CORRELATION OF MAP UNITS

Qal	Qac		Holocene	QUATERNARY
Qls	Qls?	Qaf	Holocene and Pleistocene(?)	
Qtg			Pleistocene	
Tbp			Miocene and Pliocene(?)	TERTIARY
Kar			Upper Cretaceous	CRETACEOUS
Khu				
Khm				
Khl				
Ks				
Kn				

DESCRIPTION OF MAP UNITS

Qal — ALLUVIUM--Flood plain deposits of clay, silt, sand, and gravel in the valleys of Savery Creek and its larger tributaries

Qac — ALLUVIUM AND COLLUVIUM--Deposits of clay, silt, sand, and gravel in valleys of some small streams tributary to Savery and Big Sandstone Creeks; includes some alluvial fan deposits along the sides of valleys

Qaf — ALLUVIAL FAN DEPOSITS--Deposits of clay, silt, sand, and gravel; some deposits are dissected by the modern drainage system, others are now forming

Qls — LANDSLIDE DEPOSITS--Mostly composite landslide deposits (Varnes, 1958) consisting of large coherent blocks to heterogeneous mixtures of conglomerate, sandstone, shale, and their disaggregated counterparts derived mainly from pre-Quaternary formations exposed in quadrangle; some deposits may contain small islands of bedrock; landslides are both larger and more numerous on the east side of Savery Creek than on the west side, probably because in the westerly flowing ground-water regime dissected west-dipping rocks and sediments on the east side contain more water

Qls? — LANDSLIDE DEPOSITS?--Possible older, dissected landslide deposits

Qtg — TERRACE DEPOSITS--Deposits of sand and gravel along Savery Creek and a few of its principal tributaries; most of the deposits are strath deposits and are 5-15 ft (1.5-4.6 m) thick; the valley-side margins of the deposits are commonly overlain by colluvium

Tbp — BROWNS PARK FORMATION--Deposits of cobble and boulder conglomerate and sandstone which overlie all exposed older formations in the quadrangle with angular unconformity; conglomerate is generally dark yellowish orange and composed mostly of rounded clasts of igneous and metamorphic rocks derived from the Sierra Madre Range to the east; matrix material in conglomerate is commonly sand and clay minerals and is soft; carbonate forms a hard cement in some places; sandstone is light yellowish gray to dark yellowish orange, coarse grained, and conglomeratic to very fine and fine grained, clayey, commonly calcareous, and locally pyritic; thin tuff beds occur in the sandstone and the sandstone itself is generally tuffaceous; no more than the basal 270 ft (82 m), which is mostly conglomerate with lenticular intervals of sandstone as thick as 50 ft (15 m), crops out, although as much as 700 ft (213 m) of the formation may underlie some areas of Green Ridge near the center of the quadrangle

Kar — ALLEN RIDGE FORMATION--Mostly fluvial deposits of grayish- to yellowish-orange, yellowish- to light-gray sandstone and grayish-brown, olive, and dusky-yellow siltstone, mudstone, and claystone; few thin brown carbonaceous shale, impure coal, and coal beds; in northwestern part of sec. 31, T. 14 N., R. 88 W., as much as 2.5-4.0 ft (0.8-1.2 m) of coal grading to carbonaceous shale near base; 700-800 ft (213-244 m) exposed near southwestern corner of quadrangle; the upper part of the formation, which contains some marine and marginal marine beds, is not exposed in the quadrangle; one of four formations which make up the Mesaverde Group in south-central Wyoming (Gill, Merewether, and Cobban, 1970)

Khu — Upper part of the HAYSTACK MOUNTAIN FORMATION--Marine sandstone and shale; in northwestern part of sec. 31, T. 14 N., R. 88 W., consists in ascending order of (1) about 70 ft (21 m) of gray clay-shale to silt-shale interbedded toward the top with very thin grayish-orange siltstone to sandstone beds and (2) about 30 ft (9 m) of grayish-orange yellowish-gray to very light gray sandstone

Khm — Middle part of HAYSTACK MOUNTAIN FORMATION--Marine sandstone and shale; in northwestern part of sec. 31, T. 14 N., R. 88 W., consists in ascending order of (1) about 114 ft (35 m) of gray clay-shale (16 ft, 5 m), thin-bedded grayish-orange sandstone (6 ft, 1.8 m), and gray clay- to silt-shale (92 ft, 28 m) interbedded with gray- to grayish-orange sandstone near the top and (2) about 172 ft (52 m) of grayish-orange, yellowish-gray to very light gray sandstone very thinly interbedded with shale near the base and middle; sandstone unit at the top informally referred to as the "Savery Creek Sandstone"

Khl — Lower part of the HAYSTACK MOUNTAIN FORMATION--Marine sandstone and shale; consists in ascending order of (1) 120-140 ft (37-42 m) of grayish- to yellowish-orange glauconitic sandstone very thinly interbedded with gray shale near the base, (2) about 315 ft (96 m) of gray clay- to silt-shale with a few intervals of grayish- to yellowish-orange glauconitic sandstone very thinly interbedded with shale, and (3) 130-150 ft (40-46 m) of grayish-orange to yellowish and very light gray sandstone and subordinate gray clay-shale; the sandstone unit at the base is the Deep Creek Sandstone Member of Hale (1961), the middle shale unit is the Espy Tongue (of the Steele Shale) of Hale (1961), and the upper sandstone and subordinate shale unit is the Hatfield Sandstone Member (Gill, Merewether, and Cobban, 1970); the base of the Deep Creek is actually the base of both the Haystack Mountain Formation and the Mesaverde Group, but for mapping purposes here, the lower contact of the Haystack Mountain Formation is drawn at the top of its Deep Creek Sandstone Member

Ks — STEELE SHALE--Gray marine shale with a few intervals of very thinly interbedded shale and grayish- to yellowish-orange glauconitic sandstone; contact with chalky shales of the subjacent Niobrara Formation is gradational; probably includes some shale beds of the uppermost part of the Niobrara Formation near the eastern edge of the quadrangle; for mapping purposes the Deep Creek Sandstone Member of the Haystack Mountain Formation is included in the Steele Shale

Kn — NIOBRARA FORMATION--Subsurface only; gray shale and light-gray, bluish chalky shale

———— Contact
Dashed where approximately located, short dashed where inferred

U / D — Fault
Dashed where approximately located, short dashed where inferred, dotted where concealed: U, upthrown side; D, downthrown side

10 — Strike and dip of beds

◇ — Dry hole (oil and gas test)

References

Gill, J. R., Merewether, F. A., and Cobban, W. A., 1970, Stratigraphy and nomenclature of some upper Cretaceous and lower Tertiary rocks in south-central Wyoming: U.S. Geol. Survey Prof. Paper 667, 53 p.

Hale, L. A., 1961, Late Cretaceous (Montanan) stratigraphy, eastern Washakie Basin, Carbon County, Wyoming in Symposium on Late Cretaceous rocks, Wyoming and adjacent areas - Wyoming Geol. Assoc. 16th Ann. Field Conf., Green River, Washakie, Wind River, and Powder River Basins, 1961: Casper, Wyoming, Petroleum Inf., p. 129-137.

Varnes, David J., 1958, Landslide types and processes, in National Research Council, Highway Research Board, Special Report 29, p. 20-47.