Village								
Consolidated Tertiary rocks	Miocene	Columbia River Basalt Group	Basalt lava flows	0-150	Caps two hills in northeastern part of area	--	--	--	--	--	--	--	--
	Oligocene	Tertiary intrusive rocks	Gabbro and diorite dikes and sills	0-500	In foothills in western one-third of area	--	--	--	--	--	--	--	--
	Eocene	Tertiary rocks, undifferentiated	Tuffaceous sandstone and shale and volcanic ash	500-1,000	Exposed in northeastern part of area; may underlie unconsolidated deposits on east side of area								
		Spencer Formation	Sandy, micaceous marine siltstone	0-2,000	Crops out in east half of area and underlies younger formations in same area								
		Yamhill Formation	Thin-bedded marine sandstone and siltstone	0-3,000	Crops out in west-central and northwest foothills; slopes eastward and underlies younger formations in northeastern part of area	186	39	10	5.4	.10	.3	.00001-0.001	2-5
		Tyee Formation	Micaceous, arkosic marine sandstone and sandy siltstone	0-1,500	Crops out on west-central and southwest foothills; probably underlies younger formations in southeastern part of area								
		Siletz River Volcanics: Kings Valley Siltstone Member	Tuffaceous marine siltstone, shaly siltstone, and tuff	0-3,000	Crops out in Kings Valley in southwestern part of area								
		Siletz River Volcanics	Basalt flows, breccia, pillow lava, and tuffaceous sedimentary rocks	?-10,000	Crops out in northwestern and south-central parts of the area; may underlie entire area at great depths	192	44	13	7	.11	.2	.00001-0.001	

Ground water is recharged directly or indirectly by precipitation that falls in the surface drainage basin of the study area. Precipitation infiltrates directly into the subsurface wherever unsaturated permeable deposits are at the land surface. The water then percolates downward under the influence of gravity in the unsaturated zone until it reaches the zone of saturation and becomes ground water.

Recharge from precipitation varies widely and depends on factors such as precipitation rate and duration, soil permeability, soil moisture, surface slope, and vegetative cover. In general, the lower the permeability of the surface deposits the lower will be the rate of ground-water recharge.

All the consolidated rocks in the Dallas-Monmouth area are low-permeability formations; consequently, the recharge to these units is estimated to be small. Although reliable recharge data are not available, it is conservatively estimated that the annual ground-water recharge to the consolidated rocks ranges between 2 and 5 in. A similar range of recharge is estimated for the older alluvium because the upper several feet of that unit also consist of low-permeability silt or clay.

Recharge to the younger alluvium is estimated to range between 8 and 15 in. annually. This high recharge rate occurs because (1) the surface deposits are thin and relatively permeable, and (2) precipitation runoff collects in numerous surface depressions from which it percolates downward into underlying sand and gravel.

Recharge also occurs indirectly by movement of ground water between adjacent geologic formations. This probably occurs, for example, beneath the Willamette River flood plain, where small quantities of water move upward from the deeper consolidated sedimentary rocks into the younger alluvium.

Under certain hydrologic conditions, ground-water recharge also occurs along streams or lakes. Surface water will percolate into adjacent formations when the stream or lake levels are higher than the local ground-water level. This condition occurs naturally in most areas during sudden storms or snowmelt periods when stream stages rise more rapidly than local ground-water levels. Surface water can also be induced into the ground artificially by lowering ground-water levels in the formations adjacent to the streams or lakes. Induced infiltration of surface water is a particularly important factor in development of ground water from the younger alluvium.

Lateral movement of ground water toward a discharge area begins when recharge reaches the zone of saturation. Movement occurs if the pore spaces are interconnected and if a hydraulic gradient is present. Movement of unconfined ground water generally is from topographically high areas toward low areas, where water is discharged to surface-water bodies or to the atmosphere by evapotranspiration. In most areas, the approximate direction of ground-water flow can be estimated from topographic maps, as it generally follows the topographic slope. Unconfined ground water is present at greater depths beneath hills than in valleys. The top of the saturated zone is the water table and is indicated by water levels in wells. Water levels and other well data are included in tables of well records and drillers' logs (tables 7 and 8) at the end of this report.

Potentiometric contours for sand and gravel in the east-central part of the Dallas-Monmouth area are shown on plate 1. The sand-and-gravel aquifer in that area is the most productive in the project area. Arrows crossing some of the potentiometric contours denote the approximate direction of ground-water flow in the aquifer, toward the east into the Willamette River. The contours indicate that the gradient is much flatter for the sand-and-gravel aquifer beneath the Willamette River flood plain than it is for the sand and gravel immediately west of the flood plain. The steeper gradient suggests that the sand-and-gravel aquifer in that area is less permeable than sand and gravel beneath the flood plain.

Potentiometric contours are not shown for the remainder of the project area because water-level data are too sparse and because the formations elsewhere yield only small to moderate supplies of ground water.

Natural discharge of ground water is by seepage to surface-water bodies, by springflow, and by evapotranspiration in areas where ground water is shallow. Artificial discharge of ground water is chiefly by wells, by tile subdrains, and by water-table irrigation ponds. In dry weather, ground-water discharge sustains the flow of many perennial streams. The quantity of ground-water discharge to streams depends on several conditions, including formation permeability and thickness, the hydraulic gradient, the area of the ground-water basin, and many other factors.

Fluctuations of Water Levels

Fluctuations of ground-water levels reflect changes in the volume of ground water in storage caused by changes in the rate of ground-water recharge and discharge. Changes in the rate of recharge and discharge are due to natural causes such as drought or precipitation and to artificial causes such as pumping of ground water.

During the past several years, personnel of the Oregon Water Resources Department have made water-level measurements in 12 observation wells in the Dallas-Monmouth area. In general, the data indicate that changes in ground-water storage are seasonal and that ground-water recharge is in balance with ground-water discharge.

Annual fluctuations of ground-water levels range from 5 to 15 ft. Hydrographs for six representative observation wells (fig. 5) show the fluctuations of ground-water levels during 1962 to 1977. Water levels in the wells rose each year during the rainy winter season and declined during the summer and fall. The annual high and low water levels differ each year by only a small amount, indicating that recharge and discharge are in balance at the well sites.

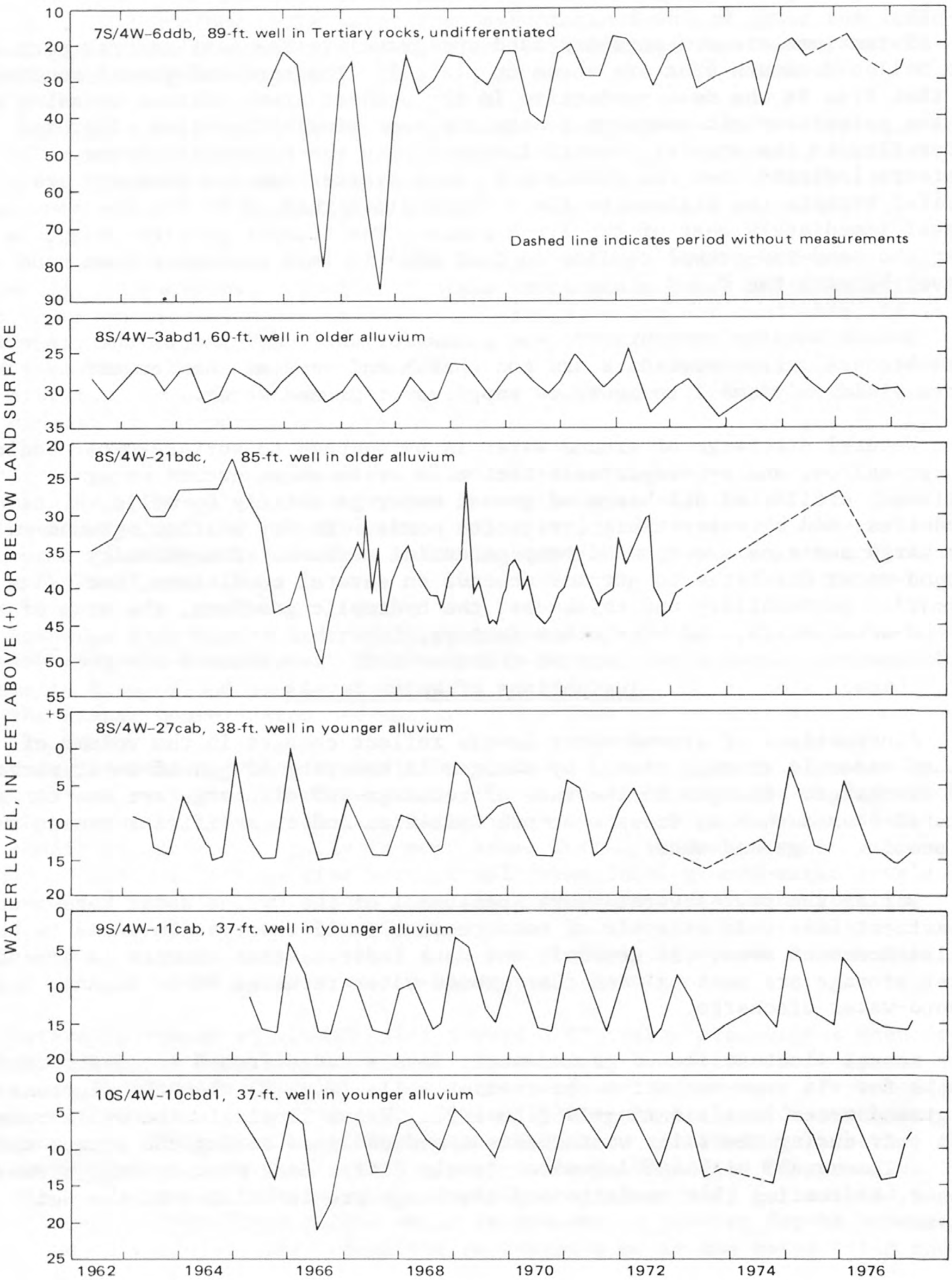

Figure 5. – Hydrographs of water levels in selected wells.

Possible changing conditions at well 8S/4W-21bdc are illustrated by the hydrograph in figure 5. This well, an 85-foot industrial-supply well tapping sand and gravel in older alluvium, had a sharp water-level decline in 1965 and lower water levels thereafter. The most probable causes for the 1965 decline are (1) an increase in pumping rate of the well beginning in 1965 and (2) a decrease in the aquifer recharge rate. To differentiate between these causes would require daily pumpage and water-level data on the well. The well is within a few feet of a log and fire-protection pond and is used to replenish water seeping or evaporating from the pond and for boiler feed water.

Availability

Consolidated Rocks

The consolidated rocks are a source of water supply for domestic use throughout the Dallas-Monmouth area. These rocks generally yield only small quantities of water to wells, however, and "dry holes" were reported for about 14 percent of the drilling attempts in the sedimentary rocks and in 6 percent of the attempts in basalt. Well yields of as much as 200 gal/min have been reported, but the probability of obtaining such a large quantity of good-quality water from any of the consolidated-rock formations is small. In addition, the risk of obtaining poor-quality water at depth in these rocks is fairly high.

Despite the small well yields, the consolidated rocks will continue to be used for water supplies because no other source is available in many areas. Yields of wells may fluctuate annually because of seasonal variations in recharge, water levels, and water use. An estimated 5 percent of the wells in the consolidated rocks in the area have required deepening to obtain dependable domestic supplies. Typical wells completed in consolidated rocks are 6 in. in diameter. They are cased and grouted with cement to a depth of at least 18 ft. Below 18 ft the well is generally uncased except where caving formations are penetrated.

About 130 of approximately 1,500 wells drilled in the Dallas-Monmouth area since 1956 have been completed in basalt of the Siletz River Volcanics. The reported yield of the basalt wells ranged from 0 to 80 gal/min (gallons per minute); the median yield was 7 gal/min. About 6 percent of the wells were reported to be dry holes; 11 percent were reported to yield 1 gal/min or less. Reported depths of the basalt wells ranged from 26 to 580 ft and averaged 192 ft. Reported depths to the static or nonpumping water levels in these wells ranged from 1 ft above the land surface to 266 ft below it and averaged 44 ft.

The average well depth and the average depth to the static water level in the area are greatest in wells completed in the basalt of the Siletz River Volcanics.

About 75 percent of the Dallas-Monmouth area is underlain by Eocene marine sedimentary rocks and by the undifferentiated Tertiary rocks, a sequence of several sedimentary formations that have similar water-bearing and water-yielding characteristics. These formations include the Kings Valley Siltstone

Member of the Siletz River Volcanics; the Tyee, Yamhill, and Spencer Formations; and the undifferentiated Tertiary rocks. About 875 wells, or 60 percent of the wells for which data are available, have been drilled in these formations, mainly for domestic water supplies. About 14 percent of these wells reportedly were dry holes. Yields ranged from 0 to 200 gal/min. The average yield was 10 gal/min and the median was 5.4 gal/min. The distribution of yields of the 875 wells is listed in table 2.

Table 2.--Yield-frequency data for the consolidated sedimentary rock wells

Reported yield (gal/min)	Percentage of wells with yield equal to or less than indicated values
0	14
1	19
2	28
3	34
4	40
5	48
6	53
7	57
8	61
9	66
10	71
11	75
20	90
50	99

Wells tapping these formations ranged in depth from 24 to 614 ft and averaged 186 ft. A 614-ft well (7S/4W-5daa) produced saline water and was backfilled to a depth of 248 ft to seal it off.

Evaluation of well and aquifer data for the consolidated rocks in the Dallas-Monmouth area indicates that the hydraulic properties of the Tertiary sedimentary formations do not differ appreciably, because the lithologies of the formations are similar. The principal occurrence of water in each formation apparently is in the interconnected fracture-and-joint openings that are distributed irregularly but are most abundant at shallow depths.

In most areas, wells capable of yielding adequate supplies of ground water for household use have been drilled in the consolidated rocks, but in many places two or more wells were drilled before an adequate supply was obtained. In most of these cases, the successful well was completed within 100 ft of the dry hole.

Unsuccessful wells in the consolidated rocks are reported more frequently on hill or hillside well sites than in lowland well sites where the consolidated rocks are commonly overlain by saturated unconsolidated deposits. At a given well site, the best water-bearing beds in the consolidated rocks will generally be the coarsest beds penetrated by the well below the water table; for example, sandstone will generally be more productive than siltstone, which, in turn, will be more productive than claystone or shale.

The performance of wells provides a general indication of aquifer transmissivity and hydraulic conductivity. In the Dallas-Monmouth area, reported specific capacities of many wells are available in the well-completion reports submitted by drillers to the Oregon Water Resources Department. Although the specific-capacity values (table 7) are based generally on 1 to 2 hours of pumping, and well efficiency is not known, the data permit some gross estimates of relative aquifer capabilities. Thus, the specific-capacity values indicate that the hydraulic conductivity of the basalt and Tertiary marine rocks is very low, similar to silt-clay mixtures. Hydraulic conductivity of the older alluvium is low to moderate; and for the younger alluvium it is moderate to good, about 10 times that of the older alluvium.

A separate evaluation was made to judge if the hydraulic conductivity of the Tertiary marine rocks differs with topography. For that evaluation, selected well data were separated into two topographic groups: (1) hillside or hilltop sites, and (2) lowland valley sites. The results indicated that the median hydraulic conductivity of the aquifer in the lowland is slightly greater than that in the hillside-hilltop areas, but the difference is too small to be of significance.

Although the hydraulic conductivity of the consolidated rocks is small compared to that of the aquifers in the younger alluvium, the large total saturated thickness of the consolidated rocks makes the total transmissivity of these units large. Therefore, at almost any locality, it should be possible to obtain a few hundred gallons per minute from wells 1,500 to 2,000 ft deep in these rocks. Such wells would probably yield poor-quality, highly mineralized water, however.

Table 3 is a summary of some well statistics for the Dallas-Monmouth area. The table shows, by township and range, data on the number of wells, well depth, and static-water-level depth.

Unconsolidated Deposits

The principal aquifers in the unconsolidated deposits are saturated sand or gravel in terrace deposits, older alluvium, and younger alluvium. Small quantities of water are obtained from finer grained materials, but they are not significant aquifers. Sand-and-gravel layers in the terrace deposits and in older alluvium generally are local in extent and less than 10 ft thick. Near Independence, however, sand-and-gravel layers in the older alluvium range from 10 to 45 ft in thickness over an area of several square miles.

Table 3.--Summary of data for wells drilled in the Dallas-Monmouth area

[F, flowing well]

Township and range	Number of drilled wells									Well depth (feet)								Static water-level depth (feet)							
	Total	Principal water-bearing units1/					Dry	Section with highest well density		Range	Mean	Mean by principal water-bearing units1/				Section with greatest mean well depth		Range	Mean	Mean by principal water-bearing units1/				Section with greatest mean water-level depth	
		Tsv	T		Qoal	Qyal																			
			Units present	No. of wells				Section number	No. of wells			Tsv2/	T	Qoal2/	Qyal	Section number	Mean depth (feet)			Tsv2/	T	Qoal2/	Qyal	Section number	Mean depth (feet)
T.7 S., R.4 W.3/	104	0	Ts,Tu	68	25	11	5	26	16	27-362	100	--	119	70	51	7	160	4-85	26	--	29	39	28	26	40
T.7 S., R.5 W.	243	14	Ty,Ts, Tu	184	44	0	16	19	23	28-554	126	160	137	69	--	19	209	0-266	32	72	33	14	--	7	92
T.7 S., R.6 W.	56	20	Ty	36	0	0	5	11, 26	11	45-402	147	163	138	--	--	36	164	5-170	36	46	30	--	--	12	58
T.8 S., R.4 W.3/	166	0	Ts,Tu	27	98	24	2	9	22	26-240	61	--	98	57	46	6	108	6-40	20	--	18	25	17	28	29
T.8 S., R.5 W.	238	2	Ty,Ts	182	32	0	26	8	16	15-411	109	--	118	68	--	11, 15	203	F-276	31	--	34	16	--	22	60
T.8 S., R.6 W.	112	29	Ty	79	2	0	9	1	9	34-575	146	179	136	--	--	1	203	F-216	44	65	36	--	--	12	62
T.9 S., R.4 W.3/	197	0	Ts	59	47	73	7	14	17	25-560	93	--	157	47	47	35	252	F-114	23	--	29	21	20	8	49
T.9 S., R.5 W.	35	0	Ty,Ts	33	2	0	4	5	12	40-580	124	--	126	--	--	2	354	0-70	22	--	21	--	--	12	26
T.9 S., R.6 W.	32	2	Tt,Ty	28	2	0	0	34	6	45-330	94	--	93	--	--	15	148	8-45	25	--	24	--	--	34	25
T.10 S., R.4 W.3/	185	19	Tt,Ts	84	54	27	6	30	36	25-500	116	240	94	76	36	25	149	F-261	22	20	31	15	17	31	44
T.10 S., R.5 W.	65	41	Tsvk, Tt	15	7	0	4	34	17	25-405	138	151	127	84	--	36	188	F-115	25	27	22	13	--	36	46
T.10 S., R.6 W.	56	3	Tsvk, Tt	52	1	0	4	30	7	26-410	150	113	152	--	--	27	247	F-65	26	24	26	--	--	22	38

1/ Water-bearing units: Tsv, chiefly wells completed in basalt in Siletz River Volcanics, but may also include a few wells completed in Tertiary intrusive rocks.
T, includes all wells completed in consolidated Tertiary sedimentary rocks; (Tsvk), Kings Valley Siltstone of Siletz River Volcanics; (Tt), Tyee Formation; (Ty), Yamhill Formation; (Gs), Spencer Formation; (Tu), Tertiary rocks, undifferentiated.
Qoal, chiefly wells completed in older alluvium, but includes a few wells completed in terrace deposits.
Qyal, includes only wells completed in younger alluvium.

2/ Mean values not determined where township had less than three wells.

3/ Includes only the sections within the study area.

Typical wells completed in unconsolidated deposits are 6 to 20 in. in diameter and cased with steel the entire depth. The casing is generally perforated opposite the most productive sand or gravel beds, which allows water in but keeps most of the formation particles out of the well. A few large-capacity wells in unconsolidated deposits are completed with wire screen instead of a perforated casing. The screen generally has more open area per unit of length, and the openings are sized to allow only the smallest particles to enter the well. A properly constructed screened well generally operates more efficiently than a perforated-casing well, but the initial cost of the screened well generally is greater.

Wells capable of pumping more than about 50 gal/min for irrigation, public, or industrial supplies range between 6 and 20 in. in diameter.

Terrace deposits and older alluvium.--Sand and gravel in the terrace deposits and in the older alluvium generally yield a few to more than 50 gal/min to properly constructed wells. Most wells in these units, however, yield less than 30 gal/min. Near Independence, many wells in the older alluvium yield more than 100 gal/min because the sand and gravel in the older alluvium is thickest and most extensive in that area.

The older alluvium apparently contains no sand and gravel in the Salt Creek and Baskett Slough drainage basins north of Rickreall Creek, in the Thielsen area south of Rickreall Creek, nor in the area beneath the E. E. Wilson Game Management Area near Adair Village. The general absence of wells and lithologic information for the valleys of the Luckiamute and Little Luckiamute Rivers upstream from the Highway 99W bridge in sec. 18, T. 9 S., R. 5 W., strongly suggests that few sand and gravel beds are present in these areas either.

Data are available for about 315 wells completed in terrace deposits and in older alluvium in the Dallas-Monmouth area. Only a few of these wells are in terrace deposits, however. The yields of these wells ranged from 0 to 1,000 gal/min and averaged 29 gal/min. Static water levels ranged from a few feet above to 55 ft below the land surface, and the average static water-level depth was 19 ft. The average well depth was 69 ft.

Younger alluvium.--Sand-and-gravel beds in the younger alluvium are the most productive aquifers in the Dallas-Monmouth area. These beds underlie the entire Willamette River flood plain and extend both upstream and downstream beyond the boundaries of the study area. The sand-and-gravel aquifer is in good hydraulic connection with the Willamette River; therefore, wells completed in the younger alluvium within several hundred feet of the river could be capable of inducing recharge from the river during pumping. Estimated recharge to the younger alluvium from direct infiltration of precipitation ranges from 8 to 15 in. annually. Occasional flooding of the flood plain ensures that the sand-and-gravel aquifer in the younger alluvium is periodically recharged. Large additional ground-water supplies can be developed from the younger alluvium; but, because of its relatively small total saturated thickness and limited extent, development of the younger alluvium should be carefully planned.

Data are available for about 160 wells completed in the younger alluvium. The reported yields of these wells ranged from 0 to 1,700 gal/min and averaged 160 gal/min. The average well depth was 45 ft. Static water levels ranged from 3 to 45 ft and averaged 19 ft. Properly constructed wells completed in sand and gravel in the younger alluvium can generally obtain 100 to 500 gal/min.

In the east-central part of the project area, near Independence, sand-and-gravel beds in younger alluvium are continuous with and hydraulically connected with sand-and-gravel beds in the adjacent older alluvium. When pumping stresses are applied, the two units respond as a single continuous aquifer. The discussion that follows concerns the availability of ground water from this source.

Map A of plate 2, compiled from drillers' logs of wells and from geologic-map data, shows contours on the bottom of the sand-and-gravel aquifer. Potentiometric-surface contours for the sand-and-gravel aquifer in the Independence area are shown on plate 1. Because the potentiometric surface of the sand-and-gravel aquifer was compiled from water-level data collected in October 1976, during a period when ground-water levels were low, the surface is one that approximates a low for the aquifer. The altitude of the potentiometric surface probably ranges from 5 to 10 ft higher each winter and spring.

Map B of plate 2 is a saturated-thickness map of the sand-and-gravel unit in the Independence area. It was compiled from the potentiometric-surface map on plate 1, the contour map of the bottom of the aquifer (map A of pl. 2), drillers' logs of wells, and the geologic map. Map B of plate 2 approximately defines the minimum saturated thickness of the sand-and-gravel aquifer. In many places, the saturated thickness will be greater in winter and spring when ground-water levels are much higher. The sand-and-gravel part of the older alluvium is overlain by 15 to 45 ft of clay and silt, whereas in the younger alluvium it is overlain by 5 to 30 ft of silt, very fine sand, and fine sand that averages less than 15 ft in thickness.

Ground water in the sand and gravel near Independence occurs chiefly under unconfined conditions, but locally beneath the older alluvium the sand and gravel may respond as a confined aquifer when pumped for periods of less than a few weeks. The entire aquifer will probably respond as an unconfined aquifer, however, when pumped for periods of more than a few weeks. A value of about 0.2 probably is suitable for use as a storage coefficient of the sand-and-gravel aquifer. More reliable estimates of the storage coefficient could be obtained from aquifer tests.

No saturated-thickness map or potentiometric-surface map has been prepared for the younger alluvium along the Willamette River south of Buena Vista, because lithologic data for that area were sparse. Irrigation wells completed in the younger alluvium in that area, however, generally are less than 37 ft deep, and they yield 75 to more than 300 gal/min.

The reported yields of wells in the sand-and-gravel aquifer in the east-central part of the project area near Independence are as high as 1,700 gal/min, but most wells yield less than 500 gal/min. The highest reported yield was obtained from well 8S/4W-2cac1, a 45-foot irrigation well in younger alluvium. The maximum yield reported for a well in the older alluvium was 1,000 gal/min from well 9S/4W-3ccc, a 97-foot irrigation well that obtains most of its yield from sand and gravel between the depths of 30 and 61 ft.

Specific-capacity values for wells completed in the sand and gravel near Independence range from near 0 to as much as 500 (gal/min)/ft of drawdown. All reported values greater than 100 (gal/min)/ft of drawdown are for wells tapping sand and gravel in the younger alluvium. The highest specific capacity is for well 8S/4W-35bdc, a 36-foot irrigation well. The specific capacity of wells in sand and gravel in the older alluvium ranges from near 0 to 25 (gal/min)/ft; however, most have specific capacities of less than 15 (gal/min)/ft.

Reduced pumping capacity due to interference will occur if wells in the sand and gravel are spaced too closely. Problems of reduced pumping capacity may become more common and more serious during extended droughts. Interference problems can be minimized through proper well spacing and well location.

Drawdown due to well interference or to reduced well efficiency has diminished the capacity of the individual wells in the city of Monmouth well field. Wells 8S/4W-28cdb, -28cdc1, -28cdc2, and -28cdc3 (pl. 1) are separated by a distance of about 200 ft. They each tap sand and gravel in the older alluvium. Use of well 8S/4W-28cdc1 has been discontinued because its capacity is significantly decreased and it is no longer economical to operate.

The quantity of ground water that can be developed from the sand and gravel near Independence without widespread decline of water levels is determined by the amount of recharge that the sand and gravel receives. The most important sources of recharge to the sand and gravel are direct infiltration of precipitation and infiltration of streamflow. Less important sources are underflow from adjacent formations and infiltration of excess irrigation water. The natural annual recharge to younger alluvium from infiltration of precipitation was conservatively estimated to range between 8 and 15 in. It probably averages about 12 in., or more than 200 Mgal/mi^2. Without extensive aquifer tests and mathematical model studies, it is not practicable to estimate the recharge that could be induced from the Willamette River. The amount probably is several times greater than the amount of recharge to the aquifer from precipitation and depends on the hydraulic connection between the river and the sand and gravel.

Water Quality

The quality of the ground water in the Dallas-Monmouth area varies widely. Water from shallow depths in the consolidated rocks generally is of good quality, but, in most localities, water in the consolidated rocks contains increasing concentrations of dissolved mineral solids with increasing depth in the rocks and commonly is too mineralized for most uses. Unconsolidated deposits generally contain water suitable for most uses, but in localized areas the water may contain high concentrations of iron or manganese or dissolved solids and may require treatment for some uses.

Water samples were collected from 45 wells in the area to determine the range and areal variation in chemical quality. Analyses were made by the U.S. Geological Survey and by a commercial laboratory. The analytical methods used by the commercial laboratory may differ from those of the U.S. Geological Survey.

A report covering the Kings Valley area (Penoyer and Niem, 1975) contains a detailed discussion of the chemistry of the ground water in that area. The chemical analyses from that study are not listed in this report.

Table 4 shows the range and median concentration of each dissolved constituent and physical property determined for water samples from the principal aquifers. These data suggest that the largest variations in concentrations of dissolved constituents occur in water from the consolidated rocks. Plate 1 has diagrams that show the relative concentrations of the major cations (positive ions) and anions (negative ions) in milliequivalents per liter. Similarity in shapes of diagrams indicates a similarity in water composition. The size of the diagram indicates the magnitude of concentration of the major ions.

During the well inventory, specific-conductance, water-temperature, and pH data were collected for many wells; these data were used to assist in selection of sampling sites for complete water analyses. Specific-conductance and water-temperature data are listed in table 7.

Table 5 shows the chemical analyses of ground water, by aquifer, from selected wells in the Dallas-Monmouth area.

Consolidated Rocks

Seven out of 28 water samples taken from wells in the consolidated rocks contained more than 1,000 mg/L of dissolved solids. All seven of these wells are in lowland sites and most are within a few hundred feet of perennial or intermittent streams. Many reports by local residents about the occurrence of ground water containing high concentrations of dissolved solids suggest that the frequency of occurrence of saline ground water at shallow depth is significantly greater in valleys near streams than in the uplands. Instances were reported to the author throughout the area where the water quality at a well site became more saline with increasing depth. Drillers also reported saline water at depth in several wells; the flow of saline water commonly was shut

Table 4.--Summary of chemical and physical characteristics of water from principal aquifers in the Dallas-Monmouth area

Statistic	Milligrams per liter																							
	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite plus nitrate, as N	Phosphate ortho, as P	Boron (B)	Arsenic (As)	Dissolved solids calculated from determined constituents	Hardness, as $CaCO_3$	Noncarbonate hardness	Sodium-adsorption-ratio (SAR)	Specific conductance (micromhos per centimeter at 25°C)	pH (units)	Temperature (°C)
Consolidated rocks																								
Minimum	3.2	0.0.	0	0	0.1	5.7	.2	3	0	0.5	2	0	0.01	0	0.01	0.000	57	4	0	0.4	78	4.9	9.5
Maximum	56	19	.8	1,200	210	3,000	11	503	68	300	5,300	.8	3.2	.4	2.8	.01	5,650	3,900	3,900	76	15,100	8.9	21
Median	14	.23	.04	17	3.1	160	1.7	115	0	5.1	120	.3	.38	.05	.7	.001	441	66	0	10	716	8.0	14
Number of values	29	30	30	30	30	30	29	30	29	27	29	30	28	28	28	29	28	30	28	28	28	30	28
Older alluvium																								
Minimum	23	0	0	6	1.9	2.8	.3	35	0	.1	2.9	0.1	0	.02	0	.000	112	26	0	.7	134	6.8	11
Maximum	46	2.13	.52	62	26	230	2.8	418	0	13	250	.4	2.7	.57	.25	.000	640	260	0	18	1,180	8.7	14
Median	37	.03	.04	21	11	17	1.5	157	0	2.3	13	.1	.63	.25	.01	.000	176	92	0	.9	273	8.1	13
Number of values	9	9	8	9	9	9	9	8	7	9	9	8	8	7	7	7	9	9	7	7	7	7	7
Younger alluvium																								
Minimum	28	.01	0	3.7	.1	6.1	.7	63	0	5	3	0	.06	.01	.002	.000	129	10	0	.3	176	6.6	12
Maximum	54	16	.67	42	16	170	1.8	251	18	130	120	.4	11	.46	.25	.007	497	150	99	24	746	8.8	17
Median	43	.21	.02	20	10	10	1.1	89	0	17	7	.1	1	.10	.01	.001	211	91	22	.5	287	7.7	13
Number of values	11	12	10	11	11	11	11	12	11	12	12	11	10	10	10	10	12	11	10	10	10	12	10

Table 5.--Chemical analyses of ground water from selected wells in the Dallas-Monmouth area

[Analyses by the U.S. Geological Survey, except as noted. Analyses are for dissolved constituents]

Sample number	Well number	Date sampled	Well depth (feet)	Water-bearing unit 1/	Milligrams per liter																		Sodium-adsorption ratio (SAR)	Specific conductance (micromhos per centimeter at 25°C)	pH (units)	Temperature (°C)
					Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite plus nitrate, as N	Phosphate ortho, as P	Boron (B)	Arsenic (As)	Dissolved solids calculated from determined constituents	Hardness, as $CaCO_3$	Noncarbonate hardness				
1	7S/4W-7acc	9-16-76	--	Ts	29	0.6	0.39	44	8.5	250	3.9	286	0	300	100	0.2	1.1	0.05	0.48	0.000	883	140	0	9.0	1,390	8.6	14.0
2	7S/4W-26ccb	do	83	Ts	56	2.2	.41	25	12	31	3.5	202	0	2.0	10	.3	.70	.22	.02	.006	246	110	0	1.3	330	8.0	14.5
3	7S/5W-2bac	do	40	Ts	3.2	.13	.03	7.0	1.4	50	1.0	133	0	.7	13	.3	.59	.02	.22	.001	145	23	0	4.5	254	8.3	14.0
4	7S/5W-6bdd	do	47	Ty	12	.16	0	18	3.5	460	2.5	422	0	10	500	.1	2.2	.07	1.90	.000	1,230	59	0	26	2,170	8.0	16.0
5	7S/5W-15acc1	do	129	Ty	16	.24	.02	19	5.0	340	3.5	274	0	1.3	400	.3	2.1	.12	1.80	.001	942	68	0	18	1,700	7.8	14.0
6	7S/5W-29cad	9-17-76	38	Ty	4.7	19	.58	1,200	210	1,500	11	3	0	--	5,200	.0	.12	.02	2.8	.000	--	3,900	3,900	11	14,800	4.9	14.0
7	7S/6W-4cdd	9-16-76	90	Tsv	11	.17	0	12	.1	26	.2	20	0	2.3	38	.1	3.2	.01	.36	.000	114	30	14	2.1	198	7.9	15.0
8	8S/4W-31dda1	10- 8-76	122	Ts	23	3	.46	60	20	500	5.4	286	0	1.6	810	.2	2.7	.02	1.10	.001	1,580	230	0	14	2,700	8.4	14.5
9	8S/5W-7bbb	9-17-76	97	Ty	22	.03	.02	51	.7	70	.7	94	0	27	120	.3	.68	.08	.46	.001	342	130	53	2.7	611	7.9	14.0
10	8S/5W-21dca	10-21-76	300	Ts	7.8	.04	0	1.9	.3	280	.8	503	68	3.0	75	.6	.75	.27	1.70	.000	691	6	0	50	1,170	8.6	13.0
11	8S/6W-16acc	do	100	Ty	23	.06	.02	4.3	1.9	5.7	1.3	24	0	4.5	3.0	.1	.28	.01	.005	.000	57	19	0	.6	78	6.5	11.0
12	8S/6W-23bcb	do	68	Tt	13	.14	.04	8.2	1.3	51	1.7	115	0	29	4.0	.1	.07	.01	.08	.000	166	26	0	4.4	270	7.1	12.0
13	8S/6W-32abc	9-17-76	112	Ty	32	.04	0	13	2.4	6.2	.6	52	0	5.1	3.4	.1	.38	.03	.009	.000	90	42	0	.4	95	7.6	12.5
14	9S/4W-21dba	10-21-76	--	Ts	53	8.10	.13	12	5.7	17	2.9	53	0	40	2.7	.2	.21	.02	.02	.000	169	53	10	1.0	195	8.0	13.5
15	9S/4W-35aa 2, 3/	6-22-72	420	Ts	20	4/1.50	4/.07	24	6	125	1.7	150	--	2.3	192	.3	--	--	--	.005	5/525	85	--	--	--	7.1	--
16	9S/4W-35bbb	4-26-73	84	Ts	--	4/.40	4/.80	17	8.5	14	--	110	0	--	--	.3	--	--	--	--	180	87	--	--	--	7.2	--
17	9S/5W-7cbd	10-20-76	--	Ty	13	.30	.01	1.4	.1	140	.5	366	9	1.4	42	.4	.48	.40	1.00	.000	393	4	0	31	713	8.9	11.5
18	9S/5W-16abc	do	535	Ts	13	.05	.01	5.4	.4	320	.7	211	16	9.2	360	.8	1.1	.06	1.40	.000	836	15	0	36	1,480	8.8	13.5
19	9S/5W-30adc	do	103	Tt	12	.40	.03	4.4	.9	160	.9	291	0	87	28	.3	.79	.05	.45	.000	441	15	0	36	728	8.6	13.0
20	9S/6W-9ccb	10-21-76	171	Tt	26	.16	.02	17	5.8	20	1.6	114	0	7.3	2.0	.1	.33	.07	.05	.000	138	66	0	1.1	211	8.2	11.0
21	9S/6W-31dba	do	81	Tt	14	.27	.14	40	2.0	120	.7	65	0	7.3	210	.4	.06	.00	1.10	.000	428	110	55	5.0	874	8.1	11.5
22	10S/4W-7cdc	9-28-76	260	Tsv	47	.26	.02	13	1.2	41	.4	116	0	3.0	22	.2	.02	.05	.08	.000	186	37	0	2.9	299	8.2	14.0
23	10S4W-16dcc	9-15-76	134	Ts	13	1.00	.50	530	37	1,500	7.3	59	0	4.4	3,400	.0	.02	.01	.42	.000	5,520	1,500	1,400	17	10,100	8.0	18.0
24	10S/4W-27bbb	11- 9-76	130	Ts	42	.04	.04	13	2.3	32	.5	110	0	14	2.2	.2	.16	.09	.04	.000	162	42	0	2.2	218	8.4	13.0
25	10S/4W-30bdd	9-15-76	100	Tsv	8.8	.01	.02	470	3.1	300	1.8	13	0	8.6	1,300	.3	.08	.00	.70	.010	2,100	1,200	1,200	3.8	4,080	7.9	15.0
26	10S/6W-1cac	do	105	Tt	13	.02	.07	270	1.8	610	2.6	43	0	8.0	1,400	.8	.03	.00	1.30	.000	2,330	680	650	10	4,580	7.9	9.5
27	10S/6W-5dad2	do	80	Tt	13	.03	.03	4.4	.3	230	.6	173	0	4.1	260	.8	.03	.07	1.20	.000	600	12	0	29	1,110	8.2	19.0
28	10S/6W-16cac	do	250	Tsv	17	.23	.12	180	13	2,000	5.3	41	0	8.2	3,400	.3	.01	.01	2.70	.000	5,650	500	470	39	10,200	7.8	21.0
29	10S/6W-30ddb	do	180	Tt	6.1	1.10	.58	320	24	3,000	5.6	88	0	--	5,300	.4	.03	.03	2.40	.000	--	900	830	44	15,100	7.8	15.0
30	10S/7W-12dcc	do	88	Tt	11	.04	.05	12	4.1	1,200	3.3	354	0	.5	1,800	.6	.86	.23	1.30	.000	3,210	47	0	76	5,660	8.2	13.0

See footnotes at end of table.

Table 5.--Chemical analyses of ground water from selected wells in the Dallas-Monmouth area--Continued

Well number	Date sampled	Well depth (feet)	Water-bearing unit 1/	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite plus nitrate, as N	Phosphate ortho, as P	Boron (B)	Arsenic (As)	Dissolved solids calculated from determined constituents	Hardness, as $CaCO_3$	Noncarbonate hardness	Sodium-adsorption-ratio (SAR)	Specific conductance (micromhos per centimeter at 25°C)	pH (units)	Temperature (°C)
				Milligrams per liter																						
Older alluvium																										
7S/4W-31bcd	11- 9-76	37	--	37	0.17	0.27	21	9.6	15	0.3	132	0	2.3	2.9	0.1	0.09	0.57	0.009	0.001	156	92	0	0.7	223	8.5	12.0
7S/4W-32aab	10-20-76	114	--	27	.02	.01	9.8	1.8	230	2.8	213	0	.1	250	.1	.63	.07	.250	.000	630	32	0	18	1,180	8.3	13.0
7S/4W-34ddc	10-12-76	65	--	46	.06	.04	18	11	16	2.8	111	0	13	5.9	.2	2.7	.57	.007	.000	118	90	0	.7	244	7.9	13.3
8S/4W-18dbd	11- 9-76	60	--	24	.03	.13	25	12	17	.9	157	0	10	7.8	.2	.22	.2	.01	.001	176	110	0	.7	273	8.1	11.0
8S/4W-19bdb	10-20-76	55	--	23	.82	.33	62	26	150	1.5	418	0	1.4	160	.1	1.9	.02	.08	.001	640	260	0	4.0	1,080	8.1	14.0
8S/4W-28c, a 3, 6/	10-13-28	45	--	34	2.13	--	11	4.5	7.6	.6	35	--	4.8	11	--	--	--	--	--	5/ 114	46	--	--	--	--	11
8S/4W-28cdb	11- 6-76	72	--	45	.03	.01	33	17	25	2.0	221	0	3.8	13	.2	.3	.41	.007	.002	251	150	0	.9	386	8.7	12.0
8S/4W-33bbb	9- 2-76	60	--	39	0	.52	34	134	38	2.8	--	--	2.0	.4	.0	--	--	--	--	5/ 268	140	--	--	--	--	--
9S/5W-12ddd	10-21-76	80	--	44	.03	0	6.0	2.6	17	.5	37	0	1.0	13	.1	2.0	.25	0	.001	112	26	0	1.5	134	6.8	13.5
Younger alluvium																										
8S/4W-2cac2	10-13-76	46	--	34	.03	.01	20	11	8.0	1.1	89	0	15	6.3	.1	4.9	.01	.007	.001	161	95	22	.4	225	8.2	17.0
8S/4W-22abd	10-21-76	--	--	38	.21	0	21	9.0	6.1	1.0	76	0	17	3.7	.0	4.6	.09	.007	.000	154	90	27	.3	207	7.3	12.0
8S/4W-28acb	10-13-76	59	--	39	2.20	.43	20	10	8.8	1.4	117	0	5.8	6.3	.1	.25	.45	.010	.005	154	91	0	.4	209	8.4	16.0
8S/4W-35bba	10- 6-76	26	--	28	.73	.21	14	7.7	10	.9	72	0	22	4.6	.1	1.1	.01	.02	.001	129	67	8	.5	176	7.9	13.0
8S/4W-36cbd	do	110	--	35	.13	.01	3.7	.1	170	1.6	251	18	130	11	.3	.58	.10	.25	.001	497	10	0	24	746	8.8	12.0
9S/4W-2dca	9-23-76	60	--	48	.07	0	25	16	8.2	.7	98	0	21	7.0	.1	11	.09	.005	.001	223	130	48	.3	292	7.7	13.0
9S/4W-4abd	9-24-76	39	--	54	6.00	.48	22	14	32	1.8	192	0	9.3	11	.4	1.8	.46	.02	.007	255	110	0	1.3	341	7.9	13.0
9S/4W-10bad1 2/	4-28-69	75	--	--	4/ 1.30	--	--	--	--	--	181	--	30	102	--	--	--	--	--	5/ 474	--	--	--	--	7.2	--
9S/4W-10bad1	9-30-76	75	--	52	.02	.01	14	8.0	9.0	1.3	82	0	5.9	4.3	.1	.66	.21	.002	.001	139	68	1	.5	191	8.3	13.5
9S/4W-10bad2 2/	10-23-74	55	--	43	.09	--	14	1.5	13	1.0	75	0	5.0	3	.4	--	--	--	--	5/ 144	41	--	--	--	6.6	--
9S/4W-14dbb	9-22-76	36	--	44	.01	.02	23	14	10	.9	90	0	24	8.7	.1	9.5	.21	.01	.000	211	120	41	.4	287	7.2	13.0
10S/4W-10cdb1	9-27-76	37	--	52	16	.67	42	11	36	1.3	63	0	6.2	120	.1	.06	.06	.03	.005	317	150	99	1.3	537	7.6	17.0

1/ Water-bearing unit: Tsv, Siletz River Volcanics; Tt, Tyee Formation; Ty, Yamhill Formation; Ts, Spencer Formation; Tu, Tertiary rocks, undifferentiated.
2/ Analysis by MEI-Charlton, Inc.
3/ Well location approximate; well data not in table 8.
4/ Total iron (Fe) or manganese (Mn).
5/ Determined by residue on evaporation.
6/ Composite sample from three interconnected public-supply wells.

off by backfilling the deepest part of the well with cement. This information suggests that the ground-water quality is strongly affected by the pattern of ground-water flow in the consolidated rocks.

An example of a flow-system water-quality change was noted in a small rural development in the valley of Soap Creek in sec. 34, T. 10 S., R. 5 W. Scattered within a few tens of acres in the valley are several wells of varying depths that supply individual homes with water for domestic and stock uses. Saline water is obtained from wells close to Soap Creek and to an unnamed perennial tributary. The owner of well 10S/5W-34acb2 drilled two other wells on his property close to Soap Creek and obtained water too salty for drinking or for lawn irrigation. The saltiest water was from a shallow dug well within about 20 ft of the stream; the second well, about 200 ft west of Soap Creek, was less salty; the third well (10S/5W-34acb2), on a line with the other wells but about 500 ft west of the creek, produced water that was suitable for household use. The land surface at the site slopes toward the stream, and the land elevation at the shallow well is about 15 ft lower than it is at the well 500 ft from the stream.

The depth of the shallow dug well is probably less than 20 ft, but the second well, 200 ft from the stream, is 63 ft deep, and the third well (10S/5W-acb2) is 86 ft deep. The second and third wells are completed in basalt in the Siletz River Volcanics. Occurrence of the saltiest water in the shallow well close to Soap Creek suggests that near the stream older, more mineralized ground water is moving upward from deeper parts of the flow system.

The highest concentration of both sodium and chloride ions is in water from well 10S/6W-30ddb, an unused 180-foot well completed in the Tyee Formation. The well is about 70 ft from the Luckiamute River. The concentration of sodium and chloride ions in the water is 3,000 and 5,300 mg/L, respectively.

Chemical diagrams on plate 1 show by their size that the wells completed in the consolidated rocks and located on hilltops or hillsides generally had water with low concentrations of major ions. In most of these wells, sodium, calcium, and bicarbonate are the principal ions.

Excessive concentrations of certain constituents in water may impair its use for some purposes. For example, water from wells in the consolidated rocks commonly has concentrations of iron, manganese, chloride, boron, dissolved solids, or hardness that exceed the limits recommended for use of the water in public or irrigation supplies. The sodium-adsorption-ratio (SAR) is also high in many water samples from these rocks. The discussion of constituents below is limited to the occurrence of those ions or properties that occur in concentrations that may impair the use of the water for some purposes.

Iron and manganese in concentrations greater than 0.3 and 0.05 mg/L, respectively, may cause an unpleasant taste or may stain laundry and plumbing fixtures (National Academy of Sciences, 1974). Concentrations exceeding these amounts are a nuisance but are not harmful to health if ingested. Eleven water samples from the consolidated rocks contained 0.3 mg/L or more of iron. The highest concentration, 19 mg/L, was in water from well 7S/5W-29cad, an unused 38-foot well completed in the Yamhill Formation. The median iron concentration was 0.23 mg/L. Manganese equaled or exceeded 0.05 mg/L in 12 analyses of water from the consolidated rocks. The highest concentration, 0.8 mg/L, was for water from well 9S/4W-35bbb.

Twelve ground-water samples from wells completed in the consolidated rocks contained concentrations of chloride greater than the maximum recommended limit of 250 mg/L (National Academy of Sciences, National Academy of Engineering, 1974). Chloride in concentrations greater than 250 mg/L is objectionable because it may impart an unpleasant taste to water. The highest concentration was 5,300 mg/L in water from well 10S/6W-30ddb.

Boron in small concentrations is essential to plant growth, but in concentrations greater than about 1.00 mg/L, boron may be toxic to sensitive plants; in concentrations exceeding about 2 mg/L, it may be toxic even to tolerant plants under certain conditions. Boron equaled or exceeded 1 mg/L in 13 samples and was greater than 2 mg/L in three water samples from consolidated rocks. The maximum concentration, 2.8 mg/L, was for water from well 7S/5W-29cad.

Hardness is a property of water that causes the formation of an insoluble curd with soap and is chiefly due to the presence of calcium and magnesium ions in solution. The U.S. Geological Survey classification of water hardness is given below (Hem, 1970, p. 225).

Hardness range (mg/L of $CaCO_3$)	Description
0-60	Soft
61-120	Moderately hard
121-180	Hard
More than 180	Very hard

Hard and very hard water may require softening for many uses. Water in the consolidated rocks ranges from soft to very hard. The water is classified as very hard in seven samples; the median concentration is 66 mg/L, which is equivalent to a moderately hard water.

Although wells in the consolidated rocks are not used as a supply source for irrigating large acreages, some gardens, lawns, and household plants are watered from this source. The diagram in figure 6 is for evaluating irrigation water (U.S. Salinity Laboratory, 1954), and on it are plotted some data from the consolidated rocks. These data indicate that some of the water may be poorly suited for irrigation because of a high sodium hazard, a high salinity hazard, or both. Several values are not shown because they plot off the high end of the diagram.

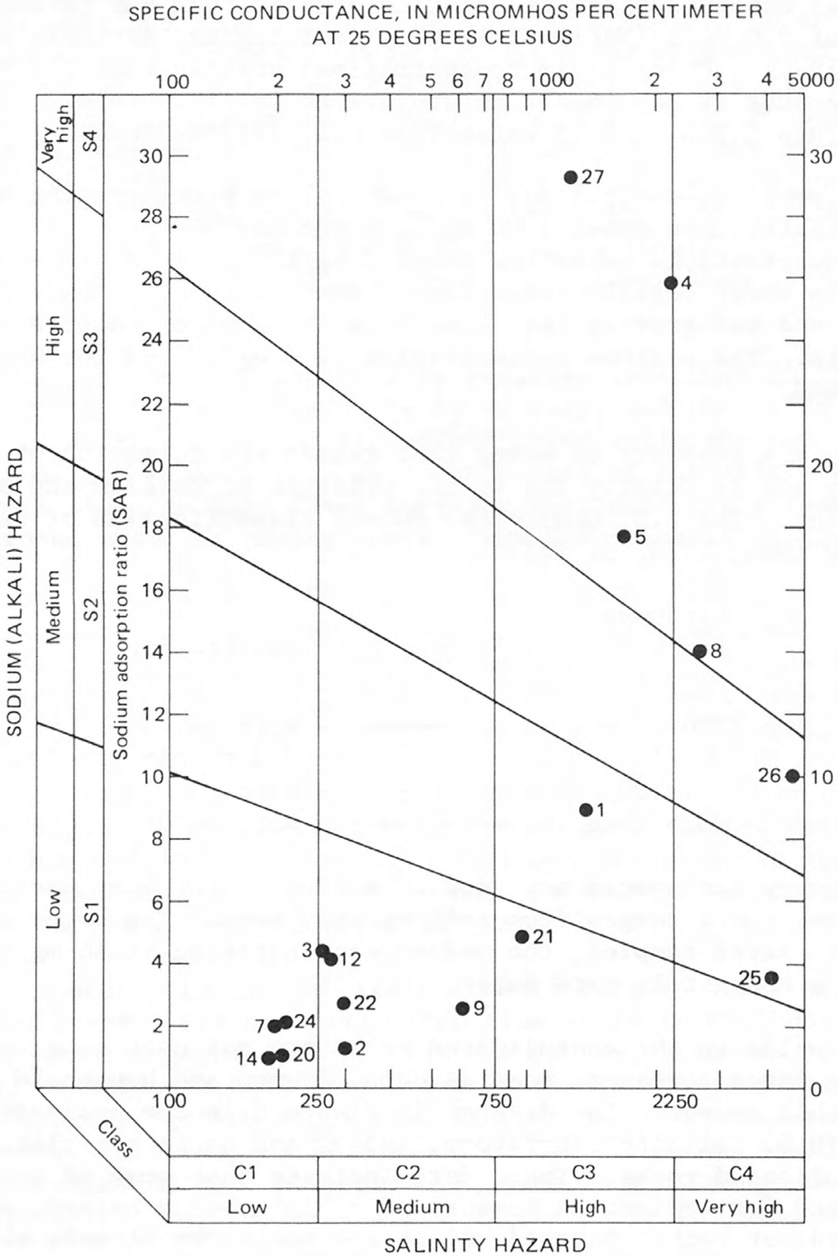

Figure 6. – Diagram for evaluating water for irrigation.

The pH or hydrogen-ion concentration in water from the consolidated rocks generally is greater than 7.0, indicating that the water is alkaline. The pH determinations made in the field ranged from 5.9 to 9.4.

Water temperatures generally were determined after several minutes of pumping. At most sites, the water passed through a storage tank before sampling. Thus, some of the high temperatures measured probably were for wells not pumped sufficiently long to completely flush the warmer stored water from the system.

Unconsolidated Deposits

Analyses of water samples from the older alluvium and the younger alluvium (table 5) show no major chemical differences. Many specific-conductance values listed in table 7 indicate, however, that water from the older alluvium may generally contain greater concentrations of dissolved solids. The water from unconsolidated deposits generally contains lower concentrations of dissolved solids than does water from the consolidated rocks. Concentrations of iron, manganese, or nitrate in localized areas may exceed recommended limits, and the water may require treatment for some uses. Some wells completed in unconsolidated deposits yield water similar to that from the consolidated rocks. The discussion below generally is restricted to the chemical characteristics and properties that exceed recommended limits and to the occurrences of water similar in composition to some of the poor-quality water from the consolidated rocks.

Iron exceeds the recommended maximum limit of 0.3 mg/L in two water samples from older alluvium and in five samples from the younger alluvium. The highest concentration, 16 mg/L, was in water from well 10S/4W-10cdb1, a 37-foot irrigation well in younger alluvium. The median concentration of iron was 0.03 mg/L in water samples from the older alluvium and 0.13 mg/L in samples from the younger alluvium.

Manganese was excessive in four water samples from the older alluvium and in four samples from the younger alluvium. The highest concentration in samples from each unit was 0.52 mg/L (well 8S/4W-33bbb) in older alluvium and 0.67 mg/L (well 10S/4W-10cdb) in younger alluvium. The median concentration of manganese was 0.04 mg/L in water samples from the older alluvium and 0.02 mg/L in samples from the younger alluvium.

Water containing more than 10 mg/L of nitrite plus nitrate reported as nitrogen may cause methemoglobinemia, a blood disorder generally confined to infants under 3 months old (U.S. Environmental Protection Agency, 1975). An irrigation well (9S/4W-2dca), completed in younger alluvium and located in a field several hundred feet from the nearest dwellings, produced water with 11 mg/L of nitrate nitrogen. Because of the distance of the well from other potential sources, the nitrate nitrogen probably is from agricultural fertilizers. Fertilizers probably are the source of the 4.9 mg/L of nitrite plus nitrate as nitrogen in water from well 8S/4W-2cac2. That concentration is the second highest determined for the entire study area. The occurrence of greater nitrate nitrogen concentrations in water from the younger alluvium suggests that because of its shallow depth and high permeability, the younger alluvium may be more susceptible to contamination or degradation of water quality than are other aquifers in the study area.

Water in the unconsolidated deposits ranges from soft to very hard. The median concentrations are 92 mg/L in water from the older alluvium and 91 mg/L in water from the younger alluvium.

Interchange of ground water between the consolidated rocks and the overlying unconsolidated deposits occurs in most areas where the two types of material are in contact. The interchange may be due to the natural flow pattern or may be induced artificially by pumping. Each of the analyses of water from wells 7S/4W-32aab and 8S/4W-19bdb in the older alluvium and from wells 8S/4W-36cbd and 9S/4W-10bad1 in the younger alluvium shows evidence of the ground-water interchange. Water from the first three wells contains a high sodium concentration, which is more characteristic of water from the consolidated rocks.

Well 9S/4W-10bad1, a public supply well, was sampled on two dates--the first time on April 28, 1969, when the well reportedly was pumping 970 gal/min, and the second time on September 30, 1976, when it was pumping 200 gal/min. Chloride was 102 mg/L in the first water sample and 4.3 mg/L in the second sample. These data suggest that at the higher pumping rate a larger percentage of water pumped was being induced upward from the underlying consolidated rocks.

Downward flow of shallow freshwater into the consolidated rocks probably took place at well 10S/7W-12dcc, an 88-foot well completed in the Tyee Formation and located about 100 ft from the Luckiamute River. Two visits were made to the site, the first on July 20, 1976, and the second on September 15, 1976, when a water sample was collected for analysis. On the July 20 visit, the well had been pumping for several weeks for lawn irrigation, whereas on the September 15 visit, the well had been unused for at least a few weeks. The specific conductance of the water was 1,500 micromhos/cm on July 20 and 5,660 micromhos/cm on September 15. The lower specific conductance on the first visit probably was due to dilution by shallow freshwater induced to flow downward by pumping. The higher value probably was determined after the natural ground-water flow pattern was reestablished at the site.

Water Withdrawals and Use

Ground-water withdrawal for all types of use in 1975 in the Dallas-Monmouth area was estimated to be 9,500 acre-ft, of which irrigation pumpage accounted for the greater part (table 6).

By 1975, water rights totaling about 45 ft^3/s for irrigation of about 4,600 acres from ground-water sources had been applied for in the Dallas-Monmouth area. All but about 150 acres was in Tps. 7, 8, 9, and 10 S., R. 4 W., and most of the acreage was in the younger alluvium in the Willamette River flood plain.

Table 6.--Estimated ground-water withdrawals by use, in the Dallas-Monmouth area

Use	Source and quantity				Combined total	
	Consolidated rocks		Unconsolidated deposits			
	Mgal/d	Acre-ft	Mgal/d	Acre-ft	Mgal/d	Acre-ft
Irrigation	--	--	6.4	7170	6.4	7170
Public supply	0	15	1.1	1230	1.1	1245
Domestic and stock	0.5	560	0.2	224	0.7	784
Industrial	--	--	0.3	336	0.3	336
Total	0.5	575	8.0	8960	8.5	9535

On the basis of field observation and discussions with irrigators, during any one year a maximum of about two-thirds of the ground-water irrigation water rights are in use. The length of the irrigation season is about 120 days, or from mid-May to mid-September on the average, depending on the type of crop, summer precipitation, and soil-moisture conditions. The maximum daily withdrawal for irrigation, on the basis of the above estimates, is about 29 Mgal/d for the 120-day irrigation period. Most of this water is withdrawn from younger alluvium.

In 1975, an average of 1.1 Mgal/d of ground water was withdrawn for public-supply purposes. Nearly all this amount was pumped from the unconsolidated deposits. The Pacific Power & Light Co. pumped an average of 0.72 Mgal/d to supply the city of Independence; the remainder was withdrawn by the city of Monmouth, Luckiamute Water Cooperative, Rickreall Water Association, and the Fir View Water District.

Two of the five wells that supply the city of Independence are in a well field in younger alluvium in the SW¼ of the NE¼ of sec. 28 in T. 8 S., R. 4 W., within 150 ft of each other, and generally are used only during the summer peak demand period. The other three wells are within 250 ft of one another in the NE¼ of the SW¼ of sec. 28. Detailed information about the construction and depth of each well is not available; consequently, the wells are not listed in table 7 nor shown on plate 1.

The city of Monmouth obtains most of its water supply from surface-water sources and from small springs in the Teal Creek area south of Falls City. The city also obtains a supplemental supply for the summertime peak demand period from wells 8S/4W-28cdb, -28cdc1, -28cdc2, and -28cdc3 in older alluvium. In 1975, the wells pumped an average of 0.11 Mgal/d. The combined yield from both sources is sometimes inadequate to meet peak demands, and water conservation is occasionally required in summer.

The Luckiamute Water Cooperative system serves a small population living in a large rural area in the Luckiamute and Little Luckiamute River drainage basins in the central part of the study area. Two wells in younger alluvium (9S/4W-10bad1 and -10bad2) supply water to a system that extends from the supply wells westward for more than 16 mi. The system has about 80 mi of pipelines, and the 1975 pumpage averaged 0.13 Mgal/d.

The Rickreall Water Association, also, is a rural water-supply system that services a small population scattered over a large area generally north of Rickreall Creek and extending west almost to Dallas and into the Salt Creek area. Two wells in older alluvium (7S/4W-34ddc and -35cbc) supply water to the system; in 1975, they pumped an average of 0.04 Mgal/d.

The Fir View Water District is in a development in the NW¼ of sec. 23, T. 10 S., R. 4 W. The source of water supply is two wells in the Spencer Formation at the development.

Many homes in the Oak Grove area in the southeastern part of the study area are served by ground water from a well field in younger alluvium just east of the study area (Frank, 1974). In 1975, about 0.26 Mgal/d was pumped by that system, but not all the water was used within the study area.

A small area in the Salt Creek basin in the northwestern part of the study area is served by the Perrydale Water Cooperative. The system is supplied by a well in alluvium near the Willamette River several miles north of West Salem outside the study area. The volume of water supplied to residents living in the study area is small.

The city of Dallas obtains its water supply from a reservoir on Rickreall Creek west of Dallas. Falls City obtains its supply from springs and from surface-water sources on Teal Creek south of Falls City. Adair Village and a few rural customers nearby are served by surface water withdrawn from the Willamette River south of the study area. Their supply was originally developed by the U.S. Army to serve troops training at Camp Adair during World War II.

Ground-water withdrawals for domestic and stock use in rural areas were estimated to be 0.7 Mgal/d. The withdrawal rate is based on an estimated rural population of 6,800 persons not served by public water supplies. Seventy-five percent, or 0.5 Mgal/d, is estimated to be from wells in consolidated rocks and the remainder, or 0.2 Mgal/d, from unconsolidated deposits.

Problems and Solutions

The major ground-water-related problems in the Dallas-Monmouth area are low well yield and poor-quality ground water. These problems commonly occur together in individual wells, and they occur most frequently in wells drilled into the consolidated rocks. The problems occur because the consolidated rocks consist chiefly of low-permeability formations that generally contain water having increasing concentrations of dissolved minerals with depth below the land surface. Commonly, several wells are drilled into the consolidated rocks before an adequate domestic freshwater supply is obtained. Unsuccessful wells generally are backfilled and abandoned. Records indicate that as many as five unsuccessful wells have been drilled on a given property. Other solutions have been to develop water supplies from nearby springs, obtain water from neighbors, collect water in cisterns, connect into existing public water supplies, or to form a new public water-supply system utilizing a distant but dependable source of supply.

Excessive pumping of sand is a significant problem associated chiefly with wells completed in sand and gravel. The sand enters the well through casing perforations and causes excessive wear of pumping equipment, clogging of pipes, and sometimes results in the destruction of the well through the collapse of the unsupported casing. The problem is caused by high turbulence around the well bore due to excessive ground-water velocities. It can be controlled by reducing the pumping rate of an affected well; it is prevented through good well design, operation, and maintenance.

Excessive declines of ground-water levels resulting from heavy pumping of wells is a potential problem in the Dallas-Monmouth area. These declines could become a significant problem in the area's most productive sand and gravel because sand and gravel will continue to supply much of the area's increasing water needs. The problem will occur if pumping wells are spaced too closely and if they extract water at rates that exceed the sand and gravel local hydraulic capacity. Future development of the sand and gravel therefore should be planned with care so as to minimize the adverse effects.

Ground-water pollution is not a major or widespread problem in the Dallas-Monmouth area, but local occurrences have been reported. Pollution of ground water will occur if facilities for the disposal of wastes or for application of other degrading substances are poorly designed, operated, and maintained for the type of soil conditions existing at a disposal site or if the potential pollutants are handled carelessly. The risk of pollution is higher in sand and gravel in the younger alluvium because of their high porosity and permeability and shallow depth. These soil characteristics may allow a potential pollutant to reach the water table and to move downgradient toward a discharge area more quickly than in other water-bearing formations in the area.

Locally, ground water from sand-and-gravel aquifers contains concentrations of iron and (or) manganese that may be excessive for some types of uses. Prediction of the occurrence of excessive concentrations of iron or manganese is not feasible with the data presently available.

SUMMARY AND CONCLUSIONS

Ground water is the principal source of water for most of the rural population of the Dallas-Monmouth area. Water-bearing formations include consolidated rocks consisting of basalt, marine siltstone, sandstone, shale, and tuff and unconsolidated deposits consisting of clay, silt, sand, and gravel. Consolidated rocks are exposed in about 70 percent of the area, and they are chiefly low-permeability formations that yield less than 10 gal/min to wells. Commonly these rocks yield quantities of water that are inadequate even for household use. Ground water in the consolidated rocks is of suitable quality for most uses in most localities; however, the water contains concentrations of dissolved minerals that increase with depth in the rocks. Locally, wells may intercept water that contains excessive concentrations of dissolved minerals and is too saline for most uses. The depth at which saline water occurs is highly variable, and determination of that depth in each locality was beyond the scope of this study.

Movement of unconfined ground water in the project area is from topographically high areas toward lowlands where the water may be discharged as springs, as seepage to surface-water bodies, or as evapotranspiration to the atmosphere. The depth to unconfined ground water generally is greater beneath hills and hillsides than beneath lowlands. The potentiometric-surface contour map for the sand and gravel in the east-central part of the Dallas-Monmouth area (pl. 1) indicates a general eastward flow of ground water toward the Willamette River. Potentiometric-surface contours were not prepared for other parts of the project area because water-level data are inadequate and because the formations elsewhere yield only small to moderate supplies of ground water.

The best water-bearing materials in the study area are beds of sand and gravel in the unconsolidated deposits. The thickest, most extensive, and most productive sand and gravel deposits are in the younger alluvium underlying the flood plain of the Willamette River. The largest yielding wells completed in sand and gravel in the younger alluvium generally yield 100-500 gal/min. In the east-central part of the Dallas-Monmouth area, sand-and-gravel beds in the younger alluvium are continuous and are hydraulically connected with sand and gravel in adjacent older alluvium. When either unit is heavily pumped, the two units respond as a single aquifer. Although large quantities of ground water are being withdrawn from this aquifer, additional large quantities can be developed if adequate well spacing is maintained. Outside the Willamette River flood plain and the east-central area, sand and gravel beds in older alluvium or in terrace deposits are too thin and too small in extent to support wells of large yield.

The quality of water in the unconsolidated deposits is adequate for most uses; however, it may contain excessive concentrations of iron or manganese in some localities.

About 9,500 acre-ft of ground water was withdrawn from all sources in the Dallas-Monmouth area in 1975. Of this total, about 7,200 acre-ft was pumped from sand and gravel in unconsolidated deposits for irrigation. Most ground water for irrigation was pumped from wells completed in younger alluvium. About 1,200 acre-ft was pumped from unconsolidated deposits for public-supply use, and the remainder, or about 1,100 acre-ft, was for domestic, stock, and industrial uses.

Principal ground-water-related problems are low well yield, poor-quality ground water, and sand pumping by wells. Low well yield and poor-quality ground water occur most frequently in wells tapping the low-permeability consolidated rocks. Because the consolidated rocks are the only source of ground water in much of the area, these problems will continue to persist as long as people are attracted to build in the area's rural setting. Sand pumping by wells is a common problem, occurring most frequently in large-capacity wells completed in the unconsolidated deposits. The sand causes excessive wear of pumping equipment, clogging of irrigation systems, and caving around pumping wells.

Potential ground-water problems include pollution and excessive water-level decline. Excessive water-level declines result from spacing pumping wells too closely for the local hydraulic conditions or simply from heavy pumping. Excessive declines could be a problem, especially in the productive sand-and-gravel deposits in younger and older alluvium where the water table is shallow and the water-bearing sand and gravel are highly permeable. Particular caution is needed in these areas in the use and disposal of potential pollutants.

SELECTED REFERENCES

Allison, I. S., 1953, Geology of the Albany quadrangle, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 37, 18 p.

Balaster, C. A., and Parsons, R. B., 1968, Geomorphology and soils, Willamette Valley, Oregon: Agricultural Experiment Station, Oregon State University (Corvallis) Special Report 265, 31 p.

Baldwin, E. M., 1964, Geology of the Dallas-Valsetz quadrangles, Oregon [revised ed.]: Oregon Department of Geology and Mineral Industries Bulletin 35, 56 p.

________1975, Revision of the Eocene stratigraphy: Oregon Paleogene symposium and selected technical papers, annual meeting--Pacific sections--AAPG, SEPM, SEG, Long Beach, Calif., April 1975, edited by D. W. Weaver, G. R. Hornaday, and A. Tipton, p. 49-64.

________1976, Geology of Oregon [revised ed.]: Dubuque, Iowa, Kendall/Hunt Publishing Co., 146 p.

Bartholomew, W. S., and DeBow, Robert, 1967, Ground-water levels, 1966: Oregon State Engineer Ground-Water Report 12, 122 p.

________1970, Ground-water levels, 1967-1968: Oregon State Engineer Ground-Water Report 15, 122 p.

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

Foxworthy, B. L., 1970, Hydrologic conditions and artificial recharge through a well in the Salem Heights area of Salem, Oregon: U.S. Geological Survey Water-Supply Paper 1594-F, 56 p.

Frank, F. J., 1974, Ground water in the Corvallis-Albany area, central Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 2032, 48 p.

Glenn, J. L., 1965, Late Quaternary sedimentation and geologic history of the north Willamette Valley, Oregon: Oregon State University (Corvallis), 231 p.

Helm, D C., and Leonard, A. R., 1977, Ground-water resources of the lower Santiam River basin: Oregon Water Resources Department Ground-Water Report 24, 75 p.

Hem, J. D., 1970, Study and interpretation of the chemical characteristics of natural water [2d ed.]: U.S. Geological Survey Water-Supply Paper 1620, 162 p.

Hubbert, M. K., 1940, The theory of ground water motion: Journal of Geology, v. 48, no. 8, pt. 1, p. 785-944.

Jacob, C. E., 1950, Flow of ground water, chap. 5 in Rouse, Hunter, Engineering hydraulics: New York, John Wiley.

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

Mundorff, M. J., 1939, Geology of the Salem quadrangle, Oregon: Oregon State College (Corvallis) unpublished master's thesis, 79 p.

National Academy of Sciences, National Academy of Engineering, 1974, Water quality criteria, 1972: Washington, D.C., U.S. Government Printing Office, 594 p.

National Oceanic and Atmospheric Administration, 1977, Climatological data, Annual summary, 1975: U.S. Department of Commerce, Environmental Data Service, v. 82, no. 13, 18 p.

Oregon Bureau of Municipal Research and Service, 1954, Water-supply sources and water use in 187 Oregon cities: Report prepared for Oregon Water Resources Commission, 31 p.

Penoyer, P. E., and Niem, A. R., 1975, Geology and ground-water resources of the Kings Valley area, central Coast Range, Oregon: Water Resources Research Institute, Oregon State University (Corvallis), WRRI-39, 92 p.

Piper, A. M., 1942, Ground-water resources of the Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 890, 194 p.

Price, Don, 1967, Ground water in the Eola-Amity Hills area, northern Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 1847, 66 p.

Sceva, J. E., 1964, Ground-water levels, 1963: Oregon State Engineer Ground-Water Report 4, 71 p.

________1965, Ground-water levels, 1964: Oregon State Engineer Ground-Water Report 5, 109 p.

Sceva, J. E., and DeBow, Robert, 1966, Ground-water levels, 1965: Oregon State Engineer Ground-Water Report 9, 111 p.

U.S. Bureau of Census, 1971, U.S. census of population: 1970, Number of inhabitants, Final report PC(1)-A39 Oregon: U.S. Department of Commerce, 33 p.

U.S. Environmental Protection Agency, 1977, National interim primary drinking water regulations: Office of Water Supply EPA-570/9-76-003, 159 p.

U.S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U.S. Department of Agriculture Handbook 60, 160 p.

Vokes, H. E., Myers, D. A., and Hoover, Linn, 1954, Geology of the west-central border area of the Willamette Valley, Oregon: U.S. Geological Survey Oil and Gas Investigations Map OM-150.

Walton, W. C., 1970, Ground water resource evaluation: New York, McGraw-Hill, 664 p.

Willamette Basin Task Force, 1969, Willamette Basin comprehensive study of water and related land resources, Appendix B, Hydrology: Pacific Northwest River Basins Commission report, 163 p.

Table 7.--Records of selected wells in the Dallas-Monmouth area

Local number: See page 3 for description of well-numbering system.

Method constructed: A, air rotary; B, bored or augered; C, cable-tool; R, reverse rotary.

Altitude of land surface: Altitude of land surface at well, determined from 1:24,000 scale topographic maps, except in Kings Valley area where only 1:62,500 scale maps are available.

Depth of well: Depth of completed well, in feet. Several wells backfilled with cement to shut off flow of saline water.

Finish: F, gravel pack with perforated casing; G, gravel pack with wire-wound screen; O, open-end casing; P, perforated or slotted casing; S, screen; T, sand point; W, stone or brick lined; X, open hole, Z, other.

Principal aquifer(s): Water-bearing formation contributing water to well; Tsv, Siletz River Volcanics; Tsvk, Siletz River Volcanics (Kings Valley Siltstone Member); Tt, Tyee Formation; Ty, Yamhill Formation, Ts, Spencer Formation; Tu, undifferentiated Tertiary rocks; Ti, Tertiary intrusives; Tcr, Columbia River Basalt Group; Qt, terrace deposits; Qoal, older alluvium; Qyal, younger alluvium.

Water level: Depths to water in feet and decimal fractions were measured; those without decimal fractions were reported by driller or owner. Plus sign before water level indicates height above land surface. F, indicates flowing well where no method of measuring water level was available.

Specific conductance: Field measurement by U.S. Geological Survey personnel, generally made on same date as water-level measurement, and reported in micromhos per centimeter at 25 degrees celsius.

Type of lift: B, bucket; C, centrifugal pump; J, jet pump; P, piston pump; R, rotary pump; S, submergible pump; T, turbine pump; U, unknown.

Discharge: Yield, in gallons per minute, during production well test.

Specific capacity: Pumping rate divided by the drawdown determined during production test of well. Values rounded. Where zero drawdown is reported, value of 1 foot of drawdown is arbitrarily assumed.

Pumping period: Reported length of production test, in hours.

Use of water: First letter is primary use, second is secondary use, and third is the tertiary use of the water from the well. C, commercial; F, fire; H, domestic; I, irrigation; N, industrial; P, public supply; R, recreation; S, stock; T, institution; U, unused.

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL		SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
											FEET BELOW DATUM	DATE						
							T. 7 S., R. 4 W.											
05BBB	COVILLE, MERTON	C	1968	248	72	8	40	X	40	Tu	43.27	07/21/76	800	S	12	0.3	1.0	H,S
05DAA	ELLIS, VERTA W	A	1967	468	248	6	37	X	37	Tu	23.93	07/22/76	45	S	1.0	0.0	1.0	H
06DDB	LEPPIN, ARTHUR J	A	1956	248	89	6	17	X	17	Tu	27.83	07/21/76	710	J	3.0	0.0	--	S
07ACC	LOWERY, JERRY	-	1973	195	--	6	--	-	--	Tu	22.56	07/21/76	1100	S	--	--	--	H
08DDB	BOATWRIGHT, MARTIN G	C	1973	202	120	6	25	X	25	Tu	21.93	07/22/76	430	S	7.0	0.1	1.0	H,S
18ABD	ARMS, R W	C	1965	215	118	6	26	X	26	Tu	50.65	07/22/76	3000	J	8.3	0.1	1.0	H
19CCD	FAST, HARRY T	A	1965	211	169	6	20	X	20	Ts	34.00	10/12/65	--	--	1.0	0.0	1.0	U
21DCC	BICE, HOLLIS	C	1969	175	78	12	32	P	47	Tu	37.77	07/22/76	1100	S	30	1.1	1.0	S
26CCB	MYERS, VIRGIL	A	1970	169	83	6	43	P	45	Tu	15.54	07/23/76	320	J	6.0	0.2	1.0	H
26DCC	KENNEDY, DAVID	C	1975	170	85	8	50	P	79	Qoal	45.00	07/31/75	--	--	45	11.3	1.0	H
26DCD	WHITEMAN, EDDIE	C	1966	150	42	10	29	P	42	Qoal	20.00	08/11/66	--	--	300	27.3	5.0	U
28DCA	SAVAGE, BEN	C	1963	170	69	6	47	X	47	Tu	10.00	02/27/63	--	--	15	0.3	1.0	H
28DDC	BEYERS, LYLE E	C	1960	171	111	6	51	X	51	Tu	17.47	07/23/76	1090	--	10	0.1	1.0	U
30CAC	FARM SUPPLY, RICKREALL	C	1966	209	50	10	18	F	35	Qoal	5.00	01/19/66	--	--	50	5.0	--	U

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONSTRUCTED	YEAR COMPLETED	ALTITUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUIFER	WATER LEVEL FEET BELOW DATUM	WATER LEVEL DATE	SPECIFIC CONDUCTANCE OF WATER	TYPE OF LIFT	DISCHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
T. 7 S., R. 4 W.--Continued																		
30DAD	POLK CTY, COOP	C	1968	194	100	6	21	P	80	Ts	6.88	07/22/76	275	S	15	0.2	1.5	N
31BAB	NORMAN, RICHARD	C	1969	210	65	8	22	F	30	Qoal	7.00	08/14/69	--	--	70	1.2	1.0	U
31BAC	SHIER, ROBERT O	C	1969	211	51	6	31	P	51	Qoal	5.58	07/23/76	260	S	15	0.9	1.0	H
31BCD	EQUIPMENT, DALLAS	C	1971	213	28	6	22	P	28	Qoal	6.70	10/06/76	230	--	40	10.0	2.0	C,I
32AAB	ROTH, GARFIELD	C	1973	200	110	8	19	X	19	Ts	69.80	07/22/76	960	S	7.0	0.1	--	S
33AAB	BEYERS, LYLE E	A	1967	172	176	6	20	P	60	Tu	11.41	07/23/76	370	S	1.7	0.0	1.0	H
33ADD	STEELE, RAYMOND E	C	1975	171	100	6	32	X	32	Ts	20.25	10/06/76	--	--	20	0.2	2.0	H
34BBD	FREEBORN, CLYDE	C	1970	171	50	6	39	F	50	Qoal	20.65	10/06/76	--	--	8.0	0.3	2.0	H
34CCC1	VANDEROFF, DAVID	C	1969	175	100	6	23	P	32	Qoal	15.00	06/23/69	1300	--	5.5	0.1	1.0	H,I
34CCC2	VANDEROFF, DAVID	C	1975	175	130	6	46	X	46	Tu	22.00	01/06/75	--	--	45	1.5	1.0	I
34CCD1	WEDEL, PAUL	C	1967	176	120	10	28	P	40	Qoal	12.05	10/05/76	--	--	11	0.1	1.0	U
34DDC	WATER ASSN, RICKREALL	C	1971	172	65	12	40	S	41	Qoal	27.00	04/27/71	285	--	125	3.8	24.0	P
35ABB	MUELLER, THOMAS	C	1973	172	61	6	60	O	60	Qoal	39.00	02/02/73	--	--	30	6.0	4.0	H
35BAC	MUELLER, MRS EDWARD E	C	1967	176	79	10	57	P	79	Qoal	45.43	10/05/76	--	--	300	18.8	1.0	I
35CBB	BROWN, WALTER H	C	1960	175	58	6	--	O	58	Qoal	40.00	09/23/60	236	--	30	8.6	1.0	H,I
35CBC	WATER ASSN, RICKREALL	C	1973	169	60	12	40	P	60	Qoal	36.40	10/12/76	320	--	110	7.3	48.0	P
35DBD	BROWN, W H	C	1966	138	40	12	19	P	40	Qyal	10.32	10/13/76	--	--	400	25.9	1.0	I
36BDD	KENNEDY, DAVID	C	1964	141	43	12	22	P	34	Qyal	18.87	10/13/76	--	--	510	36.4	2.0	I
T. 7 S., R. 5 W.																		
02BAC	BEYERLE, GEORGE	C	1957	226	40	12	14	F	20	Qoal	1.43	04/27/76	250	Z	0.1	--	12.0	U
06BDD	SEXTON, DARREL G	C	1974	217	47	6	19	X	19	Ty	19.79	04/28/76	1180	S	3.0	0.1	1.0	H
07CAB	JOHNSON, JUDY	A	1973	555	242	6	34	X	34	Tsv	15.07	05/05/76	220	S	2.5	0.0	1.0	H
08BCC	HEVNER, CLARENCE G	A	1965	275	163	6	20	X	20	Ty	11.00	05/21/65	480	S	4.0	0.0	1.0	H
08DDD	WYNIA, CLIFFORD	A	1973	480	218	6	59	X	59	Ty	86.69	05/04/76	--	--	22	0.2	1.0	U
09BCC	HOEKSTRE, HENRY	C	1960	218	36	12	16	X	17	Ty	2.49	05/04/76	130	J	3.3	--	--	H
09CCB	WYNIA, CLIFFORD	A	1975	360	118	5	60	X	114	Ty	55.75	05/04/76	--	--	30	0.5	1.0	U
10CAC2	HARRIS, VERN	A	1967	305	143	6	56	X	56	Ts	11.87	05/05/76	130	S	4.0	0.0	1.0	H
10CBD	SIMPSON, WILLIAM A	C	1960	315	55	10	12	X	12	Ts	4.47	04/28/76	130	J	3.3	--	--	U
13ACA	--	C	1955	245	100	6	37	X	45	Tu	19.78	04/29/76	810	P	5.0	--	--	S
15AAC1	SCHELLENBERG, DON A	A	1969	272	129	6	21	X	21	Ts	4.95	04/29/76	1100	--	0.2	0.0	1.0	U
15DCC	WIEBE, HARRY B	C	1965	290	65	6	27	F	38	Qt	5.93	04/29/76	90	J	8.0	0.2	1.0	H,I
16CDD	KOLSKI, JOHN	A	1973	348	176	6	29	X	29	Ty	13.45	04/30/76	--	--	16	0.1	1.0	U
16DCC	DALKE, GERALD L	A	1969	335	132	6	40	X	40	Ty	30.34	04/30/76	265	S	120	1.3	1.0	H
16DDB	SIMPSON, ROSS A	A	1974	302	240	10	20	X	20	Ty	9.92	05/04/76	330	--	200	1.2	1.0	U
17BCD	AIME, GEORGE	A	1970	680	117	6	40	X	40	Tsv	21.41	05/06/76	150	S	6.0	0.1	1.0	H,S
17CDD	SIEROSLAWSKI, ED	A	1972	720	178	6	41	X	41	Ty	94.20	05/06/76	310	S	--	--	--	H
18ABB	FRESH, LARRY	A	1972	738	202	6	85	X	85	Tsv	70.30	05/05/76	140	S	9.0	0.1	1.0	H
18ADA	MILLER, ROBERT L	A	1972	675	71	6	40	X	40	Tsv	40.32	05/05/76	205	S	50	2.2	1.0	H,I
18ADB	STULL, W T	A	1969	706	370	6	44	X	44	Tsv	2.05	05/05/76	--	S	2.0	0.0	1.0	U
19ACA	UNRUH, EDWARD	C	1971	614	250	5	110	X	250	Ty	56.76	05/06/76	580	S	3.0	0.0	1.0	H

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL FEET BELOW DATUM	WATER LEVEL DATE	SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
T. 7 S., R. 5 W.--Continued																		
19BDC	DUNMIRE, ERNEST	A	1973	622	157	6	26	X	26	Ty	26.79	05/07/76	375	S	18	0.1	1.0	H
19CCA	SEYMOUR, LYLE	A	1969	602	323	6	31	X	31	Ty	235.23	05/09/76	925	S	3.0	0.0	1.0	H
19CDB	SEYMOUR, LYLE	A	1971	603	554	6	27	X	27	Ty	--	--	300	T	14	--	--	H
20AAA	DICKERSON, PAUL	C	1971	412	100	6	80	X	80	Ty	22.24	05/06/76	330	A	32	--	1.0	H,I
20CDC	TRAINOR, WILLIAM	A	1974	430	218	6	19	X	19	Ty	110.40	05/07/76	1500	S	2.0	0.0	1.0	H
21BCD	DICKERSON, PAUL E	C	1975	322	110	6	21	X	21	Ty	27.41	04/30/76	--	--	45	1.5	1.0	U
22AAC	VOGEL, LEE	C	1969	295	50	6	35	P	44	Qt	12.00	03/13/69	75	S	5.0	0.2	1.0	H
22BDB	DUNN, ALLEN A	A	1968	305	191	6	27	X	27	Ts	27.87	05/18/76	530	S	0.5	0.0	1.0	H
25AAC	FLEMING, H B	C	1966	205	36	6	23	P	36	Ts	5.56	05/19/76	265	J	15	0.7	1.0	I
25DAD	LARSEN, RUSSELL L	C	1968	205	47	6	22	F	47	Ts	13.09	05/19/76	235	S	22	1.1	1.0	H,I
26CDC	LESTER, LARRY T	C	1974	265	120	6	113	X	113	Qt	12.59	05/19/76	205	S	10	0.5	2.0	I
27CAC	RUGGLES, CLARK	A	1973	322	78	6	33	F	41	Qt	10.88	05/19/76	170	S	20	0.3	1.0	H
29CAD	BITIKOFER, MERLE	A	1974	370	38	6	20	X	20	Ty	3.98	05/20/76	5500	--	3.0	--	--	U
31DBC	FREISEN, ALTON W	A	1971	595	191	6	40	X	40	Ty	26.08	08/11/76	265	S	2.5	0.0	1.0	H
34ACA	KROEKER, MARTIN	C	1959	270	56	6	25	F	52	Qt	4.51	05/20/76	375	J	25	1.6	1.0	H,I
34BBD	REEVES, JERRY	C	1971	295	60	6	48	P	57	Qt	6.97	05/20/76	160	J	14	0.6	1.0	H,I
35BAB	ANDERSON, WILBUR D	A	1971	260	71	6	34	F	71	Qt	12.99	05/19/76	110	J	6.0	0.1	1.0	H,I
35BBB	SHARP, T M	C	1973	276	95	6	63	X	63	Qt	7.27	05/20/76	115	S	8.0	0.1	1.0	I
T. 7 S., R. 6 W.																		
04CDD	BUREAU OF, LAND MGMT.	C	1963	510	90	6	21	X	21	Tsv	9.24	04/28/76	160	P	0.6	--	--	P
12AAD	WOODRUM, WILLIAM A	A	1970	450	272	6	55	X	55	Ty	97.30	05/11/76	240	S	19	0.2	1.0	H,I
12CCD	DHABOLT, J C	C	1970	1115	45	6	25	X	25	Tsv	4.95	05/11/76	235	S	8.3	0.3	1.0	H
13AAC	BELTZ, DAVID A	A	1970	925	402	6	50	X	50	Tsv	107.10	05/11/76	195	S	5.0	0.0	2.0	H,S
13ABD1	KING, LEROY L	A	1970	857	98	6	64	X	64	Tsv	37.15	05/11/76	260	S	45	0.9	2.0	H
13ABD2	JONES, C P	A	1974	855	160	6	80	X	80	Tsv	32.67	05/11/76	280	S	50	0.4	1.0	H,I
13CCC1	BRIGGS, HARRY E	A	1976	890	103	6	31	X	31	Ty	53.21	05/20/76	200	--	14	0.3	1.0	U
14DBC	MERRYMAN, LARRY E	A	1969	990	161	6	21	P	24	Tsv	43.00	05/13/76	180	S	1.0	0.0	1.0	H,I
14DDC	WILSON, NORMAN	C	1956	800	160	6	21	X	21	Tsv	25.69	05/12/76	180	J	2.0	0.0	--	H
24BDC	TERRY, HOWARD	A	1972	778	118	6	23	X	23	Ty	26.71	05/13/76	265	J	6.0	0.1	1.0	H
24CAC	WYSCAVER, ELDON	A	1974	758	161	6	23	X	23	Ty	8.22	05/12/76	260	S	2.0	0.0	1.0	H
24CDC	JOHNSON, F M	C	1963	681	130	6	28	P	67	Tsv	40.00	07/26/63	120	J	30	0.5	2.0	H
25ACA	HUDSON, ROBERT	C	1970	630	82	6	40	X	40	Ty	25.71	05/12/76	165	S	20	0.5	2.0	H
36CCA	HAYES, ROBERT C	A	1973	692	116	6	31	X	31	Tsv	45.48	05/14/76	--	S	7.5	0.1	1.0	H,S
36CCD	PARSONS, TOM	A	1974	680	271	6	54	X	54	Tsv	35.56	05/14/76	105	S	3.0	0.0	1.0	H
36DBD	SPENGLER, MICHAEL	A	1973	642	162	6	59	X	59	Tsv	38.00	05/14/76	50	S	8.0	0.1	1.0	H
T. 8 S., R. 4 W.																		
02BBA	SETNIKER, FRANK	C	1961	144	45	12	33	F	45	Qyal	20.10	09/29/76	--	T	640	58.2	7.0	I
02CAC1	VILLA FARM, GREEN	C	1975	150	53	12	35	P	52	Qyal	24.00	07/31/75	--	T	1700	170.0	--	I

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL		SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
											FEET BELOW DATUM	DATE						
								T. 8 S., R. 4 W.--Continued										
02CAC2	VILLA FARM, GREEN	C	1975	150	46	6	--	O	46	Qyal	24.00	09/23/75	248	--	30	30.0	--	N
02CDA	KENNEDY, DAVID	C	1959	150	41	8	26	P	41	Qyal	20.00	04/20/59	--	T	--	--	--	I
03AAC1	MULLER, THEODORE C	C	1968	164	48	8	27	P	48	Qoal	20.00	06/14/68	320	--	60	6.0	--	H
03ABD1	MULLER, T	C	1962	169	60	12	38	F	60	Qoal	26.00	04/14/62	--	T	400	14.3	6.0	I
03ABD2	MULLER, LEO	C	1975	169	51	8	42	P	51	Qoal	30.00	10/04/75	--	--	50	25.0	--	H
04ACA	KNAUPP, DAVID	C	1963	171	50	10	38	F	50	Qoal	22.00	08/02/63	480	--	18	1.4	2.0	S
04BCC	DALKE, BRUCE	C	1973	186	49	6	39	X	39	Qoal	11.00	06/25/73	--	--	12	0.3	1.0	H
04CCC	RAIBLEY, LEE	C	1966	186	51	8	35	F	51	Qoal	20.00	10/12/66	440	--	20	1.1	1.0	H
04CDD	PETERSON, LOUIS	C	1971	177	80	6	31	X	31	Qoal	12.06	09/29/76	330	S	7.0	0.1	2.0	H,I
04DAB	PETERSON, JOHN	C	1975	171	65	6	38	X	38	Qoal	24.00	09/18/75	--	--	10	0.2	2.0	H
04DAC	WATTENBERGER, DEAN	C	1969	162	65	6	37	X	37	Ts	25.64	09/30/76	610	S	30	1.0	2.0	H,I
04DBA	PETERSON, GROVE	C	1971	168	80	6	31	P	40	Qoal	18.00	08/23/71	--	--	9.0	0.1	2.0	H
06BAC	BOYER, WALTER	C	1959	222	121	6	42	X	42	Ts	12.00	10/19/59	--	--	8.0	0.1	1.0	H,I
06BBD	KESTER, W C	C	1959	224	75	12	36	X	36	Ts	15.71	10/06/76	--	--	9.2	--	--	H
06CAC1	HERRERA, KATHERINE	C	1955	222	80	6	48	X	48	Ts	18.30	10/06/76	--	--	5.0	0.1	--	H,S
06CAC2	KOPPENSTEIN, CHRIS	C	1969	222	58	8	25	P	50	Qoal	14.00	07/01/69	--	--	5.0	0.1	2.0	H
07ABA	HANSON, D M	C	1972	208	40	6	22	P	32	Qoal	5.00	07/05/72	--	--	3.0	0.6	2.0	,I,S
07CCA	OAKES, ROD	C	1973	201	77	8	63	F	76	Qoal	38.00	08/27/73	--	--	25	1.1	1.0	H
08BBC	ROGERS JR, JOE	C	1969	201	73	8	22	P	66	Qoal	12.00	09/09/69	--	--	3.0	0.1	2.0	U
09AAA1	DUNCAN, W C	C	1969	165	45	8	37	F	45	Qoal	25.34	09/30/76	320	S	35	5.8	1.0	H,I
09AAA2	BISBEE, DONALD G	C	1965	165	45	12	34	F	44	Qoal	22.00	10/22/65	--	--	70	3.7	--	H,I
09AAB1	EDMONDS, EARL	C	1973	167	43	6	42	X	42	Ts	28.00	07/31/73	--	--	30	7.5	1.0	H
09AAB2	KNAUPP, DAVID	C	1968	167	50	12	35	F	45	Qoal	30.00	05/15/68	--	--	80	3.5	3.5	I
09AAC	GEISBRECHT, EDWARD	C	1972	165	55	8	34	P	55	Qoal	19.00	07/15/72	--	--	100	3.4	1.0	I
09ACD1	HARDMAN, GLEN	C	1970	165	46	6	--	O	46	Qyal	23.25	08/13/70	320	--	22	1.1	1.0	H,I
09ACD2	EDIGER, DONALD	C	1970	165	54	6	42	X	42	Ts	23.00	08/15/70	260	--	25	1.3	1.0	H,I
09CDB	ROGERS, HUGH	C	1966	169	190	6	27	P	38	Qoal	25.00	09/26/66	--	--	4.0	0.0	1.0	S
09CDC	ROGERS, HUGH	C	1963	168	65	8	26	F	42	Qoal	24.00	03/04/63	--	--	6.7	0.2	2.0	H
09CDD	ALDERSON, WILLIAM	C	1965	167	51	8	28	G	44	Qoal	23.90	09/30/76	480	--	35	4.4	1.0	H,I
15BBB	VILLA FARM, GREEN	C	1969	148	34	12	18	P	34	Qyal	14.00	09/14/69	--	T	500	71.4	2.0	I
15BCC	VILLA FARM, GREEN	R	1973	151	41	18	21	S	21	Qyal	16.67	10/13/76	--	T	400	17.4	5.0	I
16ADC	VILLA FARM, GREEN	R	1973	155	38	18	18	G	18	Qyal	15.58	10/13/76	--	--	800	40.0	4.0	I
18ACD	ROBERTS, HERBERT	C	1972	191	32	6	24	P	31	Qoal	8.00	02/04/72	--	--	18	1.2	2.0	H
18DBA	ROBERTS, HERBERT	C	1973	188	56	6	26	P	44	Qoal	14.58	10/06/76	--	--	40	3.3	3.0	I
18DBD	LEBECK, TED	C	1957	187	60	10	23	P	33	Qoal	13.30	11/09/76	295	--	140	6.7	2.0	I,H
19BDB	REYNOLDS, LOREN A	C	1964	184	55	8	28	F	55	Qoal	15.95	10/15/76	850	S	15	0.5	1.0	H,I
20BDD	RENNINGER, EARL A	C	1974	182	33	6	27	P	33	Qoal	10.00	08/21/74	410	S	25	2.5	2.0	H
20CDD	MELANDY, PATRICK	C	1961	163	36	6	28	F	36	Qoal	10.94	10/15/76	375	S	--	--	--	R
21ACA	VILLA FARM, GREEN	-	1964	150	42	12	--	-	--	Qyal	18.65	10/07/76	285	--	--	--	--	I
21BDC	CASCADE, BOISE	C	1959	169	85	6	41	F	71	Qoal	27.00	07/03/59	--	T	--	--	--	N,F
21DBA	POWER, PACIFIC	C	1957	154	50	16	20	P	50	Qyal	18.00	07/14/57	--	--	1200	85.7	25.0	U

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL: FEET BELOW DATUM	WATER LEVEL: DATE	SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
							T. 8 S., R. 4 W.--Continued											
22AAA	SETNIKER, FRANK	C	1960	141	26	12	--	-	--	Qyal	10.81	10/07/76	225	C	350	--	--	I
22ABD	SETNIKER, FRANK	C	1960	155	--	12	--	-	--	Qyal	--	--	224	T	500	--	--	I
22BAB	SETNIKER, FRANK	C	1956	150	63	12	20	P	60	Qyal	18.43	10/07/76	--	T	--	--	--	I
22CCA	HUYCK, W D	C	1961	150	31	12	26	F	40	Qyal	17.83	10/05/76	325	--	350	16.7	2.0	I
23CDC	WILLIAMS, MACK	C	1972	198	81	6	75	X	75	Qyal	70.20	10/05/76	585	S	25	25.0	1.0	I
27CBA	BREYMAN, DAVID	C	1958	150	32	12	20	F	38	Qyal	14.59	10/07/76	225	--	550	--	--	I
27DCD	SCHINDLER, TED	C	1958	155	35	12	34	X	34	Qyal	20.76	10/06/76	275	--	--	--	--	I
28AAB	HUYCK, W. K	C	1968	150	44	12	24	P	44	Qyal	10.00	04/05/68	--	--	275	9.2	2.5	I
28ABC	CONCRETE & GRAVEL, VALLE	C	1972	152	49	10	39	P	48	Qyal	21.50	05/12/72	--	--	50	50.0	2.0	N
28ACB	LIGHT, PAC. PWR. &	-	1945	160	--	-	--	-	--	Qyal	--	--	--	--	--	--	--	P
28ADD	HUYCK, W C	C	1974	154	97	6	94	X	94	Ts	22.80	10/05/76	200	S	33	33.0	1.0	H
28CDB	MONMOUTH, CITY OF	C	1968	173	72	10	47	F	66	Qoal	37.50	03/29/68	400	T	270	12.3	--	P
28CDC1	MONMOUTH, CITY OF	C	1968	173	72	10	45	P	66	Qoal	36.00	03/18/68	--	T	165	13.8	--	P
28CDC2	MONMOUTH, CITY OF	C	1969	174	62	12	41	P	62	Qoal	39.00	09/25/69	--	--	170	14.2	4.0	P
28CDC3	MONMOUTH, CITY OF	C	1969	174	62	12	40	F	62	Qoal	38.00	10/16/69	--	T	280	20.0	9.5	P
29AAC	BISHOP, JOHN	C	1958	166	27	12	10	F	27	Qoal	16.02	10/14/76	335	S	30	--	--	F
29BDC	DUGGER, J.LYELL	C	1968	177	46	8	32	F	46	Qoal	14.29	10/14/76	320	T	20	1.1	1.0	H
29CAA	HUMPHREY, CHARLES R	C	1964	175	61	10	47	F	61	Qoal	41.60	10/14/76	350	S	40	3.3	1.0	C,H
29CCA	CURRIE, JEROME	C	1969	171	80	6	37	F	42	Qoal	15.28	10/14/76	1100	S	1.5	0.0	2.0	H
30AAD	GORNICK, P A	C	1972	181	65	6	39	F	63	Qoal	13.91	10/13/76	600	S	30	1.5	2.0	H,I
30ADA	CRABB, LLOYD	C	1969	181	80	6	42	P	47	Qoal	16.49	10/13/76	625	J	40	3.3	2.0	H,I
30DBB	PURVINE, DANE J	C	1975	187	63	6	22	F	40	Ts	12.00	10/14/75	--	--	10	0.2	2.0	U
31BAC	HENRY, ALLEN	C	1973	191	80	8	22	F	43	Qoal	16.98	10/13/76	510	S	5.0	0.1	--	H
31BDB	PESANO, JAMES F	C	1957	190	55	6	19	F	40	Qoal	19.75	10/13/76	680	S	30	5.0	--	H,S
31DDA1	MCLEAN, DANIEL	A	1966	200	122	8	92	F	122	Ts	30.32	10/08/76	2650	S	8.0	0.1	1.0	S
31DDA2	MCLEAN, DANIEL	C	1959	203	132	12	40	P	72	Ts	94.62	10/08/76	483	S	4.2	--	--	H
32CCD	GILLIAM, MAX	C	1964	193	57	6	47	P	57	Qoal	11.80	10/08/76	560	J	15	0.5	2.0	H
32DCD	LAMERS, BILL	C	1976	185	100	4	40	F	100	Ts	12.62	10/08/76	390	J	2.0	0.0	2.0	H
33BBB	MONMOUTH, CITY OF	C	1970	175	60	12	28	F	60	Qoal	35.00	10/15/70	--	--	153	9.8	--	P
33CCC	FARM SERV., CASCADE	C	1969	182	70	6	50	P	70	Qoal	34.20	10/07/76	580	S	15	0.8	1.0	N
33DBC	WEBBER, R J	C	1972	171	49	8	--	O	49	Qyal	30.60	10/07/76	455	J	40	40.0	1.0	H,I
35BBA	DINSDALE, PETER	C	1961	148	24	12	15	P	26	Qyal	11.55	10/06/76	212	C	450	450.0	1.0	I
35BDC	LONG, C E	C	1966	155	36	12	22	F	36	Qyal	19.13	10/05/76	160	C	500	500.0	6.0	I
35DAD	LAUDERBACK, GERALD	C	1960	161	28	12	18	P	28	Qyal	17.33	10/06/76	163	C	300	--	--	I
36CBD	BRADTL, JOHN	C	1966	157	110	8	20	F	33	Qyal	17.47	10/06/74	802	S	60	--	--	P,I
36CCA	BRADTL, ERNIE J	C	1965	162	40	10	22	P	32	Qyal	20.00	05/19/65	190	J	12	--	1.0	H,I
							T. 8 S., R. 5 W.											
01CCD1	WARKENTIN, HENRY	C	1970	223	55	6	51	P	55	Qoal	8.02	08/10/76	425	S	50	2.5	2.0	--
01CCD2	WARKENTIN, HENRY	C	1973	223	64	8	54	P	60	Qoal	8.46	08/10/76	--	S	50	3.3	2.0	U

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL FEET BELOW DATUM	WATER LEVEL DATE	SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
	T. 8 S., R. 5 W.--Continued																	
02DCD	CLENDENIN, CHET V	A	1970	313	216	6	80	X	80	Ts	136.65	08/10/76	540	S	9.0	0.1	2.0	H
04CAC	ALBRECHT, HAROLD	A	1970	407	131	6	20	P	40	Ts	39.57	08/13/76	520	S	12	0.1	1.0	H
05DDC	FORSBERG, NORMAN	C	1969	515	110	6	33	X	33	Ty	30.00	07/07/69	480	S	9.0	0.1	1.0	I
06CDC	DICKEY, JAMES	A	1973	515	161	6	38	P	40	Ty	36.33	08/12/76	280	S	6.0	0.0	1.0	H,I
07BBB	OLLIFF, PAUL O	A	1972	405	97	6	40	X	40	Ty	18.45	07/28/76	610	S	11	0.1	1.0	H
07BCD	HANSEN, TOM	A	1974	724	161	6	52	X	52	Ty	99.78	08/13/76	210	S	50	0.7	1.0	H
08BBC	PATZLAFF, IRVIN H	A	1967	435	99	6	40	X	40	Ty	23.76	08/13/76	--	J	2.5	0.0	1.0	U
09DCB	BRANDT, VICTOR J	C	1970	655	100	6	78	X	78	Ts	59.96	08/13/76	210	S	11	0.3	1.0	H
11ABD	CLENDENIN, CHET V	A	1973	316	311	6	40	P	60	Ts	11.23	08/10/76	--	--	4.0	0.0	1.0	U
11ACD	NALL, FRANK	A	1973	418	251	6	58	P	81	Ts	20.09	08/10/76	70	S	5.0	0.0	1.5	H
12DCC	HASSLER, EARL	C	1975	212	57	6	39	P	55	Qoal	16.19	08/10/76	400	S	20	0.5	2.0	H
13ADC	CASTLE, FLOYD J	C	1962	201	59	6	58	O	58	Qoal	15.64	08/11/76	1100	S	25	1.3	1.0	H
13ADD	GRASSER, S	C	1951	192	98	8	--	-	--	Qoal	6.32	09/28/76	--	--	40	0.5	--	I
14AAC2	HILL, WALLACE D	C	1966	262	72	8	42	P	72	Qoal	32.85	08/11/76	165	S	15	0.4	1.0	H
15ADB	SEVIER, ROBERT D	C	1965	290	175	8	57	P	99	Ts	100.28	03/12/76	780	S	3.0	0.0	1.0	H
15CCB	ELLIS, DEAN	C	1971	516	244	6	46	X	46	Ts	54.98	08/12/76	270	--	4.0	0.0	1.0	U
16ACC	GORMAN, KENNETH G	C	1974	635	85	6	33	X	33	Ts	63.66	08/12/76	340	S	30	30.0	2.0	H
18CAA	SCRUGGS	C	1971	328	40	6	20	X	20	Ty	12.58	08/13/76	400	J	50	5.0	2.0	H
21DCA	FALK, ALTON	A	1970	395	300	6	51	X	51	Ts	93.35	08/05/76	950	S	12	0.1	1.0	H
21DCB	HUXFORD, GARY	C	1974	505	185	4	120	P	185	Ts	104.70	08/05/76	470	S	4.0	0.0	--	H
22BDB	ROSS, NORMAN	C	1973	422	90	6	20	X	20	Ts	77.04	08/06/76	305	S	20	20.0	2.0	U
23BDC	ZIMMERDAHL, RONALD R	A	1969	303	82	6	70	X	70	Ts	48.04	08/06/76	350	S	45	0.7	--	H,Z
24ADB	BROWN, HARRY A	C	1964	195	85	6	47	X	47	Ts	22.06	08/06/76	500	S	35	--	--	H
26ACA	KIRSHNER, ROGER P	C	1971	254	80	6	73	P	80	Qoal	23.77	08/06/76	255	S	30	0.9	2.0	H
28BCB1	MARSTELLAR, DAVID	A	1974	410	118	6	25	X	25	Ts	52.30	08/05/76	250	S	11	0.2	1.0	H
28BCC	OGDEN, RAY	A	1974	510	118	6	40	X	40	Ts	78.80	08/05/76	--	--	30	0.9	1.0	U
29CAD	TURAN, CAROLINE	A	1971	317	149	6	19	X	19	Ty	24.23	08/04/76	520	S	1.5	0.0	1.0	H
30CDB	KELLUM, FRANK	C	1975	507	160	6	18	X	18	Ty	80.86	08/04/76	460	S	6.0	0.1	1.0	H
32BBC	WARD, HAL K	C	1970	412	70	6	28	X	28	Ty	50.62	08/04/76	245	S	6.0	0.3	1.0	H
33AAD	KEGGIN, BILL	A	1975	685	258	5	39	X	39	Ts	109.00	11/04/75	850	S	1.0	0.0	--	H
33BAB	FISCHER, JEROME C	C	1964	602	164	6	104	P	164	Ts	119.80	08/05/76	--	S	4.0	0.0	1.0	H
33BBD	ELVIN, R E	A	1966	565	163	6	23	X	23	Ts	65.56	08/04/76	305	S	15	0.2	1.0	H
	T. 8 S., R. 6 W.																	
01BCD	KENYON, R. V	A	1972	895	186	4	34	P	176	Ty	103.55	07/27/76	265	S	7.0	0.0	1.0	H
02ADD	DUESTERHOEFT, H	A	1969	890	138	8	25	P	42	Ty	25.93	07/27/76	95	S	12	0.1	--	H
02CBB	BAILEY, WAYNE	A	1974	1160	460	6	29	X	29	Tsv	231.90	07/27/76	160	S	6.0	0.0	1.0	H
11CCA	PARKER, ED	A	1973	660	251	6	40	X	40	Ty	52.05	07/28/76	370	S	15	0.2	1.0	H
12AAB	WILLIAMS, FRED F	A	1973	585	154	6	24	X	24	Ty	63.27	07/28/76	335	S	75	0.8	1.0	H,I
14BCC	MORGAN, GEORGE J	A	1967	575	489	6	40	X	40	Ty	41.31	07/28/76	260	--	2.0	0.0	1.0	U
15AAD	PROCTOR, H A	A	1973	750	191	6	40	X	40	Ty	86.65	07/28/76	255	S	23	0.2	--	H

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL FEET BELOW DATUM	WATER LEVEL DATE	SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
									T. 8 S., R. 6 W.--Continued									
16ACC	BECKLUND, W B	C	1972	575	100	6	40	X	40	Ty	45.12	08/04/76	70	S	6.5	1.6	2.0	H
17DBD	WAGNER, KARL	A	1966	575	86	6	20	X	20	Ty	15.85	08/04/76	90	--	5.0	0.1	1.0	U
20BDB1	WEBB, FRED	A	1967	680	298	6	41	X	41	Ti	56.01	08/03/76	60	S	0.5	0.0	1.0	H
20BDB2	CONNELLA, ROBERT	A	1975	665	80	6	19	X	19	Ti	31.93	08/03/76	105	S	22	0.5	1.0	H
22ABB	CAREY, CECIL	C	1975	390	60	6	20	X	20	Ty	4.00	11/17/75	280	--	4.0	0.1	2.0	H
22BDA	MILLER, JOHN	-	1951	295	79	6	50	X	50	Ty	7.76	09/28/76	--	--	100	--	--	I
23BCB	LANGFORD, VERN	C	1959	365	68	12	15	X	15	Ty	15.78	08/03/76	160	J	8.3	--	--	H
25CBB	BRIDGEPORT, CHURCH	C	1968	302	66	6	40	P	50	Ty	20.39	07/29/76	680	J	4.0	0.1	1.0	P
25DDD	NORTON, MAX B	C	1948	256	52	12	24	X	24	Ty	7.18	09/28/76	--	--	300	10.0	8.0	I
26ACD	GALLE, HENRY P	C	1964	282	70	8	20	X	20	Ty	14.62	08/03/76	900	S	1.7	--	--	U
27ADC	GAGE, GLENN E	C	1958	320	47	12	27	C	27	Ty	32.35	07/29/76	80	J	22	--	--	H
28ADC	QUALEY, JOHN A	C	1966	340	132	8	21	X	21	Ty	12.67	07/29/76	160	J	2.7	--	--	H
32ABC	CAMPFIRE, GIRLS	A	1965	670	112	6	50	F	112	Ty	76.50	07/29/76	110	S	70	0.8	--	P
34ADA	GREEN, LARRY	A	1971	590	280	6	57	X	57	Ty	131.57	07/29/76	90	S	2.5	0.0	1.0	H,S
36CCD	VEIERA, JAMES	C	1956	298	52	6	23	P	33	Ty	6.23	07/29/76	--	J	10	0.3	--	U
									T. 9 S., R. 4 W.									
01BDD	PAPKE, CARL	C	1967	163	34	12	28	F	34	Qyal	20.94	09/23/76	--	T	30	7.5	1.0	I
01CBD	HADLEY, DOUGLAS	C	1975	161	37	12	25	P	37	Qyal	14.39	09/23/76	195	T	50	50.0	--	I
01DDB	HAINER, ALVIN	C	1966	163	32	12	--	-	--	Qyal	13.16	10/01/76	200	--	--	--	--	I
02DCA	FARMS, WIGRICH	C	1974	159	60	12	39	P	50	Qyal	14.00	01/03/74	317	T	50	50.0	2.0	I
03BAD	KRAUGER, FRANK	C	1966	145	47	12	35	P	47	Qyal	11.36	09/24/76	220	--	300	75.0	4.0	U
03CCC	BOWMAN, CHARLES	C	1957	178	97	12	30	F	61	Qoal	23.25	09/30/76	--	--	1000	--	--	U
03DBD	SMITH, ARTHUR	C	1974	171	150	6	53	P	60	Qoal	20.04	09/24/76	160	S	40	10.0	2.0	H
04ABD	SHONE, GEORGE A	-	1945	160	39	-	--	-	--	Qyal	20.26	09/24/76	409	C	--	--	--	I
04BCD	NELSON, KENNETH	C	1971	188	48	12	30	P	48	Qoal	13.15	09/24/76	380	S	80	3.3	3.0	I,H
04CDA	BOWMAN, CHARLES	C	1967	197	93	8	31	P	80	Qoal	18.51	09/30/76	290	--	50	0.9	2.0	U
04CDC	BOWMAN, CHARLES	C	1967	212	80	8	30	P	80	Ts	7.00	03/05/67	--	--	10	0.2	2.0	U
05AAA	MAGILL, FULTON Y	C	1961	186	75	8	59	F	75	Qoal	26.00	10/06/61	380	J	50	50.0	--	H
07ACC	RIDENOUR, GORDON W	C	1970	272	140	6	120	X	120	Ts	26.15	09/10/76	230	S	30	1.0	2.0	H,I
07ADC	LEITH, CHARLES	C	1966	296	148	6	24	P	134	Ts	21.90	09/10/76	105	S	20	0.4	2.0	H
07BCD	COPP, JAMES	C	1966	300	59	6	45	P	59	Ts	28.35	09/10/76	150	J	14	1.4	2.0	H,I
08CCC	CHRISTIANSON, D W	-	1948	262	120	6	--	O	120	Ts	21.38	09/28/77	--	J	50	1.3	--	I
08DBC	GARNER, RAYMOND L	C	1969	273	60	6	47	P	60	Ts	17.80	09/10/76	300	S	30	1.7	2.0	H,I
09AAC	BOWMAN, CHARLES	C	1964	187	124	10	46	P	124	Qoal	20.00	04/28/64	--	T	225	4.8	3.0	U
09BBD	BOWMAN, CHARLES	C	1966	275	307	6	42	P	307	Ts	20.74	09/30/76	--	J	40	0.2	1.0	U
10BAD1	LUCKIAMUTE, WATER COOP	C	1969	168	75	10	22	F	59	Qyal	14.50	09/30/76	171	T	970	23.7	--	P
10BAD2	LUCKIAMUTE, WATER COOP	C	1974	167	55	12	35	P	46	Qyal	25.50	09/30/76	162	T	50	50.0	2.0	P
11CAB	COBINE, DONALD R	C	1964	159	37	12	24	P	35	Qyal	15.96	09/23/76	--	T	600	50.0	2.0	U
12ACD	MORLON, GERALD	C	1963	167	38	12	33	P	38	Qyal	21.59	10/01/76	--	T	550	157.1	2.5	I
13BCB	SPINAS, DON	C	1970	171	40	6	32	F	40	Qyal	23.49	09/23/76	160	S	25	6.3	1.0	H,I

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONSTRUCTED	YEAR COMPLETED	ALTITUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUIFER	WATER LEVEL: FEET BELOW DATUM	WATER LEVEL: DATE	SPECIFIC CONDUCTANCE OF WATER	TYPE OF LIFT	DISCHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
								T. 9 S., R. 4 W.--Continued										
14ACC	HULTMAN, CECIL	C	1961	169	40	12	27	P	38	Qyal	18.44	09/22/76	235	C	640	--	--	I
14DBB	HULTMAN, CECIL	C	1962	168	36	12	23	P	36	Qyal	19.95	09/22/76	230	C	700	--	--	I
15ABA	YOUNG, PAUL D	C	1975	173	64	10	42	P	59	Qyal	14.88	09/29/76	170	C	50	50.0	2.0	I
16DCD	SCHOLZE, RAYMOND	C	1964	433	107	6	57	F	99	Ts	32.60	09/29/76	60	S	10	0.1	1.0	H
18AAB	WHITNEY, BESS	C	1962	250	92	6	72	F	92	Ts	19.85	09/28/76	350	J	20	0.4	2.0	H
19CCC	HASEN, JACK E	C	1967	239	67	6	44	X	44	Ts	27.21	09/28/76	400	S	30	5.0	2.0	H
21ADC	KALSBEEK, ARTHUR	C	1970	249	126	12	65	F	116	Ts	47.22	09/29/76	255	S	27	0.3	1.0	S
21DBA	SEED CO, DESERT	A	1976	268	143	6	37	X	37	Ts	9.32	09/15/76	200	J	7.0	0.1	1.0	H
22CDD	PRATHER, LELAND	A	1969	361	191	4	91	P	191	Ts	72.01	09/29/76	90	S	5.0	0.0	1.0	H
23ABB	WELLS, PERRY A	C	1971	192	50	6	45	P	50	Qyal	36.42	09/22/76	330	S	40	40.0	2.0	H,S
23BBC	GODFREY, RAYMOND E	A	1967	235	157	6	57	F	156	Ts	10.60	09/29/76	90	S	5.0	0.0	1.0	H
27ACC	OLSEN, H G	C	1974	235	57	6	40	P	49	Qoal	26.62	09/15/76	270	S	20	2.2	2.0	H
28DBA	SEED CO, DESERT	C	1966	200	65	8	43	P	65	Qoal	30.85	09/15/76	200	J	25	0.8	1.0	H
30BBA	SNAIR, TOM	C	1968	243	104	6	46	X	46	Ts	23.12	09/28/76	195	S	35	7.0	3.0	H
30BBB	MERRILL, WESLEY	C	1966	296	175	8	34	X	34	Ts	30.00	04/23/66	345	S	33	6.6	1.0	H
31DBB	JOHNSTON, VERN	C	1967	214	51	6	20	P	42	Qoal	6.70	09/14/76	500	--	6.0	1.5	1.0	U
32DBC	WIENEZ, NORMAN	C	1968	206	43	6	39	P	43	Qoal	11.26	09/14/76	500	S	35	3.5	1.0	H,I
34DBD	REED, ROBERT	C	1966	185	100	8	76	P	100	Ts	21.02	09/14/76	500	J	8.0	0.1	0.1	H
35BBB	LEWIS, CHARLES	C	1973	218	84	6	21	P	84	Qoal	19.74	09/14/76	--	S	40	4.0	2.0	U
35CCB	MCCORMICK, ROLAND	A	1974	374	160	6	25	P	140	Ts	50.09	09/14/76	160	S	10	0.1	2.0	H,I
								T. 9 S., R. 5 W.										
02ABD	BOWMAN, CHARLES S	A	1969	370	323	6	24	X	24	Ts	10.72	09/01/76	215	--	4.0	0.0	2.0	U
05CBD	SIMS, HOMER M	C	1961	315	73	12	24	X	24	Ty	18.16	09/03/76	350	J	--	--	--	U
07CBD	KUTZER, TED C	C	1973	425	185	6	40	P	106	Ty	66.35	09/02/76	520	S	5.0	0.1	2.0	H
08CAB	RATZLAFF, VERNON	C	1963	223	78	6	20	X	20	Ty	24.23	09/02/76	830	J	4.3	--	--	H
10CBB	WILLIARD, DOW D	C	1959	321	156	6	28	X	28	Ts	62.54	09/01/76	380	S	10	0.2	1.5	H
11ABD	BORLIN, ED	C	1961	383	580	5	562	P	580	Ts	14.83	08/31/76	--	S	25	0.1	2.0	U
12AAD	THOMAS, WILLARD	C	1956	350	120	6	60	F	100	Ts	69.96	09/01/76	--	J	10	0.1	--	U
12CBC	JOHNSON, WARREN	C	1963	265	90	8	20	P	63	Ts	25.24	09/01/76	295	J	0.0	0.0	1.0	H
12DAD	MESISCA, ANTHONY	C	1966	306	100	6	20	F	82	Ts	14.00	06/08/66	95	--	20	0.4	2.0	H
12DDD	PORTER, ROBERT L	C	1966	280	80	6	19	P	80	Ts	11.66	08/31/76	130	J	8.5	0.2	1.0	S,I
16ABC	KING, JOHN J	A	1967	262	535	6	21	X	21	Ts	104.87	10/20/76	1550	--	15	0.1	2.0	S
17BCB	HIEBENTHAL, B E	C	1959	265	111	6	42	F	82	Ty	11.53	09/03/76	180	P	1.3	0.0	1.0	U
18DBB	MCGUIRE, WILLIAM S	C	1965	265	93	6	53	F	93	Ty	10.87	09/03/76	200	J	10	0.1	1.0	U
19ADC	WILLIAMS, IVAN A	C	1954	223	40	12	25	F	40	Qoal	13.44	09/03/76	210	S	--	--	--	S,H
21BDA	AVER, J W	C	1971	248	80	6	20	X	20	Ts	24.00	09/27/71	500	S	13	0.3	--	H
23DAB	HANSEN, BEN	C	1957	250	100	6	62	P	70	Ts	60.00	06/04/57	190	J	15	15.0	--	H
29ABA	BURCHAM, CLYDE A	C	1970	383	95	6	26	X	27	Ts	19.62	08/27/76	800	S	5.0	0.1	2.0	H
30ADC	PENNIE, DALE	A	1976	256	103	6	43	X	43	Tt	10.91	09/09/76	--	S	12	0.1	1.0	U
30CCA	MCKEHNIE, DONALD F	C	1969	340	61	8	31	P	61	Tt	21.78	08/27/76	265	S	35	5.8	1.0	H,I

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL FEET BELOW DATUM	WATER LEVEL DATE	SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
								T. 9 S., R. 5 W.--Continued										
30CCD	NIEMIEC, TED	C	1975	382	70	6	33	X	33	Tt	38.92	08/27/76	335	S	6.0	0.1	2.0	H
31CDA	MATEJOVSKY, JAMES	C	1963	305	60	6	36	F	48	Tt	26.00	08/15/63	450	S	16	0.6	1.0	I
31DCB	JONES, ALVIN	C	1963	390	125	6	34	F	73	Tt	30.00	07/15/63	--	--	3.3	0.0	1.0	H,I
32BAC	TARTER, RAYMOND	C	1959	250	100	6	26	F	40	Tt	16.25	08/27/76	450	S	6.7	0.2	0.5	H,I
32BDA	JONES, JAMES E	C	1962	310	66	6	53	F	65	Tt	21.00	10/09/62	--	J	10	0.3	2.0	U
32DDD	HAMILTON, LOUIS	C	1959	310	40	6	12	F	40	Tt	9.00	07/20/59	330	S	10	0.6	1.0	,S,I
								T. 9 S., R. 6 W.										
09CCB	TYLER, JOHN	C	1972	1060	171	6	36	X	36	Ty	32.80	08/23/73	205	J	2.5	0.0	--	H
10DCC	GABRIEL, E. B	C	1961	370	74	-	--	F	--	Qoal	15.09	08/24/76	520	J	8.0	--	--	H
15ACB	MCBETH, A. DARREL	A	1976	485	145	5	--	O	145	Ty	38.18	08/23/76	700	S	15	0.2	2.0	H
15CCD	ROSS, CHARLES R	A	1971	436	149	6	62	X	62	Tt	33.91	08/24/76	460	J	3.5	0.0	1.0	H
16BCAS	JAHN, ROBERT	-	--	780	--	-	--	-	--	Tt	--	--	80	--	4.0	--	--	H
21DAD	BROWN, ARCHIE M	C	1963	295	60	6	25	F	49	Tt	11.68	08/24/76	240	J	20	0.8	2.0	H
22ABA	BLACK, DELMAR M	A	1972	418	100	6	60	X	60	Tt	45.61	08/25/73	320	S	9.0	0.1	1.0	H
22CBC	HILL, DALE	C	1963	283	55	6	36	F	55	Tt	7.39	08/24/76	40	J	20	1.0	2.0	H
24CBD	BROSTROM, DONALD E	C	1960	250	70	6	39	F	45	Ty	12.90	08/27/76	--	--	20	0.5	1.0	U
27BDD	MADDUX, PAUL	C	1956	322	100	6	50	F	70	Tt	41.21	08/27/76	700	--	10	0.1	--	H
29ADC	TABER, LOYD	C	1971	355	73	6	32	P	38	Qoal	29.35	08/25/76	800	C	3.0	0.1	1.0	H
31DAA	DYER, RALPH	C	1961	350	75	6	20	X	20	Tt	18.20	03/26/76	250	--	5.0	0.1	2.0	U
31DBA	WORKS, DONALD L	C	1973	360	85	6	18	X	18	Tt	10.69	09/02/76	630	S	3.0	0.0	--	H
32AAA	FINO, ANTHONY T	A	1972	338	330	6	42	X	42	Tt	21.98	08/25/76	2300	S	5.5	0.0	1.0	H,S
32DAA	SKIDMORE, HAROLD E	C	1964	305	47	8	32	F	46	Tt	20.00	03/25/64	200	--	15	1.3	1.0	H
33BCC	COLBY, MASON S	C	1969	320	70	6	19	X	19	Tt	54.44	08/26/76	850	S	10	0.4	1.0	H,S
34BBA	MCCORMACK, CLINTON R	C	1965	250	50	6	25	X	25	Tt	19.57	08/27/76	370	J	30	5.0	1.0	H
34BBB	LINVILLE, WILLIAM W	C	1963	285	102	8	20	X	20	Tt	28.30	08/26/76	480	J	1.7	--	--	H
								T. 9 S., R. 7 W.										
36DDA	GALLASPY, MELVIN	A	1971	370	75	6	20	X	20	Tt	5.53	09/02/76	180	S	10	0.2	2.0	H

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL FEET BELOW DATUM	WATER LEVEL DATE	SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
							T. 10 S., R. 4 W.											
04ABC	OLSEN, H G	C	1963	205	58	8	47	P	58	Qoal	14.00	08/20/63	490	S	88	--	--	H,I
04BAD1	OLSEN, H G	A	1975	204	130	6	24	F	103	Qoal	16.00	07/24/75	--	--	100	1.3	2.0	U
04BAD2	OLSEN, H G	C	1975	204	90	6	36	X	36	Qoal	11.40	09/29/76	--	--	25	1.3	2.0	U
04DCB	DANNEN, GEORGE B	C	1968	201	50	6	32	F	50	Qoal	9.00	10/31/68	320	C	15	0.5	1.0	H
06ABB1	FLECKINGER, JOSEPH	C	1966	210	60	10	37	F	47	Qoal	26.00	09/03/66	725	--	12	0.4	1.0	I,H
06DBC	GRAHAM, BEN	C	1965	220	48	6	36	P	48	Qoal	16.00	11/19/65	230	--	5.0	0.3	1.0	H,I
07CAC1	SCHAFFNER, ALEXANDER	A	1974	220	89	6	29	X	29	Qoal	15.87	09/16/76	230	S	5.0	0.1	1.0	H,S
07CDC	JOHNSTON, VERNON	A	1975	235	260	6	29	X	29	Tsv	13.97	09/28/76	265	--	50	0.3	1.0	H,I
07DCC	DAVIS, WAYNE E	A	1975	235	290	6	60	X	60	Tsv	13.40	09/28/76	265	S	7.0	0.1	1.0	H
09ABC	LEPPIN, W.	C	1974	203	50	6	43	P	50	Qoal	28.00	11/04/74	1180	S	30	1.5	1.0	H,I
09ACC	LEPPIN, WALTER	C	1974	186	31	6	25	P	31	Qoal	7.00	11/05/74	--	--	7.0	0.3	1.0	U
10CDB1	UNDERWOOD, RUSSEL	C	1962	185	37	10	31	F	37	Qyal	15.00	09/11/62	--	--	500	35.7	2.0	I
10DBC	LYON, J D	C	1958	185	32	6	27	P	32	Qyal	14.00	11/13/58	315	S	20	2.0	--	H,I
15ADC	HILL, LELAND	C	1967	183	31	10	23	F	31	Qyal	10.00	02/21/67	--	--	300	300.0	3.0	I
15BAD	WEESE, ILA	C	1966	188	34	10	25	F	34	Qyal	10.80	09/28/76	--	--	45	45.0	1.0	U
15BCD	UNDERWOOD, RUSSELL D	C	1967	183	40	10	25	F	34	Qyal	20.00	12/19/67	--	T	30	15.0	1.0	U
15DBA	HILL, IVAL	C	1966	184	29	10	20	F	29	Qyal	18.00	09/20/66	--	--	75	9.4	1.0	I
15DCD	UNDERWOOD, RUSSEL D	C	1968	185	40	10	28	F	40	Qyal	13.00	07/30/68	--	T	40	40.0	1.0	I
16AAD	UNDERWOOD, RUSSEL	C	1975	208	55	8	39	P	50	Qoal	26.92	09/02/76	280	S	66	3.5	1.0	H,I
16BBC	BAY SEAFOOD, WINCHESTER	A	1968	210	320	6	214	X	214	Ts	--	08/08/68	--	--	0.0	--	--	U
16DCC	WEATHERS, LEONARD	C	1970	222	134	6	72	P	81	Ts	19.00	08/08/70	8500	S	30	0.4	1.5	S
17CBB	WILD COMM, OR.FISH &	C	1950	223	235	6	235	X	235	Ts	+0.50	09/28/76	3500	--	0.1	--	--	U
19ABD1	ROSS, RICK	C	1963	288	72	6	44	P	49	Tsv	10.00	09/28/63	50	--	17	0.3	1.0	H
19ACA	PUTNAM, JERE	C	1961	340	76	6	41	P	79	Tsv	18.50	76	100	--	8.0	0.4	2.0	H,I
19BBB	HELM, FRANK	A	1971	308	400	6	41	X	41	Tsv	43.00	09/18/71	180	S	5.0	0.0	1.0	H
19DDC2	WHITE, ROBERT	C	1968	285	105	6	50	X	50	Tsv	--	09/02/76	--	--	20	--	2.0	H,I
21CDD	VOIT	C	1974	295	121	6	20	P	109	Ts	8.50	07/25/75	--	S	10	0.3	2.0	H
21DBA	FREESE, EUGENE	A	1974	275	163	6	134	X	134	Ts	21.00	11/20/74	--	S	13	0.1	1.0	H,I
22DAD	SNYDER, GEORGE	C	1955	355	158	6	88	X	88	Ts	30.00	09/21/55	240	--	10	0.1	--	H,I
23BBA	DUNAGAN, VERNON	C	1966	225	210	6	127	P	138	Ts	29.00	09/07/66	260	S	20	0.2	1.0	H,I
23BCA	HOMES, FIRVIEW	C	1971	263	384	8	85	P	384	Ts	--	--	--	S	50	1.3	2.0	P
23CAA	GURNER, WILLIAM	C	1973	328	70	6	42	X	42	Ts	18.00	10/01/73	130	S	11	0.3	1.0	H,I
24CAD	CRENSHAW, ROBERT	C	1971	197	38	6	--	O	38	Qyal	26.00	04/19/71	150	S	35	2.9	1.0	,I,S
24DCC	ALLEN, NEIL G	C	1959	200	52	8	27	P	37	Ts	18.00	10/19/59	280	--	7.0	0.3	--	H
25BAD	AFFOLTER, WILLIAM	A	1974	415	223	6	80	X	80	Ts	145.00	10/21/74	--	--	50	1.0	2.0	H
25DBC	HARDING, RICHARD	C	1960	295	213	6	65	X	65	Ts	80.00	05/09/60	280	S	6.0	--	--	H,I

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL		SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
											FEET BELOW DATUM	DATE						
								T. 10 S., R. 4 W.--Continued										
26ACD	KENAGY, EARL D	C	1956	495	95	6	0	P	50	Ts	45.00	09/25/56	--	--	3.0	0.0	--	H
27BBB	WEBBER, ROBERT K	C	1973	410	130	6	18	X	18	Ts	85.00	02/16/73	190	--	40	1.1	2.0	H
27CDA	LEMONS, EUGENE	C	1973	315	115	8	52	X	52	Ts	15.00	04/25/73	235	S	75	0.8	1.5	H,I
27DCB	BRENNEMAM, HARLEY	C	1974	347	200	6	31	X	31	Ts	26.00	02/07/74	140	S	8.0	0.0	1.0	H,I
28DBD	WILCOX, P L	C	1963	263	65	8	28	P	37	Ts	9.00	05/18/63	1100	--	5.0	0.1	1.0	H,I
30ABA	SHINE, ROBERT J	A	1974	322	100	6	21	X	21	Tsv	20.00	10/25/74	800	S	100	1.3	2.0	H,I
30BAA	KENDRICK, L	C	1965	392	75	6	25	X	25	Tsv	14.00	03/29/65	140	C	7.5	0.1	1.0	,I,S
30BBA	JANUARY, MARTIN	A	1972	360	95	6	75	X	75	Qt	15.00	06/28/72	210	--	15	0.2	1.0	,I,S
30BDD	PLEMMONS, MELVIN	C	1974	342	100	6	65	X	65	Tsv	+9.24	05/08/74	3400	S	7.0	0.1	2.0	H
30CDD	HILDENBRAND, JERRY	A	1974	360	460	6	87	X	87	Tsv	3.00	09/28/74	1300	S	15	0.0	1.0	H,I
30DAC	WILD. COMM, OR. FISH &	C	1956	325	97	5	51	P	97	Qt	20.00	06/22/56	--	--	30	0.8	--	U
30DBC	WILD. COMM, OR FISH &	C	1956	319	130	6	102	X	102	Qt	--	--	--	--	10	--	--	U
31ACA	FOX, CHARLES	C	1968	289	160	6	118	X	118	Tsv	+0.50	04/05/68	--	--	8.0	0.1	1.0	H,I
31BAA	WEIGLE, WAYNE	C	1955	314	109	6	83	X	83	Tt	10.00	10/20/55	--	--	30	1.4	--	,I,S
31BAB	FORBES	A	1975	365	239	6	20	X	20	Tsv	1.00	05/02/75	440	--	10	0.0	2.0	H,I
31BDD	FOX, CHARLES	C	1960	311	119	6	90	X	90	Tsv	6.00	09/08/60	150	--	22	0.9	1.0	,I,S
31CCA	SAVAGE, DAVID	A	1973	324	70	6	37	X	37	Tt	12.00	10/07/73	--	--	35	1.6	--	U
31CCC	PARKER, JAMES	A	1973	341	125	6	20	X	20	Tsv	--	--	380	--	40	--	1.0	H,I
33BAA	KUTSCH, MYRON	C	1969	255	125	6	29	X	29	Tt	20.19	10/27/70	660	--	8.0	0.1	1.0	H
34BAD	METGE, CHARLES	C	1974	262	50	6	27	X	18	Tt	15.00	06/22/74	245	S	12	0.6	1.0	,I,S
35ABA	STEEPROW, EDWARD	B	1967	302	40	30	20	C	40	Qoal	17.09	10/27/70	--	--	20	20.0	1.0	H
35ABB	DURR, EDWARD L	C	1956	308	60	5	46	P	60	Qoal	18.15	10/27/70	75	--	20	2.0	--	H
35ACC	OCHSE, HOWARD	C	1956	283	100	6	24	P	37	Qoal	11.00	08/21/56	--	--	6.0	0.1	--	U
35DDD	GERSTNER, PHILLIP L	A	1972	370	435	6	186	P	435	Ts	179.00	12/08/72	875	S	40	0.2	1.0	,S,I
36CBA	PANKRATZ, LOUIS	C	1974	322	317	6	299	X	299	Ts	65.00	10/29/74	--	--	20	0.1	1.0	U
								T. 10 S., R. 5 W.										
02BAC	MULKEY, GYLAN	C	1958	210	83	6	50	P	70	Qoal	18.00	10/27/58	725	C	8.0	0.1	--	H,I
07BAB	DUNCAN, SYDNEA A	C	1969	470	65	6	20	X	20	Tt	6.00	11/08/69	675	C	40	2.0	2.0	H,S
07BDA	HOLMES	C	1974	620	158	6	50	X	50	Tsv	56.10	08/27/76	280	S	12	1.0	1.0	H,I
09ACD	OREGON STATE, UNIVERSITY	C	1968	340	130	6	60	P	80	Tt	42.00	06/14/72	400	--	12	0.4	1.0	H
12BBC	KUNKEL, WILLIAM	C	1969	215	150	6	138	P	150	Qoal	15.00	10/27/69	420	--	7.0	0.1	2.0	H
12DAA	KELSO, RICHARD	C	1970	231	140	6	35	P	82	Qoal	12.00	04/16/70	300	--	8.0	0.1	2.0	H
13ACA	DENOMA, JOHN	A	1970	280	270	6	56	X	56	Tsv	72.00	02/12/70	275	C	5.0	0.0	1.0	H
13BCC	GOETZINGER, LARRY	A	1974	220	175	6	20	X	20	Tsv	15.00	09/10/74	--	--	60	1.0	1.0	H,I
13CAD	BUNN, ROBERT	C	1964	249	50	6	45	X	45	Qoal	7.00	07/07/64	300	--	10	0.2	1.0	H
14ACC	ANDREWS, MELVIN	A	1968	250	125	6	85	X	85	Tsv	2.00	10/15/68	--	--	15	0.1	1.0	H
14BCB	LIEN, ALLAN	A	1967	275	250	6	36	X	36	Tsv	50.00	07/19/68	310	--	30	0.2	--	--
14BDC	SAGER, ROBERT W	A	1972	275	135	6	48	X	48	Tsv	9.00	06/28/72	100	S	20	0.2	1.5	,S,I
24ADB	GRAY, FLOYD	C	1964	282	125	6	62	X	62	Tsv	9.00	03/13/64	210	--	2.5	--	--	H
24DAD	MERRILL, MILO	C	1958	338	55	6	36	F	36	Qt	12.00	10/23/58	100	S	15	3.0	2.0	H,I

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL FEET BELOW DATUM	WATER LEVEL DATE	SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
T. 10 S., R. 5 W.--Continued																		
25BBB	LUEBBERT, EDWIN	A	1970	340	250	6	32	X	32	Tsv	63.00	05/05/70	195	--	8.3	0.1	1.0	,I,S
26ADA1	WESTFALL, ROBERT	A	1970	475	80	6	26	X	26	Tsv	21.00	09/21/70	250	--	12	0.2	1.0	H
26ADA2	LOFGREN, MARTIN	A	1972	475	405	6	23	X	23	Tsv	20.00	05/26/76	260	--	3.0	0.0	4.0	H
26CCC	WOODCOCK, RICHARD	A	1972	380	145	6	144	O	145	Tsv	5.00	06/30/72	200	S	17	0.3	1.0	H
27CCD	HIGGINS, MARVIN	A	1971	510	100	6	20	X	20	Tsv	10.00	06/14/71	240	--	10	0.1	--	H
27DCD	DEARDORFF, DONALD K	C	1964	420	60	6	38	X	38	Tsv	18.00	09/23/64	260	--	20	0.9	1.0	,I,S
34ACB1	BARNETT, MARIE	A	1970	375	130	6	19	X	19	Tsv	20.00	09/26/70	1250	--	5.0	0.1	1.5	H
34ACB2	JOENS, HUGH	C	1973	375	86	6	64	X	64	Tsv	3.00	07/02/73	--	C	12	0.2	1.0	H
34ACD	SCHELL, T H	A	1972	375	294	6	20	X	20	Tsv	8.00	10/11/72	--	--	2.0	0.0	2.0	U
34ADC	SCHELL, T H	C	1959	400	72	6	35	P	48	Tsv	14.00	08/05/59	220	--	3.5	0.1	0.5	H
34CAA	WOLD, RONALD	C	1974	395	180	6	28	X	28	Tsv	18.00	12/13/74	440	C	45	1.4	2.0	,S,I
T. 10 S., R. 6 W.																		
01CAC	JILLIONS, WALTER	A	1971	405	105	6	42	X	42	Tt	41.00	09/04/71	3600	S	15	0.3	1.0	I
05ACD	KAISER, HENRY R	C	1962	325	60	6	19	X	19	Tt	12.00	06/30/62	190	C	20	2.0	1.0	,S,I
05DAD1	HALL, TOTO	A	1970	290	140	6	20	X	20	Tt	15.10	08/25/76	--	S	33	0.3	1.0	U
05DAD2	HALL, TOTO	A	1974	295	80	6	20	X	20	Tt	22.00	09/25/74	1000	S	5.0	0.1	1.0	H
11BBA1	RAPPAPORT, D	A	1973	750	125	8	19	X	19	Tt	27.00	08/26/76	300	S	30	0.4	1.0	,S,I
12ACB	KOCHIS, FRANK	C	1965	625	91	6	26	X	26	Tt	25.00	05/03/65	--	--	5.0	0.1	3.0	H
12DBB	WEDMAN, DR. E. E	A	1973	635	255	6	21	X	21	Tt	5.35	08/26/76	--	--	8.0	0.0	1.0	U
14ABD	HAYES, LYNN	C	1970	548	48	6	26	X	26	Tsvk	6.00	08/05/70	180	S	7.0	0.2	1.0	H
14CDA	BENNETT, R D	C	1971	500	38	6	22	X	22	Tsv	3.00	06/16/71	--	--	12	0.5	2.0	H
16CAC	MURPHY, R G	C	1962	348	250	6	28	X	28	Tsvk	38.00	12/20/62	7500	--	2.0	--	--	I
17ACA	HILL, GARRY	A	1974	405	195	6	20	X	20	Tt	+1.00	05/16/74	--	--	1.8	0.0	1.0	H
21ABA	ALBRIGHT, M	C	1960	365	243	6	96	X	96	Tsvk	+41.60	05/23/60	3920	--	6.0	0.1	--	H
21ABB	MALONEY, THOMAS	C	1968	361	142	6	70	P	116	Tsvk	10.50	08/25/76	--	--	20	0.3	2.0	H
21CAC	KAPLAN, H	C	1965	356	74	6	20	X	20	Tsvk	15.50	08/09/65	250	--	12	0.3	2.0	H
21DDA	BREWER, DONALD J	C	1974	435	200	6	29	X	29	Tsvk	24.00	09/09/74	535	--	15	0.3	1.0	H
22ABA	MOORE, T	C	1967	458	250	6	46	X	46	Tsvk	50.00	05/13/75	403	--	20	0.2	2.0	H
22ACB	MOORE, EMORY	C	1973	500	91	5	58	P	91	Tsvk	36.00	04/28/73	--	--	20	0.7	2.0	H
22ACC1	MOORE, EMORY	C	1965	538	100	6	18	X	18	Tsvk	34.20	05/13/75	612	--	20	1.0	2.0	H
22BAA	MOORE, EMORY	C	1967	415	150	6	42	X	42	Tsvk	40.00	03/09/67	--	--	30	0.5	3.0	H
22DAC	MOORE, EMORY	C	1974	538	60	6	32	X	32	Tsvk	3.30	05/13/75	--	S	7.0	0.2	2.0	S
27BAB	WINDGATE, R	C	1965	475	122	6	34	X	34	Tsvk	14.00	05/21/65	320	S	7.0	0.1	2.0	H
27BBD	HUNTER, RAYMOND	A	1973	498	95	6	20	X	20	Tsvk	13.50	08/10/75	--	--	9.0	0.2	1.0	U
27BDB	HUNTER, RAYMOND	A	1973	498	410	6	20	X	20	Tsvk	50.00	10/11/73	--	--	0.5	0.0	1.0	U
28BCC	EDDY, ISRAEL	C	1966	410	100	6	33	X	33	Tsvk	5.00	01/20/67	--	--	12	0.2	2.0	H
29ADD	PRICE, EARL	C	1961	370	75	8	10	X	10	Tsvk	2.00	10/31/61	150	Z	4.0	0.1	2.0	H
30ADD	COX, JACK	C	1973	374	115	6	56	X	56	Tt	20.00	05/09/75	--	--	6.0	0.1	2.0	U
30DBB	OWEN, JOSEPH	A	1971	371	65	6	49	X	49	Qoal	15.70	05/08/75	--	--	10	0.2	1.0	H
30DBC1	CLAY, HENRY	A	1972	392	345	6	62	X	62	Tt	--	--	--	--	0.0	--	--	U

Table 7.--Records of selected wells in the Dallas-Monmouth area--Continued

LOCAL NUMBER	OWNER	METHOD CONST-RUCTED	YEAR COM-PLETED	ALTI-TUDE (FEET)	DEPTH OF WELL (FEET)	DIAMETER OF WELL (INCHES)	DEPTH TO FIRST OPENING (FEET)	FINISH	DEPTH CASED (FEET)	AQUI-FER	WATER LEVEL		SPECIFIC CONDUCT-ANCE OF WATER	TYPE OF LIFT	DIS-CHARGE (GPM)	SPECIFIC CAPACITY (GPM/FT)	PUMPING PERIOD (HOURS)	USE OF WATER
											FEET BELOW DATUM	DATE						
	T. 10 S., R. 6 W.--Continued																	
30DBC2	CLAY, HENRY	A	1972	395	165	6	63	X	63	Tt	33.40	05/08/75	--	--	1.0	0.0	1.0	U
30DCA1	JOHNSON, JAMES H	A	1973	375	245	6	30	X	30	Tt	60.00	07/11/73	--	S	1.5	0.0	1.0	U
30DDB	JOHNSON, JAMES	A	1973	370	180	6	55	X	55	Tt	44.00	05/05/73	--	--	6.0	0.0	1.0	U
33BAB	COSGROVE, CHARLES	C	1955	495	74	6	28	X	28	Tsvk	18.00	10/12/55	--	--	7.0	0.1	--	H
	T. 10 S., R. 7 W.																	
12DCC	COOPER, JAMES D	C	1966	390	88	8	20	X	20	Tt	26.00	08/18/66	1500	S	12	0.2	1.0	I
13ABC	DICKASON, GEORGE	C	1973	385	130	6	20	X	20	Tt	25.00	10/09/73	750	S	1.0	0.0	2.0	H
13ACD	JENCO, JOHN	C	1965	380	40	8	18	X	18	Tt	10.00	02/20/65	230	C	1.7	--	1.0	H

7S/4W-5daa. V. W. Ellis. Altitude 468 ft. Drilled by R. Stadeli & Sons, 1967. Casing: 6-in diam to 37 ft; unperforated. Well backfilled to 248 ft because of occurrence of saltwater

Materials	Thickness (feet)	Depth (feet)
Soil, brown	1	1
Clay, light-brown	15	16
Clay, gray, gritty	20	36
Sandstone, gray	45	81
Claystone, grayish-brown	296	377
Sandstone, gray	2	379
Claystone, gray	159	538
Claystone, dark-gray	76	614

7S/4W-32aab. Roth Garfield. Altitude 200 ft. Drilled by Robinson Eola Drilling, 1973. Casing: 8-in diam to 19 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Clay, brown	9	9
Clay, brown, and gravel	7	16
Shale, blue	67	83
Sandstone, blue	27	110

7S/4W-33add. R. E. Steele. Altitude 171 ft. Drilled by Todd's Drilling Service, 1975. Casing: 6-in diam to 32 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	3	3
Silt, brown	7	10
Clay, brown	8	18
Clay, blue, soft	7	25
Claystone, blue	50	75
Claystone, brown and blue	25	100

7S/4W-34ddc. Rickreall Water Assoc. Altitude 172 ft. Drilled by Robinson Eola Drilling, 1971. Casing: 12-in diam to 41 ft; unperforated. Screen installed in 1973; slot size 160 from 40-57 ft

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, brown	30	31
Gravel, with clay binder	10	41
Sand and gravel, loose	20½	61½
Claystone, gray, hard	3½	65

7S/5W-6bdd. D. G. Sexton. Altitude 217 ft. Drilled by Robinson Eola Drilling, 1974. Casing: 6-in diam to 19 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, brown	8	10
Clay, gray	10	20
Claystone, gray	27	47

7S/5W-15dcc. H. B. Wiebe. Altitude 290 ft. Drilled by J. A. Sneed & Sons, 1965. Casing: 6-in diam to 37½ ft; perforated 27-32 ft; gravel packed 27-36 ft

Materials	Thickness (feet)	Depth (feet)
Soil	3	3
Clay, yellow	5	8
Conglomerate	27	35
Gravel, tight, water-bearing	2	37
Claystone, gray, firm	28	65

7S/5W-25dad. R. L. Larsen. Altitude 205 ft. Drilled by Miller-Robinson Well Drilling, 1968. Casing: 6-in diam to 47 ft; perforated 22-44 ft; gravel packed 22-44 ft

Materials	Thickness (feet)	Depth (feet)
Clay, brown	20	20
Claystone, gray	26	46
Claystone, blue	1	47

7S/5W-26cdc. L. T. Lester. Altitude 265 ft. Drilled by Robinson Eola Drilling, 1974. Casing: 6-in diam to 118 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	4	4
Clay and gravel	19	23
Gravel and sand, cemented	22	45
Clay, blue	25	70
Sand, blue	2	72
Sand and gravel	3	75
Clay, blue, sandy	10	85
Sand, blue	10	95
Clay, blue, sticky	25	120
Gravel and sand, blue	5	125

7S/6W-36ccd. Tom Parsons. Altitude 680 ft. Drilled by J. A. Sneed & Sons, 1974. Casing: 6-in diam to 54 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, yellow	10	12
Basalt, weathered	20	32
Basalt, fractured	14	46
Basalt, dense	36	82
Basalt, seamy	2	84
Basalt, dense	128	212
Sandstone, hard	59	271

8S/4W-2cacl. Green Villa Farms. Altitude 150 ft. Drilled by Robinson Eola Drilling, 1975. Casing: 12-in diam to 52 ft; perforated 35-48 ft

Materials	Thickness (feet)	Depth (feet)
Clay and gravel	20	20
Gravel, small- to medium-sized	9	29
Sand	2	31
Gravel, small- to medium-sized	17	48
Sand	1	49
Shale, gray	4	53

8S/4W-9cdd. William Alderson. Altitude 167 ft. Drilled by Art Clinton Well Drilling Co., 1965. Casing: 8-in diam to 44 ft; perforated 28-43 ft; gravel packed 18-44 ft

Materials	Thickness (feet)	Depth (feet)
Soil	4	4
Clay, brown	26	30
Sand and gravel, water-bearing	13	43
Shale, blue	8	51

8S/4W-15bcc. Green Villa Farms. Altitude 151 ft. Drilled by by R. Stadeli & Sons, Inc., 1973. Casing: 18-in diam to 21 ft. Screen installed; slot size 100 from 21-41 ft; gravel packed 21-41 ft

Materials	Thickness (feet)	Depth (feet)
Soil, brown	3	3
Clay, brown, sandy	14	17
Gravel, brown, medium-sized, water-bearing	19	36
Conglomerate, brown, coarse	4	40
Shale, gray-brown, hard	1	41

8S/4W-18dbd. Ted Lebeck. Altitude 187 ft. Drilled by Art Clinton Well Drilling Co., 1957. Casing: 10-in diam to 33 ft; perforated 23-33 ft; gravel packed 0-33 ft

Materials	Thickness (feet)	Depth (feet)
Loam	3	3
Clay, yellow	18	21
Gravel	16	37
Shale, blue	23	60

8S/4W-28cdb. City of Monmouth. Altitude 173 ft. Drilled by Art Clinton Well Drilling Co., 1968. Casing: 12-in diam to 66 ft; perforated 47-66 ft; gravel packed 18-66 ft

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, gray	32	34
Sand, coarse, and medium-sized gravel; water-bearing	32	66
Clay, blue	6	72

8S/4W-36cbd. John Bradtl. Altitude 157 ft. Drilled by R. C. Weston, 1966. Casing: 12-in diam to 33 ft; perforated 20-30 ft; gravel packed 0-31 ft. Deepened to 110 ft (no data available)

Materials	Thickness (feet)	Depth (feet)
Soil and sand	25	25
Sand and gravel	6	31
Shale, gray	29	60

8S/5W-1ccd2. Henry Warkentin. Altitude 223 ft. Drilled by Todd's Drilling Service, 1973. Casing: 8-in diam to 60 ft; perforated 54-59 ft

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, red	6	8
Gravel, with clay	10	18
Clay, blue	2	20
Gravel, cemented	5	25
Clay, blue, soft	20	45
Gravel, fine	1	46
Clay, blue	8	54
Gravel, medium-sized	6	60
Clay, blue, with gravel	4	64

8S/5W-15adb. R. D. Sevier. Altitude 290 ft. Drilled to 165 ft in 1965 by Art Clinton Well Drilling; deepened to 175 ft in 1975. Casing: 8-in diam to 99 ft; perforated 57-97 ft; gravel packed, interval unknown

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, brown	26	28
Shale, blue	64	92
Sandstone, blue, water-bearing	4	96
Shale, blue	34	130
Sandstone, gray, water-bearing	2	132
Shale, blue	33	165

8S/5W-30cdb. Frank Kellum. Altitude 507 ft. Drilled by Robinson Eola Drilling, 1975. Casing: 6-in diam to 18 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, yellow	14	16
Claystone, blue	29	45
Claystone, gray	95	140
Claystone, blue	5	145
Claystone, gray	15	160

8S/6W-2cbb. Wayne Bailey. Altitude 1,160 ft. Drilled by Corvallis Drilling Co., Inc., 1974. Casing: 6-in diam to 29 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Clay, red-brown	3	3
Clay, red, and basalt rocks	6	9
Basalt, broken	13	22
Basalt, black, hard	104	126
Basalt, light-gray, hard	26	152
Basalt, red, soft	11	163
Sandstone, gray	12	175
Basaltic conglomerate, purple and green	22	197
Basalt, blue-gray	45	242
Basalt, black	72	314
Basalt, gray	78	392
Sandstone, blue	18	410
Basalt, gray	22	432
Sandstone, blue-gray	28	460

8S/6W-14bcc. G. J. Morgan. Altitude 575 ft. Drilled by J. H. Sneed & Sons, 1967. Altitude 489 ft. Casing: 6-in diam to 40 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, yellow	15	16
Claystone, blue, firm	56	72
Sandstone, white, hard	8	80
Claystone, interbedded with limestone	360	440
Limestone, hard	49	489

8S/6W-25cbb. Bridgeport Community Church. Altitude 302 ft. Drilled by Art Clinton Well Drilling Co., 1968. Casing: 6-in diam to 50 ft; perforated 40-48 ft; gravel packed 18-50 ft

Materials	Thickness (feet)	Depth (feet)
Soil	3	3
Clay, brown	13	16
Clay, blue	22	38
Rock, gray, water-bearing	3	41
Shale, blue	25	66

8S/6W-34ada. Larry Green. Altitude 590 ft. Drilled by J. H. Sneed & Sons, 1971. Casing: 6-in diam to 57 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Basalt, weathered	37	37
Basalt, seamy	101	138
Claystone, gray, hard	142	280

9S/4W-2dca. Wigrich Farms. Altitude 159 ft. Drilled by Todd's Drilling Service, 1974. Casing: 12-in diam to 50 ft; perforated 39-49 ft

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Silt, brown, with clay	16	18
Gravel, medium- to coarse-sized	32	50
Clay, red	8	58
Clay, blue	2	60

9S/4W-3ccc. C. S. Bowman. Altitude 178 ft. Drilled by R. Stadeli & Sons, Inc., 1957. Casing: 12-in diam to 61 ft; perforated 30-61 ft; gravel packed 0-30 ft

Materials	Thickness (feet)	Depth (feet)
Soil, brown	3	3
Clay, blue	27	30
Sand and gravel, gray	5	35
Gravel, water-bearing	26	61
Clay, gray	36	97

9S/4W-7acc. G. W. Ridenour. Altitude 272 ft. Drilled by Todd's Drilling Service, 1970. Casing: 6-in diam to 120 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, yellow	4	6
Clay, white	10	16
Clay, red	6	22
Clay, blue	53	75
Clay, brown and blue, water-bearing	32	107
Clay, blue, with wood; water-bearing	3	110
Clay, blue, sandy, water-bearing	20	130
Sand, fine, water-bearing	10	140

9S/4W-31dbb. Vern Johnston. Altitude 214 ft. Drilled by R. G. Weston, 1967. Casing: 6-in diam to 42 ft; perforated 20-25 ft, 35-40 ft

Materials	Thickness (feet)	Depth (feet)
Soil and clay	22	22
Clay, blue, and fine gravel	18	40
Sand, green, soft	11	51

9S/5W-2abd. C. S. Bowman. Altitude 370 ft. Drilled by Schoen Electric & Pump, 1969. Casing: 6-in diam to 24 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Clay, yellow	17	17
Claystone, blue, shaley	51	68
Claystone, blue, hard	28	96
Claystone, blue, sandy	32	128
Sandstone, blue, soft	22	150
Sandstone, blue, hard	2	152
Claystone, blue	46	198
Shale, blue, hard	3	201
Claystone, blue	13	214
Claystone, blue, sandy	24	238
Claystone, blue	16	254
Claystone, blue to brown	12	266
Claystone, blue to gray, shaley	57	323

Materials	Thickness (feet)	Depth (feet)
9S/5W-32bda. J. E. Jones. Altitude 310 ft. Drilled by Art Clinton Well Drilling Co., 1962. Casing: 6-in diam to 65 ft; perforated 53-61 ft, gravel packed 18-65 ft		
Soil	1½	1½
Clay, brown	26½	28
Shale, blue	28	56
Sandstone, gray	4	60
Shale, blue	6	66
9S/6W-15ccd. C. R. Ross. Altitude 436 ft. Drilled by Robinson Eola Drilling, 1971. Casing: 6-in diam to 62 ft; unperforated		
Soil	1	1
Clay, yellow	15	16
Sandstone, gray, broken	34	50
Sandstone, green	11	61
Claystone, brown	42	103
Sandstone, gray	2	105
Claystone, brown	34	139
Sandstone, gray	2	141
Claystone, brown	8	149
9S/6W-34bba. C. R. McCormack. Altitude 250 ft. Drilled by Bill Howell Well Drilling, 1965. Casing: 6-in diam to 25 ft; unperforated		
Clay, brown	19	19
Gravel, brown, and sand	2	21
Claystone, blue	29	50
10S/4W-4abc. H. G. Olsen. Altitude 205 ft. Drilled by Merle E. Warren Well Drilling, 1963. Casing: 8-in diam to 58 ft; perforated 47-57 ft		
Soil	19	19
Clay, blue	24	43
Sand, black	11	54
Clay, brown	4	58
10S/4W-10cdb1. Russel Underwood. Altitude 185 ft. Drilled by Ace Drilling Co., 1962. Casing: 10-in diam to 37 ft; perforated 31-36 ft; gravel packed 20-25 ft		
Soil and clay	19	19
Sand, black, fine	5	24
Gravel	13	37
10S/4W-16dcc. Leonard Weathers. Altitude 222 ft. Drilled by Merle Warren Well Drilling, 1970. Casing: 6-in diam to 81 ft; perforated 72-81 ft		
Soil	3	3
Clay, brown	17	20
Clay, brown, and weathered rock	4	24
Clay, blue	17	41
Clay, red, with streaks of blue	11	52
Clay, light-blue	12	64
Clay, blue, and shale	15	79
Shale, dark-brown	9	88
Shale, dark-gray	37	125
Shale, gray	9	134
10S/4W-19bbb. Frank Helm. Altitude 308 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1971. Casing: 6-in diam to 41 ft; unperforated		
Soil	3	3
Clay, yellow	8	11
Clay and boulders	13	24
Sandstone, brown, soft	9	33
Sandstone, blue	4	37
Basalt, black	72	109
Conglomerate, blue-black	54	163
Basalt, black, broken	8	171
Basalt, black	125	296
Conglomerate, blue-black	104	400
10S/4W-30dbc. Oregon Department of Fish and Wildlife. Altitude 319 ft. Drilled by Gilbert A. Pruitt, 1956. Casing: 6-in diam to 102 ft; unperforated		
Gravel and yellow clay	15	15
Clay, blue	11	26
Gravel and yellow clay	26	52
Clay, soft	11	63
Gravel and yellow clay	22	85
Gravel, water-bearing	2	87
Gravel and yellow clay	16	103
Clay, blue	27	130
10S/5W-2bac. Gylan Mulkey. Altitude 210 ft. Drilled by Art Clinton Well Drilling Co., 1958. Casing: 6-in diam to 70 ft; perforated 50-70 ft		
Clay, brown	40	40
Shale, blue	25	65
Sandstone	18	83
10S/5W-14acc. Melvin Andrews. Altitude 250 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1968. Casing: 6-in diam to 85 ft; unperforated		
Soil	3	3
Clay, yellow	25	28
Clay and boulders	55	83
Basalt, broken	42	125
10S/6W-1cac. Walter Jillions. Altitude 405 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1971. Casing: 6-in diam to 42 ft; unperforated		
Soil	4	4
Clay, yellow	20	24
Clay, blue	13	37
Claystone, blue-gray	34	71
Sandstone, blue	34	105
10S/6W-5dad1. Toto Hall. Altitude 290 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1970. Casing: 6-in diam to 20 ft; unperforated		
Soil	4	4
Clay, sandy	10	14
Gravel	2	16
Sandstone and shale, interbedded	124	140
10S/6W-21aba. M. Albright. Altitude 365 ft. Drilled by Raymond C. Gellatly, 1960. Casing: 8-in diam to 33½ ft, 6-in diam from 3-96 ft; unperforated		
Soil	2	2
Clay and boulders	16	18
Shale, gray	72	90
Shale, gray, hard	140	230
Sandstone and shale	10	240
Sandstone, porous	3	243
10S/6W-30dbc1. Henry Clay. Altitude 392 ft. Drilled by Corvallis Drilling Co., Inc., 1972. Casing: 6-in diam to 62 ft; unperforated		
Soil	1	1
Clay, brown, sticky	17	18
Clay, blue, sandy	25	43
Clay, blue-gray, silty	13	56
Claystone, dark-gray	61	117
Sandstone, blue-gray, hard	90	207
Sandstone, brown and gray, medium-hard	54	261
Sandstone, blue-gray, medium-hard	84	345