
**FEASIBILITY OF ARTIFICIAL RECHARGE
TO THE OAKES AQUIFER,
SOUTHEASTERN NORTH DAKOTA:
GROUND-WATER DATA
VOLUME 1A
RECORDS AND LITHOLOGIC LOGS
OF WELLS AND TEST HOLES**

**By Robert B. Shaver
and Michael H. Hove**

**Water Resources Investigation No. 6
North Dakota State Water Commission**



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**SELECTED FACTORS FOR CONVERTING
INCH-POUND UNITS TO THE INTERNATIONAL SYSTEM (SI)
OF METRIC UNITS**

For those readers who may prefer to use the International System (SI) of metric units rather than inch-pound units, the conversion factors for the terms used in this report are given below.

Multiply inch-pound unit	by	to obtain SI unit
Acre	0.4047	hectare (ha)
Foot (ft)	0.3048	meter (m)
Inch (in)	25.4	millimeter (mm)

National Geodetic Vertical Datum of 1929 (NGVD of 1929): A geodetic datum derived from a general adjustment of the first-order nets of both the United States and Canada, formerly called "mean sea level."

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INTRODUCTION

In 1957, the U.S. Bureau of Reclamation redesigned the Pick-Sloan Missouri River Basin Plan enacted by Congress in the Flood Control Act of 1944. Under the redesigned plan, 1,007,120 acres of land were to be irrigated in central and eastern North Dakota using Missouri River water diverted eastward from the Garrison Reservoir. The plan designated 108,000 acres of land to be irrigated in the Oakes area, southeastern North Dakota.

In 1965, Congress enacted legislation to authorize construction of the 250,000-acre Garrison Diversion Unit as the initial stage of the ultimate 1,007,120-acre project. The 1965 authorization designated 45,980 acres to be irrigated in the East and West Oakes irrigation development tracts of the Garrison Diversion Unit. Missouri River water would be diverted eastward to the James River via the McClusky Canal, Lonetree Reservoir, New Rockford Canal, and the James River Feeder Canal. Because channel capacity of the James River was insufficient to meet peak irrigation demands for the East and West Oakes irrigation development tracts, the U.S. Bureau of Reclamation proposed construction of Lake Taayer Reservoir.

The Garrison Diversion Unit, as authorized in 1965, raised significant issues of environmental, economic, and international concern. As a result, in accordance with Public Law 98-360, sec. 207, enacted by Congress July 16, 1984, a 12-member commission was appointed by the Secretary of the Interior to "examine, review, evaluate, and make recommendations with regard to the contemporary water development needs of the State of North Dakota." Concerning

irrigation in the Oakes area, the Garrison Diversion Unit Commission recommended the following in December 1984:

- 1) Reduce the 45,980 acres to be irrigated under the 1965 authorization to 23,660 acres (West Oakes = 19,660 acres; West Oakes extension = 4,000 acres);
- 2) deauthorize construction of Lake Taayer Reservoir; and
- 3) initiate a feasibility study to assess artificial recharge to the Oakes aquifer as an alternative to a surface reservoir (Garrison Diversion Unit Commission, 1984).

Based on recommendations of the Garrison Diversion Unit Commission, the Congress of the United States passed the Garrison Diversion Unit Reformulation Act of 1986. The act directed the Secretary of the Interior to submit a comprehensive report to Congress no later than the end of fiscal year 1988. The report would include the results of an artificial-recharge feasibility study for the Oakes aquifer. Under the proposed artificial-recharge plan, the Oakes aquifer would function as a storage reservoir. Water would be diverted from the Missouri River to the James River and then into recharge facilities at selected sites in the aquifer. Withdrawals for irrigation would be from wells completed in the Oakes aquifer.

In July 1985, the North Dakota State Water Commission and the U.S. Geological Survey entered into a cooperative agreement with the U.S. Bureau of Reclamation to investigate the feasibility of artificial recharge to the Oakes aquifer, southeastern North Dakota (fig.1). The feasibility study was divided into three phases. Phase I defines the geometric, hydraulic, and hydrochemical properties of the Oakes aquifer. Field work was initiated in August 1985 and completed in April 1986. Results of phase I of the artificial-recharge feasibility study are described in North Dakota State Water Commission Water-Resources Investigations No. 5 and 6. Investigation No. 5 (Shaver and Schuh, 1990) describes the hydrogeology of the Oakes aquifer. Investigation No. 6 (Shaver and Hove, 1990) presents the ground-water data, which consists of records and lithologic logs of test holes and wells in T.128 N., R.60 W. through T.130 N., R.58 W. (volume 1A - this report), records and lithologic logs of test

holes and wells in T.130 N., R.59 W. through T.131 N., R.59 W. (volume 1B) water-level measurements (volume 2), and water-quality analyses (volume 2).

Phase II of the artificial-recharge feasibility study describes the selection, construction, maintenance, and performance evaluation of surface-recharge test facilities in the Oakes aquifer. Water used to perform the recharge tests was diverted from the James River. Field work was initiated in May 1986 and completed in November 1987. Results of phase II of the artificial-recharge feasibility study are presented in North Dakota State Water Commission Water-Resources Investigation No. 7 (Schuh and Shaver, 1988) and U.S. Geological Survey Water Resources Investigations Report 89-41122 (Huff and Wald, 1989). The report, prepared by the North Dakota State Water Commission, describes infiltration through recharge basins, physical processes that affected infiltration, and operational and maintenance techniques used to enhance infiltration rates. The report prepared by the U.S. Geological Survey describes the chemical and biological processes operative during basin recharge.

Phase III of the artificial-recharge feasibility study describes a preliminary design and cost-estimate analysis of a full project-scale and pilot-scale well field and artificial-recharge facilities for the Oakes aquifer. Results of the Phase III artificial-recharge feasibility study are presented in North Dakota State Water Commission Water-Resources Investigation No. 8 (Shaver, 1989). A summary of the Phase I, II, and III studies is presented in North Dakota State Water Commission Water-Resources Investigation No. 9 (Shaver and Schuh, 1989).

Purpose

The purpose of this report is to describe the hydrogeology of the Oakes aquifer in southeastern North Dakota, with special emphasis on identifying areas of the Oakes aquifer that: (1) can sustain a minimum withdrawal rate of 100 cubic feet per second for 60 days (11,900 acre-feet), (2) pose no water-quality limitations for irrigation, and (3) have initial surface infiltration rates of at least one foot per day.

Specific objectives of this report are to describe: (1) composition and geometry of the Oakes aquifer, (2) occurrence and movement of ground water in the aquifer, (3) aquifer hydraulic properties, (4) aquifer water quality, and (5) the effect on water levels in the aquifer of continuously withdrawing water at a rate of 100 cubic feet per second for 60 days.

Location-numbering system

The location-numbering system used in this report is based on the public land classification system used by the U.S. Bureau of Land Management. The system is illustrated in figure 2. The first number denotes the township north of a base line, the second number denotes the range west of the fifth principal meridian, and the third number denotes the section in which the well or test hole is located. The letters A, B, C, and D designate, respectively, the northeast, northwest, southwest, and southeast quarter section, quarter-quarter section, and quarter-quarter-quarter section (10-acre tract). For example, well 130-059-15DAA is located in the NE1/4 NE1/4 SE1/4 sec.15, T.130 N., R.59 W. Consecutive terminal numerals are added if more than one well or test hole is located within a 10-acre tract.

Acknowledgements

Thanks are due to the following North Dakota State Water Commission personnel: Allen E. Comeskey for supervising test drilling and for test-hole logging and Milton O. Lindvig for scheduling drilling activities. Recognition is due to the U.S. Bureau of Reclamation and commercial drilling companies for supplying drill-hole logs, and to landowners who allowed access to their lands.

METHODS OF DATA COLLECTION

Test drilling

Test-drilling data used in this report were provided by the North Dakota State Water Commission, the U.S. Bureau of Reclamation,

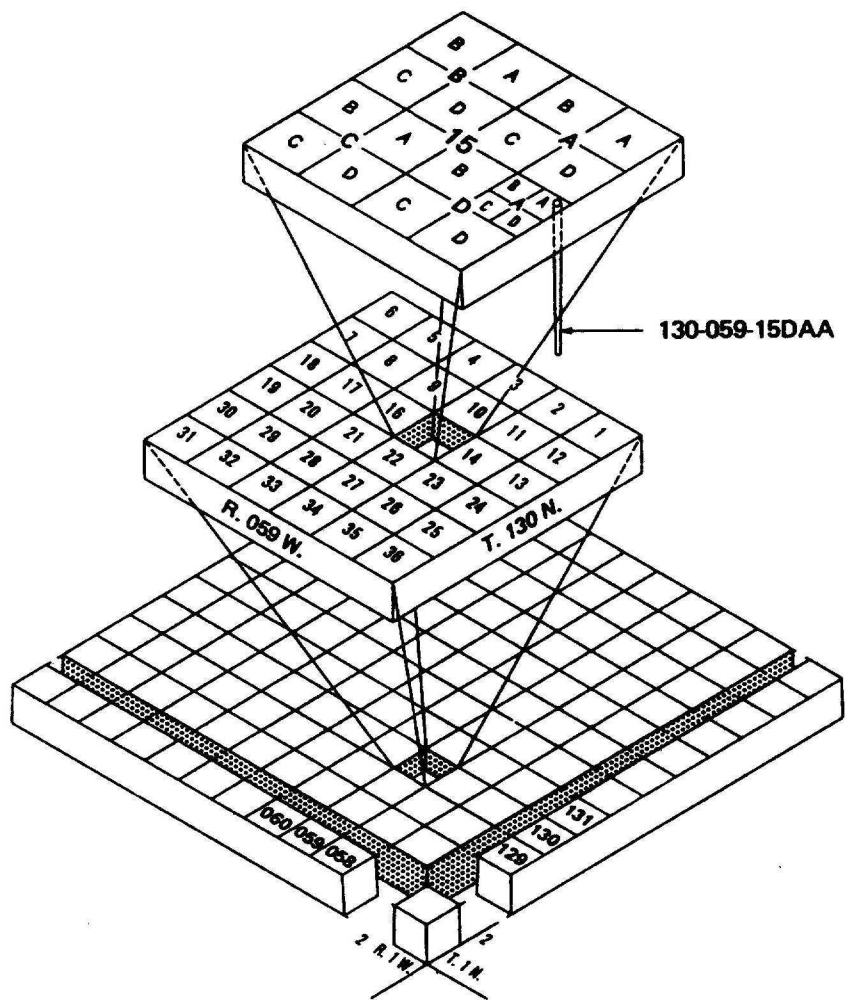


Figure 2. -- Location-numbering system

and commercial well-drilling firms. The North Dakota State Water Commission used a forward, mud-rotary rig to drill all test holes. The U.S. Bureau of Reclamation used a forward, mud-rotary rig to drill all test holes completed between 1950 and 1954 and a truck-mounted, solid-stem spiral power auger to drill all test holes from 1966 to 1986. Most commercial test holes and wells were drilled using forward, mud-rotary rigs. Occasionally, a reverse, hydraulic-rotary rig was utilized.

Observation well construction

For the Dickey-LaMoure (Armstrong and Luttrell, 1978) and Ransom-Sargent (Armstrong, 1979) Counties ground-water studies, the North Dakota State Water Commission constructed observation wells using 20-foot lengths of 1.25-inch diameter acrylonitrile-butadiene-styrene (abs) or 1.5-inch diameter polyvinyl-chloride (pvc) plastic casing. The well screen was of 1.25-inch diameter or 1.5-inch diameter abs plastic or 1.25-inch diameter galvanized steel. Screen lengths generally varied from 3 to 6 feet. Slot size generally was 0.018 inch. A check valve was attached to the bottom of each screen. The plastic casing, well screen, and check valve were assembled prior to insertion into the drill hole. After insertion, the hole was backwashed through the screen to clean the formation. After back washing, the hole was blown with air to collapse the formation around the screen. The remaining annular area was backfilled with drill cuttings.

The North Dakota State Water Commission installed a network of piezometer nests for the hydrogeochemical study conducted by Williams (1984). Each piezometer was constructed using 20-foot lengths of 2-inch diameter pvc plastic casing and variable lengths of 1.5-inch diameter pvc plastic screen. Slot size of the screen was 0.010 inch. A check valve was attached to the bottom of each screen. After the casing, screen, and check-valve assembly was inserted into the drill hole, the hole was backwashed through the screen to clean the formation. After back washing, silica sand was placed around the screened interval using a tremie pipe. A cement slurry was injected into the annulus from the top of the sand pack to land surface.

During the fall, 1985, the North Dakota State Water Commission drilled additional test holes and constructed additional observation wells to further define the occurrence, movement, and quality of ground water in the Oakes aquifer. Observation wells were constructed using 20-foot lengths of 2-inch diameter pvc plastic casing and variable lengths of 2-inch diameter pvc plastic screen. The slot size of the screen was 0.018 inch. A check valve was attached to the bottom of each screen. After the casing, screen, and check valve assembly was inserted into the drill hole, the hole was backwashed through the screen to clean the formation. After back washing, the hole was blown with air to collapse the formation around the screen. The remaining annular space was backfilled with drill cuttings.

Piezometers were constructed at sites where the aquifer consisted of sand and gravel layers separated by a confining bed. At these sites, the drill hole was not blown with air to collapse the formation around the screen. Instead, the well screen was packed with silica sand, and a cement slurry was injected into the well annulus from the top of the sand pack to at least the top of the confining bed.

During 1966 and 1967, the U.S. Bureau of Reclamation installed an observation well network in the Oakes aquifer. Test holes were drilled using a truck-mounted, solid-stem spiral power auger. Well casing was 3-inch diameter galvanized steel downspout. The entire length of downspout used in construction of the observation well had been slotted with a hand drill, and the bottom of the downspout was left open. The downspout casing was jetted into the aquifer to the desired depth.

In 1979, the U.S. Bureau of Reclamation installed a second observation-well network in the Oakes aquifer, which in part replaced some of the older downspout wells. The new wells were spaced at 0.5-mile intervals in a square grid pattern within a 5,000-acre test plot of the proposed West Oakes irrigation development tract of the Garrison Diversion Unit. For the most part, wells were installed at section corners, at section centers, and at half-section locations.

In 1983, the U.S. Bureau of Reclamation installed a third observation-well network in the Oakes aquifer to replace the remaining older downspout wells. The new wells also were spaced at 0.5-mile intervals in a square grid pattern. The wells were located between the 5,000-acre test plot and the North Dakota-South Dakota line.

Both of the replacement observation-well networks were completed using 2-inch diameter pvc plastic casing and variable lengths of 1.5-inch diameter pvc plastic screen. Slot size of the screen was 0.010 inch. A check valve was attached to the bottom of each screen. The casing, screen, and check-valve assembly was jetted into the aquifer to the desired depth.

EXPLANATION OF TABLES

The data in this report are listed in table 1. The locations of wells and test holes are shown on plate 1. The data consists of records and lithologic logs of wells and test holes. Depths and lithologies reported for wells and test holes tapping the Oakes aquifer can be determined from table 1. However, use of the data as a guide to conditions at different sites should be made with caution because of the lenticular character of the water-bearing sediment in the Oakes aquifer.

Records and lithologic logs of wells and test holes

Records and logs collected from the North Dakota State Water Commission, U.S. Bureau of Reclamation, and water-well drillers, and records and logs of test holes drilled as part of this investigation are included in table 1. Minor changes in word order have been made on some of the driller's logs and logs of test holes drilled for previous investigations. Most test holes drilled during this investigation have geophysical logs in addition to a description of the materials penetrated. The geophysical logs are useful for geologic correlation purposes. These logs are not published in this report, but are available for inspection at the North Dakota State Water Commission office in Bismarck, North Dakota. Grain-size determinations refer to the Wentworth (1922) size scale. The color

descriptions were determined by comparing fresh samples with the Geological Society of America's rock color chart (1963).

Land-surface elevations in table 1 are reported as integers and decimal numbers. Integer values represent land-surface elevations estimated from U.S Geological Survey 7 1/2-minute topographic quadrangles. Decimal numbers represent surveyed land-surface elevations determined by differential leveling techniques.

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- Shaver, R.B., and Hove, M.H., 1990, Feasibility of artificial recharge to the Oakes aquifer, southeastern North Dakota: Ground-water data, vol 1B, Records and lithologic logs of wells and test holes (T.130 N., R.59 W. through T.131 N., R.59 W.). North Dakota State Water Commission Water-Resources Investigation No. 6, 666 p.

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- Williams, D.L., 1984, The geochemical evaluation of saline groundwater within a fresh water aquifer south of Oakes, North Dakota. Ground Forks, University of North Dakota, M.S. thesis, 328 p.

Table 1. -- Records and lithologic logs of wells and test holes

	EXPLANATION
Screened interval (ft.)	Values shown represent top and bottom of the screen, in feet below land surface.
Altitude of land surface (ft., msl.)	Altitude of land surface is reported with respect to the National Geodetic Vertical Datum of 1929 (NGVD). NGVD is a geodetic datum derived from a general adjustment of the first-order nets of both the United States and Canada, formerly called "mean sea level." Land surface elevations are reported as integers and decimal numbers. Integer values represent land surface elevations estimated from U.S. Geological Survey 7 1/2-minute topographic quadrangles. Decimal numbers represent surveyed land-surface elevations determined by differential leveling techniques.
Depth (ft.)	Depths shown on lithologic logs are the base of the unit, in feet below land surface.

Test Hole and Observation Well Record

Location: 128-60-01AAB Use of well: Test Hole
Owner and number: S.D.G.S. R-4 Principal aquifer: Oakes
Depth drilled (ft.): 200 Altitude of land surface (ft., msl): 1330
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 8/31/71

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine, blue	68	68
Clay, silty, greenish gray (lacustrine)	72	140
Gravel and coarse sand, some clay layers	22	162
Clay, sandy, gravelly, gray (till)	18	180
Clay, dark bluish gray (Pierre Formation)	8	188
Clay, light gray, chalk (Niobrara Formation)	12	200

Test Hole and Observation Well Record

Location: 128-60-01ABB Use of well: Test Hole
Owner and number: S.D.G.S. B-70-41 Principal aquifer: Oakes
Depth drilled (ft.): 149 Altitude of land surface (ft., msl): 1325
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 8/13/70

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, very fine, black-gray	4	4
Sand, very fine, brown	19	23
Silt, brown	10	33
Silt, gray	110	143
Clay, gravelly, gray, compact	6	149

Test Hole and Observation Well Record

Location: 128-60-03AAA Use of well: Test Hole
Owner and number: S.D.G.S. R-5 Principal aquifer: Oakes
Depth drilled (ft.): 170 Altitude of land surface (ft., msl): 1305
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 9/1/71

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine, gray	107	107
Silt, sandy (lacustrine)	8	115
Clay, gravelly, gray (till)	5	120
Sand	6	126
Clay, gravelly, gray (till)	18	144
Clay (Pierre Formation)	12	156
Clay, chalk (Niobrara Formation)	14	170

Test Hole and Observation Well Record

Location: 128-60-03BBB Use of well: Test Hole
Owner and number: S.D.G.S. B-70-42 Principal aquifer: Oakes
Depth drilled (ft.): 99 Altitude of land surface (ft., msl): 1295
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 8/12/70

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, medium, yellow brown, fairly clean	9	9
Sand, medium, gray, fairly clean	40	49
Clay, silty, gray	50	99

Test Hole and Observation Well Record

Location: 128-60-05AAA Use of well: Test Hole
Owner and number: S.D.G.S. R-6 Principal aquifer: Oakes
Depth drilled (ft.): 155 Altitude of land surface (ft., msl): 1290
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 9/1/71

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, silty, light yellow brown	14	16
Clay, silty (lacustrine)	74	90
Clay, gravelly (till)	34	124
Gravel, coarse	31	155

Test Hole and Observation Well Record

Location: 128-60-06BBB Use of well: Test hole
Owner and number: S.D.G.S. R-7 Principal aquifer: Unknown
Depth drilled (ft.): 170 Altitude of land surface (ft., msl): 1289
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 9/1/71

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	5	5
Clay, silty, yellow brown (lacustrine)	10	15
Clay, silty, light gray (lacustrine)	109	124
Gravel	23	147
Clay, dark bluish gray (Pierre Formation)	2	149
Clay, chalk (Niobrara Formation)	21	170

Test Hole and Observation Well Record

Location: 128-60-10AAA	Use of well: Observation
Owner and number: Harold Treeby	Principal aquifer: Oakes
Depth drilled (ft.): 135	Altitude of land surface (ft., msl): 1309
Screened interval (ft.): Slotted 95-115	Lithologic log from: M & W Drilling
Casing diameter: 2-inch PVC	Comments:
Date completed: 3/14/78	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	6	7
Sand, clayey, brown	4	11
Sand, fine, gray, clean	7	18
Sand, medium, gray, clean	14	32
Silt, sandy, gray	4	36
Silt, soft	46	82
Sand, medium to coarse, clean	20	102
Gravel, coarse, clean	18	120
Clay, silty, gray	15	135

Test Hole and Observation Well Record

Location: 128-60-11CAC Use of well: Irrigation
Owner and number: Harold Treeby Principal aquifer: Oakes
Depth drilled (ft.): 135 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): Unknown Lithologic log from: Huron Drilling
Casing diameter: Unknown Comments:
Date completed: Unknown

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, yellow	4	5
Sand, fine	35	40
Clay, sandy	45	85
Sand, medium to coarse	25	110
Sand, coarse to very coarse	10	120
Gravel, coarse	15	135

Test Hole and Observation Well Record

Location: 128-61-01BAB Use of well: Observation
Owner and number: S.D.G.S. BN-79A Principal aquifer: Middle James
Depth drilled (ft.): 130 Altitude of land surface (ft., msl): 1292
Screened interval (ft.): Unknown Lithologic log from: S.D.G.S.
Casing diameter: 2-inch PVC Comments:
Date completed: 7/2/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine, brown	6	6
Silt, yellow brown	20	26
Silt, gray	63	89
Sand, coarse	9	98
Clay, silty, pebbly (till)	123	121
Shale	9	130

Test Hole and Observation Well Record

Location: 128-61-01BBB Use of well: Observation
Owner and number: S.D.G.S. BN-77-P Principal aquifer: Middle James
Depth drilled (ft.): 95 Altitude of land surface (ft., msl): 1299
Screened interval (ft.): 68-73 Lithologic log from: S.D.G.S.
Casing diameter: 2-inch PVC Comments:
Date completed: 5/10/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine	7	8
Silt, yellow brown	8	16
Silty clay	24	40
Sand, very fine, silty	25	65
Clay, silty, pebbly (till)	2	67
Gravel, medium	12	79
Clay, pebbly, with gravel layers (till)	16	95

Test Hole and Observation Well Record

Location: 128-61-02BBB Use of well: Test Hole
Owner and number: S.D.G.S. R-8 Principal aquifer: Oakes
Depth drilled (ft.): 155 Altitude of land surface (ft., msl): 1290
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 9/2/71

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, gray	16	17
Silt, gray (lacustrine)	20	37
Clay, sandy, gravelly, gray (till)	12	49
Sand, coarse	1	50
Clay, sandy, gravelly, gray	64	114
Shale (Pierre Formation)	41	155

Test Hole and Observation Well Record

Location: 128-61-11AAA Use of well: Test Hole
Owner and number: S.D.G.S. HB-70-61 Principal aquifer: Middle James
Depth drilled (ft.): 89 Altitude of land surface (ft., msl): 1295
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 8/26/70

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine, brown	4	4
Sand, fine, yellow brown	7	11
Sand, very fine, yellow	9	20
Silt, yellow brown	12	32
Silt, gray	36	68
Sand, very coarse, clean	7	75
Gravel, rocky	9	84
Clay, gravelly (till)	5	89

Test Hole and Observation Well Record

Location: 128-61-11BBA Use of well: Test Hole
Owner and number: S.D.G.S. HB-70-61 Principal aquifer: Middle James
Depth drilled (ft.): 104 Altitude of land surface (ft., msl): 1300
Screened interval (ft.): None Lithologic log from: S.D.G.S.
Casing diameter: None Comments:
Date completed: 8/27/70

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, yellow	3	3
Sand, very fine, yellow	4	7
Sand, fine, yellow	14	21
Sand, fine, gray	24	45
Sand, very fine, clayey, gray	15	60
Clay, silty, gray	3	63
Sand, very coarse, gravelly	5	68
Gravel, rocky	4	72
Clay, gravelly, gray (till)	32	104

Test Hole and Observation Well Record

Location: 128-61-12BBB Use of well: Observation
Owner and number: S.D.G.S. BN-79-B Principal aquifer: Middle James
Depth drilled (ft.): 130 Altitude of land surface (ft., msl): 1295
Screened interval (ft.): Unknown Lithologic log from: S.D.G.S.
Casing diameter: 2-inch PVC Comments:
Date completed: 7/2/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine, brown	3	3
Silt, yellow brown	13	16
Silt, gray	46	62
Sand, fine to medium	19	81
Clay, silty, gray (till)	19	100
Clay, silty, gray, with interbedded sand and gravel layers (till)	20	120
Clay, gray (till)	5	125
Shale (Pierre Formation)	5	130

Test Hole and Observation Well Record

Location: 129-58-04DCC Use of well: Test hole
Owner and number: USBR-D.H. 67 Principal aquifer: Oakes
Depth drilled (ft.): 191 Altitude of land surface (ft., msl): 1380
Screened interval (ft.): None Lithologic log from: USBR
Casing diameter: None Comments:
Date completed: 6/23/53

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil, gray brown, silty, sandy	1.0	1.0
Sand, gray, fine grain, slightly silty	2.5	3.5
Sand, buff, fine grain, slightly silty	8.0	11.5
Silt, gray, laminated, slightly sandy	18.0	29.5
Till, gray, silty, sandy, gravelly	21.5	51.0
Silt, gray, laminated, slightly sandy	2.0	53.0
Till, gray, very sandy	72.0	125.0
Till, gray, sandy, gravelly	66.0	191.0

Test Hole and Observation Well Record

Location: 129-58-05CCC Use of well: Observation
Owner and number: U.S.B.R. W-77 Principal aquifer: Oakes
Depth drilled (ft.): 20 Altitude of land surface (ft., msl): 1314.1
Screened interval (ft.): Slotted, 0-9.4 Lithologic log from: U.S.B.R.
Casing diameter: 3-inch downspout Comments:
Date completed: 6/21/66

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy sand	2	2
Loamy fine sand	2	4
Loam	1	5
Fine sand	15	20

Test Hole and Observation Well Record

Location: 129-58-06AAA₁ Use of well: Test hole
 Owner and number: SWC 9619 Principal aquifer: Oakes
 Depth drilled (ft.): 180 Altitude of land surface (ft., msl): 1316
 Screened interval (ft.): None Lithologic log from: SWC
 Casing diameter: None Comments:
 Date completed: 7/1/76

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, very fine to coarse grain, predom. medium, well sorted, subangular to rounded, predom. rounded	6	8
Clay, yellow brown, very sandy	4	12
Clay, olive gray	7	19
Sand, very fine grain to medium pebble, predom. medium sand, moderately sorted, subangular to rounded	73	92
Clay, very sandy	12	104
Clay, olive gray, silty, sandy, pebbly, interbedded gravel	66	170
Clay, brownish gray, white specks, calcareous (Niobrara Fm.)	10	180

Test Hole and Observation Well Record

Location: 129-58-06AAA ₂	Use of well: Observation
Owner and number: SWC 9619A	Principal aquifer: Oakes
Depth drilled (ft.): 80	Altitude of land surface (ft., msl): 1315.9
Screened interval (ft.): 51-56	Lithologic log from: SWC
Casing diameter: 6 -inch plastic	Comments: Well equipped with continuous water level recorder
Date completed: 7/1/76	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, very fine to coarse grain, predom. medium, well sorted, subangular to rounded, predom. rounded	6	8
Clay, yellow brown, very sandy	4	12
Clay, olive gray, silty, slightly sandy	7	19
Sand, very fine sand to medium pebble, predom. medium to coarse sand, moderately sorted, subangular to rounded	61	80

Test Hole and Observation Well Record

Location: 129-58-06BAA₁ Use of well: Observation
 Owner and number: SWC 11680 Principal aquifer: Oakes
 Depth drilled (ft.): 180 Altitude of land surface (ft., msl): 1311.2
 Screened interval (ft.): 138-143 Lithologic log from: SWC
 Casing diameter: 1½-inch pvc Comments: Electric log available; well is
 Date completed: 9/19/85 located 500 feet north of 6BAD₅

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, light gray, v. sl. sandy, soft, red-yellow stringers, oxidized	8	8
Sand, v. fine to fine, silty, yellow brown, oxidized	1	9
Clay, as above	1	10
Clay, v. sl. silty, greenish gray, soft, sticky	6	16
Sand, v. fine to v. coarse, predom. fine to medium, subangular to well rounded, composed of detrital shale, quartz, carbonates, shield silicates	6	22
Sand, as above, interbedded with numerous less than 1-foot thick silty clay or clayey silt layers	21	43
Sand, v. fine to v. coarse, predom. medium to coarse, sl. gravelly, composition as above, subangular to well rounded, clean section	33	76
Sand, v. fine to fine or sandy, clayey, silty, poor recovery, most into suspension, bit slowed	7	83
Sand, v. fine to v. coarse, predom. fine to medium, subangular to well rounded, composition as above	24	107
Silty clay or clayey silt, poor recovery, most into suspension, bit slowed	4	111
Sand, v. fine to v. coarse, predom. medium to coarse, sl. gravelly, composition as above, subangular to well rounded	13	124
Sand (90-95%) and gravel, sand is v. fine to v. coarse, predom. coarse, composition as above, subangular to well rounded, drills as stratified	27	151

Test Hole and Observation Well Record

Location: 129-58-06BAA ₂	Use of well: Observation
Owner and number: SWC 11681	Principal aquifer: Oakes
Depth drilled (ft.): 180	Altitude of land surface (ft., msl): 1312.2
Screened interval (ft.): 138-143	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: Electric log available; well is located 803 feet north of 6BAD ₅
Date completed: 9/19/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, light gray, sl. silty, red-yellow stringers, oxidized, soft	9	9
Clay, as above, pale greenish gray	7	16
Sand, v. fine to v. coarse, predom. fine to medium, subangular to well rounded, composed of quartz, carbonates, silicates, detrital shale and lignite	5	21
Sand, as above, interbedded with greenish gray silty clay	21	42
Sand, as above, drills smooth	9	51
Sand, v. fine to v. coarse, predom. medium, v. sl. gravelly, fine, composition as above, taking water, caving, mixed bentonite mud to prevent caving	42	93
Clay, moderately silty, sl. sandy, olive gray	11	104
Sand, sl. gravelly, as above	41	145
Sand and gravel, more gravel than above, sand is v. fine to v. coarse, predom. medium to coarse, gravel is fine, subangular to well rounded, drills as stratified	10	155
Sand and gravel, gravel is fine to medium, sand as above, composition as above, drills as stratified	6	161
Gravel, cobbles, sand, stratified, very hard drilling, takes water, composition as above	12	173
Clay, sl. silty, brown with light gray specks, soft (Niobrara Formation)	7	180

Unit description	Thickness (ft.)	Depth (ft.)
Sand and gravel, caving, mixed bentonite mud to prevent caving, gravel is fine to medium, thick mud prevents sand grain size analysis. Numerous gravel sized subangular pieces of Niobrara Formation, drills as stratified	12	163
Gravel, cobbles, sandy, very hard drilling, mixed more bentonite mud, takes lots of water	10	173
Clay, sl. silty, brown with light gray specks, soft (Niobrara Formation)	7	180

Test Hole and Observation Well Record

Location: 129-58- 06BAD ₁	Use of well: Observation
Owner and number: SWC 11676	Principal aquifer: Oakes
Depth drilled (ft.): 180	Altitude of land surface (ft., msl): 1311.5
Screened interval (ft.): 138-143	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: Electric log available; east well of pair located 210 feet north of 6BAD ₅
Date completed: 9/18/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, sl. sandy, light gray with red-yellow stringers, soft, oxidized	6	6
Clay, silty, upper few feet greenish gray, remainder brownish-gray, soft	11	17
Sand, v. fine to fine, probably silty, composed of detrital shale, quartz, carbonates, and silicates, lignitic	2	19
Clay, silty, gray brown, soft	9	28
Sand, v. fine to fine, as above	2	30
Clay, silty, as above	14	44
Sand (80-90%), v. fine to v. coarse, predom. medium to coarse, subangular to well rounded, and gravel, fine, composed of detrital shale, quartz, carbonates, shield silicates and detrital lignite	17	61
Sand, v. fine to fine, predom. v. fine, silty, from 88 to 93 clayey	51	112
Sand (90%) and gravel, as above, drills as stratified	31	143
Sand and gravel, mixed 5 bags bentonite to prevent caving, takes lots of water	18	161
Gravel, sandy, strong bit chatter, poor recovery, mixed 12 bags bentonite to prevent caving, drills as stratified	12	173
Clay, silty, brown, with light gray specks (Niobrara Formation)	7	180

Test Hole and Observation Well Record

Location: 129-58-06BAD ₂	Use of well: Observation
Owner and number: SWC 11677	Principal aquifer: Oakes
Depth drilled (ft.): 60	Altitude of land surface (ft., msl): 1311.1
Screened interval (ft.): 48-53	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: West well of pair ; located 207 feet north of 6BAD ₅
Date completed: 9/18/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, sl. sandy, light gray, with red-yellow stringers, oxidized, soft	6	6
Sand, v. fine to fine, possibly silty, greenish gray	1	7
Clay, silty, greenish gray, soft	2	9
Sand, as above	1	10
Clay, v. sl. silty, greenish gray, soft	6	16
Sand, as above	3	19
Clay, v. sl. silty, gray brown, soft	25	44
Sand (80-90%) and gravel, sand, v. fine to v. coarse, predom. medium to coarse, subangular to well rounded, composed of detrital shale, quartz carbonates, shield silicates, lignitic, gravel is fine	16	60

Test Hole and Observation Well Record

Location: 129-58- 06BAD ₃	Use of well: Observation
Owner and number: SWC 11678	Principal aquifer: Oakes
Depth drilled (ft.): 180	Altitude of land surface (ft., msl): 1312.1
Screened interval (ft.): 138-143	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: Electric log available
Date completed: 9/18/85	east well of pair, located 304 feet north of 6BAD ₅

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, light gray, with red-yellow stringers, oxidized	4	4
Sand, v. fine to fine, silty, yellow brown oxidized	1	5
Clay, v. sl. silty, greenish gray to light gray, varved, soft, sticky	4	9
Clay, sl. silty, brownish gray, soft sticky	1	10
Sand, as above, greenish gray	1	11
Clay, v. sl. silty, greenish gray, varved, soft, sticky	7	18
Sand, as above	2	20
Sand, as above, interbedded with greenish gray clay	11	31
Clay, v. sl. silty, greenish gray, varved, soft, sticky	7	38
Sand (95%) and gravel, sand, v. fine to v. coarse, predom. medium to coarse, subangular to well rounded, composed of detrital shale, carbonates, silicates, quartz, lignitic	15	53
Clay, greenish gray, soft	5	58
Sand, as above, sl. gravelly	5	63
Sand, v. fine to fine, possibly silty, greenish gray, poor recovery, most into suspension	25	88

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to v. coarse, sl. gravelly, predom. medium to coarse sand, composition as above	18	106
Clay, silty, interbedded with sand	5	111
Clay, silty, greenish gray, soft, smooth	4	115
Sand (95%) and gravel, sand v. fine to v. coarse, composition as above, gravel fine, clean section	32	147
Clay, silty, sl. sandy, olive gray, soft, good recovery	14	161
Gravel, sandy, very hard drilling, fine to medium gravel, composition as above, taking water	8	169
Clay, sl. silty, brown with light gray specks (Niobrara Formation)	11	180

Test Hole and Observation Well Record

Location: 129-58-06BAD₅ Use of well: Irrigation
Owner and number: Larry Hansen Principal aquifer: Oakes
Depth drilled (ft.): 160 Altitude of land surface (ft., msl): 1313
Screened interval (ft.): 126-158 Lithologic log from: Traut Wells, Inc.
Casing diameter: 12-inch Comments: Aquifer test conducted using
Date completed: 1/24/75 this well

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, brown	15	15
Clay, brown, sandy	26	41
Sand, brown	11	52
Silt, gray	46	98
Silt, gray, pebbly	20	118
Sand and gravel, gray	42	160

Test Hole and Observation Well Record

Location: 129-58-06BBB₁ Use of well: Observation
Owner and number: U.S.B.R. W-69 Principal aquifer: Oakes
Depth drilled (ft.): ? Altitude of land surface (ft., msl): 1312.8
Screened interval (ft.): ? Lithologic log from: No log
Casing diameter: ? Comments: Old well, 1950 study?
Date completed: ?

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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Test Hole and Observation Well Record

Location: 129-58-06BBB₂ Use of well: Test hole
Owner and number: Larry Hansen Principal aquifer: Oakes
Depth drilled (ft.): 120 Altitude of land surface (ft., msl): 1313
Screened interval (ft.): None Lithologic log from: Traut Wells, Inc.
Casing diameter: None Comments:
Date completed: 1/23/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, brown, fine grain	27	27
Sand, gray, fine grain	21	48
Sand, brown, gravelly	2	50
Clay, gray	23	73
Sand, gray, fine grain, lignitic	32	105
Clay, gray	15	120

Test Hole and Observation Well Record

Location: 129-58-06BBD

Use of well: Test hole

Owner and number: Larry Hansen

Principal aquifer: Oakes

Depth drilled (ft.): 124

Altitude of land surface (ft., msl): 1310

Screened interval (ft.): None

Lithologic log from: Traut Wells, Inc.

Casing diameter: None

Comments:

Date completed: 1/23/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Clay, gray	41	43
Sand, brownish gray	8	51
Clay, gray	9	60
Sand, gray, fine grain	38	98
Sand, gray, gravelly	4	102
Sand, gray	16	118
Clay, gray	1	119
Sand, gray	3	122
Clay, gray	2	124

Test Hole and Observation Well Record

Location: 129-58-06CDD ₁	Use of well: Observation
Owner and number: SWC 6307A	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1310.0
Screened interval (ft.): 92-97	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: Electric, neutron, and gamma logs available.
Date completed: 9/9/85	East well of pair

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, oxidized	2	3
Clay, silty, oxidized to 5 feet	5	8
Sand, coarse, and gravel, predom. fine, below 30 feet predom. coarse qtz. sand	34	42
Silt, clayey, olive gray	10	52
Sand, fine to v. coarse	20	72
Clay, poor recovery	10	82
Sand, coarse to v. coarse, interbedded detrital lignite	16	98
Clay, silty, sandy, pebbly, olive gray, (till)	61	159
Claystone, silty, brown with tan specks (Niobrara Formation)	23	182

Test Hole and Observation Well Record

Location: 129-58-06CDD₂ Use of well: Observation
Owner and number: SWC 6307B Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1310.0
Screened interval (ft.): 35-40 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments: West well of pair
Date completed: 9/9/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for hole #6307A

Test Hole and Observation Well Record

Location: 129-58-07BBA	Use of well: Observation
Owner and number: SWC 6306	Principal aquifer: Oakes
Depth drilled (ft.): 162	Altitude of land surface (ft., msl): 1310.2
Screened interval (ft.): 138-143	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: No geophysical logs due to hole caving
Date completed: 9/6/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, oxidized	4	5
Clay, silty, oxidized to 12 feet	15	20
Sand, medium to v. coarse, angular to rounded, below 25 feet becomes gravelly, fine, carbonates, shale and quartz, interbedded gravel below 102 feet	97	117
Gravel, fine to coarse, sandy, rough drilling, takes water, lots of carbonates and silicates	26	143
Clay, silty, sandy, pebbly, olive gray (till)	19	162

Test Hole and Observation Well Record

Location: 129-58-08BBB ₁	Use of well: Test hole
Owner and number: SWC 6308	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1314
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/9/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, silty, oxidized	4	5
Sand, fine to coarse, predom. medium to coarse, subrounded to rounded, some interbedded gravel	39	44
Silt, some clay and sand lenses, most into suspension, poor recovery	53	97
Clay, silty, sandy, pebbly, olive gray, brittle (till)	63	160
Claystone, silty, brown with tan specks (Niobrara Formation)	22	182

Test Hole and Observation Well Record

Location: 129-58-08BBB2

Use of well: Observation

Owner and number: SWC 6308A

Principal aquifer: Oakes

Depth drilled (ft.): 40

Altitude of land surface (ft., msl): 1314.3

Screened interval (ft.): 35-40

Lithologic log from: SWC

Casing diameter: 2-inch pvc

Comments:

Date completed: 9/9/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6308		

Test Hole and Observation Well Record

Location: 129-58-08CDB₁ (south well) Use of well: Irrigation
Owner and number: Shelton Bros. Principal aquifer: Oakes
Depth drilled (ft.): 39 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 22-38 Lithologic log from: M&W Drilling
Casing diameter: 8-inch Comments:
Date completed: 3/16/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain	9	10
Sand, gray, fine grain	8	18
Sand, medium grain	12	30
Gravel, coarse, sandy	8	38
Silt, gray	1	39

Test Hole and Observation Well Record

Location: 129-58-08CDB₂ (north well) Use of well: Irrigation
Owner and number: Shelton Bros. Principal aquifer: Oakes
Depth drilled (ft.): 37 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 22-37 Lithologic log from: M&W Drilling
Casing diameter: 8-inch Comments:
Date completed: 3/13/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, medium grain	16	17
Sand, gray, fine grain	8	25
Sand, gray, medium grain	5	30
Sand and gravel	5	35
Sand, fine grain	2	37

Test Hole and Observation Well Record

Location: 129-58-08CDC₁ (south well) Use of well: Irrigation
Owner and number: Shelton Bros. Principal aquifer: Oakes
Depth drilled (ft.): 39 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 23-37 Lithologic log from: M&W Drilling
Casing diameter: 8-inch Comments:
Date completed: 3/14/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain	11	12
Sand, gray, fine grain	10	22
Gravel, medium	12	34
Gravel, coarse	3	37
Sand	2	39

Test Hole and Observation Well Record

Location: 129-58-08CDC₂ (north well) Use of well: Irrigation
Owner and number: Shelton Bros. Principal aquifer: Oakes
Depth drilled (ft.): 39 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 24-39 Lithologic log from: M&W Drilling
Casing diameter: 8-inch Comments:
Date completed: 3/16/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain	7	8
Sand, gray, fine grain	12	20
Sand, gray, medium grain	10	30
Sand, medium sand to coarse gravel	5	35
Sand, fine grain	4	39

Test Hole and Observation Well Record

Location: 129-58-09AAB Use of well: Domestic
Owner and number: Clark Lamport Principal aquifer: Oakes
Depth drilled (ft.): 137 Altitude of land surface (ft., msl): 1356
Screened interval (ft.): 122-137 Lithologic log from: Manikowski Well Drilling
Casing diameter: 4-inch Comments:
Date completed: 12/10/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil, black	3	3
Clay, blue	7	10
Sand, clayey	8	18
Clay, blue	22	40
Sand, interbedded clay	45	85
Clay, blue	35	120
Sand, fine grain	17	137

Test Hole and Observation Well Record

Location: 129-58-09BBB	Use of well: Test hole
Owner and number: SWC 9235	Principal aquifer: Oakes
Depth drilled (ft.): 260	Altitude of land surface (ft., msl): 1375
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric log available
Date completed: 11/25/74	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, dark yellowish orange, sandy, interbedded sand and gravel, oxidized	4	4
Clay, dark yellow brown, silty, sandy, pebbly, interbedded gravel, oxidized (till)	11	15
Clay, dark gray, silty, sandy, pebbly, interbedded silt and gravel (till)	13	28
Gravel, fine to medium, angular to subrounded, 40% sand, medium to very coarse grain, subangular to subrounded, 20% interbedded silt	18	46
Silt, medium dark gray, pebbly	56	102
Silt, medium dark gray, moderately clayey, very sandy	80	182
Clay, dark olive gray, silty, sandy, pebbly, interbedded gravel (till)	44	226
Clay, grayish black, silty, very sandy, pebbly (till)	10	236
Shale, olive gray, white specks, very calcareous (Niobrara Formation)	24	260

Test Hole and Observation Well Record

Location: 129-58-17BAB₁ (north well) Use of well: Irrigation
Owner and number: Shelton Bros. Principal aquifer: Oakes
Depth drilled (ft.): 38 Altitude of land surface (ft., msl): 1314
Screened interval (ft.): 23-38 Lithologic log from: M&W Drilling
Casing diameter: 8-inch Comments:
Date completed: 4/5/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	8	9
Sand, gray, medium grain	18	27
Sand, gray, medium grain, gravelly	11	38

Test Hole and Observation Well Record

Location: 129-58-17BAB₂ (south well) Use of well: Irrigation
Owner and number: Shelton Bros. Principal aquifer: Oakes
Depth drilled (ft.): 38 Altitude of land surface (ft., msl): 1314
Screened interval (ft.): 23-38 Lithologic log from: M&W Drilling
Casing diameter: 8-inch Comments:
Date completed: 4/5/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	11	12
Sand, gray, medium grain	24	36
Gravel, medium	2	38

Test Hole and Observation Well Record

Location: 129-58-17BBA Use of well: Test hole
Owner and number: Shelton Bros. Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 4/8/80

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain, clean	7	8
Sand, gray, fine grain, clean	17	25
Sand, gray, fine to medium grain	10	35
Sand and gravel, medium sand to coarse gravel	3	38
Sand, very fine grain, silty	2	40

Test Hole and Observation Well Record

Location: 129-58-17BBC₁ (west test hole)
 Owner and number: Shelton Bros.
 Depth drilled (ft.): 155
 Screened interval (ft.): None
 Casing diameter: None
 Date completed: 4/7/80

Use of well: Test hole
 Principal aquifer: Oakes
 Altitude of land surface (ft., msl): 1313
 Lithologic log from: M&W Drilling
 Comments:

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain, clean	7	8
Sand, gray, fine grain, clean	12	20
Sand, medium grain	5	25
Sand, medium to coarse grain	10	35
Sand, medium grain	5	40
Sand, fine to medium grain	5	45
Sand, very fine grain, silty	11	56
Gravel, clayey	4	60
Sand, gray, very fine grain, silty	25	85
Sand, gray, fine grain, clean	17	102
Gravel, clayey	3	105
Till, gray, interbedded gravel	25	130
Clay, gray (till)	25	155

Test Hole and Observation Well Record

Location: 129-58-17BBC₂ (east test hole) Use of well: Test hole
 Owner and number: Shelton Bros. Principal aquifer: Oakes
 Depth drilled (ft.): 50 Altitude of land surface (ft., msl): 1315
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 4/8/80

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, gray, silty	7	8
Sand, gray, fine to medium grain	12	20
Sand, gray, medium to coarse grain, 10% gravel	23	43
Sand, gray, fine grain, clayey	7	50

Test Hole and Observation Well Record

Location: 129-58-17BBD Use of well: Test hole
 Owner and number: Shelton Bros. Principal aquifer: Oakes
 Depth drilled (ft.): 170 Altitude of land surface (ft., msl): 1315
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 4/7/80

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, brown, sandy	7	8
Sand, brown, medium grain	2	10
Sand, gray, very fine grain, silty, lignitic	10	20
Sand, gray, fine to medium grain	10	30
Sand, gray, medium grain, shaley	5	35
Sand, medium to coarse grain, 10% gravel	5	40
Clay, gray	50	90
Sand, very fine grain	10	100
Sand, gray, fine grain, dirty	8	108
Till, gray	16	124
Gravel, coarse, clean	3	127
Till, gray	4	131
Gravel	2	133
Clay	5	138
Gravel	2	140
Till, gray, interbedded sand and gravel	30	170

Test Hole and Observation Well Record

Location: 129-58-17BDC Use of well: Test hole
 Owner and number: Shelton Bros. Principal aquifer: Oakes
 Depth drilled (ft.): 45 Altitude of land surface (ft., msl): 1315
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed:

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain	9	10
Sand, gray, fine grain	20	30
Sand, gray, medium grain	5	35
Sand, gray, fine to medium grain	5	40
Sand, gray, very fine, silty	5	45

Test Hole and Observation Well Record

Location: 129-58-18AAA ₁	Use of well: Test hole
Owner and number: SWC 6333	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1313
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma logs available
Date completed: 9/20/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, sandy, yellow orange, oxidized	2	3
Sand, fine to v. coarse, predom. medium to coarse, subrounded to rounded, predom. quartz and detrital shale, coarse gravel after 25 feet	30	33
Clay, silty, olive gray	7	40
Silt or v. fine sand, poor recovery, most into suspension, possibly clayey	70	110
Clay, silty, sandy, pebbly, olive gray, soft (till)	55	165
Claystone, silty, brown with tan specks, (Niobrara Formation)	17	182

Test Hole and Observation Well Record

Location: 129-58-18AAA₂ Use of well: Observation
Owner and number: SWC 6333A Principal aquifer: Oakes
Depth drilled (ft.): 32 Altitude of land surface (ft., msl): 1313.4
Screened interval (ft.): 27-32 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/20/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6333		

Test Hole and Observation Well Record

Location: 129-58-18CCC

Use of well: Observation

Owner and number: USBR W-113

Principal aquifer: Oakes

Depth drilled (ft.): ?

Altitude of land surface (ft., msl): 1311.12

Screened interval (ft.): Slotted, 0-11 Lithologic log from: No log

Casing diameter: 3-inch downspout

Comments:

Date completed: ?

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

Test Hole and Observation Well Record

Location: 129-58-19AAA₂ Use of well: Observation
Owner and number: SWC 6317A Principal aquifer: Oakes
Depth drilled (ft.): 65 Altitude of land surface (ft., msl): 1315.7
Screened interval (ft.): 60-65 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/12/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6317		

Test Hole and Observation Well Record

Location: 129-58-20CCC ₂	Use of well: Observation
Owner and number: SWC 6318A	Principal aquifer: Oakes
Depth drilled (ft.): 38	Altitude of land surface (ft., msl): 1314.7
Screened interval (ft.): 33-38	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments:
Date completed: 9/12/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6318		

Test Hole and Observation Well Record

Location: 129-58-30CCC Use of well: Observation
Owner and number: SWC 4834 Principal aquifer: Oakes
Depth drilled (ft.): 160 Altitude of land surface (ft., msl): 1310.5
Screened interval (ft.): 93-96 Lithologic log from: SWC
Casing diameter: 1.25-inch Comments: Electric log and gamma log available
Date completed: 10/7/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, moderate yellow brown, fine to medium grain, oxidized	14	14
Sand, dark gray, fine to medium, well sorted	60	74
Sand, very silty, interbedded clay	38	112
Sand, medium dark gray, very fine grain, silty, interbedded clay and gravel	34	146
Shale, gray to black, noncalcareous, slightly fissile (Pierre Formation)	14	160

Test Hole and Observation Well Record

Location: 129-58-30CCD₂ Use of well: Observation
Owner and number: SWC 6315A Principal aquifer: Oakes
Depth drilled (ft.): 47 Altitude of land surface (ft., msl): 1911.4
Screened interval (ft.): 42-47 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/11/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6315		

Test Hole and Observation Well Record

Location: 129-58-30CDD ₁	Use of well: Test hole
Owner and number: SWC 6316	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1313
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/12/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, oxidized	4	5
Clay, silty, oxidized to 7 feet	9	14
Sand, medium to coarse, rounded, possible interbedded clay	31	45
Clay, silty, olive gray, color turns brown then back to olive gray at about 70 feet	76	121
Clay, silty, sandy, pebbly, olive gray, below 120 feet, interbedded gravel layers, below 140 feet, interbedded silty clay layers (till)	29	150
Claystone, silty, brown with tan specks (Niobrara Formation)	32	182

Test Hole and Observation Well Record

Location: 129-58-30CDD₂

Use of well: Observation

Owner and number: SWC 6316A

Principal aquifer: Oakes

Depth drilled (ft.): 45

Altitude of land surface (ft., msl): 1313.4

Screened interval (ft.): 40-45

Lithologic log from: SWC

Casing diameter: 2-inch pvc

Comments:

Date completed: 9/12/85

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

See log for test hole #6316

Test Hole and Observation Well Record

Location: 129-58-30DDD₁ Use of well: Observation
Owner and number: SWC 4835 Principal aquifer: Oakes
Depth drilled (ft.): 180 Altitude of land surface (ft., msl): 1315.2
Screened interval (ft.): 133-136 Lithologic log from: SWC
Casing diameter: 1.25-inch Comments: Electric log available
Date completed: 10/7/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, yellow brown, fine grain, oxidized	13	15
Sand, medium dark to dark gray, fine to coarse grain	33	48
Sand, fine to coarse grain, very silty, interbedded clay	32	80
Sand, medium dark gray, fine grain, clayey, silty	71	151
Clay, medium dark gray, silty, sandy, pebbly (till)	20	171
Shale, light olive gray, very calcareous, (Niobrara Formation)	9	180

Test Hole and Observation Well Record

Location: 129-58-30DDD₂ Use of well: Observation
Owner and number: SWC 4835A Principal aquifer: Oakes
Depth drilled (ft.): 50 Altitude of land surface (ft., msl): 1315.8
Screened interval (ft.): 38-41 Lithologic log from: SWC
Casing diameter: 1.25-inch Comments:
Date completed: 10/7/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, yellow brown, fine grain, oxidized	13	15
Sand, fine to coarse grain	33	48
Sand, very silty	2	50

Test Hole and Observation Well Record

Location: 129-58-31AAA Use of well: Observation
Owner and number: U.S.B.R. W-118 Principal aquifer: Oakes
Depth drilled (ft.): ? Altitude of land surface (ft., msl): 1315.8
Screened interval (ft.): Slotted, 0-14 Lithologic log from: No log
Casing diameter: 3-inch downspout Comments:
Date completed: 3/1/67

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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Test Hole and Observation Well Record

Location: 129-58-31AAC Use of well: Irrigation
Owner and number: Marshall Claeys Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 20-60 Lithologic log from:
Casing diameter: 16-inch Comments:
Date completed: 8/3/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, yellow, fine grain	19	20
Sand, white, fine grain	32	52
Sand, coarse grain, interbedded clay	8	60

Test Hole and Observation Well Record

Location: 129-58-31ABC Use of well: Irrigation
Owner and number: Marshall Claeys Principal aquifer: Oakes
Depth drilled (ft.): 72 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 32-72 Lithologic log from:
Casing diameter: 16-inch Comments:
Date completed: 8/3/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, yellow, fine grain	21	22
Sand, white, fine grain	32	54
Gravel, medium, interbedded clay	18	72

Test Hole and Observation Well Record

Location: 129-58-31DBD₁ (east test hole) Use of well: Test hole
Owner and number: Marshal Claeys Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1314
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 6/18/84

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Fine brown sand	4	5
Fine brown sand with clay	8	13
Fine to medium gray sand	14	27
Medium sand, some fines, clean	30	57
Gray clay	3	60

Test Hole and Observation Well Record

Location: 129-58-31DBD₂ (west test hole) Use of well: Test hole
 Owner and number: Marshal Claeys Principal aquifer: Oakes
 Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1314
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 6/18/84

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Fine sand, brown	3	5
Clay and sand	7	12
Fine to medium sand, lignitic	33	45
Fine to coarse sand	8	53
Gray clay	7	60

Test Hole and Observation Well Record

Location: 129-59- 01BBB ₁	Use of well: Test hole
Owner and number: SWC 6293	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma logs available
Date completed: 8/29/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, oxidized to 10 feet, subrounded to rounded	12	13
Sand, fine to v. coarse, predom. medium to coarse, predom. quartz and shale and carbonates	36	49
Clay, sl. to v. silty, olive gray	43	92
Clay, silty, sandy, pebbly, below 120 some interbedded gravel and sandy clay	60	152
Claystone, silty, brownish-gray with tan specks (Niobrara Formation)	30	182

Test Hole and Observation Well Record

Location: 129-59-01BBB₂ Use of well: Observation
Owner and number: SWC 6293A Principal aquifer: Oakes
Depth drilled (ft.): 50 Altitude of land surface (ft., msl): 1310.4
Screened interval (ft.): 43-48 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 8/29/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6293A		

Test Hole and Observation Well Record

Location: 129-59-01DDD₁ Use of well: Observation
 Owner and number: SWC 9431 Principal aquifer: Oakes
 Depth drilled (ft.): 180 Altitude of land surface (ft., msl): 1311.5
 Screened interval (ft.): 83-86 Lithologic log from: SWC
 Casing diameter: 1.25-inch Comments: Electric log available
 Date completed: 8/27/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, very fine to coarse grain, predom. medium, subangular to subrounded, oxidized	7	7
Silt, moderately yellowish brown, clayey, sandy, oxidized (lacustrine)	3	10
Silt, medium gray, clayey, sandy (lacustrine)	14	24
Sand, very fine to very coarse grain, predom. medium, subangular to subrounded	36	60
Silt, medium gray, clayey, sandy (lacustrine)	4	64
Sand, very fine to very coarse grain, predom. medium, subangular to subrounded, interbedded clay	29	93
Clay, silty, sandy, pebbly, gravelly (till)	63	156
Shale, medium gray to medium bluish gray, white specks, very calcareous (Niobrara Formation)	24	180

Test Hole and Observation Well Record

Location: 129-59-01DDD2 Use of well: Observation
Owner and number: SWC 9431A Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1312.9
Screened interval (ft.): 42-45 Lithologic log from: SWC
Casing diameter: 1.25-inch Comments:
Date completed: 8/27/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for test hole #9431

Test Hole and Observation Well Record

Location: 129-59-02DDD	Use of well: Test hole
Owner and number: SWC 9432	Principal aquifer: Oakes
Depth drilled (ft.): 180	Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric log available
Date completed: 8/28/75	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, very fine to coarse grain, predom. medium, subangular to subrounded, clayey	11	11
Silt, medium gray, clayey, sandy (lacustrine)	3	14
Sand, fine to very coarse grain, predom. coarse, angular to subrounded	17	31
Silt, medium gray, clayey, sandy (lacustrine)	56	87
Clay, medium dark to olive gray, silty, sandy, pebbly (till)	65	152
Shale, medium to medium bluish gray, white specks, very calcareous (Niobrara Formation)	28	180

Test Hole and Observation Well Record

Location: 129-59-03AAA₃ Use of well: Observation
Owner and number: U.S.B.R. W-66 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1308.5
Screened interval (ft.): 19.0-20.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-66
Date completed: 9/28/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	3	3
Medium sand, shale and lignite chips	25	28

Test Hole and Observation Well Record

Location: 129-59-03BBB Use of well: Test hole
Owner and number: Hilda Louma Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1305
Screened interval (ft.): None Lithologic log from:
Casing diameter: None Comments:
Date completed: 7/27/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, silty	2	3
Clay, brown	1	4
Sand, brown, medium grain	1	5
Sand, oxidized	7	12
Sand, gray, medium grain	3	15
Sand, gray, fine to medium grain	20	35
Sand, gray, fine grain	3	38
Silt, gray	2	40

Test Hole and Observation Well Record

Location: 129-59-03BBD Use of well: Test hole
Owner and number: Hilda Luoma Principal aquifer: Oakes
Depth drilled (ft.): 45 Altitude of land surface (ft., msl): 1305
Screened interval (ft.): None Lithologic log from:
Casing diameter: None Comments:
Date completed: 9/27/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain	4	5
Sand, brown, fine to medium grain	5	10
Sand, gray, fine to medium grain	10	20
Sand, gray, medium gray	5	25
Sand, gray, fine grain	15	40
Sand, gray, fine to medium grain	5	45

Test Hole and Observation Well Record

Location: 129-59-03BDB Use of well: Test hole
Owner and number: Hilda Loma Principal aquifer: Oakes
Depth drilled (ft.): 35 Altitude of land surface (ft., msl): 1304
Screened interval (ft.): None Lithologic log from:
Casing diameter: None Comments:
Date completed: 9/27/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain	7	8
Sand, gray, fine grain	2	10
Sand, gray, fine to medium grain	10	20
Sand	12	32
Silt, gray	3	35

Test Hole and Observation Well Record

Location: 129-59-03CAA Use of well: Observation
Owner and number: U.S.B.R. W-287 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl):1307.72
Screened interval (ft.): 18.6-20.5 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 11/2/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	3	3
Loamy sand, shale and lignite chips	13	16
Fine sand, shale and lignite chips	7	23

Test Hole and Observation Well Record

Location: 129-59- 03CBB Use of well: Observation
Owner and number: U.S.B.R. W-221 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1307.0
Screened interval (ft.): 18.4-19.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 9/28/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	2.5	2.5
Loamy sand	3.5	6
Medium sand, shale and lignite chips	22	28

Test Hole and Observation Well Record

Location: 129-59-03CCC	Use of well: Test hole
Owner and number: SWC 9434	Principal aquifer: Oakes
Depth drilled (ft.): 160	Altitude of land surface (ft., msl): 1304
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric log available
Date completed: 8/28/75	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine to coarse grain, predom. medium, subangular to subrounded	36	36
Silt, medium gray, clayey, sandy (lacustrine)	44	80
Clay, medium dark gray to olive gray, silty, sandy, pebbly, gravelly (till)	62	142
Shale, medium gray to mediumbluish gray, white specks, very calcareous (Niobrara Formation)	18	160

Test Hole and Observation Well Record

Location: 129-59-03CDB Use of well: Test hole
Owner and number: Hilda Louma Principal aquifer: Oakes
Depth drilled (ft.): 36 Altitude of land surface (ft., msl): 1304
Screened interval (ft.): None Lithologic log from:
Casing diameter: None Comments:
Date completed: 9/27/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine grain	4	5
Sand, brown, fine to medium grain	3	8
Sand, gray, fine to medium grain	2	10
Sand, gray, fine grain, shaley	26	36
Silt, gray		36

Test Hole and Observation Well Record

Location: 129-59-03DDB Use of well: Test hole
Owner and number: Ron Ray Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1305
Screened interval (ft.): None Lithologic log from: K&K Well Drilling
Casing diameter: None Comments:
Date completed: 7/20/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil, sandy	1	1
Sand, brown	7	8
Sand, fine	26	34
Clay, gray	6	40

Test Hole and Observation Well Record

Location: 129-59- 04BAA Use of well: Observation
Owner and number: U.S.B.R. W-219 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1307.7
Screened interval (ft.): 17.8-19.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 9/28/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	3.5	3.5
Loamy sand, lignite chips	8.5	12
Medium sand, clean	11	23

Test Hole and Observation Well Record

Location: 129-59-04BBB₁ Use of well: Test hole
 Owner and number: SWC 9435 Principal aquifer: Oakes
 Depth drilled (ft.): 160 Altitude of land surface (ft., msl): 1305
 Screened interval (ft.): None Lithologic log from: SWC
 Casing diameter: None Comments: Electric log available
 Date completed: 8/28/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine to coarse grain, predom. medium, subangular to subrounded	37	37
Silt, medium gray, clayey, sandy (lacustrine)	32	69
Clay, medium dark gray to olive gray, silty, sandy, pebbly, gravelly (till)	3	72
Sand, fine to coarse grain, predom. medium	6	78
Clay, medium dark gray to olive gray, silty, sandy, pebbly, gravelly (till)	12	90
Sand, fine to coarse grain, predom. medium	5	95
Clay, medium dark gray to olive gray, silty, sandy, pebbly (till)	35	130
Shale, brownish black to black, non-calcareous (Pierre Formation)	18	148
Shale, medium gray to medium bluish gray, white specks, very calcareous (Niobrara Formation)	12	160

Test Hole and Observation Well Record

Location: 129-59-04BBB₂ Use of well: Observation
Owner and number: U.S.B.R. W-64 Principal aquifer: Oakes
Depth drilled (ft.): 20 Altitude of land surface (ft., msl): 1306.1
Screened interval (ft.): Slotted, Lithologic log from: U.S.B.R.
0-13.8
Casing diameter: 3-inch downspout Comments:
Date completed: 7/28/66

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	3	3
Fine sand with few shale chips	17	20

Test Hole and Observation Well Record

Location: 129-59-04CAA Use of well: Observation
Owner and number: U.S.B.R. W-222 Principal aquifer: Oakes
Depth drilled (ft.): 27 Altitude of land surface (ft., msl): 1307.3
Screened interval (ft.): 17.3 - 19.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 9/29/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	3	3
Loamy sand	7.5	10.5
Medium sand, shale and lignite chips	16.5	27

Test Hole and Observation Well Record

Location: 129-59-04CDD Use of well: Observation
Owner and number: U.S.B.R. W-229 Principal aquifer: Oakes
Depth drilled (ft.):28 Altitude of land surface (ft., msl): 1305.5
Screened interval (ft.): 18.2-19.3 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/4/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	4.5	4.5
Loamy sand	7.5	12
Medium sand, shale and lignite chips	16	28

Test Hole and Observation Well Record

Location: 129-59-04DDD₂ Use of well: Observation
 Owner and number: U.S.B.R. W-74 Principal aquifer: Oakes
 Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1303.5
 Screened interval (ft.): 18.5-19.6 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments: Replaces old well W-74
 Date completed: 10/4/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	0.5	0.5
Loam	1.5	2
Loamy sand	3.5	5.5
Sandy loam	0.5	6
Loamy sand	4.5	10.5
Sand, shale and lignite chips	17.5	28

Test Hole and Observation Well Record

Location: 129-59-05ACC Use of well: Observation
Owner and number: U.S.B.R. W-224 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1305.5
Screened interval (ft.): 18.7-19.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 9/29/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy sand	8	8
Loam	2	10
Loamy sand	3	13
Medium sand, shale chips	10	23
Silt loam	5	28

Test Hole and Observation Well Record

Location: 129-59-05ADD Use of well: Observation
 Owner and number: U.S.B.R. W-223 Principal aquifer: Oakes
 Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1304.2
 Screened interval (ft.): 18.3-19.5 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments:
 Date completed: 9/29/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	2	2
Loamy sand	5	7
Medium sand	14	21
Loamy very fine sand, shale and lignite chips	7	28

Test Hole and Observation Well Record

Location: 129-59-05CBC Use of well: Observation
Owner and number: U.S.B.R. W-225 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1301.1
Screened interval (ft.): 17.0-18.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 9/29/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Very fine sandy loam	3	3
Loamy sand	6	9
Silty clay loam	6	15
Loamy sand	3.5	18.5
Silty clay loam	3.5	22
Very fine sandy loam	4	26
Silt loam	2	28

Test Hole and Observation Well Record

Location: 129-59-05CCC Use of well: Test hole
 Owner and number: U.S.B.R. D.H. 10 Principal aquifer: Oakes
 Depth drilled (ft.): 53 Altitude of land surface (ft., msl): 1306.2
 Screened interval (ft.): None Lithologic log from: U.S.B.R.
 Casing diameter: None Comments:
 Date completed: 1/17/51

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, black organic	5	5
Sand, buff, fine to medium grain, clayey, oxidized	10	15
Clay, gray, very silty	15	30
Sand, gray, medium grain	2	32
Gravel, gray, fine to medium, clayey and sandy	8	40
Sand, gray, fine to medium grain	5	45
Till, gray, sandy, gravelly, plastic	8	53

Test Hole and Observation Well Record

Location: 129-59-05DDD₂ Use of well: Observation
Owner and number: U.S.B.R. W-73 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1305.0
Screened interval (ft.): 18.6-19.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-73
Date completed: Fall, 1983

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	8	8
Medium sand, shale and lignite chips	20	28

Test Hole and Observation Well Record

Location: 129-59-05DDD3 Use of well: Test hole
 Owner and number: U.S.B.R. DH-9 Principal aquifer: Oakes
 Depth drilled (ft.): 46 Altitude of land surface (ft., msl): 1303.2
 Screened interval (ft.): None Lithologic log from: U.S.B.R.
 Casing diameter: None Comments:
 Date completed: 1/12/51

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt	1.5	1.5
Sand, fine, silty, slightly clayey, buff	7.5	9
Sand, medium, gray, lignitic	9.8	18.8
Clay, silty, gray, plastic	3.3	22.1
Clay, silty, sandy, gravelly (till)	18.5	40.6
Sand and gravel, silty, detrital shale	3.5	44.1
Clay, silty, sandy, gravelly (till?)	1.9	46

Test Hole and Observation Well Record

Location: 129-59-06CAA Use of well: Observation
Owner and number: U.S.B.R. W-226 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1296.6
Screened interval (ft.): 19.4-20.4 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 9/29/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loam	0.5	0.5
Sandy clay loam	2.5	3
Loamy sand	2.5	5.5
Silt loam	2.5	8
Very fine sandy loam	1	9
Loamy sand	0.5	9.5
Silt loam	13.5	23

Test Hole and Observation Well Record

Location: 129-59-07ABB Use of well: Observation
Owner and number: U.S.B.R. W-227 Principal aquifer: Oakes
Depth drilled (ft.): 33 Altitude of land surface (ft., msl): 1301.9
Screened interval (ft.): 12.6-17.6 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/3/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Very fine sandy loam	4	4
Loamy fine sand	5	9
Loamy sand	1	10
Fine sand, lignite and shale chips	8	18
Silt loam, varved	15	33

Test Hole and Observation Well Record

Location: 129-59-07ACC Use of well: Observation
Owner and number: U.S.B.R. W-237 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1306.3
Screened interval (ft.): 18.9-21.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/6/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3	3
Loamy sand	13.5	16.5
Fine sand, shale and lignite chips	6.5	23

Test Hole and Observation Well Record

Location: 129-59-07ADD	Use of well: Observation
Owner and number: U.S.B.R. W-236	Principal aquifer: Oakes
Depth drilled (ft.): 28	Altitude of land surface (ft., msl): 1307.7
Screened interval (ft.): 18.4-20.6	Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic	Comments:
Date completed: 10/6/83	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3	3
Very fine sandy loam	2	5
Silt loam	3	8
Very fine sandy loam	6	14
Loamy fine sand	5	19
Medium sand, shale and lignite chips	4	23
Silt loam	5	28

Test Hole and Observation Well Record

Location: 129-59-07CBB Use of well: Observation
 Owner and number: U.S.B.R. W-238 Principal aquifer: Oakes
 Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1300.2
 Screened interval (ft.): 19.9-22.1 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments:
 Date completed: 10/6/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3	3
Sandy loam	2	5
Loamy sand	4	9
Loamy fine sand	3	12
Loamy sand	1.5	13.5
Loamy very fine sand	1	14.5
Fine sand, shale and lignite chips	13.5	28

Test Hole and Observation Well Record

Location: 129-59-07DDD ₁	Use of well: Observation
Owner and number: U.S.B.R. W-80	Principal aquifer: Oakes
Depth drilled (ft.): 20	Altitude of land surface (ft., msl): 1302.2
Screened interval (ft.): Slotted, 0-13.6	Lithologic log from: U.S.B.R.
Casing diameter: 3-inch downspout	Comments:
Date completed: 8/2/66	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	1	1
Silt loam	1	2
Very fine sandy loam	8	10
Very fine sand	5	15
Silt loam	5	20

Test Hole and Observation Well Record

Location: 129-59-07DDD₂ Use of well: Observation
Owner and number: U.S.B.R. W-80 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1303.4
Screened interval (ft.): 18.9-21.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-80
Date completed: 10/7/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	2	2
Fine sandy loam	4.5	6.5
Loamy fine sand	6	12.5
Fine sand, shale and lignite chips	5	17.5
Silty loam	5.5	23

Test Hole and Observation Well Record

Location: 129-59-08ABB Use of well: Observation
Owner and number: U.S.B.R. W-228 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1303.9
Screened interval (ft.): 17.4-18.6 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/4/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	2	2
Loamy sand	11	13
Medium sand, shale and lignite chips	14	27
Silt loam	1	28

Test Hole and Observation Well Record

Location: 129-59-08ACC Use of well: Observation
Owner and number: U.S.B.R. W-235 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1307.8
Screened interval (ft.): 19.7-21.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/6/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3.5	3.5
Loamy sand	5.5	9
Sandy loam	7.5	16.5
Loamy sand, lignite and shale chips	3.5	20
Very fine sandy loam	2	22
Silt loam	6	28

Test Hole and Observation Well Record

Location: 129-59-08BBB₂ Use of well: Observation
Owner and number: U.S.B.R. W-72 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1306.4
Screened interval (ft.): 14.0-15.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-72
Date completed: 10/4/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	12.5	12.5
Loamy sand	2	14.5
Fine sand, lignite and shale chips	2.5	17
Silt loam, varved	6	23

Test Hole and Observation Well Record

Location: 129-59-08DDD₂ Use of well: Observation
 Owner and number: U.S.B.R. W-81 Principal aquifer: Oakes
 Depth drilled (ft.): 27 Altitude of land surface (ft., msl): 1303.9
 Screened interval (ft.): 19.3-21.5 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments: Replaces old well W-81
 Date completed: 10/11/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3	3
Fine sandy loam	1	4
Loamy fine sand	6	10
Silt loam	1	11
Loamy very fine sand	4.5	15.5
Very fine sandy loam, lignite chips	4	19.5
Silt loam	1.5	21
Silty clay loam	6	27

Test Hole and Observation Well Record

Location: 129-59-08DDD ₃	Use of well: Test hole
Owner and number: U.S.B.R. D.H. 11	Principal aquifer: Oakes
Depth drilled (ft.): 57	Altitude of land surface (ft., msl): 1291.0
Screened interval (ft.): None	Lithologic log from: U.S.B.R.
Casing diameter: None	Comments:
Date completed: 1/18/51	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, buff, clayey, oxidized	15	15
Clay, gray, silty, sandy, plastic	31	46
Sand, medium sand to fine gravel, slightly clayey	4	50
Till, gray, gravelly, interbedded silt and sand	7	57

Test Hole and Observation Well Record

Location: 129-59- 09BCC Use of well: Observation
Owner and number: U.S.B.R. W-234 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1304.4
Screened interval (ft.): 18.8-20.8 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/5/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3	3
Loamy sand	2.5	5.5
Sandy loam	5	10.5
Silt loam	0.5	11
Loamy sand	1	12
Silt loam	16	28

Test Hole and Observation Well Record

Location: 129-59-09CAA Use of well: Observation
Owner and number: U.S.B.R. W-233 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1300.7
Screened interval (ft.): 20.3-21.3 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/5/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	1.5	1.5
Loamy sand	10.5	12
Medium sand, shale and lignite chips	16	28

Test Hole and Observation Well Record

Location: 129-59-09DCC Use of well: Observation
Owner and number: U.S.B.R. W-241 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1300.6
Screened interval (ft.): 19.9-21.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/13/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	1	1
Fine sandy loam	2	3
Loamy sand	3	6
Silt loam	1	7
Silty clay loam	3	10
Fine sand, shale and lignite chips	13	23

Test Hole and Observation Well Record

Location: 129-59-10AAA ₁	Use of well: Test hole
Owner and number: SWC 9433	Principal aquifer: Oakes
Depth drilled (ft.): 180	Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric log available
Date completed: 8/28/75	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine to coarse grain, predom. medium, subangular to subrounded	40	40
Silt, medium gray, clayey, sandy (lacustrine)	46	86
Clay, medium dark gray to olive gray, silty, sandy, pebbly, gravelly (till)	60	146
Shale, medium gray to medium bluish gray, white specks, very calcareous (Niobrara Formation)	34	180

Test Hole and Observation Well Record

Location: 129-59-10AAA ₂	Use of well: Observation
Owner and number: SWC 9433A	Principal aquifer: Oakes
Depth drilled (ft.): 60	Altitude of land surface (ft., msl): 1308.9
Screened interval (ft.): 33-36	Lithologic log from: SWC
Casing diameter: 1.25-inch	Comments:
Date completed: 8/28/75	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #9433		

Test Hole and Observation Well Record

Location: 129-59-10AAC

Use of well: Test hole

Owner and number: John Louma

Principal aquifer: Oakes

Depth drilled (ft.): 40

Altitude of land surface (ft., msl): 1305

Screened interval (ft.): None

Lithologic log from: K&K Drilling

Casing diameter: None

Comments:

Date completed: 7/16/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, yellow, fine grain	9	10
Sand, white, fine grain	9	19
Clay, blue	2	21
Sand, white, fine grain	15	36
Clay, blue	4	40

Test Hole and Observation Well Record

Location: 129-59-10ABB

Use of well: Test hole

Owner and number: John Louma

Principal aquifer: Oakes

Depth drilled (ft.): 40

Altitude of land surface (ft., msl): 1306

Screened interval (ft.): None

Lithologic log from: K & K Drilling

Casing diameter: None

Comments:

Date completed: 7/16/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, yellow, fine grain	14	15
Sand, white, fine grain	23	38
Clay, blue	2	40

Test Hole and Observation Well Record

Location: 129-59-10 BAA Use of well: Observation
Owner and number: U.S.B.R. W-230 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1305.9
Screened interval (ft.): 18.4-19.6 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/4/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3	3
Loamy sand	7	10
Medium sand, shale and lignite chips	18	28

Test Hole and Observation Well Record

Location: 129-59-10BAB

Use of well: Test hole

Owner and number: John Louma

Principal aquifer: Oakes

Depth drilled (ft.): 40

Altitude of land surface (ft., msl): 1306

Screened interval (ft.): None

Lithologic log from: K&K Drilling

Casing diameter: None

Comments:

Date completed: 7/14/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, yellow, fine grain	6	8
Sand, white, fine grain	31	39
Clay, blue	1	40

Test Hole and Observation Well Record

Location: 129-59-10BBB Use of well: Test hole
Owner and number: John Louma Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1305
Screened interval (ft.): None Lithologic log from: K&K Drilling
Casing diameter: None Comments:
Date completed: 7/14/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, yellow, fine grain	7	8
Sand, white, fine grain	29	37
Clay, blue	3	40

Test Hole and Observation Well Record

Location: 129-59-10BBD

Use of well: Test hole

Owner and number: John Louma

Principal aquifer: Oakes

Depth drilled (ft.): 40

Altitude of land surface (ft., msl): 1305

Screened interval (ft.): None

Lithologic log from: K&K Drilling

Casing diameter: None

Comments:

Date completed: 7/14/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, yellow, fine grain	6	8
Sand, white, fine grain	30	38
Clay, blue	2	40

Test Hole and Observation Well Record

Location: 129-59-10CAA Use of well: Observation
Owner and number: U.S.B.R. W-231 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1309.0
Screened interval (ft.): 18.6-19.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/4/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy sand	12	12
Medium sand, shale and lignite chips	16	28

Test Hole and Observation Well Record

Location: 129-59-10CBB Use of well: Observation
Owner and number: U.S.B.R. W-232 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1305.4
Screened interval (ft.): 20.5-22.6 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/4/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy sand	6	6
Sandy loam	1	7
Loamy sand	5	12
Medium sand, shale and lignite chips	16	28

Test Hole and Observation Well Record

Location: 129-59-12AAB ₁	Use of well: Test hole
Owner and number: SWC 6305	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1311
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/5/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine to coarse, predom. coarse, oxidized	6	7
Clay, silty, oxidized to 15 feet	19	26
Sand, medium to v. coarse, subrounded to rounded	20	46
Silt, slightly to very clayey, olive gray, most into suspension, few clay layers	46	92
Clay, silty, sandy, soft, olive gray (till)	68	160
Claystone, silty, brown with tan specks (Niobrara Formation)	22	182

Test Hole and Observation Well Record

Location: 129-59-12AAB₂ Use of well: Observation
Owner and number: SWC 6305A Principal aquifer: Oakes
Depth drilled (ft.): 45 Altitude of land surface (ft., msl): 1310.6
Screened interval (ft.): 40-45 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments: West well of pair
Date completed: 9/5/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6305		

Test Hole and Observation Well Record

Location: 129-59-12AAB ₃	Use of well: Observation
Owner and number: SWC 6305B	Principal aquifer: Oakes
Depth drilled (ft.): 10	Altitude of land surface (ft., msl): 1310.8
Screened interval (ft.): 5-10	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: East well of pair
Date completed: 9/5/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6305		

Test Hole and Observation Well Record

Location: 129-59-12AAC Use of well: Test hole
Owner and number: Allen Hansen Principal aquifer: Oakes
Depth drilled (ft.): 100 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None Lithologic log from: Empire Drilling
Casing diameter: None Comments:
Date completed: 2/18/76

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand	3	5
Clay	20	25
Sand, gravelly	15	40
Sand, very fine grain	45	85
Sand, medium grain	15	100
Clay		100

Test Hole and Observation Well Record

Location: 129-59-12AAD

Use of well: Test hole

Owner and number: Allen Hansen

Principal aquifer: Oakes

Depth drilled (ft.): 101

Altitude of land surface (ft., msl): 1311

Screened interval (ft.): None

Lithologic log from: Empire Drilling

Casing diameter: None

Comments:

Date completed: 2/18/76

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand	3	5
Clay	20	25
Sand, gravelly	15	40
Sand, very fine grain	38	78
Sand, medium to coarse grain	23	101
Clay		101

Test Hole and Observation Well Record

Location: 129-59-12ABB ₁	Use of well: Test hole
Owner and number: SWC 6304	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1309
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/5/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, well sorted, rounded, oxidized	4	5
Clay, silty, pale yellow-brown, oxidized to 15 feet, after 15 feet olive gray	21	26
Sand, fine to v. coarse, angular to rounded, predom. quartz and carbonates	20	46
Sequence of interbedded clayey silts and silty clays, olive gray, most into suspension, more clay after 72 feet	51	97
Clay, silty, sandy, pebbly, olive gray, soft at top, becomes brittle with depth some interbedded gravel below 130 feet, lignitic (till)	61	158
Claystone, silty, brown with tan specks (Niobrara Formation)	24	182

Test Hole and Observation Well Record

Location: 129-59-12ABB ₂	Use of well: Observation
Owner and number: SWC 6304A	Principal aquifer: Oakes
Depth drilled (ft.): 45	Altitude of land surface (ft., msl): 1309.4
Screened interval (ft.): 40-45	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments:
Date completed: 9/5/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for test hole #6304

Test Hole and Observation Well Record

Location: 129-59-12ABD Use of well: Test hole
Owner and number: Allen Hansen Principal aquifer: Oakes
Depth drilled (ft.): 160 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None Lithologic log from: Empire Drilling
Casing diameter: None Comments:
Date completed: 2/18/76

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand	3	5
Clay	20	25
Gravel, sandy	15	40
Sand, very fine grain	61	101
Till, gray	54	155
Clay (shale)	5	160

Test Hole and Observation Well Record

Location: 129-59-12ADD	Use of well: Irrigation
Owner and number: Allen Hansen	Principal aquifer: Oakes
Depth drilled (ft.): 105	Altitude of land surface (ft., msl): 1310
Screened interval (ft.): 85-105	Lithologic log from: Adair Drilling
Casing diameter: 16-inch	Comments:
Date completed:	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine grain	4	5
Clay, gray	15	20
Sand, gray, fine grain	15	35
Sand, coarse grain	40	75
Sand, medium to coarse grain	30	105

Test Hole and Observation Well Record

Location: 129-59-12CCC ₁	Use of well: Test hole
Owner and number: SWC 6295	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1306
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma logs available
Date completed: 8/30/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine to medium, rounded, oxidized	7	8
Clay, silty, oxidized to 17 feet, then olive gray	24	32
Sand, medium to v. coarse, subrounded to rounded, quartz + shale + carbonates, lignitic	10	42
Sand, fine to medium, as above	14	56
Gravel, sandy, gravel to ¼-inch diameter, v. coarse sand, angular to well rounded, shale + carbonates + silicates	6	62
Sand, fine, as above, becomes finer, more silty with depth	14	76
Clay, silty, sandy, pebbly, olive gray, from 76 to 88 feet thin layers of gravel	76	152
Claystone, brownish-gray, with tan specks, silty (Niobrara Formation)	30	182

Test Hole and Observation Well Record

Location: 129-59-12CCC₂ Use of well: Observation
Owner and number: SWC 6295A Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1306.0
Screened interval (ft.): 50-55 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 8/30/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for test hole 6295A

Test Hole and Observation Well Record

Location: 129-59-12DAD Use of well: Irrigation
Owner and number: Allen Hansen Principal aquifer: Oakes
Depth drilled (ft.): 110 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): 85-105 Lithologic log from:
Casing diameter: 16-inch Comments:
Date completed:

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine grain	4	4
Sand, silty	16	20
Sand, fine to medium grain, silty	60	80
Sand, coarse grain, clean	25	105
Till	5	110

Test Hole and Observation Well Record

Location: 129-59-13AAA ₁	Use of well: Observation
Owner and number: SWC 11670	Principal aquifer: Oakes
Depth drilled (ft.): 160	Altitude of land surface (ft., msl): 1312.3
Screened interval (ft.): 105-110	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: 800 feet north of 13AAD ₆
Date completed: 9/13/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to fine, silty, dark brown, oxidized	4	4
Clay, silty, sl. sandy, dark brown-gray brown, oxidized, soft	4	8
Sand, v. fine to v. coarse, predom. fine to medium, subangular to well rounded, composed of detrital shale, quartz, carbonates and shield silicates, yellow stained, oxidized	7	15
Sand, as above, gray, unoxidized	38	53
Clay, silty, v. sl. sandy, olive gray	1	54
Sand (80-90%) and gravel, sand is v. fine to v. coarse, predom. medium to coarse, gravel is fine to coarse, subangular to well rounded, composed of detrital shale, quartz, carbonates, shield silicates, lignite, takes water, caving badly, mixed bentonite mud to prevent caving	31	85
Gravel, sandy, composition as above, drills as stratified, gravel is fine to coarse, lots of subangular gravel sized pieces of Niobrara Formation, takes water, mixed bentonite mud to prevent caving	35	120
Clay, silty, sandy, pebbly, olive gray, moderately brittle (till)	27	147
Clay, black, greasy,, non-calcareous, tight, (Pierre Formation)	13	160

Test Hole and Observation Well Record

Location: 129-59-13AAD ₁	Use of well: Observation
Owner and number: SWC 11671	Principal aquifer: Oakes
Depth drilled (ft.): 150	Altitude of land surface (ft., msl): 1310.9
Screened interval (ft.): 105-110	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: Electric log available, 500 feet north of 13AAD ₆
Date completed: 9/16/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to fine, silty, dark brown, oxidized	2	2
Clay, silty, sl. sandy, dark brown to gray brown, soft, oxidized	5	7
Sand, v. fine to coarse, predom. fine to medium, subangular to well rounded, composed of detrital shale, quartz, carbonates, silicates, yellow stained, oxidized	4	11
Sand, as above, gray, unoxidized	38	49
Sand (80-90%) and gravel, sand, v. fine to v. coarse, predom. medium to coarse, gravel fine to coarse, subangular to well rounded, composition as above, lignitic, takes water	43	92
Gravel, fine to coarse, sandy, caving badly, mixed bentonite mud to prevent caving, drills as stratified, takes lots of water	37	129
Clay, silty, sandy, pebbly, olive gray (till)	21	150

Test Hole and Observation Well Record

Location: 129-59-13AAD ₂	Use of well: Observation
Owner and number: SWC 11672	Principal aquifer: Oakes
Depth drilled (ft.): 150	Altitude of land surface (ft., msl): 1311.6
Screened interval (ft.): 105-110	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: East well of pair, 302 feet north of 13AAD ₆
Date completed: 9/17/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to fine, silty, dark brown, oxidized	3	3
Clay, silty, sl. sandy, dark brown to gray brown, oxidized, soft	4	7
Sand, fine to medium, subangular to well rounded, yellow stained, oxidized, composed of detrital shale, quartz, carbonates, shield silicates, lignite	4	11
Sand, v. fine to v. coarse, sl. gravelly at bottom, composition as above	21	32
Clay, silty, greenish gray	4	36
Sand, fine to medium, as above	9	45
Sand, v. fine to v. coarse, gravelly, fine to medium, subangular to well rounded, composition as above, drills as stratified	25	70
Sand, v. fine to v. coarse and gravel, fine to coarse, composition as above, clay layer from 78-79 feet	47	117
Gravel, sandy, harder drilling, caving, mixed bentonite mud to prevent caving, composition as above, subangular to well rounded	24	141
Clay, silty, sandy, pebbly, olive gray (till)	9	150

Test Hole and Observation Well Record

Location: 129-59-13AAD ₃	Use of well: Observation
Owner and number: SWC 11673	Principal aquifer: Oakes
Depth drilled (ft.): 20	Altitude of land surface (ft., msl): 1311.4
Screened interval (ft.): 14-19	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: West well of pair, 302 feet north of 13AAD ₆
Date completed: 9/17/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, brown to gray, yellow-gray, oxidized, smooth	7	7
Sand, v. fine to fine, brown to yellow brown, oxidized, subangular to well rounded, composed of detrital shale, quartz, carbonates, shield silicates	4	11
Sand, v. fine to v. coarse, gray, unoxidized, composition as above	9	20

Test Hole and Observation Well Record

Location: 129-59-13AAD ₄	Use of well: Observation
Owner and number: SWC 11674	Principal aquifer: Oakes
Depth drilled (ft.): 140	Altitude of land surface (ft., msl): 1311.2
Screened interval (ft.): 105-110	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: East well of pair, 205 feet north of irrigation well 129-059-13AAD ₆
Date completed: 9/17/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, yellow-gray-brown, soft, oxidized	7	7
Sand, v. fine to v. coarse, sl. gravelly, fine, subangular to well rounded, composed of detrital shale, quartz, carbonates, silicates, yellow stained, oxidized	4	11
Sand, as above, gray, unoxidized	21	32
Clay, silty, greenish gray, soft	2	34
Sand, as above, gray	3	37
Clay, silty, greenish gray, soft	1	38
Sand, as above, more gravelly, drills as stratified, gravel is fine to medium, composition as above, caving, mixed bentonite mud to prevent caving	10	48
Sand (80%), v. fine to v. coarse, predom. medium to coarse, and gravel (20%) fine to medium, less detrital shale, more carbonates and silicates	19	67
Sand and gravel, coarser section than above, gravel is fine to coarse, composition as above, subangular to well rounded, mixed bentonite mud to prevent caving, takes water	43	110
Gravel, sandy, composition as above, drills as stratified, strong bit chatter	21	131
Gravel and cobbles, very hard drilling, many carbonate and silicate chips	4	135
Clay, silty, sandy, pebbly, olive gray (till)	5	140

Test Hole and Observation Well Record

Location: 129-59-13AAD ₅	Use of well: Observation
Owner and number: SWC 11675	Principal aquifer: Oakes
Depth drilled (ft.): 20	Altitude of land surface (ft., msl): 1311.2
Screened interval (ft.): 14-19	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: West well of pair, 205 feet north of 13AAD ₆
Date completed: 9/17/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, yellow-brown-gray, oxidized, soft	7	7
Sand, v. fine to v. coarse, sl. gravelly, fine, subangular to well rounded, predom. detrital shale and quartz, some carbonates and silicates, yellow stained, oxidized	4	11
Sand, as above, gray, unoxidized	9	20

Test Hole and Observation Well Record

Location: 129-59-13AAD₆ Use of well: Irrigation
Owner and number: Oakes Farms Principal aquifer: Oakes
Depth drilled (ft.): 115 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): 95-115 Lithologic log from: Green Circle Supply
Casing diameter: 16-inch Comments: Aquifer test performed using
Date completed: 7/24/75 this well

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	8	8
Sand, fine grain	19	27
Till, gray, sandy, lignite	31	58
Gravel, interbedded coarse sand	57	115

Test Hole and Observation Well Record

Location: 129-59-13CDD	Use of well: Observation
Owner and number: SWC 6309	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1309.4
Screened interval (ft.): 92-97	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: Electric, neutron, and gamma logs available
Date completed: 9/10/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine to coarse to 40 feet, subrounded to rounded, oxidized to 5 feet, below 40 feet predom. fine sand	81	82
Gravel, predom. fine, sandy, coarse, subrounded to rounded, carbonates detrital shale and silicates	17	99
Clay, silty, sandy, pebbly, olive gray, soft, below 128 feet interbedded gravel (till)	46	145
Claystone, silty, brown with tan specks (Niobrara Formation)	37	182

Test Hole and Observation Well Record

Location: 129-59-13DAC Use of well: Irrigation
Owner and number: Oakes Farms Principal aquifer: Oakes
Depth drilled (ft.): 125 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): 95-125 Lithologic log from: Green Circle Supply
Casing diameter: 16 -inch Comments:
Date completed: 7/21/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	8	8
Sand, gray, fine grain, lignitic	19	27
Till, gray, sandy, interbedded gravel	34	61
Gravel, medium to coarse	15	76
Gravel, medium to coarse, interbedded fine to coarse sand	32	108
Gravel, coarse	17	125

Test Hole and Observation Well Record

Location: 129-59-13DDC

Use of well: Observation

Owner and number: SWC 6310

Principal aquifer: Oakes

Depth drilled (ft.): 132

Altitude of land surface (ft., msl): 1311.8

Screened interval (ft.): 105-110

Lithologic log from: SWC

Casing diameter: 2-inch pvc

Comments: No geophysical logs due to
caving hole

Date completed: 9/10/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand and clay, oxidized	4	5
Sand, fine to v. coarse, rounded, predom. quartz	25	30
Sand, coarse, and gravel, fine, predom. v. coarse sand and fine gravel, subrounded to rounded, occasional clay layers, lignitic	47	77
Gravel, fine to coarse, predom. medium, sandy, subrounded to rounded, predom. carbonates and silicates	33	110
Clay, silty, sandy, pebbly, olive gray, soft, interbedded gravel layers (till)	22	132

Test Hole and Observation Well Record

Location: 129-59-13DDD Use of well: Observation
Owner and number: SWC 9430 Principal aquifer: Oakes
Depth drilled (ft.): 160 Altitude of land surface (ft., msl): 1308.9
Screened interval (ft.): 98-101 Lithologic log from: SWC
Casing diameter: 1.25 Comments: Electric log available
Date completed: 8/27/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine to very coarse grain, predom. medium to coarse, angular to subrounded	103	103
Clay, medium dark gray to olive gray, silty, sandy, pebbly, gravelly (till)	49	152
Shale, medium gray to medium bluish gray, very calcareous (Niobrara Formation)	8	160

Test Hole and Observation Well Record

Location: 129-59-14BBB ₁	Use of well: Test hole
Owner and number: SWC 6294	Principal aquifer: Oakes
Depth drilled (ft.): 202	Altitude of land surface (ft., msl): 1304
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma logs available
Date completed: 8/29/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, oxidized	2	3
Clay, silty, yellow-brown and olive gray interbedded with fine sand	15	18
Sand, gray, fine	16	34
Clay, no recovery, bit slowed	1	35
Sand, medium to v. coarse, rounded to subrounded, predom. shale	10	45
Silt, clayey, poor recovery, most into suspension	27	72
Clay, silty, sandy, pebbly, olive gray, interbedded gravel from 99 to 110 feet, (till)	102	174
Claystone, silty, brownish gray with tan specks (Niobrara Formation)	28	202

Test Hole and Observation Well Record

Location: 129-59-14BBB2 Use of well: Observation
Owner and number: SWC 6294A Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1303.8
Screened interval (ft.): 34-39 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 8/29/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for test hole #6294A

Test Hole and Observation Well Record

Location: 129-59-15ABB Use of well: Observation
Owner and number: U.S.B.R. W-242 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1303.3
Screened interval (ft.): 18.9-21.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/13/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy sand	4.5	4.5
Silt loam	1	5.5
Loamy fine sand	7.5	13
Medium sand, shale + lignite chips	15	28

Test Hole and Observation Well Record

Location: 129-59-15BBB

Use of well: Observation

Owner and number: U.S.B.R. W-105

Principal aquifer: Oakes

Depth drilled (ft.): 13.5

Altitude of land surface (ft., msl): 1305.7

Screened interval (ft.): Slotted,
0-12

Lithologic log from: No log

Casing diameter: 3-inch downspout

Comments:

Date completed: 1/31/67

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

Test Hole and Observation Well Record

Location: 129-59-15CAA Use of well: Observation
Owner and number: U.S.B.R. W-243 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1302.0
Screened interval (ft.): 17.8-20.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/13/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy sand	6	6
Sandy loam	2	8
Loamy sand	2	10
Medium sand, shale + lignite chips	18	28

Test Hole and Observation Well Record

Location: 129-59-15 CBB Use of well: Observation
Owner and number: U.S.B.R. W-244 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1300.4
Screened interval (ft.): 15.6-17.8 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/13/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	2.5	2.5
Loamy sand	8	10.5
Peat	2.5	13
Medium sand	5	18
Very fine sand loam	2	20
Silt loam	3	23
Medium sand, lignite chips	5	28

Test Hole and Observation Well Record

Location: 129-59-16AAA Use of well: Observation
Owner and number: U.S.B.R. W-105 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1304.8
Screened interval (ft.): 19.9-22.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/13/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	1.5	1.5
Loamy sand	3	4.5
Sandy loam	1.5	6
Loamy sand	6.5	12.5
Sand, lignite + shale chips	15.5	28

Test Hole and Observation Well Record

Location: 129-59-16ACC Use of well: Observation
Owner and number: U.S.B.R. W-245 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1301.4
Screened interval (ft.): 19.1-20.6 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/13/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6	6
Very fine sandy loam	5	11
Loamy very fine sand	4	15
Silty clay loam	5.5	20.5
Fine sand, shale chips	2.5	23

Test Hole and Observation Well Record

Location: 129-59-16CCC Use of well: Observation
Owner and number: U.S.B.R. W-85 Principal aquifer: Oakes
Depth drilled (ft.): 25 Altitude of land surface (ft., msl): 1303.3
Screened interval (ft.): ? Lithologic log from: U.S.B.R.
Casing diameter: 3-inch downspout Comments:
Date completed: 7/29/66

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	2	2
Loamy sand	11	13
Silty clay loam	12	25

Test Hole and Observation Well Record

Location: 129-59-16 DCC Use of well: Observation
Owner and number: U.S.B.R. W-253 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1301.3
Screened interval (ft.): 15.4-17.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/20/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	3	3
Loamy fine sand	1	4
Loamy very fine sand	7.5	11.5
Very fine sandy loam	2	13.5
Silt loam	3.5	17
Silty clay loam	6	23

Test Hole and Observation Well Record

Location: 129-59-17ABB Use of well: Observation
Owner and number: U.S.B.R. W-240 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1308.4
Screened interval (ft.): 19.3-21.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: Fall, 1983

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	4	4.4
Loamy sand	3.5	7.5
Sandy loam	0.5	8
Loamy sand	12	20
Fine sand, lignite chips	8	28

Test Hole and Observation Well Record

Location: 129-59-17BDD Use of well: Observation
Owner and number: U.S.B.R. W-247 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1307.1
Screened interval (ft.): 16.7-18.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/14/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	15	15
Very fine sandy loam	5	20
Silt loam	3	23

Test Hole and Observation Well Record

Location: 129-59-17DAA Use of well: Observation
Owner and number: U.S.B.R. W-246 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1301.1
Screened interval (ft.): 16.6-18.5 Lithologic log from: U.S.B.R
Casing diameter: 2-inch plastic Comments:
Date completed: 10/14/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	4	4
Fine sandy loam	3	7
Very fine sandy loam	3.5	10.5
Loamy fine sand	5.5	16
Very fine sandy loam	3	19
Silty clay loam	9	28

Test Hole and Observation Well Record

Location: 129-59-17DCC Use of well: Observation
Owner and number: U.S.B.R. W-252 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1304.4
Screened interval (ft.): 19.8-21.6 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6.5	6.5
Loamy fine sand	4	10.5
Very fine sandy loam	5	15.5
Silt loam, varved	7.5	23

Test Hole and Observation Well Record

Location: 129-59-18ABB Use of well: Observation
Owner and number: U.S.B.R. W-239 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1303.3
Screened interval (ft.): 19.9-21.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/6/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	5.5	5.5
Loamy sand	1	6.5
Very fine sandy loam	1.5	8
Loamy fine sand	5	13
Fine sand, shale + lignite chips	10	23

Test Hole and Observation Well Record

Location: 129-59-18BBB Use of well: Observation
Owner and number: U.S.B.R. W-79 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1297.4
Screened interval (ft.): 11.2-13.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/6/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4	4
Loamy sand	3	7
Medium sand, lignite + shale chips	6	13
Silty clay loam	2	15
Clay loam (till)	8	23

Test Hole and Observation Well Record

Location: 129-59-18DAA Use of well: Observation
Owner and number: U.S.B.R. W-248 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1304.6
Screened interval (ft.): 19.2-20.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/14/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	3	3
Fine sandy loam	1.5	4.5
Very fine sandy loam	5.5	10
Loamy fine sand	4	14
Fine sand, lignite + shale chips	9	23

Test Hole and Observation Well Record

Location: 129-59-18 DBB; Use of well: Observation
 Owner and number: U.S.B.R. W-249 Principal aquifer: Oakes
 Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1305.1
 Screened interval (ft.): 18.3-20.1 Lithologic log from: U.S.B.R
 Casing diameter: 2-inch plastic Comments:
 Date completed: 10/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	2	2
Loamy fine sand	14.5	16.5
Fine sand, shale + lignite chips	4.5	21
Silty clay loam	2	23

Test Hole and Observation Well Record

Location: 129-59-18DDD₂ Use of well: Observation
Owner and number: U.S.B.R. W-84 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1306.5
Screened interval (ft.): 19.4-21.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-84
Date completed: 10/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	1.5	1.5
Very fine sandy loam	8.5	10
Loamy fine sand	3	13
Very fine sandy loam	4.5	17.5
Loamy very fine sand, shale + lignite chips	5.5	23

Test Hole and Observation Well Record

Location: 129-59-18DDD ₃	Use of well: Test hole
Owner and number: U.S.B.R. D.H. 12	Principal aquifer: Oakes
Depth drilled (ft.): 155	Altitude of land surface (ft., msl): 1306.7
Screened interval (ft.): None	Lithologic log from: U.S.B.R.
Casing diameter: None	Comments:
Date completed: 1/31/51	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, buff, clayey, oxidized	10	10
Sand, buff, very fine, clayey, silty, oxidized	7	17
Sand, gray, fine grain, silty, interbedded clay	13	30
Clay, gray, silty, sandy, plastic	110	140
Sand, brown, fine to medium grain, poorly sorted, slightly clayey	10	150
Sand, medium sand to medium gravel, slightly clayey, interbedded clay	5.2	155.2

Test Hole and Observation Well Record

Location: 129-59-19ABB Use of well: Observation
Owner and number: U.S.B.R. W-251 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1305.7
Screened interval (ft.): 14.9-16.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	4	4
Loamy sand	12	16
Silty clay loam, varved	7	23

Test Hole and Observation Well Record

Location: 129-59-19ACC Use of well: Observation
Owner and number: U.S.B.R. W-261 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1303.1
Screened interval (ft.): 19.8-21.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/25/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	13	13
Silt loam	1.5	14.5
Loamy sand	8.5	23

Test Hole and Observation Well Record

Location: 129-59-19BCC Use of well: Observation
Owner and number: U.S.B.R. W-262 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1296.0
Screened interval (ft.): 19.0-21.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/25/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6.5	6.5
Loamy fine sand	2.5	9
Fine sand, shale + lignite chips	14	23

Test Hole and Observation Well Record

Location: 129-59-19CCC₁ Use of well: Observation
Owner and number: U.S.B.R. W-88 Principal aquifer: Oakes
Depth drilled (ft.): 13 Altitude of land surface (ft., msl): 1291.9
Screened interval (ft.): Slotted, Lithologic log from: U.S.B.R.
0-5.7
Casing diameter: 3-inch downspout Comments:
Date completed: 6/22/66

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy fine sand	4	4
Sandy loam	5	9
Silt loam	4	13

Test Hole and Observation Well Record

Location: 129-59-19CCC₂ Use of well: Observation
Owner and number: U.S.B.R. W-88 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1291.7
Screened interval (ft.): 11.2-13.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-88
Date completed: 10/24/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	2	2
Loamy sand	3	5
Loamy fine sand, shale + lignite chips	6.5	11.5
Silt loam	11.5	23

Test Hole and Observation Well Record

Location: 129-59-19CDD Use of well: Observation
Owner and number: U.S.B.R. W-263 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1302.6
Screened interval (ft.): 19.7-21.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/24/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	6	6
Loamy sand	3.5	9.5
Silty clay	7.5	17
Silty clay loam, varved	6	23

Test Hole and Observation Well Record

Location: 129-59-20ABB	Use of well: Test hole
Owner and number: SWC 9110	Principal aquifer: Oakes
Depth drilled (ft.): 220	Altitude of land surface (ft., msl): 1305
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric log available
Date completed: 9/17/74	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, dark yellow brown, fine grain, silty, oxidized (colluvium)	8	8
Clay, dark gray, very silty	44	52
Silt, dark gray with light gray laminations	14	66
Clay, dark gray, silty, sandy, pebbly interbedded sand and gravel (till)	66	132
Shale, grayish black to brownish black, non-calcareous (Pierre Formation)	24	156
Shale, brown, very calcareous (Niobrara Formation)	64	220

Test Hole and Observation Well Record

Location: 129-59-20BDD Use of well: Observation
Owner and number: U.S.B.R. W-259 Principal aquifer: Oakes
Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1305.2
Screened interval (ft.): 18.6-20.4 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/24/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	5	5
Very fine sandy loam	3	8
Loamy very fine sand, shale + lignite chips	10	18

Test Hole and Observation Well Record

Location: 129-59-20 CBB Use of well: Observation
 Owner and number: U.S.B.R. W-260 Principal aquifer: Oakes
 Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1308.7
 Screened interval (ft.): 19.8-21.3 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments:
 Date completed: 10/24/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	13	13
Silt loam	1	14
Very fine sandy loam	2.5	16.5
Loamy very fine sand, lignite + shale chips	6.5	23

Test Hole and Observation Well Record

Location: 129-59-20CCC₁ Use of well: Test hole
 Owner and number: SWC 10959 Principal aquifer: Oakes
 Depth drilled (ft.): 140 Altitude of land surface (ft., msl): 1305
 Screened interval (ft.): None Lithologic log from: SWC
 Casing diameter: None Comments:
 Date completed: 6/15/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, yellow, slightly clayey, oxidized (lacustrine)	17	17
Silt, greenish gray, slightly clayey (lacustrine)	43	60
Clay, greenish gray, slightly silty (lacustrine)	68	128
Sand, gravelly	1	129
Clay, olive gray, silty, sandy, pebbly (till)	6	135
Clay, black, non-calcareous (Pierre Formation)	5	140

Test Hole and Observation Well Record

Location: 129-59-20CCC₂ Use of well: Observation
Owner and number: U.S.B.R. W-89 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1306.3
Screened interval (ft.): 19.2-21.5 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/24/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4	4
Fine sandy loam	5	9
Loamy fine sand	7	16
Fine sand, shale + lignite chips	7	23

Test Hole and Observation Well Record

Location: 129-59-20DCC Use of well: Observation
Owner and number: U.S.B.R. W-264 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl):1305.1
Screened interval (ft.): 18.6-20.8 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/25/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4	4
Loamy fine sand	6.5	10.5
Silt loam	1	11.5
Loamy fine sand	2.5	14
Very fine sandy loam	2	16
Loamy fine sand	2	18
Fine sand	3	21
Silt loam	2	23

Test Hole and Observation Well Record

Location: 129-59-20DDC Use of well: Test hole
Owner and number: SWC 10960 Principal aquifer: Oakes
Depth drilled (ft.): 145 Altitude of land surface (ft., msl): 1305
Screened interval (ft.): None Lithologic log from: SWC
Casing diameter: None Comments:
Date completed: 6/15/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, yellow brown, slightly clayey	17	17
Silt, dark brown with gray brown stringers, slightly clayey (lacustrine)	6	23
Silt, greenish gray, clayey (lacustrine)	27	50
Clay, greenish gray, slightly silty (lacustrine)	35	85
Clay, olive gray, silty, sandy, pebbly (till)	60	145

Test Hole and Observation Well Record

Location: 129-59-21AAA Use of well: Observation
Owner and number: U.S.B.R. W-106 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1301.9
Screened interval (ft.): 19.2-21.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/20/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	3	3
Sandy loam	2.5	5.5
Clay loam	5	10.5
Silty clay loam	1	11.5
Medium sand, shale + lignite chips	11.5	23

Test Hole and Observation Well Record

Location: 129-59-21BBB Use of well: Observation
Owner and number: U.S.B.R. W-85 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl):1304.1
Screened interval (ft.): 19.3-21.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/20/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	8	8
Loamy fine sand	10	18
Silt loam	5	23

Test Hole and Observation Well Record

Location: 129-59-21CBB Use of well: Observation
Owner and number: U.S.B.R. W-258 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1303.7
Screened interval (ft.): 19.2-20.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/21/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	11	11
Silt loam	12	23

Test Hole and Observation Well Record

Location: 129-59-21DBB Use of well: Observation
Owner and number: U.S.B.R. W-257 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1303.2
Screened interval (ft.): 20.1-21.5 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/21/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6	6
Silt loam	17	23

Test Hole and Observation Well Record

Location: 129-59-22ABB

Use of well: Observation

Owner and number: U.S.B.R. W-254

Principal aquifer: Oakes

Depth drilled (ft.): 23

Altitude of land surface (ft., msl): 1300.5

Screened interval (ft.): 19.2-20.8

Lithologic log from: U.S.B.R.

Casing diameter: 2-inch plastic

Comments:

Date completed: 10/20/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	1	1
Sandy clay	2	3
Fine sandy loam	2	5
Loamy sand	1	6
Silty clay loam	3	9
Medium sand, shale + lignite chips	14	23

Test Hole and Observation Well Record

Location: 129-59-22ACC Use of well: Observation
Owner and number: U.S.B.R. W-255 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1294.8
Screened interval (ft.): 19.4-20.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/21/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam		
Loamy sand	2.5	2.5
Loam	2	4.5
Very fine sandy loam	2	6.5
Silt loam	1.5	8
Silty clay loam	3	11
	12	23

Test Hole and Observation Well Record

Location: 129-59-22BCC Use of well: Observation
Owner and number: U.S.B.R. W-256 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1305.0
Screened interval (ft.): 19.3-21.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/21/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	1	1
Silt loam	12.5	13.5
Silty clay loam	4	17.5
Loamy sand	5.5	23

Test Hole and Observation Well Record

Location: 129-59-22CDD Use of well: Observation
Owner and number: U.S.B.R. W-266 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1299.0
Screened interval (ft.): 20.8-23.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay loam	1	1
Silty clay loam	7	8
Loamy sand	2	10
Medium sand, shale + lignite chips	13	23

Test Hole and Observation Well Record

Location: 129-59-23AAA	Use of well: Observation
Owner and number: SWC 6296	Principal aquifer: Oakes
Depth drilled (ft.): 162	Altitude of land surface (ft., msl): 1306.2
Screened interval (ft.): 33-38	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: Electric, neutron and gamma logs available
Date completed: 8/30/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, oxidized	4	5
Clay, black from 5 to 7 feet, oxidized from 7 to 12 feet	7	12
Clay, olive gray, silty	7	19
Sand, fine to medium, subrounded, quartz + carbonates + shale, lignitic, becomes finer with depth, some interbedded clay	75	94
Clay, silty, sandy, pebbly, olive gray, occasionally interbedded gravel layers	54	148
Claystone, silty, brownish-gray, tan specks (Niobrara Formation)	14	162

Test Hole and Observation Well Record

Location: 129-59-23BBB Use of well: Test hole
 Owner and number: SWC 9109 Principal aquifer: Oakes
 Depth drilled (ft.): 220 Altitude of land surface (ft., msl): 1302
 Screened interval (ft.): None Lithologic log from: SWC
 Casing diameter: None Comments: Electric log available
 Date completed: 9/17/74

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, moderate yellow brown, fine grain, silty, oxidized (colluvium)	5	5
Sand, dark gray, very fine grain, silty	6	11
Silt, dark gray, clayey	7	18
Clay, olive gray, silty, laminated (lacustrine)	64	82
Clay, dark gray to olive gray, silty, sandy, pebbly, interbedded sand and gravel (till)	25	107
Sand, medium dark gray, very fine grain, silty	17	124
Clay, dark gray to olive gray, silty, sandy, pebbly, interbedded sand and gravel (till)	24	148
Silt, medium gray to medium dark gray, slightly clayey, very sandy, very calcareous, white specks (Niobrara Formation)	50	198
Shale, dark gray, very calcareous	6	204
Shale, medium gray, calcareous	6	210
Shale, grayish black, very calcareous	10	220

Test Hole and Observation Well Record

Location: 129-59-23DDD ₁	Use of well: Test hole
Owner and number: SWC 6320	Principal aquifer: Oakes
Depth drilled (ft.): 162	Altitude of land surface (ft., msl): 1309
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma logs available
Date completed: 9/13/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, silty, pale yellow gray, oxidized	7	8
Sand, medium to v. coarse, subrounded to rounded, predom. quartz with some detrital shale and lignite, becomes fine sand after 30 feet	69	77
Clay, silty, olive gray, poor recovery, most into suspension	16	93
Clay, v. silty, sandy, pebbly, olive gray, occasional gravel layer, poor sample recovery	47	140
Clay, black, tight, waxy (Pierre Formation)	?	?
Claystone, silty, brown, with tan specks (Niobrara Formation)	?	162

Test Hole and Observation Well Record

Location: 129-59-23DDD ₂	Use of well: Observation
Owner and number: SWC 6320A	Principal aquifer: Oakes
Depth drilled (ft.): 25	Altitude of land surface (ft., msl): 1308.7
Screened interval (ft.): 20-25	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments:
Date completed: 9/13/85	

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

See log for test hole #6320

Test Hole and Observation Well Record

Location: 129-59-24DDD ₂	Use of well: Observation
Owner and number: SWC 6319A	Principal aquifer: Oakes
Depth drilled (ft.): 30	Altitude of land surface (ft., msl): 1308.2
Screened interval (ft.): 25-30	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments:
Date completed: 9/12/85	

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

See log for test hole #6319

Test Hole and Observation Well Record

Location: 129-59-25DCC ₁	Use of well: Observation
Owner and number: SWC 6313	Principal aquifer: Oakes
Depth drilled (ft.): 162	Altitude of land surface (ft., msl): 1305.8
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine to v. coarse, oxidized to 10 feet, subrounded to rounded	33	34
Clay, v. silty, olive gray, light gray laminations, around 55 feet color changed to brown, then back to olive gray, below 72 feet more clay, less silt	51	85
Silt or v. fine sand, poor recovery, most into suspension	12	97
Clay, silty, sandy, pebbly, olive gray, soft, some interbedded gravel below 110 feet (till)	43	140
Clay, black, v. tight, waxy (Pierre Formation)	18	158
Claystone, silty, brown with tan specks (Niobrara Formation)	4	162

Test Hole and Observation Well Record

Location: 129-59-25DCC₂ Use of well: Observation
Owner and number: SWC 6313A Principal aquifer: Oakes
Depth drilled (ft.): 30 Altitude of land surface (ft., msl): 1305.8
Screened interval (ft.): 24-29 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/11/85

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

See log for test hole #6313

Test Hole and Observation Well Record

Location: 129-59-26DDD ₁	Use of well: Test hole
Owner and number: SWC 6314	Principal aquifer: Oakes
Depth drilled (ft.): 162	Altitude of land surface (ft., msl): 1302
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, yellow brown, sandy oxidized	5	6
Sand, fine to coarse, subrounded to rounded	41	47
Clay, silty, olive gray, color changed to brown and back to olive gray at about 70 feet, much into suspension below 80 feet	49	96
Clay, silty, sandy, pebbly, soft, olive gray, brittle below 110 feet, also interbedded clayey silt below 110 feet (till)	32	128
Clay, black, tight, waxy (Pierre Formation)	31	159
Claystone, silty, brown with tan specks (Niobrara Formation)	3	162

Test Hole and Observation Well Record

Location: 129-59-26DDD ₂	Use of well: Observation
Owner and number: SWC 6314A	Principal aquifer: Oakes
Depth drilled (ft.): 47	Altitude of land surface (ft., msl): 1301.5
Screened interval (ft.): 42-47	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments:
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for test hole #6314

Test Hole and Observation Well Record

Location: 129-59-27AAA	Use of well: Test hole
Owner and number: SWC 6297	Principal aquifer: None
Depth drilled (ft.): 162	Altitude of land surface (ft., msl): 1297
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma logs available
Date completed: 9/3/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, v. silty, oxidized to about 13 feet	27	28
Sand, fine to coarse, oxidized	3	31
Clay, v. silty, contains silt and iron oxide concretions	58	89
Clay, silty, sandy, pebbly, olive gray (till)	48	137
Claystone, silty, brown with tan specks (Niobrara Formation)	25	162

Test Hole and Observation Well Record

Location: 129-59-28AAA ₁	Use of well: Observation
Owner and number: U.S.B.R. W-91	Principal aquifer: Oakes
Depth drilled (ft.): 20	Altitude of land surface (ft., msl): 1294.5
Screened interval (ft.): Slotted, 0-19.2	Lithologic log from: U.S.B.R.
Casing diameter: 3-inch downspout	Comments:
Date completed: 6/23/66	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt loam	1.5	1.5
Silty clay loam	6.5	8
Silt loam	12	20

Test Hole and Observation Well Record

Location: 129-59-28AAA₂ Use of well: Observation
Owner and number: U.S.B.R. W-91 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1294.1
Screened interval (ft.): 19.5-21.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-91
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Very fine sandy loam	0.5	0.5
Fine sandy loam	1.5	2
Silt loam	6	8
Silty clay loam	2.5	10.5
Silt loam	3	13.5
Silty clay loam	3.5	17
Silt loam	6	23

Test Hole and Observation Well Record

Location: 129-59-28ADD Use of well: Observation
Owner and number: U.S.B.R. W-267 Principal aquifer: Oakes
Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1299.3
Screened interval (ft.): 18.3-20.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	2.5	2.5
Silt loam	7.5	10
Silty clay loam	6	16
Silt loam	2	18

Test Hole and Observation Well Record

Location: 129-59-28BAA Use of well: Observation
Owner and number: U.S.B.R. W-265 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1303.5
Screened interval (ft.): 18.9-20.3 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	2	2
Very fine sandy loam	1.5	3.5
Silt loam	19.5	23

Test Hole and Observation Well Record

Location: 129-59-28BCC Use of well: Observation
Owner and number: U.S.B.R. W-269 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1305.2
Screened interval (ft.): 19.3-21.4 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	5.5	5.5
Sandy loam	2	7.5
Loam	0.5	8
Fine sandy loam	7	15
Loamy fine sand, lignitic	8	23

Test Hole and Observation Well Record

Location: 129-59-28DBB Use of well: Observation
Owner and number: U.S.B.R. W-268 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1296.7
Screened interval (ft.): 19.0-20.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Very fine sandy loam	2.5	2.5
Silt loam	12.5	15
Silty clay loam	2	17
Silt loam	6	23

Test Hole and Observation Well Record

Location: 129-59-29AAA₂ Use of well: Observation
Owner and number: U.S.B.R. W-90 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1306.4
Screened interval (ft.): 18.1-20.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-90
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6	6
Loamy fine sand	12	18
Silty clay loam	1.5	19.5
Very fine sandy loam	1.5	21
Silt loam	2	23

Test Hole and Observation Well Record

Location: 129-59-29CCC₂ Use of well: Test hole
 Owner and number: U.S.B.R. D.H. 13 Principal aquifer: Oakes
 Depth drilled (ft.): 126.2 Altitude of land surface (ft., msl): 1298.9
 Screened interval (ft.): None Lithologic log from: U.S.B.R.
 Casing diameter: None Comments:
 Date completed: 2/7/51

Lithologic Log

Unit Description	Thickness (ft.)	Depth (ft.)
Silt, black, organic	2.8	2.8
Sand, buff to gray, fine grain, slightly clayey, silty	3.7	6.5
Sand, gray brown, fine grain, slightly clayey, oxidized	11.5	18.0
Sand, gray, fine grain, slightly clayey, very silty, interbedded clay	16.0	34.0
Clay, gray, silty, sandy	56.0	90.0
Clay, gray, very plastic	10.0	100.0
Sand, gray brown, fine grain	6.2	106.2
Sand, gray brown, fine grain, slightly clayey, silty, and gravelly	20.0	126.2

Test Hole and Observation Well Record

Location: 129-59-29DBB Use of well: Observation
Owner and number: U.S.B.R. W-270 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1303.4
Screened interval (ft.): 19.2-21.4 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/26/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6	6
Loamy fine sand, lignitic	17	23

Test Hole and Observation Well Record

Location: 129-59-29DCC Use of well: Observation
Owner and number: U.S.B.R. W-275 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1300.5
Screened interval (ft.): 19.1-21.3 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	7	7
Loamy sand	3	10
Loam	1	11
Silt loam	1	12
Loamy fine sand	4.5	16.5
Silty clay loam	6.5	23

Test Hole and Observation Well Record

Location: 129-59-29DDD₂ Use of well: Observation
Owner and number: U.S.B.R. W-95A Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1302.2
Screened interval (ft.): 15.9-20.9 Lithologic log from: U.S.B.R.
Casing diameter: 2 -inch plastic Comments:
Date completed: 10/2/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	1	1
Loamy fine sand	1.5	2.5
Very fine sandy loam	20.5	23

Test Hole and Observation Well Record

Location: 129-59-30ADD Use of well: Observation
Owner and number: U.S.B.R. W-271 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1299.0
Screened interval (ft.): 19.2-21.4 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	3	3
Loamy fine sand	18	21
Silt loam	2	23

Test Hole and Observation Well Record

Location: 129-59-30DBB Use of well: Observation
Owner and number: U.S.B.R. W-272 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1305.0
Screened interval (ft.): 19.1-21.3 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	8	8
Very fine sandy loam	1	9
Sandy loam	7	16
Silty clay loam	7	23

Test Hole and Observation Well Record

Location: 129-59-30DDD Use of well: Observation
 Owner and number: SWC 10958 Principal aquifer: Oakes
 Depth drilled (ft.): 130 Altitude of land surface (ft., msl): 1300
 Screened interval (ft.): 98-101 Lithologic log from: SWC
 Casing diameter: 1.25 Comments: Electric log available
 Date completed: 6/14/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, yellow brown, very fine to fine grain, predom. very fine, silty, oxidized	3	3
Clay, pale yellow brown, silty, oxidized	13	16
Clay, greenish gray, slightly silty	53	69
Sand, gravelly, interbedded clay	4	73
Clay	3	76
Sand, very fine to very coarse, predom. coarse, 10%-20% gravel, subangular to rounded	27	103
Clay	1	104
Sand, gravelly	3	107
Clay, interbedded with sand and gravel (till)	3	110
Clay, olive gray, silty, sandy, pebbly (till)	16	126
Clay, black, non-calcareous (Pierre Formation)	4	130

Test Hole and Observation Well Record

Location: 129-59-31AAA Use of well: Observation
Owner and number: U.S.B.R. W-94 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1300.8
Screened interval (ft.): 19.4-21.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	7	7
Loam	1	8
Loamy fine sand	11.5	19.5
Silty clay loam	8.5	28

Test Hole and Observation Well Record

Location: 129-59-31ABB Use of well: Observation
Owner and number: U.S.B.R. W-274 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1300.0
Screened interval (ft.): 19.5-21.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4	4
Loamy fine sand	4.5	8.5
Silt loam	2.5	11
Silty clay loam	12	23

Test Hole and Observation Well Record

Location: 129-59-31DAC Use of well: Irrigation
 Owner and number: Tom Daniels Principal aquifer: Oakes
 Depth drilled (ft.): 111 Altitude of land surface (ft., msl): 1295
 Screened interval (ft.): 90-105 Lithologic log from: M&W Drilling
 Casing diameter: 12-inch Comments: Abandoned
 Date completed: 2/10/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, silty	5	6
Clay, brown	11	17
Clay, gray (till)	16	33
Clay	31	64
Sand, medium grain	9	73
Sand, coarse grain, gravelly	32	105
Clay, gray (till)	6	111

Test Hole and Observation Well Record

Location: 129-59-31DBB Use of well: Observation
Owner and number: U.S.B.R. W-282 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1298.3
Screened interval (ft.): 18.9-20.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 11/1/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	3	3
Loamy sand	3.5	6.5
Silty clay loam	0.5	7
Very fine sandy loam	1	8
Silty clay loam	15	23

Test Hole and Observation Well Record

Location: 129-59-31DCC

Use of well: Observation

Owner and number: U.S.B.R. W-284

Principal aquifer: Oakes

Depth drilled (ft.): 23

Altitude of land surface (ft., msl): 1296.9

Screened interval (ft.): 19.1-21.0

Lithologic log from: U.S.B.R.

Casing diameter: 2-inch plastic

Comments:

Date completed: 11/1/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	2	2
Loamy sand	1	3
Sandy loam	1	4
Loamy sand	1	5
Silty clay	1.5	6.5
Silty clay loam, varved	16.5	23

Test Hole and Observation Well Record

Location: 129-59-31DDD₂ Use of well: Observation
Owner and number: U.S.B.R. W-100 Principal aquifer: Oakes
Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1289.3
Screened interval (ft.): 17.3-18.9 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-100
Date completed: 11/1/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	5	5
Loam	1	6
Very fine sandy loam	3	9
Silty clay	9	18

Test Hole and Observation Well Record

Location: 129-59-32ACC Use of well: Observation
 Owner and number: U.S.B.R. W-280 Principal aquifer: Oakes
 Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1293.8
 Screened interval (ft.): 18.8-20.7 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments:
 Date completed: 10/31/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	4	4
Loamy sand	3	7
Sandy loam	2	9
Fine sandy loam	3.5	12.5
Silty clay loam	10.5	23

Test Hole and Observation Well Record

Location: 129-59-32CBB Use of well: Observation
Owner and number: U.S.B.R. W-281 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1296.1
Screened interval (ft.): 18.5-20.3 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 11/1/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	2	2
Sandy loam	1.5	3.5
Very fine sandy loam	4.5	8
Silt loam	4.5	12.5
Very fine sandy loam	3	15.5
Silty clay loam	7.5	23

Test Hole and Observation Well Record

Location: 129-59-32CDD Use of well: Observation
 Owner and number: U.S.B.R. W-285 Principal aquifer: Oakes
 Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1288.1
 Screened interval (ft.): 18.7-20.6 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments:
 Date completed: 11/2/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4	4
Loam	2.5	6.5
Silt loam	1.5	8
Very fine sandy loam	3.5	11.5
Silty clay loam	1.5	13
Very fine sandy loam	4	17
Loamy fine sand	2	19
Silty clay	4	23

Test Hole and Observation Well Record

Location: 129-59-32DDD Use of well: Observation
Owner and number: U.S.B.R. W-101 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1293.4
Screened interval (ft.): 19.0-20.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 11/2/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4.5	4.5
Loam	3	7.5
Silt loam	2	9.5
Silty clay	10.5	20
Silt loam	3	23

Test Hole and Observation Well Record

Location: 129-59-33AAA₁ Use of well: Observation
Owner and number: U.S.B.R. W-96 Principal aquifer: Oakes
Depth drilled (ft.): 18.2 Altitude of land surface (ft., msl): 1295.8
Screened interval (ft.): Slotted, Lithologic log from: U.S.B.R.
0-14.5
Casing diameter: 3-inch downspout Comments:
Date completed: 8/5/66

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt loam	18	18
Silt	.2	18.2

Test Hole and Observation Well Record

Location: 129-59-33AAA₂ Use of well: Observation
Owner and number: U.S.B.R. W-96 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1296.3
Screened interval (ft.): 18.8-20.6 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-96
Date completed: 10/28/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loam	4	4
Silt loam, gypsum crystals	19	23

Test Hole and Observation Well Record

Location: 129-59-33ACC Use of well: Observation
Owner and number: U.S.B.R. W-278 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1300.1
Screened interval (ft.): 19.1-21.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/28/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	2	2
Loamy sand	1	3
Sandy loam	2	5
Loamy fine sand	1.5	6.5
Silt loam	3.5	10
Fine sandy loam	3	13
Silt loam	2	15
Silty clay loam	8	23

Test Hole and Observation Well Record

Location: 129-59-33 BAA Use of well: Observation
Owner and number: U.S.B.R. W-276 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1300.3
Screened interval (ft.): 19.3-20.7 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/28/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6	6
Very fine sandy loam	8.5	14.5
Silt loam	8.5	23

Test Hole and Observation Well Record

Location: 129-59-33CDD Use of well: Observation
Owner and number: U.S.B.R. W-286 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1302.2
Screened interval (ft.): 19.2-21.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 11/2/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4.5	4.5
Loam	1	5.5
Silt loam	1.5	7
Fine sandy loam	5.5	12.5
Sandy loam	2.5	15
Silt loam	3	18
Silty clay loam	5	23

Test Hole and Observation Well Record

Location: 129-59-33 DAA Use of well: Observation
Owner and number: U.S.B.R. W-277 Principal aquifer: Oakes
Depth drilled (ft.): 24 Altitude of land surface (ft., msl) 1301.3
Screened interval (ft.): 19.2-20.8 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/29/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	5.5	5.5
Silt loam	14.5	20
Silty clay loam	4	24

Test Hole and Observation Well Record

Location: 129-59-33DDD₂ Use of well: Observation
 Owner and number: U.S.B.R. W-102 Principal aquifer: Oakes
 Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1296.5
 Screened interval (ft.): 18.5-20.3 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments: Replaces old well W-102
 Date completed: 11/2/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	5	5
Loam	3	8
Very fine sandy loam	4.5	12.5
Loamy very fine sand, lignite chips	5.5	18
Very fine sandy loam	5	23

Test Hole and Observation Well Record

Location: 129-59-35BBB₁ Use of well: Test hole
Owner and number: SWC 6321 Principal aquifer: None
Depth drilled (ft.): 163 Altitude of land surface (ft., msl): 1291
Screened interval (ft.): None Lithologic log from: SWC
Casing diameter: None Comments:
Date completed: 9/13/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	3	3
Silt, clayey, yellow brown	5	8
Silt, clayey to clay, silty, gray	83	91
Clay, silty, sandy, pebbly, olive gray (till)	34	125
Clay, black, v. dense (Pierre Formation)	28	153
Clay, tan, with white specks (Niobrara Formation)	10	163

Test Hole and Observation Well Record

Location: 129-59-36ABA ₁	Use of well: Test hole
Owner and number: SWC 6312	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1308
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/10/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, v. sandy, oxidized	4	5
Sand, v. fine to v. coarse, predom. medium to coarse, rounded	27	32
Clay, silty, olive gray, light gray laminations, below 63 feet most into suspension, poor recovery	67	99
Gravel, fine, rounded, detrital shale	3	102
Sand, coarse to v. coarse, rounded, predom. quartz, interbedded detrital lignite	20	122
Gravel, fine to coarse, sandy, v. coarse, rough drilling	16	138
Clay, silty, sandy, pebbly, olive gray, soft (till)	11	149
Clay, dark black, waxy (Pierre Formation)	18	167
Claystone, silty, brown with tan specks (Niobrara Formation)	15	182

Test Hole and Observation Well Record

Location: 129-59-36ABA₂

Use of well: Observation

Owner and number: SWC 6312A

Principal aquifer: Oakes

Depth drilled (ft.): 135

Altitude of land surface (ft., msl): 1307.6

Screened interval (ft.): 130-135

Lithologic log from: SWC

Casing diameter: 2-inch pvc

Comments: North well of pair

Date completed: 9/10/85

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

See log for test hole #6312

Test Hole and Observation Well Record

Location: 129-59-36ABA₃ Use of well: Observation
Owner and number: SWC 6312B Principal aquifer: Oakes
Depth drilled (ft.): 30 Altitude of land surface (ft., msl): 1307.7
Screened interval (ft.): 25-30 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments: South well of pair
Date completed: 9/10/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6312		

Test Hole and Observation Well Record

Location: 129-59-36ACD Use of well: Test hole
 Owner and number: Harold Treeby Principal aquifer: Oakes
 Depth drilled (ft.): 155 Altitude of land surface (ft., msl): 1310
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 3/13/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, silty	5	6
Sand, brown, clayey	6	12
Sand, gray, fine grain	6	18
Sand, gray, fine to medium grain	11	29
Sand, medium grain	5	34
Sand, gray, fine grain	8	42
Silt, clayey	52	94
Sand, medium to coarse grain	22	116
Till, gray	37	153
Shale	2	155

Test Hole and Observation Well Record

Location: 129-59-36BDC Use of well: Test hole
 Owner and number: Harold Treeby Principal aquifer: Oakes
 Depth drilled (ft.): 142 Altitude of land surface (ft., msl): 1305
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 4/27/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, medium grain	13	14
Sand, gray, medium grain	24	38
Silt, gray	27	65
Sand, gray, fine grain, dirty	23	88
Sand, medium grain, clean	12	100
Sand, medium grain, interbedded fine and coarse sand	34	134
Gravel, coarse	8	142

Test Hole and Observation Well Record

Location: 129-59-36CAB Use of well: Test hole
Owner and number: Harold Treeby Principal aquifer: Oakes
Depth drilled (ft.): 155 Altitude of land surface (ft., msl): 1304
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 4/27/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Silt	3	4
Sand, brown, medium grain	13	17
Sand, gray, medium grain	18	35
Silt, gray	55	90
Sand, gray, fine grain	5	95
Sand, gray, medium grain	15	110
Till, gray, interbedded sand and gravel	45	155

Test Hole and Observation Well Record

Location: 129-60-01AAA Use of well: Observation
Owner and number: U.S.B.R. W-216 Principal aquifer: Oakes
Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1293.5
Screened interval (ft.): 11.0-13.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 9/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loam	1.5	1.5
Sandy clay loam	2	3.5
Loamy sand	3.5	7
Loamy fine sand	4.5	11.5
Silty clay loam, varved	6.5	18

Test Hole and Observation Well Record

Location: 129-60-01DDD Use of well: Observation
Owner and number: U.S.B.R. W-71 Principal aquifer: Oakes
Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1296.8
Screened interval (ft.): 18.9-20.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/3/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Very fine sandy loam	10.5	10.5
Fine sand, lignite chips	17.5	28

Test Hole and Observation Well Record

Location: 129-60-13DAA Use of well: Observation
 Owner and number: U.S.B.R. W-250 Principal aquifer: Oakes
 Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1294.9
 Screened interval (ft.): 11.1-13.0 Lithologic log from: U.S.B.R.
 Casing diameter: 2-inch plastic Comments:
 Date completed: 10/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	1	1
Sandy clay loam	3	3
Sandy loam, lignitic	1	4
Loamy sand, lignite + shale chips	9	13
Silty clay loam, varved	7	20
Loam (till)	3	23

Test Hole and Observation Well Record

Location: 129-60-13DDD₂ Use of well: Observation
Owner and number: U.S.B.R. W-83 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1297.9
Screened interval (ft.): 14.0-16.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Fine sandy loam	6	6
Silty clay loam	1	7
Loamy sand	5.5	12.5
Medium sand, shale + lignite chips	3.5	16
Silt loam	7	23

Test Hole and Observation Well Record

Location: 129-60-24BBB	Use of well: Test hole
Owner and number: SWC 9111	Principal aquifer: Oakes
Depth drilled (ft.): 160	Altitude of land surface (ft., msl): 1297
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric log available
Date completed: 9/17/74	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, dark yellow brown, silty	5	5
Silt, medium dark gray, clayey	9	14
Clay, dark gray to olive gray, silty, sandy, pebbly interbedded sand and gravel	129	143
Shale, dark gray to grayish black, non-calcareous (Pierre Formation)	12	155
Shale, medium gray, very calcareous (Niobrara Formation)	5	160

Test Hole and Observation Well Record

Location: 129-60-25DAA Use of well: Observation
Owner and number: U.S.B.R. W-273 Principal aquifer: Oakes
Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1293.8
Screened interval (ft.): 13.8-16.2 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	5	5
Loam	1	6
Loamy sand	8	14
Silt loam	4	18

Test Hole and Observation Well Record

Location: 129-60-25DDD Use of well: Observation
Owner and number: U.S.B.R. W-93 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1294.2
Screened interval (ft.): 13.8-16.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 10/27/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4	4
Loamy sand	7.5	11.5
Sand	4.5	16
Silty clay loam	7	23

Test Hole and Observation Well Record

Location: 129-60-36DAA Use of well: Observation
Owner and number: U.S.B.R. W-283 Principal aquifer: Oakes
Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1300.6
Screened interval (ft.): 17.3-19.1 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments:
Date completed: 11/1/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	4	4
Fine sandy loam	1.5	5.5
Silt loam	2.5	8
Silty clay loam	6.5	14.5
Fine sand	3	17.5
Silty clay loam	0.5	18

Test Hole and Observation Well Record

Location: 129-60-36DDD₂ Use of well: Observation
Owner and number: U.S.B.R. W-99 Principal aquifer: Oakes
Depth drilled (ft.): 23 Altitude of land surface (ft., msl): 1295.5
Screened interval (ft.): 18.1-20.0 Lithologic log from: U.S.B.R.
Casing diameter: 2-inch plastic Comments: Replaces old well W-99
Date completed: 11/1/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sandy loam	3	3
Fine sandy loam	3.5	6.5
Very fine sandy loam	4	10.5
Silty clay	1.5	12
Silty clay loam, varved	11	23

Test Hole and Observation Well Record

Location: 130-58-07CAA Use of well: Irrigation
Owner and number: Bill Huebner Principal aquifer: Oakes
Depth drilled (ft.): 53 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): 33-53 Lithologic log from: M&W Drilling
Casing diameter: 12-inch Comments:
Date completed: 6/7/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, brown	6	7
Sand, brown	2	9
Sand, gray, fine to medium grain	11	20
Sand, gray, interbedded silt	12	32
Sand, coarse, gravelly	21	53
Silt, gray		53

Test Hole and Observation Well Record

Location: 130-58-07CBB₁ (south well) Use of well: Observation
 Owner and number: U.S.B.R. W-200A Principal aquifer: Oakes
 Depth drilled (ft.): 33 Altitude of land surface (ft., msl): 1307.3
 Screened interval (ft.): 28.3-29.5 Lithologic log from: Dave Williams (UND)
 Casing diameter: 2-inch plastic Comments: Masters Thesis
 Date completed: 5/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty	1.5	1.5
Sand, fine to medium, silty, light brown	1	2.5
Sand, fine, silty, clayey, light brown	1	3.5
Sand, fine, silty, clayey, dark brown	1.5	5
Sand, fine, silty	9	14
Sand, fine to medium, lignitic layers	11	25
Sand, very coarse, pebbly	4	29
Gravel, sandy	2.5	31.5
Sand, medium	0.5	32
Silt, clayey, sandy, laminated	1	33

Test Hole and Observation Well Record

Location: 130-58-07CBB₂ (north well) Use of well: Observation
Owner and number: U.S.B.R. W-200B Principal aquifer: Oakes
Depth drilled (ft.): 15 Altitude of land surface (ft., msl): 1307.3
Screened interval (ft.): 13.4-14.6 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty	1.5	1.5
Sand, fine to medium, silty, light brown	1	2.5
Sand, fine, silty, clayey, light brown	1	3.5
Sand, fine, silty, clayey, dark brown	1.5	5
Sand, fine, silty	9	14
Sand, fine to medium, lignitic layers	1	15

Test Hole and Observation Well Record

Location: 130-58-07CCC Use of well: Observation
Owner and number: U.S.B.R. W-201 Principal aquifer: Oakes
Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1307.4
Screened interval (ft.):13.7-14.8 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, sandy, black	1	1
Clay, silty, sandy, laminated, gray	1.5	2.5
Clay, silty, sandy, laminated, brown	1	3.5
Sand, silty, fine to medium, brown	1	4.5
Sand, fine to medium, silty, gray	4	8.5
Sand, medium to coarse, gray	3.5	12
Sand, medium, gray	6	18

Test Hole and Observation Well Record

Location: 130-58-07DAB Use of well: Test hole
Owner and number: Bill Huebner Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 5/20/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, brown	8	9
Sand, fine to medium grain, interbedded clay	15	24
Clay, gray	10	34
Sand and gravel	5	39
Sand and gravel, interbedded clay and silt	21	60

Test Hole and Observation Well Record

Location: 130-58-07DAC Use of well: Test hole
Owner and number: Bill Huebner Principal aquifer: Oakes
Depth drilled (ft.): 45 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 4/28/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, gray	3	4
Clay, brown, oxidized	5	9
Sand, gray, fine to medium grain, interbedded silt	26	35
Sand, gray, medium to coarse grain	7	42
Silt, gray, clayey	3	45

Test Hole and Observation Well Record

Location: 130-58-07DBB Use of well: Test hole
Owner and number: Bill Huebner Principal aquifer: Oakes
Depth drilled (ft.): 55 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 4/28/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, brown, oxidized	6	7
Sand, brown	2	9
Sand, gray, fine to medium grain	11	20
Sand, gray, interbedded silt	12	32
Sand, coarse grain to coarse gravel	21	53
Silt, gray	2	55

Test Hole and Observation Well Record

Location: 130-58-07DBC Use of well: Test hole
Owner and number: Bill Huebner Principal aquifer: Oakes
Depth drilled (ft.): 54 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 4/28/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, brown	11	12
Clay, gray	7	19
Sand, gray, silty	10	29
Silt, gray	3	32
Sand, coarse grain, gravelly	22	54

Test Hole and Observation Well Record

Location: 130-58-07DDC₂

Use of well: Observation

Owner and number: SWC 6337A

Principal aquifer: Oakes

Depth drilled (ft.): 50

Altitude of land surface (ft., msl): 1312.5

Screened interval (ft.): 45-50

Lithologic log from: SWC

Casing diameter: 2-inch pvc

Comments:

Date completed: 9/24/85

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

See log for test hole #6337

Test Hole and Observation Well Record

Location: 130-58- 08CDC ₁	Use of well: Test hole
Owner and number: SWC 6336	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1312
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/24/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, sandy, oxidized	4	5
Sand, fine to v. coarse, and gravel, fine to coarse, rounded to subrounded, composed of carbonates, silicates and detrital shale	49	54
Clay, silty, olive gray	44	98
Clay, silty, sandy, pebbly, olive gray, (till)	61	159
Claystone, silty, brown with tan specks (Niobrara Formation)	23	182

Test Hole and Observation Well Record

Location: 130-58-08CDC₂ Use of well: Observation
Owner and number: SWC 6336A Principal aquifer: Oakes
Depth drilled (ft.): 53 Altitude of land surface (ft., msl): 1312.3
Screened interval (ft.): 48-53 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/24/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6336		

Test Hole and Observation Well Record

Location: 130-58- 08CDD₁ Use of well: Test hole
 Owner and number: SWC 6335 Principal aquifer: Oakes
 Depth drilled (ft.): 202 Altitude of land surface (ft., msl): 1320
 Screened interval (ft.): None Lithologic log from: SWC
 Casing diameter: None Comments: Electric, neutron, and gamma
 Date completed: 9/24/85 logs available

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, sandy, yellow gray, oxidized	7	8
Gravel	1	9
Sand, fine to coarse, interbedded clay from 30 to 40 feet	31	40
Gravel, fine to coarse, predom. fine to medium, rounded, composed of detrital shale, carbonates and silicates	7	47
Clay, silty, olive gray, poor recovery, most into suspension	82	129
Clay, silty, sandy, pebbly, olive gray, soft, numerous thin gravel layers	6	135
Gravel, interbedded with till	6	141
Clay, silty, sandy, pebbly, olive gray (till)	30	171
Claystone, silty, brown with tan specks (Niobrara Formation)	31	202

Test Hole and Observation Well Record

Location: 130-58-08CDD₂ Use of well: Observation
Owner and number: SWC 6335A Principal aquifer: Oakes
Depth drilled (ft.): 45 Altitude of land surface (ft., msl): 1320.3
Screened interval (ft.): 40-45 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/24/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6335		

Test Hole and Observation Well Record

Location: 130-58-08DDD₁ Use of well: Observation
 Owner and number: SWC 6332 Principal aquifer: Oakes
 Depth drilled (ft.): 262 Altitude of land surface (ft., msl): 1372.1
 Screened interval (ft.): 207-212 Lithologic log from: SWC
 Casing diameter: 2-inch pvc Comments: Electric, neutron and gamma
 Date completed: 9/19/85 logs available, north well of pair

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Gravel, oxidized	2	3
Clay, silty, sandy, pebbly, soft, yellow orange, oxidized	19	22
Clay, as above, olive gray, gravel layers at 41 and 56 feet	40	62
Silt, slightly clayey, olive gray, poor recovery, most into suspension	10	72
Sand, fine to v. coarse, 50% detrital shale, much interbedded clay, gravelly below 115 feet, below 140 feet, interbedded silty clay	88	160
Clay, silty, interbedded with v. fine sand and occasionally coarse to v. coarse sand	42	202
Clay, sandy, olive gray, soft (till)	4	206
Gravel, fine to coarse, angular to rounded, composed of carbonates and silicates	7	213
Clay, silty, sandy, pebbly, olive gray, soft (till)	14	227
Claystone, silty, brown with tan specks (Niobrara Formation)	35	262

Test Hole and Observation Well Record

Location: 130-58-08DDD₂ Use of well: Observation
Owner and number: SWC 6332A Principal aquifer: Oakes
Depth drilled (ft.): 110 Altitude of land surface (ft., msl): 1372.3
Screened interval (ft.): 105-110 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments: South well of pair
Date completed: 9/19/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6332		

Test Hole and Observation Well Record

Location: 130-58-09AAA Use of well: Observation
 Owner and number: SWC #4861 Principal aquifer: Oakes
 Depth drilled (ft.): 280 Altitude of land surface (ft., msl): 1408
 Screened interval (ft.): 158-161 Lithologic log from: SWC
 Casing diameter: 1.25-inch Comments: Electric log available
 Date completed: 10/17/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil, sandy loam	1	1
Clay, dark yellow brown, silty, sandy, pebbly, gravelly, oxidized (till)	73	74
Till, dark gray	12	86
Silt, medium dark gray	14	100
Till, medium dark gray, gravelly	19	119
Sand, very fine to medium grain, silty	54	173
Till, medium dark gray, interbedded gravel	81	254
Shale, light olive gray, white specks, calcareous (Niobrara Formation)	26	280

Test Hole and Observation Well Record

Location: 130-58-09BCD Use of well: Domestic
Owner and number: Howard Best Principal aquifer: Oakes
Depth drilled (ft.): 100 Altitude of land surface (ft., msl): 1378
Screened interval (ft.): 80-90 Lithologic log from: Traut Wells, Inc.
Casing diameter: 4-inch Comments:
Date completed: 7/13/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Clay, brown	46	48
Clay, gray	3	51
Clay, brown, cobbly	19	70
Sand, brown, fine grain	22	92
Clay, gray	8	100

Test Hole and Observation Well Record

Location: 130-58-16BBC

Use of well: Domestic

Owner and number: Leslie Savey

Principal aquifer: Oakes

Depth drilled (ft.): 103

Altitude of land surface (ft., msl): 1367

Screened interval (ft.): 92-103

Lithologic log from: Wieber Well Drilling

Casing diameter: 4-inch

Comments:

Date completed: 7/31/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil, black	1	1
Clay, yellow	19	20
Clay, yellow, sandy	15	35
Clay, blue	55	90
Sand, coarse grain	13	103

Test Hole and Observation Well Record

Location: 130-58-16CAC Use of well: Test hole
 Owner and number: Leslie Savey Principal aquifer: Oakes
 Depth drilled (ft.): 140 Altitude of land surface (ft., msl): 1346
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 3/18/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	17	18
Clay, tan	4	22
Gravel, brown, oxidized	4	26
Clay, brown	6	32
Clay, gray	23	55
Sand, fine grain, clean	5	60
Clay, gray	20	80
Clay, gray, interbedded silt and sand	7	87
Sand, fine grain	4	91
Sand, very fine grain, interbedded clay	6	97
Sand, fine grain	11	108
Clay	12	120
Clay, interbedded sand	20	140

Test Hole and Observation Well Record

Location: 130-58-16CBD Use of well: Test hole
 Owner and number: Leslie Savey Principal aquifer: Oakes
 Depth drilled (ft.): 120 Altitude of land surface (ft., msl):1340
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 1/12/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, brown, clayey	16	18
Clay, white, silty	2	20
Gravel, brown, coarse	4	24
Silt, gray	11	35
Till, gray	5	40
Sand, very fine grain, interbedded silt	24	64
Sand, fine to medium grain	6	70
Gravel, fine	28	98
Silt	22	120

Test Hole and Observation Well Record

Location: 130-58-16CCB	Use of well: Test hole
Owner and number: Leslie Savey	Principal aquifer: Oakes
Depth drilled (ft.): 140	Altitude of land surface (ft., msl): 1333
Screened interval (ft.): None	Lithologic log from: M&W Drilling
Casing diameter: None	Comments:
Date completed: 1/12/82	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, brown	11	13
Clay, brown	3	16
Sand, brown, fine grain	4	20
Silt, brown	3	23
Silt, gray	2	25
Sand, gray, very fine grain	23	48
Clay, gray	7	55
Sand, gray, fine grain	5	60
Silt, gray	20	80
Clay	60	140

Test Hole and Observation Well Record

Location: 130-58-16DDD Use of well: Test hole
 Owner and number: USBR D.H.66 Principal aquifer: Oakes
 Depth drilled (ft.): 225 Altitude of land surface (ft., msl): 1390
 Screened interval (ft.): None Lithologic log from: USBR
 Casing diameter: None Comments:
 Date completed: 6/18/53

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, dark brown, slightly clayey and silty, very organic	4.5	4.5
Sand, buff, fine grain, clayey	9.3	13.8
Silt, buff, laminated, clayey, interbedded fine sand	14.7	28.5
Sand, buff, coarse grain, clayey	1.5	30.0
Till, buff, very sandy	12.5	42.5
Silt, gray, laminated, slightly clayey interbedded clay	7.5	50.0
Till, gray, gravelly	6.0	56.0
Sand, buff, fine grain, slightly silty	14.0	70.0
Sand, gray, very fine grain, slightly silty	98.0	168.0
Sand, gray, silty	17.0	185.0
Sand, gray, very fine grain	10.0	195.0
Sand, gray, silty	25.0	220.0
Till, gray	5.0	225.0

Test Hole and Observation Well Record

Location: 130-58-17ABB₁ Use of well: Test hole
Owner and number: Walt Wiese Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1320
Screened interval (ft.): None Lithologic log from: Green Circle Supply
Casing diameter: None Comments:
Date completed: 2/18/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, oxidized	5	6
Limestone (boulder)	1	7
Clay, oxidized	7	14
Clay, pebbly	3	17
Sand, medium to coarse grain, well rounded	26	43
Sand, silty	17	60

Test Hole and Observation Well Record

Location: 130-58-17ABB₂ Use of well: Irrigation
Owner and number: Walter Wiese Principal aquifer: Oakes
Depth drilled (ft.): 46 Altitude of land surface (ft., msl): 1313
Screened interval (ft.): 25-45 Lithologic log from: Adair Drilling Co.
Casing diameter: 12-inch Comments:
Date completed: 5/19/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, medium to coarse grain	44	45
Clay	1	46

Test Hole and Observation Well Record

Location: 130-58-17ABC₁ Use of well: Test hole
Owner and number: Walt Wiese Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1316
Screened interval (ft.): None Lithologic log from: Green Circle Supply
Casing diameter: None Comments:
Date completed: 2/18/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Clay, oxidized	6	8
Limestone	1	9
Clay, oxidized	6	15
Clay, gray	3	18
Gravel, fine, well rounded	18	36
Sand, silty	24	60

Test Hole and Observation Well Record

Location: 130-58-17ABC₂ (west well) Use of well: Irrigation
Owner and number: Walter Wiese Principal aquifer: Oakes
Depth drilled (ft.): 46 Altitude of land surface (ft., msl): 1313
Screened interval (ft.): 24-44 Lithologic log from: Adair Drilling
Casing diameter: 12-inch Comments:
Date completed: 5/18/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay	14	15
Sand, coarse, gravelly	29	44
Clay, gray	2	46

Test Hole and Observation Well Record

Location: 130-58-17ABC₃ (east well) Use of well: Irrigation
Owner and number: Walter Wiese Principal aquifer: Oakes
Depth drilled (ft.): 55 Altitude of land surface (ft., msl): 1313
Screened interval (ft.): 30-50 Lithologic log from: Adair Drilling Co.
Casing diameter: 12-inch Comments:
Date completed: 4/30/77

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, yellow	4	5
Sand and gravel	45	50
Clay (till)	5	55

Test Hole and Observation Well Record

Location: 130-58-17BAA Use of well: Observation
 Owner and number: U.S.B.R. W-209 Principal aquifer: Oakes
 Depth drilled (ft.): 33 Altitude of land surface (ft., msl): 1320.8
 Screened interval (ft.): 24.8-26.0 Lithologic log from: Dave Williams (UND)
 Casing diameter: 2-inch plastic Comments: Masters Thesis
 Date completed: 5/24/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, sandy, black	3	3
Sand, fine, silty, white	2	5
Silt, sandy, brown-white laminations, iron oxides	2	7
Sand, medium, brown, pebbly	1	8
Sand, medium, white-brown	3	11
Sand, fine to medium, silty, brown	3.5	14.5
Sand, fine to medium, silty, gray	9	23.5
Sand, coarse, gray	9.5	33

Test Hole and Observation Well Record

Location: 130-58-17BBB₁ (south well) Use of well: Observation
 Owner and number: SWC 11922 Principal aquifer: Oakes
 Depth drilled (ft.): 180 Altitude of land surface (ft., msl): 1312.09
 Screened interval (ft.): 45-50 Lithologic log from: SWC
 Casing diameter: 1.25-inch Comments: Electric log available
 Date completed: 7/12/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, yellow brown to whitish gray, slightly plastic and silty (lacustrine)	11	11
Clay, olive gray, plastic (lacustrine)	6	17
Sand, very fine to medium grain, well sorted, subrounded to rounded	6	23
Gravel, angular to subrounded, shaley	29	52
Silt, olive gray, sandy	35	87
Till, olive gray, silty, sandy, pebbly	38	125
Gravel, subrounded, interbedded fine to coarse grain sand	3	128
Till, olive gray, silty, very sandy, slightly pebbly	34	162
Mudstone, olive gray, white specks, calcareous (Niobrara Formation)	18	180

Test Hole and Observation Well Record

Location: 130-58-17BBB₂ (north well) Use of well: Observation
 Owner and number: U.S.B.R. W-204B Principal aquifer: Oakes
 Depth drilled (ft.): 28 Altitude of land surface (ft., msl): 1312.3
 Screened interval (ft.): 16.8-18.0 Lithologic log from: Dave Williams (UND)
 Casing diameter: 2-inch plastic Comments: Masters Thesis
 Date completed: 5/19/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, black	1	1
Silt, clayey, laminated, dark gray	0.5	1.5
Silt, clayey, light gray	1	2.5
Silt, sandy, white	0.5	3
Silt, clayey, laminated with dark gray layers	4	7
Clay, silty, brown silt layers, selenite crystals	2	9
Clay, with sand layers, selenite crystals	7.5	16.5
Sand, fine, silty	0.5	17
Sand, fine to medium, silty, with clay layers	8	25
Sand, coarse	3	28

Test Hole and Observation Well Record

Location: 130-58-17BBB₃ (middle well) Use of well: Observation
Owner and number: U.S.B.R. W-204C Principal aquifer: Oakes
Depth drilled (ft.): 9 Altitude of land surface (ft., msl): 1312.3
Screened interval (ft.): 7.1-8.2 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/19/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, black	1	1
Silt, clayey, laminated, gray	0.5	1.5
Silt, clayey, light gray	1	2.5
Silt, sandy, white	0.5	3
Silt, clayey, laminated with dark gray layers	4	7
Clay, silty, brown silt layers, selenite crystals	2	9

Test Hole and Observation Well Record

Location: 130-58-17BBD₁ Use of well: Test hole
Owner and number: Doug Zuber Principal aquifer: Oakes
Depth drilled (ft.): 100 Altitude of land surface (ft., msl): 1314
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 8/31/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	4	5
Clay, brown	2	7
Clay, gray	7	14
Sand, fine grain, interbedded gravel	41	55
Sand, medium grain, interbedded gravel	20	75
Sand, fine to medium grain, lignitic	5	80
Sand, very fine grain	20	100

Test Hole and Observation Well Record

Location: 130-58-17BBD₂ Use of well: irrigation
Owner and number: Doug Zuber Principal aquifer: Oakes
Depth drilled (ft.): 75 Altitude of land surface (ft., msl): 1314
Screened interval (ft.): 55-75 Lithologic log from: M&W Drilling
Casing diameter: 12-inch Comments:
Date completed: 5/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	4	5
Clay, brown	2	7
Clay, gray	7	14
Sand, fine grain, interbedded gravel	41	55
Sand, medium grain, interbedded gravel	20	75

Test Hole and Observation Well Record

Location: 130-58-17BCC₁ (north well) Use of well: Observation
 Owner and number: U.S.B.R. W-203A Principal aquifer: Oakes
 Depth drilled (ft.): 33 Altitude of land surface (ft., msl):1312.8
 Screened interval (ft.): 27.7-28.9 Lithologic log from: Dave Williams (UND)
 Casing diameter: 2-inch plastic Comments: Masters Thesis
 Date completed: 5/19/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty, fine, dark brown	1	1
Sand, silty, fine to medium, brown	1	2
Silt, sandy, laminated, iron stains	1	3
Silt, sandy, laminated	3	6
Clay, silty, gray	1	7
Sand, coarse, gray	1	8
Sand, medium, with clay layers	5	13
Sand, medium, silty, gray	3	16
Sand, fine to medium, silty, gray	3	19
Silt, with fine sand layers, gray	2	21
Silt, with brown laminations	1	22
Sand, coarse, brown	1	23
Sand, coarse, gray, shaley	10	33

Test Hole and Observation Well Record

Location: 130-58-17BCC₂ (middle well) Use of well: Observation
Owner and number: U.S.B.R. W-203B Principal aquifer: Oakes
Depth drilled (ft.): 17 Altitude of land surface (ft., msl): 1312.6
Screened interval (ft.): 15.8-16.9 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/19/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty, fine, dark brown	1	1
Sand, silty, fine to medium, brown	1	2
Silt, sandy, laminated, iron stains	1	3
Silt, sandy, laminated	3	6
Clay, silty, gray	1	7
Sand, coarse, gray	1	8
Sand, medium, with clay layers	5	13
Sand, medium, silty, gray	3	16
Sand, fine to medium, silty, gray	3	19

Test Hole and Observation Well Record

Location: 130-58-17BCC₃ (south well) Use of well: Observation
Owner and number: U.S.B.R. W-203C Principal aquifer: Oakes
Depth drilled (ft.): 7 Altitude of land surface (ft., msl): 1312.9
Screened interval (ft.): 4.9-6.1 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/19/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty, fine, dark brown	1	1
Sand, silty, fine to medium, brown	1	2
Silt, sandy, laminated, iron stains	1	3
Silt, sandy, laminated	3	6
Clay, silty, gray	1	7

Test Hole and Observation Well Record

Location: 130-58-17CCC₁ (east well) Use of well: Observation
 Owner and number: U.S.B.R. W-202A Principal aquifer: Oakes
 Depth drilled (ft.): 18 Altitude of land surface (ft., msl): 1311.8
 Screened interval (ft.): 13.2-14.4 Lithologic log from: Dave Williams (UND)
 Casing diameter: 2-inch plastic Comments: Masters Thesis
 Date completed: 5/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty, dark brown	1	1
Sand, fine, silty, light brown	1	2
Sand, silty, fine to medium, light brown	1	3
Clay, silty, sandy, laminated, brown	2	5
Clay, sandy, silty, sand lenses, gray	1	6
Clay, sandy, silty, dark gray	2	8
Sand, medium, silty, gray	9	17
Sand, medium, gray, clay laminations	1	18

Test Hole and Observation Well Record

Location: 130-58-17CCC₂ (west well) Use of well: Observation
 Owner and number: U.S.B.R. W-202B Principal aquifer: Oakes
 Depth drilled (ft.): 9 Altitude of land surface (ft., msl): 1312.2
 Screened interval (ft.): 6.8-8.4 Lithologic log from: Dave Williams (UND)
 Casing diameter: 2-inch plastic Comments: Masters Thesis
 Date completed: 5/18/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty, dark brown	1	1
Sand, fine, silty, light brown	1	2
Sand, silty, fine to medium, light brown	1	3
Clay, silty, sandy, laminated, brown	2	5
Clay, sandy, silty, sand lenses, gray	1	6
Clay, sandy, silty, dark gray	2	8
Sand, medium, silty, gray	1	9

Test Hole and Observation Well Record

Location: 130-58-17CDD₁ Use of well: Observation
Owner and number: USBR W-208 Principal aquifer: Oakes
Depth drilled (ft.): 33 Altitude of land surface (ft., msl): 1314.0
Screened interval (ft.): 17.9-19.1 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/24/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, fine, black	1	1
Sand, fine, silty, iron oxides, light brown	2	3
Sand, medium, silty, brown	11	14
Sand, coarse, silty, brown-gray	4	18
Sand, medium to coarse, gray, lignitic	15	33

Test Hole and Observation Well Record

Location: 130-58-17CDD ₂	Use of well: Test hole
Owner and number: Leslie Savey	Principal aquifer: Oakes
Depth drilled (ft.): 60	Altitude of land surface (ft., msl): 1316
Screened interval (ft.): None	Lithologic log from: M&W Drilling
Casing diameter: None	Comments:
Date completed:	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, brown, fine grain	3	5
Sand, brown, clayey	5	10
Sand and gravel, brown, oxidized	10	20
Sand, gray, medium grain	5	25
Sand, gray, fine grain	7	32
Sand, gray, medium grain	3	35
Sand, medium grain to fine gravel	12	47
Sand, gray, silty	7	54
Clay, gray	6	60

Test Hole and Observation Well Record

Location: 130-58-17DBC Use of well: Test hole
Owner and number: Leslie Savey Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1316
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 2/10/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, medium grain	12	13
Sand, gray, medium grain	17	30
Sand, medium sand to coarse gravel	10	40
Gravel, clean	6	46
Gravel, medium, sandy	3	49
Clay, gray	11	60

Test Hole and Observation Well Record

Location: 130-58-17DCA Use of well: Test hole
Owner and number: Leslie Savey Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1318
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 2/13/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, brown, clayey	11	13
Sand, brown, medium grain	12	25
Sand, gray, very fine to fine grain	13	38
Sand, fine to medium grain	7	45
Sand, fine grain	4	49
Silt, gray	11	60

Test Hole and Observation Well Record

Location: 130-58-17DCB Use of well: Test hole
Owner and number: Leslie Savey Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 2/10/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, medium grain	12	13
Sand, gray, medium grain	12	25
Sand, medium to coarse grain	5	30
Gravel, medium	10	40
Sand, medium grain	15	55
Clay, gray	5	60

Test Hole and Observation Well Record

Location: 130-58-17DDD₁ Use of well: Test hole
 Owner and number: SWC 9108 Principal aquifer: Oakes
 Depth drilled (ft.): 260 Altitude of land surface (ft., msl): 1323
 Screened interval (ft.): None Lithologic log from: SWC
 Casing diameter: None Comments: Electric log available
 Date completed: 9/17/74

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Gravel, fine to medium, sandy, subangular to rounded, oxidized	38	38
Silt, dark gray, very sandy, varved	42	80
Silt, olive gray to greenish gray, plastic	30	110
Clay, dark gray, silty, sandy, pebbly, interbedded sand and gravel (till)	68	178
Shale, medium dark gray to greenish gray, very sandy, very calcareous (Niobrara Formation)	74	252
Shale, dark gray to grayish black, calcareous	8	260

Test Hole and Observation Well Record

Location: 130-58-17DDD₂ Use of well: Observation
Owner and number: SWC 9108A Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1323.3
Screened interval (ft.): 32-35 Lithologic log from: SWC
Casing diameter: 1.25-inch Comments:
Date completed: 9/17/74

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Gravel, fine to medium, coarse sand, subangular to rounded	38	38

Test Hole and Observation Well Record

Location: 130-58-18AAB Use of well: Test hole
Owner and number: Dale Hvistendahl Principal aquifer: Oakes
Depth drilled (ft.): 50 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 1/23/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, clayey	11	12
Sand, gray, fine grain, interbedded clay	16	28
Sand, coarse grain, 10% gravel	15	43
Silt, gray	7	50

Test Hole and Observation Well Record

Location: 130-58-18AAC₁ Use of well: Observation Well
 Owner and number: Dale Hvistendahl Principal aquifer: Oakes
 Depth drilled (ft.): 48 Altitude of land surface (ft., msl): 1312
 Screened interval (ft.): 28-48 Lithologic log from: M&W Drilling
 Casing diameter: Unknown Comments:
 Date completed:

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, clayey, calcareous	11	12
Sand, brown, fine grain	4	16
Sand, very fine to fine grain	12	28
Sand, medium to coarse grain, 10% gravel	12	40
Sand, fine to medium grain	8	48
Silt, gray		48

Test Hole and Observation Well Record

Location: 130-58-18AAC₂ Use of well: Irrigation
Owner and number: Dale Hvistendahl Principal aquifer: Oakes
Depth drilled (ft.): 55 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): 35-55 Lithologic log from: M&W Drilling
Casing diameter: 8-inch Comments:
Date completed: 6/5/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, calcareous	11	12
Sand, brown, fine grain	16	28
Sand, medium to coarse grain, interbedded gravel	27	55

Test Hole and Observation Well Record

Location: 130-58-18AAD Use of well: Test hole
 Owner and number: Dale Hvistendahl Principal aquifer: Oakes
 Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1312
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 1/23/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, calcareous	5	6
Clay, calcareous	6	12
Sand, brown, fine grain	4	16
Sand, gray, fine grain	7	23
Clay, gray	5	28
Sand, coarse grain, gravelly	8	36
Sand, medium to coarse grain, gravelly	19	55
Sand, lignite	4	59
Clay, gray	1	60

Test Hole and Observation Well Record

Location: 130-58-18ABD Use of well: Irrigation
Owner and number: Dale Hvistendahl Principal aquifer: Oakes
Depth drilled (ft.): 50 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): 22-50 Lithologic log from: M&W Drilling
Casing diameter: 8 -inch Comments:
Date completed: 6/2/81

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, calcareous	3	4
Sand, calcareous	8	12
Sand, brown, fine grain	10	22
Sand, gray, fine grain to medium gravel	28	50

Test Hole and Observation Well Record

Location: 130-58-18BAA Use of well: Test hole
 Owner and number: Dale Hvistendahl Principal aquifer: Oakes
 Depth drilled (ft.): 140 Altitude of land surface (ft., msl): 1310
 Screened interval (ft.): None Lithologic log from: M&W Drilling
 Casing diameter: None Comments:
 Date completed: 8/8/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, oxidized	7	8
Sand, gray, fine to medium grain	29	37
Sand, gray, medium to coarse grain	5	42
Silt, gray, interbedded sand	14	56
Silt, gray	20	76
Clay, gray (till)	32	108
Sand, clayey	32	140

Test Hole and Observation Well Record

Location: 130-58-18BCC Use of well: Observation
Owner and number: U.S.B.R. W-211 Principal aquifer: Oakes
Depth drilled (ft.): 34 Altitude of land surface (ft., msl): 1311.4
Screened interval (ft.): 17.4-18.6 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/25/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, sandy, black	2	2
Sand, fine, silty, brown	2	4
Sand, fine to medium, silty brown	3.5	7.5
Sand, medium to coarse, shaley, gray	8.5	16
Sand, fine, silty, gray	9.5	25.5
Sand, coarse, gray	8.5	34

Test Hole and Observation Well Record

Location: 130-58-18BCD Use of well: Test hole
Owner and number: Dale Hvistendahl Principal aquifer: Oakes
Depth drilled (ft.): 120 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 8/8/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine grain	6	7
Sand, gray, medium grain	3	10
Sand, gray, medium grain	32	42
Silt, gray, interbedded sand	42	84
Till, gray	36	120

Test Hole and Observation Well Record

Location: 130-58-18BDB Use of well: Test hole
Owner and number: Dale Hvistendahl Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1308
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 8/8/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	5	6
Sand, gray, medium grain	6	12
Sand, medium to coarse grain, lignitic	21	33
Silt, gray	7	40

Test Hole and Observation Well Record

Location: 130-58-18BDD Use of well: Test hole
Owner and number: Dale Hvistendahl Principal aquifer: Oakes
Depth drilled (ft.): 160 Altitude of land surface (ft., msl): 1311
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 8/7/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown, fine to medium	7	8
Sand, gray, fine to medium grain	12	20
Sand, gray, medium grain	30	50
Gravel, fine	5	55
Silt, gray, interbedded gravel	19	74
Sand, gray, silty	24	98
Sand, gravelly, interbedded clay	11	109
Till, interbedded silt and gravel	51	160

Test Hole and Observation Well Record

Location: 130-58-18CCA Use of well: Test hole
Owner and number: Dale Hvistendahl Principal aquifer: Oakes
Depth drilled (ft.): 50 Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None Lithologic log from: M&W Drilling
Casing diameter: None Comments:
Date completed: 8/8/79

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, brown	5	6
Sand, gray, medium grain	14	20
Sand, gray, fine to medium grain	10	30
Sand, gray, medium to coarse grain, gravelly	12	42
Sand, gray, silty	4	46
Silt, gray	4	50

Test Hole and Observation Well Record

Location: 130-58-18DBB₁ (west well) Use of well: Observation
Owner and number: U.S.B.R. W-205A Principal aquifer: Oakes
Depth drilled (ft.): 33 Altitude of land surface (ft., msl): 1312.1
Screened interval (ft.): 29.8-31.0 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/19/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, sandy, black	1	1
Sand, fine, dark gray	0.5	1.5
Sand, fine, silty, brown, laminated at base	4.5	6
Silt, clayey, sandy, dark gray, laminations, iron oxides, shell and plant fragments	4.5	10.5
Silt, sandy, dark gray, interbedded with sand	4	14.5
Sand, medium, silty, gray	18.5	33

Test Hole and Observation Well Record

Location: 130-58-18DBB₂ (east well) Use of well: Observation
Owner and number: U.S.B.R. W-205B Principal aquifer: Oakes
Depth drilled (ft.): 16 Altitude of land surface (ft., msl): 1312.2
Screened interval (ft.): 14.5-15.6 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/19/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Silt, sandy, black	1	1
Sand, fine, dark gray	0.5	1.5
Sand, fine, silty, brown, laminated at base	4.5	6
Silt, clayey, sandy, dark gray laminations, iron oxides, shell and plant fragments	4.5	10.5
Silt, sandy, dark gray, interbedded with sand	4	14.5
Sand, medium, silty, gray	1.5	16

Test Hole and Observation Well Record

Location: 130-58-18DDD₁ Use of well: Test hole
Owner and number: SWC 4863 Principal aquifer: Oakes
Depth drilled (ft.): 180 Altitude of land surface (ft., msl): 1312
Screened interval (ft.): None Lithologic log from: SWC
Casing diameter: None Comments: Electric log available
Date completed: 10/20/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, dark gray, fine to medium grain, interbedded silt	36	36
Clay, dark gray, silty (lacustrine)	28	64
Clay, dark gray, very silty, sandy (till)	48	112
Till, dark olive gray, gravelly	50	162
Shale, light olive gray, white specks, very calcareous (Niobrara Formation)	18	180

Test Hole and Observation Well Record

Location: 130-58-18DDD₂ Use of well: Observation
Owner and number: SWC 4863A Principal aquifer: Oakes
Depth drilled (ft.): 40 Altitude of land surface (ft., msl): 1312.5
Screened interval (ft.): 33-36 Lithologic log from: SWC
Casing diameter: 1.25-inch Comments:
Date completed: 10/20/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, dark gray, fine to medium grain, interbedded silt	36	36
Clay, dark gray, silty (lacustrine)	4	40

Test Hole and Observation Well Record

Location: 130-58-18DDD₃ Use of well: Test hole
 Owner and number: U.S.B.R. D.H. 3 Principal aquifer: Oakes
 Depth drilled (ft.): 45 Altitude of land surface (ft., msl): 1309.8
 Screened interval (ft.): None Lithologic log from: U.S.B.R.
 Casing diameter: None Comments:
 Date completed: 12/14/50

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, brown, fine grain, silty	5.0	5.0
Clay, gray, sandy, plastic, oxidized	5.0	10.0
Sand, gray brown, fine to medium grain	10.0	20.0
Clay, gray, sandy, lignitic, plastic	6.0	26.0
Clay, gray, brown, very sandy, slightly plastic interbedded silt and sand	5.0	31.0
Sand, gray brown, fine to medium grain, poorly sorted	5.5	36.5
Sand and gravel, medium sand to medium gravel, clayey	2.5	39.0
Clay, gray, silty, plastic	6.0	45.0

Test Hole and Observation Well Record

Location: 130-58-19ABB	Use of well: Test hole
Owner and number: SWC 6326	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1310
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/17/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, silty, pale yellow gray, oxidized	4	5
Sand, fine to v. coarse, predom. coarse, angular to rounded	34	39
Clay, silty, olive gray	43	82
Clay, silty, sandy, pebbly, olive gray, interbedded gravel below 120 feet (till)	47	129
Sand, v. fine to fine, clean to 132 feet, below 132 feet, v. clayey, drilled tighter	11	140
Clay, silty, sandy, pebbly, olive gray, poor recovery (till?)	16	156
Claystone, silty, brown with tan specks (Niobrara Formation)	26	182

Test Hole and Observation Well Record

Location: 130-58-19ABD

Use of well: Irrigation

Owner and number: Harry Cline

Principal aquifer: Oakes

Depth drilled (ft.): 75

Altitude of land surface (ft., msl): 1313

Screened interval (ft.): 50-75

Lithologic log from: Empire Drilling

Casing diameter: 16-inch

Comments:

Date completed: 12/74

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Clay, sandy	5	7
Sand	34	41
Sand and gravel	9	50
Sand, medium grain	25	75

Test Hole and Observation Well Record

Location: 130-58-19ADD Use of well: Observation
Owner and number: U.S.B.R. W-210 Principal aquifer: Oakes
Depth drilled (ft.): 32 Altitude of land surface (ft., msl): 1313.0
Screened interval (ft.): 18.3-19.5 Lithologic log from: Dave Williams (UND)
Casing diameter: 2-inch plastic Comments: Masters Thesis
Date completed: 5/25/83

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, silty, black	1	1
Sand, fine, silty, light brown	2.5	3.5
Sand, fine to medium, silty, iron oxides	0.5	4
Silt, interbedded sand layers, iron oxide stains	1	5
Clay, silty, interbedded sand layers	1.5	6.5
Sand, medium, silty, interbedded silt layers	23.5	30
Sand, medium to coarse, gray	2	32

Test Hole and Observation Well Record

Location: 130-58-19DDB Use of well: Irrigation
Owner and number: Dale Cutler Principal aquifer: Oakes
Depth drilled (ft.): 80 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 63-78 Lithologic log from: Adair Drilling Co.
Casing diameter: 12-inch Comments:
Date completed: 4/27/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine to medium grain	62	63
Sand, medium to coarse grain	15	78
Clay, sandy	2	80

Test Hole and Observation Well Record

Location: 130-58-20BBA ₂	Use of well: Observation
Owner and number: SWC 6328A	Principal aquifer: Oakes
Depth drilled (ft.): 40	Altitude of land surface (ft., msl): 1314.5
Screened interval (ft.): 35-40	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments:
Date completed: 9/17/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6328		

Test Hole and Observation Well Record

Location: 130-58-20CCC₂ Use of well: Observation
Owner and number: SWC 6323A Principal aquifer: Oakes
Depth drilled (ft.): 30 Altitude of land surface (ft., msl): 1319.3
Screened interval (ft.): 25-30 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/16/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6323		

Test Hole and Observation Well Record

Location: 130-58-22BAB	Use of well: Test hole
Owner and number: SWC 9107	Principal aquifer: Oakes
Depth drilled (ft.): 420	Altitude of land surface (ft., msl): 1464
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments:
Date completed: 9/17/74	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, very fine to fine, well sorted	18	18
Sand, very fine, very clayey, very slightly silty, very slightly plastic, thin organic zones, 95% quartz, detrital lignite, yellow brown	103	121
Sand, as above, medium gray	34	155
Sand, fine to medium, predom. fine, yellow brown, subangular to well rounded, oxidized, well sorted, 85% quartz, some thin silt and clay layers	48	203
Sand, very fine, very silty, slightly clayey, gray, sticky	58	261
Silty sand or sandy silt, numerous clay layers, gray, sticky, few sand and gravel lenses from 278'- 310'	49	310
Clay, silty, sandy, pebbly, dark gray, sticky, some sand and gravel layers (till)	22	332
Silt, clayey, very sandy, medium-dark gray, calcareous, sticky, soft, occasional thin gravel layers	74	406
Clay, light gray, calcareous, tight (Niobrara Formation)	14	420

Test Hole and Observation Well Record

Location: 130-58-29CCC Use of well: Observation
 Owner and number: SWC 11923 Principal aquifer: Oakes
 Depth drilled (ft.): 200 Altitude of land surface (ft., msl): 1312.77
 Screened interval (ft.): 171-176 Lithologic log from: SWC
 Casing diameter: 1.25-inch Comments: Electric log available
 Date completed: 7/13/82

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, yellow brown, very fine to fine grain, well sorted, rounded, oxidized	12	13
Clay, olive gray, slightly silty (lacustrine)	10	23
Sand, fine grain to pebble gravel, angular to rounded, oxidized to 41'	65	88
Silt, olive gray to brown, slightly sandy	13	101
Silt, interbedded very fine to fine grain shale sand	55	156
Gravel, pebble, subrounded to rounded, interbedded fine grain sand	5	161
Gravel, subrounded to rounded, cobbly, sandy	16	177
Mudstone, brown, white specks (Niobrara Formation)	23	200

Test Hole and Observation Well Record

Location: 130-58-29CDC₂ Use of well: Observation
Owner and number: SWC 6301A Principal aquifer: Oakes
Depth drilled (ft.): 55 Altitude of land surface (ft., msl): 1315.2
Screened interval (ft.): 50-55 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments: East well of pair
Date completed: 9/4/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log of test hole #6301

Test Hole and Observation Well Record

Location: 130-58-29CDC ₃	Use of well: Observation
Owner and number: SWC 6301B	Principal aquifer: Oakes
Depth drilled (ft.): 13	Altitude of land surface (ft., msl): 1315.1
Screened interval (ft.): 8-13	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: West well of pair
Date completed: 9/4/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log of test hole #6301		

Test Hole and Observation Well Record

Location: 130-58-29CDD₂ Use of well: Observation
Owner and number: SWC 6302A Principal aquifer: Oakes
Depth drilled (ft.): 58 Altitude of land surface (ft., msl): 1327.6
Screened interval (ft.): 53-58 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments:
Date completed: 9/5/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
See log for test hole #6302		

Test Hole and Observation Well Record

Location: 130-58-29DDD	Use of well: Test hole
Owner and number: SWC 6303	Principal aquifer: None
Depth drilled (ft.): 262	Altitude of land surface (ft., msl): 1390
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma log available
Date completed: 9/5/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, sl. to v. silty, contains few sand grains and pebbles, yellow-orange, oxidized	16	17
Clay, olive gray, as above, some thin gravel layers, less silty below 60 feet, no pebbles or gravel	147	164
Clay, silty, sandy, pebbly, olive gray, brittle, gravel layers between 185 and 198 feet (till)	65	229
Claystone, silty, brown, with tan specks (Niobrara Formation)	33	262

Test Hole and Observation Well Record

Location: 130-58-30ADA ₁	Use of well: Observation
Owner and number: SWC 11666	Principal aquifer: Oakes
Depth drilled (ft.): 80	Altitude of land surface (ft., msl): 1317.5
Screened interval (ft.): 60-65	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: South well of pair, located 500 feet north of 30ADD ₇
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to medium, predom. fine, possibly silty, subangular to well rounded, composed of detrital shale, quartz, carbonates, shield silicates, yellow stained, oxidized	5	5
Clay, v. silty or silt, v. clayey, fair to good sample recovery, yellow-gray-brown, oxidized, soft, bit penetration slowed	10	15
Sand, as above	3	18
Sand, gray, unoxidized as above, clean interval, lacks silt and clay layers	18	36
Clay, silty, or silt clayey, with thin interbedded fine sand layers, bit penetration slowed, fair recovery	3	39
Sand, v. fine to v. coarse, predom. medium to coarse, sl. gravelly, predom. detrital shale and quartz, some carbonates and shield silicates, lignitic, subangular to well rounded, clean interval, takes water	33	72
Clay, silty or silt, clayey, pale greenish gray, poor recovery, most into suspension, bit slowed	8	80

Test Hole and Observation Well Record

Location: 130-58-30ADA ₂	Use of well: Observation
Owner and number: SWC 11667	Principal aquifer: Oakes
Depth drilled (ft.): 20	Altitude of land surface (ft., msl): 1317.5
Screened interval (ft.): 15-20	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: North well of pair, located 512 feet north of 30ADD ₇
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to fine, possibly silty, composed of detrital shale, quartz, carbonates and shield silicates, subangular to well rounded, yellow stained, oxidized	6	6
Clay, v. silty, sl. sandy, yellow gray brown, oxidized, soft bit, penetration slowed	4	10
Sand, as above, gray, unoxidized	10	20

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, sandy, pebbly, olive gray (till)	61	179
Clay, sl. silty, brown with light gray specks, calcareous, soft (Niobrara Formation)	6	185

Test Hole and Observation Well Record

Location: 130-58-30ADD ₁	Use of well: Observation
Owner and number: SWC 11660	Principal aquifer: Oakes
Depth drilled (ft.): 200	Altitude of land surface (ft., msl): 1313.9
Screened interval (ft.): 105-110	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: Electric, neutron and gamma log available. South well of three well nest, located 175 feet north of 30ADD ₇
Date completed: 9/10/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to medium, predom. fine, subangular to well rounded, composed of detrital shale, carbonates, shield silicates and quartz, yellow stained, oxidized	14	14
Sand, as above, pale gray, unoxidized	4	18
Sand, v. fine to fine, predom. fine, with thin layers of silt and clay, poor recovery, most into suspension, bit penetration slowed, some pale greenish gray clay recovery	18	36
Sand, v. fine to v. coarse, sl. gravelly, predom. medium to coarse sand, composition as above, lignite	15	51
Clay, sl. silty, pale greenish gray, greasy	5	56
Sand, as interval from 36-51 feet	14	70
Silt, sl. clayey, pale greenish gray, poor recovery, most into suspension	24	94
Sand (70-80%) and gravel, sand is v. fine to v. coarse, predom. coarse, gravel is fine to medium, composition as above, takes water	36	130
Clay, silty, sandy, pebbly, olive gray (till)	47	177
Clay, sl. silty, gray brown, with light gray specks, soft (Niobrara Formation)	23	200

Test Hole and Observation Well Record

Location: 130-58-30ADD ₂	Use of well: Observation
Owner and number: SWC 11661	Principal aquifer: Oakes
Depth drilled (ft.): 70	Altitude of land surface (ft., msl): 1313.7
Screened interval (ft.): 60-65	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: Middle well of three well nest, located 185 feet north of 30ADD ₇
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to medium, predom. fine, subangular to well rounded, composed of detrital shale, carbonates, silicates and quartz, yellow stained, oxidized	11	11
Sand, as above, gray, unoxidized	7	18
Sand, v. fine to fine, with thin silt and clay layers, bit penetration slowed, poor recovery, drills as stratified, sand composition as above	18	36
Sand, v. fine to v. coarse, sl. gravelly, predom. medium to coarse sand, lots of detrital lignite, composition as above	15	51
Clay, silty, pale greenish gray	5	56
Sand, as 36-51 foot interval	14	70

Test Hole and Observation Well Record

Location: 130-58-30ADD ₃	Use of well: Observation
Owner and number: SWC 11662	Principal aquifer: Oakes
Depth drilled (ft.): 30	Altitude of land surface (ft., msl): 1313.9
Screened interval (ft.): 15-20	Lithologic log from: SWC
Casing diameter: 1½-inch plastic	Comments: North well of three well nest, located 196 feet north of 30ADD ₇
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to medium, predom. fine, subangular to well rounded, composed of detrital shale, carbonates, quartz and shield silicates, yellow stained oxidized	11	11
Sand, as above, gray, unoxidized	7	18
Sand, v. fine to fine, with thin silt and clay layers, bit penetration slowed, poor recovery, most into suspension, sand composition as above	12	30

Test Hole and Observation Well Record

Location: 130-58-30ADD ₄	Use of well: Observation
Owner and number: SWC 11663	Principal aquifer: Oakes
Depth drilled (ft.): 120	Altitude of land surface (ft., msl): 1315.5
Screened interval (ft.): 108-113	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: South well of three well nest, located 300 feet north of 30ADD ₇
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to medium, predom. v. fine to fine, possibly silty, subangular to well rounded, composed of detrital shale, quartz, carbonates and shield silicates, yellow stained, oxidized from 3 to 4 feet, yellow brown silty clay layer	12	12
Sand, as above, gray, unoxidized	6	18
Sand, v. fine to fine, predom. v. fine, with thin silt and clay layers, fair recovery, much into suspension, bit penetration slowed, sand composition as above	13	31
Clay, silty, greenish gray	5	36
Sand, v. fine to v. coarse, sl. gravelly predom. medium to coarse sand, composed of detrital shale, quartz, carbonates, and shield silicates, lignitic, subangular to well rounded	30	66
Clay, silty, greenish gray, poor recovery, much into suspension	17	83
Stratified sequence of v. fine to fine silty sands and silty clays, poor recovery, much into suspension	23	106
Sand (70-80%) and gravel, sand is v. fine to v. coarse, predom. coarse, subangular to well rounded, composed of detrital shale, carbonates, shield silicates, lignitic	9	115
Clay, silty, greenish gray, soft, bit penetration slowed, fair sample recovery	5	120

Test Hole and Observation Well Record

Location: 130-58-30ADD ₅	Use of well: Observation
Owner and number: SWC 11664	Principal aquifer: Oakes
Depth drilled (ft.): 70	Altitude of land surface (ft., msl): 1316.0
Screened interval (ft.): 56-61	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: Middle well of three well nest, located 312 feet north of 30ADD ₇
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Clay, silty, some interbedded v. fine to fine sand, pale yellow brown, oxidized	5	5
Sand, v. fine to medium predom. fine, predom. detrital shale and quartz, some carbonates and shield silicates, lignitic, subangular to well rounded, possibly silty	19	24
Sand, v. fine to fine, composition as above, interbedded with silt and clay layers, bit penetration slowed, poor to fair sample recovery, much into suspension	9	33
Clay, silty, greenish gray, soft, some interbedded fine sand, more clay than above	5	38
Sand, v. fine to v. coarse, sl. gravelly, predom. medium to coarse, predom. quartz, detrital shale, some carbonates and shield silicates, lignitic subangular to well rounded, drills as stratified	23	61
Clay, silty, greenish gray, soft, good recovery	9	70

Test Hole and Observation Well Record

Location: 130-58-30ADD ₆	Use of well: Observation
Owner and number: SWC 11665	Principal aquifer: Oakes
Depth drilled (ft.): 20	Altitude of land surface (ft., msl): 1316.4
Screened interval (ft.): 15-20	Lithologic log from: SWC
Casing diameter: 1½-inch pvc	Comments: North well of three well nest, located 323 feet north of 30ADD ₇
Date completed: 9/11/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Sand, v. fine to medium, predom. fine, yellow stained, oxidized, subangular to well rounded, composed of detrital shale, quartz, carbonates and shield silicates, lignitic	5	5
Clay, v. silty, yellow-brown-gray brown, soft, oxidized	3	8
Sand, as above	7	15
Sand, gray, unoxidized, as above	5	20

Test Hole and Observation Well Record

Location: 130-58-30ADD7 Use of well: Irrigation
Owner and number: Dale Cutler Principal aquifer: Oakes
Depth drilled (ft.): 77 Altitude of land surface (ft., msl): 1317
Screened interval (ft.): 55-75 Lithologic log from: Adair Drilling Co.
Casing diameter: 12-inch Comments: Aquifer test conducted using
Date completed: 4/13/78 this well

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand	54	55
Sand, medium to coarse grain	20	75
Clay, sandy	2	77

Test Hole and Observation Well Record

Location: 130-58-30CCC Use of well: Observation
Owner and number: U.S.B.R. W-62 Principal aquifer: Oakes
Depth drilled (ft.): 20 Altitude of land surface (ft., msl): 1313.7
Screened interval (ft.): ? Lithologic log from: U.S.B.R.
Casing diameter: 3-inch downspout Comments:
Date completed: 6/16/66

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Loamy sand	2	2
Sand	1	3
Loamy fine sand	1	4
Fine sand, clean, with lignite and shale chips	16	20

Test Hole and Observation Well Record

Location: 130-58-30CDD Use of well: Observation
 Owner and number: SWC 6299 Principal aquifer: Oakes
 Depth drilled (ft.): 202 Altitude of land surface (ft., msl): 1313.3
 Screened interval (ft.): 57-62 Lithologic log from: SWC
 Casing diameter: 2-inch pvc Comments: Electric, neutron and
 Date completed: 9/3/85 gamma logs available

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine to coarse, predom. fine, angular to rounded, predom. subangular, oxidized to 15 feet	19	20
Sand, coarse to v. coarse, predom. coarse, rounded, quartz + shale + carbonates	50	70
Clay, silty, olive gray	29	99
Clay, silty, sandy, pebbly, olive gray, gravelly from 150 to 157 feet (till)	73	172
Claystone, silty, brown with tan specks (Niobrara Formation)	30	202

Test Hole and Observation Well Record

Location: 130-58-30DAC

Use of well: Irrigation

Owner and number: Allen Hansen

Principal aquifer: Oakes

Depth drilled (ft.): 68

Altitude of land surface (ft., msl): 1315

Screened interval (ft.): 53-68

Lithologic log from: Empire Drilling

Casing diameter: 16-inch

Comments:

Date completed: 5/15/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand	8	10
Clay	13	23
Sand, medium grain	32	55
Sand and gravel	13	68
Clay		68

Test Hole and Observation Well Record

Location: 130-58-30DDD Use of well: Observation
 Owner and number: SWC 4836 Principal aquifer: Oakes
 Depth drilled (ft.): 220 Altitude of land surface (ft., msl): 1316
 Screened interval (ft.): 158-161 Lithologic log from: SWC
 Casing diameter: 1.25-inch Comments:
 Date completed: 10/7/75

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, moderate yellow brown, fine to medium grain, oxidized	10	12
Sand, medium dark gray, coarse grain to fine gravel, interbedded silt	138	150
Gravel, fine to medium, sandy	32	182
Sand, medium dark gray, medium grain	15	197
Shale, light olive gray, white specks, very calcareous (Niobrara Formation)	23	220

Test Hole and Observation Well Record

Location: 130-58-31AAD

Use of well: Irrigation

Owner and number: Harry Cline

Principal aquifer: Oakes

Depth drilled (ft.): 63

Altitude of land surface (ft., msl): 1315

Screened interval (ft.): 39-63

Lithologic log from: Empire Drilling

Casing diameter: 16-inch

Comments:

Date completed: 12/74

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, clayey	18	20
Sand, fine grain	10	30
Clay, sandy	12	42
Sand, coarse	21	63

Test Hole and Observation Well Record

Location: 130-58-31ABA ₁	Use of well: Test hole
Owner and number: SWC 6300	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1316
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron and gamma logs available
Date completed: 9/4/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine to coarse, predom. medium to coarse, subrounded, oxidized to 15 feet	51	52
Gravel, fine to ½-inch diameter, angular to rounded, predom. subrounded, carbonates + shale + silicates	3	55
Clay, silty or silt, clayey, most into suspension, poor recovery	35	90
Sand, medium to v. coarse, predom. coarse, rounded	42	132
Gravel, fine to 1-inch diameter, angular to rounded, predom. subangular, carbonates + silicates, interbedded with till 50% below 140 feet predom. shale gravel	15	147
Clay, silty, sandy, pebbly, olive gray (till)	18	165
Clay, silty, brown with tan specks, (Niobrara Formation)	17	182

Test Hole and Observation Well Record

Location: 130-58-31ABA ₂	Use of well: Observation
Owner and number: SWC 6300A	Principal aquifer: Oakes
Depth drilled (ft.): 140	Altitude of land surface (ft., msl): 1316.4
Screened interval (ft.): 126-131	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: West well of pair
Date completed: 9/4/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for test hole #6300

Test Hole and Observation Well Record

Location: 130-58-31ABA₃ Use of well: Observation
Owner and number: SWC 6300B Principal aquifer: Oakes
Depth drilled (ft.): 52 Altitude of land surface (ft., msl): 1316.3
Screened interval (ft.): 45-50 Lithologic log from: SWC
Casing diameter: 2-inch pvc Comments: East well of pair
Date completed: 9/4/85

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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See log for test hole #6300

Test Hole and Observation Well Record

Location: 130-58-31BBB	Use of well: Observation
Owner and number: SWC 6298	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1313.1
Screened interval (ft.): 20-25	Lithologic log from: SWC
Casing diameter: 2-inch pvc	Comments: Electric, neutron and gamma logs available
Date completed: 9/3/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine, oxidized	7	8
Sand, medium to v. coarse, predom. coarse, rounded, quartz + carbonates + shale, lignitic	28	36
Clay, silty, olive gray	58	94
Clay, silty, sandy, pebbly, olive gray (till)	71	165
Claystone, silty, brown with tan specks (Niobrara Formation)	17	182

Test Hole and Observation Well Record

Location: 130-58-31CCC ₁	Use of well: Test hole
Owner and number: SWC 6334	Principal aquifer: Oakes
Depth drilled (ft.): 182	Altitude of land surface (ft., msl): 1314
Screened interval (ft.): None	Lithologic log from: SWC
Casing diameter: None	Comments: Electric, neutron, and gamma logs available
Date completed: 9/23/85	

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Clay, sandy, pale yellow gray, oxidized	7	8
Sand, fine to v. coarse, predom. fine to medium, subrounded to rounded, some interbedded clay	42	50
Silt, clayey, olive gray, poor recovery, most into suspension	65	115
Clay, silty, sandy, pebbly, olive gray, soft (till)	45	160
Clay, black, tight, waxy (Pierre Formation)	6	166
Claystone, silty, brown with tan specks (Niobrara Formation)	16	182

Test Hole and Observation Well Record

Location: 130-58-31CCC₂

Use of well: Observation

Owner and number: SWC 6334A

Principal aquifer: Oakes

Depth drilled (ft.): 50

Altitude of land surface (ft., msl): 1313.7

Screened interval (ft.): 45-50

Lithologic log from: SWC

Casing diameter: 2-inch pvc

Comments:

Date completed: 9/23/85

Lithologic Log

Unit description

Thickness (ft.) Depth (ft.)

See log for test hole #6334

Test Hole and Observation Well Record

Location: 130-58-31DDD Use of well: Observation
Owner and number: U.S.B.R. W-103 Principal aquifer: Oakes
Depth drilled (ft.): ? Altitude of land surface (ft., msl): 1314.01
Screened interval (ft.): ? Lithologic log from: No log
Casing diameter: ? Comments: Old well #16
Date completed: 1/9/67

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
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Test Hole and Observation Well Record

Location: 130-58-32BAB

Use of well: Domestic

Owner and number: Dale Cutler

Principal aquifer: Oakes

Depth drilled (ft.): 60

Altitude of land surface (ft., msl): 1326

Screened interval (ft.): 50-60

Lithologic log from: Adair Drilling Co.

Casing diameter: 4-inch

Comments:

Date completed: 9/25/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand, fine grain	24	25
Clay, sandy	11	36
Sand, fine grain	3	39
Clay, sandy	6	45
Sand, fine to medium grain	15	60
Clay, sandy	1	61

Test Hole and Observation Well Record

Location: 130-58-32BBB Use of well: Irrigation
Owner and number: Dale Cutler Principal aquifer: Oakes
Depth drilled (ft.): 76 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 58-76 Lithologic log from: Adair Drilling Co.
Casing diameter: 12-inch Comments:
Date completed: 4/14/78

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Sand	57	58
Sand, medium to coarse grain	18	76

Test Hole and Observation Well Record

Location: 130-58-32BBC

Use of well: Test hole

Owner and number: Harry Cline

Principal aquifer: Oakes

Depth drilled (ft.): 80

Altitude of land surface (ft., msl): 1315

Screened interval (ft.): None

Lithologic log from: Empire Drilling

Casing diameter: None

Comments:

Date completed:

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, fine grain	28	30
Sand and gravel	50	80

Test Hole and Observation Well Record

Location: 130-58-32BBD Use of well: Test hole
Owner and number: Harry Cline Principal aquifer: Oakes
Depth drilled (ft.): 60 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): None Lithologic log from: Empire Drilling
Casing diameter: None Comments:
Date completed:

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, fine grain	33	35
Clay	25	60

Test Hole and Observation Well Record

Location: 130-58-32CBC₁ Use of well: Irrigation
Owner and number: Harry Cline Principal aquifer: Oakes
Depth drilled (ft.): 75 Altitude of land surface (ft., msl): 1315
Screened interval (ft.): 50-75 Lithologic log from: Empire Drilling
Casing diameter: 16-inch Comments:
Date completed: 12/74

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	2	2
Sand, clayey	13	15
Sand	27	42
Sand and gravel	8	50
Sand, medium grain	25	75

Test Hole and Observation Well Record

Location: 130-58-32CBC₂ Use of well: Irrigation
Owner and number: Anderson Co. Principal aquifer: Oakes
Depth drilled (ft.): 80 Altitude of land surface (ft., msl): 1316
Screened interval (ft.): 40-55 Lithologic log from: M&W Drilling
Casing diameter: 16-inch Comments: Replacement well
Date completed: 7/24/84

Lithologic Log

Unit description	Thickness (ft.)	Depth (ft.)
Topsoil	1	1
Brown sand	10	11
Gray medium sand	14	25
Gray medium sand with stratified gravels	30	55
Fine to very fine sand	25	80

PLATE 1

Map showing location of wells and test holes in the Oakes aquifer study area, southeastern North Dakota and northeastern South Dakota.