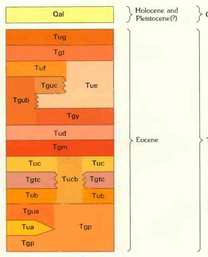
DEPARTMENT OF THE INTERIOR
U.S.GEOLOGICAL SURVEY

GEOLOGIC QUADRANGLE MAP
BARCUS CREEK QUADRANGLE, COLORADO
GQ-1578

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE AND PLEISTOCENE?)—Locally derived material confined to stream valleys; also includes much slope wash along base of steep valley walls, and alluvial fans at mouths of branch streams. Most drainages contain at least some alluvial deposits, but only the thickest, most persistent, or most extensive deposits are shown on map

UINTA FORMATION (EOCENE)

Tug Unnamed tongue G—Mostly brown to light-gray sandstone, conglomeratic sandstone, and conglomerate. Lesser marly siltstone and silty marlstone. Clasts in conglomeratic beds include chert pebbles, and fragments of clay and siltstone. Maximum thickness about 20 ft (6 m)

Tuf Unnamed tongue F—Light- to medium-brown sandstone, lesser siltstone, silty marlstone, and marlstone. Sandstone includes some channel deposits. Basal contact is probably disconformable, characterized by scouring and penecontemporaneous slumping. Maximum thickness about 110 ft (34 m)

Tue Unnamed tongue E—Mostly light- to medium-brown sandstone and siltstone, locally marly. Relatively abundant channel deposits. Considerable light-gray-weathering marlstone, especially in southeastern part of quadrangle. Some mudstone and claystone; greenish-gray claystone near top. Maximum thickness about 300 ft (92 m)

Tud Unnamed tongue D—Brown and gray sandstone and siltstone. Sandstone is fine to coarse grained, locally conglomeratic, limonitic, and concretionary. Relatively abundant channel deposits. Some light-gray marlstone, mudstone, and claystone. Basal contact is locally scoured and disconformable. Resistant beds form cliffs along some valley walls. Maximum thickness about 380 ft (116 m)

Tuc Unnamed tongue C—Light-gray to brown sandstone and siltstone. Some mudstone and silty marlstone. Sandstone is fine to coarse grained. Abundant channel deposits. Also contains a few ostracodal limestone and sandstone beds in northwest part of quadrangle. Basal contact is locally sharp, scoured, and disconformable. Resistant beds form cliffs along some valley walls. Maximum thickness about 220 ft (67 m)

Tucb Unnamed tongues C and B, undifferentiated—Includes sandstone and siltstone beds laterally equivalent to marlstone at Trail Canyon (Tgtc). Mostly brown sandstone and siltstone. Lesser marlstone and marly siltstone and sandstone. Sandstone includes abundant channel deposits. Maximum thickness about 300 ft (92 m)

Tub Unnamed tongue B—Mostly sandstone and siltstone. Sandstone is locally conglomeratic and concretionary. Contains abundant channel deposits. Siltstone is variably marly. Resistant beds form cliffs along some valley walls. Maximum thickness about 300 ft (92 m)

Tua Unnamed tongue A—Mostly brown to gray sandstone and siltstone. Lesser marly siltstone and silty marlstone. Fairly abundant channel deposits. Present only in extreme northern part of quadrangle, although unmapped isolated pods and lenses are present farther south in the drainage of North and Middle Forks Greasewood Creek. Unit may be represented elsewhere by a brown-weathering silty zone in the main body of the Parachute Creek Member. Maximum thickness about 150 ft (46 m)

GREEN RIVER FORMATION (EOCENE)

Tgt Thirteenmile Creek Tongue—Very light gray marlstone and limestone. Commonly contains one or more beds of ostracodal limestone in middle to lower part. Sandstone beds present locally. Limestone and marlstone beds, locally algal and silty, very hard and resistant, form isolated stripped surfaces. Tongue merges far south of quadrangle with main body of the Parachute Creek Member. Maximum thickness about 50 ft (15 m)

Tguc Unnamed tongue C—Light-gray marlstone, variably sandy and silty. Contains one or two sandstone beds. Numerous sandstone beds mark an abrupt facies change at east margin of outcrop area where map unit is arbitrarily terminated. Maximum thickness about 90 ft (27 m)

Tgub Unnamed tongue B—Light-gray marlstone, variably silty and sandy. Minor siltstone and sandstone. Unit represents merged unnamed tongue C (Tguc) and Yellow Creek Tongue (Tgy). Equivalent to unnamed tongue (Tgu) in the Wolf Ridge quadrangle to the south (Duncan, 1976). Maximum thickness about 80 ft (24 m)

Tgy Yellow Creek Tongue—Light-gray marlstone, variably silty. Some ostracodal limestone. Minor siltstone and sandstone. Merges with unnamed tongue C (Tguc) in southwestern part of quadrangle. Maximum thickness about 70 ft (21 m)

Tgm Marlstone at Mare Canyon—Tongue of Green River Formation informally named for exposures in NW1/4 sec. 34, T. 1 N., R. 99 W., along Trail Canyon just east of mouth of Mare Canyon. (Mare Canyon is entirely within Calamity Ridge quadrangle, adjacent on west to Barcus Creek quadrangle). Mostly light-gray, variably silty marlstone, and some marly siltstone. Some greenish-gray marly claystone in north-central part of quadrangle. Contains a very thin (0.4 ft or 0.12 m) bed of papery, rich oil shale (20 to 25 gal/ton) in southwestern part of quadrangle. Thickness ranges from about 5 to 30 ft (2 to 9 m); a thin but persistent unit throughout quadrangle. Shown as a single line on cross section and locally on map where less than 10 ft (3 m) thick

Tgtc Marlstone at Trail Canyon—Tongue of the Green River Formation informally named for exposures along Trail Canyon in SE1/4 sec. 28, T. 1 N., R. 99 W., in the Calamity Ridge quadrangle, adjacent on west to Barcus Creek quadrangle. Mostly light-gray marlstone, variably silty. Lesser marly siltstone. Contains two thin ledges of very lean oil shale (4 gal/ton or less) in southwestern part of quadrangle. Contains some thin, light-gray, marly, ostracodal limestone and sandstone beds in northwestern part of quadrangle. Unit is absent in north-central part of quadrangle owing to a facies change into a lobe of sandstone and siltstone of the Uinta Formation (Tucb). Maximum thickness about 250 ft (76 m)

Tgua Unnamed tongue A—Light-gray, variably silty marlstone. Unit present only in northern part of quadrangle. Maximum thickness about 90 ft (27 m)

Tgp Parachute Creek Member—Mostly light-gray-weathering, massive, to platy marlstone. Also contains considerable amounts of silty marlstone and a few sandstone beds. Contains rich oil shale in the subsurface, mostly in and below Mahogany zone. (See section on oil shale below.) Maximum exposed thickness about 400 ft (120 m)

CONTACT—Approximately located where obscured by soil cover or vegetation

FACIES BOUNDARY—Arbitrarily placed between laterally gradational map units

FAULT—Dotted where concealed. Bar and ball on downthrown side

5500 STRUCTURE CONTOURS—Drawn on top of Mahogany oil-shale zone (not exposed in this quadrangle), showing elevation in feet above mean sea level. Approximately located. Contour interval 100 ft (about 30 m). Adapted in part from Austin (1971). Interpreted largely from sparse drill-hole information. Contours and fold axes in northern part of quadrangle are projected from mapped units lying at varying intervals above top of Mahogany zone. Mahogany zone may be absent in extreme northeast part of quadrangle

FOLDS—Showing crestline or troughline and direction of plunge. Approximately located

Anticline

Syncline

o3 DRILL HOLE SHOWING MAP NUMBER

OIL SHALE

Valuable oil shale does not crop out in the quadrangle. In the subsurface, rich oil shale is present in the main body of the Parachute Creek Member, mostly in and below the Mahogany zone, and in the probable stratigraphic equivalent of the Garden Gulch Member of the Green River Formation. Subsurface information is sparse, and evaluation of oil-shale resources is mostly limited to the Mahogany and R-6 zones. Rich oil-shale zones below the R-6 zone are largely unevaluated. Evaluation of the Mahogany and R-6 zones is based mostly on assays of cores from the following three drill holes, two of which are outside the boundaries of the quadrangle: (1) U.S. Bureau of Mines Barcus Creek corehole 1, in the NW1/4NE1/4 sec. 21, T. 1 N., R. 99 W., Calamity Ridge quadrangle, about one-half mile west of the Barcus Creek quadrangle; (2) Sinclair Oil and Gas Co. Federal 8024 corehole 1, in the center sec. 20, T. 1 N., R. 98 W., Barcus Creek quadrangle; (3) U.S. Bureau of Mines-AEC corehole 3, in the SW1/4SW1/4 sec. 14, T. 1 N., R. 98 W., Barcus Creek SE quadrangle, about one-half mile east of the Barcus Creek quadrangle.

For the Mahogany zone, Pitman and Johnson (1978) estimated that oil-shale resources range from about 50,000 bbl/acre (20,000 m^3/hm^2) in the northwestern part of the quadrangle, to about 350,000 bbl/acre (137,000 m^3/hm^2) in the southeastern part of the quadrangle. On the basis of these figures, the total oil-shale resource for the Mahogany zone in the quadrangle is about 6.7 billion bbl (1.1 billion m^3). The Mahogany zone ranges from about 160 ft (49 m) thick in the western part of the quadrantle to about 240 ft (73 m) thick in the east-central part of the quadrangle.

For the R-6 rich oil-shale zone, Pitman (1979) estimated that resources range from less than 50,000 bbl/acre (20,000 m^3/hm^2) in the northwestern part of the quadrangle to more than 350,000 bbl/acre (137,000 m^3/hm^2) in the southeastern part of the quadrangle. On the basis of these figures, the total oil-shale resource for the R-6 zone in the quadrangle is about 7.9 billion bbl (1.3 billion m^3). The R-6 zone ranges in thickness from less than 200 ft (76 m) in the northern and southwestern parts of the quadrangle to about 250 ft (76 m) in the east-central part of the quadrangle.

Oil-yield bar graphs and correlation of rich oil-shale zones are shown on the accompanying figure. Fischer assays shown on this figure were made by the U.S. Bureau of Mines (now Department of Energy) at Laramie, Wyo. The six rich oil-shale zones (R-1 through R-6) designated on the figure were established by J. R. Donnell (written commun., 1974), Donnell and Blair (1970), and Cashion and Donnell (1972).

Assays for oil-shale values of rotary cuttings from two General Petroleum Company test holes (64-8 Government, and 22-25 Unit) are shown by Stanfield and others (1960, figs. 59 and 61).

At the northeast margin of the quadrangle, it is likely that the Parachute Creek Member is largely barren of oil shale. Outcrops of Parachute Creek at Blair Mountain and along Yellow and Greasewood Creeks, about 2 miles north of the quadrangle contain very little oil shale, and the Mahogany ledge locally cannot be identified.

REFERENCES CITED

Austin, A. C., 1971, Structure contours and overburden on the top of the Mahogany zone, Green River Formation, in the northern part of the Piceance Creek Basin, Rio Blanco County, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-309, scale 1:62,500.

Cashion, W. B., and Donnell, J. R., 1972, Chart showing correlation of selected key units in the organic-rich sequence of the Green River Formation, Piceance Creek Basin, Colorado, and Uinta Basin, Utah: U.S. Geological Survey Oil and Gas Investigations Chart OC-65.

Donnell, J. R., and Blair, R. W., Jr., 1970, Resource appraisal of three rich oil-shale zones in the Green River Formation, Piceance Creek Basin, Colorado: Colorado School of Mines Quarterly, v. 65, no. 4, p. 73-87.

Duncan, D. C., 1976, Preliminary geologic map of Wolf Ridge Quadrangle, Rio Blanco County, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-753, scale 1:24,000.

Hail, W. J., Jr., 1974, Preliminary geologic map and section of the Barcus Creek Quadrangle, Rio Blanco County, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-619, scale 1:24,000.

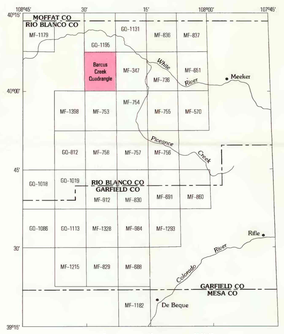
Pitman, J. K., 1979, Isopach, structure contour and resource maps of the R-6 oil-shale zone, Green River Formation, Piceance Creek Basin, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-1069, scale 1:126,720.

Pitman, J. K., and Johnson, R. C., 1978, Isopach, structure contour, and resource maps of the Mahogany oil-shale zone, Green River Formation, Piceance Creek Basin, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-958, scale 1:126,720.

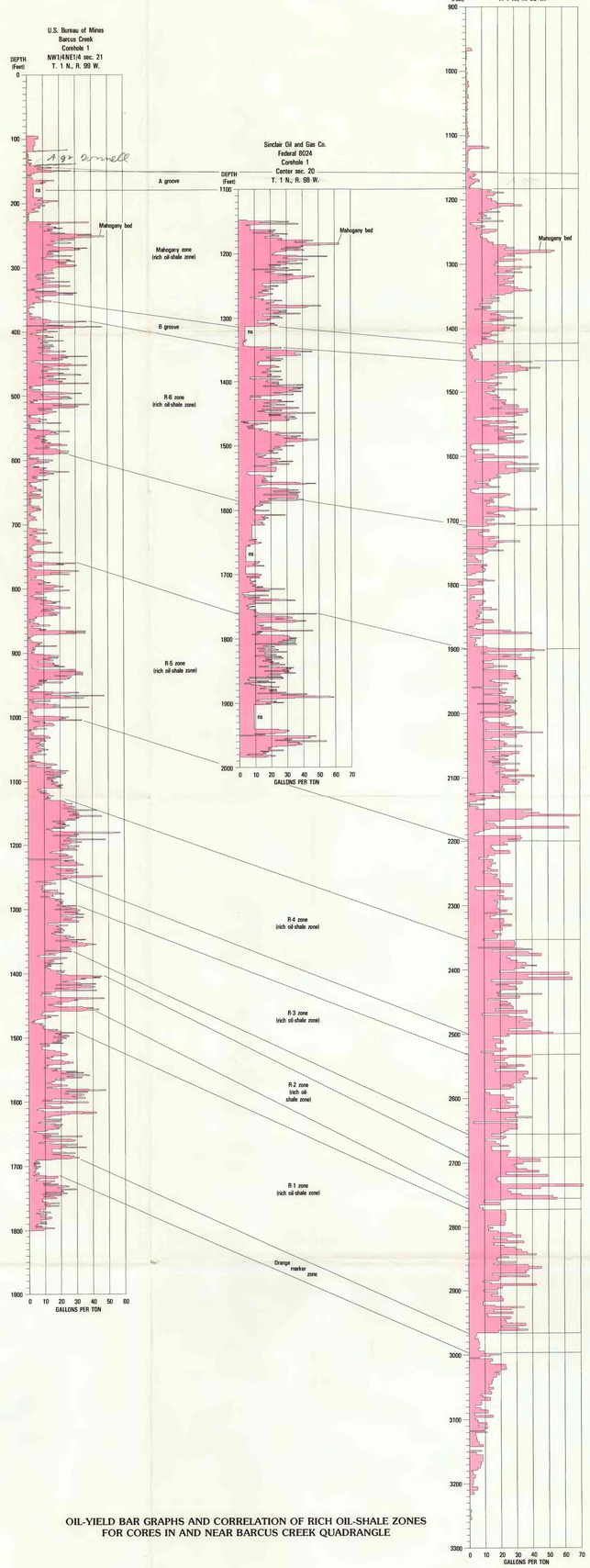
Stanfield, K. E., Smith, J. W., Smith, H. N., and Robb, W. A., 1960, Oil yields of sections of Green River oil shale in Colorado, 1954-57: U.S. Bureau of Mines Report of Investigations 5614, 186 p.

LIST OF DRILL HOLES

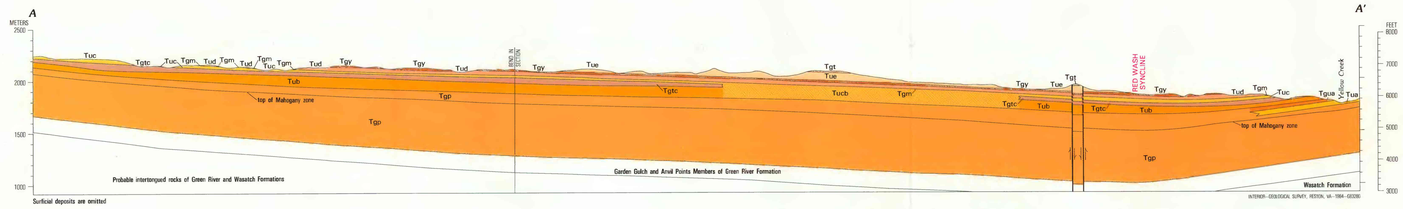
Map no.	Name	Location	Total depth
1	Barodynamics Incorporated Corehole B72-1	SW1/4 sec. 20, T. 2 N., R. 98 W.	1,005 ft (306 m)
2	General Petroleum Corp. Yellow Creek 64-8	NE1/4 sec. 8, T. 1 N., R. 98 W.	3,859 ft (1176 m)
3	Sinclair Oil and Gas Co. Federal 8024 CH-1	C sec. 20, T. 1 N., R. 98 W.	1,992 ft (607 m)
4	General Petroleum Corp. Government 46-27	SW1/4 sec. 27, T. 1 N., R. 98 W.	3,223 ft (981 m)
5	Exxon Coal Resources Pinto Gulch 1	NE1/4 sec. 32, T. 1 N., R. 98 W.	(Proprietary)
6	Pacific Transmission Supply Co. Federal 22-12	NW1/4 sec. 12, T. 1 N., R. 99 W.	15,686 ft (4776 m)
7	General Petroleum Corp. Yellow Creek 26-25	SW1/4 sec. 25, T. 1 N., R. 99 W.	7,624 ft (2322 m)
8	General Petroleum Corp. Yellow Creek 88-26	SE1/4 sec. 26, T. 1 N., R. 99 W.	1,231 ft (375 m)



INDEX OF U.S. GEOLOGICAL SURVEY MISCELLANEOUS FIELD STUDIES MAPS (MF) AND GEOLOGICAL QUADRANGLE MAPS (GQ) OF 7½-MINUTE QUADRANGLES IN THE PICEANCE CREEK BASIN AREA, NORTHWESTERN COLORADO



OIL-YIELD BAR GRAPHS AND CORRELATION OF RICH OIL-SHALE ZONES FOR CORES IN AND NEAR BARCUS CREEK QUADRANGLE



GEOLOGIC MAP OF THE BARCUS CREEK QUADRANGLE, RIO BLANCO COUNTY, COLORADO

By

William J. Hail, Jr.

1984

For sale by Branch of Distribution, U.S. Geological Survey
Box 25286, Federal Center, Denver, CO 80225