UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

EXPLANATION

Qal — Alluvium
Unconsolidated silt, sand, and gravel; also includes the lowest terrace deposits (Q1) along tributary streams of the Bighorn River

Ql — Landslide material

Qu — Undifferentiated surficial deposits on erosional surfaces
Mostly pediments, some of which are covered with reworked terrace gravels

Q1 / Qt / T1 / Tt — Stream terrace deposits
Terraces along Bighorn River and its tributaries covered by about 25 feet of unconsolidated silt, sand, and gravel. Q1 is lowest and youngest surface, T0 is highest and oldest surface. A s or — indicates an intermediate level. Qt and Tt are unterraced surfaces away from the Bighorn River

Kh — Hell Creek formation
Sandstone which supports growth of pine trees; lower few feet exposed only in northeast corner of area

Kb — Bearpaw shale
Dark-gray shale with numerous bentonite beds

Kp — Parkman sandstone
Upper part mostly massive yellowish-brown sandstone; lower part gray sandy shale

Kcc / Kcs / Kcl / Kcm / Kcg — Cody shale
Dark-gray shale, in part bentonitic and in part sandy; Kcc, Claggett shale member—dark-gray bentonitic shale; Kcs, shale member equivalent to Eagle sandstone—dark-gray sandy shale and fine-grained sandstone; thin sandy zone indicated by "ss"; Kcl, Telegraph Creek member—calcareous, weathers to buff soil; Kcm, Niobrara and Carlile shale members—dark-gray bentonitic shale; thin zone of calcareous shale, indicated on map by "ls"; Kcg, Greenhorn calcareous member—dark-gray calcareous shale; Kc, lower shale member; Kcu, upper part of Cody shale undifferentiated in area south of Little Bighorn River, east of Bighorn River, and along Rotten Grass Creek

Kf — Frontier formation
Dark-gray sandy shale

Km — Mowry shale
Gray partly siliceous shale, siltstone, and sandstone

Kt — Thermopolis shale
Dark-gray bentonitic shale

Kcl / Jm / Kju — Cloverly and Morrison formations
Cloverly formation (Kcl): upper zone of shale and siltstone with rusty beds, middle zone of variegated shale, and lower basal lenticular conglomeratic sandstone—Pryor conglomerate member. Morrison formation (Jm) mostly green sandstone and siltstone with variegated shale locally. In areas where there is no Pryor conglomerate member, the two formations are undifferentiated (Kcl)

Js — Swift and Rierdon formations, undifferentiated
Swift formation green and brown glauconitic fossiliferous sandstone, siltstone, and shale; Rierdon formation brownish calcareous shale with fine-grained ledge-forming sandstone and sandy limestone at top

Jp — Piper formation
Red shale and sandstone and gray limestone above basal gypsum beds

UNCONFORMITY (?)

Pc — Chugwater formation
Red sandstone and siltstone; north of Porcupine Creek, gypsum and thin beds of limestone in lower part indicated by "s", equivalent to Embar formation; a 5-foot bed of limestone 100 feet below top may be Alcova limestone

Pe — Embar formation
Red siltstone and sandstone and light-gray dolomite and limestone. Mapped only in area from Crooked Creek to Porcupine Creek

UNCONFORMITY

Ts — Tensleep sandstone
Gray to buff sandstone and a few thin beds of dolomite

Fs — Amsden formation
Interbedded red shale and sandstone and thin beds of limestone, dolomite, and chert; basal 50 feet red shale and siltstone

UNCONFORMITY

Mm — Madison limestone
Light-gray to light-brown dense and finely crystalline limestone with some dolomitic limestone

UNCONFORMITY

DSj — Three Forks shale and Jefferson limestone, undifferentiated
Greenish and brownish shaly limestone and dolomite, upper part contains well-rounded frosted sand grains

UNCONFORMITY

Ob — Bighorn dolomite
Massive cliff-forming dolomitic limestone overlain by thin-bedded dolomite

UNCONFORMITY (?)

Cg — Gallatin limestone and Gros Ventre formation, undifferentiated
Formation crops out only in Bighorn Canyon where the base is not exposed and most of the strata are concealed; contains thin-bedded limestone, shale, and sandstone at top and intraformational limestone, conglomerate, and shale below

Quaternary; Tertiary; Cretaceous; Jurassic; Triassic and Permian; Pennsylvanian; Mississippian; Devonian; Ordovician; Cambrian; Pleistocene (?); Pliocene (?); Upper Cretaceous; Lower Cretaceous; Upper Jurassic; Middle Jurassic; Ellis group; Upper Devonian; Upper Ordovician; Middle and Upper Cambrian

Contact
Dashed where approximately located, dotted where concealed

Fault
Dashed where approximately located, dotted where concealed, U, upthrown side; D, downthrown side

Strike and dip of beds

4500 — Structure contour
Drawn on top of the Mowry shale; interval, 100 feet; datum, mean sea level. Structure contours in area stratigraphically lower than the Mowry shale were extrapolated from the Madison limestone

Axis of anticline
Dashed where approximately located

Axis of syncline
Dashed where approximately located

Irrigation canal

•53 — Oil well

⊕ 38 — Shut-in oil well

⊙ 15 — Gas well

W ⊕ 32 — Dry hole
W, when used as water well

Well numbers referred to in table 4

BM 2696.7 — U. S. Coast and Geodetic Survey benchmark
Elevation in feet

Dam

R. 29 E. · R. 30 E. · R. 31 E. · R. 32 E. · R. 33 E. · R. 34 E.
108°00′ · 107°45′ · 107°30′
45°45′ · 45°30′
T. 1 N. · T. 1 S. · T. 2 S. · T. 3 S. · T. 4 S. · T. 5 S.

YELLOWSTONE COUNTY
BIG HORN COUNTY
CROW INDIAN RESERVATION
TWO LEGGINS UPLIFT
BEAUVAIS CREEK UPLIFT
WOODY CREEK DOME
GRAPEVINE DOME
HARDIN GAS FIELD
NINEMILE AREA
HARDIN
St. Xavier
Custer
Crow Agency
Lodge Grass
Pryor
Bighorn
Yellowtail
Bighorn Canyon
Bighorn Lake
Crooked Creek
Tullock Creek
Hell Creek
Beauvais Creek
Woody Creek
Soap Creek
Pryor Creek
Middle Creek
Dunbar Creek
Reno Creek
Rotten Grass Creek
Little Bighorn River
Bighorn River
Two Leggins Ditch
Bighorn Canal
Auxiliary Airfield
Pryor Gap
Pryor Mountains
Bighorn Mountains
Big Horn Mountains

GEOLOGIC AND STRUCTURE CONTOUR MAP OF THE BIGHORN CANYON-HARDIN AREA, MONTANA AND WYOMING (NORTH HALF)

Scale 1:62,500
1 0 1 Miles

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.

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