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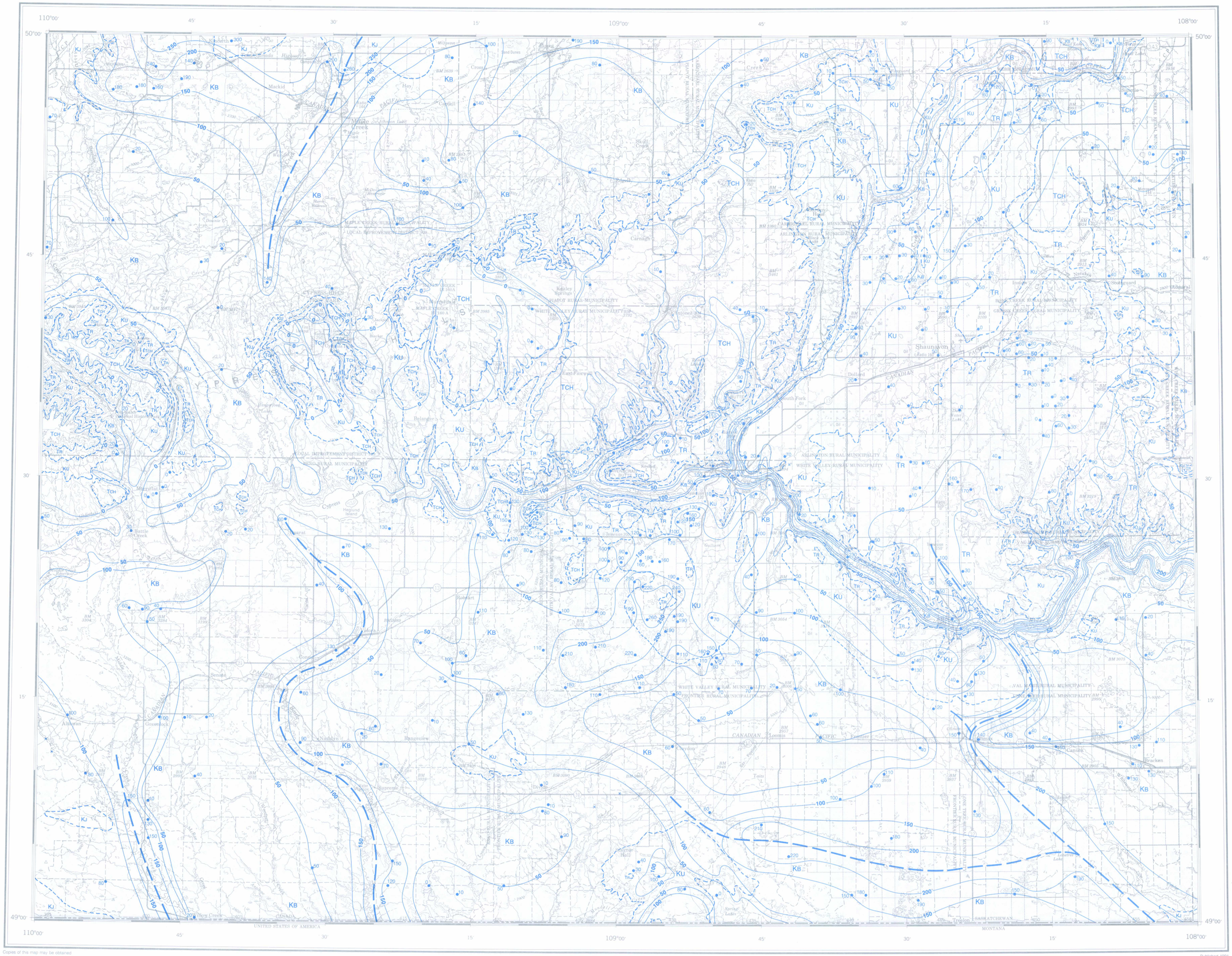
GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA



DESCRIPTIVE NOTES

Thicknesses of surficial deposits were obtained primarily from drill records for some 400 sites in the map area. The density of sites is not uniform, but at least one site is located within most townships and the average is more than two per township; locations are to the nearest quarter section. The borehole data on which the drift thickness map is based are given in feet, as are the elevational contours on the topographic base map. Therefore, the drift isopachs are also shown in feet to allow easy comparison with elevational information. Drift thicknesses recorded were rounded off to the nearest 10 foot interval to avoid implying a degree of accuracy not possible because of variations in local relief. Isopachs were plotted at 50 foot (15 m) intervals. Thicknesses range from nil on extensive bare bedrock surfaces to 300 feet (100 m). Over parts of the area where borehole information is lacking and the drift is thin or the borehole surface is in bedrock, the 50 foot (15 m) and 0 isopachs were plotted on the basis of interpretations drawn from the surficial geology map of the area.

Surficial deposits generally mask the bedrock except on the highest parts of the Cypress Hills upland (see Surficial Geology map). Drift, consisting mostly of till, forms the surfaces beyond the upland. It is generally thin, 6-50 feet (2-15 m) on the bedrock benches along the upland flanks and on the ground moraine plains to the south and east of the upland. The thickest drift includes till and stratified sediments along the northwest margin of the map area. Drift some 150-250 feet (45-75 m) thick, that consists mainly of till, forms hummocky moraine belts south of Frenchman River valley. The surficial deposits within the main valleys are mostly stratified less than 100 feet (30 m) thick, except along Frenchman River valley below the junction with Swift Current Creek valley where the valley fill is 200 feet (60 m) thick.

The drift reflects the lithologies of the underlying bedrock and the lithologies of the igneous, metamorphic, and carbonate rocks carried by glaciers from the Canadian Shield and of the bordering belt of Paleozoic carbonate to the northeast. The tills consist of roughly equal proportions of sand, silt, and clay with minor gravel. Fine sediments make up most of the stratified drift, and gravel size clasts have a comparitively limited distribution whether as components of till (about 5%) or as gravel beds.

Local thickening of drift in places reflects the occurrence of buried valleys. A buried valley trending southward across Frenchman River valley is confluent with an eastward trending valley in the southeast corner of the map area. Battle Creek and Lodge Creek are coincident with buried valleys in the southwestern part of area; Gap Creek in the northwest is in part coincident with a major buried valley trending northward.

Drill records suggest that major buried valleys are filled mostly with till and therefore have limited potential as aquifers. Exploration for drift aquifers should, however, have maximum potential over buried valleys as permeable drift may occur within tills or between till and underlying impervious bedrock.

Towns and farms in the area obtain water supplies mainly from bedrock aquifers or surface runoff. The high levels of total dissolved solids in water supplies from most bedrock aquifers restrict their use, particularly for domestic purposes, and make exploration for drift aquifers attractive.

Acknowledgments

Much of the subsurface data used were from testhole and water well records made available from the Saskatchewan Water Resources Corporation with the help of U. Roper and B. Duncan. Testhole logs and cross-sections from Prairie Farm Rehabilitation Administration studies in Frenchman Valley were provided by A.F. Lukey in Regina. E.A. Christiansen Consulting Ltd., Saskatoon provided logs of testholes in the vicinity of Shaunavon.

LEGEND

TERTIARY

TCH — *CYPRESS HILLS FORMATION: Quartzite and chert gravel, interbedded with sand, silt, and clay; conglomerate zones with carbonate cement and bentonite beds occur locally; 0-75 m thick*

TR — *RAVENSCRAG FORMATION: Sand, silt, clay, and lignite; carbonaceous, concretionary, or calcareous zones occur locally; 0-100 m thick*

CRETACEOUS

KU — *UNDIFFERENTIATED FRENCHMAN, BATTLE, WHITEMUD, AND EASTEND FORMATIONS: Sand, silt, clay, and clay-shale; bentonitic, carbonaceous, concretionary, or calcareous zones occur locally; 0-50 m thick*

KB — *BEARPAW FORMATION: Silty clay and clay, noncalcareous; bentonitic and concretionary zones occur locally; includes several extensive sandy clay and sand beds; 0-400 m thick*

KJ — *JUDITH RIVER FORMATION: Fine grained sand, silt, and clay-shale; commonly carbonaceous and noncalcareous; bentonitic and concretionary zones occur locally; 70 to 235 m thick*

Geological boundary
Drift thickness contour (feet) — 50
Thalweg of buried valley
Borehole and drift thickness (feet) — 130
Bedrock outcrop

Compiled by R.W. Klassen and M. Pawson 1986

Bedrock geology after Whitaker, S.H. (1976). Geology and groundwater resources of the Cypress area (72 F), Saskatchewan; Saskatchewan Research Council, Geology Division; Map no.22, scale 1:250 000

Geological cartography by the Geological Survey of Canada

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Base map at the same scale published by the Surveys and Mapping Branch in 1977

Copies of the topographical edition of this map may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, Ontario, K1A 0E9

Mean magnetic declination 1991, 15°23'East, decreasing 6.5' annually. Readings vary from 14°33'E in the SE corner to 16°14'E in the NW corner of the map

Elevations in feet above mean sea level

Copies of this map may be obtained from the Geological Survey of Canada
601 Booth Street, Ottawa, Ontario K1A 0E8
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7

Published 1991

MAP 1766A

DRIFT THICKNESS

CYPRESS LAKE

SASKATCHEWAN

Scale 1:250 000 - Échelle 1/250 000

Kilometres 5 0 5 10 15 20 Kilometres

Universal Transverse Mercator Projection / Projection transverse universelle de Mercator

INDEX MAP

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE

Canada

Recommended citation:
Klassen, R.W.
1991: Surficial geology and drift thickness, Cypress Lake, Saskatchewan; Geological Survey of Canada, Map 1766A, scale 1:250 000