CANADA

DEPARTMENT OF MINES

AND

TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

WATER SUPPLY PAPER No. 11

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF SOURIS VALLEY NO. 7 SASKATCHEWAN

By

B. R. MacKay, & H. N. Hainstock

OTTAWA
1936

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BUREAU OF ECONOMIC GEOLOGY

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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 purposes and the smaller supplies of ground water required for domestic and stock-raising purposes by settlers, villages, and Indian reserves. The drought conditions resulted in repeated crop failures, and in a large number of farms in the acute drought areas of Saskatchewan and Alberta being abandoned. In an effort to relieve the serious situation a number of special studies of the water problem were begun by both Federal and Provincial Governments and allied organizations. The Federal Department of Agriculture undertook among other phases of the drought problem an investigation into the existing supplies of surface water, their conservation by means of dams and dug-outs, and how they could be made more generally available for irrigation. The Geological Survey of the Federal Department of Mines began an extensive study of the underground water conditions of southern Saskatchewan, this water being used principally for domestic and stock-raising purposes. For many years past the water problems in this and other provinces of Canada have engaged the attention of the Geological Survey, and considerable information had already been collected. A number of short reports dealing with the ground water conditions of special areas in Manitoba, Saskatchewan and Alberta have been published by both the Federal and Provincial Geological Surveys, but no systematic study of the ground water resources has been made up to the present.

Field Work

The senior author was in charge of this investigation and was instructed to cover as much of the territory as possible in the season. To effect this it was decided to maintain an

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 given 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 age.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Cypress Hills Formation. The name given to a series of conglomerates and sand beds which occur in the southwest corner of Saskatchewan, and rests 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 Souris valley is an area of 324 square miles in southeastern Saskatchewan. It consists of nine township blocks, described as townships 1, 2, and 3, ranges 13, 14, and 15. The centre of the municipality lies 36 miles due south of Weyburn. The topographic relief of this municipality varies greatly. The northeastern half is quite flat, but to the south of Long creek the land rises abruptly to an elevation of slightly more than 2,300 feet. This highland area, which roughly parallels Long creek, is known as the Missouri coteau. It is formed by a bedrock escarpment upon which a thick accumulation of glacial drift (terminal moraine) has been deposited. The northeastern half of the area is mantled by glacial till or boulder clay, in which a few small patches of outwash gravels occur.

Water-bearing Horizons of the Unconsolidated Deposits

The thickness of the glacial drift varies throughout the municipality. On Missouri coteau it is from 60 to 300 feet thick, with an average thickness of 250 feet. The minimum thickness occurs along the northwestern edge of township 3, range 15, and in township 2, range 13, where there is an abrupt rise in the bedrock. In the flat section in the northeast of the municipality, the drift is from 25 to 175 feet in thickness. Coal outcrops in some of the draws along Long creek in township 3, range 15.

Throughout the greater part of the municipality the upper 30 feet of the drift is composed of yellow clay which contains pockets of sand and gravel. This zone is underlain by a fine textured, blue clay. In the northeastern half of the municipality the upper part of the blue clay contains a considerable amount of sand and gravel in the form of pockets and layers, but in the terminal moraine or highland area, these sandy deposits are almost entirely absent. At various locations throughout the

southern two-thirds of the municipality, deposits of sand and gravel occur immediately below the blue clay. These deposits were laid down in depressions in the bedrock land surface.

Three water-bearing horizons occur in the mantle of glacial drift. The uppermost is formed by the pockets of sand and gravel that occur within the upper 30 feet of the drift. Where this horizon comes to the surface along the base of the coteau, and along Long creek and its tributaries, springs are common. They provide an abundant supply of water that can be used for both domestic and stock requirements. The shallow wells that tap this horizon, however, are dependent for their water supply upon the amount of yearly precipitation. During the drought period many of them went dry, and in 1935 the supply of water from the average individual well was sufficient only for household use and 10 to 15 head of stock. The water from this horizon is hard and often "alkaline" in character. It is used for stock and unless the "alkali" salts content is very high, it is usable for domestic purposes.

The pockets and layers of sand that occur within the upper part of the blue clay form a second water-bearing horizon. This horizon is encountered over most of the area covered by glacial till at depths of 40 to 70 feet. The wells that tap this horizon yield sufficient water for 30 to 70 head of stock, and they are only slightly effected by drought conditions. The water is invariably hard and "alkaline" in character, the "alkaline" content apparently being derived from the blue clay. In many instances it is too "alkaline" for house use.

The deposits of sand and gravel that underlie the blue clay form a third water-bearing horizon. This horizon is encountered in the southern six township blocks, but it is not continuous as the deposits that form it occur in depressions and old stream channels in the pre-glacial land-surface. It is encountered at depths of

90 to 240 feet, and the individual wells that tap it produce an abundant supply of hard water. The water contains a fairly large amount of iron and in many cases is "alkaline" in character. It is satisfactory for stock use, but if its mineral salt content is high it is not desirable for household purposes. The wells are non-flowing artesian in character, the water being under pressure and rising to within 4 to 160 feet of the surface.

Water-bearing Horizons in the Bedrock

The Ravenscrag formation underlies the glacial drift throughout the township. It is composed of a series of shale, soft sandstone, and sandy shale beds and it contains one or more small seams of lignite coal. One of these coal seams outcrops along the banks of a tributary stream of Long creek in township 3, range 15. The total thickness of this formation is not known, but it is at least 300 feet in the southern part of the municipality, and becomes much thinner in the northern part.

The sandstone, sandy shale, and coal seams form water-bearing horizons. Four horizons have been noted to occur in this formation. The uppermost horizon is encountered at depths of 60 to 80 feet. This horizon is not continuous and apparently occurs in the highlands of the old bedrock land surface. It is formed by a lignite coal seam and its associated sandy beds. The water is medium soft in character, of moderate quantity, and can be used for both stock and domestic purposes. A second horizon is encountered in township 1, range 15; township 2, range 15; and in township 3, ranges 13 and 14. It is formed by sandy shale and sandstone beds, and occurs at depths of 150 to 225 feet. The water is medium hard in character, abundant in quantity, and rises to within 20 to 100 feet of the surface. A sandy bed forms a third horizon at depths of 300 to 350 feet. This horizon appears to be fairly continuous throughout the municipality. It

yields an abundant supply of soft water that has a high soda content. It is used for both domestic and stock requirements. The water is under pressure and rises to within 20 to 70 feet of the surface. The lowest horizon that was noted occurs at a depth of 400 to 475 feet. It is formed by a sandy bed and it appears to be fairly continuous throughout the municipality. The wells that have tapped this horizon are deriving from it an abundant supply of soft, salty water, which is satisfactory for stock use, but too salty for household purposes.

GROUND WATER SUPPLY BY TOWNSHIPS

Township 1, Range 13

The glacial drift of this township contains three water-bearing horizons. The pockets of sand and gravel that occur within the upper 25 feet of the drift form the uppermost horizon. In years of normal rainfall the wells that tap these pockets yield a supply of hard, usable water that is sufficient for 15 to 35 head of stock, and in drought periods the yield from many of them proved to be adequate for farm needs. The pockets of sand and gravel are more numerous in the terminal moraine deposit that occurs in the southwestern part of the township than in the unmodified ground moraine or till that is found in the northeastern half. Several dry holes are usually dug before a pocket is located. The second aquifer is formed by pockets of fine sand that occur within the blue clay at depths of 60 to 80 feet. This horizon is not continuous and its location is only known where it is tapped by wells. The water from this horizon is under slight pressure and rises to within 30 feet of the surface in the majority of the wells. It is hard and "alkaline" in character, but in most cases it can be used for domestic purposes, although it is not usually desirable. The third horizon is formed by the deposits of sand and gravel that immediately underlie the blue clay. This horizon is encountered

by a number of wells at depths of 100 to 200 feet. The deposits of sand that form this horizon have apparently been laid down in depressions in the pre-glacial bedrock land surface, and thus the horizon occurs at various elevations and is discontinuous. This horizon appears to occur at slightly shallower depths in the terminal moraine country than in that part covered by unmodified till. The water that is being obtained by individual wells from this aquifer is sufficient for 10 to 50 head of stock. It is hard and in many cases slightly "alkaline" in character, and it is under sufficient pressure to rise to within 25 to 60 feet of the surface. Should this horizon be encountered by other wells, they will doubtless yield a supply of water that is sufficient for local needs.

Only two wells have been drilled into the Ravenscrag formation and both are yielding an abundant supply of water. In one of these, located in the SE.$\frac{1}{4}$, section 9, the water is hard and rises to within 70 feet of the surface and is derived from a sand bed at a depth of 300 feet. In the second, located in the NE.$\frac{1}{4}$, section 14, the water is soft and rises to within 15 feet of the surface. It is derived from a sand bed encountered at a depth of 487 feet. The lateral extent of these aquifers is unknown but they will probably be found to exist elsewhere in the township.

Township 1, Range 14

Ground water from the glacial drift of this township is derived from two horizons. The uppermost horizon is formed by pockets of sand and gravel that occur within the upper 20 feet of the drift. In years of normal and abundant rainfall the individual wells that tap these pockets provide a supply of water that is sufficient for 10 to 30 head of stock. In drought years, however, their supply is inadequate for farm needs. Unless deep wells are drilled, the only method of deriving a fairly abundant supply of

water is by the construction of dugouts or by damming some of the coulées and retaining the spring run-off water.

The second horizon in the drift is formed by the deposits of sand and gravel that underlie the blue clay. This horizon is encountered at depths of 190 and 240 feet by two wells located in the SE.$\frac{1}{4}$, section 18, and the SW.$\frac{1}{4}$, section 30. The water is hard to medium soft in character and abundant in quantity. The hydrostatic pressure is sufficient to cause the water to rise to within 4 feet of the surface in section 18, and 160 feet of the surface in section 30. The areal extent of this horizon is not known but it will doubtless occur at other localities throughout the township.

Practically no information was obtained on the water-bearing horizons of the Ravenscrag formation. A well located in the NW.$\frac{1}{4}$, section 30, is thought to be obtaining its supply of water from a horizon in these sediments. This horizon is formed by a sand bed that occurs at a depth of 350 feet. It yields an abundant supply of soft, usable water that is under pressure and rises to within 150 feet of the surface. The writer is of the opinion, however, that adequate supplies of usable water can be obtained from the Ravenscrag sediments at depths of 350 to 500 feet.

Township 1, Range 15

The glacial drift that covers this township is in the form of a terminal moraine. The upper 30 feet of this drift covering contains a considerable amount of sand and gravel which is either in the form of pockets or fairly extensive outwash layers. These sand and gravel deposits form a water-bearing horizon and it is the source of water for all of the shallow wells in the township. Several dry holes are usually dug before a pocket is located. The supply of water that is derived from this horizon is not abundant and in 1935 the average individual well yielded

a supply that was sufficient for only 10 to 15 head of stock. A few wells, however, gave an abundant supply, whereas others produced only enought for household requirements. During the drought years of 1931 to 1934 the water supply from the shallow wells was inadequate for local needs, but in years of normal rainfall the supply is usually sufficient for local requirements. The water from this horizon is hard and usually not very high in sulphates, and it is usable for both humans and stock.

A well located in the SW.$\frac{1}{4}$, section 32, is deriving an abundant supply of hard, usable water from sand deposits that underlie the blue clay at a depth of 240 feet. The water is under pressure and rises to within 190 feet of the surface. The extent of this aquifer is not known, but it should be encountered at other localities throughout the township.

Only one well has been drilled into the Ravenscrag formation. It is located in the NE.$\frac{1}{4}$, section 12, and its water-bearing horizon is a sandstone bed that occurs at a depth of 415 feet. The water is hard in character, abundant in quantity, and rises to within 80 feet of the surface. The writer is of the opinion that similar supplies of water can be obtained throughout the township at depths of 350 to 500 feet.

Township 2, Range 13

Ground water is derived from three horizons in the glacial drift in this township. The uppermost horizon occurs at a depth of 10 to 30 feet and it is formed by pockets of sand and gravel. The supply of water from this horizon is small, and the wells that tap it produce sufficient water for only 10 to 25 head of stock. The water is hard in character, and is "alkaline" in many instances. It is used for stock and unless the sulphate content is too high it can also be used for domestic purposes. Long creek, and the springs that occur along its banks, are used by many farmers for stock. In drought years the majority of the

shallow wells do not yield a supply of water that is sufficient for local needs.

Along the northern boundary of the township a number of wells are obtaining water from pockets of sand that occur at a depth of approximately 60 feet. This horizon has not been encountered elsewhere in the municipality. The water is sufficient for 30 head of stock and it is hard and "alkaline" in character. Similar sand pockets may be found at other localities throughout the township. The third horizon is formed by the sand and gravel that lies below the blue clay. It is encountered by two wells located in the SE.$\frac{1}{4}$, section 5, and SE.$\frac{1}{4}$, section 9, at depths of 120 and 108 feet, respectively. The water is sufficient for 25 to 70 head of stock. It is hard and "alkaline" in character, and cannot be used for domestic purposes. The hydrostatic pressure is sufficient to cause the water to rise to within 40 feet of the surface. The areal distribution of this horizon is unknown, but it should occur elsewhere in the municipality.

Very little is known of the water horizons of the Ravenscrag formation. Only two wells have been drilled into it and these are located on the highland of the Missouri coteau or escarpment, in sections 6 and 8. At these localities a coal seam occurring at a depth of 62 and 84 feet forms a water-bearing horizon. It is only of small extent and is confined to the areas mentioned above. The water derived from this horizon is soft, and is of a brown colour. It is abundant in quantity, usabl for both humans and stock, and rises to within 40 feet of the surface. On the lowlands an abundant supply of water should be obtained from the Ravenscrag formation at depths of 250 to 400 feet.

Township 2, Range 14

The shallow wells that tap the pockets of sand and gravel that occur within the upper 20 to 60 feet of the drift in this township obtain a varying supply of water. In the southern part

of the township, where Missouri coteau occurs, it is difficult to obtain a supply that is sufficient for local needs, and many farmers who have not deep wells are forced to haul water for stock use. Along the edge of the coteau, and on the flat region to the north of it, the majority of the shallow wells yield a fairly abundant supply of water. In the northwestern corner of the township the wells that tap the sand pockets are deeper than those located elsewhere in the municipality, and they average from 35 to 50 feet in depth. Springs are common along the edge of the coteau and along Long creek and its tributaries, and they are used by many farmers. The water that is obtained from the shallow wells is hard, and in the majority of instances "alkaline" in character, but unless the "alkaline" content is very high it can be used for domestic purposes.

The deposits of sand and gravel that occur at the base of the blue clay constitute a second water-bearing horizon. Three wells are definitely obtaining their supply of hard, alkaline water from this horizon. They are located in the SE.$\frac{1}{4}$, section 8, SW.$\frac{1}{4}$, section 17, and the NW.$\frac{1}{4}$, section 23, and are 110, 106, and 90 feet in depth, respectively. The water from these wells is abundant in quantity, but its high "alkali" salt content may render it unfit for domestic use. It is under pressure and rises to within 60 to 90 feet of the surface. Four other wells located in the SE.$\frac{1}{4}$, and NW.$\frac{1}{4}$, section 5, NW.$\frac{1}{4}$, section 8, and the SW.$\frac{1}{4}$, section 18, may also be obtaining their water from this horizon. They are much deeper, however, being 225, 240, 225, and 210 feet in depth, and it is possible that the horizon they have tapped occurs in the upper part of the Ravenscrag formation. The water is fairly abundant in quantity, hard and not very high in sulphates. and rises to within 80 to 100 feet of the surface. These horizons should be encountered elsewhere in the township.

Two wells located in the SW.¼, section 6, and the NW.¼, section 22, are obtaining their water from the Ravenscrag formation. In section 6, the water-bearing horizon is a sandy bed and it is encountered at a depth of 317 feet. The water is medium hard in quality, abundant in quantity, and rises to within 75 feet of the surface. In section 22 the horizon is also a sand bed and it occurs at a depth of 180 feet. The water is soft and rises to within 30 feet of the surface. As there is a difference of 200 feet in surface elevation between the two well sites, it is possible that the two wells are drawing from the same horizon. The writer is of the opinion that an abundant supply of usable water can be obtained from the Ravenscrag formation at depths of 300 to 450 feet on the uplands, and at shallower depths on the lowlands to the north of the coteau.

Township 2, Range 15

Ground water can be obtained from two horizons in the glacial drift that mantles this township. The pockets of sand and gravel that occur within the upper 20 feet of the drift constitute the uppermost horizon. This horizon is not continuous as the pockets that form it are scattered, and many holes are dug into the clay without obtaining any water. Those wells that tap this horizon produce enough water for only 10 to 15 head of stock, and many farmers who have not deep wells are forced to haul water for stock requirements. At the edge of the moraine or Missouri coteau, in the northeastern corner of the township, springs are common and they yield an abundant supply of hard water. Only small seepages of "alkaline" water are derived from the blue clay.

The second water-bearing horizon is formed by the deposits of sand and gravel that immediately underlie the blue clay. This horizon is tapped by five wells located in sections 5, 6, 8, 10, and 24, at a depth of approximately 220 feet, and it yields a fairly abundant supply of hard water. The water from

one of the wells is too "alkaline" for house use. The hydrostatic pressure is sufficient to cause the water to rise to within 130 to 180 feet of the surface. This horizon will doubtless occur at other localities in the township.

Five wells have been drilled into the Ravenscrag formation and four are producing an abundant supply of water. The water-bearing horizons are formed by sandy beds which occur at depths of from 195 to 470 feet, the average depth being 350 feet. The water is medium hard to soft in character, and rises to within 19 to 100 feet of the surface. It is used for both stock and domestic purposes. Little trouble should be experienced in obtaining supplies of water from the Ravenscrag formation at depths of from 300 to 500 feet.

Township 3, Range 13

A small supply of water is derived from the sand pockets in the upper 20 feet of the drift. The wells that tap these pockets are dependant upon the amount of rainfall for their supply, and in drought years they are practically dry. In years of normal rainfall, however, their supply is sufficient for 10 to 20 head of stock. The water is hard and slightly "alkaline" in character. An adequate supply of water is not to be expected from the upper 20 feet of the drift.

Throughout the greater part of the township a fairly abundant supply of water is being obtained from pockets or layers of sand, that lie within the blue clay at depths of 50 to 80 feet. The wells that tap this horizon are but little affected by rainfall and even during the drought years of 1930 to 1935 they produced a supply of water that was sufficient for 30 head of stock. The water is hard, and is usually too "alkaline" for household use. It is under slight pressure and rises 20 feet or more above the top of the horizon.

In the eastern half of the township a number of wells have been drilled into the Ravenscrag formation, and three water-bearing horizons are noted to occur. The uppermost horizon is a sandy bed that underlies a coal seam. It is encountered by two wells located in the SE.¼, section 34, and the NE.¼, section 36, at depths of 225 and 170 feet, respectively. The water is abundant in quantity, soft in character, and rises to within 30 feet of the surface. It can be used for both stock and domestic purposes. The second horizon is also a sandy bed and it has been tapped by two wells. They are located in the NE.¼, section 24, and the SE.¼, section 25, and are 280 and 312 feet in depth. The water from this horizon is soft and slightly salty but it can be used for domestic purposes. It is abundant in quantity and rises to within 60 feet of the surface. The lowermost horizon that is tapped occurs at a depth of 400 to 450 feet. It is also a sandy bed, and it is penetrated by three wells located in the NE.¼, section 3, NW.¼, section 22, and NW.¼, section 26. These wells are producing an abundant supply of soft, salty water. It is used for stock but it is too salty for domestic purposes.

These horizons will doubtless occur throughout the township, and an abundant supply of water can be obtained from them should they be tapped by other wells. The water will be suitable for stock use, but may prove to be too salty for domestic purposes.

Township 3, Range 14

The ground water supply from the glacial drift of this township is derived from the upper 60 feet of the drift. The water-bearing horizons are formed by the pockets of sand and gravel that occur within the yellow clay, or within the upper 30 feet of the drift, and by the pockets and layers of sand within the upper part of the blue clay, or at depths of approximately 60 feet. The wells that tap the pockets within the yellow clay

are dependant upon rainfall or seepage from Long creek for their supply, and in drought years they do not yield an adequate supply for farm needs. In years of normal rainfall, however, the individual wells produce sufficient water for 10 to 20 head of stock. The water is hard and usually not very high in sulphates. The wells that tap the pockets within the blue clay are not easily affected by drought, and they yield a fairly abundant supply of water even during drought periods. The water is hard and "alkaline" in character and in many cases it cannot be used for domestic purposes. This horizon appears to be fairly general throughout the township, and if it is encountered by other wells, a fairly abundant supply of water can be expected. A few springs occur along Long creek and they yield an abundant supply of water.

Two wells are deriving an abundant supply of water from the Ravenscrag formation. In the SE.$\frac{1}{4}$, section 33, a well has tapped a shale bed at a depth of 127 feet, and it is producing a very large supply of soft, salty water. The water is too salty for domestic purposes, but is satisfactory for stock use. At the same location, a second well is deriving its water from a sandy bed which underlies a coal seam at a depth of 220 feet. This water is soft in character and can be used for both stock and domestic purposes. The writer is of the opinion that throughout the township an abundant supply of water can be obtained from the Ravenscrag formation at depths of 200 to 400 feet.

Township 3, Range 15

The ground water supply from the glacial drift in this township is very small. Springs are common along Long creek and its tributaries and they yield an abundant supply of hard, usable water. The majority of the shallow wells that are dug into the small sand pockets provide only enough water for household purposes and a few head of stock. No wells have been drilled into the bedrock, but a well dug 25 feet is obtaining a

small supply of "alkaline" water from a coal seam in section 35. The writer is of the opinion that if wells were drilled to a depth of 200 feet or more a fairly abundant supply of water would be obtained from the Ravenscrag formation. Unless deep wells are drilled, the only method of deriving a fairly abundant supply of water is by the excavation of large dugouts or by damming some of the draws and ravines, and thus retaining the run-off waters.

STATISTICAL SUMMARY OF WELL INFORMATION IN RURAL MUNICIPALITY OF SOURIS VALLEY, NO.7, SASKATCHEWAN

West of 2nd mer.	Township	1	1	1	2	2	2	3	3	3	Total No. in Municipality
	Range	13	14	15	13	14	15	13	14	15	
Total No. of Wells in Township		111	36	122	50	75	53	46	47	54	594
No. of wells in bedrock		1	2	2	2	4	6	11	5	1	35
No. of wells in glacial drift		110	34	120	47	71	47	35	42	53	559
No. of wells in alluvium					1						1
Permanency of Water Supply											
No. with permanent supply		48	19	48	40	44	28	32	35	34	328
No. with intermittent supply		1	1	7				1		2	12
No. dry holes		62	16	67	10	31	25	13	12	18	254
Types of Wells											
No. of flowing artesian wells											
No. of non-flowing artesian wells		5	3	2	3	8	10	10	5		46
No. of non-artesian wells		44	17	53	37	36	18	23	30	36	294
Quality of Water											
No. with hard water		48	18	55	38	43	26	23	30	35	316
No. with soft water		1	2		2	1	2	10	5	1	24
No. with salty water								6	1	1	8
No. with alkaline water		16	1	5	12	6	7	13	14	12	86
Depths of Wells											
No. from 0 to 50 feet deep		85	33	112	40	62	39	27	38	53	489
No. from 51 to 100 feet deep		18		7	8	3	3	11	6	1	57
No. from 101 to 150 feet deep		2		1	2	1	1		1		8
No. from 151 to 200 feet deep		3	2			2	2	1			10
No. from 201 to 500 feet deep		3	1	2		7	8	7	2		30
No. from 501 to 1,000 feet deep											
No. over 1,000 feet deep											
How the Water is used											
No. usable for domestic purposes		43	20	53	31	42	22	26	28	29	294
No. not usable for domestic purposes		6		2	9	2	6	7	7	7	46
No. usable for stock		49	20	55	39	44	27	33	35	36	338
No. not usable for stock					1		1				2
Sufficiency of Water Supply											
No. sufficient for domestic needs		49	20	55	40	44	28	33	35	36	340
No. insufficient for domestic needs											
No. sufficient for stock needs		39	13	23	28	30	20	29	25	18	225
No. insufficient for stock needs		10	7	32	12	14	8	4	10	18	115

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 boilders 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 hardness to the sulphates and chlorides of calcium and magnesium. The permanent hardness

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

Analyses of Water Samples from the Municipality of Souris Valley, No. 7, Saskatchewan

LOCATION						Depth of Well, Ft.	Total dis'vd Solids	Cl.	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.				Total	Perm.	Temp.	Alkalinity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl		
1.	SW.	6	2	14	2	337	1,580	23	600	550	50	615	80	97	640	576	1,576	143		203		244	948	38		x 2
2.	NW.	22	2	14	2	200	1,440	231	15	not	det.	860	10	7	78	763	1,402	18		15		873	115	381		x 2
3.	NE.	6	2	15	2	210	1,020	12	700	500	200	600	140	83	340	318	1,099	251		174		151	503	20		x 1
4.	SE.	12	2	15	2	194	1,088												(4)		(5)	(2)	(1)	(3)		x 2
5.	NE.	30	2	15	2	24	686											(2)	(5)		(4)		(1)	(3)		x 1
6.	NE.	34	2	15	2	6	1,120	10	750	750		365	70	97	484	309	1,032	125		203			687	17		x 1

Water samples indicated thus, x 1, are from glacial drift.
Water samples indicated thus, x 2, are from bedrock, Ravenscrag formation.
Analyses are reported in parts per million; where numbers (1), (2), (3), (4), and (5), are used instead of parts per million, they represent the relative amounts in which the five main constituents are present in the water.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).

Analyses Nos. 4, and 5, by Provincial Analyst, Regina.
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

The waters from the glacial drift in this municipality vary greatly in quality. In general, they contain much the same mineral salts in solution, but the amounts of the individual salts differ. In the municipality of Souris Valley, the waters from the glacial drift are usually suitable for drinking as well as for stock use, so far as the mineral salt content is concerned but in a few cases their mineral salt content is so high thay they are unfit for drinking.

Three samples of water from the glacial drift of this municipality were analysed, and their results are listed in the accompanying table. These samples were taken from wells that are 6, 24, and 210 feet in depth respectively. This content of salts in solution is relatively low, many of the waters from the glacial drift of the Prairie Provinces having over 2,000 parts per million. Sodium sulphate (Glauber's salt) is the most abundant mineral salt present in both the samples from shallow depth. Magnesium sulphate (Epsom salts) is practically lacking but calcium carbonate, magnesium carbonate, sodium chloride, and calcium sulphate occur, their comparative quantity decreasing in the order given. The waters analysed are very hard, but suitable for drinking.

The water that was obtained from a depth of 210 feet has a total dissolved solid content of 1,020 parts per million. It is excessively hard having a hardness of 700 parts per million. Sodium sulphate is also the most abundant mineral salt present in solution. This water is suitable for drinking and for stock. As the water contains 151 parts per million of sodium carbonate (black alkali) its continued use for irrigation purposes, unless the soil is well drained, may prove injurious to vegetation.

Water from the Bedrock

Three samples of water from the Ravenscrag formation were analysed. Their total dissolved solid content ranges from 1,088 to 1,580 parts per million. In sample No. 1, sodium sulphate is predominant and the calcium and magnesium salts are in sufficient

quantity to impart considerable hardness to the water. In sample No. 2, sodium carbonate is predominant, the calcium and magnesium salts content is very low and therefore the water is soft. Sodium sulphate and sodium carbonate are the two most abundant salts present in solution. The waters are usable for drinking and for stock. The high sodium salt content may give them a "soda" taste, and it may darken vegetables that are cooked in it. The water represented by sample No. 2, is preferable to that represented by sample No. 1, as sodium carbonate is less injurious than is sodium sulphate. Because of the fairly high salt content and expecially the sodium carbonate content the waters are not suitable for irrigation.

WELL RECORDS—Rural Municipality of SOURIS VALLEY NO. 7

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	1	13	1	Dug	20	2,175	- 4	2,171	13	2,162	Glacial gravel	Hard,clear	48	D. S.	Waters 30 head stock.
2	NE.	2	"	"	"	Drilled	120	2,165	- 64	2,101	100	2,065	Sand below blue clay	" "	44	D,S	" 25 " " .
3	SW.	4	"	"	"	Dug	21	2,190					Glacial	" "	44	D,S	Watered 16 head stock until 1934.
4	NE.	4	"	"	"	Spring		2,190					Glacial gravel	" "		S,	Waters 31 head stock.
5	NW.	4	"	"	"	Dug	14	2,230	- 4	2,226	12	2,218	" "	alkaline Hard,clear, alkaline	44	D. S.	" 16 " " .
6	NW.	7	"	"	"	"	14	2,290	- 10	2,280	10	2,280	" "	Hard,clear,	44	D, S	" 10 " " .
7	NW.	9	"	"	"	"	14	2,235	- 9	2,226	12	2,223	" sand	" "		D, S	" 23 " " .
8	NE.	9	"	"	"	Drilled	300	2,288	- 70	2,218	300	1,988	Ravenscrag sand	" soda clear	46	D, S	Sufficient supply.
9	SE.	10	"	"	"	Dug	11	2,215	- 4	2,211	7	2,208	Glacial,sand	Hard,clear	46	D, S	Waters 11 head stock.
10	NW.	10	"	"	"	Drilled	101	2,260	- 2	2,258	100	2,160	Sand below blue clay	Hard,clear, alkaline	46	D, S	" 42 " " .
11	SE.	12	"	"	"	Spring	1	2,100	- 0	2,100	1	2,099	Glacial gravel	Hard,clear	48	D, S	Abundant supply.
12	SW.	12	"	"	"	Bored	60	2,172	- 30	2,142	60	2,112	" sand	" iron alkaline	46	D, S	Waters 24 head stock.
13	NE.	12	"	"	"	Dug	2	2,111	- 1	2,110	2	2,109	" clay	Hard,clear	82	S,	Waters 6 head stock.
14	SE.	14	"	"	"	Bored	36	2,200	- 27	2,173	27	2,173	" gravel	" "		D, S	" 14 " " .
15	NE.	14	"	"	"	Drilled	487	2,090	- 15	2,075	480	1,610	Ravenscrag sand	Soft,sulphur	46	D, S	Abundant supply.
16	NW.	15	"	"	"	Dug	14	2,200	- 8	2,192	14	2,186	Glacial gravel	Hard,clear, alkaline	43	D, S	Waters 4 head stock.
17	NW.	16	"	"	"	Bored	89	2,250	- 15	2,235	45	2,205	" "	Hard,clear, alkaline	43	D, S	" 4 " " .
18	SE.	17	"	"	"	"	64	2,245	- 25	2,220	64	2,181	" sand	Hard,clear, alkaline		D, S	" 20 " " .
19	SE.	18	"	"	"	Drilled	114	2,250	- 60	2,190	100	2,150	Gravel below blue clay	Hard,clear	47	D, S	" 10 " " .
20	SW.	19	"	"	"	Dug	6	2,200	- 2	2,198	6	2,194	Glacial yellow clay	" "	44	D, S	" 100 " " . Springsflows into well.
21	SE.	20	"	"	"	"	22	2,200	- 10	2,190	22	2,178	Glacial sand	" "	43	D, S	" 35 " " .
22	NW.	20	"	"	"	"	14	2,190	- 2	2,188	14	2,176	" clay	" " alkaline		D,	Poor supply. Insufficient supply.
23	NE.	20	"	"	"	"	27	2,175	- 10	2,165			" "	Hard,clear	46	D,	Insufficient supply. Dry holes to 260'.
24	SE.	21	"	"	"	"	24	2,195	- 20	2,175	24	2,171	" sand	Soft,clear	42	D, S	Waters 25 head stock.
25	SW.	21	"	"	"	"	20	2,210	- 6	2,204	15	2,195	" "	" "	45	D, S	" 15 " " .
26	SE.	22	"	"	"	"	20	2,175	- 17	2,158	19	2,156	" gravel	Hard,clear	44	D, S	" 30 " " .
27	SW.	22	"	"	"	"	20	2,170	- 6	2,164			" clay	" "		D, S	Dry in 1935.

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 SOURIS VALLEY NO. 7

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	NW.	22	1	13	2	Bored	87	2,145	- 5	2,140	87	2,058	Glacial sand	Hard, clear		S,	Waters 10 head stock.
29	NE.	22	"	"	"	Dug	14	2,145	- 13	2,132	14	2,131	" "	" "	48	D, S	House supply and 1 cow.
30	SW.	26	"	"	"	Drilled	200	2,110	- 150	1,960	200	1,910	Sand below blue clay	" "	46	D, S	Waters 9 head stock only.
31	NE.	26	"	"	"	Bored	84	2,065	- 12	2,053	74	1,991	Glacial sand	" "	44	D, S	" 35 " " .
32	SW.	27	"	"	"	Dug	30	2,125	- 25	2,100	27	2,098	" gravel	alkaline Hard,clear	44	S,	Laxative waters 50 head stock.
33	NE.	28	"	"	"	Drilled	185	2,125	- 25	2,100	180	1,945	Sand below blue clay	alkaline Hard,clear	45	D, S	Waters 40 head stock.
34	NE.	33	"	"	"	"	160	2,090			132	1,958	Sand below blue clay	" "		D, S	" 13 " " .
35	SW.	34	"	"	"	Dug	56	2,100	- 28	2,072	55	2,045	Glacial sand	alkaline Hard,clear		D, S	" 30 " " .
36	NE.	34	"	"	"	Bored	59	2,055	- 53	2,002	59	1,996	" "	" "	44	S,	" 6 " " only. Not good for stock.
37	NE.	35	"	"	"	"	57	2,030	- 42	1,988	57	1,973	" gravel	alkaline Hard, clear	48	D, S	" 12 " " .
38	SE.	36	"	"	"	"	58	2,020	- 7	2,013	58	1,962	" sand	" "	42	S,	" 42 " " .
39	NE.	36	"	"	"	"	57	2,015	- 32	1,983	55	1,960	" "	alkaline Hard,clear,	44	D, S	" 38 " " .
1	SE.	3	1	14	2	Dug	12	2,300	- 8	2,292	7	2,293	" "	alkaline Hard,clear,	46	D, S.	" 20 " " .
2	SE.	4	"	"	"	"	13	1,975	- 10	1,965	10	1,965	" "	Soft,clear,	48	D, S	Sufficient supply.
3	SW.	10	"	"	"	"	16	2,250	- 11	2,239	14	2,236	" gravel	" "	46	D,	House supply only.
4	NW.	14	"	"	"	"	20	2,230	- 17	2,213	16	2,214	" sand	Hard, "	46	D, S	Waters 30 head stock.
5	NW.	15	"	"	"	"	19	2,230	- 16	2,214	19	2,211	" "	" "		D, S	" 10 " " .
6	SW.	16	"	"	"	"	14	2,000	- 9	1,991	13	1,987	" "	" "	46	D, S	Sufficient for local needs.
7	SE.	18	"	"	"	Drilled	190	2,290	- 3	2,287	190	2,100	Gravel below blue blue clay	" "	43	D, S	Waters 130 head stock.
8	SW.	24	"	"	"	Dug	16	2,250	- 3	2,247			Glacial clay	" "	46	D, S	House supply and 2 horses.
9	SE.	25	"	"	"	"	10	2,200	- 6	2,194	6	2,194	Glacial,gravel	" "	47	D, S, I	Waters 150 head stock.
10	NE.	27	"	"	"	"	12	2,210	- 8	2,202	8	2,202	" "	" "	46	D, S	" 22 " " .
11	SW.	30	"	"	"	Drilled	242	2,250	- 160	2,090	240	2,010	Gravel below blue clay	Soft,clear,	44	D, S	Abundant supply.
12	NW.	30	"	"	"	"	350	2,250	- 150	2,100	340	1,910	Ravenscrag sand	" "	48	D, S	" " .
13	SE.	31	"	"	"	Dug	20	2,225	- 13	2,212	15	2,210	Glacial sand	Hard, "		S,	Waters 20 head stock.
14	NW.	33	"	"	"	"	20	2,225	- 12	2,213	17	2,208	" "	" "	46	D, S	" 4 " " .
15	SW.	34	"	"	"	"	30	2,220	- 21	2,199	25	2,195	" gravel	" "	48	D, S	Sufficient for 20 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 SOURIS VALLEY NO.7

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	S..	35	1	14	2	Dug	12	2,250.	- 6	2,244			Glacial yellow clay	Hard,clear alakline		D,	House supply only.
1	SW.	3	1	15	2	Drilled	130	2,250					Glacial clay				Dry hole.
2	NW.	"	"	"	"	Dug	16	2,250	- 8	2,242	10	2,240	" gravel	Hard,clear		D, S	Waters 60 head stock.
3	NE.	3	"	"	"	"	30	2,240	- 18	2,222	28	2,212	" "	" "	48	D, S	" 3 " " .
4	NE.	4	"	"	"	"	25	2,235	- 23	2,212	22	2,213	" "	" "	46	D, S	" 6 " " .
5	NW.	5	"	"	"	"	26	2,200	- 16	2,184	16	2,184	" sand	" "		D, S	" 25 " " .
6	SE.	9	"	"	"	"	26	2,210	- 10	2,200	25	2,185	" gravel	alkaline Hard,clear	42	D, S	Small supply.
7	NE.	9	"	"	"	"	17	2,220	- 15	2,205	14	2,206	" "	" "	48	D, S	Insufficient supply.
8	NW.	10	"	"	"	Bored	70	2,250	- 60	2,190	70	2,180	" "	" "		D, S	Waters 25 head stock.
9	NW.	12	"	"	"	Dug	20	2,200	- 7	2,193	10	2,190	" sand	" "	48	D, S	Sufficient supply.
10	NE.	12	"	"	"	Drilled	420	2,275	- 80	2,195	420	1,855	Ravenscrag sandstone	" "	46	D, S	Waters 100 head stock.
11	SW.	13	"	"	"	Dug	13	2,260	- 9	2,251	9	2,251	Glacial clay and sand	" "		D, S	" 35 " " .
12	SE.	14	"	"	"	"	19	2,250	- 15	2,235	16	2,234	Glacial sand	" "		D, S	" 35 " " .
13	SE.	15	"	"	"	Bored	35	2,240	- 12	2,228	34	2,206	" gravel	" "	42	D,	House supply only.
14	NE.	16	"	"	"	Dug	22	2,230	- 17	2,213	20	2,210	" "	Soft,clear		D, S	Sufficient for 6 head stock only.
15	NW.	17	"	"	"	"	16	2,290	- 12	2,278	13	2,277	" sand	Hard,clear alkaline		D, S	Waters 25 head stock.
16	SE.	19	"	"	"	"	13	2,240	- 11	2,229	11	2,229	" clay	Hard,clear alkaline		D, S	" 14 " " .
17	SE.	20	"	"	"	"	15	2,320	- 12	2,308	10	2,310	" gravel	Hard,clear	44	D, S	Sufficient for 3 head stock.
18	NE.	20	"	"	"	Bored	50	2,300	- 32	2,268			" sand	" "		D, S	1 bbl. a hour.
19	SW.	20	"	"	"	Dug	18	2,265	- 3	2,262	6	2,259	" " "	" "	44	D, S	Waters 25 head stock.
20	NW.	20	"	"	"	"	18	2,240	- 17	2,223	17	2,223	" gravel	" "	52	D, S	House supply and 2 horses.
21	SE.	21	"	"	"	"	32	2,250	- 20	2,230	20	2,230	" sand	alkaline Hard, clear			Waters 30 head stock.
22	SW.	21	"	"	"	"	22	2,335	- 17	2,318	10	2,325	" "	" "		D, S	Sufficient for 2 horses only.
23	SW.	22	"	"	"	"	21	2,260	- 14	2,246	14	2,246	" "	" "		D, S	Laxative, sufficient for 11 head stock.
24	NE.	22	"	"	"	Bored	54	2,300	- 24	2,276	40	2,260	" gravel	" "	47	D, S	Waters 20 head stock.
25	SE.	24	"	"	"	Dug	20	2,250	- 10	2,240	18	2,232	" "	" "	43	D, S	Insufficient supply.
26	SW.	26	"	"	"	"	10	2,280	- 6	2,274	6	2,274	" "	" "	42	D, S	Abundant supply.

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 SOURIS VALLEY NO.7.

WELL No.	LOCATION ¼	Sec.	Tp.	Rge.	Mer.	TYPE OF WELL	DEPTH OF WELL	ALTITUDE WELL (above sea level)	HEIGHT TO WHICH WATER WILL RISE Above (+) Below (−) Surface	Elev.	PRINCIPAL WATER-BEARING BED Depth	Elev.	Geological Horizon	CHARACTER OF WATER	TEMP. OF WATER (in °F.)	USE TO WHICH WATER IS PUT	YIELD AND REMARKS
27	SE.	27	1	15	2	Dug	25	2,280	- 10	2,270	10	2,270	Glacial clay and sand	Hard, clear, alkaline	46	D, S	Insufficient supply.
28	NW.	27	"	"	"	"	16	2,250	- 15	2,235	15	2,235	Glacial clay and sand	Hard, clear,	45	D, S	" " .
29	NE.	27	"	"	"	"	35	2,270	- 20	2,250	33	2,237	Glacial clay and sand	" "	46	D, S	" " .
30	NE.	28	"	"	"	"	24	2,300	- 20	2,280	20	2,280	Glacial clay and sand	" "	48	D,	Poor supply.
31	NW.	30	"	"	"	Drilled	265	2,330	-240	2,090	251	2,079	Ravenscrag sandstone	" cloudy,	43	D, S	Also water at 450 feet.
32	NE.	32	"	"	"	Dug	26	2,310	- 21	2,289	21	2,289	Glacial sand	" clear	46	D, S	Insufficient supply.
33	SW.	32	"	"	"	Drilled	240	2,345	-190	2,115	230	2,155	Sand below blue clay	" "		D, S	Sufficient supply
34	NE.	33	"	"	"	Dug	30	2,300	- 15	2,285	28	2,272	Glacial sand	Soft, clear	44	D,	2 pails a day.
35	NW.	33	"	"	"	"	12	2,260	- 7	2,253	7	2,253	" " clay	Hard, "		D, S	Sufficient supply.
36	NE.	34	"	"	"	"	42	2,250	- 30	2,220	30	2,220	Glacial sand	" " alkaline		S,	Laxative, sufficient supply.
37	SW.	35	"	"	"	Bored	33	2,270	- 16	2,254	24	2,246	" "	Hard, clear	44	D, S	Sufficient supply.
1	NE.	2	2	13	2	"	30	1,980	- 10	1,970	15	1,965	" "	" " alkaline	47	D, S	Waters 20 head stock.
2	SE.	5	"	"	"	"	120	2,090	- 40	2,050	120	1,970	Gravel below blue clay	Hard, clear, alkaline	41	D, S	" 70 " " .
3	NE.	6	"	"	"	"	65	2,085	- 47	2,038	62	2,023	Ravenscrag coal-seam	Soft, brown		D, S	" 20 " " .
4	SW.	7	"	"	"	Dug	12	2,100	- 9	2,091	11	2,089	Glacial gravel	Hard, clear	48	D, S	" 25 " " .
5	NW.	7	"	"	"	"	15	2,060	- 12	2,048	12	2,048	" sand	" " alkaline		S,	Laxative, sufficient for 6 head stock.
6	NW.	8	"	"	"	Bored	84	2,010	- 24	1,986	83	1,927	Ravenscrag coal-seam	Soft, brown		D, S	Waters 20 head stock.
7	SE.	9	"	"	"	Drilled	113	2,020	- 53	1,967	108	1,912	Gravel below blue clay	Hard, clear, alkaline	44	S,	Laxative, waters 25 head stock.
8	SW.	10	"	"	"	Bored	48	2,015	- 32	1,983			Glacial	Hard, clear, alkaline	47	S,	Waters 22 head stock.
9	SW.	12	"	"	"	Dug	16	1,950	- 13	1,937	13	1,937	" gravel	Hard, clear		D, S	" 25 " " .
10	NE.	12	"	"	"	"	14	1,945	- 9	1,936	9	1,936	" "	" "	48	D,	House use only.
11	NE.	13	"	"	"	"	8	1,949	- 3	1,946	2	1,947	" sand	" "	43	D, S	Abundant supply.
12	SE.	14	"	"	"	"	12	1,945	- 8	1,937	12	1,933	" gravel	Soft, "		D, S	Sufficient for 2 head stock only.
13	SW.	15	"	"	"	"	16	1,950	- 8	1,942	16	1,934	" "	Hard, "		D, S	Waters 25 head stock.
14	SW.	16	"	"	"	"	16	2,060	- 8	2,052	12	2,048	" "	Soft, clear	46	D, S	" 25 " " .
15	NW	18	"	"	"	"	48	2,010	- 38	1,972	38	1,972	" "	Hard, "		D, S	Sufficient supply.
16	NE.	18	"	"	"	"	16	1,985	- 12	1,973	12	1,973	" gravel	" " alkaline	46	D, S	Sufficient for 100 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of SOURIS VALLEY NO.7

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	NW.	20	2	13	2	Dug	26	1,965	- 20	1,945	20	1,945	Glacial clay	Hard, clear, alkaline	50	S,	Waters only 8 head stock.
18	SE.	21	"	"	"	"	20	1,954	- 17	1,937	17	1,937	" yellow clay	Hard, clear, alkaline		S,	Sufficient for 2 head stock.
19	NW.	22	"	"	"	Borod	40	1,945	- 10	1,935			Glacial	Hard, clear	46	D, S	Waters 6 head stock.
20	SW.	23	"	"	"	Dug	18	1,951	- 5	1,946	12	1,939	" sandy gravel	" "		D, S	" 18 " " .
21	SE.	23	"	"	"	Spring							Glacial gravel	" "		D, S	" 50 " " .
22	NE.	23	"	"	"	Dug	11	1,948	- 8	1,940	8	1,940	" "	" "	44	D, S	Sufficient for 18 head stock.
23	SW.	27	"	"	"	Bored	28	1,973	- 20	1,953	20	1,953	"	" " alkaline		S,	Laxative. Waters 10 head stock.
24	SW.	28	"	"	"	Dug	19	1,950	- 15	1,935	10	1,940	" gravel	Hard, clear	47	D, S	Small seepage from creek.
25	SE.	29	"	"	"	"	18	1,955	- 14	1,941	18	1,937	" "	" "	48	D, S	Waters 16 head stock.
26	SE.	30	"	"	"	"	24	1,970	- 16	1,954	20	1,950	" sand	" " alkaline	46	D, S	" 30 " " .
27	NE.	33	"	"	"	Bored	70	1,970	- 20	1,950	20	1,950	"	Hard, clear alkaline		N.	Too alkaline for use.
28	NW.	34	"	"	"	Dug	52	1,970	- 30	1,940	50	1,920	" gravel	Hard, clear alkaline		D, S	Water 30 head stock.
29	NE.	35	"	"	"	Bored	62	1,965	- 15	1,950	62	1,903	" sand	Hard, cloudy		D, S	" 30 " " .
30	NW.	36	"	"	"	"	48	1,955	- 33	1,922			"	" clear	46	D, S	" 30 " " .
1	SE.	1	2	14	2	Dug	15	2,200	- 11	2,189	11	2,189	Glacial sand and clay	Hard, clear		D, S	House supply only.
2	NW.	2	"	"	"	"	24	2,185	- 3	2,182	12	2,173	Glacial sand	" "		S,	1 bbl. a day.
3	NE.	2	"	"	"	"	17	2,190	- 13	2,177	16	2,174	" gravel	" "	48	D, S	Sufficient for 6 head stock.
4	SE.	3	"	"	"	"	12	2,220	- 8	2,212	8	2,212	" sandy clay	" " alkaline		D, S	House supply and 6 head stock.
5	NE.	3	"	"	"	"	15	2,200	- 11	2,189	11	2,189	Glacial sand	Hard, clear alkaline		N,	Not in use.
6	SW.	4	"	"	"	Bored	60	2,175					Glacial clay				Dry hole.
7	SE.	5	"	"	"	Drilled	225	2,225	-100	2,125	225	2,000	Sand	Hard, iron		D, S	Waters 70 head stock.
8	NW.	5	"	"	"	"	240	2,245			238	2,007	Sand	" "		D, S	Plugs with sand.
9	SW.	6	"	"	"	"	337	2,250	- 75	2,175	317	1,933	Ravenscrag sand	" clear, soda	48	D, S	Abundant supply. #.
10	SE.	8	"	"	"	"	110	2,200			100	2,100	Sand below blue clay	Hard, clear, alkaline		D, S	Waters 18 head stock.
11	NW.	8	"	"	"	"	225	2,150			225	1,925	Sand	Hard, iron	44	D, S	" 15 " " .
12	NE.	8	"	"	"	Dug	16-19	2,150					Glacial clay				Dry holes.
13	SW.	10	"	"	"	"	20	2,180	-,13	2,167	18	2,162	" sand	Hard, clear, alkaline	44	S,	Laxative, sufficient for 5 head stock only.

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WELL RECORDS—Rural Municipality of SOURIS VALLEY NO.7

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
14	SE.	12	2	14	2	Dug	26	2,155	- 19	2,136	23	2,132	Glacial sand	Hard,clear	43	D, S	Waters 17 head stock.
15	NW.	16	"	"	"	"	12	2,140	- 10	2,130	10	2,130	" gravel	" "		D, S	Sufficient supply.
16	SW.	17	"	"	"	Drilled	106	2,160	- 86	2,074	100	2,060	Sand below blue clay	" "		D, S	Waters 25 head stock.
17	SW.	18	"	"	"	"	210	2,175	- 80	2,095	201	1,974	Sand layers	" "	46	D, S	Sufficient supply.
18	SE.	19	"	"	"	Dug	19	2,130	- 4	2,126	15	2,115	Glacial gravel	" "	44	D, S	Insufficient supply.
19	NW.	19	"	"	"	Bored	47	2,115	- 8	2,107	39	2,076	" sand	" "	46	D, S	Abundant supply.
20	SW.	20	"	"	"	Dug	10	2,090	- 8	2,082	8	2,082	" gravel	" "		D, S	Waters 24 head stock.
21	NE.	20	"	"	"	"	4	2,094	- 1	2,093	1	2,093	" "	Soft, "	44	D, S	Spring. Abundant supply.
22	SW.	22	"	"	"	"	28	2,075	- 12	2,063	26	2,049	" "	Hard, "	45	D, S	House supply and 50 head stock.
23	NW.	22	"	"	"	Drilled	200	2,040	- 30	2,010	180	1,860	Ravenscrag sand	Soft,soda	46	D, S, M	Abundant supply.#.
24	NW.	23	"	"	"	Bored	90	2,042	- 60	1,982	88	1,954	Glacial	Hard, clear, alkaline		S,	Sufficient for 15 head stock.
25	SE.	24	"	"	"	Dug	22	1,990	- 19	1,971	19	1,971	Glacial gravel	Hard,clear	46	D,	House supply only.
26	SE.	26	"	"	"	"	30	2,000	- 22	1,978	22	1,978	" sandy clay	" "		D,mS	Laxative. Waters 10 head stock.
27	SW.	26	"	"	"	"	4	2,030	- 1	2,029	1	2,029	Glacial gravel	" "	44	D, S	Spring. Abundant supply.
28	NE.	26	"	"	"	"	11	1,965	- 9	1,956	7	1,958	" sand	" "		D,	House use only
29	NW.	28	"	"	"	"	12	2,020	- 8	2,012	8	2,012	" gravel	alkaline Hard,clear	47	D, S	Waters 15 head stock.
30	SE.	30	"	"	"	"	2	2,065	0	2,065	1	2,064	" "	" "	45	D, S	Spring. Abundant supply.
31	SW.	30	"	"	"	Bored	40	2,125	- 35	2,090	35	2,090	" sand	" "	48	D, S	Abundant supply.
32	NW.	30	"	"	"	"	60	2,090	- 54	2,036	54	2,036	" "	alkaline Hard,clear	50	D, S	Waters 24 head stock.
33	SE.	32	"	"	"	Dug	62	2,030	- 42	1,988	42	1,988	" gravel	" "	42	D, S	" 22 " " .
34	NE.	32	"	"	"	"	28	1,995	- 18	1,977	28	1,967	" "	alkaline Hard,clear	44	D, S	Sufficient supply.
35	SE.	34	"	"	"	"	13	1,985	- 9	1,976	10	1,975	" "	" "		D, S	Sufficient for 4 head stock.
36	NE.	34	"	"	"	"	14	1,985	- 10	1,975	12	1,973	" "	" "	46	D, S	Waters 14 head stock.
37	SE.	36	"	"	"	"	3	1,950	- 2	1,948	2	1,948	" "	" muddy		D, S	House supply only.
38	NW.	36	"	"	"	"	14	1,975	- 12	1,963	13	1,962	" "	" clear		D,	" " " .
1	SW.	3	2	15	2	Drilled	330	2,285	- 19	2,266	328	1,957	Ravenscrag sand	Soft,clear		D, S	Waters 20 head stock.
2	SW.	4	"	"	"	Bored	33	2,310	- 19	2,291	33	2,277	Glacial sand	Hard,cloudy alkaline		S,	Sufficient for 15 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of SOURIS VALLEY NO. 7

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
3	NW.	4	2	15	2	Bored	22	2,290	- 11	2,279	6	2,284	Glacial gravel	Hard,clear	46	D, S	Sufficient for 15 head stock.
4	NW.	5	"	"	"	Drilled	225	2,325	-180	2,145	225	2,100	"	" "		D, S	Waters 30 head stock.
5	NE.	6	"	"	"	"	210	2,330	-170	2,160	190	2,140	Sand below blue clay	" "		D, S	Sufficient supply. #.
6	NW.	8	"	"	"	"	230	2,350	-180	2,170	222	2,128	Sand layers	" " alkaline		S,	Very laxative. Sufficient supply.
7	SE.	9	"	"	"	Dug	14	2,260	- 12	2,248	12	2,248	Glacial sandy clay	Hard,clear	44	S,	Waters 5 head stock only.
8	SE.	10	"	"	"	Drilled	210	2,245	-130	2,115	200	2,045	Glacial,sand	" "	45	D, S	Sufficient for 100 head stock.
9	SE.	12	"	"	"	"	194	2,220	- 80	2,140	194	2,026	Ravenscrag gravel	" brown	44	D, S	Waters 120 head stock.#.
10	NW.	14	"	"	"	"	250	2,190	-130	2,060	250	1,940	Ravenscrag	Hard,clear		D, S	Abundant supply.
11	NE.	15	"	"	"	Dug	20	2,235	- 20	2,215			Glacial clay				Dry hole.
12	NW.	17	"	"	"	"	18	2,290	- 10	2,280	16	2,274	" sand	Hard,clear alkaline		S,	Very small supply.
13	NE.	18	"	"	"	Bored	83	2,360	- 31	2,329	70	2,290	" sand clay	Hard,iron	44	D, S	Laxative. Waters only 5 head stock.
14	NW.	20	"	"	"	"	64	2,300					Glacial clay				Dry hole.
15	NW.	20	"	"	"	"	25	2,275	- 10	2,265			" bluo clay	Hard,clear	44	D, S	Water only 8 head stock.
16	NE.	21	"	"	"	Dug		2,230					Glacial clay				Dry hole.
17	SW.	22	"	"	"	"	25	2,230					" bluo clay				" " .
18	NE.	23	"	"	"	Drilled	389	2,200	- 90	2,110	389	1,811	Ravenscrag sand	Soft,clear		D, S	Sufficient supply.
19	SW.	24	"	"	"	"	120	2,200			120	2,080	Sand below blue clay	Hard, "		D, S	Sufficient for 25 head stock only.
20	SE.	25	"	"	"	Dug	25	2,180	- 20	2,160	20	2,160	Glacial clay	" " alkaline		D, S	Dry since 1932.
21	SW.	27	"	"	"	Drilled	470	2,210	-160	2,050	450	1,760	Ravenscrag	Hard,clear alkaline	48	S,	Pluggod with sand.
22	SE.	30	"	"	"	Dug	18	2,390	- 14	2,376	14	2,376	Glacial sand	Hard,clear		D, S	House use and 10 head stock.
23	NE.	30	"	"	"	Bored	24	2,385	- 10	2,375	20	2,365	" gravel	Soft, "	44	N,	Insufficient supply. #.
24	SW.	34	"	"	"	Drilled	200	2,200	-125	2,075	200	2,000	Sand	Hard, "	45	D, S	Waters 40 head stock.
25	NE.	34	"	"	"	Dug	6	2,140	0	2,140			Glacial gravel	" "	46	D, S	Flowing spring. #.
26	NW.	35	"	"	"	"	7	2,135	0	2,135			" "	" "	47	D, S	" " .
27	NE.	36	"	"	"	"	6	2,000	0	2,000	2	1,998	" "	" "	46	D, S	" " .
1	SE.	2	3	13	2	Bored	60	1,950	- 20	1,930	60	1,890	" sand	" "	46	D, S	Waters 40 head stock.
2	NW.	2	"	"	"	"	55	1,959	- 12	1,947	53	1,906	" sand	Hard,yellow	44	D, S	" 10 " " .

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WELL RECORDS—Rural Municipality of SOURIS VALLEY NO.7

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
3	NE.	3	3	13	2	Drilled	440	1,964	- 12	1,952	425	1,539	Ravenscrag sand	Soft,salty	45	S,	Abundant supply.
4	SE.	6	"	"	"	Bored	30	1,953	- 14	1,939	28	1,925	Glacial sand	Hard,clear, alkaline	44	S,	Waters 30 head stock.
5	NW.	6	"	"	"	Dug	23	1,958	-18	1,940	18	1,940	" "	Hard,clear, alkaline	45	S,	Sufficient for 12 horses.
6	SE.	8	"	"	"	Bored	84	1,972	- 20	1,952	84	1,888	" gravel	Hard,clear, alkaline	43	D, S	Waters 30 head stock.
7	NW.	9	"	"	"	"	83	1,970	- 20	1,950	50	1,920	" "	Hard,clear alkaline		S,	" 14 " " .
8	NE.	9	"	"	"	Dug	20	1,956	- 14	1,942	15	1,941	" sand	Hard,alk-aline	45	D, S	Sufficient for 4 head stock only.
9	NE.	10	"	"	"	Bored	80	1,950	- 18	1,932	18	1,932	" "	Hard,clear, alkaline	46	D, S	Waters 35 head stock.
10	NE.	12	"	"	"	Dug	8to16	1,969					Glacial yellow clay				Dry holes.
11	SE.	14	"	"	"	"	30	1,962	- 22	1,940	18	1,944	Glacial clay, sand	Hard,clear	48	D, S	Waters only 10 head stock.
12	SW.	15	"	"	"	Bored	58	1,973	- 20	1,953	57	1,916	Glacial sand	" " alkaline	44	D, S	" 50 head stock.
13	SE.	19	"	"	"	Dug	60	1,978	- 43	1,935	43	1,935	Glacial	Hard,brown	44	D, S	" 30 " " .
14	NW.	21	"	"	"	Bored	77	1,990	- 23	1,967	75	1,915	Ravenscrag coal-seam	Soft,salty, sulphur,brown	44	D, S	Abundant supply.
15	NE.	21	"	"	"	Dug	30	1,990	- 18	1,972	18	1,972	Glacial gravel	Hard,clear	46	D, S	Waters 50 head stock.
16	NW.	22	"	"	"	Drilled	450	1,990	- 50	1,940	450	1,540	Ravenscrag sand	Soft, salty, clear		S,	Abundant supply.
17	NW.	24	"	"	"	Dug	26	1,958	- 21	1,937	20	1,938	Glacial sandy clay	Hard,clear, alkaline		S,	Laxative, waters 2 head stock only.
18	NE.	24	"	"	"	Drilled	282	1,962	- 50	1,912	282	1,680	Ravenscrag sand	Soft,soda, salty		D, S	Waters 60 head stock.
19	NW.	26	"	"	"	"	400	1,973	- 40	1,933	400	1,573	" "	Soft,salty, clear	44	D, S	" 60 " " .
20	NW.	27	"	"	"	Dug	45	1,989	- 25	1,964	44	1,945	Glacial gravel	Hard,clear, alkaline		S,	" 30 " " .
21	NE.	31	"	"	"	Bored	82	1,983	- 16	1,967	73	1,910	" "	Hard,bitter, alkaline	45	D, S	Laxative, waters 66 head stock.
22	NE.	32	"	"	"	Dug	18	1,978	- 13	1,965	15	1,963	" sand	Soft,clear	46	D, S	Dry in 1935.
23	SE.	34	"	"	"	Drilled	225	1,978	- 50	1,928	215	1,763	Ravenscrag sand	Soft,soda, brown	45	D, S	Abundant supply.
24	NW.	34	"	"	"	Dug	10	1,974	- 6	1,968	6	1,968	Glacial sand	Soft,clear		D, S	Dry in 1935.
25	SE.	35	"	"	"	Drilled	312	1,963	- 60	1,903	300	1,663	Ravenscrag sand	Soft,salty, clear	48	D, S	Waters 80 head stock.
26	SW.	36	"	"	"	"	?						"	Soft,salty,	48	D, S	Abundant supply.
27	NE.	36	"	"	"	"	168	1,955	- 20	1,935	163	1,792	" sand	Soft, soda, clear	47	D, S	Waters 36 head stock.
1	NE.	2	3	14	2	Bored	40	1,997					Glacial	Hard,clear, alkaline	44	D, S	" 23 " " .
2	NE.	3	"	"	"	"	60	1,988	- 20	1,968	60	1,928	" sand	Hard,clear, alkaline	43	D, S	House use and 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 SOURIS VALLEY NO.7

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
3	SE.	3	3	1-	2	Bored	56	1,990	- 30	1,960	56	1,934	Glacial gravel	Hard,clear, alkaline	44	D, S	Waters 50 head stock.
4	SW.	4	"	"	"	Dug	17	1,968	- 12	1,956	16	1,952	" "	Hard,clear	43	D,	House supply only.
5	NE.	5	"	"	"	"	43	2,003	- 8	1,995	35	1,968	" sand	Soft,clear	43	D, S	House supply and 12 horses.
6	SE.	6	"	"	"	"	30	2,008	- 27	1,981	26	1,982	" gravel	Hard,clear, alkaline	43	D, S	Laxative. 1 bbl. an hour.
7	NE.	6	"	"		Bored	38	1,995	- 13	1,982	30	1,965	" sand	Hard,iron	43	D, S	Waters 24 head stock.
8	NE.	7	"	"	"	Dug	12	1,970	- 8	1,962	10	1,960	" "	Soft,cloudy	49	D, S	Sufficient supply.
9	NE.	8	"	"	"	"	26	2,012	- 17	1,995	17	1,989	" gravel	Hard, clear		D, S	House supply and 12 horses.
10	NW.	10	"	"	"	Bored	50	1,998	- 20	1,978			"	Hard, iron, alkaline	44	S,	Waters 50 head stock.
11	NW.	12	"	"	"	"	54	1,973	- 24	1,949	52	1,921	" sand ?	Hard,clear, alkaline	46	S,	Sufficient supply.
12	SW.	13	"	"	"	"	53	1,976	- 23	1,953	50	1,926	Ravenscrag sand	Soft, soda, yellow		N,	Good supply but not in use.
13	NW.	13	"	"	"	"	76	1,972	- 16	1,956	76	1,896	stones below blue clay	Hard,bitter alkaline		S,	Sufficient for 20 head stock.
14	NW.	15	"	"	"	Dug	48	1,995	- 45	1,950	30	1,965	Glacial sand	Hard,bitter, alkaline	46	S,	Laxative, sufficient for 5 head stock.
15	NE.	15	"	"	"	"	48	1,985	- 28	1,957	45	1,940	" gravel	Hard,clear	44	D, S	Waters 40 head stock.
16	SW.	16	"	"	"	"	26	1,998	- 16	1,982	25	1,973	" "	" " alkaline	44	D, S	" 25 " " .
17	NW.	16	"	"	"	"	30	1,993	- 15	1,978	15	1,978	" "	Hard,bitter, alkaline		S,	Very alkaline. 1 tank a day.
18	SE.	18	"	"	"	"	6	1,975	- 1	1,974	4	1,971	" Sand	Hard,cloudy	52	D, S	Waters 16 head stock.
19	NW.	18	"	"	"	Bored	60	2,004	- 35	1,969	63	1,944	Ravenscrag coal seam	Soft,soda	46	D, S	House supply and team of horses.
20	NE.	18	"	"	"	Dug	23	1,993	- 20	1,973	19	1,974	Glacial gravel	Hard,clear	44	D, S	Waters 10 head stock.
21	NE.	19	"	"	"	"	22	1,994	- 18	1,976	20	1,974	" sand	" "		D, S	" 18 " " .
22	SW.	20	"	"	"	"	27	1,992	- 21	1,971	23	1,969	" gravel	" "	43	D, S	" 12 " " .
23	NE.	21	"	"	"	"	24	1,992	- 12	1,980	12	1,980	" clay	" " alkaline		S,	" 6 " " .
24	NW.	21	"	"	"	"	20	2,005	- 14	1,991	14	1,991	" "	Hard,clear	42	D, S	Insufficient supply.
25	NE.	28	"	"	"	Bored	38	1,987	- 20	1,967	38	1,949	" "	" " alkaline	44	S,	Sufficient for 1 cow only.
26	NW.	30	"	"	"	Dug	12	2,030	- 10	2,020	6	2,024	" sand	Hard,clear		D, S	Waters 30 head stock.
27	SE.	33	"	"	"	Drilled	127	1,996	- 14	1,982	127	1,869	Ravenscrag sand shale	Soft, salty	47	S, M	Abundant supply.
28	SE.	33	"	"	"	"	228	1,996	- 20	1,976	218	1,778	Ravenscrag coal-seam	Soft, brown	45	S, M	Sufficient supply.
29	SW.	33	"	"	"	Bored	50	1,994	- 34	1,960	44	1,950	Glacial sand	Hard,clear		D,	House use only.

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

WELL RECORDS—Rural Municipality of SOURIS VALLEY NO.7

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
30	NW.	33	3	14	2	Bored	50	1,986	- 15	1,971	45	1941	Glacial gravel	Hard, clear, alkaline	44	D, S	Waters 9 head stock.
31	NW.	34	"	"	"	Dug	22	1,982	- 17	1,965	17	1,965	"	Hard, clear,		D, S	Dry in 1935.
1	NW.	2	3	15	2	Bored	42	2,199	- 33	2,166	42	2,157	" sand	" " alkaline	45	D, S	Sufficient for 10 head stock.
2	SE.	3	"	"	"	Dug	22	2,190					" clay				Dry holes.
3	SE.	5	"	"	"	"	20	2,340	- 14	2,326	16	2,324	" gravel	Hard, brown	43	S,	Waters 8 head stock.
4	NW.	5	"	"	"	"	22	2,330	- 20	2,310	20	2,310	" "	" clear, alkaline		D,	Small supply.
5	SW.	6	"	"	"	"	24	2,375	- 22	2,353	18	2,357	" yellow clay	Hard, clear	44	D, S	1 bbl. a day.
6	NW.	10	"	"	"	Bored	45	2,202	- 39	2,163	44	2,158	Glacial sand	" " alkaline	45	D, S	Waters 10 head stock.
7	NE.	10	"	"	"	Dug	19	2,166	- 3	2,163	17	2,149	" "	Hard, clear, alkaline	43	D, S	" 30 " " .
8	SE.	12	"	"	"	"	4	2,035	0	2,035	4	2,031	" gravel	Soft, clear	43	D, S	Overflows. Waters 25 cattle.
9	SW.	12	"	"	"	"	6	2,048	0	2,048			" clay	Hard, clear	50	D, S	Spring. Waters 25 head stock.
10	NW.	12	"	"	"	"	38	2,052	- 18	2,034	30	2,022	" gravel	" bitter, clear		S,	Dry since 1930.
11	SE.	13	"	"	"	Bored	99	2,023					" blue clay				Dry hole.
12	SW.	13	"	"	"	"	40	2,023	- 27	1,996	40	1,983	Glacial sand	Hard, clear	43	D, S	Insufficient for 10 head stock.
13	SW.	14	"	"	"	Dug	11	2,106	- 3	2,103	5	2,101	" gravel	" "	45	D, S	Waters 5 head stock.
14	SE.	15	"	"	"	"	3	2,127	0	2,127	3	2,124	" "	" "		D, S	Abundant supply.
15	SE.	16	"	"	"	"	30	2,250					" sand				Dry hole.
16	SW.	16	"	"	"	"	16	2,250	- 5	2,245	16	2,234	" "	Hard, clear		D, S	House supply only.
17	NW.	16	"	"	"	"	16	2,195	- 14	2,181	14	2,181	" "	" "	44	D,	" " " .
18	NE.	16	"	"	"	"	18	2,125	- 17	2,108	17	2,108	" "	" "		D, S	Water 14 head stock.
19	SW.	17	"	"	"	"	20	2,300	- 18	2,282	20	2,280	" yellow clay	" "		D, S	Very poor supply.
20	NE.	16	"	"	"	"	15	2,285	- 7	2,278	13	2,272	Glacial gravel	" " alkaline	44	D, S	Waters 50 head stock.
21	NW.	19	"	"	"	"	60	2,200					" clay				Dry hole.
22	SW.	20	"	"	"	"	30	2,240	- 15	2,225	10	2,230	" "	Hard, clear		D,	House supply only.
23	NW.	22	"	"	"	"	6	2,070	- 2	2,068	2	2,068	" sand	" " alkaline	44	S,	Abundant supply.
24	SE.	24	"	"	"	"	12	1,978	- 4	1,974	12	1,966	" gravel	Hard, clear	50	D, S	Waters 20 head stock only.
25	NW.	24	"	"	"	"	18	1,998	- 10	1,988	12	1,986	" "	" " alkaline	48	D, S	Laxative, sufficient for 6 head stock.

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(#) Sample taken for analysis.

WELL RECORDS—Rural Municipality of SOURIS VALLEY NO. 7

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
26	NE.	26	3	15	2	Dug	18	1,988	- 13	1,975	14	1,974	Glacial sand	Hard,muddy, alkaline	42	D,	House supply only.
27	NE.	27	"	"	"	"	20	1,987	- 8	1,979	18	1,969	" "	Hard,clear		D, S	Dry in 1935.
28	SW.	30	"	"	"	"	14	2,200	- 6	2,194	3	2,197	" blue clay	" alk-aline		D, S	" " 1935.
29	NE.	30	"	"	"	"	24	2,200	- 16	2,184	20	2,180	Glacial gravel	Hard,clear		S,	Insufficient for 7 head stock.
30	SW.	31	"	"	"	"	20	2,215					" blue clay				Dry holes.
31	NW.	31	"	"	"	"	20	2,200	- 14	2,186	14	2,186	Glacial sand	Hard,clear alkaline	46	D, S	Insufficient for 7 head stock.
32	NE.	31	"	"	"	"	18	2,250	- 7	2,243	7	2,243	" "	Hard,cloudy, alkaline		S,	Waters only 4 cows.
33	SE.	32	"	"	"	"	20	2,125	- 12	2,113	12	2,113	" " gravel	Hard,clear		D,	House supply only.
34	NW.	34	"	"	"	"	28	1,985	- 4	1,981	28	1,957	Glacial gravel	" " alkaline	42	D, S	Waters 60 head stock.
35	SW.	35	"	"	"	"	25	1,979	- 10	1,969	25	1,954	Ravenscrag coal-seam	Soft,soda, alkaline			House supply only.
36	SE.	36	"	"	"	"	37	2,024	- 22	2,002	36	1,988	Glacial gravel	Hard,clear		D, S	Waters 40 head stock.

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