

Qal	Qls	Holocene	Quaternary
QTg		Pleistocene and Pliocene?	
Tw		Eocene	TERTIARY
TKe		Paleocene	
Kav			
Kal		Upper Cretaceous	CRETACEOUS
Kf	Kfu		
	Kfl		
Ka			
Kbr		Lower Cretaceous	
KJsp		Upper Jurassic	

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS (HOLOCENE)

Qal	Alluvium
Qls	Landslide deposits
QTg	GRAVEL (PLEISTOCENE AND PLIOCENE?)--Cobble-gravel terrace deposits about 600 ft (183 m) above present stream drainages
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 ft (610 m) thick
TKe	EVANSTON FORMATION (PALEOCENE AND UPPER CRETACEOUS)--Gray siltstone, carbonaceous claystone, and shaly mudstone; minor amounts of quartzitic siltstone, gray carbonaceous sandstone, and some dark-brown concretionary ironstone. 200+ ft (61+ m) thick
Kav	ADAVILLE FORMATION (UPPER CRETACEOUS)--Predominantly gray-brown-weathering carbonaceous shale and mudstone that contain beds of yellowish-brown to reddish-brown sandstone and siltstone. Contains workable coal beds as much as 30 ft (9 m) thick (Adaville 1 coal) in lower part. 2,000+ ft (610+ m) thick.
Kal	Lazeart Sandstone Member--Light-gray to white, fine- to coarse-grained sandstone; basal part of formation. About 200-400 ft (61-122 m) thick
Kf	FRONTIER FORMATION (UPPER CRETACEOUS), UNDIFFERENTIATED, Shown on cross section only
Kfu	
Kfl	Upper unit--Middle part consists of a prominent hogback of white to light-gray-weathering, oyster-bearing sandstone (Oyster Ridge Sandstone Member) overlain by shale and thin beds of gray sandstone that contain the Kemmerer coal zone; underlain by a thick shale interval that contains the Willow Creek coal zone in the Kemmerer area. About 1,200 ft (366 m) thick
Ka	Lower unit--Dark-gray shale, tan siltstone, and brown sandstone; sandstone beds less resistant than those in upper unit; contains the Spring Valley coal zone in lower part. About 1,000 ft (305 m) thick
Ka	ASPEN FORMATION (LOWER CRETACEOUS)--Light- to dark-gray siltstone and shale, quartzitic sandstone, and porcellanite; forms prominent silver-gray hogbacks. About 900-1,000 ft (274-305 m) thick. Shown on cross section only
Kbr	BEAR RIVER FORMATION (LOWER CRETACEOUS)--Black to dark-gray fissile shale and olive- to tan-weathering, fine-grained sandstone; contains a few fossiliferous limestone beds. About 500-600 ft (152-183 m) thick. Shown on cross section only
KJsp	GANNETT GROUP (LOWER CRETACEOUS), STUMP SANDSTONE (UPPER JURASSIC), AND PREUSS RED BEDS (UPPER JURASSIC), UNDIFFERENTIATED--Total thickness about 4,000 ft (1,219 m) 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, tan to red sandstone and conglomerate Stump Sandstone--Greenish- to brownish-gray, crossbedded, fine-grained sandstone and limestone Preuss Red Beds--Purplish-red to red silty mudstone and thin beds of red, tan, and gray sandstone

ECONOMIC GEOLOGY

The eastern half of the Guild Hollow 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 eastern half of the quadrangle include subbituminous coal in the Adaville Formation, bituminous coal in the Frontier Formation, sand and gravel, and ground water. Oil and gas may occur at depth.

Coal beds of economic thickness in the Adaville Formation have long been known, having been first exploited in 1876 in the area west of Kemmerer, Wyo. In typical analysis, coal from the Adaville Formation would be high in moisture, low in ash, have a Btu/lb content of about 10,400, and contain about 0.6 percent sulfur (Smith and others, 1972). The coal is of subbituminous B rank.

In the eastern half of the Guild Hollow quadrangle, the Adaville Formation is known to be present only east of the Round Mountain fault. It is concealed over most of its extent by the flat-lying Wasatch Formation, and crops out only in the southwestern part of sec. 8, and the northwestern part of sec. 17, T. 15 N., R. 118 W. The thickest Adaville coal bed (Adaville 1) lies immediately above the basal Lazeart Sandstone Member and attains its greatest thickness of about 30 ft (9.1 m) at the old abandoned Lazeart mine in SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 8, T. 15 N., R. 118 W., just east of the quadrangle boundary. The amount of coal available for strip-mining operations is limited because of the 30° dip of the coal beds in the mine area, the steeply rising slope above the mine area in the Guild Hollow quadrangle, and the presence of the Round Mountain fault, which brings the Frontier Formation upward into fault contact with the Adaville. The amount of vertical displacement along the fault in this area is between 4,000 and 5,000 ft (1,219 and 1,524 m).

Coal beds in the Frontier Formation are much thinner but have a greater Btu/lb content than those in the Adaville and are minable only by underground 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, and the Spring Valley, near the middle of the lower part of the formation. The Willow Creek coal zone, however, is restricted to the Kemmerer area north of the quadrangle. The rank of the Kemmerer coal is high-volatile B bituminous. Berryhill and others (1950) give an analysis for a sample from the Kemmerer 6 mine, on an as-received basis, assaying 6.9 percent ash, 0.6 percent sulfur, and 12,880 Btu/lb.

In the eastern half of the Guild Hollow quadrangle, the Frontier is known to be present between the Absaroka thrust fault and the high-angle Round Mountain fault, with exposures limited to the southeastern part of the mapped area. It is probable that the Frontier occurs at depth west of the Absaroka thrust fault, as shown on section along A-A'. Only the Kemmerer coal zone crops out in the southeastern part of the mapped area, having been mined in the northern part of sec. 30, T. 15 N., R. 118 W., and prospected in sec. 12, T. 15 N., R. 119 W. Measurement of the vertical coal bed in the abandoned mine area in sec. 30 indicates about 4.7 ft (1.4 m) of coal in this part of the Kemmerer coal zone. The coal bed in sec. 12 is poorly exposed and no thickness measurements could be made. Undoubtedly, the Kemmerer coal zone, as well as the Spring Valley coal zone, is present in the Frontier under the extensive Wasatch cover that exists to the north of the Albert Creek area. The following factors probably preclude any extensive underground mining for many years: the structurally complex nature of the Frontier, the cover of the Wasatch Formation, the extensive drilling needed to outline reserve blocks, and the thinness of the coal beds.

Adequate supplies of sand and gravel for road building in this area are available from the unconsolidated Quaternary deposits. Ground water for domestic and stock use is generally derived from the Quaternary deposits. Sandstones within the Frontier are potential aquifers, but their structurally complex nature indicates that more drilling than normal might be necessary to produce adequate water supplies from them.

Oil and gas have not been produced in significant amounts within the mapped area. However, shallow wells along the Oil Spring fault have produced very small quantities of oil and gas. An oil seep near Hilliard, in the NW $\frac{1}{4}$ sec. 4, T. 13 N., R. 119 W., Sulphur Creek Reservoir quadrangle, about 8 mi (13 km) southwest of the mapped area, 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. Significant quantities of oil, gas, and condensate have since been found in the Nugget Sandstone in an Amoco wildcat, 1 Champlin-224 Amoco-A, in the NW $\frac{1}{4}$ sec. 19, T. 17 N., R. 118 W., Little Dee Creek quadrangle, about 6 mi (9 km) northwest of the northeast corner of the Guild Hollow quadrangle. Mapping in the Meadow Draw quadrangle, east of the discovery, suggests that this oil and gas discovery may be partly due to an extensive breccia zone along the western extension of the Shurtleff Creek fault. However, this nearby Jurassic(?) and Triassic(?) discovery, along with the overlying thick Cretaceous section and small shows of oil and gas within the Guild Hollow quadrangle, will undoubtedly encourage further exploration.

REFERENCES

- Berryhill, H. L., Jr., Brown, D. M., Brown, Andrew, and Taylor, D. A., 1950, Coal resources of Wyoming: U.S. Geol. Survey Circ. 81, 78 p.
Smith, J. B., Ayler, M. F., Knox, C. C., and Pollard, B. C., 1972, Strippable coal reserves of Wyoming--Location, tonnage, and characteristics of coal and overburden: U.S. Bur. Mines Inf. Circ. 8538, 51 p.
Veatch, A. C., 1907, Geography and geology of a portion of southwestern Wyoming, with special reference to coal and oil: U.S. Geol. Survey Prof. Paper 56, 178 p.

---	COAL BED--Dashed where approximately located
---	CONTACT--Approximately located
U D	FAULT--Dashed where approximately located; dotted where concealed. U, upthrown side; D, downthrown side. Arrows show relative movement
---	THRUST FAULT--Sawteeth on upper plate. Dotted where concealed
---	SYNCLINE--Showing troughline; dotted where concealed
65	STRIKE AND DIP OF BEDS
80	
+	
+	COAL MINE--Inactive or abandoned
x	COAL PROSPECT

