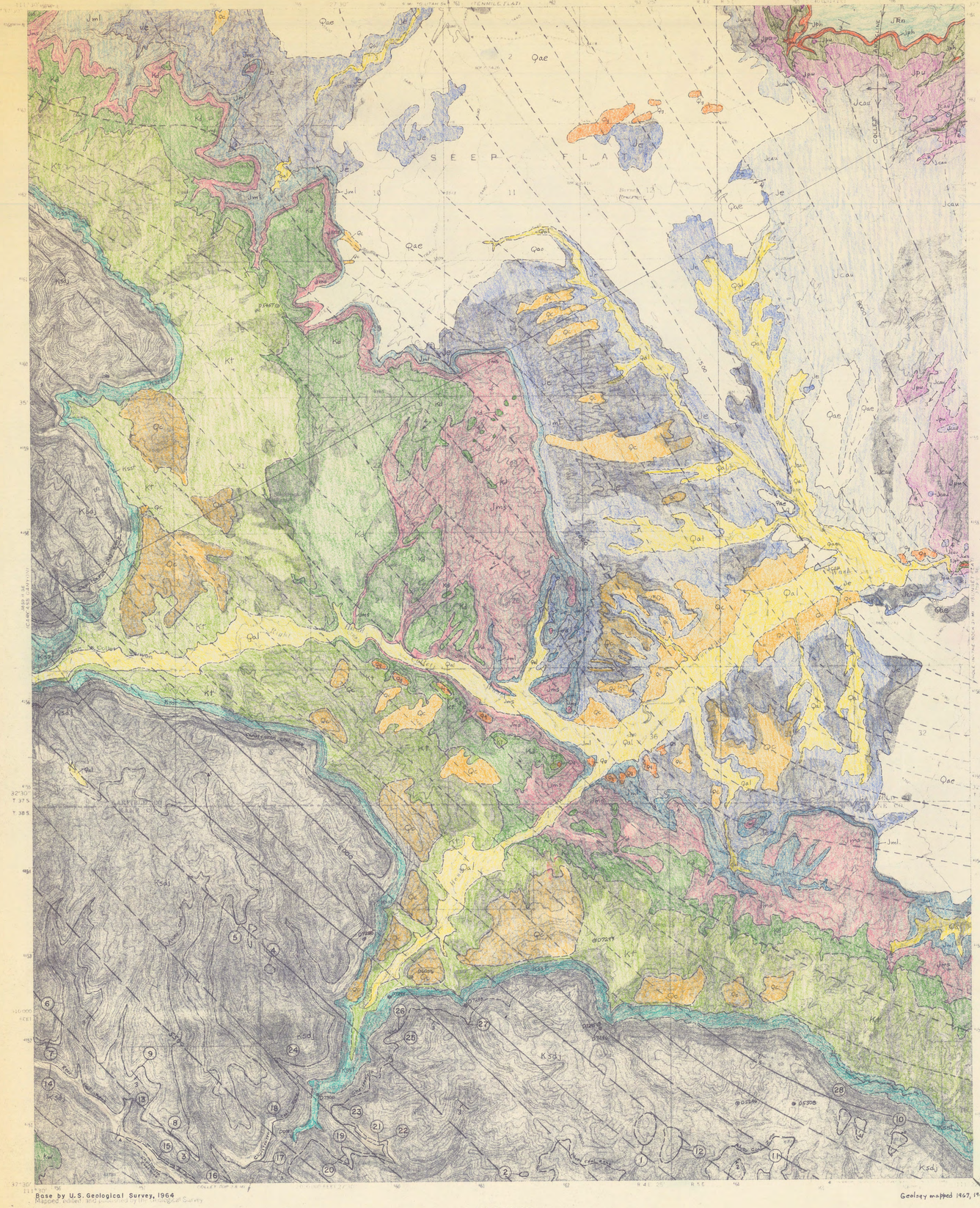


CORRELATION OF MAP UNITS

Qal, Qae, Qc, Qg	HOLOCENE AND PLEISTOCENE	QUATERNARY
unconformity		
Kw	UPPER CRETACEOUS	CRETACEOUS
Ksdj		
unconformity		
Ksst		
Kt		
Kd	UPPER AND LOWER(?) CRETACEOUS	
unconformity		
Jms	UPPER JURASSIC	JURASSIC
Jml		
unconformity		
Je	UPPER AND MIDDLE JURASSIC	
Jcau		
Jpu	MIDDLE JURASSIC	
Jcj		
Jph		
unconformity		
JRn		JURASSIC AND TRIASSIC(?)

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS (HOLOCENE AND PLEISTOCENE)

- Qal — Alluvium
- Qae — Alluvium and eolian deposits
- Qc — Colluvium
- Qg — Gravel deposits

Kw — WAHWEAP FORMATION (UPPER CRETACEOUS)

STRAIGHT CLIFFS FORMATION (UPPER CRETACEOUS)

- Ksdj — Drip Tank and John Henry Members
- Ksst — Smoky Hollow and Tibbet Canyon Members

Kt — TROPIC SHALE (UPPER CRETACEOUS)

Kd — DAKOTA FORMATION (UPPER AND LOWER? CRETACEOUS)

MORRISON FORMATION (UPPER JURASSIC)

- Jms — Salt Wash Member
- Jml — Lower member

Je — ENTRADA SANDSTONE (UPPER JURASSIC)

Jcau — UPPER MEMBER OF CARMEL FORMATION (UPPER AND MIDDLE JURASSIC)

Jpu — UPPER SANDSTONE TONGUE OF SANDSTONE AT PAGE (MIDDLE JURASSIC)

Jcj — JUDD HOLLOW TONGUE OF CARMEL FORMATION (MIDDLE JURASSIC)

Jph — TONGUE AT HARRIS WASH OF SANDSTONE AT PAGE (MIDDLE JURASSIC)

JRn — NAVAJO SANDSTONE (JURASSIC AND TRIASSIC?)

① 2.1 — Coal bed-- Dashed where approximately located; short dashed where inferred. Thickness of coal, in feet, measured at triangle. Number in circle refers to measured coal section

Clinker and ash of burned coal bed-- Approximately located

Contact-- Approximately located; short dashed where inferred

Anticline-- Showing crestline and direction of plunge; approximately located

Strike and dip of beds

Component of dip-- Dot marks point of observation

—6500— Structure contours-- Drawn on top of Smoky Hollow and Tibbet Canyon Members of Straight Cliffs Formation. Dashed where control less accurate; short dashed where projected over land surface. Contour interval 100 feet

@ D5457 Fossil locality-- U.S. Geological Survey collection number (Denver catalogue)

ECONOMIC GEOLOGY

The Seep Flat 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.

Coal

Coal occurs in the southwestern part of the map area in the Cretaceous Straight Cliffs Formation that crops out along the Straight Cliffs escarpment. The main coal beds, which are poorly exposed, are in the Alvey and Christensen coal zones of the John Henry Member of the Straight Cliffs.

The Alvey coal zone is at the top of the John Henry Member, which is 1,000 feet thick. The Christensen coal zone is about 600-700 feet above the base of the Straight Cliffs Formation near the middle of the John Henry Member. A few thin coal beds are found in the Rees coal zone between the Alvey and Christensen coal zones. A local coal zone near the base of the Smoky Hollow Member contains a thin coal bed at one place, but this zone throughout the rest of the quadrangle is represented by only carbonaceous shale.

Individual coal beds are in general lenticular, grading laterally into carbonaceous shale, and in a few places interfinger with sandstones that were deposited along a beach or offshore bar. Marine oyster beds occur below and above coal beds, indicating fluctuations of the shoreline. The strand line during deposition of the Alvey coal zone trended about N. 20° W., and field observations indicate that both the Alvey and the Christensen coal zones are more persistent in a northwesterly direction. The coal was deposited in a lagoonal-type environment, and coal beds are less continuous perpendicular to the strand line.

Coal beds 1 foot 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 correlated any significant distance from a measured section. In general, the symbol or line showing a coal bed on the geologic map represents a single bed, but on steep cliff faces it may represent an interval of as many as four or five coal beds (see coal sections 15, 16, 17, and 24). The only coal of significance is found in the extreme southwest corner of the quadrangle where the Christensen zone contains a 12.5-foot bed at coal section 15. At coal section 16, 3,000 feet southeast of coal section 15, a 6-foot and a 6.9-foot coal bed are separated by 2 feet of carbonaceous shale. To the northeast 1,500 feet at coal section 17, these beds thin to 3.5 and 4.0 feet, carbonaceous shale replacing much of the coal. From coal section 17 eastward and northward, no coal more than 4 feet thick occurs in the Christensen zone. At coal section 18 (1,700 ft north of 17) only a 1.5-foot bed in the Christensen zone is present.

The coal in the Alvey zone is generally thin and poorly exposed, and only at coal section 5 does it attain a local thickness of 5 feet; the bed thins to 1 or 2 feet in both directions along the outcrop.

Information on the quality of the coal in the quadrangle is not available; however, an analyses of the coal in the Christensen zone about 15 miles to the northwest at the Dan Shurtz mine (Gregory and Moore, 1931, p. 153) on an air-dried basis showed 12.20 percent moisture, 39.35 percent volatile matter, 44.20 percent fixed carbon, 4.25 percent ash, and 0.82 percent sulfur and a heat value of 11,108 British thermal units.

Resources.--Coal resources were not calculated for individual beds within a coal zone because of limited exposures and the lenticularity of the beds. Total resources were estimated by adding the average thickness of coal in each zone in beds more than 4 feet thick and multiplying by the average weight of 1,770 tons per acre-foot for subbituminous coal. According to these calculations the Seep Flat quadrangle contains about 2 million tons of total coal resources, all in the Christensen coal zone in the southwest corner of the quadrangle.

Oil and gas

An oil and gas test hole was drilled by Webb Resources, Inc., just 200 feet east of the quadrangle on the axis of the Collet anticline in sec. 17, T. 37 S., R. 5 E. The Kaibab Limestone and the Cedar Mesa Member of the Cutler Formation, both of Permian age, were tested, but the hole was dry and was abandoned. The top of the Kaibab was drilled at 3,330 feet, and the top of the Cedar Mesa was drilled at 4,020 feet. The total depth was 4,097 feet.

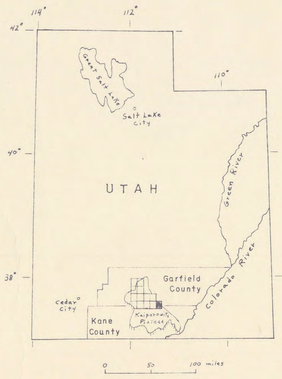
REFERENCE CITED

Gregory, H. E., and Moore, R. C., 1931, The Kaiparowits region, a geographic and geologic reconnaissance of parts of Utah and Arizona: U.S. Geol. Survey Prof. Paper 164, 161 p.

FOSSIL COLLECTIONS

[Identifications and zone assignment by W. A. Cobban]

USGS locality No.	Collector	Fossils
D5308	Fred Peterson	"These inoceramids seem rather closely related to Inoceramus (Cordiceramus) muelleri Petrascheck from the upper Santonian of Europe. Poorly preserved inoceramids resembling the Utah specimens have been found in the Clioscaphites choteauensis zone in Montana (late Santonian)" (W. A. Cobban, written commun., July 1, 1966).
D5296	----do.	Inoceramus sp. "This specimen has a truncate anterior margin like that of some inoceramids in the Scaphites hippocrepis zone. Possibly the specimen is that young (early Campanian)" (W. A. Cobban, written commun., June 16, 1966).
D7296	----do.	Crassostrea sp. Protodonax oblongus (Stanton). Cardium sp. Tellina sp.
D7285	----do.	Baculites codyensis Reeside.
D7298	----do.	Cymbophora sp. Placenticeras sp.
D6057	----do.	Baculites codyensis Reeside. Protexanites shoshonensis (Meek). Placenticeras sp.
D7295	----do.	Nucula (Pectinucula) sp. Inoceramus stantoni Sokolow. Anomia subquadrata Stanton. Lucina sp. Cardium cf. C. pauperculum Meek. Cyprimeria sp. Cymbophora sp. Placenticeras sp.
D7300	----do.	Inoceramus stantoni Sokolow. Tellina sp. Cymbophora cf. C. emmonsi (Meek). Gyrodes depressa Meek. Placenticeras n. sp.
D7297	----do.	Inoceramus aff. I. koeneni Müller. Species should be lower Coniacian (W. A. Cobban, oral commun., April 14, 1971).
D7299	----do.	Inoceramus aff. I. howelli White.
D6056	----do.	Inoceramus sp. Ostrea sp. Legumen cf. L. ellipticum Conrad. The inoceramid resembles an undescribed species from the Prionocyclus hyatti zone of the Black Hills region.
D5457	H. D. Zeller	Exogyra sp. Psilomya meeki White. Turritella whitei Stanton. Sciponoceras gracile (Shumard). Allocrioceras annulatum (Shumard).



This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards or nomenclature

PRELIMINARY

GEOLOGIC MAP AND COAL RESOURCES OF THE SEEP FLAT QUADRANGLE, GARFIELD AND KANE COUNTIES, UTAH

By
H. D. Zeller and E. V. Stephens

1972