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BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF STANLEY No. 215 SASKATCHEWAN

BY

B. R. MacKay, H. N. Hainstock & G. L. Scott

Water Supply Paper No. 160

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GROUND WATER RESOURCES OF THE RURAL MUNICIPALITY OF STANLEY, NO.215 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.

Porvious 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 Stanley, No.215, is an area of 330 square miles in southeastern Saskatchewan. It consists of townships 22, 23, and 24, ranges 7, 8, and 9, and the eastern row of sections in township 22, range 10, all west of the Second meridian. The main line of the Canadian National railways traverses the central part of the municipality in a southeast-northwest direction and on it are located the hamlet of Birmingham and the villages of Fenwood and Goodeve. A branch line of the Canadian National railways, which runs between Regina and Melville, traverses the southern part of the municipality in a southwest-northeast direction, and on it are located the village of Duff and the hamlet of Colmer. The centre of the municipality lies 30 miles southwest of the city of Yorkton.

Four small streams, Crescent, Kaposvar, Pearl, and Pheasant creeks, flow in a southerly direction through the municipality. The headwaters of these creeks are in the Beaver Hills highland area. The three western streams, Kaposvar, Pearl, and Pheasant creeks, are tributaries of Qu'Appelle river, whereas Crescent creek flows into Crescent lake, situated 15 miles northeast of Melville. The valleys of these creeks are wide and less than 50 feet deep.

The southwestern part of township 22, range 8, and the southern two-thirds of township 22, ranges 9 and 10, were once covered by a shallow glacial lake. Glacial lake sands occur in the southern part of township 22, range 9, but the remainder of the glacial lake basin is mantled by clay. The ground surface of this region is quite flat and treeless, and the top soil in the clay-covered district is a heavy, black loam, free of large stones. A small portion of the Pheasant Hills moraine

extends into the southern parts of township 22, ranges 7 and 8, and the large Beaver Hills moraine occupies the greater part of the northern 12 miles of the municipality. The ground surface of the moraine-covered areas is very undulating, contains many undrained depressions, and is usually wooded with poplar. Undrained depressions or sloughs are very numerous in the Beaver Hills moraine, many of them covering an area of 50 to 160 acres.

The remainder of the municipality is mantled by glacial till and glacial outwash sands and gravels. These areas are at a lower elevation than the surrounding moraine-covered areas; the ground surface is less undulating and the top soil of the glacial outwash areas is sandy and light. The glacial outwash areas are situated at or near the base of the Beaver Hills moraine, and almost all the outwash deposits are located on or near the courses of the four creeks or their tributaries. These deposits of outwash sand, and less often gravel, are generally 10 to 20 feet thick, but in some localities wells have been sunk that have penetrated 30 to 60 feet of sand and gravel. In many places the wind has blown the surface sand into small dunes.

Water-bearing Horizons in the Unconsolidated Deposits

Ground water conditions in the greater part of the southern 6 miles of the municipality, the southern 4 miles of township 23, range 7, and the southeastern part of township 23, range 8, are very favourable. Within this area there are only approximately twenty-five farms that are short of water. In township 22, range 8, there is not a single farm that has an inadequate supply of water. The upper 40 feet of the glacial drift in the area mentioned above contains thick beds of sand and occasionally gravel; and the thick deposits of sand are not

confined entirely to the glacial out-wash-covered area. The water in these sand and gravel beds originates from rainfall seepage, but the beds are so thick and extensive that enormous quantities of water are stored within them. The water in most of the wells less than 40 feet deep in this area is only slightly mineralized and many shallow wells dug in the sand deposits that lie at the surface yield soft water. Although 10- to 15-foot wells dug entirely in sand generally yield soft water, the deeper 20- to 60-foot wells dug or bored entirely in sand or gravel generally yield hard and "alkaline" water. The water in the shallow wells is not under pressure and the drought of 1930 to 1934 decreased the water supply slightly, but not to the extent where the water situation became acute.

In the remainder of the municipality the supply of ground water obtained is poor. Almost every well in this large area is less than 40 feet deep, and at least one hundred and ten farms are short of water. The greater part of this area is covered by moraine and the occurrence of sand or gravel in the upper 40 feet of the glacial drift is rare. Occasional pockets of sand and gravel, however, are tapped by hand dug wells in the upper 40 feet of the drift mantle and yield small permanent supplies of water, but individual wells that tap one of these pockets seldom water more than 25 head of stock in drought years. Nearly all the wells yielding a permanent supply in township 24, range 7, have been dug in thick deposits of sand that lie at or near the surface and which resemble the glacial outwash deposits in the southern part of the municipality. Yellow or red boulder clay, however, usually underlies the top soil to a depth of 10 to 20 feet and is underlain by blue or black clay. In years of average rainfall farmers in this area obtain sufficient water for stock from the numerous sloughs and from seepage wells, but

in drought years and winters much water is tanked and snow is melted. The water is generally hard and "alkaline", but it is being used for drinking. Very few attempts have been made to secure water at depths greater than 40 feet. Holes have been bored to depths ranging from 50 to 100 feet, but most of them are dry.

The only district wherein water is obtained at depths ranging from 40 to 100 feet is shown on the map by the "A" boundary line. The aquifer is usually sand and the water rises under a slight pressure. An 85-foot flowing artesian well occurs in the SE.$\frac{1}{4}$, sec. 24, tp. 23, range 8, but the remaining wells are non-flowing artesian. All the water is hard and most of it is too highly mineralized to be used for drinking, although it has no ill effects on stock. Iron is also present in the water from several wells. The abundant supply of water was not noticeably decreased by the drought of 1930 to 1934.

The two deepest producing wells in the municipality have been drilled and bored to a depth of 150 feet, and are located in the NE.$\frac{1}{4}$, sec. 36, tp. 22, range 10, and the NW.$\frac{1}{4}$, sec. 18, tp. 23, range 8. A 170-foot drilled well in the SW.$\frac{1}{4}$, sec. 18, tp. 24, range 8, struck an abundant supply of good water, but it was shut off by fine sand particles plugging the casing. The deepest unsuccessful attempts for water were made in the SW.$\frac{1}{4}$, sec. 30, tp. 23, range 7, and the SW.$\frac{1}{4}$, sec. 7, tp. 24, range 7, the holes being 240 and 175 feet deep, respectively. The 240-foot dry hole is the deepest in the municipality.

The thickness of the glacial drift is estimated to be 400 feet in the southeastern part of the municipality and from 500 to 600 feet in the moraine-covered area in the northwestern part of the municipality. Since the deepest well is 240 feet no definite information can be given as to the possibilities of obtaining water from the lower part of the drift.

Farmers who reside within the area outlined by the "A" boundary line are advised to bore or drill to depths ranging from 40 to 130 feet if they are unable to obtain an adequate supply at shallow depths. The water obtained will be too highly mineralized for drinking, however, but the supply will be abundant and suitable for stock. Farmers residing in the north-western part of the municipality where the supply of ground water is poor, are advised to excavate deep dugouts. The topography of this area is very favourable for the excavation of these dugouts; they should be at least 12 feet deep. Slough basins are the best locations for such dugouts. Deep wells could be drilled as it is highly improbable that so thick a deposit of glacial drift does not contain a single water-bearing horizon of sand or gravel. Deep drilling, however, should be confined to the glacial drift. Boring operations, done with a large auger, in this district are not advisable. Testing augers should always be used before a shallow well is dug in order to locate a pocket of water-bearing sand or gravel.

Water-bearing Horizons in the Bedrock

No well in the municipality has passed through the glacial drift and penetrated the underlying Marine Shale series. The Marine Shale seldom contains water in this part of Saskatchewan, and the water that has been obtained is too highly mineralized for any farm purpose. Farmers and well drillers are advised to refrain from drilling into the Marine Shale series.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 22, Range 7

Kaposvar and Pearl creeks flow intermittently in a southeasterly direction, the former passing through the northeastern and the latter through the southwestern part of the township. A small tributary of Pearl creek passes through the northern half of section 18. Both creeks flow through wide, shallow ravines. Glacial deposits of moraine, till, and glacial outwash gravel or sand cover the township, and the ground surface is slightly rolling. The moraine-covered area in the southwestern part of the township is thinly wooded.

A good supply of water is obtained in this township, and all but three farmers have sufficient water for local requirements. These three farmers are located in the NW.$\frac{1}{4}$, section 10, NW.$\frac{1}{4}$, section 23, and NW.$\frac{1}{4}$, section 24. The farmer on section 23 has dug no wells and hauls all water a distance of $\frac{1}{2}$ mile. Two small springs were reported in the SE.$\frac{1}{4}$, section 4, and the SW.$\frac{1}{4}$, section 20, in Pearl Creek valley. All the wells in the township are dug or bored to depths less than 100 feet. Large, thick beds of sand, that extend from the surface to depths of 8 to 15 feet, occur not only in the glacial outwash-covered areas but even in the till- and moraine-covered districts. These beds of sand collect the water resulting from rainfall and they are so extensive that wells tapping them yield sufficient water for 20 to 35 head of stock even in drought years. The drought of 1930 to 1934 lowered the water-level in these wells, but not to the extent where their yield became insufficient for local needs. The water from most of these wells is soft as it does not come into contact with clay which is the chief source of mineral salts in ground water. A well bored on a hill in the SW.$\frac{1}{4}$, section 21, penetrated 49 feet of glacial outwash sands. Hard, "alkaline" water was struck

14 feet below the surface. Another well in the SE.$\frac{1}{4}$, section 33, was bored through 65 feet of sand and the drought of 1930 to 1934 lowered the water-level from 29 feet to 50 feet below the surface. The water is also hard and "alkaline". Even in regions where the sand does not come to the surface, little difficulty is experienced in striking beds of sand in the clay that yield moderate to abundant supplies of water. Seven wells in the township tap two water-bearing horizons of sand in the blue clay and yield water under pressure. Five of these wells tap the first water-bearing horizons at depths of 52 to 64 feet below the surface and are located in the SE.$\frac{1}{4}$, section 12, NE.$\frac{1}{4}$, section 13, SW.$\frac{1}{4}$, section 20, SE.$\frac{1}{4}$, section 31, and SE.$\frac{1}{4}$, section 34. The water is hard and highly mineralized but is often used for drinking. The water rises under hydrostatic pressure to a point approximately half-way up the well and the supply is abundant, an individual well watering 50 head of stock with ease. Two wells in the SW.$\frac{1}{4}$, section 12, and the NW.$\frac{1}{4}$, section 20, tap a second water-bearing horizon composed of sand at depths of 99 and 90 feet below the surface. The water rises to a point 24 feet below the surface in both wells and the supply is abundant. The water is hard and highly mineralized and is only suitable for stock. The supply in any of these seven wells was not decreased by the drought of 1930 to 1934.

Water-bearing beds of sand are of frequent occurrence in the upper 100 feet of the glacial drift, so that very few dry holes were dug in this township. No attempts have been made to secure water at depths greater than 100 feet, but it is probable that water-bearing horizons do exist in the drift at greater depths. The thickness of the glacial drift is not definitely known, but it is believed to be at least 350 to 400 feet.

Township 22, Range 8

Pearl creek flows in a southerly direction through the centre of the township to the NE.$\frac{1}{4}$, section 9, where it bends sharply and flows east. Three, small, intermittent tributary streams also occur. The abrupt deviation in the direction of the flow of Pearl creek is caused by the existence of a moraine that covers the southeastern part of the township. The ground surface in this area is rolling and is characterized by many sloughs and clumps of poplar trees. The southwestern corner of the township is covered by a thin veneer of glacial lake clay and the ground surface is very flat. The remainder of the township is overlain by glacial till and extensive deposits of glacial outwash sands and gravels. The ground surface is slightly rolling and is devoid of tree growth.

Every farmer in this township obtains a sufficient supply of ground water to meet all farm requirements. Water-bearing beds of sand and less often gravel are of frequent occurrence in the upper 100 feet of the glacial drift, and only one dry hole in the SW.$\frac{1}{4}$, section 32, was recorded. Deposits of sand and occasionally gravel not only lie at the surface in the glacial outwash-covered areas but also occur in places in the glacial till and lake clay-covered districts. These deposits are usually less than 15 feet thick, but a 60-foot well in the SW.$\frac{1}{4}$, section 16, was bored through 10 feet of sand and 50 feet of gravel. At least fourteen farmers in the township depend on wells that have been dug or bored in these outwash deposits. The water in the shallow 8- to 15-foot wells is soft, whereas the water in the deeper wells that have sand and gravel as an aquifer, is hard and "alkaline". The supply of water in these deposits of sand and gravel comes from rainfall, but these beds are so thick and extensive that enormous quantities of water are stored within them. Prolonged drought has a slight effect on the water-level in the

wells, but the supply is usually abundant. The village of Duff derives its water supply from a 40-foot bored well that penetrated 10 feet of sand and 30 feet of gravel. The water is soft and the supply is sufficient to meet the village requirements.

Seven wells in the township strike a water-bearing horizon of sand and gravel at depths of 60 to 75 feet. Clay overlies the aquifer and the water in six of these wells is under a slight hydrostatic pressure. The seventh well, 70 feet deep, in the SE.$\frac{1}{4}$, section 3, struck a 20-foot bed of sand beneath 50 feet of clay and the water does not rise above the top of the aquifer. The supply of water in all these seven wells is abundant, but the water is hard and highly mineralized. It is being used for drinking.

It has not been found necessary to drill deep for water in this township. The glacial drift is very thick, and is believed to extend to an approximate depth of 400 feet below the surface. Water-bearing horizons of sand and gravel probably exist in the lower 300 feet of the drift, although the bulk of the deposits probably is blue clay.

Township 22, Range 9

Pheasant creek flows across the township in a southeasterly direction. Its valley is wide and shallow, but although the stream is small it has never been known to be dry. The southern part of the township is quite flat and marks the site of a shallow glacial lake. Two areas in the southern 2 miles of the township, within the glacial lake basin, are mantled by a thin covering of glacial lake sands. The remainder of the glacial lake district is covered by a thin veneer of glacial lake clays. The northern 3 miles of the township are largely mantled by glacial till, but a small area in the west-central part is covered by glacial outwash sand, and parts of sections 32, 33, 35, and 36

are covered by moraine. The ground surface in the northern half of the township is gently rolling and contains a few small, scattered clumps of poplar trees.

The supply of ground water obtained in this township is not as good as in the two townships immediately to the east. Twelve of the nineteen farmers interviewed obtain an adequate, but not always an abundant supply of water and sometimes more than one well is needed to meet all requirements. Thick deposits of sand occur less frequently than they do in the two preceding townships, but at least eight wells have been dug or bored in sand deposits of considerable areal extent. A bored well, 45 feet deep, in the SE.$\frac{1}{4}$, section 11, penetrated 45 feet of sand, and another well in the SE.$\frac{1}{4}$, section 22, was bored through 30 feet of sand. A water horizon is generally penetrated at depths of 20 feet or somewhat less, but the highest water-level in the 45-foot well in the SE.$\frac{1}{4}$, section 11, is 30 feet below the surface. The water from these sand deposits is generally soft, since it does not come into contact with clay. In areas other than those overlain by thick deposits of sand, permanent supplies of ground water are difficult to locate at depths less than 35 feet below the surface. A 16-foot well in the SE.$\frac{1}{4}$, section 10, gives a characteristic log of the materials that may be expected in most shallow wells. This well was dug through 4 feet of yellow clay, 9 feet of blue clay, 1 foot of sand, and 2 feet of blue clay. The water in this well is hard and the supply is only sufficient for house use.

Three wells, located in the NE.$\frac{1}{4}$, section 23, and the SE. and SW.$\frac{1}{4}$'s, section 24, 80, 60, and 85 feet deep, respectively, tap a common water-bearing horizon of sand at an approximate elevation of 1,860 feet. The water rises under hydrostatic pressure to points 20, 25, and 45 feet below the surface, respectively, and the supply is abundant and constant. The water is hard and highly

mineralized, but it is being used for drinking. This water-bearing horizon is not continuous, since dry holes were bored 85 and 112 feet deep in the NE.$\frac{1}{4}$, section 7, and the SW.$\frac{1}{4}$, section 26.

Four farmers in the township haul water and several others depend upon sloughs as a supplementary supply to their wells for watering stock. No attempts have been made to drill to depths for a permanent water supply, but it is quite probable that water-bearing horizons do exist in the thick covering of glacial drift. The glacial drift is believed to be approximately 400 feet thick, and it overlies the Marine Shale series.

Township 22, Range 10

Sections 1, 12, 13, 24, 25, and 36, of this township, lie within the municipality of Stanley. A small, intermittent tributary of Pheasant creek flows eastward through section 1. The eastern parts of sections 1, 12, 13, and 24 are mantled by glacial lake clays; parts of sections 25 and 36 are covered by glacial outwash sands and gravels; and the remainder of the six sections is covered by glacial till. The ground surface is flat in the lake clay-covered region, but becomes slightly rolling in the till- and glacial outwash-covered areas. The area is devoid of any tree growth.

Of the seven farmers interviewed only one, located in the SE.$\frac{1}{4}$, section 12, is unable to obtain an adequate supply of water. Four wells in the NW.$\frac{1}{4}$, section 24, SE.$\frac{1}{4}$, section 25, and SW. and SE.$\frac{1}{4}$'s, section 36, were dug entirely in sand. The deepest of these four wells is 16 feet and the shallowest 7 feet. The 7-foot well waters 50 head of stock even in drought years, and the other wells yield a sufficient supply of water for local needs. The water in the 16-foot well is hard and "alkaline", but the water in the remaining three wells is soft.

Two drilled wells, located in the NE.$\frac{1}{4}$, section 12, and NE.$\frac{1}{4}$, section 36, are 125 and 150 feet deep, and tap a water-bearing horizon at elevations of 1,850 and 1,835 feet above sea-level. The water rises under pressure to points 65 and 80 feet below the surface and the supply is abundant. The water is hard, but is too highly mineralized to be used for drinking although it has no ill effects on stock.

The farmer on the SE.$\frac{1}{4}$, section 12, has bored a dry hole 100 feet deep and depends upon a shallow well and a small dam for a supply of water for his stock, and in drought years the supply is insufficient for his needs. This farmer is advised to drill to a depth of at least 125 feet for a permanent supply of water. The glacial drift is believed to be at least 400 feet thick and the possibilities of obtaining water under pressure are good, but the water will probably contain a large amount of mineral salts in solution.

Township 23, Range 7

Crescent creek meanders southwards through the centre of the northern 4 miles of the township and then flows southeastwards through sections 10, 11, and 12. The Canadian National Railway Company has constructed a dam across the valley of Crescent creek near Melville in the municipality of Cana, and the flooded area extends into sections 1 and 2 in this township. Kaposvar creek flows in a southeasterly direction through sections 18, 7, and 6. Both Crescent and Kaposvar creeks are small streams that flow intermittently through shallow, wide ravines. A small lake, approximately 80 acres in area and 6 feet deep, occurs in Kaposvar valley in sections 7 and 8.

A strip of country 1 to 2 miles wide, which follows the course of Crescent creek, is mantled by glacial till in the northern 3 miles of the township and by glacial outwash sands

and gravels in the southern 3 miles. Glacial till also occurs in parts of sections 4, 5, and 6, but the remainder of the township is covered by moraine. The ground surface is slightly rolling and the top soil is sandy in the glacial outwash-covered area. Tree growth is confined to the northern sections of the township.

The supply of water is much larger in the southern 4 miles of the township than in the northern 2 miles. Eleven of the thirty-eight farms visited by the field party are short of water, and seven of these eleven farms are located in the northern 2 miles of the township. The ground water conditions in the southern 4 miles are similar to those in township 22, ranges 7 and 8. A flowing spring occurs in the SE.$\frac{1}{4}$, section 6. This spring has been used since 1912 and it delivers a very good supply of soft water that rises to a point 2 feet above the ground surface. Thick beds of sand and gravel occur at the surface not only in the glacial outwash area in the southeastern part of the township but also in the moraine- and till-covered areas. Wells dug into these sand and gravel deposits are seldom more than 20 feet deep, but one in the SW.$\frac{1}{4}$, section 5, was bored through 50 feet of gravel. The water-level in this well is at a point 25 feet below the surface and the water is hard and "alkaline". Shallower, 8- to 20-foot wells in the glacial outwash sand and gravel usually yield soft water. The supply of water in these wells was decreased slightly during the drought of 1930 to 1934, but an individual well can water from 25 to 50 head of stock even in periods of drought. There are thirteen wells of this type in the southern 4 miles of the township.

In the northern 2 miles there are seven wells less than 25 feet deep that have been dug in sand and gravel, but only three wells, in the SE.$\frac{1}{4}$, section 27, SW.$\frac{1}{4}$, section 34, and SW.$\frac{1}{4}$, section 36, deliver sufficient water to meet the owner's requirements.

Apparently the sand deposits become less extensive towards the north and the water supply is more readily affected by drought. These three wells together with a 21-foot well in the NW.$\frac{1}{4}$, section 30, which was dug through 4 feet of black loam, 12 feet of yellow clay, and 5 feet of sand, are the only wells in the northern 2 miles of the township that yield an adequate supply of water.

Farmers in the township who have been unable to locate thick surface deposits of sand and gravel usually have a bored well. The depths of these wells range from 50 to 133 feet, and nine of them, located in the southern 4 miles of the township, yield an abundant supply of hard, highly mineralized water. The water rises under pressure, the greatest pressure being in the 133-foot well in the SW.$\frac{1}{4}$, section 4, where the water rises to a point 28 feet below the surface. The hamlet of Birmingham owns a 60-foot bored well that delivers an inadequate supply of soft water. The drought of 1930 to 1934 lowered the water-level in this well from a point 35 feet below the surface to a point 58 feet below the surface. One dry hole, 90 feet deep, was bored in the NW.$\frac{1}{4}$, section 22, and three dry holes, 70 to 80 feet deep, were bored in the NW.$\frac{1}{4}$, section 29. A 75-foot well in the SW.$\frac{1}{4}$, section 35, yields water that is unfit for use. A 240-foot dry hole was drilled in blue clay in the SW.$\frac{1}{4}$, section 30.

Farmers who have been unable to secure a permanent water supply, particularly in the northern sections, are advised to test with hand augers before digging a well. By so doing a pocket of water-bearing sand or gravel may be located with a minimum of effort and expense. If water cannot be located at shallow depth it is advisable to excavate deep dugouts and retain run-off water for stock use.

Township 23, Range 8

Kaposvar creek flows intermittently in a southerly direction through sections 36, 25, 24, and 13. The headwaters of Pearl creek occur in a small lake located in the northern

parts of sections 19 and 20. The creek flows in a southerly direction and small lakes occur in its valley in sections 7 and 18. The greater part of the township is covered by moraine, but small areas in the southern part of the township are mantled by glacial till and glacial outwash sands and gravels. The elevation rises towards the northwest and the ground surface is rolling and is characterized by many large, undrained depressions. The northern part of the township is wooded with poplar.

Most of the wells in the township have been dug by hand and none of them exceeds a depth of 25 feet. The supply of water obtained is variable, as the water-bearing sands and gravels occur as pockets in the upper 25 feet of the glacial drift. It is not uncommon to find one farmer obtaining a fairly abundant supply from a shallow well, whereas his neighbour is forced to haul water. Deposits of sand and gravel are scattered throughout the till- and moraine-covered areas of the township, but wells dug in them do not always yield an adequate supply of water. For instance, a 16-foot well dug in gravel in the SE.$\frac{1}{4}$, section 20, delivers a poor supply of hard water, whereas an 8-foot well dug in sand in the NW.$\frac{1}{4}$, section 19, delivers a supply of soft, slightly "alkaline" water that is sufficient for 100 head of stock. Sixteen farmers in the township were short of well water during the drought of 1930 to 1934 and were forced to use sloughs and haul water to meet their stock requirements. The village of Fenwood obtains a sufficient supply of water from six wells, 15 to 20 feet deep, that yield small supplies of hard, "alkaline" water.

Seven bored wells ranging from 60 to 150 feet deep tap a water-bearing horizon composed of sand at elevations of 1,820 to 1,870 feet above sea-level. The 150-foot well was bored in the NW.$\frac{1}{4}$, section 18, at a point where the surface elevation is 50 to 70 feet higher than it is in sections 12, 14, and 24, where

the remaining six wells were bored. The water rises under hydrostatic pressure. In a 99-foot well in the SW.$\frac{1}{4}$, section 24, the water rises to a point 10 feet below the surface, and in an 83-foot well bored in the SE.$\frac{1}{4}$, section 24, the water rises to a point 4 feet above the surface. The water in these deep bored wells is hard, "alkaline", and frequently contains iron. It is not suitable for drinking and is only used for that purpose when water of better quality is not obtainable. A 100-foot dry hole was bored in the SW.$\frac{1}{4}$, section 32. Its base is at an elevation of 1,920 feet and it was not bored deep enough to strike the water-bearing horizon encountered by the seven bored producing wells. This aquifer is not continuous, as a 240-foot drilled dry hole occurs in the SW.$\frac{1}{4}$, sec. 30, tp. 23, range 7. This dry hole is less than 2 miles from the flowing artesian well in the SE.$\frac{1}{4}$, section 24, of this township.

Farmers who anticipate digging a well are advised to test with hand augers in order that a pocket of sand or gravel may be encountered before the expense and effort of digging is undertaken. Boring or drilling to the water-bearing horizon of sand that occurs at elevations of 1,820 to 1,870 feet is advisable, although it is known that the aquifer is discontinuous. The water will probably be "alkaline", but suitable for stock. The undulating ground surface is very favourable for the excavation of deep dugouts and they are recommended as a means of collecting and storing surface water for stock purposes. The slightly mineralized surface water is better for stock than the highly mineralized water from the deep wells.

Township 23, Range 9

With the exception of the southern parts of sections 5 and 6, which are mantled by boulder clay or glacial till, the entire township is covered by moraine. The elevation of the

ground surface increases from 1,960 feet at the southeastern corner to 2,080 feet at the northwestern corner. The ground surface is rolling, contains many large undrained depressions, and is wooded in sections 32 and 33.

All the wells in the township, with the exception of one, were dug to depths less than 45 feet, and most of them are from 15 to 20 feet deep. The supply of water obtained from these wells is generally small and at least twenty-one farms in the township were short of water during the drought of 1930 to 1934. Many of the wells are dug in clay with no sand or gravel aquifer, and depend entirely on surface seepage from nearby sloughs. If the well has been dug through blue or black clay the water usually is hard and "alkaline". Six wells have been dug through sand or gravel that extends from the surface to the base of the well, but only three yield a permanent supply of soft or medium hard water. These three wells are located in the SW.$\frac{1}{4}$, section 3, SW.$\frac{1}{4}$, section 22, and SW.$\frac{1}{4}$, section 35, and they are 25, 26, and 7 feet deep, respectively. The thick deposits of sand and gravel are not as numerous in this township as in the three southern townships and in township 23, range 7.

Sloughs are used by many farmers for watering stock and other farmers are forced to haul water. A 100-foot well was drilled in the SW.$\frac{1}{4}$, section 2, but it is not being used as the water is too highly mineralized. No other wells were drilled and there is not a single bored well in the township.

Dugout excavation is recommended as a means of conserving run-off water. A dugout should be at least 12 feet deep and slough depressions are favourable locations for their excavation. Small, deep dugouts will prove more satisfactory than large, shallow dugouts. The glacial drift is very thick and probably extends to a depth of 500 feet. Deep drilling operations could be attempted

although the possibility of striking water cannot be forecast. It is very probable that water-bearing horizons of sand or gravel occur at several levels within the thick mantle of drift.

Township 24, Range 7

Crescent creek flows across the western half of the township in a southeasterly direction. The stream is small and flows intermittently through a wide, shallow ravine. Glacial till or boulder clay mantles an area approximately 2 miles wide along the course of Crescent creek, and a small area in parts of sections 3, 9, and 10, is covered by glacial outwash sands and gravels. The remainder of the township is overlain by moraine. The ground surface is undulating, contains many sloughs, and is wooded with poplar.

Every producing well in the township has been dug by hand and no well exceeds a depth of 30 feet. The supply of water in these shallow wells is exceedingly variable. Many wells are merely seepage wells dug in clay with no sand or gravel aquifer and depend entirely on adjacent sloughs for seepage water. Twenty-five recorded wells were dug in deposits of sand and gravel. In most of these wells the sand and gravel extend from the surface to an approximate depth of 10 feet, but in a well on the SE.$\frac{1}{4}$, section 11, the sand and gravel extend to a depth of 25 feet. Clay underlies the sand and gravel and the wells are sometimes deepened into the clay to form a reservoir. Most of the wells yield a permanent supply of water, and the size of the deposit encountered influences the supply of water obtained. The water in some wells is soft, and in others it is hard and "alkaline", but it is used for drinking. A few scattered wells tap aquifers of sand and gravel beneath a top covering of yellow clay, but the supply of water obtained by them is insufficient for local needs.

The drought of 1930 to 1934 caused a severe shortage of water for stock purposes in this township. Many wells became dry and farmers were forced to tank water. Dugouts are not often used and their excavation is recommended.

One well was bored in the SW.$\frac{1}{4}$, section 7, to a depth of 175 feet without striking a water-bearing horizon. The bulk of the drift penetrated was blue clay. No further attempts to secure water at depths greater than 30 feet have been made. The glacial drift is estimated to be approximately 500 feet thick and water-bearing horizons of sand and gravel are apt to occur at any level within it. Test borings should always be made with a hand auger before a shallow well is dug, in order that a water-bearing pocket of sand or gravel may be located as economically as possible.

Township 24, Range 8

The headwaters of Kaposvar creek occur in the NE.$\frac{1}{4}$, section 11, and the stream flows intermittently through the south half of section 11 and through section 2. The entire township, with the exception of a glacial till-covered area in sections 25 and 36, is mantled by moraine. This moraine is known as the Beaver hills. The ground surface is undulating, contains numerous large undrained depressions, and is wooded with poplar trees.

Of the forty-five farmers interviewed in this township thirty-two are unable to secure a sufficient supply of ground water. All the producing wells, with the exception of two bored wells, 50 and 28 feet deep, have been dug by hand to depths less than 37 feet below the surface. The upper 40 feet of glacial drift consists of yellow clay, layers of blue clay, and pockets of sand and gravel. The log of a 20-foot well in the NW.$\frac{1}{4}$, section 23, shows, in descending order, 3 feet of yellow clay, 8 feet of gravel, 4 feet of blue

clay, and 5 feet of sand. A few wells were dug into surface deposits of sand and gravel that occur on the lower slopes of the moraine and which are probably of glacial outwash origin. An 11-foot well in the NW.$\frac{1}{4}$, section 24, one of the best wells in the township, was dug through 2 feet of loam and 9 feet of gravel. The water is soft and the supply is adequate for 100 head of stock. Those wells that have tapped fairly large and thick deposits of sand or gravel, such as the well in the NW.$\frac{1}{4}$, section 24, yield moderate, and in a few instances quite abundant, supplies of water. In most of the wells, however, either little or no sand or gravel is penetrated. Consequently, drought years, such as those experienced from 1930 to 1934, have depleted the supply of ground water to a great extent. Many wells yield highly mineralized water that cannot be used for drinking. The water from the 50-foot bored well in the SE.$\frac{1}{4}$, section 12, cannot be used even for stock because of its high dissolved mineral salt content. Farmers who are short of water use sloughs whenever possible and convenient, or haul water. A few farmers use dugouts.

Many dry holes to a maximum depth of 100 feet have been dug and bored. One drilled well in the SW.$\frac{1}{4}$, section 18, struck a water-bearing horizon of very fine sand at a depth of 170 feet below the surface, or at an elevation of 1,885 feet. The water obtained was of good quality and the supply was abundant, but the fine sand particles plugged the casing and rendered the well useless. Drilling is preferable to boring in an attempt to locate a permanent supply of water in this township. The glacial drift is believed to be at least 500 feet thick and the possibilities of striking water in this thick drift mantle are probably very good. Test borings should always be sunk before a shallow well is dug by hand. The topography of the ground surface is very favourable for the excavation of dugouts.

Township 24, Range 9

This entire township is covered by a part of the Beaver Hills moraine. The ground surface is very undulating and rough. Large, deep, undrained depressions are numerous; one in the southwestern part of the township covers an area of approximately 160 acres. Poplar bush occurs throughout the area. The supply of water derived from wells in this township is poor and at least twenty-two farms were short of water during the drought of 1930 to 1934. Every producing well has been dug by hand to depths ranging from 8 to 30 feet. Pockets of sand and gravel occur within the yellow boulder clay and the size and thickness of the pockets determine the amount of water obtained in wells that have tapped them. The supply is readily affected by variations in rainfall, and wells that will water 40 to 50 head of stock in years of average rainfall become either intermittent or yield very small supplies of water during winter and drought years. The quality of the water is extremely variable, but usually wells that tap thick beds of sand or gravel yield water that is less highly mineralized than do those that tap small layers of sand or gravel, or have been dug entirely through clay. The clays of the glacial drift are the main source of dissolved mineral salts contained in ground water. The village of Goodeve derives a small but sufficient supply of hard, "alkaline" water from shallow dug wells.

Numerous dry holes have been made in the township, the deepest being a 60-foot bored well in the NE.$\frac{1}{4}$, section 22. The glacial drift is estimated to be 500 feet thick. Deep drilling operations, although never attempted in the township, would probably be successful in obtaining a permanent supply of water. Many farmers use sloughs as a source of water for stock, whereas others tank water. Slough basins are of frequent occurrence and

should dugouts be excavated in these depressions they will prove to be a satisfactory means of collecting and storing surface water for stock purposes. Test holes should always be sunk prior to digging a shallow well.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF STANLEY, NO.215, SASKATCHEWAN.

West of 2nd meridian — Township / Range	22 / 7	22 / 8	22 / 9	22 / 10	23 / 7	23 / 8	23 / 9	24 / 7	24 / 8	24 / 9	Total No. in municipality
Total No. of Wells in Township	37	34	34	15	68	63	50	68	68	51	488
No. of wells in bedrock	0	0	0	0	0	0	0	0	0	0	0
No. of wells in glacial drift	37	34	34	15	68	63	50	68	68	51	488
No. of wells in alluvium	0	0	0	0	0	0	0	0	0	0	0
Permanency of Water Supply											
No. with permanent supply	33	33	25	14	42	47	31	43	37	32	337
No. with intermittent supply	2	0	1	0	9	12	14	16	17	12	83
No. dry holes	2	1	8	1	17	4	5	9	14	7	68
Types of Wells											
No. of flowing artesian wells	0	0	0	0	0	1	0	0	0	0	1
No. of non-flowing artesian wells	8	6	3	2	9	6	1	0	1	0	36
No. of non-artesian wells	27	27	23	12	42	52	44	59	53	44	383
Quality of Water											
No. with hard water	29	22	18	11	31	49	39	46	40	33	318
No. with soft water	6	11	8	3	20	10	6	13	14	11	102
No. with salty water	0	0	0	0	0	0	0	0	0	0	0
No. with "alkaline" water	12	10	8	3	12	30	20	23	24	24	166
Depths of Wells											
No. from 0 to 50 feet deep	29	26	26	12	51	54	49	66	66	49	428
No. from 51 to 100 feet deep	8	8	7	1	14	7	1	1	1	2	50
No. from 101 to 150 feet deep	0	0	1	2	2	2	0	0	0	0	7
No. from 151 to 200 feet deep	0	0	0	0	0	0	0	1	1	0	2
No. from 201 to 500 feet deep	0	0	0	0	1	0	0	0	0	0	1
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0	0	0	0	0
How the Water is used											
No. usable for domestic purposes	28	29	23	10	41	50	42	50	48	42	363
No. not usable for domestic purposes	7	4	3	4	10	9	3	9	6	2	57
No. usable for stock	34	32	25	14	49	58	44	54	49	44	403
No. not usable for stock	1	1	1	0	2	1	1	5	5	0	17
Sufficiency of Water Supply											
No. sufficient for domestic needs	33	33	24	14	42	46	30	41	37	32	332
No. insufficient for domestic needs	2	0	2	0	9	13	15	18	17	12	88
No. sufficient for stock needs	30	29	14	9	36	40	22	33	15	19	247
No. insufficient for stock needs	5	4	12	5	15	19	23	26	39	25	173

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.

Water from the Unconsolidated Deposits

No water samples were collected in this municipality. The clays that constitute the bulk of glacial drift, especially the blue clay, are the chief sources of dissolved mineral salts in ground water. The water from shallow wells less than 20 to 25 feet deep usually contains a smaller amount of mineral salts in solution than does the water from deeper wells that tap an aquifer lying within the blue clay. In the municipality of Stanley many of the wells yield soft water. Most of these wells are dug in large, thick deposits of sand and gravel that extend from the ground surface to the base of the well. The seepage water passes directly into the sand without coming into contact with clay and, consequently, the water is only slightly mineralized. Care should be taken to see that these wells do not become polluted by surface waters containing sewage. In the moraine-covered district in the northwestern part of the municipality, these thick deposits of sand and gravel are seldom found. Wells penetrate yellow and blue clay and the water is, therefore, quite highly mineralized with sulphate salts. These salts are most undesirable in drinking water as they cause the water to be laxative.

The bored and drilled wells, 40 to 100 feet deep, in the southeastern part of the municipality almost invariably yield water that is much too highly mineralized to be used for drinking. The water probably contains large amounts of sodium, magnesium, and calcium sulphates; and small amounts of calcium carbonate and sodium chloride.

Water from the Bedrock

No water is being derived from the Marine Shale series in this municipality. In the southeastern part of Saskatchewan the water that has been obtained from the Marine Shale series is highly charged with sodium sulphate, magnesium sulphate, and sodium chloride. It is unfit for drinking and often cannot be used for stock.

WELL RECORDS—Rural Municipality of STANLEY NO. 215, 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	NE.	2	22	7	2	Dug	14	1,820	- 11	1,809	4	1,816	Glacial sand	Soft		D, S	Sufficient for 20 head stock.
2	SE.	4	"	"	"	Dug	20	1,840	- 16	1,824	16	1,824	Glacial sand	Hard		D, S	Oversufficient for 3 head stock; owns a spring in a ravine.
3	SW.	4	"	"	"	Dug	27	1,860	- 15	1,845			Glacial sand	Hard		D, S	Sufficient for 30 head stock.
4	SW.	6	"	"	"	Dug	17	1,960	- 4	1,956	17	1,943	Glacial sand	Hard, iron		D, S	Good supply for 12 head stock.
5	NW.	6	"	"	"	Dug	40	1,945	- 24	1,921	38	1,907	Glacial sand	Hard, iron, "alkaline"		D, S	Another similar well used; sufficient supply.
6	NW.	10	"	"	"	Bored	32	1,850	- 14	1,836			Glacial clay	Hard, "alkaline"		N	Water is hihgly mineralized; hauls water ½ mile.
7	SW.	12	"	"	"	Bored	99	1,830	- 24	1,806	99	1,731	Glacial sand	Hard, "alkaline"		S	Sufficient for 50 head stock; 10-foot well used for house.
8	SE.	12	"	"	"	Bored	60	1,825	- 35	1,790			Glacial drift			D, S	Sufficient for 15 head stodk; water imparts a laxative effect and deposits a green sediment.
9	NE.	13	"	"	"	Bored	60	1,825	- 30	1,795			Glacial drift	Hard, "alkaline"		D, S	Sufficient for 25 head stock; one dry hole made.
10	NE.	14	"	"	"	Bored	20	1,820	- 18	1,802	15	1,805	Glacial sand	Hard		D, S	Sufficient for 45 head stock with the aid of an 8-foot well.
11	SW.	15	"	"	"	Dug	8	1,825	- 6	1,819	6	1,819	Glacial sand	Soft		S	Sufficient for 35 head stock in summer.
12	NE.	16	"	"	"	Dug	9	1,850	- 5	1,845	5	1,845	Glacial sand	Soft, "alkaline"		D, S	Sufficient for 15 head stock.
13	NE.	17	"	"	"	Bored	32	1,880	- 18	1,862			Glacial drift			S	Sufficient for 12 head stock.
14	NE.	19	"	"	"	Dug	7	1,880	- 4	1,876	4	1,876	Glacial sand	Hard		D, S	Sufficient for 20 head stock; one dry hole made.
15	SW.	20	"	"	"	Bored	64	1,875	- 29	1,846	64	1,811	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 60 head stock; a 7-foot well also used.
16	NW.	20	"	"	"	Bored	90	1,875	- 24	1,851			Glacial drift	Hard		D, S	Sufficient for 30 head stock; a 6-foot well used in summer.
17	SW.	21	"	"	"	Bored	49	1,865	- 14	1,851			Glacial sand	Hard, "alkaline"		D, S	Sufficient for 20 head stock.
18	NE.	23	"	"	"	Dug	10	1,830	- 6	1,824	6	1,824	Glacial sand	Soft		D, S	Sufficient for 22 head stock.
19	NW.	24	"	"	"	Dug	11	1,830	- 6	1,824			Glacial gravel	Hard		D, S	Insufficient supply.
20	NE.	26	"	"	"	Dug	14	1,825	- 10	1,815	10	1,815	Glacial sand	Soft		D, S	Sufficient for 60 head stock; also uses a dam for stock.
21	SW.	30	"	"	"	Bored	44	1,885	- 24	1,861	24	1,861	Glacial sand	Hard, "alkaline"		S	Sufficient for 35 head stock; uses seepage well for drinking.
22	NE.	30	"	"	"	Dug	50	1,880					Glacial drift	Hard		D	
23	SE.	31	"	"	"	Bored	56	1,880	- 20	1,860	56	1,824	Glacial gravel	Hard, iron		D, S	Sufficient for 50 head ; another well 14 feet deep.
24	SE.	33	"	"	"	Bored	65	1,850	- 29	1,821	29	1,821	Glacial sand	Hard, "alkaline"		S	Sufficient for 36 head stock.
25	NW.	34	"	"	"	Dug	9	1,850	- 4	1,846	4	1,846	Glacial sand	Soft		D, S	Sufficient for 30 head stock.
26	SE.	34	"	"	"	Bored	52	1,840	- 30	1,810	52	1,788	Glacial sand	Hard, iron, "alkaline"		D, S	Sufficient for 40 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 STANLEY NO.215, 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	SW.	2	22	8	2	Bored	60	1,980	- 15	1,965	60	1,920	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 25 head stock.
2	NW.	2	"	"	"	Dug	23	1,945	- 13	1,932			Glacial drift	Soft		D, S	Sufficient for 20 head stock.
3	SE.	3	"	"	"	Bored	70	1,970	- 50	1,920	50	1,920	Glacial sand	Hard		D	A 15-foot well and a dugout are used for stock
4	NW.	4	"	"	"	Bored	63	1,950	- 28	1,922	63	1,887	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 20 headstock; owns a small dam.
5	SE.	5	"	"	"	Bored	75	1,960	- 55	1,905	75	1,885	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 25 head stock.
6	NW.	5	"	"	"	Bored	37	1,925	- 22	1,903	22	1,903	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 25 head stock.
7	SW.	8	"	"	"	Bored	40	1,915	- 10	1,905	10	1,905	Glacial gravel	Soft		D	Well in village of Dugg; sufficient supply.
8	SW.	9	"	"	"	Dug	14	1,920	- 6	1,914	6	1,914	Glacial sand	Soft		D, S	Sufficient for 15 head stock.
9	SW.	10	"	"	"	Dug	19	1,910	- 13	1,897			Glacial sand	Hard		D	A 34-foot well yields a good supply for 30 head stock.
10	SE.	12	"	"	"	Dug	26	1,930	- 23	1,907	23	1,907	Glacial sand	Hard		D, S	Sufficient for 30 head stock.
11	SW.	16	"	"	"	Bored	60	1,900	- 40	1,860	40	1,860	Glacial gravel	Hard, "alkaline"		D	A 6-foot well waters 35 head stock.
12	NW.	17	"	"	"	Bored	70	1,920	- 23	1,897	70	1,850	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 30 head stock.
13	NW.	20	"	"	"	Bored	30	1,935	- 20	1,915	20	1,915	Glacial sand	Hard, "alkaline"		S	A 13-foot well used for the house; sufficient supply of water.
14	NW.	24	"	"	"	Bored	28	1,905	- 20	1,885			Glacial sand	Hard, "alkaline"		D, S	
15	SE.	24	"	"	"	Dug	8	1,890	- 4	1,886			Glacial gravel	Soft		D, S	
16	NW.	27	"	"	"	Dug	8	1,915	- 4	1,911	4	1,911	Glacial sand	Soft		D, S	Sufficient for 10 head stock.
17	NW.	27	"	"	"	Bored	22	1,910	- 18	1,892	18	1,892	Glacial sand	Soft		D	School well, sufficient supply.
18	NE.	30	"	"	"	Dug	8	1,940	- 4	1,936	4	1,936	Glacial sand	Soft		D, S	Sufficient for 12 head stock.
19	NW.	31	"	"	"	Dug	7	1,950	- 4	1,946	4	1,946	Glacial sand	Soft		D, S	Sufficient supply.
20	SE.	31	"	"	"	Bored	75	1,930	- 25	1,905	75	1,855	Glacial sand	Hard, iron		D, S	Sufficient for 25 head stock; 18-foot well seldom used.
21	SW.	32	"	"	"	Dug	9	1,940	- 6	1,934	6	1,934	Glacial sand	Hard		D, S	Sufficient for 20 head stock; one dry hole made.
22	SE.	32	"	"	"	Dug	10	1,940	- 2	1,938	2	1,938	Glacial sand	Soft		D, S	Sufficient for 15 head stock.
23	SW.	34	"	"	"	Dug	8	1,925	- 3	1,922	3	1,922	Glacial sand	Soft		D, S	Sufficient supply.
24	NE.	34	"	"	"	Dug	11	1,910	- 6	1,904	6	1,904	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 10 head stock.
25	SW.	35	"	"	"	Dug	13	1,910	- 7	1,903	7	1,903	Glacial sand	Soft		D, S	Sufficient for 27 head stock.
26	NW.	36	"	"	"	Dug	69	1,910	- 20	1,890	69	1,841	Glacial sand	Hard, "alkaline"		D, S	Sufficient supply.
1	NW.	3	22	9	2	Bored	37	1,920	- 30	1,890	30	1,890	Glacial sand	Hard, "alkaline"		S	Sufficient for 25 head stock; shallow well used for drinking.

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 STANLEY NO.215, 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
2	NE.	7	22	9	2	Bored	85	1,950					Glacial drift				The deepest of 6 dry holes; all water is hauled.
3	SE.	10	"	"	"	Dug	16	1,920	- 8	1,912	13	1,907	Glacial sand	Hard		D, S	Poor supply; one other intermittent well, hauls water.
4	NE.	10	"	"	"	Bored	20	1,925	- 18	1,907	18	1,907	Glacial sand	Hard, "alkaline"		N	Stock refuse this water; hauls all water.
5	SE.	11	"	"	"	Bored	45	1,920	- 30	1,890	30	1,890	Glacial sand	Hard, "alkaline"		D	Sufficient with a creek for 35 head stock.
6	SW.	12	"	"	"	Dug	27	1,925	- 12	1,913			Glacial gravel	Soft		D, S	Sufficient supply.
7	NW.	17	"	"	"	Bored	16	1,950	- 11	1,939			Glacial clay	Hard		D	Insufficient supply.
8	NE.	17	"	"	"	Bored	26	1,940	- 15	1,925			Glacial clay	Hard		D, S	Yields 1 barrel of water a day; an 8-foot well yields 40 barrels a day.
9	SE.	18	"	"	"	Bored	23	1,960	- 20	1,940	20	1,940	Glacial sand	Hard		D, S	Insufficient supply; hauls water.
10	NW.	18	"	"	"	Dug	20	1,965	- 17	1,948			Glacial sandy clay	Soft		D, S	Insufficient for 20 head stock.
11	SE.	19	"	"	"	Dug	15	1,965	- 11	1,954	11	1,954	Glacial sand	Soft		D, S	Sufficient for 50 head stock.
12	SE.	22	"	"	"	Bored	30	1,940	- 20	1,920	20	1,920	Glacial sand	Soft		D, S	Sufficient supply with a 5-foot well for 25 head stock.
13	NE.	23	"	"	"	Bored	80	1,940	- 20	1,920	80	1,860	Glacial sand	Hard, "alkaline"		D, S	Good supply for 25 head stock.
14	SW.	24	"	"	"	Bored	85	1,940	- 15	1,925	85	1,855	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 60 head stock.
15	SE.	24	"	"	"	Dug	60	1,930	- 25	1,905	60	1,870	Glacial sand	Hard		D, S	Sufficient supply.
16	SW.	26	"	"	"	Dug	12	1,960	- 6	1,954	6	1,954	Glacial sand	Soft		D, S	Sufficient for 35 head stock; a bored 112-foot dry hole.
17	NE.	27	"	"	"	Dug	8	1,960	- 5	1,955	5	1,955	Glacial sand	Soft		D, S	Sufficient for 10 head stock.
18	SE.	30	"	"	"	Bored	86	1,965	- 77	1,888	58	1,907	Glacial gravel	Hard, "alkaline"		S	Poor supply; shallow seepage well used for drinking and 20 head stock watered in sloughs.
19	NE.	32	"	"	"	Dug	20	1,990	- 18	1,972	18	1,972	Glacial sand	Soft		D, S	Sufficient for 50 head stock.
1	SE.	12	22	10	2	Bored	21	1,960	- 18	1,942			Glacial sand	Hard, "alkaline"		S	Insufficient for 10 head stock; 1 dry hole 100 feet deep.
2	NE.	12	"	"	"	Drilled	125	1,965	- 65	1,900	115	1,850	Glacial gravel	Hard, "alkaline"		S	Good supply for 35 head stock; seepage well used for drinking.
3	NW.	24	"	"	"	Dug	12	1,975	- 6	1,969	6	1,969	Glacial sand	Soft		D, S	Sufficient for 25 head stock with the aid of two other wells.
4	SE.	25	"	"	"	Dug	16	1,975	- 10	1,965	10	1,965	Glacial sand	Hard, "alkaline"		S	Sufficient for 30 head stock; uses a dugout and another well for drinking.
5	SW.	36	"	"	"	Dug	13	1,990	- 9	1,981	9	1,981	Glacial sand	Soft		D, S	Sufficient for 10 head stock; uses a 14-foot well also.
6	SE.	36	"	"	"	Dug	7	1,980	- 4	1,976	4	1,976	Glacial sand	Soft		D, S	Sufficient for 52 head stock.
7	NE.	36	"	"	"	Drilled	150	1,975	- 80	1,895	140	1,835	Glacial sand	Hard, iron		S	Good supply for 25 head stock; 32-foot well used for drinking.
1	SW.	2	23	7	2	Bored	50	1,845	- 20	1,825			Glacial drift	Hard, iron		S	Sufficient for 15 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of STANLEY NO.215, 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
2	SW.	4	23	7	2	Bored	133	1,855	- 28	1,827			Glacial sand	Hard		D, S	Sufficient supply; a 10-foot well also used.
3	NW.	4	"	"	"	Dug	9	1,860	- 2	1,858	2	1,858	Glacial gravel	Soft		D, S	Sufficient for 22 head stock.
4	SW.	5	"	"	"	Bored	50	1,880	- 25	1,855	25	1,855	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 25 head stock.
5	SE.	6	"	"	"	Spring		1,875	+ 2	1,877			Glacial sand	Soft		D, S	Abundant supply.
6	SW.	6	"	"	"	Dug	8	1,890	- 2	1,888	2	1,888	Glacial gravel	Hard		D, S	Sufficient for 20 head stock.
7	NW.	6	"	"	"	Dug	9	1,900	- 7	1,893	7	1,893	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 20 head stock.
8	NW.	9	"	"	"	Bored	60	1,890	- 35	1,855	58	1,832	Glacial sand	Soft		D, S	Hamlet well of Birmingham; insufficient supply.
9	SE.	10	"	"	"	Dug	14	1,870	- 11	1,859	11	1,859	Glacial gravel	Hard		D, S	Sufficient for 40 head stock.
10	NE.	10	"	"	"	Dug	12	1,850	- 8	1,842	8	1,842	Glacial sand	Hard		D, S	Sufficient for 30 head stock.
11	NE.	11	"	"	"	Dug	15	1,860	- 5	1,855	5	1,855	Glacial gravel	Soft, "alkaline"		D, S	Sufficient for 35 head stock; also uses creek for stock.
12	SE.	12	"	"	"	Bored	52	1,850	- 32	1,818	50	1,800	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 45 head stock; a 10-foot well yields soft water.
13	NE.	12	"	"	"	Bored	64	1,860	- 34	1,826	64	1,796	Glacial sand	Hard, iron		D, S	Sufficient for 50 head stock.
14	SE.	14	"	"	"	Dug	15	1,860	- 7	1,853	5	1,855	Glacial sand	Hard		D, S	Sufficient for 50 head stock.
15	NE.	14	"	"	"	Bored	80	1,860	- 30	1,830	80	1,780	Glacial sand	Hard, iron		S	Oversupply for 25 head stock; 7-foot well used for drinking.
16	NW.	15	"	"	"	Dug	20	1,840					Glacial drift				One of 4 dry holes.
17	SE.	16	"	"	"	Dug	22	1,880	- 19	1,861	19	1,861	Glacial sand	Hard, "alkaline"		D	A 9-foot well in sand will water 50 head stock.
18	NE.	17	"	"	"	Bored	120	1,905	- 40	1,865	120	1,785	Glacial sand	Hard, "alkaline"		S	Sufficient for 30 head stock; a 28-foot well used for drinking.
19	SE.	18	"	"	"	Dug	7	1,900	- 4	1,896	4	1,896	Glacial gravel	Soft		D, S	Sufficient for 25 head stock.
20	SW.	18	"	"	"	Dug	14	1,905	- 6	1,899	6	1,899	Glacial gravel	Soft		D, S	Sufficient for 25 head stock.
21	NW.	18	"	"	"	Bored	80	1,915	- 64	1,851			Glacial sand	Hard		D, S	Sufficient supply.
22	SE.	20	"	"	"	Bored	60	1,900	- 20	1,880	60	1,840	Glacial sand	Hard, "alkaline"		S	Sufficient for 30 head stock; a 16-foot well in sand yields soft water for drinking.
23	NE.	20	"	"	"	Bored	90	1,890	- 40	1,850	90	1,800	Glacial sand	Hard, "alkaline"		S	Sufficient for 50 head stock; 11-foot well yields soft water.
24	SW.	22	"	"	"	Dug	16	1,875	- 13	1,862	10	1,865	Glacial sand	Hard		D, S	Sufficient for 35 head stock.
25	NW.	22	"	"	"	Bored	90	1,875					Glacial drift				Dry hole.
26	SE.	22	"	"	"	Bored	90	1,850	- 40	1,810	90	1,760	Glacial sand	Hard, iron, "alkaline"		S	Sufficient for 70 head stock; 12-foot well used for drinking.
27	NE.	22	"	"	"	Dug	12	1,855	- 8	1,847	5	1,850	Glacial sand and gravel	Soft		D, S	Oversufficient for 30 head stock.
28	NW.	24	"	"	"	Dug	14	1,865	- 10	1,855	10	1,855	Glacial sand	Soft		D, S	Insufficient for 25 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of STANLEY NO. 215, 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
29	NE.	25	23	7	2	Dug	10	1,860	- 5	1,855	5	1,855	Glacial sand	Hard		D, S	Intermittent supply.
30	NW.	26	"	"	"	Dug	14	1,890	- 8	1,882	8	1,882	Glacial sand	Soft		D, S	Three similar intermittent wells; insufficient supply.
31	SE.	27	"	"	"	Dug	10	1,865	- 6	1,859	6	1,859	Glacial gravel	Soft		D, S	Sufficient for 15 head stock.
32	NW.	29	"	"	"	Dug	20	1,930	- 16	1,914			Glacial clay	Hard, "alkaline"		D, S	Intermittent supply; 3 dry holes 70 to 80 feet deep.
33	SW.	30	"	"	"	Dug	22	1,950	- 17	1,933	17	1,933	Glacial sand	Hard, "alkaline"		D	Intermittent supply; a dry hole drilled 240 feet deep.
34	NW.	30	"	"	"	Dug	21	1,960	- 18	1,942	16	1,944	Glacial sand	Soft		D, S	Sufficient for 25 head stock.
35	SW.	31	"	"	"	Dug	25	1,960	- 23	1,937			Glacial clay	Hard, "alkaline"		S	Intermittent supply; seven dry holes and hauls water.
36	SW.	34	"	"	"	Dug	7	1,900	- 1	1,899	1	1,899	Glacial sand	Soft		D, S	Sufficient for 40 head stock.
37	NE.	34	"	"	"	Dug	22	1,910	- 19	1,891			Glacial clay	Hard, "alkaline"		N	Intermittent supply; hauls water 1 mile.
38	SW.	35	"	"	"	Dug	25	1,900	- 15	1,885	15	1,885	Glacial sand	Soft		D, S	Intermittent supply; a 75-foot well yielded water unfit for use.
39	SW.	36	"	"	"	Dug	8	1,880	- 3	1,877	3	1,877	Glacial sand	Soft		D, S	Sufficient for 30 head stock.
1	NW.	2	23	8	2	Bored	42	1,910	- 30	1,880			Glacial sandy clay	Hard, "alkaline"		D, S	Intermittent supply.
2	SW.	2	"	"	"	Dug	12	1,910	- 6	1,904	6	1,904	Glacial gravel	Hard		D, S	Insufficient supply.
3	SE.	2	"	"	"	Dug	11	1,915	- 8	1,907			Glacial drift	Hard		D, S	Sufficient supply.
4	NE.	3	"	"	"	Dug	8	1,920	- 6	1,914	6	1,914	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 30 head stock.
5	SW.	3	"	"	"	Dug	14	1,930	- 8	1,922	8	1,922	Glacial sand	Hard		D, S	Sufficient for 25 head stock; one other similar well.
6	SW.	4	"	"	"	Dug	12	1,930	- 10	1,920			Glacial clay	Hard, "alkaline"		D, S	Intermittent supply.
7	NW.	4	"	"	"	Dug	14	1,940	- 7	1,933	7	1,933	Glacial sand	Hard, "alkaline"		S	Sufficient for 20 head stock.
8	SE.	5	"	"	"	Dug	7	1,930	- 3	1,927	3	1,927	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 30 head stock.
9	NW.	6	"	"	"	Dug	5	1,970	- 1	1,969	1	1,969	Glacial gravel	Soft		D, S	Sufficient for 30 head stock; one other similar well.
10	NE.	7	"	"	"	Dug	22	1,950	- 19	1,931	19	1,931	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 30 head stock.
11	SE.	8	"	"	"	Dug	15	1,955					Glacial drift				Dry hole.
12	SW.	9	"	"	"	Dug	16	1,950					Glacial drift				Dry hole.
13	NW.	9	"	"	"	Dug	8	1,955	- 4	1,951	4	1,951	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 50 head stock.
14	NE.	10	"	"	"	Dug	24	1,945					Glacial clay			D	Hauls water ½ mile from a slough for stock.
15	SW.	12	"	"	"	Bored	100	1,920	- 15	1,905	100	1,820	Glacial sand	Hard, iron, "alkaline"		S	Sufficient for 50 head stock; 14-foot well used for drinking.
16	NW.	12	"	"	"	Bored	60	1,930	- 30	1,900	60	1,870	Glacial sand	Hard, iron, "alkaline"		S	Sufficient for 30 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of STANLEY NO.215, 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
17	NE.	12	23	8	2	Bored	70	1,925	- 20	1,905	70	1,855	Glacial drift	Hard,"alkaline"		S	Sufficient for 35 head stock; a 6-foot well used for drinking.
18	SW.	14	"	"	"	Dug	20	1,950	- 10	1,940	10	1,940	Glacial gravel	Hard		D, S	Poor supply; a 13-foot well yields a good supply for 28 head stock.
19	NW.	14	"	"	"	Bored	126	1,955	- 13	1,942	126	1,829	Glacial sand	Hard,"alkaline"		D, S	Good supply for 40 head stock; 16-foot well yields soft water.
20	NE.	16	"	"	"	Dug	15	1,960					Glacial drift				Dry hole.
21	SE.	18	"	"	"	Dug	14	1,950	- 10	1,940	10	1,940	Glacial sand	Hard		D, S	Sufficient for 20 head stock.
22	NW.	18	"	"	"	Bored	150	2,005	- 50	1,955	150	1,855	Glacial sand	Hard,"alkaline"		D, S	Good supply for 20 head stock.
23	NW.	19	"	"	"	Dug	8	2,000	- 6	1,994	6	1,994	Glacial sand	Soft,"alkaline"		D, S	Sufficient for 100 head stock.
24	SE.	20	"	"	"	Dug	16	1,980	- 6	1,974	6	1,974	Glacial gravel	Hard		D, S	Poor supply and insufficient; one other similar well.
25	NW.	21	"	"	"	Dug	12	1,985	- 4	1,981			Glacial gravel	Hard,"alkaline"		S	Intermittent supply.
26	SE.	22	"	"	"	Dug	12	1,960	- 7	1,953	7	1,953	Glacial sand	Soft		D, S	Sufficient for 45 head stock.
27	NE.	22	"	"	"	Bored	60	1,970	- 12	1,958			Glacial clay	Hard,"alkaline"		D	Intermittent supply.
28	SW.	24	"	"	"	Bored	99	1,940	- 10	1,930	99	1,841	Glacial sand	Hard,"alkaline"		S	Sufficient for 50 head stock; 8-foot well used for drinking.
29	SE.	24	"	"	"	Bored	83	1,930	+ 4	1,934	83	1,847	Glacial white sand	Hard,"alkaline"		S	Abundant supply for 22 head stock.
30	SE.	27	"	"	"	Dug	15	1,980	- 10	1,970	10	1,970	Glacial sand	Hard,"alkaline"		D	A similar well in the village of Fenwood. Sufficient supply.
31	SE.	28	"	"	"	Dug	14	1,985	- 10	1,975	10	1,975	Glacial gravel	Soft		D, S	Sufficient for 25 head stock.
32	NW.	28	"	"	"	Dug	12	2,005	- 10	1,995	10	1,995	Glacial fine sand	Hard		D, S	Sufficient for 30 head stock.
33	NE.	29	"	"	"	Dug	20	2,010	0	2,010			Glacial clay	Hard,"alkaline"		D, S	Insufficient for 12 head stock.
34	NW.	29	"	"	"	Dug	18	2,015	0	2,015	8	2,007	Glacial sand	Hard,"alkaline"		S	Intermittent supply; an 8-foot well used for house also intermittent well.
35	SE.	30	"	"	"	Dug	8	2,005	- 5	2,000	5	2,000	Glacail sand	Hard		D, S	Sufficient for 25 head stock.
36	SW.	31	"	"	"	Dug	12	2,025	- 2	2,023	2	2,023	Glacial sand	Hard,"alkaline"		D	Uses a small lake on the farm for stock.
37	SW.	32	"	"	"	Bored	100	2,020					Glacial drift				Dry hole.
38	SW.	33	"	"	"	Dug	10	2,000	- 5	1,995			Glacial clay	Hard,"alkaline"		D, S	Three similar intermittent wells; insufficient for 5 head stock.
39	NE.	34	"	"	"	Dug	20	1,990	- 10	1,980			Glacial clay	Hard		D, S	Intermittent supply; uses dugouts for additional water.
40	SE.	35	"	"	"	Dug	18	1,960	- 6	1,954			Glacial drift	Soft		D, S	
41	SW.	36	"	"	"	Dug	10	1,950	- 6	1,944	6	1,944	Glacial sand	Soft,"alkaline"		D, S	Sufficient for 25 head stock.
42	NE.	36	"	"	"	Dug	14	1,960	- 6	1,954	2	1,958	Glacial gravel	Soft		D, S	Sufficient for 20 head stock.
1	NW.	1	23	9	2	Dug	10	1,980	- 2	1,978	2	1,978	Glacial gravel	Soft		D, S	Sufficient for 25 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 STANLEY NO. 215, 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
2	SW.	2	23	9	2	Drilled	100	1,990	- 35	1,955			Glacial sand	Hard, "alkaline"		N	A 4-foot well in sand delivers insufficient water for 35 head stock.
3	SW.	3	"	"	"	Bored	25	2,000	- 11	1,989	11	1,989	Glacial sand	Hard		D, S	Sufficient for 20 head stock; 2 shallow wells yield good water also.
4	SE.	7	"	"	"	Dug	40	2,015					Glacial drift				Dry hole; hauls water for stock and house use.
5	NE.	7	"	"	"	Dug	14	2,020	- 2	2,018			Glacial drift	Hard, "alkaline"		D, S	Insufficient for 23 head stock.
6	NW.	8	"	"	"	Dug	20	2,020	- 14	2,006			Glacial sandy clay	Hard		D, S	Poor supply; five similar wells cannot water 18 head stock; uses slough one mile distant for stock.
7	SW.	10	"	"	"	Dug	16	2,010	- 11	1,999	5	2,005	Glacial sand	Soft		D	Intermittent supply.
8	NE.	10	"	"	"	Dug	16	2,010	- 11	1,999	11	1,999	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 26 head stock.
9	SW.	12	"	"	"	Dug	15	1,990	- 6	1,984			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply; 7-foot well yields soft water.
10	SE.	13	"	"	"	Dug	18	2,010					Glacial drift				Dry hole.
11	SE.	14	"	"	"	Dug	20	2,010	- 8	2,002			Glacial drift	Hard, "alkaline"		D, S	Intermittent and insufficient for 40 head stock.
12	NE.	15	"	"	"	Dug	22	2,025	- 18	2,007	18	2,007	Glacial sand	Soft		D, S	Insufficient for 20 head stock.
13	SE.	18	"	"	"	Dug	45	2,030	- 5	2,025	39	1,991	Glacial sand	Hard, "alkaline"		D	2 wells 12 feet deep in sand used for stock.
14	SE.	19	"	"	"	Dug	15	2,040					Glacial drift				Dry hole.
15	NW.	20	"	"	"	Dug	18	2,040	- 13	2,027			Glacial drift	Hard		D	
16	SW.	22	"	"	"	Dug	26	2,035	- 22	2,013	22	2,013	Glacial gravel	Soft		D, S	Sufficient for 40 head stock; another similar well used.
17	NE.	23	"	"	"	Dug	8	2,035					Glacial drift				Dry hole.
18	NW.	24	"	"	"	Dug	20	2,040	- 16	2,024			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
19	NE.	24	"	"	"	Dug	15	2,025	- 11	2,014			Glacial drift	Hard, "alkaline"		D	Intermittent supply; uses sloughs for stock in summer.
20	NW.	25	"	"	"	Dug	12	2,055					Glacial drift				Dry hole.
21	NE.	26	"	"	"	Dug	30	2,060	- 25	2,035			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply; uses sloughs in summer.
22	SE.	27	"	"	"	Dug	26	2,050	- 20	2,030			Glacial drift	Hard, "alkaline"		D	Sufficient for house use only.
23	SE.	28	"	"	"	Dug	21	2,055	- 17	2,038			Glacial drift	Hard		D, S	Sufficient for 60 head stock; one other similar well.
24	SW.	28	"	"	"	Dug	20	2,055	- 14	2,041			Glacial drift	Hard		D, S	Sufficient for 30 head stock.
25	NW.	28	"	"	"	Dug	10	2,060	- 7	2,053	7	2,053	Glacial sand	Hard, "alkaline"		D	A similar well used for horses and sloughs used for stock.
26	SW.	32	"	"	"	Dug	20	2,075	- 16	2,059	10	2,065	Glacial sand and gravel	Hard		D, S	Sufficient for 27 head stock.
27	NW.	32	"	"	"	Dug	24	2,080	- 18	2,062	4	2,076	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 30 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of STANLEY NO. 215, 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
28	NE.	32	23	9	2	Dug	25	2,075	- 18	2,057			Glacial drift	Hard, "alkaline"		S	Intermittent supply; one other similar well and sloughs used.
29	NE.	33	"	"	"	Dug	35	2,080	- 33	2,047	5	2,075	Glacial sand	Hard, "alkaline"		D	Also uses a 7-foot well in sand for stock.
30	SW.	34	"	"	"	Dug	8	2,065	- 6	2,059	6	2,059	Glacial gravel	Hard, "alkaline"		D, S	Insufficient for 6 head stock.
31	NE.	34	"	"	"	Dug	18	2,065	- 10	2,055	6	2,059	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 10 head stock.
32	SW.	35	"	"	"	Dug	7	2,050	- 5	2,045	5	2,045	Glacial gravel	Hard		D, S	Sufficient for 30 head stock.
1	SE.	2	24	7	2	Dug	12	1,890	- 1	1,889	1	1,889	Glacial sand	Hard		D, S	Intermittent supply.
2	NE.	2	"	"	"	Dug	13	1,905	- 1	1,904	1	1,904	Glacial gravel	Soft		D, S	Intermittent supply.
3	NW.	2	"	"	"	Dug	30	1,915	- 27	1,888			Glacial gravel	Hard, "alkaline"		D	A 10-foot well in gravel; supplies 16 head stock.
4	SE.	4	"	"	"	Dug	20	1,915	- 15	1,900	15	1,900	Glacial sand	Hard, "alkaline"		D	Insufficient for 28 head stock.
5	SW.	4	"	"	"	Dug	12	1,925	- 9	1,916	9	1,916	Glacial sand	Soft		D, S	Insufficient for 38 head stock.
6	NW.	5	"	"	"	Dug	20	1,955	- 17	1,938	14	1,941	Glacial sand	Hard		D, S	Sufficient for 42 head stock; one dry hole 80 feet deep.
7	SE.	6	"	"	"	Dug	14	1,950	0	1,950	13	1,937	Glacial gravel	Hard, "alkaline"		D, S	Insufficient for 15 head stock; 3 intermittent wells in clay.
8	NE.	6	"	"	"	Dug	17	1,955	- 7	1,948	14	1,941	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 7 head stock.
9	SW.	7	"	"	"	Bored	175	1,970					Glacial drift				Dry hole.
10	SW.	8	"	"	"	Dug	14	1,960	- 4	1,956			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply; an 8-foot well delivers highly mineralized water.
11	SE.	8	"	"	"	Dug	8	1,950	- 3	1,947	3	1,947	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 18 head stock.
12	NW.	9	"	"	"	Dug	8	1,935	- 12	1,923	12	1,923	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 15 head stock.
13	SW.	10	"	"	"	Dug	6	1,920	- 3	1,917	3	1,917	Glacial sand	Hard		D, S	Sufficient for 27 head stock.
14	SE.	10	"	"	"	Dug	15	1,920					Glacial drift				Dry hole.
15	SE.	11	"	"	"	Dug	25	1,905	- 13	1,892	13	1,892	Glacial gravel	Soft		D, S	Intermittent supply.
16	NE.	12	"	"	"	Dug	20	1,895	- 18	1,877	18	1,877	Glacial gravel	Hard		D, S	Insufficient for 20 head stock; 20-foot well yields water unfit for use.
17	SE.	14	"	"	"	Dug	30	1,910					Glacial drift				Dry hole; water is hauled a distance of one mile.
18	NW.	16	"	"	"	Dug	18	1,930	- 15	1,915	15	1,915	Glacial sand	Hard		D, S	Sufficient for 60 head stock.
19	SE.	17	"	"	"	Dug	6	1,935	- 2	1,933	2	1,933	Glacial sand	Soft		D, S	Sufficient for 11 head stock.
20	NE.	17	"	"	"	Dug	8	1,925	- 4	1,921	2	1,923	Glacial gravel	Soft		D, S	Oversufficient for 20 head stock.
21	NE.	18	"	"	"	Dug	4	1,940					Glacial drift				Dry hole; uses a small dam for 12 head stock and hauls drinking water.
22	SW.	18	"	"	"	Dug	14	1,960	- 3	1,957	3	1,957	Glacial gravel	Hard, "alkaline"		S	Sufficient for 25 head stock; 7-foot well used for drinking.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of STANLEY NO. 215, 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
23	SE.	19	24	7	2	Dug	12	1,945	- 6	1,939			Glacial drift	Soft, "alkaline"		D, S	Intermittent supply.
24	NW.	20	"	"	"	Dug	14	1,935					Glacial drift				Dry hole; 10-foot well in gravel will water 15 head stock.
25	SE.	22	"	"	"	Dug	22	1,920	- 12	1,908	12	1,908	Glacial sand	Hard, "alkaline"		S.	Sufficient for 60 head stock; 10-foot well yields soft drinking water.
26	NW.	23	"	"	"	Dug	12	1,915					Glacial drift				Dry hole; water is hauled a distance of 3½ miles.
27	SE.	24	"	"	"	Dug	17	1,880	- 13	1,867	16	1,864	Glacial sand	Hard, "alkaline"		D, S	Intermittent supply; uses a dugout for stock.
28	NE.	25	"	"	"	Dug	10	1,860	- 7	1,853	7	1,853	Glacial gravel	Hard		D, S	Sufficient for 15 head stock.
29	SW.	25	"	"	"	Dug	8	1,890	- 4	1,886	4	1,886	Glacial gravel	Soft		D, S	Sufficient for 50 head stock; one other similar well used.
30	NW.	25	"	"	"	Dug	10	1,885	- 6	1,879	6	1,879	Glacial gravel	Soft		D, S	Sufficient for 20 head stock.
31	NE.	26	"	"	"	Dug	12	1,890	- 2	1,888			Glacial drift	Hard, "alkaline"		N	Water is too highly mineralized for use.
32	NE.	28	"	"	"	Dug	10	1,930	- 2	1,928	2	1,928	Glacial gravel	Hard, "alkaline"		S	Sufficient for 25 head stock; 2 other 10-foot wells with intermittent supply.
33	SW.	28	"	"	"	Dug	16	1,930	- 2	1,928			Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 15 head stock.
34	NW.	28	"	"	"	Dug	16	1,935	0	1,935	4	1,931	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 54 head stock.
35	SW.	30	"	"	"	Dug	20	1,950					Glacial drift				Dry hole.
36	NW.	30	"	"	"	Dug	12	1,950	- 10	1,940	10	1,940	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 30 head stock; owns 2 intermittent wells dug in clay.
37	NW.	31	"	"	"	Dug	14	1,950	- 8	1,942	8	1,942	Glacial gravel	Hard, "alkaline"		D	A similar well used for watering 20 head stock.
38	NW.	32	"	"	"	Dug	10	1,945	- 6	1,939	6	1,939	Glacial sand	Soft		D, S	Intermittent supply.
39	NW.	34	"	"	"	Dug	10	1,920	- 7	1,913	7	1,913	Glacial gravel	Hard		D, S	Sufficient for 52 head stock; 2 wells 10 feet deep yield intermittent supply.
40	NE.	34	"	"	"	Dug	14	1,910	0	1,910	0	1,910	Glacial sand	Hard		D, S	Sufficient with the aid of an 8-foot well for 25 head stock.
41	NE.	35	"	"	"	Dug	13	1,885	- 8	1,877	8	1,877	Glacial gravel	Soft		D, S	Intermittent supply; another well 10 feet deep also used.
42	SW.	36	"	"	"	Dug	12	1,875	- 8	1,867	8	1,867	Glacial gravel	Hard, "alkaline"		D, S	Oversufficient for 17 head stock; another 12-foot well also used.
1	SW.	1	24	8	2	Dug	30	1,970					Glacial drift				Dry hole.
2	NE.	2	"	"	"	Dug	25	1,980	- 22	1,958	22	1,958	Glacial gravel	Hard, "alkaline"		D, S	Insufficient for 26 head stock; 2 additional wells 10 feet deep.
3	SW.	2	"	"	"	Dug	16	2,000	- 12	1,988	12	1,988	Glacial sand	Soft		D, S	Sufficient for 25 head stock; a 14-foot well also used for the house.
4	NW.	2	"	"	"	Dug	25	2,000					Glacial drift				Dry hole.
5	SW.	3	"	"	"	Dug	12	2,005	- 10	1,995	10	1,995	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 30 head stock; 30-foot well in clay is not used.
6	SE.	5	"	"	"	Dug	12	2,020	0	2,020			Glacial drift	Hard, "alkaline"		S	Intermittent supply; a 14-foot well in gravel yields soft water for drinking.
7	NE.	6	"	"	"	Dug	12	2,050	- 5	2,045			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of STANLEY NO. 215, 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
8	SW.	6	24	8	2	Dug	8	2,045	- 4	2,041	4	2,041	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 10 head stock.
9	NW.	6	"	"	"	Dug	9	2,040	- 5	2,035	5	2,035	Glacial gravel	Soft		D, S	Sufficient for 8 head stock.
10	NW.	7	"	"	"	Dug	12	2,055	- 8	2,047	10	2,045	Glacial gravel	Soft		D	Sufficient for house use; used sloughs for watering stock.
11	NE.	10	"	"	"	Dug	30	2,010					Glacial drift				Dry hole.
12	NW.	11	"	"	"	Dug	15	2,000					Glacial drift				Dry hole.
13	SE.	11	"	"	"	Dug	25	1,990					Glacial drift				Dry hole.
14	SW.	12	"	"	"	Dug	18	1,985	- 8	1,977	16	1,969	Glacial sand	Soft			One of two similar intermittent wells.
15	SE.	12	"	"	"	Bored	50	1,975	- 48	1,927	48	1,927	Glacial sand	Hard, "alkaline"		N	Water is too highly mineralized for use. haul water.
16	SE.	16	"	"	"	Dug	18	2,025	- 8	2,017	9	2,016	Glacial gravel	Hard, "alkaline"		D, S	Insufficient for 30 head stock.
17	NE.	16	"	"	"	Bored	28	2,035	- 25	2,010			Glacial gravel	Hard, "alkaline"		D	A slough is used for watering 33 head stock.
18	SW.	18	"	"	"	Dug	15	2,055	- 5	2,050			Glacial gravel	"Alkaline"		D	Water is difficult to locate. A 170-foot well yielded an abundant supply, but it became plugged by sand. Several dry test holes.
19	SW.	20	"	"	"	Dug	18	2,060					Glacial drift				Dry hole.
20	NW.	20	"	"	"	Dug	14	2,065	- 6	2,059			Glacial sand	Hard, "alkaline"			Insufficient for 25 head stock.
21	NW.	21	"	"	"	Dug	16	2,055	- 6	2,049	6	2,049	Glacial gravel	Soft		D, S	Insufficient for 20 head stock; another 12-foot intermittent well.
22	SE.	21	"	"	"	Dug	15	2,050	- 8	2,042	8	2,042	Glacial gravel	Soft		D, S	Intermittent supply.
23	SW.	22	"	"	"	Dug	10	2,030	- 10	2,020			Glacial drift	Hard, iron, "alkaline"		D, S	Sufficient for 20 head stock.
24	SE.	22	"	"	"	Dug	12	2,010	- 6	2,004	6	2,004	Glacial sand and gravel	Hard, iron		D, S	One of three intermittent wells.
25	NW.	23	"	"	"	Dug	20	2,000	- 8	1,992	3	1,997	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 20 head stock.
26	SW.	24	"	"	"	Dug	24	1,975	- 22	1,953	22	1,953	Glacial gravel	Hard, "alkaline"		N	Water is too highly mineralized for use.
27	NW.	24	"	"	"	Dug	11	1,975	- 5	1,970	3	1,972	Glacial gravel	Soft		D, S	Sufficient for 100 head stock.
28	NE.	24	"	"	"	Dug	9	1,970	- 5	1,965	5	1,965	Glacial sand	Hard		D	A 12-foot intermittent well is used for stock
29	SW.	26	"	"	"	Bored	100	2,000					Glacial drift				Dry hole; a 20-foot intermittent well and sloughs are used for 60 head stock.
30	SE.	28	"	"	"	Dug	32	2,050	- 12	2,038	24	2,026	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 60 head stock.
31	NW.	28	"	"	"	Dug	36	2,060	- 3	2,057			Glacial drift	Hard, "alkaline"		N	
32	SE.	30	"	"	"	Dug	14	2,075					Glacial drift				Dry hole.
33	NE.	30	"	"	"	Dug	12	2,090	- 4	2,086			Glacial gravelly clay	Soft		D, S	Insufficient for 18 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 STANLEY NO. 215, 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
34	NW.	30	24	8	2	Dug	12	2,095	- 7	2,088	9	2,086	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 25 head stock.
35	SW.	31	"	"	"	Dug	12	2,095	- 10	2,085	10	2,085	Glacial gravel	Hard, "alkaline"		D, S	Insufficient for 15 head stock.
36	SE.	31	"	"	"	Dug	15	2,105	- 13	2,092			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
37	SW.	32	"	"	"	Dug	15	2,095					Glacial drift				Dry hole.
38	NW.	32	"	"	"	Dug	16	2,090	- 10	2,080			Glacial drift	Hard, "alkaline"		D, S	A 6-foot well delivers soft water; sufficient supply.
39	SE.	32	"	"	"	Dug	16	2,075	- 3	2,072	10	2,065	Glacial sand	Hard, "alkaline"		D, S	Insufficient for 45 head stock; uses a dugout and another 22-foot well.
40	NE.	32	"	"	"	Dug	24	2,075	- 22	2,053			Glacial drift	Hard, "alkaline"		N	Intermittent supply.
41	SW.	34	"	"	"	Dug	35	2,040	- 5	2,035			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
42	NW.	34	"	"	"	Dug	21	2,040	- 18	2,022	18	2,022	Glacial sand	Hard		D, S	Sufficient for 16 head stock.
43	NE.	35	"	"	"	Dug	20	1,990	- 16	1,974	16	1,974	Glacial gravel	Soft		D, S	Sufficient for 25 head stock; one other similar well used.
44	SE.	36	"	"	"	Dug	15	1,950	- 12	1,938	14	1,936	Glacial sand	Hard, "alkaline"		D, S	Intermittent supply.
45	NE.	36	"	"	"	Dug	9	1,950	- 6	1,944	6	1,944	Glacial gravel	Hard		D, S	Sufficient for 40 head stock; uses a dugout for stock also.
1	SW.	1	24	9	2	Dug	20	2,055					Glacial drift	Soft		D	
2	SW.	2	"	"	"	Dug	18	2,070	- 9	2,061			Glacial drift	Hard		D	Sufficient for house use.
3	NW.	2	"	"	"	Dug	18	2,060					Glacial drift				Dry hole.
4	NE.	3	"	"	"	Dug	30	2,085	- 15	2,070	25	2,060	Glacial gravel	Hard, "alkaline"		D	Sufficient for house use; sloughs are used to water 20 head stock.
5	NE.	4	"	"	"	Dug	16	2,100	- 8	2,092			Glacial drift	Hard, "alkaline"		D, S	Insufficient for 32 head stock.
6	SW.	4	"	"	"	Dug	14	2,090	- 8	2,082			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply; a 14-foot well is used in winter for stock.
7	NW.	4	"	"	"	Dug	16	2,100	- 4	2,096			Glacial drift	Hard, "alkaline"		D	Intermittent supply.
8	NE.	6	"	"	"	Dug	18	2,090	0	2,090			Glacial drift	Soft		D	A 16-foot similar well is used for stock, as well as sloughs.
9	SW.	10	"	"	"	Dug	14	2,100	- 7	2,093	13	2,087	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 15 head stock; a 9-foot well yields soft water.
10	NW.	10	"	"	"	Dug	10	2,110	- 5	2,105	5	2,105	Glacial sand	Soft		D, S	Sufficient for 40 head stock; 1 dry hole made 20 feet deep.
11	SE.	10	"	"	"	Dug	8	2,100	- 4	2,096	4	2,096	Glacial gravel	Soft, "alkaline"		D, S	Sufficient for 18 head stock.
12	NE.	10	"	"	"	Dug	12	2,102	- 8	2,094	10	2,092	Glacial gravel	Hard, "alkaline"		D	Village well of Goodeve; sufficient supply.
13	SW.	12	"	"	"	Dug	14	2,060	- 3	2,057			Glacial sandy clay	"Alkaline"		D	Sufficient supply.
14	SW.	13	"	"	"	Dug	15	2,085	- 8	2,077	8	2,077	Glacial gravel	Soft		D, S	Insufficient for 12 head stock.
15	NE.	14	"	"	"	Dug	17	2,085	- 13	2,072	15	2,070	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 35 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of STANLEY NO.215, 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
16	SE.	15	24	9	2	Dug	18	2,105					Glacial drift				Dry hole.
17	NE.	16	"	"	"	Dug	20	2,130	0	2,130			Glacial drift	Hard, "alkaline"		D	Sloughs are used for watering 25 head stock.
18	NE.	19	"	"	"	Dug	25	2,150					Glacial drift				Dry hole.
19	SW.	22	"	"	"	Dug	10	2,130	- 4	2,126	4	2,126	Glacial sand	Soft		D, S	Sufficient for 10 head stock.
20	NW.	22	"	"	"	Dug	12	2,125	- 7	2,118	7	2,118	Glacial gravel	Soft		D, S	Sufficient for 30 head stock.
21	NE.	22	"	"	"	Bored	85	2,110					Glacial drift				Dry hole.
22	SW.	24	"	"	"	Dug	14	2,090	- 6	2,084	12	2,078	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 30 head stock; two 8-foot wells also used.
23	NW.	24	"	"	"	Dug	45	2,100	- 15	2,085	30	2,070	Glacial gravel	Hard, "alkaline"		D	An 8-foot well in gravel waters 40 head stock.
24	SE.	24	"	"	"	Dug	12	2,090					Glacial drift				Dry hole.
25	SE.	27	"	"	"	Dug	20	2,115	- 12	2,103			Glacial drift	Hard, "alkaline"		D	A 16-foot well waters 17 head stock; an 8-foot well also used.
26	SE.	28	"	"	"	Dug	12	2,125	0	2,125			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
27	NW.	28	"	"	"	Dug	8	2,140	- 5	2,135	6	2,136	Glacial gravel	Soft		D, S	Insufficient for 15 head stock;
28	NW.	29	"	"	"	Dug	30	2,140	- 10	2,130			Glacial drift	Hard, "alkaline"		D, S	One of three intermittent wells.
29	NE.	30	"	"	"	Dug	14	2,150	- 4	2,146	12	2,138	Glacial gravel	Hard, "alkaline"		D, S	Insufficient for 30 head stock.
30	SW.	30	"	"	"	Dug	14	2,150	- 10	2,140			Glacial sand and gravel	Hard, "alkaline"		S.	Sufficient supply for stock; laxative effect on man.
31	NE.	31	"	"	"	Dug	13	2,160	- 11	2,149	11	2,149	Glacial gravel	Hard, "alkaline"		D, S	Intermittent supply; water is hauled 1½ miles.
32	SW.	32	"	"	"	Dug	22	2,155	- 17	2,138	17	2,138	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 20 head stock.
33	NW.	32	"	"	"	Dug	10	2,160	- 4	2,156			Glacial drift	Hard, "alkaline"		D	Sufficient for house use.
34	NW.	33	"	"	"	Dug	10	2,150	- 4	2,146	4	2,146	Glacial gravel	Soft		D, S	Sufficient for 16 head stock.
35	SW.	34	"	"	"	Dug	16	2,120	- 6	2,114			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
36	NE.	34	"	"	"	Dug	22	2,120	0	2,120	20	2,100	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 32 head stock. Two additional wells 8 and 16 feet deep; also in use.
37	SW.	36	"	"	"	Bored	60	2,110					Glacial drift				Dry hole.
38	NW.	36	"	"	"	Dug	10	2,115	- 1	2,114			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.

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(#) Sample taken for analysis.