

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Geophysical and Lithologic Logs of six
test holes drilled during 1979 in the
Como West and Elmo Quadrangles, Carbon
County, Wyoming

By

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Margaret E. Stamm

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

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Geophysical and Lithologic Logs of six test holes drilled during 1979 in the
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Introduction

The U.S. Geological Survey drilled and logged six test holes during 1979 on Federal lands in the Como West and Elmo Quadrangles, T. 23 N., R. 80, 81, and 82 W., Hanna coal field, Hanna basin, Carbon County, Wyo. as part of the Coal Exploratory Program. The general purpose of the drilling was to explore for coal, facilitate correlation of coal beds, and to evaluate their thickness and lateral extent. The drilling was limited to three areas. Normal faulting in two of the areas led to closer than normally spaced drill holes in order to check the structural position of the coal beds and associated strata. In the third area drilled, the one drill hole was cored at a specified interval to check what appeared to be a higher than normal gamma-ray deflection in a prior test hole. The anomalous deflection was shown to be a combination of instrument error, hole conditions, and stratigraphic conditions in the prior test hole. The geologic objectives of the drilling were determined by field mapping and use of data from prior test holes (Hansen and Schugg, 1979).

Rotary holes were drilled by a truck-mounted rig using 5-inch tricone bits. Drilling fluids were air and air-water biodegradable foam. The holes were filled with heavy mud upon completion and a surface plug of cement placed therein. Drill sites were then reclaimed.

A general suite of logs consisting of gamma ray, gamma gamma (density), resistivity, and caliper were run. Two of the holes closed near the bottom prior to open hole logging, but gamma ray logs had been run through the drill pipe.

The geophysical logs in this report were photographically reduced to 20 percent of their original size. The reduced scale is about 1 inch to 50 feet. All measurements on the geophysical logs are in feet; to convert to meters multiply by 0.3048. All logs were hand-traced prior to reproduction.

Lithologic logs are based on field examination of drill-hole cuttings collected at 5-foot intervals or in the case of the one core, field description of the cored unit. Lithologic interpretations are adjusted to geophysical logs.

Reference

Hansen, D. E., and Schugg, D. L., 1979, Geophysical and lithologic logs of 39 coal test holes drilled during 1978 in the Como West and Elmo Quadrangles, Carbon County, Wyoming: U.S. Geol. Survey Open-File Rept. 79-1701, 112 p.

Table 1.--Summary of information for six drill holes in the Como West and Elmo Quadrangles, Carbon County, Wyoming

Drill hole	Location	Quadrangle	Depth drilled (ft)	Depth logged (ft)
24-E-B	NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 4, T. 23 N., R. 81 W.	Elmo	575.0	558.0
24-E-C	SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 4, T. 23 N., R. 81 W.	Elmo	636.0	629.0
34-E-C	NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 14, T. 23 N., R. 82 W.	Elmo	155.7	148.0
38-CW	NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 20, T. 23 N., R. 80 W.	Como West	415.0	387.0
39-CW	NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 20, T. 23 N., R. 80 W.	Como West	495.0	484.0
40-CW	SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 18, T. 23 N., R. 80 W.	Como West	475.0	466.0

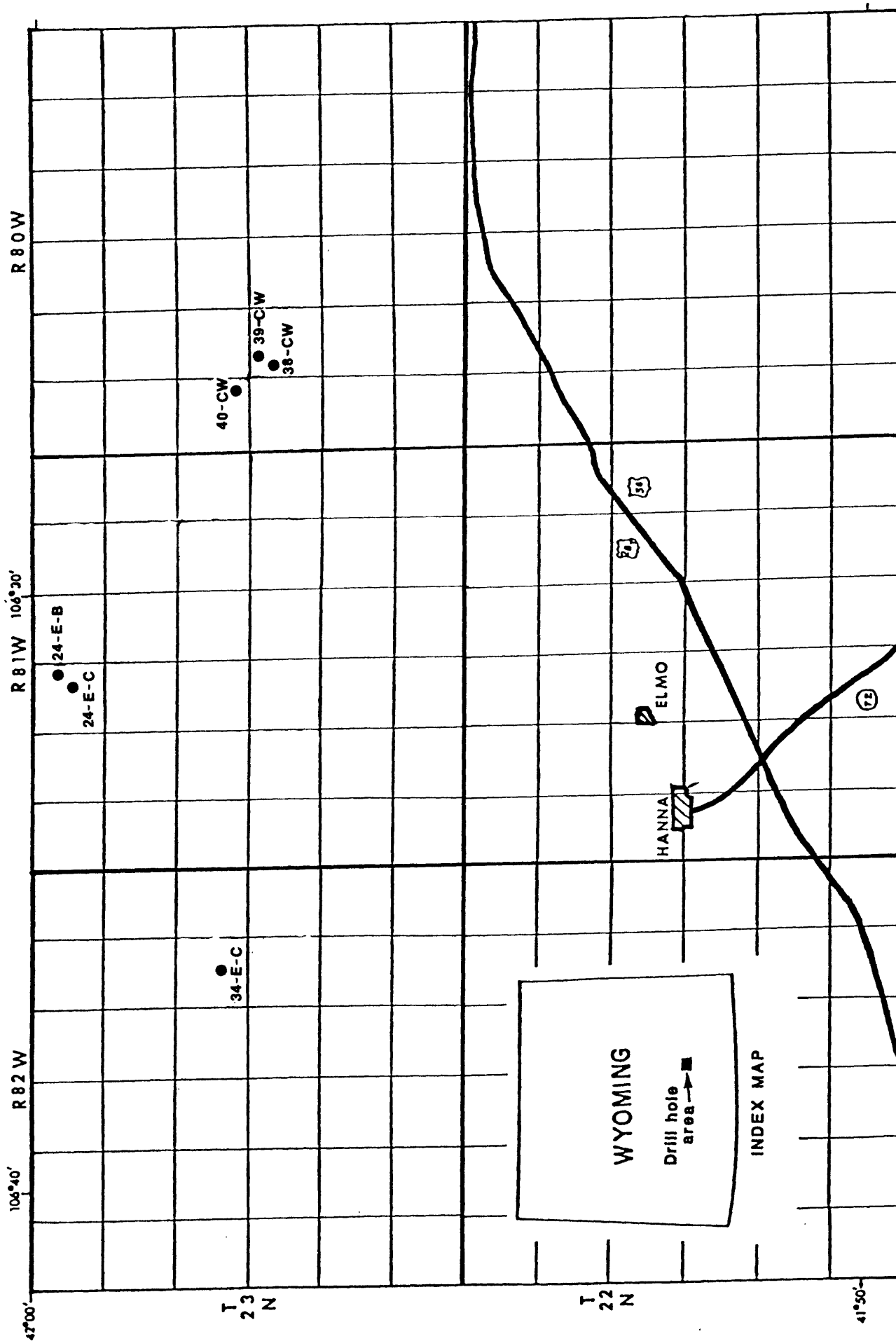


Figure 1.--Sketch map showing approximate locations of drill sites,
Hanna coal field, Wyoming

COMO WEST QUADRANGLE
WYOMING-CARBON CO.

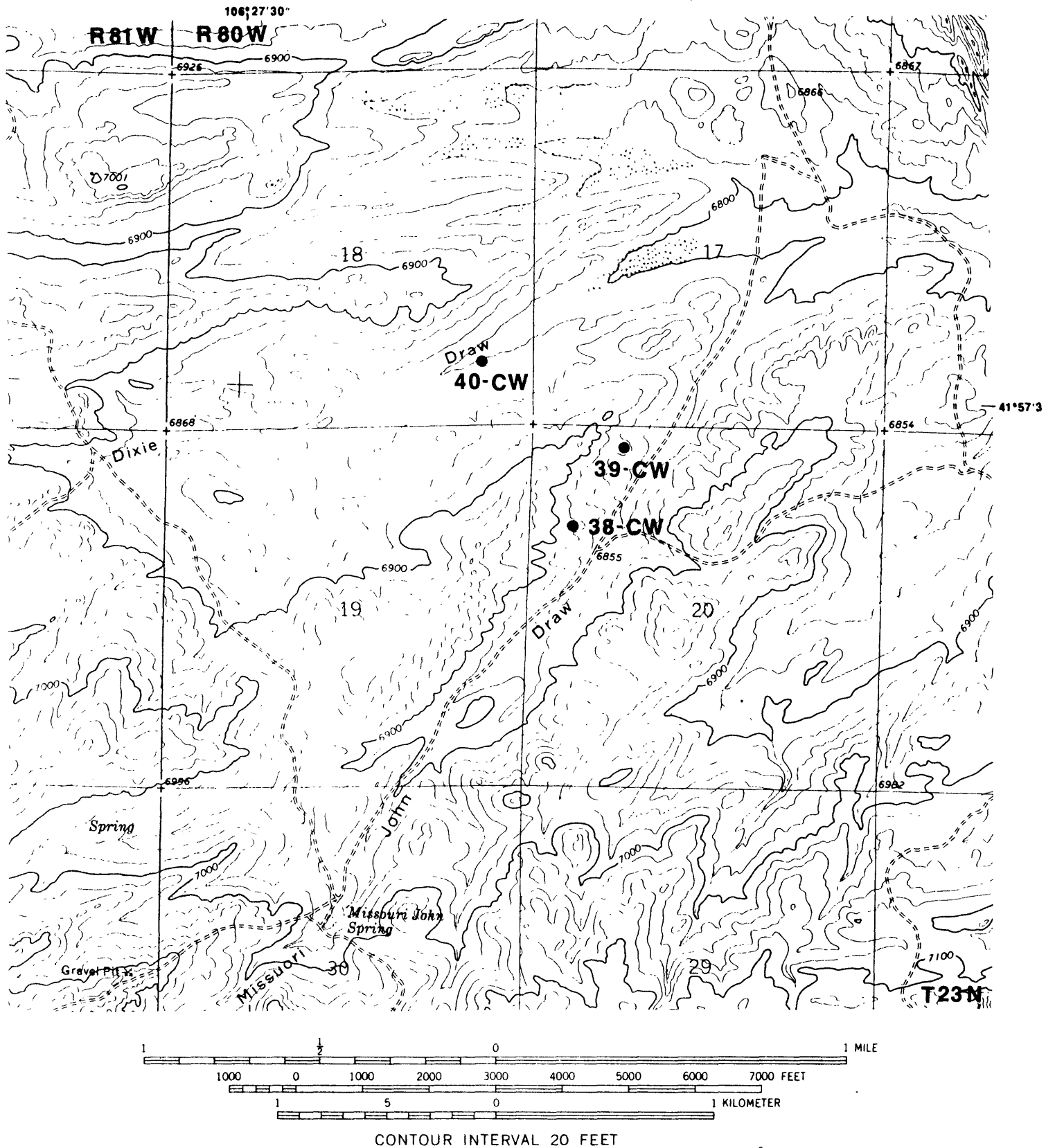


Figure 2.--Drill hole location map, central part of Como West Quadrangle, Carbon County, Wyoming

ELMO QUADRANGLE
WYOMING—CARBON CO.

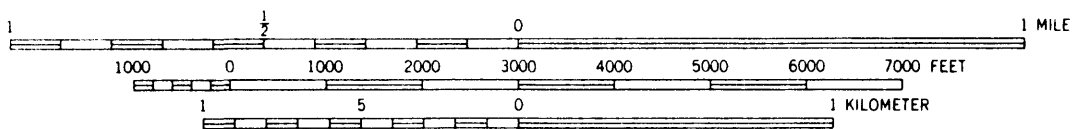
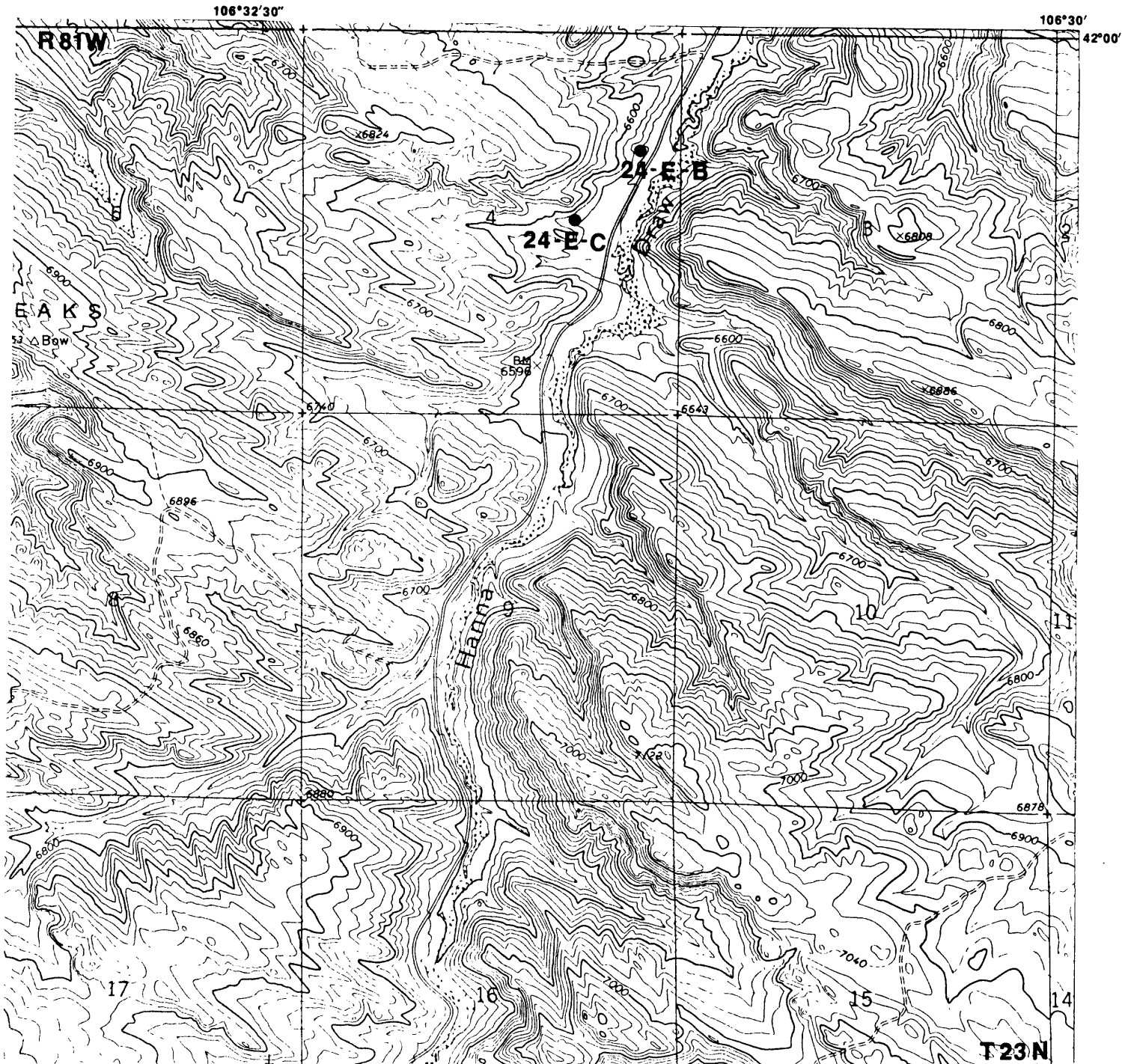


Figure 3.--Drill hole location map, northeast part of Elmo
Quadrangle, Carbon County, Wyoming

ELMO QUADRANGLE
WYOMING-CARBON CO.

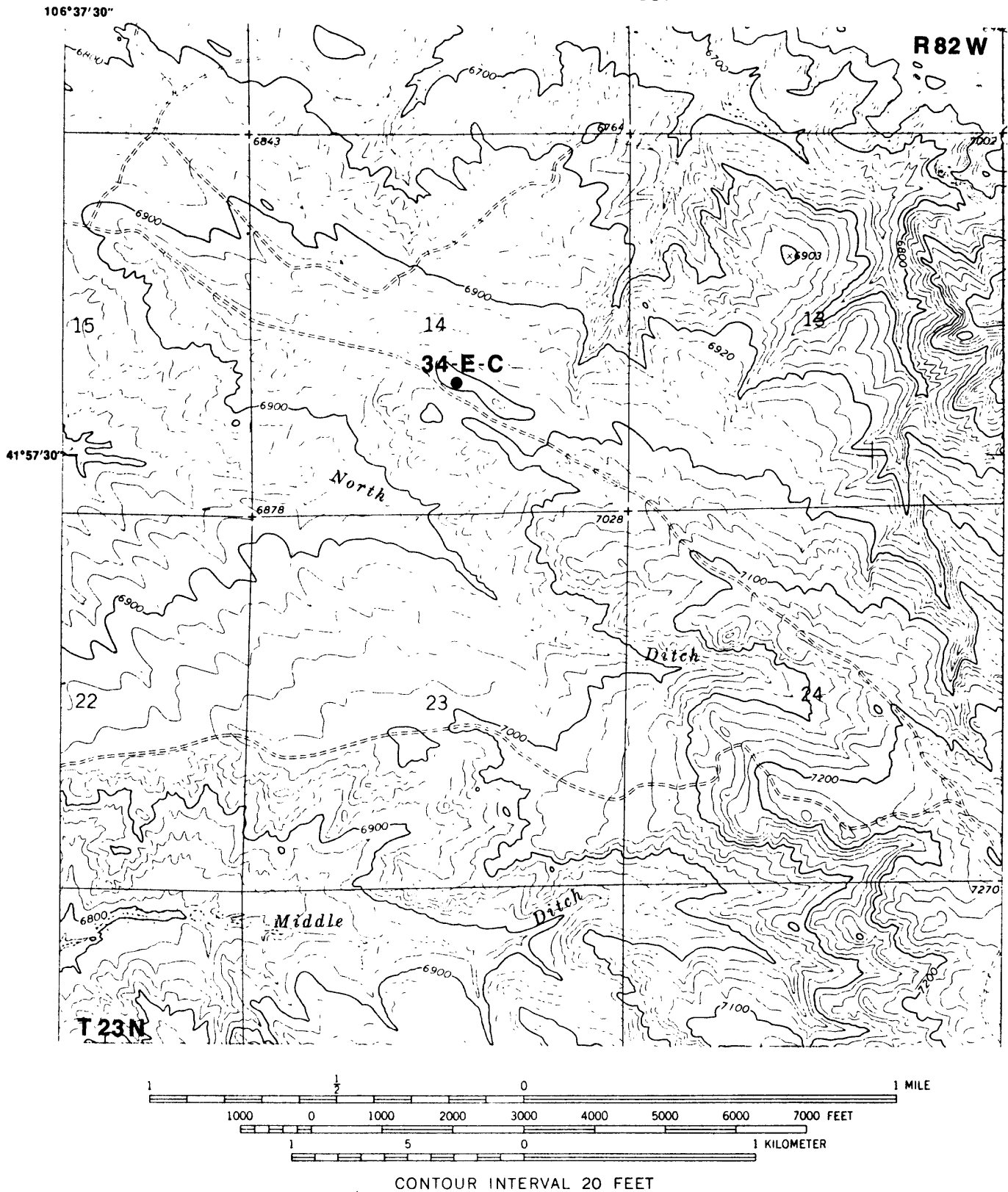


Figure 4.--Drill hole location map, northwest part of Elmo
Quadrangle, Carbon County, Wyoming

LITHOLOGIC AND GEOPHYSICAL LOGS

LOCATION NUMBER 24-E-B DATE July 10, 1979 SURFACE ELEVATION(ft) 6540

LOCATION NW¹/₄NE¹/₄SE¹/₄NE¹/₄ Sec. 4 T. 23 N. R. 81 W. Quad. Elmo

COUNTY Carbon STATE Wyoming TOTAL DEPTH(ft) 575

CORED YES ☐ NO ☒ INTERVAL(s) _____

DRILLING MEDIUM: ☒ AIR ☒ FOAM ☐ MUD ☐ WATER OBSERVATION WELL

GEOPHYSICAL LOGS:

Natural Gamma	;	Scale	<u>13 cps/in</u>	Logging Speed	<u>15</u>	fpm
Gamma Gamma	;	Scale	<u>1.33K cps/in</u>	Logging Speed	<u>15</u>	fpm
Resistivity	;	Scale	<u>20 ohms/in</u>	Logging Speed	<u>15</u>	fpm
Caliper	;	Scale	<u>1"/in</u>	Logging Speed	<u>15</u>	fpm

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
5.0	10.5	Alluvium, light to medium-yellow brown, clayey sand		0	0				
10.5	15.0	Alluvium, medium yellow-brown, clayey sand and silt		10					
15.0	18.0	Alluvium, brown clayey sand		50					
18.0	25.0	Sandstone, light-yellow-brown, clayey		20					
25.0	27.0	Sandstone, light-yellow-brown, silty and clayey		30					
27.0	44.2	Sandstone and siltstone, gray, shaley		100					
44.2	57.9	Shale, dark-brown to black, carbonaceous, lenses and very thin coal beds		40					
57.9	69.5	Coal and bone coal		50					
69.5	71.0	Shale, black, carbonaceous		150					
71.0	76.0	Coal, dull; carbonaceous shale partings		50					
76.0	79.5	Shale, black, carbonaceous		60					
79.5	85.5	Coal, bone and shale		70					
85.5	91.0	Shale, black, carbonaceous, coaly		200					
91.0	95.5	Coal							
95.5	97.0	Shale, gray							
97.0	106.2	Sandstone, light- to medium-gray, very fine-grained, silty							
106.2	112.3	Shale, medium-gray to black, carbonaceous, coaly							
112.3	115.5	Coal							

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
115.5	117.0	Shale, black, carbonaceous, coaly			80				
117.0	124.0	Coal			90				
124.0	126.5	Shale, black, carbonaceous							
126.5	130.0	Coal							
130.0	145.0	Sandstone, light- to medium-gray, very fine-grained, silty		300					300
145.0	153.0	Siltstone, medium- to dark-gray			100				
153.0	186.5	Sandstone, light- to medium-gray, fine- to medium-grained. Some thin interbeds of medium- to dark-gray siltstone and shale		350	110				350
186.5	189.0	Shale, light- to medium-gray			120				
189.0	194.5	Coal and shale; shale is black, carbonaceous and coaly							
194.5	196.5	Shale, black, carbonaceous		400					400
196.5	200.8	Coal, shaly			130				
200.8	204.3	Shale, black, carbonaceous, partly coaly							
204.3	206.0	Coal							
206.0	210.5	Coal and shale; shale is black and carbonaceous		450	140				450
210.5	214.0	Shale, black, carbonaceous							
214.0	222.0	Coal			150				
222.0	230.0	Shale, black, carbonaceous, and thin coal beds							
230.0	234.5	Coal							
234.5	240.0	Shale, black, carbonaceous, and thin coal beds		500	160				500
240.0	245.0	Coal							
245.0	246.5	Shale, black, carbonaceous			170				
246.5	249.5	Coal							
249.5	269.0	Sandstone, light- to medium-gray, very-fine-grained. Grades downward into siltstone, dark-gray with coal fragments		550					550
269.0	272.5	Shale, black, carbonaceous							
272.5	284.0	Coal, thin interbeds of black carbonaceous shale							
284.0	288.0	Shale, black, carbonaceous, coaly							
288.0	291.5	Coal							
291.5	296.0	Shale, black, carbonaceous, coaly							
296.0	298.0	Coal							
298.0	300.5	Shale, black, carbonaceous, coaly							
300.5	304.0	Coal and shale, interbedded. Shale is black, carbonaceous and coaly							
304.0	307.0	Shale, black, carbonaceous							

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
307.0	315.0	Coal and shale interbedded. Shale is black, carbonaceous and coaly							
315.0	320.0	Siltstone, medium-gray; dark- gray carbonaceous shale streaks							
320.0	325.0	Sandstone, medium-gray, very- fine-grained, silty							
325.0	335.0	Siltstone, medium-gray, sandy							
335.0	346.0	Sandstone, light-gray, very- fine-grained							
346.0	352.2	Siltstone, medium-gray, sandy							
352.2	358.2	Sandstone, light- to medium- gray, silty							
358.2	371.5	Siltstone, light- to medium- gray, sandy							
371.5	373.0	Sandstone, light- to medium- gray, silty							
373.0	378.0	Siltstone, light- to medium- gray, sandy							
378.0	391.0	Sandstone, light-gray, very fine-grained, silty							
391.0	440.0	Sandstone, light-gray, medium- to coarse-grained							
440.0	470.0	Sandstone, light- to medium- gray, very fine-grained , silty							
470.0	488.0	Sandstone, light-gray, very- fine-grained							
488.0	530.0	Siltstone, light- to medium- gray, sandy							
530.0	542.0	Siltstone, medium-gray, sandy at base							
542.0	558.0	Sandstone, light- to medium- gray, very fine- to fine- grained							

LITHOLOGIC AND GEOPHYSICAL LOGS

LOCATION NUMBER 24-E-C DATE July 19, 1979 SURFACE ELEVATION(ft) 6575

LOCATION SE¹/₄SE¹/₄SW¹/₄NE¹/₄ Sec. 4 T. 23 N. R. 81 W. Quad. Elmo

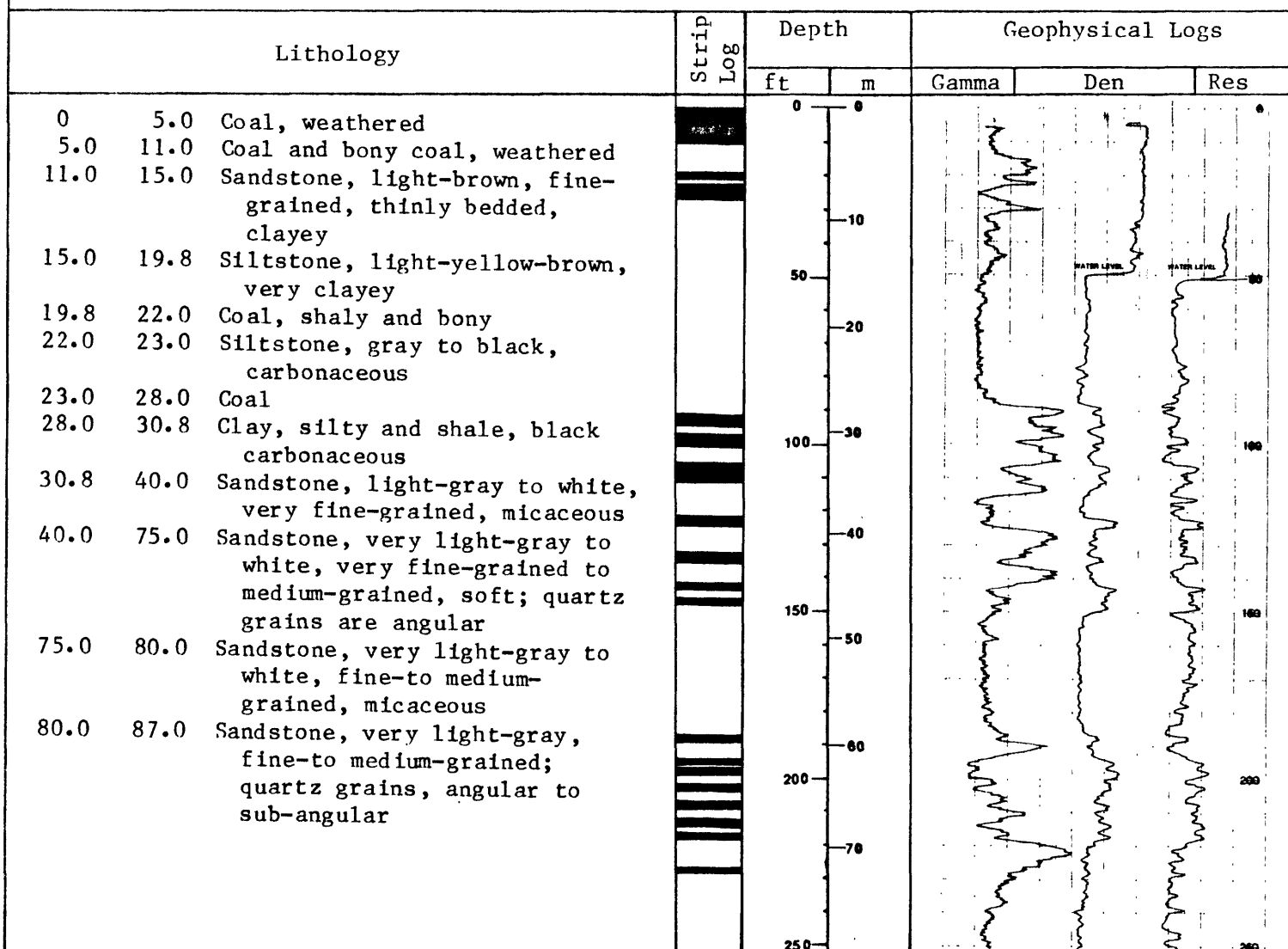
COUNTY Carbon STATE Wyoming TOTAL DEPTH(ft) 636

CORED YES ☐ NO ☒ INTERVAL(s) _____

DRILLING MEDIUM: ☒ AIR ☐ FOAM ☐ MUD ☐ WATER OBSERVATION WELL

GEOPHYSICAL LOGS:

Natural Gamma	;	Scale <u>10 cps/in</u>	Logging Speed <u>15</u> fpm
Gamma Gamma	;	Scale <u>1.33K cps/in</u>	Logging Speed <u>15</u> fpm
Resistivity	;	Scale <u>20 ohms/in</u>	Logging Speed <u>15</u> fpm
Caliper	;	Scale <u>1"/in</u>	Logging Speed <u>15</u> fpm



Lithology		Strip Log	Depth		Geophysical Logs		
			ft	m	Gamma	Den	Res
87.0	89.0	Sandstone, light- to medium-gray, very fine-grained, thinly bedded and slightly silty		80			
89.0	92.0	Shale, medium-gray, silty		90			
92.0	95.0	Coal, shaly					
95.0	98.0	Shale, black, carbonaceous	300				300
98.0	102.0	Coal and shale. Shale is black and carbonaceous		100			
102.0	106.0	Shale, black, carbonaceous, very thin coal interbeds					
106.0	112.0	Coal, includes a few partings of black, carbonaceous, shale	350	110			360
112.0	115.0	Shale, black, carbonaceous					
115.0	122.0	Sandstone and siltstone, medium- to dark-gray; sandstone is very fine- to fine-grained; unit is thinly bedded		120			
			400				400
122.0	125.0	Coal		130			
125.0	133.0	Shale, dark-gray and black, with thin coal partings					
133.0	136.0	Coal and very thin shale beds, black and carbonaceous		140			
136.0	142.0	Shale, medium- to dark-brownish-gray, carbonaceous	450				450
142.0	144.0	Coal					
144.0	147.0	Shale, medium- to dark-brownish-gray, carbonaceous		150			
147.0	149.0	Coal					
149.0	153.0	Siltstone, medium- to dark-gray, and thinly bedded, medium-gray shale	500	160			500
153.0	156.0	Sandstone, medium-gray, very fine-grained, interbedded with medium-gray, thinly bedded siltstone		170			
			550				550
156.0	159.0	Siltstone, medium-gray, interbedded with light-gray, fine-grained sandstone		180			
159.0	178.0	Sandstone, medium-gray, very fine-grained, interbedded with medium-gray, thinly bedded siltstone	600	190			600
178.0	181.0	Siltstone, medium-gray, with interbedded sandy shale					
181.0	184.0	Sandstone, medium-gray, very fine-grained, interbedded with medium-gray, thinly bedded siltstone		200			
184.0	186.0	Siltstone, medium-gray, interbedded with sandy shale					
186.0	187.2	Siltstone, as above and thin interbeds of coal					
187.2	189.0	Coal					

Lithology			Strip Log	Depth		Geophysical Logs		
				ft	m	Gamma	Den	Res
189.0	194.0	Shale, dark-gray to black, carbonaceous, silty						
194.0	196.0	Coal						
196.0	197.6	Shale, dark-gray to black carbonaceous and siltstone, medium-gray						
197.6	199.8	Coal						
199.8	202.0	Shale, dark-gray to black, carbonaceous and siltstone, medium-gray						
202.0	204.0	Coal						
204.0	207.0	Shale, dark-gray to black, carbonaceous, silty						
207.0	209.7	Coal						
209.7	212.8	Shale, dark-gray to black, carbonaceous						
212.8	215.2	Coal						
215.2	217.0	Shale, black, carbonaceous, and thin coal beds						
217.0	218.5	Coal						
218.5	228.0	Shale, black, carbonaceous interbeds of bony coal						
228.0	229.0	Coal, bony						
229.0	230.0	Shale, medium- to dark-gray, carbonaceous						
230.0	238.7	Siltstone, medium- to dark-gray						
238.7	254.5	Sandstone, medium- to dark-gray, very-fine-grained, silty						
254.5	266.5	Siltstone, medium- to dark-gray						
266.5	271.8	Sandstone, medium- to dark-gray, very-fine-grained, silty						
271.8	284.0	Siltstone, medium- to dark-gray and thin interbeds of dark-gray shale						
284.0	351.0	Sandstone, light- to medium-gray, fine- to medium-grained, micaceous, quartz grains, sub-angular						
351.0	363.2	Siltstone, gray, and sandstone, light-gray, fine- to medium-grained						
363.2	366.6	Sandstone, light-gray, fine- to medium-grained, crossbedded and very-thin beds of gray siltstone						
366.6	370.0	Siltstone and sandstone, light- to medium-gray, fine- to medium-grained, crossbedded						
370.0	375.0	Sandstone, light- to medium-gray, fine- to coarse-grained, with medium-gray siltstone						

Lithology			Strip Log	Depth		Geophysical Logs		
				ft	m	Gamma	Den	Res
375.0	388.8	Siltstone, light- to medium-gray, with light-gray, fine- to medium-grained sandstone						
388.8	395.0	Sandstone, medium-gray, medium- to coarse-grained with thinly bedded siltstone						
395.0	402.2	Siltstone, medium-gray, with sandstone						
402.2	411.0	Siltstone, medium-gray						
411.0	421.0	Siltstone, with thin beds of carbonaceous shale						
421.0	443.9	Siltstone, medium- to dark-gray						
443.9	446.5	Shale, medium- to dark-gray, very-silty						
446.5	452.0	Siltstone, medium-gray, very-sandy						
452.0	459.0	Shale, medium- to dark-brown, very-silty						
459.0	467.0	Siltstone with shaly interbeds, medium- gray						
467.0	472.0	Siltstone, medium-gray						
472.0	475.0	Shale, medium- to dark-brown and siltstone						
475.0	491.0	Siltstone, medium-gray						
491.0	497.0	Siltstone, medium-gray, shaly						
497.0	503.0	Sandstone, light-gray, very-fine-grained						
503.0	513.0	Siltstone, medium-gray, sandy						
513.0	538.5	Siltstone, medium-gray						
538.5	541.5	Siltstone, medium-gray, shaly						
541.5	549.0	Siltstone, medium-gray						
549.0	557.5	Siltstone, and shale interbedded, medium-gray						
557.5	565.2	Sandstone, medium-gray, fine- to medium-grained, thinly bedded						
565.2	570.2	Siltstone, medium-gray, sandy						
570.2	587.5	Sandstone, medium-gray, fine- to medium-grained, thinly bedded						
587.5	598.3	Siltstone, medium-gray						
598.3	601.4	Shale, dark-gray						
601.4	604.2	Siltstone, medium-gray						
604.2	606.8	Shale, dark-brown to black, carbonaceous						
606.8	610.0	Siltstone, medium-dark-gray						
610.0	614.5	Shale, carbonaceous, silty, dark-gray						
614.5	619.0	Siltstone, medium-dark-gray, shaly						
619.0	636.0	Shale, carbonaceous, dark-gray to black						

LITHOLOGIC AND GEOPHYSICAL LOGS

LOCATION NUMBER 34-E-C DATE July 9, 1979 SURFACE ELEVATION(ft) 7005

LOCATION NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 14 T. 23 N. R. 82 W. Quad. Elmo

COUNTY Carbon STATE Wyoming TOTAL DEPTH(ft) 155.7

CORED YES ☒ NO ☐ INTERVAL(s) 137-150

DRILLING MEDIUM: ☒ AIR ☒ FOAM ☐ MUD ☐ WATER OBSERVATION WELL

GEOPHYSICAL LOGS:

Natural Gamma	;	Scale	<u>10 cps/in</u>	Logging Speed	<u>15</u>	fpm
Gamma Gamma	;	Scale	<u>1K cps/in</u>	Logging Speed	<u>15</u>	fpm
Resistivity	;	Scale	<u>20 ohms/in</u>	Logging Speed	<u>15</u>	fpm
Caliper	;	Scale	<u>1"/in</u>	Logging Speed	<u>15</u>	fpm

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
0	5.0	Colluvium, sand, clay and sandstone fragments		0	0				
5.0	17.0	Shale, dark-brown, carbonaceous							
17.0	20.0	Shale, black, carbonaceous, coaly							
20.0	33.0	Shale, light-gray, gypsiferous, clayey, silty							
33.0	36.0	Siltstone, light-gray, clayey							
36.0	37.0	Claystone, gray, silty							
37.0	38.6	Coal, bony							
38.6	42.0	Shale, black, carbonaceous, coaly							
42.0	49.2	Shale, medium-gray, silty							
49.2	56.0	Sandstone, light-gray, silty							
56.0	78.0	Siltstone, medium- to dark-gray, clayey and shaly; some interbedding of thin shale							
78.0	90.0	Sandstone, light-gray, fine- to coarse-grained, crossbedded							
90.0	105.0	Sandstone, light-gray, fine- to medium-grained, crossbedded gypsiferous, feldspathic, quartz rounded to sub-rounded							
105.0	110.0	Sandstone, light- to medium-gray, fine- to medium-coarse-grained, crossbedded, thin shale and siltstone streaks							
110.0	113.0	Sandstone, medium-gray, fine- to medium-grained							

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
113.0	115.0	Shale, dark-brown, carbonaceous, coaly with some light-gray sandstone							
115.0	125.0	Shale, dark-brown to black, carbonaceous							
125.0	135.0	Sandstone, light- to medium-gray, medium- to coarse-grained, feldspathic and gypsiferous with thin, coaly, carboniferous shale cross-beds							
135.0	137.0	Sandstone, light- to medium-gray; interbedded with thin, dark-brown beds of carbonaceous shale							
137.0	142.0	Sandstone, light- to medium-gray, medium- to coarse-grained; with black chert							
142.0	143.3	Sandstone, light- to medium-gray, medium- to coarse-grained with black chert, bony coal, carbonaceous shale							
143.3	143.4	Coal							
143.4	143.8	Shale, carbonaceous							
143.8	143.9	Coal, bony							
143.9	144.5	Shale carbonaceous							
144.5	144.6	Sandstone, light-gray, fine-grained, crossbedded with carbonaceous shale							
144.6	145.8	Coal, bony, and black, carbonaceous shale							
145.8	146.3	Shale, black, carbonaceous							
146.3	146.8	Clay, medium- to dark-gray							
146.8	150.0	Claystone, dark-gray, carbonaceous							
150.0	150.6	Shale, black, carbonaceous							
150.6	151.6	Clay, medium-dark-gray, slightly carbonaceous							
151.6	151.8	Shale, black, carbonaceous							
151.8	151.9	Coal							
151.9	152.1	Shale, black, carbonaceous							
152.1	152.4	Claystone, dark-gray							
152.4	155.7	Sandstone, light- to medium-gray, medium- to coarse-grained; with feldspar and black chert grains							

LITHOLOGIC AND GEOPHYSICAL LOGS

LOCATION NUMBER 38-CW DATE July 20, 1979 SURFACE ELEVATION(ft) 6885

LOCATION NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 20 T. 23 N. R. 80 W. Quad. Como West

COUNTY Carbon STATE Wyoming TOTAL DEPTH(ft) 415

CORED YES ☐ NO ☒ INTERVAL(s) _____

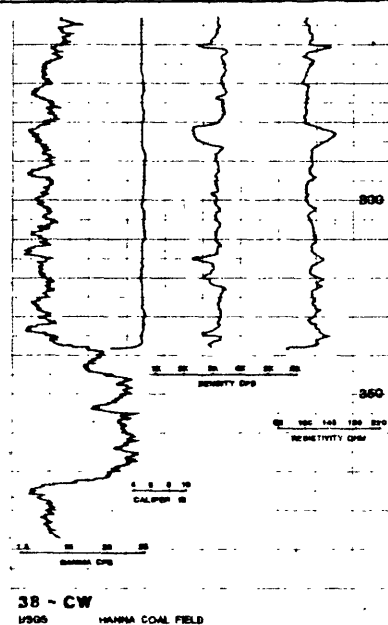
DRILLING MEDIUM: ☒ AIR ☐ FOAM ☐ MUD ☐ WATER OBSERVATION WELL

GEOPHYSICAL LOGS:

Natural Gamma	;	Scale	<u>5 cps/in</u>	Logging Speed	<u>15</u>	fpm
Gamma Gamma	;	Scale	<u>1.33K cps/in</u>	Logging Speed	<u>15</u>	fpm
Resistivity	;	Scale	<u>20 ohms/in</u>	Logging Speed	<u>15</u>	fpm
Caliper	;	Scale	<u>1"/in</u>	Logging Speed	<u>15</u>	fpm

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
0	15.0	Colluvium, yellow sand, coarse-grained; a few pebbles		0	0				
15.0	22.0	Sandstone, light-yellow, to light-gray, medium- to coarse-grained		10					
22.0	27.0	Siltstone, medium-gray, sandy		50					
27.0	34.0	Sandstone, light-yellow, to light-gray, medium- to coarse-grained		20					
34.0	38.3	Siltstone, medium-gray, sandy		100	30				
38.3	40.0	Sandstone, yellowish-brown to dark-brown, medium- to coarse-grained, silty and clayey		40					
40.0	45.0	Sandstone, yellowish-brown silty and clayey, poorly indurated		150	50				
45.0	54.0	Sandstone, yellowish-brown, fine- to coarse-grained, poorly indurated		60					
54.0	63.0	Siltstone, medium-gray, sandy		200	80				
63.0	80.0	Sandstone, light-gray, medium- to coarse-grained, conglomeratic; pebbles, 1/8" to 3/8", of black chert, quartz; some pyrite, rounded to sub-rounded		70					
80.0	95.0	Sandstone, light- to medium-gray, medium- to coarse-grained; with black chert grains		250					

Lithology		Strip Log	Depth		Geophysical Logs			
			ft	m	Gamma	Cal	Den	Res
95.0	109.0	Sandstone, light- to medium-gray, medium- to coarse-grained, with conglomeratic streaks, pebbles 1/4" to 5/8", quartz rounded to sub-rounded; pyrite and feldspar						
109.0	111.0	Siltstone, medium-gray, sandy						
111.0	175.7	Sandstone, light to medium-gray, medium- to coarse-grained, conglomeratic streaks, quartz rounded to sub-rounded, pyrite and feldspar						
175.7	199.0	Siltstone, light- to medium-gray, sandy and clayey						
199.0	200.3	Claystone, medium-gray, silty						
200.3	214.0	Siltstone, medium-gray, clayey						
214.0	218.2	Claystone, medium-gray, silty						
218.2	252.0	Siltstone and sandstone interbedded, medium-gray; sandstone is fine-grained						
252.0	260.0	Siltstone, medium-gray, interbedded with light-gray sandstone, medium-grained; pyrite						
260.0	270.0	Sandstone, medium-gray, fine- to medium-grained, traces pyrite, interbedded with medium-gray shale						
270.0	280.0	Sandstone, light- to medium-gray with pyrite, interbedded with medium- to dark-gray silty shale						
280.0	295.0	Sandstone, light-gray, medium- to coarse-grained, with thin, dark-brown shale, interbedded or cross-bedded						
295.0	300.0	Shale, dark-brown-gray with thin, light-gray, fine- to medium-grained sandstone						
300.0	315.0	Sandstone, light-gray, medium- to coarse-grained, conglomeratic; pebbles of rounded quartz with some pyrite and chert, with dark-gray, thin shale						
315.0	325.0	Sandstone, light-gray, medium-grained, interbedded with gray shale						
325.0	337.8	Sandstone, coarse-grained, conglomeratic; pebbles 1/8" to 1/2", rounded, quartz and black chert						



Lithology	Strip Log	Depth		Geophysical Logs			
		ft	m	Gamma	Cal	Den	Res
337.8 344.5 Siltstone, medium-gray; very thin interbeds of dark-gray shale							
344.5 352.8 Shale, medium- to dark-gray, silty							
352.8 354.5 Siltstone, medium- to dark-gray, silty							
354.5 372.0 Shale, medium- to dark-gray, slightly carbonaceous							
372.0 415.0 Shale, medium- to dark-gray							
Geophysical log ends at 387.0. The drill hole collapsed.							

LITHOLOGIC AND GEOPHYSICAL LOGS

LOCATION NUMBER 39-CW DATE July 22, 1979 SURFACE ELEVATION(ft) 6865

LOCATION NE¹/₄NE¹/₄NW¹/₄NW¹/₄ Sec. 20 T. 23 N. R. 80 W. Quad. Como West

COUNTY Carbon STATE Wyoming TOTAL DEPTH(ft) 495

CORED YES ☐ NO ☒ INTERVAL(s) _____

DRILLING MEDIUM: ☒ AIR ☒ FOAM ☐ MUD ☐ WATER OBSERVATION WELL

GEOPHYSICAL LOGS:

Natural Gamma	;	Scale	<u>5 cps/in</u>	Logging Speed	<u>15</u>	fpm
Gamma Gamma	;	Scale	<u>1.33K cps/in</u>	Logging Speed	<u>15</u>	fpm
Resistivity	;	Scale	<u>20 ohms/in</u>	Logging Speed	<u>15</u>	fpm
Caliper	;	Scale	<u>1"/in</u>	Logging Speed	<u>15</u>	fpm

Lithology		Strip Log	Depth		Geophysical Logs			
			ft	m	Gamma	Cal	Den	Res
0	15.0		0	0				
15.0	25.0							
25.0	39.0		50					
39.0	44.0		100	30				
44.0	120.0		150	40				
120.0	140.0		200	50				
140.0	170.0		250	60				
170.0	173.0							
173.0	174.0							

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
174.0	180.3	Shale, medium- to dark-gray, clayey and silty							
180.3	205.0	Siltstone, medium-gray, clayey; sample includes some dark-gray shale, red dog and clinker particles							
205.0	209.0	Shale, medium- to dark-gray, silty, partly carbonaceous							
209.0	215.0	Siltstone, medium-gray; contains many thin beds of dark-gray claystone, carbonaceous							
215.0	222.8	Siltstone and claystone, interbedded, medium- to dark-gray, partly carbonaceous							
222.8	226.5	Siltstone, medium-gray, clayey and sandy							
226.5	230.0	Siltstone and claystone interbedded, medium-gray							
230.0	234.8	Siltstone, medium-gray							
234.8	241.3	Claystone, medium-gray, very silty							
241.3	249.0	Siltstone, medium-gray, clayey							
249.0	254.0	Siltstone, medium-gray, sandy							
254.0	262.0	Siltstone, medium-gray							
262.0	311.0	Sandstone, light-gray, medium- to coarse-grained; quartz grains sub-angular to sub-rounded; chert pebbles, hornblend and quartzite with pyrite							
311.0	336.0	Sandstone, medium-gray, coarse-grained; conglomeratic, rounded chert pebbles, quartz and quartzite; quartz grains; rounded to sub-rounded with pyrite							
336.0	344.8	Shale, dark-gray, carbonaceous, traces of coal and bony coal							
344.8	351.8	Shale, dark-brown, carbonaceous							
351.8	354.8	Shale, dark-brownish-gray, clayey, carbonaceous							
354.8	372.0	Shale, dark-brownish-gray, clayey							
372.0	374.2	Shale, dark-brownish-gray, carbonaceous							
374.2	390.3	Shale, dark-brownish -gray, clayey							
390.3	394.3	Shale, dark-brownish-gray, carbonaceous							
394.3	408.0	Shale, dark-gray to dark-brownish-black, slightly carbonaceous							
408.0	410.5	Siltstone, medium-gray, clayey							
410.5	414.8	Sandstone, medium-gray, silty							

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Hanna Coal Field

500

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
414.8	417.0	Siltstone, medium-gray, sandy							
417.0	420.7	Claystone, medium-gray							
420.7	428.0	Coal, partly shaly							
428.0	443.0	Shale, dark-gray, carbonaceous, bony coal streaks							
443.0	464.2	Shale, dark-gray, carbonaceous							
464.2	473.0	Shale, medium- to dark-gray							
473.0	480.0	Siltstone, medium-gray, carbonaceous, sandy							
480.0	495.0	Shale, dark-brown, carbonaceous, clayey							
Hole closed below 350 feet, gamma ray log run through drill rod.									

LITHOLOGIC AND GEOPHYSICAL LOGS

LOCATION NUMBER 40-CW DATE July 21, 1979 SURFACE ELEVATION(ft) 6825

LOCATION SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 18 T. 23 N. R. 80 W. Quad. Como West

COUNTY Carbon STATE Wyoming TOTAL DEPTH(ft) 475

CORED YES ☐ NO ☒ INTERVAL(s) _____

DRILLING MEDIUM: ☒ AIR ☒ FOAM ☐ MUD ☐ WATER OBSERVATION WELL

GEOPHYSICAL LOGS:

Natural Gamma	;	Scale	<u>5 cps/in</u>	Logging Speed	<u>15</u>	fpm
Gamma Gamma	;	Scale	<u>1K cps/in</u>	Logging Speed	<u>15</u>	fpm
Resistivity	;	Scale	<u>20 ohms/in</u>	Logging Speed	<u>15</u>	fpm
Caliper	;	Scale	<u>1"/in</u>	Logging Speed	<u>15</u>	fpm

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
0	25.0	Alluvium, yellowish-gray sand and silt		0	0				
25.0	30.0	Sandstone, light- to medium-gray, fine- to medium-grained							
30.0	59.0	Sandstone, light- to medium-gray, fine- to coarse-grained, cherty		10					
59.0	85.0	Sandstone, light- to medium-gray interbedded with coal and thin medium-gray shale		20					
85.0	90.0	Siltstone, medium-gray, sandy							
90.0	93.0	Sandstone, light- to medium-gray, fine- to coarse-grained; with black chert		30					
93.0	96.0	Siltstone, dark-gray, sandy							
96.0	105.0	Sandstone, light- to medium-gray, fine- to coarse-grained; with black chert and quartz, sub-angular		40					
105.0	115.0	Sandstone, light- to medium-gray, medium- to coarse-grained with thin siltstone beds		50					
115.0	120.0	Sandstone, light- to medium-gray, medium- to coarse-grained with thin dark-brown shale		60					
120.0	130.0	Sandstone, light- to medium-gray, medium- to coarse-grained with thin carbonaceous shale		70					
				250					

Lithology			Strip Log	Depth		Geophysical Logs			
				ft	m	Gamma	Cal	Den	Res
130.0	147.0	Sandstone, light- to medium-gray, medium- to coarse-grained, with black chert and quartz, angular to sub-angular			80				
147.0	155.2	Sandstone, light- to medium-gray, fine-grained, silty			90				
155.2	165.0	Siltstone, medium-gray			300				300
165.0	173.3	Shale, medium-gray, clayey			100				
173.3	176.0	Sandstone, medium-gray, fine-grained, silty							
176.0	181.0	Siltstone, medium-gray, clayey			350				350
181.0	199.7	Coal			110				
199.7	210.8	Shale, medium-gray, silty							
210.8	215.3	Coal			120				
215.3	218.0	Shale, dark-brown and black, carbonaceous, includes a very thin bed of bony coal			400				400
218.0	219.7	Coal			130				
219.7	225.0	Shale, black, carbonaceous, some bony coal							
225.0	230.0	Siltstone, light- to medium-gray, sandy			140				
230.0	240.0	Shale, medium- to dark-gray, carbonaceous			450				450
240.0	275.0	Sandstone, light-gray, coarse-grained							
275.0	279.7	Siltstone, medium-gray, clayey							
279.7	284.0	Sandstone, light-gray, coarse-grained							
284.0	295.8	Siltstone, medium-gray, clayey							
295.8	348.0	Sandstone, light- to medium-gray, coarse grained; interbedded with medium-gray siltstone							
348.0	352.0	Coal, bony coal and black, carbonaceous shale							
352.0	362.0	Shale, black, carbonaceous, includes some bony coal							
362.0	366.8	Sandstone, gray, silty							
366.8	374.0	Shale, black, carbonaceous, clayey, some bony coal							
374.0	376.0	Sandstone and siltstone, gray							
376.0	389.0	Shale, medium-gray, carbonaceous							
389.0	391.0	Coal							
391.0	393.0	Shale, medium-gray, carbonaceous, coaly							
393.0	396.0	Coal							
396.0	404.6	Shale, medium-gray, carbonaceous, coaly							

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USGS

HANNA COAL FIELD

Lithology	Strip Log	Depth		Geophysical Logs		
		ft	m	Gamma	Den	Res
404.6 475.0 Sandstone, light- to medium-gray, medium- to coarse-grained, quartz and chert grains, rounded to sub-rounded						