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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

RECONNAISSANCE DRILLING IN THE DANFORTH HILLS COAL FIELD,
MOFFAT AND RIO BLANCO COUNTIES, COLORADO,
AUGUST-SEPTEMBER 1976

By

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Open-file Report 76- 870

1976

OPEN-FILE REPORT

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Reconnaissance drilling in the Danforth Hills coal field,

Moffat and Rio Blanco Counties, Colorado,

August-September 1976

By

Marith J. Reheis

Introduction

The Becker Drilling Company, under Contract No. 14-08-0001-15097 awarded by the U.S. Geological Survey, rotary drilled and geophysically logged 11 holes in the Danforth Hills coal field for a total footage drilled of 13,205. The drilling program was done to collect data on the depths, thicknesses, and correlations of coal beds and coal zones in parts of the Danforth Hills coal field, Moffat and Rio Blanco Counties, Colorado. These data will aid in the reconnaissance mapping of quadrangles located in the eastern part of the coal field and in the evaluation of subsurface mining possibilities in the Bureau of Land Management's tracts 5 and 19 located about 15 mi (24 km) north of Meeker, Colorado. Seven of the holes drilled were located in the BLM tracts and 4 were outside the tracts. Geological Survey personnel located the drill sites, arranged permission for access, coordinated the drilling and geophysical logging, performed the lithologic sampling and logging, and analyzed the data.

Location and correlation of major coal beds

Using data derived from the lithologic and geophysical logs, thicknesses of the coal beds and overburden were determined and probable correlations between drill holes were made. The thickest and most persistent coal beds are in the Williams Fork Formation of Late Cretaceous age, between the Trout Creek Sandstone Member of the underlying Iles Formation and the Twentymile(?) Sandstone Member of the Williams Fork Formation. Thick coals are also common above the Twentymile(?) Sandstone but, according to these data, do not appear as persistent as the lower coals. The presence of numerous thick coal beds precludes a detailed discussion of each bed in this report.

In BLM tracts 5 and 19, two zones have the most potential for subsurface mining: Zone one, from about 75 to 250 ft (23 to 76 m) above the Trout Creek Member, contains two to three major coal beds; and zone two, from 300 to 700 ft (91 to 213 m) above the Trout Creek, contains from two to four major coal beds.

Restraints on lithologic log interpretations

Lithologic logs were compiled primarily from field notes made during the lithologic sampling and logging of the drill holes. Owing to gaps in the sampling, mixing of the rock material during drilling (especially when drilling mud was used), and poor recovery of the coals, the lithologic logs are of limited reliability and may only be used in a general sense. Coal beds on these logs were taken from the geophysical logs to minimize the inaccuracies.

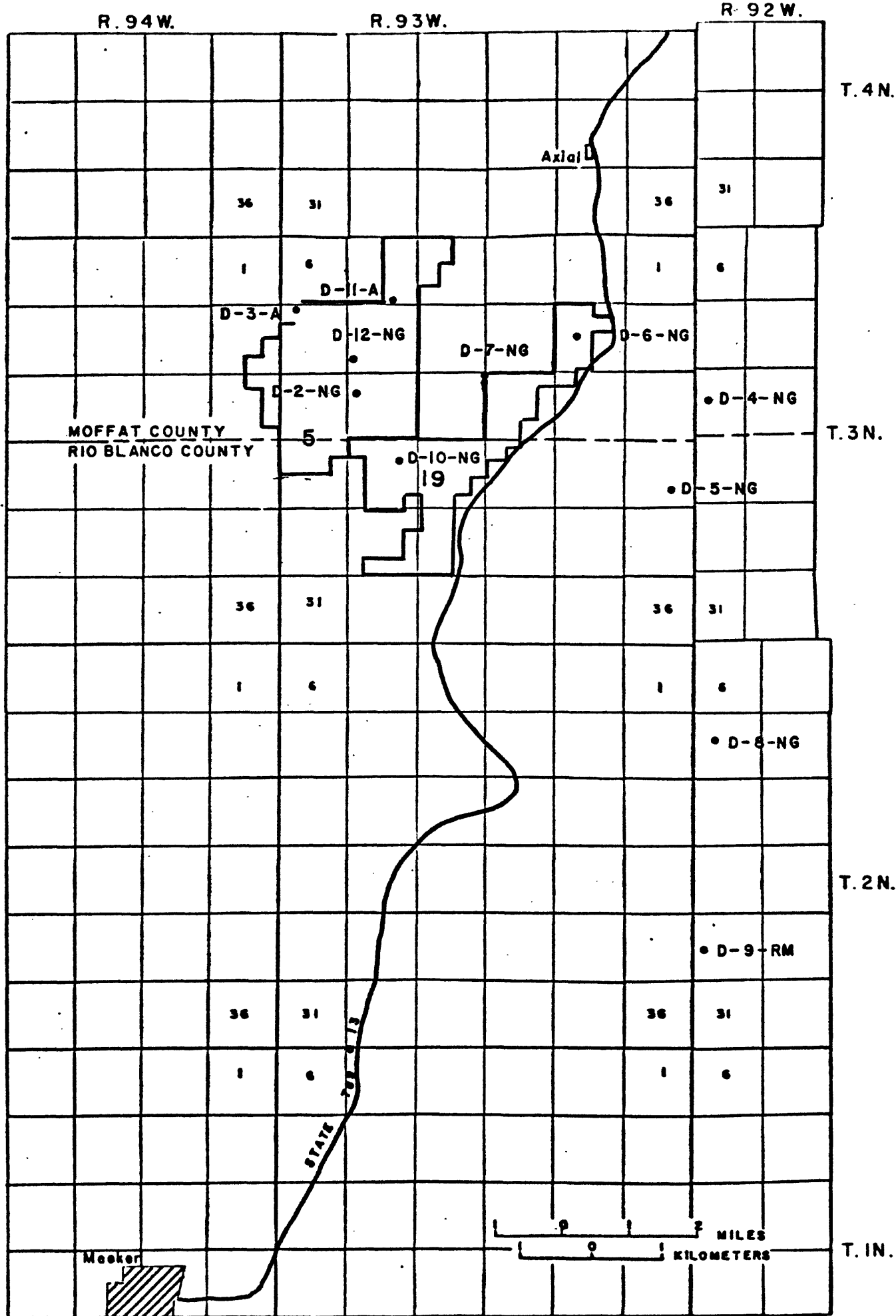
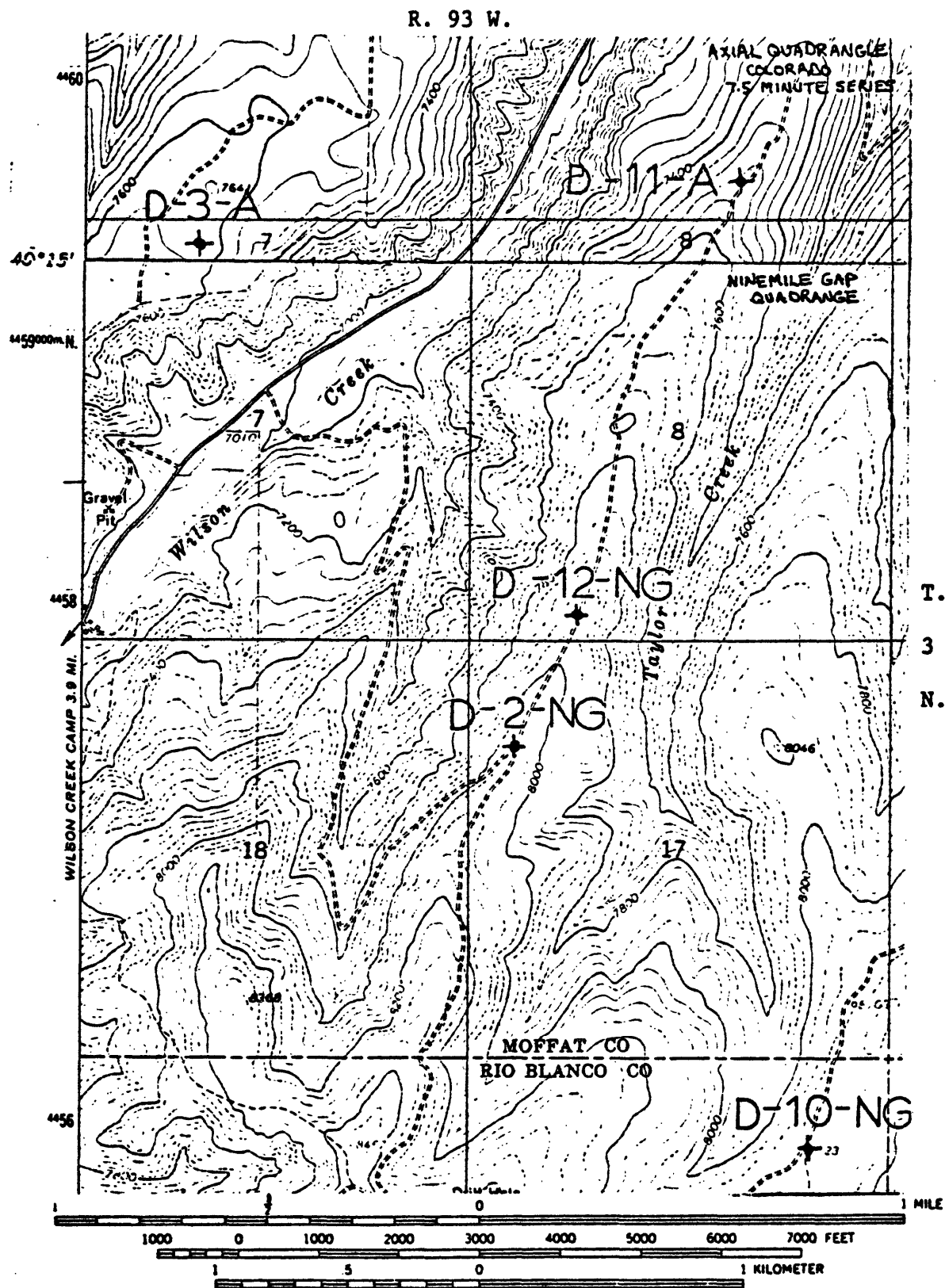
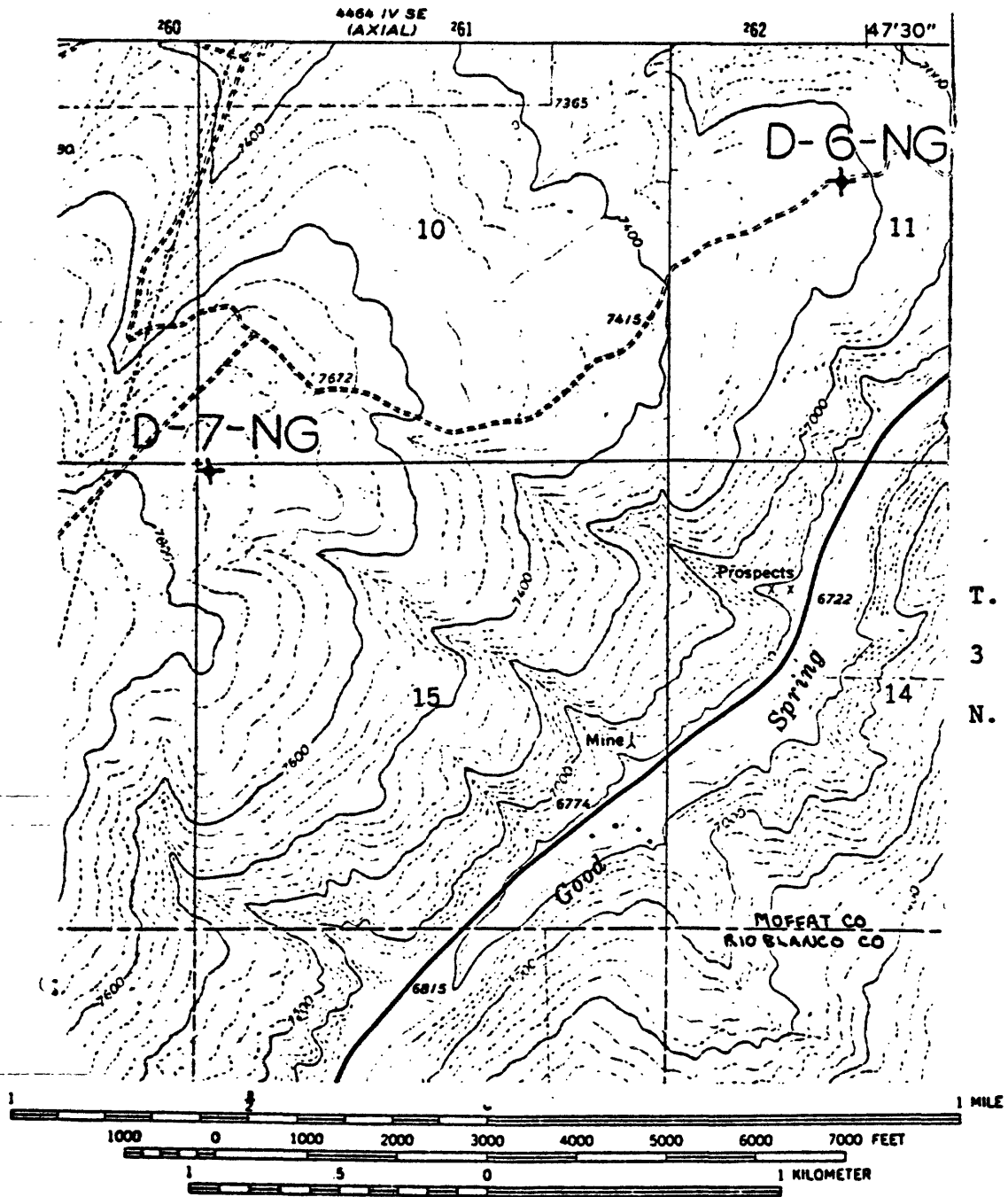


Figure 1.--Regional map showing location of drill holes in BLM tracts 5 and 19.



R. 93 W.



Contour interval 40 feet

Figure 3.--Location of drill holes, Ninemile Gap quadrangle, Colorado.

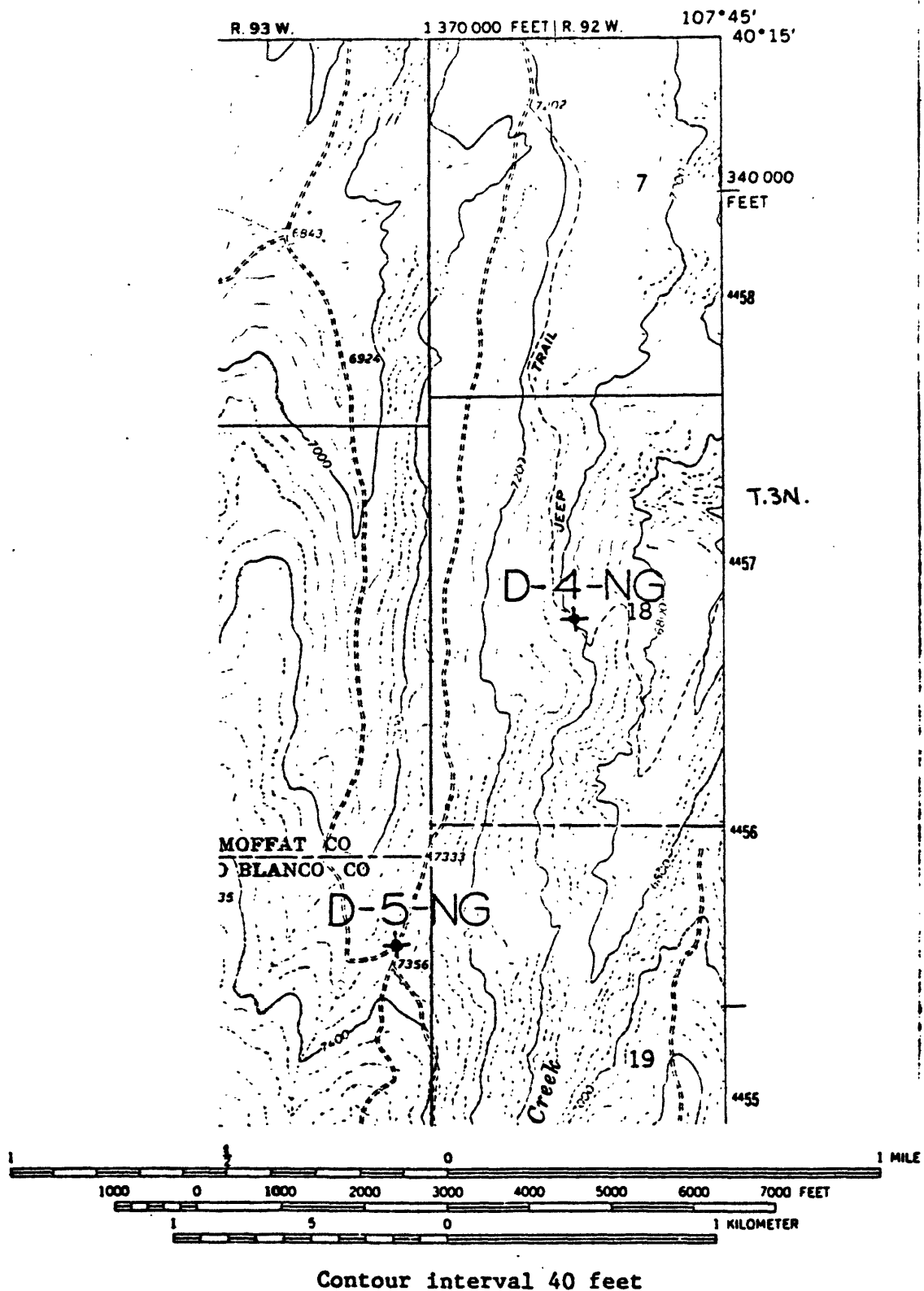


Figure 4.--Location of drill holes, Ninemile Gap quadrangle, Colorado

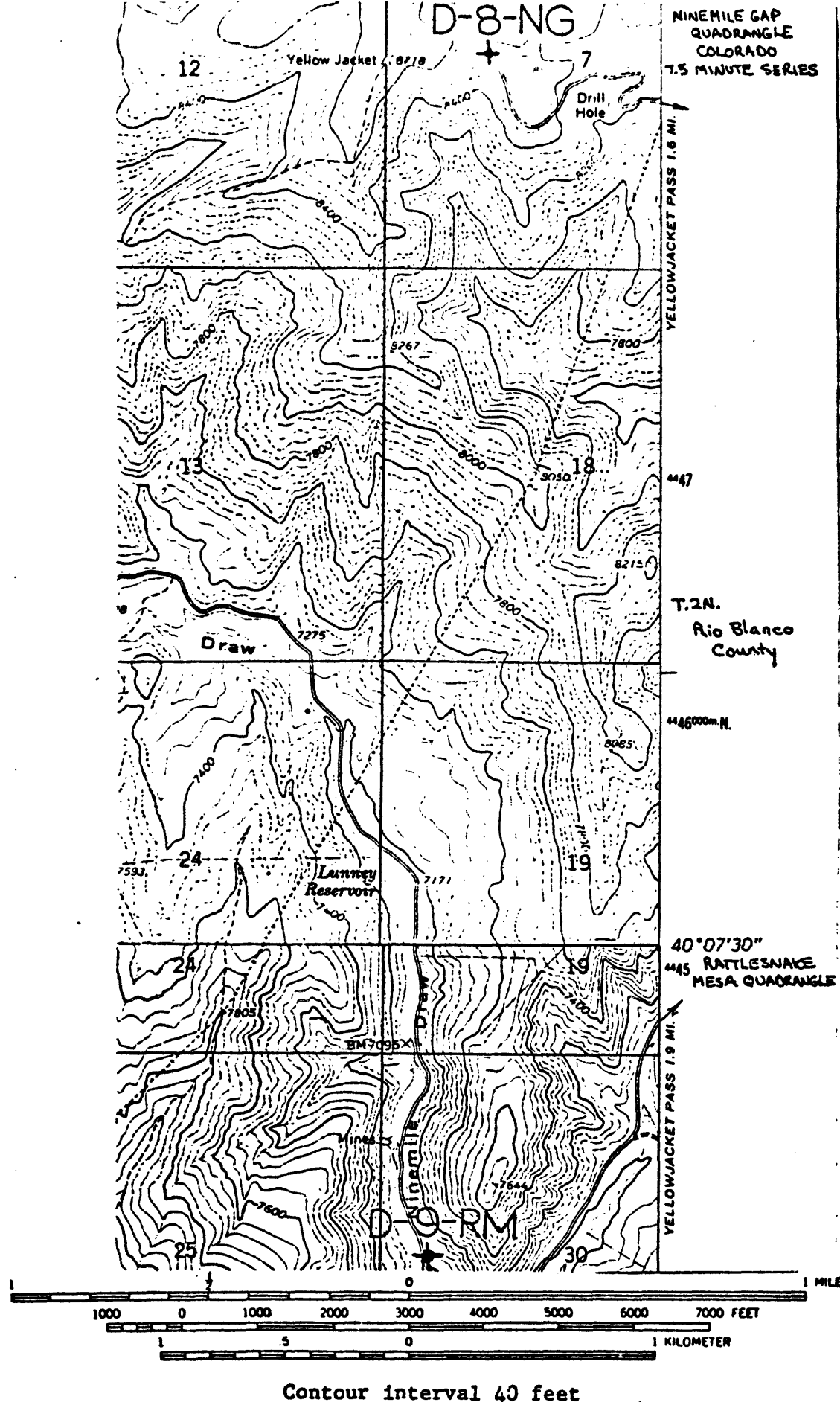


Figure 5.--Location of drill holes, Ninemile Gap and Rattlesnake Mesa quadrangles, Colorado.

Table 1.--Location of drill holes in the Danforth Hills coal field, Moffat and Rio Blanco Counties, Colorado.

[Measurements are in feet; to convert to meters, multiply by 0.3048]

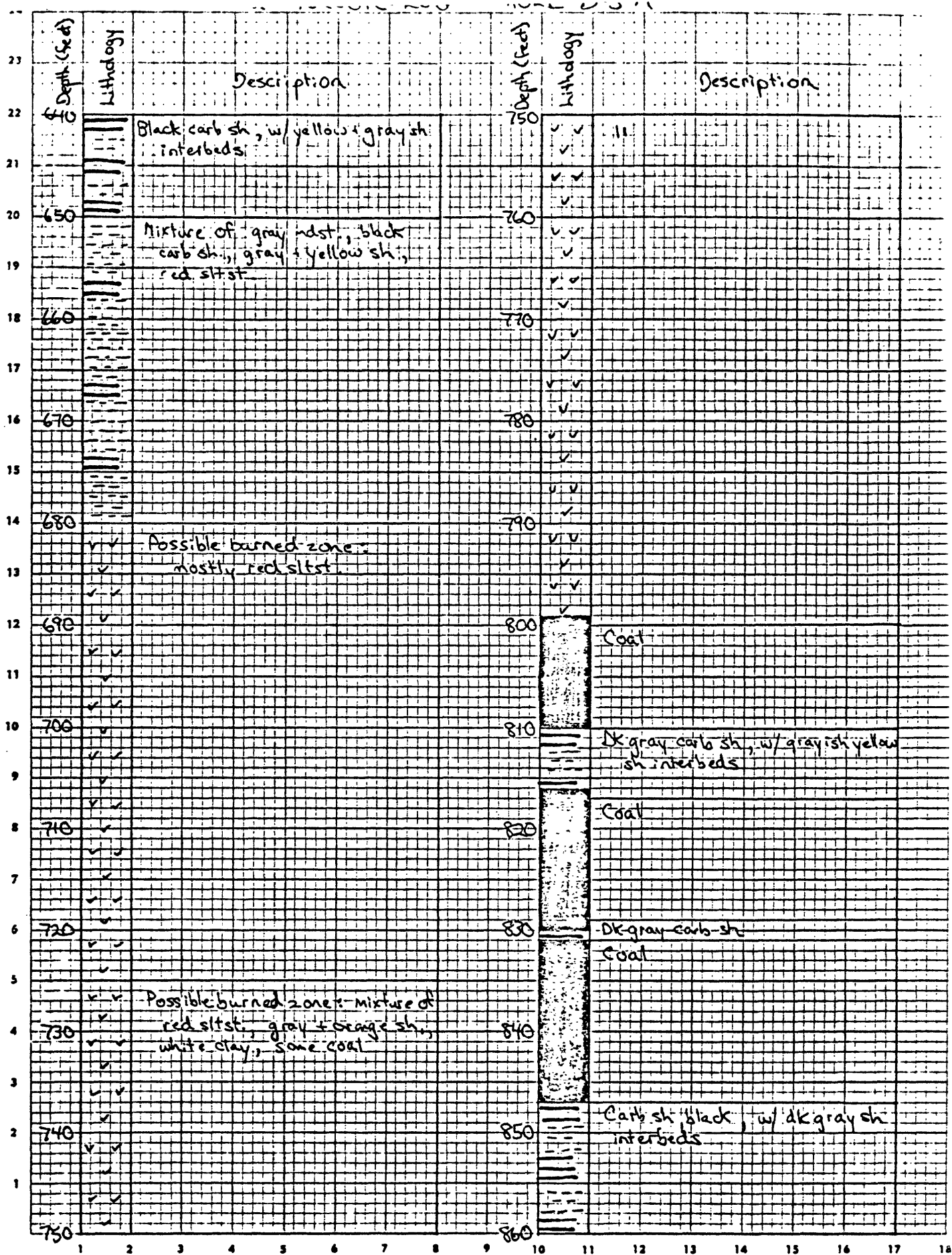
Drill-hole No.	Location	Elevation (approx)	Total depth drilled	Total depth logged
BLM tract 5				
D- 3-A	T. 3 N., R. 93 W., sec. 7, NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$	7,620	900	898
D-11-A	T. 3 N., R. 93 W., sec. 5, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$	7,546	1,140	992
¹ D-12-NG	T. 3 N., R. 93 W., sec. 8, SW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$	7,945	1,240	1,224
D- 2-NG	T. 3 N., R. 93 W., sec. 17, NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$	8,050	800	650
BLM tract 19				
D-10-NG	T. 3 N., R. 93 W., sec. 20, NW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$	8,123	1,480	1,466
D- 7-NG	T. 3 N., R. 93 W., sec. 15, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$	7,755	1,675	1,600
D- 6-NG	T. 3 N., R. 93 W., sec. 11, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$	7,240	1,583	1,581
Outside BLM tracts				
D- 4-NG	T. 3 N., R. 92 W., sec. 18, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$	7,000	1,171	1,171
D- 5-NG	T. 3 N., R. 93 W., sec. 24, SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$	7,345	1,235	1,234
D- 8-NG	T. 2 N., R. 92 W., sec. 7, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$	8,490	1,231	1,231
D- 9-RM	T. 2 N., R. 92 W., sec. 30, NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$	7,025	761	725

¹ This drill hole was added to originally planned program to compensate for problems encountered in attempts to drill holes D-11-A and D-2-NG to the desired depths.

Elev. ~ 7620' Total Depth 900' Location T. 3N, R. 93W, sec. 7, NW 1/4 NE 1/4 NW 1/4
Moffat County Colorado Becker Drilling Company Geologist - Marith Rehels

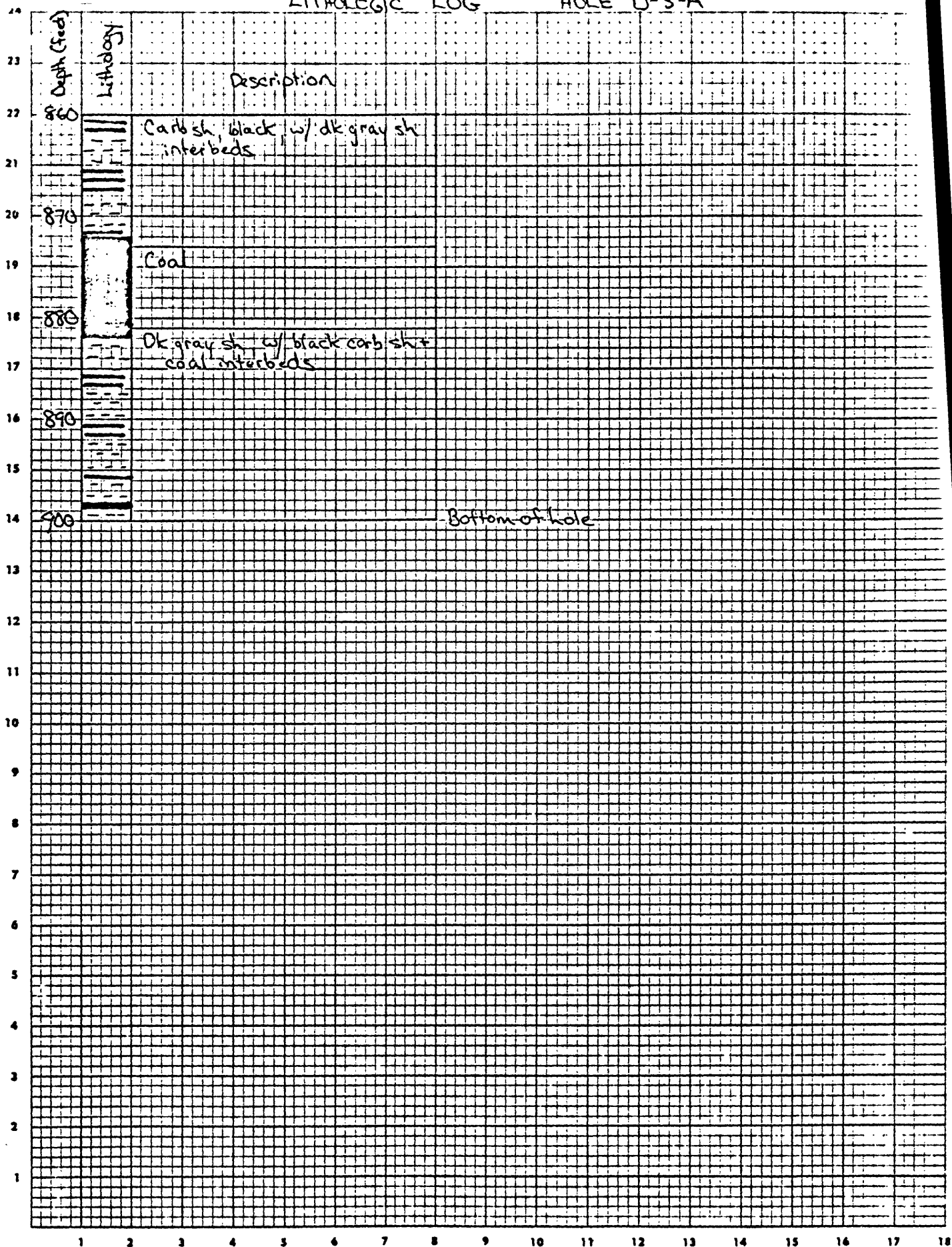
Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
100		Orange & brown cr. shale	100		Interbedded lt. gray ss, gray siltst., dk gray carb sh, gray sh., coal
110		Gray sh	110		Ok gray to brown carb sh
120		Yellowish-brown to lt. gray to white vfg ss.	120		lt. gray siltst
130		Yellowish-gray to gray sh	130		
140			140		Interbedded lt. gray siltst., lt. gray fgr ss, dk gray carb sh
150			150		Interbedded dk gray carb sh and coal (inc. towards bottom)
160			160		White clay interbedded w/ coal. Clay is prob. ash.
170			170		Brick red siltst. w/ coal incr. towards bottom
180			180		Coal Burned, poss. ash bed
190			190		Burned zone: reddish vfg ss, reddish siltst, black carb sh, white clay (ash), coal
200			200		
210					
220					
230					
240					
250					
260					
270					
280					
290					
300					
310					
320					
330					
340					
350					
360					
370					
380					
390					
400					
410					
420					
430					
440					
450					
460					
470					
480					
490					
500					
510					
520					
530					
540					
550					
560					
570					
580					
590					
600					
610					
620					
630					
640					
650					
660					
670					
680					
690					
700					
710					
720					
730					
740					
750					
760					
770					
780					
790					
800					
810					
820					
830					
840					
850					
860					
870					
880					
890					
900					

Depth (feet)	Logarithm	Description	Depth (feet)	Lithology	Description
420	v v	Burned zone - brick red	530		"
	v	fg. ss			
430	v v		540		Dk. gray sh., w/ coal interbeds
	v				
	v				Coal
	v				
440	v v		550		Black carb sh.
	v				Lt. gray + yellow shale
	v				
450	v v		560		
	v				
	v v				
460	v v		570		Lt. gray sh. + black carb sh. interbedded
	v				
	v				
470	v v	Burned zone - mixture of grayish-yellow sh., red fg. ss., red silt.	580		Red siltst., w/ gray sh. + dk brown carb sh. interbeds
	v				Black carb sh., w/ gray sh. interbeds
480	v v		590		
	v				
	v				
490	v	Red vfgr ss	600		
		Dark gray to black carb sh.	610		Red siltst., w/ lt. gray sh. + dk gray carb sh. interbeds
500					
			620		Gray mdst., w/ carb sh. + yell. brown sh. interbeds
510					
					Red siltst., w/ sh. + carb sh. interbeds
520		Coal	630		Lt. gray mdst. interbedded w/ gray sh. + dk brown carb sh.
		Lt. gray sh.			Red siltst., w/ gray sh. + coal interbeds
530			640		



LITHOLOGIC LOG

HOLE D-3-A



LITHOLOGIC LOG HOLE D-11-A

Elev. ~ 7546' Total Depth 1140' Location T3N, R.93W, sec. 5, SE 1/4 SW 1/4 SE 1/4
 Moffat County, Colorado Becker Drilling Co. Geologist - Marith Reheis

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0		Yellow-brown vfg s+p ss, weathered	100		
10			110		Sample missing
20		Yellow-brown sh interbedded w/ black carb sh	120		Dk gray carb siltst, w/ gray carb ss interbeds
30		Coal	130		Coal
40		Samples missing	140		Gray siltst, w/ dk gray carb ss + yellow-brown ss interbeds
50		Yellow-brown sh and black carb sh interbedded	150		Sample missing
60		Samples missing	160		Same as 130-140
70			170		Sample missing
80		Yellow-brown sh and black carb sh interbedded	180		Same as 130-140
90		Gray s+p carb ss, w/ gray sh interbeds	190		Carb ss w/ gray siltst
100		Dk gray carb siltst, w/ gray carb ss interbeds	200		Samples missing

LITHOLOGIC LOG HOLE D-11-A

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		Dk gray carb siltst	310		
210			320		
220		Coal	330		
230		Gray carb ss w/ dark gray carb siltst interbeds	340		Gray siltst ss, w/ gray siltst interbeds
240		Gray siltst ss, with dk gray carb sh	350		
250		Dk gray carb ss	360		Samples missing to 375; coal beds from geophysical logs
260		Gray siltst	370		Coal
270		Sample missing	380		Samples missing
280		Dk gray carb siltst, w/ yellow-brown ss interbeds	390		Coal
290		Coal	400		Dk gray siltst carb ss
300		Dk gray carb siltst, w/ yellow-brown ss interbeds	410		Gray siltst
310		Coal	420		
		60' samples missing somewhere in first 340' - correction made here - coal beds from geophysical logs			
		Samples missing			
		Sample missing			
		Interbedded gray siltst + gray siltst ss			

LITHOLOGIC LOG

HOLE D-II-A

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
420		Gray siltst + gray ssp ss interbedded	530		
430			540		
440			550		Coal
450			560		Gray ssp ss, vfg, w/ gray siltst interbeds
460			570		
470		Interbedded gray ssp carb ss, gray siltst, dk gray carb sh	580		
480			590		
490			600		
500			610		DK gray ssp carb ss
510			620		Coal
520			630		DK gray ssp carb ss
530			640		

24

LITHOLOGIC LOG				HOLE D-11-A			
Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description		
650	Coal		750	DK gray sfp carb ss w/ brown + gray siltst interbeds			
650	OK gray sfp carb ss		760				
660			770				
670			780				
680	Sample missing		790				
680	Gray sfp ss		800				
690			810				
700	Coal		820	Coal			
710			830	DK gray sfp ss			
720	Coal		840				
730			850				
740	Gray sfp ss interbedded w/ gray siltst		860				
750	OK Gray sfp carb ss						

100-443887-100

D-11-A

18

HOLE D-11-A

19

LITHOLOGIC LOG

D-12-NG

Elevation ~ 7945' Total Depth 1240' Location T.3N, R.93W, sec. 8, SW 1/4 SE 1/4 SW 1/4
 Moffat County, Colorado Becker Drilling Company Geologist - Marith Reheis

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0			100	✓ ✓	11
10			110	✓ ✓	
20		Lt. yellowish-brown fg well-sorted ss, weathered	120	✓	Red and yellow ss (burn zone)
30		Lt. yellowish-gray sh	130	✓ ✓	
40		Coal	140	✓	
50		Lt gray to lt brown sh + carb sh	150	✓ ✓	
60		Lt gray to white fg well-sorted ss, + lt gray siltst interbeds	160	✓ ✓	
70		Samples missing to 75' - coal bed from geophysical logs	170	✓ ✓	
80			180	✓ ✓	Black carb sh, w/ some burnt ss at top
90		Lt gray + yellow fg well-sorted ss, w/ dk gray carb sh interbeds	190	✓	
100		Ok gray carb sh + gray sh interbedded			Ok gray carb siltst, w/ gray + yellow ss interbeds
		Black carb sh			
		Gray siltst and brick-red ss - burnt zone	200		

LITHOLOGIC LOG

D-12-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200			310		
210		Lt yellowish-gray fq well-sorted rounded ss w/ dk gray carb sh interbeds	320		Lt yellowish-brown s+p ss, w/ dk gray carb siltst interbeds
220			330		
230			340		Dk carb sh, w/ gray ss + siltst interbeds
240			350		Dk gray carb ss
250		Dk gray carb siltst, w/ varying amounts of yellowish-gray ss, buff carb ss, greenish-gray + brown siltst	360		
260			370		Dk gray carb siltst (to brown), w/ gray to yellowish brown s+p ss
270			380		
280			390		Yellowish-brown ss, w/ dk gray carb siltst + lt gray ss interbeds
290			400		
300			410		Coal
310			420		Yellowish-brown to buff ss

LITHOLOGIC LOG

D-12-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
420			530		
430			540		Dk gray carb siltst, w/ some gray ss
440		Yellowish-brown to gray ss, w/ dk gray carb siltst interbeds	550		Coal
450		Samples missing	560		Gray st. p. ss, w/ some gray siltst
460		Yellowish-gray st. p. ss, w/ black carb sh interbeds	570		
470		Dk gray carb siltst, w/ black carb sh interbeds	580		Coal
480			590		Gray st. p. ss
490		Lt gray to yellowish-gray st. p. ss	600		
500			610		
510			620		
520			630		
530			640		

LITHOLOGIC LOG

D-12-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200			310		
210		Lt yellowish-gray, fq well-sorted rounded ss w/ dk gray carb sh interbeds	320		Lt yellowish-brown s+p ss, w/ dk gray carb siltst interbeds
220			330		
230			340		Dk carb sh, w/ gray ss + siltst interbeds
240			350		Dk gray carb ss
250		Dk gray carb siltst, w/ varying amounts of yellowish-gray ss, buff carb ss, greenish-gray + brown siltst	360		
260			370		Dk gray carb siltst (to brown), w/ gray to yellowish brown s+p ss
270			380		
280			390		Yellowish-brown ss, w/ dk gray carb siltst + lt gray ss interbeds
290			400		
300			410		Coal
310			420		Yellowish-brown to buff ss

LITHOLOGIC LOG

D-12-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
860	II		970	II	
870	Coal		980		Dk gray carb siltst w/ gray carb ss + small coal interbeds
	Dk gray carb siltst				
	Coal				Dk gray carb siltst, w/ yellowish-brown ss
880	Dk gray carb siltst		990		
	Coal				Dk gray carb ss + siltst
890			1000		
900			1010		Gray carb siltst
910	Dk gray carb siltst		1020		APPROX TOP TROUT CREEK SS MEMBER
920			1030		
	Dk gray carb siltst w/ gray carb ss				Dk gray carb siltst, w/ gray carb ss interbeds
930			1040		Lt gray carb ss, w/ dk gray siltst + shale interbeds
	Lt gray carb ss				Sample missing
940	Lt gray carb ss w/ dk gray carb sh		1050		Sample missing Lt gray ss w/ dk gray sh interbeds
	Coal				
950	Dk gray carb sh to siltst		1060		
960	Coal		1070		
970	Gray carb ss w/ carb siltst interbeds		1080		APPROX BASE TROUT CREEK SS MEMBER

LITHOLOGIC LOG

D-12-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
1080		Samples missing	1190		
1090		Same as 1050-1080	1200		Lt gray ss interbedded w/ dk gray sh
1100			1210		
1110			1220		Dk gray sh interbedded w/ lt to med gray ss
1120			1230		Med gray ss interbedded w/ dk gray sh
1130			1240		bottom of hole
1140					
1150					
1160		Dk gray sh interbedded w/ lt gray ss			
1170					
1180		Lt to dk gray ss			
1190		Dk gray sh interbedded w/ lt to med gray ss			

Elev ~ 8050' Total Depth 800' Location 1.3N, R.43W, sec.17, NW 1/4 SW 1/4 N

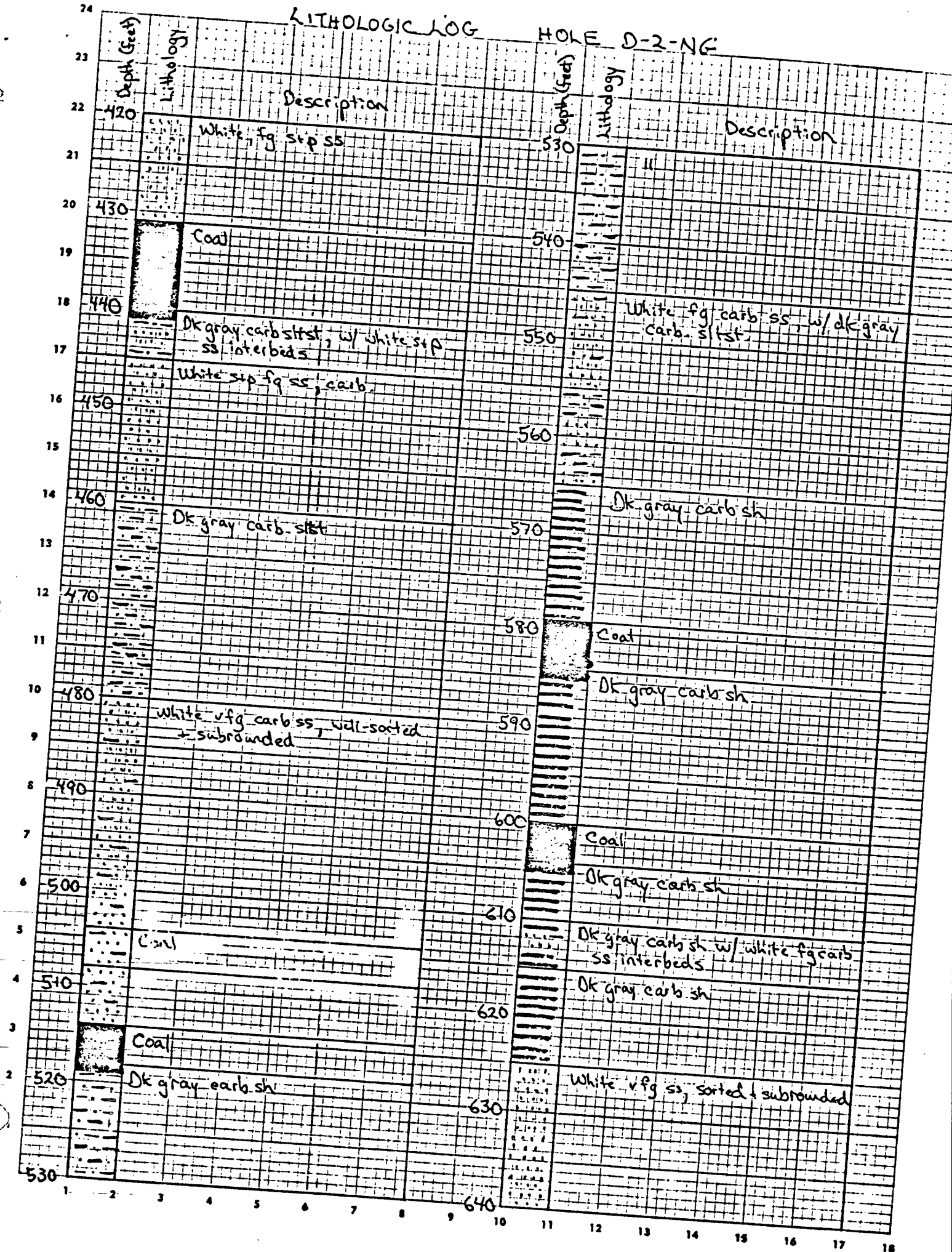
Moffat County Colorado Becker Drilling Company Geologist - Marith Rehe

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0		Yellow-brown to white fg ss, subang, sorted	100		Gray carb sh, w/ red + yellow siltst interbeds
10		Brown to black carb sh	110		White + yellow-brown, for. ss, sorted, subrounded, friable
20		Interbedded red sh + white to gray siltst	120		Gray carb siltst, w/ red + yellow ss + black carb sh interbeds
30		White to gray siltst	130		White siltst, white to gray vfg, well-sorted, subrounded, ss
40		Yellow fg ss, sorted + subangular	140		Dk gray carb sh, some white, + red friable ss
50		Gray sandy sh	150		Coal, prob. bony
60		Gray sh, w/ gray carb sh interbeds	160		Gray to dk gray carb sh and siltst
70		Red, pink, and white fg, sorted, subrounded, friable ss	170		
80		Yellow siltst, w/ red + white sh	180		Gray carb siltst, dk grayish-white vfg friable ss
90		Dk gray carb sh	190		
		White to yellow vfg ss, sorted + subrounded	200		Yellowish-white fg ss
		Lt. gray siltst			
		Dark gray carb sh			

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		Yellowish-white fg ss	310		
210			320		
220		Coal	330		
230		Dk gray-black carb sh	340		
240		Brick-red sh w/ whitish gray siltst + fg ss	350		
250		Dk gray-black carb sh	360		Ss as above, w/ dk gray siltst interbeds
260		White to pink fg ss, well-sorted, subrounded, w/ some dk gray carb sh	370		Gray siltst interbedded w/ white to yellowish brown ss; gray siltst decreases to bottom
270			380		
280			390		
290		White to yellowish brown ss well-sorted subrounded friable	400		White fg siltst ss, sorted + sub-angular
300			410		
310			420		

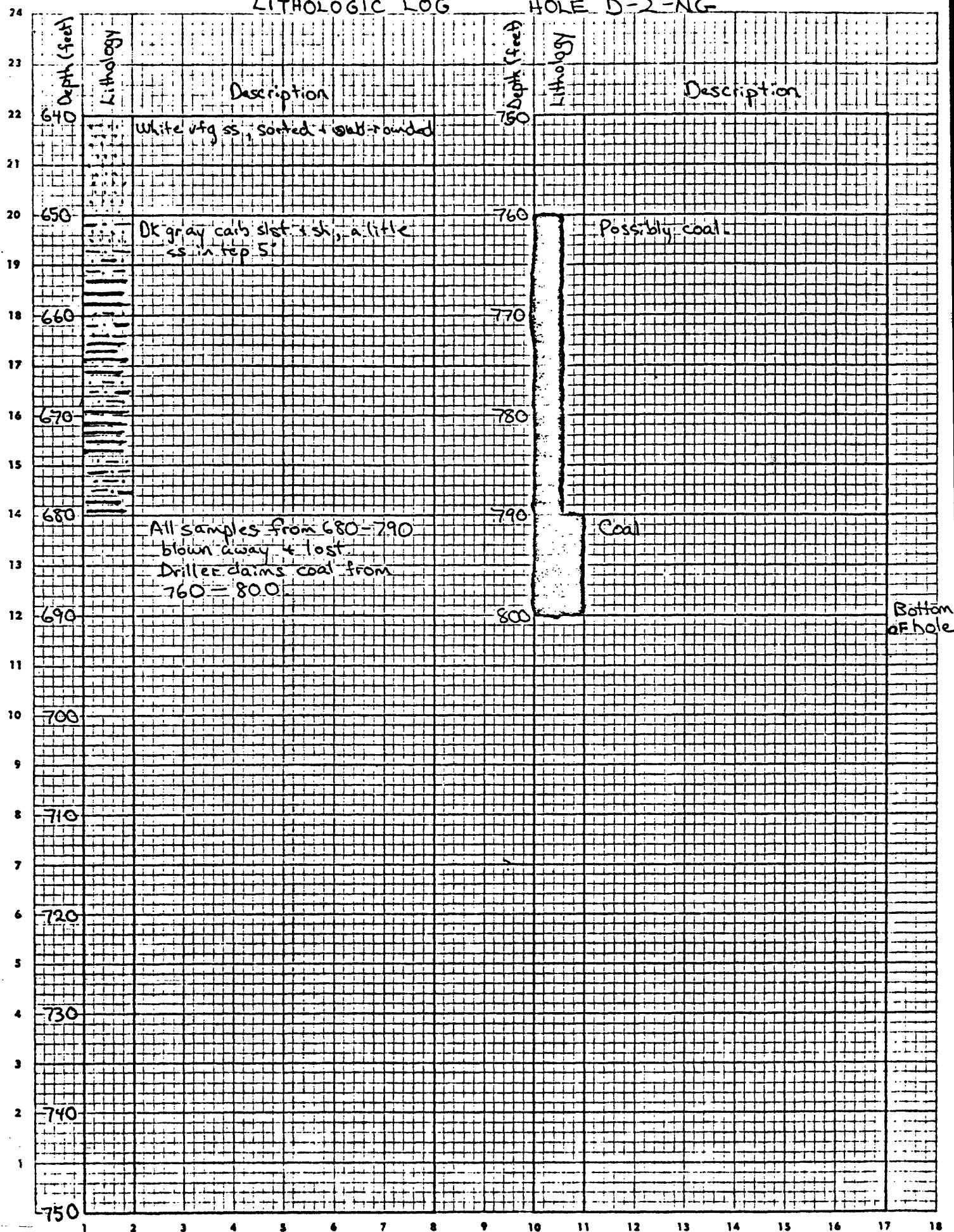
LITHOLOGIC LOG

HOLE D-2-NG



LITHOLOGIC LOG

HOLE D-2-NG



LITHOLOGIC LOG HOLE D-70-NG

24	Elev. ~ 8123'		Total Depth 1480'		Location T.3N., R.93W., sec. 20, NW 1/4 SE 1/4 NE 1/4	
23	Rio Blanco County, Colorado		Becker Drilling Company		Geologist - Marith Reheis	
22	Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
21						
20	0		Yellowish-brown siltst, w/ lt gray vfg stp ss interbeds	100		Gray siltst interbedded w/ lt gray vfg stp ss
19			lt gray sh, w/ some grayish brown siltst at top			lt gray vfg stp ss, w/ gray siltst interbeds
18	10		Gray to buff vfg stp ss, well-rounded + sorted, w/ grayish-brown siltst interbeds	110		
17						lt gray vfg stp ss
16	20		Grayish white to orange vfg, well-sorted + rounded ss	120		
15						
14	30		Dk gray shale	130		
13						
12	40		lt gray vfg stp ss interbedded w/ dk gray sh + carb sh	140		Coal
11			Dk gray sh			Black carb sh
10	50			150		Coal
9						Black carb sh
8	60			160		Coal
7						Dk gray sh, w/ lt gray vfg stp ss interbeds
6	70		Black carb sh	170		lt gray vfg stp ss w/ dk gray sh + dk gray carb sh interbeds
5			Coal			
4	80		Dk gray carb sh, w/ dk gray sh interbeds	180		Dk gray carb sh
3						
2	90		lt gray vfg stp ss, well-sorted, subrounded, w/ gray siltst interbeds	190		lt gray vfg stp ss w/ dk gray carb sh + sh interbeds
1						
	100			200		

LITHOLOGIC LOG HOLE D-10-NG

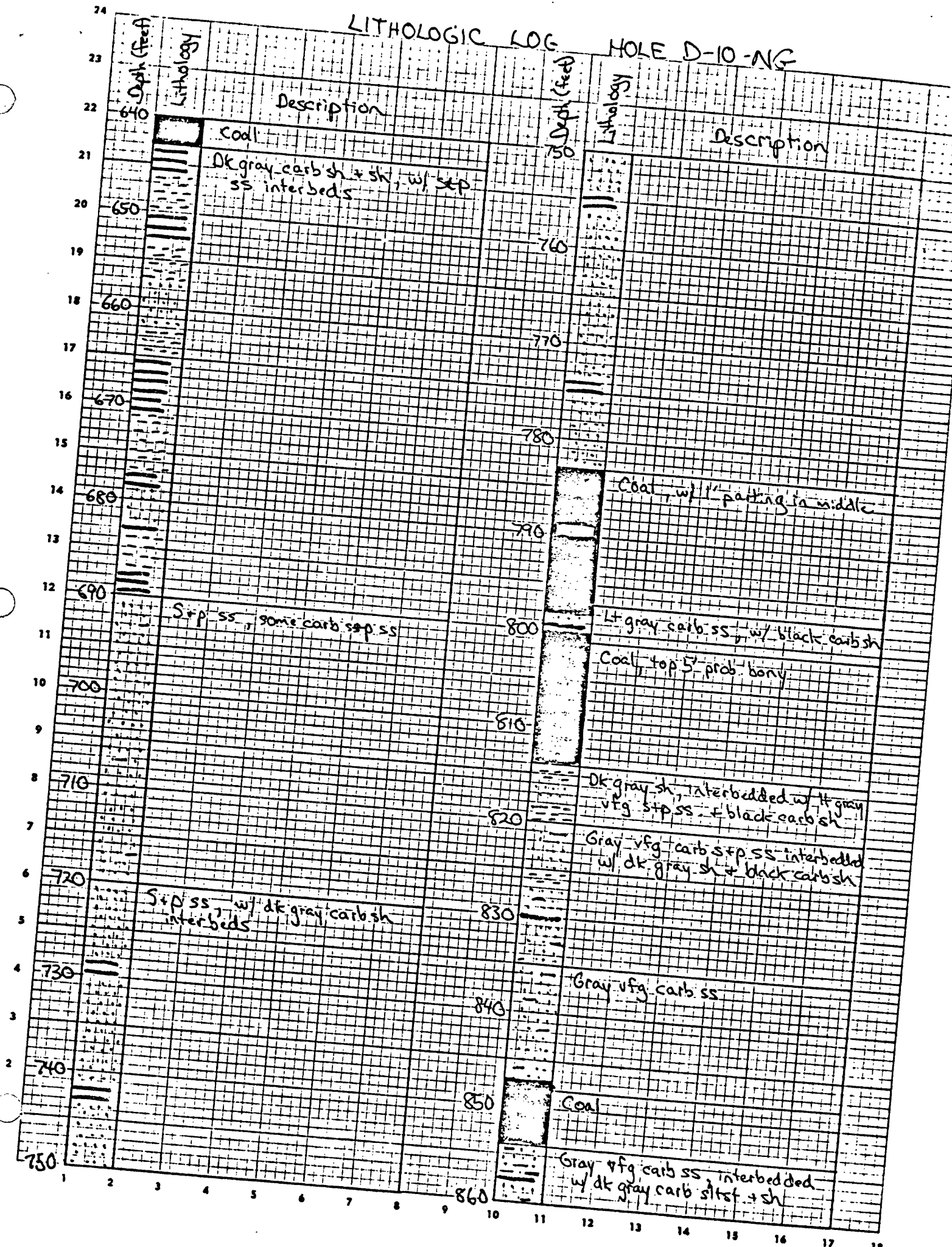
Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		Lt gray vfg stp ss, w/ dk gray carb sh + sh interbeds	310		
210			320		Stp ss, w/ dk gray sh interbeds
220			330		
230		Coal	340		Gray siltst interbedded w/ stp ss
240		Lt gray vfg stp ss w/ brown carb sh interbeds	350		Dk gray carb sh, w/ gray siltst + gray stp ss interbeds
250		Sample missing	360		Gray stp to brownish-gray vfg stp ss, well-sorted + rounded
260		Coal	370		
270		Gray sh	380		
280		Sample missing	390		
290		Lt gray vfg stp ss, w/ dk gray sh, black carb sh, + small coal interbeds	400		Coal
300			410		Brownish-gray vfg stp ss
310		Dk gray sh interbedded w/ white stp ss	420		Coal
					Dk gray sh + carb sh, w/ some brownish-gray vfg stp ss at top

LITHOLOGIC LOG

HOLE D-10-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
420		Dk gray sh. + carb sh	580		
430		Brownish-gray vfg stp ss, interbedded w/ gray sh + dk brown carb sh	540		Gray sh, interbedded w/ stp ss + dk gray carb sh
440		Coal	550		
450			560		
460		Brownish gray vfg stp ss, interbedded w/ gray sh + dark brown carb sh	570		Dk gray carb sh, w/ yellowish-brown sh interbeds
470			580		Stp ss
480			590		Stp + yellowish ss, w/ dk gray carb sh + gray sh interbeds
490			600		
500		Brownish-gray vfg stp ss	610		
510			620		Dk gray carb sh interbedded w/ stp ss
520		Coal, with partings at top	630		Coal
530			640		Dk gray carb sh interbedded w/ stp ss, gray sh
					Coal

LITHOLOGIC LOG HOLE D-10-NG



LITHOLOGIC LOG D-10-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
860		Gray vfg carb ss, interbedded w/ dk gray carb siltst + shale	970		Dk gray carb sh
870		Coal	980		Gray vfg stp carb ss, w/ dk gray carb sh interbeds + also yellowish-brown siltst.
880		Dk gray carb sh	990		
		Coal			
890		Gray vfg carb ss, interbedded w/ dk gray carb siltst + sh	1000		Coal
		Coal, w/ 2' parting	1010		Gray vfg stp carb ss, w/ dk gray siltst interbeds
900		Gray carb ss, interbedded w/ dk gray sh + black carb sh	1020		Approx top Trout Creek Ss Member
		Sample missing			Gray vfg stp carb ss, w/ gray sh interbeds
910		Coal	1030		
		Lt gray vfg stp carb ss, w/ dk gray sh + carb sh interbedded	1040		
920			1050		Gray vfg stp carb ss, w/ gray sh + black carb sh interbeds
930			1060		
940			1070		
950			1080		
960		Dk gray carb sh, w/ gray carb ss, yellowish-brown siltst, and reddish brown ss interbeds			
970		Coal, top 2' prob. bony			

KwF

Ki

LITHOLOGIC LOG D-10-N/E

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
1080		Gray vfg stp carb ss, w/ gray sh + black carb sh interbeds	1190		
1090			1200		
1100		Gray sh, w/ gray vfg stp carb ss + yellowish brown siltst interbeds	1210		Gray carb sh, with gray vfg stp carb ss interbeds
		Gray carb vfg stp ss, w/ gray sh interbeds			Gray carb vfg stp ss, w/ gray carb sh interbeds
		APPROX BASE TROUT CREEK SS MEMBER			
1110			1220		
					APPROX TOP BLACK DIAMOND COAL ZONE
1120			1230		Gray vfg stp carb ss w/ small coal interbeds
					Gray vfg stp carb ss w/ dk gray carb sh interbeds
1130			1240		Gray vfg stp carb ss w/ small coal interbeds
					Gray carb sh, w/ gray ss interbeds
1140			1250		Gray vfg stp carb ss w/ dk gray carb sh + small coal interbeds
1150			1260		
1160			1270		
1170			1280		
1180			1290		Sample missing
1190			1300		same as 1250-290

LITHOLOGIC LOG D-10-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
1300		Same as 1250-1290	1410		APPROX BASE BLACK DIAMOND COAL ZONE
		Sample missing			Sample missing
1310		Dk gray carb sh, w/ gray carb ss interbeds	1420		Same as 1355-1385
1320			1430		
1330		lt gray silt carb ss, w/ dk gray carb sh interbeds	1440		Mixture of lt gray vfg ss, lt grayish-brown sh, dk gray carb sh
1340			1450		
1350		Dk gray siltst, w/ gray silt carb ss + gray sh + carb sh interbeds	1460		
		Gray silt ss, w/ dk gray carb sh interbeds			
1360			1470		
1370			1480		
1380					
		Sample missing			
1390		Same as 1355-1385			
1400					
1410					

Bottom of hole

LITHOLOGIC LOG HOLE D-7-NG

Elev. ~7755' Total Depth 1675' Location T.3N., R.93W., sec.15, NW 1/4 NW 1/4 NW 1/4
 Moffat County Colorado Becker Drilling Company Geologist - Martin Reheis

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0		Gray sh., w/ yellowish-brown fg ssp ss interbeds	100		
10		Yellowish-brown fg ssp ss, w/ gray sh at base	110		
20		Gray sh., w/ yellowish-brown ss + dk gray carb sh interbeds at base	120		Coal
30			130		
40		Coal	140		Dk gray carb sh, w/ lt gray ssp vfg ss interbeds
50		Carb sh, black, w/ dark gray sh interbeds	150		
60		White fg ssp carb ss	160		Lt gray carb ss, ssp, vfg, w/ dk gray carb sh interbeds
70		Dk gray-black carb sh, w/ gray sh + white fg ssp carb ss interbeds	170		
80			180		
90		Lt gray ssp vfg carb ss, w/ dark gray carb sh + lt brown siltst interbeds	190		
100			200		

LITHOLOGIC LOG

HOLE D-7-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		black carb sh w/ lt gray carb ss interbeds - dk gray sh at base	310		
210		Sample missing	320		Coal
220		dk gray carb sh w/ lt gray carb ss interbeds	330		White to gray s+p carb ss, w/ some dk gray carb sh
230		lt gray carb ss, w/ gray carb sh interbeds	340		Coal
240		Coal	350		lt gray s+p ss, w/ dk gray carb sh at top
250		dk gray carb sh, w/ s+p ss interbeds	360		
260			370		
270			380		Coal
280		dk gray carb sh, w/ s+p ss interbeds	390		lt gray s+p ss, w/ dk gray carb sh at top
290		Coal	400		dk gray carb sh, w/ lt gray s+p ss
300		dk gray to black carb sh, w/ some dk gray sh	410		lt gray s+p carb ss, w/ dk gray sh + carb sh interbeds
310		lt gray s+p carb ss, w/ dk gray carb sh interbeds	420		

LITHOLOGIC LOG

HQE D-7-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
420			530		
430			540		
440	Coal		550		
450		lt gray carb ss w/ dk gray carb sh interbeds	560		
460			570		
470		dk gray carb sh, w/ lt gray carb ss interbeds	580		
480			590		S+pcarb ss w/ dk gray carb sh interbeds
490			600		Gray-brown siltst, w/ dk gray carb sh + gray s+p carb ss
500	Coal - prob. bony at bottom		610		Gray s+p carb ss, w/ gray siltst + carb sh interbeds
510	Coal		620		Gray s+p ss, w/ dk gray siltst interbeds
520		lt gray carb ss	630		
530			640		

LITHOLOGIC LOG

D-7-NG

Depth (Feet)	Lithology	Description	Depth (Feet)	Lithology	Description
640		"	750		Gray s+p ss, w/ dk gray siltst interbeds
650		Coal	760		
		Gray s+p ss, w/ dk gray siltst interbeds in varying amounts	770		
660			780		
670			790		
680			800		Gray carb ss, w/ dk gray carb sh + sh
690			810		Coal
700					Gray carb sh + siltst
710			820		
720					Coal
730			830		Dk gray to black carb sh, w/ lt. brown siltst interbeds
740		Coal	840		
			850		Gray s+p ss
		Carb sh	860		
		Coal			

LITHOLOGIC LOG D-7-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
860		"	970		"
870			980		
880			990		Interbedded gray s+p ss, lt brown sltst, + dk gray carb sh
890			1000		
900		Dk gray carb sh	1010		Coal
910		Sample missing	1020		Dk gray carb sh
920		Gray carb ss, w/dk gray carb sh at top	1030		Coal
930		Coal	1040		Brown to black carb sh
940		Gray carb ss	1050		Gray to yellowish-brown s+p ss, w/gray sh + black carb sh interbeds
950		Coal	1060		
960		Gray s+p ss, w/dk gray carb sh interbeds in varying amounts	1070		Gray s+p fg ss
970			1080		

LITHOLOGIC LOG

D-7-NF

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
24					
23					
22	1080		1190		
21					
20	1090		1200		
19		Gray stp ss w/ gray slt st + carb sh interbeds			
18	1100		1210		
17					
16	1110	Coal	1220		
15		Interbedded gray stp ss + black carb sh			
14	1120	Coal	1230		
13		Gray stp sg ss, w/ gray slt + dk gray carb sh at base			
12	1130		1240		
11					
10	1140	Sample missing	1250		
9					APPROX BASE TROUT CREEK SS MEMBER
8	1150	Dk gray carb sh w/ gray carb stp ss interbeds	1260		
7		Gray carb ss, w/ dk gray carb sh interbeds			
6	1160		1270		
5		Gray stp ss			
4	1170		1280		
3					
2	1180	TOP OF TROUT CREEK SS MEMBER			
1		Sample missing			
		Same as 1165-1175	1290		
	1190		1300		

LITHOLOGIC LOG

HOLE D-7-N/G

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
1300	§ II		1410	II	
					Sample missing
1310			1420		Same as 1395-1415
1320			1430		
1330			1440		Gray carb sh, w/ gray s+p ss + lt brown sstst interbeds
1340		Gray s+p ss, w/ gray sh interbeds + some carb sh	1450		Gray carb ss, w/ dk gray carb sh interbeds
1350		Dk gray carb sh, w/ gray carb ss interbeds	1460		
1360			1470		
		Gray s+p ss			
1370			1480		
1380		APPROX TOP BLACK DIAMOND COAL ZONE	1490		Dk gray carb sh, w/ gray s+p carb ss + gray sh interbeds
					Gray s+p ss, w/ gray carb sh interbeds in varying amounts
1390		Dk gray to black carb sh	1500		
		Coal			
		Gray carb ss, w/ dk gray carb sh interbeds			
1400			1510		
1410			1620		

LITHOLOGIC LOG

D-7-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
1520		Gray stp ss, w/dk gray carb sh interbeds	1630		"
1530		Coal	1640		
1540		Gray stp ss, w/dk gray carb sh interbeds	1650		
1550		Coal	1660		
1560		Gray stp ss, w/dk gray carb sh interbeds	1670		
1570		APPROX BASE BLACK DIAMOND COAL ZONE			
1580					
1590		Samples missing			
1600		Same as 1550-1590			
1610					
1620					
1630					

Bottom of hole

LITHOLOGIC LOG HOLE D-6-NF

Elev. ~ 7240' Total Depth 1583' Location T.3N, R.93W, sec.11, SW 1/4 SE 1/4 NW 1/4
 Moffat County Colorado Becker Drilling Company Geologist - Marith Reheis

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0		Sample missing	100		
10		Lt brownish-gray sh, w/ some vari-colored clst interbeds	110		
20		Lt gray fg s+p ss, carb	120		Coal
30		Dk gray carb sh, w/ some lt gray fg s+p carb ss at top	130		Gray s+p carb ss
40		Dk gray sh	140		
50		Gray carb s+p fg ss, w/ thin dk gray sh interbeds	150		Coal
60			160		Gray s+p ss
70		Dk gray sh interbedded w/ some gray s+p carb ss	170		
80		Gray s+p carb ss, w/ varying amounts of dk gray sh interbeds	180		
90			190		
100			200		

LITHOLOGIC LOG

HOLE D-6-NF

Depth (feet)	Lithology	Depth (feet)	Lithology
200	Coal	310	Lt brownish-gray vfg st p ss
210	Lt gray stp carb ss, w/ some carb sh interbeds, brown	320	
220		330	
230	Coal	340	Lt brownish-gray vfg st p ss
240		350	
250	Coal	360	Coal
260	Lt brownish-gray vfg st p ss	370	Dk gray to brown carb siltst and Lt brownish-gray vfg st p ss interbedded
270	Coal	380	
280	Dk gray carb siltst + dk gray to brown carb sh interbedded	390	
290	Coal	400	
300	Gray to Lt brown siltst w/ Lt brownish-gray vfg st p ss inc. to bottom	410	Sample missing
310		420	Dk gray carb siltst, w/ gray carb sh interbeds

LITHOLOGIC LOG

HOLE D-6-NIG

Depth (Feet)	Lithology	Description	Depth (Feet)	Lithology	Description
420			530		Gray stp ss, w/ gray sh interbeds
430			540		Gray fg stp ss, carb at base
440			550		
450		Coal, partings in upper half	560		
460		Dk gray carb sltst, w/ gray carb sh interbeds	570		
470		Lt brownish-gray vfg stp ss, w/ gray sh interbeds	580		
480			590		Coal
490		Dk grayish-brown sltst	600		Sample missing
500		Dk gray carb sh, w/ stp ss interbeds	610		Coal
510		Coal, lower 2' heavy	620		Lt gray carb ss, w/ some yellowish brown sh at top
520		Dk gray carb sh	630		
530		Coal	640		
		Lt gray stp ss, w/ thin dk gray carb sh interbeds			
		Lt brownish-gray sltst + sh			

LITHOLOGIC LOG

HOLE D-6-AJF

Depth (feet)	Lithology	Depth (feet)	Lithology
640		750	
650	Gray carb ss, w/ dk gray carb sh interbeds	760	
660		770	
670	Carb sh + gray carb ss	780	Dk gray carb siltst + lt gray s+p carb ss
	Dk gray carb s+p ss		Coal
680		790	Carb sh
			Coal
690	Dk gray carb sh, w/ varying amounts of gray carb ss interbeds		Lt gray s+p ss + dk gray siltst interbedded
		800	Lt gray s+p ss, w/ occasional carb sh interbeds
700		810	
	Coal		
710		820	
	Samples missing		
720		830	
	Lt gray carb ss + dk gray sh		
730	Lt gray s+p carb ss	840	
740		850	Sample missing
750		860	

HOLE D-6-NF

LITHOLOGIC LOG										HOLE D-6-N5											
Depth (feet)		Lithology	Description								Depth (feet)		Lithology	Description							
24											970										
23											980										
22	860		Same as 800-805								990										
21											1000										
20	870		Dk gray carb sh + lt gray carb ss interbedded								1010										
19			Sample missing								1020										
18	880		lt gray carb ss w/ varying amounts of dk gray carb sh interbeds								1030										
17											1040										
16	890										1050										
15											1060										
14	900										1070										
13											1080										
12	910																				
11																					
10	920																				
9																					
8	930																				
7																					
6	940																				
5																					
4	950		Sample missing																		
3			Same as 880-885																		
2	960																				
1			Coal																		
	970																				

LITHOLOGIC LOG HOLE D-6-NF

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description	
24						
23						
22	1080	Coal	1190		Lt gray carb ss + dk gray carb sh interbeds	
21		Interbedded lt gray carb ss + dk gray carb sh				
20	1090		1200			
19						
18	1100	Gray carb ss	1210		Gray sh	Kwf
17					APPROX TOP TROUT CREEK SS MEMBER	Ki
16	1120		1220			
15		Coal				
14	1120	Dk gray to black carb sh	1230		Gray ss + dk gray siltst interbedded	
13		Coal				
12	1130	Dk gray to black carb sh	1240		Gray sh	
11						
10	1140	Lt gray carb ss	1250			
9					Samples missing	
8	1150		1260			
7		Coal			Same as 1240-1255	
6	1160	Lt gray carb ss, w/ dk gray carb sh at top	1270		Lt gray carb ss + gray sh interbedded	
5						
4	1170	Lt gray carb ss, w/ lt brown siltst interbeds	1280			
3					Gray sh, w/ red-brown siltst interbeds	
2	1180	Dk gray to black carb sh, w/ lt brown siltst interbeds	1290			
1					APPROX BASE TROUT CREEK SS MEMBER	
	1190		1300		Gray sh + dk gray carb sh interbedded	

LITHOLOGIC LOG

D-6-NG

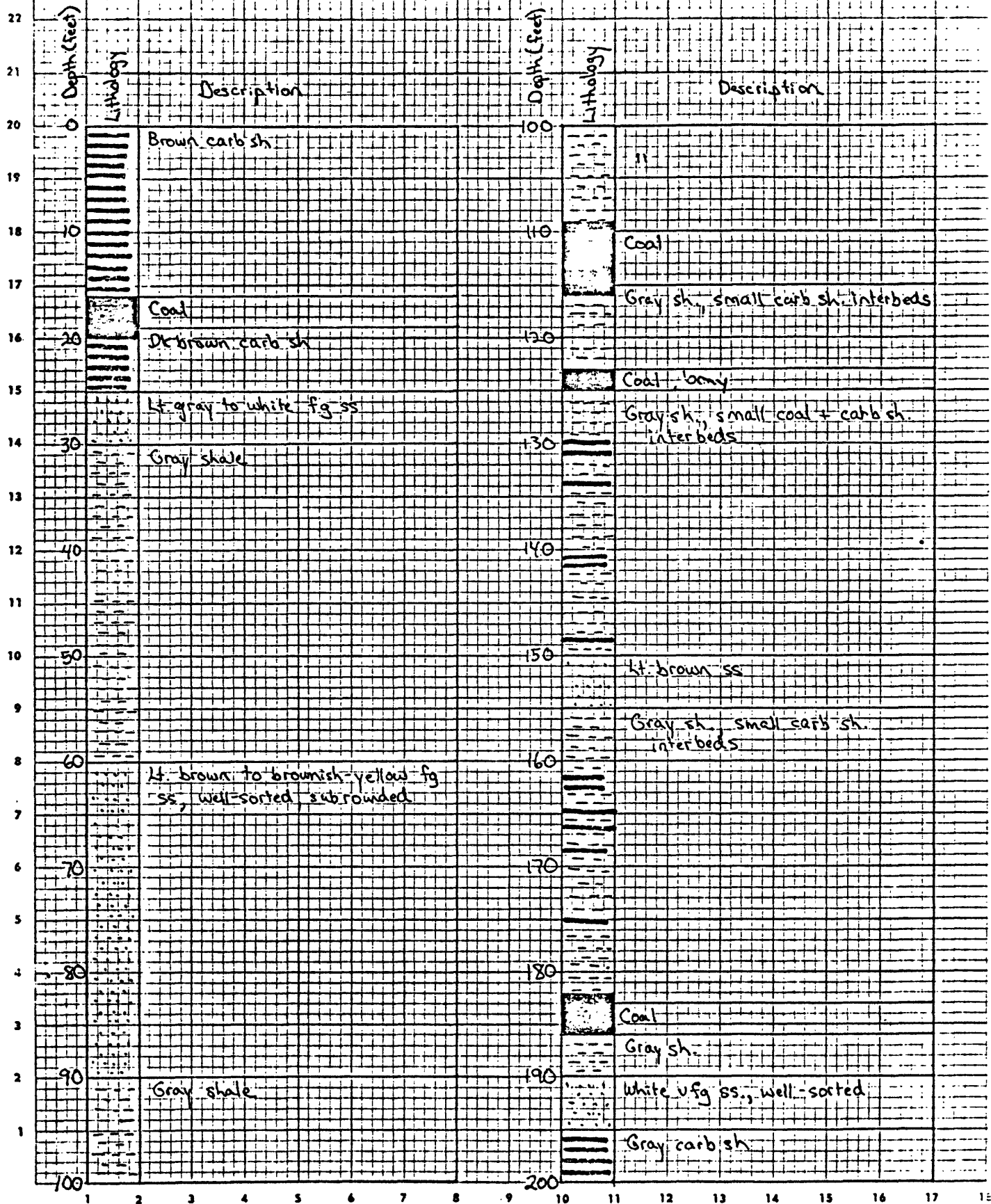
Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
24					
23					
22	1300		1410		
21					APPROX TOP BLACK DIAMOND COAL ZONE
20	1310		1420		
19		20' samples missing somewhere in interval between			Dk gray sh + lt gray s+p ss interbedded
18	1320	11.95 and 13.35	1430		
17					Dk gray sh
16	1330		1440		lt gray s+p carb ss + dk gray carb sh interbedded
15		Gray, vfg s+p carb ss, w/ dk gray carb sh interbeds			
14	1340		1450		
13					Dk gray sh, w/ some gray s+p carb ss interbeds
12	1350		1460		
11		Dk gray to black carb sh			
10	1360		1470		Coal
9					Dk gray sh
8	1370	lt gray carb ss + dk gray carb sh interbedded	1480		Gray s+p carb ss, w/ gray sh + dk gray carb sh interbeds
7		Dk gray sh			Coal
6	1380		1490		Dk gray carb sh + lt gray sh, w/ gray s+p ss interbeds
5					Coal
4	1390		1500		Dk gray carb sh + lt gray sh
3					Samples missing
2	1400	S+p gray ss, w/ dk gray sh interbeds	1520		
1					Dk gray to black carb sh + lt gray sh
	1410		1530		

LITHOLOGIC LOG

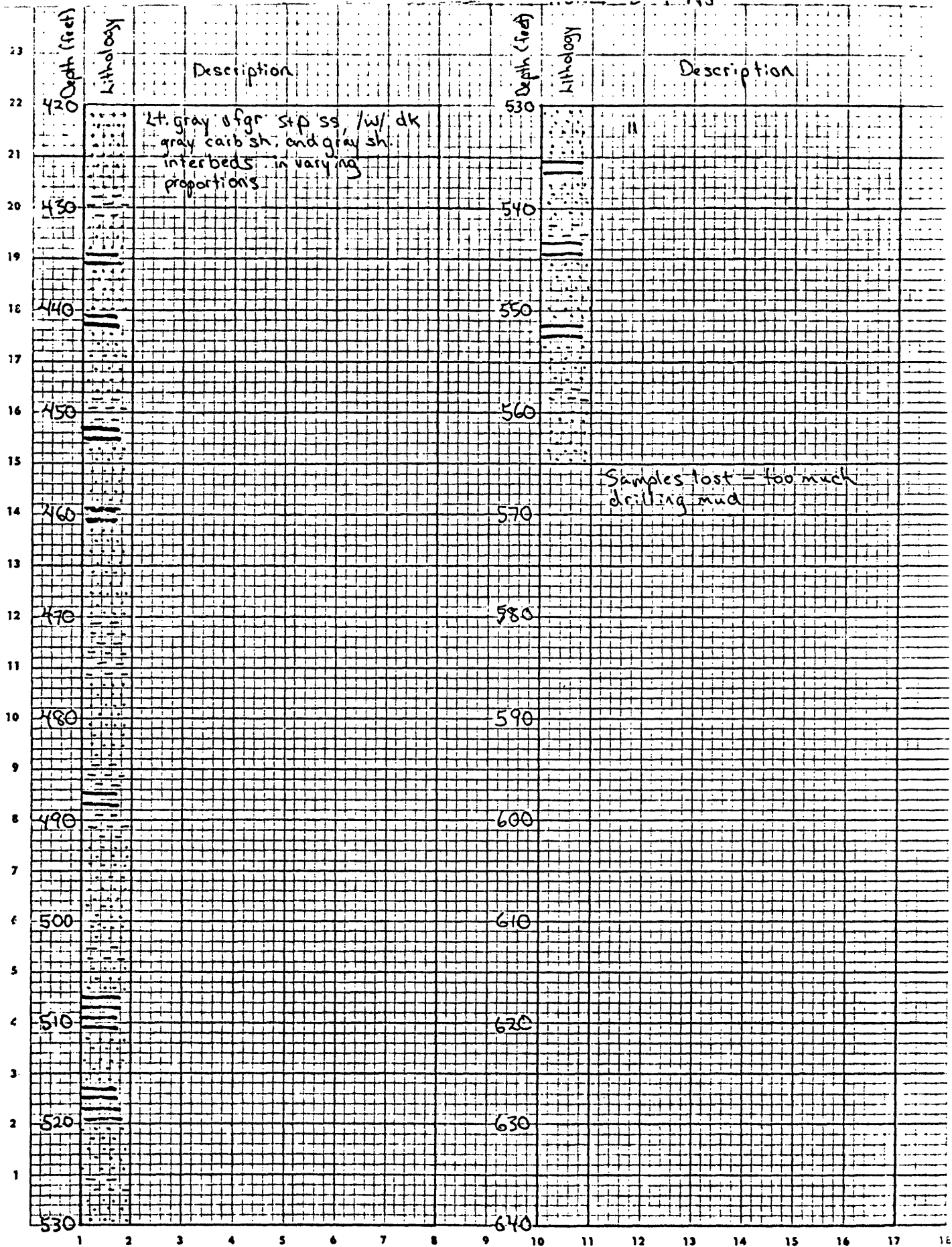
HOLE D-6-N/G

Depth (feet)	Lithology	Description
24		
23		
22	1520	"
21		
20	1530	
19		
18	1540	Gray st p ss, w/ dk gray carb sh at top
17		Sample missing
16	1550	Same as 1530-1540
15		Sample missing
14	1560	25 feet of samples are missing somewhere in the interval 1570 to 1583
13		
12	1570	
11		
10	1580	
9		Bottom of hole
8		
7		
6		
5		
4		
3		
2		
1		

Elev. ~7000' Total Depth 1171' Location T.3N, R.92W, sec.18, NW¼ NW¼ SE¼
Moffat County Colorado Becker Drilling Co. Geologist-Marith Reheis



Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		White ss, vfg, well-sorted	310		"
210			320		Coal P.
220			330		Gray sh, w/ dk gray carb sh & lt gray ss interbeds
230		Dark gray carb sh	340		
240		Lt. gray fg ss, well-sorted	350		Lt. gray fg ss, w/ dk gray carb sh and dk gray sh. interbeds
250		Gray sh	360		
260		Lt. gray ss, fg, well-sorted	370		Coal w/ dark gray carb sh. interbeds
270		Lt. gray silt st.	380		Lt. gr. vfg st & ss, w/ dk gray carb sh and gray sh. interbeds
280			390		
290		Lt. gray fg to vfg, well-sorted & rounded ss	400		
300		Gray sh, w/ dk gray carb sh & lt. gray ss interbeds	410		
310		Dk gray carb sh, w/ gray sh & lt. gray ss interbeds	420		



LITHOLOGIC LOG

WELL D-4-N-2

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
640		Samples lost - too much drilling mud	750		
650			760		
660		Dark gray carb sh, w/ lt. gray vfg. ssp ss interbeds; some gr. brown siltst. + gray sh.	770		Coal / w/ n/l parting
670			780		Approx. top of Twenty mile (?) ss. Member - Lt. gray vfg. ssp ss, w/dk gray carb sh. interbeds
680		Coal, bony	790		
690		Coal, bony	800		
700		Coal	810		
710		Samples missing to 740 - coal beds from geophysical logs.	820		
720			830		
730			840		
740		Coal	850		
750		Lt. gray vfg. ssp ss, well-sorted + rounded, w/ gray sh. interbeds	860		

23	Depth (feet)	Lithology	Description	23	Depth (feet)	Lithology	Description
22	860		Lt. gray vfg. stp ss, w/dk gray carb sh. interbeds	22	970		"
21				21		Coal	
20	870			20	980		
19				19			
18	Appr	or. base Twenty mile (?) Ss. Member		18			
17	880		Coal	17	990		Lt. gray vfg. stp ss, w/dk gray sh interbeds
16			Lt. gray vfg stp ss, w/dk gray carb sh. & lt. gray sltst. interbeds	16			
15	890		Dk gray carb sh, w/ lt. gray vfg stp ss interbeds	15	1000		Lt. gray to white vfg. stp ss, well-sorted & rounded
14				14			
13	900		Coal	13	1010		
12				12			
11	910			11	1020		
10			Dk gray carb sh, w/ lt. gray vfg stp ss interbeds	10			
9	920		Dark gray sh, w/ black carb sh & lt. gray vfg stp ss interbeds	9	1030		
8				8			
7	930		Lt. gray vfg stp ss, w/dk gray sh & black carb sh interbeds	7	1040		
6				6			
5	940		Lt. gray vfg stp ss, w/dk gray sh interbeds	5	1050		
4				4			
3	950			3	1060		
2				2			
1	960		Dk gray sltst. interbedded w/ lt. gray vfg stp ss & dk gray sh	1	1070		
	970				1080		

23
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2
1

1080
1090
1100
1110
1120
1130
1140
1150
1160
1170

Lt. gray to white vfg s+p ss,
well sorted + rounded

Lt. gray to white vfg s+p ss
interbedded w/ gray sh

Gray sh w/ dk gray carb sh
interbeds

Lt. gray to white vfg s+p ss
interbedded w/ gray sh

NO SAMPLES FROM 1120-1171;
coal beds taken from
geophysical logs

Coal

Coal

bottom of hole

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

LITHOLOGIC LOG HOLE D-5-NG

Elev. ~ 7345' Total Depth 1235' Location T.3N., R. 93W., Sec. 24, SE 1/4 NE 1/4 NE 1/4
 Rio Blanco County Colorado Becker Drilling Company Geologist - Marith Reheis

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0		Brown sh	100		"
10		Gray carb sh	110		
20		Lt to dark gray sh	120		Interbedded gray sh + siltst
30		Lt brown fg ss	130		
40		Interbedded lt gray to dk gray sh + carb sh	140		
50			150		Coal
60		Lt brownish-gray fg ss	160		Lt gray carb siltst
70		Lt gray siltst	170		
80		Lt brown vfg ss	180		
90			190		
100			200		

LITHOLOGIC LOG

D-5-NF

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		Coal	310		"
		Ok gray carb sh			
210		Lt gray sh	320		
220			330		Gray carb sh
230			340		Gray sh w/ lt gray vfg ss + dk gray carb sh interbeds
240		Dk grayish-brown carb sh	350		
		Coal	360		Gray vfg ss + lt gray carb sh interbedded in varying proportions
250		Dk grayish-brown carb sh	370		
		Gray sh with gray slt st interbeds	380		
260			390		
270			400		
280		Gray sh	410		
290		Gray sh w/ dk gray carb sh interbeds	420		
300					
310		Gray sh w/ lt gray vfg ss + dk gray carb sh interbeds			

LITHOLOGIC LOG

HOLE D-5-NG

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
420			530		
430			540		
440	Coal		550		Lt gray s+p vfg ss, w/ gray sh interbeds
450			560	Coal	
460			570		Yellow sh, w/ lt gray vfg s+p ss and carb sh interbeds
470			580		
480			590		
490			600	Coal	
500	Coal		610	Coal	
510	Coal		620		
520			630		
530			640		

LITHOLOGIC LOG HOLE D-5-N5

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
24					
23					
22	640		750		in varying amounts
21					
20	650	Yellowish-brown to gray sh, w/ dk gray carb sh interbeds	760		
19					
18	660	vfg st p ss, w/ black carb sh + yellow-brown sh interbeds	770		
17					Coal
16	670	Coal, parting at top	780		
15					
14	680	Yellowish-brown sh, w/ some gray carb sh	790		Gray sh, dk gray carb sh, + lt gray to white f.g. st p ss interbedded
13					
12	690		800		
11					
10	700		810		
9					
8	710	Coal	820		
7		Yellowish-brown sh + gray carb sh			
6	720		830		
5					
4	730		840		
3					
2	740		850		
1					
750		S + p vfg ss, w/ yellowish-brown sh + dk gray carb sh interbeds	860		

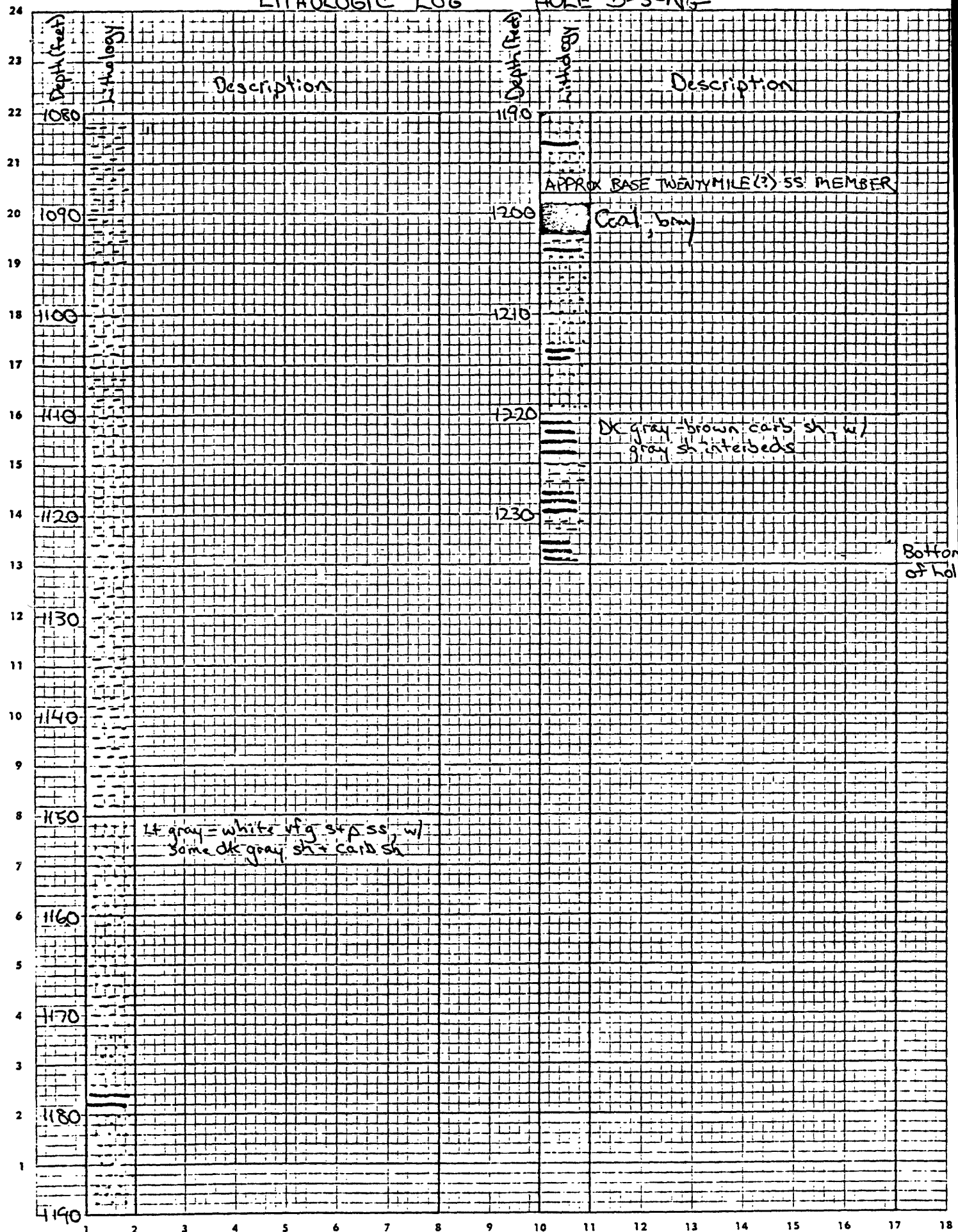
LITHOLOGIC LOG

HOLE D-5-NF

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
24			970		
23					
22					
21					
20	870	Lt gray vfg ss w/ gray sh interbeds	980		Coal
19					Gray to dk gray sh
18	880		990		
17					
16	890		1000		
15					Coal
14	900		1010		Gray to dk gray sh
13					
12	910	Yellowish-brown to gray sh	1020		Lt gray vfg str ss w/ gray sh + dk gray carb sh interbeds
11					
10	920	Coal	1030		
9					
8	930	Gray to dk gray sh	1040		
7					
6	940		1050		
5					
4	950		1060		
3					
2	960		1070		APPROX TOP TWENTYMILE (?) SS MEMBER
1					Dk gray sh
	970		1080		

LITHOLOGIC LOG

HOLE D-5-NG



LITHOLOGIC LOG HOLE D-8-N

Elev. ~8490' Total Depth 1231' Location T. 2N, R. 92W, sec. 7, SW 1/4 SE 1/4 NW 1/4
 Rio Blanco County Colorado Becker Drilling Company Geologist - Marith Reheis

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0		Yellow-brown fgr ss, well-sorted + subang.	100		Gray stp carb ss and yellowish-brown stp fgr ss
10			110		
20		Black carb sh, w/ brownish yellow vfg ss interbeds	120		
30		Gray fgr ss, w/ black carb sh interbeds	130		Lt. gray stp ss, some dark gray carb sh interbeds
40		Gray + black carb sh	140		Dark gray stp carb ss
50		Lt. gray stp carb ss	150		Coal, 2' parting near bottom
60		Coal, some bony lenses	160		Gray vfg ss
70			170		Coal
80		Lt. gray carb stp ss	180		Dark gray carb sh
90		Yellowish-brown fgr stp ss	190		Yellowish-brown stp ss
100		Yellowish-brown fgr stp ss, w/ gray carb sh interbeds	200		

LITHOLOGIC LOG

HOLE D-8-N:-

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		Lt. gray fg carb stp ss. and yellowish-brown stp ss	310		Black carb sh, w/lt gray fg stp ss interbeds
210			320		Lt gray fg stp carb ss
220			330		Ecd, bony
230			340		Dk gray carb sh, w/ small coal + lt brown carb sltst interbeds
240			350		Dk gray carb sh, w/ small coal + lt gray fgr stp ss interbeds
250	Coal		360		
260	S+P ss, lvsy coal lvs		370		Dk gray stp vfg carb ss, w/ dk gray carb sh interbeds
270	Coal		380		
280		Lt gray fg stp ss, some yellowish-brown stp ss	390		Lt gray stp vfg carb ss, w/ dk gray carb sh + small coal interbeds
290	Coal		400		Coal
300		Black carb sh	410		
310			420		Brownish-black carb sh
					Lt gray vfg carb stp ss
					Coal
					Lt gray vfg carb stp ss

LITHOLOGIC LOG

D-8-Nr

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
420		Black carb sh, w/ lt gray stp ss interbeds	530		Lt gray vfg stp ss, w/ black carb sh interbeds
430		Coal, w/ parting in middle	540		Black carb sh, some lt brown carb siltst interbeds
440			550		Dark gray carb sh, w/ gray stp vfg carb ss
450		Lt gray vfg stp ss	560		Gray vfg stp carb ss, w/ thin coals at top
460			570		
470		Coal	580		Gray vfg stp carb ss, w/ thin coal interbeds
		Lt gray stp carb ss			Gray vfg stp carb ss
480		Coal	590		Gray vfg stp carb ss w/ thin coal interbeds
		Lt gray vfg carb stp ss			Brownish gray to gray ss
490			600		
500					APPROX TOP TROUT CREEK SS MEMBER
510			610		
520		Lt gray vfg stp ss, w/ carb sh interbeds + small coals	620		
			630		
		Black carb sh, small coals	640		

LITHOLOGIC LOG

D-8-NF

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
640		Brownish gray to gray ss	750		
650			760		
660			770		
670		Gray s+p fg ss + yellowish brown s+p ss	780		
680			790		Gray vfg s+p ss, some dk gray sh interbeds
690			800		
700		APPROX BASE TROUT CREEK SS MEMBER	810		Ok gray marine sh, w/ gray vfg s+p ss interbeds
710			820		
720			830		APPROX TOP BLACK DIAMOND COAL ZONE
730			840		Fg s+p carb ss, lt gray
740			850		Gray vfg s+p carb ss, w/ dk gray carb sh interbeds, some coral bony
750			860		

LITHOLOGIC LOG

HOLE D-8-NF

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
860		Sample missing	970		"
870		Same as 840-860	980		
880		Sample missing	990		
890		Same as 840-860	1000		Gray vfg s+p carb ss, w/ lt brown siltst interbeds
900	Bay coal		1010		Sample missing
910	Coal		1020		APPROX. BASE BLACK DIAMOND COAL ZONE
920		Vfg gray s+p carb ss, w/ dk gray sh interbeds	1030		Dk gray sh interbedded w/ yellowish-brown s+p ss + lt gray s+p vfg carb ss in varying amounts
930		Sample missing	1040		
940		Vfg gray s+p carb ss, w/ dk gray sh interbeds	1050		
950		Dk gray sh, w/ lt brown siltst + lt gray s+p vfg ss interbeds	1060		
960	Coal		1070		
970		Sample missing	1080		Lt gray vfg s+p ss, w/ dk gray sh interbeds

LITHOLOGIC LOG HOLE D-8-N

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
1080		Lt gray vfg stp ss, w/dk gray sh interbedded	1190		Lt gray stp ss
1090			1200		Sample missing
1100			1210		Lt gray stp ss, w/dk gray sh small coal interbeds
1110			1220		Sample missing
1120		Lt gray stp ss	1230		Gray stp ss, with dk gray sh interbeds near base
1130		Dr gray sh, w/ lt gray + yellowish-brown s + p ss			
1140		Sample missing			
1150		Same as 1120-1130			
1160		Sample missing			
1170		Lt gray stp ss, w/dk gray sh + small coal interbeds			
1180		Gray sh, w/ yellowish-brown ss interbeds			
1190		Sample missing			
		Same as 1165-1170			
		Sample missing			

Bottom of hole

LITHOLOGIC LOG HOLE D-9-RM

Elev. ~7025'

Total Depth 761'

Location T.2N., R.12W., sec. 30, NE 1/4 NW 1/4 SW 1/4

Rio Blanco County

Colorado

Secker Drilling Company

Geologist - Marith Rehe

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
0		Gray-brown soil - alluvial	100		Coal
10		Alluvial fill - red siltst. yellowish soil	110		DK gray carb sh
20		Brick red siltst	120		Coal
30		Samples missing	130		DK gray carb sh
40			140		Lt to med. gray vfg well-sorted stp carb ss
50		Coal	150		DK gray carb sh
60			160		Coal - prob. bony at top
70			170		DK gray carb sh
80		Buff siltst + red sh, red fg well-sorted ss. Burn zone	180		DK gray sh, w/ lt gray stp carb ss interbeds
90		Gray stp ss w/ red mdst + buff siltst	190		DK gray sh
100			200		

LITHOLOGIC LOG HOLE D-9-RM

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
200		lt gray s+p carb ss, w/ varying amounts of dk gray sh interbeds	310		
210			320		
220		dk gray carb sh, w/ lt gray s+p carb ss interbeds	330		
230			340		
240		Coal	350		
		dk gray sh			
250		Mixture of dk gray sh, lt gray fg well-sorted s+p ss, red mdst, red ss	360		APPROX BASE TROUT CREEK SS MEMBER
260			370		lt gray s+p ss, some dk gray sh
270		lt gray s+p ss, w/ dk gray sh + thin coal interbeds	380		
		Mixture lt gray s+p ss, dk gray sh, red mdst, red ss			
280		APPROX TOP TROUT CREEK SS MEMBER	390		
290			400		lt gray vfg s+p ss
300			410		lt gray vfg s+p ss, w/ dk gray sh interbeds
310			420		

LITHOLOGIC LOG HOLE D-9-R11

Depth (feet)	Lithology	Description	Depth (feet)	Lithology	Description
420		"	530		"
430			540		
440		Interbedded gray vfg s+p ss and dk gray sh	550		APPROX TOP BLACK DIAMOND COAL ZONE
450			560		Lt gray fg s+p ss, w/ varying amounts of dk gray sh interbeds
460			570		
470		Dk gray sh	580		Bony coal
480			590		Bony coal
490			600		
500		Dk gray sh w/ varying amounts of gray vfg s+p ss interbeds	610		Bony coal
510			620		Coal
520			630		Lt grayish brown siltst, w/ dk gray sh
530			640		Lt gray s+p ss
					Lt gray s+p ss, w/ some dk gray sh interbeds

LITHOLOGIC LOG HOLE D-9-RM

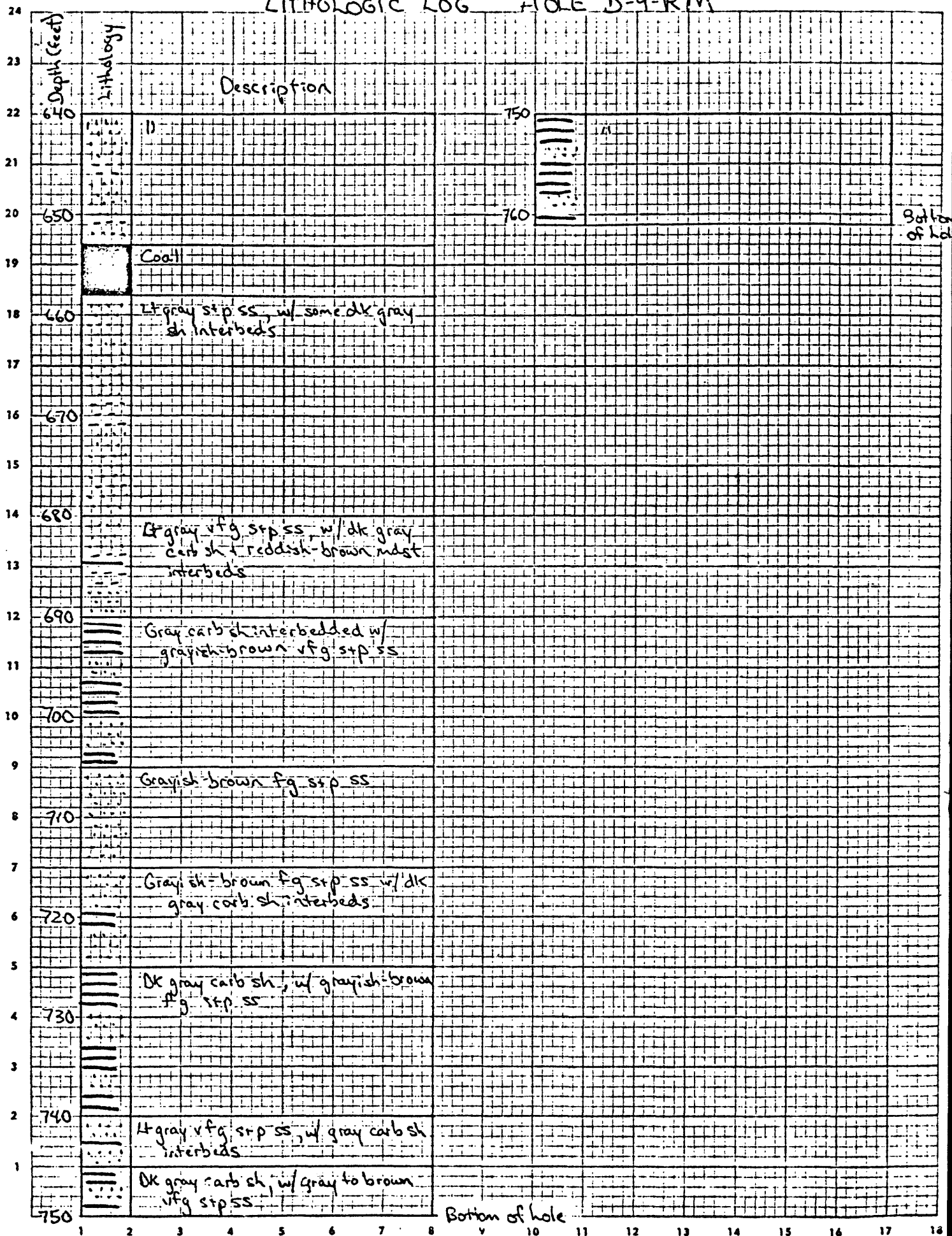


Figure 10.--DRILL-HOLE D-2NG



1

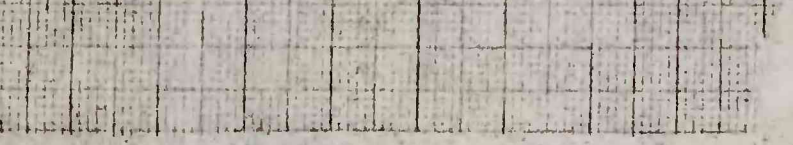


Figure 12.-- DRILL-HOLE D-7NG

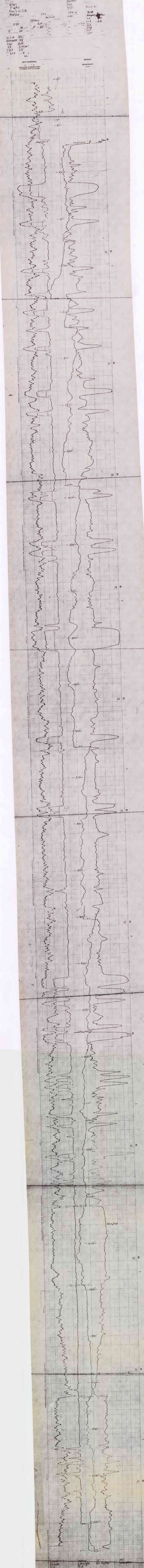


Figure 14.-- DRILL-HOLE D-4NG

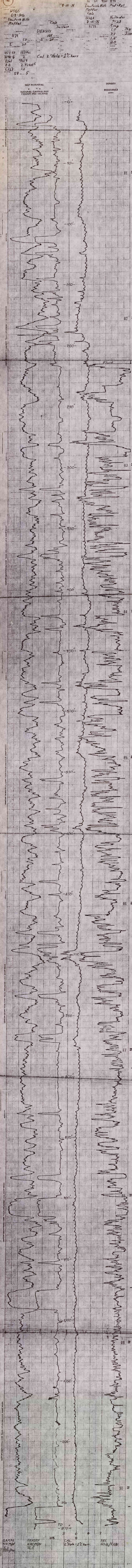
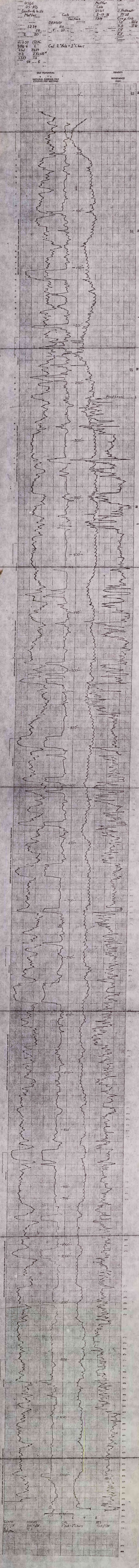


Figure 15.-- DRILL-HOLE D-5-NC



Century Geophysical Corp.
Denver, Colo.

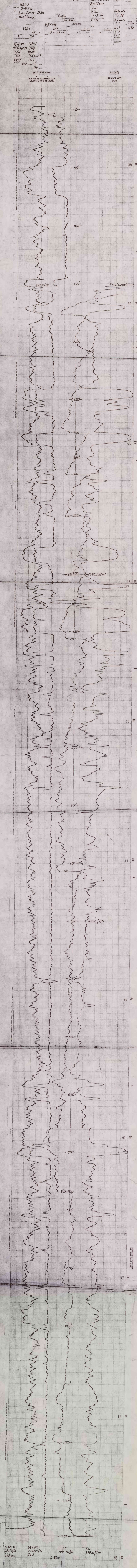
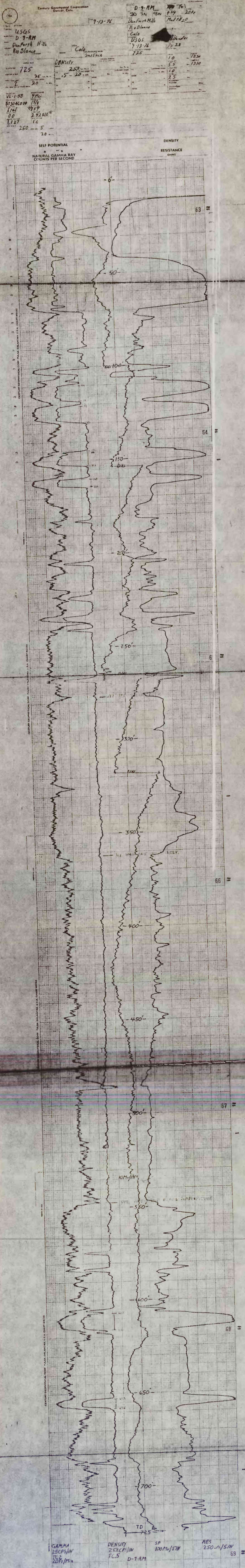


Figure 17.--- DRILL-HOLE D-9-KM



U.S. Geological Survey
Open-file Report 1976

Figure 7.-- DRILL-HOLE D-3A

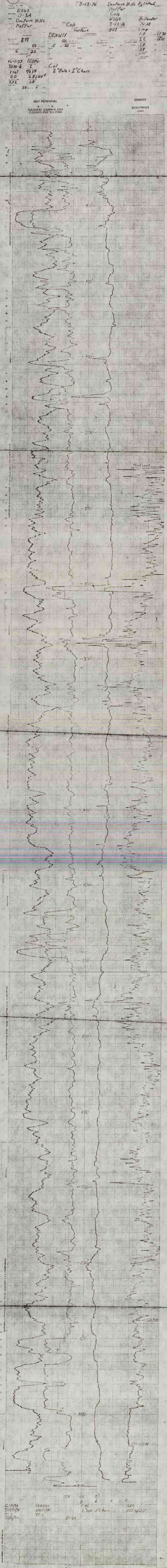


Figure 8.--DRILL-HOLE D-11A

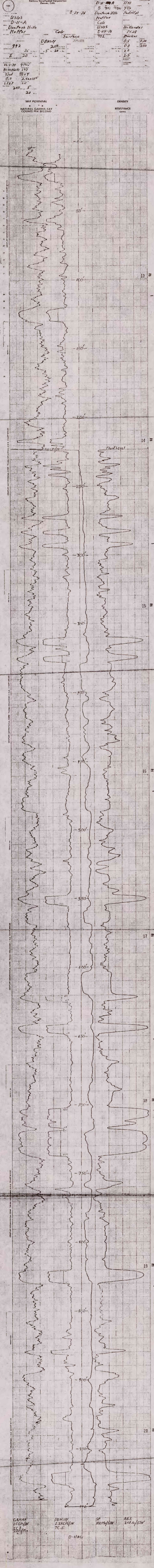


Figure 7. **EXTRA HOLD D TING**

