

DESCRIPTION OF MAP UNITS

Qal Alluvium of the Colorado River (Holocene)--Mud, silt, sand, and gravel along present-day lowest flood plain of Colorado River. Gravel consists of more than 50 percent crystalline rocks derived from a distant easterly source.

Qes Alluvial valley fill, fan, and terrace deposits (Holocene)--Mud, silt, sand, and gravel. Valley fill along Beaver and Porcupine Creeks and fan at mouth of Porcupine Creek consist mostly of locally derived, poorly sorted basalt and sedimentary rock detritus. Terrace gravels along Colorado River contain locally derived detritus and well-rounded and well-sorted crystalline rocks derived from a nonlocal easterly source.

Qgs Earthflow and soil creep deposits (Holocene)--Poorly sorted boulder, cobble, and pebble gravel in a matrix of greenish-gray sandy silt. Contains some basalt boulders derived from older fill, landslide and colluvial deposits, and angular fragments of sandstone, siltstone, and claystone derived from the Wasatch and Green River Formations. Restricted to areas underlain by claystone units in the Wasatch Formation.

Qop Alluvial and eolian sand and silt deposits (Holocene)--Yellowish-brown silt and sand, and reddish-brown silt and gray clay; generally well sorted. Composed mostly of quartz derived from nearby sedimentary rocks. Locally occupies depressions and young valleys. Only one small outcrop in northeastern part of quadrangle.

Tws Tertiary (Holocene)--Basalt blocks and boulders, and unconsolidated material moved downslope by gravity. Slump blocks form ridges of basalt rubble mantling much of Battlement Mesa. Unbroken blocks are as much as 1 mi (1.6 km) long. Most deposits are of Pleistocene age but some movement continues to present time.

Tga Grand Mesa Formation (Pleistocene--Probably of Pinedale(?) glaciation) Alluvial gravel deposits--Silt, sand, and gravel. Pebble, cobble, and boulder gravel includes both locally derived sedimentary rocks and basalt. Reddish-brown windblown sand and silt locally mantles terrace surfaces and fills the valley of West Mamm Creek.

Qgm Mudflow and fan-gravel deposits--Pebble, cobble, and boulder gravel in a gray matrix of coarse sand. Poorly sorted clasts of primarily unweathered basalt, but some sandstone, marlstone, siltstone, and claystone. Derived largely from slump blocks and solifluction deposits (Qsl). Forms both smooth and irregular slopes, and some natural levees. Maximum thickness about 200 ft (60 m).

Qla Lands End Formation (Pleistocene--Probably of Bull Lake(?) glaciation)--Alluvial-terrace and fan-gravel deposits consisting of grayish-brown sandy gravel of basalt and locally derived silty siltstone, marlstone, and sandstone; moderately to poorly sorted; poorly stratified, angular to well-rounded rock fragments. Only two small outcrops in northern part of quadrangle. Ranges in thickness from 20 to 200 ft (6-61 m).

Qga Older deposits (Pleistocene--Pre-Bull Lake(?) age) Alluvial-terrace and fan-gravel deposits--Pebble, cobble, and boulder gravel; nearly equal amounts of basalt and sedimentary rock fragments of locally derived sandstone, claystone, and marlstone. Matrix is greenish-gray, silty sand. Reddish-brown windblown sand and silt locally mantles terrace surfaces. Ranges in thickness from 10 to 180 ft (3-55 m).

Qop Pediment-gravel deposits--Subangular to subrounded pebble, cobble, and boulder gravel; coarse, poorly sorted. Locally derived basalt boulders as much as 8 ft (2.5 m) in diameter are common near slopes of Battlement Mesa. Siltstone, claystone, and marlstone derived from the Wasatch, Green River, and Uinta Formations make up most of the gravel. Surface is generally covered with a thin patchy layer of reddish-brown windblown sand and silt. Maximum thickness about 300 ft (91 m).

Tb Basalt (Holocene)--Erosional remnant of basalt flow that caps Grand and Battlement Mesas. Occurs on summit of North Mamm Peak.

Tbi Intrusive rocks (Holocene)--Dike of basaltic composition; presumably fills a vent that fed overlying igneous flows.

Tsr Unmetamorphosed rocks (Holocene or Oligocene?)--Poorly exposed. Correlative strata on Grand Mesa, about 24 mi (38 km) to southwest, include variegated claystone, mudstone, fine- to medium-grained sandstone, and gravel. Gravel contains stream-worn quartz, quartzite, chert, and basaltic pebbles probably eroded from the igneous and sedimentary sequence of rocks on the White River uplift about 28 mi (45 km) to northeast.

Tu Uinta Formation (Eocene)--Light-brown and gray, very fine grained to medium-grained sandstone and light-gray, medium-grained marlstone and siltstone; contains pelecypods, gastropods, ostracodes, and fragments of fossil vertebrates. Covered to a great extent by solifluction deposits (Qsl). Maximum thickness of exposed rocks about 1,000 ft (305 m).

Tgp Green River Formation (Eocene) Parachute Creek Member--Gray-weathering, black, brown and gray marlstone, including oil shale, that locally forms cliffs; contains minor amounts of light-gray siltstone, light-gray and brown fine- to medium-grained sandstone, and numerous very thin persistent amolites and tuff beds. Thickness ranges from 400 to 350 ft (122-108 m). Mahogany oil-shale bed--Outcrop of richest oil-shale bed forms base of Parachute Creek Member except near west edge of quadrangle where it is as much as 40 ft (12 m) above the base. In drill-hole C-183, the mahogany bed yields as much as 31 gallons of oil per ton (213 liters per metric ton); thickness 2-4 ft (0.6-1.2 m). The entire mahogany zone in this hole is 50 ft (15 m) thick and averages 15.1 gallons of oil per ton (63 liters per metric ton).

Tgs Anvil Points Member--Brown and buff, massive, fine- to coarse-grained sandstone that forms conspicuous ledges; minor amounts of light-gray siltstone and marlstone, and a few thin tan low-grade oil-shale beds. Maximum thickness about 1,000 ft (305 m).

Tws Shire Member of Wasatch Formation (Eocene)--Variegated purple, lavender, red, gray, and brown claystone; some locally lenticular, fine- to coarse-grained sandstone and conglomerate and thin limestone beds. Exposed thickness about 1,600 ft (488 m); however, based on drill-hole and outcrop information, the Shire Member may exceed 3,800 ft (1,158 m) in thickness (Johnson and others, 1979).

Legend

- Contact--Approximately located where obscured by soil cover or vegetation
- Gas well--Number keyed to table 1
- Dry hole--Oil and gas test. Number keyed to table 1
- C-183 Oil-shale corehole--Number keyed to table 1
- Structure contour--Drawn on top of Wasatch Formation. Dashed where removed by erosion. Contour interval 100 ft (30.5 m)

REFERENCES CITED

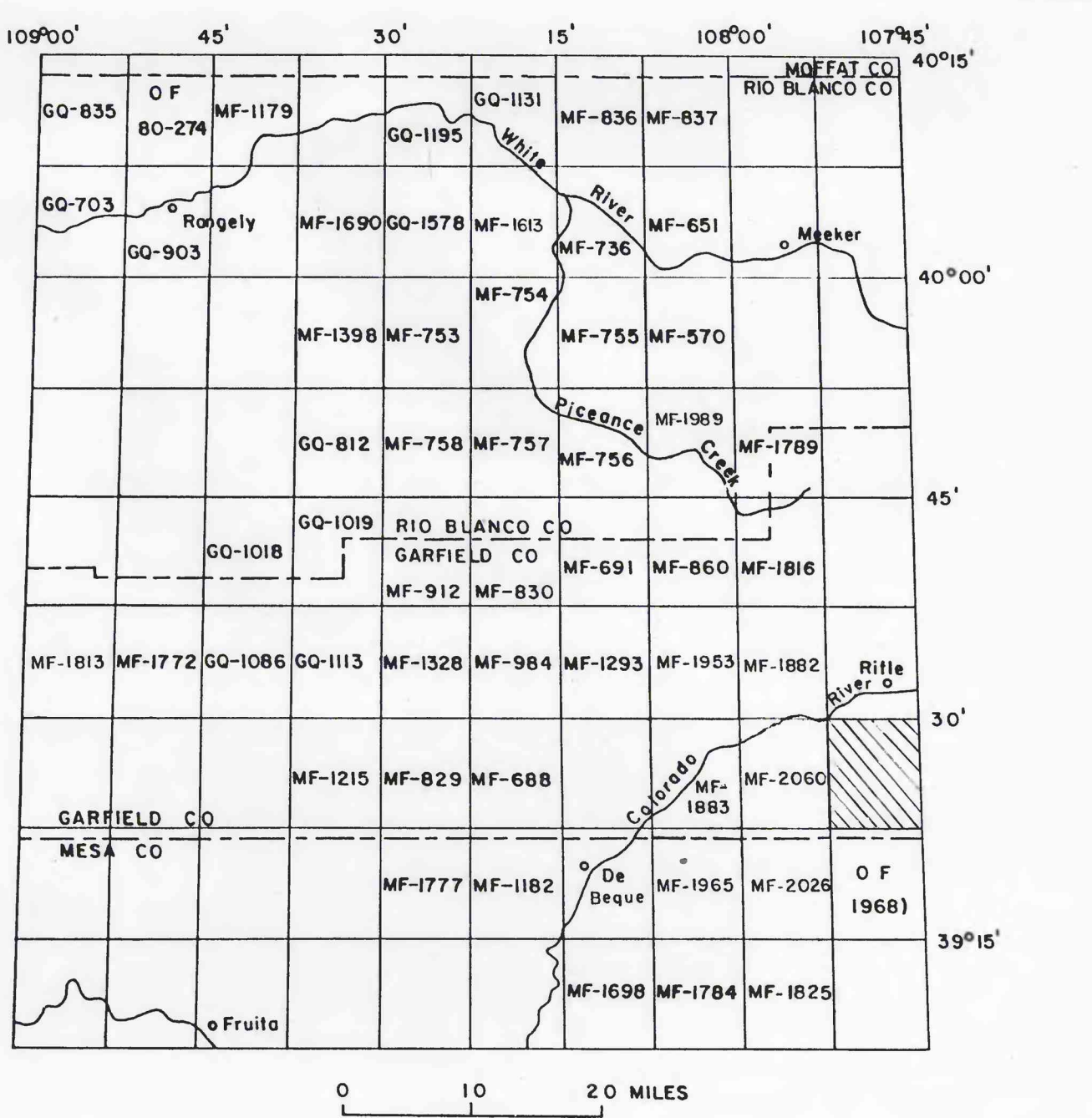
Johnson, R.C., Granica, M.P., and Deussenberger, N.C., 1979, Cross section B-B' of Upper Cretaceous and Lower Tertiary rocks, southern Piceance Creek basin, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-1130-B, 2 sheets.

Yeend, V.E., 1969, Quaternary geology of the Grand and Battlement Mesas area, Colorado: U.S. Geological Survey Professional Paper 617, 50 p.

Table 1.--Drill-hole data, North Mamm Peak quadrangle, Colorado

[All drill holes are gas exploration wells except for C-183, which is an oil-shale corehole]

Drill-hole No. (on map)	Section	Company and name	Total depth Feet	Meters
T. 6 S., R. 93 W.				
1	30	Carter & Carter, 1 Juhon	6,345	1,955
2	30	Carter & Carter, 1 Juhon	1,611	491
T. 6 S., R. 94 W.				
3	26	Southern Union Gas Co., 1 Juhon	4,452	1,357
4	34	Carter & Carter, 2 A. C. Hunter	1,750	533
5	27	Carter & Carter, 1 Langstaff	7,060	2,152
6	34	Carter & Carter, 1 Juhon	1,565	477
7	34	Carter & Carter, 1 Juhon	3,351	1,021
8	34	Carter & Carter, 1 Juhon	6,939	2,125
9	34	Carter & Carter, 1 Juhon	1,576	480
10	35	Austral Oil Co., 35-94 Federal	1,608	490
T. 7 S., R. 93 W.				
11	35	Chevron Oil Co., 1 Afilli Skonberg	8,741	2,664
T. 7 S., R. 94 W.				
12	1	Carter & Carter, 1 Juhon	7,050	2,149
13	36	Pure Oil Co., 1 Battlement Mesa	826	252



INDEX MAP SHOWING LOCATION OF THIS QUADRANGLE (PATTERNED) AND OTHER PUBLISHED U.S. GEOLOGICAL SURVEY 7 1/2-MINUTE GEOLOGIC MAPS IN THE PICEANCE CREEK BASIN AREA, NORTHWESTERN COLORADO. PUBLISHED USGS MAPS INCLUDE GEOLOGIC QUADRANGLE MAPS (Q), MISCELLANEOUS FIELD STUDIES MAPS (MF), AND OPEN-FILE REPORTS (OF).

