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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

AEC - 846/5

April 20, 1955

Mr. Robert D. Nininger, Acting Assistant Director
Division of Raw Materials
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Bob:

Transmitted herewith are three copies of TEM-873, "Geologic map of the northern and western flanks of the Black Hills, Wyoming and Montana," compiled by C. S. Robinson, W. J. Mapel, and M. H. Bergendahl, February 1955.

On March 9, 1955, Mr. Hosted approved our plan to place this report in open file.

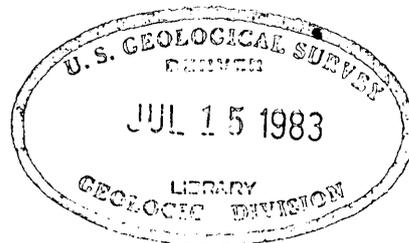
Sincerely yours,

for John H. Eric
for W. H. Bradley
Chief Geologist

NOTED

APR 21 1955

D. C. DUNCAN



EXPLANATION

Igneous rocks

Ti

Intrusive rocks

Chiefly syenite porphyry in plugs, dikes, and sills.

Tag

Agglomerate

Aphanitic matrix, containing angular to subangular fragments of surrounding igneous and sedimentary rocks.

Sedimentary rocks

Qal

Alluvial deposits of silt, sand, and gravel.

Qtl

Talus and landslide

Qt

Stream terrace deposits

Unconformity

Tvr

White River (?) formation

Light-gray, coarse-grained sandstone at base, overlain by light brownish-gray claystone and siltstone; thickness, 0-150 feet.

Unconformity

Pleistocene and Recent

Oligocene

TERTIARY

QUATERNARY

TERTIARY

Eocene

Tw

Wasatch formation
Drab sandstone and shale, numerous coal
beds; thickness, 100+ feet.

TERTIARY

Paleocene

Tfu	Tfr
	Tfl
Tft	

Fort Union formation
Tfr, Tongue River member; light colored,
massive sandstone, containing numerous thick
coal beds; thickness, 600-800 feet.

Tfl, Lebo shale member; dark colored
shale with some interbedded sandstone;
thickness, 200-2000 feet.

Tft, Tullock member; yellowish sandstone
and shale; contains several lenticular coal
beds; thickness, 250-1300 feet.

Tfu, Tongue River and Lebo shale members,
undifferentiated.

Kh

Hell Creek formation
Alternating beds of massive sandstone,
dark colored shale, and coal; thickness,
850-1150 feet.

Upper Cretaceous

Kfc	
Kfh	

Fox Hills sandstone
Kfh, Fox Hills sandstone; brownish sandy
shale, siltstone, and sandstone; thickness,
150-250 feet.

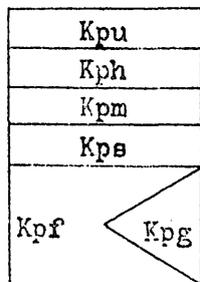
Kfc, Colgate member; conspicuous white
sandstone; thickness, 35 feet.

CRETACEOUS

Montana group

Upper Cretaceous

Montana group



Pierre shale

Kpu, Pierre shale, upper unit; dark gray shale and mudstone with calcareous concretions; thickness, 150-250 feet.

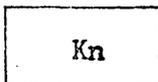
Kph, Monument Hill bentonitic member; impure bentonite and siltstone, some limestone and barite concretions; thickness, 150± feet.

Kpm, Pierre shale, middle unit; fissile shale and mudstone with abundant calcareous concretions; light gray in upper part, darker in lower part; thickness, 500-800 feet.

Kps, Mitten black shale member; blue-black shale with a few iron-stained calcareous concretions; thickness, 150-200 feet.

Kpf, Gammon ferruginous member; light gray mudstone and shale with abundant iron-stained concretions and thin beds of siderite; thickness, 800-1000 feet.

Kpg, Goat sandstone bed of Gammon ferruginous member; ferruginous and glauconitic sandstone; present in northern part of the area; thickness, 0-150 feet.



Niobrara formation

Gray chalk marl and calcareous siltstone, weathering light yellow; thickness, 125-200 feet.

Colorado group

CRETACEOUS

Kcs
Kct
Kcl

Carlile shale

Kcs, Sage Breaks member; gray, non-calcareous mudstone and shale, with many large light-gray calcareous septarian concretions; thickness, 250-325 feet.

Kct, Turner sandy member; more or less sandy shale and siltstone with iron-stained concretions; thickness, 150-200 feet.

Kcl, Unnamed member; dark gray shale with a few calcareous concretions; thickness, 150-200 feet.

Kgm

Kgc

Kgl

Greenhorn formation

Kgm, chalk marl facies.

Kgc, concretionary facies; dark gray shale, containing gray limestone concretions.

Kgl, limestone facies.
Thickness, 50-350 feet.

Kbf

Belle Fourche shale

Black shale with concretions and bentonite beds in upper half and lowermost part; thickness, 550-1000 feet.

Kmy

Mowry shale

Dark-gray siliceous shale, weathering to light silvery gray; many thin beds of bentonite; thickness, 125-225 feet.

Kks

Newcastle sandstone

Discontinuous beds of sandy shale, sandstone, impure lignite, and bentonite; thickness, 0-75 feet.

Upper Cretaceous

Colorado group

Lower Cretaceous

CRETACEOUS

Lower Cretaceous

Colorado group

Ksc

Skull Creek shale
 Black fissile shale with a few
 ferruginous concretions; thickness, 175-
 275 feet.

Kr	Ki
Kf1	

Kr, Fall River sandstone; brown, thick-
 bedded, slabby, iron-stained sandstone,
 interbedded with dark-colored mudstone in
 upper part; contains plant remains;
 thickness, 40-150 feet.

Kf1, Fuson formation and Lakota sandstone,
 undifferentiated. Fuson formation; predom-
 inantly light-colored claystone, shale, and
 mudstone, containing lenticular gray sand-
 stones, much fossil plant material.
 Lakota sandstone; massive gray sandstone,
 locally conglomeratic; contains abundant
 plant remains. Combined thickness, 100-
 250 feet.

Ki, Inyan Kara group, undifferentiated.

Unconformity (?)

Jm

Morrison formation
 Variegated claystone with a few thin
 discontinuous beds of sandstone and lime-
 stone; thickness, 0-250 feet.

Upper Jurassic

Inyan Kara group

CRETACEOUS

JURASSIC

Upper Jurassic

Jsu
Jsh
Jsb

Sundance formation

Jsu, Redwater shale and Lak members, undifferentiated; Redwater shale consists of mostly greenish-gray shale with a few thin beds of yellow sandstone and thin platy limestone. Lak member is red to light yellow, friable, calcareous sandstone. Combined thickness, 200-240 feet.

Jsh, Hulett sandstone member; yellow and tan massive, calcareous sandstone; thickness, 70-100 feet.

Jsb, Stockade Beaver shale member; greenish-gray shale with thin beds of calcareous sandstone; thickness, 60-90 feet.

Unconformity

Jsg

Gypsum Spring formation

Massive gypsum at base, overlain by interbedded gypsiferous red claystone and cherty gray limestone; thickness, 0-125 feet.

Unconformity (?)

Rs

Spearfish formation

Red shale, siltstone, and sandstone; beds of massive gypsum in lower part; thickness, 600± feet.

Pm

Minnekahta limestone

Light-gray, tinged with pink or purple, thin-bedded, dense limestone; weathers into slabs; thickness, less than 40 feet.

Middle Jurassic

JURASSIC

TRIASSIC (?)

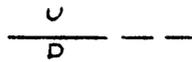
PERMIAN (?)



Contact
(Dashed where approximately located)



Contacts of surficial deposits



Fault
(Dashed where approximately located. U,
upthrown side; D, downthrown side.)



Intraformational contact and limit of
mapping for members of a formation.