DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

WATER-RESOURCES INVESTIGATIONS 82-4040

INTRODUCTION

In 1978 the U.S. Geological Survey began a 4-year study of aquifers in the northern Great Plains. The purpose of this map, which is a product of that study, is to show the cumulative thickness of sandstone in the Lakota Formation and equivalent rocks. Other maps show the altitude of the top (Feltis, 1982a), total thickness (Feltis, 1982b), and potentiometric surface of water (Levings, 1982) of the Lakota Formation and equivalent rocks. These maps are part of a series that describes the geology and potentiometric surface of selected rock units of Jurassic or younger age in the plains area of Montana.

SOURCE OF DATA

Most geologic data used to compile the map have been obtained from records of oil and gas exploration wells on file in offices of the Montana Department of Natural Resources and Conservation and the U.S. Geological Survey. The data were derived from interpretation of geophysical logs of oil or gas test wells. One site per township was the optimum density of data selected for map compilation; however, geophysical logs were not available for all townships.

LAKOTA FORMATION AND EQUIVALENT ROCKS

The Lakota Formation is the basal Cretaceous rock unit in eastern Montana and generally is a fluvial sandstone or conglomeratic sandstone that was deposited on the eroded surface of Jurassic rocks, mostly the Morrison Formation. These deposits represent sediments that were deposited by an Early Cretaceous drainage system that extended south to Arizona and from Utah east to Kansas (McGookey and others, 1972, p. 193, 196). The Lakota stratigraphically is equivalent to the Pryor Conglomerate Member, Third Cat Creek sandstone (of subsurface usage), and Sunburst Sandstone Member--all of the Kootenai Formation of south-central and central Montana. In the northwest part of the area, the Lakota is equivalent to the Cut Bank Sandstone Member of the Kootenai Formation. In central Montana, Gardner (1959) reported the basal sandstone of the Kootenai Formation as a 20- to 100-foot-thick unit that forms long prominent ridges but locally thins or disappears.

CUMULATIVE SANDSTONE THICKNESS

As shown on the map, the cumulative thickness of sandstone is less than about 100 feet across most of the area. However, in a few areas the cumulative thickness of sandstone may be as much as 250 feet thick. The large cumulative thickness in central Montana and in the southeast corner of the State may be the result of accumulation of sand in the larger valleys of the Early Cretaceous drainage system described above.

The difference between the formation thickness and the cumulative thickness of sandstone is small, because the formation generally is a continuous sequence of sandstone. However, shale beds are common and the cumulative thickness of sandstone may be a few tens of feet less than the formation thickness.

REFERENCES CITED

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Gardner, L. S., 1959, Geologic map of the Lewistown area, Fergus County, Montana: U.S. Geological Survey Oil and Gas Investigations Map OM-199, scale 1:63,360.

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McGookey, D. P., and others, 1972, Cretaceous System, *in* Geologic atlas of the Rocky Mountain region, 1972: Denver, Colorado, Rocky Mountain Association of Geologists, p. 190-228.

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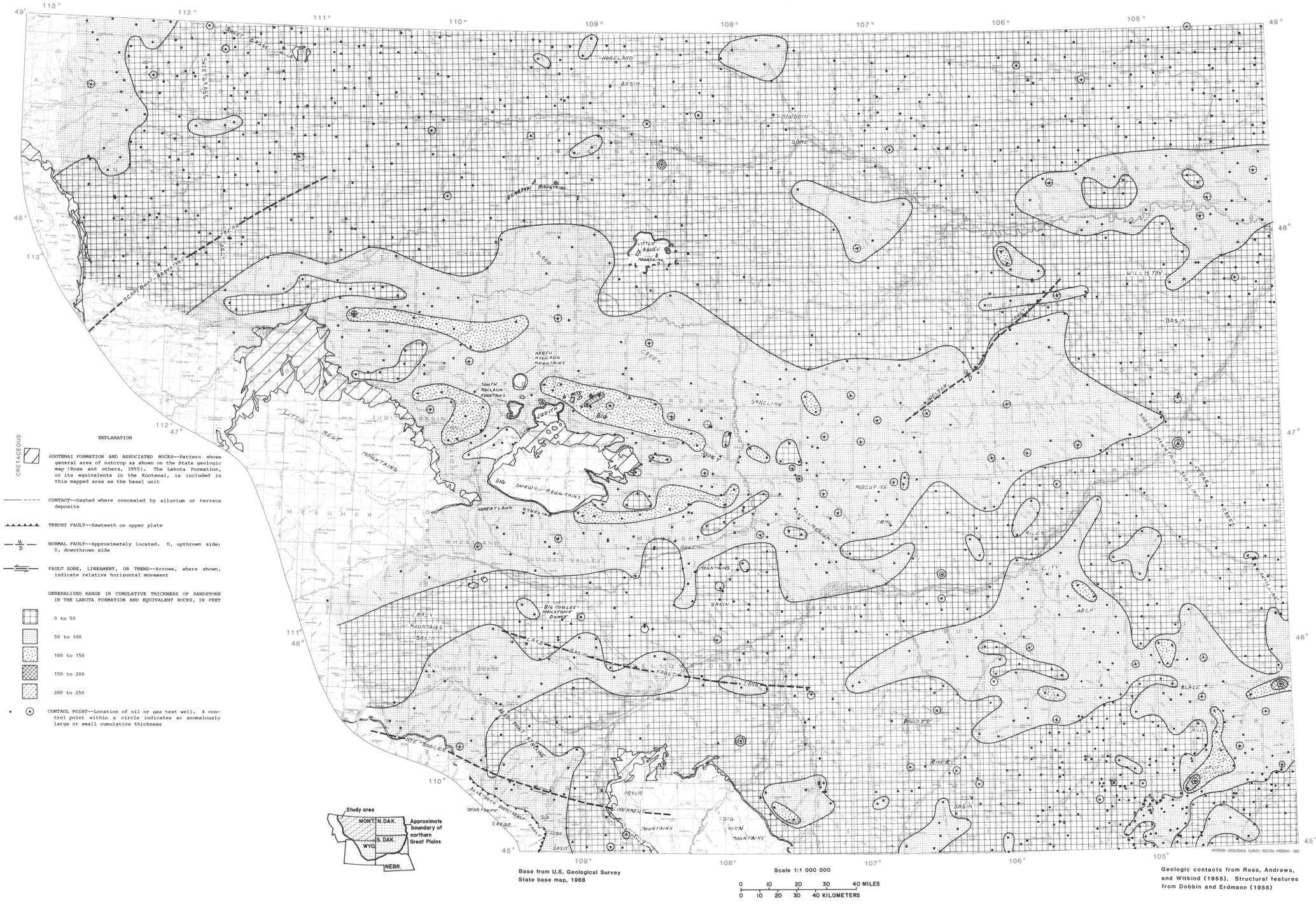
METRIC CONVERSION TABLE

The following factors can be used to convert inch-pound units in this report to the International System (SI) of metric units:

Multiply inch-pound unit	By	To obtain SI unit
foot	0.3048	meter
mile	1.609	kilometer



MAP SHOWING CUMULATIVE THICKNESS OF SANDSTONE IN THE LAKOTA FORMATION AND EQUIVALENT ROCKS, MONTANA

by
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1982

Helena, Montana