GEOLOGIC MAP OF THE MILES CITY 30' x 60' QUADRANGLE, EASTERN MONTANA

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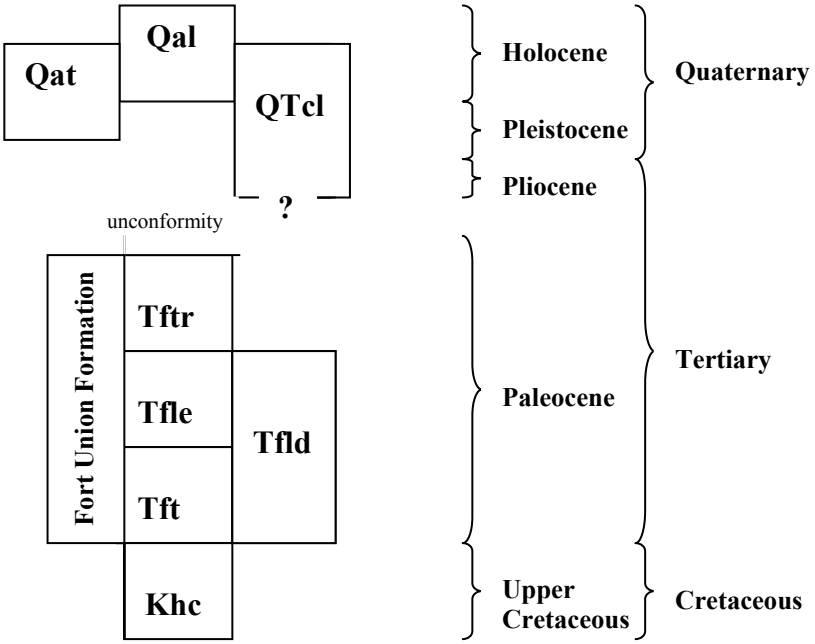
CORRELATION DIAGRAM
MILES CITY 30’ x 60’ QUADRANGLE



DESCRIPTION OF MAP UNITS
MILES CITY 30' x 60' QUADRANGLE

Note: Thicknesses are given in feet because original field maps were on 7.5' quadrangles with contour intervals in feet. To convert feet to meters (the contour interval unit on this map) multiply feet x 0.3048.)

Qal **Alluvium (Holocene)—**Light-brown and gray gravel, sand, silt, and clay deposited in stream and river channels and on flood plains. Clasts are poorly to well sorted, and most are well rounded. Deposits are poorly to well stratified. Thickness as much as 50 ft under flood plains of Yellowstone and Tongue Rivers (Lewis and Roberts, 1978) and less than 25 ft under flood plains of tributaries.

Qat **Alluvial terrace deposit (Holocene and Pleistocene)—**Light-gray to light-brown gravel, sand, silt, and clay in terrace remnants at elevations from 2 to 260 ft above rivers and streams. Clasts are well rounded to subangular. Deposits are poorly to well stratified and poorly to well sorted. Along the Yellowstone and Tongue Rivers includes significant colluvium, a few small alluvial fan deposits and eolium. Thickness as much as 50 ft.

QTcl **Clinker (Holocene, Pleistocene, and Pliocene?)—**Red, pink, orange, black, and yellow, very resistant metamorphosed sandstone, siltstone, and shale of the Fort Union Formation. Bedrock was baked by natural burning of underlying coal, and collapsed into voids created by burning. Locally, baked rock was melted and fused to form buchite, a black, glassy, vesicular or scoriaceous rock. Thickness generally about 20 ft, but locally as much as 50 ft.

Fort Union Formation (Paleocene)

Tftr Tongue River Member—Yellow, orange, or tan, fine-grained sandstone with thinner interbeds of yellowish brown, orange, or tan siltstone, and light-colored mudstone and clay. Clay dominantly non-swelling. The Dominy is the most prominent coal zone and has produced much of the clinker in the member. In part of the map area (shown with hachure pattern) the lower part of the member contains a paleosol unit characterized by thin, orange, silty limestone beds that form caprocks, and light-colored siltstone and mudstone beds that may contain white- or light-gray-weathered silcrete and other paleosols. The silcrete and other paleosols characteristically contain molds of plant stems and roots, and range from 1 to 6 inches thick. The upper part of the member was removed by erosion in the map area. Thickness as much as 350 ft exposed in map area.

Tfld Ludlow Member—Gray and grayish brown fine-grained sandstone, siltstone, smectitic mudstone, and carbonaceous shale interbedded with thinner yellow or orange fine-grained sandstone beds. In part of the map area (shown with hachure pattern) the paleosol unit described above in the lower Tongue River Member extends into the upper Ludlow Member. Facies change from Lebo and Tullock Members of the Fort Union Formation to the Ludlow Member is indicated in the eastern part of the map area. Four or five thin, lenticular lignite beds are present in the member and have produced clinker in some areas. Thickness of member about 460 ft.

Tfle Lebo Member—Dark- to light-gray smectitic shale and mudstone interbedded with less dominant lenticular to tabular beds of yellow, brown, and gray sandstone, gray siltstone, carbonaceous shale and ironstone concretion zones. Locally sandstone channels are present. In part of the map area (shown with hachure pattern), the paleosol unit described above in the lower Tongue River Member extends into the upper Lebo Member. Two to four thin lignite beds are present in the member and have produced clinker in some areas. Thickness of member 175–225 ft.

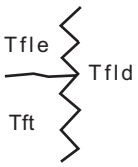
Tft Tullock Member—Light-yellow and light-brown, planar-bedded, very fine- to medium-grained sandstone interbedded with less dominant gray shale and mudstone, and locally, with brownish gray well-indurated argillaceous limestone beds that may contain plant fragment molds. Locally lower part contains narrow, sinuous, steep-walled channel deposits less than 50 ft wide composed of brownish yellow, cross-bedded sandstone. Thickness of member 150 ft.

Khc **Hell Creek Formation (Upper Cretaceous)—**Gray and grayish brown sandstone, smectitic, silty, greenish brown, gray, or reddish-brown shale and mudstone, and dark gray or black carbonaceous shale. Sandstone is fine- or medium-grained, and calcium carbonate-cemented concretions are typical in the fine-grained sandstone. Base of formation not exposed. Exposed thickness about 160 ft.

MAP SYMBOLS

Contact—Dotted where concealed.

Fault—Ball and bar on downthrown side, dashed where inferred



Facies change—Indicates stratigraphic change from Lebo and Tullock Members to Ludlow Member of Fort Union Formation.

(green)

Paleosol interval—Zone of thin orange limestone beds, light colored beds, and paleosol beds, including silcrete.

(purple)

Silcrete bed—Siliceous paleosol bed within paleosol interval.

GEOLOGIC MAP SOURCES AND INDEX OF 7.5' QUADRANGLES
MILES CITY 30' x 60' QUADRANGLE

106°						107°	
46°30'	1. Big Hill	2. Miles City	3. Govern-ment Hill	4. The Knob	5. Buck Mountain	6. Locate	7. Hogan Creek	8. Monta-gue Butte
	9. Lignite Creek	10. Paddy Fay Creek	11. Whitney Creek	12. Govern-ment Hill SE	13. Locate SW	14. Locate SE	15. Red Knob	16. Knowl-ton
	17. Jack Creek NW	18. Circle L Creek	19. Horse Creek	20. First Creek	21. Loaf of Bread	22. Mizpah	23. Pennock Creek	24. Tepee Butte NE
	25. Garland School	26. Jack Creek	27. Beebe SW	28. Beebe	29. Miles City Creek	30. Forty Creek	31. Bear Jaw Creek	32. Tepee Butte
46°								46°

See following page for corresponding reference list.

GEOLOGIC MAP SOURCES
MILES CITY 30' x 60' QUADRANGLE

Numbers correspond to index on preceding page.
Map scale is 1:24,000 unless otherwise indicated.

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13. Luft, S.J., Colton, R.B., and Heffern, E.L., 1984g.
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