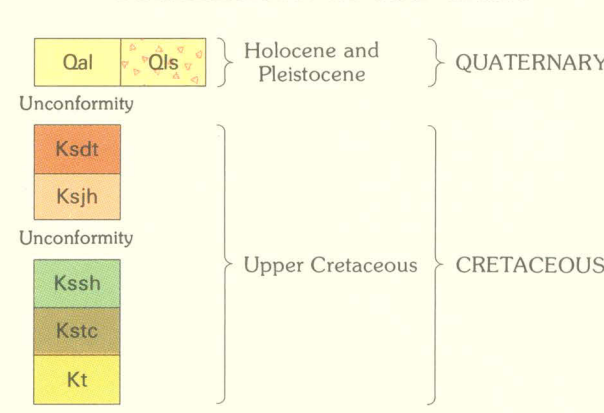


CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Qal** Alluvium (Holocene and Pleistocene)—Unconsolidated stratified deposits of silt, sand, and gravel along major drainages; includes coarse unsorted flood deposits in Last Chance Creek, Reese Canyon, and Dry Wash. Thickness 5–50 feet
- Qs** Landslide deposits (Holocene and Pleistocene)—Gravel, sand, mud, unstratified deposits; includes large sandstone blocks of Drip Tank Member of the Straight Cliffs Formation (Ksd). Thickness 5–50 feet
- Ksd** Straight Cliffs Formation (Upper Cretaceous) Drip Tank Member—Grayish-orange to light-gray, medium- to coarse-grained, crossbedded sandstone. Generally of fluvial origin. Thickness 180–250 feet
- Ksh** John Henry Member—Pale-yellowish-orange, fine-grained, marine or beach sandstone interbedded with fluvial sandstone, gray mudstone, brownish-gray carbonaceous shale, and coal. Coal resources mainly in the Christensen, Reese, and Alvey coal zones. Thickness 600–700 feet
- Ksh** Smoky Hollow Member—Mottled white to grayish-orange, coarse-grained to conglomeratic, massive sandstone; crossbedded at top (Calico bed). Lower part interbedded gray mudstone, carbonaceous shale, and thin lenticular coal beds. Thickness 120–150 feet
- Ksh** Tibbet Canyon Member—Grayish-yellow, fine-grained sandstone; marginal marine, intertongues with Tropic Shale (Kt). Thickness 80–100 feet
- Kt** Tropic Shale (Upper Cretaceous)—Olive-gray marine shale; a few thin grayish-orange, fine-grained sandstone beds in upper part. Thickness 600–700 feet

- Coal bed**—Dashed where approximately located. Thickness of coal, in feet, measured at triangle (multiple numbers indicate thicknesses of individual beds). Number in circle keyed to measured coal sections
- Burned coal bed**—Approximately located
- Contact**—Approximately located
- Top "B" ss** Bed—Top of marine or beach sandstone in John Henry Member of the Straight Cliffs Formation (Ksh). Approximately located
- Structure contours**—Drawn on unconformity at top of Smoky Hollow Member (Calico bed) (Ksh) from subsurface and projected surface control. Approximately located; dashed where projected over land surface
- Anticline**—Showing crestline and direction of plunge. Approximately located
- Syncline**—Showing troughline and direction of plunge. Approximately located
- Fault**—Dashed where approximately located. U, upthrown side; D, downthrown side. Showing adjoining dip symbol below line and throw in feet above line
- Strike and dip of beds**
- Component of dip of beds**—Dot marks point of observation
- Coal drill hole**—Circled number keyed to subsurface coal section
- Dry hole**—Showing operator name and number, year completed, and total depth in feet

ECONOMIC GEOLOGY

The Needle Eye Point quadrangle, Utah, was mapped as part of the U.S. Geological Survey program of classifying and evaluating mineral lands in the public domain. Lying within the Kaiparowits Plateau coal field, coal is the main resource of economic interest. Approximately 13.4 percent of the quadrangle is covered by Federal coal leases and 10.8 percent is covered by State of Utah coal leases. Although three quarters of the quadrangle (75.8 percent) is not leased, the entire quadrangle is in the Kaiparowits Plateau Known Recoverable Coal Resource Area (KRCRA). The quadrangle was mapped by Doelling and Graham (1972, p. 185–190) and their report contains pertinent geographic and stratigraphic descriptions. New coal and structural information not available to them has been incorporated in the present report.

Access to the Needle Eye Point quadrangle is limited; the north edge of the quadrangle is about 39 miles south of Escalante, Utah, and can be

reached by vehicle from the Alvey Wash-Big Sage road south to town. The south edge of the quadrangle is about 24 miles northeast of Glen Canyon City, Utah, on U.S. Highway 89, and can be reached from the Kelly Grade-Smoky Mountain road. The topography is rugged and the quadrangle is deeply dissected by large canyons that drain in a southerly direction into Lake Powell. Reese Canyon in the center and Dry Wash in the west drain into Last Chance Creek. Navajo Canyon on the east drains south into Croton Canyon. The only relatively flat areas are in the western part on Window Sah, Dry Bench, and the north end of Smoky Mountain; all of the flat areas are part of the Nipple Bench set of Sargent and Hanson (1980) who analyzed the landforms of the Kaiparowits coal-basin area.

COAL

The Christensen, Reese, and Alvey coal zones are present in drill hole no. 4 drilled by the El Paso Coal Company. Drill hole no. 21 was drilled by Peabody Coal Company, however, the coal lease was dropped and returned to the Federal Government.

In much of the quadrangle there are large areas of pink and red baked rocks where coal beds have been burned. In places near where the coal beds are still burning, the rocks become molten and in small areas flow like lava; in isolated areas the smell of sulfuric gas is an indication that the coal is still burning. Coal ash and scoria-like clinker occur near the actual burn site, but generally are obscured by talus; the baked shale talus is hard and platy and covers most of the slope area. Many landslide deposits and collapse blocks result from the burning coal beds. Hundreds of feet above the burned-out coal beds, large fractures cut the sandstone blocks that have settled near the edge of the cliffs.

Individual coal beds are generally lenticular and grade laterally into carbonaceous shale and mudstone. During coal deposition the strandline trended about N. 35° W. locally. Field observations indicate that all coal zones are more continuous parallel to the strandline and tend to split and interfinger with carbonaceous shale, mudstone, and sandstone at right angles to this line. Coal beds that are 1 foot or more thick are indicated on the geologic map and are shown in the coal sections. Only the thicker beds can be correlated for any significant distance from a measured section. In general, the coal bed symbol on the map represents a single coal bed, but on steep cliff faces it may include as many as three coal beds.

No resource calculations were made because of the lenticular nature of the coal beds, a lack of data on quantity and quality of the coal, and the extensive burning of coal beds over one half of the quadrangle. I estimate that there are 800 million tons of coal in beds 4 feet thick or greater in the quadrangle. No official information on coal quality is available in the quadrangle, however, an analysis of coal from the Christensen coal zone about 25 miles to the northwest at the abandoned Don Shurtz mine (Gregory and Moore, 1931, p. 153) produced the following results on an

air-dried basis: 12.20 percent moisture, 39.35 percent volatile matter, 40.20 percent fixed carbon, 4.25 percent ash, 0.82 percent sulfur, and a heating value of 11,108 Btu/lb. Coal from the Alvey, Reese, and Christensen coal zones taken from a core hole drilled by the U.S. Geological Survey about 19 miles northwest of the quadrangle on Mossy Dell Ridge had an average (as-received) analysis of 20 percent moisture, 34 percent volatile matter, 38 percent fixed carbon, 7 percent ash, 0.80 percent sulfur, and a heating value of 9,600 Btu/lb (Zeller, 1979). The average heating value for moist, mineral-matter-free Bu was calculated according to the American Society for Testing and Materials (Parr Formula) (Wood and others, 1983, p. 28) and is 10,400 Btu/lb. All of the coal sampled in the Kaiparowits Plateau coal field is nonagglomerating.

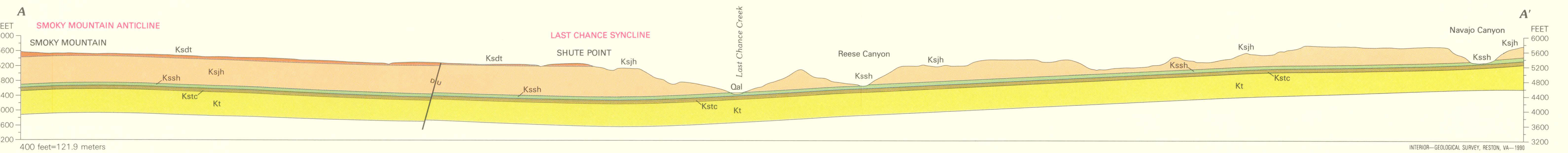
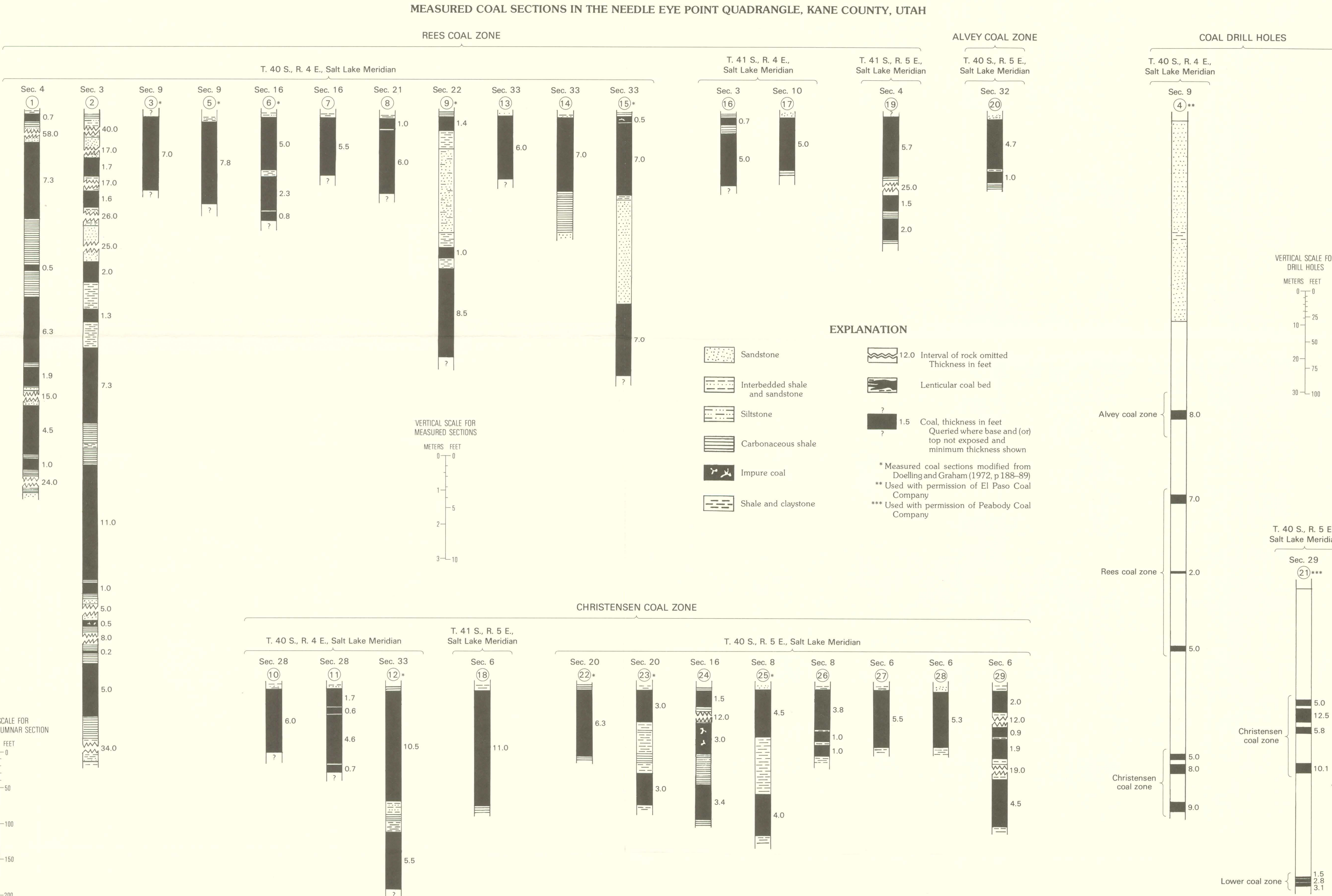
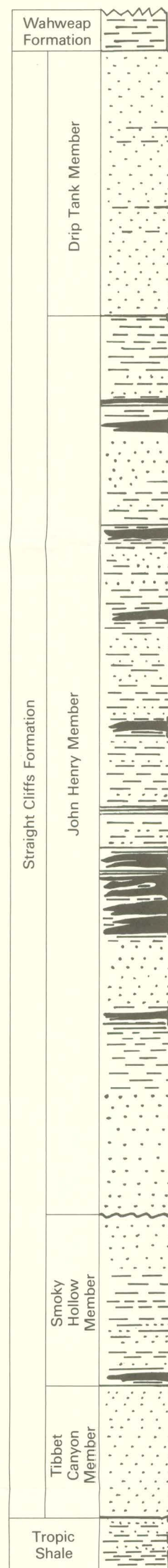
OIL AND GAS

An oil and gas test hole drilled by Byrd Corporation on the Reese Canyon anticline was completed as a dry hole on March 19, 1954. The drill hole spudded in the Upper Cretaceous Straight Cliffs Formation and bottomed in the Cambrian Bright Angel Shale at a total depth of 11,045 feet.

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GENERALIZED COLUMNAR SECTION
OF UPPER CRETACEOUS ROCKS



GEOLOGIC MAP AND COAL STRATIGRAPHY OF THE NEEDLE EYE POINT QUADRANGLE, KANE COUNTY, UTAH

By
H. D. Zeller
1990