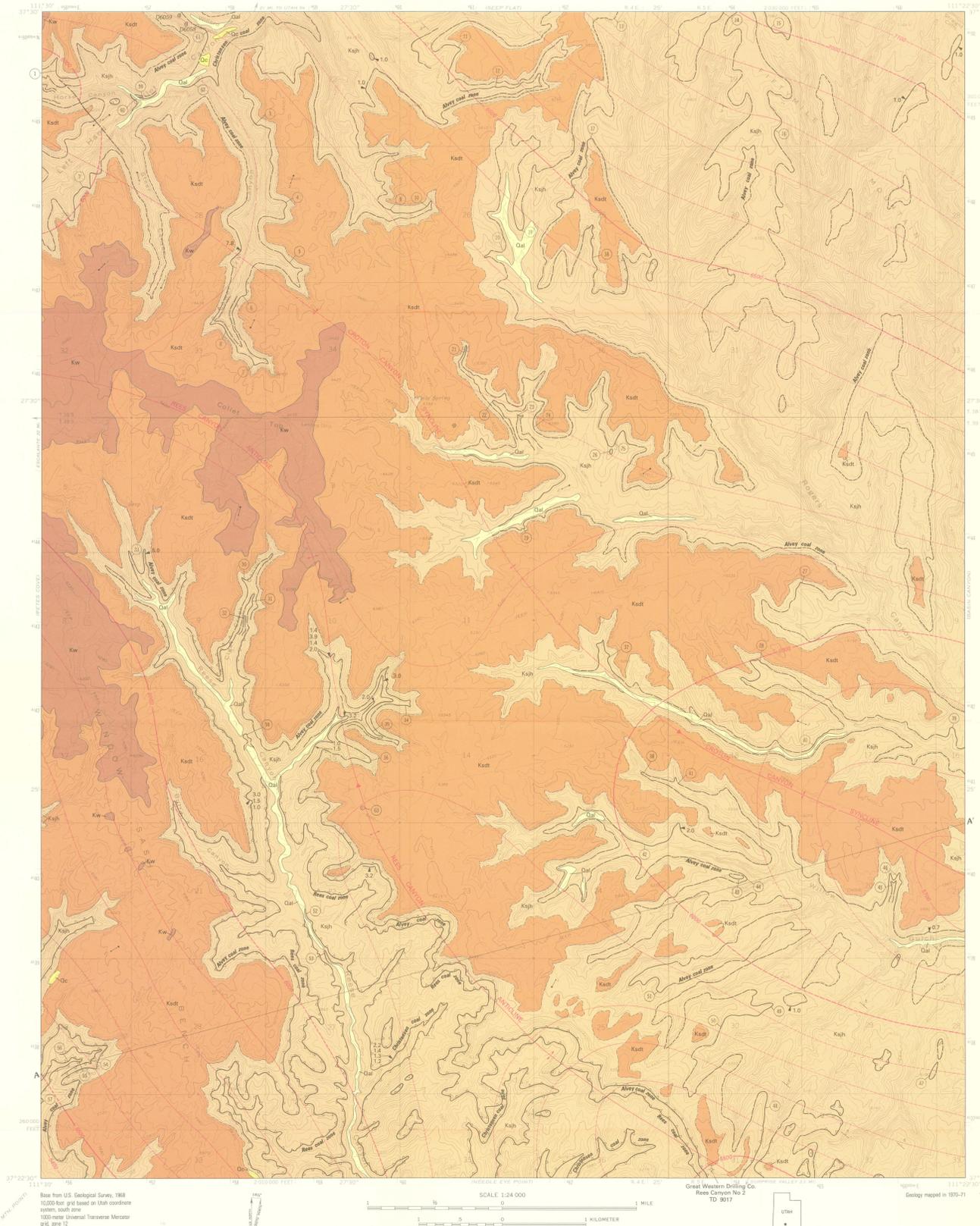
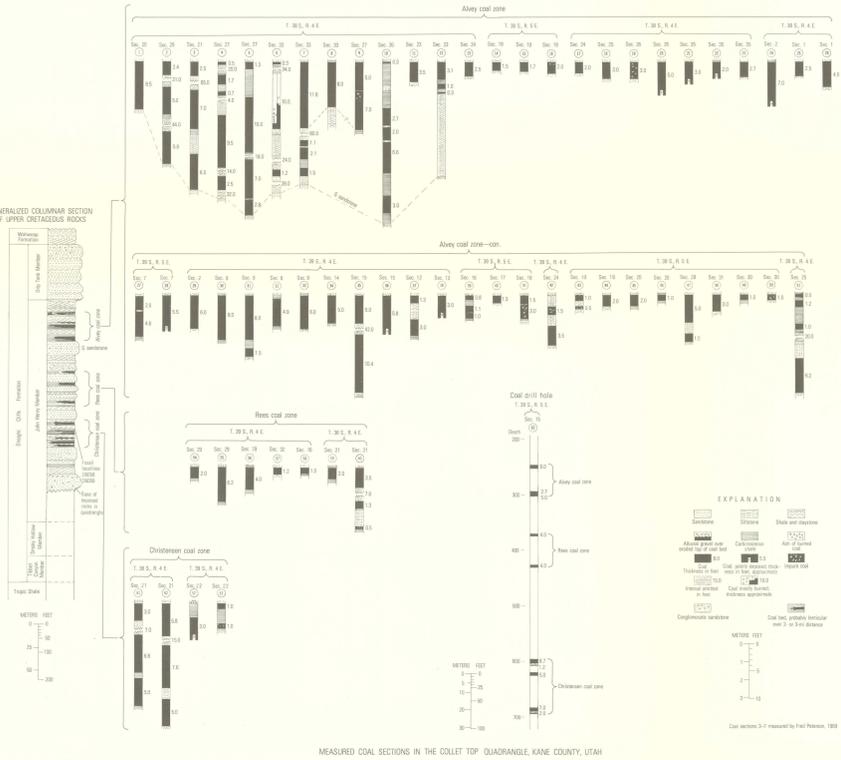


Table 1.—Coal resources of the Collet Top quadrangle, Kane County, Utah

[Resources calculations by D. T. Sandberg. Resources expressed in thousands of short tons; overburden and coal thicknesses in feet. Demonstrated category comprises measured and indicated resources. —, no data]

T. S. R. E.	Area	Coal zone	Economic (Reserve Base) 0-1,000 feet overburden						Subeconomic 0-1,000 feet overburden			Total economic and subeconomic	
			Demonstrated		Inferred		Total	Demonstrated		Inferred			Total
			4-10 ft	>10 ft	4-10 ft	>10 ft		2.5-4 ft	>4 ft	2.5-4 ft	>4 ft		
FEDERAL LAND													
38 4---	Alvey	25,654	44,270	69,924	1,164	---	1,164	71,088	4,358	---	4,358	75,446	
	Rees	---	---	---	---	---	---	---	4,747	237	4,984	4,884	
	Christensen	---	27,800	27,800	6,701	88,806	95,507	123,307	---	3,980	3,980	127,287	
Township total		25,654	72,070	97,724	7,865	88,806	96,671	194,395	9,105	4,117	13,222	207,617	
38 5---	Alvey (total)	---	---	---	---	---	---	---	122	---	122	122	
	Rees	55,883	5,750	61,633	22,210	70,470	92,880	154,513	3,129	---	3,129	157,642	
	Christensen	12,170	---	12,170	---	---	---	12,170	22,279	22,279	44,558	417,652	
Township total		68,053	45,024	113,077	47,348	418,107	465,455	578,532	3,129	28,082	31,211	609,743	
39 4---	Alvey	8,829	---	8,829	451	---	451	9,280	3,087	223	3,310	12,590	
	Rees	---	---	---	---	---	---	---	4,299	4,299	8,598	8,598	
	Christensen	---	---	---	---	---	---	---	---	---	---	---	
Township total		8,829	---	8,829	451	---	451	9,280	3,087	4,428	7,515	19,406	
Quadrangle total		102,536	117,094	219,630	57,509	506,913	564,822	784,452	15,443	36,627	52,070	836,522	
STATE LAND													
38 4---	Alvey	1,085	147	1,232	5,645	---	5,645	6,877	1,522	---	1,522	8,399	
	Rees	---	---	---	---	---	13,551	13,551	---	---	---	13,551	
	Christensen	---	---	---	---	---	---	---	---	---	---	---	
Township total		1,085	147	1,232	5,645	---	13,551	19,196	20,428	---	1,522	21,950	
39 4---	Alvey	5,444	9,168	14,612	1,026	5,345	6,371	20,983	---	---	---	20,983	
	Rees	1,758	---	1,758	---	---	---	1,758	2,907	2,907	4,665	4,665	
	Christensen	---	---	---	---	4,943	33,415	38,358	---	700	700	39,058	
Township total		7,202	9,168	16,370	5,969	38,760	44,729	61,099	---	3,607	3,607	64,706	
39 5---	Alvey (total)	---	---	---	---	---	---	---	225	---	225	225	
	Rees	---	---	---	---	---	---	---	---	---	---	---	
	Christensen	---	---	---	---	---	---	---	---	---	---	---	
Quadrangle total		8,287	9,315	17,602	11,614	52,311	63,925	81,527	1,747	3,607	5,354	86,881	



CORRELATION OF MAP UNITS

Qal	Quaternary
Qc	Quaternary
Kw	Upper Cretaceous
Kajh	
Kadt	Cretaceous
Ki	

ECONOMIC GEOLOGY

The Collet Top quadrangle was mapped as part of the U.S. Geological Survey program of classifying and evaluating mineral lands in the public domain. Coal is the main resource of economic interest. Collet Top is about 30 mi southeast of Escalante, Utah, in the east-central part of the Kaiparowits Plateau and can be reached by vehicle from either the Hole-in-the-Rock road or the Alvey Wash Big Sage road, southeast of town. The quadrangle contains 59 mi² of coal land, and the remaining 52 mi² of Federal land administered by the U.S. Bureau of Land Management. Federal coal leases cover 35.5 mi² and State coal leases cover 5.5 mi². Eighty-five percent of the Collet Top quadrangle is in the Kaiparowits Plateau Known Recoverable Coal Resource Area (KRCRA).

COAL

The Collet Top quadrangle contains a central flat area and drainage divide cut by deep canyons draining northward into Left Hand Collet Canyon and the Escalante River, eastward and southward into Rogers and Rees Canyons, and westward into Dry Wash. All drainage ultimately enters Lake Powell, through the Escalante River or through Last Chance Creek. Coal beds occur in three zones in the John Henry Member of the Straight Cliffs Formation and are from base upward, Christensen, Rees (splitting per Doelling and Graham, 1972), and Alvey. The Dip Tank Member, a massive cliff-forming sandstone, overlies the coal-bearing sequence. Individual coal beds are generally lenticular, grading laterally into carbonaceous shale and, in a few places, interfingering with sandstone that was deposited along a beach or offshore bar. Marine oyster beds occur below and above coal beds, indicating eastward and westward fluctuations of the shoreline. During deposition of the Alvey coal beds, the shoreline trended about N. 20° W., and field observations indicate that both the Alvey and Christensen coal zones are more prevalent northward. The coal was deposited in lacustrine, and coal beds are continuous perpendicular to the strandline. Coal beds 1 ft or more thick are indicated on the geologic map and are shown in the coal sections; however, because the coal is lenticular, only the thicker coal beds were considered for any significant distance from a measured section. In general, the map symbol of a line showing a coal bed represents a single bed, but on steep cliff faces it may represent as many as three coal beds (see coal sections 2-5, 7, 61, 62).

This coal investigation maps phases 03 measured coal sections: Doelling and Graham, (1972, p. 140-141, fig. 26) published sections for other localities in the quadrangle.

The Christensen coal zone is best observed in Left Hand Collet Canyon (coal sections 52, 53), but is almost completely buried along the entire outcrop. Generally, it contains two or three mineable coal beds each 5-8 ft thick. Thickness of overburden on the Christensen coal nowhere exceeds 1,000 ft and generally is only 700-800 ft.

The Rees coal zone is buried along much of its exposure, but in the southwest corner of the quadrangle one unburied bed 6.2 ft thick was measured (coal section 56). Although it contains significant amounts of coal, the Rees is the least important of the three coal zones. Overburden is generally 500-600 ft thick.

The Alvey coal zone is the most widely exposed. More than 20 measured coal sections contain beds at least 5 ft thick. The Alvey coal thins to the east to 1- or 2-ft-thick beds and the zone is only interbed in the extreme northeast quarter of the quadrangle. Thickness of overburden on the Alvey coal zone averages 300-400 ft, but in much of the area is less than 100 ft. No information on the quality of the quadrangle's coal is available; however, an analysis of coal from the Christensen zone 20 mi to the northwest at the Don Shurtz mine (Gregory and Moore, 1951, p. 155) on an air-dried basis, showed 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. Analyses of samples from other nearby areas are generally similar, except that commonly the ash content is higher (5 to 8 percent), and the sulfur content is lower (0.5 to 0.7 percent).

Resources

Because of limited exposures and lenticular beds, coal resources were not calculated for individual beds within a coal zone. Total resources (Reserve Base) were calculated by adding the coal bed thicknesses in each zone for beds 48 in. thick or more and multiplying by the average weight of 1.770 tons per acre foot of subbituminous coal. An area of about 1 mi² in sec. 26, 27, 34, 35, and 36, T. 39 S., R. 4 E., where the coals are extensively buried, was omitted from resource calculation. According to these calculations the Collet Top quadrangle contains about 920 million tons of total coal resources in the three zones. The resources of each zone are shown in table 1, by township and by land ownership. All coal in the quadrangle has less than 1,000 ft of overburden. Probably 55-60 percent of the coal is mineable by underground mining. Coal at least 48 in. thick is judged to be commercially mineable in this area. Therefore, as allowed by the definition of Reserve Base in U.S. Geological Survey Bull. 1450-B (p. 5), the thickness—rather than the usual 60-in. thickness—was used for the Reserve Base calculation.

OIL AND GAS

A test hole for oil and gas was drilled by the Great Western Drilling Company in sec. 31, T. 39 S., R. 5 E., and was completed as a dry hole. It probably bottomed in Pennsylvanian rocks at a total depth of 9,017 ft.

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE AND PLEISTOCENE)—Gravel, sand, and silt in stratified deposits along major drainages. Includes coarse unsorted flood deposits in Rees Canyon. COLLUVIUM AND LANDSLIDE DEPOSITS (HOLOCENE AND PLEISTOCENE)—Gravel, sand, and silt in unstratified deposits; includes large sandstone blocks of Straight Cliffs Formation and rubble that has moved down steep slopes partly as landslide material and talus. Thickness 20-50 ft.

Qc WAHAPAP FORMATION (UPPER CRETACEOUS)—Olive-gray claystone and mudstone alternating with grayish-orange, medium-grained sandstone. Only lower 50-200 ft exposed in quadrangle.

Kw STRAIGHT CLIFFS FORMATION (UPPER CRETACEOUS): Dip Tank Member—Grayish-orange to light-gray, medium- to coarse-grained, cross-bedded sandstone. Generally of fluviatile origin, but base may be reworked marine or beach sand. Thickness 180-200 ft.

Kadt John Henry Member—Pale-yellowish-orange, fine-grained, marine sandstone interbedded with nonmarine sandstone, mudstone, carbonaceous shale, and coal. Coal resources are in Alvey, Rees, and Christensen coal zones. Thickness 830-900 ft.

Kajh Smoky Hollow and Tibbet Canyon Members—Shown in section only.

Ki Smoky Hollow Member—Mottled white to grayish-orange, coarse-grained to conglomeratic, massive sandstone, cross-bedded at top. Lower part is interbedded gray mudstone, carbonaceous shale, and thin lenticular coal beds. Thickness 120-150 ft.

Tibbet Canyon Member—Grayish-yellow, fine-grained sandstone. Marginal marine in origin; intertongues with Tropic Shale. Thickness 90-100 ft.

TIROPIC SHALE (UPPER CRETACEOUS)—Olive-gray shale a few thin grayish-orange, fine-grained sandstone beds in upper part. Thickness about 700 ft. Shown in section only.

COAL BED—Dashed where approximately located; short dashed where inferred. Thickness of coal, feet, measured on triangle (multiple numbers indicate thicknesses of individual beds). Circle number refers to measured coal section.

BURNED COAL BED—Approximately located.

CONTACT—Approximately located, short dashed where inferred.

FAULT—Dashed where approximately located. Bar and ball on downthrown side.

ANTICLINE—Showing crestline and direction of plunge. Dashed where approximately located.

SYNCLINE—Showing troughline and direction of plunge. Dashed where approximately located, dotted where concealed.

STRIKE AND DIP OF BEDS

- Horizontal
- Component of dip of beds—Dot marks point of observation.

STRUCTURE CONTOURS—Drawn on top of Alvey coal zone of John Henry Member of Straight Cliffs Formation. (Generally drawn on top of an actual coal bed 50 ft above C sandstone.) Dashed where control less accurate; short dashed where projected above land surface. Contour interval 100 ft. Datum is mean sea level.

COAL DRILL HOLE—Circle number refers to subsurface coal section.

DRY HOLE—Showing name of operator, lease name, and total depth (TD), in feet.

MESOZOIC FOSSIL LOCALITY—Showing USGS Denver catalog number.

FOSSIL COLLECTIONS

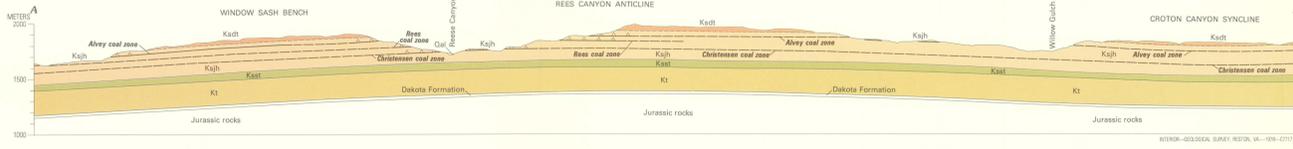
(Fossils collected in NE1/4NW1/4 sec. 21, T. 38 S., R. 4 E., by Fred Peterson; stratigraphic locations shown in columnar section. Mollusks identified by W. A. Cobban; gastropods, by N. F. Solt.)

USGS loc. D6058—Calcareous worm tube *Foraminosia* cf. *I. medullaris* Bergquist *Corbula* sp. *Sinemurina* sp. *Pachychiloides* sp. *Artemesia* fragment.

USGS loc. D6059—*Bygonia* (attached to oyster) *Crossostoma coahuilensis* (Meek) *Crossostoma solonchoca* (Meek) *Brachiolites* sp.

CONVERSION FACTORS FOR METRIC EQUIVALENTS

To convert ENGLISH UNIT	Multiply by	To obtain METRIC UNIT
Short ton	0.9072	Metric tonne
Mile	1.609	Kilometer
Foot	3048	Meter
Inch	2.54	Centimeter
Square mile	2.59	Square kilometer
Acre	4047	Hectare



GEOLOGIC MAP AND COAL RESOURCES OF THE COLLET TOP QUADRANGLE, KANE COUNTY, UTAH
By
H. D. ZELLER
1978