

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE)—Unconsolidated gray and brown silt, sand, and gravel of stream-bed, slope-wash and fan deposits

Qc COLLUVIUM (HOLOCENE AND PLEISTOCENE)—Unconsolidated talus and cliff debris and some slope wash

Qcb COLLUVIUM (HOLOCENE AND PLEISTOCENE)—Red, reddish-orange, and pink talus composed of fragments weathered from outcrops of burned oil shale of the Mahogany ledge

Qcl LANDSLIDE DEPOSITS (HOLOCENE AND PLEISTOCENE)—Slide and creep deposits composed of material from the lower part of the Green River Formation

Qat TERRACE DEPOSITS (PLEISTOCENE)—Cobbles and pebbles composed predominantly of gray and tan quartzite and chert in a matrix of sand. Represents at least three earlier stages of erosion of the White River

UNITA FORMATION (EOCENE)

Tub Unit B—Yellow-gray massive very fine grained to medium-grained sandstone, greenish-gray siltstone, and a few lenses of pebble conglomerate. Unit weathers to yellow-brown cliffs and ledges and greenish-gray slopes. Basal contact of unit is at the base of a yellow-orange weathering tuffaceous bed 0.5-2.0 m (2-6 ft) thick that caps prominent benches and buttes. The basal contact is approximately the same as the contact between Unit A and Unit B of Osborn (1929, fig. 63). Lower 150 m (500 ft) is exposed in the quadrangle

Tua Unit A—Yellow-gray and yellow-brown very fine grained sandstone, yellow-gray siltstone, and gray marlstone. Sandstone is medium to massively bedded. Unit A weathers to yellow-brown and yellow-orange cliffs and ledges and gray slopes. In the eastern part of the quadrangle, the lower part of the unit includes two sequences that intertongue with the Parachute Creek Member of the Green River Formation (Tgp). Plastic flowage or flowring of tuffaceous sandstones and siltstones has produced contorted bedding in the lower part of the main body of the unit and an irregular contact with the underlying Green River. Thickness of the main body of the unit ranges from about 213 m (700 ft) to about 305 m (1,000 ft), thickening from south to north

Tgp Parachute Creek Member—Gray and yellow-brown marlstone and dark-gray and brown oil shale with numerous beds of yellow-brown tuff and tuffaceous siltstone. Numerous small pods and lenses of nahcolite (NaHCO₃) occur in an interval approximately 30 m (100 ft) thick and 106 m (350 ft) above the Mahogany oil-shale bed in the western half of the quadrangle. Nahcolite has been leached from all outcrops and some subsurface areas but is found in core. Strata are characteristically laminar to thin bedded with many varved oil-shale sequences. A rich oil-shale sequence, the Mahogany zone (Mahogany ledge on outcrop), occurs near the middle of the member. The Mahogany zone is approximately 35 m (115 ft) thick in the west-central part of the quadrangle and

Tgdu Douglas Creek Member—Divided into three parts. Upper part—Yellow-brown and gray algal and oolitic limestone and yellow-brown sandstone and siltstone and gray marlstone. Weathers to yellow-brown and gray cliffs, ledges and steep slopes. Thickness 122-152 m (400-500 ft)

Tgdm Middle part—Gray shale, siltstone, and low-grade oil shale with sparse lenses of fluvial sandstone and some algal and oolitic limestone. Equivalent, in part, to the Garden Gulch Member of the Green River Formation in the Florence Creek basin. Thickness ranges approximately from 122 to 183 m (400-600 ft). Shown on section only

Tgdl Lower part—Yellow-brown and gray oolitic and algal limestone and some gray shale. Includes the Renegade Tongue of the Wasatch Formation which, where present, lies between middle part and lower part of the Douglas Creek Member. Approximate thickness is 45-60 m (175-200 ft). Shown on section only

Tw WASATCH FORMATION, MAIN BODY (EOCENE)—Maroon and gray claystone and mudstone and brown and gray sandstone and siltstone. Intertongues with the Green River Formation. Thickness ranges approximately from 213 to 305 m (700-1,000 ft). Shown on section only

thins to about 25 m (80 ft) in the easternmost part of the quadrangle. Member weathers to steep gray and yellow-brown slopes and blue-gray and yellow-brown ledges. Thickness ranges from about 228 to 365 m (750-1,200 ft). Intertongues with the Uinta Formation (Tua) and the Douglas Creek Member of the Green River Formation (Tgdu)

Base of a yellow-orange weathering, ledge- and bench-forming sequence 3-15 m (10-50 ft) thick—Composed of massive, contorted tuffaceous beds and thin-bedded marlstone. This sequence occurs in the upper part of the nahcolite-bearing zone and is equivalent to the lower part of the lowermost tongue of the Uinta Formation. Base of sequence is about 122 m (400 ft) above the Mahogany oil-shale bed

Mahogany oil-shale bed—The richest bed in the Mahogany zone; approximately 3 m (10 ft) thick and about 10 m (33 ft) below top of Mahogany zone

Douglas Creek Member—Divided into three parts. Upper part—Yellow-brown and gray algal and oolitic limestone and yellow-brown sandstone and siltstone and gray marlstone. Weathers to yellow-brown and gray cliffs, ledges and steep slopes. Thickness 122-152 m (400-500 ft)

Middle part—Gray shale, siltstone, and low-grade oil shale with sparse lenses of fluvial sandstone and some algal and oolitic limestone. Equivalent, in part, to the Garden Gulch Member of the Green River Formation in the Florence Creek basin. Thickness ranges approximately from 122 to 183 m (400-600 ft). Shown on section only

Lower part—Yellow-brown and gray oolitic and algal limestone and some gray shale. Includes the Renegade Tongue of the Wasatch Formation which, where present, lies between middle part and lower part of the Douglas Creek Member. Approximate thickness is 45-60 m (175-200 ft). Shown on section only

WASATCH FORMATION, MAIN BODY (EOCENE)—Maroon and gray claystone and mudstone and brown and gray sandstone and siltstone. Intertongues with the Green River Formation. Thickness ranges approximately from 213 to 305 m (700-1,000 ft). Shown on section only

- CONTACT—Boundaries of all units of Quaternary age are approximately located
- FAULT—Dashed where indefinite. Ball and bar on downthrown side
- GILSONITE VEIN—Identified by name on map
- STRUCTURE CONTOURS—Drawn on top of Mahogany oil-shale bed. Dashed where Mahogany oil-shale bed is eroded. Contour interval 100 feet. Datum is mean sea level
- AXIS OF UINTA BASIN—Arrow indicates direction of plunge
- CORE HOLE—Drilled to evaluate oil-shale beds. Oil-shale assay results for Stringham 1 (map location 13) are shown by Stanfield and others (1964). Map numbers keyed to list of drill holes
- DRY HOLE—Queried where location is indefinite. Map numbers keyed to list of drill holes
- SHUT-IN GAS WELL—Map numbers keyed to list of drill holes

ECONOMIC GEOLOGY

Gilsonite, oil, gas, oil shale, and bituminous sandstone occur in or near the Walsh Knolls quadrangle, but only gilsonite, a solid hydrocarbon, has been produced in the quadrangle. The Cowboy gilsonite vein, which is as much as 5.5 m wide, has been extensively mined. Characteristics of the Cowboy vein have been described by Cashion (1967, p. 34). Two shut-in gas wells in the quadrangle penetrate gas-bearing zones in the Green River Formation. The thickest and richest of the numerous oil-shale zones in the Parachute Creek Member of the Green River Formation is the Mahogany zone (Mahogany ledge on outcrop). In the west-central part of the quadrangle, that part of the Mahogany zone that will yield an average of 104 liters of oil per tonne (25 gallons per ton) may be as much as 30 m (100 ft) thick. Some sandstone and siltstone beds of the Green River Formation exposed a short distance to the north are oil impregnated and probably extend under part of the quadrangle. Nahcolite found thus far in the quadrangle is in the form of small pods and thin lenses.

REFERENCES

Cashion, W. B., 1967, Geology and fuel resources of the Green River Formation, southeastern Uinta Basin, Utah and Colorado: U.S. Geological Survey Professional Paper 548, 48 p.

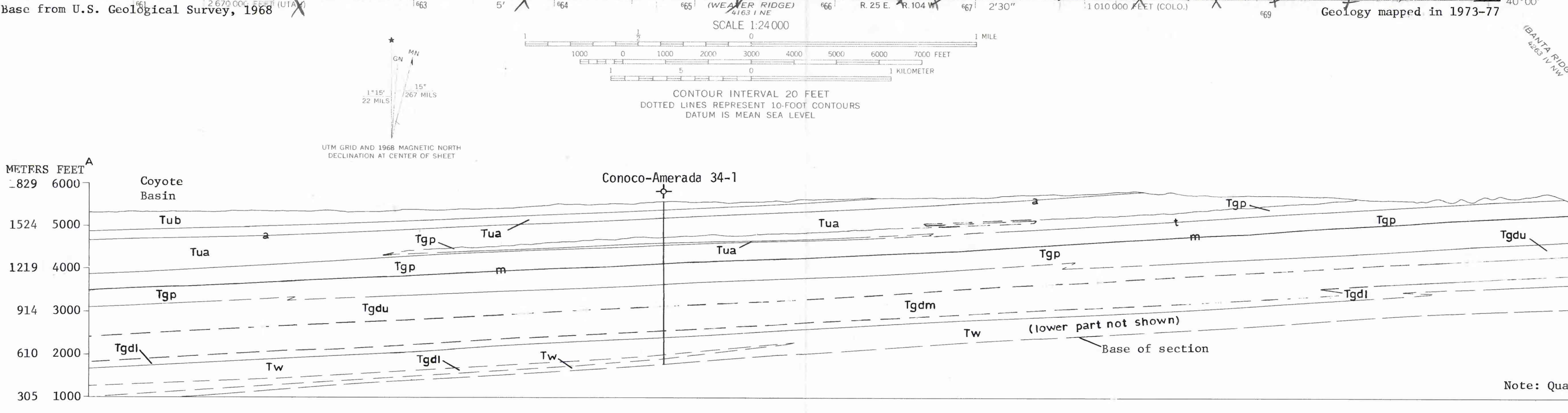
Osborn, H. F., 1929, The titanotheres of ancient Wyoming, Dakota, and Nebraska: U.S. Geological Survey Monograph 55, v. 1, 701 p.

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LIST OF DRILL HOLES

WALSH KNOLLS QUADRANGLE

Map No.	Operator	Hole name and No.	Location	Total depth Feet	Meters	Formation reached
1	Dale W. James	Majestic-Govt. 1	Sec. 24, T. 2 N., R. 104 W.	3,200	975	Wasatch Formation
2	Dale W. James	Majestic-Govt. 2	Sec. 19, T. 2 N., R. 104 W.	2,991	912	Wasatch(?) Formation
3	Amerada Petroleum	Coyote Basin 2	Sec. 21, T. 8 S., R. 25 E.	3,600	1,097	Wasatch Formation
4	Penka Drilling and Production	Amerada-Coyote 28-1	Sec. 28, T. 8 S., R. 25 E.	3,543	1,080	Wasatch Formation
5	Northland Resources	Coyote Basin 27-6	Sec. 27, T. 8 S., R. 25 E.	2,435	742	Green River Formation
6	Penka Drilling and Production	Conoco-State 32-2	Sec. 32, T. 8 S., R. 25 E.	2,389	728	Green River Formation
7	Northland Resources	Coyote Basin 33-5	Sec. 33, T. 8 S., R. 25 E.	2,444	745	Green River Formation
8	Continental Oil	Conoco-Amerada 34-1	Sec. 34, T. 8 S., R. 25 E.	14,125	4,305	Weber Sandstone
9	Northland Resources	Coyote Basin 34-4	Sec. 34, T. 8 S., R. 25 E.	996	304	Green River Formation
10	Amerada Petroleum	Coyote Basin 1	Sec. 34, T. 8 S., R. 25 E.	6,610	2,015	Mancos Shale
11	Penka Drilling and Production	Conoco-Federal 35-3	Sec. 35, T. 8 S., R. 25 E.	2,399	731	Green River Formation
12	Western Oil Shale Corp.	EX-3	Sec. 16, T. 9 S., R. 25 E.	1,165	355	Green River Formation
13	Skyline Oil Co.	Stringham 1	Sec. 23, T. 9 S., R. 25 E.	548	167	Green River Formation
14	Roy M. Johnson	Watson Fee 1	Sec. 27, T. 9 S., R. 25 E.	2,162	659	Wasatch(?) Formation



GEOLOGIC MAP OF THE WALSH KNOLLS QUADRANGLE, UTAH COUNTY, UTAH, AND RIO BLANCO COUNTY, COLORADO

By
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