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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF LANGENBURG No. 181 SASKATCHEWAN

BY

B. R. MacKay, H. N. Hainstock & P. D. Bugg

Water Supply Paper No. 107

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF LANGENBURG NO. 181 SASKATCHEWAN

INTRODUCTION

Lack of rainfall during the years 1930 to 1934 over a large part of the Prairie Provinces brought about an acute shortage both in the larger supplies of surface water used for irrigation and the smaller supplies of ground water required for domestic purposes and for stock. In an effort to relieve the serious situation the Geological Survey began an extensive study of the problem from the standpoint of domestic uses and stock raising. During the field season of 1935 an area of 80,000 square miles, comprising all that part of Saskatchewan south of the north boundary of township 32, was systematically examined, records of approximately 60,000 wells were obtained, and 720 samples of water were collected for analyses. The facts obtained have been classified and the information pertaining to any well is readily accessible. The examination of so large an area and the interpretation of the data collected were possible because the bedrock geology and the Pleistocene deposits had been studied previously by McLearn, Warren, Rose, Stansfield, Wickenden, Russell, and others of the Geological Survey. The Department of Natural Resources of Saskatchewan and local well drillers assisted considerably in supplying several hundred well records. The base maps used were supplied by the Topographical Surveys Branch of the Department of the Interior.

Publication of Results

The essential information pertaining to the ground water conditions is being published in reports, one being issued for each municipality. Copies of these reports are being sent to the secretary treasurers of the municipalities and to certain Provincial and Federal Departments, where they can be consulted by residents of the municipalities or by other persons, or they may be obtained by writing direct to the Director, Bureau of Economic Geology, Department of Mines, Ottawa. Should anyone require more detailed information than that contained in the reports such additional information as the Geological Survey possesses can be obtained on application to the director. In making such request the applicant should indicate the exact location of the area by giving the quarter section, township, range, and meridian concerning which further information is desired.

The reports are written principally for farm residents, municipal bodies, and well drillers who are either planning to sink new wells or to deepen existing wells. Technical terms used in the reports are defined in the glossary.

How to Use the Report

Anyone desiring information about ground water in any particular locality should read first the part dealing with the municipality as a whole in order to understand more fully the part of the report that deals with the place in which he is interested. At the same time he should study the two figures accompanying the report. Figure 1 shows the surface and bedrock geology as related to the ground water supply, and Figure 2 shows the relief and the location and type of water wells. Relief is shown by lines of equal elevation called "contours". The elevation above sea-level

is given on some or all of the contour lines on the figure.

If one intends to sink a well and wishes to find the approximate depth to a water-bearing horizon, he must learn: (1) the elevation of the site, and (2) the probable elevation of the water-bearing bed. The elevation of the well site is obtained by marking its position on the map, Figure 2, and estimating its elevation with respect to the two contour lines between which it lies and whose elevations are give on the figure. Where contour lines are not shown on the figure, the elevations of adjacent wells as indicated in the Table of Well Records accompanying each report can be used. The approximate elevation of the water-bearing horizon at the well-site can be obtained from the Table of Well Records by noting the elevation of the water-bearing horizon in surrounding wells and by estimating from these known elevations its elevation at the well-site.[1] If the water-bearing horizon is in bedrock the depth to water can be estimated fairly accurately in this way. If the water-bearing horizon is in unconsolidated deposits such as gravel, sand, clay, or glacial debris, however, the estimated elevation is less reliable, because the water-bearing horizon may be inclined, or may be in lenses or in sand beds which may lie at various horizons and may be of small lateral extent. In calculating the depth to water, care should be taken that the water-bearing horizons selected from the Table of Well Records be all in the same geological horizon either in the glacial drift or in the bedrock. From the data in the Table

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[1] If the well-site is near the edge of the municipality, the map and report dealing with the adjoining municipality should be consulted in order to obtain the needed information about nearby wells.

of Well Records it is also possible to form some idea of the quality and quantity of the water likely to be found in the proposed well.

GLOSSARY OF TERMS USED

Alkaline. The term "alkaline" has been applied rather loosely to some ground waters. In the Prairie Provinces a water is usually described as "alkaline" when it contains a large amount of salts, chiefly sodium sulphate and magnesium sulphate in solution. Water that tastes strongly of common salt is described as "salty". Many "alkaline" waters may be used for stock. Most of the so-called "alkaline" waters are more correctly termed "sulphate waters".

Alluvium. Deposits of earth, clay, silt, sand, gravel, and other material on the flood-plains of modern streams and in lake beds.

Aquifer or Water-bearing Horizon. A water-bearing bed, lens, or pocket in unconsolidated deposits or in bedrock.

Buried pre-Glacial Stream Channels. A channel carved into the bedrock by a stream before the advance of the continental ice-sheet, and subsequently either partly or wholly filled in by sands, gravels, and boulder clay deposited by the ice-sheet or later agencies.

Bedrock. Bedrock, as here used, refers to partly or wholly consolidated deposits of gravel, sand, silt, clay, and marl that are older than the glacial drift.

Coal Seam. The same as a coal bed. A deposit of carbonaceous material formed from the remains of plants by partial decomposition and burial.

Contour. A line on a map joining points that have the same elevation above sea-level.

Continental Ice-sheet. The great ice-sheet that covered most of the surface of Canada many thousands of years ago.

Escarpment. A cliff or a relatively steep slope separating level or gently sloping areas.

Flood-plain. A flat part in a river valley ordinarily above water but covered by water when the river is in flood.

Glacial Drift. The loose, unconsolidated surface deposits of sand, gravel, and clay, or a mixture of these, that were deposited by the continental ice-sheet. Clay containing boulders forms part of the drift and is referred to as glacial till or boulder clay. The glacial drift occurs in several forms:

(1) Ground Moraine. A boulder clay or till plain (includes areas where the glacial drift is very thin and the surface uneven).

(2) Terminal Moraine or Moraine. A hilly tract of country formed by glacial drift that was laid down at the margin of the continental ice-sheet during its retreat. The surface is characterized by irregular hills and undrained basins.

(3) Glacial Outwash. Sand and gravel plains or deltas formed by streams that issued from the continental ice-sheet.

(4) Glacial Lake Deposits. Sand and clay plains formed in glacial lakes during the retreat of the ice-sheet.

Ground Water. Sub-surface water, or water that occurs below the surface of the land.

Hydrostatic Pressure. The pressure that causes water in a well to rise above the point at which it is struck.

Impervious or Impermeable. Beds, such as fine clays or shale, are considered to be impervious or impermeable when they do not permit of the perceptible passage or movement of the ground water.

Pervious or Permeable. Beds are pervious when they permit of the perceptible passage or movement of ground water, as for example porous sands, gravel, and sandstone.

Pre-Glacial Land Surface. The surface of the land before it was covered by the continental ice-sheet.

Recent Deposits. Deposits that have been laid down by the agencies of water and wind since the disappearance of the continental ice-sheet.

Unconsolidated Deposits. The mantle or covering of alluvium and glacial drift consisting of loose sand, gravel, clay, and boulders that overlie the bedrock.

Water Table. The upper limit of the part of the ground wholly saturated with water. This may be very near the surface or many feet below it.

Wells. Holes sunk into the earth so as to reach a supply of water. When no water is obtained they are referred to as dry holes. Wells in which water is encountered are of three classes.

(1) Wells in which the water is under sufficient pressure to flow above the surface of the ground. These are called Flowing Artesian Wells.

(2) Wells in which the water is under pressure but does not rise to the surface. These wells are called Non-Flowing Artesian Wells.

(3) Wells in which the water does not rise above the water table. These wells are called Non-Artesian Wells.

NAMES AND DESCRIPTIONS OF GEOLOGICAL FORMATIONS, REFERRED TO IN THESE REPORTS

Wood Mountain Formation. The name given to a series of gravel and sand beds which have a maximum thickness of 50 feet, and which occur as isolated patches on the higher parts of Wood mountain. This is the youngest bedrock formation and, where present, overlies the Ravenscrag formation.

Cypress Hills Formation. The name given to a series of conglomerates and sand beds which occur in the southwest corner of Saskatchewan, and rest upon the Ravenscrag or older formations. The formation is 30 to 125 feet thick.

Ravenscrag Formation. The name given to a thick series of light-coloured sandstones and shales containing one or more thick lignite coal seams. This formation is 500 to 1,000 feet thick, and covers a large part of southern Saskatchewan. The principal coal deposits of the province occur in this formation.

Whitemud Formation. The name given to a series of white, grey, and buff coloured clays and sands. The formation is 10 to 75 feet thick. At its base this formation grades in places into coarse, limy sand beds having a maximum thickness of 40 feet.

Eastend Formation. The name given to a series of fine-grained sands and silts. It has been recognized at various localities over the southern part of the province, from the Alberta boundary east to the escarpment of Missouri coteau. The thickness of the formation seldom exceeds 40 feet.

Bearpaw Formation. The Bearpaw consists mostly of incoherent dark grey to dark brownish grey, partly bentonitic shales, weathering light grey, or, in places where much iron

is present, buff. Beds of sand occur in places in the lower part of the formation. It forms the uppermost bedrock formation over much of western and southwestern Saskatchewan and has a maximum thickness of 700 feet or somewhat more.

Belly River Formation. The Belly River consists mostly of non-marine sand, shale, and coal, and underlies the Bearpaw in the western part of the area. It passes eastward and northeastward into marine shale. The principal area of transition is in the western half of the area where the Belly River is mostly thinner than it is to the west and includes marine zones. In the southwestern corner of the area it has a thickness of several hundred feet.

Marine Shale Series. This series of beds consists of dark grey to dark brownish grey, plastic shales, and underlies the central and northeastern parts of Saskatchewan. It includes beds equivalent to the Bearpaw, Belly River, and older formations that underlie the western part of the area.

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The rural municipality of Langenburg, No. 181, has an area of 258 square miles in southeastern Saskatchewan. It consist of six full townships described as townships 20 and 21, ranges 30, 31, and 32, and two fractional townships 20 and 21, range 33, W. 1st mer. The Manitoba boundary forms the eastern border of the municipality and the Second meridian forms the western border. The town of Langenburg on the Canadian Pacific railway in the north-central part of the municipality lies 125 miles east and 25 miles north of Regina.

The Maximum elevation of 1,750 feet occurs in the northwestern sections of the municipality. From this high part the elevation decreases gradually in a southerly and easterly direction. Smith creek, a small permanent stream, flows in an easterly direction through the northeastern corner of the municipality. Cutarm river, a much larger stream, occupies a deep valley in the southwestern part of the municipality. These creeks are very important to the municipality as they are the main source of water for many of the farmers.

The municipality is covered with glacial drift that varies in thickness from 60 to at least 300 feet. Moraine covers the southwestern corner of the municipality, but glacial till or boulder clay mantles the remainder of the area. A few small deposits of glacial outwash sands and gravels overlie the boulder clay in township 20, range 30, and townships 21, ranges 32 and 33.

Water-bearing Horizons in the Unconsolidated Deposits

Water-bearing deposits of sand or gravel occur discontinuously throughout the glacial drift, and many holes have been dug, bored, or drilled to depths ranging up to 300 feet in attempts to locate these water-bearing beds. As the water-bearing

deposits are in the form of scattered pockets it is not uncommon to find dry holes in the immediate vicinity of wells that yield large supplies of water. This is characteristic of both the glacial till and moraine-covered areas.

The uppermost water-bearing horizon in the glacial drift is formed by fairly extensive deposits of glacial outwash sands and gravels, and by pockets of sand and gravel that occur within the upper 30 feet of the drift. Water that is obtained from the glacial outwash deposits and from the larger pockets of sand and gravel is medium hard and usable for all farming purposes. The supply is fairly abundant and constant, whereas the supply from wells that tap small pockets of sand and gravel is intermittent and the water is more highly mineralized.

The second water-bearing horizon occurs at depths ranging from 50 to 100 feet and is formed by a sand or gravel bed that occurs between beds of impervious, blue clay. This horizon is discontinuous, but it has been tapped by a number of wells in the southeastern sections of the municipality. The water is very hard and "alkaline", but it is being used for all domestic purposes on many farms, since water of better quality is not obtainable within reasonable hauling distance. The hydrostatic pressure varies in the individual wells and the water rises to points ranging from 16 to 90 feet below the surface.

A few wells in township 21, ranges 30 and 31, have encountered water-bearing beds at depths of 165 to 212 feet. They yield an abundant supply of usable water and the hydrostatic pressure is sufficient to cause the water to rise to points varying from 50 to 100 feet below the surface. This horizon is not

continuous as wells in this vicinity were drilled much deeper before water was located. These deeper wells are from 240 to 300 feet deep and the water from them is unfit for domestic use. The water from one well is unfit for any farm purpose.

Dry holes have been sunk to a depth of 400 feet in this municipality. It does not seem advisable to drill to depths in excess of 200 feet, for although water-bearing beds are known to exist below this depth, the quality of the water likely to be obtained does not warrant the expenditure of drilling.

Water-bearing Horizons in the Bedrock

The Marine Shale series underlies the glacial drift throughout the municipality. In the southeastern corner of township 20, range 30, it was encountered at a depth of 60 feet below the surface. A 400-foot dry hole on the NW.$\frac{1}{4}$, section 33, in this same township entered the shale at a depth of 200 feet. These are the only places where bedrock has been penetrated in the municipality, although holes as deep as 300 feet have been sunk in glacial drift. The Marine Shale in this municipality is non-water bearing where it is encountered at depth, but small amounts of water are obtained from the upper few feet of the shale in a few wells in the southeastern part of township 20, range 30, where the shale is close to the surface.

Throughout the municipality dugouts or small dams could be used to collect and store run-off waters for stock use.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 20, Range 30

The glacial drift of this township, with the exception of a small moraine-covered area in section 4, is in the form of glacial till or boulder clay. The ground surface is slightly rolling and the elevation varies from 1,600 to 1,650 feet above sea-level. No lakes, rivers, or creeks occur, so that the water supply is derived wholly from wells, and as a consequence many holes have been sunk in an endeavour to obtain a permanent supply of water.

A few of the numerous holes sunk into the upper 30 feet of glacial drift have encountered scattered pockets of sand and gravel. In sections 18, 19, 21, and 28, the wells that have tapped these pockets yield large supplies of medium hard water that can be used for all household purposes. Other wells tapping smaller pockets of sand and gravel yield intermittent supplies of water. In some sections the holes failed to encounter any water-bearing deposits.

In the southern and southeastern parts of the township, wells from 40 to 85 feet deep have encountered water-bearing beds of sand or gravel. Some of these wells yield large supplies of water. The water-bearing beds are not continuous, but they do appear to be fairly extensive in this locality. The water is very hard and highly mineralized, but is used for all general household uses. The hydrostatic pressure varies in different places and the water rises to points 16 to 65 feet below the surface.

A few wells in the central sections of the township obtain an abundant supply of water at depths of 100 to 140 feet. The aquifer is a discontinuous bed of sand and gravel that is overlain by an 80-to 110-foot bed of impervious, blue

clay. The water is very hard and has a high iron content, but as a rule it is used for all domestic purposes. The discontinuity of these water-bearing beds is shown by the number of holes that have been drilled to depths ranging from 100 to 200 feet without encountering water. A well on the SW.$\frac{1}{4}$, section 30, tapped an abundant supply of water at a depth of 230 feet, but the supply gradually decreased and in 1935 the well was dry.

The Marine Shale series underlies the glacial drift of this township. In sections 1, 2, and 13, it is encountered within 65 feet of the surface. Small supplies of water are being obtained from a thin bed of sand and gravel immediately overlying the Marine Shale in this area and some water is also obtained from the upper few feet of the shale. The supply is sufficient only for household use and water for stock purposes is hauled from Assiniboine river in the municipality to the east. On the NW.$\frac{1}{4}$, section 33, a hole drilled to a depth of 400 feet or to an elevation of 1,240 feet, encountered shale beds at a depth of 200 feet, or at an elevation of 1,440 feet. It appears that the Marine Shale series does not contain water in places where it is overlain by a thick deposit of drift and in these places it is inadvisable to drill into it.

Township 20, Range 31

This township is a rolling plain with an average elevation of 1,630 feet above sea-level. Deerhorn creek, a small permanent stream, which occupies a shallow valley, enters the township in section 31, and flows in a southerly direction leaving the township in section 4. Small deposits of glacial outwash sands and gravels are located along Deerhorn creek in the northeastern corner of the township and also in sections 27 and 28, but elsewhere glacial till or boulder clay mantles the township. The upper 30 feet of glacial till is composed of yellow clay in which isolated pockets

of sand and gravel are embedded. These sand and gravel pockets and the deposits of glacial outwash sands and gravels comprise the first water-bearing horizon of the township. Water derived from wells sunk in the deposits of glacial outwash is medium hard and is suitable for all farm purposes. Several of the wells yield an abundant supply and they are being used by a number of farmers. Wells that have tapped pockets of sand and gravel yield small supplies that in many instances are only sufficient for household purposes. This water-bearing horizon is the main source of water for the township, but the supply is inadequate. Numerous holes bored to depths ranging from 50 to 80 feet were dry or yielded only small amounts of very "alkaline" water.

In sections 2, 12, and 14, a few wells obtain moderate supplies of water from a gravel aquifer at depths ranging from 89 to 120 feet. The water is very hard and highly mineralized and should not be used for domestic purposes, although it is being used since water of better quality is not available within reasonable hauling distance. The hydrostatic pressure is sufficient to cause the water to rise to a point 25 to 40 feet below the surface. This water-bearing bed of gravel is not continuous, as holes drilled to greater depths within short distances of the producing wells failed to locate water.

The Marine Shale series underlies the glacial drift throughout the township. The elevation at which the shale occurs is not known, but a 167-foot hole did not encounter the bedrock. The Marine Shale series, if encountered at this depth, will likely be non-water bearing.

Township 20, Range 32

This township is a rolling plain with an average elevation of 1,650 feet above sea-level. Cutarm river, which occupies an abrupt, deep valley, enters the township in section 31, and flows in a southeasterly direction, leaving the township in section 3. The township is mantled by an unknown thickness of glacial till or boulder clay.

Numerous holes have been dug or bored in the upper 40 feet of glacial till in an effort to locate adequate supplies of water. A few of these holes have encountered isolated pockets of sand and gravel that yield water. Several of these wells yield an abundance of medium hard water, but the greater number yield only small supplies of very highly mineralized water. Usually a number of farmers haul from a few good wells. Other holes have been drilled to a depth of 110 feet without striking water. At least half the residents are forced to haul water for all purposes. Many farmers situated 4 or 5 miles from Cutarm river haul water from it for both household and stock use.

The supply of water in this township is poor, and no continuous water-bearing horizons are known to occur in the drift mantle. By excavating dugouts or constructing small dams to collect and retain run-off water for stock use, the water shortage may be somewhat alleviated.

The Marine Shale series underlies the glacial drift of this township, but it has not been encountered by any well. It is doubtful if any usable water will be obtained from it at depth.

Township 20, Range 33

This fractional township comprises an area of 21 square miles. The elevation rises from less than 1,600 feet in section 36, to over 1,700 feet in the southwestern corner of the area.

The ground surface is rolling and a few pronounced hills and depressions occur in the southwestern corner that is mantled by part of a moraine. Glacial till covers the remainder of the township.

The water conditions in this township are poor and many holes from 30 to 200 feet deep have been sunk in an effort to locate a permanent supply of water. Several of the shallow wells have tapped pockets of sand and yield small supplies of water. In section 36 two wells have tapped an abundance of water at depths of 128 and 134 feet, respectively, or at an elevation of 1,520 feet above sea-level. The bed of water-bearing gravel tapped by these wells is of small areal extent, however, as deeper holes within short distances of the producing wells failed to locate it. The water is locally termed soft and is usable for all farming purposes. It rises to a point 112 feet below the surface where it maintains a constant level.

Only two or three farmers in this township are obtaining sufficient supplies of ground water for their local requirements, and the remainder are forced to haul water from considerable distances. The use of dugouts and dams for the collection and retention of run-off water for stock use is highly recommended in this township.

The Marine Shale series that underlies the glacial drift of this township is not encountered at an elevation of 1,486 feet above sea-level. It is not known at what depth it would be encountered, but it is doubtful if any usable water will be obtained from the shale when it occurs at depth.

Township 21, Range 30

The township has an average elevation of 1,650 feet above sea-level and the land surface is flat to gently rolling. Smith creek, a small permanent stream, occupies a shallow valley in the northern part of the township. The whole area is mantled with glacial till or boulder clay.

The uppermost water-bearing horizon in the drift mantle lies within 30 feet of the surface. It is formed by scattered pockets of sand and gravel that occur in the yellow clay. Some of these pockets or lenses of sand and gravel are quite extensive as an abundant supply of moderately soft water is obtained from several wells. Most of the shallow wells, however, yield only small supplies of highly mineralized but usable water. This water-bearing horizon is not continuous and numerous holes are usually sunk before an adequate supply of water is obtained. It is, however, the main source of water supply for the township.

A few holes have been sunk to depths of 45 to 100 feet, but most of them were dry. The small supplies of water that were obtained were too highly mineralized to be used for domestic purposes.

In sections 14, 15, 20, 21, and 29, drilled wells obtain an abundant supply of water from a fine sand aquifer at depths of 165 to 212 feet, or at an average elevation of 1,460 feet above sea-level. The water is very hard and "alkaline", but it is usable for all household purposes. The hydrostatic pressure is sufficient to cause the water in the wells in section 15 to rise to within 25 to 50 feet of the surface; in the other sections to within 100 to 160 feet. Some difficulty is experienced in keeping the fine sand from plugging the wells. This water-bearing horizon may extend throughout the township as no dry holes have been drilled to this elevation.

The Marine Shale series underlies the glacial drift throughout the township, but it has not been encountered by any well, the deepest drilled well, 212 feet, being in glacial drift. It is doubtful if water would be obtained from the Marine Shale series if it were tapped at so great a depth.

Township 21, Range 31

The ground surface of this township is slightly rolling and the elevation rises gradually towards the west, attaining 1,720 feet in the northwestern corner. Boulder clay or till mantles the entire township to a depth of at least 300 feet. No creeks or lakes occur in this township and the water supply is derived from wells that tap water-bearing deposits in the glacial drift.

The main source of water for the township is a water-bearing horizon that is located in the upper 30 feet of the glacial drift. This aquifer is formed by pockets of sand and gravel that are scattered throughout the yellow clay and wells tapping it yield varying supplies of water. The larger and more extensive pockets yield an abundance of medium hard water that is usable for all farm purposes. Most of the wells, however, tap sand or gravel pockets of small areal extent and the water is more highly mineralized and not as abundant, and during drought periods the supply is often insufficient for local needs. In some sections numerous holes were dug before a water-bearing deposit was encountered.

A well on the NE.$\frac{1}{4}$, section 27, and another on the NE.$\frac{1}{4}$, section 31, tap a sand aquifer at depths of 130 and 180 feet, respectively, or at an elevation of 1,550 feet above sea-level. The water from these wells is very hard, highly mineralized and has a high iron content, and that from the latter well is not usable for domestic purposes. The hydrostatic pressure is low, but the water maintains a constant level at 85 feet below the surface in the first well and 160 feet in the other well. These water-bearing sands are apparently not continuous, as deeper holes within short distances of the producing wells did not encounter a water-bearing sand bed at this level.

Two wells on the NE.$\frac{1}{4}$, section 7, and the NE.$\frac{1}{4}$, section 27, tap an abundant supply of very "alkaline" water at depths of

240 and 260 feet, respectively. The water from the well on section 27 was analysed and pronounced unfit for drinking or for stock use. The water in both wells is under pressure and rises to points 100 and 140 feet below the surface. A 300-foot well on the SW.$\frac{1}{4}$, section 35, obtains an abundant supply of water from a 10-foot sand bed at an elevation of 1,390 feet above sea-level. This water is used for drinking and by the Co-Operative Creameries of Langenburg for washing butter. This water-bearing horizon appears to be below that of the two wells mentioned above. It is possible that water of similar quality may be located at about the same elevation in other sections of the township.

The glacial till is underlain by the Marine Shale series. Local well drillers report that it is encountered at a depth of approximately 300 feet, although it was not encountered in the 300-foot well on SW.$\frac{1}{4}$, section 35. Elsewhere it is usually non-water bearing when encountered at so great a depth.

Township 21, Range 32

This township is relatively flat, the elevation gradually rising from 1,700 feet in the southern part to 1,750 feet above sea-level in the northern part. Deerhorn creek, a small stream that occupies a shallow valley, heads in section 22, and flows in a southeasterly direction. The entire township is mantled by glacial till or boulder clay, but in the central and west-central parts the till is overlain by deposits of glacial outwash sands or gravels at least 20 feet thick.

The uppermost water-bearing horizon in the township is formed by the deposits of glacial outwash and by isolated pockets of sand and gravel that occur in the upper 20 feet of glacial till. Wells that tap the glacial outwash deposits and the larger pockets of sand and gravel in the boulder clay yield

a fairly abundant supply of slightly mineralized water, whereas those that tap pockets of small areal extent yield small supplies of highly mineralized water. This water-bearing horizon is the main source of supply in this township.

A few wells in the western part of the township obtain small supplies of highly mineralized water from a sand aquifer at depths ranging from 35 to 75 feet below the surface. The water from some of these wells is suitable for domestic use, but that from others is hardly fit for stock use. A well on the NE.$\frac{1}{4}$, section 34, is obtaining a large supply of water from a sand aquifer at a depth of 130 feet. The water is under sufficient pressure to rise to a point 40 feet below the surface where it maintains a constant level. It is used for all household purposes although it has a high iron content. It is possible that this or similar beds of water-bearing sand would be encountered at approximately this same depth in other sections.

No wells have been sunk to the bedrock in this municipality, so that the exact depth at which the Marine Shale series occurs is not known. It is usually non-water bearing in places where it is overlain by a thick deposit of drift.

Township 21, Range 33

This fractional township comprises an area of 21 square miles. Cutarm river flows in a southeasterly direction through the southwestern corner of the township. The river is at an elevation of slightly less than 1,600 feet above sea-level, but throughout the remainder of the township the elevation varies between 1,600 and 1,750 feet above sea-level. Glacial till mantles the entire township, but a deposit of glacial outwash sands and gravels overlies the till in the east-central part of the township.

In the area mantled by glacial outwash deposits abundant supplies of medium soft, usable water are obtained at depths of 20 feet or less. Other wells have tapped isolated pockets of sand and gravel in the upper 30 feet of the glacial till and yield varying amounts of water. Wells that tap pockets of large areal extent usually yield a permanent supply of hard water, but those that tap smaller pockets of sand and gravel yield intermittent supplies and become dry during periods of continued drought. This township does not experience a grave shortage of water, although a few farmers are forced to haul water during part of the year. Several of these farmers have attempted to locate water at depth. Holes from 70 to 100 feet deep in different parts of the township were dry, but at depths of 110 feet to 125 feet a number of wells have tapped an abundant supply of highly mineralized water. The aquifer is a bed of fine sand that is overlain by impervious, blue clay. The hydrostatic pressure is sufficient to cause the water to rise to a point 50 feet below the surface where it maintains a constant level. This water-bearing horizon may extend throughout the township as wells in widely separated sections have encountered it. A 170-foot well on the SE.$\frac{1}{4}$, section 1, taps an abundant supply of comparatively soft water that rises to a point 130 feet below the surface where it maintains a constant level. It is improbable that this water-bearing bed is very extensive, as a 204-foot hole on the NW.$\frac{1}{4}$, sec. 34, tp. 20, range 33, failed to encounter water.

The Marine Shale series underlies the glacial drift throughout the township. The drift is at least 200 feet thick and it is improbable that any water will be obtained from the shale when it is overlain by such a thickness of glacial drift. Drilling into the bedrock is not advised.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF LANGENBURG, NO. 181, SASKATCHEWAN

Township	20	20	20	20	21	21	21	21	Total No. in Municipality
West of 1st meridian Range	30	31	32	33	30	31	32	33	
Total No. of Wells in Township	110	218	117	56	98	58	47	29	733
No. of wells in bedrock	11	0	0	0	0	0	0	0	11
No. of wells in glacial drift	99	218	117	56	98	58	47	29	722
No. of wells in alluvium	0	0	0	0	0	0	0	0	0
Permanency of Water Supply									
No. with permanent supply	53	48	47	20	44	49	35	27	323
No. with intermittent supply	8	11	12	1	2	3	3	1	41
No. dry holes	49	159	58	35	52	6	9	1	369
Types of Wells									
No. of flowing artesian wells	0	0	0	0	0	0	0	0	0
No. of non-flowing artesian wells	15	5	2	8	8	7	4	6	55
No. of non-artesian wells	46	54	57	13	38	45	34	22	309
Quality of Water									
No. with hard water	58	56	53	16	42	50	32	25	332
No. with soft water	3	3	6	5	4	2	6	3	32
No. with salty water	0	0	0	1	0	0	0	0	1
No. with "alkaline" water	3	5	0	3	15	12	6	2	46
Depths of Wells									
No. from 0 to 50 feet deep	53	191	105	44	85	51	45	22	596
No. from 51 to 100 feet deep	46	14	10	3	6	0	1	3	83
No. from 101 to 150 feet deep	7	9	2	4	0	2	1	3	28
No. from 151 to 200 feet deep	1	4	0	4	5	1	0	1	16
No. from 201 to 500 feet deep	3	0	0	1	2	4	0	0	10
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0	0	0
How the Water is used									
No. usable for domestic purposes	56	53	54	19	40	41	34	22	319
No. not usable for domestic purposes	5	6	5	2	6	11	4	6	45
No. usable for stock	60	58	57	21	46	49	36	26	353
No. not usable for stock	1	1	2	0	0	3	2	2	11
Sufficiency of Water Supply									
No. sufficient for domestic needs	53	48	46	20	43	49	35	27	321
No. insufficient for domestic needs	8	11	13	1	3	3	3	1	43
No. sufficient for stock needs	37	42	28	12	31	43	27	23	243
No. insufficient for stock needs	24	17	31	9	15	9	11	5	121

ANALYSES AND QUALITY OF WATER

General Statement

Samples of water from representative wells in surface deposits and bedrock were taken for analyses. Except as otherwise stated in the table of analyses the samples were analysed in the laboratory of the Borings Division of the Geological Survey by the usual standard methods. The quantities of the following constituents were determined; total dissolved mineral solids, calcium oxide, magnesium oxide, sodium oxide by difference, sulphate, chloride, and alkalinity. The alkalinity referred to here is the calcium carbonate equivalent of all acid used in neutralizing the carbonates of sodium, calcium, and magnesium. The results of the analyses are given in parts per million--that is, parts by weight of the constituents in 1,000,000 parts of water; for example, 1 ounce of material dissolved in 10 gallons of water is equal to 625 parts per million. The samples were not examined for bacteria, and thus a water that may be termed suitable for use on the basis of its mineral salt content might be condemned on account of its bacteria content. Waters that are high in bacteria content have usually been polluted by surface waters.

Total Dissolved Mineral Solids

The term "total dissolved mineral solids" as here used refers to the residue remaining when a sample of water is evaporated to dryness. It is generally considered that waters that have less than 1,000 parts per million of dissolved solids are suitable for ordinary uses, but in the Prairie Provinces this figure is often exceeded. Nearly all waters that contain more than 1,000 parts per million of total solids have a taste due to the dissolved mineral matter. Residents

accustomed to the waters may use those that have much more than 1,000 parts per million of dissolved solids without any marked inconvenience, although most persons not used to highly mineralized water would find such waters highly objectionable.

Mineral Substances Present

Calcium and Magnesium

The calcium (Ca) and magnesium (Mg) content of water is dissolved from rocks and soils, but mostly from limestone, dolomite, and gypsum. The calcium and magnesium salts impart hardness to water. The magnesium salts are laxative, especially magnesium sulphate (Epsom salts, $MgSO_4$), and they are more detrimental to health than the lime or calcium salts. The calcium salts have no laxative or other deleterious effects. The scale found on the inside of steam boilers and tea-kettles is formed from these mineral salts.

Sodium

The salts of sodium are next in importance to those of calcium and magnesium. Of these, sodium sulphate (Glauber's salt, Na_2SO_4) is usually in excess of sodium chloride (common salt, NaCl). These sodium salts are dissolved from rocks and soils. When there is a large amount of sodium sulphate present the water is laxative and unfit for domestic use. Sodium carbonate (Na_2CO_3) "black alkali", sodium sulphate "white alkali", and sodium chloride are injurious to vegetation.

Sulphates

Sulphates (SO_4) are one of the common constituents of natural water. The sulphate salts most commonly found are sodium sulphate, magnesium sulphate, and calcium sulphate ($CaSO_4$). When the water contains large quantities of the sulphate of sodium it is injurious to vegetation.

Chlorides

Chlorides are common constituents of all natural water and are dissolved in small quantities from rocks. They usually occur as sodium chloride and if the quantity of salt is much over 400 parts per million the water has a brackish taste.

Iron

Iron (Fe) is dissolved from many rocks and the surface deposits derived from them, and also from well casings, water pipes, and other fixtures. More than 0.1 part per million of iron in solution will settle as a red precipitate upon exposure to the air. A water that contains a considerable amount of iron will stain porcelain, enamelled ware, and clothing that is washed in it, and when used for drinking purposes has a tendency to cause constipation, but the iron can be almost completely removed by aeration and filtration of the water.

Hardness

Calcium and magnesium salts impart hardness to water. Hardness of water is commonly recognized by its soap-destroying powers as shown by the difficulty of obtaining lather with soap. The total hardness of a water is the hardness of the water in its original state. Total hardness is divided into "permanent hardness" and "temporary hardness". Permanent hardness is the hardness of the water remaining after the sample has been boiled and ~~it represents~~ the amount of mineral salts that cannot be removed by boiling. Temporary hardness is the difference between the total hardness and the permanent hardness and represents the amount of mineral salts that can be removed by boiling. Temporary hardness is due mainly to the bicarbonates of calcium and magnesium and iron, and permanent harness to the sulphates and chlorides of calcium and magnesium. The permanent hardness

can be partly eliminated by adding simple chemical softeners such as ammonia or sodium carbonate, or many prepared softeners. Water that contains a large amount of sodium carbonate and small amounts of calcium and magnesium salts is soft, but if the calcium and magnesium salts are present in large amounts the water is hard. Water that has a total hardness of 300 parts per million or more is usually classed as excessively hard. Many of the Saskatchewan water samples have a total hardness greatly in excess of 300 parts per million; when the total hardness exceeded 3,000 parts per million no exact hardness determination was made. Also no determination for temporary hardness was made on waters having a total hardness less than 50 parts per million. As the determinations of the soap hardness in some cases were made after the samples had been stored for some time, the temporary hardness of some of the waters as they come from the wells probably is higher than that given in the table of analyses.

Analyses of Water Samples from the Municipality of Langenburg, No. 181, Saskatchewan

LOCATION						Depth of well, Ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alkalinity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	
1	SE.	10	20	33	1	28	1,336																		*1
2	NE.	14	20	33	1	102	3,300												(2)				(1)	(3)	*1
3	SW.	36	20	33	1	134	1,400											(3)					(2)	(1)	*1
4	NE.	15	21	30	1	185	2,360	1,050	850	200	110	400	280	126	1,120	561	2,162	400	136		375		1,070	181	*1
5	SE.	1	21	33	1	170	1,140	500	180	320	200	450	140	54	217	356	1,084	251			113	69	321	330	*1

Water samples indicated thus, *1, are from glacial drift.
Analyses are reported in parts per million; where numbers (1). (2). and (3). are used instead of parts per million, they represent the relative amounts in which the main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$)
Analysis No. 1 by A. Nuttall, Analyses Nos. 2 and 3 by Y.A. Vigfussan.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

Five samples of water from the glacial drift of the municipality of Langenburg were analysed and the results are listed in the accompanying table. Sample No. 1 was taken from a 28-foot well that tapped a sand and gravel pocket in the glacial drift. It has a total dissolved solid content of 1,336 parts per million. This amount of dissolved salts may be fairly representative of the type of water derived from wells tapping pockets of sand or gravel in the glacial drift. The water is usable for all domestic purposes and is satisfactory for stock. Samples Nos. 2 and 4, from wells 102 and 185 feet deep, respectively, have a total dissolved solid content of 3,300 and 2,360 parts per million. These waters should not be used for drinking if better water is obtainable, as the magnesium sulphate and sodium sulphate present in solution in the water cause it to act as a laxative. The iron content in these waters is also sufficiently high to render them unsuitable for household purposes. Much of the iron, however, can be removed by aeration and filtration of the water. Samples Nos. 3 and 5 are from wells that tap the same water-bearing horizon at depths of 134 and 170 feet. The total dissolved solid content of these samples is 1,100 and 1,400 parts per million and sodium chloride, sodium sulphate, and calcium carbonate are the predominant mineral salts in solution. This water can be used for drinking as well as for stock, probably with no ill effects.

Water from the Bedrock

Small supplies of water are obtained from the upper few feet of the Marine Shale series at depths of 50 to 60 feet in township 20, range 30. The water is highly mineralized and is similar to the water that is derived from the lower part of the glacial drift. It is suitable for stock, but may be undesirable for drinking. Water that is derived from the Marine Shale at depth is usually too highly mineralized to be used for any farm purposes.

WELL RECORDS—Rural Municipality of LANGENBURG, NO.181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
1	SE.	1	20	30	1	Bored	40	1,615	- 20	1,595	40	1,575	Glacial gravel	Hard		D, S	Sufficient for 50 head stock.
2	SW.	1	"	"	"	Bored	63	1,615	- 40	1,575	62	1,553	Marine shale	Hard, clear		D, S	Insufficient for 10 head stock. 2 dry holes 70 feet deep.
3	NE.	2	"	"	"	Dug	50	1,615	- 10	1,605	50	1,565	Glacial gravel			D, S	Insufficient for 25 head stock. 1 dry hole 65 feet deep.
4	NE.	2	"	"	"	Bored	65	1,615	- 30	1,585	65	1,550	Glacial gravel	Hard, clear, "alkaline"		S	Intermittent supply. Also 2 other wells 15 feet deep.
5	NW.	3	"	"	"	Bored	100	1,615									Dry hole; glacial blue clay at base. Another dry hole 102 feet deep. Also a shallow well used for household needs.
6	SE.	4	"	"	"	Bored	75	1,620	- 70	1,550	70	1,550	Glacial sand	Hard, clear		D, S	Sufficient for 80 head stock.
7	SE.	4	"	"	"	Bored	77	1,620	- 65	1,555	75	1,545	Glacial gravel	Hard, clear		D, S	Sufficient for 30 head stock
8	NE.	4	"	"	"	Bored	75	1,620	- 70	1,550	70	1,550	Glacial gravel	Hard, clear		D, S	Insufficient due to caving.
9	NE.	5	"	"	"	Bored	80	1,625	- 16	1,609	80	1,545	Glacial gravel	Hard, clear		D, S	Sufficient for 100 head stock.
10	SW.	6	"	"	"	Bored	65	1,620	- 45	1,575	65	1,555	Glacial gravel	Hard, clear		D, S	Sufficient for 70 head stock.
11	SE.	8	"	"	"	Dug	8	1,625	0	1,625			Glacial yellow clay	Hard, clear		D, S	Intermittent supply. Several dry holes to a depth of 80 feet.
12	NW.	8	"	"	"	Dug	12	1,625	- 10	1,615	10	1,615	Glacial gravel	Hard, clear		D, S	Sufficient for 20 to 30 head stock.
13	NW.	9	"	"	"	Drilled	91	1,625	- 75	1,550	90	1,535	Glacial gravel	Hard, clear		D, S	Oversufficient for local needs. Several dry holes up to 100 feet deep.
14	NE.	9	"	"	"	Drilled	100	1,620	- 85	1,535	100	1,520	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
15	SW.	10	"	"	"	Dug	106	1,620									Dry hole; glacial blue clay at base. Another dry hole 64 feet deep.
16	SE.	10	"	"	"	Bored	78	1,620	- 70	1,550	77	1,543	Glacial gravel	Hard, clear		D, S	Sufficient for 100 head stock.
17	NW.	11	"	"	"	Bored	70	1,620	- 35	1,585			Glacial sand	Hard, cloudy, "alkaline"		D, S	Insufficient for 15 head stock. Another well 8 feet deep has good supply.
18	SW.	12	"	"	"	Dug	12	1,615	- 10	1,605	10	1,605	Glacial sand	Hard, clear		D, S	Sufficient supply; yields about 4 barrels a day.
19	SE.	12	"	"	"	Bored	45	1,615	- 30	1,585	45	1,570	Glacial gravel	Hard, clear		D, S	Sufficient for 35 head stock. Also another shallow well.
20	NE.	13	"	"	"	Bored	55	1,615	- 39	1,576	39	1,576	Glacial sand	Hard, clear		D, S	Insufficient for 15 head stock. Base in Marine shale.
21	SW.	13	"	"	"	Bored	65	1,615	- 60	1,555	60	1,555	Marine shale	Hard, clear		D, S	Insufficient for local needs. Several dry holes to 90 feet deep.
22	SW.	14	"	"	"	Bored	86	1,620	- 65	1,555	85	1,535	Glacial fine sand	Hard, clear		D, S	Sufficient for 50 head stock. Another well 90 feet deep plugged with sand.
23	NW.	16	"	"	"	Drilled	100	1,625	- 90	1,535	100	1,525	Glacial gravel	Hard, clear		D, S	Sufficient for 25 head stock.
24	NE.	17	"	"	"	Drilled	200	1,625									Dry hole. Glacial blue clay at base.
25	SE.	17	"	"	"	Bored	101	1,625	- 60	1,565	100	1,525	Glacial sand, gravel	Hard, clear		D, S	Sufficient for 30 head stock. 3 dry holes 123, 108 and 94 feet deep. Also a shallow well used for household needs.
26	SW.	18	"	"	"	Dug	18	1,645	- 16	1,629	16	1,629	Glacial sand	Hard, clear		D, S	Sufficient for 50 head stock.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
27	NW.	18	20	30	1	Dug	21	1,630	- 18	1,612	18	1,612	Glacial sand	Hard, clear		D, S	Sufficient for 50 head stock.
28	NW.	19	"	"	"	Dug	20	1,655	- 18	1,637	18	1,637	Glacial sand, gravel	Hard, clear		D, S	Insufficient for 15 head stock.
29	SE.	19	"	"	"	Dug	30	1,660	- 27	1,633	27	1,633	Glacial sand	Hard, clear		D, S	Sufficient for 20 head stock.
30	NW.	20	"	"	"	Bored	100	1,650									Dry hole; glacial blue clay at base. Also a number of other dry holes.
31	NW.	21	"	"	"	Dug	24	1,660	- 21	1,639	21	1,639	Glacial sand	Soft, clear		D, S	Sufficient for 40 head stock.
32	NW.	22	"	"	"	Dug	10	1,650	- 7	1,643	7	1,643	Glacial sand	Hard, clear		D, S	Sufficient for 15 head stock.
33	SW.	22	"	"	"	Drilled	140	1,655	- 50	1,605	140	1,515	Glacial sand	Hard, cloudy, iron		D, S	
34	NW.	23	"	"	"	Bored	100	1,650									Dry hole; glacial blue clay at base.
35	SW.	24	"	"	"	Bored	55	1,635	- 20	1,615	54	1,581	Glacial sand	Hard, clear		D, S	Sufficient supply; cannot be lowered by pumping
36	NW.	27	"	"	"	Drilled	126	1,645	-112	1,533	122	1,523	Glacial sand	Hard, clear, iron		S	Sufficient for 175 head stock.
37	S½	27	"	"	"	Drilled	108	1,645	- 70	1,575	108	1,537	Glacial sand	Hard, clear, iron		S	Sufficient for 150 to 200 head stock.. Also a 12-foot well used for household needs.
38	NE.	28	"	"	"	Dug	14	1,645	- 3	1,642	5	1,640	Glacial sand	Hard, clear		D, S	Sufficient for 15 head stock. 3 other similar wells.
39	SW.	28	"	"	"	Dug	20	1,645	- 17	1,628	17	1,628	Glacial sand	Hard, clear, "alkaline"		S	Sufficient for 70 head stock.
40	NE.	30	"	"	"	Dug	24	1,645	- 20	1,625	20	1,625	Glacial sand, gravel	Hard, clear		D, S	Sufficient for 40 head stock. Many dry holes up to 40 feet.
41	SW.	30	"	"	"	Drilled	230	1,640									Dry hole; glacial sand at base. Also a 14-foot well; supplies 5 horses.
42	NE.	31	"	"	"	Dug	18	1,645	- 15	1,630	15	1,630	Glacial gravel	Hard, clear		D, S	Sufficient for 35 head stock. Also a 40-foot well with small supply not used.
43	NW.	32	"	"	"	Dug	27	1,645	- 25	1,620	25	1,620	Glacial sand	Hard, clear		D, S	Sufficient for 40 head stock. Several dry holes, the deepest being 135 feet.
44	NW.	33	"	"	"	Drilled	400	1,640									Dry hole; Marine shale at base. Another dry hole 185 feet deep. Also seepage wells.
45	NW.	35	"	"	"	Dug	14	1,640	- 9	1,631	9	1,631	Glacial sand	Hard, clear		D, S	Sufficient for 70 head stock.
46	NW.	35	"	"	"	Dug	10	1,640	- 6	1,634	6	1,634	Glacial sand	Soft, clear		D, S	Sufficient for 35 head stock.
47	NW.	36	"	"	"	Dug	22	1,640	- 13	1,627			Glacial gravel	Hard, clear		D	Intermittent supply. Several similar wells. Also many dry holes 47 to 50 feet deep.
48	SW.	36	"	"	"	Dug	14	1,640	- 9	1,631	9	1,631	Glacial sand	Soft, clear		D, S	Sufficient for 35 head stock.
1	NE.	1	20	31	1	Dug	12	1,625	- 10	1,615			Glacial clay	Hard, clear		S	Intermittent supply. Also a few dry holes.
2	NE.	2	"	"	"	Bored	95	1,625	- 90	1,535	95	1,530	Glacial sand	Hard, clear		D, S	Intermittent supply. Many dry holes 25 to 60 feet deep; one 70 feet deep.
3	SW.	3	"	"	"	Dug	7	1,620	- 4	1,616	4	1,616	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
4	SE.	4	"	"	"	Dug	6	1,620	- 2	1,618	2	1,618	Glacial sand, gravel	Hard, clear		D, S	Sufficient for 60 head stock.
5	SW.	4	"	"	"	Dug	10	1,620	- 8	1,612	8	1,612	Glacial gravel	Hard, clear		D, S	Insufficient supply. Enough for household needs.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
6	NW.	4	20	31	1	Dug	30	1,625	- 20	1,605			Glacial drift	Hard, clear, "alkaline"		N	Unfit for use.
7	SE.	5	"	"	"	Dug	16	1,630	- 13	1,617	13	1,617	Glacial sand	Hard, clear		D, S	Sufficient for 10 head stock.
8	NW.	5	"	"	"	Dug	24	1,630	- 19	1,611	19	1,611	Glacial sand	Hard, clear		D, S	Insufficient for 20 head stock. Another well 14 feet deep.
9	SW.	6	"	"	"	Dug	20	1,635	- 12	1,623	20	1,615	Glacial sand	Hard, clear		D	Intermittent supply. 4 other similar wells Also a number of dry holes.
10	SW.	6	"	"	"	Dug	42	1,635	- 20	1,615			Glacial sand	Hard, clear		S	Intermittent supply.
11	SW.	8	"	"	"	Dug	25	1,635	- 15	1,620	22	1,613	Glacial sand	Hard, clear		D, S	Insufficient for 40 head stock. Also many dry holes to 42 feet.
12	SE.	8	"	"	"								Glacial drift			D, S	Farmer on SW.8-20-31-1 hauls from here.
13	NE.	9	"	"	"	Dug	50	1,630									A number of dry holes; glacial blue clay to base.
14	NW.	12	"	"	"	Drilled	106	1,635	- 45	1,590	106	1,529	Glacial sand, gravel	Hard, clear, "alkaline"		S	Sufficient for 70 to 80 head stock.
15	NE.	12	"	"	"	Dug & Drilled	120	1,635	- 55	1,580	120	1,515	Glacial gravel	Hard, clear		D, S	Sufficient for 75 head stock. Also a shallow well for household use.
16	SE.	14	"	"	"	Bored	90	1,635	- 40	1,595	90	1,545	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient for 60 head stock.
17	SW.	14	"	"	"	Bored	89	1,635	- 25	1,610	89	1,546	Glacial drift	Hard, clear, "alkaline"		S	Sufficient for 60 head stock.
18	NE.	15	"	"	"	Dug	25	1,635									Dry holes from 18 feet to 25 feet deep; glacial clay at base.
19	SW.	15	"	"	"	Dug	16	1,630	- 8	1,622	8	1,622	Glacial gravel	Soft, clear		D, S	Sufficient for 150 head stock.
20	SW.	16	"	"	"	Dug	40	1,635									Dry hole; glacial drift at base.
21	NW.	16	"	"	"	Dug	16	1,635	- 12	1,623	13	1,622	Glacial sand	Hard, clear		D, S	Sufficient for 50 head stock.
22	NE.	17	"	"	"	Dug	6	1,630	- 2	1,628	2	1,628	Glacial gravel	Hard, clear		D, S	Sufficient for 50 to 60 head stock.
23	SE.	17	"	"	"	Dug	7	1,630	- 4	1,626	4	1,626	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
24	NW.	17	"	"	"	Dug	21	1,635	- 5	1,630	7	1,628	Glacial sand	Hard, clear		D, S	Sufficient for 50 head stock.
25	NW.	18	"	"	"	Dug	50	1,645									15 dry holes from 30 to 50 feet deep. Glacial blue clay at base.
26	NW.	20	"	"	"	Dug	24	1,645	- 8	1,637	8	1,637	Glacial gravel	Hard, clear		D, S	Sufficient for local needs. Also a spring on farm.
27	SE.	20	"	"	"	Dug	8	1,635	- 2	1,633	2	1,633	Glacial gravel	Hard, clear		D, S	Sufficient for 40 head stock.
28	NE.	20	"	"	"	Dug	8	1,635	- 5	1,630	5	1,630	Glacial gravel	Soft, clear		D, S	Sufficient for 60 head stock.
29	SW.	20	"	"	"								Glacial drift			D, S	Farmer on NW.21-20-31-1 hauls from here.
30	NW.	21	"	"	"	Dug	35	1,640									Dry hole; glacial at base.
31	SE.	21	"	"	"	Dug	32	1,645	- 21	1,624	21	1,624	Glacial gravel	Hard, clear		D, S	Sufficient for 50 head stock.
32	SE.	22	"	"	"	Drilled	167	1,650									25 dry holes from 25 to 167 feet deep; glacial blue clay at base.

NOTE—All depths, altitudes, heights and elevations given above are in feet.

(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
33	SW.	24	20	31	1	Dug	25	1,650	- 22	1,628			Glacial sand	Hard, cloudy, "alkaline"		S	Insufficient for local needs. Also a shallow well on road allowance.
34	SW.	24	"	"	"	Dug	25	1,650									60 dry holes; glacial blue clay at base.
35	NW.	25	"	"	"	Dug	24	1,655	- 21	1,634	21	1,634	Glacial gravel	Hard, clear		D, S	Sufficient for 30 head stock. Also a shallow well for household needs.
36	NW.	26	"	"	"	Bored	80	1,655	- 70	1,585	80	1,575	Glacial gravel	Hard, clear		D, S	Sufficient for 25 head stock. Three other wells.
37	S½.	26	"	"	"	Dug	8	1,660	- 2	1,658	2	1,658	Glacial gravel	Soft, clear		D, S	Sufficient for 90 head stock.
38	NE.	27	"	"	"	Drilled	160	1,665									Dry hole; glacial drift to base.
39	SE.	27	"	"	"	Dug	8	1,660	- 6	1,654	6	1,654	Glacial sand, gravel	Hard, clear		D, S	Sufficient for local needs.
40	NE.	28	"	"	"	Dug	14	1,650	- 9	1,641	9	1,641	Glacial sand			D, S	Sufficient for 50 head stock. Many shallow dry holes.
41	SE.	28	"	"	"	Dug	16	1,650	- 8	1,642	8	1,642	Glacial gravel	Hard, clear		D, S	Intermittent supply.
42		29	"	"	"								Glacial drift			D, S	Farmer on SW. 32-20-31-1 hauls water from here.
43	NE.	30	"	"	"	Dug	10	1,645	- 8	1,637	8	1,637	Glacial gravel	Hard, clear		D, S	Sufficient for 20 head stock. Also another well 5 feet deep.
44	NW.	30	"	"	"	Dug	30	1,665	- 24	1,641	29	1,636	Glacial sand	Hard, clear		D, S	Sufficient for 30 head stock. 3 other similar wells. A few dry holes.
45	NE.	31	"	"	"	Dug	12	1,645	- 7	1,638	8	1,637	Glacial gravel	Hard, clear		D, S	Sufficient for 450 head stock.
46	SW.	32	"	"	"	Dug	20	1,660									Several dry holes; glacial clay to base.
47	SE.	32	"	"	"	Dug	30	1,660	- 17	1,643	17	1,643	Glacial sand	Hard, clear		D, S	Sufficient for 10 head stock. Also 5 dry holes.
48	NW.	33	"	"	"	Dug	18	1,655									Dry hole; glacial drift at base.
49	NE.	33	"	"	"	Dug	14	1,655	- 9	1,646	9	1,646	Glacial sand	Hard, clear		D, S	Intermittent supply. Also a few dry holes.
50	NW.	34	"	"	"	Dug	43	1,655	- 39	1,616	39	1,616	Glacial sand	Hard, clear		D	Intermittent supply. Also several dry holes.
51	NE.	34	"	"	"	Dug	28	1,665	- 26	1,639			Glacial clay	Hard, clear		D, S	Insufficient supply. Only enough for household.
52	SW.	35	"	"	"	Dug	17	1,655	- 8	1,647	8	1,647	Glacial gravel			D, S	Sufficient for 60 head stock.
53	NE.	35	"	"	"	Dug	20	1,660	- 18	1,642	18	1,642	Glacial gravel	Hard		D, S	Sufficient for 5 head stock.
1	SW.	2	20	32	1	Dug	8	1,610	- 5	1,605	5	1,605	Glacial gravel	Hard, green		N	Unfit for use.
2	SE.	4	"	"	"	Dug	18	1,660	- 16	1,644	16	1,644	Glacial sand			D, S	Insufficient for local needs.
3	SW.	5	"	"	"	Dug & Bored	43	1,680	- 7	1,673	43	1,637	Glacial gravel	Hard, clear		D, S	Sufficient for 70 head stock.
4	SW.	6	"	"	"	Dug	42	1,690	- 30	1,660	42	1,648	Glacial sand	Hard, clear		D, S	Sufficient for 30 to 40 head stock.
5	NW.	6	"	"	"	Dug	20	1,690	- 6	1,684			Glacial sand, gravel	Hard, clear		D, S	Oversufficient for 30 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
6	SW.	7	20	32	1	Dug	22	1,680	- 20	1,660	18	1,662	Glacial sand	Hard, clear		D	Intermittent supply. Also several dry holes.
7	SW.	8	"	"	"	Dug	20	1,680	- 19	1,661	19	1,661	Glacial sand	Hard, clear		D, S	Insufficient supply. enough for household needs.
8	SE.	8	"	"	"	Dug	16	1,620	- 12	1,608	13	1,607	Glacial sand	Hard, clear		D, S	Insufficient for 25 head stock.
9	NE.	8	"	"	"	Dug	20	1,630	- 17	1,613	17	1,613	Glacial fine sand	Hard, clear		D, S	Insufficient for local needs. Also another well 18 feet deep.
10	NW.	10	"	"	"	Dug	70	1,620									Many dry holes from 50 to 70 feet deep; glacial blue clay at base.
11	SW.	10	"	"	"	Dug	8	1,600	- 2	1,598	2	1,598	Glacial sand	Hard, clear		D, S	Sufficient for 50 head stock.
12	SW.	11	"	"	"	Dug	14	1,630	- 9	1,621	9	1,621	Glacial gravel	Hard, clear		D, S	Sufficient for 150 head stock. Also some dry holes.
13	SE.	12	"	"	"	Dug	12	1,660	- 8	1,652	10	1,650	Glacial gravel	Hard, clear		D, S	Sufficient for 20 head stock.
14	NE.	12	"	"	"	Dug	18	1,670	- 14	1,656	15	1,655	Glacial gravel	Hard, clear		D, S	Sufficient for 100 head stock.
15	SW.	13	"	"	"	Dug	9	1,650	- 6	1,644	6	1,644	Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
16	SE.	15	"	"	"	Dug	30	1,610									Dry hole; glacial blue clay at base.
17	SW.	15	"	"	"	Dug	33	1,610									Several dry holes; glacial blue clay at base.
18	SW.	16	"	"	"	Dug	9	1,600	- 6	1,594	6	1,594	Glacial fine sand	Hard, clear		D, S	Sufficient for 25 head stock.
19	NE.	17	"	"	"	Dug	30	1,605									A number of dry holes; glacial blue clay at base.
20	NE.	18	"	"	"	Bored	60	1,610									Dry hole; glacial blue clay at base
21	NW.	18	"	"	"	Bored	103	1,620									Dry hole; glacial blue clay at base.
22	NW.	19	"	"	"	Bored	110	1,605									A number of dry holes; glacial blue clay at base.
23	SE.	20	"	"	"	Bored	75	1,610					Glacial drift	Hard, clear		N	Unfit for use and caved in. Also several dry holes.
24	SE.	21	"	"	"	Bored	84	1,620	- 80	1,540	84	1,536	Glacial gravel	Hard, clear		D	Intermittent supply; several similar wells.
25	SE.	22	"	"	"	Dug	12	1,635	- 8	1,627	8	1,627	Glacial gravel	Hard, clear		D, S	Sufficient for 20 head stock.
26	NE.	22	"	"	"	Dug	10	1,635	- 5	1,630	8	1,627	Glacial sand	Hard, clear		D, S	Intermittent supply.
27	SE.	24	"	"	"	Dug	40	1,655									A number of dry holes from 20 to 40 feet deep; glacial blue clay at base.
28	NE.	24	"	"	"	Dug	21	1,660	- 14	1,646	15	1,645	Glacial sand	Hard, clear		D, S	Sufficient for 100 head stock.
29	NW.	25	"	"	"	Dug	22	1,665	- 16	1,649	20	1,645	Glacial sand	Hard, clear		D, S	Insufficient for 25 head stock. Also similar well on road allowance.
30	SE.	26	"	"	"	Dug	10	1,640	- 7	1,633	7	1,633	Glacial sand	Soft, clear		S	Sufficient for 50 head stock. Another well 26 feet deep used for household.
31	NW.	26	"	"	"	Dug	18	1,655	- 15	1,640			Glacial drift	Hard, clear		D, S	Intermittent supply. Another well 27 feet deep used for household needs only.
32	NE.	27	"	"	"	Dug	8	1,640	- 6	1,634	6	1,634	Glacial sand	Hard, clear		D, S	Sufficient for 30 head stock,

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WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT.	YIELD AND REMARKS
33	NW.	27	20	32	1	Dug	27	1,640					Glacial drift			D	
34	NE.	28	"	"	"	Dug	8	1,635	- 6	1,629	6	1,629	Glacial sand	Hard, clear		S	Sufficient for 20 head stock. Another well 12 feet deep used only for household needs.
35	NW.	28	"	"	"	Dug	14	1,630	- 8	1,622			Glacial yellow clay	Hard, clear		D, S	Intermittent supply.
36	SW.	29	"	"	"	Dug	25	1,610									Dry hole; glacial yellow clay at base.
37	NW.	29	"	"	"	Dug	40	1,615									Dry hole; glacial blue clay at base.
38	NW.	31	"	"	"	Dug	20	1,620									Dry hole; glacial blue clay at base.
39	SE.	31	"	"	"	Dug	25	1,615									Several dry holes; glacial blue clay at base.
40	NW.	32	"	"	"	Dug	9	1,620	- 5	1,615	5	1,615	Glacial gravel	Hard, clear		D, S	Sufficient for 45 head stock.
41	SW.	32	"	"	"	Bored	65	1,625									Many dry holes; glacial blue clay at base.
42	NE.	32	"	"	"	Dug 5	25	1,620	- 20	1,600	20	1,600	Glacial gravel	Hard, clear		D, S	Sufficient for 50 head stock by using 3 other similar wells.
43	NW.	33	"	"	"	Dug	20	1,665	- 16	1,649	16	1,649	Glacial gravel	Soft, clear		S	Sufficient for 40 head stock. 2 other similar wells.
44	SE.	33	"	"	"	Dug	14	1,655	- 10	1,645	10	1,645	Glacial gravel	Soft, clear		D, S	Sufficient for 35 head stock. Also another well with very little water.
45	NW.	34	"	"	"	Dug	30	1,680	- 27	1,653			Glacial clay	Hard, clear		D, S	Intermittent supply. Another well 25 feet deep.
46	SW.	34	"	"	"	Dug	15	1,670	- 12	1,658			Glacial drift	Hard, clear		D, S	Intermittent supply. A number of dry holes up to 25 feet deep. Also a house well 27 feet deep.
47	SE.	34	"	"	"	Dug	14	1,675	- 9	1,666	12	1,663	Glacial gravel	Soft, clear		D, S	Sufficient for 60 head stock. 2 other similar wells.
48	NE.	34	"	"	"	Dug	10	1,670	- 6	1,664	6	1,664	Glacial gravel	Hard, clear		D, S	Sufficient, by using 2 other similar wells, for 50 to 60 head stock.
49	SW.	36	"	"	"	Dug	17	1,680	- 6	1,674	6	1,674	Glacial coarse gravel	Hard, clear		D, S	Sufficient for 65 head stock.
50	NE.	36	"	"	"	Dug	26	1,685	- 20	1,665	20	1,665	Glacial sand	Hard, clear		D, S	Sufficient for 80 head stock.
1	SW.	1	20	33	1	Bored	31	1,700	- 16	1,684	30	1,670	Glacial gravel	Hard, clear, "alkaline"		S	Sufficient for 16 head stock.
2	SE.	2	"	"	"	Dug	32	1,705	- 28	1,677	30	1,675	Glacial sand	Hard, clear		D, S	Insufficient for 15 head stock.
3	SW.	2	"	"	"	Dug	25	1,710	- 22	1,688	22	1,688	Glacial sand	Hard, clear		D, S	Sufficient for 6 head stock.
4	NW.	2	"	"	"	Dug	22	1,710	- 19	1,691	19	1,691	Glacial sand	Hard, clear		D, S	Insufficient for 15 head stock.
5	NE.	3	"	"	"	Dug	30	1,710	- 21	1,689	27	1,683	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 50 head stock.
6	SE.	10	"	"	"	Dug	60	1,705									A number of dry holes to a depth of 60 feet; glacial blue clay at base.
7	SE.	10	"	"	"	Dug	28	1,705	- 14	1,691	28	1,677	Glacial coarse sand	Hard, cloudy		D, S	Sufficient for local needs; #.
8	SE.	12	"	"	"	Bored	26	1,685	- 12	1,673	25	1,660	Glacial sand	Hard, clear		D, S	Sufficient for 30 head stock.

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WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
9	NE.	12	20	33	1	Dug & Bored	43	1,670	- 12	1,658	42	1,628	Glacial gravel	Hard, iron		D, S	Sufficient for 30 head stock.
10	SE.	13	"	"	"	Dug	24	1,660	0	1,660			Glacial gravel	Soft, clear		D, S	Intermittent supply. Another shallow well for household needs.
11	NE.	13	"	"	"	Dug	18	1,660	- 16	1,644			Glacial drift	Hard, clear		D, S	Insufficient; enough only for household needs. Several dry holes up to 50 feet deep.
12	NE.	14	"	"	"	Bored	102	1,680	- 42	1,638	100	1,580	Glacial coarse sand	Hard, clear, "alkaline"		D, S	Sufficient for 35 head stock. Also a dry hole 135 feet deep. #.
13	NE.	21	"	"	"	Dug	24	1,710	- 18	1,692	20	1,690	Glacial sand	Soft, clear		D, S	Insufficient; enough for about 5 head stock.
14	SE.	22	"	"	"	Dug	30	1,700									Dry hole; glacial blue clay at base.
15	SE.	23	"	"	"	Dug	9	1,680	- 5	1,675	5	1,675	Glacial sand, gravel	Soft, clear		D, S	Sufficient for 20 head stock.
16	SW.	23	"	"	"	Dug	31	1,690									3 dry holes; glacial blue clay at base.
17	NE.	23	"	"	"	Dug	24	1,680									Dry hole; glacial blue clay at base.
18	SE.	24	"	"	"	Dug	40	1,670									A number of dry holes; glacial blue clay at base.
19	SW.	24	"	"	"	Dug	13	1,675	- 9	1,666	9	1,666	Glacial sand, gravel	Hard, clear		D, S	Sufficient for local needs.
20	NW.	24	"	"	"	Dug & Bored	46	1,670	- 36	1,634	45	1,625	Glacial gravel	Hard, salty		S	Insufficient supply; enough for 5 head stock.
21	SE.	25	"	"	"	Dug	17	1,660	- 14	1,646	14	1,646	Glacial sand	Hard, clear		D, S	Sufficient for local needs.
22	NE.	25	"	"	"	Dug	20	1,660									Dry hole; glacial blue clay at base.
23	NE.	27	"	"	"	Dug	40	1,690									Dry hole; glacial blue clay at base.
24	SW.	34	"	"	"	Dug	50	1,690									Many dry holes; glacial blue clay at base. Also a shallow well for household needs.
25	NW.	34	"	"	"	Drilled	204	1,690									5 dry holes;glacial blue clay at base. Also a shallow well for household needs.
26	SW.	35	"	"	"	Dug	20	1,670									Dry hole; glacial blue clay at base.
27	SE.	36	"	"	"	Dug	20	1,640									Dry hole; glacial blue clay at base.
28	SW.	36	"	"	"	Drilled	134	1,650	-112	1,538	134	1,516	Glacial gravel	Soft, clear		D, S	Sufficient; cannot be pumped dry. #.
29	NE.	36	"	"	"	Drilled	128	1,650	-108	1,542	128	1,522	Glacial gravel	Soft, clear		D, S	Sufficient; cannot be lowered by pumping.
1	NW.	1	21	30	1	Drilled	30	1,640	- 10	1,630			Glacial clay	Hard, cloudy, "alkaline"		S	Sufficient for local needs.
2	SW.	2	"	"	"	Dug	10	1,670	- 4	1,666	4	1,666	Glacial sand	Soft, clear	43	D, S	Sufficient for 40 head stock. Several dry holes as deep as 80 feet.
3	NW.	3	"	"	"	Dug	15	1,660	- 8	1,652	8	1,652	Glacial gravel	Hard, clear		D, S	Sufficient for 50 head stock. Also 2 other auxiliary wells.
4	NW.	5	"	"	"	Dug	35	1,675	- 33	1,642			Glacial gravel	Hard, clear		D, S	Insufficient for local needs.
5	NE.	6	"	"	"	Dug	32	1,680	- 28	1,652	28	1,652	Glacial gravel	Hard, clear, "alkaline"	44	D, S	Sufficient for 50 head stock. 2 other wells 25 feet deep with poor supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
6	SE.	7	21	30	1	Dug	15	1,675	- 14	1,661	14	1,661	Glacial gravel	Hard, clear	42	D, S	Sufficient for 30 head stock. Another well 25 feet deep has a poor supply.
7	NE.	8	"	"	"	Dug	52	1,660									15 dry holes; glacial blue clay at base.
8	NE.	9	"	"	"	Dug	22	1,670	- 17	1,653	17	1,653	Glacial gravel	Hard, clear	44	D	Sufficient for household needs only. Another well 35 feet deep is sufficient for 90 head stock.
9	NE.	12	"	"	"	Dug	26	1,640	- 20	1,620	20	1,620	Glacial sandy clay	Hard, clear, iron		D, S	Sufficient for 45 head stock.
10	NE.	13	"	"	"	Dug	30	1,625	- 27	1,598	27	1,598	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient for 50 head stock.
11	NW.	13	"	"	"	Dug	30	1,630	- 15	1,615	20	1,610	Glacial gravel	Hard, clear		D, S	Sufficient for 12 head stock.
12	SW.	14	"	"	"	Drilled	190	1,660	-100	1,560	190	1,470	Glacial fine sand	Hard, clear, "alkaline"		D, S	Oversufficient for 40 head stock. Hauls drinking water.
13	SE.	15	"	"	"	Drilled	165	1,645	- 26	1,619	165	1,480	Glacial fine sand	Hard, clear, "alkaline"		S	Oversufficient for 20 head stock. A 30-foot well is used for household needs.
14	NE.	15	"	"	"	Drilled	185	1,650	- 50	1,600	185	1,465	Glacial sand	Hard, clear, iron, "alkaline"	44	D, S	Sufficient for 37 head stock; #.
15	SW.	15	"	"	"	Drilled	180	1,646	- 25	1,621	165	1,481	Glacial fine sand	Hard, clear, "alkaline"		D, S	Oversufficient for 50 people.
16	NW.	20	"	"	"	Drilled	198	1,675	-158	1,517	198	1,477	Glacial sand	Hard, cloudy, iron		D, S	Sufficient for 36 head stock.
17	SE.	20	"	"	"	Dug	22	1,650	- 20	1,630	20	1,630	Glacial gravel	Hard, iron, cloudy		S	Was not used during summer of 1935. Also a shallow well used for household needs.
18	SE.	21	"	"	"	Drilled	206	1,660	-106	1,554	206	1,454	Glacial gravel	Hard, clear		D, S	Abundant supply.
19	NE.	21	"	"	"	Dug	24	1,680	- 18	1,662	20	1,660	Glacial sand	Hard, clear, iron, "alkaline"	43	D, S	Sufficient for 30 head stock. Also another 35-foot well with good supply.
20	NE.	23	"	"	"	Dug	23	1,630	- 13	1,617	13	1,617	Glacial gravel	Hard, clear, "alkaline"		D, S	Insufficient; enough for household needs and 20 head stock.
21	SW.	24	"	"	"	Dug	10	1,630	- 5	1,625	5	1,625	Glacial sand	Soft, clear	42	D, S	Sufficient for 10 head stock. Also several dry holes.
22	NE.	25	"	"	"	Dug	5	1,625	- 1	1,624			Glacial gravel	Hard, clear		D, S	Sufficient for local needs.
23	SE.	26	"	"	"	Dug	31	1,625	- 27	1,598	27	1,598	Glacial sand	Hard, clear		D, S	Oversufficient for 20 head stock.
24	NE.	26	"	"	"	Dug	30	1,675	- 20	1,655	33	1,642	Glacial gravel	Hard, clear, iron, "alkaline"	44	D, S	Sufficient for 50 head stock.
25	NW.	27	"	"	"	Dug	26	1,650	- 16	1,634	20	1,630	Glacial sand	Hard, clear, "alkaline"		D, S	Intermittent supply.
26	NW.	28	"	"	"		86	1,660									4 dry holes 86, 50, 40 and 40 feet deep; glacial drift at base.
27	NE.	28	"	"	"	Dug	45	1,660									7 dry holes; glacial blue clay at base.
28	NW.	29	"	"	"	Drilled	212	1,660	-162	1,498	212	1,448	Glacial sand, gravel	Hard, clear		D, S	Oversufficient for 35 head stock.
29	SE.	30	"	"	"	Dug	24	1,670									Dry hole; glacial gravel at base.
30	SW.	30	"	"	"												Dry hole; glacial drift at base.

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(D) Domestic; (S) Stock; (I) Irrigation; (M) Municipality; (N) Not used.
(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
31	NW.	30	21	30	1	Dug	30	1,675	- 25	1,650			Glacial gravel	Hard, clear, "alkaline"	43	D, S	Intermittent supply. Also 10 dry holes.
32	SW.	31	"	"	"	Dug	15	1,650	- 9	1,641			Glacial sand	Hard, clear		D, S	Sufficient for local needs. 2 other wells used as auxilliary.
33	SE.	31	"	"	"	Dug	32	1,670	- 28	1,642	28	1,642	Glacial gravel	Soft, clear	43	D, S	Sufficient for 20 head stock. 4 dry holes about 20 feet deep.
34	NE.	33	"	"	"	Dug	7	1,660	- 2	1,658	2	1,658	Glacial gravel	Hard, clear, "alkaline"		D, S	Oversufficient for 20 head stock.
35	NW.	35	"	"	"	Drilled	50	1,670	- 4	1,666			Glacial drift	Clear, "alkaline"		D	Insufficient for local needs.
36	SW.	36	"	"	"	Dug	25	1,630	- 15	1,615	20	1,610	Glacial sand	Hard, clear, iron, "alkaline"	42	S	Insufficient for 30 head stock. A 19-foot well also used for stock and a 28-foot well is used for household needs.
37	NE.	36	"	"	"	Dug	6	1,630	- 3	1,627	5	1,625	Glacial sand	Soft, clear		S	Insufficient for 18 head stock. A similar well used for household needs.
1	SE.	2	21	31	1	Dug	18	1,680	- 16	1,664	16	1,664	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient only for household needs.
2	NE.	2	"	"	"	Dug	32	1,680	- 24	1,656	24	1,656	Glacial sand	Hard, clear		S	Insufficient for 13 head stock. Another shallow well used for household.
3	NW.	2	"	"	"	Dug	25	1,700	- 22	1,678	22	1,678	Glacial sand	Hard, clear, iron	44	D	Sufficient for 10 head stock. Another well 18 feet deep.
4	NW.	3	"	"	"	Dug	12	1,690	- [illegible]	1,682	8	1,682	Glacial sand	Hard, clear	44	D, S	Sufficient for 35 head stock. Also a dry hole 18 feet deep.
5	SE.	3	"	"	"								Glacial drift			S	Farmer on NE.34-20-31-1 uses this well for stock.
6	NW.	6	"	"	"	Dug	9	1,685	- 5	1,680	5	1,680	Glacial gravel	Hard, clear		D, S	Oversufficient for 30 head stock.
7	SW.	7	"	"	"	Dug	14	1,690	- 9	1,681	12	1,678	Glacial gravel	Hard, clear		D, S	Sufficient for 40 head stock.
8	NE.	7	"	"	"	Drilled	240	1,700	-140	1,560			Glacial sand	Hard, clear, "alkaline"	40	N	Oversufficient but unfit for use. Another well 112 feet deep gives a supply of good water.
9	SE.	8	"	"	"	Dug	18	1,685	- 10	1,675	10	1,675	Glacial gravel	Hard, cloudy, "alkaline"			Sufficient for 22 head stock.
10	SE.	9	"	"	"	Dug	17	1,680	- 15	1,665	15	1,665	Glacial gravel	Hard, clear, "alkaline"		D, S	Insufficient; enough for 5 head stock.
11	SE.	10	"	"	"	Dug	20	1,680					Glacial gravel	Hard, clear		D, S	
12	NW.	10	"	"	"	Dug	24	1,680	- 23	1,657			Glacial sand	Hard, clear, iron		D	Intermittent supply. Another similar well.
13	NE.	11	"	"	"	Dug	18	1,680					Glacial sand	Clear		D, S	Insufficient for local needs.
14	NW.	12	"	"	"	Dug	22	1,675	- 15	1,660	15	1,660	Glacial gravel	Hard, clear		D, S	Oversufficient for 37 head stock.
15	NE.	14	"	"	"	Dug	20	1,690	- 16	1,674	16	1,674	Glacial sand	Hard, clear "alkaline"	44	D, S	Sufficient for 13 head stock.
16	SW.	15	"	"	"	Dug	20	1,680	- 18	1,662	18	1,662	Glacial fine gravel	Hard, clear, "alkaline"		D, S	Insufficient for 20 head stock.
17	NW.	18	"	"	"	Dug	8	1,720	- 4	1,716	5	1,715	Glacial gravel	Hard, clear		D, S	Sufficient for 24 head stock.
18	NW.	19	"	"	"	Dug	21	1,675	- 15	1,660	15	1,660	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for 28 head stock.
19	SE.	19	"	"	"	Dug	28	1,670	- 27	1,643	27	1,643	Glacial sand	Hard, clear		D	Intermittent supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
20	NE.	19	21	31	1	Dug	14	1,710	- 10	1,700	10	1,700	Glacial gravel	Hard, clear		D, S	Sufficient for 35 head stock. Another similar well.
21	NE.	20	"	"	"	Dug	24	1,690	- 14	1,676	14	1,676	Glacial gravel	Hard, cloudy, "alkaline"		D, S	Oversufficient for 50 head stock. Another well 10 feet deep.
22	SE.	21	"	"	"	Dug	24	1,685	- 19	1,666	19	1,666	Glacial gravel	Soft, clear		D, S	Sufficient for 35 head stock. Also another well used for stock.
23	NW.	24	"	"	"	Dug	18	1,675	- 8	1,667	8	1,667	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for household needs only. Also another well used for stock.
24	NE.	25	"	"	"	Dug	20	1,690									Several dry holes; glacial clay at base.
25	SE.	26	"	"	"	Dug	25	1,675	- 20	1,655	20	1,655	Glacial sand	Hard, clear, iron	44	S	Sufficient for 35 head stock.
26	SW.	26	"	"	"	Dug	16	1,695	- 10	1,685	10	1,685	Glacial gravel	Hard, clear	45	D, S	Sufficient for 40 head stock.
27	NE.	27	"	"	"	Drilled	260	1,684	-140	1,544	260	1,424	Glacial fine sand	Hard, clear, "alkaline"		N	Oversufficient but unfit for use. Used for flooding town ice rinks.
28	NE.	27	"	"	"	Drilled	130	1,684	- 85	1,599	110	1,574	Glacial sand	Hard, clear, "alkaline"		D, S	Sufficient for local needs. Also several shallow wells.
29	NE.	28	"	"	"	Dug	20	1,685	- 16	1,669	16	1,669	Glacial fine sand	Soft, cloudy		D, S	Insufficient for 20 head stock.
30	SE.	31	"	"	"	Dug	24	1,710	- 20	1,690	22	1,688	Glacial sand	Hard, clear		D, S	Sufficient for 30 head stock. Another 30-foot well.
31	NE.	31	"	"	"	Bored	180	1,710	-160	1,550	180	1,530	Glacial sand	Hard, cloudy, iron, "alkaline"		N	Has not been used for 4 years. An 8-foot well is used for all requirements.
32	NW.	32	"	"	"	Dug	28	1,700	- 23	1,677	23	1,677	Glacial gravel	Hard, clear		D, S	Insufficient for 20 head stock.
33	SW.	35	"	"	"	Drilled	300	1,690	-100	1,590	280	1,410	Glacial sand	Hard, clear, soda	40	D, S	Sufficient; 8 gallons a minute. Used in creamery business. Another similar well 280 feet deep.
34	SW.	36	"	"	"	Dug	12	1,670	- 2	1,668	2	1,668	Glacial sand	Hard, iron, cloudy		S	Sufficient for 50 head stock. 3 other similar wells; one used for household needs.
1	SE.	5	21	32	1	Dug	12	1,690	- 7	1,683	7	1,683	Glacial fine sand	Hard, clear, "alkaline"		D, S	Sufficient for 20 head stock. A similar well is used for household needs.
2	SE.	6	"	"	"	Bored	40	1,690	- 37	1,653	37	1,653	Glacial sand, gravel	Hard, sandy colour, "alkaline"		N	Insufficient and unfit for use. A shallow well is used for household needs and a creek for stock needs.
3	NW.	7	"	"	"	Dug	8	1,720	- 6	1,714	6	1,714	Glacial gravel	Hard, clear		S	Sufficient for 40 head stock. A shallow well is used for household needs.
4	SW.	8	"	"	"	Bored	75	1,720	- 50	1,670	75	1,645	Glacial sand	Hard, clear		D, S	Sufficient for 23 head stock. A shallow well is used for household needs.
5	SE.	8	"	"	"	Dug	12	1,710	- 9	1,701	9	1,701	Glacial gravel	Hard, clear		D, S	Sufficient for 40 head stock. Another well 17 feet deep.
6	SW.	10	"	"	"	Dug	26	1,720	- 18	1,702	23	1,697	Glacial sand	Hard, clear, "alkaline"		D, S	Insufficient for 30 head stock.
7	NW.	10	"	"	"	Dug	30	1,725	- 29	1,696			Glacial gravel	Hard, clear		D	Sufficient for household needs only. Also 4 dry holes from 9 to 30 feet deep.
8	NE.	11	"	"	"	Dug	10	1,710	- 5	1,705	5	1,705	Glacial gravel	Hard, clear		D, S	Sufficient for 10 head stock.
9	NW.	12	"	"	"	Dug	30	1,710	- 25	1,685	25	1,685	Glacial gravel	Hard, clear, "alkaline"		D, S	Sufficient for household needs only. A shallow well is used for stock needs.
10	NE.	12	"	"	"	Dug	13	1,700	- 8	1,692	8	1,692	Glacial sand, gravel	Hard, clear	48	D, S	Sufficient for 22 head stock.

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WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
11	NE.	14	21	32	1	Dug	11	1,725	- 7	1,718			Glacial sand	Soft, clear		D, S	Sufficient for 40 head stock. Another well 22 feet deep used for household needs.
12	NE.	16	"	"	"	Dug	20	1,725	- 16	1,709	16	1,709	Glacial sand	Soft, clear		D, S	Sufficient for 30 head stock. Also another well.
13	NW.	17	"	"	"	Dug	14	1,725	- 10	1,715	10	1,715	Glacial gravel	Hard, clear		D, S	Sufficient for 100 head stock.
14	NE.	18	"	"	"	Dug	16	1,720	- 10	1,710	14	1,706	Glacial gravel	Soft, clear		D, S	Sufficient for 30 head stock. Another similar well.
15	NW.	18	"	"	"	Dug	15	1,725	- 8	1,717	8	1,717	Glacial sand	Soft, clear		D, S	Sufficient for 20 head stock.
16	NE.	19	"	"	"	Dug	34	1,740	- 19	1,721	19	1,721	Glacial gravel	Hard, clear	45	D, S	Sufficient for 20 head stock.
17	SE.	21	"	"	"	Dug	20	1,725	- 14	1,711	14	1,711	Glacial gravel	Hard, clear		D, S	Sufficient for 35 head stock. Also another well.
18	NE.	23	"	"	"	Dug	8	1,730	- 4	1,726	4	1,726	Glacial gravel	Hard, clear		D, S	Oversufficient for 35 head stock. Also another well 14 feet deep.
19	NW.	25	"	"	"	Dug	14	1,725	- 6	1,719	6	1,719	Glacial gravel	Hard, clear		D, S	Intermittent supply.
20	SE.	27	"	"	"	Dug	46	1,725	- 42	1,683			Glacial clay	Hard, clear, "alkaline"		D, S	Intermittent supply. Another similar well. Also several dry holes.
21	NW.	28	"	"	"	Bored	45	1,735	- 33	1,702	40	1,695	Glacial sand	Hard, clear		D, S	Insufficient; enough for 30 head stock.
22	NE.	31	"	"	"	Dug	20	1,750	- 16	1,734	19	1,731	Glacial fine sand	Soft, clear		D, S	Oversufficient for 40 head stock. Another similar well.
23	SE.	32	"	"	"	Bored	45	1,740	- 33	1,707	42	1,698	Glacial sand	Hard, clear		D, S	Oversufficient for 45 head stock.
24	NE.	34	"	"	"	Drilled	130	1,735	- 40	1,695	130	1,605	Glacial sand	Hard, iron, rusty		D, S	Oversufficient for 27 head stock. Also a shallow well which is not used.
1	SE.	1	21	33	1	Drilled	170	1,695	-130	1,565	170	1,525	Glacial fine sand	Soft, clear	41	D, S	Oversufficient for 16 head stock. #.
2	SW.	3	"	"	"	Dug	28	1,720	- 14	1,706	14	1,706	Glacial sandy gravel	Hard, clear		D, S	Sufficient for 50 head stock. Also two other wells.
3	NW.	10	"	"	"	Dug	8	1,705	- 6	1,699	6	1,699	Glacial gravel	Hard, clear, "alkaline"		S	Sufficient for 17 head stock.
4	SE.	12	"	"	"	Dug	10	1,710	- 8	1,702	8	1,702	Glacial sand, gravel	Hard, clear		D, S	Insufficient for local needs.
5	SW.	12	"	"	"	Dug	124	1,700					Glacial clay	Hard, "alkaline"		S	Sufficient for local needs.
6	NE.	13	"	"	"	Bored	70	1,720	- 68	1,652			Glacial sand	Hard, clear		S	Intermittent supply.
7	SW.	13	"	"	"	Dug	99	1,720	- 49	1,671	99	1,621	Glacial sand	Hard, iron, cloudy		D, S	Oversufficient for 65 head stock.
8	NE.	14	"	"	"	Dug	9	1,720	- 8	1,712	8	1,712	Glacial sand	Hard, clear		D, S	Barely sufficient for 20 head stock. 2 other wells, that are not used.
9	NE.	16	"	"	"	Dug	9	1,710	- 4	1,706	8	1,702	Glacial gravel	Hard, clear		D, S	Oversufficient for 20 head stock.
10	SE.	21	"	"	"	Dug	5	1,600	- 1	1,599	5	1,595	Glacial sand	Soft, clear		D, S	Sufficient for 10 head stock.
11	NW	23	"	"	"	Drilled	125	1,730					Glacial sand(?)	Hard, clear, iron		D, S	Sufficient for 50 head stock.
12	NW.	24	"	"	"	Dug	16	1,735	- 12	1,723	14	1,721	Glacial gravel	Hard, clear	44	S	Sufficient for 30 head stock. An 11-foot well is used for domestic needs.

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WELL RECORDS—Rural Municipality of LANGENBURG, NO. 181, SASKATCHEWAN.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
13	SE.	24	21	33	1	Dug	30	1,765	- 8	1,757	28	1,737	Glacial gravel	Hard, clear, iron	45	D, S	Sufficient for 15 head stock. Another well 75 feet deep has a poor supply.
14	NE.	24	"	"	"	Dug	10	1,740	- 7	1,733	7	1,733	Glacial sand, gravel	Hard, clear		D, S	Sufficient for 15 head stock. Another similar well.
15	NE.	26	"	"	"	Dug	13	1,745	- 9	1,736	9	1,736	Glacial gravel	Soft, clear		D, S	Sufficient for 15 head stock. Another well is generally used for domestic needs.
16	SE.	27	"	"	"	Dug	14	1,740	- 7	1,733	7	1,733	Glacial gravel	Hard, clear		D, S	Sufficient for 20 head stock.
17	NW.	35	"	"	"	Bored	30	1,750	- 15	1,735	15	1,735	Glacial sand	Hard, clear	42	D, S	Sufficient for 15 head stock. Another well 8 feet deep. Also a 40-foot dry hole.
18	NW.	35	"	"	"	Dug	23	1,750					Glacial sand	Hard, clear		D, S	Sufficient for local needs.
19	SW.	36	"	"	"	Bored	110	1,750	- 50	1,700	110	1,640	Glacial sand	Hard, clear		D, S	Sufficient for 25 head stock.

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(#) Sample taken for analysis.