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LIMITED REPORT

Geology and Groundwater Resources of the Hudson Bay Area (63C-D), Saskatchewan

by

M.J. Millard

Resources and Environment Group

SRC Publication No. R-1510-3-E-96

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INTRODUCTION

Geological mapping, test drilling, and groundwater observation well measurements have been completed for the entire settled area of Saskatchewan during the past 30 years. These data provide a basis for the evaluation of the groundwater resources of Saskatchewan. The objective is to continuously improve the understanding of provincial groundwater resources in terms of occurrence, quality, and behaviour, in order to support the development, management, and protection of these water supplies.

With this need in mind, the Saskatchewan Research Council has worked co-operatively with the Saskatchewan Water Corporation to complete a new Geology and Groundwater Resources map series corresponding to the 1:250,000 NTS areas of southern Saskatchewan.

The present report accompanies the preliminary maps and cross sections that depict the geology and groundwater resources in the Hudson Bay area (63C-D). This work, which is an update of maps published during the late 1960's and 1970's, in particular Moran and Whitaker (1969), indicates the location, extent, and depth of aquifers throughout the area. It also demonstrates the close relationship of soil salinity to geology and groundwater conditions and assists in evaluating irrigation potential and contamination hazards.

Compilation for the current work was completed at a scale of 1:250,000. Control was provided by stratigraphic cross sections that are spaced 14 to 19 kilometres apart; ideally, one cross section every one and one-half townships, which results in about 15 sections per map. The original cross sections (horizontal scale = 1:125,000; vertical exaggeration = 50X) were constructed by fixing photographically-reduced copies of testhole logs to the topographic section. The testhole logs used were obtained from records stored at SRC and include records with electrical logs only (oil and potash exploration holes), testholes drilled by SRC (comprised of electrical logs, driller's logs, and geologist's descriptions), and farm or municipal water-well testholes (comprised of electrical logs and driller's logs) which were drilled with the assistance of SWC, or formerly, the Family Farm Improvement Branch of the Saskatchewan Department of Agriculture.

Separate map sheets were compiled, on paper copies of the original topographic sheet, for each stratigraphic level at which aquifers, or potential aquifers (i.e. sands and gravels) are known to occur. In some cases, aquifers at different stratigraphic levels may be shown on a single sheet. Information included on the aquifer maps consists of the surface elevation of the site, depth to and thickness of the deposit, and static water level, when known. In addition to these maps, a separate map showing the bedrock surface geology and topography was prepared.

Upon completion of the map compilations, the line work was digitized and the point data were compiled into a database. A digital base map, obtained by SWC from the Central Survey and Mapping Agency (CSMA) was utilized to produce the final output in AutoCad. The maps, which are archived as AutoCad drawing files, were plotted at a scale of 1:250,000. The cross sections were reduced by 50 per cent in order to make them more manageable. Map 1 shows the

location of the testhole logs that were used in this compilation, as well as the SRC Acquisition Number of each testhole log.

GEOLOGY

General

All sediments between the bedrock surface and the present surface are considered to be "glacial drift". The drift in the Hudson Bay area attains a maximum thickness of about 320 m in the Porcupine Hills. The bedrock surface (Map 2) slopes generally towards the northeast. Isolated bedrock topographic highs occur along the northern boundary and near the southeast corner of the area (Pasquia Hills and Porcupine Hills, respectively). Bedrock-surface elevations range between 544 to 290 metres ASL.

The glacial ice eroded pre-existing sediments, but also deposited material, mainly till, which is an unsorted mixture of sand, silt, clay, pebbles, and boulders accumulated by the glacier. As the ice retreated from the area much meltwater was released resulting in the deposition of stratified gravels, sands, silts, and clays. This process of erosion and deposition of till and stratified deposits occurred several times as the ice repeatedly advanced and retreated over the area. This sequence of events resulted in the drift stratigraphy that presently exists.

Where information makes it possible, the drift has been subdivided into three groups; Empress Group, Sutherland Group, and Saskatoon Group. The Empress Group consists of stratified gravels, sands, silts, and clays that lie between the bedrock surface and the lowest till unit. The Sutherland Group, as well as the Saskatoon Group, consists of several till and associated stratified units that are not formally separated and identified here. The definition of these groups and the description of the typical drift units forming the stratigraphy are provided by Christiansen (1992) and Whitaker and Christiansen (1972).

Glaciotectonic Structures

A compressive ice-flow regime, caused by glacial ice flowing upward, over the Manitoba Escarpment, provides mechanisms whereby bedrock, or previously deposited drift sediments can be displaced to a higher elevation or a higher (ie. younger) stratigraphic level. Moran (1969) documents two examples of glaciotectonic structures in the Hudson Bay area: Thunder Hill, in the extreme southeast corner of the map area (SRC Thunder Hill, NE 11-24-35-30W1), and a site near the village of Steen (SRC Steen, NW 115-31-42-11W2).

Bedrock

Fine-grained marine sediments, deposited in epeiric seas during the Cretaceous Period, form the bedrock surface throughout most of the Hudson Bay area. These dominantly marine sediments include, in descending order, the Pierre Shale, Niobrara Formation, Morden Shale, Favel Formation, and Ashville Formation. Below the Ashville Formation, the basal-Cretaceous

Swan River Formation is comprised of marine and non-marine, locally cemented, fine- to medium-grained sand, silt, and clay. Comprehensive descriptions of the Cretaceous units found in the Hudson Bay area are provided by McNeil and Caldwell (1981).

Swan River Formation

The Swan River formation, consisting of locally cemented, fine- to medium-grained sand, silt, and clay, is considered to be the lithostratigraphic equivalent of the Mannville Group of western Saskatchewan. The basal Jurassic-Cretaceous sands that disconformably overly Paleozoic sediments have been included in this unit following the practise of Christopher (1984). The Swan River Formation varies in thickness from about 45 m to about 150 m. This unit forms the bedrock surface in the extreme northeast corner of the Hudson Bay area and is reported to be exposed at several locations along the Red Deer River (McNeil and Caldwell, 1981).

Ashville Formation

The Ashville Formation, which is comprised mainly of noncalcareous dark grey or black silt and clay is the lithostratigraphic equivalent of the lower Colorado Group of western Saskatchewan. This unit forms the bedrock surface in the northeastern part of the Hudson Bay area as well as in the southeast corner where glaciotectonic activity has removed or displaced overlying Cretaceous sediments. The Ashville Formation is exposed at several locations along the Red Deer River and along the Armit River (McNeil and Caldwell, 1981).

Favel Formation

The Favel Formation, which consists of dark gray, calcareous shale with thin beds of clayey limestone, is the lithostratigraphic equivalent of the Second White Speckled Shale that marks the base of the upper Colorado Group farther west.

Morden Shale and Niobrara Formation

The Morden Shale and Niobrara Formation are, for the purposes of the present report, considered as a single unit. Formerly known as the Vermillion River Formation (Moran and Whitaker, 1969), the lower part of this unit (Morden Shale) is comprised of uniform, black, noncalcareous shale with occasional thin bentonite beds, while the upper part (Niobrara Formation) consists of chalky or chalk-speckled shale. The Niobrara Formation is lithostratigraphically equivalent to the First White Speckled Shale of western Saskatchewan, however, the Morden Shale, or its equivalent, pinches out to the west (McNeil and Caldwell, 1981).

Pierre Shale

The Pierre Shale is the lithostratigraphic equivalent of the Bearpaw, Judith River, and Lea Park formations of western Saskatchewan. The noncalcareous silts and clays are mainly

indistinguishable from those of the Bearpaw and Lea Park formations. The Pierre Shale forms the bedrock surface throughout most of the Hudson Bay area.

Tertiary - Quaternary(?) Sediments

The youngest bedrock deposits encountered in the Hudson Bay area consist of noncalcareous to slightly calcareous sand that grades upward into interbedded sand and silt with occasional carbonaceous and peaty horizons. These sediments, which in the Yorkton area (62M-N) to the south have been designated informally as the "Wynard Formation" (Christiansen, 1970) and the "Bredenbury Formation" (Christiansen, 1981), occur as erosional remnants of Tertiary to earliest Quaternary fluvial(?) bedrock deposits. This unit is known to occur over a very limited area along the southern boundary of the Hudson Bay area and attains a maximum thickness of 36 m.

Drift

Empress Group

The Empress group (Whitaker and Christiansen, 1972) lies between the bedrock surface and the lowest till. In the Hudson Bay area, the Empress Group sediments, comprised of stratified gravels and sands, are found primarily in buried valleys that were incised into the bedrock surface. Therefore, these sediments are not very extensive and are restricted to the western half of the Hudson Bay area. The maximum thickness of Empress Group sediments in the Hudson Bay area is about 26 m.

Sutherland Group

The Sutherland Group (Christiansen, 1992) lies beneath the Saskatoon Group and on top of bedrock or the Empress Group. In Saskatchewan, this group comprises at least three till units and associated stratified deposits, which, where the data make it possible, have been delineated on the cross sections. In areas where the data are sparse, or ambiguous, the units comprising the Sutherland Group have not been delineated. In the Hudson Bay area, the Sutherland Group varies in thickness and attains a maximum (about 225 m) in the Porcupine Hills.

The tills of the Sutherland Group are commonly clayier, harder, less resistive electrically, and are more difficult to penetrate by drilling than are tills of the Saskatoon Group. These two groups are also differentiated by geochemical means (Schreiner, 1990), the presence of clay pebbles in the till, and a weathering zone separating the two groups. The weathering is signified by leaching, oxidation, staining, and other alteration features.

Saskatoon Group

The Saskatoon Group (Christiansen, 1992) includes all sediments lying between the Sutherland Group and the present surface. The Saskatoon Group includes the Floral Formation, which itself consists of multiple tills and associated stratified units, as well as the Battleford

Formation (till) and "Surficial Stratified Deposits". The thickness of the Saskatoon Group in the Hudson Bay area ranges to about 185 m at Thunder Hill, a glaciotectonic structure formed during the last glaciation.

The tills of the Saskatoon Group are commonly more sandy, more resistive electrically, and have a higher carbonate content than the tills of the Sutherland Group. However, in some parts of the Hudson Bay area, tills units that correlate to tills of the Saskatoon Group, elsewhere in the province, can resemble tills of the Sutherland Group. This is due to thin drift deposits or absence of Sutherland Group sediments (or both) in these areas, which resulted in a higher proportion of bedrock material being incorporated into Saskatoon Group tills than is common elsewhere in the province. "Surficial Stratified Deposits" occur as glaciolacustrine and glaciofluvial sediments as well as alluvial sediments that were deposited by modern streams and rivers.

GROUNDWATER RESOURCES

General

Groundwater originates from precipitation the infiltrates to the water table, moves downward and laterally under the influence of gravity, and eventually discharges back to the ground surface at some point of lower elevation (Meneley, 1977).

An aquifer is a layer in which a well can be constructed yielding sufficient water for production. Aquifers are separated by aquitards, which are layers sufficiently permeable to transmit water, but not sufficiently permeable to allow completion of a production well. The inter-relationships between aquifers, aquitards, and aquifer systems are discussed by Meneley (1983). The Swan River Formation and intertill sands and gravels form the major aquifers in the Hudson Bay area. Till units and bedrock clays form aquitards.

Groundwater moves through inter-granular openings and fractures in the sediments. The water moves under the influence of gravity from regions of higher hydraulic head to regions of lower hydraulic head. The hydraulic head generally is expressed as the elevation above sea level of the static water level in a well. If the layers are vertical and of large areal extent, such as in the Hudson Bay area, the water tends to move vertically in aquitards while in aquifers it moves horizontally. The distribution of the hydraulic head, which is controlled by factors such as topography, stratigraphic setting, and the type of material forming the aquifers and aquitards, determines the direction of flow.

Surficial Aquifers

Many shallow seepage wells, generally less than 15 m deep, have been constructed throughout the area. These wells have been completed in "Surficial Stratified Deposits" and in stratified materials that are part of the Battleford Formation.

Intertill Aquifers

Intertill aquifers are defined stratigraphically rather than topographically. Thus, in some areas the depth to the same intertill aquifer can vary from relatively shallow to deep. Where intertill aquifers are reasonably well defined they are shown on the cross sections. Intertill aquifers can be quite variable in thickness, and where these stratified deposits are interbedded with till, or where insufficient data exist, the aquifers are not shown. In the Hudson Bay area, intertill aquifers are almost entirely absent throughout all but the southwest quarter of the map area.

The stratified deposits that are classed as shallow intertill aquifers (Map 5 and cross sections) occur at two stratigraphic positions within the Saskatoon Group. Shallow intertill sands and gravels occur primarily in the southwest and south-central portion of the Hudson Bay area. The lower unit, that which occurs at the base of the Floral Formation is the most extensive. The shallow intertill aquifers are found at depths that rarely exceed 50 m.

The stratified deposits that are classed as deep intertill aquifers (Map 4 and cross sections) occur within the Sutherland Group. The deposits that form these aquifers are restricted to southwest part of the Hudson Bay area, where they are generally more extensive and continuous than those classed as shallow intertill aquifers. Although deep intertill aquifers occur occasionally at depths as shallow as 30 m, they are generally found at depths in excess of 50 m.

Empress Group Aquifers

Silts, sands, and gravels that occupy the stratigraphic position of the Empress Group (Map 3 and cross sections) are found in three areas. Near the northwest corner of the Hudson Bay area, a northwest-trending buried valley, incised into Cretaceous bedrock contains Empress Group sediments at depths greater than about 50 m. In the Porcupine Plain region sands and gravels that have been included in the Empress Group occur at depths between 20 m and 50 m. These sediments might actually represent intertill deposits, but because no till was recorded on the testhole logs below the sands, they have been included with the Empress Group. The most extensive deposits of Empress Group sediments is found in the Rockford - Stove Creek region. Here these sediments occur at depths in excess of 100 m.

Bedrock Aquifers

The Swan River Formation is the most extensive aquifer in the Hudson Bay area. However, due to its depth it is rarely used as a source of domestic water. Near Smoking Tent, in the northeast corner of the Hudson Bay area, several wells have been completed into the Swan River Formation. These wells indicate a piezometric elevation of about 310 m ASL.

Southwest of the town of Hudson Bay, in Twp 44, Rge 3W2, wells have been completed in a sand within the Ashville Formation; the Newcastle Member of McNeil and Caldwell (1981). However, this is not considered to be an important aquifer as the Newcastle Member is not very homogeneous (McNeil and Caldwell, 1981; Cross-Section L/L'), and one testhole log (SWC

NW13-16-45-3W2) reports insufficient supply and crude oil in the water. The piezometric elevation for the wells completed into the Newcastle Member is about 350 m ASL.

One well has been completed into the Tertiary - Quaternary (?) sediments that are found near the southern boundary of the Hudson Bay area. The piezometric elevation is about 535 m ASL.

Flowing Wells

Flowing wells, where the static water level is above the ground surface, generally indicate an upward groundwater flow. Appendix I lists the flowing wells from the Hudson Bay area which are stored in SRC's testhole record database.

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APPENDIX I

Flowing Wells in the Hudson Bay Area (63C-D)

LOCATION	AQUIFER CLASS./STRAT. POSITION	COMPLETION DEPTH
NE 16-13-36-11W2	Shallow Intertill/Upper Saskatoon Group	16m
SE 9-40-14W2	Shallow Intertill/Lower Saskatoon Group	43m
NE 16-12-37-8W2	Empress Group	99m
SW 13-37-8W2	Deep Intertill/Sutherland Group	40m
SW 4-24-37-8W2	Deep Intertill/Sutherland Group	41m
SE 1-25-37-8W2	Deep Intertill/Sutherland Group	52m
SE 19-36-9W2	Deep Intertill/Sutherland Group	97m
NW 15-11-36-11W2	Deep Intertill/Sutherland Group	63m
4-16-37-10-W2	Deep Intertill/Sutherland Group	52m
NE 1-13-37-11W2	Deep Intertill/Sutherland Group	63m
SW 21-37-11W2	Deep Intertill/Sutherland Group	45m
NE 16-2-38-11W2	Deep Intertill/Sutherland Group	48m
SE 1-1-37-12-W2	Deep Intertill/Sutherland Group	40m
SE 6-40-12W2	Deep Intertill/Sutherland Group	31m
SW 12-23-37-13W2	Deep Intertill/Sutherland Group	52m
NE 2-40-13W2	Deep Intertill/Sutherland Group	30m

APPENDIX II

Index of Cross Section Logs

The following types of logs and records have been used for the compilation of this work.

1. The SRC file contains logs that include E-logs, driller's logs, geologist's description of the cutting samples, and often analytical results. These logs are listed as SRC, POC, SHT, SDH, DIA, DMR, UOFS, HAYTER, and DTRR.

2. The Oil - Potash logs consist of geophysical logs only. These logs are listed as OIL.

3. The SWC file contains records consisting of E-logs, driller's logs, and information pertaining to well completion. Collection of this type of data was initiated under the Family Farm Improvement Branch (FFIB) Testhole Assistance Program, which was the forerunner of a program later administered under the SWC. These logs are listed as SWC.

Log No.	Log Type	Name	Land Location
1	SWC	S. Gagnon	15-34-44-14W2
2	SWC	G. Daschuk	SW 5-45-13W2
3	OIL	Gulf Tisdale 5TH 6	NW 5-2-45-12W2
4	SWC	J. Kapeller	NW 15-4-45-12W2
5	OIL	Cal STD Mistatim 1	SW 13-7-45-11W2
6	OIL	Cal STD Mistatim 2	NW 15-8-45-11W2
7	OIL	Cal STD Mistatim 3	SW 3-16-45-11W2
8	OIL	Cal STD Mistatim 4	SE 10-15-45-11W2
9	OIL	Cal STD Mistatim 19	NW 13-13-45-11W2
10	OIL	Cal STD Mistatim 23	SE 2-19-45-10W2
11	OIL	Cal STD Mistatim 31	SW 4-10-45-10W2
12	OIL	Cal STD Mistatim 32	NW 13-1-45-10W2
13	OIL	Cal STD Mistatim 41	NW 13-5-45-9W2
14	SWC	A. White	SE 3-45-9W2
15	SRC	Prairie River	NE 14-31-44-7W2
16	SWC	W. Kocay	NE 14-34-44-7W2
17	SRC	Greenbush	SE 9-5-45-5W2
18	SWC	L. Leray	13-7-45-4W2
19	SWC	S. Klima	NE 1-7-45-4W2
20	SWC	G. Smith	SW 10-45-4W2
21	OIL	Imp. H.B. Junc. 11	14-3-45-4W2
22	SWC	K. Leason	NE 16-3-45-4W2
23	SWC	E. Cherkowski	SW 4-17-45-3W2
24	SWC	A. Dereshkevich	NE 8-45-3W2
25	OIL	Imp. H.B. Junc. 1	12-9-45-3W2
26	SDH	Erwood	SE 4-11-45-2W2
27	SWC	G. Melnychuk	SW 14-45-2W2
28	UOFS	Eagle 129 Erwood	SE 1-36-45-2W2
29	SWC	V. Kowalko	SW 2-17-45-1W2
30	SWC	P. Welygan	1-8-45-1W2
31	SRC	Smoking Tent	NW 13-3-45-1W2
32	SWC	G. Wasylin	NE 15-8-45-1W2
33	SWC	A. Smigarowski	3-11-45-1W2
34	SHT	Smoking Tent Creek 1	SW 2-11-45-1W2
35	SWC	W. Pshyk	NW 10-2-45-1W2
36	SHT	Little Armit River 2	NE 6-31-44-30W1
37	DMR	Armit	NW 6-32-44-30W1
38	SHT	Armit River	NE 2-36-44-30W1
39	SWC	W.C. Hunt	NE 15-42-14W2
40	SWC	W.C. Hunt	SW 4-23-42-14-W2
41	SRC	Steen	NW 15-31-42-11W2
42	SWC	R. Hoffus	SE 1-33-42-11W2

Log No.	Log Type	Name	Land Location
43	SWC	G. Lakinger	NW 7-30-42-10W2
44	SWC	F. Trish	SW 4-36-42-10W2
45	SWC	W. Potoreyko	SE 1-36-42-10W2
46	SWC	H. Hill	SW 4-3-43-9W2
47	SWC	J. Mercer	12-1-43-9W2
48	SWC	E. Pegg	SE 30-42-8W2
49	SWC	J. Smith	12-28-42-8W2
50	SWC	D. Dick	SE 34-42-8W2
51	SWC	B. Bender	SW 13-8-43-7W2
52	SRC	Blighty	NE 8-9-43-7W2
53	SWC	L. Fleming	SW 13-34-42-6W2
54	OIL	Imp. H.B. Junc. Sth 12	1-6-43-5W2
55	OIL	Phillips Hudson Bay S	5-10-43-5W2
56	SWC	J. Homenuk	SE 2-4-43-4W2
57	OIL	Imp. H.B. Junc. Sth 2	13-23-43-3W2
58	SWC	C. Purcell	SE 5-25-43-3W2
59	SWC	H. Kurulak	NE 16-34-43-2W2
60	U of S	Eagle 130 P. Hills 2	SE 5-18-43-30W1
61	SWC	B. Elphinstone	NE 8-13-40-14W2
62	SWC	Village of Archerwill	SE 18-40-13W2
63	SRC	Archerwill	NW 4-17-40-13W2
64	SWC	K. Folstad	16-7-40-12W2
65	DIA	Nut Lake IR 04	SW 4-30-40-12W2
66	DIA	Nut Lake IR 07	NE 14-35-39-12W2
67	SWC	R. Bjorgaard	SW 3-5-40-11W2
68	SWC	J. Swift	SE 4-6-40-10W2
69	SWC	W. Rodenberg	NW 16-33-39-10W2
70	SWC	W. Rupps	NE 16-13-40-10W2
71	SWC	J. Wonsiak	NE 1-5-39-14W2
72	SWC	R. Prosko	SW 11-2-39-14W2
73	SWC	A. Anderson	9-32-38-13W2
74	SWC	L. Kulbatski	5-3-39-13W2
75	SWC	R. Peterson	SE 13-34-38-13W2
76	SWC	Bjerland	NW 11-7-39-12W2
77	DIA	Nut Lake IR 09	EC 4-10-39-12W2
78	DIA	Nut Lake IR 06	SE 3-14-39-12W2
79	SWC	E. Doan	NW 5-12-39-11W2
80	OIL	Miami HB Nut Mtn 3	4-1-39-11W2
81	SWC	O. Campbell	4-15-38-10W2
82	SWC	L. Strome	NE 16-12-38-10W2
83	POC	Porcupine Hills	1-21-38-8W2
84	POC	Porcupine Hills	15-17-38-6W2

Log No.	Log Type	Name	Land Location
85	SRC	Tall Pines	NE 7-15-38-5W2
86	SWC	O. Haugrud	SE 1-29-37-14W2
87	SWC	J. Lysyshyn	SE 2-21-37-14W2
88	SWC	S. Bailey	12-10-37-14W2
89	SWC	M. Zimroz	NE 9-6-37-13W2
90	SWC	A. Sawchuck	SW 5-37-13W2
91	SRC	Ponass Lake	SW 4-4-37-13W2
92	SWC	P. Kizlyk	SW 11-37-13W2
93	SWC	D. Zaeradney	SW 24-37-13W2
94	SWC	D. Zaeradney	NW 7-24-37-13W2
95	SWC	J. Perron	SE 3-30-37-12W2
96	SWC	G. Gutek	SE 1-34-37-12W2
97	SWC	C. Hrycak	NW 1-35-37-12W2
98	SWC	F. McNamee	SW 4-21-37-11W2
99	SWC	G. Ziola	NE 1-13-37-11W2
100	SWC	J. Pearson	4-16-37-11W2
101	SWC	M. Pearson	SE 2-37-10W2
102	SWC	C. Bagnall	SW 1-37-10W2
103	SWC	G. Schultz	3-4-37-9W2
104	SWC	I. Klassen	4-1-37-9W2
105	SWC	D. Delawski	NE 16-12-37-8W2
106	SRC	Rockford	SW 1-16-37-7W2
107	SRC	Rockford	SE 3-13-37-7W2
108	OIL	Pheas Endeavor	10-12-37-6W2
109	SWC	N. Brown	NE 8-12-37-6W2
110	SWC	A. Romanchuk	SE 1-7-37-5W2
111	SWC	L. Scharfenberg	SE 1-17-37-5W2
112	SWC	J. Yaremchuk	1-13-37-5W2
113	SWC	L. Toma	NW 4-37-4W2
114	SWC	R. Kapeck	NW 3-37-4W2
115	SWC	E. Gradin	NE 5-11-36-14W2
116	SWC	N. Gradin	SE 9-11-36-14W2
117	SWC	S. Bell	SE 10-1-36-14W2
118	SWC	L. Gutek	NW 9-6-36-13W2
119	SWC	B. Zukewich	SE 16-33-35-13W2
120	SWC	M. Tweidt	SW 9-6-36-12W2
121	SWC	E. Rosenthal	SE 13-4-36-12W2
122	SWC	M. Clark	NE 8-7-36-11W2
123	SRC	Roscommon School	NW 13-33-35-11W2
124	SWC	C. Colby	9-10-36-11W2
125	SWC	P. Finnie	NW 5-12-36-11W2
126	SWC	E. Finnie	NW 5-16-36-10W2

Log No.	Log Type	Name	Land Location
127	SWC	P. Madarash	8-12-36-10W2
128	SWC	G. Bocking	NW 13-8-36-9W2
129	SWC	E. Smith	SW 12-10-36-9W2
130	SWC	M. Tokarchuk	NE 15-7-36-8W2
131	SWC	Hamlet of Okla	SE 17-36-8W2
132	OIL	Imp. Bures	7-16-36-8W2
133	SWC	R. Radawetz	SW 2-36-8W2
134	SWC	E. Campbell	SE 1-2-36-7W2
135	SWC	F. Head	NW 5-1-36-6W2
136	SWC	L. Kozloski	NE 9-31-35-5W2
137	SWC	E. Kardyk	SE 2-34-35-4W2
138	SWC	D. Wasylenchuk	SE 27-35-3W2
139	SWC	A. Rahn	NE 36-35-3W2
140	SWC	A. Shostal	SW 12-16-35-2W2
141	OIL	Dome Danbury	15-21-35-2W2
142	SRC	Whitebeech	SW 2-2-36-31W1
143	SRC	Thunderhill	NE 11-24-35-30W1
144	SWC	Eyre Farms	NE 8-34-35-14W2
145	SWC	A. Bergman	8-2-36-14W2
146	SWC	A. Bergman	9-2-36-14W2
147	SWC	B. Stasiuk	NW 4-34-36-14W2
148	SWC	T. Lipka	NW 14-26-37-14W2
149	SWC	D. Angell	SE 6-12-38-14W2
150	SWC	A. Nelson	SE 9-13-38-14W2
151	SWC	B. Hamilton	NW 13-24-38-14W2
152	SWC	N. Pressacco	SW 12-25-38-14W2
153	SWC	E. Hillestad	NE 16-13-39-14W2
154	SWC	M. Winnichyn	NE 9-24-39-14W2
155	SWC	J. Herring	8-7-40-13W2
156	SWC	Village of Archerwill	NE 15-18-40-13W2
157	Hayter	Barrier Lake	SE 4-12-41-14W2
158	SWC	B. Thompson	NW 10-41-14W2
159	SWC	K. Reimer	SW 27-41-14W2
160	SWC	A. Trombley	SE 2-35-41-14W2
161	SWC	D. Vickery	SE 15-42-14W2
162	SWC	P. Reimer	SE 2-27-42-14W2
163	OIL	Gulf Tisdale 5th 19	SW 13-9-44-13W2
164	OIL	Gulf Tisdale 5th 19	SW 4-21-44-13W2
165	OIL	Gulf Tisdale 5th 19	NW 12-28-44-13W2
166	OIL	Gulf Tisdale 5th 19	SW 4-28-45-13W2
167	OIL	Gulf Tisdale 5th 19	NW 13-28-45-13W2
168	OIL	Gulf Tisdale 5th 19	SW 13-5-40-13W2

Log No.	Log Type	Name	Land Location
169	OIL	Gulf Tisdale Sth 19	SW 13-8-46-13W2
170	OIL	Gulf Tisdale Sth 19	SW 12-16-46-13W2
171	SWC	T. Smale	SE 1-17-35-12W2
172	SWC	J. Wicksrom	SW 4-26-35-12W2
173	SWC	E. Coates	NW 13-34-35-12W2
174	SWC	K. Harrison	SW 7-20-35-12W2
175	SWC	E. Boen	SW 8-28-36-12W2
176	SWC	W. Witowski	SW 12-34-36-12W2
177	SWC	G. Gradin	NE 16-33-36-12W2
178	SWC	B. Sawka	SW 12-9-37-12W2
179	SWC	D. Robinson	NW 14-10-38-12W2
180	SWC	E. Scott	SW 2-27-38-12W2
181	DIA	Nut Lake IR 02	NE 10-27-38-12W2
182	DIA	Nut Lake IR 02	NW 4-33-38-12W2
183	DIA	Nut Lake IR 02	SE 1-21-39-12W2
184	DIA	Nut Lake IR 02	SE 3-26-39-12W2
185	SWC	E. Letestu	NE 1-14-40-12W2
186	SWC	L. Gaetz	9-12-41W2
187	DTRR	Greenwater Lake	NE 31-41-11W2
188	SWC	W. Shiels	NW 8-9-43-11W2
189	SWC	B. Hayes	9-24-43-12W2
190	SWC	J. Spedding	SW 30-43-11W2
191	OIL	Phillips Speddington 1	7-35-44-12W2
192	OIL	Cal STD Mistatim 6	NE 16-6-45-11W2
193	OIL	Cal STD Mistatim 5	SW 3-34-45-11W2
194	SWC	C. Musselman	N 16-36-45-12W2
195	OIL	Cal STDMistatim 6	SE 14-5-46-11W2
196	OIL	Cal STD Mistatim 7	SW 4-20-46-11W2
197	SWC	H. Braaton	SE 15-20-35-10W2
198	SWC	D. Banadygo	5-32-35-10W2
199	SWC	G. Ake	NW 13-34-35-10W2
200	OIL	Sohio Nut Mountain	1-28-36-10W2
201	SRC	Nut Mountain	SE 14-28-36-10W2
202	SWC	W. Keller	5-33-36-10W2
203	SWC	R. Sheets	SW 5-21-37-10W2
204	SWC	M. Patenaude	1-34-37-10W2
205	SWC	H. Minky	SE 3-4-38-10W3
206	SWC	B. Larwood	SE 4-6-41-9W2
207	SWC	J. Jenkins	NW 6-8-41-9W2
208	SWC	S. Suab	NE 1-42-10W2
209	SWC	M. Nagyl	12-7-42-9W2
210	SWC	R. Moroz	4-18-42-9W2

Log No.	Log Type	Name	Land Location
211	SWC	P. Phlipowich	SW 19-42-9W2
212	SWC	W. Charbonneau	SE 9-20-42-9W2
213	SWC	B. Serhan	NW 4-27-43-9W2
214	SWC	J. Gunderson	SW 14-44-9W2
215	OIL	Cal STD Mistatim 61	NE 16-14-45-9W2
216	OIL	Cal STD Mistatim 52	SW 4-36-45-9W2
217	OIL	Cal STD Mistatim 59	NE 16-34-45-9W2
218	OIL	Cal STD Mistatim 45	SW 13-3-46-9W2
219	OIL	Cal STD Mistatim 64	SW 2-90-46-9W2
220	OIL	Cal STD Mistatim 46	NE 16-16-46-9W2
221	SWC	M. Alberts	SW 12-15-35-8W2
222	SWC	E. Swehca	SE 4-23-35-8W2
223	SWC	R. Larsen	SW 13-37-8W2
224	SWC	P. Johnston	SW 4-24-37-8W2
225	SWC	J. Fenske	SE 1-25-37-8W2
226	SWC	J. Gibson	NW 13-12-42-8W2
227	OIL	Imp. HB Junc. 6	13-18-43-7W2
228	SWC	E. Jinjoe	SW 13-9-44-7W2
229	SWC	W. Scheller	SE 8-24-35-7W2
230	SWC	A. Hueser	SW 4-1336-7W2
231	SWC	L. Ebel	NE 9-13-36-7W2
232	SWC	B. Fairburn	NE 1-1-37-7W2
233	SWC	A. Bodnar	SW 5-30-37-6W2
234	SWC	G. Sivertson	SE 1-36-37-7W2
235	SWC	W. Masley	NW 13-15-35-4W2
236	SWC	H. Teresk	12-23-35-4W2
237	OIL	Can Res. Endeavor	4-16-36-4W2
238	SRC	Lady Lake	SW 5-13-36-5W2
239	SWC	A. Carsten	SE 1-23-36-5W2
240	SWC	J. Dolton	NW 5-25-36-5W2
241	SWC	D. Dalton	SW 12-25-36-5W2
242	SWC	D. Dalton	SW 13-25-36-5W2
243	SWC	B. Wiwcharuk	SE 8-34-37-5W2
244	SDH	Bertwell	NW 15-6-42-4W2
245	OIL	Imp. H.B. Junc. 10	5-7-42-4W2
246	SWC	R. Moroz	SW 18-42-4W2
247	UOFS	Eagle 127 Akosane	NW 13-24-43-4W2
248	SWC	P. Klimp	SE 16-12-44-4W2
249	SWC	R. Fedak	8-25-44-4W2
250	SWC	F. Bejlar	8-25-44-4W2
251	SWC	S. Kulyk	SW 12-30-44-3W2
252	SWC	R. Stolear Civc	NE 16-36-44-4W2

Log No.	Log Type	Name	Land Location
253	SWC	C. Leason	NW 13-16-45-3W2
254	OIL	Phillips Hudson Bay 2	9-10-46-3W2
255	SRC	Parr Hill	NE 1-22-38-1W2
256	SRC	Porcupine Hills	SW 6-12-42-31W1
257	UOFS	Eagle 133 P. Hills 3	NE 4-36-42-31W1
258	UOFS	Eagle 131 Roscoe	NW 11-7-44-31W1
259	SWC	G. Beauchene	NE 16-26-45-1W2
260	SWC	J. Duch	SE 4-36-45-1W2
261	SWC	G. Coats	NE 1-36-45-1W2
262	SWC	J. Chester	16-36-45-1W2
263	UOFS	Eagle 128 Smokey Ridge	SE 1-18-46-31W1