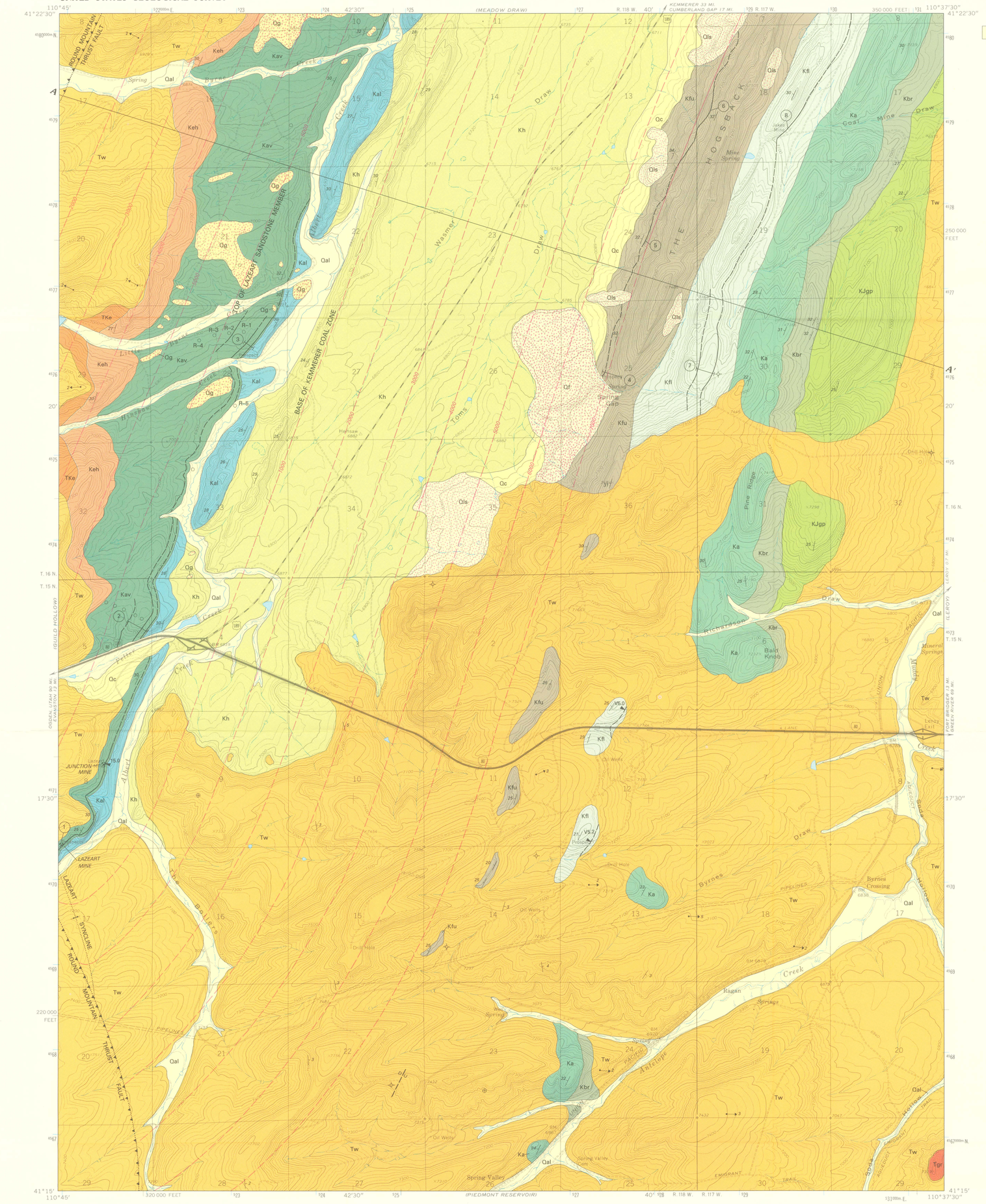
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

COAL INVESTIGATIONS
MAP C–85



CORRELATION OF MAP UNITS

Qal, Qc, Qf, Qls, Qg	Holocene	QUATERNARY
	Pleistocene	
Tgr, Tw	Eocene	TERTIARY
TKe	Paleocene	
Keh, Kav, Kal, Kh, Kf, Kfu, Kfl, Ka, Kbr	Upper Cretaceous	CRETACEOUS
	Lower Cretaceous	
KJgp	Upper Jurassic	JURASSIC
Jt	Middle Jurassic	
J'r'n		JURASSIC(?) AND TRIASSIC(?)

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS (HOLOCENE)

Qal Alluvium

Qc Colluvium

Qf Alluvial-fan deposits

Qls Landslide deposits and mudflows

Qg GRAVEL (HOLOCENE AND PLEISTOCENE)—Cobble-gravel to silt-size particles in lag concentrates overlying parts of Hilliard Shale and Adaville Formation; derived predominantly from Hams Fork Conglomerate Member of Evanston Formation

Tgr GREEN RIVER FORMATION (EOCENE)—White-weathering marlstone, calcareous siltstone, and claystone. Present only in one outcrop in southeastern corner of quadrangle. 200+ feet thick

Tw WASATCH FORMATION (EOCENE)—Red, maroon, yellow, and gray mudstone and yellow, brown, and gray fine- to coarse-grained sandstone. Sequence contains some stream-channel conglomerate beds containing boulders, cobbles, and pebbles of quartzite, chert, and limestone. As much as 2,000 feet thick

TKe EVANSTON FORMATION (PALEOCENE AND UPPER CRETACEOUS)—Gray siltstone, carbonaceous claystone, and shaly mudstone; quartzitic siltstone, gray carbonaceous sandstone, and some dark-brown concretionary ironstone. 200+ feet thick

Keh Hams Fork Conglomerate Member (Upper Cretaceous)—Boulder-conglomerate beds containing small boulders, cobbles, and pebbles of well-rounded quartzite, chert, and limestone and interbedded white to brown calcareous sandstone. Forms conspicuous boulder trains on topographic highs in western part of quadrangle. As much as 1,000 feet thick

Kav ADAVILLE FORMATION (UPPER CRETACEOUS)—Predominantly gray-brown-weathering carbonaceous shale and mudstone that contains beds of yellowish-brown to reddish-brown sandstone and siltstone; contains workable coal beds as much as 30 feet thick (Adaville 1 coal) in lower part. 2,000+ feet thick

Kal Lazeart Sandstone Member—Light-gray to white fine- to coarse-grained sandstone; basal part of formation. About 350–400 feet thick

Kh HILLIARD SHALE (UPPER CRETACEOUS)—Dark-gray to dark-brown marine shale, siltstone, and sandy shale; contains a few conspicuous light-gray to light-tan, fine-grained, resistant sandstone beds in upper part. About 6,000 feet thick

Kf FRONTIER FORMATION (UPPER CRETACEOUS)

Kfu Upper unit—Shale and thin beds of gray sandstone that contain Kemmerer coal zone; underlain by the Oyster Ridge Sandstone Member, a prominent hogback of white to light-gray-weathering, oyster-bearing sandstone; underlain by thick shale. About 1,200 feet thick

Kfl Lower unit—Dark-gray shale, tan siltstone and brown sandstone; sandstone beds less resistant than those in upper unit; contains Spring Valley coal zone in middle part. About 1,000 feet thick

Ka ASPEN FORMATION (LOWER CRETACEOUS)—Light- to dark-gray siltstone and shale, quartzitic sandstone, and porcelanite; forms prominent silver-gray hogbacks. About 900–1,000 feet thick

Kbr BEAR RIVER FORMATION (LOWER CRETACEOUS)—Black to dark-gray fissile shale and olive- to tan-weathering, fine-grained sandstone; contains a few thin fossiliferous limestone beds. About 500–600 feet thick

KJgp GANNETT GROUP (LOWER CRETACEOUS), STUMP FORMATION (UPPER AND MIDDLE JURASSIC), AND PREUSS REDBEDS (MIDDLE JURASSIC)—Total thickness about 1,200 feet

Gannett Group—Upper part contains interbedded red sandy mudstone and thin beds of gray to reddish- to purplish-gray limestone; lower part contains brick-red shale and mudstone and tan to red sandstone and conglomerate

Stump Formation—Greenish- to brownish-gray crossbedded fine-grained sandstone and limestone

Preuss Redbeds—Purplish-red to red silty mudstone and thin beds of red, tan, and gray sandstone

Jt TWIN CREEK LIMESTONE (MIDDLE JURASSIC)—Light-gray fine-grained limestone and shaly limestone that weathers into splinters; contains a red calcareous mudstone and light-gray limestone breccia (Gypsum Spring Member) at its base. Shown in cross section only. About 800 feet thick

J'r'n NUGGET SANDSTONE (JURASSIC? AND TRIASSIC?)—Buff to pinkish-tan quartzite and calcareous quartzitic sandstone. Shown in cross section only. About 700 feet thick

(5) V5.2 COAL BED—Dashed where approximately located. Thickness of coal in feet, measured at triangle; V indicates coal thickness measured by Veatch (1907). Circled number refers to measured coal section

CONTACT—Approximately located

FAULT—Approximately located. U, upthrown side; D, downthrown side

PROJECTED TRACE OF THRUST FAULT—Sawteeth on upper plate

CONCEALED SYNCLINE—Showing troughline

STRIKE AND DIP OF BEDS
- Inclined
- Horizontal

COMPONENT OF DIP OF BEDS

2000 STRUCTURE CONTOUR—Drawn on top of Lazeart Sandstone Member in western part of quadrangle and on base of Kemmerer coal zone in central part of quadrangle. Dashed where control less accurate. Contour interval 1,000 feet

COAL MINE—Inactive or abandoned

ABANDONED OIL AND GAS TEST HOLE

DRILL HOLE
- R–4 U.S. Geological Survey
- Company

(2) LINE OF MEASURED SECTION—Circled number refers to measured coal section

CONVERSION FACTORS FOR METRIC EQUIVALENTS

To convert ENGLISH UNIT	Multiply by	To obtain METRIC UNIT
Short ton	0.9072	Metric ton
Mile	1.609	Kilometer
Foot	.3048	Meter
Btu/lb	2.326	Joule/kilogram

Table 1.—*Coal resources, to 3,000-foot depth, of the Ragan quadrangle, showing coal ownership*

Area T.N.	R.W.	Ownership of coal	Resources (millions of short tons) Measured	Indicated	Inferred	Total
		ADAVILLE FORMATION				
15	118	Federal--------	0.125	----	----	0.125
		Non-Federal---	11.550	9.750	----	21.300
16	118	Federal--------	10.225	22.325	2.525	35.075
		Non-Federal---	16.000	32.625	6.275	54.900
		FRONTIER FORMATION Kemmerer coal zone				
15	118	Federal--------	1.050	1.050	11.800	13.900
		Non-Federal---	.575	3.275	16.250	20.100
16	117	Federal--------	----	----	.025	.025
		Non-Federal---	.100	.025	.700	.825
16	118	Federal--------	----	6.900	3.675	10.575
		Non-Federal---	3.300	6.200	7.725	17.225
		Spring Valley coal zone				
16	117	Federal--------	2.075	3.000	3.000	8.075
		Non-Federal---	.525	2.325	1.025	3.875
16	118	Federal--------	----	1.975	----	1.975
		Non-Federal---	----	.800	2.600	3.400
		QUADRANGLE TOTAL:				
		Federal--------	13.475	35.250	21.025	69.750
		Non-Federal---	32.050	55.000	34.575	121.675

ECONOMIC GEOLOGY

The Ragan quadrangle was mapped as part of the U.S. Geological Survey's program of classifying and evaluating mineral lands in the public domain. The regional geology of the area was mapped and discussed by Veatch (1907). Resources of economic interest within the quadrangle include subbituminous coal, sand and gravel, and ground water; oil and gas may occur at depth. Coal resources have been calculated according to U.S. Geological Survey Bulletin 1450–B to 3,000-foot depth and are given in table 1 for the Adaville and Frontier Formations.

COAL

Coal beds of economic thickness have long been known from the Upper Cretaceous Adaville Formation, having been first exploited in 1876 in the area west of Kemmerer, 33 miles north of the Ragan quadrangle. Typically, coal from the Adaville Formation is high in moisture and low in ash, has a Btu/lb content of about 10,400, and contains about 0.6 percent sulfur (Smith and others, 1972). The coal is of subbituminous *B* rank.

The thickest Adaville coal bed in the Ragan quadrangle, the Adaville 1, lies immediately above the basal Lazeart Sandstone Member and attains its greatest thickness of about 30 feet at the abandoned Lazeart mine in sec. 8, T. 15 N., R. 118 W. Veatch (1907, p. 132) reported that the small amount of production from the mine was either hauled by wagons to Evanston for local consumption or sold to local oil operators. The amount of coal currently available by strip-mining methods in the old mine area is small because of the 30° dip of the coal beds, the sharply rising slope over the mine area, and the Round Mountain thrust fault west of the quadrangle boundary. The Adaville 1 coal bed thins northward to about 15 feet at the abandoned Junction mine, 12 feet in sec. 5, T. 15 N., R. 118 W., near Interstate 80, and thickens again to 18.5 feet in sec. 28, T. 16 N., R. 118 W., in the northern part of the quadrangle. The Adaville 1 coal is thinner in the northern part of the quadrangle; but existence of a second coal bed less than 80 feet above it, 7 and 7.5 feet thick is secs. 28 and 5, respectively, together with the relatively gentle slope to the west, gives this area good potential for future strip mining. The geophysical logs from four drill holes in the lower part of the Adaville Formation, R–1 to R–4, in sec. 28, T. 16 N., R. 118 W., are included in Open-File Report 78–658 (Schroeder, 1978).

Coal beds in the Frontier Formation are much thinner but have a greater Btu/lb content than those in the Adaville Formation and are exploitable only by underground mining methods. Most coal mining in the Frontier Formation has been in the Kemmerer coal zone, the highest of three such zones in the Frontier. Other coal zones are the Willow Creek, near the middle of the formation in the Kemmerer area, and the Spring Valley, near the lower middle part of the formation. The Kemmerer coal zone is above the Oyster Ridge Sandstone Member, a very conspicuous, ridge-forming, white-weathering sandstone in the upper part of the formation. North of the Ragan quadrangle, at the Kemmerer, Frontier, and Diamondville mines near Kemmerer, the main Kemmerer coal bed is as much as 18.6 feet thick. The rank of the Kemmerer coal is high-volatile *B* bituminous. An analysis for a sample from the Kemmerer 6 mine, on the as-received basis, showed 6.9 percent ash, 0.6 percent sulfur, and 12,880 Btu/lb (Berryhill and others, 1950, p. 28).

In the Ragan quadrangle, the thickest coal bed in the Kemmerer coal zone is 6.2 feet at an old prospect in the NE¼SW¼ sec. 25, T. 16 N., R. 118 W. The coal bed thins northward to 5.5 feet in sec. 24, T. 16 N., R. 118 W., and 4.5 feet in sec. 18, T. 16 N., R. 117 W.

In the Ragan quadrangle, no Willow Creek coal beds have been found, although the coal zone is about 200 feet below the Oyster Ridge Sandstone Member in the Kemmerer area. The coal beds apparently pinch out to the south.

The Spring Valley coal zone has at least three beds of coal in the Kemmerer area. The rank is high-volatile *B* bituminous. An analysis, on the as-received basis, indicated 12.2 percent ash, 0.6 percent sulfur, and 11,670 Btu/lb (Berryhill and others, 1950, p. 28).

In the Ragan quadrangle, the thickest coal bed in the Spring Valley coal zone is 6.5 feet thick. The coal bed contains a small shale parting 1.5 feet below the top of the coal at the abandoned coal mine in the NW¼SE¼ sec. 18, T. 16 N., R. 117 W. The coal bed thins southward to 3.0 feet in the W½ sec. 30, T. 16 N., R. 117 W. Several other thin coals or coaly shales are also present above the lower coal bed in this area. Veatch (1907, p. 129) showed a thickness of 5 feet and 5.5 feet at two old prospects in sec. 12, T. 15 N., R. 118 W., but these prospects are now caved in and no coal beds are exposed.

SAND AND GRAVEL

Adequate supplies of sand and gravel for road building in this area are available from the unconsolidated Quaternary deposits. Another potential source of gravel is in the Hams Fork Conglomerate Member of the Evanston Formation, but the gravel in this unit is usually consolidated and probably recoverable only by mining methods.

GROUND WATER

Ground water for domestic and livestock use is generally derived from Quaternary deposits. However, a water-quality control hole (R–5) was drilled 210 feet deep in the Lazeart Sandstone Member in sec. 28, T. 16 N., R. 118 W., to determine the potential of the Lazeart as an aquifer in this area. Within 12 hours after drilling, the water in the drill hole rose to within 2 feet of the surface. This water level is significant because it occurred in a year when ranchers in the area were beset with drought-like conditions. Because the Lazeart Sandstone Member contains very permeable zones, the recharge capacity of any wells drilled in it is expected to be very high, thus making it an excellent reservoir that would be continually recharged each year by the runoff of the winter snows. Because the Lazeart Member extends from the old Lazeart coal mine to an area just north of Kemmerer, its reservoir capacity could be economically important for ranchers needing irrigation water in drought years, and for coal mining operations being planned in this area.

OIL AND GAS

Significant quantities of oil and gas have not been produced within the Ragan quadrangle. However, shallow wells in the Aspen Formation have produced very small quantities of oil and gas at various times since 1900. An oil seep near Hilliard, in the NW¼ sec. 4, T. 13 N., R. 119 W., southwest of the quadrangle, was one of the first recorded occurrences of oil in this general area and was used by the Mormons in their historic journey to Salt Lake City in 1847. During 1976 significant gas and condensate were found in the Nugget Sandstone in an Amoco wildcat, 1 Champlin–224 Amoco-A, in the NW¼NW¼ sec. 19, T. 17 N., R. 118 W., about 6 miles northwest of the northwest corner of the Ragan quadrangle on the upper plate of the Absaroka thrust. This discovery (which led to development of the Ryckman Creek oil field), the thick Cretaceous section, and the small shows of oil and gas will probably encourage further exploration in the Ragan quadrangle.

REFERENCES

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Schroeder, M. L., 1978, Lithologic and geophysical logs drilled in the Meadow Draw and Ragan quadrangles, Uinta County, Wyoming: U.S. Geological Survey Open-File Report 78–658, 30 p.

Smith, J. B., Ayler, M. F., Knox, C. C., and Pollard, B. C., 1972, Strippable coal resources of Wyoming: U.S. Bureau of Mines Information Circular 8538, 51 p.

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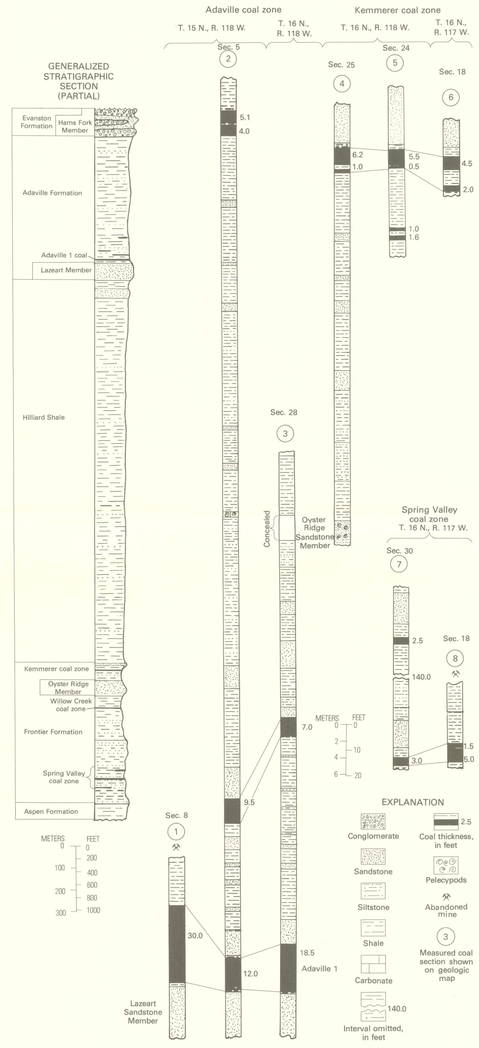
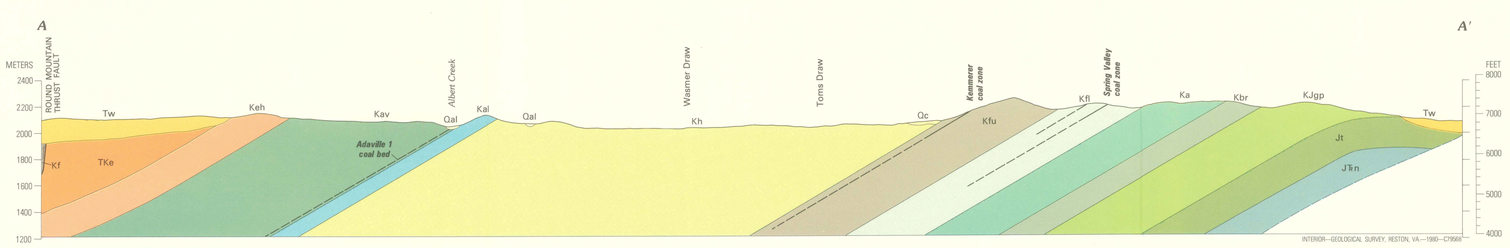
MEASURED COAL SECTIONS





GEOLOGIC MAP AND COAL RESOURCES OF THE RAGAN QUADRANGLE, UINTA COUNTY, WYOMING

By

Marvin L. Schroeder

1980

Base from U.S. Geological Survey, 1965
Photorevision as of 1968
10,000-foot grid based on Wyoming coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

APPROXIMATE MEAN DECLINATION, 1980

SCALE 1:24 000
1 MILE
1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

WYOMING
QUADRANGLE LOCATION

Geology mapped in 1974–75

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1980—C7956

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