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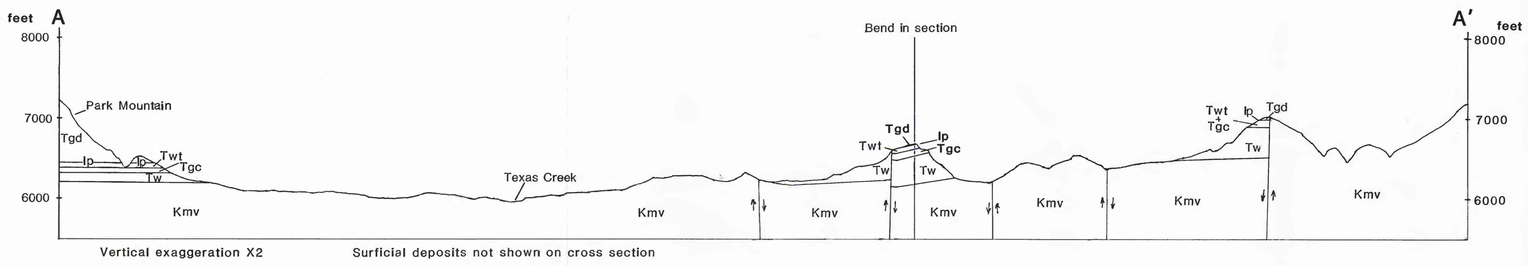

GEOLOGIC MAP OF THE TEXAS CREEK QUADRANGLE, RIO BLANCO COUNTY, COLORADO

By
Richard W. Scott, Jr. and Michael P. Pantea

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CORRELATION OF MAP UNITS

Qal, Qc, Qs	Holocene	QUATERNARY
	Holocene and Pleistocene(?)	QUATERNARY
Unconformity		
Tgc, lp, Twt, Tgd	Eocene	TERTIARY
Tw	Eocene and Paleocene	TERTIARY
Unconformity		
Kmv	Upper Cretaceous	CRETACEOUS

DESCRIPTION OF MAP UNITS

Qal **Alluvium (Holocene)**--Unconsolidated clay, silt, sand, and gravel in and along active stream channels. May also include some slope-wash, fan, and terrace deposits. In flat areas near heads of intermittent streams also includes fine silty eolian deposits. Gravel clasts are composed of sandstone, siltstone, and mudstone; these clasts are tabular and do not usually exceed 2 in. in longest dimension. Clinkered rock clasts are found in alluvium in northeast quarter of quadrangle where major coal beds of Mesaverde Group crop out

Qc **Colluvium (Holocene)**--Unconsolidated clay, silt, sand, and gravel of slope-wash, eolian, terrace, pediment, slump, and alluvial origin. Terrace- and pediment-type deposits bordering active stream channels dip gently toward stream. A thin veneer of sand and gravel of fluvial origin cap these deposits. Locally associated with grassland vegetation. In northwest quarter of quadrangle, composed of fine-grained sand- and silt-sized particles of presumed eolian origin

Qs **Slump and landslide deposits (Holocene and Pleistocene?)**--Includes unconsolidated talus, slope wash, and associated mass-wasting debris, which range from clay-sized particles to large boulders. Commonly forms conspicuous hummocky topography. Slumps and landslides commonly occur on steep walls along Wasatch Formation-Green River Formation contact, and Mesaverde Group-Wasatch Formation contact. Locally associated with faults

Green River Formation (Eocene)--Predominantly of lacustrine origin

Tgd **Douglas Creek Member**--Consists of light-gray fissile shale, brown sandstone and calcareous siltstone, light-gray to light-yellow oolitic, ostracodal, and algal limestone, brown and gray marlstone, grayish-green and gray claystone, and a few thin dark-brown to gray oil-shale beds. Bituminous sandstone crops out in lower part of the Douglas Creek Member east of mapped area (R.W. Scott, Jr. and B.E. Barnum, unpub. mapping, 1987) but none was found in the Texas Creek quadrangle. Sandstone beds are fine- to very fine grained and are locally trough cross-stratified. Sandstone and siltstone beds weather to cliffs and ledges of limited lateral extent. Locally within sandstone beds lateral accretion bedding is present. Limestone beds range from several inches to several feet in thickness and weather to ledges and benches that are usually laterally extensive and form local marker beds. Oolitic and ostracodal beds weather reddish brown to orange brown; algal beds weather light gray to white. Marlstone and claystone weather to slopes but, where more thoroughly indurated, may form ledges ranging from several inches to several feet in thickness. Oil shale weathers silver gray to whitish and forms conspicuous ledges with papery edges. Top of member eroded; maximum remaining thickness about 800 ft on Park Mountain

lp **Long Point Bed**--Light-brown to tan ostracodal limestone marker bed containing Goniobasis and Viviparus gastropods (Johnson, 1984). Base of Long Point Bed is lower contact of Douglas Creek Member of Green River Formation (Tgd) and marks beginning of Long Point transgression (Johnson, 1984). Bed is 3 in. to about 2 ft in thickness, thinning to east, and weathers to a conspicuous reddish-brown or orange-brown ledge or bench. In western half of quadrangle, overlies a fluvial tongue of Wasatch Formation but, in eastern half of quadrangle, tongue of the Wasatch is unrecognizable or is absent, and Long Point Bed overlies lacustrine beds of Cow Ridge Member of Green River Formation (Tgc)

Tgc **Cow Ridge Member**--Predominantly lacustrine unit consisting of yellow-brown to tan ostracodal, oolitic, and algal limestone, yellow-brown sandstone, ostracodal and oolitic sandstone, and a few thin beds of gray fissile shale. Limestone beds weather to ledges 1 in. to 3 ft thick. Sandstone beds are fine- to very fine grained, have channel-form geometry, and weather to cliffs and ledges 2 ft to about 15 ft thick. Shale beds weather to steep slopes. Thins from about 90 ft in thickness along west edge of quadrangle to approximately 20 ft at eastern edge of quadrangle (sec. 20, T. 3 S., R. 102 W.). Absent at south end of Texas Mountain, which is about 2 mi east of quadrangle (R.W. Scott, Jr. and B.E. Barnum, unpub. mapping, 1987). Along south margin of quadrangle, member includes beds mapped elsewhere as part of unnamed tongue of Wasatch Formation. Where member is too thin to map, it is included with Long Point Bed (lp)

Wasatch Formation (Eocene and Paleocene)

Twt **Unnamed tongue of Wasatch Formation**--Consists of maroon, gray, and light-green shale, mudstone, and claystone, and light-gray to brown sandstone and siltstone. Shale, mudstone, and claystone weather to slopes of variable gradient and may have surfaces that are covered with a thin veneer of claystone clasts forming a ball-bearing or popcorn-like surface. Sandstones are fine- to very fine grained and usually contain abundant trough cross-stratification. Sandstone and siltstone beds extend laterally as far as several hundred feet and weather to cliffs and ledges ranging from 2 ft to 30 ft in thickness. Stratigraphic intervals that are predominantly sandstone may be continuous across many miles. Isolated sandstone channels may occur anywhere throughout vertical extent of tongue, suggesting that this tongue was deposited on a flood plain of low relief. Tongue may be part of unit X of Renegade Tongue of Wasatch Formation (Cashion, 1967). Where exposed in western part of quadrangle thickness is 40-80 ft. Along south margin of quadrangle, (sec. 27, T. 3 S., R. 103 W.) 20-40 ft is exposed but is mapped with Cow Ridge Member of Green River Formation. Not mapped separately in extreme northwest corner of quadrangle and is included with Long Point Bed (lp)

Tw **Main body**--Composed of maroon, gray, and green shale, mudstone and claystone, dark-brown to black carbonaceous shale, and brown, yellow-brown, light-red, and white sandstone. Shale, mudstone, and claystone weather to slopes. Locally slopes have a popcorn-like or a ball-bearing surface as in tongue of Wasatch (Twt). Sandstone beds are very fine to fine grained, are cross-stratified to apparently structureless, and may contain siltstone and claystone rip-up clasts along bedding planes. Sandstone and siltstone beds weather to ledges and cliffs ranging from 3 ft to about 30 ft in thickness. As with unnamed tongue of Wasatch Formation, sandstone ledges of limited lateral extent occur throughout main body making correlation of individual sand bodies impossible. Red-bed units within main body of Wasatch are randomly distributed and are not laterally continuous throughout quadrangle. Sandstone beds at base of member are medium grained and contain rounded quartzite pebbles. Pebbles may be scattered, concentrated along bedding planes, or form lenses of matrix-supported conglomerate that are laterally extensive and as thick as 4 ft. Conglomeratic interval usually overlies one or more fine-grained, white, cliff-forming sandstone beds. Conglomerate-bearing sandstone is mapped as lowermost part of Wasatch Formation. Conglomerate lenses pinch out to east. In eastern part of quadrangle, main body of Wasatch Formation contains fewer and thinner maroon beds and black carbonaceous shale separates several beds of friable white very fine grained sandstone. Both rock types weather to steep slopes along eastern margin of quadrangle. White sandstone beds in eastern part of quadrangle contain abundant kaolinite, possibly indicating repeated episodes of subaerial exposure and weathering during deposition of basal Wasatch. A zone of silicified wood fragments occurs near the same stratigraphic interval in northwest corner of quadrangle (SE1/4SE1/4 sec. 19, T. 2 S., R. 103 W.). Pollen recovered near Cretaceous-Tertiary unconformity in NW1/4 sec. 13, T. 3 S., R. 103 W. indicates a late Paleocene age for base of Wasatch Formation (genera Momipites and Caryapollenites; USGS paleobotany loc. no. D5237-C) and a Campanian age for underlying Mesaverde Group (genera Tricolpites, Interangulus, and Loranthacites; USGS paleobotany loc. no. D5237-B) (D.J. Nichols, written commun., 1987). Thickness ranges from about 100 ft to 400 ft in most of quadrangle; thins to approximately 70 ft along east margin of quadrangle, where accurate thickness measurement is difficult because of extensive cover and slumping

Kmv **Mesaverde Group, undifferentiated (Upper Cretaceous)**--White, gray, and light-brown sandstone, gray and black silty and carbonaceous shale, and coal beds. In upper part of group, sandstone is fine to medium grained and usually cross-stratified. In cross section, sand bodies are channel-form and contain scoured lower contacts and fining-upward sequences. Some sandstone bodies in upper third of Mesaverde Group extend laterally for more than 0.5 mi. Sandstone beds near top of Mesaverde Group have a bright white appearance, which may result from weathering alteration of feldspar to kaolinite during the hiatus represented by Cretaceous-Tertiary unconformity. Sandstone weathers to cliffs that range in thickness from 2 ft to more than 50 ft. Sandstone is often interbedded with thin laminations of shale, siltstone, and flecks of coal. Shale weathers to steep slopes. In northeast corner of quadrangle in drainages of Red Wash, West Red Wash, and Middle Red Wash a conspicuous very fine grained, horizontally laminated, white sandstone ledge with a "salt and pepper" appearance crops out. This is the "coal marker" or "cm" sandstone of Cactus Reservoir quadrangle about 20 mi to north (Barnum and Garrigues, 1980) and the adjoining Texas Mountain quadrangle to the east (R.W. Scott, Jr. and B.E. Barnum, unpub. mapping, 1987). The cm sandstone ledge, not mapped separately in this report, is near the bottom of the "coal unit" of Mesaverde Group in areas where the thickest and most laterally persistent coals in the Mesaverde Group occur. The "coal unit" is about 450 ft thick in the quadrangle and dominant lithologies include dark-brown to black carbonaceous shale, light-gray mudstone, thin yellowish-gray, fine- to very fine grained sandstone, gray to brown siltstone, and coal. Sandstone beds of the "coal unit" in this quadrangle are thinner than in upper part of Mesaverde Group and are generally less than 10 ft thick. Coal seams range from 0.25 in. stringers to beds 1-3 ft thick. Carbonaceous shale and coal weather to steep slopes. Contact between "coal unit" and upper part of Mesaverde Group (not mapped) is gradational and does not follow a particular stratigraphic horizon. Approximately 1,200 ft of undifferentiated Mesaverde Group is exposed in quadrangle

EXPLANATION OF MAP SYMBOLS

- **Contact**--Dashed where approximately located
- **Fault**--Ball and bar on downthrown side where relative displacement is known. Dashed where uncertain, dotted where concealed, queried where inferred
- 8 **Strike and dip of bedding**
- →5 **Apparent dip**
- **Strike of vertical joints**--Secondary joint pattern shown by dashed lines
- •-5237-C **USGS paleobotany locality number**
- ○30 **Drill hole**--Number keyed to list of drill holes

ECONOMIC GEOLOGY

Oil and Gas

Oil and gas are produced in the Texas Creek quadrangle. Most gas is produced from the Mancos B horizon of the Mancos Shale with lesser production (in order of importance) from the Dakota Sandstone, Castlegate Sandstone, Morapos Sandatone Member of the Mancos Shale, Niobrara Formation equivalent, and Morrison Formation (R.W. Scott, Jr. and B.E. Barnum, unpub. mapping, 1987). Oil is presently being produced on a trial basis from the Castlegate Sandstone (drill hole no. 64, on map).

Coal

Coal is not known to have been mined in the Texas Creek quadrangle. Approximate coal rank based on vitrinite-reflectance values from the Douglas Creek arch area is sub-bituminous (V.F. Nuccio, oral commun., 1987).

STRUCTURE

The structure in the Texas Creek quadrangle is dominated by a series of northeast-trending normal faults and fault zones. The direction of faulting is reflected in the principal joint patterns in indurated sandstones seen in many areas of the quadrangle. Another major component of faulting trends nearly east-west. The outcrop pattern of faults in the area of secs. 25 and 26, T. 2 S., R. 103 W. suggest that the east-west fault shown on the map may offset the northeast-trending faults and may, therefore, be younger. This relationship is unclear, however, because of the difficulty of tracing fault scarps through thick vegetation and beneath alluvium. Tweto (1987) shows that fault trends within the Precambrian basement roughly parallel the northeast-trending faults mapped in the Texas Creek quadrangle. Steep southward dips in the vicinity of the east-west fault indicate that the dominant structure in the area immediately north of the fault is a faulted monocline which raises the "coal unit" of the Mesaverde to outcrop level in the northeast corner of the quadrangle. Elevations of the top of the Castlegate Sandstone in drill holes suggest a displacement of several hundreds of feet along the eastern part of the major east-west fault.

Drill-hole data indicate that many oil and gas wells drilled in the quadrangle cut fault planes. Analysis of drill-hole elevations of the top of the Castlegate Sandstone suggests the presence of faults at depth that are not evident at the surface. The complexity of faulting and the lack of closely spaced subsurface control in most of the southern and western parts of the quadrangle precludes the drawing of reliable structure contours.

REFERENCES CITED

Barnum, B.E., and Garrigues, R.S., 1980, Geologic map and coal sections of the Cactus Reservoir quadrangle, Rio Blanco and Moffat Counties, Colorado: U.S. Geological Survey Miscellaneous Field Studies Map MF-1179, scale 1:24,000.

Cashion, W.B., 1967, Geology and fuel resources of the Green River Formation, southeastern Uinta Basin, Utah and Colorado: U.S. Geological Survey Professional Paper 548, 48 p.

Johnson, R.C., 1984, New names for units in the lower part of the Green River Formation, Piceance Creek Basin, Colorado: U.S. Geological Survey Bulletin 1529-I, 25 p.

Tweto, Ogden, 1987, Rock units of the Precambrian basement in Colroado: U.S. Geological Survey Professional Paper 1321-A, 54 p.

List of drill holes in Texas Creek quadrangle, Rio Blanco County, Colorado

[Leaders (----) indicate data not known, not available, or unreliable. 1 ft = 0.305 m. Query following section number indicates that location is uncertain. TD, total depth. Kc, elevation of top of Castlegate Sandstone as interpreted from geophysical logs. Map number shown keyed to numbered drill holes on map]

Map No.	Section	Well Name	TD (ft)	Kc (ft)
		T. 2 S., R. 102 W.		
1	18	Phillips W. Douglas Crk. 18-7	----	----
2	18	Beardmore W. Douglas Crk. 18-3	2908	----
3	19	Conoco W. Douglas Crk. 1	----	----
4	19	Conoco W. Douglas Crk. 15	3048	5291
5	19	Conoco W. Douglas Crk. 10	3307	5213
6	19	Conoco W. Douglas Crk. 14	2960	5416
7	19	Conoco W. Douglas Crk. 8	2800	----
8	30	Phillips W. Douglas Crk. 30-1	2700	----
9	30	Phillips W. Douglas Crk. 30-6	3094	----
10	31	Phillips W. Douglas Crk. 31-4	3237	----
		T. 2 S., R. 103 W.		
11	13	Fuelco Lower Horse Draw 16	2478	5047
12	13	Fuelco Lower Horse Draw 12	2311	5121
13	14	Alamo Lower Horse Draw 3	2322	4890
14	15	Fuelco Lower Horse Draw 18	2510	4878
15	15	Wexpro Lower Horse Draw 22	----	----
16	16	Alamo Lower Horse Draw 6	2900	4689
17	17	Alamo Lower Horse Draw 5	2330	4486
18	20	Wexpro 20-1	3650	----
19	20	Phillips Gov't. 20-4	2787	4536
20	20	Ponka Lower Horse Draw 20-1-A	3275	4610
21	21	Ponka Lower Horse Draw 21-8	3020	----
22	21	Ponka Gov't. 21-1	3225	4915
23	21	Gould Lower Horse Draw 21-3	----	----
24	21	Gould Lower Horse Draw 21-7	2625	4969
25	22	Fuelco Lower Horse Draw 17	3200	5011
26	22	Wexpro Lower Horse Draw 21	----	----
27	22	Alamo Lower Horse Draw 4	2650	5052
28	22	Wexpro Lower Horse Draw 20	----	----
29	23	Wexpro Lower Horse Draw 15	2580	5145
30	23	Wexpro Lower Horse Draw 14	2611	5173
31	24	Conoco W. Douglas Crk. 9	3265	5168
32	24	Conoco W. Douglas Crk. DI-A	3024	----
33	24	Conoco W. Douglas Crk. 24-3	2960	5282
34	24	Conoco W. Douglas Crk. 11	3100	5241
35	25	Conoco W. Douglas Crk. 13	2810	5326
36	25	Conoco W. Douglas Crk. 25-2	3193	5396
37	25	Conoco W. Douglas Crk. 6	----	----
38	25	Conoco W. Douglas Crk. 5	2356	----
39	25	Conoco W. Douglas Crk. 12	5559	4956
40	26	Fuelco Lower Horse Draw 11	2800	5381
41	26	Alamo Lower Horse Draw 2-A	3018	5161
42	27	Wexpro Lower Horse Draw 26	3100	5070
43	27	Fuelco Lower Horse Draw 23	3114	4944
44	27	Alamo Lower Horse Draw 8	2945	5163
45	28	Ponka W. Lower Horse Draw 28-16	2699	4627
46	28	Ponka W. Lower Horse Draw 28-5	3040	4830
47	28	Gould 28-19	3429	4801
48	28	Alamo Lower Horse Draw 9	3186	4703
49	33	Gould 33-17	3227	4698
50	34	Fuelco Lower Horse Draw 19	3117	5059
51	34	Gould W. Lower Horse Draw 34-13	3054	4952
52	34	Gould A-2	1703	5026
53	34	Gould Lower Horse Draw 34-6	2723	5255
54	34	Pease Lower Horse Draw Fed. 1	5588	----
55	34	Gould Lower Horse Draw 1-A	----	----
56	34	Gould Lower Horse Draw 34-15	----	----
57	35	Northland Lower Horse Draw 35-18	----	----
58	35	Gould 35-1	5225	4561
59	35	Burr-Cooley Lower Horse Draw Fed. 1	----	----
60	35	Alamo Lower Horse Draw 7	3490	4534
61	36	Conoco W. Douglas Crk. 16	----	----
62	36	Conoco Fed. 36-3	----	----
63	36	Conoco W. Douglas Crk. 36-4	3582	4543
		T. 3 S., R. 102 W.		
64	6	Chandler Dragon Trail Fed. 6-6-3-2	----	----
65	6	Chandler Gov't. 2-6	3676	----
66	6	Conoco Dragon Trail 18	2000	----
67	7	Fuelco Texas Mountain Fed. 7-2	6344	4199
68	7	Stelbar Gov't. 1	4514	4224
69	19	Fuelco Texas Mountain 19-2	2815	----
70	19	Conoco Missouri Crk. 2	2500	4877
71	30	Conoco Missouri Crk. 3	2220	4921
72	30	Conoco Texas Mountain Gov't. 30-1	6400	----
73	30	Conoco Missouri Crk. 6	3250	4695
		T. 3 S., R. 103 W.		
74	1	Chandler Gov't. 3-1	6051	----
75	10	Northwest Texas Creek 4	5990	4128
76	10	National Fed. 10-1	----	----
77	12	Krey Gov't. 1	1905	4695
78	14	Dome Texas Crk. Fed. 2	4125	4275
79	17	Coors Missouri Crk. 1-17	7050	3728
80	19	Coors Missouri Crk. 1-19	3880	3526
81	23	Conoco Gov't. 3	----	----
82	24	Fuelco Fed. 24-1	3128	4793
83	25	Conoco Missouri Crk. 4	1700	4812
84	25	Northwest Urado 5	8085	4843
85	27	Conoco Missouri Crk. 27-1	6700	3895
86	28	Conoco Missouri Crk. 28-1	6910	4163
87	30	Conoco Urado 2	4050	3668

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