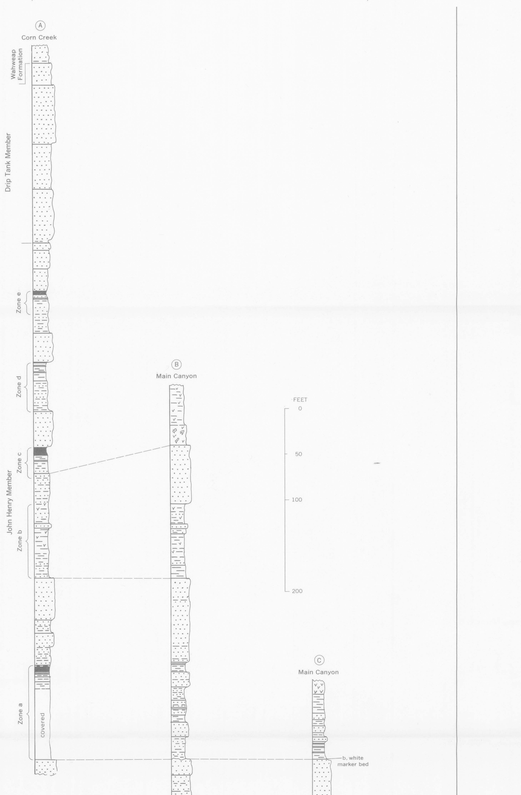
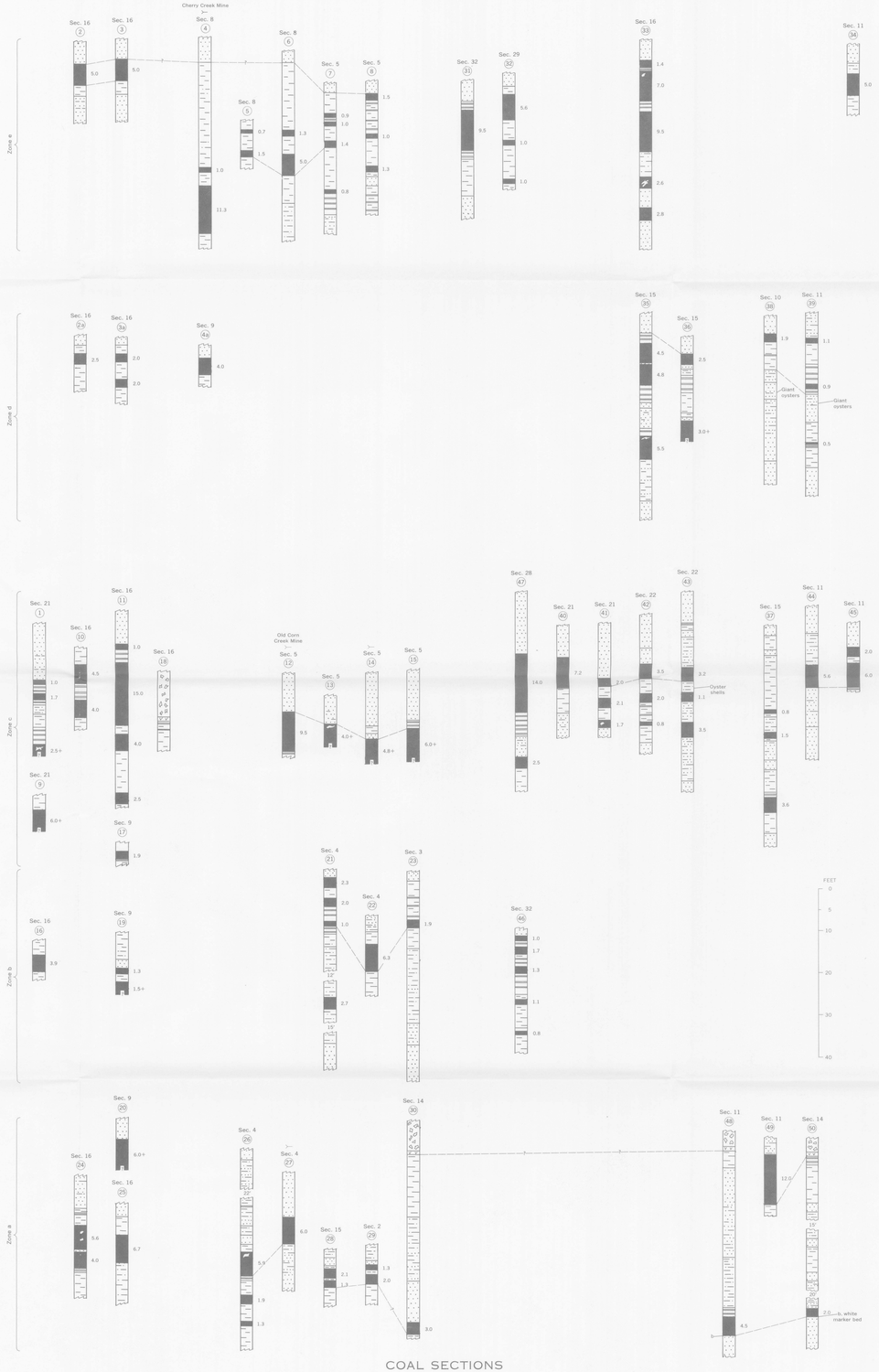
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

COAL INVESTIGATIONS
MAP C-61 (SHEET 2 OF 2)

MEASURED SECTIONS OF THE STRAIGHT CLIFFS FORMATION





EXPLANATION

- Conglomeratic sandstone
- Sandstone
- Siltstone
- Mudstone or shale
- Carbonaceous mudstone
- Coal — *Thickness, in feet*
- Impure coal
- Coal — *Base covered; minimum thickness, in feet*
- Burned coal
- Baked brecciated beds
- Interval omitted
- (15) Location shown on geologic map
- Coal mine — *Inactive or abandoned*

COAL SECTIONS

GENERALIZED COLUMNAR SECTION

SYSTEMS	SERIES	FORMATION AND MEMBER	THICKNESS, IN FEET	LITHOLOGY	DESCRIPTION
QUATERNARY	Pleistocene and Holocene	Surficial deposits			Surficial deposits of alluvium, colluvium, slope wash, and talus. Alluvium is silt, sand, and gravel. Colluvium and slope wash are composed of poorly sorted silt, sand, gravel, and angular fragments of bedrock; includes areas where bedrock is obscured by soil, vegetation, or debris derived from older surficial deposits. Talus deposits are composed mostly of angular fragments and blocks of latite and include active and inactive rubble streams. Large area in northwestern part of quadrangle is mapped as undifferentiated surficial deposits, a complex of surficial material masking bedrock and including soil, slope wash, colluvium, talus, protalus ridges, rubble streams, and rockfall, earthflow, landslide, and slump deposits.
		UNCONFORMITY			
TERTIARY	Miocene(?)	Tuff of Osiris	200–600		Landslide deposits consist of mixed debris of soil, mud, and fragments of bedrock or large slump or slide blocks of latite or limestone. Older landslide(?) remnant mapped in northern part of quadrangle is a crudely stratified deposit of red calcareous mudstone containing large blocks of pink limestone that dips steeply southward (may be older than Quaternary).
		UNCONFORMITY			Older valley-fill is mostly older alluvium and colluvium along Main Canyon and its tributaries as much as 150 feet above present drainage.
	Eocene	Variegated sandstone member	280–400		Terrace gravels are undivided remnants of terrace deposits at several levels, generally composed of well-rounded pebbles, cobbles, and boulders of latite, quartzite, and chert. Also contains abundant fragments of limestone and quartzite pebbles and cobbles. Mostly cobbles and boulders of volcanic rock along North Creek.
	Wasatch Formation	White limestone member	200–550		Pediment deposits are poorly sorted and stratified, partly consolidated deposits of subrounded to subangular pebble- to boulder-sized fragments of white limestone and latite and well-rounded pebbles and cobbles of quartzite, all in a sand, silt, and clay matrix. Deposits form even surfaces whose gentle to moderate slopes extend away from steep mountain fronts.
		Pink limestone member	700–850		Older pediment remnants are isolated remnants of pediment deposits at higher levels. Includes other surficial deposits of similar composition but of uncertain origin.
	Paleocene	*LOCAL UNCONFORMITY*			Latite, light- to medium-gray, porphyritic; mostly densely welded ash-flow tuff; contains abundant sanidine phenocrysts; commonly shows flow structure and locally contains coarse flow breccia. Base mostly obscured by talus. Equivalent to the tuff of Osiris in the Salina quadrangle (P. L. Williams, oral commun., 1970; Williams and Hackman, 1971).
		Pine Hollow Formation	0–400		Sandstone, siltstone, mudstone, and limy mudstone, pink to red, soft; interbedded with white to gray fine- to coarse-grained sandstone. A basal conglomerate (10–30 ft) contains well-rounded pebbles of abundant dark chert, light quartzite, and gray limestone. Unit thickens northwestward, and 2 miles northwest of quadrangle is more than 600 feet thick and is overlain by several hundred feet of white tuffaceous sediments beneath the latite flows. Member mostly covered by debris from overlying volcanic rocks.
		LOCAL UNCONFORMITY			Limestone; white to light-gray, very fine granular to microcrystalline; contains thin yellowish-gray mudstone interbeds, mostly in lower part; some beds contain probable early to middle Eocene fresh-water gastropods. Thins eastward and grades laterally into pink clastic limestone and limy mudstone. Forms white cliffs with narrow benches or steep forested slopes.
TERTIARY(?)	Paleocene(?)	Canaan Peak Formation	0–800		Limestone, pink, pale-orange, light-gray, and white, commonly mottled pink or yellow, irregularly bedded to massive, very fine grained to fine-grained, clastic; contains thin gray to red limy mudstone interbeds. Locally contains lenticular fine- to coarse-grained calcareous sandstone and thin (1–6 ft) dark-gray microcrystalline limestone beds containing dark shell fragments. Overall pink color of member produced by stain from interbedded red units. Forms pink cliffs, columns, and spires where deeply eroded or steep forested slopes.
		UNCONFORMITY			Mudstone and claystone, gray, purplish-gray, or red. Mudstone is commonly arenaceous or calcareous, grading to light-gray sandy limestone. Sandstone is light-gray, fine- to medium-grained, and lenticular near middle of formation. Contains interbeds of gray, tan, or red fine- to coarse-grained sandstone, mostly in lenses and channels. Thick conglomerate lenses common near base. Overall color of formation ranges from dominantly gray to bright red. Thickly exposed in quadrangle and forms gentle to moderate slopes mostly covered by soil and vegetation. Upper and lower contacts in adjacent quadrangles locally marked by unconformity or disconformity. Lower part intertongues with Canaan Peak Formation southwest of quadrangle. Wedges out to northwest over Dutton monocline, but nature of wedge not obscured by surficial deposits. West of the quadrangle, this formation, formerly included in the Wasatch Formation, is separated from the pink limestone member of the Wasatch by an unconformity.
		Kaiparowits Formation	600–2,600		Sandstone, conglomeratic sandstone, and conglomerate, interbedded, tan, pink, or red near top to light-brown or gray in lower part. Contains multicolored rounded pebbles, cobbles, and small boulders of quartzite, chert, dense to porphyritic acidic igneous rocks, and minor amounts of gray limestone; some boulders exceed 12 inches in diameter. Type section south of quadrangle yielded Late Cretaceous (Campanian) palynomorphs. Poorly exposed and forms steep gravel-covered slopes. Base unconformable on Kaiparowits Formation. Beds deformed along steep limb of Dutton monocline. Wedge out to northeast on Dutton monocline obscured by surficial deposits. This coarse clastic unit, formerly considered to be the basal conglomerate of the Wasatch Formation, is unconformable on the Kaiparowits Formation and west of the quadrangle is unconformable beneath the pink limestone member of the Wasatch Formation.
CRETACEOUS	Upper	Wahweap Formation	900–1200		Sandstone, light-gray to white, fine- to coarse-grained, thick-bedded to massive, crossbedded, in upper 250–500 feet; contains gray shale interbeds and grades into Kaiparowits Formation in upper 100 feet. Sandstone, light- to dark-brown, fine- to medium-grained, crossbedded, lenticular, and interbedded gray mudstone in lower 650 feet. Formation forms low cliffs or hogbacks, benches, and slopes. Base is conformable on Straight Cliffs Formation.
	Straight Cliffs Formation	Drip Tank Member	200–350		Sandstone, light-gray to white, medium- to coarse-grained, locally conglomeratic, massive, crossbedded, cliff-forming.
		John Henry Member	900		Sandstone, mudstone, carbonaceous mudstone, and coal. Sandstone is light gray to light brown, very fine grained to coarse grained, and crossbedded. Mudstone is olive gray to light brown. Carbonaceous mudstone is dark gray to black. Upper part contains the major coal resources in quadrangle. Marker bed b, a white fine- to medium-grained massive cliff-forming sandstone, 40–80 feet thick about 400 feet above base, marks base of lowest major coal zone present in quadrangle. Marker bed not mapped in southern part of area where it changes character and becomes indistinct.
		UNCONFORMITY			
		Smoky Hollow Member	300		EXPOSED SUBSURFACE[1] Sandstone, light-gray to light-brown, fine- to coarse-grained, massive, conglomeratic. May contain mudstone or carbonaceous mudstone and thin coal beds in upper and lower parts.
		Tibbet Canyon Member	80–100		Sandstone, light-brown, fine-grained, partly crossbedded, marine. Not exposed in quadrangle.
		Tropic Shale	600–700		Shale, medium- to olive-gray. Contains thin grayish-orange fine-grained sandstone interbeds in upper 100 feet. Some thin beds of bentonite and limestone concretions near base.
	Lower(?)	Dakota Formation	120–160		Sandstone, grayish-orange; interbedded with light-olive-gray shale in upper half. Coal beds may be present in about middle of formation. Brownish-black carbonaceous claystone, shale, and siltstone and some beds of grayish-orange sandstone in lower half. At some places conglomerate occurs at base.
		UNCONFORMITY			
		Morrison Formation	30–150		Sandstone and conglomerate, gray. Pebbles of red chert, limestone, petrified wood, and quartzite in upper part. Light-gray massive fine-grained sandstone and interbedded greenish-gray and reddish-brown shale in lower part. May be cut out by pre-Dakota erosion.
		Summerville Formation	60–110		Claystone and siltstone, mottled dark-reddish-brown and grayish-olive; 1- to 2-foot-thick dense gray partially recrystallized limestone 16 feet from top. Recent work by Fred Peterson (oral commun., 1970) indicates that rocks mapped as Summerville may belong to the Morrison Formation. May be cut out locally by pre-Dakota erosion.
	Upper	Entrada Sandstone	950–1000		Sandstone, light-gray to very pale orange, fine-grained, crossbedded, massive, in upper 250 feet; interbedded reddish-brown sandstone and red and gray shale in middle 400 feet; reddish-brown silty sandstone in about basal 350 feet.

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SYSTEMS	SERIES	FORMATION AND MEMBER	THICKNESS, IN FEET	LITHOLOGY	DESCRIPTION
JURASSIC	Middle and Upper	Carmel Formation	490–590		Siltstone and claystone, mottled reddish-brown to greenish-gray; thin-bedded crinkly yellowish-gray limestone in upper part; pale-reddish-brown calcareous siltstone containing some interbeds of limestone and shale in lower part. Thousand Pockets Tongue of Navajo Sandstone may be included with lower part.
TRIASSIC(?) AND JURASSIC		Navajo Sandstone	1,500–1,550		Sandstone, grayish-orange, medium- to fine-grained, massive, cliff-forming; large-scale festoon crossbedding.
TRIASSIC(?)	Upper	Kayenta Formation	250–320		Sandstone, reddish-brown, thin- to thick-bedded, and interbedded siltstone.
TRIASSIC	Upper	Wingate Sandstone	200–260		Sandstone, reddish-orange to reddish-brown, fine-grained, crossbedded, massive.
		UNCONFORMITY			
	Lower and Upper	Chinle Formation	440–460		Claystone, variegated greenish-gray and grayish-red, bentonitic; interbedded with pale-red to reddish-orange sandstone; some conglomerate near base.
		Shinarump Member	60–100		Sandstone, light-gray, medium-grained, crossbedded.
		UNCONFORMITY			
	Lower and Middle(?)	Moenkopi Formation	800–880		Sandstone, shale, and siltstone, reddish-brown.
PERMIAN	Lower	Timpoweap Member	60–70		Dolomite, tan to buff; oil-stained in part; contains a thin gray siltstone parting.
		UNCONFORMITY			
		Kaibab Limestone	140–200		Dolomite, light-gray to tan; contains abundant chert; fractures and vugs are oil saturated. Contains main oil-producing zones of Upper Valley oil field.
		White Rim Sandstone Member of Cutler Formation	140–170		Sandstone, light-gray, dolomitic; some interbedded light-brown dolomite.
		Toroweap Formation	360–420		Dolomite, light-brown, dense; interbedded light-gray sandstone, oil-stained in part; interbedded anhydrite throughout.
		Organ Rock Member	140–160		Siltstone, light-gray to light-red; some brown oil-stained sandstone.
		Cutler Formation — Cedar Mesa Sandstone Member	1,350–1,400		Sandstone, light-gray to buff, fine- to medium-grained. Lower one-third contains interbedded tan to buff limestone and dolomite.
		UNCONFORMITY			
PENNSYLVANIAN		Hermosa Formation	340		Sandstone, light-gray; interbedded buff dolomite and reddish- and purplish-gray siltstone.
		Molas Formation	40–70		Shale, reddish-gray; some limestone concretions and sandstone.
		UNCONFORMITY			
MISSISSIPPIAN	Lower and Upper	Redwall Limestone	900		Limestone and dolomite, light-gray to buff. Extensive karst topography at top. Many cavernous intervals.
DEVONIAN	Lower	Ouray Limestone	160		Limestone, buff, dense.
CAMBRIAN	Upper		230		Dolomite, buff; some interbedded sandstone and greenish-gray shale.
		(?)UNCONFORMITY(?)			
			100		Dolomite, buff, and interbedded greenish- and reddish-gray shale.

[1] Subsurface data modified after Zeller (1973). No subsurface data is available in the quadrangle.

GEOLOGIC MAP AND COAL RESOURCES OF THE GRIFFIN POINT QUADRANGLE, GARFIELD COUNTY, UTAH

By
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1973

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1973—C71326