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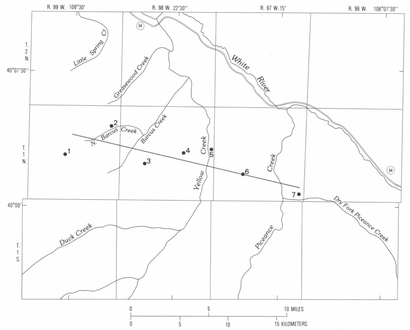
MAP I–1797–B



INDEX MAP SHOWING LOCATION OF DRILL HOLES AND MEASURED SECTIONS

LOCATION OF INDEX MAP

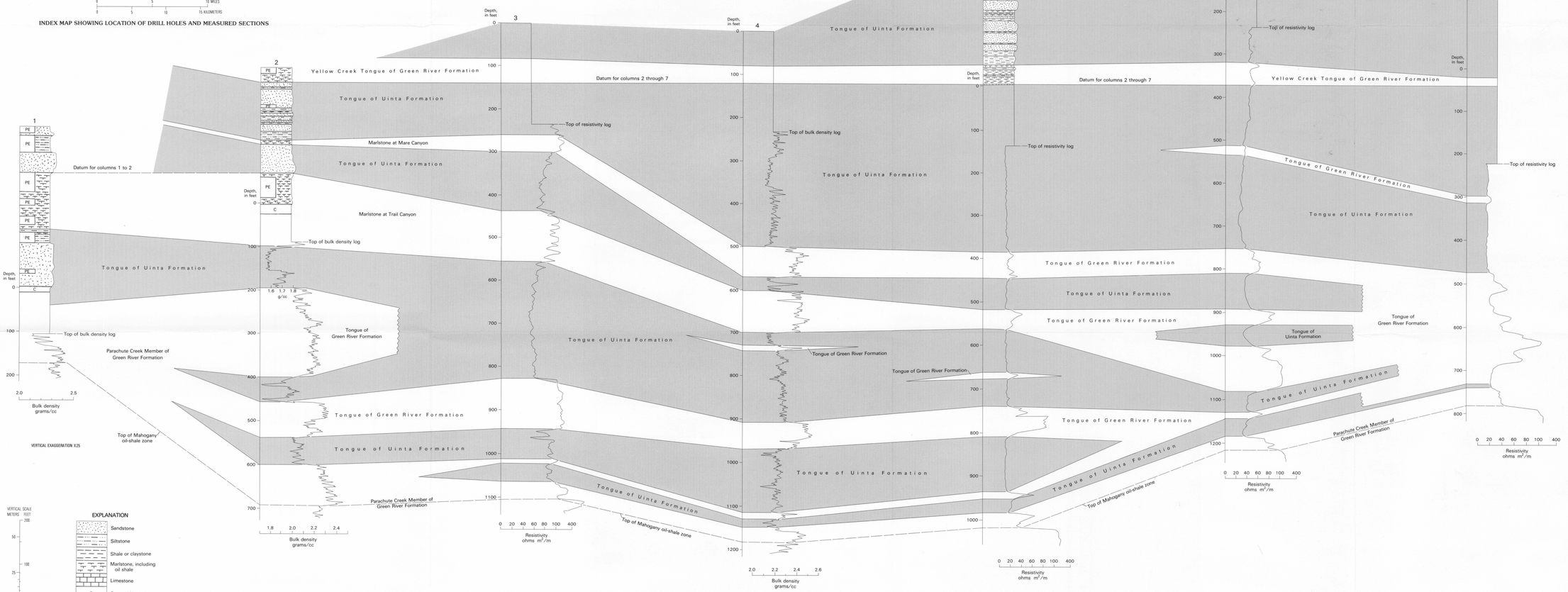


CHART SHOWING INTERTONGUED UNITS OF THE EOCENE GREEN RIVER AND UINTA FORMATIONS, NORTHWESTERN PICEANCE CREEK BASIN, NORTHWESTERN COLORADO

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NOTES

Detailed geologic mapping and stratigraphic studies in recent years have revealed complex and widespread intertonguing between the upper part of the Parachute Creek Member of the Green River Formation and the Uinta Formation, both of Eocene age. Rocks of the Parachute Creek Member are mostly lacustrine marlstone, including oil shale, but also include some sandstone and siltstone. Rocks of the Uinta Formation, mostly representing a complex deltaic system, include primarily tuffaceous sandstone and siltstone, as well as mudstone, shale, claystone, and minor marlstone and oil shale. Where known lithologies of the intertonguing sequence have been accurately correlated to geophysical logs, the marlstone beds generally show higher resistivity, density, and sonic-log responses than do the sandstones and siltstones. Beds interpreted from the geophysical logs to be predominantly marlstone are designated tongues of the Green River Formation; other lithologies are designated tongues of the Uinta Formation.

The cross sections shown here span a distance of about 15 mi in the northwestern part of the Piceance Creek basin. Subsurface correlations shown on the sections are largely interpretive, based in part on the pattern of intertonguing observed in exposed rocks. Marlstone tongues at Mare Canyon and Trail Canyon are shown on the cross sections only in the vicinity of measured surface sections. These names have been used on detailed geologic maps of the area. Column 1 is in the Calamity Ridge quadrangle (Donnell and Hail, 1984); columns 2 and 3 are in the Barcus Creek quadrangle (Hail, 1984); columns 4, 5, and 6 are in the Barcus Creek SE quadrangle (Hail, in press); and column 7 is in the White River City quadrangle (Pipiringos and Johnson, 1976). About 4 mi southeast of the location of this chart, O'Sullivan (1974) shows the nature of intertonguing between the Green River and Uinta Formations extending about 15 mi farther to the southeast.

The lowest stratigraphic correlation line shown on the cross sections is the top of the Mahogany oil-shale zone (Mahogany ledge on outcrop) of the Parachute Creek Member of the Green River Formation. This line is the base of the *A* groove (lean oil-shale zone) of the Parachute Creek Member. The highest correlation line shown is the base of the Thirteenmile Creek Tongue of the Green River Formation. The datum horizon for columns 2 through 7 is a horizontal line at the base of the Yellow Creek Tongue of the Green River Formation. The Yellow Creek Tongue is absent at the location of column 1. Therefore, the top of the marlstone at Trail Canyon is projected as a horizontal line from column 1 to column 2.

The intertonguing sequence thickens toward the center of the cross section. This thickening coincides approximately with one of the deepest structural parts of the Piceance Creek basin, as expressed in rocks of the Green River Formation along the axis of the Red Wash syncline, and with the depocenter containing the thickest section of oil-shale-bearing rocks in the basin (Dyni, 1969, pl. 1 and fig. 3; Pitman and Johnson, 1978, sheet 2; and Pitman, 1979, sheet 2).

The larger cross section combines stratigraphy with geophysical log characteristics. The columns are evenly spaced without regard to true map distances. On the smaller cross section, the columns are spaced according to map distances in order to show a more realistic representation of the stratigraphic intertonguing. Each column on the smaller cross section was projected to a straight line drawn between the map location of the columns (see index map). Distances between columns were scaled along this line.

Column 1 is based on logs of the U.S. Bureau of Mines Barcus Creek 1 drill hole and a measured surface section. The drill hole is located in the NW1/4NE1/4 sec. 21, T. 1 N., R. 99 W. The surface section began at the drill pipe ground surface and extended into the NE1/4NW1/4 sec. 21, T. 1 N., R. 99 W., and the SE1/4SW1/4 sec. 16, T. 2 N., R. 99 W. The bulk density log, measured below a depth of 100 ft, was supplemented by interpretation of a resistivity log and an oil-shale Fischer assay log. That part of the column from the surface to a depth of 100 ft was projected from outcrops about 1/2 mi to the northwest.

Column 2 is based on logs of the Pacific Transmission Supply Company Federal 22–11 drill hole and a measured surface section. The drill hole is located in the SE1/4NW1/4 sec. 12, T. 1 N., R. 99 W. The surface section began at the drill pipe ground surface and extended into NE1/4NW1/4 sec. 12, T. 1 N., R. 99 W. The bulk density log, measured below a depth of 100 ft, was supplemented by interpretation of a sonic log of the same interval. That part of the column from the surface to a depth of 100 ft was projected from outcrops about 1 mi to the northwest.

Column 3 is based on logs of the Sinclair Oil and Gas Company Federal 8024 CH–1 drill hole in the center of sec. 20, T. 1 N., R. 98 W. The resistivity log, measured below a depth of 240 ft, was supplemented by interpretation of a bulk density log. That part of the column from the surface to a depth of 240 ft was projected from outcrops within 1 mi to the northwest and southeast of the drill hole.

Column 4 is based on logs of the U.S. Bureau of Mines USBM-AEC Colorado core hole 3 in the SW1/4SW1/4 sec. 14, T. 1 N., R. 98 W. The bulk density log, measured below a depth of 232 ft, was supplemented by interpretations of sonic and resistivity logs measured below 410 ft, of an oil-shale Fischer assay log measured below 962 ft, and of a lithologic log (Ege and others, 1969, fig. 10) measured below 962 ft. That part of the column from the surface to a depth of 262 ft was projected from outcrops within 1/2 mi south of the drill hole.

Column 5 is based on logs of the U.S. Bureau of Mines USBM-AEC Colorado core hole 1 and a measured surface section. The drill hole is located in the NE1/4SE1/4 sec. 13, T. 1 N., R. 98 W. The surface section is a composite of three segments: the lower 48 ft of the section began at the drill pipe ground surface in the NE1/4SE1/4 sec. 13, T. 1 N., R. 98 W; the next 111 ft was measured in the SE1/4SE1/4 sec. 13, T. 1 N., R. 98 W; and the upper 243 ft was measured in the NE1/4NW1/4 sec. 19, T. 1 N., R. 97 W. and the SE1/4SW1/4 sec. 18, T. 1 N., R. 97 W. The resistivity log, measured below a depth of 140 ft, was supplemented by interpretation of sonic and neutron logs of approximately the same interval, of a density log measured below 730 ft, of an oil-shale Fischer assay log measured below 383 ft, of a lithologic log of cuttings from 45 ft down to 765 ft (Carroll and others, 1967, appendix A, p. 34–36), and of a lithologic core log measured below 770 ft (Trudell and others, 1970, table B–1 and fig. 16). That part of the column from the surface to a depth of 45 ft was projected from outcrops about 3/4 mi to the south.

Column 6 is based on logs of the Sinclair Oil and Gas Company Federal 8005 drill hole in the NE1/4NE1/4 sec. 29, T. 1 N., R. 97 W. The resistivity log, measured below 232 ft, was supplemented by interpretation of a bulk density log below 232 ft and an oil-shale Fischer assay log measured below a depth of 1,100 ft. That part of the column from the surface to a depth of 232 ft was projected from outcrops about 1 1/2 mi to the northeast.

Column 7 is based on a log of the Tintic Standard Mining Company 1 Government drill hole in the SE1/4NE1/4 sec. 36, T. 1 N., R. 97 W. The resistivity log, measured below a depth of 222 ft, was supplemented by interpretation of an oil-shale Fischer assay log of drill-hole cuttings below a depth of 308 ft (Stanfield and others, 1960, p. 186) and an oil-shale Fischer assay log of the U.S. Geological Survey CR–2 drill hole below a depth of 505 ft drilled at the same location. That part of the column from the surface to a depth of 222 ft was projected from a cross section shown on the geologic map of the White River City quadrangle (Pipiringos and Johnson, 1976). Stratigraphy above the top of the drill hole was based on thickness measurements of nearby outcrops of map units.

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