STATE ENGINEER
SALEM, OREGON

A RECONNAISSANCE OF THE GROUND WATER RESOURCES

OF

LINCOLN COUNTY, OREGON

by

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INTRODUCTION

Purpose of Report

The need for additional fresh water supplies for Lincoln County has rapidly become manifest. The county contains a generous portion of Oregon's beautiful coastal landscape and forest lands. The annual increase in the number of people being drawn to the county's recreational areas and the urban and suburban expansions along the coast in recent years have accelerated the demands for additional domestic, industrial and municipal water supplies.

On July 10, 1964, the State Engineer entered into a contract with the Water Resources Board to make a reconnaissance study of the ground water resources of Lincoln County. Records of representative wells have been assembled to provide basic data and assist in defining areas of ground water use and water quality characteristics. Most of the available well records are for wells constructed since August 4, 1955 when the Ground Water Act of 1955 became law. This law required that a well log be filed for each water well constructed in Oregon subsequent to August 4, 1955. There are many older wells in Lincoln County for which well log information is not available. A large number of these wells are shallow dug wells.

A majority of the county's population of 22,425 people live in urban areas. It has been estimated that several times this number of people may be moving into the county during the summer vacation season. Their arrival usually coincides with the onset of the dry summer weather when water demands are greatest. Water needs are becoming paramount to the economic growth of Lincoln County. Therefore, this report describes the availability of ground water in Lincoln County and presents records of some of the more recently constructed water wells. Areas suitable for future ground water exploration are identified.

Location and Description of Area

Lincoln County contains 985 square miles and is situated along the western flank of the Oregon Coast Range Mountains. The county is rectangular in shape, being about 54 miles long from north to south and about 20 miles wide from east to west. The county reaches from the Pacific Ocean to the crest of the Coast Range Mountains and extends from the Salmon River on the north to Cape Perpetua on the southern county line. The area is included within T.'s 6 to 15 S. and R.'s 8 to 12 W., W.M..

Topography

The higher elevations are found in the eastern portion of the county near the summit of the Coast Range Mountains. The average elevation of timber lands along the eastern side of the county is about 1,500 feet. Ridge lines and peaks, however, often stand above 2,000 feet. The highest elevations are found at Saddleback Mountain and at Mt. Scott in the northeastern section of the county. They reach 3,395 feet and 3,128 feet above sea level, respecitvely. Farther to the south, Euchre Mountain stands at 2,446 feet elevation. Table Mountain approaches 2,804 feet while Cannibal Mountain is 1,946 feet

above sea level. Much of western Lincoln County lies below 700 feet elevation, and the terrain slopes uniformly westward to meet a narrow coastal plain. At Cape Foulweather and Yachats, the forested high lands meet the sea and disrupt the narrow coastal plain forming rocky headlands.

The topography of Lincoln County has been developed by an intense drainage system. The area has been dissected into youthful and mature stream topography. Closely spaced streams have carved easily eroded marine sedimentary rocks into a very rugged landscape. Elevation changes are often abrupt between sharp ridge lines and incised stream channels which are often only a few hundred feet apart. The intensity of the drainage system is directly attributed to the heavy rainfall and soft, easily eroded sedimentary formations that form much of the county. Nearly all of the isolated highland peaks such as Euchre Mountain, Cannibal Mountain, Scott Mountain and Saddleback Mountain are capped by hard volcanic rock formations. Being less susceptible to erosion, these lava capped areas now stand as prominent erosional remnants. Numerous sea stacks and coastal headlands have been formed by resistant volcanic rocks that are associated with the coastal marine formations. Seal Rock, Yaquina Head, Otter Rock, Cape Foulweather and Government Point are examples of these volcanic rock headlands.

Coastal subsidence along the Lincoln County coast has caused all major stream valleys to be drowned by the invading sea. Tidal zones reach far up these submerged stream valleys often as far as 15 to 20 miles upstream. Large embayments and wide estuaries are typical of coastlines of submergence. Shoreline currents have produced sand spits and bars that now form bays at the mouth of the Siletz, Yaquina, and Alsea Rivers. Local sand dunes and terrace deposits have developed at these locations in Lincoln County.

Climate

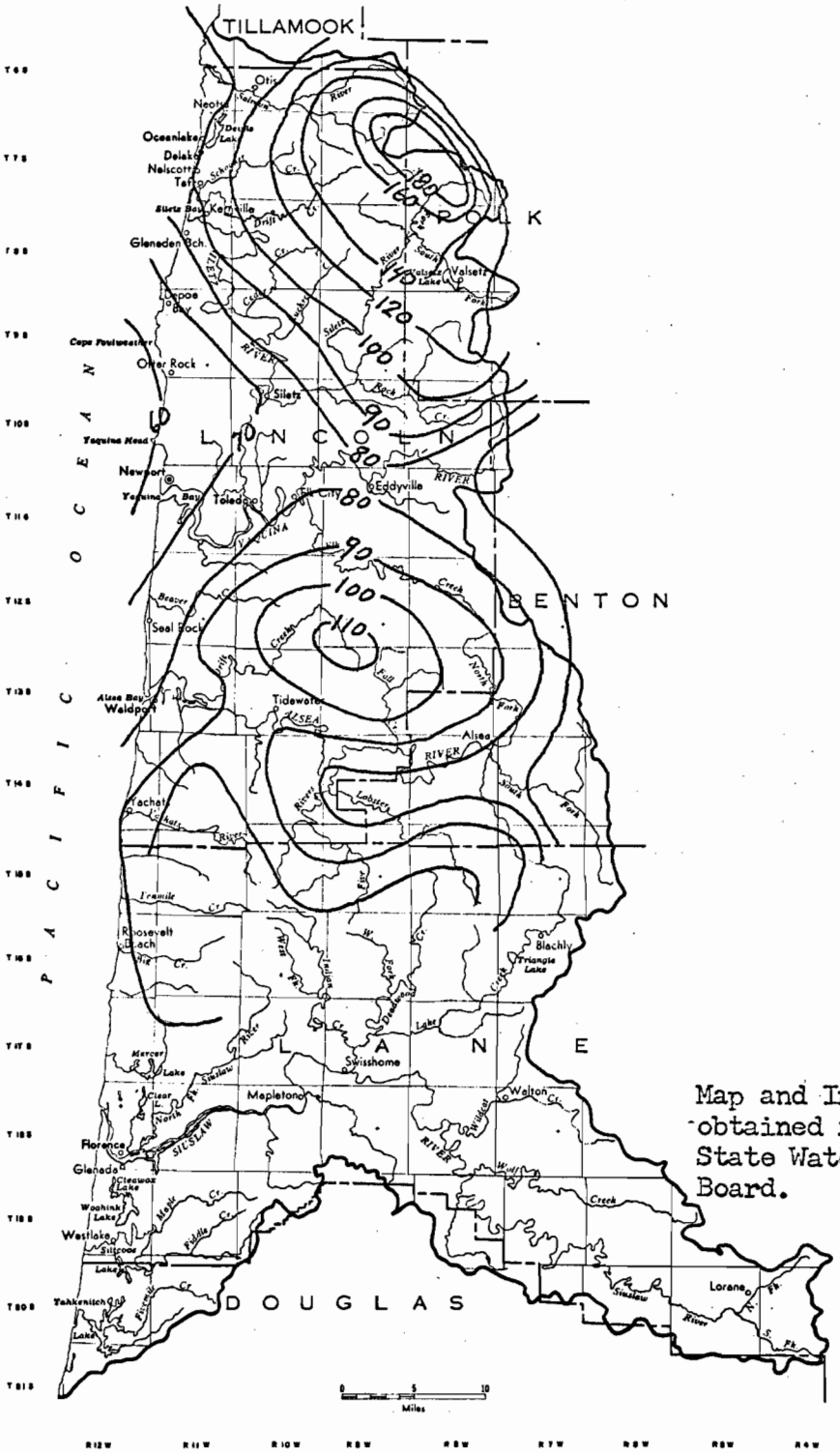
Lincoln County lies under the dominant influence of a mild mediterranean type climate. Its winter season is characterized by heavy, mild temperature rains, high humidities, and moderate southwest winds of 4 to 15 miles per hour. Summer seasons are mild, cool and usually free of rain. Prevailing winds come from the southwest during the winter months and average less than 16 m.p.h. in velocity. In the summer months dune forming winds above 16 m.p.h. blow from northwest. The average annual temperature at Newport, Oregon based on 57 years of record is 50.9° F.. Winter temperatures average 42° to 44° F. and summer averages range between 55° and 57° F..

Winter storm tracks often center on the Oregon Coast where they dump heavy rains. The annual average precipitation at Newport is approximately 66.87 inches per year. Nearer the summit of the Coast Range Mountains at Valsetz, Oregon, the precipitation averages 120 inches per year. At higher elevations the precipitation reaches 200 inches per year. (See Figure 1) Summer storm tracks pass to the north and the area enjoys a cool, dry season. Morning fogs are common from June through September.

Drainage

A large portion of Lincoln County's annual rainfall is rejected immediately and forced to flow directly back to the sea. Short, closely spaced streams feed the run-off directly to five major rivers that drain Lincoln County. They are listed from north to south as follows: Salmon River, Siletz River, Yaquina River, Alsea River and the Yachats River. Stream gaging stations on the Siletz River at Siletz, Oregon, and on the Alsea River near Tidewater, Oregon, indicate that during the 1962-63 water year 993,100 acre feet and 1,033,000 acre feet respectively, passed these stations toward the sea. Mill Creek

Isohyetal Map Showing Precipitation
in Inches within Lincoln County



Map and Information obtained from the State Water Resources Board.

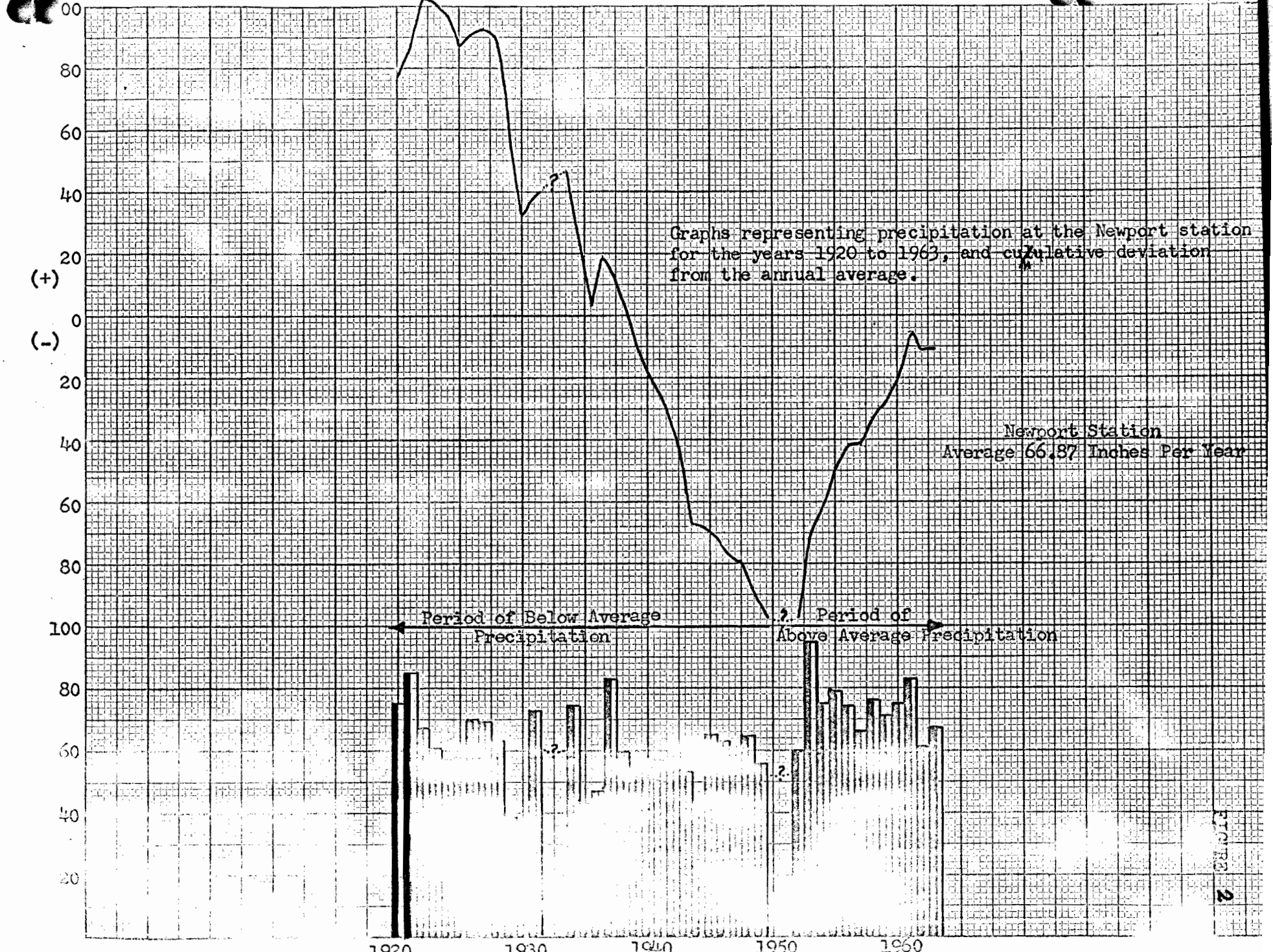

Graphs representing precipitation at the Newport station for the years 1920 to 1963, and cumulative deviation from the annual average.
Newport Station
Average 66.87 Inches Per Year
Period of Below Average Precipitation
Period of Above Average Precipitation
Cumulative Deviation from Annual Average
(+)
(-)
Precipitation in Inches
1920
1930
1940
1950
1960

FIGURE 2

at Toledo, Oregon, flowed approximately 13,120 acre feet for the 1963 water year. Typical of areas of rapid run-off, Lincoln County water supplies are abundant during the winter season and are in short supply when most needed during the late summer.

Cultural Development

Cultural development in the county has continued to accelerate along the narrow coastal plain, the major estuaries, and streams. Smaller communities are expanding laterally along the coast and in some places these cities now merge with one another. This type of growth is particularly noted along a 15 mile section of coastline between Wecoma Beach and Depoe Bay. Industrial growth continues also in response to the population increases of the area.

Sand dune areas at Siletz Bay, South Beach at Newport and immediately north of Waldport are being thoroughly developed as residential areas. The largest industrial use of water is at Toledo, Oregon. Commercial fish processing, timber processing and sand and gravel production are also prominent water users in Lincoln County. Their peak water needs occur from mid-December through January and from late May through September of each year. Quarry locations are not wide spread in Lincoln County. Gravel production is concentrated on the Siletz River above Siletz and fish processing plants are centered on the Yaquina estuary. Timber production is high in the county and much of the processing and shipping takes place in the Toledo-Newport area.

Acknowledgments

The gracious assistance of the many local and county officials and especially the many well owners of Lincoln County is gratefully acknowledged. Well owners supplied a great deal of data regarding water levels and past well construction in the area of study. Well owners also provided interesting information in regard to water quality

problems within their areas of residence. Accurate well logs filed by Oregon's licensed water well contractors were of great value.

Well Numbering System

The location of wells and springs listed in this report is designated by number symbols. Each number or symbol indicates the position of the well or spring as referenced to the official rectangular survey of public land. For example, in the well number 8/11W-33F1, the portion preceding the hyphen indicates the township and range (T. 8 S., R. 11 W.) south and west of the Willamette base line and meridian. Since most of Oregon lies south of the Willamette base line and east of the Willamette meridian, the letters S for south and E for east are omitted from the location number. Only the letters N for north and W for west are shown in the numbers for wells and springs lying north and west of the base line and meridian. The first number after the hyphen indicates the section, Section 33. The letter following the number refers to a particular 40 acre tract within the section as shown in Figure 3. The final digit indicates the serial number of the well with respect to the other wells located within the same 40 acre tract.

The example above, therefore, indicates that well 8/11W-33F1 was the first well scheduled in the SE¼ of the NW¼ of Section 33, T. 8 S., R. 11 W., W.M..

Section 33

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

Figure 3

In the tables, well and spring numbers are listed in the order of lettered 40 acre tracts within successive sections. Townships are listed in numerical order from north to south and range numbers increase from east to west.

In Tables 1 and 2, the location numbers are arranged by township and range, under appropriate subheadings. Each well or spring is designated only by part of the number indicating section, 40 acre tract, and serial number.

THE OCCURRENCE OF GROUND WATER

The source of Lincoln County's ground water supply is the seasonal precipitation in the form of rain and snow that is incident to the porous zones of the earth's surface within and adjacent to Lincoln County. Water from the sea is carried inland by storm clouds and is released as rain and snow. Some of this water is lost by evaporation; some is used by trees and plants in transpiration; and much of the water is returned directly back to the sea as stream flow. Some water seeps into porous areas and becomes temporarily stored as ground water.

Ground water occupies many and varied kinds of intergranular spaces within sedimentary materials. In rocks and consolidated materials, water is found in fractures, joints, and solution channels. Ground water is under constant motion and moves slowly from areas of intake (recharge) to areas of use (discharge). This movement starts as the water percolates vertically downward from the earth's surface toward the regional water table.

The Water Table

The water table marks the zone and saturation below which all open spaces in the earth's materials are filled with water. It is in this zone that the ground water begins to move laterally to areas of lower

hydrostatic pressure such as springs, wells and seeps.

The main factors controlling the shape and slope of the regional water table are the topography of the land surface, the shape of the underlying bedrock, the permeability of the materials through which the ground water moves, the locations of areas of recharge and discharge, and the relative rates of recharge and discharge.

The water table is always a sloping surface. Ground water moves in response to gravity and the water table slopes in the direction of ground water movement. The water table is a continually fluctuating surface, rising when recharge to the water body exceeds discharge and declining when discharge exceeds recharge. When the water table fluctuates within the same general elevations, season after season, the water table indicates that recharge is in balance with discharge. In general, changes of water levels in wells reflect changes in the amount of ground water stored in the aquifer, or water bearing formation.

The water table usually reaches its highest position in the early spring following the winter recharge by precipitation. The water table then declines during the long dry summer season and usually reaches its lowest position in mid-October of each year. No record of water table fluctuations has been established in wells in Lincoln County due to the short period of study. Several wells in the county have been placed in the State Engineer's observation well net and their water levels will be measured several times each year.

Regional water level declines in wells of Lincoln County are not indicated at the present time. Owners occasionally report individual well failures during the dry summer seasons; however, there has been no regional water level decline reported in Lincoln County.

Ground Water Movement

To promote ground water movement the water bearing units must be both porous and permeable.

The best water bearing formations are those that offer high porosity and high permeability. Such factors are dependent on the size, uniformity, and degree of connection of the intergranular openings within the reservoir rock materials. Usually unconsolidated, uniform, sands or gravels offer the best water bearing characteristics. The average rate of movement of ground water varies between 5 feet per day to 5 feet per year.

The relative amounts of ground water that is released or retained in rock materials is dependent on the adhesive forces between water and rock particles and the relative size of the pore spaces. In rocks of uniform porosity the yield is poorest in those materials having the smallest intergranular spaces. Both clay and sand are porous yet the greater yields will be obtained from the sands because of the larger intergranular spaces. This ability to transmit water is termed permeability. Fine grain clays may retain 50 per cent of its own volume as water, yet it will not yield water readily.

Many wells in Lincoln County have been constructed in fine clay formations. Water levels in these wells are often within 10 feet of land surface. When such wells are pumped steadily the drawdown becomes excessive and the well may break suction and fail. However, after a period of non-use the well recovers to its former static position. This shows that the area around the well is saturated below the water table position; never the less, the formation is incapable of yielding adequate amounts of water to the pumped well.

Most of the water taken from such wells comes from storage in the well bore. Large diameter dug wells are most often used in clay areas

for they serve as underground storage tanks. Being low yielding wells, and having large diameters, they store adequate water for normal domestic needs. These shallow dug wells often have a high incidence of bacterial pollution due to improper construction and maintenance.

Since clays usually act as barriers to ground water movement, they are called aquicludes. Water moves in permeable zones of sand and coarser materials between clay beds. Springs occur where extensive clay beds outcrop at land surface and force ground water to the surface along hillsides and steep embankments.

Volcanic rocks are consolidated materials and depend on joints, fractures, and broken interflow zones to hold and transmit ground water supplies. In areas of extensive fractures below the water table, these rocks can be excellent water bearing formations.

Water Quality

Rain water and snow contains only small amounts of dissolved salts and gases; however, as water infiltrates the earth's crust, it dissolves gases such as carbon dioxide and other soluable minerals. Carbon dioxide in water forms a weak acid and together with humic acids in soils the water begins to attack rock materials through which it moves.

Consolidated rocks such as sandstone have spaces between the individual grains partially or completely filled with cementing materials. These cementing materials are usually subject to re-solution in water and make up much of the mineral content of ground waters. Most of these cements are high in calcium carbonate; they may contain additional materials such as iron hydroxides, oxides, ferrous carbonate, silica, and sulfates. Usually ground water bodies in sedimentary rocks do not contain high amounts of silica.

Fine grained rocks such as silts and clays, expose considerable surface area to the solvent action of water and formations made up of fine grained rocks usually yield highly mineralized water.

The longer water is in contact with rocks, the more mineralized it becomes. Surface water that runs off quickly is usually low in dissolved mineralization, but ground water is moving much more slowly and therefore contains an increased amount of dissolved salts and minerals.

Chemical reactions occur as water moves through rocks; some of these reactions are as follows:

1. Evaporation and transpiration in the soil zone concentrates the water solutions and salts such as calcium carbonate, may precipitate.

2. Water softening can occur in areas where water is in contact with clays containing bentonite and natural zeolites. Calcium and magnesium from the water may be exchanged for sodium from the clay. The water tends to become rich in sodium and depleted of calcium and magnesium, thereby rendering the water soft.

3. In the presence of organic materials and methane gas, as found in many areas of Lincoln County sediments, sulphate reduction occurs in the water and results in an increase in the carbonate content of water with the release of hydrogen sulfide gas. $CaSO_4 + CH_4 = CaCO_3 + H_2S + H_2O$

Six ground water samples were collected from wells during this study. The water analyses are listed on Table 3. A bar graph (Figure 4) shows the relative mineral content of each sample. Water samples of the Hartley well, 6/10W-35B3, and the Corkhill well, 6/10W-33F1, represent ground waters from the Siletz River Volcanics. These waters are classed as sodium bicarbonate type waters. They are very soft waters having less than 20 p.p.m. hardness and are reported to have a slight sulfur odor. Sulfur odors can be removed by aeriation of the water. The iron content of these samples is well below the general standards of .3 p.p.m.. Iron staining is not reported to be a problem in the local area along the Salmon River in T. 6 S., R. 10 W.

Water from the Lincoln Beach municipal well, 8/11W-21Q1, is classed as a sodium chloride type water. This well develops ground water from the alluvial terrace sands and gravels deposited along the northern county beach areas. Some leaching of marine salts is indicated by the

Bargraphs showing chemical content of six water samples in Lincoln County.

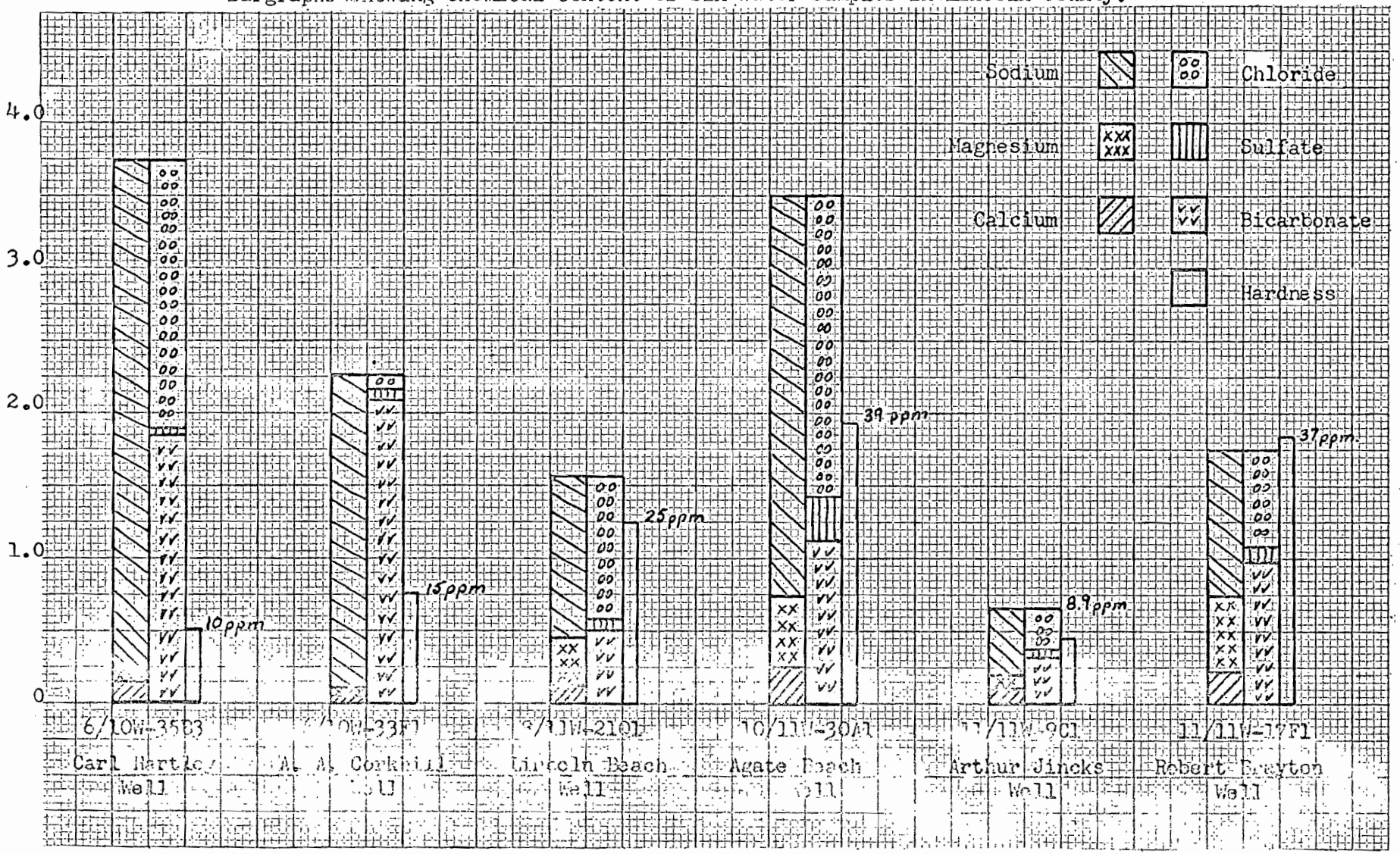


FIGURE 4

magnesium and chloride content of the water. The iron content of this sample is also reported low and should not present excessive iron staining problems. The water is expected to be corrosive since the pH is very low at 5.4. Being soft and acidic, this water can be very corrosive to water pipes and water heaters.

The Agate Beach Water District's Well #1, 10/11W-30A1, was also sampled. This water is considered to be a sodium chloride type water. More magnesium and sulfate is noted in this water sample and indicates that the water it is derived of marine sedimentary rocks. Actually the well develops water from the Astoria Formation. This water contains about 40 p.p.m. as $CaCO_3$ hardness and is rated as a soft water. However, the pH of 6.0 indicates that the water may be corrosive to metal water pipes and plumbing fixtures. Iron is not reported to be a problem in this well water.

The Jinck's well, 11/11W-9C1, is located in the Nye Mudstone Formation east of Newport, Oregon. Water from this well is very soft and considered a sodium bicarbonate type of water. The iron content is low; however, this water has a pH value of 5.2. This acidic water is expected to be very corrosive to metal pipes and fixtures. It has been estimated that the life of normal metal water pipes subjected to water of this type may be as short as 6 to 10 years.

Water from the dune sands at South Beach were sampled at the Brayton's domestic well, 11/11W-17F1. The water appears to be a mixture of water types, though it is classed as a sodium bicarbonate water and it is soft. As in the other samples the iron content is reported to be slight.

The chemical analysis of water samples listed in Table 3 of this report do not represent the quality of all of Lincoln County's ground water reservoirs. Many well owners were contacted during this

study. In the areas of marine sedimentary rocks the universal complaint of well owners has been that their well water was high in iron. Such waters stained plumbing fixtures, stained clothing washed in the water and usually had an irony taste. In some cases, a glass of water when freshly drawn from the well would be quite clear; but upon standing and mixed with air, a reddish rusty colored sediments formed and settled to the bottom of the glass. Such waters may contain several parts per million of iron.

Sulfur odors in water also seem to be a very common complaint especially in the fine grained claystone and mudstone areas of the Nye Mudstone and Toledo Formations. Deeper wells in these marine deposits often encounter high amounts of chloride in the ground water. One well near Siletz, Oregon produces ground water having 710 p.p.m. chloride. Water from this well has a flat taste. Persons with sensitive taste can usually detect chlorides in excess of 300 parts per million.

GEOLOGY

Lincoln County's land mass is composed of a thick sequence of Tertiary age rock units. The geology of the coastal areas has long been of interest to those seeking oil, gas, and coal deposits in Oregon. A brief discussion of the geologic units is presented in this report and is taken from earlier geologic reports of the U. S. Geological Survey's oil and gas investigations preliminary reports Nos. 88, 97 and 129. The title of these reports and their respective authors are listed as follows: OM-88 "Geology of the Newport-Waldport Area, Lincoln and Lane Counties, Oregon," by H. E. Vokes, Hans Norbisrath, and Parke D. Snavely, Jr., 1949; OM-97 "Geology of the Coastal Area Between Cape Kiwanda and Cape Foulweather, Oregon," by Parke D. Snavely, Jr. and H. E. Vokes, 1949; OM-129 "Geology of the Spirit Mountain Quadrangle, Northwestern Oregon," by Ewart M. Baldwin and Albert E. Roberts, 1952; "Geology of Oregon," by Dr. Ewart M. Baldwin, University of Oregon.

Dense vegetational cover and deep weathering has made field mapping of individual rock units difficult and time consuming. Most rock exposures are badly weathered and deep soil cover often obscures the various rock units. The rock formations are described in their order of occurrence from the oldest to the youngest units. It will be noted that marine deposits dominate the entire area and their uniformly poor water bearing properites plague much of Lincoln County.

Description of Rock Units and Related Water Bearing Characteristics

Siletz River Volcanics

Age and Thickness

The oldest rock formation in Lincoln County is the Siletz River Volcanics Formation. These rock units were deposited in and adjacent to the shallow marine seas and embayments of the ocean during lower and middle Eocene time, some 50 million years ago.

Though the base of the formation is not exposed in the area, the thickness has been estimated to 10,000 feet to 20,000 feet. These volcanic rocks form the core of a gentle arching fold having a southwest-Northeast axis. The community of Rose Lodge lies on the axis of the structure. The rock dips to the northwest and to the southeast at angles of 10 to 30 degrees. East of Otis, the Siletz River Volcanics dip beneath the younger sediments to the west.

The formation has developed a radial drainage pattern formed by the following named streams: Salmon River, Schnooer Creek, Drift Creek, Cedar Creek, Euchre Creek, and Upper Siletz River. The formation holds a high topographic position in the county due to its resistance to erosion and regional folding and uplift. Erosion has stripped away the younger overlying formations exposing an area of about 100 square miles of the volcanic rocks.

Aerial Distribution

The formation is well exposed in the northeastern 1/3 of the county. The outcrop varies from 4 to 5 miles in width and forms a "C" configuration through the northeastern corner of the county. The formation is covered in many areas by younger marine sedimentary formations and becomes exposed where folding has brough the formation to land surface.

These volcanic rocks outcrop 2 to 3 miles east of the coastal communities of Ocean Lake and Taft, now Lincoln City, Oregon. The contact between the Siletz River Volcanics and the younger sediments swings to the southeast toward Euchre Mountain and then leaves the county to the east.

Rock Description

The Siletz River Volcanics formed as a thick sequence of sub-marine basalt flows, pillow lavas, flow breccias, and related ash deposits. Interbedded marine sands and clays are occasionally found in this formation. The lavas are usually dark green, gray to black in color and they are fine grained. Gas holes in the rock are common and are usually filled with white to greenish zeolite minerals. As these sub-marine lavas poured out onto the sea floor the rapid cooling formed fine grained and glassy coatings on rounded "pillow structures" of lava. Steam explosions and shattering formed ejecta and breccia deposits. Extensive alterations due to cooling and shattering in sea water formed dark green volcanic glas and clusters of secondary zeolite minerals. Many fractures have been filled with secondary minerals, thereby reducing the rocks porosity. Weathered portions of this formation form yellow-clay and reddish stains soils. The Widow Creek quarry on Highway #18 near Rose Lodge exposes typical pillow basalt flows in this formation. (Figure 5A)

A. Old quarry face in the Siletz River Volcanics at Widow Creek. These sub-marine pillow lavas are not well fractured and do not yield water readily in this area.

B. Volcanic agglomerates exposed at Government Point. Rocks are jointed but poorly fractured and are not good water bearing materials.

Ground Water Characteristics

The water bearing characteristics of these volcanic rocks are largely unknown. A few domestic wells penetrate these rocks in the vicinity of Rose Lodge near the Salmon River. One of the deeper wells, 6/10W-33F1, is 215 feet deep and produces 33 g.p.m. with 150 feet of drawdown. The specific capacities of local domestic wells average about ½ gallon per minute per foot of drawdown. Therefore, low yields are thus fare indicated from shallow wells in these volcanic rocks. Deep zones of the Siletz River Volcanics have not been explored in Lincoln County. It is possible that porous interflow zones exist at moderate depths. This thick formation, therefore, presents a large area for future water well exploration. The formation outcrops in an area of high annual rainfall which may provide excellent recharge.

Wells constructed in these rocks will encounter hard rock drilling. Usually minimum amounts of well casing are required. Some broken and brecciated zones may require liner pipe to prevent caving. Small diameter 6 inch wells can be used to test the water bearing characteristics of the rocks. When justified, the 6 inch well can be reamed to a larger diameter production well.

The water quality in this formation is largely unknown. Only two local water samples from wells near Rose Lodge were collected for analysis. Table lists the results of the analysis for well 6/10W-33F1 and 6/10W-36G1. The tests indicate that the water contained in the shallower zones of this formation is a very soft bicarbonate type water. Dissolved gases in the water are common and may cause sulfur odors. Gases of this type can be readily dissipated by aeriation and usually present no water quality problem. The amounts of iron in the sampled waters is well below the standards of .3 p.p.m. iron set by the U. S. Department of Health.

Tyee Formation (Burpee Formation)

Age and Thickness

The Tyee Formation and the Burpee Formation appear to be time equivalents and will be discussed as the Tyee Formation in this report. This formation was deposited in a shallow sea 45 to 50 million years ago and is considered to be middle Eocene in age. The formation has been estimated to be 6,000 to 10,000 feet thick and it contains calcareous cemented silts and sandstones near its base where it overlies the Siletz River Volcanics.

Aerial Distribution

The Tyee sedimentary beds cover more than 60 per cent of the entire area of Lincoln County. In the central and southern portion of the county, these sedimentary rocks extend from the eastern county border to within a few miles of the coast. Almost all of the area drained by the Yaquina and Alsea Rivers and their tributaries is made up of the Tyee Formation.

Rock Description

The Tyee sediments make up a thick sequence of rhythmically bedded marine sandstones and interbedded tuffaceous clay shales. Individual sandstone beds vary from 1 to 12 feet in thickness and contain large amounts of mica. Each unit grades upward from coarse and medium grained sands to fine silty sands and finally organic clays where upon the cycle is repeated in the next overlying beds. This demonstrates that the sea advanced and retreated repreatedly over the area for an extensive period of time. The sandstones and clays are usually blue-gray in color, when fresh. Thin clay partings, carbonaceous plant debris and mica flakes best reveal the bedding planes in the Tyee formation. The interbedded clay beds are rich in organic debris and are often gray to black in color. The beds weather very easily and undercut the more resistant cemented sandstone members in exposed outcrops. (Figure 6A)

FIGURE 6

A. Rhythmic bedded sandstones and clays of the Tyee Formation near Elk City, Oregon. Springs along the upper surface of the interbedded clay are shown as dark wet zones between the sandstone members.

B. Tyee sandstone and carbonaceous clays exposed near Eddyville, Oregon. The soft shales undercut the dense cemented sandstone.

Ground Water Characteristics

The Tyee Formation offers poor prospects for the development of large capacity water wells. Several wells were attempted near Nashville in Section 36, T. 10 S., R. 8 W.. These wells were drilled to depths of 200, 120, and 73 feet and all of them were abandoned. Either the wells were dry or the water encountered was too brackish to be suitable for domestic use. Springs are used exclusively in this eastern portion of Lincoln County.

To the south near Burnt Woods and Harlin, domestic wells 80 to 90 feet deep produce adequate domestic water supplies of 4 to 10 g.p.m.. It is not uncommon for well attempts in this formation to produce less than 2 g.p.m. with excessive drawdowns. Well abandonment is common.

Surface springs are common in these flat lying sedimentary rock units. Perhaps 75 per cent of the rural domestic water supplies are obtained from springs and stream draining the formation. Dug wells 20 to 40 feet deep far outnumber drilled wells in the marine deposits. Weathered surface soil zones, alluvial fill materials, and choked stream channels form areas in which springs and dug wells are located. Large amounts of decayed timber and organic debris choke many stream channels and probably contribute to the development of the dark brown tannin waters found in surface streams during the late summer season.

Well owners of the Tyee areas usually report excessive amounts of iron and/or hydrogen sulfide gas in their well water. Fragmental plant debris is almost universally present in the fine clay beds between sandstone members and the decay of these materials is expected to affect the ground water quality in this manner.

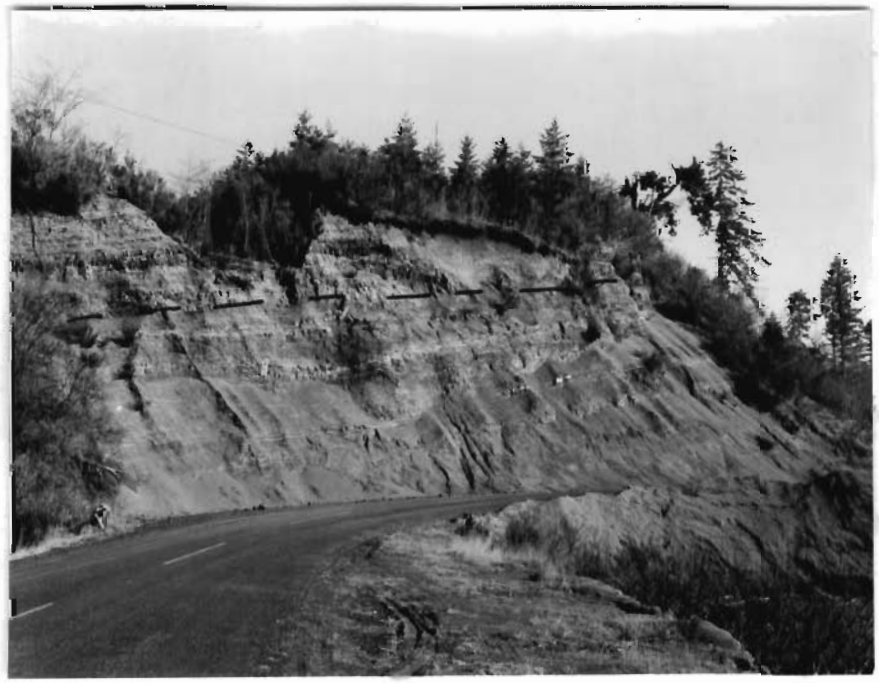
Toledo Formation

Age and Thickness

The Toledo Formation was deposited as offshore sediments during the upper Eocene and early Oligocene time, 35 to 40 million years ago.

FIGURE 7

A. Outcrop of the Upper Sandy member of the Toledo Formation as exposed near Devils Lake, Oregon. The terrace sands cover the top of the formation.



B. The Toledo Formation outcrops along the north bank of the Yaquina Bay. The Moody Shale member can be seen at the lower right. The Upper Sandy member is shown in the upper left of the picture.

This unit approaches 3,000 feet in total thickness.

Aerial Distribution

The Toledo Formation overlies the older Tyee beds and forms a narrow band, two to four miles wide that parallels the coast east of Gleneden Beach in the vicinity of Toledo, Oregon. South of Toledo, the formation outcrop swings westward and approaches to within a mile or two of the sea near Seal Rock from which it continues southward through the east half of Alsea Bay to within three miles of the Yachats River.

Near Yachats, the marine sedimentary rocks of the Toledo Formation interfinger with volcanic rocks. Most of these volcanic rocks are basaltic lava flows, flow breccias, with related feeder dikes, and sills. Interbedded coarse clastic debris within these rocks indicates that the area experienced explosive activity during the deposition of the Toledo Formation. The thickness of the volcanic rocks increases toward Cape Perpetua, an area which was closer to the center of the volcanic activity. The formation is composed of two main members and can be examined along the banks of the Yaquina River south of Toledo, Oregon.

Rock Description

Moody Shale: Schenk 8/ named the lower unit the Moody Shale. This unit is about 1800 feet thick and is dark gray to black tuffaceous mudstone that containes discontinuous limy bands of cemented siltstone. See Figure . Occasional interbeds of fine grained sandstone are present. The Moody Shale becomes increasingly tuffaceous toward the south where it interfingers with volcanic rocks in the vicinity of Yachats, Oregon. The Moody Shale weathers to soft light gray to tan flakey slopes. Landslides are commonly developed on steep well lubricated slopes of this material. Wet, tuffaceous clays in this shale are very plastic and have poor foundation characteristics. Building sites on this material must be picked with care.

Upper Toledo Sands: Approximately 1,200 feet of fine grained silty sandstones, tuffaceous sandstone, and mudstones overlie the Moody Shale member of the Toledo Formation. These sands contain a large amount of volcanic ash and fine silt. Limy concreations are often found in the fine grained micaceous siltstones and sandstones. This unit is well exposed on the north side of Yaquina Bay in Sections 35 and 36, T. 11 S., R. 11 W., and again in Section 8, T. 13 S., R. 11 W., on the north side of Alsea Bay.

Ground Water Characteristics

The Toledo Formation is a poor water bearing unit. The lower Moody Shale beds form the eastern half of the formations outcrop and contain the majority of drilled wells. A number of recent wells have been constructed in Sections 20, 29, and 30 of T. 11 S., R. 10 W. These wells represent the typical low yield wells found in this formation. Yields of ½ to 10 gallons per minute are accompanied by severe drawdowns. Well depths vary between 50 and 120 feet and water levels are usually close to land surface which indicates that most wells serve as sub-surface water storage facilities. Few wells in this formation are capable of sustained pumping yields. The average domestic well produces less than 5 g.p.m.

In 1948 the C. D. Johnson Lumber Company of Toledo, Oregon, attempted to develop two industrial wells south of Toledo. Two 10-inch wells were drilled in the NE¼ of Section 18, T. 11 S., R. 10 W. Well #1 was drilled in April 1948 to a depth of 975 feet and was abandoned as a dry hole. Saline water was encountered at a depth of 450 feet. A second well was drilled in October 1948. This well was drilled to 1,900 feet. Inflammable methane gases were found at numerous horizons in the well. Below 65 feet the water was found to be brackish and this well was also abandoned.

Landslides are common in this formation. Very old slide areas have been used as home sites and wells located on these slide masses often have above average yields. Slide masses are usually well lubricated and saturated with ground water and broken zones in the slide offer better than average well yields. A well in Section 33 of T. 10 S., R. 10 W. is 140 feet deep. The owner reports that the well never runs short of water and can pump several hours at a rate of 12 gallons per minute. During construction of this well the driller reported that a large buried log 3 feet in diameter was encounted at a depth of 130 feet.

Well owners commonly report excessive iron problems in this formation. No chemical analyses were made of water samples from the Toledo formation. Electrical conductivity water samples were collected and they show a conductivity range between 195 and 1,740 micromhos; this range in conductivity indicates that there is a wide range in the amounts of dissolved substances in these water samples. See Table 1. It is expected that some of these well water samples would show one to several parts per million of iron. Hydrogen sulfide gas odors are common in many wells near Siletz, Toledo, and Waldport. Aeriation will quickly reduce the amount of dissolved gases in well water. Several owners report cloudy, muddy well water during the rainy season which signifies leaky well casings and poor well seals. Springs and dug wells also outnumber the drilled wells in this formation.

The volcanic rocks near Yachats appear to be very tight, low yielding formations. No well log data is presently available for this area.

Intrusive Volcanic Rocks

Age and Thickness

Baldwin 1/ considers these deposits to be late Oligocene to early Miocene in age, about 30 million years old. The largest individual intrusive bodies approach 200 feet thick in thickness. They were deposited as dike and sill bodies which invaded between the layers of

bedded marine sediments of eastern Lincoln County.

Aerial Distribution

Erosion has stripped the soft sedimentary cover from these intrusive volcanic rocks. The most prominent peaks of the Coast Range Mountains are now capped by these hard, resistant, volcanic sills. They are best seen at Saddleback Mountain, Bald Mountain, Scott Mountain and at Marys Peak in Benton County. A host of feeder dikes and smaller dikes cut the bedded marine deposits of Lincoln County. Only the largest dikes, sills and stock-like bodies have been mapped. Blodgett Peak, Cannibal Mountain, and Table Mountain represent stocks and sill-like bodies of nepheline syenite in southern Lincoln County.

Rock Description

Most of these intrusive rocks are basalts and gabbros. Usually these rocks exhibit columner jointing. They are hard, dense black to light gray colored lavas. Usually the rocks are medium grained and individual crystals can be seen in the rock.

Ground Water Characteristics

Since these volcanic rocks occur in the remote mountain crest areas of the county the area remains totally undeveloped. No well records are available to assist in evaluating their ground water potential. The small areas such as Blodgett Peak and Cannibal Mountain are not expected to be suitable areas for ground water development. The larger areas in the northeastern portion of the county near Scott and Saddleback Mountains offer poor prospects for future wells. The best yields will occur in fractured rock units. Dense, massive rocks will be unproductive. It is likely that these elevated sill bodies will be well drained in permeable zones suitable for wells. These volcanic rock deposits are not considered as priority areas for well exploration due to their remote, elevated locations.

The water quality in these rocks is expected to be excellent, if available

Yaquina Formation

Age and Thickness

The Yaquina Formation is approximately 2,700 feet thick and is well exposed along the east side of Yaquina Bay in Section 2, T. 11 S., R. 11 W.. This unit was deposited in a shallow offshore environment 28 to 30 million years ago in upper Oligocene time.

Aerial Distribution

The Yaquina Formation reaches an outcrop width of over 5 miles just a half mile east of Cape Foulweather. The formation narrows rapidly northward and becomes completely covered by younger deposits at the mouth of the Siletz River. Southward from the Cape the formation width decreases to 2 miles at Yaquina Bay and narrows to about 1 mile as it meets the coastline at Seal Rock. South of Seal Rock and Waldport the formation forms a mile wide border along the coast.

Rock Description

The formation is made up of light gray to tan colored sandstones and clays. These beds often contain large amounts of carbonaceous matter and are poorly consolidated sandstones, sandy tuffs, and clays. Large quanitities of volcanic ash were deposited in these sediments and most units are described as tuffaceous. Weathering has altered the ash content to plastic clays. Some mica bearing tuffaceous sandstones occur near the base of the formation where crossbedding is characteristic. The formation often contains thin, low grade coal seams between sandstone members. These beds were laid down in shallow, brackish water tidal zones. Large amounts of organic materials were washed into the shallow seas and buried with fine grained sediments. The lower part of the formation extends southward to the Waldport area. Volcanic debris and tuffs are more common in the formation south of Seal Rock. At Seal Rock, Otter Rock, and Devils Punch Bowl coarse grained gritty sandstones contain pebbles of igneous rocks and large amounts of fossil wood. Iron sulfide

concretions are also reported to be quite common in this area. Much of the iron sulfide is probably derived from the abundant organic materials trapped in these deposits.

Ground Water Characteristics

Few drilled wells have been constructed in the Yaquina Formation. Much of the formation lies within the rugged timber lands away from populated areas. Several domestic wells near Yaquina in Section 27 of T. 11 S., R. 11 W., indicate that the Yaquina Formation is also a poor water bearing unit. Records of seven wells drilled since 1955 in this area show a total of 1,000 feet of drilling and a total yield of 15 gallons per minute. The average well depth is 143 feet and the average yield is 2.2 gallons per minute. The highest yield was 4 g.p.m..

Most of the sandstone members of the Yaquina beds are well cemented and do not carry adequate amounts of ground water for large production wells. Iron staining and sulfur odors were not reported to be a problem in this unit; however, it is expected that local areas will encounter these quality problems in this formation.

Nye Mudstone Formation

Age and Thickness

This formation overlies the Yaquina Formation and was deposited during early Miocene time some 24 to 28 million years ago. The formation is approximately 2,500 feet thick.

Aerial Distribution

The area of outcrop of the Nye Mudstone is limited to a 15 mile long segment of the Lincoln County coast between Otter Rock on the north and Beaver Creek on the south. Between these points the formation forms a shallow eastward arc or embayment that reaches its most easterly position at the head of Yaquina Bay 2 miles east of Newport, Oregon. Due east of Newport the formation reaches its maximum width of two miles.

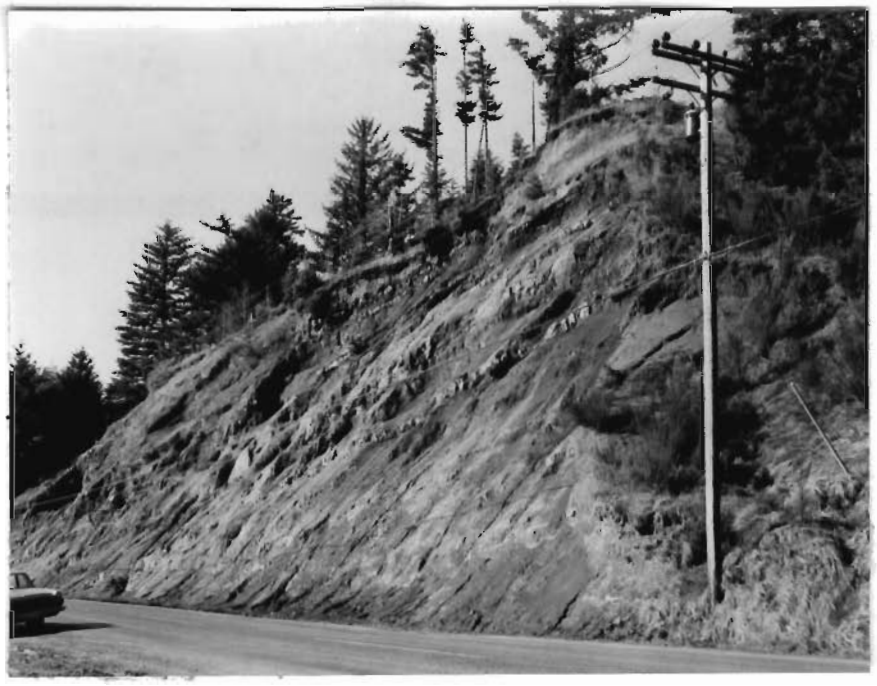
Rock Description

The Nye Mudstone as the name implies is a dark gray to black massive mudstone. Containing layers and occasional lenses of thin calcareous cemented siltstones. (Figure 8A.) The formation is exposed in road cuts east of Newport and it weathers readily to small chips and fragments of iron stained gray to brown, soft clay slopes. The formation forms a very plastic clay when disturbed by sliding or excavation. Landslides are common where this formation becomes saturated with water. Steep slopes are not common in this formation. Ancient landslides have reduced most of the deeply eroded slopes of the Nye Mudstone to hummocky slide topography. Hillside building sites should be studied closely for possible slide conditions prior to development and construction. (~~Figure~~ .)

Ground Water Characteristics

The water bearing qualities of the Nye Mudstone are poor. Very few drilled wells have been constructed in this formation. Being a fine grained, massive mudstone, the unit presents very poor aquifer properties. Occasional sandy partings carry small amounts of ground water that may be developed by large diameter dug wells.

Agate Beach Water District's Well #2 was constructed in this formation to a depth of 250 feet. The well was reported to produce 15 g.p.m. with 120 feet of drawdown which is the total available drawdown in the well. Therefore, the true yield must be even less than 15 g.p.m. for much of this yield must come from storage in the well bore. The well yield declined during the late fall of 1964. The original static water level in this well was reported to be 17 feet below land surface in February 1964. In September 1964 the pump was pulled for repairs and the static water level measured 143.80 feet below land surface. Shallow perched water bodies may have been drained near this well and the lower water levels may now represent the regional water table in these clay sediments.



A. An exposure of the Nye Mudstone approximately 1½ miles east of Newport on the Yaquina Bay road. These fine plastic clay sediments are very subject to landsliding and provide low yields to wells.

B. The Astoria Formation outcrop at Whale Cove seen in the center of the picture. A narrow coastal plain in this area is disrupted by rocky headlands.

A chemical analysis of the well water from well #2 was made in March, 1964. The tests indicated that the ground water is a very soft, bicarbonate type water that is high in iron content. See Table 3 . The water from well #2 is alkaline with a pH of 8.82 and is not expected to be corrosive.

Much of the area along the north side of Yaquina Bay is covered by active land slide masses. The Nye Mudstones are made up of plastic clays and become incompetent foundation materials when lubricated by heavy rains and ground water. Block sliding has broken many steep slopes creating sub-surface cracks and slippage plains that complicate the water bearing characteristics of the formation. Domestic wells in Sections 9 and 10, T. 11 S., R. 11 W., vary abruptly from poor to good yields over short horizontal distances. Neighboring wells in the NW¼ of the SE¼ of Section 10, T. 11 S., R. 11 W., are within 150 feet of each other. On one property five wells 98 to 130 feet in depth were drilled and abandoned as dry holes. A 50 foot well next door produces 30 g.p.m. with very little drawdown. There is no apparent correlation between the static water level in wells of this area which demonstrates that segmented blocks and perched water zones occur within slide zones.

Deep, low yielding wells have recently been abandoned in preference for surface water springs in the formation. The pollution hazard is great in these surface water sources; yet, very few surface water systems are equipped with chlorinators to eliminate bacterial pollution.

The Nye Mudstone Formation offers a poor prospect of the development of large production wells.

Astoria Formation

Age and Thickness

The Astoria Formation overlies the eroded surface of the Nye Mudstone and was deposited about 20 millions of years ago during the middle Miocene period. Pleistocene terrace materials and thin dune sands blanket much

FIGURE 9

A. Fine blue-gray sandstones of the Astoria Formation are exposed along the beach north of Yaquina Head seen in the background.

B. A close-up view of the Astoria Formation. The formation is extremely fossiliferous below the dense cemented sandstone. Spring lines emerge along the contact between the sandstone and clay members as seen at the upper right.

of the formation and obscures surface exposures. The total thickness of the Astoria beds is estimated to be about 500 feet though erosion has reduced much of the formation in Lincoln County.

Aerial Distribution

The Astoria beds are very limited in area of outcrop within Lincoln County. They occur as a scant one-half mile wide strip along the beach between Otter Rock and Agate Beach. At Newport the outcrop widens to half mile and swings out to sea below South Beach. The formation dips toward the ocean at angles of 10 to 24 degrees forming a wedge shaped sand deposit thickest near the beach areas and thinning rapidly inland.

Rock Description

Rock units in the Astoria Formation consist of soft, consolidated fine to medium grained sand and sandstone. Usually these sands are blue-gray in color and contain some volcanic ash. Interbedded with the sandstones are localized greenish-gray pebble conglomerates and white to gray tuff beds. Some hard calcareous cemented sandstone concretions occur in the lower portion of this unit. Large boulder concretions weather from the softer sands and may be found on the lower beach areas of the Lincoln County coast at Newport between Yaquina Head and Otter Rock. The formation is abundantly fossiliferous.

Ground Water Characteristics

Ground water in the Astoria Formation is contained in the soft, blue-gray medium to fine grained sandstones and greenish-gray pebble conglomerates that occur locally in the formation. These porous beds are separated by light gray to white tuff beds that act as impermeable barriers to the vertical movement of ground water.

Well #1 of the Agate Beach Water District developes approximately 20 gallons per minute with 71½ feet of drawdown from this formation. There are several domestic wells near Moloch Beach and Otter Rock that

develop adequate domestic water supplies. The water table stands about 65 feet above sea level in this area. A number of deep wells constructed into the underlying blue clays of the Nye Mudstone have been abandoned. Yields of domestic wells average less than 10 gallons per minute.

Water quality samples of the Agate Beach well #1 indicate that the water is a sodium chloride type of water. Two chemical analyses have been run on water from well #1, sampled on August 24, 1958 and February 18, 1965. Both analyses are shown in Table 3 and they compare very closely, indicating little or no change in the amounts of chloride in the water. A marked increase in the chloride content would suggest a salt water invasion from the sea; however, to date no salt water encrochment is indicated in the vicinity of Agate Beach.

Miocene Basaltic Lava Rocks

Age and Thickness

During Miocene time a variety of volcanic rock bodies were implaced in Lincoln County. These rocks are estimated to be about 12 to 15 million years old, late Miocene time. The thickness of individual units varies widely from a few 10's of feet to several hundred feet.

Aerial Distribution

The Miocene basalts form sea stacks and prominent head lands between Government Point and Seal Rocks. South of Depoe Bay the deposits reach a width of one mile. Road cuts at Otter Crest offer good exposures of these volcanic rocks.

Rock Description

Coarse, basaltic agglomerates, flows, and flow breccias make up the rocks that form Otter Rock, Yaquina Head, and Depoe Bay. These deposits overlie the Astoria formation. Intrusive plugs such as Iron Mountain are related to this volcanic rock sequence. Well developed columnar

jointing occurs at Iron Mountain and at Seal Rocks. A large number of minor feeder dikes and sill-like bodies of basalt occur throughout the county. Most are too small to be mapped. A few of the larger dikes have been used as quarry sites for road metal.

These rocks came from many local volcanic centers near the present coast line. Most of the basalts are dark gray to black in color. They are hard, dense, rocks and often well fractured. Being close to the sea, some flows poured out onto the shallow sea floor to form sub-marine pillow basalts. Water laid debris can be seen at Government Point. (Figure 5B).

Ground Water Characteristics

The water bearing characteristics of these rocks have not been demonstrated since very few wells have been constructed in these formations. One well of record has been constructed near Boiler Bay to a depth of 63 feet. This well produces 15 g.p.m. with 40 feet of drawdown. In massive unfractured zones these rocks are expected to offer low yields. This formation will probably furnish limited domestic water supplies.

No reports of water quality are available for this unit.

Dune Sands and Beach Terraces

Age and Thickness

By early Pleistocene time less than one million years ago, the coastal areas of Oregon had been subject to many periods of emergence and submergence. Drowned stream valleys were filled with coarse sand deposits and spits, bay bars, and beach sands were deposited by longshore currents and waves. Lower beach terraces now form the base of many of the dune masses in Lincoln County. Dune sands and terrace remnants average about 100 feet in thickness. These deposits thin rapidly inland from the beach areas. (Figure 10A).

Aerial Distribution

Lincoln County has four areas of dune sand and beach terrace deposits. These deposits extend from Roads End to Devils Lake; from Taft to Lincoln Beach; from South Beach to Henderson Creek; and from Fox Creek south of Seal Rocks to San Marine. Due to recent warping along the coast the terraces vary in elevation from one area to another. At Gleneden Beach and Lincoln Beach the terraces are exposed in steep wave cut cliffs 30 to 70 feet above the beach. Figure 10A Sea cliffs are absent at South Beach, San Marine, and Waconda Beaches; here, the terrace surface slopes gently to sea level and passes beneath the sea.

More than half of Oregon's coast between Ft. Stevens and Coos Bay is blanketed by dune sands of recent geologic age. Carter, Harris, and Strandberg 5/ in their studies of Oregon's dune sands for use as glass sand, state that these dunes form a narrow continuous belt of low, parallel ridges from Ft. Stevens to Tillamook. South of Tillamook the dunes are disrupted and are related to head lands and dune remnants associated with river mouths and bays between Tillamook Head and Heceta Head. From Heceta Head to Coos Bay the dune deposits become continuous, the most numerous, and largest on the Oregon coast.

Rock Description

Oregon's dune sands are very uniform in size. The Bureau of Mines Report 6484 states that the sands are sub-angular to rounded, having shiny surfaces, and they have a very narrow particle size range. Ninty-seven to one hundred per cent of the particles range from 1/2 to 1/8 m.m. in size and are retained on 35 to 120 mesh screens. The average sizes are about .25 m.m.. The sands are made up of predominately iron stained quartz and feldspar fragments. Rock fragments and heavy minerals make up the black sand concentrations of these deposits. Iron oxides stains contribute to the water quality problem. Iron concentrations at Ft. Stevens

are about 5.98 per cent Fe_2O_3 and this decreases southward to about 1 per cent at the dunes north of Alsea Bay. Iron again increases to 2.5 per cent at Heceta Beach and then reduces southward to Coos Bay. Therefore, the iron in Lincoln County's dune sands is expected to vary between 1 and 2 per cent.

Ground Water Characteristics

The dune sands and terrace deposits represent the most favorable reservoir materials in Lincoln County. Even though these sands are fine to medium grained in size they store large amounts of ground water. At Lincoln City the major portion of the dune and terrace remnants have been covered by continued urban development. The high density of septic tanks raises the question of water quality in these formations. No wells of record have been located in the Devils Lake area so the thickness of the dune sands is not known at that location.

One well was constructed in the sand spit area at the southern end of Siletz Bay. This well, 8/11W-9J1, was drilled to 150 feet in depth and was abandoned because of low yield. In the fine grained dune and terrace sands it may be necessary to install screens through most of the saturated thickness of the formation.

The most promising area for ground water development lies between Gleneden Beach and Lincoln Beach in Sections 21 and 28 of T. 8 S., R. 11 W. The terrace sands here are about 3/4 of a mile in width and 2½ miles in length. Their depth is unknown but it is estimated that about 100 feet of terrace sands are available for development. Local streams had cut their channels to the sea prior to the submergence of the coast. Dune sands filled in the old stream channels and forced the streams to alter their courses to the north or south. Fogarty Creek is an excellent example. The creek leaves

A. Coarse sand terrace deposits form steep cliffs in the vicinity of Lincoln Beach as seen in this photo. These represent water laid beach deposits and where saturated should provide good water yields to wells.

B. A close-up view of a thin gravel and sand lense in these deposits. A properly constructed and screened well in these materials should provide good yields.

the Yaquina Formation flowing westward along the lower section line of Section 21. About 1/2 mile from the beach the dune sands have caused the stream to turn south for a distance of more than one mile. See Figure 11A The dune sands give way to the volcanic rocks at Boiler Bay and Fogarty Creek is forced again to the west where it enters the sea. It is believed that well 8/11W-21Q1 was drilled in the old buried stream channel of Fogarty Creek. Well log information for the Lincoln Beach well is not available. The well is reported to be 107 feet deep and was tested at 240 gallons per minute. Slotted casing was used with a 1/4 minus gravel pack and the well continues to produce sand when pumped. The water level in this well cannot be measured; therefore, the elevation of the water table at the well site is unknown. A properly constructed screened well in this area should be capable of sand free yields in excess of 300 g.p.m..

At Gleneden Beach and Lincoln Beach the terrace deposits stand high above the beach areas. These sands are exposed in vertical sea cliffs and the underlying impervious clay formations outcrop near sea level elevations. Depressions in this buried clay surface present avenues for salt water encrochment into the fresh water sands if water levels are permitted to decline below sea level.

Salt water invasion is even more of a threat in the Waconda Beach, San Marine terrace deposits. Down warping of this portion of the coast exposes the entire deposit to direct contact with the sea. The terrace sands slope gently into the sea, no sea cliffs are present in this area. The flat swampy drainage shows that the water table in this area stands very close to land surface. At present, the high annual recharge and low well demands in this area assists in holding the salt water interface off-shore and prevents salt water contamination of the fresh water body.

At South Beach, in Sections 17, 19 and 20, T. 11 S., R. 11 W., springs occur along the western base of the dune sands. Screened wells

A. Photo of sand spit at Siletz Bay. Picture was taken from near the crest of the dune area.

B. Log in the foreground is near the crest of stabilized dune and terrace deposits at Lincoln Beach. The dune sands have blocked the drainage of Fogarty Creek. Fogarty Creek is forced to the south at this point for a distance of over 1½ miles before returning to the sea.

located within the western half of Section 17 and 20 should provide good yields if the deposits prove to be sufficiently thick. One well, 11/11W-17F1 was drilled to a depth of 55 feet and jetted an additional 10 feet to 65 feet. A water sample was collected and the results of the test are shown in Table 3. The water is soft and is reported to be low in iron content.

North of Waldport, fresh water lakes have formed where dune sands have blocked Buckley Creek and other short streams attempting to drain to the sea. These dunes are 100 feet in height, 1/4 mile wide and over 2 miles in length. Much of this area is presently under development for homesites. It is expected that a good production well can be obtained west of Highway 101 in the SW¼ of Section 7, T. 13 S., R. 11 W., south of Hidden Lake.

Large production wells in the sand dune areas should be accompanied by a program of small observation wells. These observation wells would assist in determining the thickness of the deposits and would serve as water quality points to monitor changes in salinity, and water level fluctuations could be observed periodically. Any major development of ground water from the dune sands will require careful monitoring. Exploratory drilling will be necessary to determine the thicker sections and better water bearing zones. At present, there is no well log information for water wells in the terrace deposits between Waldport and Yachats.

The water quality in the dune sands and terrace materials may be impaired by local septic drainage in areas of heavy population density. The location of these deposits, being adjacent to the sea, afford excellent views and building sites. New housing areas will soon cover much of the dune sands at Alsea Bay and Siletz Bay. Hampton 6/ pointed out in his study of "The Ground Water in Coastal Dune Areas Near Florence, Oregon 1963" that the sands are fine grained and serve as excellent filters. Special studies of bacterial pollution in California _/ have

shown that the travel of bacterial pollution in similar fine grained sands was of very limited extent. Bacterial travel in ground water in fine sands was found to be generally less than 150 feet. Bacterial pollution is not a prime threat in the dune areas. Household detergents and related chemicals often travel long distances and are, therefore, a prime threat to water quality. Only a few parts per million of a detergent is necessary to cause tap water to foam.

Iron has been the most common water quality problem in the dune sands on the coast. Hampton found that ground waters in the dunes at Florence were generally acidic with pH ranges of 5.6 to 6.2. It is assumed that similar conditions will be found in the Lincoln County dune areas.

Well Construction and Development

In hard rock formations such as the Siletz River Volcanics, rock materials are stable and firm. Ground water enters directly into uncased wells from cracks and joints in these rocks. A minimum amount of well casing should be placed in a well constructed in a consolidated rock formation. An occasional need for liner pipe to prevent caving in loose material may be expected, but any requirement for completely casing a well in a rock formation will materially reduce the wells yield, increase the pumping lift and increase construction costs. All of the water being pumped from an unperforated, cased well is forced to enter the small open end of the well casing and the well is usually very inefficient.

When a well is pumped, ground water is removed from storage in the aquifer, or water bearing formation, and the water level is lowered from its static level. The area of water level lowering around the well takes the form of an inverted cone, called the cone of depression. The depression of the water table is greatest at the well and becomes less and less at greater distances from the well. The size and shape of this

cone are controlled by the rate of pumping and the water bearing characteristics of the formation. The ability of a formation to transmit water and yield it to a well is most important. This is called permeability and it is related to the size and number of openings in a rock and to their degree of interconnection. The construction of a well is only half completed when the well is drilled to the desired depth. Development work is absolutely necessary to convert a drilled hole in the ground into a water producing well. This is especially true in fine grained unconsolidated sedimentary deposits such as dune sands and alluvial deposits.

It is expected that good well yields can be obtained from some of the thicker sand dune and terrace sand deposits of Lincoln County; however, careful well design construction, and screen development are mandatory. These unconsolidated materials will require well casing and a well screen to support the walls of the well. Slotted or perforated well casing will not be satisfactory in fine grained materials.

It is reported that the 107 foot well at Lincoln Beach was gravel packed yet this well still produces sand when pumped. Several yards of fine sand have been pumped from this well since construction in 1955. Any well that pumps sand is considered a "sick well;" formation collapse could occur at any time and destroy the well. Proper screening and well development can prevent untimely well failures and insure dependable water supplies.

It is recommended that in the construction of any well for the development of moderately large supplies of ground water that representative formation samples be taken from the well every five feet, and at every change of formation. These samples should be kept in clean containers for later testing to aid in the design of the well. The best water producing

zones should be noted and samples taken should be subject to screen analysis to determine the size range distribution. A well screen or screens can then be selected based on this information. The decision to develop a natural sand pack or to introduce a gravel pack can also be made following the sand analysis. A screen size should be selected that will permit 40 to 60 per cent of the sand formation to pass into the well screen.

Development work consists of removing the finer clay, drilling muds, and sand materials from the formation surrounding the well screen. In the event that a gravel pack is to be used, the size of the gravel pack should be no more than 5 times the average size of the sand in the water bearing formation. If the sand is a uniform fine sand, the pack material may actually be a coarse sand rather than a gravel. Choosing too large a gravel pack will reduce the wells efficiency and increase the cost of well construction. Only the most uniform, rounded materials should be used as a gravel or sand pack; 3/4 minus, 1/4 minus, or crushed rock are unsatisfactory materials. Uniform sized packing materials increase the effective well diameter and assists in obtaining a high specific capacity.

The gravel pack should not be more than 4 to 6 inches in thickness. Thicker packs prevent the development of the natural formation materials, and the fine materials cannot be drawn through the pack into the well.

The municipal well at Lincoln Beach was constructed with standard perforated casing and was gravel packed with a 1/4 minus sand and gravel. It is reported that the well produced 240 g.p.m. Higher sand free yields can be expected from properly screened wells in these sand deposits.

Ground Water Potential In Lincoln County

The ground water resources of the County are directly associated

with water bearing characteristics of the geologic rock units found within the County. In order for ground water to be collected, stored, and transmitted in usable quantities, the proper reservoir rocks must be present.

The County contains 9 geologic formations. Six of these represent 15,000 feet of marine and brackish water sedimentary rocks which cover 80 per cent of the County. As described earlier, the water bearing features of these rocks are poor. In only a few isolated cases do these rocks yield more than 5 to 10 g.p.m.. Therefore, exploration drilling for large production wells in the marine sedimentary rocks is not recommended. The water quality of these rocks is usually impaired by chloride, sulfate, bicarbonate, and iron.

The entire County can be divided into three main segments. The first and largest area is the non-productive marine rocks. The next largest area is that covered by the Siletz River Volcanics. They outcrop over about 15 per cent of the County. These rocks are located in the more remote and undeveloped mountainous terrain in the NE portion of the County. Except for shallow domestic wells along the Salmon River, the formations water bearing properties remain untested and unexplored. It is very possible that good productive zones lie at moderate depths of 200 to 600 feet in these rocks. Before being abandoned, the formation should be tested.

It is common that coarse alluvial fan deposits of sand and gravel are located in stream channels adjacent to the borders of hard resistant rock bodies. The gravel deposits occur where streams change to flatter gradients and drop the coarser sands and gravels. Should such deposits actually exist around the edges of the Siletz River Volcanics they have now been covered by subsequent fine grained sediments and they cannot

be located by surface observations. The following areas appear favorable for subsurface exploration:

1. Schooner Creek area, NE¼ of Section 25, T. 7 S., R. 11 W.

2. South of the Siletz River the NE¼ of Section 19, T. 9 S. R. 9 W. The gravel pit near this location suggests excellent well yields if the gravels prove to be sufficiently thick for ground water development.

3. Cedar Creek area the SE¼ of Section 5, T. 9 S., R. 10 W.

The most promising areas for large production water wells are the dune sand and terrace deposits along the coast. These deposits are limited in area and thickness, but they are both porous and permeable. Five areas were picked as presenting good well possibilities. A properly designed well at these sites should develop good yields of sand free water. These prospective well sites are located from north to south as follows:

A. Devils Lake area in NE¼ of Section 15, T. 7 S., R. 11 W. The depth of sand may be very thin in this area.

B. Baldy Creek area, near the center of Section 22, T. 7 S., R. 11 W.

C. Fogarty Creek area in NW¼ of Section 28, T. 8 S., R. 11 W. southwest of the present Lincoln Beach municipal well.

D. Hidden Lake area in the SW¼, Section 7, T. 13 S., R. 11 W.

E. Waconda Beach area in the NE¼ of Section 1, T. 14 S., R. 12 W.

Surface streams draining the Siletz River Volcanics are expected to have better water quality and more uniform summer flows than streams draining the sedimentary areas. Storage sites will also be more stable in the volcanic rocks. Since Lincoln County enjoys an abundant annual

rain fall surface water storage will no doubt supply most of the needed water resources for future years. Ground water supplies are not plentiful within the County and can only be expected to compliment surface water sources.

Table [illegible] --Records of representative wells in Lincoln County

Type of well: Dg, dug; Dr, drilled; D, driven.

Finish: P, casing perforated; location of perforations given in feet below land surface; O. E., open end casing; G, gravel packed.

Altitude: Altitude of land surface at well site in feet above mean sea level as interpolated from topographic maps.

Water level: Depths to water given in feet and decimal fractions are measured; those given in whole feet reported by the well owner or driller.

Type of pump: C, centrifugal; J, jet; N, none; S, submersible; T, turbine.

Well performance: Yield, in gallons per minute; drawdown, in feet below static water level, information reported by owner, operator, driller or pump company. Bailed yields are indicated by "b."

Use: D, domestic; Ind, industrial; Irr, irrigation; N, none; PS, public supply; S, stock.

Remarks: Log, drillers log of well listed in Table #2; Remarks on adequacy and dependability of water supply and general water quality are as reported by owners or operators.

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE(S)			ALTITUDE (FEET)	WATER LEVEL		TYPE OF PUMP AND HP	WELL PERFORMANCE		USE	REMARKS
								DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL		FEET BELOW DATUM	DATE		YIELD (GPM)	DRAWDOWN (FEET)		
T. 6 S., R. 10 W.																		
25M1	Helen Spencer	Dr	1963	68	6	7	Uncased 7 to 68	28	31	Gray sandstone	235	13	8-19-63	J, 1/3	½	40	D	
25P1	Les Fox	Dr	1963	46	6	20	Uncased 20 to 46	28	34	Gray sandstone	245	14	8-11-63	J, 1/3	8	20	D	
30G1	Loyd Wallace	Dr	1960	40	6	22	Uncased 22 to 40	35	5	Clay shale	30	7	4-21-60	J	b,9	20	D	Log
30M1	A. Voigtle	Dr	1964	32	6	22	Uncased 22 to 32	29	3	Small gravels	30	7.89	10-30-64	N	b,10	14	N	Log, temp. 49°
31K1	Clifford Orth	Dr	1964	92	6	64	Uncased 64 to 92	64	4	Broken claystone	520	42	8-13-64	N	25	10	PS	Log, Well #2
31Q1	Clifford Orth	Dr	1964	128	6	81	70P, 64 to 70	92	11	Broken claystone	560	32	8-6-64	N	10	52	PS	Log
33D1	Harley Vest	Dr	1960	120	6	21	Uncased 21 to 120	37	80	Basalt	40	12	4-11-60	J	1	80	D	Log
33F1	Albert Corkhill	Dr	1964	215	6	21	Uncased 21 to 215			Basalt	84	49.79	2-26-65	S, 3	33	150	D,Irr	Log, temp 51 F, spec. cond. 209
34K1	E. S. Nedwill	Dr	1958	65	6	22	Uncased 22 to 65	32	28	Weathered basalt	140	18	8-14-58	J, 1/2	7	40	D	Log
34K2	R. Rogers	Dr	1961	80	6	15	Uncased 15 to 80	39	29	Basalt	150	12	8-21-61	J, 1/2	2	50	D	Log
34N1	H. P. Oliver	Dr	1958	49	6	30	Uncased 30 to 49	30	16	Weathered basalt	110	14	7-24-58	J	11	35	D	
34P1	John F. Holliday	Dr	1962	38	6	14	Uncased 14 to 38	26	6	Basalt	125	4	3-14-62	N	3	22	N	Log
34P2	A. L. Gott	Dr	1958	57	6	22	Uncased 22 to 57	22	32	Weathered basalt	125	12	8-4-58	J, 1/2	12	30	D	Log
34Q1	Harry Davenport	Dr	1960	67	6	22	Uncased 22 to 67	58	4	Basalt	130	28.07	10-30-64	J, 1/3	b,7	35	D	Log, temp 52 F spec. cond. 187

Table 1. -- Records of representative wells in Lincoln County --Continued

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE(S) DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL	ALTITUDE (FEET)	WATER LEVEL FEET BELOW DATUM	DATE	TYPE OF PUMP AND HP	WELL PERFORMANCE YIELD (GPM)	DRAWDOWN (FEET)	USE	REMARKS
T. 6 S., R. 10 W. - Continued																		
34Q2	William Sharp	Dr	1963	65	6	24	Uncased 24 to 65	38	19	Basalt	130	12	6-26-63	J	6,5	40	D	Log
34Q3	Lavine Hackett	Dr	1961	58	6	13	Uncased 13 to 58	47	5	Basalt	130	10	9-11-61	J, 1/2	10	20	D	Log
35B2	F. M. Huffman	Dr	1961	90	6	12	Uncased 12 to 90	50,70	1	Basalt	182	25.30	2-17-65	J, 1/2	1½	40	D	Log, sulfur odor temp 52°F spec.cond. 430.
35B3	Carl Hartley	Dr	1963	68	6	20	Uncased 20 to 68	34,52	5,11	Basalt	183	14	8-4-63	J, 1/3	1½	45	D	Log, sulfur odor, gas temp 52, spec.cond. 330
35B1	K. A. Hartberg	Dr	1963	65	6	9	Uncased 9 to 65	28,49	1,7	Basalt	140	14.80	2-17-65	J, 1½	8	40	D	Log, sulfur odor temp 52, spec.cond. 158
35F2	L. C. Tutt	Dr	1958	75	6	23	Uncased 23 to 75	22	44	Basalt	170			J, 1	15	30	D	Log
T. 6 S., R. 11 W.																		
35N1	Ed Granum	Dr	1962	205	6	205	230P, 90 to 205	150	10	Broken claystone	180	100	11-2-62	S, 3/4	6,22	40	D	Log, well deepened from 130 to 205'
35N2	Theodore Swett	Dr	1961	155	6	155	P, 95-155	47	50	Claystone	180	105.56	10-30-64	S, 3/4	6.12	36	D	Log, temp 52 F, spec.cond. 254
35N4	A. J. Whitley	Dr	1962	150	6	39	6P	35	3	Claystone	150	36.70	10-30-64	N	6,3	93	N	Log, uncapped
36G1	Clifford Orth	Dr	1964	136	6	40	Uncased 40 to 136	56	1	Claystone	160	31	8-20-64	N	7	34	D	Log
36F1	Mel Tappert	Dr	1963	161	6		Uncased 0 to 161	Dry		Claystone	82	Dry	7-5-63	N	Dry		D	Log, well abandoned
T. 7 S., R. 11 W.																		
25G1	Harvey Hill	Dr	1959	74	6	38	Uncased 38 to 74	64	10	Sandstone	39	1	4-9-59	J, 1/3	3	48	D	Log, high in iron, spec.cond. 1180
T. 8 S., R. 10 W.																		
17K1	A. E. Howard	Dr	1953	118	6	50	Uncased 50 to 118				29	21.40	9-15-64	J, 1/2			D	
17P1	A. E. Howard	Dr	1961	100	6			11	53	Claystone	33	5	1-25-61	N				Log, well abandoned, water milky at 50'
19Q1	K. Bales	Dr	1962	80	6	80	P, 74 to 80	66	14	Broken sandstone	36	11	3-29-62	S	12	20	D	Log
T. 8 S., R. 11 W.																		
2P1	Kernville-Cloverden Beach Lincoln Beach Water District	Dr	1958	200	8	139	G, 20-139 302P, 51-73; 120-139	51	22	Broken sandstone	160	36.08	9-15-64	S	6	80	PS	G-879, G-786, Water Rights
9J1	Salishan Properties, Inc.	Dr	1962	150	6			Dry		Sandstone & clay	40	Dry	5-2-62	N	Dry		D	Log, well abandoned
21Q1	Lincoln Beach Water District	Dr	1955	107	10		G,			Terrace Sands	90	60	7-30-55	T, 15	240		PS	GR-3701, GR-3913 Water Rights temp 52°F, Spec. Cond. 148

Table 1. --Records of representative wells in Lincoln County --Continued

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE(S) DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL	ALTITUDE (FEET)	WATER LEVEL FEET BELOW DATUM	DATE	TYPE OF PUMP AND HP	WELL PERFORMANCE YIELD (GPM)	DRAWDOWN (FEET)	USE	REMARKS
T. 8 S., R. 11 W. - Continued																		
32K1	A. G. Harbough	Dr	1956	63	6	11	Uncased 11 to 63	52	11	Basalt	52	15.81	9-15-64	J, 1/2	15	40	D	Log, serves 2 families Spec. cond. 425
T. 9 S., R. 11 W.																		
32Q1	Jim C. Gross	Dr	1963	163	6	82	Uncased 82 to 163	135	4	Broken claystone	100	28	9-15-63	J	b,12	12	D	Log, spec. cond. 760
32Q2	Richard F. Thomas	Dr	1963	168	6					Clay	65	Dry	9-25-63	N	Dry		D	Log, well abandoned
32Q3	Richard F. Thomas	Dr	1963	65	6	53	P, 23-53	35	30	Broken claystone	65	26.68	9-15-64	J, 3/4			D	Log
32Q4	Max I. Anhoury	Dr	1963	84	6	68½	G, 30-70 68P 45-68½	45	23	Claystone	55	30	10-10-63	S, 1/2	10	10	D	Log
T. 10 S., R. 8 W.																		
36K1	Ted Harmsen, Sr.	Dr	1950	200	6					Clay	350			N			D	Springs used for domestic use. Well abandoned, salt water
36K2	Ted Harmsen, Sr.	Dr	1943	120	6			80	5	Clay	350	80	1943	N			D	Well abandoned, salt water
36P1	Ted Harmsen, Jr.	Dr	1962	73	8					Clay	260	Dry	7-29-62	N	Dry		D	Log, well abandoned, 8-inch bit left in well
T. 10 S., R. 9 W.																		
4D1	Logsden Mennonite Church	Dr	1962	21	6	21	O. E.	10	11	Sand & gravel	190	7	5-10-62	J	10	3	D	Log
19N1	Mrs. Porter	Dr	1956	37	6	36	8P, 28-32	25	10	Broken sandstone	200	25	8-28-56	J, 1/2	7	10	D	Log
29N1	T. V. Rose	Dr	1958	72	6	27	Uncased 27 to 72	25	28	Sandstone	86	25	7-18-58	J, 1/2	4	35	N	Log
29N2	Crosby Photo Shop	Dr	1955	40	6	40	O. E.	15	30	Gravel	78	15.48	9-17-64	J, 1/2	5	15	D	
33C1	Charles Shuster	Dr	1956	45	6	18	Uncased 18 to 45	27	6	Sandstone	40	10	10-23-56	J	b,9	30	D	Log, temp. 49° F.
T. 10 S., R. 10 W.																		
3H1	Don Pressey	Dr	1961	85	6	60	Uncased 60 to 85	18	62	Claystone	120	17.98	9-16-64	S	5		D	710 ppm Chloride, spec. cond. 2180.
4N1	J[illegible]s Collister	Dr	1962	31	6	30	O. E.	15	10	Sand & gravel	220	10	7-15-62	J, 1/2	4	25	D	Log
17A1	W[illegible]ard Kennel	Dr	1960	69	6	3[illegible]	36P, 29-35	47	14	Sandy claystone	155	15.38	9-16-64	J	8	53	D	Log
17A2	Clarence Weaver	Dr	1960	66	6	66	34P, 29-35	52	[illegible]1	Broken claystone	150	9.57	9-16-64	S			D	Log, water tre[illegible] to remove iron spec. cond. 165

Table 1. --Records of representative wells in Lincoln County --Continued

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE(S)			ALTITUDE (FEET)	WATER LEVEL		TYPE OF PUMP AND HP	WELL PERFORMANCE		USE	REMARKS
								DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL		FEET BELOW DATUM	DATE		YIELD (GPM)	DRAWDOWN (FEET)		
T. 10 S., R. 10 W. - Continued																		
17H1	David Todd	Dr	1962	41	6	41	O. E.	5	20	Broken claystone	245	2.44	9-16-64	J, 1/2	10	36	D	Log, hydrogen sulfide odor
25A1	Franklin Cox	Dr	1964	76	6	37	Uncased 37 to 76	48	76	Broken sandstone	190	33.89	9-18-64	S	1½	Total	D	Log
32G1	Ross Reid	Dr	1962	51	6	51	O. E.	43	8	Coarse sand	70	21.98	9-18-64	J	8	6	D	Log
32Q1	Matthew Gruber	Dr	1962	42	6	42	O. E.	35	7	Small gravel	85	11.60	10-2-64	J	4	35	D	Log
33G1	John Dorry	Dr	1963	140	6	132	Uncased 132 to 140	50	130	Claystone	75	52.10	10-29-64		12		D	Log, old landslide area spec. cond. 1740
33J1	Joe Rogers	Dr	1962	80	6	20	Uncased 20 to 80	12	58	Claystone	49	12	10-9-62	J	1	45	D	Log
36A1	Alfred Jones	Dr	1962	68	6	32	Uncased 32 to 68	62	6	Claystone	40	23	9-21-62	S	8	46	D	Log, hydrogen sulfide gas, iron
36A2	V. D. Landess	Dr	1964	50	6	21	Uncased 21 to 50	46	4	Broken claystone	35	10.02	10-29-64	S, 1/2	8	26	D	Log, hydrogen sulfide gas, iron
T. 10 S., R. 11 W.																		
5J1	State Highway Comm.	Dg	1951	17				4	12	Sandstone	20	7	1951	N	45	2	Irr	GR-2196, well abandoned
20D1	Anthony Bianco	Dr	1960	90	6	31	Uncased 31 to 90	40	10	Sandstone	120	45	6-10-60	J	b,6	40	D	Log, sulphur, spec. cond. 880
20D2	Roy Pence	Dr	1963	115	6	114	O. E.			Claystone	120			J			D	Well abandoned
20E1	Ray Thomas	Dr	1959	83	6	66	Uncased 66 to 83	25	32	Sandstone	125	23	3-19-59	J, 1/2	b,8	47	D	Log
28N1	Agate Beach Water District	Dr	1958	31	6			Dry		Claystone	160	Dry	5-28-58	N			PS	Well abandoned
29C1	Agate Beach Water District	Dr	1964	250	6	240	G, 24-60 206P, 60-80 140-240	59	109	Broken claystone	220	143.80	9-15-64	S, 3	15	120	PS	Log
30A1	Agate Beach Water District	Dr	1958	108½	10	106½	G 240P, 76-106	21	100	Sand & claystone	90	46.40	9-16-64	T, 5	20	71½	PS	Log, temp 52°F, spec. cond. 285
30A2	Agate Beach Water District	Dr	1958	56	14			Dry		Claystone	80		7-15-58	N			PS	Log, well abandoned
30A3	Agate Beach Water District	Dr	1958	152	6			Dry		Claystone	90	Dry	11-6-58	N			PS	
30H1	Agate Beach Water District	Dr	1958	159	[illegible]			Dry		Claystone	100	Dry	[illegible]	N			PS	Log, well abandoned

Table 1. --Records of representative wells in Lincoln County --Continued

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE (S)			ALTITUDE (FEET)	WATER LEVEL		TYPE OF PUMP AND HP	WELL PERFORMANCE		USE	REMARKS
								DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL		FEET BELOW DATUM	DATE		YIELD (GPM)	DRAWDOWN (FEET)		
T. 11 S., R. 8 W.																		
17B1	C. O. Marshall	Dr	1963	63	6	34	Uncased 34 to 63	15	13	Sandy clay	245	25.36	10-29-64	J, 3/4	b,10	36	D	Log
24C1	LaVerne Perry	Dr	1956	69	5	23	Uncased 23 to 69	30	30	Claystone	680	30	7-30-56	J, 1/2	b,5		D	
T. 11 S., R. 9 W.,																		
9H1	Eddyville School	Dr	1957	70	8	49	Uncased 49 to 70	29	31	Claystone	125	30.83	10-29-64	T, 3	b,10	29	D	Well used as standby
13F1	A. A. Willoughby	Dr	1956	35	6	25	Uncased 25 to 35	31	4	Sandstone	148	20	10-25-56	N	b,8	11	D	Log
T. 11 S., R. 10 W.																		
5Q1	Louis Boyd	Dr	1959	100	6	30	Uncased 30 to 100	91	6	Black sandstone	70	48.15	9-17-64	J, 3/4	b,8	25	D	Log
5Q2	L. H. Hamilton	Dr	1959	94	6	33	Uncased 33 to 94	84	3	Black sandstone	80	27.52	9-18-64	J, 1/2	b,8	40	D	Log
6Q1	Opal Bates	Dr	1962	60	6	33	Uncased 33 to 60	20	5	Claystone	55	11.68	9-17-64	J, 1/2	b,2	50	D	Log
8F1	Raymond Dalbey	Dr	1962	54	6	54	O. E.	36	44	Claystone	160	30.94	9-17-64	J	b,5	9	D	Log, spec. cond. 182
18A1	Georgia Pacific Lumber Company	Dr	1948	1000	10					Sand & claystone	15			N	Dry		Ind	Log, well abandoned
18B1	Georgia Pacific Lumber Comapny	Dr	1948	1900	10					Sand & claystone	20			N	Dry		Ind	Log, well abandoned
19F1	Ernest Benton	Dr	1958	42	6	42	P, 34-42	34	8	Broken claystone	150	27.23	9-12-64	S			D	Log
20I1	Anna Davenport	Dr	1962	87	6	50	Uncased 50 to 87	70	17	Broken claystone	220	53.14	9-17-64	S	b,10	8	D	Log, temp 52 F, spec. cond. 198
20K1	Donald Thornton	Dr	1959	130	6	106	6P, at 65	65	10	Broken claystone	195	60	8-19-59	N	b,13	30	D	Log
20P1	John Lynett	Dr	1959	95	6	65	Uncased 65 to 95	34	31	Blue claystone	175	34	4-11-59		b,15	31	D	Log
29E1	Leo Jones	Dr	1961	65	6	12	Uncased 12 to 65	60	5	Blue claystone	30	8	7-8-61	J	b,5	Total	D	Log
29E2	Emil [illegible]mann	Dr	1961	80	6	[illegible]0	Uncased 50 to 80	40	20	Soft claystone	180	29.50	9-17-64	S, 3/4	b,7	15	D	
29E3	Eugene Gein	Dr	1960	50	6	33	Uncased 33 to 50	42	8	Sandstone	185	32.35	9-17-64	J, 3/4	b,8	8	D	
29E4	[illegible] Hamrick	Dr	1961	67	6	30	Uncased 30 to 67	30	[illegible]	Sandstone	37	36.87	9-17-64	S	b,10	15	D	Hydrogen sulfide, iron
29E5	[illegible]	Dr	1959	60	6	14½	Uncased 14½ to 60	50	10	Sandstone & claystone	50	32	9-10-[illegible]		b,6		D	Log, temp. 53° F.
29H1	[illegible] Huntsucker	Dr	[illegible]	60	6	[illegible]	P, 46 -58	18	26	Blue clay	70	18	7-18-60	J	b,12	40	D	Log, spec. cond. 320
29H2	Charles Eden	Dr	1960	75	6	[illegible]	Uncased 44 to 75			Blue clay	50	Dry	June, '62	N	b,4	40	D	Dry 1962, [illegible]ed

Table 1. --Records of representative wells in Lincoln County --Continued

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE(S) DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL	ALTITUDE (FEET)	WATER LEVEL FEET BELOW DATUM	DATE	TYPE OF PUMP AND HP	WELL PERFORMANCE YIELD (GPM)	DRAWDOWN (FEET)	USE	REMARKS
T. 11 S., R. 10 W. - Continued																		
29M3	Charles Eden	Dr	1962	100	6	27	Uncased 27 to 100	95	10	Fine sand	40	30	-9-4-62	J	b,4	25	D	Log, filled with sand to 28', well abandoned, dry
29M4	Jim Tuff	Dr	1960	55	6	44	Uncased 44 to 55	10	33	Claystone	115	4	7-19-60	J	b,5	50	D	Log
30A1	Wm. Sallee	Dr.	1964	104	6					Claystone	50	Dry	9-17-64	N	Dry		D	Log, abandoned, dry
30A2	Philip Krause	Dr	1963	80	6	34	Uncased 34 to 80	38	2	Broken claystone	65	26	10-12-63	N	b,½	Total	D	Well abandoned, capped
30B1	Robert Gordon	Dr	1963	58	6	50	P, 30-50	23	27	Blue claystone	80	25.22	9-18-64	S	b,5	20	D	Log, water discolored after heavy rains
30B2	Philip Krause	Dr	1963	68	6	60	Uncased 60 to 68	57	11	Broken gray claystone	120	39	10-16-63		b,5	20	D	Log
T. 11 S., R. 11 W.																		
2D1	Betty McCrae	Dr	1962	67	6	48	P, 38-48	23	2	Sandstone	290	36.60	10-28-64	S	b,8	23	D	Log
7H1	A. O. Nesheim	Dr	1957	76	6	64	Uncased 64 to 76	47	29	Soft claystone					b,15	12	D	Log
9C1	Arthur Jincks	Dr	1963	80	6	58½	80P, 32-58	44	28	Gray claystone	210	30	10-15-63	S	b,16	10	D	Log, ¼ yd. gravel placed in bottom of well
10K1	R. J. Snyder	Dr	1958	50	6	40½	56P, 28-40	41	9	Claystone	50	33.23	10-28-64	T, 3	b,30		D	Log
10K2	Louis Chabot	Dr	1961	98	6	24	Uncased 24 to 98	Dry		Black claystone	40	Dry	11-24-61	N	Dry		D	Log, well abandoned 5 wells attempted & abandoned
10K3	Lyle Atkinson	Dr	1962	75	6	30	Uncased 30 to 75	48		Claystone	85	48	10-23-62	S			D	Log
11	Mary Wallace	Dr	1960	100	6	63	Uncased 63 to 100			Claystone	40	40	7-3-60		b,3		D	
16Q1	B. D. Mobley	Dr	1962	30	6	30	P, 25-30	15	15	Sand & claystone	40	19	7-26-62	J, 1/2	b,3	20	D	Log
17F1	Robert Brayton	Dr,Dn	1960	55	6	55	O. E.	50	15	Sand	45	50	9-29-60	J, 1/2	b,4		D	Log, temp 51°F, spec. cond. 140
22K1	Don Swift	Dr	1959	100	6	46	Uncased 46 to 100	92	8	Claystone	125	37	6-19-59	J, 3/4	b,20	18	D	Log, serves 3 homes and Yaquina Marina Spec. cond. 195
27A1	Robert Bailey	Dr	1959	123	6	18	Uncased 18 to 123	28	30	Sandstone	185	17.98	10-28-64	S	b,3		D	Log
27B1	Robert Jones	Dr	1963	196	6	45	Uncased 45 to 196			Claystone	60	36	5-31-63	J	b,1	Total	D	Log
27B2	Robert Jones	Dr	1962	67	6	67	P, 27-33, 53-67	20	5	Pebble conglomerate	[illegible]	22	9-4-62	J	b,2	52	D	
27F1	W. R. Meade	Dr	1961	133	6	34	Uncased 34 to 133	133	[illegible]	Blue sandstone	150	29	7-4-61	J	b,4	Total	D	Log

Table 1. --Records of representative wells in Lincoln County --Continued

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE(S) DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL	ALTITUDE (FEET)	WATER LEVEL FEET BELOW DATUM	DATE	TYPE OF PUMP AND HP	WELL PERFORMANCE YIELD (GPM)	DRAWDOWN (FEET)	USE	REMARKS
T. 11 S., R. 11 W. - Continued																		
27F2	DunFra Corp.	Dr	1962	230	6			Dry		Claystone	120	Dry	7-28-62	N	Dry		D	Log, well abandoned and filled
27F3	DunFra Corp.	Dr	1962	100	6	43	Uncased 43 to 100	90	10	Claystone	20	10.90	10-28-64	J	b,4	Total	D	Log
T. 12 S., R. 8 W.																		
7M1	Delbert Kessi	Dr	1960	76	6	25	Uncased 25 to 76	28	20	Brown sandstone	220	28	10-19-60		b,3	45	D	Log
8F1	3G Lumber Company	Dr	1957	100	6	26	Uncased 26 to 100	39	34	Soft sandstone	250	20	4-10-57	J	b,7		D	Log
8L1	Lincoln County School District	Dr	1962	88	8	41	Uncased 41 to 88	80	8	Broken sandstone	240	16	8-17-62		b,16	56	D	Log, Harlan School
8R1	Assemblies of God Church	Dr	1960	94	6	30	Uncased 30 to 94	39	1	Claystone	260	39	9-19-60	N	b,½	Total	D	Log, abandoned
12H1	U.S.Forest Service	Dr	1958	90	6	72	Uncased 22 to 90			Sandstone	200			J, 1	b,8		D	Log, Siuslaw National Forest, Mary's Peak Dist.
T. 12 S., R. 11 W.																		
18D1	Mr. Stovall	Dr	1960	40	6	32	P, 21-31			Sand and clay	40			J	b,7	10	D	Log, motel use
T. 12 S., R. 12 W.																		
25A1	Louis Southworth	Dr	1960	109	6	60	Uncased 60 to 109	51	9	Blue sandy clay	45	55	6-10-60	S	b,4		D	Log, temp 51°F, spec. cond. 600
25Q1	C. Passmores	Dr	1960	103	6	25	Uncased 25 to 103	90	13	Claystone	60	8	5-9-60	S	b,4	Total	D	Log, well not used at present
T. 13 S., R. 9 W.																		
31E1	Charles L. Gidley	Dr	1961	70	6	32	Uncased 32 to 70	35	17	Blue sandstone	70	35.68	10-26-64	S			D	Log
T. 13 S., R. 10 W.																		
30R1	Deans Landing	Dr	1958	68	6	48	Uncased 48 to 68	47	20	Blue sandstone	16	1.16	10-26-64	S, ½			D	Log
31A1	Keith Taylor	Dr	1960	96	8	70	Uncased 70 to 96	58	9	Brown sandstone	18	5.00	10-26-64	S, 1	b,12		D	Log, Taylor's Landing
35H1	N. A. Barclay	Dr	1961	75	6	24	Uncased 24 to 75	20	55	Blue sandstone	40	23	1-30-61	J, 1	b,2½		D	Log
T. 13 S., R. 11 W.																		
26F1	Donald Tillenes	Dr	1963	52	6	40	Uncased 40 to 52	34	3	Broken sandstone	20	4.99	10-27-64	S	30	22	D	Log

Table 1. --Records of representative wells in Lincoln County --Continued

WELL NUMBER	OWNER	TYPE OF WELL	YEAR COMPLETED	DEPTH OF WELL (FEET)	DIAM. OF WELL (IN.)	DEPTH OF CASING (FEET)	FINISH	WATER-BEARING ZONE(S)			ALTITUDE (FEET)	WATER LEVEL		TYPE OF PUMP AND HP	WELL PERFORMANCE		USE	REMARKS
								DEPTH TO TOP (FEET)	THICKNESS (FEET)	CHARACTER OF MATERIAL		FEET BELOW DATUM	DATE		YIELD (GPM)	DRAWDOWN (FEET)		
T. 13 S., R. 11 W. - Continued																		
27D1	Harry Ulrey	Dr	1960	62	8	22	Uncased 22 to 62	9	36	Blue sandstone	20	11.70	10-27-64	S	b,15		D	Log, trailer court
27D2	Leo Glasgow	Dr	1960	30	6	30	O. E.	10	30	Sand and clay	22	10	9-21-60		b,7	10	D	
27E1	Whitney Green	Dr	1962	71	6	19	Uncased 19 to 71	68	71	Blue sandstone	30	15.53	10-27-64	S, 1/2	b,8	69	D	Log
27E2	Carlin S. Maxwell	Dr	1958	85	6	36	Uncased 36 to 85	79	6	Blue claystone	27				b,10	25	D	Log
27F1	Harry Thissell	Dr	1963	121	6	48½	Uncased 48½ to 121	30	11	Sand & broken claystone	90	33	4-29-63		b,6	77	D	Log
27G1	Edward Martin	Dr	1957	78	6	15½	Uncased 15½ to 78	60	20	Gray sandstone	25	13	9-4-57	S, 1	b,15	45	D	Log, Drift Cr. Landing Spec. cond. 178
27H1	York Wyman	Dr	1962	41	6	26	Uncased 26 to 41	25	41	Gray sandstone	20	16.29	10-27-64	S	b,12	15	D	Log
27J1	John Oakland	Dr	1962	45	6	45	O. E.	27	38	Brown claystone	200	25.27	10-27-64	J	b,10	13	D	Log, spec. cond. 38
27J2	William Kelley	Dr	1963	95	6	30	Uncased 30 to 95	44	50	Broken claystone	200	44	4-13-64	S	b,6	38	D	Log
27M1	John Willis	Dr	1959	130	6	48½	Uncased 48½ to 130			Claystone	110			J	b,5	80	D	Log
T. 14 S., R. 9 W.																		
2Q1	George Stouder	Dr	1955	50	6	35	Uncased 35 to 50	25	7	Gravel	210	25.24	10-27-64	S	b,5	20	D	Log
T. 14 S., R. 11 W.																		
5D1	Leland Kropf	Dr	1960	50	6	43	Uncased 43 to 50	30		Sandstone	320	30	8-10-60	S	b,6	20	D	Log

Table 2 Logs of Representative Wells

Well No. 6/10W-25M1

Owner: Helen A. Spencer Owner's No. 1

Driller: Kulick Well Drilling Date Drilled 8/19/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black	0	2	2
Inter-bedded Sedimentary rocks:			
Clay, yellow with large boulders.	2	7	5
Claystone, hard gray.	7	28	21
Sandstone, hard gray.	28	68	40

Casing: 6-in. to 7 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10-25P1

Owner: Les L. Fox Owner's No. 1

Driller: Kulick Well Drilling Date Drilled 8/8/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black	0	2	2
Inter-bedded Sedimentary rocks:			
Clay, yellow with small boulders.	2	14	12
Sandstone, hard gray.	14	28	14
Sandstone, gray, water bearing.	28	42	14
Claystone, gray	42	46	4

Casing: 6-in. to 20 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-30G1

Owner: Loyd Wallace Owner's No.

Driller: Kulick Well Drilling Date Drilled 4/21/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil	0	2	2
Clay, yellow	2	18	16
Toledo formation:			
Rock, gray, hard	18	28	10
Claystone	28	30	2
Sandstone, gray, hard	30	35	5
Claystone, water-bearing	35	40	5

Casing: 6-in. to 22 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-30M1

Owner: A. Voigtle Owner's No.

Driller: Kulick Well Drilling Date Drilled 4/9/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black.	0	4	4
Clay, yellow	4	16	12
Claystone, hard, gray.	16	29	13
Gravel, small, water bearing	29	32	3
Casing: 6-in. to 22 ft.			

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-31K1

Owner: Clifford Orth Well #2 Owner's No.

Driller: R. J. Strasser Drilling Company Date Drilled 8/13/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil	0	3	3
Clay, brown	3	19	16
Sandstone, gray	19	42	23
Clay, brown	42	58	16
Rock, broken, black; water bearing at 64'	58	68	10
Claystone, gray	68	70	2
Rock, broken, black (water bearing)	70	82	12
Claystone	82	87	5
Claystone, white, hard	87	92	5

Casing: 6-in. to 64 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-31Q1

Owner: Clifford Orth Well #1 Owner's No.

Driller: R. J. Strasser Drilling Company Date Drilled 8/6/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil, clay.	0	18	18
Clay, gray.	18	54	36
Rock, black, water bearing at 61 ft.	54	71	17
Claystone, gray	71	75	4
Sandstone, gray	75	92	17
Sandstone, brown, broken, water bearing . . .	92	103	11
Claystone, gray	103	128	25

Casing: 6-in. to 81 ft. Perforated from 64 to 71 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-33D1

Owner: Harley Vest Owner's No.

Driller: Kulick Well Drilling Date Drilled 3/29/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil.	0	3	3
Clay, yellow.	3	11	8
Siletz River Volcanics:			
Rock, broken.	11	17	6
Basalt, black, weathered.	17	37	20
Basalt	37	40	3
Basalt, black	40	85	45
Basalt, black, water bearing	85	120	35

Casing: 6-in. to 21 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-33F1

Owner: Albert A. Corkhill Owner's No.

Driller: Miller-Robinson-West Date Drilled 8/2/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Siletz River Volcanics:			
Clay, brown.	0	15	15
Basalt, black, medium hard	15	215	200

Casing: 6-in. to 21 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-34K1

Owner: E. S. Nedwill Owner's No.

Driller: Kulick Well Drilling Date Drilled 8/14/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Clay, yellow with boulders	0	16	16
Siletz River Volcanics:			
Basalt, weathered.	16	32	16
Basalt, weathered, water bearing	32	60	28
Basalt	60	65	5

Casing: 6-in. to 22 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-34K2

Owner: R. Rogers Owner's No.

Driller: Kulick Well Drilling Date Drilled 8/21/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black.	0	2	2
Clay, yellow with boulders	2	10	8
Siletz River Volcanics:			
Basalt, firm, black	10	34	24
Basalt, hard, quartz stringers, water bearing 64 to 68 feet.	34	80	46

Casing: 6-in. to 15 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-34P1

Owner: John Holliday Owner's No.

Driller: Kulick Well Drilling Date Drilled 3/14/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Siletz River Volcanics:			
Top soil.	0	3	3
Boulders, large basalt.	3	11	8
Clay, hard, blue.	11	26	15
Basalt, weathered, gray, water bearing. . . .	26	32	6
Basalt, weathered gray, hard.	32	38	6

Casing: 6-in. to 14 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-34P2

Owner: A. N. Gott Owner's No.

Driller: Kulick Well Drilling Date Drilled 8/4/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Clay, yellow with gravel.	0	18	18
Siletz River Volcanics:			
Rock, black	18	22	4
Basalt, weathered, gray; water bearing. . . .	22	54	32
Basalt, weathered, gray	54	57	3

Casing: 6-in. to 22 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-34Q1

Owner: Harry Davenport Owner's No.

Driller: Kulick Well Drilling Date Drilled 3/21/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black.	0	3	3
Clay, yellow and 6" rocks.	3	12	9
Siletz River Volcanics:			
Basalt, weathered, black to gray	12	38	26
Basalt, fresh	38	41	3
Basalt, weathered.	41	58	17
Basalt, weathered, water bearing	58	62	4
Basalt, hard, black.	62	68	6

Casing: 6-in. to 22 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-34Q2

Owner: William Sharp Owner's No.

Driller: Kulick Well Drilling Date Drilled 8/15/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black.	0	4	4
Clay, yellow, and boulders	4	16	12
Siletz River Volcanics:			
Basalt, weathered, gray, hard.	16	38	22
Basalt, weathered, water bearing	38	57	19
Basalt, weathered, hard.	57	65	8

Casing: 6-in. to 24 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-34Q3

Owner: Lavina Hackett Owner's No.

Driller: Kulick Well Drilling Date Drilled 9/11/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black.	0	2	2
Clay, yellow, large boulders	2	10	8
Siletz River Volcanics:			
Basalt, hard, gray; water bearing 47 to 52 ft.	10	58	48

Casing: 6-in. to 13 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-35B2

Owner: F. M. Huffman Owner's No.

Driller: Kulick Well Drilling Date Drilled 1/23/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Clay, yellow, with boulders.	0	9	9
Siletz River Volcanics:			
Basalt, contact zone, red, sandy	9	10	1
Basalt, hard, black.	10	22	12
Basalt, black with white zeolites.	22	90	68
water bearing at 34, 50 and 70 ft.			

Casing: 6-in. to 12 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-35B3

Owner: Carl Hartley Owner's No.

Driller: Kulick Well Drilling Date Drilled 7/29/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black.	0	2	2
Clay, yellow with boulders	2	16	14
Siletz River Volcanics (interbedded sediments):			
Claystone, gray, hard.	16	34	18
Sandstone, gray, water bearing	34	39	5
Claystone, gray, hard.	39	52	23
Sandstone, gray, water bearing	52	63	11
Claystone, gray, hard.	63	68	5

Casing: 6-in. to 20 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-35E1

Owner: K. A. Hartberg Owner's No.

Driller: Kulick Well Drilling Date Drilled 11/26/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Clay, yellow with large boulders.	0	14	14
Clay, blue.	14	18	4
Siletz River Volcanics (interbedded sediments):			
Sandstone, light gray	18	20	2
Claystone, hard, gray	20	28	8
Sandstone, porous, gray, water bearing. . . .	28	29	1
Sandstone, fresh, gray to black	29	49	20
Sandstone, porous, gray, water bearing. . . .	49	56	7
Claystone, gray, hard	56	65	9

Casing: 6-in. to 9 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/10W-35F2

Owner: L. C. Tutt Owner's No.

Driller: Kulick Well Drilling Date Drilled 7/28/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Clay, yellow with boulders.	0	16	16
Siletz River Volcanics (Interbedded sediments):			
Claystone, hard, gray	16	22	6
Sandstone, black, water bearing	22	68	46
Claystone, gray	68	75	7

Casing: 6-in. to 23 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/11W-35N1

Owner: Ed Granum Owner's No.

Driller: A. M. Jannsen Drilling Co. Date Drilled 11/5/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Claystone, water bearing (150 to 160). . . .	130	160	30
Claystone, gray	160	180	20
Gravels, small, brown.	180	180½	½
Claystone, gray.	180½	205	24½

Casing: 5-in. to 205 ft.
230 Perforated slots 1/8" x 12" set from 90 to 205 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/11W-35N2

Owner: Theodore Swett Owner's No.

Driller: Meeker Well Drilling Date Drilled 4/7/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Claystone, yellow.	0	22	22
Claystone, blue gray	22	42	20
Claystone, broken water bearing.	42	47	5
Claystone, broken, with hard sandstone . . .	47	93	46
Claystone, broken, water bearing (½ gpm) . .	93	97	4
Claystone, blue gray, medium hard.	97	143	46
Claystone, broken, water bearing (8 gpm) . .	143	150	7
Claystone, blue gray	150	152	2
Claystone, broken water bearing (4 gpm). . .	152	155	3

Casing: 6-in. to 155 ft.; perforated ¼" x 12" slots, from 95' to 135' 135' to 155'

Table 2 Logs of Representative Wells - - Continued

Well No. 6/11W-35N4

Owner: A. J. Whitley Owner's No.

Driller: Art Clinton Well Drilling Company Date Drilled 9/7/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Clay, brown, sandy	0	5	5
Clay, gray	5	55	50
Claystone, blue gray	55	80	25
Claystone, gray	80	120	40
Claystone, brown	120	150	30

Casing: 6-in. to 39 ft.; perforated from 35 to 38 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 6/11W-36G1

Owner: Clifford Orth Owner's No.

Driller: R. J. Strasser Drilling Co. Date Drilled 8/21/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	2	2
Clay, brown	2	28	26
Claystone, gray, water bearing at 56 ft. . .	28	81	53
Claystone, gray	81	93	12
Sandstone, soft gray	93	136	43

Casing: 6-in. to 40 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 7/11W-25G1

Owner: Harvey Hill Owner's No.

Driller: Kulick Well Drilling Date Drilled 4/9/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Silt, black with yellow clay.	0	14	14
Toledo formation:			
Clay, blue	14	28	14
Claystone, gray, firm	28	34	6
Siletz River Volcanics: (?)			
Rock, hard, black	34	48	14
Rock, hard, solid	48	64	16
Rock, water bearing	64	74	10

Casing: 6-in. to 38 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 8/10W-17P1

Owner: A. E. Howard Owner's No.

Driller: Art Clinton Well Drilling Co. Date Drilled 1/26/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil	0	1	1
Clay, brown	1	11	10
Tyee formation:			
Clay, blue	11	50	39
Sandstone, gray	50	52	2
Clay, blue	52	64	12
Sandstone, hard blue gray	64	84	20
Sandstone, light with limestone interbeds	84	100	16

Casing: Pulled; well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 8/10W-19Q1

Owner: K. Bales Owner's No.

Driller: Kulick Well Drilling Date Drilled 3/29/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, black.	0	14	14
Tyee formation:			
Sandstone, black, fine grained	14	40	26
Sandstone, black, medium grained	40	66	26
Sandstone, broken, gray, water bearing	66	80	14
Casing: 6-in to 80 ft.; ¼" x 6" perforations set 74 to 80 ft.			

Table 2 Logs of Representative Wells - - Continued

Well No. 8/11W-2P1

Owner: Kernville-Gleneden-Lincoln Beach Water Dist. Owner's No.

Driller: Wilcox Drilling Co. Date Drilled 6/3/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Top soil, sand.	0	4	4
Clay, sandy, brown.	4	16	12
Clay, yellow, hard.	16	31	15
Clay, hard, gray.	31	51	20
Sandstone, reddish brown, water bearing . . .	51	73	22
Sandstone, blue gray.	73	89	16
Sandstone, hard, gray	89	92	4
Claystone, hard, gray, broken	92	120	28
Claystone, hard, broken	120	128	8
Clay.	128	129	1
Claystone, very hard, gray.	129	137	8
Sandstone, hard, dary gray	137	148	11
Claystone, hard, gray	148	200	52

Casing: 8-in. to 139 ft. Gravel packed 20 to 139 ft. Pefforated ¼" x 12" slots 51 to 73 and 120 to 139 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 8/11W-9J1

Owner: Salishan Properties, Inc. Owner's No.

Driller: R. J. Strasser Drilling Co. Date Drilled 5/11/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Top soil	0	5	5
Sand, brown	5	44	39
Sand, reddish	44	51	7
Sandstone	51	79	28
Clay, blue gray	79	88	9
Sandstone	88	109	21
Sand, with small gravel and clay	109	123	14
Sand, brown	123	141	12
Claystone	141	150	9

Casing: Pulled, well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 8/11W-32K1

Owner: A. G. Harbough Owner's No.

Driller: Kulick Well Drilling Date Drilled 8/30/56

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation (volcanic interbeds):			
Top soil, clay.	0	7	7
Basalt, breccia, black.	7	33	26
Basalt, hard	33	52	19
Basalt, water bearing	52	63	11

Casing: 6-in. to 11 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 9/11W-32Q1

Owner: Jim Gross Owner's No.

Driller: Charles Panschow Date Drilled 9/16/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Clay, yellow.	0	4	4
Clay, gray	4	135	131
Claystone, water bearing	135	139	4
Claystone, hard, gray	139	163	24

Casing: 6-in. to 82 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 9/11W-32Q2

Owner: Richard Thomas Owner's No.

Driller: Charles Panschow Date Drilled 9/26/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Clay, yellow.	0	20	20
Claystone, gray	20	75	55
Claystone, gray (caved in).	75	168	83

Casing: Pulled, well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 9/11W-32Q3

Owner: Richard Thomas Owner's No.

Driller: Charles Panschow Date Drilled 10/4/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Clay, yellow.	0	15	15
Clay, blue	15	35	20
Claystone, water bearing	35	65	30
Casing: 6-in to 53 ft.; perforated 1/8" x 12" slots 23 to 53 ft.			

Table 2 Logs of Representative Wells - - Continued

Well No. 9/11W-32Q4

Owner: Max Anhoury Owner's No.

Driller: Charles Panschow Date Drilled 10/10/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Clay, yellow.	0	10	10
Clay, light brown	10	14	4
Clay, gray	14	65	41
Claystone, gray, water bearing	65	84	19

Casing: 6-in. to 68½ ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/8W-36P1

Owner: Ted Harmsen, Jr. Owner's No.

Driller: R. C. Weston Date Drilled 8/3/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil, clay.	0	16	16
Sandstone, hard	16	50	34

Casing: Pulled, well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 10/9W-4D1

Owner: Logsden Mennonite Church Owner's No.

Driller: Franklin Well Drilling Date Drilled 7/6/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil.	0	5	5
Clay, blue	5	10	5
Boulders, small	10	15	5
Tyee formation:			
Claystone	15	21	6

Casing: 6-in. to 21 ft.; perforated from 0 to 10 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/9W-19M1

Owner: Mrs. Porter Owner's No.

Driller: Raymond Gellatly Date Drilled 8/28/56

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil, sandy.	0	6	6
Claystone & sandstone, brown	6	27	21
Sandstone, reddish, broken	27	32	5
Sandstone, with clay	32	37	5
Casing: 6-in. to 36 ft.; perforated 3/8" x 6" slots from 28 to 32 ft.			

Table 2 Logs of Representative Wells - - Continued

Well No. 10/9W-29N1

Owner: T. V. Rose Owner's No.

Driller: Raymond Gellatly Date Drilled 7/18/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, and brown sand.	0	20	20
Sand, brown, fine.	20	25	5
Claystone, hard, gray	25	50	25
Sandstone, gray, water bearing at 62 ft. . .	50	65	15
Sandstone, light gray	65	72	7

Casing: 6-in. to 27 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/9W-33C1

Owner: Charles Shuster Owner's No.

Driller: Raymond Gellatly Date Drilled 10/22/56

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil.	0	2	2
Clay, brown	2	8	6
Clay, yellow, sandy	8	12	4
Claystone	12	17	5
Sandstone, hard, gray; water bearing 27-33ft.	17	45	28

Casing: 6-in. to 18 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-4N1

Owner: James Collister Owner's No.

Driller: Franklin Well Drilling Date Drilled 7/15/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil.	0	5	5
Claystone	5	15	10
Boulders.	15	25	10
Tyee formation:			
Clay, blue.	25	29	4
Sandstone	29	31	2

Casing: 6-in to 30 ft.; perforated 20 to 30 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-17A1

Owner: Willard Kennell Owner's No.

Driller: Wilcox Drilling Co. Date Drilled 6/4/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, and clay.	0	11	11
Gravel, with boulders and clay.	11	22	11
Clay, sandy, gray	22	28	6
Gravel, fine, pea	28	29	1
Toledo formation:			
Sandstone, hard, gray; water bearing at 49 & 61 ft.	29	69	40

Casing: 6-in. to 35 ft.; perforated 29 to 35 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-17A2

Owner: Clarence Weaver Owner's No.

Driller: Wilcox Drilling Co. Date Drilled 5/26/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil.	0	1	1
Clay, varied colors	1	22	21
Gravel, boulder with clay	22	24	2
Clay, sandy, gray; with wood frags	24	29	4
Toledo formation:			
Claystone, blue gray.	29	43	14
Claystone, hard, blue gray.	43	52	9
Claystone, broken; water bearing.	52	63	11
Claystone, hard, gray	63	66	3

Casing: 6-in. to 66 ft.; perforated ¼" x 12", from 52 to 66 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-17 H1

Owner: David Todd Owner's No.

Driller: Franklin Well Drilling Date Drilled 6/1/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	5	5
Claystone, soft	5	15	10
Clay, blue.	15	30	15
Claystone, broken	30	41	11

Casing: 6-in. to 41 ft.; split from 20 to 41 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-25A1

Owner: Franklin Cox Owner's No.

Driller: L. W. Mutschler Drilling Co. Date Drilled 4/23/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Sandstone, broken, yellow.	0	32	32
Claystone, yellow.	32	46	14
Sandstone, broken, blue; water bearing	46	48	2
Sandstone, blue	48	76	28

Casing: 6-in. to 37 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-32G1

Owner: Ross Reid Owner's No.

Driller: Franklin Well Drilling Date Drilled 9/23/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil	0	5	5
Claystone, soft	5	20	15
Claystone	20	26	6
Clay, yellow	26	41	15
Claystone	41	43	2
Sandstone, coarse	43	51	8

Casing: 6-in. to 51 ft.; split from 25 to 45 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-32Q1

Owner: Mathew Gruber Owner's No.

Driller: Samy Franklin Date Drilled 10/2/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil	0	5	5
Soapstone	5	20	15
Clay, blue	20	32	12
Claystone	32	35	3
Claystone, broken	35	42	7

Casing: 6-in. to 42 ft.; split from 32 to 42 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-33G1

Owner: John Dorry Owner's No.

Driller: Bill Howell Date Drilled 12/18/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, brown	0	23	23
Clay, blue	23	130	107
Sandstone, white, (wooden log at 130 ft. landslide debris)	130	140	10

Casing: [illegible]in. to 132 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-33P1

Owner: Joe Rogers Owner's No.

Driller: Samy Franklin Date Drilled 10/8/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil	0	5	5
Claystone	5	25	20
Clay, blue	25	45	20
Claystone	45	50	5
Clay, blue	50	80	30

Casing: 6-in. to 20 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-36A1

Owner: Calfred Jones Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 9/21/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil, sandy.	0	6	6
Clay, brown	6	18	12
Sandstone, blue.	18	35	17
Claystone, blue, hard.	35	62	27
Claystone, water bearing	62	68	6

Casing: 6-in. to 32 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/10W-36A2

Owner: V. D. Landess Owner's No.

Driller: L. W. Mutschler Well Drilling Date Drilled 4/17/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee fc. ation:			
Clay	0	2	2
Clay, yellow	2	10	8
Sandstone, broken	10	12	2
Sandstone, blue	12	20	8
Sandstone, gray	20	46	26
Claystone, gray, broken; water bearing	46	50	4

Casing: 6-in. to 21 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/11W-20D1

Owner: Anthony Bianco Owner's No.

Driller: Avery Crawford Date Drilled 6/16/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Top soil, with yellow clay.	0	31	31
Clay, blue.	31	82	51
Sandstone	82	90	8

Casing: To 31 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/11W-20E1

Owner: Ray Thomas Owner's No.

Driller: John W. Beck Well Drilling Co. Date Drilled 3/19/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Top soil.	0	2	2
Sand, brown	2	18	16
Sandstone, brown; water bearing	18	32	14
Clay, blue, silty	32	64	32
Claystone, blue, broken, hard	64	83	19

Casing: To 66 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/11W-29C1

Owner: Agate Beach Water District Owner's No.

Driller: American Well Drilling Co. Date Drilled 2/11/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Nye formation:			
Top soil.	0	3	3
Clay, red	3	35	32
Clay, blue.	35	59	24
Claystone, brown; water bearing	59	68	9
Claystone, green	68	148	80
Claystone, broken; water bearing.	148	150	2
Clay, gray	150	194	44
Clay, gray with thin white sand layers, water-bearing.	194	244	50
Claystone, brown.	244	250	6

Casing: 8-in. to 62 ft., 6-in. from 56 to 240 ft. Perforated ¼" x 6" slots, from 60 to 80 ft and 140 to 240 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/11W-30A1

Owner: Agate Beach Water District Owner's No.

Driller: Wilcox Drilling Co. Date Drilled 8/24/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Top soil.	0	1½	1½
Clay, sandy	1½	10	8½
Clay, blue, silty	10	21	11
Sand, with thin sandstone layers.	21	101	80
Nye Mudstone formation			
Claystone	101	108½	7½

Casing: 10-in. to 106½ ft.; perforated ¼" x 12" slots from 76 to 106 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 10/11W-30A2

Owner: Agate Beach Water District Owner's No.

Driller: Wilcox Drilling Co. Date Drilled 7/15/53

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation			
Top soil	0	1½	1½
Clay, sandy	1½	18	17½
Clay, silty, blue	18	21	3
Sand, various colors	21	34	13
Nye Mudstone formation			
Claystone, dark gray, dense	34	40	6
Claystone, blue gray	40	55	15
Claystone, hard	55	56	1

Casing: Pulled, well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 10/11W-30H1

Owner: Agate Beach Water District Owner's No.

Driller: A. M. Jannsen Drilling Co. Date Drilled 11/16/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Clay.	0	3	3
Sandstone, soft, brown.	3	13	10
Sandstone, white, with clay layers.	13	35	22
Clay, yellow.	35	36	1
Clay, sandy, yellow	36	37	1
Clay, light blue, with sandy layers	37	80	43
Nye Mudstone formation			
Claystone, gray	80	159	79

Casing: Pulled, well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 11/8W-17B1

Owner: C. O. Marshll Owner's No.

Driller: Raymond Gellatly Date Drilled 8/10/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil.	0	2	2
Clay, yellow.	2	15	13
Clay, sandy, gray, wood fragments	15	28	13
Claystone, hard, gray	28	39	11
Sandstone, gray, with claystone layers. . . .	39	63	24

Casing: 6-in. to 34 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/9W-9H1

Owner: Eddyville High School Owner's No.

Driller: Raymond Gellatly Date Drilled 8/20/57

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil.	0	2	2
Clay, yellow, sandy	2	28	26
Clay, gray.	28	41	13
Sand, with small gravel and wood.	41	45	4
Sandstone, light gray	45	48	3
Sandstone, water bearing at 60 ft.	48	70	22

Casing: 6-in. to 25 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/9W-13F

Owner: A. A. Willoughby Owner's No.

Driller: Raymond Gellatly Date Drilled 10/25/56

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil.	0	2	2
Clay, yellow.	2	24	22
Sandstone, gray	24	31	7
Sandstone, hard gray; water bearing	31	35	4

Casing: 6-in. to 25 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-5Q1

Owner: Louis Boyd Owner's No.

Driller: Kulick Well Drilling Date Drilled 4/5/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	21	21
Claystone, hard gray.	21	36	15
Sandstone, dark	36	91	55
Sandstone, dark gray, water bearing	91	96	5

Casing: 6-in. to 30 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-5Q2

Owner: L. H. Hamilton Owner's No.

Driller: Kulick Well Drilling Date Drilled 5/11/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Soil, black.	0	3	3
Clay, yellow	3	21	19
Claystone, gray, hard.	21	44	23
Sandstone, black, hard	44	84	40
Sandstone, black; water bearing.	84	87	3
Sandstone, solid, gray	87	94	7

Casing: 6-in. to 33 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-6Q1

Owner: Opal Bates Owner's No.

Driller: Franklin Well Drilling Date Drilled 5/12/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	3	3
Claystone	3	20	17
Claystone, broken	20	25	5
Claystone, blue	25	30	5
Clay, blue.	30	60	30

Casing: 6-in. to 33 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-8F1

Owner: Raymond Dalbey Owner's No.

Driller: Franklin Well Drilling Date Drilled 11/1/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil	0	4	4
Claystone	4	19	15
Clay, blue	19	36	17
Claystone	36	44	8
Clay, blue	44	54	10

Casing: 6-in. to 54 ft.; split from 34 to 54 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-18A1

Owner: Georgia Pacific Lumber Co. Owner's No.

Driller: A. M. Jannsen Drilling Co. Date Drilled 3/16/48

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Mud, blue.	0	90	90
Toledo formation:			
Sand, with salt water.	90	97	7
Claystone.	97	450	353
Claystone, water bearing, (brackish?).	450	495	45
Claystone, shells and gas at 720 ft.	495	865	370
Claystone, soft, loose	865	975	90
Claystone.	975	1000	25

Casing: None - well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-18B1

Owner: Georgia Pacific Lumber Co. Owner's No.

Driller: A. M. Jannsen Drilling Co. Date Drilled 1947

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Mud & silt, brackish water 60-65 ft.	0	65	65
Clay, brown	65	70	5
Claystone, gray, sandy; some gas at 335 ft.	70	335	265
Claystone, caving last 100 ft.	335	1000	665
Claystone, sandy; shells at 1035 to 1040 ft.	1000	1200	200
Claystone, soft.	1200	1327	127
Claystone, inflammable gas at 1330	1327	1335	8
Claystone, sandy, with shells	1335	1900	565

Casing: None-well abandoned 1948

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-19P1

Owner: Ernest Benton Owner's No.

Driller: Raymond Gellatly Date Drilled 8/2/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	2	2
Clay, yellow.	2	34	32
Claystone, yellow, broken	34	42	8

Casing: 6-in. to 42 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-20L1

Owner: Anna Davenport Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 9/14/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	4	4
Clay, yellow, soft.	4	30	26
Claystone, blue	30	70	40
Claystone, broken, water bearing.	70	87	17

Casing: 6-in. to 50 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-20M1

Owner: Donald Thornton Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 8/19/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	5	5
Clay, brown	5	40	35
Clay, blue.	40	65	25
Claystone, broken, water bearing.	65	75	10
Clay, blue.	75	125	50
Claystone, hard, broken, water bearing. . . .	125	128	3
Clay, blue.	128	130	2

Casing: Pulled, well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-20P1

Owner: John Lynett Owner's No.

Driller: John W. Beck Well Drilling Date Drilled 4/9/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	3	3
Clay, red with sand	3	32	29
Clay, blue.	32	38	6
Sandstone, red.	38	48	10
Claystone, blue	48	52	4
Claystone, light blue, hard	52	59	7
Claystone, dark blue, hard	59	68	9
Claystone, blue	68	82	14
Claystone, blue with sandy layers	82	95	13

Casing: 6-in. to 65 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-29E1

Owner: Leo Jones Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 7/8/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Sandstone, brown.	0	16	16
Sandstone, blue	16	36	20
Claystone, blue	36	60	24
Claystone, light blue; water bearing.	60	65	5

Casing: 6-in. to 12 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-29E5

Owner: Hal May Owner's No.

Driller: Raymond Gellatly Date Drilled 9/10/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	1	1
Claystone, sandy.	1	8	7
Sandstone, gray	8	12	4
Sandstone, and clay, water bearing 50 to 60 ft.	12	60	48

Casing: 6-in. to 14½ ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-29M1

Owner: Walter Huntsucker Owner's No.

Driller: Avery Crawford Date Drilled 7/18/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	11	11
Clay, yellow.	11	27	16
Clay, blue.	27	44	17
Sandstone	44	60	16

Casing: 6-in. to 58 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-29M2

Owner: Charles Eden Owner's No.

Driller: Franklin Well Drilling Date Drilled 8/31/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	5	5
Clay, white	5	45	40
Clay, blue.	45	50	5
Claystone	50	55	5
Sandstone, hard, blue	55	95	40
Sand, fine.	95	100	5

Casing: 6-in. to 27 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-29M4

Owner: Jim Tuff Owner's No.

Driller: Avery Crawford Date Drilled 7/19/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil	0	14	14
Clay, yellow	14	22	8
Clay, blue	22	31	9
Claystone	31	43	12
Sandstone	43	55	12

Casing: 6-in. to 44 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-30A1

Owner: William Sallee Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 9/17/64

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Clay, brown.	0	20	20
Sand, brown with silt.	20	25	5
Clay, blue, silty, soft.	25	52	27
Claystone, sandy	52	104	52

Casing: None - well abandoned

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-30B1

Owner: Robert Gordon Owner's No.

Driller: Franklin Well Drilling Date Drilled 6/18/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil	0	3	3
Claystone	3	23	20
Clay, blue	23	33	10
Claystone	33	40	7
Clay, blue	40	50	10
Sandstone	50	58	8

Casing: 6-in. to 50 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/10W-5032

Owner: Philip Krause Owner's No.

Driller: L. W. Mutschler Well Drilling Co. Date Drilled 10/16/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	4	4
Clay, yellow.	4	10	6
Clay, sandy yellow.	10	32	22
Clay, blue.	32	57	25
Claystone, broken, gray	57	68	11

Casing: 6-in. to 60 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-2D1

Owner: Bette McCrae Owner's No.

Driller: Franklin Well Drilling Date Drilled 9/21/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	5	5
Sandstone, white.	5	25	20
Claystone	25	40	15
Clay, yellow.	40	50	10
Claystone	50	55	5
Clay, yellow.	55	67	12

Casing: 6-in. to 48 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-7H1

Owner: A. D. Nesheim Owner's No.

Driller: Bill Howell Date Drilled 10/24/57

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Astoria formation:			
Clay, brown sandy.	0	47	47
Clay, soft, blue	47	63	16
Claystone, hard blue	63	76	13

Casing: 6-in. to 64 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-9C1

Owner: Arthur Jincks Owner's No.

Driller: Charles Panschow Date Drilled 10/15/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Nye formation:			
Top soil	0	6	6
Clay, yellow	6	30	24
Clay, brown	30	40	10
Clay, gray	40	44	4
Claystone, water bearing	44	72	28
Claystone, hard	72	80	8

Casing: 6-in. to 58 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-10K1

Owner: R. J. Snyder Owner's No.

Driller: A. M. Jannsen Drilling Co. Date Drilled 11/6/53

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Nye formation:			
Soil.	0	3	3
Clay, yellow	3	41	38
Claystone, water bearing.	41	50	9

Casing: 6-in. to 40½ ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-10K2

Owner: Louis Cabot Owner's No.

Driller: Bill Howell Date Drilled 11/24/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Nye formation:			
Clay, brown.	0	44	44
Claystone, black	44	98	44

Casing: 6-in. to 24 ft.

Well dry and abandoned 1961

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-10K3

Owner: Lyle Atkinson Owner's No.

Driller: Bill Howell Date Drilled 10/23/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Nye formation:			
Claystone, brown, sandy.	0	24	24
Claystone, gray.	24	75	51

Casing: 6-in. to 30 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-16Q1

Owner: B. D. Mobley Owner's No.

Driller: Franklin Well Drilling Date Drilled 7/24/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Nye formation:			
Sand, black.	0	5	5
Sand, white, fine.	5	15	10
Claystone, brown, with small gravels	15	27	12
Clay, blue	27	30	3

Casing: 6-in. to 30 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-17F1

Owner: Robert Brayton Owner's No.

Driller: Avery Crawford Date Drilled 9/29/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Sand Dunes:			
Sand, dune, fine.	0	65	65
Drilled to 55 ft. - Jetted to 65 ft.			
Casing: 6-in. to 55 ft. Drive point to 65 ft.			

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-22K1

Owner: Don Swift Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 6/19/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Top soil.	0	4	4
Clay, yellow.	4	44	40
Claystone, blue	44	92	48
Claystone, blue, sandy; water bearing	92	100	8

Casing: 6-in. to 46 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-27A1

Owner: Robert Smiley Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 6/27/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Clay, yellow.	0	16	16
Sandstone, blue	16	28	12
Sandstone, blue, water bearing.	28	38	10
Sandstone, blue, hard	38	90	52
Claystone, blue	90	123	33

Casing: 6-in. to 18 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-27B1

Owner: Robert Jones Owner's No.

Driller: L. W. Mutschler Well Drilling Co. Date Drilled 5/31/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Top soil	0	6	6
Sand & clay, brown	6	40	34
Claystone, blue	40	74	34
Sandstone, hard, dense	74	79	4
Claystone, blue	79	148	69
Claystone, blue, broken	148	151	3
Claystone, brown	151	180	29
Sandstone, hard, blue	180	196	16

Casing: 6-in. to 45 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-27F1

Owner: W. P. Breese Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 7/4/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Top soil.	0	3	3
Clay, yellow.	3	15	12
Sandstone, brown.	15	34	19
Sandstone, blue	34	105	71
Claystone, blue, water bearing at contact . .	105	125	20
Sandstone, blue	125	133	8

Casing: 6-in. to 34 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-27F2

Owner: Dun Fra Corp. Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 7/28/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Top soil.	0	2	2
Clay, brown, soft	2	18	16
Claystone, sandy.	18	45	27
Sandstone, blue	45	125	80
Claystone, hard, blue	125	140	15
Sandstone, blue	140	200	60
Claystone, hard, blue	200	210	10
Sandstone, blue	210	230	20

Casing: None - Well filled and abandoned-dry

Table 2 Logs of Representative Wells - - Continued

Well No. 11/11W-27F3

Owner: Dun Fra Corp. Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 8/2/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Clay, brown.	0	12	12
Clay, black, soft.	12	20	8
Claystone, sticky.	20	40	20
Claystone, sandy	40	96	56
Claystone, broken; water bearing	96	100	4

Casing: 6-in. to 43 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 12/8W-7M1

Owner: Delbert Kessi Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 10/19/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil.	0	5	5
Clay, yellow.	5	12	7
Sandstone, brown.	12	65	53
Claystone, gray	65	68	3
Sandstone, gray	68	76	8

Casing: 6-in. to 25 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 12/8W-8F1

Owner: 3-G Lumber Co. Owner's No.

Driller: Bill Howell Date Drilled 4/7/57

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Sandstone, soft.	0	15	15
Sand and clay, blue.	15	17	2
Sandstone, soft, brown	17	26	9
Claystone, gray	26	100	74

Casing: 6-in. to 26 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 12/8W-8L1

Owner: Lincoln County School District (Harland School) Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 8/17/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Top soil.	0	5	5
Clay, yellow, sandy	5	12	7
Sandstone, gray	12	36	14
Claystone, broken, blue	36	40	4
Sandstone, blue	40	72	32
Claystone, blue	72	80	8
Sandstone, gray, broken; water bearing. . . .	80	88	8

Casing: 8-in. to 41 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 12/8W-8R1

Owner: Assemblies of God Owner's No.

Driller: Bill Howell Date Drilled 9/19/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, brown.	0	29	29
Claystone, gray.	29	94	65

Casing: 6-in. to 30 ft. Well abandoned 1961-dry

Table 2 Logs of Representative Wells - - Continued

Well No. 12/9W-12H1

Owner: U. S. Forest Service Owner's No.

Driller: Bill Howell Date Drilled 5/28/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, brown, sandy.	0	18	18
Claystone, blue	18	24	6
Sandstone, with blue clay interbeds	24	90	66

Casing: 6-in. to 22 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 12/11W-18D1

Owner: Mr. Stovall Owner's No.

Driller: Avery Crawford Date Drilled 7/28/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Nye formation:			
Top soil	0	5	5
Clay, yellow	5	15	10
Sand	15	20	5
Clay, blue	20	32	12
Claystone, firm	32	40	8

Casing: 6-in. to 32 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 12/12W-25A1

Owner: Louis Southworth Owner's No.

Driller: Bill Howell Date Drilled 6/10/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquinia formation:			
Sand, brown	0	24	24
Sand, tan, fine	24	51	27
Clay, blue, sandy	51	60	9
Sandstone, blue	60	101	41
Claystone, blue	101	109	8

Casing: 6-in. to 60 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 12/12-25Q1

Owner: C. Passmores Owner's No.

Driller: G. A. Pruitt Well Drilling Date Drilled 5/19/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Yaquina formation:			
Top soil, black.	0	2	2
Sand, white.	2	20	18
Sand, brown.	20	24	4
Sandstone, blue.	24	60	36
Clay, (2 gpm water).	60	66	6
Sandstone, blue.	66	90	24
Claystone, broken, water bearing	90	103	13

Casing: 6-in. to 25 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/9W-31E1

Owner: Charles Gidley Owner's No.

Driller: Bill Howell Date Drilled 7/30/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, brown.	0	26	26
Sandstone, blue-gray	26	51	25
Claystone, blue.	51	70	19

Casing: 6-in. to 32 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/10W-30R1

Owner: Dean's Landing Owner's No.

Driller: Bill Howell Date Drilled 7/31/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Sand and blue clay.	0	43	43
Sandstone, brown, soft.	43	47	4
Sandstone, blue	47	68	21

Casing: 6-in. to 48 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/10W-31A1

Owner: Keith Taylor Owner's No.

Driller: Bill Howell Date Drilled 8/23/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, soft, blue to black.	0	58	58
Sandstone, brown	58	67	9
Sandstone, blue.	67	90	23
Claystone, blue.	90	96	6

Casing: 8-in. to 70 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/10W-35H1

Owner: N. E. Barclay Owner's No.

Driller: Bill Howell Date Drilled 1/13/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, sandy.	0	20	20
Sandstone, blue, gray.	20	75	55

Casing: 6-in. to 24 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-26F1

Owner: Donald Thienes Owner's No.

Driller: Raymond Gellatly Date Drilled 4/19/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil, yellow	0	6	6
Clay, black with organic debris, wood	6	15	9
Tyee formation:			
Clay, yellow	15	23	8
Sand, gray	23	34	11
Sandstone, broken	34	37	3
Claystone, gray	37	43	6
Sandstone, light gray	43	49	6
Sandstone, gray, hard	49	51	2
Claystone, gray	51	52	1

Casing: 6-in. to 39 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27D1

Owner: Harry Ulrey Owner's No.

Driller: Bill Howell Date Drilled 4/30/61

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Sandstone, brown	0	17	17
Sandstone, hard, blue	17	21	4
Sandstone, blue	21	44	23
Claystone, blue	44	62	18

Casing: 8-in. to 22 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27E1

Owner: Whitney Green Owner's No.

Driller: Charles Panschow Date Drilled 8/22/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, yellow.	0	18	18
Sandstone, hard, gray	18	30	12
Sandstone, blue	30	68	38
Sandstone, blue with 2" clay interbeds. . . .	68	71	3

Casing: 6-in. to 19 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27E2

Owner: Carlin Maxwell Owner's No.

Driller: Charles Panschow Date Drilled 8/27/58

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, yellow.	0	34	34
Sand, blue, hard.	34	79	45
Claystone, dense, blue.	79	85	6

Casing: 6-in. to 36 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27F1

Owner: Harry Thissell Owner's No.

Driller: Raymond Gellatly Date Drilled 4/29/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil	0	2	2
Clay, yellow	2	14	12
Clay, gray	14	21	7
Clay, gray, sandy, with gravels	21	30	9
Gravel, with yellow clay	30	41	11
Gravel, with gray clay	41	47	6
Tyee formation:			
Sandstone, hard gray	47	70	23
Sandstone, broken, gray; water bearing	70	80	10
Sandstone, gray	80	112	32
Claystone, gray	112	116	4
Sandstone, gray	116	121	5

Casing: 6-in. to 48½ ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27G1

Owner: Ed Martin Owner's No.

Driller: Raymond Gellatly Date Drilled 9/4/57

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil.	0	2	2
Clay, brown	2	14	12
Tyee formation:			
Sandstone, hard, gray	14	60	46
Sandstone, gray, with water in uncemented layers	60	78	18

Casing: 6-in. to 15½ ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27H1

Owner: York Wyman Owner's No.

Driller: Raymond Gellatly Date Drilled 7/10/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil.	0	2½	2½
Clay, gray.	2½	8	5½
Clay, yellow.	8	12	4
Tyee formation:			
Sandstone, yellow	12	17	5
Sandstone, hard, gray	17	25	8
Claystone, gray; water bearing.	25	41	16

Casing: 6-in. to 26 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27J1

Owner: John Oakland Owner's No.

Driller: Raymond Gellatly Date Drilled 7/13/62

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil.	0	2	2
Sand, yellow.	2	15	13
Clay, yellow.	15	23	8
Gravels, poorly sorted.	23	27	4
Tyee formation:			
Sandstone, hard, gray with clay	27	38	11
Sandstone, gray	38	45	7

Casing: 6-in. to 30 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27J2

Owner: William Kelley Owner's No.

Driller: Franklin Well Drilling Date Drilled 4/12/63

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Top soil	0	5	5
Clay & sand	5	25	20
Tyee formation:			
Sandstone, blue	25	45	20
Clay, blue	45	50	5
Sandstone, blue	50	80	30
Claystone	80	82	2
Clay, blue	82	95	13

Casing: 6-in. to 30 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 13/11W-27M1

Owner: John Willis Owner's No.

Driller: Charles Panschow Date Drilled 6/25/59

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Tyee formation:			
Clay, yellow.	0	44	44
Sandstone, blue	44	94	50
Claystone, hard	94	126	32
Claystone, shale.	126	130	4

Casing: 6-in. to 48½ ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 14/9W-20l

Owner: George Stouder Owner's No.

Driller: Raymond Gellatly Date Drilled 12/8/55

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Alluvium:			
Clay, reddish, with ½" gravels.	0	15	15
Clay, yellow	15	25	10
Gravel, medium, 2 to 3 inches in size	25	32	7
Tyee formation:			
Sandstone, gray	32	50	18

Casing: 6-in. to 35 ft.

Table 2 Logs of Representative Wells - - Continued

Well No. 14/11W-5D1

Owner: Leland Kropf Owner's No.

Driller: Avery Crawford Date Drilled 8/10/60

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Toledo formation:			
Top soil.	0	2	2
Clay, yellow.	2	16	14
Clay, blue, firm.	16	38	22
Sandstone, hard	38	44	6
Claystone	44	50	6

Casing: 6-in. to 43 ft.

Table No. 3. —Partial Chemical Analysis of Water from Wells and Streams in Lincoln County, Oregon
Chemical Constituents in Parts Per Million

Well No.	6/10W-33F1	6/10W-35B3	7/10W-21G	8/8W-18C	8/8W-18C	8/5W-24G
Owner	A. A. Corkhill	Carl Hartley	Lincoln City	State Game Commission	State Game Commission	State Game Commission
Collection Date	2/18/65	2/18/65	10/10/52	8/26/56	8/26/56	8/26/56
Water bearing formation or source	Wall, Siletz River Volcanics	Wall, Siletz River Volcanics	Schooner Creek	Siletz River	North Fork Siletz River	Siletz River
Temperature °F	51°	52°				
Chemical Constituents: (parts per million)						
Silica (SiO_2)			4.4		4.0	3.0
Iron (Fe)		.04	.24	.12	.5	.02
Calcium (Ca)	5.2	3.2	4.5	5.6	4.8	6.4
Magnesium (Mg)	0.6	0.6	1.4	3.88	6.8	5.34
Sodium (Na)	50.0	82.0	2.7			
Bicarbonate (HCO_3)	124.0	122.0	19.5	46.0	36.0	44.0
Carbon Dioxide (CO_2)	5.8	0.2				
Sulfate (SO_4)	4.5	0.5	2.5			
Chloride (Cl)	7.8	62.0	7.0	4.0	6.0	10.0
Florida (F)						
Total Dissolved Solids	224.0	251.0	57.0			
Hardness as $CaCO_3$	15.0	10.0	17.1	30.0	40.0	38.0
Conductance (micromhos at 25° C)	209.0	360.0		50.0	39.0	50.0
pH	7.6	9.0	7.22	6.8	7.1	6.8

Table 3. —Partial Chemical Analysis of Water from Wells and Streams in Lincoln County, Oregon —Continued
Chemical Constituents in Parts Per Million

Well No.	8/11W-16A	8/11W-21Q1	9/10W-16R	9/10W-22F	10/10W-3M	10/11W-28N	10/11W-29G1
Owner	Glendon Water District	Lincoln Beach	State Game Commission	State Game Commission	Don Pressey	Agate Beach Water District	Agate Beach Water District
Collection Date	7/8/52	2/18/65	3/24/56	8/24/56	Fall, 1964	7/6/55	3/17/64
Water bearing formation or source	Spring	Well, Terrace Sands	Siletz River	Mouth of Euchre Creek	Well, Tyee formation	Little Creek	Well #2
Temperature °F							
Chemical Constituents: (parts per million)							
Silica (SiO_2)			4.0	5.0	10.0	25.0	
Iron (Fe)	1.53	.06	.08		0.0	.28	1.0
Calcium (Ca)		2.7	6.4	11.2		3.0	
Magnesium (Mg)		4.3	3.9	13.5		2.6	
Sodium (Na)		20.0				16.0	
Potassium (K)						1.0	
Bicarbonate (HCO_3)	18.0	7.32	42.0	56.0		10.0	94.0
Carbon Dioxide (CO_2)		50.0				2.5	
Sulfate (SO_4)	9.0	3.0			10.0	2.8	5.0
Chloride (Cl)	24.0	38.0	8.0		710.0	19.0	
Fluoride (F)			.1			0.0	
Total Dissolved Solids	116.0	89.0				85.0	275.0
Hardness as $CaCO_3$	19.0	25.0	32.0	84.0	10.0	16.0	29.0
Conductance (micromhos at 25° C)		148.0	49.0	64.0			
pH	5.67	5.4	7.0	6.9	9.1	6.9	8.82

Table No. 3. —Partial Chemical Analysis of Water from Wells and Streams in Lincoln County, Oregon —Continued
Chemical Constituents in Parts Per Million

Well No.	10/11W-30A1	10/11W-30A1	11/11W-9C1	11/11W-17F1	13/11W-33L	14/12W-31C
Owner	Agate Beach Water District	Agate Beach Water District	A. Jincks	Robert Brayton	State Game Commission	Yachats Water District
Collection Date	2/18/65	8/24/58	2/18/65	2/18/65	8/24/56	8/25/54
Water bearing formation or source	Astoria formation	Well #1	Well, Nye formation	Well, Dune sand	Eckman Creek	Roady Creek
Temperature °F						
Chemical Constituents: (parts per million)						
Silica (SiO_2)					3.0	21.0
Iron (Fe)	.02	.13	0.1	0.1	.08	.4
Calcium (Ca)	5.2		1.6	4.4	4.8	5.0
Magnesium (Mg)	6.3	0.0	1.2	6.3		3.1
Sodium (Na)	50.0		7.6	16.0		
Potassium (K)						6.1
Bicarbonate (HCO_3)	21.0	66.0	1.0	15.0	32.0	25.0
Carbon Dioxide (CO_2)	40.0		14.0	30.0		10.0
Sulfate (SO_4)	15.0	27.0	1.5	6.0		2.1
Chloride (Cl)	72.0	98.0	13.0	28.0	16.0	10.0
Floride (F)						.1
Total Dissolved Solids	174.0	294.0	46.0	96.0		67.0
Hardness as $CaCO_3$	39.0	50.0	8.9	37.0	40.0	25.0
Conductance (micromhos at 25° C)	285.0		61.0	140.0	61.0	
pH	6.0		5.2	6.0	7.0	6.7

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