U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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OPEN-FILE REPORT 88-630

Base from U. S. Geological Survey

SCALE 1:24 000
1 ½ 0 1 MILE
1 .5 0 1 KILOMETER

Geology mapped in 1980 and 1981

GEOLOGIC MAP OF THE CIRCLE QUADRANGLE, MCCONE COUNTY, MONTANA

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CORRELATION OF MAP UNITS

Qac	Qal	Qg	Qbf	Qe	Holocene	QUATERNARY
		?	?	?	Pleistocene	
Tpg					Pliocene	TERTIARY
Unconformity						
Tfu					Paleocene	

DESCRIPTION OF MAP UNITS

Qal **Alluvium (Holocene)**--Light-brown and gray, well-stratified and well-sorted clay, silt, sand, and gravel. Thickness ranges from as much as 6 m (20 ft) thick under the flood plain of Redwater Creek to less than a few meters under flood plains of tributaries. Unit limited to areas characterized by meander or braided patterns on aerial photographs. Surface of unit may be subject to occasional flooding

Qac **Alluvium and colluvium (Holocene)**--Light-brown and gray, poorly sorted and poorly stratified clay, silt, sand, and gravel deposited by gravity and slope wash. The color and texture of the colluvium reflect the parent material upslope. May interfinger with alluvium; includes alluvial fans and much windblown clay, silt, and sand. As much as 10 m (33 ft) thick, but generally less than 5 m (16 ft). Soil profiles range from well-developed to poorly developed

Qbf **Baked and fused bedrock (clinker) (Holocene to Pleistocene)**--Red to orange baked shale, sandstone, and siltstone of the Fort Union Formation that was heat-metamorphosed by combustion of lignite. Hard, dense porcellanite and, locally, black, vesicular, glassy, scoriaceous rock called buchite, which forms linings of chimneys and veins in porcellanite. As much as 4 m (13 ft) thick, but generally less than 2 m (6 ft)

Qe **Eolium (Holocene to Pleistocene)**--Light- to moderate-brown windblown sand and silt deposits as much as 5 m (16 ft) thick. Thickness generally less than 2 m (6 ft)

Qg **Sand and gravel, undivided (Holocene to Pleistocene)**--Light-brown to light-gray, well-stratified to poorly stratified, and well-sorted to poorly sorted sand and gravel. Thickness is as much as 5 m (16 ft), but generally less than 3 m (10 ft)

Tpg **Sand and gravel, undivided (Pliocene)**--Light-brown to light-gray, well-stratified and well-sorted to poorly sorted sand and gravel. Thickness is as much as 10 m (33 ft), but generally less than 3 m (10 ft). May contain some Pleistocene sand and gravel

Tfu **Tongue River Member (Collier and Knechtel, 1939) of Fort Union Formation (Paleocene)**--Yellowish- or light-brown shale and sandstone containing numerous lignite beds. Thickness estimated to be 100 m (330 ft)

w **Water**

—— **Contact**--Dashed where approximately located

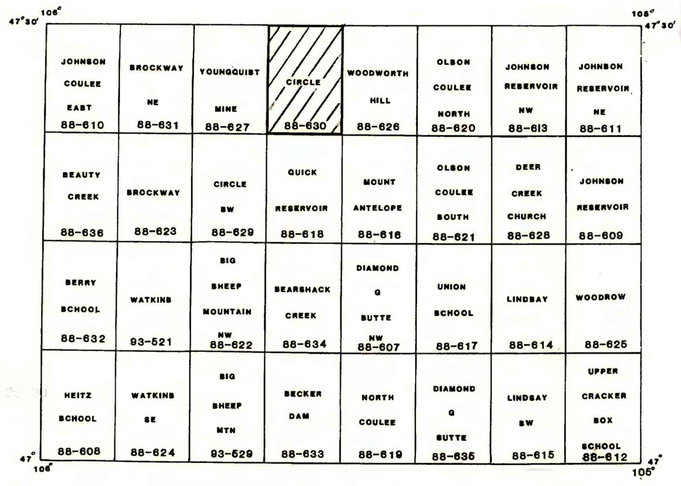
Gravel pit

xE **Location of erratic dolomite glacial boulder**--Probably ice-rafted in Glacial Lake Circle (Howard, 1960)

REFERENCES

Collier, A.J., and Knechtel, M.N., 1939, The coal resources of McCone County, Montana: U.S. Geological Survey Bulletin 905, 80 p.

Howard, A.D., 1960, Cenozoic history of northeastern Montana and northwestern North Dakota with emphasis on the Pleistocene: U.S. Geological Survey Professional Paper 326, 107 p.



INDEX TO QUADRANGLES IN THE CIRCLE 30' x 60' QUADRANGLE. MAPPED QUADRANGLE SHOWN BY STRIPES; NUMBERS ARE OPEN-FILE NUMBERS