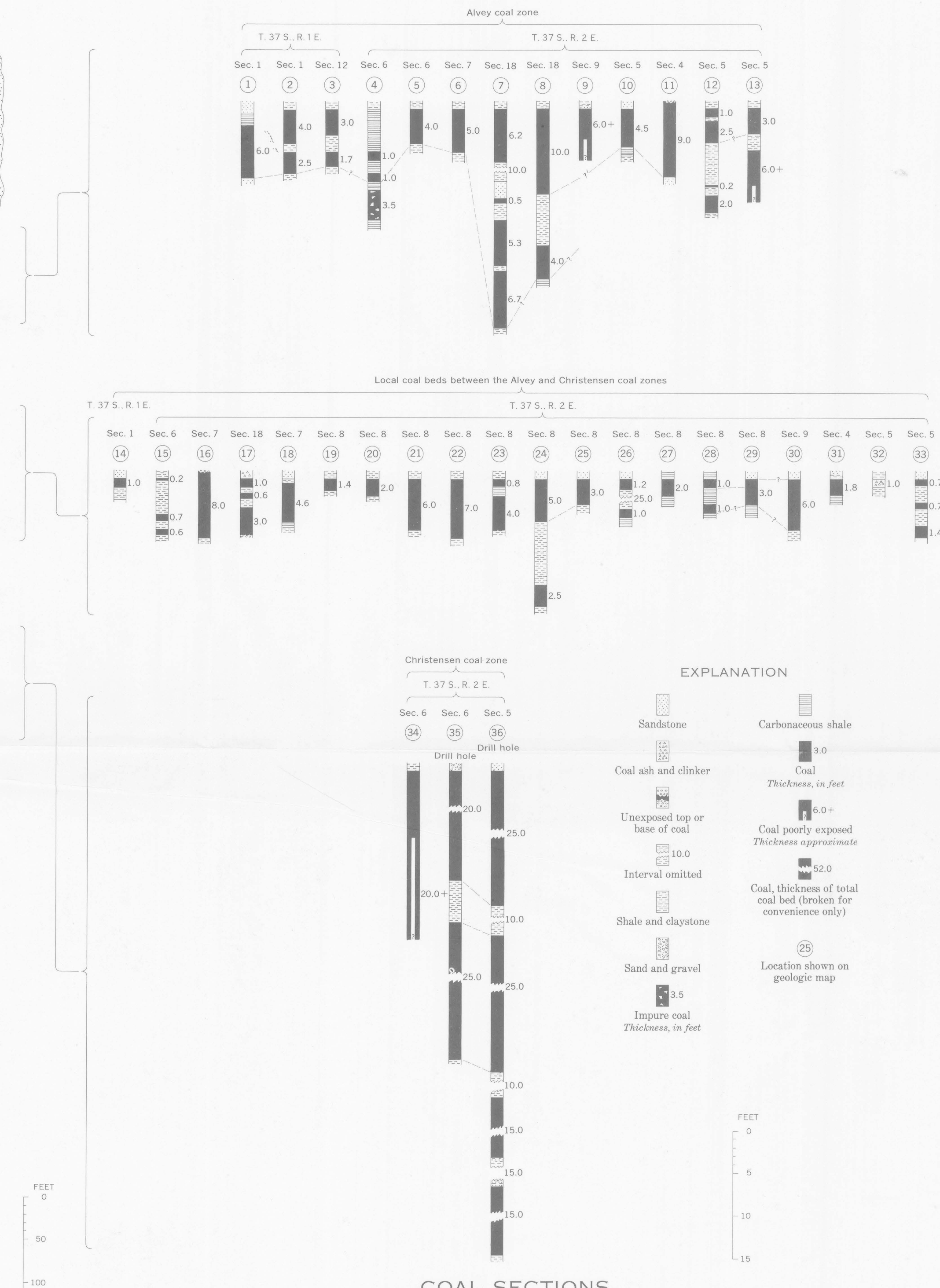
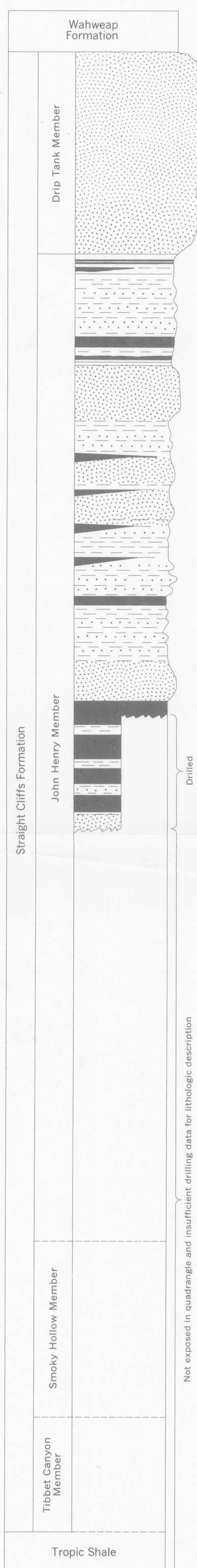


GENERALIZED SECTION



COAL SECTIONS

ECONOMIC GEOLOGY

The quadrangle was mapped as part of the U.S. Geological Survey program of classifying and evaluating mineral lands in the public domain. Resources of economic interest are coal and oil and gas.

COAL

A summary of data pertaining to the coal deposits of the entire Kaiparowits coal field is given by Doelling (1970).

Exposed coal beds in the Death Ridge quadrangle are found only in the John Henry Member of the Straight Cliffs Formation in the northwest corner of the quadrangle. The lower coal zone, the Christensen, is 760-870 feet above the base of the Straight Cliffs Formation, and the upper coal zone, the Alvey, is 1,290-1,340 feet above the base. Local coal beds occur between the Christensen and Alvey coal zones, but the continuity is poor and the beds cannot be traced any distance.

Outcrops in the quadrangle are poorly exposed, and coal beds are generally concealed by slope wash and overhanging blocks of sandstone and talus. Because of this, coal beds and zones probably extend farther than shown on the geologic map. Individual coal beds are generally lenticular, grade laterally into carbonaceous shale, and in a few places interfinger with sandstone that was deposited along a beach. Marine oyster beds occur both below and above coal beds, indicating many fluctuations of the shoreline. The strand line during deposition of the Alvey coal zone trended about N. 20° W., and field observations indicate that both coal zones are more persistent in a northwesterly direction. The coal was deposited in a lagoonal-type environment, and coal beds are less continuous perpendicular to the strand line.

Coal beds have been burned extensively in the Death Ridge quadrangle, resulting in areas of pink and red baked rocks. Near the actual site of burning, the rock in places became molten and moved like lava in small areas. Coal ash and clinker occur near the actual burn site but are generally obscured by talus consisting of baked shale, which is hard and platy and covers most of the slope area.

Beds 1 or more feet thick are indicated on the geologic map and are shown in the coal sections (sheet 2) where observed; however, because of the lenticular nature of the coal, only the thicker coal beds are extended any distance from an outcrop. In general, the symbol or line showing a coal bed on the geologic map represents a single bed, but on steep slopes and cliff faces it may represent an interval containing two or more coal beds.

The Christensen coal zone crops out at only one locality

(coal section 34); however, it was encountered in many seismicograph drill holes, two of which (coal sections 35 and 36) are shown. Coal section 36 is the thickest known coal interval in the region. In a 115-foot interval 80 feet of coal occurs in four beds. The drill holes were not cored, so exact thicknesses are not known; however, only the upper two 25-foot beds were considered in the coal resources estimate inasmuch as the continuity of the lower two 15-foot beds is not known. A local coal bed between the Christensen and Alvey coal zones has a minimum thickness of 8 feet at coal section 16. This bed is buried on the surface over the remaining part of its outcrop. The Alvey coal zone is persistent in the area, and the coal thickness ranges from 4 feet to more than 18 feet. The total coal thickness in all zones in the northwestern part of the Death Ridge quadrangle is nearly 100 feet; this is the thickest area of coal deposition in the entire region. The area of very thick coal trends southeasterly (S. 20° E.), and similar thicknesses of coal were reported in drill holes to the south. In the Tenneco Oil Co. (Upper Valley South) well 1 State (No. 4, table 2), logs indicate about 70 feet of coal in all zones.

Quality.—No mines or prospects exist in the quadrangle, and no surface coal samples were collected for analysis; however the quality should be as good as, or better than, coal 5 miles north of the quadrangle at the Alvey mine. This coal on an as-received basis has a heat value of 10,730 British thermal units and contains 12 percent moisture content, 38.1 percent volatile matter, 42.8 percent fixed carbon, and 7.1 percent ash. More detailed information on the quality of the coal in the area is given by Robison (1963, 1964) and Grose, Hileman, and Ward (1967).

Reserves.—Reserves of coal were not calculated for individual beds within a coal zone because of the limited exposures and the lenticular nature of the coal. Total reserves were estimated by adding the average thickness of coal in each zone in beds more than 4 feet thick and multiplying by the average weight of 1,770 tons per acre-foot for subbituminous coal; beds below 2,000 feet of overburden were not considered. The Death Ridge quadrangle contains more than 1,500 million tons of total coal resources, but much of it is below 1,000-1,500 feet of overburden.

OIL AND GAS

The southern part of the Upper Valley oil field is in the north end of the quadrangle. The anticlinal structure plunges steeply in a southeasterly direction, and the west edge becomes a steeply dipping monocline in less than 1 mile. The oil field operated by Tenneco Oil Co. is producing (1970)

oil mainly from the Kaiparowits Limestone. Two dry holes and two producing wells have been drilled in the quadrangle (table 2). Ritzma (1970, p. 1) reported that production in October 1969 for the entire field was 142,263 barrels from 16 wells, an average of 4,590 barrels per day. The Oil and Gas Journal (1970, p. 139) gave the 1969 production figures as 1,511,000 barrels, the cumulative production 1963-69 as 3,115,000 barrels, and the reserves as 15,651,000 barrels.

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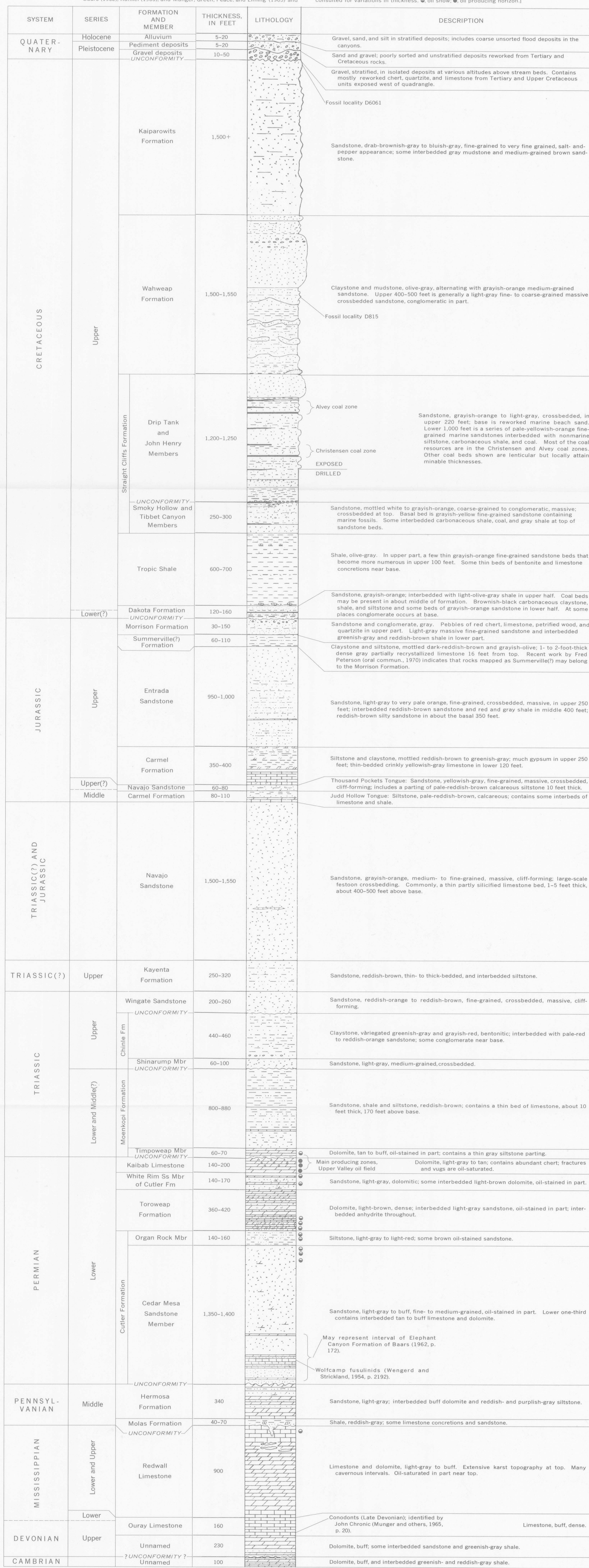
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TABLE 2.—LIST OF WELLS DRILLED FOR OIL

Number on geologic map	Company and well name	Location		Drilling ceased or well abandoned	Elevation of hole (ft)	Total depth (ft)	Lowest formation reached	Depths to oil production zones (ft)	Well status and remarks
		Section	Township and range						
1	Tenneco Oil Co., well 12	Lot 6, NW¼SW¼ sec. 6	37 S., 2 E.	July 1969	7,289	7,220	Kaiparowits Limestone	6,968-7,036	Oil well in Kaiparowits Limestone.
2	Tenneco Oil Co., well 21	Lot 1, NW¼NW¼ sec. 7	37 S., 2 E.	March 1970	7,233	9,951	Redwall Limestone	7,044-7,064	Do.
3	California Oil Co., well 2	NW¼NW¼NW¼ sec. 8	37 S., 2 E.	October 1962	7,095	7,114	Kaiparowits Limestone		Abandoned oil test.
4	Tenneco Oil Co., well 1 State	NE¼NE¼ sec. 16	38 S., 2 E.	January 1970	7,083	8,902	Cedar Mesa Sandstone Member of Cutler Formation.		Do.

GENERALIZED COLUMNAR SECTION

[Pre-Jurassic rocks occur only in the subsurface. The lithology and the nomenclature are modified from Wengert and Strickland (1954), Heylman (1958), Baars (1962), Kunkel (1965), and Munger, Green, Peace, and Liming (1965) and from American Stratigraphic Co. log 68-R (California Co. No. 1, Upper Valley); American Stratigraphic Co. logs 626-R, D-2341, D-2143, and D-2334 were consulted for variations in thickness. □ oil show; ● oil producing horizon.]



GEOLOGIC MAP AND COAL RESOURCES OF THE DEATH RIDGE QUADRANGLE, GARFIELD AND KANE COUNTIES, UTAH

By
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1973