CANADA

DEPARTMENT OF MINES

HON. T. A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

BUREAU OF ECONOMIC GEOLOGY

GEOLOGICAL SURVEY

PRELIMINARY REPORT

GROUND-WATER RESOURCES OF THE RURAL MUNICIPALITY OF INVERMAY No. 305 SASKATCHEWAN

BY

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

Water Supply Paper No. 210

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GROUND WATER RESOURCES OF PART OF THE RURAL MUNICIPALITY OF INVERMAY, NO. 305 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 wellsite 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 wellsite 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 wellsite.[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 wellsite 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 Province 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 area.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Bearpaw Formation. The Bearpaw consists mostly of incoherent dark grey to dark brownish grey, partly bentonitic shales, weathering light grey, or, in places where much iron is present, buff. Beds of sand occur in places in the lower part of the formation. It forms the uppermost bedrock

formation over much of western and southwestern Saskatchewan and has a maximum thickness of 700 feet or somewhat more.

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

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

WATER-BEARING HORIZONS OF THE MUNICIPALITY

The portion of the rural municipality of Invermay that lies south of the southern boundary of township 32 is discussed in this report. This part of the municipality, located in southeastern Saskatchewan, consists of three fractional townships, described as tp. 31, ranges 7, 8, and 9, and three full townships, described as tp. 32, ranges 7, 8, and 9, W. 2nd mer. The fractional townships each consist of eighteen full sections, sections 19 to 36, inclusive, and six fractional sections, sections 13 to 18, inclusive. A branch line of the Canadian National railway that runs between Winnipeg and Edmonton passes northwesterly through township 32, ranges 7 and 8, and on it are located the hamlets of Dernic and Rama. The centre of the area under discussion is 41 miles north and slightly west of Yorkton.

A moraine-covered area extends across the northeastern part of township 32, range 8, the southwestern part of township 32, range 7, and the northern sections of township 31, range 7. An area mantled by glacial lake sands and gravels occurs in the southeastern corner of tp. 31, range 7, and a small area occurs in secs. 15 and 16, tp. 31, range 9. In the first-mentioned area in the southeastern part of township 31, range 7, the deposit is mainly composed of gravel, and in some places it extends to a depth of at least 10 feet below the surface. Two small areas that are covered by glacial outwash sands and gravels occur east of Silvery lake in township 31, range 9, and about one-half mile east of Rama in township 32, range 7. The remainder of the municipality is mantled by glacial till. In the southwestern part of township 32, range 9, and in an area approximately 2 miles in width paralleling Whitesand river on the northeast, the glacial till has been modified by the action of water. This region is flat, almost treeless, and is so strewn with stones and boulders that it is unsettled and uncultivated. The ground surface

of the moraine-covered area is rolling, whereas in the remainder of the municipality it is slightly undulating to flat. Sloughs and flat, marshy areas or hay meadows are common, and clumps of poplar occur throughout most of the area.

The crest of the moraine forms the divide between two drainage systems, that of Whitesand river to the southwest and that of Spirit creek to the northeast. Spirit creek, which runs into Good Spirit lake in township 30, range 5, flows intermittently in a southeasterly direction across the northeastern corner of township 32, range 7. Two smaller tributary streams flow east and slightly south through the same township. Whitesand river flows in a southeasterly direction across the southwestern part of the municipality. Dog lake, at an elevation of 1,715 feet, and Newburn lake, at an elevation of 1,697 feet, occur along its course. In this municipality, Whitesand river is a small stream flowing through a shallow boulder-strewn valley. The banks of the ravine slope very gently to plain level about 30 feet above the valley floor. Lakes are numerous in the western 7 miles of the municipality, the largest being Saline lake, Stonewall lake, and Silvery lake. Saline and Stonewall lakes are connected by a short stream and the overflow water is carried south from these lakes to Whitesand river by a small, intermittent stream in township 32, range 9. Two drainage ditches have been excavated in township 31, range 7, and in township 32, range 8.

Water-bearing Horizons in the Unconsolidated Deposits

The water from lakes and Whitesand river is used extensively for stock by many farmers in the western half of the municipality. The water from some of the lakes is "alkaline" and that from Saline and Stonewall lakes is slightly salty. Small, flowing springs were reported in three quarter sections in township 32, range 9, and one spring near Whitesand river in sec. 17, tp. 31, range 8, yields sufficient hard water for 60 head of stock.

All the producing wells in the municipality tap aquifers of sand and gravel in the glacial drift at depths of 5 to 82 feet. Most of them are dug by hand and tap water-bearing pockets of sand and gravel that overlie blue clay. The blue clay is generally struck between depths of 15 and 30 feet. Adequate supplies of water are very difficult to locate in deposits of sand and gravel above the blue clay in all parts of the municipality excepting township 31, range 7. Adequate supplies of water are extremely difficult to locate at any depth in the glacial drift in township 31, range 8, and township 32, ranges 7 and 8, and the water shortage in these three townships is acute, not only in years of drought but also during winters. In the two western townships the shortage of water from wells is alleviated by the use of water from the lakes and Whitesand river. It is estimated that 40 per cent of the farmers in the municipality have an inadequate supply of water.

Moderate supplies of water are easily obtained from the glacial lake gravels in township 31, range 7, at depths less than 12 feet, and pockets of water-bearing sand and gravel that often outcrop at the surface are not particularly difficult to strike at depths less than 20 feet in the till plain of this township. Very few wells that tap aquifers above the blue clay in the remainder of the municipality yield moderate and reliable supplies of water at all times. Shallow wells that will yield sufficient water for 30 or more head of stock are rare. The water from shallow wells, except from a few in township 32, range 9, is rarely highly mineralized. It is mostly hard, usually not "alkaline", and is usable for drinking.

Numerous dry holes have been made in the glacial drift to a maximum depth of 150 feet in the four eastern townships, and the residents state that it is useless to search for water in the blue clay. No wells in the eastern 11 miles of the municipality

have tapped pockets of sand and gravel in the blue clay that yield water under pressure. Eleven wells in the western 7 miles of the municipality, however, obtain water under pressure from deposits of sand and gravel in the blue clay. Seven of these wells in townships 31 and 32, range 9, may have tapped a common water-bearing horizon between elevations of 1,645 and 1,686 feet, or at depths of 60 to 82 feet. The water in all the wells is under high pressure and in two wells, 75 and 74 feet deep, the pressure is sufficient to raise the water to points 5 and 12 feet above the surface. The supply of water from these eleven wells is abundant and variations in annual precipitation do not decrease the supply to any great extent. The water is hard, usually contains iron, and that from five wells was described as being "alkaline". A 60-foot well in township 31, range 9, yields hard, salty water. The water is used for drinking if shallow well water is not available. Four dry holes 60, 90, 120, and 150 feet deep were made in the NE.$\frac{1}{4}$, sec. 24, tp. 31, range 9.

Shallow dugouts are used by several farmers in the four eastern townships for conserving surface water for stock use in the late summer months. The excavation of these artificial reservoirs is highly recommended in this area, but existing dugouts are too shallow to be satisfactory. The dugout must be at least 12 feet deep to hold a permanent supply of water for the average farmer's requirements. A farmer who owns one of these deep dugouts and one or two shallow wells should experience no acute shortage of water.

Boring or drilling to depths less than 100 feet has generally been successful in townships 31 and 32, range 9, but drilling into the blue clay is not advised in the remaining townships.

Water-bearing Horizons in the Bedrock

The Marine Shale series underlies the glacial drift throughout the municipality. It is doubtful whether the two dry holes 150 feet deep, in township 31, range 9, and in township 32, range 7, have penetrated the glacial drift. It is believed that the Marine Shale series lies at depths greater than 150 feet in this municipality, although there is no definite evidence to corroborate this statement. In this part of Saskatchewan the Marine Shale series rarely contains deposits of water-bearing sands and gravels. The water, on the rare occasions when it has been obtained, was highly mineralized and unsuitable for stock. Drilling into the bedrock in search of water is not advisable in this municipality.

GROUND WATER CONDITIONS BY TOWNSHIPS

Township 31, Range 7

The elevation in this fractional township increases gradually from 1,720 feet at the southeastern corner of the township to 1,775 feet above sea-level at the northwestern corner. The southeastern part of the township is covered by glacial lake sands and gravels which, in some places, are at least 10 feet thick. Part of a moraine extends into the northern sections, and the remainder of the township is mantled by glacial till. The land is gently undulating, and is wooded with poplar. A drainage ditch has been excavated from the NW.$\frac{1}{4}$, section 31, diagonally across the township to the NE.$\frac{1}{4}$, section 13. This ditch carries surface water to a small tributary stream of Spirit creek in township 31, range 6.

Every well in the township has been dug by hand and no well exceeds a depth of 30 feet. Most of the wells are dug into deposits of gravel that extend from the top soil to the base of the well. A few producing wells tap pockets of sand and gravel that underlie 8 to 10 feet of yellow boulder clay. Water-bearing deposits of sand and gravel are not particularly difficult to locate, especially in the area mantled by glacial lake sands and gravels. The supply of water, however, is small and decreases in winter and years of drought. Two wells yielding an abundant supply are located in the NW.$\frac{1}{4}$, section 20, and the NE.$\frac{1}{4}$, section 36. The wells are 8 and 14 feet deep, and yield sufficient water for 50 and 40 head of stock, respectively. Approximately one-third of the farmers in the township are unable to obtain an adequate supply of water for stock. Although the supply of water from the wells is small, the quality of the water is good. The water is nearly always hard, suitable for drinking, and only three wells yield "alkaline" water.

Boring or drilling for water is not recommended in this township. Farmers are advised to prospect the upper 30 feet of the glacial drift with test augers prior to digging a well. In this manner a pocket of water-bearing sand or gravel may be tapped with the minimum expense and effort. Deep dugouts for conserving surface water would serve as valuable standbys for shallow wells during winter and drought years. To be satisfactory the dugout should be excavated in a location where the maximum amount of water will be collected, and it must be at least 12 feet deep.

Township 31, Range 8

Whitesand river flows in a southeasterly direction through the southwestern part of the township. The valley through which the river flows is about 30 feet deep and approximately one-quarter of a mile wide. The banks of the valley slope very gently to plain level, and the valley floor is littered with stones and boulders. The elevation decreases gradually from 1,775 feet at the northeastern corner of the township to approximately 1,690 feet at Whitesand river. This fractional township is covered by glacial till and is undulating, and wooded with poplar. The till plain for a distance of 2 miles east of Whitesand river has been modified by water action and this area is very stony and unsuitable for cultivation.

A flowing spring is located near Whitesand river in the SW.$\frac{1}{4}$, section 17. The water from the spring is hard, and the supply is sufficient for 60 head of stock.

The producing wells in the township are from 7 to 16 feet deep. Pockets of water-bearing sand and gravel are very difficult to locate in the upper 25 feet of the glacial drift particularly in the southern 2 miles of the township. Only nine wells in the township have struck pockets of sand and gravel that

yield a sufficient supply of water for the owner's requirements. The most productive wells, located in the SW.¼, section 34, and the SE.¼, section 36, are 10 and 8 feet deep and are dug in beds of gravel that extend from the top soil to the base of the well. The wells yield sufficient water for 60 and 70 head of stock, respectively. The supply of water from most of the wells, however, is very small and unreliable, and many wells become dry in winter. The shortage of ground water in this township was acute during the drought years of 1930 to 1934. Many farmers haul water from Whitesand river.

The only attempt to secure water at depths greater than 25 feet was made in the NE.¼, section 14. A dry hole, 90 feet deep, was bored in this quarter section. Further boring or drilling operations are not recommended in this township. Farmers are advised to excavate dugouts in slough basins to collect and conserve surface water. These dugouts must be at least 12 feet deep to be satisfactory.

Township 31, Range 9

The elevation of this fractional township decreases from 1,790 feet at the southwestern corner of section 18 to a minimum elevation of 1,697 feet at the shore-line of Newburn lake. A small area in sections 15 and 16 is covered by glacial lake sands, and a larger area in sections 22, 23, and 27, is mantled by glacial outwash sands and gravels. The remainder of the township is covered by glacial till. The land is slightly undulating in the southern part of the township, but becomes quite flat in the northern sections. Sloughs, large hay-marshes, and small lakes are common. Whitesand river flows through section 34 and empties into Newburn lake, which lies at an elevation of 1,697 feet in the NW.¼, section 35. The river flows from the lake in the SE.¼, section 35, in a southeasterly direction across section 25.

Silvery lake, at an elevation of 1,727 feet above sea-level, is the largest body of water in the township, and it covers an area of approximately 800 acres.

The shortage of ground water is not nearly as acute in this township as it is in township 31, range 8. This is due to the presence of so many lakes, and it is in many cases more convenient to drive stock to the lakes than to pump or bail water from wells. The distance of haul for farmers who must tank water is not great.

Most of the producing wells are dug to depths less than 30 feet. These wells usually tap pockets of sand and gravel beneath yellow, and occasionally red, clay. Three wells, 9, 12, and 12 feet deep, in the NE.$\frac{1}{4}$ and the NW.$\frac{1}{4}$, section 17, and the NE.$\frac{1}{4}$, section 18, tap an aquifer of grey sand that extends from the top soil to the base of the wells. The supply of water in these three wells is quite abundant and the water in the well in the NE.$\frac{1}{4}$, section 18, barely rises above the top of the well casing. The water is reported soft and that from the 9-foot well is slightly "alkaline". Another well, 7 feet deep, in the NE.$\frac{1}{4}$, section 13, yields an abundant supply of soft water. The remaining wells in the township less than 30 feet deep yield small but sufficient supplies of water.

Six wells, 40 to 75 feet deep, tap deposits of sand and gravel in the blue clay and yield water under hydrostatic pressure. Two wells, 72 and 68 feet deep, in the NE.$\frac{1}{4}$, section 22, and the NE.$\frac{1}{4}$, section 27, apparently tap the same aquifer at elevations of 1,651 feet and 1,660 feet above sea-level, respectively. The aquifer is a black gravel and the water rises to points 40 and 25 feet below the surface. The supply of water is abundant, but it has decreased in the 72-foot well due to a cave-in near the base of the well. The water is hard, and that in the 72-foot well is "alkaline", but it is used for drinking. A 60-foot

well in the SE.¼, section 33, taps a red sand aquifer at an elevation of 1,662 feet above sea-level and yields hard water that contains iron, and which is salty. The water is used for drinking.

A 75-foot well in the NW.¼, section 33, was drilled through 20 feet red clay, 55 feet blue clay, and struck grey sand at an elevation of 1,645 feet above sea-level. The water is under sufficient pressure to rise to a point 5 feet above the surface, and the supply is abundant and constant. The water is hard, contains iron, but is being used for drinking. The four wells, 60, 68, 72, and 75 feet deep, may possibly have tapped the same water-bearing horizon, but four dry holes 60, 90, 120, and 150 feet deep were drilled in the NE.¼, section 24. These dry holes are believed to be drilled entirely in glacial drift, although it is possible that the 150-foot well, whose base is at an elevation of 1,565 feet above sea-level, may have struck the Marine Shale series.

The only two farmers who are short of water are located in the SW.¼, section 15, and the NE.¼, section 24. The distance of haul for either farmer is not excessive. Large dugouts will conserve a permanent supply of surface water if they are at least 12 feet deep, and the site chosen is such that the maximum amount of water can be collected in the spring.

Township 32, Range 7

The elevation increases from 1,675 feet at the eastern side of section 13 to approximately 1,835 feet in the northwestern corner of the township. The southwestern part of the township is covered by moraine, and an area of about 125 acres, one-half mile east of Rama, is mantled by glacial outwash sands and gravels. The remainder of the township is covered by glacial till. The land is undulating, sloughs are numerous, and the township is

wooded with poplar. The ground surface in some sections is strewn with stones and boulders. Spirit creek flows intermittently in a southeasterly direction through sections 35, 26, 25, and 24. Two smaller tributary streams, originating in the NW.$\frac{1}{4}$, section 19, and the NW.$\frac{1}{4}$, section 32, flow east and slightly south across the township.

The producing wells in the township, with the exception of two wells 26 and 45 feet deep, which yield intermittent supplies of water, do not exceed a depth of 20 feet. Pockets of water-bearing sand and gravel in the upper 20 feet of the drift above the blue clay are generally not difficult to locate, but the supply of water obtained from these pockets is very small. Farmers experience great difficulty in obtaining a sufficient supply of water for stock, and in years of drought and during winters the shortage of water in the township is acute. Even in years of average rainfall over one-half the farmers are unable to obtain an adequate supply of well water. Most of the water from the wells is hard, but not highly mineralized and is usable for drinking. Surface water in sloughs is used by most farmers when possible for stock purposes. Cisterns to collect rain water, and shallow dugouts are also used by several farmers. The hamlet of Dernis obtains a small but sufficient supply of hard water from a well 10 feet deep. The hamlet of Rama owns two wells that yield an intermittent supply of water. Water is hauled into the hamlet during the winter and most of the summer months.

Attempts to obtain water at depths greater than 45 feet were made in the NE.$\frac{1}{4}$, section 13, and the SE.$\frac{1}{4}$, section 36. Several dry holes were bored to a maximum depth of 100 feet in the glacial drift in the NE.$\frac{1}{4}$, section 13, and three dry holes 100 feet deep and a dry hole 150 feet deep, were bored in the glacial drift in the SE.$\frac{1}{4}$, section 36.

The acute water shortage in this township could be alleviated by excavating dugouts or other artificial reservoirs for collecting and conserving surface water. Slough basins are usually suitable sites for dugouts, but the reservoir must be at least 12 feet deep to retain sufficient water from the spring floods for use during the summer and winter months. It is apparently useless to bore or drill into the blue clay in search of water-bearing pockets of sand and gravel.

Township 32, Range 8

The elevation in this township decreases 90 feet from the northeastern corner to the southwestern. A strip of country approximately 3 miles wide in the northeastern half of the township is covered by moraine. The northeastern corner and the southwestern half of the township are mantled by glacial till. The ground surface in the moraine-covered area is rolling, whereas in the till plain it is slightly undulating, becoming quite flat in the southwestern sections. The till plain in parts of sections 5 and 6 has been modified by water. The top soil in this small area is very stony and the land cannot be cultivated. Small, undrained depressions are common and the township is wooded with groves of poplar. The eastern part of Stonewall lake, a permanent body of water at an elevation of 1,782 feet above sea-level, lies within sections 19, 30, and 31. A drainage ditch has been excavated through sections 26, 35, and 34.

The ground water conditions of this township are better than they are in township 32, range 7, but they are far from being satisfactory. The wells are from 5 to 60 feet deep, but most of them do not exceed a depth of 20 feet. The producing wells less than 20 feet deep tap small pockets of sand and gravel that overlie the blue clay. These wells usually yield small supplies of water and are easily affected by variation in the

seasonal rainfall. Occasionally a well strikes a fairly large pocket of sand and gravel and the supply is above average. One such well, 6 feet deep in the SW.¼, section 2, yields sufficient water for 60 head of stock.

Most of the farmers who depend on shallow wells were very short of water for stock during the drought of 1930 to 1934. The water from wells that tap aquifers above the blue clay is generally not highly mineralized and is suitable for drinking. Only two farmers have been successful in obtaining permanent supplies of water under pressure from aquifers in the blue clay. Two wells 50 and 53 feet in the SW.¼ and the SE.¼, section 19, have tapped a common aquifer of grey quicksand at elevations of 1,725 and 1,727 feet above sea-level. The water rises to points 18 feet below the surface in both wells, and the supply is abundant and constant. The water is hard, contains iron, and is "alkaline". The water from the 50-foot well is used for drinking, but it would not be used for this purpose if water of better quality were available. Wells 50, 54, 60, and 50 feet deep, in the NW.¼, section 20, the SE.¼, section 25, the SE.¼, section 29, and the SW.¼, section 31, yield small seepages of water. A 100-foot dry hole was bored in the glacial drift in the SW.¼, section 21.

Boring or drilling to locate water-bearing pockets of sand and gravel in the blue clay is not advised in this township. Farmers would be better advised to excavate deep dugouts for conserving surface water. Sloughs and shallow dugouts are used by many farmers for watering stock, but the existing dugouts do not retain permanent supplies of water as they are made large and shallow, rather than small and deep. To be satisfactory a dugout should be at least 12 feet deep.

Township 32, Range 9

The entire township is mantled by glacial till and the land is slightly undulating to flat. The elevation decreases from

1,800 feet in the northeastern corner of the township to approximately 1,715 feet at the edge of Dog lake, and then rises to an elevation of 1,745 feet at the southwestern corner of the township. Shallow sloughs and large, flat, marshy areas are common. Whitesand river enters the township in the SW.¼, section 18, and flows into Dog lake. The river flows out of Dog lake in the NW.¼, section 8, and meanders southeasterly through sections 9, 4, and 3. Saline and Stonewall lakes in the northeastern part of the township are large, permanent bodies of water at elevations of 1,782 feet above sea-level. The lakes are connected by a small stream in the SW.¼, section 36. The overflow water from these two lakes is carried to Whitesand river by a small, intermittent stream that flows out of Saline lake in the NE.¼, section 26. The confluence of this creek and Whitesand river is in the NE.¼, section 4. The till plain throughout most of the southwestern half of the township has been modified by water action, and the ground surface is strewn with stones and boulders. This part of the township is not settled.

Surface water in sloughs and lakes is used by many farmers for stock. The water in Saline lake and Stonewall lake is "alkaline" and slightly salty. Small, flowing springs that yield hard, and slightly "alkaline" water were reported in the NW.¼, section 14, the NE.¼, section 20, and the SW.¼, section 23. Adequate supplies of water are difficult to obtain from pockets of sand and gravel in that part of the glacial drift that lies above the blue clay. In some cases as many as four or five shallow wells are required to meet stock requirements, and at least ten farmers in the township have been unable to secure a permanent supply of water from wells. Two of the most productive shallow wells, 20 and 8 feet deep, are located in the NW.¼, section 16, and the NW.¼, section 24. The 8-foot well will water 100 head of stock, although like most shallow wells the supply

decreased during the drought years of 1930 to 1934. The water from shallow wells in this township is usually more highly mineralized than that in other townships of the municipality.

Three wells, 80, 82, and 74 feet deep, in the NE.$\frac{1}{4}$, section 20, the NE.$\frac{1}{4}$, section 21, and the SW.$\frac{1}{4}$, section 31, have apparently tapped a common aquifer of fine sand in the blue clay at elevations of 1,670, 1,678, and 1,686 feet above sea-level, respectively. The water in these wells is under sufficient hydrostatic pressure to rise to points 30 and 25 feet below the surface in the 80 and 82-foot wells, and to a point 12 feet above the surface in the 74-foot well. The supply is abundant and not easily reduced by drought conditions. The water is hard and contains iron, and that from the 80-foot well is "alkaline", but it is being used for drinking. A 90-foot bored well in the SW.$\frac{1}{4}$, section 23, failed to strike the water-bearing horizon of fine sand. It is possible that four of the wells that yield water under pressure in township 31, range 9, including the 75-foot flowing artesian well, have tapped the same water-bearing horizon that was located by the three wells in this township.

STATISTICAL SUMMARY OF WELL INFORMATION IN PART OF RURAL MUNICIPALITY OF INVERMAY, NO. 305, SASKATCHEWAN

Township	31	31	31	32	32	32	Total No. in municipality
West of 2nd meridian Range	7	8	9	7	8	9	
Total No. of Wells in Township	38	25	27	73	56	44	263
No. of wells in bedrock	0	0	0	0	0	0	0
No. of wells in glacial drift	38	25	27	73	56	44	263
No. of wells in alluvium	0	0	0	0	0	0	0
Permanency of Water Supply							
No. with permanent supply	30	11	19	32	34	36	162
No. with intermittent supply	5	10	4	27	12	6	64
No. dry holes	3	4	4	14	10	2	37
Types of Wells							
No. of flowing artesian wells	0	0	2	0	0	1	3
No. of non-flowing artesian wells	0	0	5	0	2	2	9
No. of non-artesian wells	35	21	16	59	44	39	214
Quality of Water							
No. with hard water	34	20	16	52	42	42	206
No. with soft water	1	1	7	7	4	0	20
No. with salty water	0	0	1	0	0	0	1
No. with "alkaline" water	3	8	6	5	11	19	52
Depths of Wells							
No. from 0 to 50 feet deep	38	24	19	66	51	39	237
No. from 51 to 100 feet deep	0	1	6	6	4	5	22
No. from 101 to 150 feet deep	0	0	2	1	1	0	4
No. from 151 to 200 feet deep	0	0	0	0	0	0	0
No. from 201 to 500 feet deep	0	0	0	0	0	0	0
No. from 501 to 1,000 feet deep	0	0	0	0	0	0	0
No. over 1,000 feet deep	0	0	0	0	0	0	0
How the Water is Used							
No. usable for domestic purposes	33	20	23	56	37	36	205
No. not usable for domestic purposes	2	1	0	3	9	6	21
No. usable for stock	35	21	23	59	44	37	219
No. not usable for stock	0	0	0	0	2	5	7
Sufficiency of Water Supply							
No. sufficient for domestic needs	30	11	19	32	34	36	162
No. insufficient for domestic needs	5	10	4	27	12	6	64
No. sufficient for stock needs	25	10	18	25	26	27	131
No. insufficient for stock needs	10	11	5	34	20	15	95

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 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 Invermay, No. 305, Saskatchewan

LOCATION						Depth of Well, ft.	Total dis'vd solids	HARDNESS			CONSTITUENTS AS ANALYSED						CONSTITUENTS AS CALCULATED IN ASSUMED COMBINATIONS								Source of Water
No.	Qtr.	Sec.	Tp.	Rge.	Mer.			Total	Perm.	Temp.	Cl.	Alkalinity	CaO	MgO	SO_4	Na_2O	Solids	$CaCO_3$	$CaSO_4$	$MgCO_3$	$MgSO_4$	Na_2CO_3	Na_2SO_4	NaCl	
1	SW.	31	32	9	2	74	2,620	1,500	1,300	200	61	395	280	198	1,450	620	2,533	395	143		590		1,305	100	x1

Water samples indicated thus, x1, are from glacial drift.
Analyses are reported in parts per million.
Hardness is the soap hardness expressed as calcium carbonate ($CaCO_3$).
For interpretation of this table read the section on Analyses and Quality of Water.

Water from the Unconsolidated Deposits

No samples of water were collected from wells whose aquifers lie above blue clay, the most common type of well in this municipality. The water from those wells, except those in township 32, range 9, is generally not highly mineralized. It is nearly always hard, but it was rarely reported as being "alkaline". Wells that yield the best drinking water in the municipality are those that tap sand and gravel above the blue clay. The water from the shallow wells is probably a slightly mineralized, "sulphate" water, the sulphates of magnesium, sodium, and calcium being the most prominent mineral salts present.

A sample of the water from the flowing artesian well in township 32, range 9, was analysed and the results are tabulated in the accompanying table. The water has a total dissolved solid content of 2,620 parts per million. Sodium sulphate (Glauber's salt) is the predominant mineral salt, 1,305 parts per million. This large amount of sodium sulphate, together with 590 parts of magnesium sulphate (Epsom salts), will cause the water to be laxative on most people unaccustomed to its use. The water is essentially a "sulphate" water, which water is common in the glacial drift. It should impart no injurious effects to stock.

Water from the Bedrock

No wells in the municipality are deriving water from the Marine Shale series. Water from the Marine Shale, in this part of Saskatchewan, is almost invariably so highly mineralized with sodium sulphate, magnesium sulphate, and sodium chloride, that it cannot be used even for stock.

WELL RECORDS—Rural Municipality of INVERMAY, NO. 305, SASKATCHEWAN, (Part only)

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.	13	31	7	2	Dug	10	1,720	- 5	1,715	5	1,715	Glacial gravel	Soft		D, S	Sufficient for 8 head stock.
2	NW.	13	"	"	"	Dug	10	1,730	- 5	1,725	5	1,725	Glacial gravel	Hard		D, S	Sufficient for 12 head stock.
3	NE.	14	"	"	"	Dug	10	1,730	- 5	1,725	5	1,725	Glacial gravel	Hard		D, S	Sufficient for 10 head stock.
4	SE.	16	"	"	"	Dug	20	1,740									Dry hole in glacial drift.
5	NE.	16	"	"	"	Dug	10	1,740	- 4	1,736	4	1,736	Glacial gravel	Hard		D, S	Sufficient for 25 head stock.
6	NW.	16	"	"	"	Dug	5	1,745	- 2	1,743	2	1,743	Glacial gravel	Hard		D, S	Sufficient for 20 head stock.
7	NE.	17	"	"	"	Dug	15	1,750	- 8	1,742	8	1,742	Glacial gravel	Hard		D, S	Sufficient for 16 head stock.
8	SW.	17	"	"	"	Dug	7	1,745	- 1	1,744	1	1,744	Glacial gravel	Hard		D, S	Sufficient for 25 head stock.
9	NW.	17	"	"	"	Dug	10	1,745	- 7	1,738	7	1,738	Glacial gravel	Hard		D, S	Sufficient for 15 head stock.
10	SW.	19	"	"	"	Dug	8	1,750	- 4	1,746	4	1,746	Glacial gravel	Hard		D, S	Sufficient for 25 head stock.
11	NW.	19	"	"	"	Dug	8	1,755	- 5	1,750	5	1,750	Glacial gravel	Hard		D, S	Intermittent supply.
12	NE.	19	"	"	"	Dug	8	1,755	- 4	1,751	4	1,751	Glacial gravel	Hard		D, S	Insufficient for 30 head stock.
13	NW.	20	"	"	"	Dug	8	1,755	- 4	1,751	4	1,751	Glacial gravel	Hard		D, S	Sufficient for 50 head stock.
14	NW.	21	"	"	"	Dug	18	1,750	- 14	1,736			Glacial drift	Hard		D, S	Insufficient for 20 head stock; a 10-foot well in sand is also used.
15	SE.	21	"	"	"	Dug	10	1,745	- 5	1,740	5	1,740	Glacial gravel	Hard		D, S	Sufficient for 15 head stock.
16	SW.	22	"	"	"	Dug	16	1,745	- 6	1,739			Glacial drift	Hard, "alkaline"		D, S	Sufficient for 15 head stock.
17	SE.	22	"	"	"	Dug	8	1,745	- 2	1,743	2	1,743	Glacial gravel	Hard		D, S	Sufficient for 5 head stock.
18	NE.	22	"	"	"	Dug	10	1,750	- 3	1,747	3	1,747	Glacial gravel	Hard		D, S	Sufficient for 9 head stock; a 7-foot well is also used.
19	NW.	23	"	"	"	Dug	30	1,750	- 15	1,735			Glacial drift	Hard		D, S	Sufficient for 8 head stock.
20	NE.	23	"	"	"	Dug	10	1,745	- 5	1,740	5	1,740	Glacial sand	Hard		D, S	Sufficient for 25 head stock.
21	SE.	24	"	"	"	Dug	15	1,730	- 7	1,723	7	1,723	Glacial gravel	Hard		D, S	Intermittent supply; a 12-foot well is also used.
22	SE.	25	"	"	"	Dug	12	1,725	- 9	1,716	9	1,716	Glacial sand	Hard, "alkaline"		D, S	Sufficient for 35 head stock.
23	NW.	25	"	"	"	Dug	14	1,745	- 6	1,739	6	1,739	Glacial sand	Hard		D, S	Sufficient for 40 head stock.
24	SE.	27	"	"	"	Dug	15	1,750	0	1,750	8	1,742	Glacial gravel	Hard		S	Insufficient for 9 head stock.
25	SW.	27	"	"	"	Dug	12	1,750	- 6	1,744			Glacial drift	Hard		D, S	Insufficient for 12 head stock.
26	SE.	28	"	"	"	Dug	6	1,750	0	1,750	0	1,750	Glacial gravel	Hard		D, S	Sufficient for 10 head stock.
27	SW.	28	"	"	"	Dug	16	1,750									Dry hole in glacial drift.

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 INVERMAY, NO. 305, SASKATCHEWAN, (Part only).

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	SE.	30	31	7	2	Dug	8	1,755	- 6	1,749	6	1,749	Glacial gravel	Hard		D, S	Intermittent supply.
29	NE.	30	"	"	"	Dug	8	1,760	- 4	1,756	4	1,756	Glacial gravel	Hard		D, S	Sufficient for 15 head stock.
30	NE.	34	"	"	"	Dug	10	1,760	- 5	1,755	5	1,755	Glacial gravel	Hard		D, S	Sufficient for 10 head stock.
31	NW.	35	"	"	"	Dug	20	1,760									Dry hole in glacial drift.
32	SE.	35	"	"	"	Dug	14	1,750	- 8	1,742	8	1,742	Glacial gravel	Hard		D, S	Intermittent supply; another 8-foot well yields a poor supply.
33	SE.	36	"	"	"	Dug	8	1,720	- 4	1,716	4	1,716	Glacial gravel	Hard,		D, S	Sufficient for 15 head stock.
34	NE.	36	"	"	"	Dug	14	1,710	- 8	1,702	10	1,700	Glacial gravel	Hard, "alkaline"		S	Sufficient for 40 head stock.
1	SE.	13	31	8	2	Dug	11	1,740	0	1,740			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
2	NE.	13	"	"	"	Dug	9	1,745	- 5	1,740	7	1,738	Glacial gravel	Hard		D, S	Intermittent supply.
3	NW.	13	"	"	"	Dug	12	1,740	0	1,740			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
4	NE.	14	"	"	"	Bored	90	1,740									Dry hole in glacial drift.
5	SE.	15	"	"	"	Dug	16	1,730	- 12	1,718			Glacial drift	Hard, "alkaline"		S	Intermittent supply.
6	NW.	16	"	"	"	Dug	16	1,725	- 12	1,713	12	1,713	Glacial gravel	Hard, "alkaline"		D, S	Intermittent supply.
7	SW.	17	"	"	"	Spring		1,700					Glacial gravel	Hard		D, S	Sufficient for 60 head stock.
8	SW.	19	"	"	"	Dug	25	1,705									Dry hole in glacial drift.
9	NE.	20	"	"	"	Dug	14	1,720	- 11	1,709			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
10	NE.	21	"	"	"	Dug	14	1,730	- 11	1,719			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
11	NW.	23	"	"	"	Dug	10	1,740	- 4	1,736	4	1,736	Glacial gravel	Hard		D, S	Sufficient for 32 head stock.
12	SE.	23	"	"	"	Dug	20	1,745									Dry hole in glacial drift.
13	NE.	23	"	"	"	Dug	15	1,745									Dry hole in glacial drift.
14	NE.	24	"	"	"	Dug	10	1,755	- 6	1,749	6	1,749	Glacial gravel	Hard		D, S	Sufficient for 10 head stock.
15	SE.	25	"	"	"	Dug	10	1,755	- 6	1,749	8	1,747	Glacial gravel	Hard		D, S	Insufficient for 20 head stock.
16	NE.	26	"	"	"	Dug	12	1,755	- 1	1,754			Glacial drift	Hard		D, S	Intermittent supply.
17	NE.	27	"	"	"	Dug	10	1,745	- 5	1,740	5	1,740	Glacial gravel	Hard		D, S	Sufficient for 25 head stock.
18	NW.	28	"	"	"	Dug	7	1,740	- 5	1,735	5	1,735	Glacial fine sand	Hard		D, S	Sufficient for 12 head stock.
19	NW.	33	"	"	"	Dug	7	1,750	- 2	1,748	2	1,748	Glacial gravel	Hard		D, S	Sufficient for 4 head stock.
20	SW.	34	"	"	"	Dug	10	1,750	- 3	1,747	3	1,747	Glacial gravel	Hard		D, S	Sufficient for 60 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 3 INVERMAY, NO. 305, SASKATCHEWAN, (Part only).

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
21	NW.	35	31	8	2	Dug	8	1,760	- 2	1,758	2	1,758	Glacial gravel	Hard		D, S	Sufficient for 13 head stock.
22	NE.	35	"	"	"	Dug	8	1,760	0	1,760			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
23	NW.	36	"	"	"	Dug	9	1,770	- 6	1,764	6	1,764	Glacial gravel	Soft		D, S	Sufficient for 6 head stock.
24	SE.	36	"	"	"	Dug	8	1,765	- 3	1,762	3	1,762	Glacial gravel	Hard		D, S	Sufficient for 70 head stock.
25	NE.	36	"	"	"	Dug	12	1,765	0	1,765			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
1	NE.	13	31	9	2	Dug	7	1,715	- 3	1,712	3	1,712	Glacial gravel	Soft		D, S	Plenty of water.
2	SW.	15	"	"	"	Dug	30	1,745	0	1,745			Glacial drift	Hard, "alkaline"		D	Intermittent supply; two wells 8 and 16 feet deep, also yield poor supplies; stock water at sloughs.
3	SW.	16	"	"	"	Dug	16	1,750	- 8	1,742			Glacial sand	Hard		D, S	Sufficient supply; stock also water at a lake.
4	NE.	17	"	"	"	Dug	9	1,755	- 5	1,750	5	1,750	Glacial grey sand	Soft, "alkaline"		D, S	Sufficient supply.
5	NW.	17	"	"	"	Dug	12	1,745	- 9	1,736	9	1,736	Glacial grey sand	Soft		D, S	Sufficient supply.
6	NE.	18	"	"	"	Dug	12	1,750	+ 1	1,751			Glacial grey sand	Soft		D, S	Good supply; the supply decreased during the drought.
7	SW.	19	"	"	"	Dug	8	1,755	- 2	1,753			Glacial sand	Soft		D, S	Sufficient supply.
8	NW.	20	"	"	"	Dug	20	1,730	- 15	1,715	15	1,715	Glacial sand	Soft		D	Stock are watered at a lake.
9	NE.	22	"	"	"	Bored	72	1,720	- 40	1,680	69	1,651	Glacial black gravel	Hard, "alkaline"		D, S	Abundant supply until the well partly caved in.
10	NE.	23	"	"	"	Dug	16	1,720	- 7	1,713	9	1,711	Glacial sand	Hard		D, S	Sufficient supply.
11	SE.	23	"	"	"	Dug	14	1,725			9	1,716	Glacial sand	Hard		D, S	Sufficient supply.
12	SE.	24	"	"	"	Dug	16	1,715	- 4	1,711	11	1,704	Glacial sand	Hard		D, S	Sufficient supply.
13	NE.	24	"	"	"	Drilled	150	1,715									Dry hole, probably in galcial drift; 3 other dry holes 60, 90 and 120 feet deep.
14	NW.	25	"	"	"	Bored	40	1,710	- 10	1,700	40	1,670	Glacial sand	Hard, "alkaline"		D	A 15-foot well is also used; stock are watered at a lake; plenty of water.
15	NE.	27	"	"	"	Bored	68	1,710	- 25	1,685	50	1,660	Glacial black gravel	Hard		D, S	Abundant supply.
16	NW.	28	"	"	"	Dug	8	1,735	- 3	1,732			Glacial sandy clay	Hard		D	Intermittent supply; stock water at a lake.
17	SE.	30	"	"	"	Dug	40	1,750	- 12	1,738	40	1,710	Glacial fine sand	Hard		D, S	Abundant supply.
18	NW.	30	"	"	"	Dug	28	1,755	- 24	1,731	26	1,729	Glacial sand	Hard		D, S	Sufficient supply.
19	SE.	31	"	"	"	Dug	20	1,745	- 10	1,735			Glacial gravel	Soft		D, S	Sufficient supply.
20	NW.	33	"	"	"	Drilled	75	1,720	+ 5	1,725	75	1,645	Glacial grey sand	Hard, iron		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 INVERMAY, NO. 305, SASKATCHEWAN, (Part only)

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
21	SE.	33	31	9	2	Bored & Drilled	60	1,720	- 20	1,700	58	1,662	Glacial red sand	Hard, iron, salty		D, S	Sufficient for at least 40 head stock.
1	SW.	1	32	7	2	Dug	16	1,740	- 10	1,730	10	1,730	Glacial sand	Hard, iron, "alkaline"		D	Poor supply; melts snow in winter for stock.
2	SE.	1	"	"	"	Dug	14	1,720	- 9	1,711	9	1,711	Glacial sand	Hard		D, S	Poor supply; 2 other shallow wells yield small supplies of water. Insufficient supply in summer.
3	NE.	2	"	"	"	Dug	8	1,750	- 4	1,746	4	1,746	Glacial sand	Hard, "alkaline"		D, S	Sufficient supply.
4	NW.	2	"	"	"	Dug	8	1,755	- 4	1,751	4	1,751	Glacial sand	Soft		D, S	Stock are watered at sloughs.
5	SE.	3	"	"	"	Dug	10	1,760	0	1,760			Glacial sand	Hard, "alkaline"		S	Intermittent supply; hauls water.
6	SW.	3	"	"	"	Dug	9	1,765	- 8	1,757			Glacial drift	Hard		[illegible]	Intermittent supply.
7	SW.	4	"	"	"	Dug	12	1,770	- 6	1,764			Glacial sandy clay	Hard		D, S	Intermittent supply; an 18-foot well also yields a poor supply.
8	NW.	4	"	"	"	Dug	5	1,780	- 2	1,778	2	1,778	Glacial sand	Hard		D, S	Sufficient supply.
9	NW.	5	"	"	"	Dug	16	1,780	- 11	1,769	11	1,769	Glacial sand	Hard		D, S	Sufficient supply.
10	SW.	5	"	"	"	Dug	8	1,775	- 4	1,771			Glacial sand	Hard		D, S	Intermittent supply.
11	NE.	6	"	"	"	Dug	14	1,785	- 8	1,777	8	1,777	Glacial gravel	Hard		S	Sufficient supply.
12	NW.	7	"	"	"	Dug	45	1,800	- 40	1,760			Glacial sand	Hard		D	Well was dry in 1931; 3 other wells 15 feet deep yield small supplies; melts snow in winter.
13	NE.	9	"	"	"	Dug	8	1,780	- 5	1,775	5	1,775	Glacial sand	Hard		D, S	Sufficient supply.
14	NE.	10	"	"	"	Dug	10	1,755	- 4	1,751	4	1,751	Glacial sand	Hard		D, S	Sufficient supply.
15	SW.	12	"	"	"	Dug	12	1,725	- 9	1,716	9	1,716	Glacial sand	Hard		D, S	Sufficient supply.
16	SE.	12	"	"	"	Dug	10	1,695	- 6	1,689	6	1,689	Glacial sand	Hard		D	Well in hamlet of Dernic; sufficient supply.
17	NE.	12	"	"	"	Dug	10	1,685	- 6	1,679	6	1,679	Glacial sand	Hard		D, S	Sufficient supply.
18	NE.	13	"	"	"	Bored	100	1,690									One of several dry holes in glacial drift; hauls water.
19	NW.	14	"	"	"	Dug	15	1,735	- 12	1,723	12	1,723	Glacial sand	Soft		D, S	Sufficient supply.
20	NE.	16	"	"	"	Dug	10	1,750	- 6	1,744	6	1,744	Glacial sand	Hard		D, S	Sufficient supply.
21	NE.	17	"	"	"	Dug	15	1,800									One of several shallow dry holes in glacial drift.
22	NW.	18	"	"	"	Dug	8	1,815	0	1,815			Glacial drift	Hard		D, S	Intermittent supply.
23	SW.	19	"	"	"	Dug	20	1,820	- 12	1,808			Glacial sand	Hard		D	One of two shallow wells in the village of Rama; insufficient supply; water is hauled in winter and part of summer.
24	NW.	19	"	"	"	Dug	10	1,820	- 6	1,814	6	1,814	Glacial sand	Soft		D, S	Abundant supply; four farmers haul from this well in winter.

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 INVERMAY, NO. 305, SASKATCHEWAN, (Part only).

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
25	NE.	19	32	7	2	Dug	12	1,815	- 9	1,806			Glacial drift	Hard		D, S	Intermittent supply; hauls water from well in NW.¼, section 19.
26	NW.	20	"	"	"	Dug	10	1,810	- 7	1,803	7	1,803	Glacial sand	Hard		D, S	Intermittent supply.
27	NW.	21	"	"	"	Dug	16	1,800	- 8	1,792			Glacial sand	Soft		D, S	Intermittent supply; another 12-foot well also yields a poor supply.
28	NE.	21	"	"	"	Dug	20	1,785					Glacial drift	Hard		D, S	One of several intermittent wells.
29	NW.	22	"	"	"	Dug	12	1,780	- 6	1,774			Glacial sand	Hard, iron		D, S	Intermittent supply; an 8-foot well yields sufficient water for 25 head stock.
30	SE.	22	"	"	"	Dug	14	1,750									Dry hole in glacial drift.
31	SE.	23	"	"	"	Dug	16	1,715									One of several dry holes 10 to 16 feet deep.
32	NW.	24	"	"	"	Dug	9	1,710	- 6	1,704	6	1,704	Glacial sand	Hard		D, S	Sufficient for 16 head stock.
33	SE.	24	"	"	"	Dug	10	1,695	- 5	1,690	5	1,690	Glacial sand	Hard		D, S	Sufficient supply.
34	SE.	26	"	"	"	Dug	15	1,725	- 12	1,713	12	1,713	Glacial sand	Hard		D, S	Sufficient supply.
35	SE.	27	"	"	"	Dug	12	1,740	- 6	1,734	6	1,734	Glacial sand	Hard, "alkaline"		D, S	Intermittent supply in winter.
36	NE.	27	"	"	"	Dug	12	1,750	- 6	1,744	6	1,744	Glacial sand	Hard, "alkaline"		D, S	Sufficient supply.
37	NE.	28	"	"	"	Dug	15	1,775					Glacial sand	Hard		D, S	Insufficient supply in winter.
38	SE.	28	"	"	"	Dug	7	1,785	0	1,785	0	1,785	Glacial sand	Hard		D, S	Sufficient supply.
39	SE.	30	"	"	"	Dug	15	1,815	- 7	1,808			Glacial sand	Hard		D, S	Insufficient supply in winter.
40	NW.	31	"	"	"	Dug	14	1,825	- 10	1,815			Glacial sand	Hard		D, S	Sufficient supply.
41	NE.	31	"	"	"	Dug	12	1,820	- 6	1,814	6	1,814	Glacial sand	Soft		D, S	Sufficient supply.
42	NW.	32	"	"	"	Dug	10	1,820	0	1,820			Glacial sand	Hard		S	Intermittent supply in drought years; a 20-foot well yields sufficient water for the house.
43	NE.	32	"	"	"	Dug	15	1,800	- 5	1,795	5	1,795	Glacial sand	Soft		D, S	Sufficient supply.
44	NE.	34	"	"	"	Dug	12	1,760	- 6	1,754			Glacial drift	Hard		D, S	Intermittent supply.
45	SE.	34	"	"	"	Dug	26	1,750	- 24	1,726			Glacial sand	Hard		D, S	Intermittent supply; 2 other wells 6 and 10 feet deep yield a very small supply.
46	NW.	34	"	"	"	Dug	12	1,780					Glacial sand	Hard		D, S	Sufficient supply; farmers haul drinking water from this well.
47	SE.	35	"	"	"	Dug	14	1,740	- 12	1,728	12	1,728	Glacial sand	Hard		D, S	Sufficient supply.
48	SW.	36	"	"	"	Dug	16	1,740	- 10	1,730	10	1,730	Glacial sand	Hard,		D, S	One of two shallow wells; sufficient supply.
49	SE.	36	"	"	"	Bored	150	1,740									Dry hole in glacial drift; 3 dry holes 100 feet deep; uses sloughs and hauls water.
1	SW.	2	32	8	2	Dug	6	1,770	- 3	1,767	3	1,767	Glacial fine sand	Soft		D, S	Sufficient for 60 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 INVERMAY, NO. 305, 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	SE.	3	32	8	2	Dug	6	1,765	- 3	1,762	3	1,762	Glacial fine sand	Hard, iron, "alkaline"		S	Sufficient supply.
3	SW.	3	"	"	"	Dug	8	1,760	- 5	1,755	5	1,755	Glacial gravel	Hard, "alkaline"		D, S	Intermittent supply.
4	NW.	3	"	"	"	Dug	8	1,770	- 5	1,765	5	1,765	Glacial gravel	Hard, "alkaline"		D, S	Sufficient supply.
5	NE.	4	"	"	"	Dug	10	1,760	- 6	1,754	6	1,754	Glacial gravel	Hard		D, S	One of two similar wells; sufficient supply.
6	SE.	4	"	"	"	Dug	8	1,755	- 4	1,751	4	1,751	Glacial gravel	Hard		D, S	Sufficient supply.
7	SW.	4	"	"	"	Dug	8	1,750	- 6	1,744			Glacial sand	Hard, "alkaline"		S	Intermittent supply.
8	NW.	4	"	"	"	Dug	9	1,760	- 4	1,756	4	1,756	Glacial sand and gravel	Hard		D, S	Sufficient supply.
9	NE.	5	"	"	"	Dug	7	1,760	- 3	1,757	3	1,757	Glacial gravel	Hard		D, S	Sufficient supply.
10	SE.	7	"	"	"	Dug	20	1,760	- 17	1,743			Glacial drift	Hard		D, S	Intermittent supply; several shallow dry holes.
11	NE.	7	"	"	"	Dug	5	1,770	- 2	1,768	2	1,768	Glacial gravel	Soft		D, S	Sufficient supply
12	NE.	8	"	"	"	Dug	7	1,775	- 4	1,771	4	1,771	Glacial gravel	Hard		D, S	Sufficient supply.
13	SE.	8	"	"	"	Dug	7	1,765	- 3	1,762	3	1,762	Glacial gravel	Hard		D, S	Sufficient supply.
14	SW.	9	"	"	"	Dug	6	1,765	- 3	1,762	3	1,762	Glacial gravel	Hard		D, S	Intermittent supply in winter.
15	NW.	10	"	"	"	Dug	6	1,780	- 3	1,777	3	1,777	Glacial gravel	Hard		D, S	Sufficient supply.
116	NW.	11	"	"	"	Dug	8	1,780	- 4	1,776	4	1,776	Glacial gravel	Hard		D, S	Sufficient supply.
17	SE.	12	"	"	"	Dug	6	1,790	- 4	1,786	4	1,786	Glacial fine sand	Soft		D, S	Sufficient supply.
18	NE.	12	"	"	"	Dug	20	1,795									Dry hole in glacial drift.
19	NE.	13	"	"	"	Dug	12	1,815	0	1,815	5	1,810	Glacial sand	Hard		D, S	One of several intermittent wells; hauls water.
20	SE.	15	"	"	"	Dug	10	1,790	- 6	1,784	6	1,784	Glacial fine sand	Hard		D, S	Sufficient supply.
21	NE.	15	"	"	"	Dug	10	1,800					Glacial drift	Soft		D	Intermittent supply; a 4-foot well is used for stock; hauls water.
22	NW.	15	"	"	"	Dug	10	1,800	- 6	1,794	6	1,794	Glacial gravel	Hard		D, S	Sufficient supply.
23	NW.	16	"	"	"	Dug	8	1,790	- 4	1,786	4	1,786	Glacial gravel	Hard		D, S	Sufficient supply.
24	SW.	19	"	"	"	Dug	50	1,775	- 18	1,757	50	1,725	Glacial fine sand	Hard, iron, "alkaline"		D, S	Abundant supply.
25	SE.	19	"	"	"	Bored	53	1,780	- 18	1,762	53	1,727	Glacial fine sand	Hard, iron, "alkaline",		S	Abundant supply; an 18-foot well is used for drinking water.
26	NW.	20	"	"	"	Bored	50	1,790	- 48	1,742			Glacial drift	Hard, iron, "alkaline"		N	Water is too mineralized for use; hauls water.
27	SW.	21	"	"	"	Bored	110	1,795									Dry hole in glacial drift.
28	SE.	22	"	"	"	Dug	10	1,710	- 6	1,804			Glacial drift	Hard		D, S	Sufficient for house use only; one of several dry holes in glacial drift.

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 INVERMAY, NO. 305, 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	SE.	25	32	8	2	Bored	54	1,825									One of several dry holes in glacial drift.
30	NE.	25	"	"	"	Dug	20	1,830									Dry hole in glacial drift.
31	SW.	25	"	"	"	Dug	14	1,825	- 9	1,816			Glacial gravel	Hard		S	Sufficient for 40 head stock; an 18-foot well is used for drinking water.
32	SE.	27	"	"	"	Dug	9	1,820	- 3	1,817	3	1,817	Glacial sand	Hard, "alkaline"			Sufficient supply.
33	SE.	28	"	"	"	Dug	15	1,810	- 7	1,803			Glacial gravel	Hard		D, S	Insufficient supply.
34	NE.	28	"	"	"	Dug	15	1,815	- 10	1,805	10	1,805	Glacial sand	Hard		D, S	Sufficient supply.
35	SE.	29	"	"	"	Dug	60	1,800	- 56	1,744			Glacial fine sand	Hard, "alkaline"		N	Intermittent supply and water is highly mineralized; a 10-foot well is dry in winter.
36	NE.	29	"	"	"	Bored	25	1,810	- 19	1,791			Glacial gravelly clay	Hard, "alkaline"		S	Sufficient for stock; hauls drinking water.
37	SW.	31	"	"	"	Dug	50	1,765	- 23	1,762			Glacial sand	Hard		D	Sufficient for house use only; stock water at a lake.
38	NW.	31	"	"	"	Bored	36	1,800	- 20	1,780			Glacial gravel	Hard		D, S	Insufficient supply; hauls water.
39	SE.	31	"	"	"	Bored	46	1,800	- 26	1,774			Glacial sand	Hard		D, S	Sufficient but supply decreases in winter.
40	SW.	32	"	"	"	Bored	40	1,805					Glacial gravelly clay	Hard		S	Sufficient for stock; hauls drinking water.
41	SE.	34	"	"	"	Dug	10	1,825	- 3	1,822			Glacial sandy clay	Soft		D, S	Insufficient for 14 head stock.
42	NW.	35	"	"	"	Dug	17	1,835	- 9	1,826			Glacial gravel	Hard		D, S	Plenty of water.
43	NW.	36	"	"	"	Dug	14	1,835	- 8	1,827			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply.
1	SE.	12	32	9	2	Dug	17	1,745	- 16	1,729	16	1,729	Glacial black sand	Hard		D, S	Sufficient supply; 3 other shallow wells yield "alkaline" water.
2	NW.	12	"	"	"	Dug	11	1,750					Glacial drift	Hard, "alkaline"		D, S	Barely sufficient for 4 head stock; owns two other similar wells.
3	NW.	13	"	"	"	Bored	45	1,760									Dry hole in glacial drift.
4	SE.	14	"	"	"	Dug	10	1,755	- 7	1,748	7	1,748	Glacial gravel	Hard, "alkaline"		D, S	Sufficient for 10 head stock.
5	NE.	14	"	"	"	Dug	14	1,765	- 6	1,759			Glacial drift	Hard, "alkaline"		D, S	Insufficient supply.
6	NW.	14	"	"	"	Spring		1,755					Glacial gravel	Hard, "alkaline"		D, S	Sufficient supply.
7	NW.	16	"	"	"	Dug	20	1,750	- 10	1,740	10	1,740	Glacial gravel	Hard		D, S	Plenty of water.
8	NE.	20	"	"	"	Bored	80	1,750	- 30	1,720	80	1,670	Glacial fine sand	Hard, iron, "alkaline"		D, S	Abundant supply; used springs for stock before well was bored.
9	NE.	21	"	"	"	Bored	82	1,760	- 25	1,735	82	1,678	Glacial fine sand	Hard, iron		D, S	Abundant supply.
10	SE.	21	"	"	"	Bored	57	1,750	- 22	1,728			Glacial drift	Hard, "alkaline"		D, S	Poor supply and hauls water.
11	SW.	22	"	"	"	Dug	10	1,750	0	1,750			Glacial sand	Hard, "alkaline"		D, S	Sufficient supply.
12	SW.	23	"	"	"	Bored	90	1,765					Glacial drift	Hard, very "alkaline"		N	A spring and two wells 7 and 8 feet deep in a ravine are used.
13	NW.	23	"	"	"	Dug	6	1,775	0	1,775			Glacial sand	Hard		D	A lake is used for watering 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 INVERMAY, NO. 305, 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
14	SW.	24	32	9	2	Dug	12	1,775	- 6	1,769			Glacial sand and gravel	Hard		D, S	Plenty of water.
15	NW.	24	"	"	"	Dug	8	1,780	0	1,780	4	1,776	Glacial sand	Hard		D, S	Sufficient for 100 head stock.
16	NE.	26	"	"	"	Dug	10	1,790	- 4	1,786			Glacial drift	Hard		D, S	Sufficient supply.
17	SW.	27	"	"	"	Dug	30	1,770	- 15	1,755			Glacial drift	Hard, "alkaline"		D, S	Intermittent supply; 3 other wells 10 to 15 feet deep yield small supplies; use lake for stock.
18	NW.	27	"	"	"	Dug	10	1,780									Dry hole in glacial drift; hauls water from a lake.
19	NE.	28	"	"	"	Dug	24	1,765	- 14	1,751			Glacial sand	Hard		D, S	Insufficient supply.
20	SW.	28	"	"	"	Dug	25	1,760					Glacial drift	Hard, iron, "alkaline"		N	Intermittent supply; water is too "alkaline" for use.
21	SE.	30	"	"	"	Dug	10	1,750	- 7	1,743	7	1,743	Glacial fine sand	Hard		D, S	Sufficient supply.
22	SW.	31	"	"	"	Bored	74	1,760	+ 12	1,772	74	1,686	Glacial fine sand	Hard, iron		D, S	Abundant supply; #.
23	NW.	32	"	"	"	Dug	10	1,765	- 7	1,758	7	1,758	Glacial sand	Hard		S	Sufficient supply; several other shallow wells yield small supplies of water.
24	SW.	32	"	"	"	Dug	10	1,760	- 7	1,753	7	1,753	Glacial fine sand	Hard		D, S	Sufficient supply.
25	SE.	33	"	"	"	Dug	12	1,770	- 6	1,764			Glacial drift	Hard		D, S	Insufficient supply.
26	SE.	35	"	"	"	Bored	15	1,795	- 6	1,789			Glacial sand	Hard		D	A 4-foot well is used for stock; plenty of water.
27	NE.	36	"	"	"	Dug	28	1,800	- 25	1,775			Glacial drift	Hard, "alkaline"		D, S	Poor supply; hauls water from a lake.

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.