



DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

SCALE 1:126,720

GEOLOGIC MAP OF TERTIARY AND UPPERMOST CRETACEOUS ROCKS SHOWING STRUCTURE CONTOURS, OIL AND GAS FIELDS, DRY HOLES, AND MINES IN THE SOUTHERN PART OF THE POWDER RIVER BASIN, CONVERSE, NIOBRARA, AND NATRONA COUNTIES, WYOMING

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MAP UNITS

Quaternary

- Qs: Quaternary sand (recent)
- Qo: Quaternary sand (older)

Tertiary

- To: Tertiary (Pliocene)
- Ta: Tertiary (Lower Miocene)
- Tw: Tertiary (Oligocene)
- Tv: Tertiary (Lower Eocene)
- Tf: Tertiary (Paleocene)
- Tc: Tertiary (Upper Cretaceous)

Neogene and Paleogene

- Ne-Pa: Neogene and Paleogene (excluding Lance Formation)
- Ne: Neogene
- Pa: Paleogene

Pre-Cambrian

- PC: Pre-Cambrian

DESCRIPTION OF MAP UNITS

Quaternary sand (recent)--fine to medium grained dune sand. As much as 200 feet thick.

Quaternary sand (older)--poorly cemented calcareous claystone, siltstone, sandstone, and conglomerate of fluvial origin. Derived largely from older Tertiary and Precambrian rocks. Composition and sorting vary laterally and vertically. Commonly contains boulders of Precambrian granite and gneiss 1-4 feet in diameter which are 15-25 miles from the nearest Precambrian outcrop. Unconformity at base transitional lower Miocene, Oligocene, Paleocene and Precambrian rocks. 0-100 feet thick.

NEBRASKA FORMATION (LOWER EOCENE)--half to ten very fine grained poorly bedded sandstone with abundant tiny grains of bluish-gray magnetite and siliceous and limonitic. Presumably alluvial and largely of volcanic origin. Altered chalky-white ash beds as well as 2 feet thick coarse sandstone. Poorly cemented conglomerate, 0-25 feet thick made up of pebbles derived largely from Precambrian rocks, occurs locally near base. Coal detritus, laterally persistent lithology, and the general absence of coarse detritus and of locally derived detritus are outstanding characteristics. Average thickness about 600 feet.

WHITE RIVER FORMATION (OLIGOCENE)--interbedded chocolate brown, pink and light to medium gray and green tuffaceous siltstone and conglomerate; conglomerate 0-50 feet thick near base made up of pebbles and cobbles derived from Precambrian igneous and metamorphic rocks. This bed of fresh water limestone, altered chalky white ash beds occur locally. Upper half is generally alluvial and contains locally along the eastern flank of the Laramie Mountains where it is highly conglomeratic and predominantly of fluvial origin; the lower half is generally of fluvial origin. 0-1100 feet thick. Average thickness about 300 feet.

MASKETT FORMATION--carbonaceous sandstone, conglomeratic to fine grained, siltstone, carbonaceous shale, and coal of fluvial and pebbled origin. In general, the sandstone is coarser grained, has two to three times more heavy minerals than those in the underlying Tertiary rocks, and does not contain beds or lenses of hard, dense quartzite (granite) common in the unconformably underlying base of the Fort Union Formation. Conglomerate 2-4 feet thick composed primarily of black chert pebbles present locally at the base. Contains some of the largest uranium deposits in the Powder River Basin. 0-1800 feet thick.

LEBO MEMBER OF FORT UNION FORMATION--very fine grained to conglomeratic sandstone interbedded with varying amounts of siltstone, claystone, and coal of fluvial and pebbled origin. Granitic boulders or clasts with numerous lent and root impressions and from alluvial sandstone and some common remnants on an eroded Fort Union surface. Thin-bedded calcareous ironstone concretions interbedded with massive white sandstone and light to dark gray slightly basaltic shale occur throughout the unit. Locally coal beds exceed 4 feet in thickness. Conglomeratic, coarse grained sandstone interbedded with shale occurs in the southern and northeastern parts of the basin. In general, the rocks included in the Lebo are finer grained and better sorted than the Maskett. Percentage of heavy minerals in the sand fraction very low. 100 to 2000 feet thick.

TULLOCK MEMBER OF FORT UNION FORMATION--interbedded sandstone siltstone, shale, carbonaceous shale, and thin coal beds. Sandstone is tan to buff and massive to thin and evenly bedded. Shale generally are dark gray and brown. Distinguished from the underlying upper Cretaceous Lance Formation by the presence of this coal beds, the lack of dinosaur bone fragments, and a bedded appearance due to the presence of coal beds and persistent thin to massive sandstone beds. Strata and dip measurements are easily obtainable. The Tulluck is easily distinguished from the Lebo member by color contrast, the Tulluck having a drab appearance with massive sandstone; the Lebo generally having a lighter overall aspect with a predominance of shale. 1000-1500 feet thick.

LANCE FORMATION--massive shale and drab massive lenticular concretary sandstone with many thin coal beds in the lower half. Coal generally absent in upper half. Dinosaur bone fragments common throughout the unit. Base of Lance drawn at the top of the conformably underlying white sandstone Collage Sandstone Member of the Fox Hills Formation. The contact with the overlying Tulluck is entirely direct at most localities at the base of the lowest coal. Dinosaur bones generally are present below the lowest coal but are absent in the overlying rocks. Because of the massive and lenticular character of the rocks included in the formation, dip measurements except in steeply dipping beds are generally difficult to obtain. The Lance Formation used for purposes of Lance Creek in the eastern part of the area ranges in thickness from about 2000 feet in the southwestern part of the basin to about 2000 feet in the northeastern part of the area.

MAP SYMBOLS

- Structure contours-- drawn on base of Lance Formation (top of Fox Hills Sandstone). Contour interval 500 feet (locally 1,000 feet).
- o Gas well
- o Oil well
- o Abandoned oil well
- o Selected oil and gas test (dry)
- o Boundary of known geologic structure of a producing oil and gas field-- As delineated for purposes of Federal leasing-law administration. Well drilled within the field are not shown. Data as of 1951, 1972.
- o South Douglas Boundary of oil field producing from depths generally less than 1,000 feet near the base of the White River Formation. Contains no Federal Lands.
- o Proposed mine shaft
- o Uranium mine
- o Abandoned uranium mine (open pit)
- o Coal mine (open pit)
- o Abandoned coal mine
- o Triangulation station-- Altitude in feet
- o Localities where samples of Tertiary or Upper Cretaceous rocks were collected for heavy-metal analysis-- See tables 1 through 3.

INDEX MAP OF AREA

[Numbers indicate the areas of previous mapping from which the present geology is modified]

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NOTE: Ne-Pa, Ne, Pa, Neogene and Paleogene rocks (excluding Lance Formation), Paleocene, rock, and Precambrian rocks not described.

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OPEN FILE MAP
This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.

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