

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DRILLING DURING 1977 IN THE DANFORTH HILLS COAL FIELD,
AXIAL AND NINEMILE GAP QUADRANGLES, MOFFAT AND
RIO BLANCO COUNTIES, COLORADO

By Constance J. Nutt

Open-File Report 78-273

1978

This report has not been edited for conformity
with Geological Survey editorial standards or
stratigraphic nomenclature.

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DRILLING DURING 1977 IN THE DANFORTH HILLS COAL FIELD, AXIAL AND NINEMILE
GAP QUADRANGLES, MOFFAT AND RIO BLANCO COUNTIES, COLORADO

By Constance J. Nutt

INTRODUCTION

Five test holes were drilled in the Danforth Hills coal field, Axial and Ninemile Gap quadrangles, Moffat and Rio Blanco Counties, northwestern Colorado, as part of the U.S. Geological Survey's program to evaluate and classify mineral lands in the public domain. This drilling, and eight holes drilled in the adjacent Easton Gulch and Devils Hole Gulch quadrangles (Reheis, 1978), was a continuation of the Survey's 1976 drilling (Reheis, 1976; Reheis and Peterson, 1977), and was done in conjunction with surface mapping of the quadrangles. The purpose of the drilling was to obtain information on the quality, thickness, and extent of the coal in the Williams Fork Formation of Late Cretaceous age.

The drilling was done by Geck, Inc., under Contract No. 14-08-0001-15794, awarded by the U.S. Geological Survey. The total depth drilled at the five sites was 3,090 feet. Geophysical logging of the holes was done by Rocky Mountain Logging Service, Century Geophysical Corp., and Savage Scientific, Inc. A total of 3,061 feet was logged. Ellen Naiman assisted in choosing the drilling sites, supervising the drilling, arranging for access permission, and in the lithologic sampling and logging.

This report includes the geophysical and lithologic logs of the holes as well as the exact locations of the holes. Descriptions of the rock types are explained in the text; they are not repeated in the lithologic logs because the rock types in the Williams Fork Formation have little recognizable variation.

To facilitate correlation of these logs with other holes in the area, the Trout Creek Sandstone Member, which marks the top of the Upper Cretaceous Iles Formation of the Mesaverde Group, has been noted in the lithology or, where the hole does not penetrate the Trout Creek Sandstone Member, the estimated depth to it is given at the end of the lithologic log.

EXPLANATION OF ROCK LITHOLOGIES USED ON STRIP LOGS



Sandstone, salt-and-pepper, fine-grained to very fine grained; commonly carbonaceous



Siltstone, gray, occasionally brown; commonly carbonaceous



Shale, gray to light-brown



Shale, black to gray; very carbonaceous



Coal



Coal, dirty



Burned sandstone, siltstone, shale, or coal

REFERENCES

- Reheis, M. J., 1976, Reconnaissance drilling in the Danforth Hills coal field, Moffat and Rio Blanco Counties, Colorado, August-September 1976: U.S. Geol. Survey Open-File Report 76-870, 74 p.
- Reheis, M. J., and Peterson, J. E., 1977, Reconnaissance drilling in the Danforth Hills coal field, Moffat and Rio Blanco Counties, Colorado, September-October 1976: U.S. Geol. Survey Open-File Report 77-42, 67 p.
- Reheis, M. J., 1978, Drilling during 1977 in the Danforth Hills coal field, Easton Gulch and Devils Hole Gulch quadrangles, Moffat County, Colorado: U.S. Geol. Survey Open-File Report 78-~~272~~, 29 p.

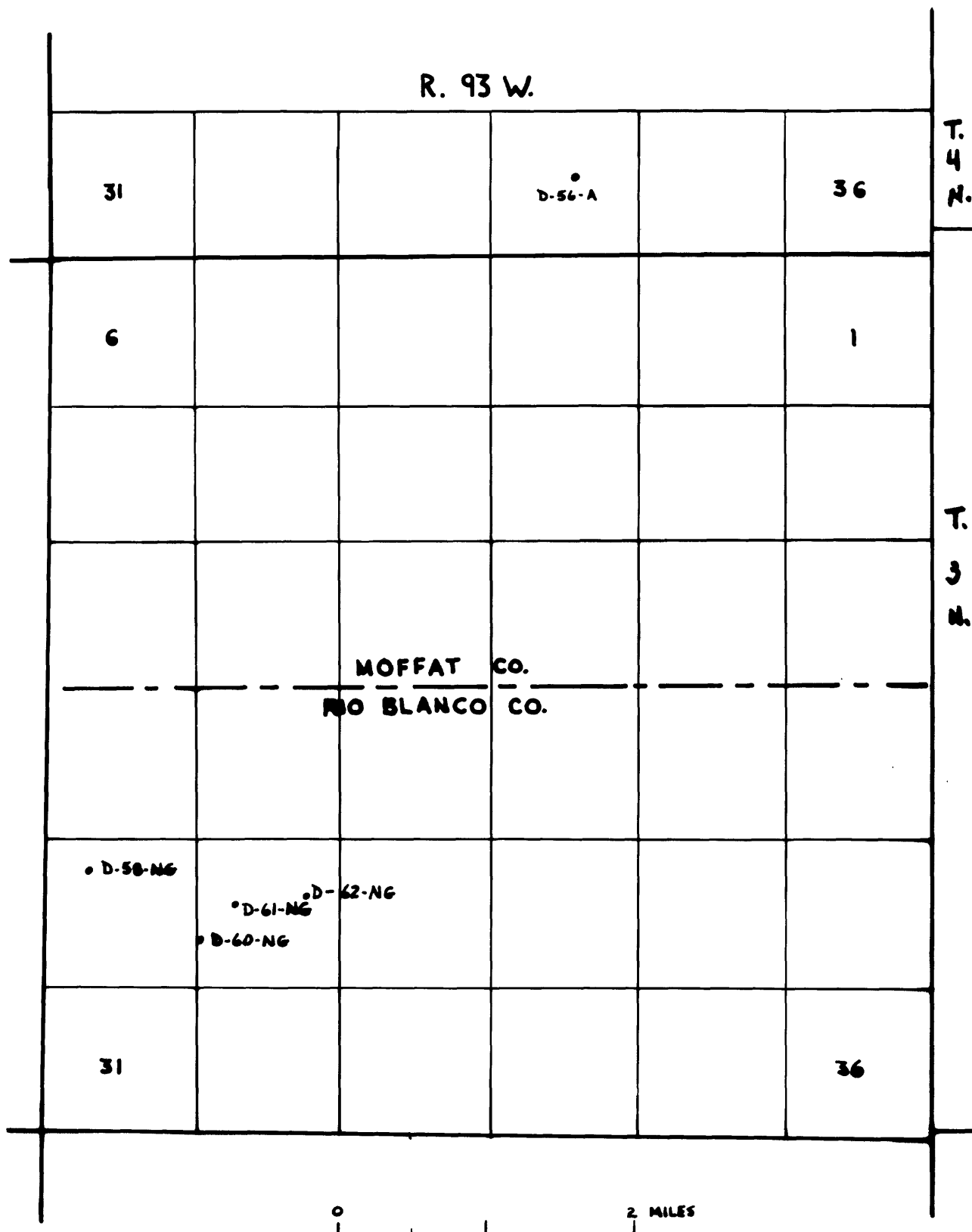


Figure 1.--Regional map showing drill-hole locations in the Danforth Hills coal field, Colorado.

R. 93 W.

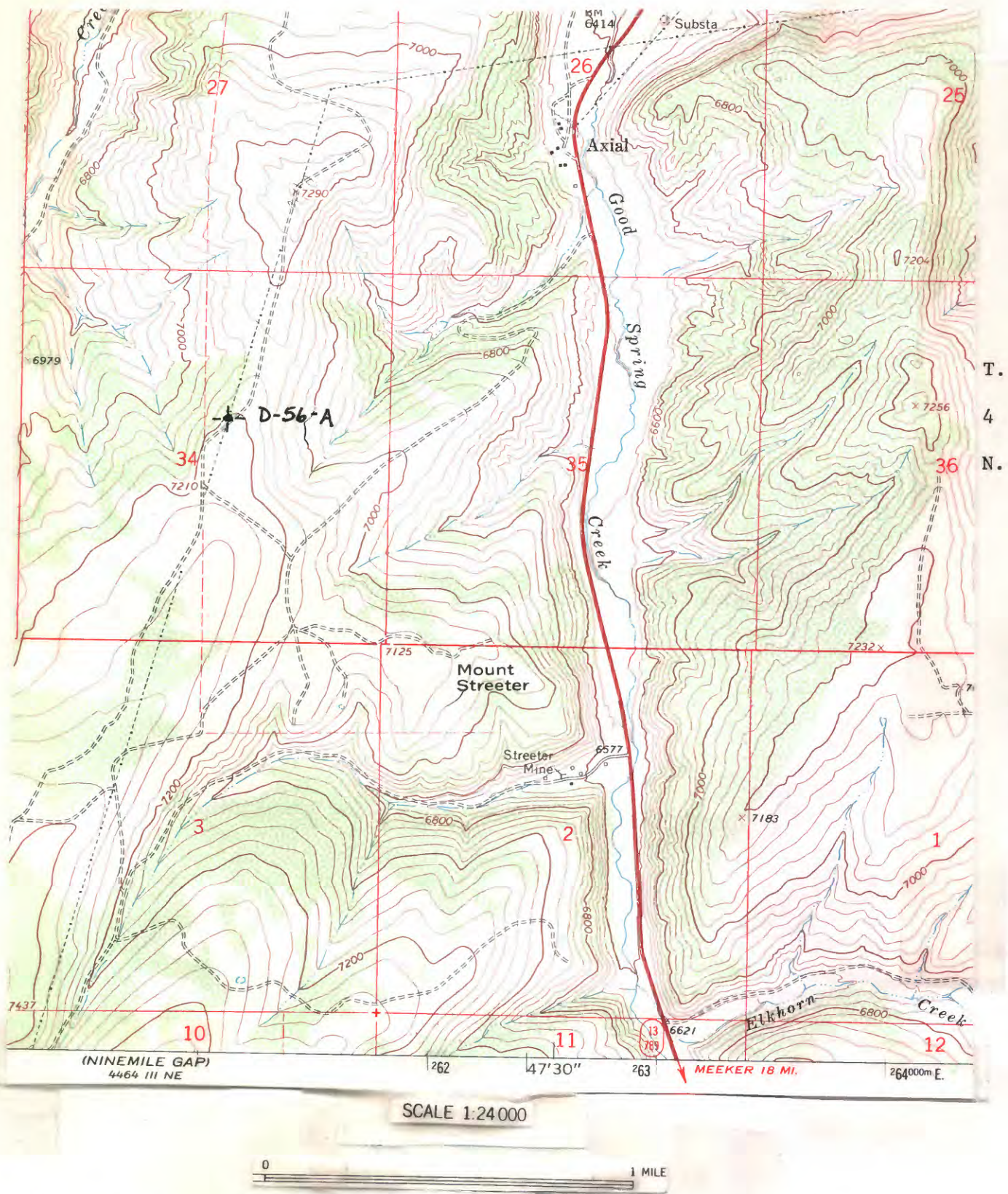


Figure 2.--Location of drill hole in the Axial quadrangle, Moffat County, Colo.

R. 93 W.

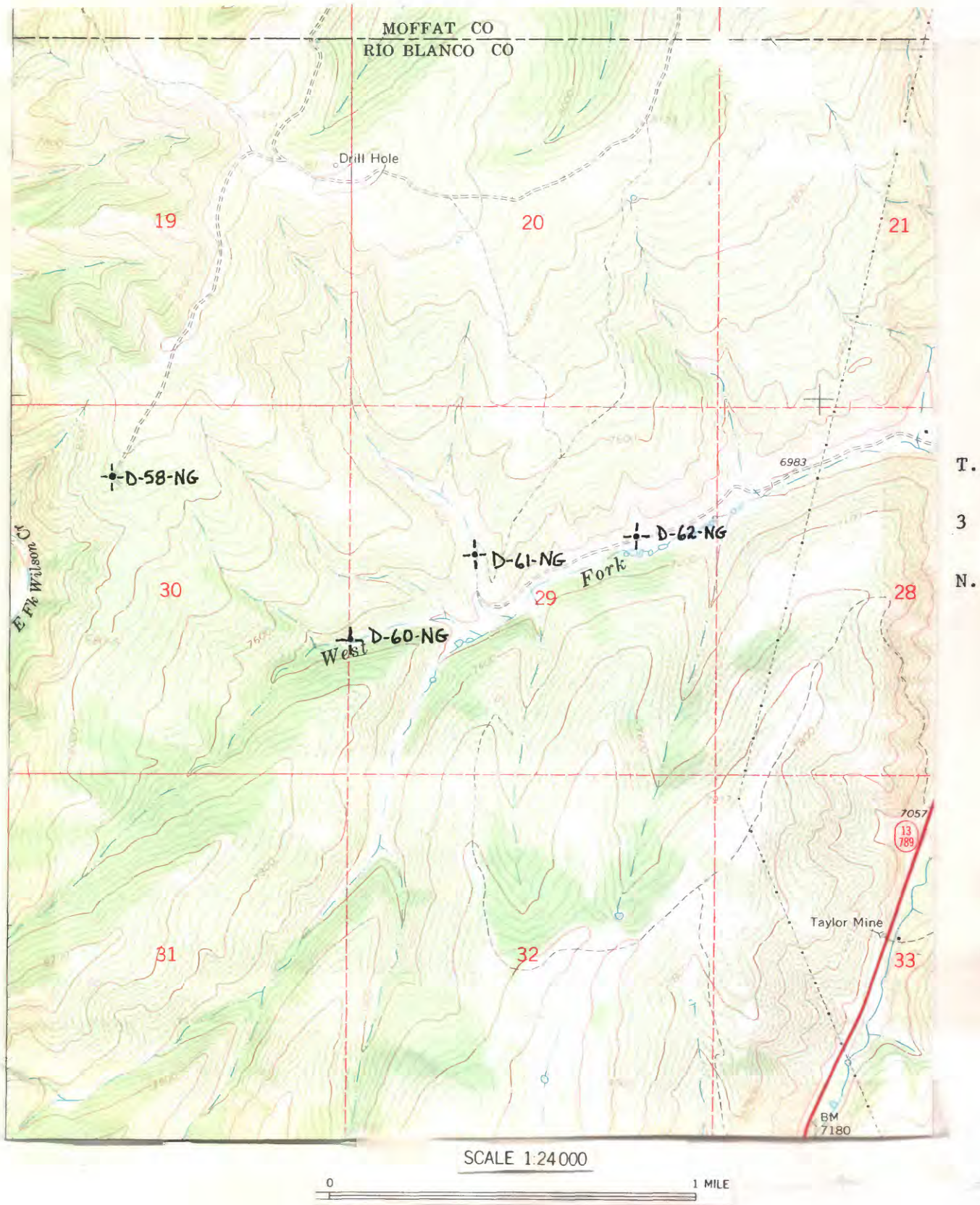


Figure 3.--Locations of drill holes in the Ninemile Gap quadrangle, Rio Blanco County, Colorado.

U.S. GEOLOGICAL SURVEY
DRILL-HOLE LOG, DANFORTH HILLS COAL FIELD

Hole No. D-56-A State Colorado County Moffat Date Logged 11/13/77 Elev.(ft) 7205

Location: T. 4 N., R. 93 W., sec. 34 SW $\frac{1}{4}$ NE $\frac{1}{4}$ Cored: ☐ Yes ☒ No

Drilled depth 1430' Logged depth 1426' Drilling medium mud Fluid level 0'

Geophysical logs: Logger Savage Scientific, Inc.

Spontaneous potential (SP): Scale _____ Logging speed _____ fpm

Resistance (RES): Scale 55 Ω /in Logging speed 25 fpm

Gamma (G): T.C. 1 Scale 50 cps/in Logging speed 25 fpm

Density (DEN): T.C. 1 Scale 1,250 cps/in ^{625 cps/in 1426-213'} _{213-0'} Logging speed 25 fpm

Remarks: Change in density scale at 213'. Common mode interference apparent on

RES curve due to proximity of power line.

LITHOLOGY		STRIP LOG	GEOPHYSICAL LOGS			DEPTH	
			G	DEN	RES	FT	M
0 - 16.5	Alluvium, yellow-brown to gray, sandy to clayey, with up to 50% pebbles and gravel					0	0
16.5- 19.5	Coal						
19.5- 56.5	Sandstone					10	
56.5- 78.5	Interbedded shale, carbonaceous shale, and siltstone					50	
78.5-142.5	Interbedded sandstone, siltstone, shale, and carbonaceous shale					20	
142.5-165	Sandstone						
165 -226	Interbedded sandstone, carbonaceous shale, shale, and siltstone					100	30
226 -228.5	Coal, dirty						
228.5-229.5	Shale					40	
229.5-232	Coal, dirty						
232 -271	Shale, sandstone, siltstone, and carbonaceous shale					150	
271 -272.5	Coal, dirty					50	
272.5-321	Thin bedded shale, carbonaceous shale, and siltstone; minor sandstone					200	60
						70	
						250	
						80	
						90	
						300	

U.S. GEOLOGICAL SURVEY

Hole No. D-56-A continued

LITHOLOGY		STRIP LOG	GEOPHYSICAL LOGS			DEPTH	
			G	DEN	RES	FT	M
697.5 - 705	Coal						
705 - 725	Interbedded sandstone, siltstone, and shale						
725 - 728	Coal					220	
728 - 777.5	Interbedded siltstone, shale, and carbonaceous shale					750	
777.5 - 796	Coal					230	
796 - 819.5	Interbedded siltstone, shale, and carbonaceous shale						
819.5 - 822.5	Coal					240	
822.5 - 824.5	Coal, dirty					800	
824.5 - 829.5	Coal						
829.5 - 837.5	Shale and carbonaceous shale						
837.5 - 843.5	Coal					250	
843.5 - 904.5	Sandstone; minor siltstone, and shale						
904.5 - 910	Coal					850	
910 - 956.5	Siltstone, carbonaceous shale, sandstone, and shale					260	
956.5 - 964.5	Coal						
964.5 - 966.5	Shale						
966.5 - 968.5	Coal, dirty					270	
968.5 - 969.5	Carbonaceous shale					900	
969.5 - 972.5	Coal, dirty						
972.5 - 1012.5	Sandstone, siltstone, shale, and carbonaceous shale. Section fines upward.					280	
1012.5 - 1015	Coal, dirty						
1015 - 1037.5	Sandstone, siltstone, and shale. Fining upward sequences.					950	
1037.5 - 1052.5	Coal					290	
1052.5 - 1102	Sandstone, siltstone, and shale					300	
						1000	
						310	
						1050	
						320	
						330	
						1100	

U.S. GEOLOGICAL SURVEY

Hole No. D-56-A continued

LITHOLOGY			STRIP LOG	GEOPHYSICAL LOGS			DEPTH	
				G	DEN	RES	FT	M
1102 -1104.5	Coal							
1104.5-1124	Sandstone; minor siltstone							
1124 -1128	Coal						340	
1128 -1144	Sandstone, siltstone, and shale. Fining upward sequences.						1150	
1144 -1148	Coal						350	
1148 -1151.5	Shale							
1151.5-1152.5	Coal, dirty							
1152.5-1164.5	Siltstone, shale, and carbonaceous shale						360	
1164.5-1168	Coal						1200	
1168 -1170.5	Shale							
1170.5-1178.5	Coal							
1178.5-1193.5	Sandstone, siltstone, and shale						370	
1193.5-1197	Coal							
1197 -1267.5	Sandstone and siltstone; minor shale and carbonaceous shale						1250	
1267.5-1271	Coal						380	
1271 -1276.5	Shale and carbonaceous shale							
1276.5-1280.5	Coal						390	
1280.5-1284.5	Shale and carbonaceous shale						1300	
1284.5-1286.5	Coal						400	
1286.5-1297.5	Siltstone, shale, and carbonaceous shale							
1297.5-1299.5	Coal						1350	
1299.5-1303.5	Shale						450	
1303.5-1309	Coal							
1309 -1330	Sandstone, siltstone, shale, and carbonaceous shale						460	
1330 -1334	Coal						1400	
1334 -1355.5	Sandstone, siltstone, shale, and carbonaceous shale						470	
1355.5-1358.5	Coal							
1358.5-1377.5	Sandstone, siltstone, and shale							
1377.5-1426	Trout Creek Sandstone Member Top of Iles Formation						1450	480
							490	
							1500	

U.S. GEOLOGICAL SURVEY
DRILL-HOLE LOG, DANFORTH HILLS COAL FIELD

Hole No. D-56-A State Colorado County Moffat Date Logged 11/13/77 Elev. (ft) 7205

Location: T. 4 N., R. 93 W., sec. 34 SW $\frac{1}{4}$ NE $\frac{1}{4}$ Cored: ☐ Yes ☒ No

Drilled depth 1430' Logged depth 1426' Drilling medium mud Fluid level 0'

Geophysical logs: Logger Savage Scientific, Inc.

Spontaneous potential (SP): Scale _____ Logging speed _____ fpm

Resistance (RES): Scale 55 Ω /in Logging speed 25 fpm

Gamma (G): T.C. 1 Scale 50 cps/in Logging speed 25 fpm












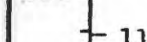















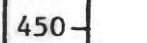























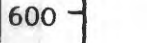








Density (DEN): T.C. 1 Scale 1,250 cps/in ^{625 cps/in 1426-213'} _{213-0'} Logging speed 25 fpm

Remarks: Change in density scale at 213'. Common mode interference apparent on
RES curve due to proximity of power line.

LITHOLOGY	STRIP LOG	GEOPHYSICAL LOGS			DEPTH	
		G	DEN	RES	FT	M
0 - 16.5 Alluvium, yellow-brown to gray, sandy to clayey, with up to 50% pebbles and gravel					0	0
16.5- 19.5 Coal					-10	
19.5- 56.5 Sandstone					50	
56.5- 78.5 Interbedded shale, carbonaceous shale, and siltstone					-20	
78.5-142.5 Interbedded sandstone, siltstone, shale, and carbonaceous shale					100	
142.5-165 Sandstone					-30	
165 -226 Interbedded sandstone, carbonaceous shale, shale, and siltstone					150	
226 -228.5 Coal, dirty					-40	
228.5-229.5 Shale					50	
229.5-232 Coal, dirty					-50	
232 -271 Shale, sandstone, siltstone, and carbonaceous shale					200	
271 -272.5 Coal, dirty					-60	
272.5-321 Thin bedded shale, carbonaceous shale, and siltstone; minor sandstone					70	
					250	
					-80	
					90	
					300	

U.S. GEOLOGICAL SURVEY

Hole No. D-56-A continued

LITHOLOGY			STRIP LOG	GEOPHYSICAL LOGS			DEPTH	
				G	DEN	RES	FT	M
321	-323	Coal						
323	-356	Thin bedded shale and carbonaceous shale						
356	-360.5	Coal					100	
360.5	-381	Sandstone, siltstone, shale, and carbonaceous shale					350	
381	-383	Coal					110	
383	-412	Sandstone, siltstone, shale, and carbonaceous shale. Section fines upward.						
412	-457	Sandstone					120	
457	-462	Coal					400	
462	-529.5	Sandstone; minor siltstone, shale, and carbonaceous shale					130	
529.5	-535	Coal						
535	-559	Siltstone; interbedded shale					140	
559	-563	Coal					450	
563	-583.5	Carbonaceous shale and shale; minor siltstone					140	
583.5	-586	Coal						
586	-588	Coal, dirty					150	
588	-596.5	Coal						
596.5	-642.5	Sandstone; minor siltstone, shale, and carbonaceous shale					500	
642.5	-648.5	Coal						
648.5	-655.5	Carbonaceous shale					160	
655.5	-664.5	Coal						
664.5	-697.5	Siltstone, carbonaceous shale, and shale					170	
697.5	-705	Coal					550	
							180	
							600	
							190	
							650	
							200	
							210	
							700	

U.S. GEOLOGICAL SURVEY

Hole No. D-56-A continued

LITHOLOGY		STRIP LOG	GEOPHYSICAL LOGS			DEPTH	
			G	DEN	RES	FT	M
697.5 - 705	Coal						
705 - 725	Interbedded sandstone, siltstone, and shale						
725 - 728	Coal					220	
728 - 777.5	Interbedded siltstone, shale, and carbonaceous shale					750	
777.5 - 796	Coal					230	
796 - 819.5	Interbedded siltstone, shale, and carbonaceous shale						
819.5 - 822.5	Coal					240	
822.5 - 824.5	Coal, dirty					800	
824.5 - 829.5	Coal						
829.5 - 837.5	Shale and carbonaceous shale					250	
837.5 - 843.5	Coal						
843.5 - 904.5	Sandstone; minor siltstone, and shale					850	
904.5 - 910	Coal					260	
910 - 956.5	Siltstone, carbonaceous shale, sandstone, and shale						
956.5 - 964.5	Coal					270	
964.5 - 966.5	Shale						
966.5 - 968.5	Coal, dirty					900	
968.5 - 969.5	Carbonaceous shale						
969.5 - 972.5	Coal, dirty					280	
972.5 - 1012.5	Sandstone, siltstone, shale, and carbonaceous shale. Section fines upward.						
1012.5 - 1015	Coal, dirty					950	
1015 - 1037.5	Sandstone, siltstone, and shale. Fining upward sequences.					290	
1037.5 - 1052.5	Coal					300	
1052.5 - 1102	Sandstone, siltstone, and shale					1000	
						310	
						1050	
						320	
						330	
						1100	

U.S. GEOLOGICAL SURVEY

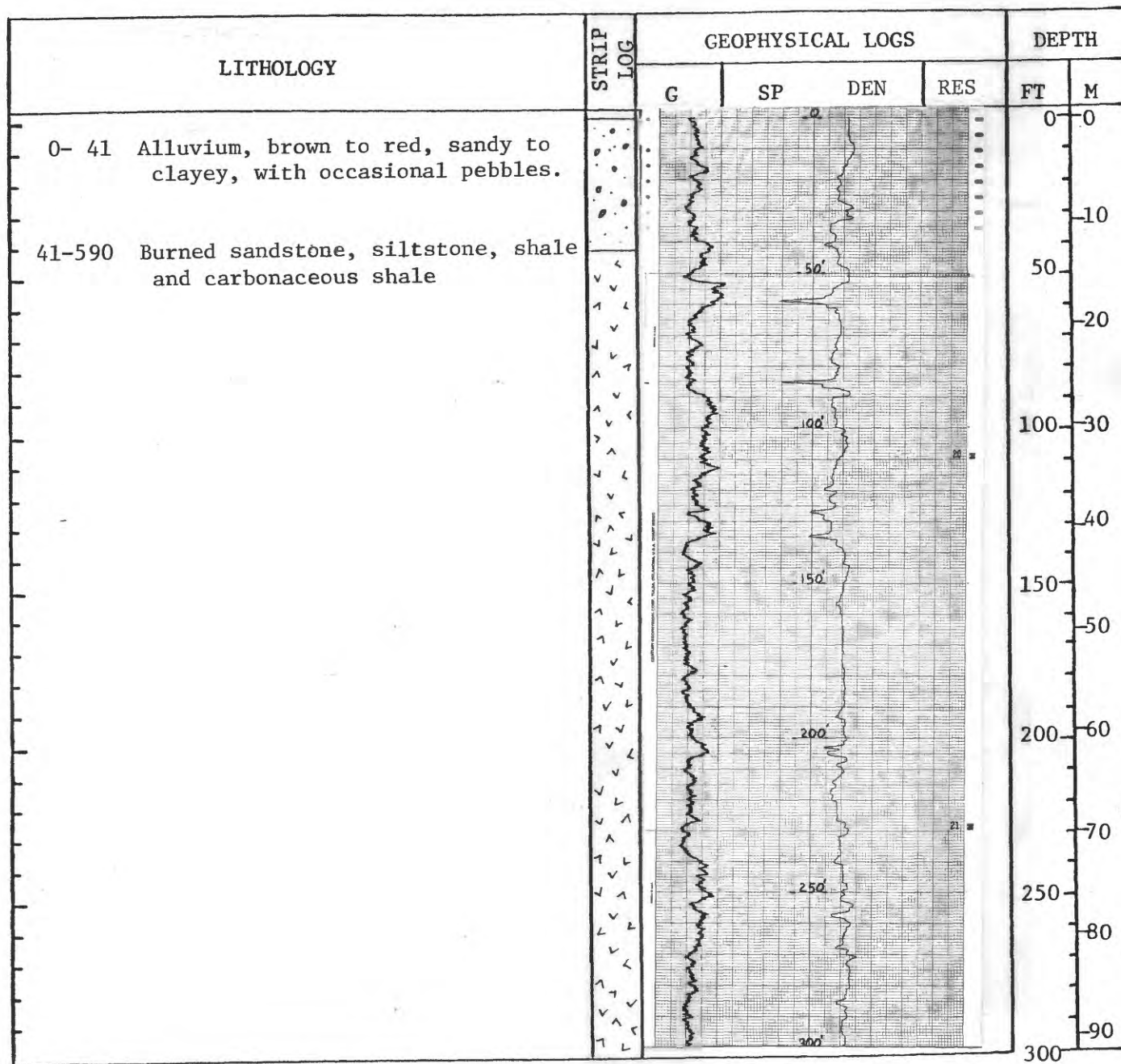
Hole No. D-56-A continued

LITHOLOGY			STRIP LOG	GEOPHYSICAL LOGS			DEPTH	
				G	DEN	RES	FT	M
1102 -1104.5	Coal							
1104.5-1124	Sandstone; minor siltstone							
1124 -1128	Coal						340	
1128 -1144	Sandstone, siltstone, and shale. Fining upward sequences.						1150	
1144 -1148	Coal						350	
1148 -1151.5	Shale							
1151.5-1152.5	Coal, dirty							
1152.5-1164.5	Siltstone, shale, and carbonaceous shale						360	
1164.5-1168	Coal						1200	
1168 -1170.5	Shale							
1170.5-1178.5	Coal							
1178.5-1193.5	Sandstone, siltstone, and shale						370	
1193.5-1197	Coal							
1197 -1267.5	Sandstone and siltstone; minor shale and carbonaceous shale						1250	
1267.5-1271	Coal						380	
1271 -1276.5	Shale and carbonaceous shale							
1276.5-1280.5	Coal						390	
1280.5-1284.5	Shale and carbonaceous shale						1300	
1284.5-1286.5	Coal						400	
1286.5-1297.5	Siltstone, shale, and carbonaceous shale							
1297.5-1299.5	Coal						1350	
1299.5-1303.5	Shale						450	
1303.5-1309	Coal							
1309 -1330	Sandstone, siltstone, shale, and carbonaceous shale						460	
1330 -1334	Coal						1400	
1334 -1355.5	Sandstone, siltstone, shale, and carbonaceous shale						470	
1355.5-1358.5	Coal							
1358.5-1377.5	Sandstone, siltstone, and shale							
1377.5-1426	Trout Creek Sandstone Member Top of Iles Formation						1450	
							480	
							490	
							1500	

**U.S. GEOLOGICAL SURVEY
DRILL-HOLE LOG, DANFORTH HILLS COAL FIELD**

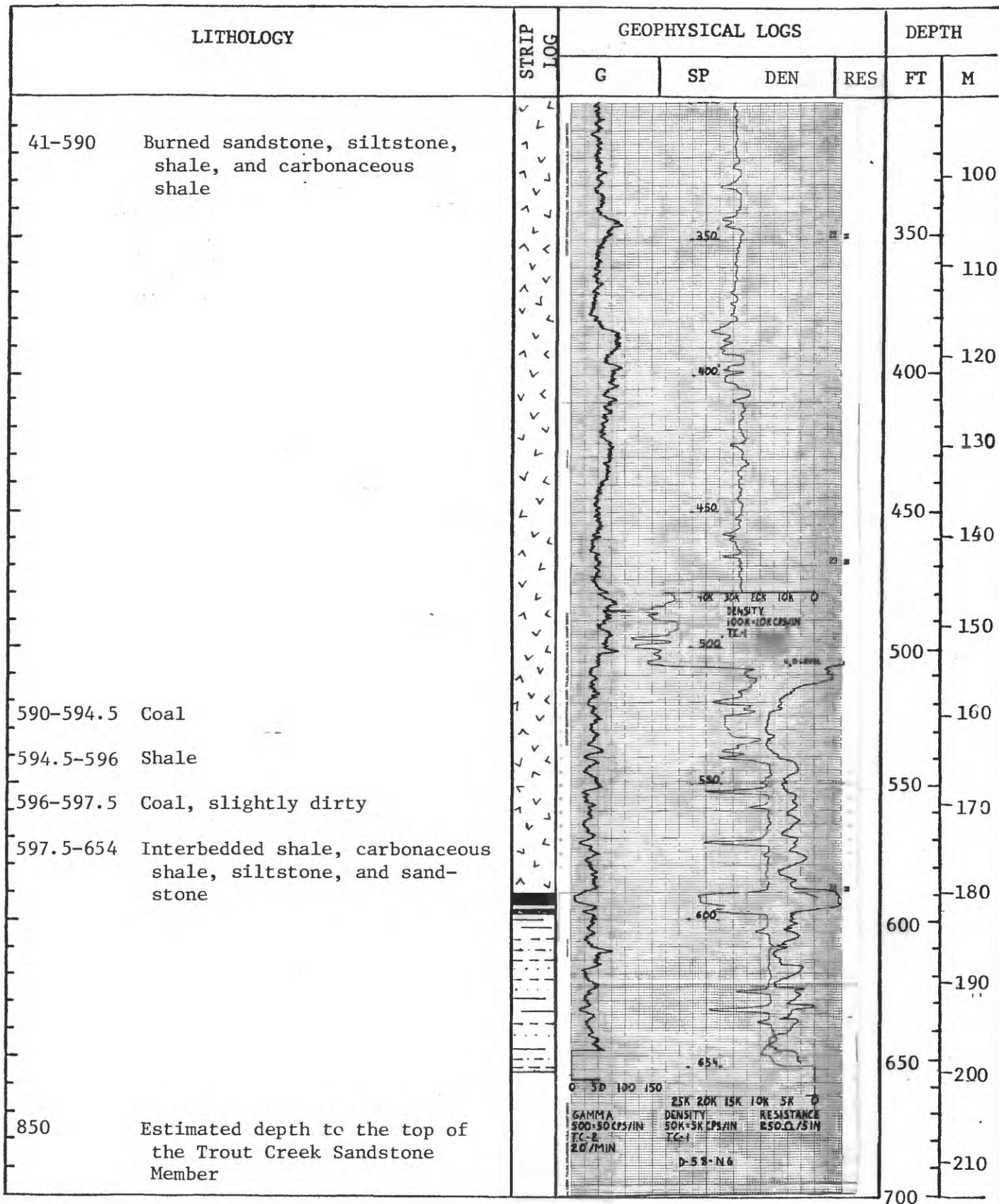
Hole No. D-58-NG State Colorado County Rio Blanco Date Logged 8/10/77 Elev. (ft) 8155
 Location: T. 3 N., R. 93 W., sec. 30 NE $\frac{1}{4}$ NW $\frac{1}{4}$ Cored: ☐ Yes ☒ No
 Drilled depth 660' Logged depth 654' Drilling medium air Fluid level 508'
 Geophysical logs: Logger Century Geophysical Corp.

Spontaneous potential (SP): Scale _____ Logging speed _____ fpm
 Resistance (RES): Scale 50 Ω /in Logging speed 20 fpm
 Gamma (G): T.C. 2 Scale 50 cps/in Logging speed 20 fpm
 Density (DEN): T.C. 1 Scale 5K cps/in 654-480'
10K cps/in 480-0' Logging speed 20 fpm
 Remarks: Blind hole, poor to no chip samples 260-580'. Change density scale at 480'.




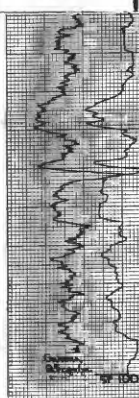


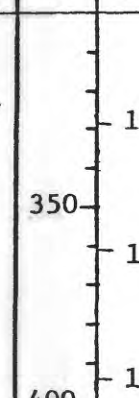
U.S. GEOLOGICAL SURVEY

Hole No. D-58-NG continued



U.S. GEOLOGICAL SURVEY

Hole No. D-60-NG continued

LITHOLOGY	STRIP LOG	GEOPHYSICAL LOGS				DEPTH	
		G	SP	RES	DEN	FT	M
297-338.5 Interbedded siltstone, sandstone, shale, and carbonaceous shale. Thick sandstone beds in the middle of the section are over- and underlain by thinly bedded siltstone, shale, and carbonaceous shale						100	
						350	
						110	
338.5-340.5 Coal, dirty						120	
340.5-394 Siltstone, shale, carbonaceous shale, and sandstone. Section coarsens upward, with thick sandstone beds at the top of the section underlain by thinly bedded siltstone, shale, and carbonaceous shale						400	
						130	
						140	
						150	
						160	
						170	
						180	
						190	
						200	
						210	
675 Estimated depth to the top of the Trout Creek Sandstone Member						700	

U.S. GEOLOGICAL SURVEY
DRILL-HOLE LOG, DANFORTH HILLS COAL FIELD

Hole No. D-61-NG State Colorado County Rio Blanco Date Logged 7/30/77 Elev. (ft) 7240

Location: T. 3 N., R. 93 W., sec. 29 SE $\frac{1}{4}$ NW $\frac{1}{4}$ Cored: ☐ Yes ☒ No

Drilled depth 280' Logged depth 275' Drilling medium water, mud Fluid level 0'

Geophysical logs: Logger Rocky Mountain Logging Service

Spontaneous potential (SP): Scale 50 mv/in Logging speed 20 fpm

Resistance (RES): Scale 25 Ω /in Logging speed 20 fpm

Gamma (G): T.C. 1 Scale 25 cps/in Logging speed 20 fpm

Density (DEN): T.C. 1 Scale 5K cps/in Logging speed 20 fpm

Remarks: _____

LITHOLOGY		STRIP LOG	GEOPHYSICAL LOGS				DEPTH	
			G	SP	RES	DEN	FT	M
0 - 41.5	Alluvium, dark- to light-brown, sandy, with up to 20% gravel						0	0
41.5- 61	Coal						10	
61 - 62.5	Shale						50	
62.5- 70	Coal						20	
70 - 72.5	Shale						100	30
72.5- 78	Coal						40	
78 -102	Interbedded sandstone, siltstone, carbonaceous shale, and shale						150	50
102 -110	Coal						200	60
110 -166.5	Interbedded sandstone, siltstone, carbonaceous shale, and shale. Sand content of section increases upward, beds thicken upward.						250	75
166.5-168.5	Coal, dirty						275	83
168.5-185.5	Interbedded siltstone, sandstone, carbonaceous shale, and shale. Middle section predominantly sandstone and siltstone; lower and upper sections consist of carbonaceous shale and shale.							
185.5-190.5	Coal							
190.5-195.5	Sandstone, siltstone, and carbonaceous shale							
195.5-199.5	Coal, dirty							
199.5-231	Siltstone, carbonaceous shale and shale							
231 -275	Sandstone							
575	Estimated depth to the top of the Trout Creek Sandstone Member							

U.S. GEOLOGICAL SURVEY
DRILL-HOLE LOG, DANFORTH HILLS COAL FIELD

Hole No. D-62-NG State Colorado County Rio Blanco Date Logged 7/30/77 Elev. (ft) 7100

Location: T. 3 N., R. 93 W., sec. 29 SE 1/4 NE 1/4 Cored: ☐ Yes ☒ No

Drilled depth 320' Logged depth 312' Drilling medium water, mud Fluid level 0'

Geophysical logs: Logger Rocky Mountain Logging Servid

Spontaneous potential (SP): Scale 100 mv/in Logging speed 20 fpm

Resistance (RES): Scale 25 Ω /in Logging speed 20 fpm

Gamma (G): T.C. 1 Scale 25 cps/in Logging speed 20 fpm

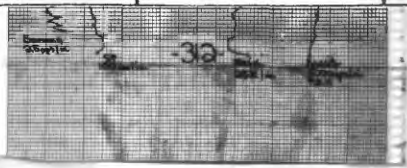
Density (DEN): T.C. 1 Scale 5K cps/in Logging speed 20 fpm

Remarks: _____

LITHOLOGY		STRIP LOG	GEOPHYSICAL LOGS				DEPTH	
			G	SP	RES	DEN	FT	M
0-30	Alluvium, tan to light-tan, sandy, with up to 15% gravel						0	0
30-52	Burned sandstone and shale						10	
52-53.5	Coal, dirty						50	
53.5-69	Interbedded shale and carbonaceous shale						20	
69-129.5	Interbedded shale, carbonaceous shale, and sandstone						100	30
129.5-136	Coal							
136-141.5	Shale						40	
141.5-145	Coal							
145-212.5	Sandstone and siltstone; minor shale. Shale most common at top and bottom of section.						150	50
212.5-252	Sandstone						200	60
252-267.5	Siltstone, carbonaceous shale and shale						70	
267.5-312	Sandstone and siltstone						250	80
							300	90

U.S. GEOLOGICAL SURVEY

Hole No. D-62-NG continued

LITHOLOGY	STRIP LOG	GEOPHYSICAL LOGS				DEPTH	
		G	SP	RES	DEN	FT	M
267.5-312 Sandstone and siltstone							
						100	
						350	
						110	
						120	
						400	
						130	
						450	
						140	
525 Estimated depth to the top of the Trout Creek Sandstone Member						150	
						500	
						160	
						550	
						170	
						180	
						600	
						190	
						650	
						200	
						210	
						700	